APPENDIX D-1 – FLOW MODEL SIMULATIONS

FINAL FEASIBILITY STUDY
CASMALIA RESOURCES SUPERFUND SITE
CASMALIA, CALIFORNIA

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ATTACHMENT D1-1 HELP MODEL RESULTS

LIST OF ACRONYMS

ASTM	American Society for Testing and Materials
CSC	Casmalia Resources Superfund Site Steering Committee
ET	Evapotranspiration
FS	Feasibility Study
HELP	Hydrologic Evaluation of Landfill Performance
HFB	Horizontal Flow Barrier
HSU	Hydrostratigraphic Unit
P/S	Pesticide/Solvent
PCB	Polychlorinated biphenyl
PCT	Perimeter Control Trench
PSCT	Perimeter Source Control Trench
RCF	Runoff Containment Facility
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RMS	root mean squared error
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WCSA	West Canyon Spray Area

1.0 Introduction

Groundwater flow model simulations were performed to support the evaluation of the alternative sitewide remedies for the Feasibility Study (FS) of the Casmalia Resources Superfund Site (site) in Santa Barbara County, California. In addition, in the comments on the Draft FS Report, the United States Environmental Protection Agency (USEPA) requested that flow model simulations be performed to evaluate the need for continued operation of the Perimeter Control Trench (PCT) at the A-Drainage. This appendix describes the groundwater models that were used for these evaluations, outlines the methods that were used to perform these evaluations and summarizes the results of the model simulations.

The sitewide groundwater flow models developed by the Casmalia Resources Superfund Site Steering Committee (CSC) for the site Final Remedial Investigation (RI) were used for this evaluation. The design, construction and calibration of these models are briefly described in Section 2.0 and documented in more detail in Attachment F-3 to Appendix F of the *Final Remedial Investigation Report, Casmalia Resources Superfund Site* (CSC, 2011).

The groundwater model simulations for this evaluation were performed in accordance with the American Society for Testing and Materials (ASTM) guidelines for groundwater modeling (ASTM, 1996) and generally accepted industry practice (Anderson and Woessner, 1992). The ASTM guidelines were developed as part of a cooperative agreement between the USEPA, the U.S. Geological Survey (USGS), and the U.S. Navy.

The groundwater model simulations were constructed with Groundwater Vistas™, a computer-aided design program for groundwater modeling (Environmental Simulations, Inc., 2007). Groundwater Vistas™ fully supports the model codes MODFLOW-2000 (McDonald and Harbaugh, 1988; Harbaugh et al., 2000) and MODPATH (Pollack, 1994), which were used to perform the simulations for this evaluation.

2.0 Groundwater Flow Models

To simulate the variability in hydrologic conditions at the site, the CSC constructed steady-state models simulating two different historical periods, March 2004 and March 2001. The March 2004 model represents “dry” or “low groundwater” conditions after several below-average rainfall years between late 2001 and early 2004. The March 2001 model represents peak “wet” or “high groundwater” conditions, based on high rainfall and inferred recharge rates preceding this period, high extraction system pumping rates, and peak historical groundwater elevation conditions, based on water level hydrographs. Both models were used in this evaluation.

2.1 Model Design

This subsection briefly describes the principal design elements of the groundwater flow models developed for the Casmalia Resources Superfund Site. These design elements include the model codes that were used to develop the models, the model grid and layering, and the boundary conditions used in the models.

2.1.1 Model Codes

2.1.1.1 Groundwater Flow

The groundwater flow models were developed with MODFLOW-2000, a three-dimensional, finite-difference, groundwater flow model code developed by the USGS (McDonald and Harbaugh, 1988; Harbaugh et al., 2000). MODFLOW-2000 is non-proprietary, well documented, and has been verified for a wide range of field problems (USEPA, 1993). Numerous models based on this code have been published in technical journals (Anderson and Woessner, 1992).

2.1.1.2 Groundwater Flow Paths

Groundwater flow paths were simulated with the model code MODPATH. MODPATH is a three-dimensional, particle tracking model code developed by the USGS for calculating groundwater flow paths and travel times from the head solution output by MODFLOW-2000 (Pollack, 1994). MODPATH is well documented and has been verified for a range of field problems.

2.2 Model Domain and Layering

The model domain includes the area bounded by Casmalia Creek to the west; the North Drainage and North Ridge to the north; an eastern boundary between well RP-108 in the A-Drainage and well RP-110 in the North Drainage; and a southern boundary between well RP-108 in the A-Drainage and a point on Casmalia Creek around 2,000 feet south of well RP-72 (Figure D1-1). The row and column spacing of the model grid are an approximately uniform 20 feet. The model grid consists of 469 rows and 375 columns.

The groundwater flow system is represented in the groundwater flow models by seven layers. The geometries of the model layers were developed on the basis of the Upper/Lower Hydrostratigraphic Unit (HSU) contact surface (Figure D1-2). Model layers 1 through 3 were used to represent the Upper HSU, with the base of model layer 3 corresponding to the HSU contact surface, and layers 4 through 7 represent the Lower HSU. To simulate locally dry conditions in the Upper HSU, portions of the model grid in Layers 1, 2, and 3 were inactivated.

2.3 Boundary Conditions

The following flow boundary conditions are used in the groundwater flow models:

- Constant-head boundaries were used along the creeks, where groundwater elevations are controlled by these natural boundaries and do not vary significantly over time;
- Constant-head and general-head (head-dependent-flow) boundaries were used along the northwestern edge of the model grid, to allow underflow along the North Ridge;
- No-flow boundaries were defined along other lateral edges of the model;
- Constant-head boundaries were used to represent the five on-site ponds; and
- A general-head (head-dependent-flow) boundary was assigned to the base of layer 7 to allow limited inflow and outflow through the bottom of the model.

The locations of the boundary conditions used the models are shown in Figures D1-3 through D1-7.

2.4 Extraction Trenches and Wells

The Gallery Well, Sump 9B, and Well C-5 extract groundwater from the Upper HSU and are represented in the models as point sinks (MODFLOW well nodes) in layer 3. The Perimeter Source Control Trench (PSCT) and PCTs in the Upper HSU are represented in the models as high-permeability zones in the layers 1 through 3, which simulate the gravel backfill of the trenches, and the trench sumps (PSCT-1, PSCT-2, PSCT-4, RAP-1A, RAP-2A, RAP-3A, RAP-1B, and RAP-1C) are represented as point sinks in layer 4 Figure D1-8. The discharge rates of the point sinks representing the extraction wells and extraction trench sumps were set at the average measured flow rates of the wells and trench sumps during March 2001 for the 2001 model and during March 2004 for the 2004 model.

2.5 Clay Barrier Walls

The clay barrier walls adjacent to the Polychlorinated Biphenyls (PCB) Landfill, Gallery Well, and in the PCT-B and PCT-C trenches are represented in the model with the MODFLOW Horizontal Flow Barrier (HFB) Package (Figure D1-8). The clay barriers adjacent to the Gallery Well, PCB Landfill, and the PCT-B and PCT-C trenches were simulated using a hydraulic conductivity of 0.00001 feet/day. The clay barrier near the PCB Landfill is represented in the model as a HFB in layer 1, while the other clay barriers are represented in the model as HFBs extending from layer 1 through layer 3 (Upper HSU).

3.0 Modification to Groundwater Models for Feasibility Study

Minor modifications were made to the site groundwater flow models to evaluate the effectiveness of the remedial alternatives for the FS Report. In order to evaluate the potential impact of the remedial alternatives on flows in the PSCT and PCTs, the trench extraction wells, which were represented in the original models as well nodes (point sinks) with fixed discharge rates, were converted to drain (head-dependent flow boundaries) boundaries (Figures D1-9 and D1-10). The drain boundaries allow the flow rates of the trench extraction wells in revised models to vary with the changes in groundwater levels that result from the different remedial alternatives. The drain boundaries remove water at a rate proportional to the difference between the head elevation in the aquifer and the drain (pumping) elevation as long as the water level in the aquifer is above the drain elevation (McDonald and Harbaugh, 1988). No water is removed by the drain boundaries when the water level in the aquifer is below the drain elevation. The drain boundary elevations were set at the pumping (action) levels of extraction wells, and the drain conductance values were adjusted so that drain boundaries approximately simulated the flow rates and heads at the well nodes in the calibrated 2004 (dry season) and 2001 (wet season) models.

The flow rates of the drain boundaries reasonably match the flow rates of the well nodes, except for PSCT-1 and PSCT-4 (Tables D1-1 and D1-2). The drain boundary flow rates for PSCT-1 closely match the well node flow rates in the 2004 model, but are lower than well node flow rates in the original 2001 model due to the greater calibration error in the model head solution of the 2001 model in this area. The drain boundary flow rates of PSCT-4 are lower than the well node flow rates in the 2004 and 2001 models because the model head solutions are below the

Action/Target pumping levels of PSCT-4. However, since the model simulations of the alternative sitewide remedies (Section 5.0) indicate that most of the Upper HSU upgradient of the PSCT will go dry due to the expanded capping, the lower flow rates of PSCT-1 and PSCT-4 in the modified models will not affect the alternative sitewide remedy performance evaluation.

In addition, a hydraulic conductivity zone with a value of 5 feet/day in model layers 1 through 3 (Upper HSU) along the southwest margin of the A-Series Pond was extended northward under the A-5 Pond and a hydraulic conductivity zone with a value of 2.62 feet/day along the northern margin of the Runoff Containment Facility (RCF) Pond was extended southward under the pond (Figure D1-11). These modifications were made to reduce the model head solution elevations near the two ponds, which rose above the elevation of the ground surface after removal of the constant-head boundaries representing the ponds for the evaluation of the remedial alternatives (Section 4.0).

4.0 Comparison of Original and Modified Groundwater Model Calibration

The head and groundwater flow path solutions, and the volumetric mass balance from the modified groundwater models were compared to those from the original models developed for the RI to verify that the modifications did not significantly affect the calibration of the models. The model head solutions were compared both qualitatively and quantitatively. The head solutions were evaluated qualitatively by comparing contoured maps of the model head solutions from the modified and original models. The error in the model head solutions was also quantified by determining the mean error, mean absolute error, and root mean squared error (RMS) for the calibration residuals (model head – target head) from the modified and original models. The results of these comparisons are described in the following subsections.

4.1 Contoured Model Head Solutions

The comparison of the contoured model head solutions from the modified and original models are shown in Figures D1-12 through D1-25. The contoured head solutions in the Upper HSU (layers 1, 2, and 3) from the original and modified models are very similar (Figures D1-12 through D1-14 and D1-19 through D1-21). Overall horizontal hydraulic gradients in layers 1, 2, and 3 of the original and modified models are also very similar. The head solution contour patterns in the Upper HSU reflect the boundary conditions, sinks and permeability zones, which cause changes in the magnitude and direction of hydraulic gradient in the Upper HSU.

The contoured head solutions in the Lower HSU (layers 4, 5, 6 and 7) from the original and modified models are very similar and consistent with observed flow conditions (Figures D1-15 through D1-18 and D1-22 through D1-25). Overall horizontal hydraulic gradients in layers 4, 5, 6 and 7 of the original and modified models are also very similar. With increasing depth, the contoured head solutions head field in each layer is smoother, reflecting the homogenous hydraulic conductivities assigned to layers 5, 6, and 7.

The contoured difference in the head solutions between the modified and original models are shown in Figures D1-26 through D1-39. The head solutions from the modified 2004 model in the vicinity of the A-5 Pond are significantly lower due to the changes made to hydraulic conductivity in this area (Figure D1-11). However, the head solutions in the calibration target wells for the

original 2004 model in this area (Figures D1-26 through D1-32) were too high and the changes to the hydraulic conductivity in the modified 2004 model improved the model calibration (Table D1-3).

The head solution from the modified 2001 model is somewhat higher in the vicinity of the PSCT extraction well PSCT-4 (Figures D1-33 through D1-39). This difference is due to the lower flow rates of the drain boundary representing PSCT-4 in the modified model. The drain boundary flow rates are lower than the well node flow rates for PSCT-4 in the 2001 models because the model head solutions are below the Action/Target pumping levels of PSCT-4 due to the greater error in the model head solution in the 2001 model in this area (Section 3.0).

4.2 Model Head Solutions and Residual Statistics

A complete listing of the target water levels in the calibration data sets, and the model head solutions, residuals and calibration statistics from the modified and original 2004 and 2001 models are given in Tables D1-3 and D1-4. Comparisons of the head solutions and the observed water levels for the modified and original 2004 models are presented in Figures D1-40 through D1-46. Comparisons of the head solutions and the observed water levels for the modified and original 2001 models are presented in Figures D1-47 through D1-53.

The overall calibration of the modified 2004 and 2001 models meet the calibration criteria defined in the RI/FS Work Plan. As shown on the regression charts and residual tables, correlation between observed and simulated heads for each model layer is good. For the sitewide model, the CSC proposed a mean head residual of less than five percent of the model area groundwater elevation range and a RMS error of less than 10 percent of the model area groundwater elevation range, which corresponds to an RMS of 30 (Upper HSU) to 36 (Lower HSU) feet and mean error of 15 to 18 feet for the 2004 model, and an RMS of 27 (Upper HSU) to 41 (Lower HSU) feet and mean error of 9 to 20 feet for the 2001 model.

As shown in Table D1-3, the RMS and mean error results for the modified March 2004 model are significantly lower than the maximum criteria. In model layers 1 through 3, the mean error residuals are 0.56, 4.36, and 0.52 feet, respectively. In model layers 4 through 7, the mean error residuals are -0.82, 5.34, -0.19, and 2.14 feet, respectively. The composite mean error for all layers for the modified March 2004 model is approximately 1.54 feet, significantly lower than the calibration criteria of 15 to 18 feet. The RMS errors for each of model layers 1 through 7 (7.69 to 21.07 feet) and for the entire model (13.41 feet) are also lower than the calibration criteria of 30 to 36 feet.

The RMS and mean error results for the modified March 2001 model are also significantly lower than the maximum criteria (Table D1-4). In model layers 1 through 3, the mean error residuals are 2.49, 7.21, and 5.46 feet, respectively. In model layers 4 through 7, the mean error residuals are 3.86, 14.00, 4.32, and 5.13 feet, respectively. The composite mean error for all layers for the modified March 2001 model is approximately 6.04 feet, significantly lower than the calibration criteria of 9 to 20 feet. The RMS errors for each of model layers 1 through 7 (10.81 to 28.40 feet) and for the entire model (22.28 feet) are also lower than the calibration criteria of 27 to 41 feet.

