Draft Title I Design, Volume 2, DOE/ID-10782—Monitoring System and Installation Plan for OU 3-13, Group 5, SRPA and DOE/ID 10783—Long-Term Monitoring Plan for Operable Unit 3-13, Group 5, SRPA

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
53	General	General	These two sections consist of an assortment of proposed change pages to a finalized primary document that was prepared for the Group 5 remedial action. As such, this submittal is extremely difficult to read since only selected pages are provided, requiring the reviewers to continually have to refer to the finalized Group 5 document for background information. Therefore, the following comments represent our initial concerns based on the incomplete set of pages we received. We propose the approach outlined below to fully address and resolve Agency concerns on this matter. We do not concur with the apparent proposed approach to incorporate the Group 3 monitoring needs for the ICDF complex into the finalized Group 5 plan documents. The monitoring plan for the Group 3 on-site disposal remedy needs to be developed and re-submitted as a stand-alone document. This is primarily because the objectives of the groundwater monitoring associated with Group 3 and Group 5 are not the same. A monitoring plan for a proposed disposal facility is designed to achieve early detection of releases from that unit, whereas the objectives of the Group 5 monitoring plan are to 1) evaluate model-predicted hotspots of I-129 in the existing I-129 contaminant plume in the SRPA at INTEC and update groundwater model predictions for 2095, and 2) address uncertainties regarding fluxes of groundwater contamination in the vicinity of the INTEC fenceline. Our position	A stand-alone groundwater monitoring plan will be developed specifically for the ICDF and submitted in a 60% submittal. The final groundwater monitoring plan will be included in the RD/RA work plan.

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			regarding the need to develop separate groundwater monitoring plans is consistent with comments made on the Group 2 Closure Evaluation Criteria and Checklist, wherein USDOE also proposed to use the Group 5 remedy to address future monitoring needs for soils under buildings that will eventually be closed as landfills (July 21, 2000 Draft Comment #10 and September 22, 2000 Draft Final Comment #4). The Agencies need to discuss and identify specific data needs for a detection monitoring plan for the ICDF complex, and how those data needs can be best addressed. Then, a stand-alone Group 3 monitoring plan needs to be developed for the ICDF complex. A stand-alone plan will greatly improve the ability of the regulatory agencies and interested members of the public to review and understand the groundwater monitoring needs/strategy for this remedy. It is recommended that a draft of the Group 3 Groundwater Monitoring Plan be included in the 60 Percent Design Submittal to be submitted August 31, 2001. After a Group 3 monitoring plan is developed and approved, USDOE is encouraged to look at ways to efficiently integrate the monitoring schedules of the various groundwater monitoring plans/programs at INTEC.	
54	Table 3-1	Page 3-4 and subsequent Subsection s	a. Some of the five proposed wells do not appear to be suitably constructed to monitor the ICDF landfill and evaporation pond complex. Monitoring wells associated with landfill leak detection in the State of Idaho are generally completed at or near the top of the water table. In contrast, well USGS-57 has a 255 foot open hole	The stand alone monitoring plan described in comment 53 response will address these issues Description of vadose zone monitoring will be included in the ICDF O&M plan as part of the RD/RA Workplan.

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			completion that starts about 33 feet below the water table. Well USGS-42 is completed as a 225 ft open hole and the upper part of the open hole begins about 15 ft below the water table. Well USGS-113 is completed near the water table, but has a 119 ft open interval. Well USGS-112 is completed across the water table, but has a 134 ft open interval. We question whether these wells, with such large open intervals, can be used effectively (or be modified to be used) to monitor for releases from the ICDF Complex. b. We question whether the locations of some of the monitoring wells are appropriate to adequately monitor contamination from the ICDF Complex. For example, USGS-112 and USGS-113 appear to be as much as 3000 feet away from the ICDF (no map was provided showing both the ICDF and the well locations), and may not be directly downgradient of the ICDF Complex. Groundwater flow directions in the vicinity of the ICDF need to be better determined before selecting well locations (either existing or new). This rationale needs to be applied to both upgradient and downgradient monitoring needs. c. Because contamination is known to exist in the SRPA from past releases that may be continuing sources of contamination to the aquifer upgradient of the ICDF Complex, a comprehensive approach will be needed to effectively distinguish the impact of the ICDF complex on the groundwater quality. It is unclear, at this time, whether the proposed wells can meet this need.	Requirements were described of the minimum proposed monitoring and included: Perched zone – wells screened at the perched water level below the ICDF Sump, the evaporation pond sumps, and background. SRPA – wells should be close to unit being monitored and need to be on the flow lines from the sumps for the landfill and evaporation pond. Need to develop what are good indicator parameters and include in the 60% deliverable. Testing of leachate should be coordinated with indicator parameters for gw monitoring wells. Provide logic for a reasonable frequency based on detection monitoring.

