DRAFT FINAL
EXPANDED ENGINEERING EVALUATION/COST ANALYSIS (EEE/CA)
FOR THE
McLAREN TAILINGS SITE
COOKE CITY, MONTANA

Engineering Services Agreement DEQ/MWCB 401027
Task Order Number 05

Prepared for:

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May 2002

APPENDIX F

HELP MODEL OUTPUT

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**                                                                          **
**                                                                          **
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE               **
**               HELP MODEL VERSION 3.01   (14 OCTOBER 1994)                **
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY                   **
**                    USAE WATERWAYS EXPERIMENT STATION                     **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY              **
**                                                                          **
**                                                                          **
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PRECIPITATION DATA FILE:    E:\HELP3\MCPREC.D4
TEMPERATURE DATA FILE:      E:\HELP3\MCTEMP.D7
SOLAR RADIATION DATA FILE:  E:\HELP3\MCRAD.D13
EVAPOTRANSPIRATION DATA:    E:\HELP3\MCVEG.D11
SOIL AND DESIGN DATA FILE:  E:\HELP3\MCALT5A.D10
OUTPUT DATA FILE:           E:\HELP3\MCALT5A.OUT

TIME:  16:29     DATE:   4/22/2002

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     TITLE:  MCLAREN TAILINGS SITE - ALTERNATIVE 5A

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     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  10
           THICKNESS                   =     24.00   INCHES
           POROSITY                    =      0.3980 VOL/VOL
           FIELD CAPACITY              =      0.2440 VOL/VOL
           WILTING POINT               =      0.1360 VOL/VOL
           INITIAL SOIL WATER CONTENT  =      0.1470 VOL/VOL
           EFFECTIVE SAT. HYD. COND.   =  0.119999997000E-03 CM/SEC
         NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  4.63
                  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   INCHES
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             =    250.0    FEET

                        LAYER  3
                        --------

            TYPE 4 - FLEXIBLE MEMBRANE LINER
              MATERIAL TEXTURE NUMBER  17
THICKNESS                   =      0.50   INCHES
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.   =  0.300000003000E-08 CM/SEC
FML PINHOLE DENSITY         =      4.00   HOLES/ACRE
FML INSTALLATION DEFECTS    =      4.00   HOLES/ACRE
FML PLACEMENT QUALITY       =  3 - GOOD

                        LAYER  4
                        --------

          TYPE 1 - VERTICAL PERCOLATION LAYER
              MATERIAL TEXTURE NUMBER  11
THICKNESS                   =    399.00   INCHES
POROSITY                    =      0.4640 VOL/VOL
FIELD CAPACITY              =      0.3100 VOL/VOL
WILTING POINT               =      0.1870 VOL/VOL
INITIAL SOIL WATER CONTENT  =      0.3100 VOL/VOL
EFFECTIVE SAT. HYD. COND.   =  0.639999998000E-04 CM/SEC

                        LAYER  5
                        --------

            TYPE 2 - LATERAL DRAINAGE LAYER
              MATERIAL TEXTURE NUMBER  20
THICKNESS                   =      0.50   INCHES
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             =    250.0    FEET
```

```
                              LAYER  6
                              --------

               TYPE 4 - FLEXIBLE MEMBRANE LINER
                 MATERIAL TEXTURE NUMBER  17
   THICKNESS                   =      0.50   INCHES
   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.   =  0.300000003000E-08 CM/SEC
   FML PINHOLE DENSITY         =      4.00   HOLES/ACRE
   FML INSTALLATION DEFECTS    =      4.00   HOLES/ACRE
   FML PLACEMENT QUALITY       =  3 - GOOD

           GENERAL DESIGN AND EVAPORATIVE ZONE DATA
           ----------------------------------------

 NOTE:  SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT
          SOIL DATA BASE USING SOIL TEXTURE #10 WITH A
          GOOD STAND OF GRASS, A SURFACE SLOPE OF 20.%
          AND A SLOPE LENGTH OF   50. FEET.

SCS RUNOFF CURVE NUMBER             =     83.20
FRACTION OF AREA ALLOWING RUNOFF    =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE  =      5.000  ACRES
EVAPORATIVE ZONE DEPTH              =     24.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE   =      3.527  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE  =      9.552  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE  =      3.264  INCHES
INITIAL SNOW WATER                  =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS    =    127.227  INCHES
TOTAL INITIAL WATER                 =    127.227  INCHES
TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR

            EVAPOTRANSPIRATION AND WEATHER DATA
            -----------------------------------

 NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
          BILLINGS            MONTANA