4.3 Groundwater Flow Paths

MODPATH was used to calculate the forward and reverse flow paths from the model flow solutions to compare the flow fields and extraction system capture zones simulated by the modified and original 2004 and 2001 models. Forward flow paths were calculated by placing single particles in selected individual model cells along the North Ridge, which were allowed to move advectively through the flow field. Reverse flow paths were calculated by placing a series of particles in an arc around each extraction system, which were allowed to move advectively backward through the flow field to the sources of inflow contributing to the extraction point.

Figures D1-54 through D1-57 show the comparisons between the simulated forward flow paths solutions for particles placed along the North Ridge in the Upper and Lower HSUs from the modified and original 2004 and 2001 models. The forward flow paths solutions for the modified and original models are very similar. The flow path solution from the modified 2004 model shows groundwater flow in the Upper HSU to discharge to the A-5 Pond rather than bypass the pond on the west as shown by the original model (Figure D1-54). The flow path solution from the modified model is probably more realistic since the bottom of the A-5 Pond is below the water table.

The comparisons between the simulated reverse flow path solutions from the modified and original 2004 and 2001 models are shown in Figures D1-58 and D1-59. The reverse flow path solutions from the modified and original models are very similar and show no significant differences.

During the review of the draft sitewide models, USEPA requested that additional particle tracking simulations be run to evaluate deeper groundwater flow simulated by the models and to determine potential flow paths from several areas in the Lower HSU that might have been impacted by primary source areas. For these simulations, forward particle tracking simulations were performed using the March 2004 model. Particles were placed in layer 6 of the model along the North Ridge, between the primary sources areas (burial trenches and landfills) and the PSCT cutoff trench, between the burial trenches and extraction sump PSCT-4 at deep piezometer RIPZ-16 that contains higher levels of dissolved-phase volatile organic compounds, and between the Pesticide/Solvent (P/S) Landfill and PSCT-1 at deep piezometer cluster RGPZ-7C/D that contains DNAPL. The comparisons of these flow paths simulations between the modified and original 2004 model are shown in Figures D1-60 through D1-63. The results of the flow path simulations from the modified and original models are very similar and show no significant differences.

4.4 Volumetric Mass Balance

The volumetric mass balance (difference between total groundwater inflow and outflow simulated by the model) from the modified and original groundwater models are summarized in Tables D1-5 and D1-6. Model solutions with less than one percent volumetric mass balance error are considered to be acceptable (McDonald and Harbaugh, 1988; Harbaugh et al., 2000).

The overall water budgets for these modified and original models have very low net errors, and the relative magnitudes of inflows (through recharge and boundary conditions) and outflows

(though boundaries and wells) are similar and consistent with the rates assigned as input and the site conceptual model.

5.0 Evaluation of Alternative Sitewide Remedies

The original groundwater models developed for the RI were used to evaluate existing groundwater flow conditions for Alternative Sitewide Remedy 1, the no-action alternative. The results of these simulations are presented in Figures D1-54 to D1-63 and are described in more detail in Attachment F-3 to Appendix F of the *Final Remedial Investigation Report, Casmalia Resources Superfund Site* (CSC, 2011). The Alternative Sitewide Remedies 2 through 6, which are developed and evaluated in the FS Report, were simulated and are discussed as part of this section of the report. This additional modeling was conducted with the revised groundwater models described in Section 3.0.

The remedy components of Sitewide Remedies 2 through 6 are defined in Figure D1-64 of this appendix. Each sitewide remedy alternative includes different combinations of remedy components. The list of remedy components of the different remedies include:

- Existing Resource Conservation and Recovery Act (RCRA) Cap on the P/S, Heavy Metals, Caustic/Cyanides, and Acids landfills;
- Placement of a RCRA Cap on the PCB Landfill, Burial Trench Area, Central Drainage Area, and Maintenance Shed areas;
- Placement of a Hybrid or Evapotranspiration (ET) Cap on the West RCRA Canyon Area and a 2-foot thick soil cover on the West Canyon Spray Area (WCSA);
- Placement of a Hybrid or ET Cap on the RCRA Canyon and WCSA;
- Draining, filling with soil above the water table, and placement of a RCRA Cap on Pond 18;
- Draining, filling of Pond A-5 with soil above the water table, and construction of lined stormwater retention basin in the footprint of the pond;
- Draining, filling of Pond 13 with soil above the water table, and construction of lined stormwater retention basin in the footprint of the pond;
- Draining the RCF Pond, filling with soil above the water table, and placement of an Eco cap over the bottom of the pond;
- Draining the A-Series Pond, filling with soil above the water table, and construction of lined evaporation basin in the footprint or expanded footprint of the pond;
- Aggressive extraction well systems installed north of the A-Series Pond and RCF Pond;
- Lower HSU extraction wells installed along the PSCT south of the PCB Landfill, and south of the Heavy Metals, Caustic/Cyanides, and Acids landfills; and
- Horizontal extraction wells installed in the southern portion of the P/S Landfill.

Sump 9B was not included in any of the alternative sitewide remedies because this remedial component would have no significant hydraulic containment function after installation of the RCRA Cap on the Central Drainage Area.

5.1 Simulation of Alternative Sitewide Remedies

The modifications that were made to the models to simulate the different components of Alternative Sitewide Remedies 2 through 6 are briefly outlined in this subsection. These modifications are described in more detail in Table D1-7.

The areas covered by an existing or proposed RCRA Cap (landfills, burial trench, Central Drainage, and Maintenance Shed areas) were represented in the modified models as areas of zero areal recharge (no infiltration of precipitation or surface runoff into the shallow groundwater flow system). The areas covered by a proposed Hybrid or ET Cap (RCRA Canyon and WCSA areas) and the proposed 2-foot soil cover on the WCSA (Figure D1-64) were represented in the models as areas of reduced recharge. The reduction in recharge due to the soil cover was estimated using the USEPA Hydrologic Evaluation of Landfill Performance (HELP) model (Schroeder et al., 1994). The recharge in these areas (average annual percolation/average annual precipitation) was estimated to be reduced to 9.32% for the Hybrid or ET Cap and 15.59% for the soil cover based on the HELP Model simulations (Attachment D1-1).

The closure of Pond A5, Pond 18, the A-Series Pond, the RCF Pond, and Pond 13 by complete or partial backfilling, was simulated by removing the constant-head boundaries representing the four existing ponds in layers 1 through 4 of the modified models (Figures D1-65 and D1-66). The lined proposed stormwater retention basins that would be installed in the footprints of Pond A-5 and Pond 13 and the evaporation pond that would be installed in the footprint of the A-Series Pond are represented in the modified models as an area of reduced recharge. The recharge within the footprints of the stormwater retention basins and evaporation pond was estimated to be 0.136 inch per year based on the maximum estimated leakage rate from the pond (Attachment D1-1).

The aggressive extraction wells were represented in the models as well nodes (point sinks) screened across layer 3 (Upper HSU) and layer 4 (Lower HSU). In Area 5 West, forty well nodes were placed south of RCRA Canyon/WCSA and north of the A-Series Pond outside the footprint of the lined retention basin that would be installed within the footprint of the Pond A-5. In Area 5 South, 40 well nodes were placed north of the RCF Pond. The locations of the aggressive extraction wells in the model simulations are shown in Figure D1-64.

The Lower HSU extraction wells were represented in the models as well nodes screened across layers 5 and 6 (Lower HSU). Two well nodes were placed along the PSCT south of the PCB Landfill and five well nodes were placed along the PSCT south of the Heavy Metals, Caustic/Cyanides, and Acids landfills (Figure D1-64).

The horizontal extraction wells in the P/S Landfill were represented in the model as well nodes screened across layer 3 (bottom of Upper HSU). Five horizontal wells with an approximate screen length of 300 feet were placed along the southern portion of the P/S Landfill north of the clay barrier wall (Figure D1-64). The total flow rate of the well nodes representing the horizontal wells was set a 0.1 gallon per minute, the estimated long-term flow rate of the horizontal well system.

The remedial alternative simulations were solved for steady-state flow conditions to represent long-term operation of the remedial systems.

5.2 Evaluation of Groundwater Capture

The effectiveness of the Alternative Sitewide Remedies 2 through 6 in containing groundwater in the Upper and Lower HSUs was evaluated with the particle tracking MODPATH. Forward and reverse groundwater flow paths between the landfill areas and the trench withdrawal systems were calculated for the head solutions from the simulations of the alternative sitewide remedies. Horizontal and vertical groundwater capture by the trench withdrawal systems were evaluated by placing particles along the ridgeline above the landfills in layer 3 (Upper HSU) and layer 4 (Lower HSU) in the forward particle tracking simulations and around the PSCT and PCT extraction wells in the reverse particle tracking simulations. Horizontal and vertical groundwater flow within the Lower HSU were evaluated by placing particles in layer 6 (Lower HSU) along the ridgeline above the landfills, between the landfills and the PSCT, between the PCB Landfill and PSCT-4, and near monitoring wells RGPZ-6 and RPGZ-7. Path lines were then calculated for steady-state flow conditions to fully delineate the ultimate flow paths of the particles within the model grid.

5.3 Results of Model Simulations

The flow rates of the PSCT and PCT trenches from the simulations of Alternative Sitewide Remedies 2 through 6 are summarized in Tables D1-8 to D1-12, respectively. The results of these simulations show that a significant reduction in trench flows would occur due to the extended capping, the closure of the A-Series Pond, Pond A-5, Pond 13, the RCF Pond, and Pond 18 under all of the alternative sitewide remedies evaluated.

The results of the particle tracking simulations for the Upper and Lower HSU are shown in Figures D1-67 through D1-76 for Alternative 2, in Figures D1-77 through D1-86 for Alternative 3, in Figures D1-87 through D1-96 for Alternative 4, in Figures D1-97 through D1-106 for Alternative 5, and in Figures D1-107 through D1-116 for Alternative 6. These figures show the major components of the remedial alternatives, the steady-state model head solutions and the calculated groundwater flow paths.

The particle tracking simulations indicate that major remedial components of Alternatives 2 through 6 would be generally effective in containing impacted groundwater in the Upper HSU and Lower HSU that flows southward from the landfill areas, except in the gap between the PCT-A and PCT-B trenches. In this area, the simulations suggest that some of the shallow groundwater flow that is currently discharged into the RCF Pond may bypass the western end of the PCT-A trench and eastern end of the PCT-B trench. As a result, the lateral extent of the PCTs will be evaluated during the design phase to ensure that there is no significant groundwater flow that bypasses the trenches..

The model simulations also indicate that water table elevations would decrease significantly across most of the site due to the reduction in groundwater recharge from the expansion of the capping in Area 5 North and Area 5 West (Figures D1-117 through D1-126).

6.0 Evaluation of Groundwater Flow at the Head of the A-Drainage

In their comments on the Draft FS Report, USEPA requested that flow model simulations be performed to determine if a natural groundwater divide is present in the vicinity of the PCT in the A-Drainage that would provide natural containment in this area in lieu of continued operation of the PCT-A trench. For these simulations, the hydraulic conductivity zone representing the PCT-A trench backfill and the well nodes representing the trench extraction wells RAP-1A, RAP-2A, and RAP-3A were removed from the modified models. The models were then solved for steady-state flow conditions and groundwater flow paths from the Upper HSU (layer 3) around the eastern end of the RCF Pond to the location of the PCT-A trench were calculated for the model head solutions.

The results of these particle tracking simulations are shown in Figures D1-127 and D1-128 for the modified 2004 (Dry Season) and 2001 (Wet Season) models, respectively. The simulation results indicate that a natural groundwater divide is present at the head of the A-Drainage, but it is limited in extent and does not provide natural containment for groundwater flow in the RCF Pond area. Continued operation of the PCT-A trench is needed to prevent groundwater flow from the RCF Pond area toward the A- and B-Drainages.

7.0 References

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Table D1-1
Extraction Well Drain Boundaries
Modified March 2004 (Dry Season) Model
Casmalia Resources Superfund Site
Casmalia, CA

Extraction Well	TOC Elevation (ft MSL)	Action/Target Pumping Level		Drain Boundary Parameters						Head Solution		Flow Solution	
		Depth BTOC (ft)	Elevation (ft MSL)	Model Layer	Stage Elevation (ft MSL)	Bed Width (ft)	Bed Length (ft)	Bed Thickness (ft)	Hydraulic Conductivity (ft/day)	Original Model (ft MSL)	Modified Model (ft MSL)	Original Model (gpm)	Modified Model (gpm)
PSCT Trench													
PSCT-1	454.51	45.00	409.51	4	409.51	20.73	20.73	25.00	0.70	457.25	455.77	2.86	2.89
PSCT-2	503.51	52.00	451.51	4	451.51	20.73	20.73	25.00	0.90	469.11	468.05	1.38	1.33
PSCT-3	561.34	55.00	506.34	4	506.34	20.73	20.73	25.00	--	490.64	490.29	0.00	0.00
PSCT-4	593.18	51.00	542.18	4	542.18	20.73	20.73	25.00	1.00	512.46	514.01	1.61	0.00
PCT-A Trench													
RAP-1A	449.40	29.00	420.40	4	420.40	20.73	20.73	25.00	1.50	422.21	420.78	0.13	0.05
RAP-2A	447.10	45.00	402.10	4	402.10	20.73	20.73	25.00	1.40	413.85	414.89	1.37	1.60
RAP-3A	423.05	44.00	379.05	4	379.05	20.73	20.73	25.00	0.50	408.72	410.26	1.06	1.39
PCT-B Trench													
RAP-1B	416.07	61.00	355.07	3	355.07	20.73	20.73	5.00	0.80	357.25	367.13	4.03	4.31
PCT-C Trench													
RAP-1C	450.67	55.00	395.67	4	395.67	20.73	20.73	25.00	1.90	419.16	419.23	4.07	4.00
C-5	452.38	77.00	375.38	3	375.38	20.73	20.73	5.00	0.43	415.30	411.79	5.68	6.99
Gallery Well	487.29	20.00	467.29	3	467.29	20.73	20.73	5.00	0.45	492.68	501.37	0.90	0.64
Sump 9B	561.20	88.46	472.74	3	472.74	20.73	20.73	5.00	0.20	472.74	470.73	0.28	0.31

Table D1-2
Extraction Well Drain Boundaries
Modified March 2001 (Wet Season) Model
Casmalia Resources Superfund Site
Casmalia, CA

