APPENDIX A
Permeability Laboratory Testing of Gypsum

Table A-1. Summary of Hydraulic Conductivity Test Results performed on Gypsum Obtained from different facilities

TVA Facility Name	Hydraulic Conductivity (cm/sec)
Cumberland	6.65×10^{-4}
Cumberland	5.02×10^{-4}
Cumberland	6.65×10^{-4}
Widows Creek	3.9×10^{-4}
Paradise	1.5×10^{-4}

PERMEABILITY TEST REPORT

TEST DATA:

Specimen Height (cm): 5.87
Specimen Diameter (cm): 7.24
Dry Unit Weight (pcf): 66.8
Moisture Before Test (%): 34.8
Moisture After Test (%): 54.3

Run Number:	1 ●	2 ▲
Cell Pressure (psi):	57.0	
Test Pressure(psi):	52.0	
Back Pressure(psi):	50.7	
Diff. Head (psi):	1.3	
Flow Rate (cc/sec):	4.40 x 10^-1	
Perm. (cm/sec):	6.85 x 10^-4	

SAMPLE DATA:

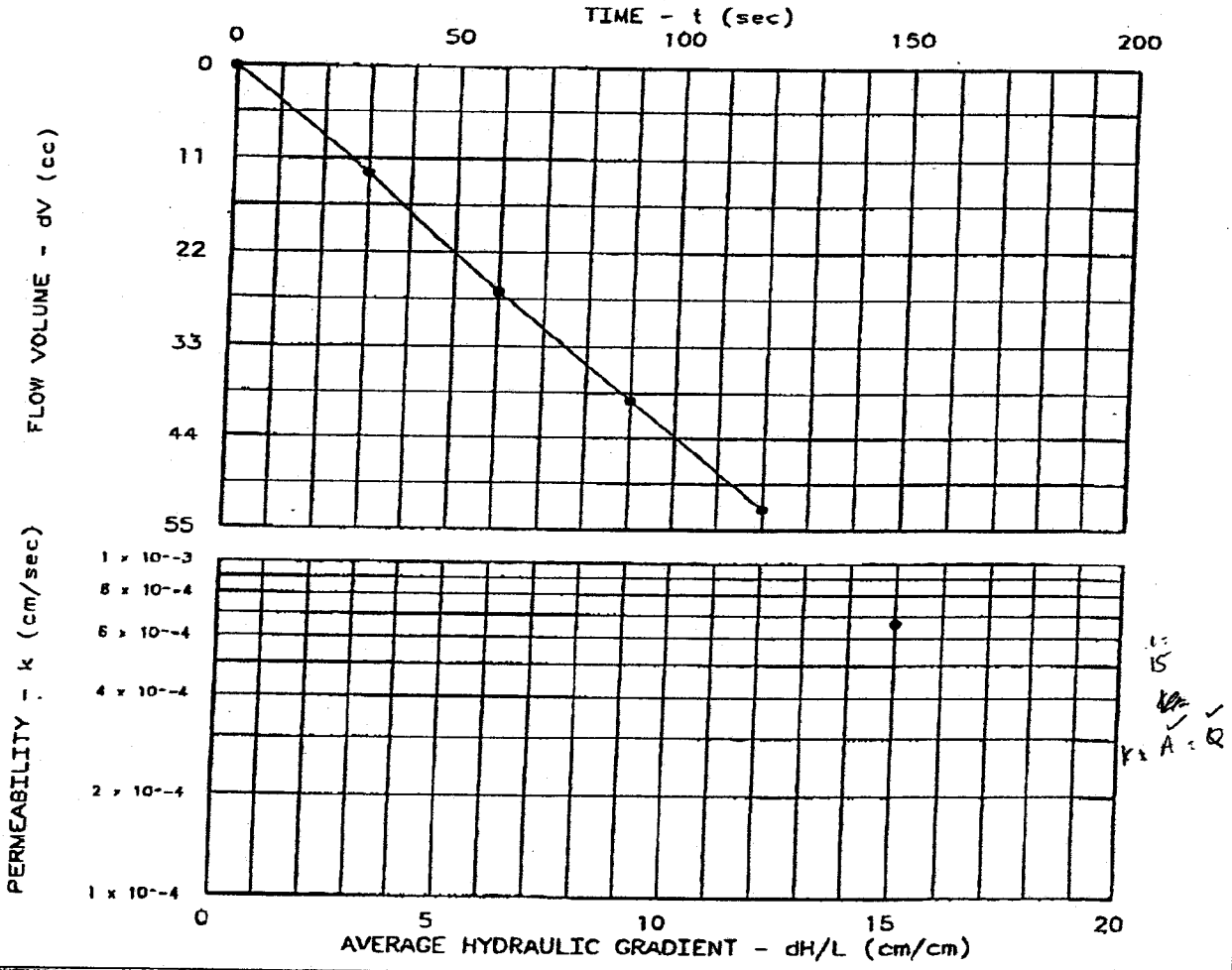
Sample Identification: Hole #2

Visual Description: Gypsum

Remarks:

Maximum Dry Density (pcf):
Optimum Moisture Content (%):

Percent Compaction:
Permeameter type: Flexible Wall
Sample type: Shelby Tube



Project: TVA Kingston Fossil Plant - CUF Gypsum	Project No.: 3043041009
Location:	File No.: As# 2651
Date: 05-04-04	Lab No.: 6226
PERMEABILITY TEST REPORT	Tested by: JA
	Checked by: MH
	Test: CH - Constant head

HAB

PERMEABILITY TEST REPORT

TEST DATA:

Specimen Height (cm): 5.04
Specimen Diameter (cm): 7.33
Dry Unit Weight (pcf): 69.0
Moisture Before Test (%): 29.0
Moisture After Test (%): 48.6
Run Number: 1 • 2 ▲
Cell Pressure (psi): 57.0 ✓ 4.3 psi
Test Pressure(psi): 52.0 ✓
Back Pressure(psi): 50.7
Diff. Head (psi): 1.3
Flow Rate (cc/sec): 4.14 x 10^-1
Perm. (cm/sec): 5.02 x 10^-4

SAMPLE DATA:

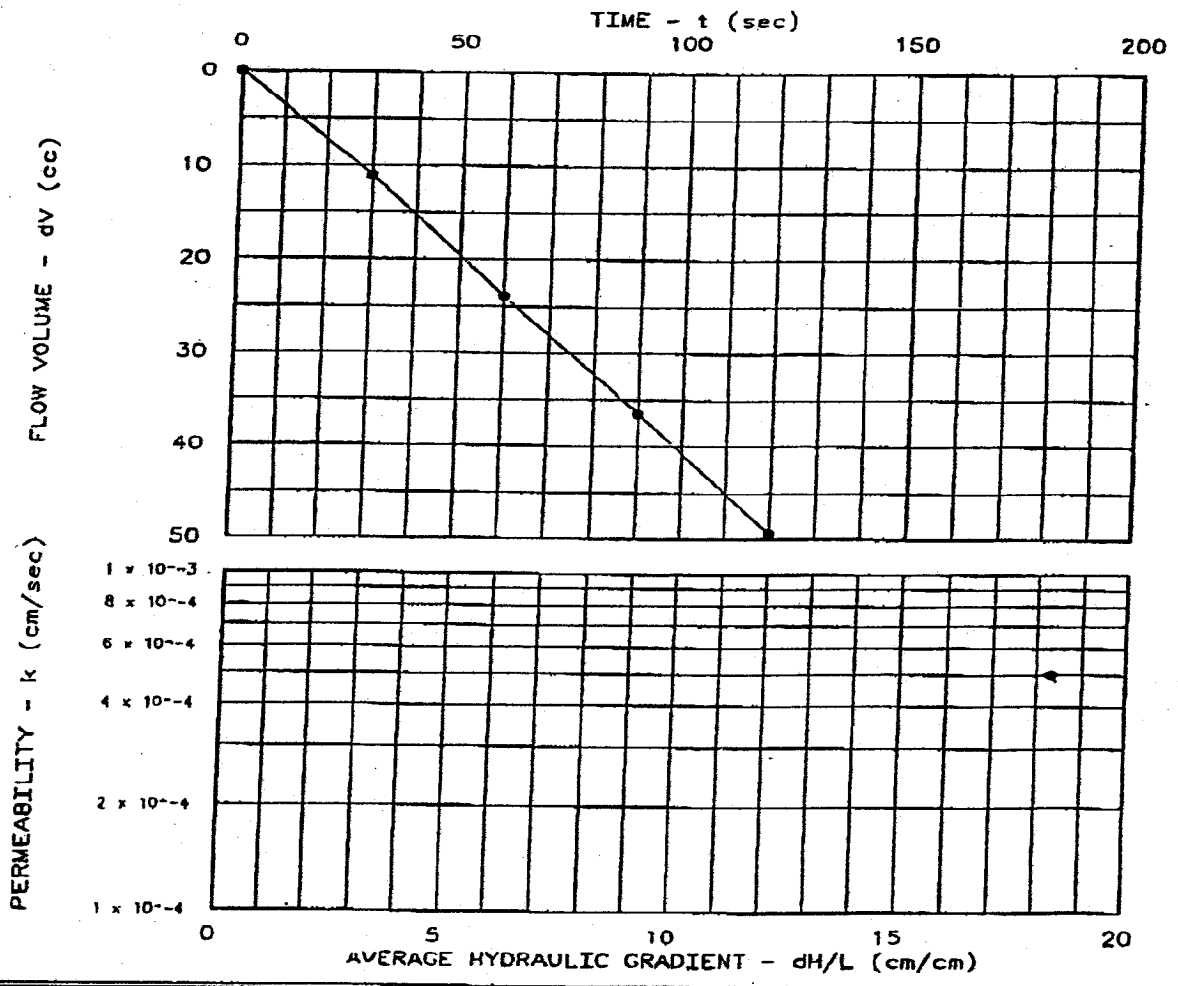
Sample Identification: Hole #3

Visual Description: Gypsum

Remarks:

Maximum Dry Density (pcf):
Optimum Moisture Content (%):

Percent Compaction:
Permeameter type: Flexible Wall
Sample type: Shelby Tube



Project: TVA Kingston Fossil Plant - CUF Gypsum	Project No.: 3043041009
Location:	File No.: As# 2651
Date: 05-04-04	Lab No.: 6226
PERMEABILITY TEST REPORT	Tested by: JA
	Checked by: MH
	Test: CH - Constant head

HAB

PERMEABILITY TEST REPORT

TEST DATA:

Specimen Height (cm): 5.05
Specimen Diameter (cm): 7.33
Dry Unit Weight (pcf): 65.6
Moisture Before Test (%): 34.3
Moisture After Test (%): 51.1
Run Number: 1 ● 2 ▲
Cell Pressure (psi): 57.0
Test Pressure(psi): 52.0
Back Pressure(psi): 50.8
Diff. Head (psi): 1.2
Flow Rate (cc/sec): 4.93 x 10--1
Perm. (cm/sec): 6.65 x 10--4

SAMPLE DATA:

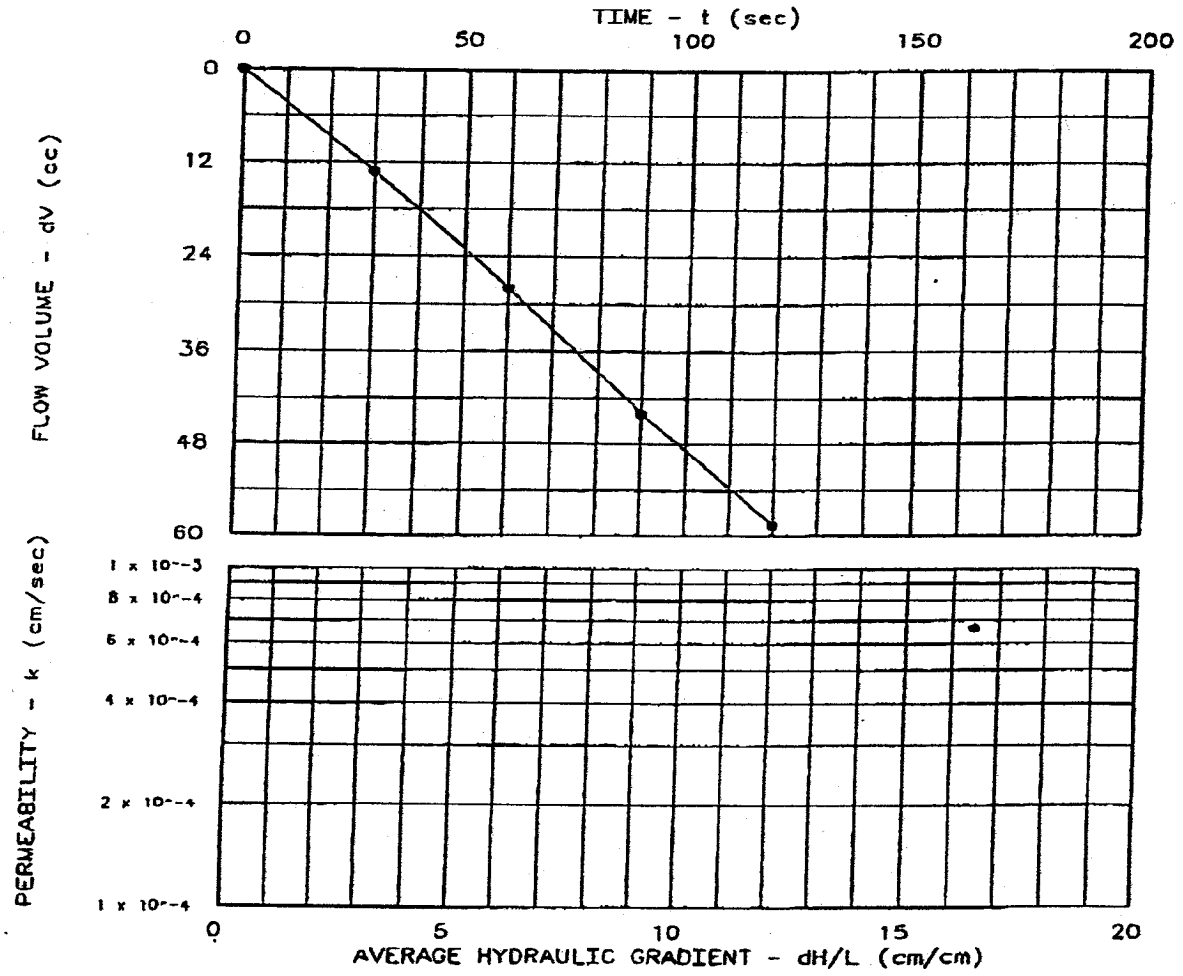
Sample Identification: Hole #5-A

Visual Description: Gypsum

Remarks:

Maximum Dry Density (pcf):
Optimum Moisture Content (%):

Percent Compaction:
Permeameter type: Flexible Wall
Sample type: Shelby Tube



Project: TVA Kingston Fossil Plant - CUF Gypsum	Project No.: 3043041009
Location:	File No.: As# 2651
Date: 05-04-04	Lab No.: 6226
PERMEABILITY TEST REPORT	Tested by: JA
	Checked by: MH
	Test: CH - Constant head

HAB

HYDRAULIC CONDUCTIVITY

LAW ENGINEERING

Project No.	*5810860101*	Tested By	*HEJ*
Project Name	*TVA -Widows Creek*	Test Date	*10/09/95*
Boring No.	*Scrubber Gypsum*	Reviewed By	*RLB*
Sample No.	*Bag*	Review Date	*10/19/95*
Sample Depth			
Sample Description	*Gypsum*		

ASTM D5084 - Falling Head

Sample Type:	*Bag*
Sample Orientation:	*Vertical*
Initial Water Content, %:	*22.2*
Wet Unit Weight, pcf:	*106.5*
Dry Unit Weight, pcf:	*87.2*
Compaction, %:	*94.7*
Hydraulic Conductivity, cm/sec. @20 °C:	***3.9E-04***

PERMEABILITY TEST - FALLING HEAD
(ASTM D5084 - 90)

LAW ENGINEERING

Job Number 5810860101
Project Name TVA -Widows Creek
Boring No. Scrubber Gypsum
Sample No. Bag
Sample Depth
Sample Description Gypsum

