

```

*****
*****
**
**
**      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    **
**
**
*****
*****

```

```

PRECIPITATION DATA FILE:  C:\DOCUME~2\LOGICI~1\HELP307\30098B.D4
TEMPERATURE DATA FILE:   C:\DOCUME~2\LOGICI~1\HELP307\30098B.D7
SOLAR RADIATION DATA FILE: C:\DOCUME~2\LOGICI~1\HELP307\30098B.D13
EVAPOTRANSPIRATION DATA: C:\DOCUME~2\LOGICI~1\HELP307\30098B.D11
SOIL AND DESIGN DATA FILE: C:\DOCUME~2\LOGICI~1\HELP307\30098EAU.D10
OUTPUT DATA FILE:        C:\DOCUME~2\LOGICI~1\HELP307\30098EAU.OUT

```

TIME: 15:25 DATE: 3/25/2004

```

*****
TITLE:  RIGMRIM - Charge hydraulique sur le premier niveau
*****

```

NOTE: INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.

LAYER 1

```

          TYPE 1 - VERTICAL PERCOLATION LAYER
          MATERIAL TEXTURE NUMBER    0
THICKNESS           =      20.00   CM
POROSITY            =      0.4170 VOL/VOL
FIELD CAPACITY      =      0.0450 VOL/VOL
WILTING POINT       =      0.0180 VOL/VOL
INITIAL SOIL WATER CONTENT =    0.1427 VOL/VOL
EFFECTIVE SAT. HYD. COND. =    0.100000005000E-02 CM/SEC

```

LAYER 2

TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 18

THICKNESS = 300.00 CM
 POROSITY = 0.6710 VOL/VOL
 FIELD CAPACITY = 0.2920 VOL/VOL
 WILTING POINT = 0.0770 VOL/VOL
 INITIAL SOIL WATER CONTENT = 0.2920 VOL/VOL
 EFFECTIVE SAT. HYD. COND. = 0.100000005000E-02 CM/SEC

LAYER 3

TYPE 2 - LATERAL DRAINAGE LAYER

MATERIAL TEXTURE NUMBER 1

THICKNESS = 60.00 CM
 POROSITY = 0.4170 VOL/VOL
 FIELD CAPACITY = 0.0450 VOL/VOL
 WILTING POINT = 0.0180 VOL/VOL
 INITIAL SOIL WATER CONTENT = 0.1814 VOL/VOL
 EFFECTIVE SAT. HYD. COND. = 0.999999978000E-02 CM/SEC
 SLOPE = 2.00 PERCENT
 DRAINAGE LENGTH = 30.0 METERS

LAYER 4

TYPE 4 - FLEXIBLE MEMBRANE LINER

MATERIAL TEXTURE NUMBER 35

THICKNESS = 0.15 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. = 0.199999996000E-12 CM/SEC
 FML PINHOLE DENSITY = 0.00 HOLES/HECTARE
 FML INSTALLATION DEFECTS = 0.00 HOLES/HECTARE
 FML PLACEMENT QUALITY = 4 - POOR

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT
 SOIL DATA BASE USING SOIL TEXTURE # 6 WITH BARE
 GROUND CONDITIONS, A SURFACE SLOPE OF 2.% AND
 A SLOPE LENGTH OF 50. METERS.

SCS RUNOFF CURVE NUMBER = 86.20
 FRACTION OF AREA ALLOWING RUNOFF = 100.0 PERCENT
 AREA PROJECTED ON HORIZONTAL PLANE = 1.0000 HECTARES
 EVAPORATIVE ZONE DEPTH = 20.0 CM
 INITIAL WATER IN EVAPORATIVE ZONE = 2.853 CM

UPPER LIMIT OF EVAPORATIVE STORAGE = 8.340 CM
 LOWER LIMIT OF EVAPORATIVE STORAGE = 0.360 CM
 INITIAL SNOW WATER = 7.612 CM
 INITIAL WATER IN LAYER MATERIALS = 101.337 CM
 TOTAL INITIAL WATER = 108.949 CM
 TOTAL SUBSURFACE INFLOW = 0.00 MM/YR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
Lamartine Quebec

STATION LATITUDE = 47.08 DEGREES
 MAXIMUM LEAF AREA INDEX = 0.00
 START OF GROWING SEASON (JULIAN DATE) = 144
 END OF GROWING SEASON (JULIAN DATE) = 260
 EVAPORATIVE ZONE DEPTH = 20.0 CM
 AVERAGE ANNUAL WIND SPEED = 17.00 KPH
 AVERAGE 1ST QUARTER RELATIVE HUMIDITY = 70.00 %
 AVERAGE 2ND QUARTER RELATIVE HUMIDITY = 69.00 %
 AVERAGE 3RD QUARTER RELATIVE HUMIDITY = 76.00 %
 AVERAGE 4TH QUARTER RELATIVE HUMIDITY = 78.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR CARIBOU MAINE

NORMAL MEAN MONTHLY PRECIPITATION (MM)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
63.0	56.7	74.1	69.5	93.7	83.0
100.6	111.7	96.1	90.7	78.1	88.5

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR CARIBOU MAINE

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES CELSIUS)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
-11.8	-10.0	-4.1	3.4	10.9	16.2
19.3	18.0	12.8	6.7	0.0	-7.8

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR CARIBOU MAINE
AND STATION LATITUDE = 47.08 DEGREES

AVERAGE MONTHLY VALUES (MM) FOR YEARS 1 THROUGH 20

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

PRECIPITATION						

TOTALS	71.05 105.21	72.11 100.14	68.21 99.88	46.97 87.95	82.94 77.83	79.57 90.14
STD. DEVIATIONS	19.01 31.89	25.35 38.99	40.16 42.42	17.92 31.22	33.01 25.47	27.29 31.64
RUNOFF						

TOTALS	0.000 2.330	0.007 2.232	94.231 3.194	167.771 1.980	5.218 7.739	1.266 3.495
STD. DEVIATIONS	0.000 5.688	0.032 2.497	80.204 4.917	96.679 3.849	8.044 15.830	1.934 13.541
EVAPOTRANSPIRATION						

TOTALS	10.900 77.302	10.064 71.371	14.224 58.946	17.046 36.516	65.710 18.394	66.160 9.848
STD. DEVIATIONS	1.387 19.336	1.569 22.585	2.812 14.131	9.908 7.863	19.322 5.865	24.036 1.462
LATERAL DRAINAGE COLLECTED FROM LAYER 3						

TOTALS	23.0851 20.2497	9.4506 18.6286	4.8654 22.0398	2.3039 29.8932	10.0439 31.5985	23.8197 40.5079
STD. DEVIATIONS	11.4457 7.0775	4.3578 7.2475	2.0579 10.8474	0.8179 12.8729	5.0881 14.8973	5.5420 17.7102
PERCOLATION/LEAKAGE THROUGH LAYER 4						

TOTALS	0.0002 0.0002	0.0001 0.0002	0.0000 0.0002	0.0000 0.0003	0.0001 0.0003	0.0002 0.0004
STD. DEVIATIONS	0.0001 0.0001	0.0000 0.0001	0.0000 0.0001	0.0000 0.0001	0.0001 0.0001	0.0001 0.0002

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (CM)

DAILY AVERAGE HEAD ON TOP OF LAYER 4

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

AVERAGES	6.4617 5.6728	2.9099 5.2179	1.3630 6.3743	0.6669 8.3545	2.8138 9.1053	6.8953 11.2411
STD. DEVIATIONS	3.1972 1.9825	1.3566 2.0287	0.5765 3.1263	0.2368 3.5710	1.4254 4.2550	1.6041 4.8282

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

	MM		CU. METERS	PERCENT
	-----		-----	-----
PRECIPITATION	982.01 (109.847)		9820.1	100.00
RUNOFF	289.464 (68.6292)		2894.64	29.477
EVAPOTRANSPIRATION	456.481 (45.1161)		4564.81	46.484
LATERAL DRAINAGE COLLECTED FROM LAYER 3	236.48640 (53.65471)		2364.864	24.08187
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.00236 (0.00053)		0.024	0.00024
AVERAGE HEAD ON TOP OF LAYER 4	55.897 (12.616)			
CHANGE IN WATER STORAGE	-0.424 (2.0467)		-4.24	-0.043

PEAK DAILY VALUES FOR YEARS	1 THROUGH	20
	(MM)	(CU. METERS)
PRECIPITATION	61.10	611.000
RUNOFF	130.916	1309.1594
DRAINAGE COLLECTED FROM LAYER 3	2.63768	26.37679
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.000025	0.00025
AVERAGE HEAD ON TOP OF LAYER 4	217.816	
MAXIMUM HEAD ON TOP OF LAYER 4	268.085	
LOCATION OF MAXIMUM HEAD IN LAYER 3 (DISTANCE FROM DRAIN)	12.4 METERS	
SNOW WATER	402.45	4024.4553
MAXIMUM VEG. SOIL WATER (VOL/VOL)		0.3720
MINIMUM VEG. SOIL WATER (VOL/VOL)		0.0180

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

FINAL WATER STORAGE AT END OF YEAR 20

LAYER	(CM)	(VOL/VOL)
1	2.9882	0.1494
2	87.5999	0.2920
3	9.6462	0.1608
4	0.0000	0.0000
SNOW WATER	7.866	

```

*****
*****
**
**
**          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       **
**
**
*****
*****

```

```

PRECIPITATION DATA FILE:   C:\HELP307\30098B.D4
TEMPERATURE DATA FILE:    C:\HELP307\30098B.D7
SOLAR RADIATION DATA FILE: C:\HELP307\30098B.D13
EVAPOTRANSPIRATION DATA:  C:\HELP307\30098B.D11
SOIL AND DESIGN DATA FILE: C:\HELP307\30098CV.D10
OUTPUT DATA FILE:         C:\HELP307\30098CVB.OUT

```

TIME: 11:16 DATE: 2/ 4/2004

```

*****
TITLE:  RIGMRIM - Cellule vide
*****

```

NOTE: INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.

LAYER 1

```

          TYPE 2 - LATERAL DRAINAGE LAYER
          MATERIAL TEXTURE NUMBER 1
THICKNESS           = 60.00 CM
POROSITY             = 0.4170 VOL/VOL
FIELD CAPACITY      = 0.0450 VOL/VOL
WILTING POINT       = 0.0180 VOL/VOL
INITIAL SOIL WATER  = 0.0748 VOL/VOL
EFFECTIVE SAT. HYD. = 0.99999978000E-02 CM/SEC
SLOPE                = 2.00 PERCENT
DRAINAGE LENGTH     = 15.0 METERS

```

LAYER 2

TYPE 4 - FLEXIBLE MEMBRANE LINER

MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.15	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.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	0.00	HOLES/HECTARE
FML INSTALLATION DEFECTS	=	0.00	HOLES/HECTARE
FML PLACEMENT QUALITY	=	4	- POOR

LAYER 3

TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 0

THICKNESS	=	0.30	CM
POROSITY	=	0.4170	VOL/VOL
FIELD CAPACITY	=	0.0450	VOL/VOL
WILTING POINT	=	0.0180	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0450	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC

LAYER 4

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	=	2.00	PERCENT
DRAINAGE LENGTH	=	15.0	METERS

LAYER 5

TYPE 4 - FLEXIBLE MEMBRANE LINER

MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.15	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.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	0.00	HOLES/HECTARE

FML INSTALLATION DEFECTS = 0.00 HOLES/HECTARE
 FML PLACEMENT QUALITY = 4 - POOR

LAYER 6

TYPE 3 - BARRIER SOIL LINER
 MATERIAL TEXTURE NUMBER 17
 THICKNESS = 0.50 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. = 0.300000003000E-08 CM/SEC

LAYER 7

TYPE 1 - VERTICAL PERCOLATION LAYER
 MATERIAL TEXTURE NUMBER 0
 THICKNESS = 15.00 CM
 POROSITY = 0.4170 VOL/VOL
 FIELD CAPACITY = 0.0450 VOL/VOL
 WILTING POINT = 0.0180 VOL/VOL
 INITIAL SOIL WATER CONTENT = 0.0449 VOL/VOL
 EFFECTIVE SAT. HYD. COND. = 0.100000005000E-02 CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS USER-SPECIFIED.

