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October 25, 1984
Project No. 84272 OG

B & V Construction Company
25301 Novi Road
Novi, Michigan 48050

Attn: Mr. Donald J. Treder

Re: Clay Cap Evaluation
BASF - Wyandotte Landfill
Riverview, Michigan

US EPA RECORDS CENTER REGION 5
406769

Dear Mr. Treder:

This letter presents the results of evaluation tests on a sample of brown silty clay material (designated as Bag Number 12) being used as a clay cap for the above referenced project. The bag sample was obtained from the overburden clay stratum at the Ottowa Silica Sand Company in Rockwood, Michigan. This material was used after the original material obtained from the Wayne County Sewage Abatement site had been exhausted. The results of the evaluation tests had been previously relayed to the parties concerned.

Test results on Bag Number 12 material consisted of Modified Proctor, sieve and hydrometer analysis, Atterberg limits and permeability. The results of the proctor, sieve analysis and Atterberg limits are presented on the attached Figures 1, 2 and 3, respectively. These results indicate that the bag material has a "CL" designation according to the Unified Classification System.

Three permeability tests were performed on samples of the silty clay that were prepared and compacted in brass liners (3-inch long and 1-3/8-inch in diameter). The soil was compacted to a density of approximately 90 percent of the Modified Proctor value at different moisture contents. The permeability test results are as follows:

Liner No.	Remolded Density (pcf)	Percent Compaction*	Percent Moisture	Coefficient of Permeability (cm/sec)
1	114.4	90.0	9.0	3.1×10^{-8}
2	114.7	90.2	11.0	2.2×10^{-8}
3	114.4	90.0	15.9	2.2×10^{-8}

*Based on a maximum Modified Proctor density value of 127.1 pcf at an optimum moisture content of 10.8 percent.

The results of the evaluation tests indicate that Bag No. 12 has a permeability coefficient of less than 1×10^{-7} cm/sec, and is therefore considered suitable for use as a clay cap.

If you have any questions about this letter or the attached data, please call.

Very truly yours,

NEYER, TISEO & HINDO, LTD.