Extraction Well	TOC Elevation (ft MSL)	Action/Target Pumping Level		Drain Boundary Parameters						Head Solution		Flow Solution	
		Depth BTOC (ft)	Elevation (ft MSL)	Model Layer	Stage Elevation (ft MSL)	Bed Width (ft)	Bed Length (ft)	Bed Thickness (ft)	Hydraulic Conductivity (ft/day)	Original Model (ft MSL)	Modified Model (ft MSL)	Original Model (gpm)	Modified Model (gpm)
PSCT Trench													
PSCT-1	454.51	45.00	409.51	4	409.51	20.73	20.73	25.00	0.70	436.31	456.18	13.95	2.92
PSCT-2	503.51	52.00	451.51	4	451.51	20.73	20.73	25.00	0.90	454.57	472.12	2.30	1.66
PSCT-3	561.34	55.00	506.34	4	506.34	20.73	20.73	25.00	--	477.79	498.62	0.00	0.00
PSCT-4	593.18	51.00	542.18	4	542.18	20.73	20.73	25.00	1.00	498.36	526.45	3.18	0.00
PCT-A Trench													
RAP-1A	449.40	29.00	420.40	4	420.40	20.73	20.73	25.00	1.50	425.24	429.12	1.89	1.17
RAP-2A	447.10	45.00	402.10	4	402.10	20.73	20.73	25.00	1.40	419.18	424.82	3.83	2.84
RAP-3A	423.05	44.00	379.05	4	379.05	20.73	20.73	25.00	0.50	416.36	420.85	1.74	1.87
PCT-B Trench													
RAP-1B	416.07	61.00	355.07	3	355.07	20.73	20.73	5.00	0.80	358.29	371.94	6.07	6.03
PCT-C Trench													
RAP-1C	450.67	55.00	395.67	4	395.67	20.73	20.73	25.00	1.90	427.38	428.77	6.17	5.62
C-5	452.38	77.00	375.38	3	375.38	20.73	20.73	5.00	0.43	418.19	421.39	10.20	8.83
Gallery Well	487.29	20.00	467.29	3	467.29	20.73	20.73	5.00	0.45	473.81	503.86	1.49	1.14
Sump 9B	561.20	88.46	472.74	3	472.74	20.73	20.73	5.00	0.20	436.25	473.21	1.19	0.53

Table D1-3
Comparison of Calibration Residuals and Summary Statistics, Modified and Original 2004 (Dry Season) Models
Casmalia Resources Superfund Site
Casmalia, CA

			Modified Model		Original Model	
Observation Well	**Model Layer**	**Observed Head March 2004 (ft msl)**	**Simulated Head March 2004 (ft msl)**	**Error Residual (ft)**	**Simulated Head March 2004 (ft msl)**	**Error Residual (ft)**
MODEL LAYER 1						
B-5	1	376.62	367.65	-8.97	358.75	-17.87
C2M	1	414.92	401.63	-13.29	401.63	-13.29
C3M	1	402.23	398.21	-4.02	398.21	-4.02
C4M	1	405.48	401.44	-4.04	401.45	-4.03
D1M	1	460.97	459.26	-1.71	460.83	-0.14
GW-P(E)	1	517.55	519.78	2.23	519.44	1.89
GW-P(E2)	1	517.38	517.73	0.35	517.51	0.13
GW-P(E3)	1	518.96	514.76	-4.20	514.71	-4.25
GW-P(W)	1	517.67	522.89	5.22	522.49	4.82
PZ-P18-2A	1	454.65	452.44	-2.21	452.61	-2.04
PZ-P18-2B	1	442.76	452.44	9.68	452.61	9.85
PZ-P18-3A	1	455.03	451.61	-3.42	451.68	-3.35
PZ-P18-3B	1	440.32	451.63	11.31	451.70	11.38
PZ-P18-4A	1	455.49	449.21	-6.28	449.29	-6.20
PZ-P18-4B	1	438.11	449.21	11.10	449.29	11.18
PZ-PA5-1A	1	448.45	442.29	-6.16	442.98	-5.47
PZ-PA5-1A1	1	457.94	442.29	-15.65	442.98	-14.96
PZ-PA5-2A	1	448.16	441.17	-6.99	442.27	-5.89
PZ-PA5-2B	1	440.75	441.12	0.37	442.24	1.49
PZ-PA5-3A	1	448.46	439.47	-8.99	444.27	-4.19
PZ-PA5-3B	1	441.73	439.47	-2.26	444.27	2.54
PZ-PA5-3C	1	443.45	439.47	-3.98	444.27	0.82
RG-3B	1	458.01	464.01	6.00	465.32	7.31
RG-8B	1	492.00	490.05	-1.95	491.35	-0.65
RG-9B	1	478.38	505.48	27.10	506.45	28.07
RP-6A	1	369.05	363.61	-5.44	355.84	-13.21
RP-10A	1	440.13	443.71	3.58	443.96	3.83
RP-11A	1	427.63	426.45	-1.18	426.60	-1.03
RP-12A	1	410.65	412.97	2.32	413.04	2.39
RP-17B	1	491.45	506.35	14.90	506.35	14.90
RP-28B	1	409.52	410.81	1.29	410.88	1.36
RP-41A	1	470.48	477.12	6.64	477.12	6.64
RP-72A	1	357.29	356.67	-0.62	356.67	-0.62
RP-73A1	1	362.53	361.48	-1.05	361.52	-1.01
RP-84A2	1	403.72	401.61	-2.11	401.61	-2.11
RP-100A	1	423.81	420.13	-3.68	421.57	-2.24
SUMP 9B-PA	1	475.60	480.21	4.61	481.32	5.72
SUMP 9B-PB	1	471.81	474.93	3.12	476.07	4.26
SUMP 9B-PC	1	472.85	482.20	9.35	483.24	10.39
TP-2A	1	424.95	430.58	5.63	430.58	5.63
TP-4	1	509.65	509.89	0.24	510.80	1.15
Road Sump	1	453.79	460.46	6.67	461.84	8.05
MODEL LAYER 1 CALIBRATION STATISTICS						
LAYER 1 MEAN ERROR (FT):				**0.56**		**0.89**
LAYER 1 ABSOLUTE MEAN ERROR (FT):				**5.71**		**5.96**
LAYER 1 ROOT MEAN SQUARED ERROR (FT):				**7.69**		**8.26**

Table D1-3
Comparison of Calibration Residuals and Summary Statistics, Modified and Original 2004 (Dry Season) Models
Casmalia Resources Superfund Site
Casmalia, CA

			Modified Model		Original Model	
Observation Well	**Model Layer**	**Observed Head March 2004 (ft msl)**	**Simulated Head March 2004 (ft msl)**	**Error Residual (ft)**	**Simulated Head March 2004 (ft msl)**	**Error Residual (ft)**
MODEL LAYER 2						
B3M	2	366.24	363.90	-2.34	356.00	-10.24
B-5	2	376.62	367.71	-8.91	359.00	-17.62
C2M	2	414.92	400.84	-14.08	400.83	-14.09
C3M	2	402.23	397.38	-4.85	397.37	-4.86
C4M	2	405.48	401.44	-4.04	401.44	-4.04
D1M	2	460.97	459.19	-1.78	460.80	-0.17
PZ-P18-4B	2	438.11	448.44	10.33	448.53	10.42
PZ-PA5-2C	2	440.71	441.05	0.34	441.41	0.70
PZ-PA5-3C	2	443.45	439.41	-4.04	441.99	-1.46
RG-1B	2	426.18	455.82	29.64	457.31	31.13
RG-3B	2	458.01	464.11	6.10	465.42	7.41
RG-7B	2	426.13	440.38	14.25	442.09	15.96
RG-8B	2	492.00	489.16	-2.84	490.47	-1.53
RG-9B	2	478.38	505.59	27.21	506.57	28.19
RGPZ-6B	2	461.49	465.47	3.98	466.76	5.27
RP-2B	2	622.15	650.38	28.23	658.98	36.83
RP-6B	2	364.76	363.41	-1.35	355.73	-9.03
RP-13B	2	423.08	419.06	-4.02	419.30	-3.78
RP-17B	2	491.45	506.34	14.89	506.34	14.89
RP-28B	2	409.52	411.29	1.77	411.37	1.85
RP-52B	2	432.44	422.56	-9.88	422.87	-9.57
RP-76A	2	395.53	394.76	-0.77	394.76	-0.77
RP-78B	2	411.04	400.61	-10.43	400.60	-10.44
RP-109B	2	451.25	463.86	12.61	463.86	12.61
Sump 9B-CW	2	466.23	477.34	11.11	478.67	12.44
SW-15	2	544.67	543.11	-1.56	545.38	0.71
SW-17	2	579.72	571.18	-8.54	573.08	-6.64
SW-44	2	625.16	644.61	19.45	650.09	24.93
SW-46	2	489.68	522.77	33.09	565.33	75.65
TP-1	2	410.15	424.97	14.82	424.94	14.79
TP-2A	2	424.95	430.38	5.43	430.38	5.43
TP-3	2	420.73	412.17	-8.56	413.12	-7.61
TP-4	2	509.65	510.22	0.57	511.11	1.46
TP-5	2	396.14	408.04	11.90	404.74	8.60
TP-15	2	548.24	550.32	2.08	555.77	7.53
WP-4S	2	413.90	410.93	-2.97	411.57	-2.33
MODEL LAYER 2 CALIBRATION STATISTICS						
LAYER 2 MEAN ERROR (FT):				**4.36**		**5.91**
LAYER 2 ABSOLUTE MEAN ERROR (FT):				**9.41**		**11.69**
LAYER 2 ROOT MEAN SQUARED ERROR (FT):				**12.79**		**18.18**

Table D1-3
Comparison of Calibration Residuals and Summary Statistics, Modified and Original 2004 (Dry Season) Models
Casmalia Resources Superfund Site
Casmalia, CA

			Modified Model		Original Model	
Observation Well	**Model Layer**	**Observed Head March 2004 (ft msl)**	**Simulated Head March 2004 (ft msl)**	**Error Residual (ft)**	**Simulated Head March 2004 (ft msl)**	**Error Residual (ft)**
MODEL LAYER 3						
A2M	3	404.41	401.98	-2.43	402.81	-1.60
B3M	3	366.24	363.91	-2.33	356.01	-10.23
B4M	3	358.41	357.94	-0.47	352.41	-6.00
B-5	3	376.62	367.72	-8.90	359.06	-17.56
C2M	3	414.92	400.76	-14.16	400.75	-14.17
C3M	3	402.23	397.27	-4.97	397.26	-4.97
C4M	3	405.48	401.44	-4.04	401.44	-4.04
D1M	3	460.97	459.19	-1.78	460.81	-0.16
LCW-1	3	531.38	512.95	-18.43	513.85	-17.53
MW-15C	3	412.58	415.14	2.56	414.06	1.48
MW-18C	3	419.41	420.97	1.56	422.48	3.07
MW-7BU	3	576.96	590.54	13.58	590.55	13.59
PZ-P18-1	3	434.71	443.42	8.71	443.53	8.82
PZ-P18-5	3	437.77	443.33	5.56	443.58	5.81
PZ-PA5-2C	3	440.71	441.04	0.33	441.30	0.59
PZ-PA5-3C	3	443.45	439.40	-4.05	441.63	-1.82
RG-1B	3	426.18	455.81	29.63	457.30	31.12
RG-2B	3	555.09	521.64	-33.45	521.63	-33.46
RG-3B	3	458.01	464.12	6.11	465.44	7.43
RG-4B	3	552.44	530.29	-22.15	531.70	-20.74
RG-7B	3	426.13	440.40	14.27	442.12	15.99
RG-8B	3	492.00	489.07	-2.93	490.38	-1.62
RG-9B	3	478.38	505.60	27.22	506.58	28.20
RG-10B	3	597.72	599.76	2.04	622.82	25.10
RGPZ-5B	3	490.13	490.43	0.30	491.27	1.14
RGPZ-6B	3	461.49	465.49	4.00	466.78	5.29
RP-2B	3	622.15	649.41	27.26	658.01	35.86
RP-3B	3	534.63	516.99	-17.64	517.57	-17.06
RP-6B	3	364.76	363.42	-1.34	355.73	-9.03
RP-13B	3	423.08	419.23	-3.85	419.48	-3.60
RP-14B	3	529.86	530.07	0.21	555.18	25.32
RP-52B	3	432.44	422.57	-9.87	422.88	-9.56
RP-59B	3	359.33	358.84	-0.49	352.99	-6.34
RP-65B	3	391.01	390.84	-0.17	391.43	0.42
RP-72B	3	362.32	358.67	-3.65	358.66	-3.66
RP-73B	3	352.20	359.86	7.66	359.87	7.67
RP-76A	3	395.53	394.71	-0.82	394.71	-0.82
RP-78B	3	411.04	400.54	-10.50	400.53	-10.51
RP-84B	3	402.91	399.85	-3.06	399.85	-3.06
RP-109B	3	451.25	463.86	12.61	463.86	12.61
RP-110B	3	439.45	450.52	11.07	450.52	11.07
Sump 9B-CW	3	466.23	473.00	6.77	474.77	8.54
SW-15	3	544.67	541.92	-2.75	544.20	-0.47
SW-17	3	579.72	570.21	-9.51	572.12	-7.60
SW-29	3	481.55	481.87	0.32	484.56	3.01
SW-44	3	625.16	643.60	18.44	649.07	23.91
SW-46	3	489.68	522.85	33.17	565.30	75.62
SW-48	3	584.05	563.95	-20.10	564.65	-19.40
SW-50	3	613.82	612.97	-0.85	613.96	0.14
TP-1	3	410.15	424.94	14.78	424.91	14.76
TP-2A	3	424.95	430.32	5.37	430.32	5.37
TP-3	3	420.73	412.16	-8.57	413.11	-7.62
TP-4	3	509.65	510.27	0.62	511.16	1.51
TP-5	3	396.14	408.03	11.89	404.74	8.60
TP-7	3	505.10	494.42	-10.68	516.08	10.98
TP-8	3	460.35	447.03	-13.32	465.20	4.85
TP-13	3	450.51	427.59	-22.92	430.79	-19.72
TP-15	3	548.24	549.56	1.32	555.08	6.84
WB-6	3	525.77	532.28	6.51	538.73	12.96
WP-4S	3	413.90	410.93	-2.97	411.56	-2.34
WP-7S	3	608.58	602.79	-5.79	603.34	-5.24
WP-8S	3	501.86	510.67	8.81	511.58	9.72
RAP-1B	3	348.60	367.43	18.83	357.58	8.98
MODEL LAYER 3 CALIBRATION STATISTICS						
LAYER 3 MEAN ERROR (FT):				**0.52**		**2.80**
LAYER 3 ABSOLUTE MEAN ERROR (FT):				**9.05**		**11.05**
LAYER 3 ROOT MEAN SQUARED ERROR (FT):				**12.55**		**16.26**

Table D1-3
Comparison of Calibration Residuals and Summary Statistics, Modified and Original 2004 (Dry Season) Models
Casmalia Resources Superfund Site
Casmalia, CA

