

PRILOG 3

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**          HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE          **
**          HELP MODEL VERSION 3.07 (1 November 1997)              **
**          DEVELOPED BY ENVIRONMENTAL LABORATORY                  **
**          USAE WATERWAYS EXPERIMENT STATION                     **
**          FOR USEPA RISK REDUCTION ENGINEERING LABORATORY        **
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PRECIPITATION DATA FILE: C:\WHI\VHELP22\data\P3728.VHP_weather1.dat
TEMPERATURE DATA FILE: C:\WHI\VHELP22\data\P3728.VHP_weather2.dat
SOLAR RADIATION DATA FILE: C:\WHI\VHELP22\data\P3728.VHP_weather3.dat
EVAPOTRANSPIRATION DATA: C:\WHI\VHELP22\data\P3728.VHP_weather4.dat
SOIL AND DESIGN DATA FILE: C:\WHI\VHELP22\data\P3728.VHP\I_388589.inp
OUTPUT DATA FILE: C:\WHI\VHELP22\data\P3728.VHP\O_388589.prt

TIME: 11:58 DATE: 2/10/2006

TITLE: 1 : 3

NOTE: INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER
WERE SPECIFIED BY THE USER.

LAYER 1 -----

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 6
THICKNESS = 100.00 CM
POROSITY = 0.4530 VOL/VOL
FIELD CAPACITY = 0.1900 VOL/VOL
WILTING POINT = 0.0850 VOL/VOL
INITIAL SOIL WATER CONTENT = 0.1900 VOL/VOL
EFFECTIVE SAT. HYD. COND. = 0.720000000000E-03 CM/SEC
NOTE: SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY 5.00
FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.

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LAYER 2

TYPE 2 - LATERAL DRAINAGE LAYER

MATERIAL TEXTURE NUMBER 34

THICKNESS	=	0.60	CM
POROSITY	=	0.8500	VOL/VOL
FIELD CAPACITY	=	0.0100	VOL/VOL
WILTING POINT	=	0.0050	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0100	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	33.0000000000	CM/SEC
SLOPE	=	20.00	PERCENT
DRAINAGE LENGTH	=	30.0	METERS

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TYPE 3 - BARRIER SOIL LINER

MATERIAL TEXTURE NUMBER 17

THICKNESS	=	2.00	CM
POROSITY	=	0.7500	VOL/VOL
FIELD CAPACITY	=	0.7470	VOL/VOL
WILTING POINT	=	0.4000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.7500	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.300000000000E-08	CM/SEC

LAYER 4

TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 18

THICKNESS	=	3800.00	CM
POROSITY	=	0.6710	VOL/VOL
FIELD CAPACITY	=	0.2920	VOL/VOL
WILTING POINT	=	0.0770	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.3100	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000224000E-02	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

SCS RUNOFF CURVE NUMBER	=	73.29	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	1.0000	HECTARES
EVAPORATIVE ZONE DEPTH	=	25.0	CM
INITIAL WATER IN EVAPORATIVE ZONE	=	4.750	CM
UPPER LIMIT OF EVAPORATIVE STORAGE	=	11.325	CM
LOWER LIMIT OF EVAPORATIVE STORAGE	=	2.125	CM
INITIAL SNOW WATER	=	0.000	CM
INITIAL WATER IN LAYER MATERIALS	=	1198.506	CM
TOTAL INITIAL WATER	=	1198.506	CM
TOTAL SUBSURFACE INFLOW	=	0.00	MM/YR

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EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
SPLIT/KASTEL FORM

STATION LATITUDE	=	43.53 DEGREES
MAXIMUM LEAF AREA INDEX	=	5.00
START OF GROWING SEASON (JULIAN DATE)	=	74
END OF GROWING SEASON (JULIAN DATE)	=	319
EVAPORATIVE ZONE DEPTH	=	25.0 CM
AVERAGE ANNUAL WIND SPEED	=	11.26 KPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	72.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	65.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	61.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	76.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SPLIT/KASTEL FORM

NORMAL MEAN MONTHLY PRECIPITATION (MM)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
82.1	80.0	94.8	70.1	79.0	50.5
20.0	50.2	52.5	79.1	89.0	99.8

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SPLIT/KASTEL FORM

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES CELSIUS)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
7.3	7.9	10.2	13.1	17.6	21.3
24.3	24.2	20.8	16.8	11.7	8.9

HEAD #1: AVERAGE HEAD ON TOP OF LAYER 3
DRAIN #1: LATERAL DRAINAGE FROM LAYER 2 (RECIRCULATION AND COLLECTION)
LEAK #1: PERCOLATION OR LEAKAGE THROUGH LAYER 3
LEAK #2: PERCOLATION OR LEAKAGE THROUGH LAYER 4