SCS RUNOFF CURVE NUMBER = 0.00
 FRACTION OF AREA ALLOWING RUNOFF = 0.0 PERCENT
 AREA PROJECTED ON HORIZONTAL PLANE = 1.0000 HECTARES
 EVAPORATIVE ZONE DEPTH = 20.0 CM
 INITIAL WATER IN EVAPORATIVE ZONE = 2.076 CM
 UPPER LIMIT OF EVAPORATIVE STORAGE = 8.340 CM
 LOWER LIMIT OF EVAPORATIVE STORAGE = 0.360 CM
 INITIAL SNOW WATER = 7.612 CM
 INITIAL WATER IN LAYER MATERIALS = 5.554 CM
 TOTAL INITIAL WATER = 13.167 CM
 TOTAL SUBSURFACE INFLOW = 0.00 MM/YR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM

Lamartine

Quebec

STATION LATITUDE = 47.08 DEGREES
 MAXIMUM LEAF AREA INDEX = 0.00
 START OF GROWING SEASON (JULIAN DATE) = 144
 END OF GROWING SEASON (JULIAN DATE) = 260
 EVAPORATIVE ZONE DEPTH = 20.0 CM
 AVERAGE ANNUAL WIND SPEED = 17.00 KPH
 AVERAGE 1ST QUARTER RELATIVE HUMIDITY = 70.00 %
 AVERAGE 2ND QUARTER RELATIVE HUMIDITY = 69.00 %
 AVERAGE 3RD QUARTER RELATIVE HUMIDITY = 76.00 %
 AVERAGE 4TH QUARTER RELATIVE HUMIDITY = 78.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
 COEFFICIENTS FOR CARIBOU MAINE

NORMAL MEAN MONTHLY PRECIPITATION (MM)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
63.0	56.7	74.1	69.5	93.7	83.0
100.6	111.7	96.1	90.7	78.1	88.5

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
 COEFFICIENTS FOR CARIBOU MAINE

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES CELSIUS)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
-11.8	-10.0	-4.1	3.4	10.9	16.2
19.3	18.0	12.8	6.7	0.0	-7.8

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
 COEFFICIENTS FOR CARIBOU MAINE
 AND STATION LATITUDE = 47.08 DEGREES

AVERAGE MONTHLY VALUES (MM) FOR YEARS 1 THROUGH 20

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	71.05	72.11	68.21	46.97	82.94	79.57
	105.21	100.14	99.88	87.95	77.83	90.14
STD. DEVIATIONS	19.01	25.35	40.16	17.92	33.01	27.29

	31.89	38.99	42.42	31.22	25.47	31.64
RUNOFF						

TOTALS	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATIONS	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION						

TOTALS	10.900	10.064	14.380	14.003	53.334	59.504
	70.213	65.761	53.783	34.680	18.067	9.849
STD. DEVIATIONS	1.387	1.569	2.632	6.618	19.004	22.029
	16.798	21.402	14.677	7.432	5.708	1.461
LATERAL DRAINAGE COLLECTED FROM LAYER 1						

TOTALS	3.1852	0.4457	27.2474	187.8956	102.6712	32.0193
	27.5135	32.8516	44.3822	38.1682	50.4347	20.4786
STD. DEVIATIONS	1.4842	0.2071	41.7865	79.5741	30.9994	11.6916
	13.6024	21.1266	25.4218	19.8140	24.2745	9.1300
PERCOLATION/LEAKAGE THROUGH LAYER 2						

TOTALS	0.0000	0.0000	0.0001	0.0007	0.0004	0.0002
	0.0001	0.0002	0.0002	0.0002	0.0002	0.0001
STD. DEVIATIONS	0.0000	0.0000	0.0001	0.0002	0.0001	0.0001
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000
LATERAL DRAINAGE COLLECTED FROM LAYER 4						

TOTALS	0.0000	0.0000	0.0001	0.0003	0.0007	0.0003
	0.0001	0.0002	0.0002	0.0002	0.0002	0.0001
STD. DEVIATIONS	0.0000	0.0000	0.0001	0.0001	0.0002	0.0002
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6						

TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 7						

TOTALS	0.0010	0.0009	0.0010	0.0009	0.0010	0.0009
	0.0010	0.0010	0.0009	0.0010	0.0009	0.0010
STD. DEVIATIONS	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (CM)

 DAILY AVERAGE HEAD ON TOP OF LAYER 2

AVERAGES	0.4462	0.0686	2.8334	19.0231	12.3419	4.5977
	3.8110	4.4766	6.1372	5.1890	6.9981	2.8627
STD. DEVIATIONS	0.2079	0.0321	3.8485	5.6842	2.8904	1.6216
	1.8467	2.7019	3.2220	2.5903	3.2182	1.2707

DAILY AVERAGE HEAD ON TOP OF LAYER 5

AVERAGES	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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

	MM		CU. METERS	PERCENT
	-----		-----	-----
PRECIPITATION	982.01	(109.847)	9820.1	100.00
RUNOFF	0.000	(0.0000)	0.00	0.000
EVAPOTRANSPIRATION	414.538	(43.0530)	4145.38	42.213
LATERAL DRAINAGE COLLECTED FROM LAYER 1	567.29333	(113.67530)	5672.934	57.76859
PERCOLATION/LEAKAGE THROUGH LAYER 2	0.00242	(0.00039)	0.024	0.00025
AVERAGE HEAD ON TOP OF LAYER 2	57.321	(9.261)		
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.00241	(0.00039)	0.024	0.00025
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.00001	(0.00000)	0.000	0.00000
AVERAGE HEAD ON TOP OF LAYER 5	0.000	(0.000)		
PERCOLATION/LEAKAGE THROUGH LAYER 7	0.01137	(0.00115)	0.114	0.00116
CHANGE IN WATER STORAGE	0.165	(2.7511)	1.65	0.017

PEAK DAILY VALUES FOR YEARS	1 THROUGH	20
	(MM)	(CU. METERS)
PRECIPITATION	61.10	611.000
RUNOFF	0.000	0.0000
DRAINAGE COLLECTED FROM LAYER 1	30.96570	309.65701
PERCOLATION/LEAKAGE THROUGH LAYER 2	0.000069	0.00069
AVERAGE HEAD ON TOP OF LAYER 2	599.995	
MAXIMUM HEAD ON TOP OF LAYER 2	709.523	
LOCATION OF MAXIMUM HEAD IN LAYER 1 (DISTANCE FROM DRAIN)	11.0 METERS	
DRAINAGE COLLECTED FROM LAYER 4	0.00004	0.00036
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.000000	0.00000
AVERAGE HEAD ON TOP OF LAYER 5	0.000	
MAXIMUM HEAD ON TOP OF LAYER 5	0.214	
LOCATION OF MAXIMUM HEAD IN LAYER 4 (DISTANCE FROM DRAIN)	0.0 METERS	
PERCOLATION/LEAKAGE THROUGH LAYER 7	0.000037	0.00037
SNOW WATER	402.45	4024.4553
MAXIMUM VEG. SOIL WATER (VOL/VOL)		0.4170
MINIMUM VEG. SOIL WATER (VOL/VOL)		0.0180

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

FINAL WATER STORAGE AT END OF YEAR 20

LAYER	(CM)	(VOL/VOL)
1	4.5848	0.0764
2	0.0000	0.0000
3	0.0135	0.0450
4	0.0050	0.0100
5	0.0000	0.0000
6	0.3750	0.7500
7	0.6510	0.0434
SNOW WATER	7.866	


```

*****
*****
**
**
**          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       **
**
**
*****
*****

```

```

PRECIPITATION DATA FILE:    C:\HELP307\30098B.D4
TEMPERATURE DATA FILE:     C:\HELP307\30098B.D7
SOLAR RADIATION DATA FILE: C:\HELP307\30098B.D13
EVAPOTRANSPIRATION DATA:   C:\HELP307\30098B.D11
SOIL AND DESIGN DATA FILE: C:\HELP307\300983M.D10
OUTPUT DATA FILE:          C:\HELP307\300983MB.OUT

```

TIME: 11:21 DATE: 2/ 4/2004

```

*****
TITLE:  RIGMRIM - Cellule avec 3m de MR
*****

```

NOTE: INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.

LAYER 1

```

          TYPE 1 - VERTICAL PERCOLATION LAYER
          MATERIAL TEXTURE NUMBER 0
THICKNESS          =      20.00   CM
POROSITY           =      0.4170 VOL/VOL
FIELD CAPACITY     =      0.0450 VOL/VOL
WILTING POINT     =      0.0180 VOL/VOL
INITIAL SOIL WATER CONTENT =    0.1427 VOL/VOL
EFFECTIVE SAT. HYD. COND. =  0.100000005000E-02 CM/SEC

```

LAYER 2

TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 18

THICKNESS = 300.00 CM
POROSITY = 0.6710 VOL/VOL
FIELD CAPACITY = 0.2920 VOL/VOL
WILTING POINT = 0.0770 VOL/VOL
INITIAL SOIL WATER CONTENT = 0.2920 VOL/VOL
EFFECTIVE SAT. HYD. COND. = 0.100000005000E-02 CM/SEC

LAYER 3

TYPE 2 - LATERAL DRAINAGE LAYER

MATERIAL TEXTURE NUMBER 1

THICKNESS = 60.00 CM
POROSITY = 0.4170 VOL/VOL
FIELD CAPACITY = 0.0450 VOL/VOL
WILTING POINT = 0.0180 VOL/VOL
INITIAL SOIL WATER CONTENT = 0.1316 VOL/VOL
EFFECTIVE SAT. HYD. COND. = 0.999999978000E-02 CM/SEC
SLOPE = 2.00 PERCENT
DRAINAGE LENGTH = 15.0 METERS

LAYER 4

TYPE 4 - FLEXIBLE MEMBRANE LINER

MATERIAL TEXTURE NUMBER 35

THICKNESS = 0.15 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. = 0.199999996000E-12 CM/SEC
FML PINHOLE DENSITY = 0.00 HOLES/HECTARE
FML INSTALLATION DEFECTS = 0.00 HOLES/HECTARE
FML PLACEMENT QUALITY = 4 - POOR

LAYER 5

TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 0

THICKNESS = 0.30 CM
POROSITY = 0.4170 VOL/VOL
FIELD CAPACITY = 0.0450 VOL/VOL
WILTING POINT = 0.0180 VOL/VOL
INITIAL SOIL WATER CONTENT = 0.0450 VOL/VOL
EFFECTIVE SAT. HYD. COND. = 0.100000005000E-02 CM/SEC

LAYER 6

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	=	2.00	PERCENT
DRAINAGE LENGTH	=	15.0	METERS

LAYER 7

TYPE 4 - FLEXIBLE MEMBRANE LINER

MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.15	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.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	0.00	HOLES/HECTARE
FML INSTALLATION DEFECTS	=	0.00	HOLES/HECTARE
FML PLACEMENT QUALITY	=	4	- POOR

LAYER 8

TYPE 3 - BARRIER SOIL LINER

MATERIAL TEXTURE NUMBER 17

THICKNESS	=	0.50	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.	=	0.300000003000E-08	CM/SEC

LAYER 9

TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 0

THICKNESS	=	15.00	CM
POROSITY	=	0.4170	VOL/VOL
FIELD CAPACITY	=	0.0450	VOL/VOL
WILTING POINT	=	0.0180	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0449	VOL/VOL

EFFECTIVE SAT. HYD. COND. = 0.100000005000E-02 CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS USER-SPECIFIED.

