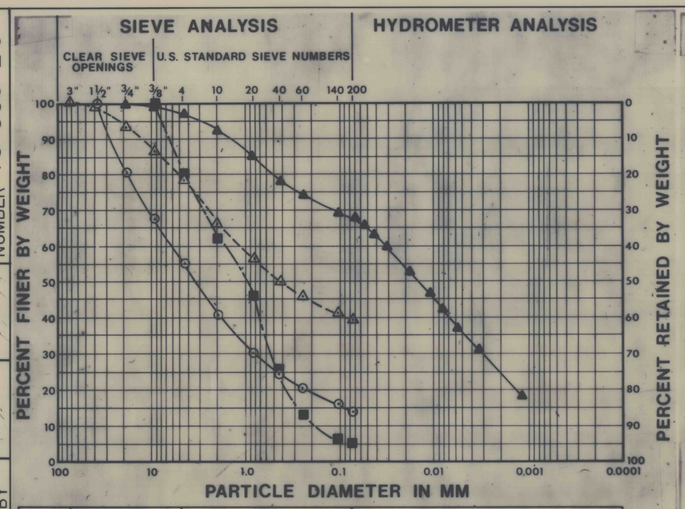
DRAWING NUMBER 78-359-E9

CHECKED BY

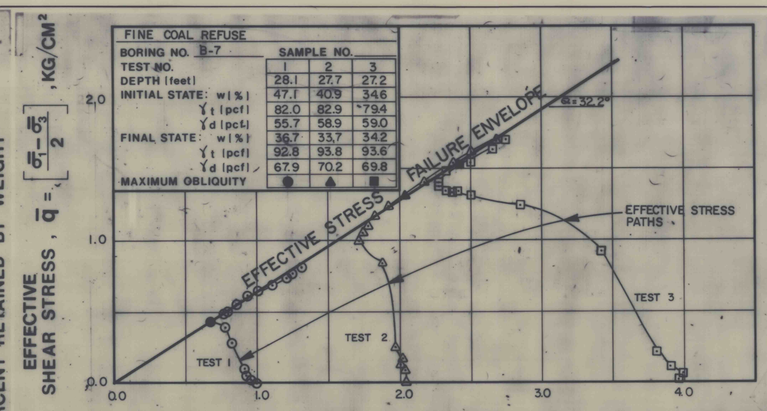
APPROVED BY

DRAWN BY JJL 5-17-79




| SYMBOL | BORING | SAMPLE | DEPTH | SOIL DESCRIPTION | U.S.C.S. | $D_{10}$ | $C_u$ | W.% |
|---|---|---|---|---|---|---|---|---|
| ○ | | BS-1 | | COARSE COAL REFUSE | | — | — | — |
| △ | | BS-2 | | COARSE COAL REFUSE | | — | — | — |
| ■ | | | | SAND WITH SOME GRAVEL (FILTER MAT'L) | | — | — | — |
| ▲ | B-1 | ST-1 | 6.0'-8.0' | SILTY CLAY | | | | |

GRAIN SIZE ANALYSES

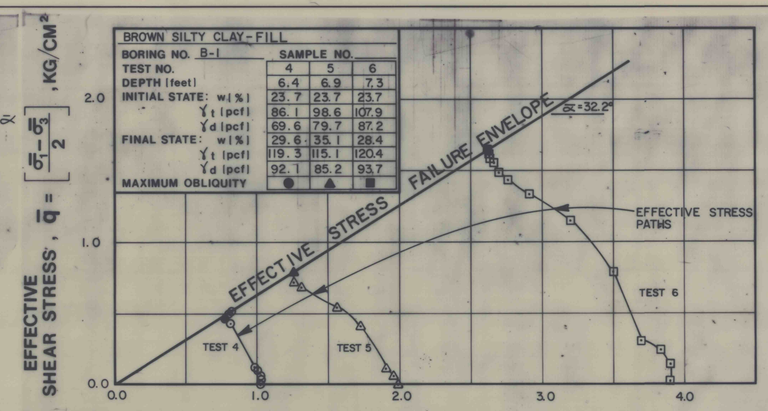



$\bar{\alpha} = 32.2°$
$\bar{\phi} = 39.0°$
$\sin \bar{\phi} = \tan \bar{\alpha}$
$\bar{c} = \frac{\bar{a}}{\cos \bar{\phi}}$
$\bar{c} = 0$

| TEST PARAMETERS | | | |
|---|---|---|---|
| TEST NO. | 1 | 2 | 3 |
| STRAIN RATE (in./min.) | 0.0016 | 0.0018 | 0.0016 |
| BACK PRESSURE (kg./cm.) | 5.02 | 5.00 | 5.05 |
| CONSOLIDATION TIME (days) | 1 | 1 | 1 |

| SAMPLE DIMENSIONS | | | |
|---|---|---|---|
| DIAMETER (inches) | 2.87 | 2.87 | 2.87 |
| LENGTH (inches) | 5.58 | 5.50 | 5.78 |

