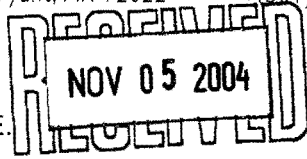


Laura



219 Brown Lane Bryant, AR 72022 (501) 847-7077 (501) 847-7943 fax

November 5, 2004



Mr. Henry Insua, P.E.
Water Division
Arkansas Department of Environmental Quality
P.O. Box 8913
Little Rock, AR 72219-8913

Re: Proposed Dewatering Area – El Dorado Chemical Company (EDCC)
GBM^c No. 2042-99-010

Dear Mr. Insua:

Pursuant to your request, EDCC has conducted an investigation to determine the soil permeability coefficient and estimate the amount of infiltration from the proposed dewatering activities over the 10-acre area adjacent to Lake Killdeer.

Six (6) soil samples were collected from the proposed dewatering area in shelly tubes at the locations shown on the attached aerial photograph. At each sampling location, the topsoil was removed (approximately 3 to 6 inches) with a backhoe and a shelly tube was pushed into the soil approximately 2 feet. The shelly tube was then removed with an undisturbed core sample inside. The samples were then transported to Anderson Engineering to perform permeability analyses on the soil. The results of the analyses are attached and summarized in Table 1 below.

Table 1. EDCC Dewatering Area Permeability Results.

Sample Location	Permeability (cm/s)
070	5.56 E-07
071	1.84 E-07
072	7.54 E-06
073	2.26 E-06
074	5.23 E-08
075	2.18 E-08
Average	1.77 E-06

Also attached are calculations estimating the volume of infiltration at the dewatering area for one year. The calculations estimate infiltration during dredging operations and infiltration of storm water for the remainder of the year while the dredged solids dewater.

We greatly appreciate the opportunity to provide this information and your prompt attention to this matter. If you have any questions, do not hesitate to contact me or Randall Whitmore, El Dorado Chemical Company.

Sincerely,
GBM^c & ASSOCIATES

Chuck Campbell, P.E., REM
Principal/Senior Engineer

Attachments

CC: Randall Whitmore
John Carver

070

075

074

071

072

073

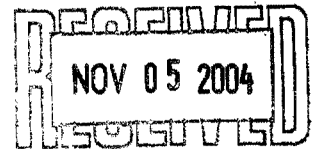
MW-EDC-16

EE ER

070

EE ER

ANDERSON ENGINEERING CONSULTANTS, INC.
10205 ROCKWOOD ROAD, LITTLE ROCK, ARKANSAS 72204



**COEFFICIENT OF PERMEABILITY
(CONSTANT HEAD)
ASTM D 5084 - FLEXIBLE WALL**

Project:	EL DORADO CHEMICAL - LAKE LEE SOLIDS DEWATERING AREA	Project No.:	9031B
Location:	EL DORADO, ARKANSAS	Date:	10/26/04
Sample No.:	070	Sample Depth:	N/A
Soil Description:	BROWN & LT. GRAY CLAY	Station No.:	N/A
Elevation:	N/A	Lift No.:	N/A

PHYSICAL PROPERTIES

Diameter, Inch.....	2.800	Diameter, Cm.....	7.11
Height, Inch.....	2.800	Height, Cm.....	7.11
Area, Square Inch.....	6.16	Area Sq. Cm.....	39.73
Volume, Cubic Inch.....	17.24	Volume, Cubic Cm.....	282.58
Initial Wt., Gram.....	538.4	Est. SP. GR.....	2.67
Water Content.....	26.6	Void Ratio.....	0.7727
Wet Unit Wt., PCF.....	119.0	Water Head:	
Dry Unit Wt., PCF.....	94.0	Cm.....	140.68
		Ft.....	4.62

TIME, MIN (T)	WATER DEG.,C	TEMP. ++ (RT)	HEAD PRESS psi (h)	FLOW ML (Q)	K20 CM./SEC
471	20.0	1.000	2.0	12.20	5.56E-07

ANDERSON ENGINEERING CONSULTANTS, INC.
 10205 ROCKWOOD ROAD, LITTLE ROCK, ARKANSAS 72204

**COEFFICIENT OF PERMEABILITY
 (CONSTANT HEAD)
 ASTM D 5084 - FLEXIBLE WALL**

Project:	EL DORADO CHEMICAL - LAKE LEE SOLIDS DEWATERING AREA	Project No.:	9031B
Location:	EL DORADO, ARKANSAS	Date:	10/26/04
Sample No.:	071	Sample Depth:	N/A
Soil Description:	LT. BROWN & GRAY SANDY CLAY	Station No.:	N/A
Elevation:	N/A	Lift No.:	N/A

PHYSICAL PROPERTIES

Diameter, Inch.....	2.800	Diameter, Cm.....	7.11
Height, Inch.....	2.800	Height, Cm.....	7.11
Area, Square Inch.....	6.16	Area Sq. Cm.....	39.73
Volume, Cubic Inch.....	17.24	Volume, Cubic Cm.....	282.58
Initial Wt., Gram.....	580.3	Est. SP. GR.....	2.67
Water Content.....	17.0	Void Ratio.....	0.5199
Wet Unit Wt., PCF.....	128.2	Water Head:	
Dry Unit Wt., PCF.....	109.6	Cm.....	140.68
		Ft.....	4.62