SCS RUNOFF CURVE NUMBER = 0.00
FRACTION OF AREA ALLOWING RUNOFF = 0.0 PERCENT
AREA PROJECTED ON HORIZONTAL PLANE = 1.0000 HECTARES
EVAPORATIVE ZONE DEPTH = 20.0 CM
INITIAL WATER IN EVAPORATIVE ZONE = 2.853 CM
UPPER LIMIT OF EVAPORATIVE STORAGE = 8.340 CM
LOWER LIMIT OF EVAPORATIVE STORAGE = 0.360 CM
INITIAL SNOW WATER = 7.612 CM
INITIAL WATER IN LAYER MATERIALS = 99.413 CM
TOTAL INITIAL WATER = 107.026 CM
TOTAL SUBSURFACE INFLOW = 0.00 MM/YR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
Lamartine Quebec

STATION LATITUDE = 47.08 DEGREES
MAXIMUM LEAF AREA INDEX = 0.00
START OF GROWING SEASON (JULIAN DATE) = 144
END OF GROWING SEASON (JULIAN DATE) = 260
EVAPORATIVE ZONE DEPTH = 20.0 CM
AVERAGE ANNUAL WIND SPEED = 17.00 KPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY = 70.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY = 69.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY = 76.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY = 78.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR CARIBOU MAINE

NORMAL MEAN MONTHLY PRECIPITATION (MM)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
63.0	56.7	74.1	69.5	93.7	83.0
100.6	111.7	96.1	90.7	78.1	88.5

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR CARIBOU MAINE

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES CELSIUS)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
-11.8	-10.0	-4.1	3.4	10.9	16.2
19.3	18.0	12.8	6.7	0.0	-7.8

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
 COEFFICIENTS FOR CARIBOU MAINE
 AND STATION LATITUDE = 47.08 DEGREES

AVERAGE MONTHLY VALUES (MM) FOR YEARS 1 THROUGH 20

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	71.05 105.21	72.11 100.14	68.21 99.88	46.97 87.95	82.94 77.83	79.57 90.14
STD. DEVIATIONS	19.01 31.89	25.35 38.99	40.16 42.42	17.92 31.22	33.01 25.47	27.29 31.64
RUNOFF						
TOTALS	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000
STD. DEVIATIONS	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000
EVAPOTRANSPIRATION						
TOTALS	10.900 77.333	10.064 71.233	14.224 59.040	17.056 36.537	65.711 18.393	66.103 9.848
STD. DEVIATIONS	1.387 19.339	1.569 22.727	2.812 14.082	9.914 7.909	19.306 5.874	23.974 1.461
LATERAL DRAINAGE COLLECTED FROM LAYER 3						
TOTALS	16.8930 32.7430	4.0060 21.7693	2.2891 26.4322	66.7544 36.3385	151.5796 35.8453	84.1776 46.8087
STD. DEVIATIONS	8.6295 12.4459	1.5291 11.4542	2.2451 15.8972	57.5281 20.5366	52.5784 19.1344	17.2440 21.8643
PERCOLATION/LEAKAGE THROUGH LAYER 4						
TOTALS	0.0001 0.0002	0.0000 0.0001	0.0000 0.0001	0.0003 0.0002	0.0006 0.0002	0.0004 0.0002

STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0002	0.0002	0.0001
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

LATERAL DRAINAGE COLLECTED FROM LAYER 6

TOTALS	0.0001	0.0000	0.0000	0.0002	0.0005	0.0005
	0.0002	0.0001	0.0001	0.0002	0.0002	0.0002
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0001	0.0001	0.0002
	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001

PERCOLATION/LEAKAGE THROUGH LAYER 8

TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

PERCOLATION/LEAKAGE THROUGH LAYER 9

TOTALS	0.0010	0.0009	0.0010	0.0009	0.0010	0.0009
	0.0010	0.0010	0.0009	0.0010	0.0009	0.0010
STD. DEVIATIONS	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (CM)

DAILY AVERAGE HEAD ON TOP OF LAYER 4

AVERAGES	2.3642	0.6165	0.3191	7.9511	17.4202	11.2611
	4.5557	3.0344	3.7962	5.0109	5.1018	6.4079
STD. DEVIATIONS	1.2046	0.2382	0.3077	5.7922	4.3974	2.0082
	1.6918	1.5665	2.2369	2.7381	2.6469	2.8982

DAILY AVERAGE HEAD ON TOP OF LAYER 7

AVERAGES	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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

	MM	CU. METERS	PERCENT
PRECIPITATION	982.01 (109.847)	9820.1	100.00

RUNOFF	0.000	(0.0000)	0.00	0.000
EVAPOTRANSPIRATION	456.443	(45.3319)	4564.43	46.480
LATERAL DRAINAGE COLLECTED FROM LAYER 3	525.63654	(115.18884)	5256.365	53.52660
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.00239	(0.00045)	0.024	0.00024
AVERAGE HEAD ON TOP OF LAYER 4	56.532	(10.771)		
LATERAL DRAINAGE COLLECTED FROM LAYER 6	0.00238	(0.00045)	0.024	0.00024
PERCOLATION/LEAKAGE THROUGH LAYER 8	0.00001	(0.00000)	0.000	0.00000
AVERAGE HEAD ON TOP OF LAYER 7	0.000	(0.000)		
PERCOLATION/LEAKAGE THROUGH LAYER 9	0.01144	(0.00116)	0.114	0.00116
CHANGE IN WATER STORAGE	-0.083	(2.6868)	-0.83	-0.008

PEAK DAILY VALUES FOR YEARS	1 THROUGH 20	
	(MM)	(CU. METERS)
PRECIPITATION	61.10	611.000
RUNOFF	0.000	0.0000
DRAINAGE COLLECTED FROM LAYER 3	16.38630	163.86305
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.000047	0.00047
AVERAGE HEAD ON TOP OF LAYER 4	407.775	
MAXIMUM HEAD ON TOP OF LAYER 4	476.893	
LOCATION OF MAXIMUM HEAD IN LAYER 3 (DISTANCE FROM DRAIN)	10.0 METERS	
DRAINAGE COLLECTED FROM LAYER 6	0.00003	0.00035
PERCOLATION/LEAKAGE THROUGH LAYER 8	0.000000	0.00000
AVERAGE HEAD ON TOP OF LAYER 7	0.000	
MAXIMUM HEAD ON TOP OF LAYER 7	0.211	
LOCATION OF MAXIMUM HEAD IN LAYER 6 (DISTANCE FROM DRAIN)	0.0 METERS	
PERCOLATION/LEAKAGE THROUGH LAYER 9	0.000037	0.00037
SNOW WATER	402.45	4024.4553
MAXIMUM VEG. SOIL WATER (VOL/VOL)		0.4170
MINIMUM VEG. SOIL WATER (VOL/VOL)		0.0180

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
 by Bruce M. McEnroe, University of Kansas
 ASCE Journal of Environmental Engineering
 Vol. 119, No. 2, March 1993, pp. 262-270.

FINAL WATER STORAGE AT END OF YEAR 20

LAYER	(CM)	(VOL/VOL)
1	2.9882	0.1494
2	87.5999	0.2920
3	7.3603	0.1227
4	0.0000	0.0000
5	0.0135	0.0450
6	0.0050	0.0100
7	0.0000	0.0000
8	0.3750	0.7500
9	0.6508	0.0434
SNOW WATER	7.866	

**
**
**
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
**
**

PRECIPITATION DATA FILE: C:\HELP307\30098B.D4
TEMPERATURE DATA FILE: C:\HELP307\30098B.D7
SOLAR RADIATION DATA FILE: C:\HELP307\30098B.D13
EVAPOTRANSPIRATION DATA: C:\HELP307\30098B.D11
SOIL AND DESIGN DATA FILE: C:\HELP307\300989M.D10
OUTPUT DATA FILE: C:\HELP307\300989MB.OUT

TIME: 11:23 DATE: 2/ 4/2004

TITLE: RIGMRIM - Cellule avec 9m de MR

NOTE: INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.

LAYER 1

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 0
THICKNESS = 20.00 CM
POROSITY = 0.4170 VOL/VOL
FIELD CAPACITY = 0.0450 VOL/VOL
WILTING POINT = 0.0180 VOL/VOL
INITIAL SOIL WATER CONTENT = 0.1427 VOL/VOL
EFFECTIVE SAT. HYD. COND. = 0.10000005000E-02 CM/SEC

LAYER 2

TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 18

THICKNESS = 900.00 CM
POROSITY = 0.6710 VOL/VOL
FIELD CAPACITY = 0.2920 VOL/VOL
WILTING POINT = 0.0770 VOL/VOL
INITIAL SOIL WATER CONTENT = 0.2948 VOL/VOL
EFFECTIVE SAT. HYD. COND. = 0.100000005000E-02 CM/SEC

LAYER 3

TYPE 2 - LATERAL DRAINAGE LAYER

MATERIAL TEXTURE NUMBER 1

THICKNESS = 60.00 CM
POROSITY = 0.4170 VOL/VOL
FIELD CAPACITY = 0.0450 VOL/VOL
WILTING POINT = 0.0180 VOL/VOL
INITIAL SOIL WATER CONTENT = 0.1533 VOL/VOL
EFFECTIVE SAT. HYD. COND. = 0.999999978000E-02 CM/SEC
SLOPE = 2.00 PERCENT
DRAINAGE LENGTH = 15.0 METERS

LAYER 4

TYPE 4 - FLEXIBLE MEMBRANE LINER

MATERIAL TEXTURE NUMBER 35

THICKNESS = 0.15 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. = 0.199999996000E-12 CM/SEC
FML PINHOLE DENSITY = 0.00 HOLES/HECTARE
FML INSTALLATION DEFECTS = 0.00 HOLES/HECTARE
FML PLACEMENT QUALITY = 4 - POOR

LAYER 5

TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 0

THICKNESS = 0.30 CM
POROSITY = 0.4170 VOL/VOL
FIELD CAPACITY = 0.0450 VOL/VOL
WILTING POINT = 0.0180 VOL/VOL
INITIAL SOIL WATER CONTENT = 0.0450 VOL/VOL
EFFECTIVE SAT. HYD. COND. = 0.100000005000E-02 CM/SEC

LAYER 6

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	=	2.00	PERCENT
DRAINAGE LENGTH	=	15.0	METERS

LAYER 7

TYPE 4 - FLEXIBLE MEMBRANE LINER

MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.15	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.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	0.00	HOLES/HECTARE
FML INSTALLATION DEFECTS	=	0.00	HOLES/HECTARE
FML PLACEMENT QUALITY	=	4	- POOR

LAYER 8

TYPE 3 - BARRIER SOIL LINER

MATERIAL TEXTURE NUMBER 17

THICKNESS	=	0.50	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.	=	0.300000003000E-08	CM/SEC

LAYER 9

TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 0

THICKNESS	=	15.00	CM
POROSITY	=	0.4170	VOL/VOL
FIELD CAPACITY	=	0.0450	VOL/VOL
WILTING POINT	=	0.0180	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0449	VOL/VOL

EFFECTIVE SAT. HYD. COND. = 0.100000005000E-02 CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS USER-SPECIFIED.