Tested By HEJ
Test Date 10/09/95
Reviewed By RLB
Review Date 10/19/95

Sample Data

Length, in		Diameter, in		Pan No.	AB-30
Location 1	6.000	Location 1	2.830	Dry Soil+Pan, grams	947.13
Location 2	6.000	Location 2	2.830	Pan Weight, grams	83.66
Location3	6.000	Location 3	2.830		
Average	6.000	Average	2.830	Moisture Content, %	22.2
		Wet Soil + Tare, grams	1054.96	Wet Unit Wt, pcf	106.5
		Tare Weight, grams	0.00	Dry Unit Wt, pcf	87.2

Chamber Pressure, psi 49
Back Pressure, psi 35
Confining Pressure, psi 14

Date Start	Date Finish	Time Start	Time Finish	Time (sec)	Division Start	Division Finish	H0 (cm)	Hf (cm)	k cm/sec	Temp (°C)	k cm/sec at 20 °C
				242	50.0	0.0	93.94	43.94	4.0E-04	21	3.9E-04
				242	50.0	0.0	93.94	43.94	4.0E-04	21	3.9E-04
				243	50.0	0.0	93.94	43.94	4.0E-04	21	3.9E-04

No. of Tria	Sample Type	Max. Densit (pcf)	Compaction %	Sample Orientation
3	Bag	92	94.7	Vertical

Avg. k at 20 °C 3.9E-04 cm/sec

a = area of burette in cm²
L = length of sample in cm
A = area of sample in cm²

H0 = initial head in cm
Hf = final head in cm
t = time in seconds

a = 0.34 cm²
A = 40.582 cm²
L = 15.24 cm

PERMEABILITY TEST - FALLING HEAD
(ASTM D5084 - 90)

LAW ENGINEERING

Job Number 5810860101
Project Name TVA-Paradise
Boring No. Scrubber Gypsum
Sample No. Bag
Sample Depth
Sample Description Gypsum

Tested By HEJ
Test Date 10/17/95
Reviewed By RLB
Review Date 10/19/95

Sample Data

Length, in		Diameter, in		Pan No.	T-19
Location 1	6.000	Location 1	2.830	Dry Soil+Pan, grams	820.30
Location 2	6.000	Location 2	2.830	Pan Weight, grams	50.64
Location3	6.000	Location 3	2.830		
Average	6.000	Average	2.830	Moisture Content, %	37.1
		Wet Soil + Tare, grams	1055.51	Wet Unit Wt, pcf	106.5
		Tare Weight, grams	0.00	Dry Unit Wt, pcf	77.7

Chamber Pressure, psi 44
Back Pressure, psi 30
Confining Pressure, psi 14

Date Start	Date Finish	Time Start	Time Finish	Time (sec)	Division Start	Division Finish	H0 (cm)	Hf (cm)	k cm/sec	Temp (°C)	k cm/sec at 20 °C
				452	0.0	22.0	127.11	105.11	1.6E-04	21	1.5E-04
				455	0.0	22.0	127.11	105.11	1.6E-04	21	1.5E-04
				453	0.0	22.0	127.11	105.11	1.6E-04	21	1.5E-04

No. of Tria	Sample Type	Max. Densit (pcf)	Compaction %	Sample Orientation
3	Bag	86	90.7	Vertical

Avg. k at 20 °C 1.5E-04 cm/sec

a = area of burette in cm²
L = length of sample in cm
A = area of sample in cm²

H0 = initial head in cm
Hf = final head in cm
t = time in seconds

a = 1.00 cm²
A = 40.582 cm²
L = 15.24 cm

HYDRAULIC CONDUCTIVITY

LAW ENGINEERING

Project No.	*5810860101*	Tested By	*HEJ*
Project Name	*TVA-Paradise*	Test Date	*10/17/95*
Boring No.	*Scrubber Gypsum*	Reviewed By	*RLB*
Sample No.	*Bag*	Review Date	*10/19/95*
Sample Depth			
Sample Description	*Gypsum*		

ASTM D5084 - Falling Head

Sample Type:	*Bag*
Sample Orientation:	*Vertical*
Initial Water Content, %:	*37.1*
Wet Unit Weight, pcf:	*106.5*
Dry Unit Weight, pcf:	*77.7*
Compaction, %:	*90.7*
Hydraulic Conductivity, cm/sec. @20 °C:	***1.5E-04***