     MAXIMUM LEAF AREA INDEX                =  3.50
     START OF GROWING SEASON (JULIAN DATE)  =   130
     END OF GROWING SEASON (JULIAN DATE)    =   278
     AVERAGE ANNUAL WIND SPEED              = 11.30 MPH
     AVERAGE 1ST QUARTER RELATIVE HUMIDITY  = 59.00 %
     AVERAGE 2ND QUARTER RELATIVE HUMIDITY  = 54.00 %
     AVERAGE 3RD QUARTER RELATIVE HUMIDITY  = 47.00 %
     AVERAGE 4TH QUARTER RELATIVE HUMIDITY  = 58.00 %
```

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR BILLINGS MONTANA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
0.97	0.71	1.05	1.93	2.39	2.07
0.85	1.05	1.26	1.16	0.85	0.80

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR BILLINGS MONTANA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
20.90	28.40	33.80	44.60	54.90	64.00
72.30	70.30	59.40	49.30	35.00	27.10

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR BILLINGS MONTANA

STATION LATITUDE = 45.80 DEGREES

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 100

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	0.98	0.70	0.94	1.95	2.50	2.05
	0.98	1.08	1.15	1.25	0.88	0.85
STD. DEVIATIONS	0.51	0.37	0.48	1.02	1.22	0.92
	0.51	0.66	0.78	0.66	0.62	0.55
RUNOFF						
TOTALS	0.113	0.168	0.147	0.157	0.014	0.001
	0.000	0.000	0.000	0.001	0.007	0.071
STD. DEVIATIONS	0.221	0.239	0.179	0.291	0.071	0.007
	0.000	0.001	0.003	0.005	0.036	0.145
EVAPOTRANSPIRATION						
TOTALS	0.676	0.738	1.164	1.712	2.441	2.573
	1.090	0.986	1.117	0.785	0.555	0.552
STD. DEVIATIONS	0.212	0.192	0.274	0.569	0.836	1.267
	0.620	0.621	0.703	0.428	0.239	0.230

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  LATERAL DRAINAGE COLLECTED FROM LAYER  2
  ----------------------------------------
    TOTALS                 0.0029   0.0000   0.0053   0.0136   0.0927   0.1021
                           0.0006   0.0002   0.0004   0.0010   0.0002   0.0102

    STD. DEVIATIONS        0.0204   0.0000   0.0418   0.0569   0.2554   0.2258
                           0.0033   0.0012   0.0014   0.0061   0.0014   0.0719

  PERCOLATION/LEAKAGE THROUGH LAYER  3
  -------------------------------------
    TOTALS                 0.0000   0.0000   0.0000   0.0002   0.0005   0.0003
                           0.0000   0.0000   0.0000   0.0000   0.0000   0.0000

    STD. DEVIATIONS        0.0001   0.0000   0.0002   0.0004   0.0008   0.0005
                           0.0000   0.0000   0.0000   0.0001   0.0000   0.0002

  LATERAL DRAINAGE COLLECTED FROM LAYER  5
  ----------------------------------------
    TOTALS                 0.0000   0.0000   0.0000   0.0001   0.0001   0.0001
                           0.0000   0.0000   0.0000   0.0000   0.0000   0.0000

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

  PERCOLATION/LEAKAGE THROUGH LAYER  6
  -------------------------------------
    TOTALS                 0.0000   0.0000   0.0000   0.0002   0.0004   0.0002
                           0.0000   0.0000   0.0000   0.0000   0.0000   0.0000

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

-------------------------------------------------------------------------------
               AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)
-------------------------------------------------------------------------------

  DAILY AVERAGE HEAD ACROSS LAYER  3
  ------------------------------------
    AVERAGES               0.0000   0.0000   0.0000   0.0000   0.0003   0.0003
                           0.0000   0.0000   0.0000   0.0000   0.0000   0.0000

    STD. DEVIATIONS        0.0001   0.0000   0.0001   0.0002   0.0007   0.0007
                           0.0000   0.0000   0.0000   0.0000   0.0000   0.0002

  DAILY AVERAGE HEAD ACROSS LAYER  6
  ------------------------------------
    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

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     AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS    1 THROUGH  100
-------------------------------------------------------------------------------
                                       INCHES            CU. FEET       PERCENT
                                  -------------------   -------------   ---------
 PRECIPITATION                     15.31    (   2.793)     277885.7     100.00

 RUNOFF                             0.680   (  0.5323)      12334.15      4.439

 EVAPOTRANSPIRATION                14.389   (  2.3648)     261169.33     93.984

 LATERAL DRAINAGE COLLECTED         0.22933 (  0.44506)      4162.417    1.49789
   FROM LAYER  2

 PERCOLATION/LEAKAGE THROUGH        0.00110 (  0.00150)        19.889     0.00716
   FROM LAYER  3

 AVERAGE HEAD ACROSS TOP            0.000 (    0.000)
   OF LAYER  3

 LATERAL DRAINAGE COLLECTED         0.00029 (  0.00041)         5.258    0.00189
   FROM LAYER  5

 PERCOLATION/LEAKAGE THROUGH        0.00081 (  0.00109)        14.631     0.00527
   FROM LAYER  6

 AVERAGE HEAD ACROSS TOP            0.000 (    0.000)
   OF LAYER  6

 CHANGE IN WATER STORAGE            0.011   (  1.2008)        190.78      0.069