SCS RUNOFF CURVE NUMBER = 0.00
FRACTION OF AREA ALLOWING RUNOFF = 0.0 PERCENT
AREA PROJECTED ON HORIZONTAL PLANE = 1.0000 HECTARES
EVAPORATIVE ZONE DEPTH = 20.0 CM
INITIAL WATER IN EVAPORATIVE ZONE = 2.853 CM
UPPER LIMIT OF EVAPORATIVE STORAGE = 8.340 CM
LOWER LIMIT OF EVAPORATIVE STORAGE = 0.360 CM
INITIAL SNOW WATER = 7.612 CM
INITIAL WATER IN LAYER MATERIALS = 278.444 CM
TOTAL INITIAL WATER = 286.056 CM
TOTAL SUBSURFACE INFLOW = 0.00 MM/YR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
Lamartine Quebec

STATION LATITUDE = 47.08 DEGREES
MAXIMUM LEAF AREA INDEX = 0.00
START OF GROWING SEASON (JULIAN DATE) = 144
END OF GROWING SEASON (JULIAN DATE) = 260
EVAPORATIVE ZONE DEPTH = 20.0 CM
AVERAGE ANNUAL WIND SPEED = 17.00 KPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY = 70.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY = 69.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY = 76.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY = 78.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR CARIBOU MAINE

NORMAL MEAN MONTHLY PRECIPITATION (MM)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
63.0	56.7	74.1	69.5	93.7	83.0
100.6	111.7	96.1	90.7	78.1	88.5

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR CARIBOU MAINE

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES CELSIUS)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
-11.8	-10.0	-4.1	3.4	10.9	16.2
19.3	18.0	12.8	6.7	0.0	-7.8

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
 COEFFICIENTS FOR CARIBOU MAINE
 AND STATION LATITUDE = 47.08 DEGREES

AVERAGE MONTHLY VALUES (MM) FOR YEARS 1 THROUGH 20

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	71.05 105.21	72.11 100.14	68.21 99.88	46.97 87.95	82.94 77.83	79.57 90.14
STD. DEVIATIONS	19.01 31.89	25.35 38.99	40.16 42.42	17.92 31.22	33.01 25.47	27.29 31.64
RUNOFF						
TOTALS	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000
STD. DEVIATIONS	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000
EVAPOTRANSPIRATION						
TOTALS	10.900 77.333	10.064 71.233	14.224 59.040	17.056 36.537	65.711 18.393	66.103 9.848
STD. DEVIATIONS	1.387 19.339	1.569 22.727	2.812 14.082	9.914 7.909	19.306 5.874	23.974 1.461
LATERAL DRAINAGE COLLECTED FROM LAYER 3						
TOTALS	29.0366 84.0562	6.6234 56.3445	2.4720 38.7370	15.9111 37.3361	76.1488 33.2903	100.3359 46.3847
STD. DEVIATIONS	19.6640 17.5936	4.1567 21.4623	1.2511 20.9157	14.2206 16.3851	26.9726 17.1300	18.4414 19.0579
PERCOLATION/LEAKAGE THROUGH LAYER 4						
TOTALS	0.0001 0.0004	0.0000 0.0003	0.0000 0.0002	0.0001 0.0002	0.0004 0.0002	0.0005 0.0002

STD. DEVIATIONS	0.0001	0.0000	0.0000	0.0001	0.0001	0.0001
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

LATERAL DRAINAGE COLLECTED FROM LAYER 6

TOTALS	0.0001	0.0000	0.0000	0.0001	0.0003	0.0005
	0.0004	0.0003	0.0002	0.0002	0.0002	0.0002
STD. DEVIATIONS	0.0001	0.0000	0.0000	0.0001	0.0001	0.0001
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

PERCOLATION/LEAKAGE THROUGH LAYER 8

TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

PERCOLATION/LEAKAGE THROUGH LAYER 9

TOTALS	0.0010	0.0009	0.0010	0.0009	0.0010	0.0009
	0.0010	0.0010	0.0009	0.0010	0.0009	0.0010
STD. DEVIATIONS	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (CM)

DAILY AVERAGE HEAD ON TOP OF LAYER 4

AVERAGES	4.0061	1.0209	0.3463	2.2691	9.8849	13.1853
	11.0457	7.6484	5.5175	5.1924	4.7749	6.3864
STD. DEVIATIONS	2.6663	0.6473	0.1753	1.9881	2.9954	1.9211
	2.0005	2.7831	2.8869	2.2621	2.4107	2.5597

DAILY AVERAGE HEAD ON TOP OF LAYER 7

AVERAGES	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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

	MM	CU. METERS	PERCENT
PRECIPITATION	982.01 (109.847)	9820.1	100.00

RUNOFF	0.000	(0.0000)	0.00	0.000
EVAPOTRANSPIRATION	456.443	(45.3319)	4564.43	46.480
LATERAL DRAINAGE COLLECTED FROM LAYER 3	526.67664	(114.69542)	5266.767	53.63251
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.00251	(0.00051)	0.025	0.00026
AVERAGE HEAD ON TOP OF LAYER 4	59.398	(12.057)		
LATERAL DRAINAGE COLLECTED FROM LAYER 6	0.00250	(0.00051)	0.025	0.00025
PERCOLATION/LEAKAGE THROUGH LAYER 8	0.00001	(0.00000)	0.000	0.00000
AVERAGE HEAD ON TOP OF LAYER 7	0.000	(0.000)		
PERCOLATION/LEAKAGE THROUGH LAYER 9	0.01145	(0.00117)	0.115	0.00117
CHANGE IN WATER STORAGE	-1.123	(2.6411)	-11.23	-0.114

PEAK DAILY VALUES FOR YEARS	1 THROUGH 20	
	(MM)	(CU. METERS)
PRECIPITATION	61.10	611.000
RUNOFF	0.000	0.0000
DRAINAGE COLLECTED FROM LAYER 3	5.86456	58.64558
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.000024	0.00024
AVERAGE HEAD ON TOP OF LAYER 4	204.002	
MAXIMUM HEAD ON TOP OF LAYER 4	239.773	
LOCATION OF MAXIMUM HEAD IN LAYER 3 (DISTANCE FROM DRAIN)	7.9 METERS	
DRAINAGE COLLECTED FROM LAYER 6	0.00002	0.00023
PERCOLATION/LEAKAGE THROUGH LAYER 8	0.000000	0.00000
AVERAGE HEAD ON TOP OF LAYER 7	0.000	
MAXIMUM HEAD ON TOP OF LAYER 7	0.172	
LOCATION OF MAXIMUM HEAD IN LAYER 6 (DISTANCE FROM DRAIN)	0.0 METERS	
PERCOLATION/LEAKAGE THROUGH LAYER 9	0.000037	0.00037
SNOW WATER	402.45	4024.4553
MAXIMUM VEG. SOIL WATER (VOL/VOL)		0.4170
MINIMUM VEG. SOIL WATER (VOL/VOL)		0.0180

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
 by Bruce M. McEnroe, University of Kansas
 ASCE Journal of Environmental Engineering
 Vol. 119, No. 2, March 1993, pp. 262-270.

FINAL WATER STORAGE AT END OF YEAR 20

LAYER	(CM)	(VOL/VOL)
1	2.9882	0.1494
2	262.7998	0.2920
3	9.1102	0.1518
4	0.0000	0.0000
5	0.0135	0.0450
6	0.0050	0.0100
7	0.0000	0.0000
8	0.3750	0.7500
9	0.6507	0.0434
SNOW WATER	7.866	


```

*****
*****
**
**
**              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           **
**
**
*****
*****

```

```

PRECIPITATION DATA FILE:      C:\HELP307\30098B.D4
TEMPERATURE DATA FILE:       C:\HELP307\30098B.D7
SOLAR RADIATION DATA FILE:   C:\HELP307\30098B.D13
EVAPOTRANSPIRATION DATA:     C:\HELP307\30098B.D11
SOIL AND DESIGN DATA FILE:   C:\HELP307\3009815M.D10
OUTPUT DATA FILE:           C:\HELP307\3009815B.OUT

```

TIME: 11:24 DATE: 2/ 4/2004

```

*****

```

TITLE: RIGMRIM - Cellule avec 15m de MR

```

*****

```

NOTE: INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.

LAYER 1

```

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 0
THICKNESS                =      20.00   CM
POROSITY                  =      0.4170 VOL/VOL
FIELD CAPACITY            =      0.0450 VOL/VOL
WILTING POINT            =      0.0180 VOL/VOL
INITIAL SOIL WATER CONTENT =      0.1427 VOL/VOL
EFFECTIVE SAT. HYD. COND. = 0.100000005000E-02 CM/SEC

```

LAYER 2

TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 18

THICKNESS = 1500.00 CM
 POROSITY = 0.6710 VOL/VOL
 FIELD CAPACITY = 0.2920 VOL/VOL
 WILTING POINT = 0.0770 VOL/VOL
 INITIAL SOIL WATER CONTENT = 0.2945 VOL/VOL
 EFFECTIVE SAT. HYD. COND. = 0.100000005000E-02 CM/SEC

LAYER 3

TYPE 2 - LATERAL DRAINAGE LAYER

MATERIAL TEXTURE NUMBER 1

THICKNESS = 60.00 CM
 POROSITY = 0.4170 VOL/VOL
 FIELD CAPACITY = 0.0450 VOL/VOL
 WILTING POINT = 0.0180 VOL/VOL
 INITIAL SOIL WATER CONTENT = 0.1485 VOL/VOL
 EFFECTIVE SAT. HYD. COND. = 0.999999978000E-02 CM/SEC
 SLOPE = 2.00 PERCENT
 DRAINAGE LENGTH = 15.0 METERS

LAYER 4

TYPE 4 - FLEXIBLE MEMBRANE LINER

MATERIAL TEXTURE NUMBER 35

THICKNESS = 0.15 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. = 0.199999996000E-12 CM/SEC
 FML PINHOLE DENSITY = 0.00 HOLES/HECTARE
 FML INSTALLATION DEFECTS = 0.00 HOLES/HECTARE
 FML PLACEMENT QUALITY = 4 - POOR

LAYER 5

TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 0

THICKNESS = 0.30 CM
 POROSITY = 0.4170 VOL/VOL
 FIELD CAPACITY = 0.0450 VOL/VOL
 WILTING POINT = 0.0180 VOL/VOL
 INITIAL SOIL WATER CONTENT = 0.0450 VOL/VOL
 EFFECTIVE SAT. HYD. COND. = 0.100000005000E-02 CM/SEC

LAYER 6

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	=	2.00	PERCENT
DRAINAGE LENGTH	=	15.0	METERS

LAYER 7

TYPE 4 - FLEXIBLE MEMBRANE LINER

MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.15	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.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	0.00	HOLES/HECTARE
FML INSTALLATION DEFECTS	=	0.00	HOLES/HECTARE
FML PLACEMENT QUALITY	=	4	- POOR

LAYER 8

TYPE 3 - BARRIER SOIL LINER

MATERIAL TEXTURE NUMBER 17

THICKNESS	=	0.50	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.	=	0.300000003000E-08	CM/SEC

LAYER 9

TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 0

THICKNESS	=	15.00	CM
POROSITY	=	0.4170	VOL/VOL
FIELD CAPACITY	=	0.0450	VOL/VOL
WILTING POINT	=	0.0180	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0449	VOL/VOL

EFFECTIVE SAT. HYD. COND. = 0.100000005000E-02 CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS USER-SPECIFIED.

