ENGINEERING DATA
MARSHALL SILO ASH

Duke Power Company
System Coal Ash Analysis

| | | | |
|---|---|---|---|
| Plant | Marshall | Report Date: | 7/26/95 |
| Ash Type | Silo Flyash | | |
| Application | Sampled 2/24/94, lab testing completed 4/19/94 | | |

## Structural Fill Properties

| Classification Tests | | |
|---|---|---|
| | Specific Gravity | 2.5 |
| | Classification | Gray Fine Sandy Clayey Silt |
| | Atterberg Limits | Non-plastic |

| Moisture and Density | | | |
|---|---|---|---|
| | Natural Moisture Content | | 0.002 |
| | Standard Proctor | Optimum Moisture, % | 24 |
| | | Maximum Dry Density, PCF | 80.8 |

| Triaxial Shear Strength (Saturated, Consolidated, Drained) | | | | | |
|---|---|---|---|---|---|
| | Wet Density, PCF, avg. | Initial: | 96.4 | Final: | 110.3 |
| | Dry Density, PCF, avg. | | 77.2 | | 79.9 |
| | Moisture Content, %, avg. | | 24.8 | | 38.1 |
| | Cohesion, c | 2448 | | | |
| | Friction Angle, phi | 26.5 | | | |
| | Bearing Capacity, PSF | >5000 | | | |

| | |
|---|---|
| Permeability, k, cm/sec | 3.45 x 10^-4 |

| Consolidation | | | | | |
|---|---|---|---|---|---|
| | Void Ratio, e | Initial: | 1.037 | Final: | 0.92 |
| | Compression Index, Cc | 0.114 | | | |
| | Strain, %, at 3000 PSF | 1.66 | | | |

CONSOLIDATED DRAINED TRIAXIAL COMPRESSION TEST
SPECIMEN DATA

| | |
|---|---|
| PROJECT: | MARSHALL STEAM STATION – SILOS |
| BOREHOLE NO.: | N/A |
| STATION: | N/A |
| DEPTH: | N/A |
| ELEVATION: | N/A |

SAMPLE DESCRIPTION TOP ASH, DESCRIBED AS:
GRAY FINE SANDY CLAYEY SILT

INITIAL CONDITIONS

| SPECIMEN NO. | 1 | 2 | 3 | AVERAGE |
|---|---|---|---|---|
| WET WEIGHT, PCF | 96.0 | 96.5 | 96.6 | 96.4 |
| DRY WEIGHT, PCF | 77.1 | 77.0 | 77.4 | 77.2 |
| WATER CONTENT % | 24.5 | 25.2 | 24.8 | 24.8 |
| SATURATION % | 59.9 | 61.5 | 61.1 | 60.8 |
| VOID RATIO | 1.0227 | 1.0251 | 1.0160 | 1.0213 |

FINAL CONDITIONS

| SPECIMEN NO. | 1 | 2 | 3 | AVERAGE |
|---|---|---|---|---|
| WET WEIGHT, PCF | 110.9 | 109.4 | 110.6 | 110.3 |
| DRY WEIGHT, PCF | 80.8 | 78.4 | 80.4 | 79.9 |
| WATER CONTENT % | 37.2 | 39.6 | 37.6 | 38.1 |
| SATURATION % | 100.0 | 100.0 | 100.0 | 100.0 |
| VOID RATIO | 0.9300 | 0.9900 | 0.9400 | 0.9533 |

