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DETERMINATION OF HYDRAULIC CONDUCTIVITY OF TILE AND UNSATURATED GREAT MIAMI AQUIFER UNITS (USED AS A REFERENCE IN OU2 AND OU1 RI REPORTS)

11/07/90

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MEMORANDUM

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INTERNATIONAL TECHNOLOGY CORPORATION

Memorandum

To: DISTRIBUTION

Date: November 7, 1990

SHD

From: Sirous H. Djafari - Pittsburgh

Subject: DETERMINATION OF HYDRAULIC CONDUCTIVITY OF TILL AND UNSATURATED GREAT MIAMI AQUIFER UNITS

On November 6, 1990, the following individuals met to determine how the hydraulic conductivity of till (grey clay portion of the glacial overburden) and unsaturated Great Miami aquifer units will be determined: Harry Windecker, Bob Galbraith, Gary Gaillot, Kevin Jones, Alauddin Khan and Sirous Djafari.

During the meeting, various ranges of hydraulic conductivity were discussed and the final conclusion was that the hydraulic conductivity of the nearest well for each waste unit will be selected and that will constitute the horizontal hydraulic conductivity. The hydraulic conductivity values to be used for each operable unit are shown on the attached table.

The vertical hydraulic conductivity will be calculated by dividing the horizontal hydraulic conduct by 20. The vertical hydraulic conductivity of the unsaturated portion of the Great Miami Aquifer will be set to 45 feet per day (which is 1/10 of the horizontal permeability).

The new numbers should be used to recalculate all operable unit concentrations at 100 and 500 years.

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DISTRIBUTION:

Harry Windecker
Bob Galbraith
Gary Gaillot
Kevin Jones
Alauddin Khan

cc: John Razor
John Frazier
All OU Managers

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CALCULATION WORKSHEET

ORIGINATOR Kaushik Khan DATE 11/6/90 SHEET 1 OF 3
CALC. NO. 1 REV. NO. 0 DATE 11/7/90 CHECKED KS
PROJECT DOE/FERNALD TASK NO. 602 23.44
SUBJECT Operable Unit 1; Solute Transport Parameters

Waste Unit	Layer	Thickness (ft)	Hydraulic Conductivity K_H ft/day	K_V ft/day	U ft/day	Dx ft²/day
Pit 1	1	5	0.147	.00735	.0071	.0012
	2	20	450	45.0	0.014	0.00187
Pit 2	1	16	0.147	.00735	.0071	.0012
	2	20	450	45.0	0.014	.00187
Pit 3	1	1	.0071	.000355	.001	.00071
	2	20	450	45.0	0.014	.00187
Pit 4	1	13	.147	.00735	.0071	.0012
	2	20	450	45.0	0.014	.00187
Pit 5	1	1	.051	.00255	.0068	.0012
	2	20	450	45.0	0.014	.00187
Pit 6	1	17	.147	.00735	.0071	.0012
	2	20	450	45.0	.014	.00187
Clear well	1	1	.147	.00735	.0071	.0012
	2	20	450	45.0	.014	.00187
Burn Pit	1	19	.147	.00735	.0071	.0012
	2	20	450	45.0	.014	.00187

For layer 1; $\frac{1}{2b+3} = .042$, $S_y = .06$, $\eta = .34$

For layer 2; $\frac{1}{2b+3} = .09$, $S_y = .25$, $\eta = .39$

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CALCULATION WORKSHEET

ORIGINATOR Alauddin Khan DATE 11/6/90 SHEET 2 OF 3
CALC. NO. 1 REV. NO. 0 DATE 11/7/90 CHECKED KJ
PROJECT DOE/FERNALD TASK NO. 602.23.44
SUBJECT Operable Unit 2: Solute Transport Parameters

Waste Unit	Layer	Thickness (ft)	Hydraulic Conductivity K_H ft/day	K_V ft/day	Seepage Vel. U ft/day	Dispersion coef. D_x ft²/day
Sanitary -	1	15	·071	·00355	·0069	·0012
Landfill	2	35	450	45.0	·014	·00187
Lime Sludge	1	9	·31	·0155	·0073	·00124
Ponds	2	13	450	45.0	·014	·00187
Active Fly Ash Pile	1	24	450	45.0	·014	·00187
Inactive Fly	1	2	·193	·00965	·0072	·00123
Ash Disposal Area	2	31	450	45.0	·014	·00187
Southfield	1	15	450	45.0	·014	·00187

For layer 1: $\frac{1}{26+3} = ·042$, $S_y = ·06$ $\eta = ·34$

For layer 2: $\frac{1}{26+3} = ·09$ $S_y = ·25$ $\eta = ·39$

CALCULATION WORKSHEET

ORIGINATOR Alauddin Khan DATE 11/7/90 SHEET 3 OF 3
CALC. NO. 1 REV. NO. 0 DATE 11/7/90 CHECKED KS
PROJECT DOE/FERNALD TASK NO. 602.23.44
SUBJECT Solute Transport Parameters; Operable Unit 4

Silos	Layers	Thickness (ft)	Hydraulic Conductivity K_H ft/day	K_V ft/day	Seepage U_x ft/day	Dispersion D_x ft²/day
K-65 Silo 1	1	17	.071	.00355	.001	.00071
	2	24	450	45	.014	.00187
K-65 Silo 2	1	17	.071	.00355	.001	.00071
	2	24	450	45.0	.014	.00187
Metal oxide Silo 3	1	25	.071	.00355	.001	.00071
	2	20	450	45.0	.014	.00187
Metaloxide Silo 4	1	25	.071	.00355	.001	.00071
	2	20	450	45.0	.014	.00187

For layer 1; $\frac{1}{2b+3} = .042$, $S_y = 0.06$ $n = .34$

For layer 2; $\frac{1}{2b+3} = .09$; $S_y = 0.25$ $n = 0.39$