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(FSME-12-020, March, Other, NUREG/CR-7028)

March 6, 2012

ALL STATE LIAISON OFFICERS
RADIATION CONTROL PROGRAM DIRECTORS
SELECTED TRIBES

NOTIFICATION OF AVAILABILITY OF NUREG/CR-7028: ENGINEERED COVERS FOR WASTE CONTAINMENT: CHANGES IN ENGINEERING PROPERTIES AND IMPLICATIONS FOR LONG -TERM PERFORMANCE ASSESSMENT (FSME-12-020)

Purpose: To inform State Liaison Officers and Radiation Control Program Directors, and selected Tribal representatives of the availability of NUREG/CR-7028: Engineered Covers for Waste Containment: Changes in Engineering Properties and Implications for Long-Term Performance Assessment. Volume 1 documents the results of a series of comprehensive field studies that demonstrate engineering properties of cover soils do change while in service. Volume 2 provides the appendices of the datasets from these laboratory and field tests of the exhumed test sections.

Background: In December 2011, the Office of Nuclear Regulatory Research's (RES's) Division of Risk Analysis issued a peer-reviewed report, NUREG/CR-7028, "Engineered Covers for Waste Containment: Changes in Engineering Properties and Implications for Long-Term Performance Assessment," for use in assessing performance of engineered covers and systems for waste containment. The report's objective was to document the field and laboratory test findings which demonstrated that engineering properties of cover soils do change while in service and that long-term engineering properties should be used as input to models employed for performance assessments. The report provides a compendium of new data sets from a series of field and laboratory tests conducted by Professor Craig Benson, University of Wisconsin at Madison.

Discussion: Engineered covers are designed, constructed, and maintained to minimize infiltration of water into the subsurface to preclude contaminant leaching, mobilization, and migration of buried hazardous and/or radioactive waste to the accessible environment. U.S. Environmental Protection Agency licensees routinely use engineered covers at municipal landfills and chemical waste sites, and U.S. Department of Energy (DOE) contractors use them at uranium mill tailings sites. The RES staff supports the Office of Federal and State Materials and Environmental Management (FSME) technical reviews and provides guidance on engineered covers involving decommissioning, low-level radioactive waste, and waste incidental to reprocessing facilities. These covers may include a wide range of designs (multiple layers to store, drain, and prevent soil water migration using a range of geotechnical materials [e.g., clay, geotextiles and geomembranes]).

The principal research findings included:

1. Soil materials used in covers to isolate radioactive waste do not maintain as-built properties over the period of regulatory interest as assumed in most modeling. Rather, the properties of these materials change to values typical of surrounding soils and thus allow more water to infiltrate the cover.
2. For some properties, the change may be several orders of magnitude and could have a profound effect on the predicted performance of the cover with respect to regulatory standards for ground water and gaseous releases.
3. The performance of geosynthetic materials in the covers was mixed and, in some cases, consistent with service life projections by their manufacturers.
4. Devices to directly monitor cover performance should be large enough to represent field conditions. Data from indirect monitoring devices (e.g., for moisture content), while important, may be off by several orders of magnitude.

The FSME staff is using the report as technical guidance for their review of DOE proposed engineered covers for new facilities, and for review of engineered covers at existing facilities. Research findings from the excavated test section studies and recommendations were presented at the August 2010 NRC-hosted public workshop on engineered barrier performance related to low-level radioactive waste, decommissioning, and uranium mill tailings facilities documented in NUREG/CP-0195. The workshop in which States and Tribes participated can be viewed on the NRC Public Website:

<http://www.nrc.gov/reading-rm/doc-collections/nuregs/conference/cp0195/#pub-info>

The report is available at <http://www.nrc.gov/reading-rm/doc-collections/nuregs/contract/cr7028/>.

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