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                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              2.77         50275.500

      RUNOFF                                     1.225        22235.1172

      DRAINAGE COLLECTED FROM LAYER  2           0.22011       3995.05029

      PERCOLATION/LEAKAGE THROUGH LAYER  3       0.000115         2.08249

      AVERAGE HEAD ACROSS LAYER  3               0.019

      DRAINAGE COLLECTED FROM LAYER  5           0.00003          0.61109

      PERCOLATION/LEAKAGE THROUGH LAYER  6       0.000081         1.47140

      AVERAGE HEAD ACROSS LAYER  6               0.000

      SNOW WATER                                 2.00         36214.1836

      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.3053

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.1191

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                  FINAL WATER STORAGE AT END OF YEAR  100
    ------------------------------------------------------------------
                    LAYER        (INCHES)       (VOL/VOL)
                    -----        --------       ---------
                      1            4.2269         0.1761

                      2            0.0050         0.0100

                      3            0.0000         0.0000

                      4          123.6900         0.3100

                      5            0.0050         0.0100

                      6            0.0000         0.0000

                  SNOW WATER       0.000

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**                                                                          **
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE               **
**               HELP MODEL VERSION 3.01   (14 OCTOBER 1994)                **
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY                   **
**                    USAE WATERWAYS EXPERIMENT STATION                     **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY              **
**                                                                          **
**                                                                          **
******************************************************************************
******************************************************************************

PRECIPITATION DATA FILE:    E:\HELP3\MCPREC.D4
TEMPERATURE DATA FILE:      E:\HELP3\MCTEMP.D7
SOLAR RADIATION DATA FILE:  E:\HELP3\MCRAD.D13
EVAPOTRANSPIRATION DATA:    E:\HELP3\MCVEG.D11
SOIL AND DESIGN DATA FILE:  E:\HELP3\MCALT5B.D10
OUTPUT DATA FILE:           E:\HELP3\MCALT5B.OUT

TIME:  16:37     DATE:   4/22/2002

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     TITLE:  MCLAREN TAILINGS SITE - ALTERNATIVE 5B

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     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  10
           THICKNESS                   =     24.00   INCHES
           POROSITY                    =      0.3980 VOL/VOL
           FIELD CAPACITY              =      0.2440 VOL/VOL
           WILTING POINT               =      0.1360 VOL/VOL
           INITIAL SOIL WATER CONTENT  =      0.1470 VOL/VOL
           EFFECTIVE SAT. HYD. COND.   =  0.119999997000E-03 CM/SEC
         NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  4.63
                  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   INCHES
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             =    250.0    FEET

                        LAYER  3
                        --------

            TYPE 4 - FLEXIBLE MEMBRANE LINER
              MATERIAL TEXTURE NUMBER  17
THICKNESS                   =      0.50   INCHES
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.   =  0.300000003000E-08 CM/SEC
FML PINHOLE DENSITY         =      4.00   HOLES/ACRE
FML INSTALLATION DEFECTS    =      4.00   HOLES/ACRE
FML PLACEMENT QUALITY       =  3 - GOOD

                        LAYER  4
                        --------

          TYPE 1 - VERTICAL PERCOLATION LAYER
              MATERIAL TEXTURE NUMBER  11
THICKNESS                   =    399.00   INCHES
POROSITY                    =      0.4640 VOL/VOL
FIELD CAPACITY              =      0.3100 VOL/VOL
WILTING POINT               =      0.1870 VOL/VOL
INITIAL SOIL WATER CONTENT  =      0.3079 VOL/VOL
EFFECTIVE SAT. HYD. COND.   =  0.639999998000E-04 CM/SEC
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GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE #10 WITH A GOOD STAND OF GRASS, A SURFACE SLOPE OF 20.% AND A SLOPE LENGTH OF 50. FEET.

SCS RUNOFF CURVE NUMBER	=	83.20	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	5.000	ACRES
EVAPORATIVE ZONE DEPTH	=	24.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	3.527	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	9.552	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	3.264	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	126.397	INCHES
TOTAL INITIAL WATER	=	126.397	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM BILLINGS MONTANA