SPECIFIC GRAVITY 2.50

SCALE ID SYSTL 10068

OVEN ID 19423

INSPECTOR J. S. Tatum DATE 3-31-94

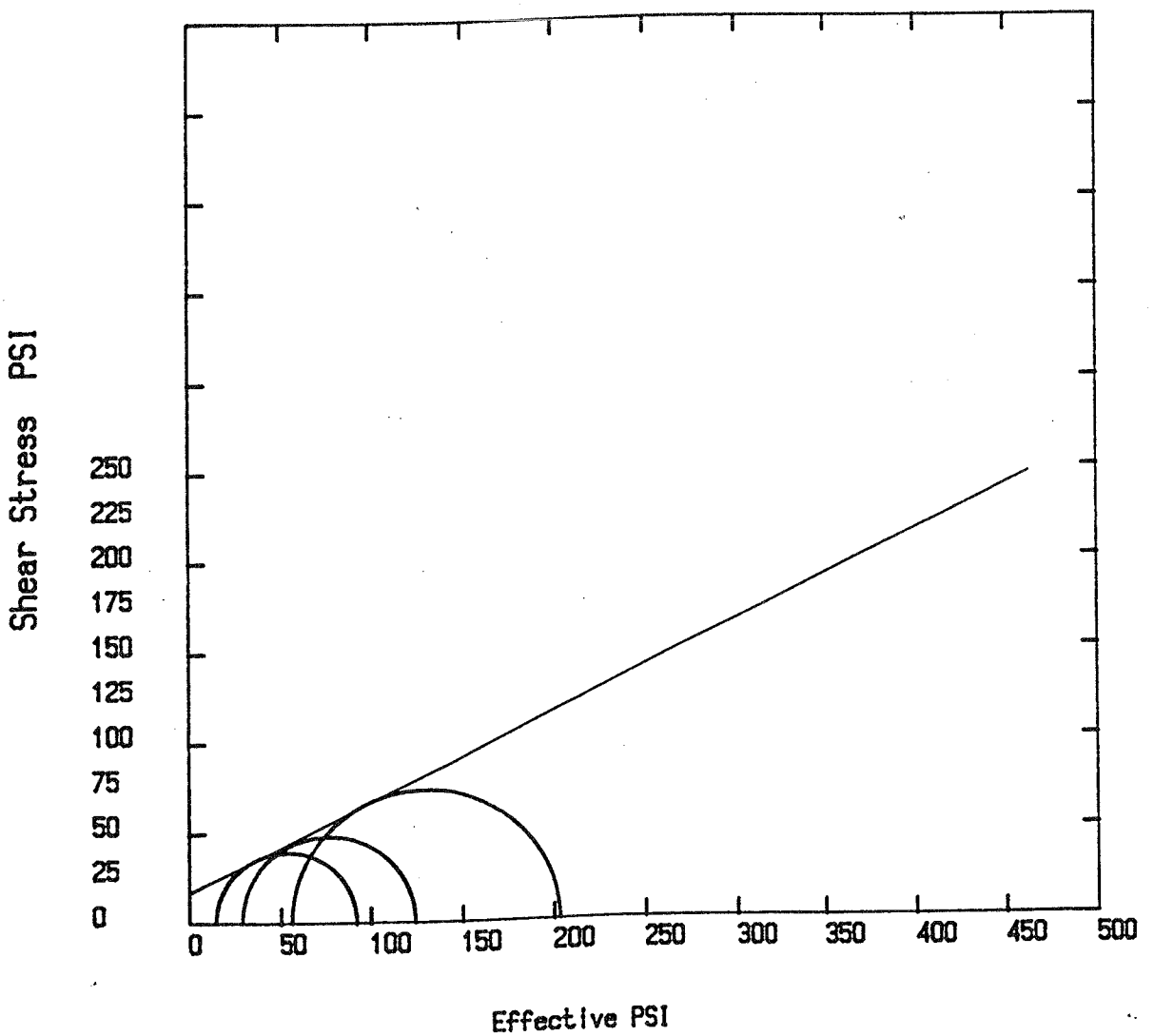
LEVEL 2 EVALUATION N/A DATE N/A

# CONSOLIDATED DRAINED TRIAXIAL COMPRESSION TEST

## SHEAR STAGE

C = 17.0PSI

PHI = 26.5 Degrees




Sample type N/A

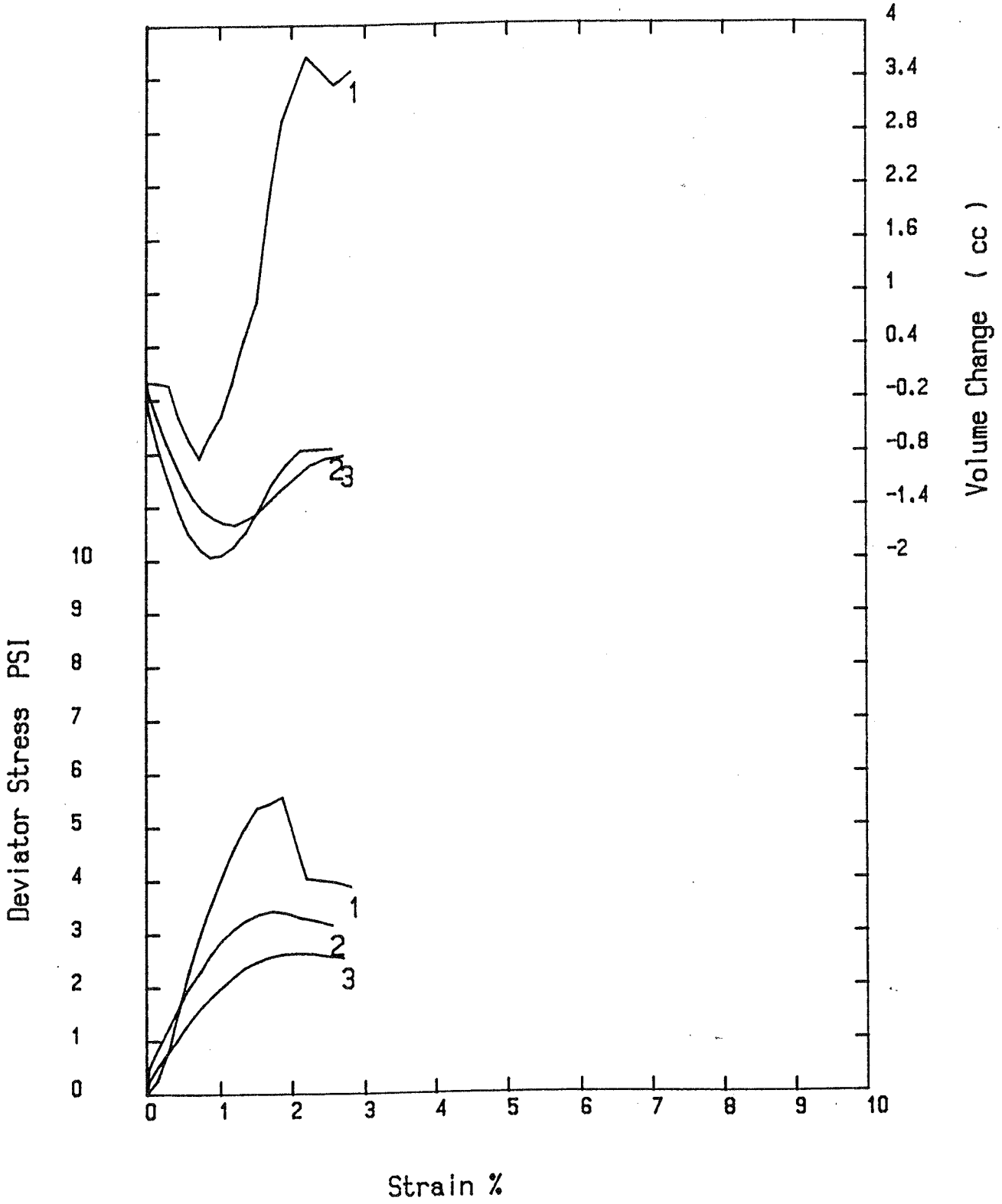
Sample Description TOP ASH, DESCRIBED AS: GRAY FINE SANDY CLAYEY SILT

Borehole No : N/A Sample No: 1 Depth : N/A

| | | |
|---|---|---|
| | Site ref : MARSHALL STEAM STATION - SILOS (ASH) | Job No :<br>Fig No : |

# CONSOLIDATED DRAINED TRIAXIAL COMPRESSION TEST

## SHEAR STAGE




Sample type N/A

Sample Description TOP ASH, DESCRIBED AS: GRAY FINE SANDY CLAYEY SILT

Borehole No : N/A Sample No: 1 Depth : N/A

| | | |
|---|---|---|
| | Site ref : MARSHALL STEAM STATION - SILOS (ASH) | Job No :<br>Fig No : |