D. Nona, P.E.
DN/tal
Attachment

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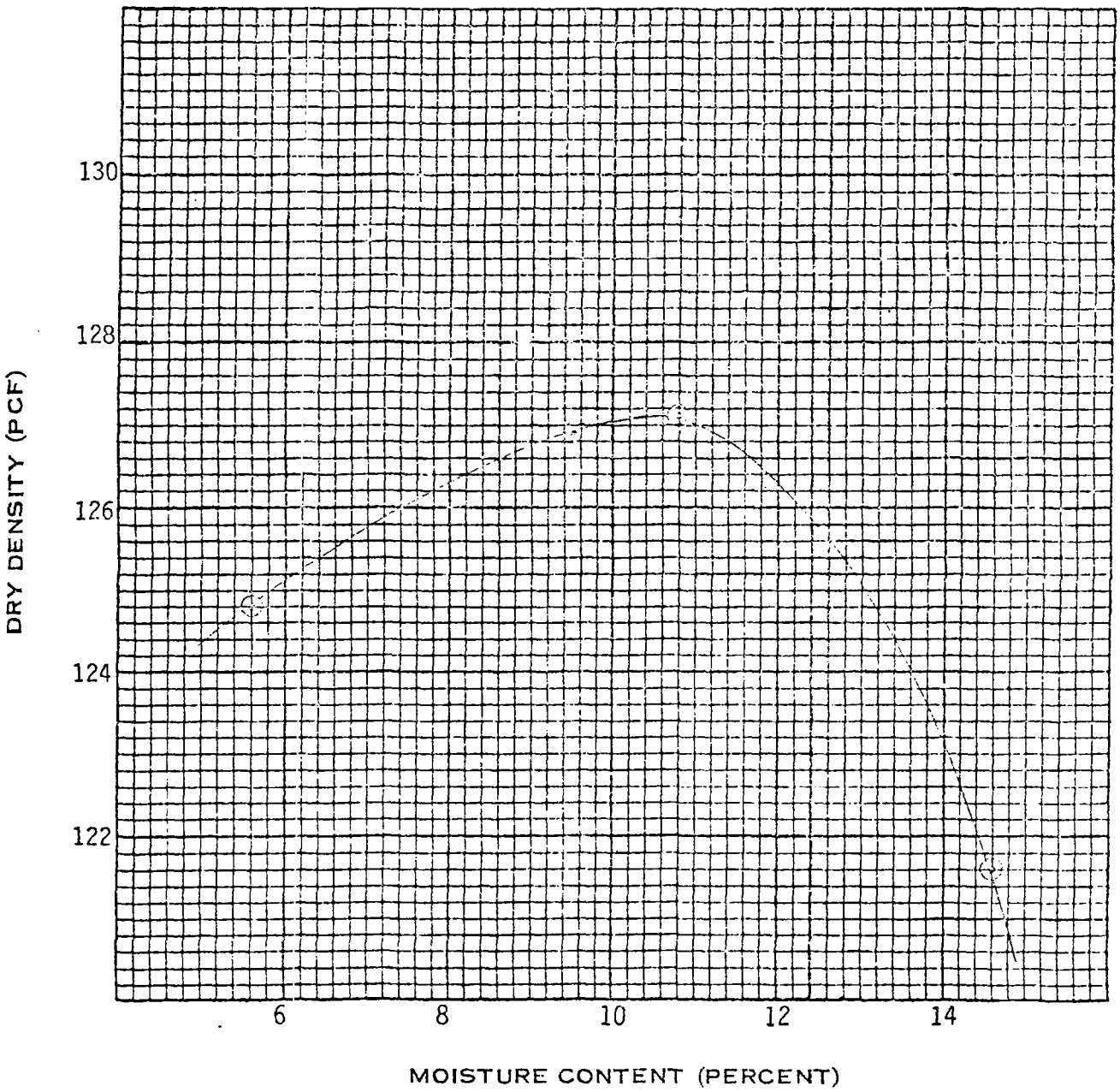
MOISTURE - DENSITY RELATIONS

PROJECT No. 84272 OC PROJECT: BASF WYANDOTTE CLAY CAP
PROJECT LOCATION WYANDOTTE, MICHIGAN (Sample Location - Ottowa Silica Sand Company
BAG SAMPLE No. 12 SAMPLE DEPTH Rockwood, Michigan)
SAMPLE DESCRIPTION Brown SILTY CLAY with a Trace of Gravel
METHOD OF COMPACTION ASTM 1557 Method A
MOLD: No. _____ DIA. _____ IN., HT. _____ IN., VOLUME .0333 CU. FT., WT. 9.44 LBS.
TESTED BY: J. Becht, S. Westrick CHECKED BY: E.W. DATE: 9-26-84



MAXIMUM DRY DENSITY 127.1 PCF OPTIMUM MOISTURE CONTENT 10.8 %
REMARKS:

Figure 1

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GRAIN SIZE DISTRIBUTION CURVE

