

SDA Cap Key Design Requirements

INL Citizen's Advisory Board Meeting

October 24, 2019

Item	Key Parameter	Key Requirement	How Satisfied
1	Cover Thickness (Isolate Waste)	10 feet or greater thickness Effective dose equivalent rate at surface less than 15 millirem/year	Cover thickness above waste ranges from 10 to 40 feet; all locations satisfied. Current practice demonstrates a thickness of less than 10 feet will be adequate for meeting the 15 millirem/year requirement. Surface measurements will be required after construction to verify.
2	Rainwater Infiltration Rate (Protect Groundwater)	Less than 1 cm/year infiltration rate; 5-year average (2008 ROD performance criterion)	Modeling shows the 1 cm/year value is met with a storage layer of approximately 4 feet (127 cm) in thickness.
3	Long-Term Performance (Perpetual Care & Monitoring Requirements)	Exceed a 1,000-year cap design life, based on modeling projections. (Wind and water erosion less than 2 tons per acre per year) Commit to perpetual care and groundwater monitoring Employ cap infiltration monitoring	Wind and water erosion modeling shows 1,000-year design-life value is met. Cap monitoring instrumentation specific for ET barriers selected and positioned as part of design. ROD commits DOE to perpetual care monitoring, inspection, and repair. Future Institutional Controls and Long-Term Monitoring Plans will be developed for agency approval.
4	Design Flood Event (Water Erosion Protection)	Accommodate 1,000 year predicted storm event	Runoff conveyance structures sized for the 1,000-year event.
5	Optimal Slopes (Slope Stability)	Slopes less than 5.5% to minimize erosion and maintain water storage for ET performance	Design calculations determined the optimal gravel/soil admixture; slopes maintained at less than 5.5%
6	Natural Phenomena Hazards (earthquakes)	Moderate earthquake analysis: return period of 2,500 years Severe earthquake analysis: return period of 10,000 years	Seismic stability analysis demonstrated that permanent seismic displacement from the 10,000-year event is less than 12 inches. Slopes remain geotechnically stable for both the 2,500 and 10,000-year return period events.

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7	Natural Phenomena Hazards (extreme climate)	Demonstrate through modeling that the 1 cm/year infiltration requirement is met under extreme conditions represented by 10-years of typical precipitation, followed by 2 consecutive years of the wettest year on record.	Model runs indicate that approximately 4 feet (127 cm) of cover thickness is sufficient to meet the 1 cm/year criterion, under both typical and the extreme scenario conditions evaluated.
8	Optimize Constructability and Minimize Maintenance	Utilize indigenous flora; Employ optimal slopes with appropriate gravel/soil surface layer; Seek proximal on-site source of natural borrow materials; Use conventional equipment and techniques where possible.	Specifications: Vegetation and seeding 32-92-19; Cover system components 31-32-00; Surface rock durability 31-38-01; Conventional off-road equipment is available and can meet desired schedules. Future contractor will select appropriate material transport methods. Spreading Areas A and B meet local on-site source objective.
9	Winter Work Stoppage	Control the effects of seasonal freeze/thaw; ensure integrity of construction	An assumed November to April winter shutdown has been adopted for future planning and scheduling.
10	Borrow Area Cultural Resource Impact Mitigation	Inspections and mitigation actions guided by a Memorandum of Agreement (MOA) between DOE-ID and the State Historic Preservation Office, and an Environmental Checklist (EC) prepared in accordance with MCP-3480.	MOA and EC to be completed as part of the future Remedial Action Work Plan. A future borrow source area Excavation and Restoration Plan will be developed under the Remedial Action Work Plan. The plan will address real-time cultural impact inspections and mitigation during construction. Tribal representatives will be included in the development and implementation of the plan.