# DUKE POWER COMPANY
# ONE DIMENSIONAL CONSOLIDATION TEST

COMPRESSION INDEX = .114

* INITIAL PROPERTIES *

VOID RATIO = 1.037

UNIT WEIGHT : WET = 95.1 PCF

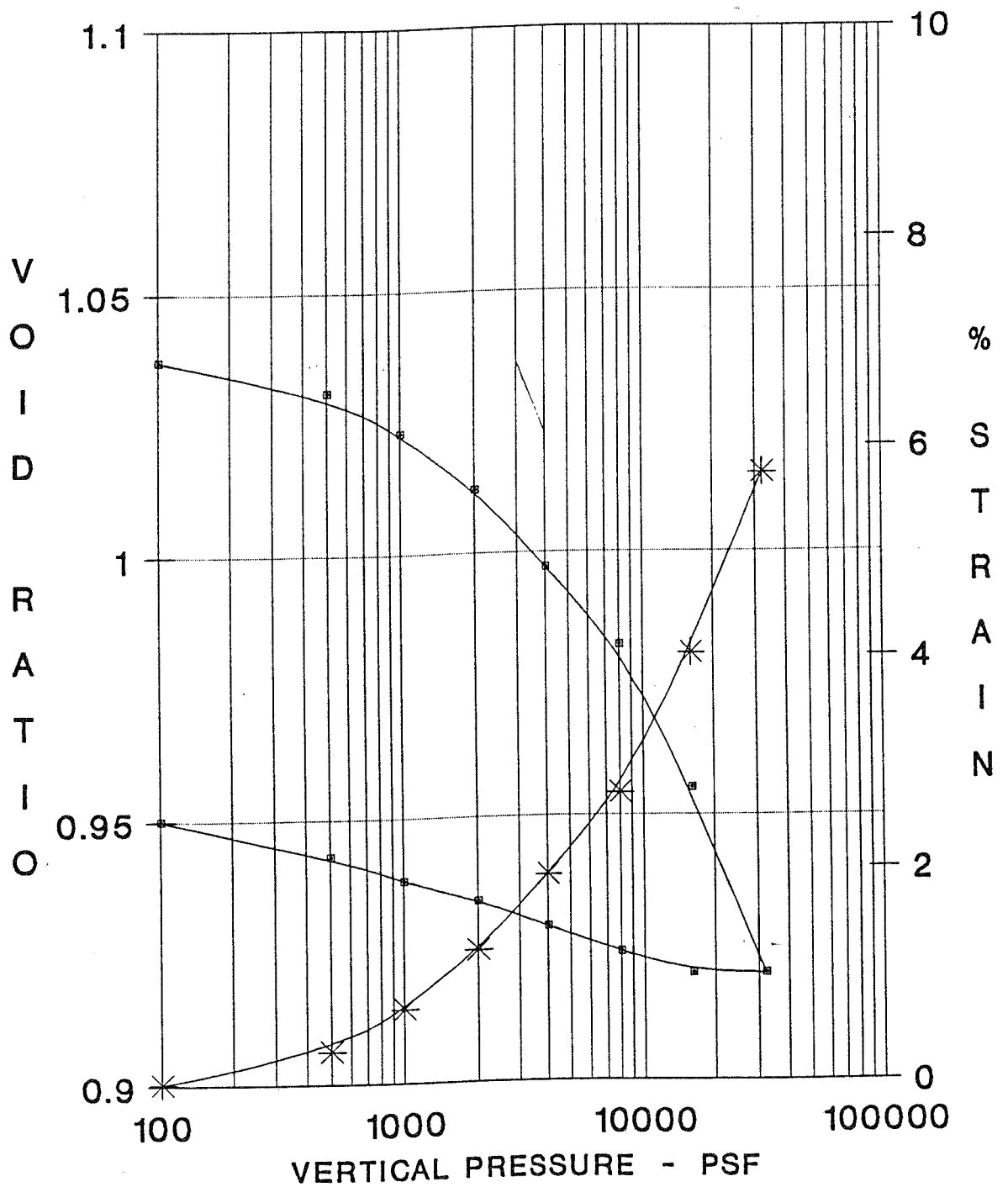
DRY = 76.6 PCF

PERCENT MOISTURE = 24.1 %

PERCENT SATURATION = 58.1 %