MAXIMUM LEAF AREA INDEX	=	3.50
START OF GROWING SEASON (JULIAN DATE)	=	130
END OF GROWING SEASON (JULIAN DATE)	=	278
AVERAGE ANNUAL WIND SPEED	=	11.30 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	59.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	54.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	47.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	58.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR BILLINGS MONTANA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
0.97	0.71	1.05	1.93	2.39	2.07
0.85	1.05	1.26	1.16	0.85	0.80

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR BILLINGS MONTANA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
20.90	28.40	33.80	44.60	54.90	64.00
72.30	70.30	59.40	49.30	35.00	27.10

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR BILLINGS MONTANA

STATION LATITUDE = 45.80 DEGREES

****

AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 100

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	0.98	0.70	0.94	1.95	2.50	2.05
	0.98	1.08	1.15	1.25	0.88	0.85
STD. DEVIATIONS	0.51	0.37	0.48	1.02	1.22	0.92
	0.51	0.66	0.78	0.66	0.62	0.55
RUNOFF						
TOTALS	0.113	0.168	0.147	0.157	0.014	0.001
	0.000	0.000	0.000	0.001	0.007	0.071
STD. DEVIATIONS	0.221	0.239	0.179	0.291	0.071	0.007
	0.000	0.001	0.003	0.005	0.036	0.145
EVAPOTRANSPIRATION						
TOTALS	0.676	0.738	1.164	1.712	2.441	2.573
	1.090	0.986	1.117	0.785	0.555	0.552
STD. DEVIATIONS	0.212	0.192	0.274	0.569	0.836	1.267
	0.620	0.621	0.703	0.428	0.239	0.230
LATERAL DRAINAGE COLLECTED FROM LAYER 2						
TOTALS	0.0029	0.0000	0.0053	0.0136	0.0927	0.1021
	0.0006	0.0002	0.0004	0.0010	0.0002	0.0102
STD. DEVIATIONS	0.0204	0.0000	0.0418	0.0569	0.2554	0.2258
	0.0033	0.0012	0.0014	0.0061	0.0014	0.0719
PERCOLATION/LEAKAGE THROUGH LAYER 3						
TOTALS	0.0000	0.0000	0.0000	0.0002	0.0005	0.0003
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0001	0.0000	0.0002	0.0004	0.0008	0.0005
	0.0000	0.0000	0.0000	0.0001	0.0000	0.0002

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  PERCOLATION/LEAKAGE THROUGH LAYER  4
  ------------------------------------
    TOTALS                 0.0145   0.0130   0.0143   0.0139   0.0142   0.0137
                           0.0141   0.0141   0.0136   0.0140   0.0135   0.0139

    STD. DEVIATIONS        0.0126   0.0112   0.0124   0.0119   0.0122   0.0117
                           0.0120   0.0119   0.0115   0.0117   0.0113   0.0115

-------------------------------------------------------------------------------
               AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)
-------------------------------------------------------------------------------

  DAILY AVERAGE HEAD ACROSS LAYER  3
  ------------------------------------
    AVERAGES               0.0000   0.0000   0.0000   0.0000   0.0003   0.0003
                           0.0000   0.0000   0.0000   0.0000   0.0000   0.0000

    STD. DEVIATIONS        0.0001   0.0000   0.0001   0.0002   0.0007   0.0007
                           0.0000   0.0000   0.0000   0.0000   0.0000   0.0002

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

     AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS    1 THROUGH  100
-------------------------------------------------------------------------------
                                      INCHES            CU. FEET       PERCENT
                                 -------------------   -------------   ---------
 PRECIPITATION                    15.31    (   2.793)     277885.7     100.00

 RUNOFF                            0.680   (  0.5323)      12334.15      4.439

 EVAPOTRANSPIRATION               14.389   (  2.3648)     261169.33     93.984

 LATERAL DRAINAGE COLLECTED        0.22933 (  0.44506)      4162.417    1.49789
   FROM LAYER  2

 PERCOLATION/LEAKAGE THROUGH       0.00110 (  0.00150)        19.889     0.00716
   FROM LAYER  3

 AVERAGE HEAD ACROSS TOP           0.000 (    0.000)
   OF LAYER  3

 PERCOLATION/LEAKAGE THROUGH       0.16684 (  0.14189)      3028.213     1.08973
   FROM LAYER  4

 CHANGE IN WATER STORAGE          -0.155   (  1.2058)      -2817.54     -1.014

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                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ---------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              2.77         50275.500

      RUNOFF                                     1.225        22235.1172

      DRAINAGE COLLECTED FROM LAYER  2           0.22011       3995.05029

      PERCOLATION/LEAKAGE THROUGH LAYER  3       0.000115         2.08249

      AVERAGE HEAD ACROSS LAYER  3               0.019

      PERCOLATION/LEAKAGE THROUGH LAYER  4       0.002791        50.66074

      SNOW WATER                                 2.00         36214.1836


      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.3053

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.1191

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                  FINAL WATER STORAGE AT END OF YEAR  100