			Modified Model		Original Model	
Observation Well	**Model Layer**	**Observed Head March 2004 (ft msl)**	**Simulated Head March 2004 (ft msl)**	**Error Residual (ft)**	**Simulated Head March 2004 (ft msl)**	**Error Residual (ft)**
MODEL LAYER 4						
A2B	4	430.15	421.83	-8.32	423.46	-6.69
B3B	4	368.93	364.60	-4.33	356.51	-12.42
B4M	4	358.41	358.01	-0.40	352.49	-5.92
B6B	4	363.17	367.86	4.69	359.07	-4.10
C1B	4	409.40	406.62	-2.78	406.66	-2.74
C2B	4	405.95	401.06	-4.89	401.05	-4.90
CpH	4	407.15	402.86	-4.29	402.87	-4.28
LCW-2	4	530.72	517.61	-13.11	518.55	-12.17
LCW-3	4	489.50	497.82	8.32	499.01	9.51
MW-18C	4	419.41	420.84	1.43	422.37	2.96
MW4-BU	4	481.66	483.65	1.99	483.68	2.02
MW-7C	4	408.00	404.62	-3.38	404.70	-3.31
PZ-P18-1	4	434.71	442.76	8.05	442.91	8.20
RG-10B	4	597.72	608.07	10.35	629.35	31.63
RG-11B	4	675.37	671.44	-3.93	672.94	-2.43
RG-1B	4	426.18	454.19	28.01	455.71	29.53
RG-2B	4	555.09	525.26	-29.83	525.56	-29.53
RG-6B	4	454.08	475.13	21.05	476.80	22.72
RGPZ-2B	4	699.22	697.58	-1.64	699.68	0.46
RGPZ-9B	4	656.38	629.49	-26.89	630.16	-26.22
RGPZ-10B	4	648.47	636.08	-12.39	636.81	-11.66
RGPZ-15B	4	503.05	501.08	-1.97	502.15	-0.90
RP-26C	4	485.74	503.97	18.23	505.63	19.89
RP-27C	4	529.34	533.65	4.31	535.71	6.37
RP-40	4	644.94	606.54	-38.40	607.04	-37.90
RP45B2	4	422.37	423.85	1.48	424.71	2.34
RP-41B	4	471.94	481.40	9.46	481.40	9.46
RP-62B-2	4	623.31	618.08	-5.23	618.41	-4.90
RP-73A-2	4	352.32	364.07	11.75	364.16	11.84
RP-84B	4	402.91	400.36	-2.55	400.37	-2.54
RP-98C	4	480.23	489.99	9.76	491.41	11.18
RP-101C	4	418.29	420.01	1.72	421.41	3.12
SW-28	4	485.24	493.51	8.27	497.07	11.83
PSCT-3	4	505.93	493.63	-12.30	494.13	-11.80
MODEL LAYER 4 CALIBRATION STATISTICS						
LAYER 4 MEAN ERROR (FT):				**-0.82**		**-0.04**
LAYER 4 ABSOLUTE MEAN ERROR (FT):				**9.57**		**10.81**
LAYER 4 ROOT MEAN SQUARED ERROR (FT):				**13.30**		**14.63**

Table D1-3
Comparison of Calibration Residuals and Summary Statistics, Modified and Original 2004 (Dry Season) Models
Casmalia Resources Superfund Site
Casmalia, CA

			Modified Model		Original Model	
Observation Well	**Model Layer**	**Observed Head March 2004 (ft msl)**	**Simulated Head March 2004 (ft msl)**	**Error Residual (ft)**	**Simulated Head March 2004 (ft msl)**	**Error Residual (ft)**
MODEL LAYER 5						
B3B	5	368.93	368.09	-0.84	361.15	-7.78
D1B	5	460.85	462.43	1.58	464.41	3.56
DB-1	5	455.29	474.95	19.66	496.62	41.33
DB-8	5	622.60	618.40	-4.20	618.93	-3.67
DW-2	5	576.52	635.16	58.64	645.82	69.30
MW-4BL	5	474.46	483.93	9.47	483.98	9.52
MW-7D	5	405.65	409.84	4.19	409.94	4.29
RG-1C	5	432.36	453.50	21.14	454.93	22.57
RGPZ-2B	5	699.22	687.39	-11.83	689.33	-9.89
RGPZ-4C	5	556.17	540.03	-16.14	542.85	-13.32
RGPZ-6C	5	457.75	473.54	15.79	474.58	16.83
RGPZ-7C	5	456.98	466.89	9.91	468.04	11.06
RP-3C	5	536.23	533.35	-2.88	535.51	-0.72
RP-5C	5	398.53	387.26	-11.27	386.86	-11.67
RP-6C	5	305.44	367.66	62.22	360.55	55.11
RP-7C	5	374.56	376.37	1.81	368.68	-5.88
RP-18C	5	373.51	418.44	44.93	418.59	45.08
RP-33C	5	429.73	418.94	-10.79	419.03	-10.70
RP-42C	5	551.06	555.69	4.63	555.88	4.82
RP-48C	5	388.88	386.55	-2.33	379.00	-9.88
RP-53C	5	457.21	472.86	15.65	475.13	17.92
RP-55C-2	5	507.34	507.72	0.38	508.72	1.38
RP-57C	5	462.06	487.72	25.66	488.71	26.65
RP-61B	5	604.72	584.40	-20.32	584.74	-19.98
RP-62B-1	5	622.71	603.20	-19.51	603.55	-19.16
RP-63B	5	616.92	613.58	-3.34	614.16	-2.76
RP-63C	5	625.56	617.11	-8.45	617.78	-7.78
RP-69C-2	5	575.79	534.42	-41.37	535.44	-40.35
RP-71C	5	531.28	548.03	16.75	562.43	31.15
RP-79C-2	5	374.84	369.04	-5.80	361.93	-12.91
RP-80C	5	408.81	410.20	1.39	410.26	1.45
RP-85C	5	420.01	413.15	-6.86	413.05	-6.96
RP-96C-2	5	465.81	492.00	26.19	493.11	27.30
RP-111B	5	473.43	478.86	5.43	479.03	5.60
WP-4D	5	404.59	408.44	3.85	408.71	4.12
WP-8D	5	513.03	521.92	8.89	522.68	9.65
MODEL LAYER 5 CALIBRATION STATISTICS						
LAYER 5 MEAN ERROR (FT):				**5.34**		**6.26**
LAYER 5 ABSOLUTE MEAN ERROR (FT):				**14.56**		**16.45**
LAYER 5 ROOT MEAN SQUARED ERROR (FT):				**21.07**		**22.94**

Table D1-3
Comparison of Calibration Residuals and Summary Statistics, Modified and Original 2004 (Dry Season) Models
Casmalia Resources Superfund Site
Casmalia, CA

			Modified Model		Original Model	
Observation Well	**Model Layer**	**Observed Head March 2004 (ft msl)**	**Simulated Head March 2004 (ft msl)**	**Error Residual (ft)**	**Simulated Head March 2004 (ft msl)**	**Error Residual (ft)**
MODEL LAYER 6						
A1-B	6	660.75	682.54	21.79	684.64	23.89
MW-7D	6	405.65	410.92	5.27	411.06	5.41
MW-13D	6	397.00	384.23	-12.77	381.57	-15.43
MW-14D-2	6	402.43	405.35	2.92	403.57	1.14
MW-6D	6	427.54	426.36	-1.18	427.13	-0.41
RGPZ-14D	6	506.12	506.03	-0.09	506.95	0.83
RGPZ-2C	6	666.08	665.19	-0.89	666.49	0.41
RGPZ-3D	6	555.99	546.61	-9.38	548.90	-7.09
RGPZ-6D	6	461.50	472.13	10.63	472.86	11.36
RGPZ-7D	6	459.87	467.49	7.62	468.27	8.40
RP-2C	6	593.26	600.67	7.41	605.73	12.47
RP-3D	6	531.06	529.03	-2.03	530.86	-0.20
RP-4D	6	432.38	429.16	-3.22	429.54	-2.84
RP-5D	6	404.52	389.78	-14.74	388.34	-16.18
RP-8C	6	394.01	399.68	5.67	395.60	1.59
RP-14D	6	520.16	508.62	-11.54	522.34	2.18
RP-18D	6	411.36	416.43	5.07	416.69	5.33
RP-23C	6	571.71	566.66	-5.05	566.96	-4.75
RP-24D	6	427.78	420.79	-6.99	421.87	-5.91
RP-25C	6	571.29	566.83	-4.46	567.46	-3.83
RP-29D	6	580.73	618.52	37.79	626.75	46.02
RP-33D	6	429.47	417.55	-11.92	417.53	-11.94
RP-34C	6	611.03	601.95	-9.08	602.46	-8.57
RP-44C	6	537.37	549.87	12.50	550.50	13.13
RP-50C	6	438.78	414.24	-24.54	413.04	-25.74
RP-54C	6	556.26	538.27	-17.99	540.80	-15.46
RP-55C	6	504.49	505.90	1.41	506.77	2.28
RP-72D	6	357.54	364.67	7.13	364.66	7.12
RP-73D	6	365.14	359.09	-6.05	359.12	-6.02
RP-74C	6	477.88	493.21	15.33	493.96	16.08
RP-81C	6	695.80	682.85	-12.95	685.05	-10.75
RP-86C	6	413.23	419.59	6.36	419.31	6.08
RP-97D	6	426.98	430.30	3.32	431.96	4.98
RP-109D	6	450.81	456.08	5.27	456.08	5.27
RP-110D	6	440.01	450.33	10.32	450.34	10.33
RP-111D	6	460.57	477.01	16.44	477.16	16.59
WP-7D	6	601.59	567.23	-34.36	567.53	-34.06
MODEL LAYER 6 CALIBRATION STATISTICS						
LAYER 6 MEAN ERROR (FT):				**-0.19**		**0.86**
LAYER 6 ABSOLUTE MEAN ERROR (FT):				**10.04**		**10.00**
LAYER 6 ROOT MEAN SQUARED ERROR (FT):				**13.12**		**13.88**

Table D1-3
Comparison of Calibration Residuals and Summary Statistics, Modified and Original 2004 (Dry Season) Models
Casmalia Resources Superfund Site
Casmalia, CA

			Modified Model		Original Model	
Observation Well	**Model Layer**	**Observed Head March 2004 (ft msl)**	**Simulated Head March 2004 (ft msl)**	**Error Residual (ft)**	**Simulated Head March 2004 (ft msl)**	**Error Residual (ft)**
MODEL LAYER 7						
MW-8D-2	7	409.09	411.68	2.59	411.71	2.62
MW-11D	7	396.00	401.91	5.91	401.89	5.89
MW-18D	7	417.48	413.78	-3.70	414.13	-3.35
MW-21D	7	495.62	502.99	7.37	503.34	7.72
RGPZ-11D	7	620.57	603.90	-16.67	604.10	-16.47
RGPZ-14D	7	506.12	502.52	-3.60	502.90	-3.22
RGPZ-16D	7	499.89	496.17	-3.72	496.60	-3.29
RP-25D	7	556.04	551.92	-4.12	552.14	-3.90
RP-26D	7	448.43	463.14	14.71	463.56	15.13
RP-41D	7	480.57	485.91	5.34	485.91	5.34
RP-42D	7	564.84	567.20	2.36	567.28	2.44
RP-47C	7	391.70	402.48	10.78	401.34	9.64
RP-62D	7	513.37	531.09	17.72	531.18	17.81
RP-65C	7	401.74	402.42	0.68	402.59	0.85
RP-92C	7	398.84	404.11	5.27	404.11	5.27
RP-97D	7	426.98	423.62	-3.36	424.20	-2.78
RP-107D	7	419.48	420.28	0.80	420.82	1.34
T-2	7	390.96	391.20	0.24	389.75	-1.22
MODEL LAYER 7 CALIBRATION STATISTICS						
LAYER 7 MEAN ERROR (FT):				**2.14**		**2.21**
LAYER 7 ABSOLUTE MEAN ERROR (FT):				**6.05**		**6.02**
LAYER 7 ROOT MEAN SQUARED ERROR (FT):				**8.00**		**7.93**

Table D1-4
Comparison of Calibration Residuals and Summary Statistics, Modified and Original March 2001 (Wet Season) Models
Casmalia Resources Superfund Site
Casmalia, CA

			Modified Model		Original Model	
Observation Well	**Model Layer**	**Observed Head March 2001 (ft msl)**	**Simulated Head March 2001 (ft msl)**	**Error Residual (ft)**	**Simulated Head March 2001 (ft msl)**	**Error Residual (ft)**
MODEL LAYER 1						
B-5	1	389.27	372.72	-16.55	360.43	-28.84
C2M	1	420.87	405.50	-15.37	405.43	-15.44
C3M	1	413.20	401.38	-11.82	401.34	-11.86
C4M	1	409.59	403.65	-5.94	403.62	-5.97
C5E	1	406.34	440.18	33.84	440.16	33.82
D1M	1	471.84	467.56	-4.28	467.61	-4.23
GW-P(E)	1	520.56	537.75	17.19	518.80	-1.76
GW-P(W)	1	522.02	541.37	19.35	522.34	0.32
PZ-P18-2A	1	454.67	458.69	4.02	458.72	4.05
PZ-P18-2B	1	449.52	458.69	9.17	458.72	9.20
PZ-P18-3B	1	447.41	457.63	10.22	457.63	10.22
PZ-P18-4B	1	444.55	455.13	10.58	455.11	10.56
PZ-PA5-1A	1	456.56	459.21	2.65	459.07	2.51
PZ-PA5-1A1	1	460.39	459.21	-1.18	459.07	-1.32
PZ-PA5-2A	1	455.10	455.99	0.89	455.77	0.67
PZ-PA5-2B	1	454.10	455.86	1.76	455.64	1.54
PZ-PA5-3A	1	455.43	456.55	1.12	456.70	1.27
PZ-PA5-3A1	1	462.27	456.55	-5.72	456.70	-5.57
PZ-PA5-3B	1	452.93	456.55	3.62	456.70	3.77
PZ-PA5-3C	1	454.47	456.55	2.08	456.70	2.23
RG-3B	1	465.95	467.57	1.62	451.24	-14.71
RG-8B	1	509.86	511.84	1.98	497.41	-12.45
RG-9B	1	523.57	532.09	8.52	516.37	-7.20
RP-6A	1	372.32	367.99	-4.33	357.29	-15.03
RP-10A	1	449.46	446.12	-3.34	446.13	-3.33
RP-11A	1	435.48	428.38	-7.10	428.38	-7.10
RP-12A	1	421.19	415.20	-5.99	415.16	-6.03
RP-17B	1	496.20	506.44	10.24	506.44	10.24
RP-28B	1	420.03	413.40	-6.63	413.35	-6.68
RP-41A	1	471.95	477.14	5.19	477.14	5.19
RP-72A	1	358.60	356.79	-1.81	356.79	-1.81
RP-73A1	1	372.65	362.07	-10.58	361.98	-10.67
RP-84A2	1	410.23	402.87	-7.36	402.86	-7.37
RP-100A	1	434.38	429.08	-5.30	425.68	-8.70
SUMP 9B-PA	1	482.94	489.44	6.50	471.77	-11.17
SUMP 9B-PB	1	483.60	481.90	-1.70	464.62	-18.98
SUMP 9B-PC	1	483.90	491.68	7.78	473.88	-10.02
TP-2A	1	433.59	442.06	8.47	442.06	8.47
TP-4	1	533.02	534.45	1.43	518.63	-14.39
C-5	1	398.78	440.18	41.40	440.16	41.38
Road Sump	1	455.09	462.71	7.62	446.38	-8.71
MODEL LAYER 1 CALIBRATION STATISTICS						
LAYER 1 MEAN ERROR (FT):				**2.49**		**-2.29**
LAYER 1 ABSOLUTE MEAN ERROR (FT):				**8.10**		**9.39**
LAYER 1 ROOT MEAN SQUARED ERROR (FT):				**11.50**		**12.70**