SCS RUNOFF CURVE NUMBER = 0.00
FRACTION OF AREA ALLOWING RUNOFF = 0.0 PERCENT
AREA PROJECTED ON HORIZONTAL PLANE = 1.0000 HECTARES
EVAPORATIVE ZONE DEPTH = 20.0 CM
INITIAL WATER IN EVAPORATIVE ZONE = 2.853 CM
UPPER LIMIT OF EVAPORATIVE STORAGE = 8.340 CM
LOWER LIMIT OF EVAPORATIVE STORAGE = 0.360 CM
INITIAL SNOW WATER = 7.612 CM
INITIAL WATER IN LAYER MATERIALS = 454.511 CM
TOTAL INITIAL WATER = 462.123 CM
TOTAL SUBSURFACE INFLOW = 0.00 MM/YR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
Lamartine Quebec

STATION LATITUDE = 47.08 DEGREES
MAXIMUM LEAF AREA INDEX = 0.00
START OF GROWING SEASON (JULIAN DATE) = 144
END OF GROWING SEASON (JULIAN DATE) = 260
EVAPORATIVE ZONE DEPTH = 20.0 CM
AVERAGE ANNUAL WIND SPEED = 17.00 KPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY = 70.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY = 69.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY = 76.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY = 78.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR CARIBOU MAINE

NORMAL MEAN MONTHLY PRECIPITATION (MM)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
63.0	56.7	74.1	69.5	93.7	83.0
100.6	111.7	96.1	90.7	78.1	88.5

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR CARIBOU MAINE

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES CELSIUS)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
-11.8	-10.0	-4.1	3.4	10.9	16.2
19.3	18.0	12.8	6.7	0.0	-7.8

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
 COEFFICIENTS FOR CARIBOU MAINE
 AND STATION LATITUDE = 47.08 DEGREES

AVERAGE MONTHLY VALUES (MM) FOR YEARS 1 THROUGH 20

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	71.05 105.21	72.11 100.14	68.21 99.88	46.97 87.95	82.94 77.83	79.57 90.14
STD. DEVIATIONS	19.01 31.89	25.35 38.99	40.16 42.42	17.92 31.22	33.01 25.47	27.29 31.64
RUNOFF						
TOTALS	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000
STD. DEVIATIONS	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000
EVAPOTRANSPIRATION						
TOTALS	10.900 77.333	10.064 71.233	14.224 59.040	17.056 36.537	65.711 18.393	66.103 9.848
STD. DEVIATIONS	1.387 19.339	1.569 22.727	2.812 14.082	9.914 7.909	19.306 5.874	23.974 1.461
LATERAL DRAINAGE COLLECTED FROM LAYER 3						
TOTALS	36.6145 82.3719	8.8764 65.0553	3.0010 48.9036	11.8784 45.5946	52.4930 39.5117	83.9563 48.6625
STD. DEVIATIONS	22.4220 13.8512	5.7321 19.3115	1.5944 20.2541	11.1448 20.8567	16.2912 18.2436	12.3862 17.2762
PERCOLATION/LEAKAGE THROUGH LAYER 4						
TOTALS	0.0002 0.0004	0.0000 0.0003	0.0000 0.0002	0.0001 0.0002	0.0003 0.0002	0.0004 0.0002

STD. DEVIATIONS	0.0001	0.0000	0.0000	0.0001	0.0001	0.0000
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

LATERAL DRAINAGE COLLECTED FROM LAYER 6

TOTALS	0.0002	0.0000	0.0000	0.0001	0.0003	0.0004
	0.0004	0.0003	0.0002	0.0002	0.0002	0.0002
STD. DEVIATIONS	0.0001	0.0000	0.0000	0.0001	0.0001	0.0000
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

PERCOLATION/LEAKAGE THROUGH LAYER 8

TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

PERCOLATION/LEAKAGE THROUGH LAYER 9

TOTALS	0.0010	0.0009	0.0010	0.0009	0.0010	0.0009
	0.0010	0.0010	0.0009	0.0010	0.0009	0.0010
STD. DEVIATIONS	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (CM)

DAILY AVERAGE HEAD ON TOP OF LAYER 4

AVERAGES	5.0308	1.3660	0.4204	1.7110	7.1355	11.4002
	10.9005	8.7800	6.9241	6.2852	5.6501	6.7028
STD. DEVIATIONS	3.0299	0.8874	0.2233	1.5859	2.0610	1.3977
	1.5650	2.4521	2.7663	2.8081	2.5609	2.3207

DAILY AVERAGE HEAD ON TOP OF LAYER 7

AVERAGES	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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

	MM	CU. METERS	PERCENT
PRECIPITATION	982.01 (109.847)	9820.1	100.00

RUNOFF	0.000	(0.0000)	0.00	0.000
EVAPOTRANSPIRATION	456.443	(45.3319)	4564.43	46.480
LATERAL DRAINAGE COLLECTED FROM LAYER 3	526.91931	(106.73888)	5269.193	53.65722
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.00255	(0.00049)	0.025	0.00026
AVERAGE HEAD ON TOP OF LAYER 4	60.256	(11.650)		
LATERAL DRAINAGE COLLECTED FROM LAYER 6	0.00254	(0.00049)	0.025	0.00026
PERCOLATION/LEAKAGE THROUGH LAYER 8	0.00001	(0.00000)	0.000	0.00000
AVERAGE HEAD ON TOP OF LAYER 7	0.000	(0.000)		
PERCOLATION/LEAKAGE THROUGH LAYER 9	0.01145	(0.00117)	0.115	0.00117
CHANGE IN WATER STORAGE	-1.366	(2.3518)	-13.66	-0.139

PEAK DAILY VALUES FOR YEARS	1 THROUGH 20	
	(MM)	(CU. METERS)
PRECIPITATION	61.10	611.000
RUNOFF	0.000	0.0000
DRAINAGE COLLECTED FROM LAYER 3	4.19657	41.96571
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.000018	0.00018
AVERAGE HEAD ON TOP OF LAYER 4	158.612	
MAXIMUM HEAD ON TOP OF LAYER 4	188.943	
LOCATION OF MAXIMUM HEAD IN LAYER 3 (DISTANCE FROM DRAIN)	7.2 METERS	
DRAINAGE COLLECTED FROM LAYER 6	0.00002	0.00018
PERCOLATION/LEAKAGE THROUGH LAYER 8	0.000000	0.00000
AVERAGE HEAD ON TOP OF LAYER 7	0.000	
MAXIMUM HEAD ON TOP OF LAYER 7	0.153	
LOCATION OF MAXIMUM HEAD IN LAYER 6 (DISTANCE FROM DRAIN)	0.0 METERS	
PERCOLATION/LEAKAGE THROUGH LAYER 9	0.000037	0.00037
SNOW WATER	402.45	4024.4553
MAXIMUM VEG. SOIL WATER (VOL/VOL)		0.4170
MINIMUM VEG. SOIL WATER (VOL/VOL)		0.0180

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
 by Bruce M. McEnroe, University of Kansas
 ASCE Journal of Environmental Engineering
 Vol. 119, No. 2, March 1993, pp. 262-270.

FINAL WATER STORAGE AT END OF YEAR 20

LAYER	(CM)	(VOL/VOL)
1	2.9882	0.1494
2	438.3973	0.2923
3	9.0944	0.1516
4	0.0000	0.0000
5	0.0135	0.0450
6	0.0050	0.0100
7	0.0000	0.0000
8	0.3750	0.7500
9	0.6507	0.0434
SNOW WATER	7.866	


```

*****
*****
**
**
**          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        **
**
**
*****
*****

```

```

PRECIPITATION DATA FILE: C:\DOCUME~2\LOGICI~1\HELP307\30098B.D4
TEMPERATURE DATA FILE:  C:\DOCUME~2\LOGICI~1\HELP307\30098B.D7
SOLAR RADIATION DATA FILE: C:\DOCUME~2\LOGICI~1\HELP307\30098B.D13
EVAPOTRANSPIRATION DATA: C:\DOCUME~2\LOGICI~1\HELP307\30098B.D11
SOIL AND DESIGN DATA FILE: C:\DOCUME~2\LOGICI~1\HELP307\30098RT.D10
OUTPUT DATA FILE:        C:\DOCUME~2\LOGICI~1\HELP307\30098RTB.OUT

```

TIME: 15:57 DATE: 2/ 4/2004

```

*****
TITLE: RIGMRIM - Cellule avec recouvrement temporaire
*****

```

NOTE: INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.

LAYER 1

```

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 0
THICKNESS = 5.00 CM
POROSITY = 0.8500 VOL/VOL
FIELD CAPACITY = 0.0100 VOL/VOL
WILTING POINT = 0.0050 VOL/VOL
INITIAL SOIL WATER CONTENT = 0.0402 VOL/VOL
EFFECTIVE SAT. HYD. COND. = 330.00000000 CM/SEC
SLOPE = 100.00 PERCENT
DRAINAGE LENGTH = 15.0 METERS

```

LAYER 2

TYPE 4 - FLEXIBLE MEMBRANE LINER

MATERIAL TEXTURE NUMBER 36

THICKNESS	=	0.03	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.	=	0.399999993000E-12	CM/SEC
FML PINHOLE DENSITY	=	5000.00	HOLES/HECTARE
FML INSTALLATION DEFECTS	=	5000.00	HOLES/HECTARE
FML PLACEMENT QUALITY	=	5	- BAD

LAYER 3

TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 0

THICKNESS	=	20.00	CM
POROSITY	=	0.4170	VOL/VOL
FIELD CAPACITY	=	0.0450	VOL/VOL
WILTING POINT	=	0.0180	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0864	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC

LAYER 4

TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 18

THICKNESS	=	500.00	CM
POROSITY	=	0.6710	VOL/VOL
FIELD CAPACITY	=	0.2920	VOL/VOL
WILTING POINT	=	0.0770	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2920	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC

LAYER 5

TYPE 2 - LATERAL DRAINAGE LAYER

MATERIAL TEXTURE NUMBER 1

THICKNESS	=	60.00	CM
POROSITY	=	0.4170	VOL/VOL
FIELD CAPACITY	=	0.0450	VOL/VOL
WILTING POINT	=	0.0180	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0459	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.999999978000E-02	CM/SEC
SLOPE	=	2.00	PERCENT
DRAINAGE LENGTH	=	15.0	METERS

LAYER 6

TYPE 4 - FLEXIBLE MEMBRANE LINER

MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.15	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.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	0.00	HOLES/HECTARE
FML INSTALLATION DEFECTS	=	0.00	HOLES/HECTARE
FML PLACEMENT QUALITY	=	4	- POOR

LAYER 7

TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 0

THICKNESS	=	0.30	CM
POROSITY	=	0.4170	VOL/VOL
FIELD CAPACITY	=	0.0450	VOL/VOL
WILTING POINT	=	0.0180	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0450	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC

LAYER 8

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	=	2.00	PERCENT
DRAINAGE LENGTH	=	15.0	METERS

LAYER 9

TYPE 4 - FLEXIBLE MEMBRANE LINER

MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.15	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. = 0.199999996000E-12 CM/SEC
 FML PINHOLE DENSITY = 0.00 HOLES/HECTARE
 FML INSTALLATION DEFECTS = 0.00 HOLES/HECTARE
 FML PLACEMENT QUALITY = 4 - POOR

LAYER 10

TYPE 3 - BARRIER SOIL LINER
 MATERIAL TEXTURE NUMBER 17

THICKNESS = 0.50 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. = 0.300000003000E-08 CM/SEC

LAYER 11

TYPE 1 - VERTICAL PERCOLATION LAYER
 MATERIAL TEXTURE NUMBER 0

THICKNESS = 15.00 CM
 POROSITY = 0.4170 VOL/VOL
 FIELD CAPACITY = 0.0450 VOL/VOL
 WILTING POINT = 0.0180 VOL/VOL
 INITIAL SOIL WATER CONTENT = 0.0449 VOL/VOL
 EFFECTIVE SAT. HYD. COND. = 0.100000005000E-02 CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT
 SOIL DATA BASE USING SOIL TEXTURE #12 WITH BARE
 GROUND CONDITIONS, A SURFACE SLOPE OF 100.% AND
 A SLOPE LENGTH OF 15. METERS.