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			d. Wells PW-1 and PW-6 are perched aquifer wells in the immediate vicinity of the proposed ICDF complex, both of which contained water during 1999 sampling events (finalized Group 4 MSIP, Field Sampling Plan, Table 4-2, Page 4-9). These wells suggest the presence of perched water in at least the uppermost basalt beneath the proposed complex. If so, it will be necessary to monitor this uppermost perched aquifer to comply with the substantive portions of 40 CFR 264.97. e. This table indicates that Well USGS-123 "*may be affected due to lateral movement of contaminants prior to entering the aquifer . . .*" The Agencies may want to consider an unsaturated zone monitoring system for early detection of contaminant movement from the ICDF and/or lateral spreading of contaminant from other contaminant sources into the subsurface beneath the ICDF complex. f. The proposed analyte list requires further discussion, based on waste types expected to be disposed in the ICDF. However, we consider the parameters TOC and TOX too generic considering that known specific VOC's have been detected in groundwater at the INTEC, in the vicinity of the proposed ICDF.	

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			g. It is too early in this project to assume that a five year monitoring frequency will be sufficient between years 17-100. Annual monitoring should be assumed until field data are evaluated and determined to support a reduced monitoring frequency. h. Note that groundwater monitoring must address the ICDF complex, which includes both the ICDF landfill and the evaporation pond per the substantive requirements of 40 CFR 264 Subpart F and 40 264 552 (e) (3), respectively.	

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
55	General	General	The text as written is confusing regarding the seismic design criteria and classification. The document should better define what hazard classification applies to the design of the ICDF Complex. Section 2 states that the seismic evaluation for the landfill and pond will be conducted using a Design Basis Earthquake (DBE) that is equivalent to that of a PC-4 hazard (return period of 10,000 years), but also states that this does not imply that the landfill and pond is classified as a PC-4 hazard. Section 6 states that BBWI's senior structural designer believes that a DBE based on PC-2 hazard may be appropriate for facilities and equipment associated with landfill and pond. These statements need to be reconciled and an unambiguous classification and design criteria outlined.	The intent of the text in Section 2 was to explain that for the seismic evaluation (in this i30% design level calculation) the most conservative design criteria (PC-4 with a return period of 10,000 years) was used for evaluating seismic stability. The analysis determined that for a PC-4 DBE that the landfill and evaporation pond were seismically stable. BBWI provided input that the ICDF is likely a less stringent hazard classification PC-2 facility. However since the facility was determined to be seismically stable (at the 30% design level) for the most conservative PC classification, evaluation of the precise PC classification was considered unnecessary.
56	Section 2	Page 2-1, Paragraph 3	The text should identify the report covering the seismic study or list it as a source for the subsequent data.	Comment noted and source will be added to the text.
57	Section 2	Page 2-1 Paragraph 4	The seismic g levels are INEEL location dependent and the location on the INEEL should be specified to tie it to hazard curves or a source document.	Comment incorporated. Text will be clarified to indicate that the seismic g levels were developed from spectra curves in Appendix S for INTEC, which the ICDF is located within or very close to. Clarification of whether Appendix S applies to all of INTEC or vary within INTEC will be included in the text. Thus the appropriate spectra curves were used for the seismic evaluation.
58	Section 4	Page 4-1, Paragraph 2	Damping is assumed to be 5% viscous damping without justification for this selection. This is a normal value used for structures and use with soil masses should be justified.	Comment noted. This discussion will be clarified to explain that the peak ground acceleration is essentially independent of viscous damping in the free-field at viscous damping ratios ranging from 2 to 10%. This behavior is shown in Table A-1 to A-4 of this document. In these tables peak ground

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				acceleration is equal to the spectral acceleration at high frequencies (e.g., frequencies >50 Hz). For soil embankments viscous damping can be greater than 5%. Higher levels of damping will result in reduction in the spectral accelerations. This effect will be introduced in subsequent phases of design. For this submittal, the assumption of 5% damping provides a degree of conservatism to the design. In the 90% submittal, the specific damping selected will be further defined or procedures will be referenced as to why the specific damping is used.
59	Section 5	Page 5-1, Second Bullet	The high g levels of 0.90 and 0.74 are not clearly explained nor is the source of these numbers given. The following paragraph states that the acceleration levels correspond to return periods beyond 10,000 years. This is beyond PC 4 hazard level and suggests justification of the adequacy of the design without specifically stating it. Please clarify.	Comment incorporated. Text will be clarified. The calculations for seismic slope stability are presented in EDF-268 (Slope Stability Assessments) as stated in Para. 1 on Page 5-1. The comment is correct that our preliminary analysis has determined that the acceleration levels required to lower the FS for seismic stability to unacceptable levels exceed the design criteria established for the ICDF. Text will be clarified in future design submittals to specifically state our conclusion as opposed to just "suggest".