Table D1-4
Comparison of Calibration Residuals and Summary Statistics, Modified and Original March 2001 (Wet Season) Models
Casmalia Resources Superfund Site
Casmalia, CA

			Modified Model		Original Model	
Observation Well	**Model Layer**	**Observed Head March 2001 (ft msl)**	**Simulated Head March 2001 (ft msl)**	**Error Residual (ft)**	**Simulated Head March 2001 (ft msl)**	**Error Residual (ft)**
MODEL LAYER 2						
B3M	2	372.89	368.33	-4.56	357.46	-15.43
B-5	2	389.27	372.79	-16.48	360.76	-28.51
C2M	2	420.87	404.71	-16.16	404.63	-16.24
C3M	2	413.20	400.50	-12.70	400.45	-12.75
C4M	2	409.59	403.64	-5.95	403.62	-5.97
D1M	2	471.84	467.39	-4.45	467.44	-4.40
PZ-P18-4B	2	444.55	454.48	9.93	454.45	9.90
PZ-PA5-2C	2	452.30	455.24	2.94	454.48	2.18
PZ-PA5-3C	2	454.47	456.10	1.63	455.84	1.37
RG-1B	2	433.17	456.09	22.92	439.80	6.63
RG-3B	2	465.95	467.72	1.77	451.37	-14.58
RG-7B	2	434.26	431.41	-2.85	429.13	-5.13
RG-8B	2	509.86	509.50	-0.36	495.13	-14.73
RG-9B	2	523.57	531.53	7.96	515.90	-7.67
RGPZ-6B	2	470.69	469.54	-1.15	453.07	-17.62
RP-2B	2	635.82	695.50	59.68	681.78	45.96
RP-6B	2	371.96	367.75	-4.21	357.18	-14.78
RP-13B	2	427.59	422.98	-4.61	422.84	-4.75
RP-17B	2	496.20	506.43	10.23	506.43	10.23
RP-28B	2	420.03	413.77	-6.26	413.71	-6.32
RP-52B	2	439.61	430.50	-9.11	430.35	-9.26
RP-76A	2	403.31	396.06	-7.25	396.05	-7.26
RP-78B	2	415.64	404.19	-11.45	404.13	-11.51
RP-109B	2	453.72	463.89	10.17	463.89	10.17
Sump 9B-CW	2	462.02	484.50	22.48	461.64	-0.38
SW-15	2	554.63	561.37	6.74	541.06	-13.57
SW-17	2	581.39	596.86	15.47	575.05	-6.34
SW-44	2	634.91	688.21	53.30	672.76	37.85
SW-46	2	490.92	525.07	34.15	528.79	37.87
SW-50	2	620.50	687.64	67.14	679.20	58.70
TP-1	2	413.65	437.86	24.21	437.43	23.78
TP-2A	2	433.59	441.89	8.30	441.89	8.30
TP-3	2	427.04	420.80	-6.24	420.90	-6.14
TP-4	2	533.02	534.29	1.27	518.50	-14.52
TP-5	2	404.21	418.47	14.26	413.07	8.86
TP-15	2	560.37	567.64	7.27	548.84	-11.53
WP-4S	2	423.56	422.43	-1.13	422.89	-0.67
MODEL LAYER 2 CALIBRATION STATISTICS						
LAYER 2 MEAN ERROR (FT):				**7.21**		**0.31**
LAYER 2 ABSOLUTE MEAN ERROR (FT):				**13.43**		**13.83**
LAYER 2 ROOT MEAN SQUARED ERROR (FT):				**20.70**		**18.75**

Table D1-4
Comparison of Calibration Residuals and Summary Statistics, Modified and Original March 2001 (Wet Season) Models
Casmalia Resources Superfund Site
Casmalia, CA

			Modified Model		Original Model	
Observation Well	**Model Layer**	**Observed Head March 2001 (ft msl)**	**Simulated Head March 2001 (ft msl)**	**Error Residual (ft)**	**Simulated Head March 2001 (ft msl)**	**Error Residual (ft)**
MODEL LAYER 3						
A2M	3	415.34	410.45	-4.89	408.51	-6.83
B3M	3	372.89	368.33	-4.56	357.46	-15.43
B4M	3	365.60	361.36	-4.24	353.76	-11.84
B-5	3	389.27	372.81	-16.46	360.84	-28.43
C2M	3	420.87	404.63	-16.24	404.55	-16.32
C3M	3	413.20	400.38	-12.82	400.33	-12.87
C4M	3	409.59	403.64	-5.95	403.62	-5.97
D1M	3	471.84	467.37	-4.47	467.42	-4.42
LCW-1	3	534.88	538.20	3.32	522.73	-12.15
MW-15C	3	412.75	425.55	12.80	420.46	7.71
MW-18C	3	419.89	429.73	9.84	426.15	6.26
MW-7BU	3	582.56	590.60	8.04	590.60	8.04
PZ-P18-1	3	444.89	449.22	4.33	449.22	4.33
PZ-P18-5	3	443.36	447.75	4.39	447.60	4.24
PZ-PA5-2C	3	452.30	455.17	2.87	454.39	2.09
PZ-PA5-3C	3	454.47	456.04	1.57	455.77	1.30
RG-1B	3	433.17	456.08	22.91	439.77	6.60
RG-2B	3	562.72	535.40	-27.32	509.92	-52.80
RG-3B	3	465.95	467.73	1.78	451.38	-14.57
RG-4B	3	562.51	545.36	-17.15	522.39	-40.12
RG-7B	3	434.26	431.37	-2.89	429.11	-5.15
RG-8B	3	509.86	509.26	-0.60	494.90	-14.96
RG-9B	3	523.57	531.51	7.94	515.87	-7.70
RG-10B	3	599.32	681.38	82.06	676.42	77.10
RGPZ-5B	3	498.77	502.21	3.44	483.88	-14.89
RGPZ-6B	3	470.69	469.56	-1.13	453.09	-17.60
RP-2B	3	635.82	694.19	58.37	680.47	44.65
RP-3B	3	536.66	530.59	-6.07	508.66	-28.00
RP-6B	3	371.96	367.76	-4.20	357.18	-14.78
RP-13B	3	427.59	423.13	-4.46	423.00	-4.59
RP-14B	3	533.37	543.28	9.91	545.07	11.70
RP-52B	3	439.61	430.50	-9.11	430.36	-9.25
RP-59B	3	365.54	362.42	-3.12	354.36	-11.18
RP-65B	3	405.95	397.68	-8.27	396.30	-9.65
RP-72B	3	367.40	359.04	-8.36	359.02	-8.38
RP-73B	3	371.74	360.05	-11.69	360.02	-11.72
RP-76A	3	403.31	395.99	-7.32	395.98	-7.33
RP-78B	3	415.64	404.13	-11.51	404.06	-11.58
RP-84B	3	409.46	400.78	-8.68	400.77	-8.69
RP-109B	3	453.72	463.89	10.17	463.89	10.17
RP-110B	3	441.27	450.57	9.30	450.57	9.30
Sump 9B-CW	3	462.02	477.08	15.06	445.10	-16.92
SW-15	3	554.63	559.91	5.28	539.61	-15.02
SW-17	3	581.39	595.72	14.33	573.92	-7.47
SW-29	3	482.17	491.97	9.80	483.50	1.33
SW-44	3	634.91	686.86	51.95	671.41	36.50
SW-46	3	490.92	525.22	34.30	528.89	37.97
SW-48	3	603.73	598.65	-5.08	587.71	-16.02
SW-50	3	620.50	684.45	63.95	676.12	55.62
TP-1	3	413.65	437.81	24.16	437.37	23.72
TP-2A	3	433.59	441.83	8.24	441.83	8.24
TP-3	3	427.04	420.80	-6.24	420.90	-6.14
TP-4	3	533.02	534.30	1.28	518.50	-14.52
TP-5	3	404.21	418.47	14.26	413.07	8.86
TP-7	3	507.94	499.36	-8.58	500.63	-7.31
TP-8	3	465.24	460.29	-4.95	461.06	-4.18
TP-13	3	451.54	438.17	-13.37	436.76	-14.78
TP-15	3	560.37	566.76	6.39	547.99	-12.38
WB-6	3	528.60	567.66	39.06	567.29	38.69
WP-4S	3	423.56	422.42	-1.14	422.87	-0.69
WP-7S	3	611.85	647.69	35.84	640.17	28.32
WP-8S	3	533.59	535.98	2.39	520.39	-13.20
MODEL LAYER 3 CALIBRATION STATISTICS						
LAYER 3 MEAN ERROR (FT):				**5.46**		**-1.66**
LAYER 3 ABSOLUTE MEAN ERROR (FT):				**13.23**		**15.62**
LAYER 3 ROOT MEAN SQUARED ERROR (FT):				**20.70**		**21.32**

Table D1-4
Comparison of Calibration Residuals and Summary Statistics, Modified and Original March 2001 (Wet Season) Models
Casmalia Resources Superfund Site
Casmalia, CA

			Modified Model		Original Model	
Observation Well	**Model Layer**	**Observed Head March 2001 (ft msl)**	**Simulated Head March 2001 (ft msl)**	**Error Residual (ft)**	**Simulated Head March 2001 (ft msl)**	**Error Residual (ft)**
MODEL LAYER 4						
A2B	4	436.83	431.17	-5.67	427.98	-8.85
B3B	4	356.60	369.12	12.52	357.98	1.38
B4M	4	365.60	361.45	-4.15	353.84	-11.76
B6B	4	385.62	373.01	-12.61	360.85	-24.77
C1B	4	406.13	408.46	2.33	408.43	2.30
C2B	4	414.08	404.82	-9.26	404.75	-9.33
CpH	4	412.97	404.71	-8.26	404.69	-8.28
LCW-2	4	528.05	547.89	19.84	533.72	5.67
LCW-3	4	503.76	521.06	17.30	506.78	3.02
MW-18C	4	419.89	429.60	9.71	426.07	6.18
MW4-BU	4	484.43	484.79	0.36	484.78	0.35
MW-7C	4	410.69	408.07	-2.62	408.01	-2.68
PZ-P18-1	4	444.89	449.01	4.12	449.01	4.12
RG-10B	4	599.32	679.84	80.52	674.90	75.58
RG-11B	4	688.54	630.92	-57.62	625.87	-62.67
RG-1B	4	433.17	454.06	20.89	437.73	4.56
RG-2B	4	562.72	539.78	-22.94	514.44	-48.28
RG-6B	4	463.23	484.68	21.45	476.17	12.94
RGPZ-2B	4	712.74	738.77	26.03	736.18	23.44
RGPZ-9B	4	662.39	576.50	-85.89	573.57	-88.82
RGPZ-10B	4	648.67	613.97	-34.70	607.84	-40.83
RGPZ-15B	4	506.55	511.96	5.41	493.93	-12.62
RP-26C	4	499.35	529.13	29.78	518.19	18.84
RP-27C	4	530.47	569.93	39.46	563.23	32.76
RP-40	4	603.42	640.05	36.63	633.19	29.77
RP45B2	4	422.45	442.18	19.73	440.21	17.76
RP-41B	4	475.62	481.62	6.00	481.58	5.96
RP-62B-2	4	623.69	615.84	-7.85	613.03	-10.66
RP-73A-2	4	373.50	365.56	-7.94	365.33	-8.17
RP-84B	4	409.46	401.28	-8.18	401.27	-8.19
RP-98C	4	497.06	509.05	11.99	496.30	-0.76
RP-101C	4	421.36	428.59	7.23	424.93	3.57
SW-28	4	485.67	516.72	31.05	513.73	28.06
PSCT-3	4	506.05	502.72	-3.33	482.44	-23.61
MODEL LAYER 4 CALIBRATION STATISTICS						
LAYER 4 MEAN ERROR (FT):				**3.86**		**-2.77**
LAYER 4 ABSOLUTE MEAN ERROR (FT):				**19.81**		**19.02**
LAYER 4 ROOT MEAN SQUARED ERROR (FT):				**28.40**		**28.59**

Table D1-4
Comparison of Calibration Residuals and Summary Statistics, Modified and Original March 2001 (Wet Season) Models
Casmalia Resources Superfund Site
Casmalia, CA