FINE COAL REFUSE



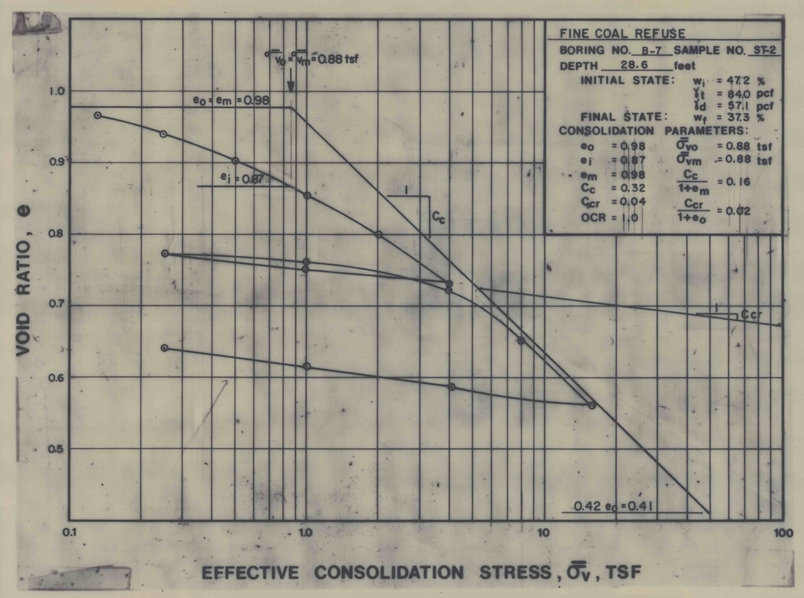

$\bar{\alpha} = 32.2°$
$\bar{\phi} = 39.0°$
$\sin \bar{\phi} = \tan \bar{\alpha}$
$\bar{c} = \frac{\bar{a}}{\cos \bar{\phi}}$
$\bar{c} = 0$

| TEST PARAMETERS | | | |
|---|---|---|---|
| TEST NO. | 4 | 5 | 6 |
| STRAIN RATE (in./min.) | 0.0016 | 0.0018 | 0.0016 |
| BACK PRESSURE (kg./cm.) | 5.06 | 5.07 | 5.06 |
| CONSOLIDATION TIME (days) | 1 | 1 | 1 |

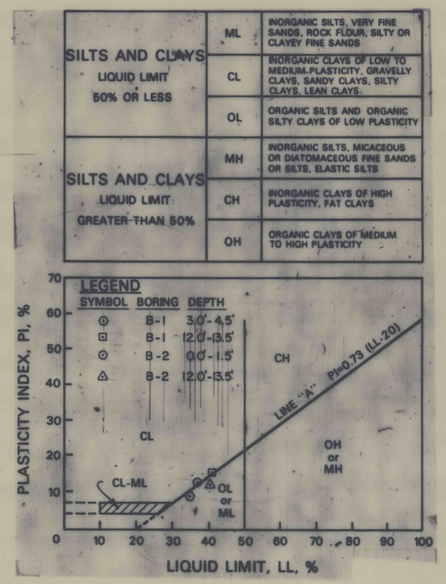
| SAMPLE DIMENSIONS | | | |
|---|---|---|---|
| DIAMETER (inches) | 2.87 | 2.87 | 2.87 |
| LENGTH (inches) | 5.57 | 5.51 | 5.75 |