Draft Title I Design, Volume 3, Slope Stability Assessments EDF-ER-268

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
60	Section 3.1.1	Page 3-3, Paragraph 2, Last Two Sentences	It is agreed that site specific testing is necessary to confirm the validity of the shear strength friction angle and the cohesion of the CCL/textured HDPE interface. Please identify how this confirmation will be accomplished and documented.	Site-specific interface shear testing is currently ongoing. Testing is being performed as described in EDF-276 (Draft Evaluation of Geotechnical Investigations and Calcs Required to Complete Design & Construction). Results of the site-specific shear tests will be compared and verified against the values used in the stability analysis. This will be documented in the 90% RD/RA submittal for this EDF (#268). Calculations will be revised if lower values are obtained from the laboratory tests.
61	Section 3.1.1	Page 3-3, Paragraph 3, Last Three Sentences	It is agreed that actual interface shear strength testing is necessary to confirm the validity of the residual interface friction angle of the non-woven GCL/non-woven geocomposite interface. Please identify how this confirmation will be accomplished and documented.	Site-specific interface shear testing is currently ongoing. Testing is being performed as described in EDF-276 (Draft Evaluation of Geotechnical Investigations and Calcs Required to Complete Design & Construction). Results of the site-specific shear tests will be compared and verified against the values used in the stability analysis. This will be documented in the 90% RD/RA submittal for this EDF (#268). Calculations will be revised if lower values are obtained from the laboratory tests.
62	Section 3.1.2	Page 3-5, Paragraph 1, First Sentence	As stated in this sentence, a portion of the HDPE tensile strength is necessary to achieve the required minimum FS of 1.5. This implies that the HDPE geomembrane must be anchored to realize this resistive force. Please state the specific anchorage requirements necessary for this to be accomplished.	Agree with comment and the anchorage requirements will be included in the 90% deliverable. There are many potential configurations of anchor trench run-out length and depth that can developed to mobilize the required anchorage force. The specific configuration has not been developed at the 30% design level but will be completed for the 90% RD/RA submittal.

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
63	Section 3.1.2	Page 3-5, Paragraph 2, First Sentence	As stated in this paragraph, only equipment with a width-to-weight ratio less than or equal to that of a D6H dozer (4,400 lb/ft) be used for liner construction and maintenance on the side slopes. Please state how this critical safety consideration will be incorporated into the construction documents.	The maximum width to weight ratio will be included in the 90% technical specifications. Equipment limitations will be added to the specifications for Fill and Backfill (Section 02315) with respect to operating over the lining system for soil cover placement. This limitation will also be coordinated with maintenance and operations documents such as the Waste Placement Plan (EDF-286)
64	Section 3.1.2	Page 3-5, Paragraph 2, Second Sentence	As stated in this paragraph, equipment must not be operated on the side slopes during or soon after a rainfall event. Please define what time frame is considered too "soon" for equipment operation on these side slopes. This definition should also be added to bullet 4 of Section 5, page 5.1.	We will provide this information in the 90% deliverable.
65	Section 3.2	Page 3-5, Paragraph 1	The list of components for the evaporation pond lining system described in this section does not include a one foot thick layer of structural fill directly above the prepared subgrade, or a sacrificial geomembrane above the primary geomembrane. This is not consistent with the evaporation pond lining system details shown in DWG-H-205 Rev 0. Please update section 3.2 to include these liner components.	Components listed in this section will be verified with Dwg-H-205 and corrected. It should be noted that 2 geomembranes are listed in Section 3.2 (one is the sacrificial and the other is the primary). The one foot of structural fill will be included in the appropriate sections of the 90% deliverable.
66	Section 4.3, Figure 4-3	Page 4-8	Figure 4-3 (ICDF Cover Detail) does not seem to indicate the same cover geometry that is depicted in DWG-C-305 Rev A (Final Cover Sections and Details). Please explain the apparent differences in geometry, particularly at the interface of the cover top slope and the cover side slopes. Additionally, the notes associated with the enlarged cross section detail are not legible on this reviewer's copy.	Comment noted. Final cover was in design development at the time of the slope stability assessment. Figure will be revised in the 90% RD/RA submittal. It should be noted that the analysis and conclusions apply to either the cover geometry presented in C-305 or Figure 4.3 in EDF-268.

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
67	Section 5	Page 5-1, Bullet 6	This paragraph states that the landfill should be filled in horizontal 10-ft-thick maximum "lifts", and that each lift should be compacted to a dense configuration. Compaction of soil lifts this thick, to a dense configuration, is not possible. Please indicate what degree of compaction is implied by the term "dense configuration", and what lift thickness and associated moisture content is required to achieve it.	It should be clarified that the 10-ft lift is actually comprised of smaller sub-lifts (1-foot thick). The 10-ft lift thickness is not referring to a single uncompacted lift thickness but a total lift of waste material for operational purposes. Refer to EDF-ER2-286 (Waste Placement Plan) for details about the filling sequence and compaction requirements for the ICDF.
68	Appendix A		The headings of the tables on pages A-5, A-6, A-7, and A-9 are completely blacked out due to the copy process. Please provide legible copies of these pages.	Legible copies will be provided in subsequent design submittals.
69	Appendix B		The headings of the tables on pages B-9, B-10, B-11, B-13, and B-14 are completely blacked out due to the copy process. Please provide legible copies of these pages.	Legible copies will be provided in subsequent design submittals.