SCS RUNOFF CURVE NUMBER = 95.90
 FRACTION OF AREA ALLOWING RUNOFF = 0.0 PERCENT
 AREA PROJECTED ON HORIZONTAL PLANE = 1.0000 HECTARES
 EVAPORATIVE ZONE DEPTH = 5.0 CM
 INITIAL WATER IN EVAPORATIVE ZONE = 0.201 CM
 UPPER LIMIT OF EVAPORATIVE STORAGE = 4.250 CM
 LOWER LIMIT OF EVAPORATIVE STORAGE = 0.025 CM
 INITIAL SNOW WATER = 7.612 CM
 INITIAL WATER IN LAYER MATERIALS = 151.750 CM
 TOTAL INITIAL WATER = 159.362 CM
 TOTAL SUBSURFACE INFLOW = 0.00 MM/YR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
Lamartine Quebec

STATION LATITUDE = 47.08 DEGREES
 MAXIMUM LEAF AREA INDEX = 0.00
 START OF GROWING SEASON (JULIAN DATE) = 144
 END OF GROWING SEASON (JULIAN DATE) = 260
 EVAPORATIVE ZONE DEPTH = 5.0 CM
 AVERAGE ANNUAL WIND SPEED = 17.00 KPH
 AVERAGE 1ST QUARTER RELATIVE HUMIDITY = 70.00 %
 AVERAGE 2ND QUARTER RELATIVE HUMIDITY = 69.00 %
 AVERAGE 3RD QUARTER RELATIVE HUMIDITY = 76.00 %
 AVERAGE 4TH QUARTER RELATIVE HUMIDITY = 78.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR CARIBOU MAINE

NORMAL MEAN MONTHLY PRECIPITATION (MM)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
63.0	56.7	74.1	69.5	93.7	83.0
100.6	111.7	96.1	90.7	78.1	88.5

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR CARIBOU MAINE

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES CELSIUS)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
-11.8	-10.0	-4.1	3.4	10.9	16.2
19.3	18.0	12.8	6.7	0.0	-7.8

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR CARIBOU MAINE
AND STATION LATITUDE = 47.08 DEGREES

AVERAGE MONTHLY VALUES (MM) FOR YEARS 1 THROUGH 20

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

STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

PERCOLATION/LEAKAGE THROUGH LAYER 10

TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

PERCOLATION/LEAKAGE THROUGH LAYER 11

TOTALS	0.0010	0.0009	0.0010	0.0009	0.0010	0.0009
	0.0010	0.0010	0.0009	0.0010	0.0009	0.0010

STD. DEVIATIONS	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (CM)

DAILY AVERAGE HEAD ON TOP OF LAYER 2

AVERAGES	0.0000	0.0000	0.1023	0.2289	0.0412	0.0227
	0.0298	0.0311	0.0355	0.0300	0.0303	0.0024

STD. DEVIATIONS	0.0000	0.0000	0.1132	0.1416	0.0240	0.0105
	0.0137	0.0144	0.0191	0.0187	0.0221	0.0049

DAILY AVERAGE HEAD ON TOP OF LAYER 6

AVERAGES	0.1388	0.1453	0.1359	0.1174	0.0872	0.0713
	0.0695	0.0721	0.0816	0.0933	0.1082	0.1116

STD. DEVIATIONS	0.0569	0.0560	0.0459	0.0341	0.0274	0.0212
	0.0186	0.0298	0.0331	0.0461	0.0436	0.0433

DAILY AVERAGE HEAD ON TOP OF LAYER 9

AVERAGES	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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

	MM		CU. METERS	PERCENT
	-----		-----	-----
PRECIPITATION	982.01	(109.847)	9820.1	100.00

RUNOFF	0.000	(0.0000)	0.00	0.000
EVAPOTRANSPIRATION	237.507	(28.0820)	2375.07	24.186
LATERAL DRAINAGE COLLECTED FROM LAYER 1	735.11798	(116.30403)	7351.180	74.85851
PERCOLATION/LEAKAGE THROUGH LAYER 2	9.22104	(1.74918)	92.210	0.93900
AVERAGE HEAD ON TOP OF LAYER 2	0.462	(0.110)		
LATERAL DRAINAGE COLLECTED FROM LAYER 5	8.61902	(2.42898)	86.190	0.87769
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.00007	(0.00000)	0.001	0.00001
AVERAGE HEAD ON TOP OF LAYER 6	1.027	(0.290)		
LATERAL DRAINAGE COLLECTED FROM LAYER 8	0.00006	(0.00000)	0.001	0.00001
PERCOLATION/LEAKAGE THROUGH LAYER 10	0.00001	(0.00000)	0.000	0.00000
AVERAGE HEAD ON TOP OF LAYER 9	0.000	(0.000)		
PERCOLATION/LEAKAGE THROUGH LAYER 11	0.01145	(0.00117)	0.115	0.00117
CHANGE IN WATER STORAGE	0.754	(2.3633)	7.54	0.077

PEAK DAILY VALUES FOR YEARS	1 THROUGH	20
	(MM)	(CU. METERS)
PRECIPITATION	61.10	611.000
RUNOFF	0.000	0.0000
DRAINAGE COLLECTED FROM LAYER 1	131.38066	1313.80664
PERCOLATION/LEAKAGE THROUGH LAYER 2	1.971135	19.71135
AVERAGE HEAD ON TOP OF LAYER 2	25.000	
MAXIMUM HEAD ON TOP OF LAYER 2	0.014	
LOCATION OF MAXIMUM HEAD IN LAYER 1 (DISTANCE FROM DRAIN)	0.0 METERS	
DRAINAGE COLLECTED FROM LAYER 5	0.06540	0.65401
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.000000	0.00000
AVERAGE HEAD ON TOP OF LAYER 6	2.840	
MAXIMUM HEAD ON TOP OF LAYER 6	5.352	
LOCATION OF MAXIMUM HEAD IN LAYER 5 (DISTANCE FROM DRAIN)	0.9 METERS	
DRAINAGE COLLECTED FROM LAYER 8	0.00000	0.00000
PERCOLATION/LEAKAGE THROUGH LAYER 10	0.000000	0.00000
AVERAGE HEAD ON TOP OF LAYER 9	0.000	
MAXIMUM HEAD ON TOP OF LAYER 9	0.020	
LOCATION OF MAXIMUM HEAD IN LAYER 8 (DISTANCE FROM DRAIN)	0.0 METERS	
PERCOLATION/LEAKAGE THROUGH LAYER 11	0.000037	0.00037
SNOW WATER	402.45	4024.4553
MAXIMUM VEG. SOIL WATER (VOL/VOL)		0.8500
MINIMUM VEG. SOIL WATER (VOL/VOL)		0.0050

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

FINAL WATER STORAGE AT END OF YEAR 20

LAYER	(CM)	(VOL/VOL)
1	0.2735	0.0547
2	0.0000	0.0000
3	1.9420	0.0971
4	146.0000	0.2920
5	3.7439	0.0624
6	0.0000	0.0000
7	0.0135	0.0450
8	0.0050	0.0100
9	0.0000	0.0000
10	0.3750	0.7500
11	0.6507	0.0434
SNOW WATER	7.866	


```

*****
*****
**
**
**          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       **
**
**
*****
*****

```

```

PRECIPITATION DATA FILE:   C:\DOCUME~2\LOGICI~1\HELP307\30098B.D4
TEMPERATURE DATA FILE:    C:\DOCUME~2\LOGICI~1\HELP307\30098B.D7
SOLAR RADIATION DATA FILE: C:\DOCUME~2\LOGICI~1\HELP307\30098B.D13
EVAPOTRANSPIRATION DATA:  C:\DOCUME~2\LOGICI~1\HELP307\30098C.D11
SOIL AND DESIGN DATA FILE: C:\DOCUME~2\LOGICI~1\HELP307\30098RF.D10
OUTPUT DATA FILE:         C:\DOCUME~2\LOGICI~1\HELP307\30098RFC.OUT

```

TIME: 9:54 DATE: 2/ 5/2004

```

*****
TITLE: RIGMRIM - Cellule avec recouvrement final (2 ans et moins)
*****

```

NOTE: INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.

LAYER 1

```

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 5
THICKNESS = 15.00 CM
POROSITY = 0.4570 VOL/VOL
FIELD CAPACITY = 0.1310 VOL/VOL
WILTING POINT = 0.0580 VOL/VOL
INITIAL SOIL WATER CONTENT = 0.2263 VOL/VOL
EFFECTIVE SAT. HYD. COND. = 0.100000005000E-02 CM/SEC
NOTE: SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY 1.80
FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.

```

LAYER 2

TYPE 2 - LATERAL DRAINAGE LAYER

MATERIAL TEXTURE NUMBER 0

THICKNESS	=	45.00	CM
POROSITY	=	0.4170	VOL/VOL
FIELD CAPACITY	=	0.0450	VOL/VOL
WILTING POINT	=	0.0180	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.3815	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.200000009000E-02	CM/SEC
SLOPE	=	5.00	PERCENT
DRAINAGE LENGTH	=	100.0	METERS

LAYER 3

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.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	3.00	HOLES/HECTARE
FML INSTALLATION DEFECTS	=	3.00	HOLES/HECTARE
FML PLACEMENT QUALITY	=	3	- GOOD

LAYER 4

TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 0

THICKNESS	=	300.00	CM
POROSITY	=	0.4170	VOL/VOL
FIELD CAPACITY	=	0.0450	VOL/VOL
WILTING POINT	=	0.0180	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0514	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC

LAYER 5

TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 18

THICKNESS	=	1500.00	CM
POROSITY	=	0.6710	VOL/VOL
FIELD CAPACITY	=	0.2920	VOL/VOL
WILTING POINT	=	0.0770	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2920	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC

LAYER 6

TYPE 2 - LATERAL DRAINAGE LAYER

MATERIAL TEXTURE NUMBER 1

THICKNESS	=	60.00	CM
POROSITY	=	0.4170	VOL/VOL
FIELD CAPACITY	=	0.0450	VOL/VOL
WILTING POINT	=	0.0180	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0450	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.999999978000E-02	CM/SEC
SLOPE	=	2.00	PERCENT
DRAINAGE LENGTH	=	15.0	METERS

LAYER 7

TYPE 4 - FLEXIBLE MEMBRANE LINER

MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.15	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.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	0.00	HOLES/HECTARE
FML INSTALLATION DEFECTS	=	0.00	HOLES/HECTARE
FML PLACEMENT QUALITY	=	4	- POOR

LAYER 8

TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 1

THICKNESS	=	0.30	CM
POROSITY	=	0.4170	VOL/VOL
FIELD CAPACITY	=	0.0450	VOL/VOL
WILTING POINT	=	0.0180	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0450	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.999999978000E-02	CM/SEC

LAYER 9

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	=	2.00	PERCENT
DRAINAGE LENGTH	=	15.0	METERS

LAYER 10

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.15	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.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	0.00	HOLES/HECTARE
FML INSTALLATION DEFECTS	=	0.00	HOLES/HECTARE
FML PLACEMENT QUALITY	=	4 - POOR	

LAYER 11

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 17

THICKNESS	=	0.50	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.	=	0.300000003000E-08	CM/SEC

LAYER 12

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 0

THICKNESS	=	15.00	CM
POROSITY	=	0.4170	VOL/VOL
FIELD CAPACITY	=	0.0450	VOL/VOL
WILTING POINT	=	0.0180	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0450	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT
 SOIL DATA BASE USING SOIL TEXTURE # 5 WITH A
 POOR STAND OF GRASS, A SURFACE SLOPE OF 5. %
 AND A SLOPE LENGTH OF 100. METERS.