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AVERAGE MONTHLY VALUES (MM) FOR YEARS 1 THROUGH 20

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
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PRECIPITATION						

TOTALS	91.94 21.86	75.85 43.90	102.40 50.22	67.88 70.36	67.34 79.52	49.46 87.70
STD. DEVIATIONS	45.26 19.47	32.70 39.46	53.08 32.08	45.18 37.11	43.66 37.14	25.03 54.96
RUNOFF						

TOTALS	0.168 0.000	0.064 0.063	0.097 0.129	0.103 0.092	0.068 0.219	0.004 0.312
STD. DEVIATIONS	0.510 0.000	0.288 0.249	0.379 0.384	0.462 0.362	0.217 0.563	0.019 0.713
EVAPOTRANSPIRATION						

TOTALS	27.551 23.049	38.366 33.033	60.011 34.901	61.551 34.230	52.170 21.703	43.931 19.098
STD. DEVIATIONS	2.836 15.595	3.345 25.776	11.539 18.883	26.149 17.453	25.568 4.436	17.495 3.106
LATERAL DRAINAGE COLLECTED FROM LAYER 2						

TOTALS	61.1544 8.3568	50.6217 7.3563	46.2787 7.8920	31.4379 11.1873	17.3382 38.9032	14.3389 61.7362
STD. DEVIATIONS	42.0024 2.7417	28.2876 3.5405	34.9850 6.6324	20.5589 8.5255	10.2102 27.0538	11.8427 44.4724
PERCOLATION/LEAKAGE THROUGH LAYER 3						

TOTALS	0.0270 0.0312	0.0257 0.0288	0.0285 0.0276	0.0294 0.0252	0.0291 0.0262	0.0296 0.0286
STD. DEVIATIONS	0.0068 0.0017	0.0041 0.0038	0.0031 0.0044	0.0029 0.0062	0.0030 0.0033	0.0025 0.0035
PERCOLATION/LEAKAGE THROUGH LAYER 4						

TOTALS	5.3524 4.0146	5.0165 1.5268	5.2262 0.0304	4.6576 0.0304	4.5645 0.0000	4.0924 0.0304
STD. DEVIATIONS	23.7938 17.8111	22.4346 6.6860	23.0865 0.1361	20.8292 0.1361	20.1276 0.0000	18.3019 0.1361

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AVERAGES OF MONTHLY AVERAGED DAILY HEADS (CM)

DAILY AVERAGE HEAD ON TOP OF LAYER 3

AVERAGES	0.0007	0.0006	0.0005	0.0004	0.0002	0.0002
	0.0001	0.0001	0.0001	0.0001	0.0005	0.0007
STD. DEVIATIONS	0.0005	0.0003	0.0004	0.0002	0.0001	0.0001
	0.0000	0.0000	0.0001	0.0001	0.0003	0.0005

AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 20

	MM		CU. METERS	PERCENT
PRECIPITATION	808.41	(155.888)	8084.1	100.00
RUNOFF	1.321	(1.4791)	13.21	0.163
EVAPOTRANSPIRATION	449.594	(60.8503)	4495.94	55.615
LATERAL DRAINAGE COLLECTED FROM LAYER 2	356.60170	(102.81910)	3566.017	44.11176
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.33683	(0.01547)	3.368	0.04167
AVERAGE HEAD ON TOP OF LAYER 3	0.003	(0.001)		
PERCOLATION/LEAKAGE THROUGH LAYER 4	34.54231	(153.04568)	345.423	4.27290
CHANGE IN WATER STORAGE	-33.654	(5.9339)	-336.54	-4.163

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PEAK DAILY VALUES FOR YEARS 1 THROUGH 20		
	(MM)	(CU. METERS)
PRECIPITATION	66.60	666.00000
RUNOFF	2.431	24.31024
DRAINAGE COLLECTED FROM LAYER 2	35.22132	352.21315
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.002172	0.02172
AVERAGE HEAD ON TOP OF LAYER 3	0.122	
MAXIMUM HEAD ON TOP OF LAYER 3	0.193	
LOCATION OF MAXIMUM HEAD IN LAYER 2 (DISTANCE FROM DRAIN)	0.0 METERS	
PERCOLATION/LEAKAGE THROUGH LAYER 4	3.891376	38.91376
SNOW WATER	23.17	231.6890
MAXIMUM VEG. SOIL WATER (VOL/VOL)		0.3335
MINIMUM VEG. SOIL WATER (VOL/VOL)		0.0850

FINAL WATER STORAGE AT END OF YEAR 20		
LAYER	(CM)	(VOL/VOL)
1	20.1021	0.2010
2	0.0063	0.0106
3	1.5000	0.7500
4	1109.5890	0.2920
SNOW WATER	0.000	