Draft Title I Design, Volume 3, Subsurface Consolidation Calculation EDF-ER-266,

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
70	Section 1	Page 1-1, Paragraph 2, Bulleted List	a) Per EDF-ER-268 (page 3-2) a geotextile cushion separates the primary geomembrane and the LCRS layer. Please include this geotextile cushion in this bulleted list. b) Also, please correct the spelling of the word "Leachage" in bullet number 6 (first word).	Comment incorporated.
71	Section 1	Page 1-1, Paragraph 2, Bulleted List	a) Per EDF-ER-268 (page 3-2) a geotextile separation and an operating layer overlie the LCRS gravel layer. Please include these layers in this bulleted list. b) Also, please elaborate on what type of material (woven, non-woven, etc) is to be used for this "geotextile separation". c) Please clarify whether this 3-foot thick operations layer been included in the overburden weights calculation?	The geotextile separation layer as well as the operating layer will be included in the bulleted list. The material type will be included in the Technical Specifications with the 90 percent submittal. The operations layer was assumed to have the same unit weight as the waste (133 pcf) and was included in the overburden weight calculation.
72	Section 2	Page 2-1, Paragraph 2, Sentence 4	This sentence states that "....because the alluvium will have the largest amount of consolidation." Please state if the term "alluvium" or "old alluvium" is the term that should be used in this sentence.	Comment incorporated. The term "old alluvium" should be used in this sentence.
73	Section 2	Page 2-1, Paragraph 3, Sentence 1	This sentence states that the foundation is loaded by the waste and landfill cover. Please add to the text that the foundation is also loaded by the operations layer.	Comment incorporated. The sentence will be revised to indicate that the foundation is also loaded by the operations layer.
74	Section 3	Page 3-1, Bulleted List	Bullet 7 states that the assumed landfill cover thickness is 15 feet. Please explain what is meant by the 15 foot cover thickness. Detail 2 of DWG-C-305 Rev 0 indicates that the thickness is 18.5 feet. Further, this does not include the variable thickness of the earth fill layer or the selected waste/earth fill layer.	The cover design and consolidation calculations were a parallel effort resulting in the discrepancy in the cover thickness. The correct cover thickness is 18.5 feet. The revised 30% deliverable will be changed to be consistent. The thickness of the earth fill layer was included in the

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
			These two variable thickness layers will be several feet thick at the center of the landfill.	surcharge load applied to the waste and landfill foundation soils (see resolution number 77). Additionally, the cover was assumed to have a slope of 10 percent grade providing a maximum waste/earth fill layer thickness of 44.5 feet. The consolidation calculation will be revised to reflect the current cover design consisting of a seven percent grade and cover thickness of 18.5 feet.
75	Section 3	Page 3-1, Bulleted List	Bullet 7 states that the assumed landfill cover is sloped at 10%, and has 3H:1V side slopes. Detail 1 of DWG-C-305 Rev 0 indicates that the cover slope is 7% and the side slopes are 2.5H:1V. Please explain why these values are different, and which one is correct. Also, a more typical value for landfill cover design slope is approximately 3.5%. Please explain why this design incorporates such a large slope value.	The cover design and consolidation calculations were a parallel effort resulting in the discrepancy in the cover slope and thickness. The correct cover design is illustrated on DWG-C-305 Rev 0 indicating a cover slope of seven percent with 2.5H:1V side slopes. A graph was developed in EDF-ER-267 (Figure 3-3) to show the possible debris thickness verses the cover slope. Based on this graph, the current cover slope of seven percent allows for the greatest thickness of debris in the landfill waste matrix The 90 percent design will include an evaluation to determine the optimal cover slope design that allows maximum flexibility in the volume of the debris and accommodates consolidation, minimizes erosion, and is stable.
76	Section 4, Table 4-1	Page 4-1	The unit weight of the cover material is listed as 133.5 pcf. The cover includes a layer of type 3 rock armor approximately 5 feet thick. Is the unit weight of this material accounted for in the consolidation calculations?	To determine loading for consolidation purposes, the cover was assumed to have a uniform unit weight 133.5 pcf. The unit weight of rock armor is typically on the order of 110 pcf.
77	Section 5.1, Figure 5-1	Page 5-1	Please provide a detailed diagram, including dimensions of the thickness of the rectangular and wedge loads shaped loads, used in the consolidation calculations (at the center of the cover). It is understood that the cover design and the consolidation calculations were a	A detailed diagram of the thickness and the rectangular and wedged shaped loads are included in Sections 5.1.1 and 5.1.2 of this calculation. The consolidation calculation will be revised to reflect the current cover design.