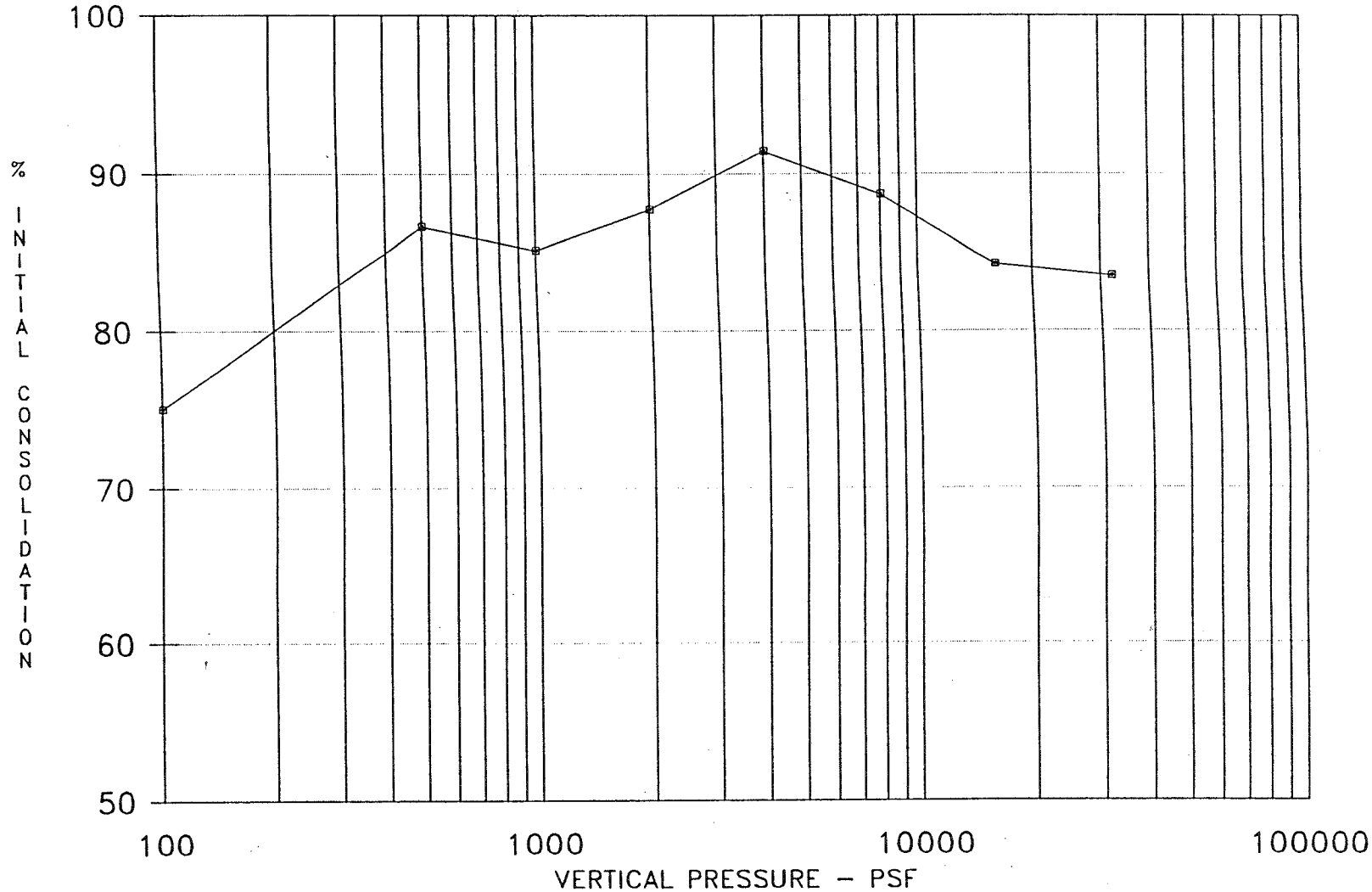
MARSHALL STEAM STATION SILOS-FLY ASH

DUKE POWER COMPANY
ONE DIMENSIONAL CONSOLIDATION TEST




MARSHALL STEAM STATION SILOS-FLY ASH

DUKE POWER COMPANY
ONE DIMENSIONAL CONSOLIDATION TEST




MARSHALL STEAM STATION SILOS–FLY ASH

25560 (R9-85)