FILL-BROWN SILTY CLAY

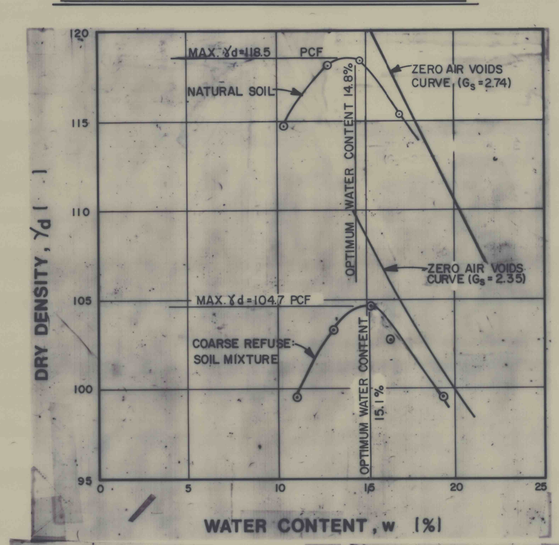
CONSOLIDATED UNDRAINED TRIAXIAL TESTS WITH PORE PRESSURE MEASUREMENTS

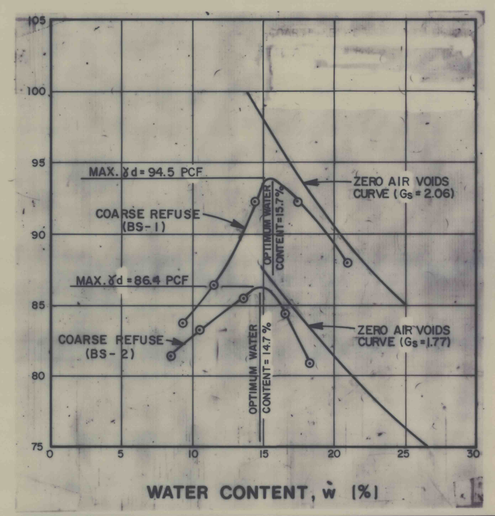



CONSOLIDATION TEST




ATTERBERG LIMITS




| ASTM DESIGNATION USED | STANDARD |
|---|---|
| **METHOD USED | C |

| ASTM DESIGNATION | HAM./DROP | LAYERS |
|---|---|---|
| STANDARD-D698 | 5.5#/12" | 3 |
| MODIFIED-D1557 | 10#/18" | 5 |

| METHOD** | MATERIAL SIZE | MOLD SIZE | BLOWS* |
|---|---|---|---|
| A | ALL PASSING #4 | 4" DIA. | 25 |
| B | ALL PASSING #4 | 6" DIA. | 56 |
| C | ALL PASSING ⅜" | 4" DIA. | 25 |
| D | ALL PASSING ⅜" | 6" DIA. | 56 |

*BLOWS/LAYER

COMPACTION TESTS

SLURRY CONTAINMENT DIKE BORROW MATERIALS

CONSOLIDATION PARAMETERS

- $e_o$ - INITIAL VOID RATIO
- $e_i$ - VOID RATIO AT IN SITU EFFECTIVE OVERBURDEN PRESSURE
- $e_m$ - VOID RATIO AT MAXIMUM PAST VERTICAL CONSOLIDATION PRESSURE
- $\bar{\sigma}_{vo}$ - INITIAL VERTICAL STRESS
- $\bar{\sigma}_{vm}$ - MAXIMUM PAST VERTICAL CONSOLIDATION PRESSURE
- $C_c$ - COMPRESSION INDEX
- $C_{cr}$ - RECOMPRESSION INDEX
- $C_v$ - COEFFICIENT OF CONSOLIDATION

NOTE: SYMBOLS WITH LINE OVER LETTER, SUCH AS $\bar{\sigma}_{vm}$ MEAN EFFECTIVE PARAMETERS.

SHEAR STRENGTH PARAMETERS

- $\sigma_1$, $\sigma_3$ - PRINCIPAL STRESS COMPONENTS
- q - SHEAR STRESS
- p - MEAN NORMAL STRESS
- $\alpha$ - SLOPE OF STRESS FAILURE ENVELOPE
- a - q AXIS INTERCEPT OF STRESS FAILURE ENVELOPE
- $\phi$ - ANGLE OF INTERNAL FRICTION
- c - COHESION
- $\sin \phi = \tan \alpha$, $c = \frac{a}{\cos \phi}$

NOTE: SYMBOLS WITH LINE OVER LETTER, SUCH AS $\bar{\phi}$, MEAN EFFECTIVE PARAMETERS.

INDEX PROPERTIES

- w - WATER CONTENT
- LL - LIQUID LIMIT
- PL - PLASTIC LIMIT
- PI - PLASTICITY INDEX
- $D_{10}$ - DIAMETER AT WHICH 10% OF THE SOIL IS FINER
- $D_{60}$ - DIAMETER AT WHICH 60% OF THE SOIL IS FINER
- $C_u$ - COEFFICIENT OF UNIFORMITY ($D_{60}/D_{10}$)
- $\gamma_t$ - WET UNIT WEIGHT
- $\gamma_d$ - DRY UNIT WEIGHT

| DRAWING NO. | SHEET NO. | FIGURE NO. |
|---|---|---|
| 78-359-E9 | | 10 |

LABORATORY TEST DATA

BETHLEHEM MINE No. 101
CENTURY, WEST VIRGINIA

PREPARED FOR

BETHLEHEM MINES CORPORATION
BRIDGEPORT, WEST VIRGINIA

D'APPOLONIA

15-15-10