SCS RUNOFF CURVE NUMBER	=	77.40	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	1.0000	HECTARES
EVAPORATIVE ZONE DEPTH	=	20.0	CM
INITIAL WATER IN EVAPORATIVE ZONE	=	5.514	CM
UPPER LIMIT OF EVAPORATIVE STORAGE	=	8.940	CM
LOWER LIMIT OF EVAPORATIVE STORAGE	=	0.960	CM
INITIAL SNOW WATER	=	7.612	CM
INITIAL WATER IN LAYER MATERIALS	=	477.754	CM
TOTAL INITIAL WATER	=	485.366	CM
TOTAL SUBSURFACE INFLOW	=	0.00	MM/YR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
 Lamartine Quebec

STATION LATITUDE	=	47.08	DEGREES
MAXIMUM LEAF AREA INDEX	=	1.00	
START OF GROWING SEASON (JULIAN DATE)	=	144	
END OF GROWING SEASON (JULIAN DATE)	=	260	
EVAPORATIVE ZONE DEPTH	=	20.0	CM
AVERAGE ANNUAL WIND SPEED	=	17.00	KPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	70.00	%
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	69.00	%
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	76.00	%
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	78.00	%

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
 COEFFICIENTS FOR CARIBOU MAINE

NORMAL MEAN MONTHLY PRECIPITATION (MM)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
-----	-----	-----	-----	-----	-----
63.0	56.7	74.1	69.5	93.7	83.0
100.6	111.7	96.1	90.7	78.1	88.5

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
 COEFFICIENTS FOR CARIBOU MAINE

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES CELSIUS)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
-----	-----	-----	-----	-----	-----
-11.8	-10.0	-4.1	3.4	10.9	16.2
19.3	18.0	12.8	6.7	0.0	-7.8

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
 COEFFICIENTS FOR CARIBOU MAINE
 AND STATION LATITUDE = 47.08 DEGREES

AVERAGE MONTHLY VALUES (MM) FOR YEARS 1 THROUGH 20

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

PRECIPITATION						

TOTALS	71.05 105.21	72.11 100.14	68.21 99.88	46.97 87.95	82.94 77.83	79.57 90.14
STD. DEVIATIONS	19.01 31.89	25.35 38.99	40.16 42.42	17.92 31.22	33.01 25.47	27.29 31.64
RUNOFF						

TOTALS	0.000 0.323	0.000 0.069	95.768 0.349	174.646 0.889	4.515 8.999	0.060 3.563
STD. DEVIATIONS	0.000 1.436	0.000 0.139	85.472 0.953	100.725 2.396	8.981 15.867	0.185 13.959
EVAPOTRANSPIRATION						

TOTALS	10.900 83.736	10.064 77.499	14.222 58.403	17.371 36.123	68.334 18.178	69.855 9.853
STD. DEVIATIONS	1.387 19.770	1.569 24.468	2.813 13.430	10.122 6.959	20.433 5.409	24.348 1.449
LATERAL DRAINAGE COLLECTED FROM LAYER 2						

TOTALS	15.2501 14.5904	11.7856 14.8032	10.9687 16.2434	9.7503 18.6493	15.1609 21.4792	14.6739 18.5162
STD. DEVIATIONS	3.1333 2.1463	2.4293 3.6774	2.2743 3.9770	1.9569 5.4001	1.6653 5.8170	2.0821 4.0834
PERCOLATION/LEAKAGE THROUGH LAYER 3						

TOTALS	3.0053 2.8972	2.3807 2.9370	2.2753 3.1739	2.0503 3.6217	2.9930 4.1519	2.8974 3.5758
STD. DEVIATIONS	0.5394 0.3651	0.4255 0.6394	0.4049 0.6960	0.3500 0.9701	0.2829 1.0741	0.3525 0.7151
LATERAL DRAINAGE COLLECTED FROM LAYER 6						

TOTALS	1.8495	1.3959	1.5473	1.7884	2.1123	2.4292

	2.7033	2.4290	2.1002	1.9974	1.9703	2.1606
STD. DEVIATIONS	1.3553	1.0623	1.1912	1.3532	1.5634	1.7391
	1.8712	1.6720	1.4504	1.4037	1.3371	1.4115
PERCOLATION/LEAKAGE THROUGH LAYER 7						
TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
LATERAL DRAINAGE COLLECTED FROM LAYER 9						
TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 11						
TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 12						
TOTALS	0.0008	0.0007	0.0008	0.0008	0.0008	0.0007
	0.0007	0.0007	0.0007	0.0007	0.0007	0.0008
STD. DEVIATIONS	0.0005	0.0004	0.0005	0.0004	0.0005	0.0004
	0.0005	0.0005	0.0005	0.0005	0.0004	0.0004

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (CM)

DAILY AVERAGE HEAD ON TOP OF LAYER 3						
AVERAGES	28.5417	24.2010	20.5288	18.8567	28.3748	28.3788
	27.3092	27.7750	31.5963	35.4194	42.8936	34.8985
STD. DEVIATIONS	5.8641	4.9914	4.2565	3.7845	3.1168	4.0267
	4.0209	7.0895	7.9752	10.7916	12.3601	7.8986
DAILY AVERAGE HEAD ON TOP OF LAYER 7						
AVERAGES	0.2591	0.2146	0.2167	0.2589	0.2959	0.3516
	0.3787	0.3402	0.3040	0.2798	0.2852	0.3026
STD. DEVIATIONS	0.1898	0.1638	0.1669	0.1959	0.2190	0.2517
	0.2621	0.2342	0.2099	0.1966	0.1935	0.1977

DAILY AVERAGE HEAD ON TOP OF LAYER 10

AVERAGES	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 20				
	MM		CU. METERS	PERCENT
	-----		-----	-----
PRECIPITATION	982.01 (109.847)		9820.1	100.00
RUNOFF	289.181 (75.9455)		2891.81	29.448
EVAPOTRANSPIRATION	474.539 (45.2653)		4745.39	48.323
LATERAL DRAINAGE COLLECTED FROM LAYER 2	181.87126 (28.68916)		1818.713	18.52031
PERCOLATION/LEAKAGE THROUGH LAYER 3	35.95940 (5.06104)		359.594	3.66182
AVERAGE HEAD ON TOP OF LAYER 3	290.645 (47.049)			
LATERAL DRAINAGE COLLECTED FROM LAYER 6	24.48349 (16.58051)		244.835	2.49320
PERCOLATION/LEAKAGE THROUGH LAYER 7	0.00012 (0.00008)		0.001	0.00001
AVERAGE HEAD ON TOP OF LAYER 7	2.906 (1.968)			
LATERAL DRAINAGE COLLECTED FROM LAYER 9	0.00012 (0.00008)		0.001	0.00001
PERCOLATION/LEAKAGE THROUGH LAYER 11	0.00001 (0.00000)		0.000	0.00000
AVERAGE HEAD ON TOP OF LAYER 10	0.000 (0.000)			
PERCOLATION/LEAKAGE THROUGH LAYER 12	0.00890 (0.00525)		0.089	0.00091
CHANGE IN WATER STORAGE	11.927 (1.9827)		119.27	1.215

PEAK DAILY VALUES FOR YEARS	1 THROUGH	20
	(MM)	(CU. METERS)
PRECIPITATION	61.10	611.000
RUNOFF	131.141	1311.4060
DRAINAGE COLLECTED FROM LAYER 2	0.97328	9.73283
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.187783	1.87783
AVERAGE HEAD ON TOP OF LAYER 3	599.755	
MAXIMUM HEAD ON TOP OF LAYER 3	888.868	
LOCATION OF MAXIMUM HEAD IN LAYER 2 (DISTANCE FROM DRAIN)	25.7 METERS	
DRAINAGE COLLECTED FROM LAYER 6	0.15554	1.55543
PERCOLATION/LEAKAGE THROUGH LAYER 7	0.000001	0.00001
AVERAGE HEAD ON TOP OF LAYER 7	6.754	
MAXIMUM HEAD ON TOP OF LAYER 7	12.121	
LOCATION OF MAXIMUM HEAD IN LAYER 6 (DISTANCE FROM DRAIN)	1.5 METERS	
DRAINAGE COLLECTED FROM LAYER 9	0.00000	0.00001
PERCOLATION/LEAKAGE THROUGH LAYER 11	0.000000	0.00000
AVERAGE HEAD ON TOP OF LAYER 10	0.000	
MAXIMUM HEAD ON TOP OF LAYER 10	0.031	
LOCATION OF MAXIMUM HEAD IN LAYER 9 (DISTANCE FROM DRAIN)	0.0 METERS	
PERCOLATION/LEAKAGE THROUGH LAYER 12	0.000038	0.00038
SNOW WATER	402.45	4024.4553
MAXIMUM VEG. SOIL WATER (VOL/VOL)		0.4470
MINIMUM VEG. SOIL WATER (VOL/VOL)		0.0480

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

FINAL WATER STORAGE AT END OF YEAR 20

LAYER	(CM)	(VOL/VOL)
1	4.7744	0.3183
2	16.4533	0.3656
3	0.0000	0.0000
4	36.7538	0.1225
5	438.0000	0.2920
6	4.3213	0.0720
7	0.0000	0.0000
8	0.0135	0.0450
9	0.0050	0.0100
10	0.0000	0.0000
11	0.3750	0.7500
12	0.6566	0.0438
SNOW WATER	7.866	


```

*****
*****
**
**
**          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       **
**
**
*****
*****

```

```

PRECIPITATION DATA FILE: C:\DOCUME~2\LOGICI~1\HELP307\30098B.D4
TEMPERATURE DATA FILE:  C:\DOCUME~2\LOGICI~1\HELP307\30098B.D7
SOLAR RADIATION DATA FILE: C:\DOCUME~2\LOGICI~1\HELP307\30098B.D13
EVAPOTRANSPIRATION DATA: C:\DOCUME~2\LOGICI~1\HELP307\30098D.D11
SOIL AND DESIGN DATA FILE: C:\DOCUME~2\LOGICI~1\HELP307\30098RFD.D10
OUTPUT DATA FILE:       C:\DOCUME~2\LOGICI~1\HELP307\30098rfd.OUT

```

TIME: 9:53 DATE: 2/ 5/2004

```

*****
TITLE: RIGMRIM - Cellule avec recouvrement final (3 ans et plus)
*****

```

NOTE: INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.

LAYER 1

```

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 5
THICKNESS = 15.00 CM
POROSITY = 0.4570 VOL/VOL
FIELD CAPACITY = 0.1310 VOL/VOL
WILTING POINT = 0.0580 VOL/VOL
INITIAL SOIL WATER CONTENT = 0.2630 VOL/VOL
EFFECTIVE SAT. HYD. COND. = 0.100000005000E-02 CM/SEC
NOTE: SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY 4.63
FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.