    ------------------------------------------------------------------------
                   LAYER        (INCHES)       (VOL/VOL)
                   -----        --------       ---------
                     1            4.2269         0.1761

                     2            0.0050         0.0100

                     3            0.0000         0.0000

                     4          106.2902         0.2664

                  SNOW WATER       0.000

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**                                                                          **
**                                                                          **
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE               **
**               HELP MODEL VERSION 3.01   (14 OCTOBER 1994)                **
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY                   **
**                    USAE WATERWAYS EXPERIMENT STATION                     **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY              **
**                                                                          **
**                                                                          **
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PRECIPITATION DATA FILE:    E:\HELP3\MCPREC.D4
TEMPERATURE DATA FILE:      E:\HELP3\MCTEMP.D7
SOLAR RADIATION DATA FILE:  E:\HELP3\MCRAD.D13
EVAPOTRANSPIRATION DATA:    E:\HELP3\MCVEG.D11
SOIL AND DESIGN DATA FILE:  E:\HELP3\MCALT5C.D10
OUTPUT DATA FILE:           E:\HELP3\MCALT5C.OUT

TIME:  16:35     DATE:   4/22/2002

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     TITLE:  MCLAREN TAILINGS SITE - ALTERNATIVE 5C

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     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  10
           THICKNESS                   =     24.00   INCHES
           POROSITY                    =      0.3980 VOL/VOL
           FIELD CAPACITY              =      0.2440 VOL/VOL
           WILTING POINT               =      0.1360 VOL/VOL
           INITIAL SOIL WATER CONTENT  =      0.1481 VOL/VOL
           EFFECTIVE SAT. HYD. COND.   =  0.119999997000E-03 CM/SEC
         NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  4.63
                  FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.
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                              LAYER  2
                              --------

                TYPE 1 - VERTICAL PERCOLATION LAYER
                    MATERIAL TEXTURE NUMBER  11
      THICKNESS                   =    399.00   INCHES
      POROSITY                    =      0.4640 VOL/VOL
      FIELD CAPACITY              =      0.3100 VOL/VOL
      WILTING POINT               =      0.1870 VOL/VOL
      INITIAL SOIL WATER CONTENT  =      0.3087 VOL/VOL
      EFFECTIVE SAT. HYD. COND.   =  0.639999998000E-04 CM/SEC

               GENERAL DESIGN AND EVAPORATIVE ZONE DATA
               ----------------------------------------

    NOTE:  SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT
             SOIL DATA BASE USING SOIL TEXTURE #10 WITH A
             GOOD STAND OF GRASS, A SURFACE SLOPE OF 20.%
             AND A SLOPE LENGTH OF   50. FEET.

   SCS RUNOFF CURVE NUMBER             =     83.20
   FRACTION OF AREA ALLOWING RUNOFF    =    100.0    PERCENT
   AREA PROJECTED ON HORIZONTAL PLANE  =      5.000  ACRES
   EVAPORATIVE ZONE DEPTH              =     24.0    INCHES
   INITIAL WATER IN EVAPORATIVE ZONE   =      3.554  INCHES
   UPPER LIMIT OF EVAPORATIVE STORAGE  =      9.552  INCHES
   LOWER LIMIT OF EVAPORATIVE STORAGE  =      3.264  INCHES
   INITIAL SNOW WATER                  =      0.000  INCHES
   INITIAL WATER IN LAYER MATERIALS    =    126.719  INCHES
   TOTAL INITIAL WATER                 =    126.719  INCHES
   TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR

               EVAPOTRANSPIRATION AND WEATHER DATA
               -----------------------------------

    NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
             BILLINGS            MONTANA

        MAXIMUM LEAF AREA INDEX                =  3.50
        START OF GROWING SEASON (JULIAN DATE)  =   130
        END OF GROWING SEASON (JULIAN DATE)    =   278
        AVERAGE ANNUAL WIND SPEED              = 11.30 MPH
        AVERAGE 1ST QUARTER RELATIVE HUMIDITY  = 59.00 %
        AVERAGE 2ND QUARTER RELATIVE HUMIDITY  = 54.00 %
        AVERAGE 3RD QUARTER RELATIVE HUMIDITY  = 47.00 %
        AVERAGE 4TH QUARTER RELATIVE HUMIDITY  = 58.00 %

    NOTE:  PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
             COEFFICIENTS FOR     BILLINGS            MONTANA

             NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL     FEB/AUG     MAR/SEP     APR/OCT     MAY/NOV     JUN/DEC
-------     -------     -------     -------     -------     -------
  0.97        0.71        1.05        1.93        2.39        2.07
  0.85        1.05        1.26        1.16        0.85        0.80
```