| FORM M-1F | REV. 4 |
|---|---|

DUKE POWER COMPANY
CONSTRUCTION DEPARTMENT

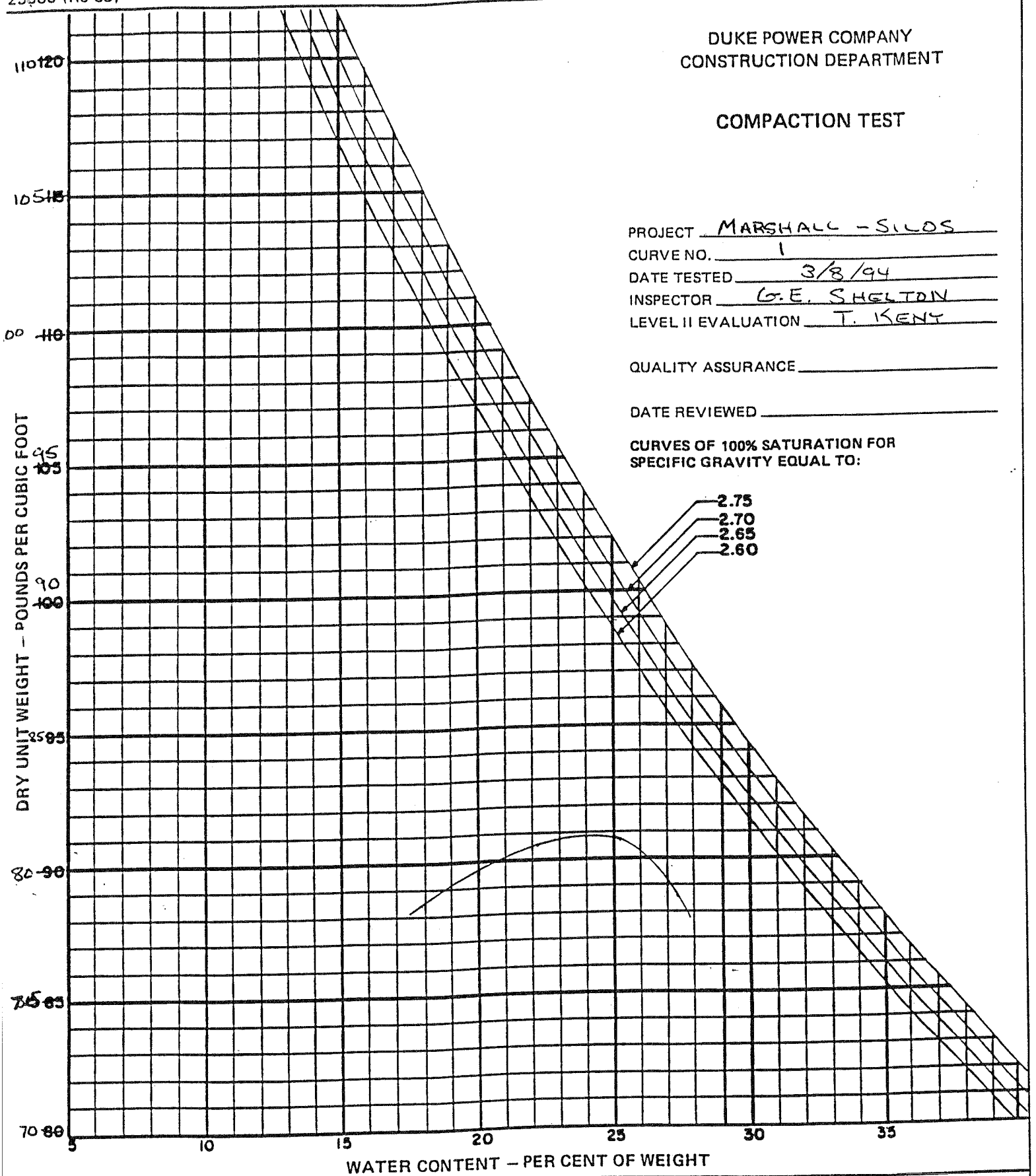
## COMPACTION TEST

PROJECT MARSHALL - SILOS
CURVE NO. 1
DATE TESTED 3/8/94
INSPECTOR G.E. SHELTON
LEVEL II EVALUATION T. KENT

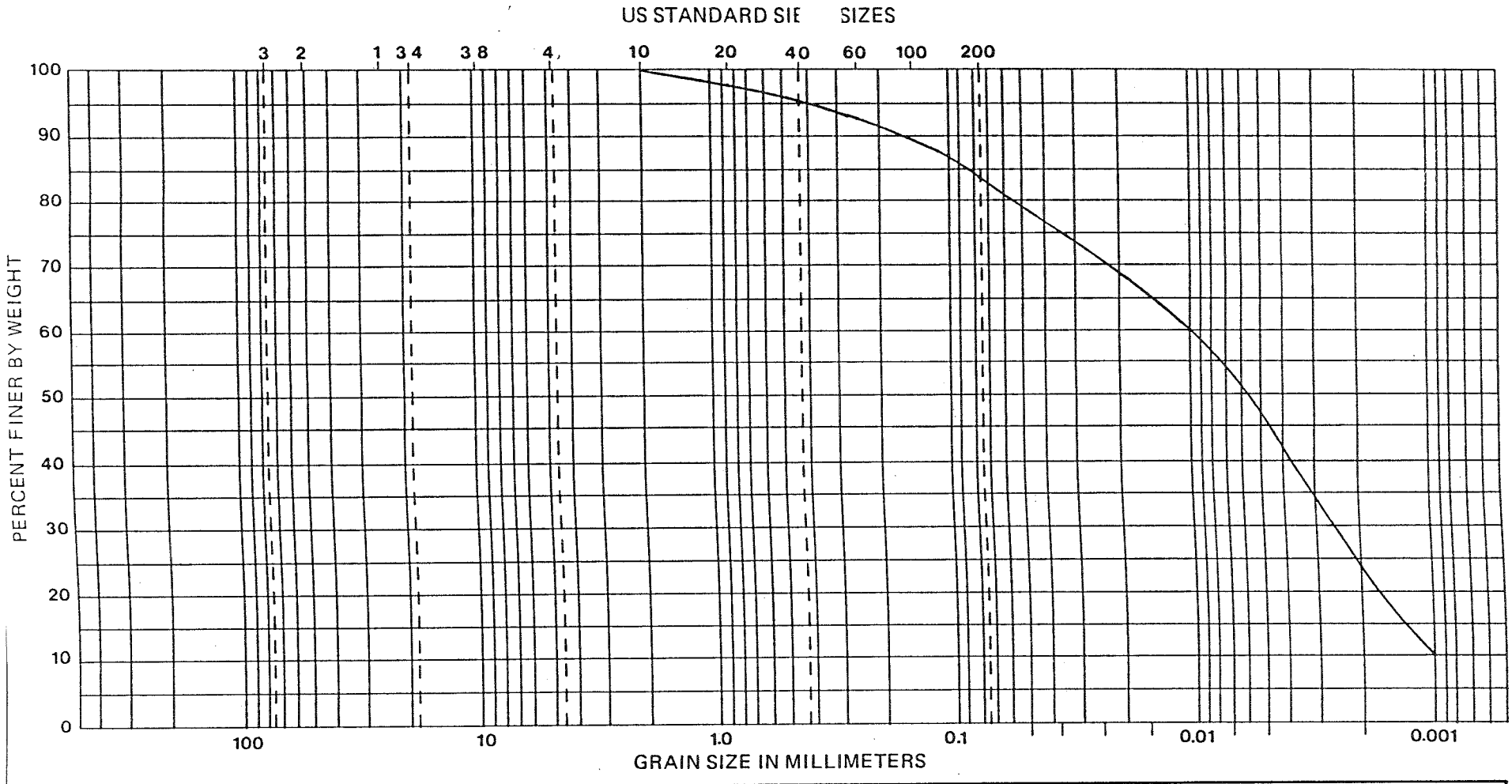
QUALITY ASSURANCE

DATE REVIEWED

CURVES OF 100% SATURATION FOR SPECIFIC GRAVITY EQUAL TO:




| MOISTURE DENSITY RELATION | METHOD OF TEST | MAX. DRY DENSITY PCF | OPTIMUM MOISTURE CONTENT % | SOIL DESCRIPTION OR CLASSIFICATION AND SAMPLE LOCATION |
|---|---|---|---|---|
| N/A | ASTM D698 METHOD | 80.8 | | TOP ASH |




| BOULDERS | COBBLES | GRAVEL | | SAND | | | FINES | |
|---|---|---|---|---|---|---|---|---|
| | | COARSE | FINE | COARSE | MEDIUM | FINE | SILT SIZES | CLAY SIZES |

PROJECT MARSHALL
SILOS - TOP ASH

| BORING NO | ELEV OR DEPTH | NAT WC | LL | PL | PI | DESCRIPTION OR CLASSIFICATION |
|---|---|---|---|---|---|---|
| SILOS - TOP ASH | N/A | 0.002% | N/A | N/A | N/A | ~~GRAY~~ DST TOP ASH DESCRIBED AS: GRAY FINE SANDY CLAYEY SILT |

**GRAIN SIZE DISTRIBUTION**

TEST NO. 1 JOB NO. N/A

INSPECTOR J. S. Tatum

DATE 3-14-94

DUKE POWER COMPANY
CONSTRUCTION DEPARTMENT

LEVEL II EVALUATION N/A

QA APPROVAL N/A DATE N/A

25565 (R9-85)

FORM M-1L

REV. 5