			Modified Model		Original Model	
Observation Well	**Model Layer**	**Observed Head March 2001 (ft msl)**	**Simulated Head March 2001 (ft msl)**	**Error Residual (ft)**	**Simulated Head March 2001 (ft msl)**	**Error Residual (ft)**
MODEL LAYER 5						
B3B	5	356.60	372.51	15.91	362.89	6.29
CT-4C	5	411.24	415.36	4.12	415.33	4.09
CT-5C	5	420.14	418.63	-1.51	418.47	-1.67
D1B	5	471.79	470.03	-1.76	470.10	-1.69
DB-1	5	462.34	476.83	14.49	477.73	15.39
DB-8	5	631.97	648.53	16.56	643.25	11.28
DW-2	5	583.02	654.52	71.50	651.80	68.78
MW-4BL	5	478.70	485.34	6.64	485.33	6.63
MW-7D	5	410.22	414.46	4.24	414.42	4.20
RG-1C	5	438.45	454.16	15.71	442.77	4.32
RGPZ-2B	5	712.74	713.21	0.47	710.78	-1.96
RGPZ-4C	5	557.04	556.27	-0.77	537.07	-19.97
RGPZ-6C	5	461.67	479.59	17.92	465.73	4.06
RGPZ-7C	5	460.40	471.31	10.91	458.05	-2.35
RP-5C	5	400.92	394.51	-6.41	392.29	-8.63
RP-6C	5	307.52	372.07	64.55	362.24	54.72
RP-7C	5	383.76	381.79	-1.97	371.21	-12.55
RP-15C	5	511.72	605.19	93.47	600.94	89.22
RP-18C	5	408.71	425.65	16.94	425.62	16.91
RP-33C	5	430.07	426.66	-3.41	426.25	-3.82
RP-42C	5	549.50	548.31	-1.19	547.00	-2.50
RP-48C	5	390.29	393.13	2.84	382.78	-7.51
RP-53C	5	462.87	478.74	15.87	477.51	14.64
RP-55C-2	5	509.00	519.28	10.28	502.36	-6.64
RP-57C	5	473.10	501.08	27.98	488.06	14.96
RP-61B	5	601.92	597.95	-3.97	592.89	-9.03
RP-62B-1	5	624.77	611.20	-13.57	608.10	-16.67
RP-63B	5	619.38	643.48	24.10	639.28	19.90
RP-63C	5	629.97	652.10	22.13	647.31	17.34
RP-69C-2	5	576.32	570.11	-6.21	559.03	-17.29
RP-71C	5	536.04	576.63	40.59	576.25	40.21
RP-79C-2	5	377.74	373.63	-4.11	363.75	-13.99
RP-80C	5	414.30	411.71	-2.59	411.68	-2.62
RP-85C	5	425.85	420.41	-5.44	420.04	-5.81
RP-96C-2	5	464.62	509.89	45.27	497.70	33.08
RP-111B	5	475.05	489.71	14.66	488.94	13.89
WP-4D	5	407.65	417.92	10.27	417.96	10.31
WP-8D	5	527.10	544.61	17.51	531.60	4.50
MODEL LAYER 5 CALIBRATION STATISTICS						
LAYER 5 MEAN ERROR (FT):				**14.00**		**8.42**
LAYER 5 ABSOLUTE MEAN ERROR (FT):				**16.78**		**15.51**
LAYER 5 ROOT MEAN SQUARED ERROR (FT):				**26.51**		**24.23**

Table D1-4
Comparison of Calibration Residuals and Summary Statistics, Modified and Original March 2001 (Wet Season) Models
Casmalia Resources Superfund Site
Casmalia, CA

			Modified Model		Original Model	
Observation Well	**Model Layer**	**Observed Head March 2001 (ft msl)**	**Simulated Head March 2001 (ft msl)**	**Error Residual (ft)**	**Simulated Head March 2001 (ft msl)**	**Error Residual (ft)**
MODEL LAYER 6						
A1-B	6	669.44	695.97	26.53	692.94	23.50
MW-7D	6	410.22	414.30	4.08	414.28	4.06
MW-13D	6	397.30	388.88	-8.42	384.97	-12.33
MW-14D-2	6	403.23	411.55	8.32	408.69	5.46
MW-23D	6	622.10	588.97	-33.13	585.84	-36.26
MW-6D	6	428.09	429.91	1.82	429.83	1.74
RGPZ-14D	6	507.78	514.26	6.48	503.82	-3.96
RGPZ-2C	6	689.08	674.38	-14.70	672.72	-16.36
RGPZ-3D	6	556.92	559.93	3.01	548.24	-8.68
RGPZ-6D	6	468.76	476.90	8.14	468.13	-0.63
RGPZ-7D	6	465.58	471.59	6.01	463.19	-2.39
RP-2C	6	594.07	622.70	28.63	614.33	20.26
RP-3D	6	533.57	539.65	6.08	528.40	-5.17
RP-4D	6	437.03	433.19	-3.84	432.68	-4.36
RP-5D	6	407.42	394.45	-12.97	391.87	-15.55
RP-8C	6	394.56	403.75	9.19	397.97	3.41
RP-14D	6	509.55	516.55	7.00	517.12	7.57
RP-16C	6	695.26	602.21	-93.05	597.14	-98.12
RP-18D	6	416.64	420.99	4.35	420.98	4.34
RP-23C	6	566.91	581.91	15.00	577.71	10.80
RP-24D	6	428.65	427.43	-1.22	425.85	-2.80
RP-25C	6	570.53	596.08	25.55	591.29	20.76
RP-29D	6	586.71	638.82	52.11	635.31	48.60
RP-33D	6	435.79	422.53	-13.26	422.11	-13.68
RP-34C	6	610.55	590.29	-20.26	587.48	-23.07
RP-38	6	453.38	455.85	2.47	452.82	-0.56
RP-44C	6	539.29	575.18	35.89	572.16	32.87
RP-50C	6	444.97	419.74	-25.23	417.91	-27.06
RP-54C	6	557.03	550.03	-7.00	538.58	-18.45
RP-55C	6	506.89	514.14	7.25	503.64	-3.25
RP-63D	6	604.83	596.14	-8.69	593.15	-11.68
RP-72D	6	361.10	364.84	3.74	364.83	3.73
RP-73D	6	367.29	359.74	-7.55	359.64	-7.65
RP-74C	6	478.84	513.21	34.37	511.04	32.20
RP-81C	6	695.37	696.04	0.67	692.78	-2.59
RP-86C	6	419.67	425.69	6.02	423.17	3.50
RP-88C	6	320.14	422.70	102.56	420.93	100.79
RP-97D	6	427.72	438.24	10.52	437.02	9.30
RP-109D	6	453.57	456.39	2.82	456.37	2.80
RP-111D	6	464.41	485.43	21.02	451.14	9.67
RP-110D	6	441.47	451.20	9.73	484.78	20.37
WP-7D	6	601.64	582.95	-18.69	579.04	-22.60
MODEL LAYER 6 CALIBRATION STATISTICS						
LAYER 6 MEAN ERROR (FT):				**4.32**		**0.68**
LAYER 6 ABSOLUTE MEAN ERROR (FT):				**17.08**		**16.73**
LAYER 6 ROOT MEAN SQUARED ERROR (FT):				**27.29**		**27.25**

Table D1-4
Comparison of Calibration Residuals and Summary Statistics, Modified and Original March 2001 (Wet Season) Models
Casmalia Resources Superfund Site
Casmalia, CA

			Modified Model		Original Model	
Observation Well	**Model Layer**	**Observed Head March 2001 (ft msl)**	**Simulated Head March 2001 (ft msl)**	**Error Residual (ft)**	**Simulated Head March 2001 (ft msl)**	**Error Residual (ft)**
MODEL LAYER 7						
MW-7BL	7	685.29	709.17	23.88	709.14	23.85
MW-8D-2	7	411.27	413.52	2.25	413.47	2.20
MW-11D	7	398.00	403.76	5.76	403.52	5.52
MW-18D	7	417.20	416.10	-1.10	415.52	-1.68
MW-21D	7	492.51	511.96	19.45	510.35	17.84
RGPZ-11D	7	619.44	604.67	-14.77	602.39	-17.05
RGPZ-14D	7	507.78	505.57	-2.21	501.88	-5.90
RGPZ-16D	7	502.33	498.99	-3.34	495.56	-6.77
RP-25D	7	554.73	561.96	7.23	560.26	5.53
RP-26D	7	453.31	468.05	14.74	465.94	12.63
RP-41D	7	479.13	486.14	7.01	486.03	6.90
RP-42D	7	564.81	565.64	0.83	565.05	0.24
RP-47C	7	395.28	404.42	9.13	402.62	7.34
RP-62D	7	512.87	534.73	21.86	533.85	20.98
RP-65C	7	397.88	404.54	6.66	404.12	6.24
RP-92C	7	399.83	405.93	6.10	405.71	5.88
RP-97D	7	427.72	426.62	-1.10	426.16	-1.56
RP-107D	7	428.02	422.13	-5.89	421.56	-6.46
T-2	7	391.83	392.72	0.89	390.65	-1.18
MODEL LAYER 7 CALIBRATION STATISTICS						
LAYER 7 MEAN ERROR (FT):				**5.13**		**3.92**
LAYER 7 ABSOLUTE MEAN ERROR (FT):				**8.12**		**8.20**
LAYER 7 ROOT MEAN SQUARED ERROR (FT):				**10.81**		**10.63**

Table D1-5
Comparison of Volumetric Mass Balance, Modified and Original 2004 (Dry Season) Models
Casmalia Resources Superfund Site
Casmalia, CA

	Modified Model		Original Model	
Boundary Type	**Inflow (ft^3/day)**	**Outflow (ft^3/day)**	**Inflow (ft^3/day)**	**Outflow (ft^3/day)**
Constant Head	49,744.98	70,123.52	43,027.00	63,420.77
General Head	59.99	224.36	60.26	235.19
Recharge	25,067.44	--	25,067.73	--
Wells	--	--	--	4,499.05
Drains	--	4,524.54	--	--
Total	74,872.40	74,872.41	68,154.99	68,155.01
In - Out		**-1.56E-02**		**-1.56E-02**

Table D1-6
Comparison of Volumetric Mass Balance, Modified and Original 2001 (Wet Season) Models
Casmalia Resources Superfund Site
Casmalia, CA

	Modified Model		Original Model	
Boundary Type	**Inflow (ft^3/day)**	**Outflow (ft^3/day)**	**Inflow (ft^3/day)**	**Outflow (ft^3/day)**
Constant Head	62,143.96	89,889.26	47,407.08	71,434.46
General Head	46.58	265.36	54.28	244.30
Recharge	34,237.95	--	34,238.38	--
Wells	--	--	--	10,021.00
Drains	--	6,273.88	--	--
Total	96,428.48	96,428.50	81,699.75	81,699.77
In - Out		**-1.56E-02**		**-1.56E-02**

Table D1-7
Modifications to Remedial Investigation Groundwater Flow Models for Feasibility Study
Casmalia Resources Superfund Site
Casmalia, CA