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
			parallel effort for this 30% design report, and that some minor inconsistencies would result as a consequence. However, the inconsistencies in this report are of sufficient magnitude to warrant the verification of the predicted consolidation values. Since the calculations were performed using spreadsheets and programs, there should not be a considerable effort related to this task. The inconsistencies include 10% verses 7% cover slope, 3H:1V verses 2.5H:1V side slopes, cover thickness values of 15 feet verses 18.5 plus feet of variable thickness layers, etc. At the approximate length of 375 feet from the edge to the center of the landfill, the difference between 7% and 10% cover slope design results in a change in thickness of approximately 11 feet at the landfill center. This amount of soil weight will have a measurable effect on the consolidation calculation.	The 90% drawings will indicate the height of the wedges in the hand calculations.
78	Section 6.4	Page 6-2, Paragraph 1, Sentence 3	This sentence states that the ICDF landfill floor is designed at a 2.5% slope to allow for differential settlement, and still maintain the EPA guidance for 2% minimum slope. Per DWG-H-201 and 203 Rev 0, the center drain slope is 2%. After the differential settlement predicted in this report, this slope value would decrease to approximately 1.5%. This center drain slope should be re-designed to maintain the 2% minimum slope value after settlement occurs.	The overall landfill floor is sloped at 2.5 percent towards the sump to minimize ponding and ensure an adequate gradient for leachate to flow through the LCRS gravel towards the sump of the landfill. If leachate reaches the center of the landfill prior to the sump, it is collected by a perforated pipe that will be located down the center of the landfill. Once in the pipe, leachate will flow at a much higher flow velocity than in the gravel thereby allowing a lesser slope. Additionally, a 2.0 percent slope exceeds the EPA minimum slope requirement of one percent (CFR 264.301).

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
79	Appendix A, Figures 1, 2, and 3	Page A-4, A-5, A-6	It appears from the constructions on these figures that the preconsolidation pressure was calculated using an incorrect method. Casagrande's method requires that a construction line be drawn tangential to the curve at the point of maximum curvature. On the figures, it appears that this construction line was drawn as an extension to the upper linear portion of the curve. The bisecting construction line between the tangential and horizontal line therefore intercepts the extension line of the lower linear curve at a value below the actual preconsolidation pressure.	The method for determining the preconsolidation pressure will be corrected . Appendix A will be revised to reflect the correct method.
80	Appendix C	Page C-2, Method Assumptions	The values stated on this calculation page for the "B" and "L" dimensions are not consistent with the values stated earlier in this report in Section 5.1.1. Please clarify which values are correct.	Figure 5-2 in the text and Appendix C-2 are correct. The text in Section 5.1.1 should read "L=398.5 ft; B=445 ft". The text will be revised to reflect the correct dimensions.

Draft Title I Design, Volume 3, Landfill Compaction/Subsidence Study EDF-ER-267

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
81	Section 2.1	Page 2-1, Paragraph 4, First Sentence	This sentence states that the maximum long term distortion in the liner and foundation soils is estimated to be 1.2 feet. The term "distortion" generally refers to lateral displacement of soils under saturated conditions. Please replace this term with "differential settlement" in order to match the intended meaning of the calculation presented in Draft Title I Design, Volume 3, Subsurface Consolidation Calculation EDF-ER-266.	Comment incorporated.
82	Section 2.1	Page 2-1, Second Bulleted List	The first bullet states that the "constant settlement" for the subsurface is 1.2 ft. Please clarify that this corresponds to the "differential settlement" shown in the subsurface calculation. This 1.2 ft settlement was assumed to occur in the center of the landfill subsurface, while 0 ft of settlement was assumed to occur at the edge of the landfill in the subsurface calculation. This assumption must be carried through to the final slope of the cover when calculating the effect on the final cover slope. Please verify that this was done.	The text will be clarified to indicate that settlement corresponds to "differential settlement". References to "constant settlement" will be removed. This assumption was also included the final cover slope analysis. Table 3-1 in EDF-ER-267 shows that the 1.2 feet of settlement in the foundation and liner was used to determine the minimum allowable slope of the final cover slope.