PROJECT NO. 84272 OC LAB SAMPLE NO. 7 SOURCE BASF - WYANDOTTE LANDFILL

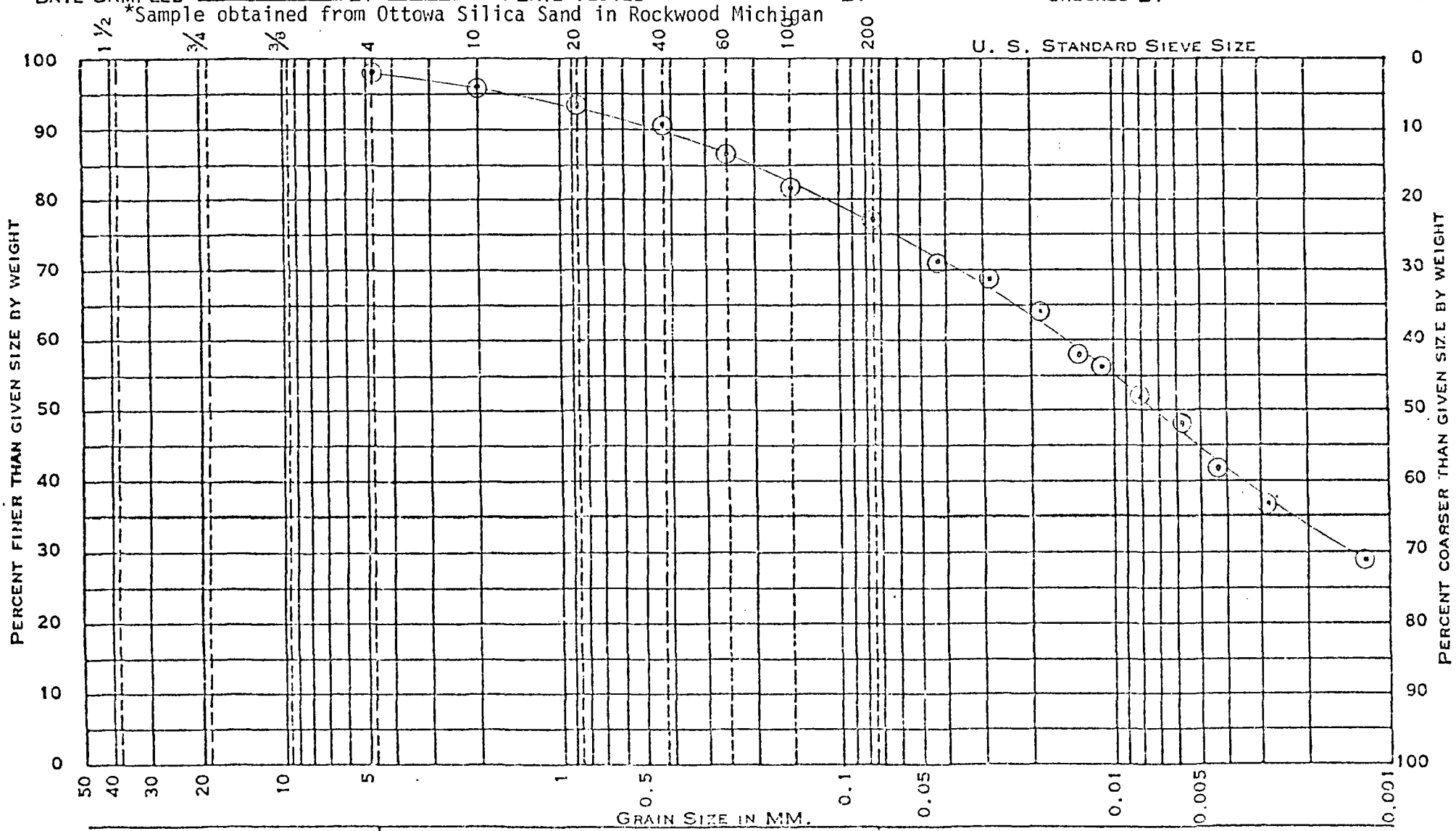
PROJECT LOCATION Wyandotte, Michigan * FOR

BORING NO. FIELD SAMPLE NO. 12 SAMPLE DEPTH SAMPLE ELEV. (TIP)

SAMPLE DESCRIPTION Brown SILTY CLAY with Trace of Sand and Gravel

DATE SAMPLED - BY - DATE TESTED 9-26-84 BY S.Y. CHECKED BY F.W.