TIME, MIN (T)	WATER DEG.,C	TEMP. ++ (RT)	HEAD PRESS psi (h)	FLOW ML (Q)	K20 CM./SEC
468	20.0	1.000	2.0	4.00	1.84E-07

ANDERSON ENGINEERING CONSULTANTS, INC.
10205 ROCKWOOD ROAD, LITTLE ROCK, ARKANSAS 72204

**COEFFICIENT OF PERMEABILITY
(CONSTANT HEAD)
ASTM D 5084 - FLEXIBLE WALL**

Project:	EL DORADO CHEMICAL - LAKE LEE SOLIDS DEWATERING AREA	Project No.:	9031B
Location:	EL DORADO, ARKANSAS	Date:	10/26/04
Sample No.:	072	Sample Depth:	N/A
Soil Description:	LT. BROWN SANDY SILT	Station No.:	N/A
Elevation:	N/A	Lift No.:	N/A

PHYSICAL PROPERTIES

Diameter, Inch.....	2.800	Diameter, Cm.....	7.11
Height, Inch.....	2.800	Height, Cm.....	7.11
Area, Square Inch.....	6.16	Area Sq. Cm.....	39.73
Volume, Cubic Inch.....	17.24	Volume, Cubic Cm.....	282.58
Initial Wt., Gram.....	512.2	Est. SP. GR.....	2.67
Water Content.....	24.0	Void Ratio.....	0.8249
Wet Unit Wt., PCF.....	113.2	Water Head:	
Dry Unit Wt., PCF.....	91.3	Cm.....	140.68
		Ft.....	4.62

TIME, MIN (T)	WATER DEG.,C	TEMP. ++ (RT)	HEAD PRESS psi (h)	FLOW ML (Q)	K20 CM./SEC
45	20.0	1.000	2.0	15.80	7.54E-06

ANDERSON ENGINEERING CONSULTANTS, INC.
 10205 ROCKWOOD ROAD, LITTLE ROCK, ARKANSAS 72204

**COEFFICIENT OF PERMEABILITY
 (CONSTANT HEAD)
 ASTM D 5084 - FLEXIBLE WALL**

Project:	EL DORADO CHEMICAL - LAKE LEE SOLIDS DEWATERING AREA	Project No.:	9031B
Location:	EL DORADO, ARKANSAS	Date:	10/26/04
Sample No.:	073	Sample Depth:	N/A
Soil Description:	LT. BROWN, BROWN & GRAY SANDY SILT	Station No.:	N/A
Elevation:	N/A	Lift No.:	N/A

PHYSICAL PROPERTIES

Diameter, Inch.....	2.800	Diameter, Cm.....	7.11
Height, Inch.....	2.800	Height, Cm.....	7.11
Area, Square Inch.....	6.16	Area Sq. Cm.....	39.73
Volume, Cubic Inch.....	17.24	Volume, Cubic Cm.....	282.58
Initial Wt., Gram.....	526.7	Est. SP. GR.....	2.67
Water Content.....	19.4	Void Ratio.....	0.7087
Wet Unit Wt., PCF.....	116.4	Water Head:	
Dry Unit Wt., PCF.....	97.5	Cm.....	140.68
		Ft.....	4.62

TIME, MIN (T)	WATER DEG.,C	TEMP. ++ (RT)	HEAD PRESS psi (h)	FLOW ML (Q)	K20 CM./SEC
172	20.0	1.000	2.0	18.10	2.26E-06

ANDERSON ENGINEERING CONSULTANTS, INC.
 10205 ROCKWOOD ROAD, LITTLE ROCK, ARKANSAS 72204

**COEFFICIENT OF PERMEABILITY
 (CONSTANT HEAD)
 ASTM D 5084 - FLEXIBLE WALL**

Project:	EL DORADO CHEMICAL - LAKE LEE SOLIDS DEWATERING AREA	Project No.:	9031B
Location:	EL DORADO, ARKANSAS	Date:	10/26/04
Sample No.:	074	Sample Depth:	N/A
Soil Description:	LT. GRAY & BROWN CLAY	Station No.:	N/A
Elevation:	N/A	Lift No.:	N/A

PHYSICAL PROPERTIES

Diameter, Inch.....	2.800	Diameter, Cm.....	7.11
Height, Inch.....	2.800	Height, Cm.....	7.11
Area, Square Inch.....	6.16	Area Sq. Cm.....	39.73
Volume, Cubic Inch.....	17.24	Volume, Cubic Cm.....	282.58
Initial Wt., Gram.....	534.1	Est. SP. GR.....	2.67
Water Content.....	27.3	Void Ratio.....	0.7974
Wet Unit Wt., PCF.....	118.0	Water Head:	
Dry Unit Wt., PCF.....	92.7	Cm.....	140.68
		Ft.....	4.62