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
83	Section 3.1	Page 3-2, Paragraph 2, First Sentence	This sentence states that municipal waste settlement can be on the order of 15% of the waste thickness. Other sources in the literature indicate that this value is typically from 5 to 30% ("Waste Containment Systems, Waste Stabilization, and Landfills", Hari D. Sharma and Sangeeta P. Lewis, Wiley & Sons, Inc., 1994, Page 578). Given this uncertainty, and the uncertainty of how much degradable waste will actually be placed in the landfill, additional controls need to be established for waste placement within the ICDF.	Fasset's study concluded that settlement greater than 15 percent are observed in municipal waste landfills containing a large percentage of paper, food and other organic materials (Fasset 1993). We believe that 15 percent of the waste thickness is reasonably conservative given the fact that the soil to debris ratio will be high and that the debris will contain very little if any municipal type waste, particularly organic materials such as paper and food. Waste placement will specify that organic material will not be placed in a single area, but will be spread out to minimize potential settlement.
84	Section 4.1	Page 4-2, First Paragraph following Table 4-1, Last Sentence	This sentence states that compaction should occur with the material in a moist condition. This requirement should specify what percent moisture content above and below the optimum moisture content for the material is allowed. This will give additional assurance that the 95% of maximum dry density requirement will be achieved for each compacted lift.	The specific ranges of wet and dry of optimum will be included in the O&M plan, provided in the 90% submittal.
85	Appendix A	Page A-1, Assumptions	The calculation supporting the estimated consolidation of the compacted clay liner (CCL) within the cover is presented in Appendix A. On page A-1 it is stated that the cover is assumed to be 13 feet thick over the CCL, with a unit weight of 133.5 pcf. The change in vertical stress associated with this assumption is 1,736 psf. Drawing DWG-C-305 Rev 0 of this submittal shows that the cover thickness over the CCL is 16.5 feet. The change in vertical stress associated with this assumption is 2,202 psf. This represents an increase of over 25 percent in the assumed vertical stress. Please provide calculations showing that this increase in stress does not alter the results of this cover calculation.	The consolidation calculation will be revised to reflect the correct cover thickness.

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
86	Appendix A	Page A-1, Assumptions	Please identify how the uniform unit weight assumption of 133.5 pcf for all the material above the cover CCL was determined. The material above this CCL includes approximately 6.5 ft of earth fill, 4 ft of gravel filter media, and 5 ft of Type 3 rock Armor. It would seem prudent to use the unit weights of these different types of material when calculating the vertical stress on the CCL.	The calculation will be revised to reflect the unit weights of the different cover materials in the 90% deliverable.

Draft Title 1 Design, Volume 3, Waste Placement Plan EDF-ER-286

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
87	Section 3.2, Figure 3-1	Page 3-2	Waste placement as presented in this document may increase the risk of liner failure due to excessive loading on a relative small portion of the landfill. It is much more common in commercial landfills to establish even lifts across the landfill in lieu of mounding waste into a corner. Since the text has not discussed anchoring of the HDPE liner, or the relative positioning of the proposed 3:1 slopes for each lift, it is difficult to determine the impacts of the proposed waste placement scenario on the liner. Please clarify.	Comment noted. The placement of wastes outlined in the Waste Placement Plan will not result in mounding of waste in a corner and is not expected to increase the risk of liner failure. Once placement of the initial fill layer has begun in the NW corner of Cell 1, the filling sequence will be to continue placing wastes in the initial lower 10-ft-thick lift, while allowing additional lifts to start in the NW corner of Cell 1. A minimum of a 100-ft wide layer of waste will be maintained adjacent to 3:1 side slopes prior to placement of additional vertical layers (see Figure3-3). This design will allow for selective placement of materials as outlined in the WPP (to further ensure maintained integrity of the liner), and will provide easier access to lifts by constructing haul roads on top of the compacted waste fill. Text will be added to clarify and appropriate reference for the anchoring of the HDPE geomembrane will be incorporated.
88	Table 3-1		These recommended compaction methods presented in this Table are only valid if the loose lift depths will compact into 12-inch layers. This will vary greatly on the composition of the material and the in situ moisture. References must be provided for the suggested compaction methods. In lieu of a generalized Table a valid QA/QC plan should actually become the basis for adequate compaction procedures. Density/moisture measuring instruments should be used to establish lift depths and compaction potential for the available field equipment.	Comment noted. References will be added to support the compaction methods identified in Table 3-1. A QA/QC plan identifying the basis for compaction procedures will be detailed in the O&M Plan and will be included in the RD/RA Work Plan in the 90% deliverable. .

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
89	Section 3.2.4	Fourth Sentence	This sentence is unclear. However, once Cell 1 is complete, operators will not be able to haul waste and equipment across Cell 1 to operate Cell 2.	Comment noted and sentence will be clarified. However, once Cell 1 is full, the intent is to use the road that crosses Cell 1 (Figure 3-2) as an approach from the north to Cell 2.

Draft Title I Design, Volume 3, Liner and Final Cover Long-Term Performance Evaluation and Final Cover Life Cycle Expectation, EDF-ER-281

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
90	General	General	At this point in the design, there is not enough information as presented to adequately evaluate the cover performance and closure plans for the ICDF landfill. Additionally, closure of the surface impoundment is not addressed at all. It is our expectation that the 90 percent RD/RA work plan will present further detail and more specific plans for these items.	This information will be provided in the 90% deliverable. The intent of the 30% deliverable was to ensure that all of the factors that need to be evaluated are identified.
91	Section 1.3	Page 1-2, Eight Bullet	Please also include under this bullet, the landfill post-closure ARARs found in 40 CFR 264.310 (b) (1) (4) (5) and (6).	Comment incorporated.
92	Section 2, Tables 2-1 and 2-2	Pages 2-3 and 2-4, respectively	The ARAR reference in the second columns should provide more specificity. The current citation of "40 CFR Part 264" is too broad to be useful.	Comment incorporated.

