

## Addendum to LSA, Revision 11, April 2008

The following sections of the LSA RFP, Revision 11, April 2008 have been updated and will become part to the LSA RFP as of May 12, 2008.

### **Table 2.7 Unsaturated Zone Hydrologic Tests and Properties**

Table 2.7b Include the following information for each unsaturated zone hydrologic test conducted:

- 1) the well and/or boring ID number (see Table 2.3),
- 2) the depth at which each sample was collected, including interval
- 3) the analysis method name and number
- 4) estimated porosity ( $\text{cm}^3/\text{cm}^3$ ),
- 5) gravimetric water content ( $\text{g}/\text{cm}^3$ ) (ASTM Method D2216),
- 6) volumetric water content ( $\text{cm}^3/\text{cm}^3$ ) (Calculation from ASTM Method D2216),
- 7) dry bulk density ( $\text{g}/\text{cm}^3$ ) (ASTM Method D2937),
- 8) **specific gravity ( $\text{g}/\text{cm}^3$ ) (ASTM Method D854)**,
- 9) organic matter (% organic matter) (ASTM Method D2974),
- 10) total organic carbon (% organic carbon) (ASTM Method D2974)

Note: The calculation for porosity is calculated using the following derivation:

$$n = 1 - \frac{p_b}{p_s}$$

Where:

$n$  = porosity ( $\text{cm}^3/\text{cm}^3$ )

$p_b$  = dry bulk density (g of dry soil/ $\text{cm}^3$  of soil)

$p_s$  = specific gravity or particle density ( $\text{g}/\text{cm}^3$ )

Previously a specific gravity value of  $2.65 \text{ g}/\text{cm}^3$  was assumed for most mineral soils. For future calculations the measured value of specific gravity using ASTM Method D854 will be used to calculate porosity.

#### **6.1.27 UNSATURATED ZONE (Permeability, Grain Size, Total Organic Carbon, Water Content, Bulk Density, Specific Gravity)**

This item shall include the cost to conduct a minimum of two permeability tests per site using ASTM Method D2434. Each test must be conducted on different lithological soil samples collected in the area(s) of the unsaturated zone determined to be the most highly contaminated using field testing methods.

If the appropriate test is not conducted, reimbursement for the incorrect test will be denied. If any hydrologic test other than a permeability test is requested, it will be indicated on page 1 of Exhibit 2.

Under certain circumstances the KDHE Project Manager may request two grain size analysis be performed using ASTM method D 422.

Total organic carbon will be determined using the ASTM Method D 2974. Water content will be determined ASTM Method D 2216. Bulk density will be determined using ASTM Method D 2937. **Specific gravity will be determined using ASTM Method D 584.**

Laboratories which perform analysis using ASTM methods must be accredited for the specific method(s) by the Army Corp of Engineers or an approved equivalent accreditation entity.

Soil samples collected to determine the physical properties must be collected from a zone that is similar to the zone of probable petroleum migration but located in an area that has not been impacted by any released substance.