

PRILOG 9

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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_389135.inp
OUTPUT DATA FILE: C:\WHI\VHELP22\data\P3728.VHP\O_389135.prt

TIME: 13:42 DATE: 2/10/2006

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TITLE: Zatvoreno 1+2_5%

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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 20

THICKNESS	=	0.50	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.	=	10.0000000000	CM/SEC
SLOPE	=	5.00	PERCENT
DRAINAGE LENGTH	=	60.0	METERS

LAYER 3

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	=	3500.00	CM
POROSITY	=	0.6710	VOL/VOL
FIELD CAPACITY	=	0.2920	VOL/VOL
WILTING POINT	=	0.0770	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2953	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000224000E-02	CM/SEC

LAYER 5

TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 5

THICKNESS	=	60.00	CM
POROSITY	=	0.4570	VOL/VOL
FIELD CAPACITY	=	0.1310	VOL/VOL
WILTING POINT	=	0.0580	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1310	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000000000E-02	CM/SEC

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LAYER 6

TYPE 2 - LATERAL DRAINAGE LAYER

MATERIAL TEXTURE NUMBER 21

THICKNESS	=	50.00	CM
POROSITY	=	0.3970	VOL/VOL
FIELD CAPACITY	=	0.0320	VOL/VOL
WILTING POINT	=	0.0130	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0300	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.300000000000	CM/SEC
SLOPE	=	3.00	PERCENT
DRAINAGE LENGTH	=	120.0	METERS

LAYER 7

TYPE 4 - FLEXIBLE MEMBRANE LINER

MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.10	CM
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.200000000000E-12	CM/SEC
FML PINHOLE DENSITY	=	7.50	HOLES/HECTARE
FML INSTALLATION DEFECTS	=	7.50	HOLES/HECTARE
FML PLACEMENT QUALITY	=	4 - POOR	

LAYER 8

TYPE 3 - BARRIER SOIL LINER

MATERIAL TEXTURE NUMBER 28

THICKNESS	=	10.00	CM
POROSITY	=	0.4520	VOL/VOL
FIELD CAPACITY	=	0.4110	VOL/VOL
WILTING POINT	=	0.3110	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4520	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.120000000000E-05	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT
SOIL DATA BASE USING SOIL TEXTURE # 6 WITH A
FAIR STAND OF GRASS, A SURFACE SLOPE OF 5. %
AND A SLOPE LENGTH OF 60. METERS.

SCS RUNOFF CURVE NUMBER	=	70.77	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT

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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	=	1067.935	CM
TOTAL INITIAL WATER	=	1067.935	CM
TOTAL SUBSURFACE INFLOW	=	0.00	MM/YR

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

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SPLIT/KASTEL FORM
AND STATION LATITUDE = 43.86 DEGREES

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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
HEAD #2: AVERAGE HEAD ON TOP OF LAYER 7
DRAIN #2: LATERAL DRAINAGE FROM LAYER 6 (RECIRCULATION AND COLLECTION)
LEAK #2: PERCOLATION OR LEAKAGE THROUGH LAYER 8

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	0.069 0.000	0.024 0.018	0.035 0.050	0.042 0.040	0.015 0.101	0.000 0.067
STD. DEVIATIONS	0.252 0.000	0.110 0.082	0.157 0.153	0.190 0.180	0.056 0.310	0.000 0.159
EVAPOTRANSPIRATION						

TOTALS	27.942 26.661	38.882 36.620	61.038 38.499	66.610 35.889	59.240 21.508	47.722 19.365
STD. DEVIATIONS	2.013 18.741	2.670 27.964	11.798 22.159	25.857 17.495	28.035 4.187	20.127 2.516
LATERAL DRAINAGE COLLECTED FROM LAYER 2						

TOTALS	60.9619 5.5122	50.5116 3.2914	45.8936 3.2841	29.4959 6.4309	14.2374 34.7938	10.6314 61.5474
STD. DEVIATIONS	42.6995 2.4672	28.2917 2.6758	34.6649 4.6680	19.8258 6.5761	9.3202 29.1322	12.2568 45.6111
PERCOLATION/LEAKAGE THROUGH LAYER 3						

TOTALS	0.0669 0.0788	0.0651 0.0538	0.0731 0.0413	0.0744 0.0443	0.0776 0.0600	0.0765 0.0709
STD. DEVIATIONS	0.0185 0.0056	0.0154 0.0275	0.0090 0.0316	0.0054 0.0300	0.0055 0.0184	0.0047 0.0174
LATERAL DRAINAGE COLLECTED FROM LAYER 6						