*Sample obtained from Ottowa Silica Sand in Rockwood Michigan



GRAVEL		SAND			FINES		
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY	COLLOIDS

Figure 2

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SOIL CONSTANTS

LAB. SAMPLE NO. 7 PROJECT NO. 84272 OC FOR BASF WYANDOTTE CLAY CAP
PROJECT LOCATION WYANDOTTE, MICHIGAN (Sampled from Ottowa Silica Sand, Rockwood, Michigan)
BORING NO. _____ FIELD SAMPLE NO. 12 SAMPLE DEPTH _____ SAMPLE ELEV. (TIP) _____
SAMPLE DESCRIPTION Brown SILTY CLAY with Trace of Gravel.

TESTED BY: S.Y. CHECKED BY: E.W. DATE 9-26-84

MOISTURE CONTENT

SPECIMEN DESIGNATION								
TARE NUMBER								
WET WEIGHT + TARE (GR)								
DRY WEIGHT + TARE (GR)								
WEIGHT OF MOISTURE (GR)								
WEIGHT OF TARE (GR)								
DRY WEIGHT (GR)								
MOISTURE CONTENT (%)								

LIQUID AND PLASTIC LIMITS

PURPOSE OF TEST								
NUMBER OF BLOWS	29	21						
TARE NUMBER	A-51	A-38	A-17					
WET WEIGHT + TARE (GR)	26.82	25.39	26.71					
DRY WEIGHT + TARE (GR)	23.28	22.11	24.53					
WEIGHT OF MOISTURE (GR)								
WEIGHT OF TARE (GR)	11.38	11.43	11.38					
DRY WEIGHT (GR)								
MOISTURE CONTENT (%)	29.7	30.7	16.6					
	36.3	36.1						

SPECIFIC GRAVITY $G = G_0 W_0 \div (W_0 - W_1 + W_2)$

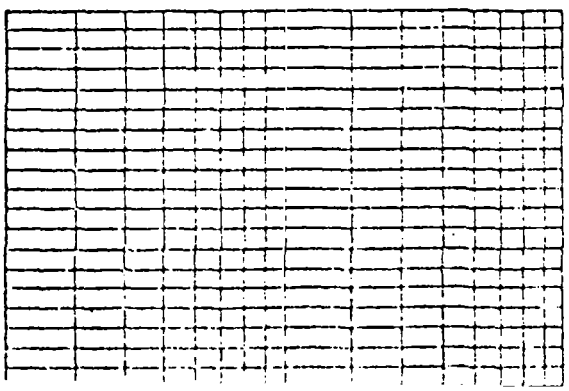
SPECIMEN DESIGNATION		
PYCNOMETER NUMBER		
WT. PYC., SOIL, WATER (W_1) (GR)		
TEMPERATURE (DEGREES CENT.)		
WT. PYC., WATER (W_2) (GR)		
TARE NUMBER		
DRY WEIGHT + TARE (GR)		
WEIGHT OF TARE (GR)		
DRY WEIGHT (W_0) (GR)		
SPECIFIC GRAVITY, WATER (G_0)		
SPECIFIC GRAVITY, SOIL (G)		

UNIT DENSITIES AND VOLUMETRIC ANALYSIS

SPECIMEN DESIGNATION				
WET WEIGHT + TARE (GR)				
WEIGHT OF TARE (GR)				
WET WEIGHT (GR)				
MOISTURE CONTENT (%)				
DRY WEIGHT (GR)				
SAMPLE LENGTH (IN)				
SAMPLE DIAMETER (IN)				
SAMPLE VOLUME (CU IN)				
SAMPLE VOLUME (CC)				
WET DENSITY (GR/CC)				
DRY DENSITY (GR/CC)				
WET DENSITY (PCF)				
DRY DENSITY (PCF)				
WEIGHT OF WATER (PCF)				
SPECIFIC GRAVITY				
VOLUME OF SOLIDS (%)				
VOLUME OF LIQUIDS (%)				
VOLUME OF AIR (%)				
SATURATION (%)				

LIQUID LIMIT FLOW CURVE

MOISTURE CONTENT (%)



LIQUID LIMIT (LL)	30
PLASTIC LIMIT (PL)	17
PLASTICITY INDEX (LL - PL)	13