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR BILLINGS MONTANA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
20.90	28.40	33.80	44.60	54.90	64.00
72.30	70.30	59.40	49.30	35.00	27.10

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR BILLINGS MONTANA

STATION LATITUDE = 45.80 DEGREES

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 100

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	0.98	0.70	0.94	1.95	2.50	2.05
	0.98	1.08	1.15	1.25	0.88	0.85
STD. DEVIATIONS	0.51	0.37	0.48	1.02	1.22	0.92
	0.51	0.66	0.78	0.66	0.62	0.55
RUNOFF						
TOTALS	0.111	0.164	0.144	0.154	0.010	0.001
	0.000	0.000	0.000	0.001	0.007	0.071
STD. DEVIATIONS	0.219	0.236	0.174	0.288	0.055	0.007
	0.000	0.001	0.002	0.005	0.035	0.143
EVAPOTRANSPIRATION						
TOTALS	0.683	0.750	1.145	1.719	2.447	2.512
	1.088	0.991	1.111	0.817	0.581	0.571
STD. DEVIATIONS	0.214	0.199	0.294	0.595	0.848	1.247
	0.603	0.631	0.702	0.434	0.242	0.225
PERCOLATION/LEAKAGE THROUGH LAYER 2						
TOTALS	0.0236	0.0220	0.0246	0.0246	0.0258	0.0268
	0.0266	0.0248	0.0223	0.0220	0.0206	0.0219
STD. DEVIATIONS	0.0126	0.0100	0.0104	0.0094	0.0099	0.0101
	0.0104	0.0103	0.0102	0.0113	0.0118	0.0121

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     AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS    1 THROUGH  100
-------------------------------------------------------------------------------
                                      INCHES            CU. FEET       PERCENT
                                 -------------------   -------------   ---------
 PRECIPITATION                    15.31    (   2.793)     277885.7     100.00

 RUNOFF                            0.663   (  0.5213)      12031.38      4.330

 EVAPOTRANSPIRATION               14.415   (  2.3879)     261623.48     94.148

 PERCOLATION/LEAKAGE THROUGH       0.28549 (  0.11025)      5181.613     1.86466
   FROM LAYER  2

 CHANGE IN WATER STORAGE          -0.053   (  1.1538)       -959.86     -0.345

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

                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              2.77         50275.500

      RUNOFF                                     1.224        22212.5059

      PERCOLATION/LEAKAGE THROUGH LAYER  2       0.003990        72.42290

      SNOW WATER                                 2.00         36214.1836


      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.2960

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.1204

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

                   FINAL WATER STORAGE AT END OF YEAR  100
    ---------------------------------------------------------------------
                    LAYER        (INCHES)       (VOL/VOL)
                    -----        --------       ---------
                      1            4.2096         0.1754

                      2          116.8693         0.2929

                  SNOW WATER       0.000

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**                                                                          **
**                                                                          **
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE               **
**               HELP MODEL VERSION 3.01   (14 OCTOBER 1994)                **
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY                   **
**                    USAE WATERWAYS EXPERIMENT STATION                     **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY              **
**                                                                          **
**                                                                          **
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PRECIPITATION DATA FILE:    E:\HELP3\MCPREC.D4
TEMPERATURE DATA FILE:      E:\HELP3\MCTEMP.D7
SOLAR RADIATION DATA FILE:  E:\HELP3\MCRAD.D13
EVAPOTRANSPIRATION DATA:    E:\HELP3\MCBARE.D11
SOIL AND DESIGN DATA FILE:  E:\HELP3\MCWRBARE.D10
OUTPUT DATA FILE:           E:\HELP3\MCWRBARE.OUT

TIME:  14:21     DATE:   1/11/2002

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     TITLE:  McLAREN TAILINGS SITE - BARE WASTE ROCK