TOTALS	0.1571 0.2679	2.4482 0.2580	1.2842 0.2310	0.5241 0.2105	0.3798 0.1732	0.2986 0.1643
STD. DEVIATIONS	0.2384 0.5694	10.3090 0.4522	5.0536 0.3629	1.6979 0.3223	1.0503 0.2746	0.7182 0.2612

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PERCOLATION/LEAKAGE THROUGH LAYER 8

TOTALS	0.0002	0.0020	0.0012	0.0006	0.0004	0.0004
	0.0003	0.0003	0.0003	0.0003	0.0002	0.0002
STD. DEVIATIONS	0.0003	0.0081	0.0044	0.0016	0.0011	0.0007
	0.0006	0.0005	0.0004	0.0004	0.0003	0.0003

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (CM)

DAILY AVERAGE HEAD ON TOP OF LAYER 3

AVERAGES	0.0137	0.0124	0.0103	0.0068	0.0032	0.0025
	0.0012	0.0007	0.0008	0.0014	0.0081	0.0138
STD. DEVIATIONS	0.0096	0.0069	0.0078	0.0046	0.0021	0.0028
	0.0006	0.0006	0.0011	0.0015	0.0068	0.0102

DAILY AVERAGE HEAD ON TOP OF LAYER 7

AVERAGES	0.0039	0.0675	0.0320	0.0135	0.0095	0.0077
	0.0067	0.0064	0.0059	0.0052	0.0045	0.0041
STD. DEVIATIONS	0.0059	0.2844	0.1259	0.0437	0.0262	0.0185
	0.0142	0.0113	0.0093	0.0080	0.0071	0.0065

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AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 20				
	MM		CU. METERS	PERCENT
PRECIPITATION	808.41	(155.888)	8084.1	100.00
RUNOFF	0.463	(0.5808)	4.63	0.057
EVAPOTRANSPIRATION	479.975	(64.2434)	4799.75	59.373
LATERAL DRAINAGE COLLECTED FROM LAYER 2	326.59171	(105.54130)	3265.917	40.39952
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.78262	(0.06939)	7.826	0.09681
AVERAGE HEAD ON TOP OF LAYER 3	0.063	(0.020)		
LATERAL DRAINAGE COLLECTED FROM LAYER 6	6.39688	(20.95535)	63.969	0.79130
PERCOLATION/LEAKAGE THROUGH LAYER 8	0.00652	(0.01825)	0.065	0.00081
AVERAGE HEAD ON TOP OF LAYER 7	0.139	(0.460)		
CHANGE IN WATER STORAGE	-5.028	(1.7534)	-50.28	-0.622

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PEAK DAILY VALUES FOR YEARS 1 THROUGH 20		
	(MM)	(CU. METERS)
PRECIPITATION	66.60	666.00000
RUNOFF	1.291	12.90664
DRAINAGE COLLECTED FROM LAYER 2	35.43326	354.33262
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.002912	0.02912
AVERAGE HEAD ON TOP OF LAYER 3	2.467	
MAXIMUM HEAD ON TOP OF LAYER 3	4.890	
LOCATION OF MAXIMUM HEAD IN LAYER 2 (DISTANCE FROM DRAIN)	0.4 METERS	
DRAINAGE COLLECTED FROM LAYER 6	3.08959	30.89591
PERCOLATION/LEAKAGE THROUGH LAYER 8	0.002376	0.02376
AVERAGE HEAD ON TOP OF LAYER 7	23.862	
MAXIMUM HEAD ON TOP OF LAYER 7	45.589	
LOCATION OF MAXIMUM HEAD IN LAYER 6 (DISTANCE FROM DRAIN)	5.3 METERS	
SNOW WATER	23.17	231.6890
MAXIMUM VEG. SOIL WATER (VOL/VOL)		0.2981
MINIMUM VEG. SOIL WATER (VOL/VOL)		0.0850

FINAL WATER STORAGE AT END OF YEAR 20		
LAYER	(CM)	(VOL/VOL)
1	20.1814	0.2018
2	0.0084	0.0169
3	1.5000	0.7500
4	1022.0000	0.2920
5	7.9315	0.1322
6	1.7369	0.0347
7	0.0000	0.0000
8	4.5200	0.4520
SNOW WATER	0.000	

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