ITEM	SECTION/ FIGURE/ APPENDIX	PAGE	COMMENT	RESOLUTION
93	Section 1.1, HELP and Soil Cover: Consistency in Data		It is noted that an attempt was made to use the same climatological data to model both leachate generation and the effectiveness of the final cover. While the use of the same data sets is appropriate, a potentially greater source of variability exists that is not addressed. That is how each model processes this data (calculations of ET, how snowmelt is handled, etc.) in order to generate water in the near surface that is available for flow further throughout the system. Please provide a comparison of the algorithms used in each of these models and how the calculations resulting from their application to a common scenario would differ.	Algorithms for the SoilCover model are presented in Hydrologic Modeling of Final Cover (EDF-ER-279). Key variables handled by SoilCover and the HELP model are conductivity, runoff, evaporation, transpiration and snowmelt. A comparison of the algorithms are provided below: • HELP models flow using a saturated conductivity. This provides a conservative estimate of infiltration through the soils. SoilCover models flow using a unsaturated conductivity curve relating conductivity to soil moisture. • HELP uses the curve number method developed by the Soil Conservation Service (1985). Infiltration into the soil is then calculated from the precipitation, snowmelt, and runoff. SoilCover calculates runoff based on infiltration into the soil surface. • Both programs use versions of the Penman equation to calculate evaporation. The equation used by SoilCover takes into account the relative humidity at the soil surface which is not considered in the HELP model. The modified Penman equation used by SoilCover reduces to the Penman equation when the soil surface is saturated. The HELP model also limits the evaporative depth. Below this depth, all vertical soil moisture movement is assumed to be towards the bottom of the profile. The evaporative depth for SoilCover is limited by the physics and is not defined within the program.

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				• Plant transpiration is calculated by both programs based on the Leaf Area Index (LAI), rooting depth and availability of water. The HELP model will calculate transpiration on any day when the mean daily temperature is above 32°F and the soil is not frozen. SoilCover calculates transpiration during a defined growing period. This would tend to increase the transpiration calculated by HELP compared to SoilCover. • The HELP model calculates snowfall based on mean daily temperature. Precipitation on days with a mean daily temperature below 32°F is assumed to be snowfall. Snowmelt is calculated based on mean air temperature and radiation. In SoilCover, snowfall is determined by the user by setting a start date and end date for the snowfall period and a start and end date for the snowmelt period. The method used by SoilCover increases the likelihood that snowmelt will occur when soils are not frozen increasing infiltration and limiting runoff resulting in more conservative results. However, direct comparison of the model outputs is not the intent of either EDF. Each model was selected to provide estimates of potential leachate generation for two very different scenarios. The use of the HELP model was intended to provide a conservative estimate of leachate generation for the purposes of sizing the engineering components of the leachate collection, transmission, and evaporation pond systems. Due to the differences in the model set-ups, design parameters, and system functions, it is expected that model outputs would be very different.

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94	Section 2.2, Dust Control	Paragraph 1	It is stated that, based on water application for dust control at other sites, the volume of 5000 gallons of water , twice per week, may be applied at a landfill similar in size to the ICDF landfill. Please provide an explanation of where these other sites are located, what their water application rates are, and the aspects of their operation that make them comparable to the ICDF 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. In the revised 30% deliverable, the site references will be provided. 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. 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.) In addition, 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 useage and subsequent leachate generation.
95	Section 2.3, Moisture Content of Incoming Waste	Page 2-2	The estimate of moisture content of the incoming waste was based on a value close to what is said to be typical of the native alluvium and optimum for compaction. The moisture content values of the native presented in the Final Geotechnical Report (Section 3.4.6, pages 3-12 through 3-17) are weight-based, not volumetric (as is used in the HELP model), and therefore are low. Second, the use of a value that is optimum for compaction has no relevance to the estimate of leachate production. Third, the value that is used should be a	HELP default soils were used to represent the incoming waste soils. Default soil types were selected on the basis of correlating with the alluvium properties as represented in the Final Geotechnical Report. Note that the actual water contents reported in the Final Geotechnical Report were not specifically input to HELP, but the volume-based default values were used in modeling. An initial moisture content (volume-based) was selected near the field capacity of the waste layer soils to reflect the fact that water will used for dust control and to promote compaction during placement. It is anticipated that this is a conservative assumption for these materials. The text will be revised to reflect this clarification.