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     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  13
           THICKNESS                  =     80.00   INCHES
           POROSITY                   =      0.4300 VOL/VOL
           FIELD CAPACITY             =      0.3210 VOL/VOL
           WILTING POINT              =      0.2210 VOL/VOL
           INITIAL SOIL WATER CONTENT  =??????????? VOL/VOL
           EFFECTIVE SAT. HYD. COND.   =  0.330000003000E-04 CM/SEC
         NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  1.34
                  FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.
```

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE #13 WITH A POOR STAND OF GRASS, A SURFACE SLOPE OF 10.% AND A SLOPE LENGTH OF 200. FEET.

SCS RUNOFF CURVE NUMBER	=	92.30	
FRACTION OF AREA ALLOWING RUNOFF	=	40.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	5.200	ACRES
EVAPORATIVE ZONE DEPTH	=	12.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	3.035	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	5.160	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	2.652	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=???????????		INCHES
TOTAL INITIAL WATER	=???????????		INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM BILLINGS MONTANA

MAXIMUM LEAF AREA INDEX	=	0.50
START OF GROWING SEASON (JULIAN DATE)	=	130
END OF GROWING SEASON (JULIAN DATE)	=	278
AVERAGE ANNUAL WIND SPEED	=	11.30 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	59.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	54.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	47.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	58.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR BILLINGS MONTANA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
0.97	0.71	1.05	1.93	2.39	2.07
0.85	1.05	1.26	1.16	0.85	0.80

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR BILLINGS MONTANA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
20.90	28.40	33.80	44.60	54.90	64.00
72.30	70.30	59.40	49.30	35.00	27.10

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR BILLINGS MONTANA

STATION LATITUDE = 45.80 DEGREES

****

AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 100

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	0.98	0.70	0.94	1.95	2.50	2.05
	0.98	1.08	1.15	1.25	0.88	0.85
STD. DEVIATIONS	0.51	0.37	0.48	1.02	1.22	0.92
	0.51	0.66	0.78	0.66	0.62	0.55
RUNOFF						
TOTALS	0.051	0.079	0.071	0.118	0.066	0.027
	0.008	0.009	0.016	0.015	0.009	0.032
STD. DEVIATIONS	0.105	0.110	0.083	0.155	0.116	0.043
	0.018	0.022	0.033	0.032	0.020	0.064
EVAPOTRANSPIRATION						
TOTALS	0.735	0.750	0.825	1.595	2.246	2.040
	1.169	0.869	1.165	0.987	0.831	0.706
STD. DEVIATIONS	0.242	0.307	0.410	0.740	0.904	0.929
	0.600	0.654	0.730	0.573	0.401	0.316
PERCOLATION/LEAKAGE THROUGH LAYER 1						
TOTALS	0.0648	0.0638	0.0672	0.0612	0.0614	0.0518
	0.0641	0.0865	0.1057	0.1018	0.0814	0.0741
STD. DEVIATIONS	0.0475	0.0438	0.0461	0.0395	0.0335	0.0568
	0.1077	0.1169	0.0771	0.0615	0.0597	0.0529

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AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 100

	INCHES		CU. FEET	PERCENT
PRECIPITATION	15.31	(2.793)	289001.2	100.00
RUNOFF	0.502	(0.3014)	9479.13	3.280
EVAPOTRANSPIRATION	13.918	(2.3158)	262712.66	90.904
PERCOLATION/LEAKAGE THROUGH FROM LAYER 1	0.88369	(0.47710)	16680.504	5.77178
CHANGE IN WATER STORAGE	0.006	(0.7762)	119.43	0.041

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****

PEAK DAILY VALUES FOR YEARS 1 THROUGH 100

	(INCHES)	(CU. FT.)
PRECIPITATION	2.77	52286.520
RUNOFF	0.786	14844.5762
PERCOLATION/LEAKAGE THROUGH LAYER 1	0.027976	528.07086
SNOW WATER	2.00	37662.7500

MAXIMUM VEG. SOIL WATER (VOL/VOL) 0.4300

MINIMUM VEG. SOIL WATER (VOL/VOL) 0.2009

****
****

FINAL WATER STORAGE AT END OF YEAR 100

LAYER	(INCHES)	(VOL/VOL)
1	24.9129	0.3114
SNOW WATER	0.000	

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**                                                                          **
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE               **
**               HELP MODEL VERSION 3.01   (14 OCTOBER 1994)                **
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY                   **
**                    USAE WATERWAYS EXPERIMENT STATION                     **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY              **
**                                                                          **
**                                                                          **
******************************************************************************
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PRECIPITATION DATA FILE:    E:\HELP3\MCPREC.D4
TEMPERATURE DATA FILE:      E:\HELP3\MCTEMP.D7
SOLAR RADIATION DATA FILE:  E:\HELP3\MCRAD.D13
EVAPOTRANSPIRATION DATA:    E:\HELP3\MCBARE.D11
SOIL AND DESIGN DATA FILE:  E:\HELP3\MCTPBARE.D10
OUTPUT DATA FILE:           E:\HELP3\MCTPBARE.OUT

TIME:  14:32     DATE:   1/11/2002

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     TITLE:  MCLAREN TAILINGS SITE - BARE TAILINGS

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     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  10
           THICKNESS                  =     12.00   INCHES
           POROSITY                   =      0.3980 VOL/VOL
           FIELD CAPACITY             =      0.2440 VOL/VOL
           WILTING POINT              =      0.1360 VOL/VOL
           INITIAL SOIL WATER CONTENT =      0.1674 VOL/VOL
           EFFECTIVE SAT. HYD. COND.  =  0.119999997000E-03 CM/SEC
         NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  1.34
                  FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.

                                   LAYER  2
                                   --------

                     TYPE 1 - VERTICAL PERCOLATION LAYER
                         MATERIAL TEXTURE NUMBER  11
           THICKNESS                  =    180.00   INCHES
           POROSITY                   =      0.4640 VOL/VOL
           FIELD CAPACITY             =      0.3100 VOL/VOL
           WILTING POINT              =      0.1870 VOL/VOL
           INITIAL SOIL WATER CONTENT =      0.3074 VOL/VOL
           EFFECTIVE SAT. HYD. COND.  =  0.639999998000E-04 CM/SEC
```