FS Area	Original Models	Alternative 2		Alternative 3		Alternative 4		Alternative 5		Alternative 6	
		Remedy Component	FS Model Modification	Remedy Component	FS Model Modification	Remedy Component	FS Model Modification	Remedy Component	FS Model Modification	Remedy Component	FS Model Modification
Area 1 - Landfills, BTA, CDA											
Capped Landfills (P/S, Heavy Metals, Caustics/Cyanides, Acids)	Zero recharge rate within capped areas.	Existing RCRA Cap	None	Existing RCRA Cap	None	Existing RCRA Cap	None	Existing RCRA Cap	None	Existing RCRA Cap	None
PCB Landfill, BTA, CDA	--	RCRA Cap	Recharge rate within capped areas reduced to zero.	RCRA Cap	Recharge rate within capped areas reduced to zero.	RCRA Cap	Recharge rate within capped areas reduced to zero.	RCRA Cap	Recharge rate within capped areas reduced to zero.	RCRA Cap	Recharge rate within capped areas reduced to zero.
Area 2 - RCRA Canyon/WCSA											
RCRA Canyon	--	ET/Hybrid Cap	Recharge rate in RCRA Canyon area reduced to 9.32% of recharge rate in calibrated models.	ET/Hybrid Cap	Recharge rate in RCRA Canyon area reduced to 9.32% of recharge rate in calibrated models.	ET/Hybrid Cap	Recharge rate in RCRA Canyon area reduced to 9.32% of recharge rate in calibrated models.	ET/Hybrid Cap	Recharge rate in RCRA Canyon area reduced to 9.32% of recharge rate in calibrated models.	ET/Hybrid Cap	Recharge rate in RCRA Canyon area reduced to 9.32% of recharge rate in calibrated models.
WCSA	--	2-Foot Soil Cover	Recharge rate in WCSA reduced to 15.59% of recharge rate in calibrated models.	ET/Hybrid Cap	Recharge rate in RCRA Canyon area reduced to 9.32% of recharge rate in calibrated models.	ET/Hybrid Cap	Recharge rate in RCRA Canyon area reduced to 9.32% of recharge rate in calibrated models.	ET/Hybrid Cap	Recharge rate in RCRA Canyon area reduced to 9.32% of recharge rate in calibrated models.	ET/Hybrid Cap	Recharge rate in RCRA Canyon area reduced to 9.32% of recharge rate in calibrated models.
Other Areas	--	BMPs	None	ET/Hybrid Cap	Recharge rate in RCRA Canyon area reduced to 9.32% of recharge rate in calibrated models.	ET/Hybrid Cap	Recharge rate in RCRA Canyon area reduced to 9.32% of recharge rate in calibrated models.	ET/Hybrid Cap	Recharge rate in RCRA Canyon area reduced to 9.32% of recharge rate in calibrated models.	ET/Hybrid Cap	Recharge rate in RCRA Canyon area reduced to 9.32% of recharge rate in calibrated models.
Area 3 - Former Ponds, Roadways, Remaining Onsite Areas, MSA, LTA											
MSA North of PSCT	--	RCRA Cap	Recharge rate within capped area reduced to zero.	RCRA Cap	Recharge rate within capped area reduced to zero.	RCRA Cap	Recharge rate within capped area reduced to zero.	RCRA Cap	Recharge rate within capped area reduced to zero.	RCRA Cap	Recharge rate within capped area reduced to zero.
LTA	--	Asphalt Cap	Recharge rate within capped area reduced to zero.	Asphalt Cap	Recharge rate within capped area reduced to zero.	Asphalt Cap	Recharge rate within capped area reduced to zero.	Asphalt Cap	Recharge rate within capped area reduced to zero.	Asphalt Cap	Recharge rate within capped area reduced to zero.
Hotspots (Pond A/B, South PSCT-1, RISBON-59)	--	Excavation	None	Excavation	None	Excavation	None	Excavation	None	Excavation	None
Area 4 - Ponds											
Pond A-5	Represented as constant-head boundaries in model layers 1 through 4 (Upper and Lower HSU).	Lined Retention Basin	Constant-head boundaries in model layers 1 through 4 (Upper and Lower HSU) representing pond removed. Pond backfill represented as a hydraulic conductivity zone of 1 foot/day within pond footprint in model layers 1 through 4. Recharge rate within pond footprint changed to 0.136 ineh/year to simulate pond liner leakage.	Lined Retention Basin	Constant-head boundaries in model layers 1 through 4 (Upper and Lower HSU) representing pond removed. Pond backfill represented as a hydraulic conductivity zone of 1 foot/day within pond footprint in model layers 1 through 4. Recharge rate within pond footprint changed to 0.136 ineh/year to simulate pond liner leakage.	Lined Retention Basin	Constant-head boundaries in model layers 1 through 4 (Upper and Lower HSU) representing pond removed. Pond backfill represented as a hydraulic conductivity zone of 1 foot/day within pond footprint in model layers 1 through 4. Recharge rate within pond footprint changed to 0.136 ineh/year to simulate pond liner leakage.	Lined Retention Basin	Constant-head boundaries in model layers 1 through 4 (Upper and Lower HSU) representing pond removed. Pond backfill represented as a hydraulic conductivity zone of 1 foot/day within pond footprint in model layers 1 through 4. Recharge rate within pond footprint changed to 0.136 ineh/year to simulate pond liner leakage.	Lined Retention Basin	Constant-head boundaries in model layers 1 through 4 (Upper and Lower HSU) representing pond removed. Pond backfill represented as a hydraulic conductivity zone of 1 foot/day within pond footprint in model layers 1 through 4. Recharge rate within pond footprint changed to 0.136 ineh/year to simulate pond liner leakage.
Pond 13	Represented as constant-head boundaries in model layers 1 through 3 (Upper HSU).	Lined Retention Basin	Constant-head boundaries in model layers 1 through 3 (Upper HSU) representing pond removed. Pond backfill represented as a hydraulic conductivity zone of 1 foot/day within pond footprint in model layers 1 through 3. Recharge rate within pond footprint changed to 0.136 inch/year to simulate pond liner leakage.	Lined Retention Basin	Constant-head boundaries in model layers 1 through 3 (Upper HSU) representing pond removed. Pond backfill represented as a hydraulic conductivity zone of 1 foot/day within pond footprint in model layers 1 through 3. Recharge rate within pond footprint changed to 0.136 inch/year to simulate pond liner leakage.	Lined Retention Basin	Constant-head boundaries in model layers 1 through 3 (Upper HSU) representing pond removed. Pond backfill represented as a hydraulic conductivity zone of 1 foot/day within pond footprint in model layers 1 through 3. Recharge rate within pond footprint changed to 0.136 inch/year to simulate pond liner leakage.	Lined Retention Basin	Constant-head boundaries in model layers 1 through 3 (Upper HSU) representing pond removed. Pond backfill represented as a hydraulic conductivity zone of 1 foot/day within pond footprint in model layers 1 through 3. Recharge rate within pond footprint changed to 0.136 inch/year to simulate pond liner leakage.	Lined Retention Basin	Constant-head boundaries in model layers 1 through 3 (Upper HSU) representing pond removed. Pond backfill represented as a hydraulic conductivity zone of 1 foot/day within pond footprint in model layers 1 through 3. Recharge rate within pond footprint changed to 0.136 inch/year to simulate pond liner leakage.
Pond 18	Represented as constant-head boundaries in model layers 1 through 3 (Upper HSU).	RCRA Cap	Constant-head boundaries in model layers 1 through 3 (Upper HSU) representing pond removed. Pond backfill represented as a hydraulic conductivity zone of 1 foot/day within pond footprint in model layers 1 through 3. Recharge rate within pond footprint reduced to zero.	RCRA Cap	Constant-head boundaries in model layers 1 through 3 (Upper HSU) representing pond removed. Pond backfill represented as a hydraulic conductivity zone of 1 foot/day within pond footprint in model layers 1 through 3. Recharge rate within pond footprint reduced to zero.	RCRA Cap	Constant-head boundaries in model layers 1 through 3 (Upper HSU) representing pond removed. Pond backfill represented as a hydraulic conductivity zone of 1 foot/day within pond footprint in model layers 1 through 3. Recharge rate within pond footprint reduced to zero.	RCRA Cap	Constant-head boundaries in model layers 1 through 3 (Upper HSU) representing pond removed. Pond backfill represented as a hydraulic conductivity zone of 1 foot/day within pond footprint in model layers 1 through 3. Recharge rate within pond footprint reduced to zero.	RCRA Cap	Constant-head boundaries in model layers 1 through 3 (Upper HSU) representing pond removed. Pond backfill represented as a hydraulic conductivity zone of 1 foot/day within pond footprint in model layers 1 through 3. Recharge rate within pond footprint reduced to zero.
A-Series Pond	Represented as constant-head boundaries in model layers 1 through 3 (Upper HSU).	Large Evaporation Pond	Constant-head boundaries in model layers 1 through 3 (Upper HSU) representing pond removed. Pond backfill represented as a hydraulic conductivity zone of 1 foot/day within pond footprint in model layers 1 through 3. Recharge rate within large evaporation pond footprint 0.136 inch/year to simulate pond liner leakage.	Small Evaporation Pond	Constant-head boundaries in model layers 1 through 3 (Upper HSU) representing pond removed. Pond backfill represented as a hydraulic conductivity zone of 1 foot/day within pond footprint in model layers 1 through 3. Recharge rate within small evaporation pond footprint reduced to 0.136 inch/year to simulate pond liner leakage.	Backfilled/Soil Cover	Constant-head boundaries in model layers 1 through 3 (Upper HSU) representing pond removed. Pond backfill represented as a hydraulic conductivity zone of 1 foot/day within pond footprint in model layers 1 through 3.	Small Evaporation Pond	Constant-head boundaries in model layers 1 through 3 (Upper HSU) representing pond removed. Pond backfill represented as a hydraulic conductivity zone of 1 foot/day within pond footprint in model layers 1 through 3. Recharge rate within small evaporation pond footprint reduced to 0.136 inch/year to simulate pond liner leakage.	Small Evaporation Pond	Constant-head boundaries in model layers 1 through 3 (Upper HSU) representing pond removed. Pond backfill represented as a hydraulic conductivity zone of 1 foot/day within pond footprint in model layers 1 through 3. Recharge rate within small evaporation pond footprint reduced to 0.136 inch/year to simulate pond liner leakage.
RCF Pond	Represented as constant-head boundaries in model layers 1 through 3 (Upper HSU).	Eco Cap	Constant-head boundaries in model layers 1 through 3 (Upper HSU) representing pond removed. Pond backfill represented as a hydraulic conductivity zone of 1 foot/day within pond footprint in model layers 1 through 3. Recharge rate within pond footprint reduced to 13.33 % of recharge rate in calibrated models to simulate Eco Cap.	Eco Cap	Constant-head boundaries in model layers 1 through 3 (Upper HSU) representing pond removed. Pond backfill represented as a hydraulic conductivity zone of 1 foot/day within pond footprint in model layers 1 through 3. Recharge rate within pond footprint reduced to 13.33 % of recharge rate in calibrated models to simulate Eco Cap.	Eco Cap	Constant-head boundaries in model layers 1 through 3 (Upper HSU) representing pond removed. Pond backfill represented as a hydraulic conductivity zone of 1 foot/day within pond footprint in model layers 1 through 3. Recharge rate within pond footprint reduced to 13.33 % of recharge rate in calibrated models to simulate Eco Cap.	Eco Cap	Constant-head boundaries in model layers 1 through 3 (Upper HSU) representing pond removed. Pond backfill represented as a hydraulic conductivity zone of 1 foot/day within pond footprint in model layers 1 through 3. Recharge rate within pond footprint reduced to 13.33 % of recharge rate in calibrated models to simulate Eco Cap.	Eco Cap	Constant-head boundaries in model layers 1 through 3 (Upper HSU) representing pond removed. Pond backfill represented as a hydraulic conductivity zone of 1 foot/day within pond footprint in model layers 1 through 3. Recharge rate within pond footprint reduced to 13.33 % of recharge rate in calibrated models to simulate Eco Cap.
Area 5N - Groundwater North											
PSCT	Trench extraction wells represented as well nodes (point sinks) in model layer 4 (Lower HSU).	PSCT Extraction	Trench extraction wells represented as drain (head-dependent flow) boundaries in model layer 4 (Lower HSU).	PSCT Extraction	Trench extraction wells represented as drain (head-dependent flow) boundaries in model layer 4 (Lower HSU).	PSCT Extraction	Trench extraction wells represented as drain (head-dependent flow) boundaries in model layer 4 (Lower HSU).	PSCT Extraction	Trench extraction wells represented as drain (head-dependent flow) boundaries in model layer 4 (Lower HSU).	PSCT Extraction	Trench extraction wells represented as drain (head-dependent flow) boundaries in model layer 4 (Lower HSU).
Lower HSU Extraction	--	None	None	None	None	None	None	None	None	7 Extraction Wells Along PSCT	Extraction wells represented as well nodes (point sinks) screened across layers 5 and 6 (Lower HSU).
P/S Landfill	--	None	None	None	None	None	None	5 Horizontal Wells in P/S Landfill along Upper/Lower HSU Contact.	Horizontal wells reporesented as well nodes in model layer 3 (Upper HSU) in southern P/S Landfill area.	5 Horizontal Wells in P/S Landfill along Upper/Lower HSU Contact.	Horizontal wells reporesented as well nodes in model layer 3 (Upper HSU) in southern P/S Landfill area.

Table D1-7
Modifications to Remedial Investigation Groundwater Flow Models for Feasibility Study
Casmalia Resources Superfund Site
Casmalia, CA

FS Area	Original Models	Alternative 2		Alternative 3		Alternative 4		Alternative 5		Alternative 6	
		Remedy Component	FS Model Modification	Remedy Component	FS Model Modification	Remedy Component	FS Model Modification	Remedy Component	FS Model Modification	Remedy Component	FS Model Modification
Gallery Well	Represented as well node (point sink) in model layer 3 (Upper HSU).	Gallery Well	Represented as drain (head-dependent flow) boundary in model layer 3 (Upper HSU).	Gallery Well	Represented as drain (head-dependent flow) boundary in model layer 3 (Upper HSU).	Gallery Well	Represented as drain (head-dependent flow) boundary in model layer 3 (Upper HSU).	Gallery Well	Represented as drain (head-dependent flow) boundary in model layer 3 (Upper HSU).	Gallery Well	Represented as drain (head-dependent flow) boundary in model layer 3 (Upper HSU).
Sump 9B	Represented as well node (point sink) in model layer 3 (Upper HSU).	None	Well node representing Sump 9B removed from model.	None	Well node representing Sump 9B removed from model.	None	Well node representing Sump 9B removed from model.	None	Well node representing Sump 9B removed from model.	None	Well node representing Sump 9B removed from model.

Table D1-7
Modifications to Remedial Investigation Groundwater Flow Models for Feasibility Study
Casmalia Resources Superfund Site
Casmalia, CA

FS Area	Original Models	Alternative 2		Alternative 3		Alternative 4		Alternative 5		Alternative 6	
		Remedy Component	FS Model Modification	Remedy Component	FS Model Modification	Remedy Component	FS Model Modification	Remedy Component	FS Model Modification	Remedy Component	FS Model Modification
Area 5S - Groundwater South											
PCT-A Extraction	Trench extraction wells represented as well nodes (point sinks) in model layer 4 (Lower HSU).	PCT-A Extraction	Trench extraction wells represented as drain (head-dependent flow) boundaries in model layer 4 (Lower HSU).	PCT-A Extraction	Trench extraction wells represented as drain (head-dependent flow) boundaries in model layer 4 (Lower HSU).	PCT-A Extraction	Trench extraction wells represented as drain (head-dependent flow) boundaries in model layer 4 (Lower HSU).	PCT-A Extraction	Trench extraction wells represented as drain (head-dependent flow) boundaries in model layer 4 (Lower HSU).	PCT-A Extraction	Trench extraction wells represented as drain (head-dependent flow) boundaries in model layer 4 (Lower HSU).
PCT-B Extraction	Trench extraction well represented as well node (point sink) in model layer 3 (Upper HSU).	PCT-B Extraction	Trench extraction well represented as drain (head-dependent flow) boundary in model layer 3 (Upper HSU).	PCT-B Extraction	Trench extraction well represented as drain (head-dependent flow) boundary in model layer 3 (Upper HSU).	PCT-B Extraction	Trench extraction well represented as drain (head-dependent flow) boundary in model layer 3 (Upper HSU).	PCT-B Extraction	Trench extraction well represented as drain (head-dependent flow) boundary in model layer 3 (Upper HSU).	PCT-B Extraction	Trench extraction well represented as drain (head-dependent flow) boundary in model layer 3 (Upper HSU).
Aggressive Extraction	--	None	None	None	None	None	None	40 Extraction Wells North of A-Series Pond	Extraction wells represented as well nodes (point sinks) screened across layer 3 (Upper HSU) and Layer 4 (Lower HSU).	40 Extraction Wells North of A-Series Pond	Extraction wells represented as well nodes (point sinks) screened across layer 3 (Upper HSU) and Layer 4 (Lower HSU).
Area 5W - Groundwater West											
PCT-C Extraction	Trench extraction wells represented as well nodes (point sinks) in model layers 3 and 4 (Upper and Lower HSU).	PCT-C Extraction	Trench extraction wells represented as drain (head-dependent flow) boundaries in model layers 3 and 4 (Upper and Lower HSU).	PCT-C Extraction	Trench extraction wells represented as drain (head-dependent flow) boundaries in model layers 3 and 4 (Upper and Lower HSU).	PCT-C Extraction	Trench extraction wells represented as drain (head-dependent flow) boundaries in model layers 3 and 4 (Upper and Lower HSU).	PCT-C Extraction	Trench extraction wells represented as drain (head-dependent flow) boundaries in model layers 3 and 4 (Upper and Lower HSU).	PCT-C Extraction	Trench extraction wells represented as drain (head-dependent flow) boundaries in model layers 3 and 4 (Upper and Lower HSU).
Aggressive Extraction	--	None	None	None	None	None	None	40 Extraction Wells North of RCF Pond	Extraction wells represented as well nodes (point sinks) screened across layer 3 (Upper HSU) and Layer 4 (Lower HSU).	40 Extraction Wells North of RCF Pond	Extraction wells represented as well nodes (point sinks) screened across layer 3 (Upper HSU) and Layer 4 (Lower HSU).