TIME, MIN (T)	WATER DEG.,C	TEMP. ++ (RT)	HEAD PRESS psi (h)	FLOW ML (Q)	K20 CM./SEC
411	20.0	1.000	2.0	1.00	5.23E-08

ANDERSON ENGINEERING CONSULTANTS, INC.
10205 ROCKWOOD ROAD, LITTLE ROCK, ARKANSAS 72204

**COEFFICIENT OF PERMEABILITY
(CONSTANT HEAD)
ASTM D 5084 - FLEXIBLE WALL**

Project:	EL DORADO CHEMICAL - LAKE LEE SOLIDS DEWATERING AREA	Project No.:	9031B
Location:	EL DORADO, ARKANSAS	Date:	10/26/04
Sample No.:	075	Sample Depth:	N/A
Soil Description:	BROWN & LT. GRAY CLAY	Station No.:	N/A
Elevation:	N/A	Lift No.:	N/A

PHYSICAL PROPERTIES

Diameter, Inch.....	2.800	Diameter, Cm.....	7.11
Height, Inch.....	2.800	Height, Cm.....	7.11
Area, Square Inch.....	6.16	Area Sq. Cm.....	39.73
Volume, Cubic Inch.....	17.24	Volume, Cubic Cm.....	282.58
Initial Wt., Gram.....	529.2	Est. SP. GR.....	2.67
Water Content.....	27.8	Void Ratio.....	0.8209
Wet Unit Wt., PCF.....	116.9	Water Head:	
Dry Unit Wt., PCF.....	91.5	Cm.....	140.68
		Ft.....	4.62

TIME, MIN (T)	WATER DEG.,C	TEMP. ++ (RT)	HEAD PRESS psi (h)	FLOW ML (Q)	K20 CM./SEC
492	20.0	1.000	2.0	0.50	2.18E-08

GBM^c & Associates

219 Brown Lane
Bryant, AR 72022

Sheet No. 1 of 2
Date RMS
By 11/5/04
Chkd AAS Date 11/5/04
Project No. 2042-99-010

SUBJECT: EDCC Dewatering Area Infiltration

Equations and Definition of variables:

Soil thickness = x

Pressure head = ψ

Depth of water = w

Elevation head = $z = x + w$

Total head = $h = z + \psi$

Hydraulic gradient = $i = [h_2 - h_1]/x$

Permeability = K

Specific discharge = $q = K i$

During Dredging:

Assumptions:

- The mixture will be held on the ground for 30 days.
- The height of the water on the soil is an average over the 30 day period (2 ft max)
- The head at the bottom will be assumed to be zero to estimate maximum infiltration

Soil thickness: = 1 ft

Depth of water: = 1 ft

Total head: = 1 ft + 1 ft
= 2 ft

Head at 1 ft below surface: = 0 ft

Hydraulic gradient: = (0 ft - 2 ft) / 1 ft
= -2

Permeability: = 1.77×10^{-6} cm/s x ft/30.48 cm
= 5.8×10^{-8} ft/s (average permeability from lab results)

Specific discharge: = 5.8×10^{-8} ft/s x -2
= -1.16×10^{-7} ft/s (negative value indicates downward direction)

Area of application: = 10 acres x 43,560 ft²/acre
= 435,600 ft²

Volumetric flow: = 1.16×10^{-7} ft/s x 435,600 ft² x 7.48 gal/ft³ x 86,400 s/day
= 32,656 gal/day

Estimated 30-day infiltration: = 32,656 gal/day x 30 day
= 979,680 gal

GBM^c & Associates

219 Brown Lane
Bryant, AR 72022

Sheet No. 2 of 2

Date RMS

By 11/5/04

Chkd AAS Date 11/5/04

Project No. 2042-99-010

SUBJECT: EDCC Dewatering Area Infiltration

After Dredging:

Assumptions:

- Based on 10 years of data, the average number of events greater than 0.1 inch is 72 events/yr.
- The head at the bottom will be assumed to be zero to estimate maximum infiltration.
- The 10-year average amount of rainfall for El Dorado is 52 in/yr.

Soil thickness: = 1 ft

Depth of water: = 52 in/yr x yr/72 x ft/12 in
= 0.06 ft

Total head: = 1 ft + 0.06 ft
= 1.06 ft

Head at 1 foot below surface: = 0 ft

Hydraulic gradient: = (0 ft - 1.06 ft) / 1 ft
= -1.06

Permeability: = 1.77×10^{-6} cm/s x ft/30.48 cm
= 5.8×10^{-8} ft/s (average permeability from lab results)

Specific discharge: = 5.8×10^{-8} ft/s x -1.06
= -6.15×10^{-8} ft/s (negative value indicates downward direction)

Area of application: = 10 acres x 43,560 ft²/acre
= 435,600 ft²

Volumetric flow: = 6.15×10^{-8} ft/s x 435,600 ft² x 7.48 gal/ft³ x 86,400 s/day
= 17,313 gal/day

Estimated infiltration after dredging is complete: = 17,313 gal/day x 72 day
= 1,246,536 gal

Total Infiltration Volume:

The total infiltration volume will be the summation of the infiltration from dredging and after dredging.

Total Infiltration Volume: = 979,680 gal + 1,246,536 gal
= 2,226,216 gal