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE #10 WITH A POOR STAND OF GRASS, A SURFACE SLOPE OF 2.% AND A SLOPE LENGTH OF 500. FEET.

SCS RUNOFF CURVE NUMBER	=	89.70	
FRACTION OF AREA ALLOWING RUNOFF	=	30.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	8.700	ACRES
EVAPORATIVE ZONE DEPTH	=	12.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	2.009	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	4.776	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	1.632	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	57.348	INCHES
TOTAL INITIAL WATER	=	57.348	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM BILLINGS MONTANA

MAXIMUM LEAF AREA INDEX	=	0.50
START OF GROWING SEASON (JULIAN DATE)	=	130
END OF GROWING SEASON (JULIAN DATE)	=	278
AVERAGE ANNUAL WIND SPEED	=	11.30 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	59.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	54.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	47.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	58.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR BILLINGS MONTANA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
0.97	0.71	1.05	1.93	2.39	2.07
0.85	1.05	1.26	1.16	0.85	0.80

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR BILLINGS MONTANA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
20.90	28.40	33.80	44.60	54.90	64.00
72.30	70.30	59.40	49.30	35.00	27.10

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR BILLINGS MONTANA

STATION LATITUDE = 45.80 DEGREES

****

AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 100

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	0.98	0.70	0.94	1.95	2.50	2.05
	0.98	1.08	1.15	1.25	0.88	0.85
STD. DEVIATIONS	0.51	0.37	0.48	1.02	1.22	0.92
	0.51	0.66	0.78	0.66	0.62	0.55
RUNOFF						
TOTALS	0.037	0.059	0.054	0.073	0.025	0.008
	0.002	0.002	0.005	0.005	0.004	0.023
STD. DEVIATIONS	0.076	0.081	0.064	0.111	0.061	0.018
	0.007	0.008	0.013	0.014	0.012	0.047
EVAPOTRANSPIRATION						
TOTALS	0.731	0.761	0.882	1.556	2.298	1.986
	1.229	0.874	1.160	1.005	0.829	0.705
STD. DEVIATIONS	0.233	0.320	0.464	0.815	0.968	1.037
	0.636	0.648	0.744	0.603	0.401	0.313
PERCOLATION/LEAKAGE THROUGH LAYER 2						
TOTALS	0.0860	0.0788	0.0895	0.0889	0.0949	0.0698
	0.0418	0.0535	0.0905	0.1077	0.0975	0.0873
STD. DEVIATIONS	0.0539	0.0490	0.0481	0.0470	0.0432	0.0338
	0.0303	0.0483	0.0493	0.0548	0.0562	0.0481

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     AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS    1 THROUGH  100
-------------------------------------------------------------------------------
                                       INCHES            CU. FEET       PERCENT
                                  -------------------   -------------   ---------
 PRECIPITATION                     15.31    (   2.793)     483521.2     100.00

 RUNOFF                             0.296   (  0.2000)       9361.97      1.936

 EVAPOTRANSPIRATION                14.017   (  2.4482)     442677.72     91.553

 PERCOLATION/LEAKAGE THROUGH        0.98630 (  0.36452)     31148.209     6.44195
   FROM LAYER  2

 CHANGE IN WATER STORAGE            0.010   (  0.9241)        317.35      0.066

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

                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              2.77         87479.367

      RUNOFF                                     0.409        12914.7148

      PERCOLATION/LEAKAGE THROUGH LAYER  2       0.015725       496.62592

      SNOW WATER                                 2.00         63012.6836


      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.3910

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.1020

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                   FINAL WATER STORAGE AT END OF YEAR  100
    ---------------------------------------------------------------------
                    LAYER        (INCHES)       (VOL/VOL)
                    -----        --------       ---------
                      1            2.4207         0.2017

                      2           55.5813         0.3088

                  SNOW WATER       0.000

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```