```

LAYER 2

TYPE 2 - LATERAL DRAINAGE LAYER

MATERIAL TEXTURE NUMBER 0

THICKNESS	=	45.00	CM
POROSITY	=	0.4170	VOL/VOL
FIELD CAPACITY	=	0.0450	VOL/VOL
WILTING POINT	=	0.0180	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.3815	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.200000009000E-02	CM/SEC
SLOPE	=	5.00	PERCENT
DRAINAGE LENGTH	=	100.0	METERS

LAYER 3

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.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	3.00	HOLES/HECTARE
FML INSTALLATION DEFECTS	=	3.00	HOLES/HECTARE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 4

TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 0

THICKNESS	=	300.00	CM
POROSITY	=	0.4170	VOL/VOL
FIELD CAPACITY	=	0.0450	VOL/VOL
WILTING POINT	=	0.0180	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0517	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC

LAYER 5

TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 18

THICKNESS	=	1500.00	CM
POROSITY	=	0.6710	VOL/VOL
FIELD CAPACITY	=	0.2920	VOL/VOL
WILTING POINT	=	0.0770	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2920	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC

LAYER 6

TYPE 2 - LATERAL DRAINAGE LAYER

MATERIAL TEXTURE NUMBER 1

THICKNESS	=	60.00	CM
POROSITY	=	0.4170	VOL/VOL
FIELD CAPACITY	=	0.0450	VOL/VOL
WILTING POINT	=	0.0180	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0450	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.999999978000E-02	CM/SEC
SLOPE	=	2.00	PERCENT
DRAINAGE LENGTH	=	15.0	METERS

LAYER 7

TYPE 4 - FLEXIBLE MEMBRANE LINER

MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.15	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.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	0.00	HOLES/HECTARE
FML INSTALLATION DEFECTS	=	0.00	HOLES/HECTARE
FML PLACEMENT QUALITY	=	4	- POOR

LAYER 8

TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 1

THICKNESS	=	0.30	CM
POROSITY	=	0.4170	VOL/VOL
FIELD CAPACITY	=	0.0450	VOL/VOL
WILTING POINT	=	0.0180	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0450	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.999999978000E-02	CM/SEC

LAYER 9

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	=	2.00	PERCENT
DRAINAGE LENGTH	=	15.0	METERS

LAYER 10

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.15	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.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	0.00	HOLES/HECTARE
FML INSTALLATION DEFECTS	=	0.00	HOLES/HECTARE
FML PLACEMENT QUALITY	=	4 - POOR	

LAYER 11

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 17

THICKNESS	=	0.50	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.	=	0.300000003000E-08	CM/SEC

LAYER 12

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 0

THICKNESS	=	15.00	CM
POROSITY	=	0.4170	VOL/VOL
FIELD CAPACITY	=	0.0450	VOL/VOL
WILTING POINT	=	0.0180	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0450	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT
 SOIL DATA BASE USING SOIL TEXTURE # 5 WITH A
 GOOD STAND OF GRASS, A SURFACE SLOPE OF 5. %
 AND A SLOPE LENGTH OF 100. METERS.

SCS RUNOFF CURVE NUMBER	=	56.30	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	1.0000	HECTARES
EVAPORATIVE ZONE DEPTH	=	20.0	CM
INITIAL WATER IN EVAPORATIVE ZONE	=	6.063	CM
UPPER LIMIT OF EVAPORATIVE STORAGE	=	8.940	CM
LOWER LIMIT OF EVAPORATIVE STORAGE	=	0.960	CM
INITIAL SNOW WATER	=	7.612	CM
INITIAL WATER IN LAYER MATERIALS	=	478.378	CM
TOTAL INITIAL WATER	=	485.991	CM
TOTAL SUBSURFACE INFLOW	=	0.00	MM/YR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
 Lamartine Quebec

STATION LATITUDE	=	47.08	DEGREES
MAXIMUM LEAF AREA INDEX	=	3.50	
START OF GROWING SEASON (JULIAN DATE)	=	144	
END OF GROWING SEASON (JULIAN DATE)	=	260	
EVAPORATIVE ZONE DEPTH	=	20.0	CM
AVERAGE ANNUAL WIND SPEED	=	17.00	KPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	70.00	%
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	69.00	%
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	76.00	%
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	78.00	%

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
 COEFFICIENTS FOR CARIBOU MAINE

NORMAL MEAN MONTHLY PRECIPITATION (MM)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
-----	-----	-----	-----	-----	-----
63.0	56.7	74.1	69.5	93.7	83.0
100.6	111.7	96.1	90.7	78.1	88.5

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
 COEFFICIENTS FOR CARIBOU MAINE

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES CELSIUS)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
-----	-----	-----	-----	-----	-----
-11.8	-10.0	-4.1	3.4	10.9	16.2
19.3	18.0	12.8	6.7	0.0	-7.8

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
 COEFFICIENTS FOR CARIBOU MAINE
 AND STATION LATITUDE = 47.08 DEGREES

AVERAGE MONTHLY VALUES (MM) FOR YEARS 1 THROUGH 20

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

PRECIPITATION						

TOTALS	71.05 105.21	72.11 100.14	68.21 99.88	46.97 87.95	82.94 77.83	79.57 90.14
STD. DEVIATIONS	19.01 31.89	25.35 38.99	40.16 42.42	17.92 31.22	33.01 25.47	27.29 31.64
RUNOFF						

TOTALS	0.000 0.000	0.000 0.000	95.516 0.000	174.795 1.199	4.462 9.506	0.000 3.474
STD. DEVIATIONS	0.000 0.000	0.000 0.000	85.067 0.000	100.180 3.371	8.969 16.254	0.000 13.630
EVAPOTRANSPIRATION						

TOTALS	10.900 86.677	10.064 79.997	14.228 52.910	16.496 32.607	63.420 17.145	73.080 9.860
STD. DEVIATIONS	1.387 18.599	1.569 26.179	2.810 11.823	9.257 6.272	20.246 4.605	23.165 1.438
LATERAL DRAINAGE COLLECTED FROM LAYER 2						

TOTALS	15.4177 15.0974	11.9165 14.8288	11.0871 16.4022	9.9612 19.6710	16.1001 23.7393	15.5724 19.0088
STD. DEVIATIONS	2.9277 2.1764	2.2769 3.4864	2.1229 4.0846	1.9150 6.0372	1.7258 7.2158	2.1974 4.1603
PERCOLATION/LEAKAGE THROUGH LAYER 3						

TOTALS	3.0343 2.9831	2.4037 2.9330	2.2965 3.1775	2.0870 3.7175	3.1511 4.2430	3.0488 3.6149
STD. DEVIATIONS	0.5034 0.3697	0.3985 0.5829	0.3774 0.6761	0.3406 0.9633	0.2920 1.0489	0.3706 0.6790
LATERAL DRAINAGE COLLECTED FROM LAYER 6						

TOTALS	1.9043	1.4214	1.6039	1.8849	2.2148	2.5470

	2.7861	2.4491	2.0798	1.9943	2.0763	2.2770
STD. DEVIATIONS	1.3665	1.0742	1.2230	1.3913	1.6100	1.8049
	1.9202	1.6802	1.4337	1.3673	1.3500	1.4718
PERCOLATION/LEAKAGE THROUGH LAYER 7						

TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
LATERAL DRAINAGE COLLECTED FROM LAYER 9						

TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 11						

TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 12						

TOTALS	0.0008	0.0007	0.0008	0.0007	0.0008	0.0007
	0.0007	0.0007	0.0007	0.0008	0.0007	0.0008
STD. DEVIATIONS	0.0005	0.0004	0.0005	0.0004	0.0005	0.0004
	0.0005	0.0005	0.0005	0.0005	0.0004	0.0004

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (CM)

DAILY AVERAGE HEAD ON TOP OF LAYER 3

AVERAGES	28.8554	24.4678	20.7504	19.2645	30.1326	30.1163
	28.2599	27.7269	31.6356	36.4841	43.9407	35.3291
STD. DEVIATIONS	5.4794	4.6631	3.9733	3.7035	3.2299	4.2498
	4.0811	6.4548	7.7505	10.7284	12.0810	7.5085

DAILY AVERAGE HEAD ON TOP OF LAYER 7

AVERAGES	0.2667	0.2185	0.2247	0.2728	0.3102	0.3687
	0.3903	0.3431	0.3010	0.2794	0.3005	0.3189
STD. DEVIATIONS	0.1914	0.1657	0.1713	0.2014	0.2255	0.2613
	0.2690	0.2353	0.2075	0.1915	0.1954	0.2062

DAILY AVERAGE HEAD ON TOP OF LAYER 10

AVERAGES	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 20				
	MM		CU. METERS	PERCENT
	-----		-----	-----
PRECIPITATION	982.01 (109.847)		9820.1	100.00
RUNOFF	288.952 (74.7064)		2889.52	29.425
EVAPOTRANSPIRATION	467.385 (45.3534)		4673.85	47.595
LATERAL DRAINAGE COLLECTED FROM LAYER 2	188.80246 (29.68694)		1888.025	19.22612
PERCOLATION/LEAKAGE THROUGH LAYER 3	36.69046 (4.87020)		366.905	3.73626
AVERAGE HEAD ON TOP OF LAYER 3	297.469 (45.358)			
LATERAL DRAINAGE COLLECTED FROM LAYER 6	25.23892 (16.83822)		252.389	2.57013
PERCOLATION/LEAKAGE THROUGH LAYER 7	0.00013 (0.00008)		0.001	0.00001
AVERAGE HEAD ON TOP OF LAYER 7	2.996 (1.999)			
LATERAL DRAINAGE COLLECTED FROM LAYER 9	0.00012 (0.00008)		0.001	0.00001
PERCOLATION/LEAKAGE THROUGH LAYER 11	0.00001 (0.00000)		0.000	0.00000
AVERAGE HEAD ON TOP OF LAYER 10	0.000 (0.000)			
PERCOLATION/LEAKAGE THROUGH LAYER 12	0.00892 (0.00529)		0.089	0.00091
CHANGE IN WATER STORAGE	11.623 (1.8845)		116.23	1.184

PEAK DAILY VALUES FOR YEARS	1 THROUGH	20
	(MM)	(CU. METERS)
PRECIPITATION	61.10	611.000
RUNOFF	131.121	1311.2072
DRAINAGE COLLECTED FROM LAYER 2	1.21788	12.17885
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.187852	1.87852
AVERAGE HEAD ON TOP OF LAYER 3	599.995	
MAXIMUM HEAD ON TOP OF LAYER 3	889.166	
LOCATION OF MAXIMUM HEAD IN LAYER 2 (DISTANCE FROM DRAIN)	25.7 METERS	
DRAINAGE COLLECTED FROM LAYER 6	0.15750	1.57500
PERCOLATION/LEAKAGE THROUGH LAYER 7	0.000001	0.00001
AVERAGE HEAD ON TOP OF LAYER 7	6.839	
MAXIMUM HEAD ON TOP OF LAYER 7	12.263	
LOCATION OF MAXIMUM HEAD IN LAYER 6 (DISTANCE FROM DRAIN)	1.5 METERS	
DRAINAGE COLLECTED FROM LAYER 9	0.00000	0.00001
PERCOLATION/LEAKAGE THROUGH LAYER 11	0.000000	0.00000
AVERAGE HEAD ON TOP OF LAYER 10	0.000	
MAXIMUM HEAD ON TOP OF LAYER 10	0.031	
LOCATION OF MAXIMUM HEAD IN LAYER 9 (DISTANCE FROM DRAIN)	0.0 METERS	
PERCOLATION/LEAKAGE THROUGH LAYER 12	0.000038	0.00038
SNOW WATER	402.45	4024.4553
MAXIMUM VEG. SOIL WATER (VOL/VOL)		0.4470
MINIMUM VEG. SOIL WATER (VOL/VOL)		0.0480

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

FINAL WATER STORAGE AT END OF YEAR 20

LAYER	(CM)	(VOL/VOL)
1	4.7656	0.3177
2	16.4518	0.3656
3	0.0000	0.0000
4	36.7618	0.1225
5	438.0000	0.2920
6	4.3405	0.0723
7	0.0000	0.0000
8	0.0135	0.0450
9	0.0050	0.0100
10	0.0000	0.0000
11	0.3750	0.7500
12	0.6565	0.0438
SNOW WATER	7.866	

