

Calculation



DAMES & MOORE

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Job No: 22007-011-120/6050

Calculation No: BUF-96-106

Date: September 23, 1996

Subject: Geonet Transmissivity

Purpose: Verify that Geonet proposed by GSE will conform to design requirements.

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References:

1. Richardson, G.N. and Koerner, R.M., "Geosynthetic Design Guidance for Hazardous Waste Landfill Cells and Surface Impoundments, U.S. Environmental Protection Agency, Hazardous Waste Research Engineering Laboratory, Office of Research and Development, Cincinnati, Ohio, Dec. 1987, EPA/600/2-87/097.

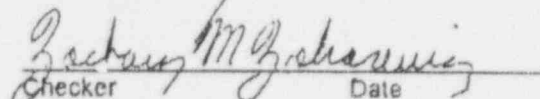
Approach:

Compute required transmissivity for geonet, considering the fact that only 6 inches of the sand layer placed above the geonet is required as a separation medium so that the lower 6 inches can function as part of the upper leachate collection system. Use calculation method in Example 3.1 of reference 1.

Prepared by:

 9/23/96
Signature Date

Checked by:

 9/23/96
Checker Date

Sheet 1 of 4

7702270314 961111
PDR ADOCK 04007604
C PDR

Sheet No. 2 of 4Calc. No. BUF-96-106Rev. No. 0.00Job No. 22007-011-120/6050 Job MIXED WASTE POND CLOSUREBy RZB Date 9/20/96Client BP CHEMICALS Subject PROPERTIES OF GEONETChk'd. R Date 11/23/96

1. SO'D TRANSMISSIVITY REQ'D 1' (30cm) OF 10^{-2} cm/sec SAND
 $= 3 \times 10^{-5} \text{ m}^2/\text{SEC}$. PER RCRA MIN TECH REQ'TS.

2. DESIGN CALLS FOR 12" OF SAND OVER LCS. RCRA MTR
 CALLS FOR 6" FILTER. THEREFORE LOWER 6" OF
 SAND CAN FUNCTION AS PART OF LCS.

3. ASSUMING THE HYDRAULIC CONDUCTIVITY OF THE SAND IS
 NO GREATER THAN THE MINIMUM SPECIFIED (10^{-2} cm/sec.)
 TOTAL TRANSMISSIVITY REQ'D - TRANSMISSIVITY OF 6" OF SAND
 $= 3 \times 10^{-5} \text{ m}^2/\text{SEC} - (15 \text{ cm})(10^{-2} \text{ cm/sec})(10^{-4} \text{ m}^2/\text{cm}^2)$
 $= 1.5 \times 10^{-5} \text{ m}^2/\text{SEC}$.

4. CONFINING STRESS. MAX HEIGHT OF SOIL, SLUDGE, CAP, ETC. IS
 60 FT. ASSUME AVG UNIT WT OF 120 LB/FT³

$$\sigma_m = (60)(120) = 7,200 \text{ LB/FT}^2 \text{ - USE 10,000 PSF. LOAD.}$$

5. HYPERNET @ 10,000 PSF HAS $4 \times 10^{-4} \text{ m}^2/\text{SEC}$ PER TEST
 RESULT FROM GSE LINER SYSTEMS (SH. 3).

$$\text{DES. RATIO} = \frac{4 \times 10^{-4}}{1.5 \times 10^{-5}} = \underline{\underline{26.7 > 10 \quad \text{OK}}}$$

6. MINIMUM AVERAGE ROLL VALUE (MARY) GUARANTEED BY
 GSE IS $1 \times 10^{-4} \text{ m}^2/\text{SEC}$. (SH. 4)

$$\text{DES. RATIO} = \frac{1 \times 10^{-4}}{1.5 \times 10^{-5}} = \underline{\underline{6.7 \text{ MARGINALLY OK.}}}$$

GSE Lining Technology, Inc.Hydraulic Transmissivity Test Results
ASTM D 4716

Job Information

Job Name : _____
MR No. : _____
Job No. : _____

Sample Information

Roll No. : 10044997
Resin Lot No. : 7141165
Product I.D. : XL4000N001

CALCULATION SHEET

JOB No: 22007-011-120/6050
CALC. No: BUF-96-106
REV: 0.00 DATE: 9/20/96
ORIG: R BLICKWEDERL
CK: FE DATE: 9/23/96
SHEET: 3 OF 4

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Test Information

Boundary Conditions:

SS PLATE
60 MJL HDPE
HYPERNET
6 OZ. GEOTEXTILE
SITE SAND
SS PLATE

9979

Test Conditions :

10,000 PSF normal load(s)
0.25 gradient(s)

Results : Transmissivity (m/sec)

Gradient

Pressure (psf)	Transmissivity (m/sec)
10000	3.98E-04

Technician: JIMMY YOUNGBLOOD

Date: 9/4/96Report Date
9/4/96
JGY

Page 13300-2, Article 2.1.1.5 & Article 7.2.1.2.5.

The geonet properties specified exceed GSE standards. The following values shall apply for material furnished for this project:

Property	Test Method	Specified Value	GSE Value
Transmissivity gradient of 0.25 and pressure of 10,000 psf	ASTM D4716 bounded by HDPE above and below	10 gal/min/ft	$1.3 \times 10^{-3} \text{ m}^2/\text{s}$
Transmissivity gradient of 0.25 and pressure of 10,000 psf	ASTM D4716 bounded by HDPE below and geotextile and soil above	5 gal/min/ft	$1.3 \times 10^{-3} \text{ m}^2/\text{s}$

The specified test frequency of 1 per 10,000 sf for transmissivity exceeds GSE standards. GSE will perform this test once per project and provide certification for each roll shipped to the site. —

CALCULATION SHEET	
JOB No:	<u>72007-011-120/6050</u>
CALC. No:	<u>BUF-96-106</u>
REV:	<u>0.00</u> DATE: <u>9/20/96</u>
ORIG:	<u>Z. BLICKWEDEHL</u>
CK:	DATE: _____
SHEET:	<u>4</u> OF <u>4</u>
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