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			reasonably conservative number within the realm of what is possible at the site, taking into consideration seasonal and spatial variability. The goal should be to simulate conditions which will generate a reasonable worst-case scenario. Fourth, we would assume that many of the soils, which will be placed in the ICDF, may have been affected by other sources of water than just natural precipitation and may have higher moisture contents. Fifth, soils other than those from INTEC, with differing moisture characteristics, will be placed in the ICDF. Please provide a summary of soil moisture contents measured for soils that would likely be placed in the ICDF, the dates when they were sampled, and an estimate of their maximum natural volumetric moisture content.	The incoming soils will generally be from alluvial sources which are similar in nature and properties. This is based on the CWID and existing geotechnical testing. For this reason, and the fact that the HELP default soil used to represent the incoming wastes only approximates the actual alluvial soil conditions, there was no basis for using different default soils or different soil moisture contents to represent slightly different incoming soil waste types. Again, the soil moisture contents assumed were relatively conservative for the modeling approach as they are coarse graded and of high permeability and therefore generate more leachate.
96	Section 4.0, Action Leakage Rate	Page 4-1	a) The calculations as presented used a drainage layer thickness of 5 mm. We were unable to verify this thickness from the technical specifications included in Section 02373 of SPC-1476. Please provide verification that the thickness of the geonet drainage materials (having a minimum transmissivity of 2×10^{-4} m^2/sec) is 5 mm. b) In addition, the hydraulic conductivity (if using Equation 4a) or the transmissivity (if using Equation 4b) as presented are estimated values per design specifications only. EPA guidance recommends that actual hydraulic conductivity values be obtained from field tests or use of established generic ALR values of 100 gpad for landfills and 1000 gpad for surface impoundments (EPA 530-R-92-004).	This thickness is the minimum core thickness of the geonet drainage layer, which conveys the flows laterally through the system. Actual total thickness with bonded non-woven fabric to each side will be thicker. This minimum thickness of the geonet core is currently specified in the project design specifications. Hydraulic conductivity values listed in the specifications are required project minimums as established by laboratory testing, Refer to design specifications for specific testing requirements. Certifications that the products used in construction meet these minimum requirements will be provided to the CQA Officer during construction.

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97	Section 4.1, Action Leakage Rate Results	Page 4-1	a) The calculated Action Leakage Rate (ALR) of 5,520 gal/day appears to be incorrect. The ALR as calculated should be divided (not multiplied) by a safety factor of two, resulting in an ALR of 1380 gal/day. The calculated ALR should be compared to the leachate pump capacity and the LDCRS flow capacity. Action Leakage Rates should not exceed the maximum flow rate capacity of the leak detection system per EPA guidance.	Comment will be incorporated. The factored flow shown in the EDF was used to set maximum flows for pump sizing within the Leak Detection System. The use of the ALR and how the ALR will be used will be provided in the 90% O&M Plan.
			b) In addition, if actual hydraulic conductivity values are not obtained from field tests, the following ALR based on EPA guidance for minimum landfill design specifications should be used: Q = (7.05 ac)(100 g/d/ac) = 705 gallons/day where Area (max) of landfill (cell #2) = 7.05 ac	Hydraulic conductivity values used in the analysis have been verified by laboratory testing by the manufacturer, and will be certified for this project during construction. See response to Comment 96.
98	Appendix A: Model Input Data		a) The source of the parameter values chosen for soil properties for layers used in the model (other than the waste layer) are not stated. Please provide information and justification for these values.	Comment will be incorporated by clarifying text in Table 2-2.
			b) The soil property values used for the waste layer do not appear to correspond (initial MC 0.1310 vs 0.700) with those stated in section 2.3 that would be used. Please explain this discrepancy.	Comment will be incorporated by clarifying text in Section 2.7.

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99	Appendix A	Page A-1 through –3	a) It is not clear how the 8 layers listed on these pages for the HELP model relate to EDF-ER-273. Please provide clarification on the correlation between these two documents and the relationship to this modeling. b) Please clarify which layer is the 10-ft waste layer in this 8 layer model. c) The surface slope listed on page A-3 is not the same slope used in the design (7%) although the lower slope value used should be conservative from an infiltration standpoint. Please provide clarification.	Comment will be incorporated. Comment will be incorporated by clarifying text in Section 2.7. Comment will be incorporated by clarifying text to indicate slope is for interim cover and not the final cover.
100	Appendix A	Page A-43 through –45	Please provide clarification on which layer is the 10 ft waste layer. It is not evident from model output.	Comment will be incorporated.
101	Appendix A	Page A-85 through –87	a) Please provide clarification on which layer is the 10 ft waste layer. It is not evident from model output. b) The surface slope is 2% in this run, which is not the same as the design slope. The slope used should be conservative from an infiltration standpoint but clarification is needed to explain the difference between the this slope and the design slope (7%).	Comment will be incorporated by clarifying text in Section 2.7. Clarification of the surface slope used will be clarified and be consistent between EDFs.