Table D1-8
Alternative 2
Flow Rates of Extraction Wells
Casmalia Resources Superfund Site
Casmalia, CA

Extraction Well	TOC Elevation (ft msl)	Model Pumping Level Elevation (ft msl)	Model Pumping Level Depth BTOC (ft)	2004 Model Flow Rate (ft^3/day)	2004 Model Flow Rate (gpm)	2001 Model Flow Rate (ft^3/day)	2001 Model Flow Rate (gpm)
PSCT Trench							
PSCT-1	454.51	409.51	45.00	592.200	3.076	721.953	3.750
PSCT-2	503.51	451.51	52.00	222.005	1.153	401.040	2.083
PSCT-3	561.34	506.34	55.00	Dry	Dry	Dry	Dry
PSCT-4	593.18	542.18	51.00	Dry	Dry	Dry	Dry
PCT-A Trench							
RAP-1A	449.40	420.40	29.00	128.524	0.668	278.533	1.447
RAP-2A	447.10	402.10	45.00	438.240	2.277	577.310	2.999
RAP-3A	423.05	379.05	44.00	310.738	1.614	362.165	1.881
PCT-B Trench							
RAP-1B	416.07	355.07	61.00	1229.255	6.386	1420.326	7.378
PCT-C Trench							
RAP-1C	450.67	395.67	55.00	580.139	3.014	729.577	3.790
C-5	452.38	375.38	77.00	1028.960	5.345	1187.223	6.167
Gallery Well	487.29	467.29	20.00	Dry	Dry	54.981	0.286
Sump 9B	561.20	472.74	88.46	Off	Off	Off	Off

Table D1-9
Alternative 3
Flow Rates of Extraction Wells
Casmalia Resources Superfund Site
Casmalia, CA

Extraction Well	TOC Elevation (ft msl)	Model Pumping Level Elevation (ft msl)	Model Pumping Level Depth BTOC (ft)	2004 Model Flow Rate (ft^3/day)	2004 Model Flow Rate (gpm)	2001 Model Flow Rate (ft^3/day)	2001 Model Flow Rate (gpm)
PSCT Trench							
PSCT-1	454.51	409.51	45.00	556.334	2.890	539.027	2.800
PSCT-2	503.51	451.51	52.00	167.159	0.868	171.995	0.893
PSCT-3	561.34	506.34	55.00	Dry	Dry	Dry	Dry
PSCT-4	593.18	542.18	51.00	Dry	Dry	Dry	Dry
PCT-A Trench							
RAP-1A	449.40	420.40	29.00	113.053	0.587	284.659	1.479
RAP-2A	447.10	402.10	45.00	418.101	2.172	644.925	3.350
RAP-3A	423.05	379.05	44.00	302.583	1.572	409.501	2.127
PCT-B Trench							
RAP-1B	416.07	355.07	61.00	1206.271	6.266	1520.378	7.898
PCT-C Trench							
RAP-1C	450.67	395.67	55.00	547.999	2.847	668.467	3.473
C-5	452.38	375.38	77.00	1026.785	5.334	1158.664	6.019
Gallery Well	487.29	467.29	20.00	Dry	Dry	Dry	Dry
Sump 9B	561.20	472.74	88.46	Off	Off	Off	Off

Table D1-10
Alternative 4
Flow Rates of Extraction Wells
Casmalia Resources Superfund Site
Casmalia, CA

Extraction Well	TOC Elevation (ft msl)	Model Pumping Level Elevation (ft msl)	Model Pumping Level Depth BTOC (ft)	2004 Model Flow Rate (ft^3/day)	2004 Model Flow Rate (gpm)	2001 Model Flow Rate (ft^3/day)	2001 Model Flow Rate (gpm)
PSCT Trench							
PSCT-1	454.51	409.51	45.00	563.934	2.930	690.964	3.589
PSCT-2	503.51	451.51	52.00	177.275	0.921	351.197	1.824
PSCT-3	561.34	506.34	55.00	Dry	Dry	Dry	Dry
PSCT-4	593.18	542.18	51.00	Dry	Dry	Dry	Dry
PCT-A Trench							
RAP-1A	449.40	420.40	29.00	120.033	0.624	269.412	1.400
RAP-2A	447.10	402.10	45.00	427.957	2.223	566.272	2.942
RAP-3A	423.05	379.05	44.00	307.061	1.595	358.244	1.861
PCT-B Trench							
RAP-1B	416.07	355.07	61.00	1223.402	6.355	1414.417	7.348
PCT-C Trench							
RAP-1C	450.67	395.67	55.00	619.975	3.221	773.442	4.018
C-5	452.38	375.38	77.00	1118.918	5.813	1291.293	6.708
Gallery Well	487.29	467.29	20.00	Dry	Dry	25.824	0.134
Sump 9B	561.20	472.74	88.46	Off	Off	Off	Off

Table D1-11
Alternative 5
Flow Rates of Extraction Wells
Casmalia Resources Superfund Site
Casmalia, CA

Extraction Well		TOC Elevation (ft msl)	Model Pumping Level Elevation (ft msl)	Model Pumping Level Depth BTOC (ft)	2004 Model Flow Rate (ft^3/day)	2004 Model Flow Rate (gpm)	2001 Model Flow Rate (ft^3/day)	2001 Model Flow Rate (gpm)
PSCT Trench								
	PSCT-1	454.51	409.51	45.00	553.738	2.877	680.801	3.537
	PSCT-2	503.51	451.51	52.00	163.636	0.850	337.636	1.754
	PSCT-3	561.34	506.34	55.00	Dry	Dry	Dry	Dry
	PSCT-4	593.18	542.18	51.00	Dry	Dry	Dry	Dry
PCT-A Trench								
	RAP-1A	449.40	420.40	29.00	111.920	0.581	260.765	1.355
	RAP-2A	447.10	402.10	45.00	416.643	2.164	554.131	2.879
	RAP-3A	423.05	379.05	44.00	301.995	1.569	352.768	1.833
PCT-B Trench								
	RAP-1B	416.07	355.07	61.00	1204.606	6.258	1393.783	7.240
PCT-C Trench								
	RAP-1C	450.67	395.67	55.00	547.304	2.843	690.193	3.585
	C-5	452.38	375.38	77.00	1025.953	5.330	1184.713	6.154
Gallery Well		487.29	467.29	20.00	Dry	Dry	18.726	0.097
Sump 9B		561.20	472.74	88.46	Off	Off	Off	Off
Horizontal Wells		--	--	--	19.250	0.100	19.250	0.100

Table D1-12
Alternative 6
Flow Rates of Extraction Wells
Casmalia Resources Superfund Site
Casmalia, CA

Extraction Well		TOC Elevation (ft msl)	Model Pumping Level Elevation (ft msl)	Model Pumping Level Depth BTOC (ft)	2004 Model Flow Rate (ft^3/day)	2004 Model Flow Rate (gpm)	2001 Model Flow Rate (ft^3/day)	2001 Model Flow Rate (gpm)
PSCT Trench								
	PSCT-1	454.51	409.51	45.00	180.199	0.936	361.956	1.880
	PSCT-2	503.51	451.51	52.00	Dry	Dry	Dry	Dry
	PSCT-3	561.34	506.34	55.00	Dry	Dry	Dry	Dry
	PSCT-4	593.18	542.18	51.00	Dry	Dry	Dry	Dry
PCT-A Trench								
	RAP-1A	449.40	420.40	29.00	Dry	Dry	Dry	Dry
	RAP-2A	447.10	402.10	45.00	Dry	Dry	159.039	0.826
	RAP-3A	423.05	379.05	44.00	121.225	0.630	194.030	1.008
PCT-B Trench								
	RAP-1B	416.07	355.07	61.00	675.906	3.511	920.973	4.784
PCT-C Trench								
	RAP-1C	450.67	395.67	55.00	322.781	1.677	481.087	2.499
	C-5	452.38	375.38	77.00	752.737	3.910	930.287	4.833
Gallery Well		487.29	467.29	20.00	Dry	Dry	Dry	Dry
Sump 9B		561.20	472.74	88.46	Off	Off	Off	Off
Area 5 West Wells (40)		--	--	--	439.863	2.285	439.863	2.285
Area 5 South Wells (40)		--	--	--	3234.962	16.805	3074.627	15.972
Lower HSU Wells (7)		--	--	--	26.950	0.140	26.950	0.140
Horizontal Wells		--	--	--	19.250	0.100	19.250	0.100

FOR ALL APPENDIX D-1 FIGURES, PLEASE REFER TO:

Appendix D-1 Figures.pdf.

ATTACHMENT D1-1 – HELP MODEL RESULTS

FINAL FEASIBILITY STUDY
CASMALIA RESOURCES SUPERFUND SITE
CASMALIA, CALIFORNIA

Prepared by: URS

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HELP Model Run Output

LIST OF ACRONYMS

CH	Highly plastic clays (per Unified Soil Classification System)	D1-1-1
cm/sec	centimeters per second	D1-1-2
ET	evapotranspirative	D1-1-1
FML	flexible membrane liner	D1-1-1
HELP	Hydrologic Evaluation of Landfill Performance (computer model)	D1-1-1
in/ft	inches per foot	D1-1-2
in/yr	inches per year	D1-1-3
m	meters	D1-1-3
m/s	meters per second	D1-1-3
m^3/s	cubic meters per second	D1-1-3
MH	highly plastic silt (per Unified Soil Classification System)	D1-1-1
NRCS	Natural Resources Conservation Service	D1-1-2
RCRA	Resource Conservation and Recovery Act	D1-1-1
SCS	Soil Conservation Service	D1-1-2

1.0 HELP Model Evaluation

1.1 Introduction

The Hydrologic Evaluation of Landfill Performance (HELP) model version 3.07 (Schroeder et al. 1994) was used to evaluate the performance of several landfill cover designs for the site. HELP was developed to provide landfill designers and regulators with a simple tool for evaluating the performance of alternative landfill cover designs. The HELP program is a quasi-two-dimensional hydrologic model of water movement across, into, through, and out of landfills. The model accepts weather, soil, and design data and uses solution techniques that account for the effects of surface storage, snowmelt, runoff, infiltration, evapotranspiration, vegetative growth, soil moisture storage, lateral subsurface drainage, leachate recirculation, unsaturated vertical drainage, and leakage through soil, geomembrane, or composite liners. Landfill systems including various combinations of vegetation, cover soils, waste cells, lateral drain layers, low permeability barrier soils, and synthetic geomembrane liners may be modeled. HELP was developed to conduct water balance analysis of landfills, cover systems, and solid waste disposal and containment facilities. As such, the model facilitates rapid estimation of the amounts of runoff, evapotranspiration, drainage, leachate collection, and liner leakage that may be expected to result from the operation of a wide variety of landfill designs. The primary purpose of the model is to assist in the comparison of design alternatives as judged by their water balances. The HELP model is applicable to open, partially closed, and fully closed sites.

1.2 HELP Model Scope and Approach

HELP modeling was performed to evaluate the following potential engineered cover options being considered for the site (Figure 10-1):

- A 5-foot thick evapotranspirative (ET) cover consisting of 4 feet of uncompacted topsoil over a 1-foot thick compacted clay foundation (Figure 10-1 Detail C)
- A Resource Conservation and Recovery Act (RCRA)-equivalent cover consisting of a five-foot compacted clay cover (Figure 10-1 Detail B)
- A RCRA hybrid cover consisting of 2 feet of uncompacted topsoil, underlain by a geonet drainage layer, flexible membrane liner (FML), and a 2-foot thick compacted clay foundation (Figure 10-1 Detail D)
- A RCRA prescriptive cover (Figure 10-1 Detail A)
- An Eco Cap consisting of a 2-foot thick compacted clay cover (Figure 10-1 Detail E)

The HELP modeling results are summarized in Table D1-1-1 and discussed in Section 1.3. The application of specific cover types to the FS areas under the various alternatives and the corresponding HELP model runs are summarized in Table D1-1-2.

The above engineered covers were modeled using the default soil types available in HELP. Default soil types were selected that are similar to site soils available for construction of the covers. The on-site borrow soil from the North Ridge was tested during previous cap construction activities and classified as MH and CH (high plasticity silts and clays) according to the Unified Soil Classification System (GeoSyntec 1999). Similar soils are anticipated for the

nearby Off-site Northwest Borrow Area soil that will be used to construct future covers. The most common soil series in the vicinity of the site identified in soil surveys prepared by the Soil Conservation Service (SCS 1972) are the Crow Hill silty clay loam, the Gazos clay loam, and possibly the Santa Lucia shaly clay loam. The permeabilities of these soils are reported (NRCS 2013) to range from 0 to 0.2 inches per hour (0 to 1.4 x 10^{-4} centimeters per second [cm/sec]). The default soil types used in the HELP modeling of as-built covers ranged from silty loams to silty clays. These soil types were selected because they appear to have similar uncompacted and compacted hydraulic properties to the soils previously used to construct covers at the site and those soils proposed for future cover construction. A summary of the default HELP model soil types and their hydraulic properties and water-holding capacities used in the various cover simulations is provided as Table D1-1-3. The default HELP model soil types have water-holding capacities (based on field capacity) that range from 3.41 to 4.93 inches per foot (in/ft) of soil. The water-holding capacities of the native soils that may be used for future cover construction range from 4.0 to 5.6 in/ft for the Crow Hill silty clay loam, 4.9 in/ft for the Gazos clay loam, and 2.2 to 2.7 in/ft for the Santa Lucia shaly clay loam (NRCS 2013). The water-holding capacities of the default soils used in the HELP simulations and the native soils are comparable.

The HELP models were run for as-constructed permeabilities and permeabilities that reflect potential long-term aging of the as-built soils that may occur over time. The aged permeability was assumed to be approximately an order of magnitude larger than the as-constructed permeability based on the findings of Benson et al. (2011) and Melchior et al. (2010). The water-holding capacities of the aged soils ranged from 1.57 to 4.45 inches per foot of soil. Cover slopes were simulated at 2:1 and 3:1. A fair grass vegetative cover was used for all simulations. Evapotranspiration and weather data available in the HELP model for Santa Maria, California were used in the simulations. Precipitation was synthetically generated using the normal mean monthly precipitation for Santa Maria and coefficients for San Diego. The evaporative zone depth was varied between 12 and 36 inches depending on the thickness of the soil cover. The evaporative zone depth is related to the rooting depths of the vegetation growing on the covers. The rooting depths for most types of grasses range from about 18 to 60 inches (Ali Harivandi et al 2009) depending on the grass species. Native purple needle grass, the state grass of California, has been reported to root as deep as 15 feet (Netstate 2009), but typically ranges from 2 to 6 feet (Tilley et al. 2009) compared to introduced annual grasses which are usually shallow rooted. A 36-inch evaporative zone depth appears reasonable if native grasses are used to seed the covers.

1.2.1 Evaporation Pond Evaluation

The potential leakage from a geomembrane lined evaporation pond was also evaluated using a semi-analytical equation developed by Giroud (1997). In principle, a geomembrane liner consists of an impermeable material that should preclude leakage. However, the occurrence of a limited number of manufacturing and/or installation defects is anticipated. The assumed number of liner defects used in the calculation is based on recommendations provided in Giroud and Bonaparte (1989a and 1989b) and Schroeder et al. (1994). The liner was assumed to have a good quality installation with 1 small hole and 4 large hole defects per acre. The liner was assumed to have good contact with the underlying compacted soil foundation. The compacted soil foundation was assumed to have an as-built permeability of 1 x 10^{-6} cm/sec.

The flow of water (i.e., leakage rate) through a single circular defect assuming good contact between the geomembrane and underlying compacted clay foundation was evaluated using the following equation from Giroud (1997):

$$Q = 0.976 * C_{qo}\left[1 + 0.1\left(\frac{h_w}{t_s}\right)^{0.95}\right] * d^{0.2} * h_w^{0.9} * k_s^{0.74}$$

where,

Q	=	leakage discharge per defect (cubic meters per second; m^3/s)
C_{qo}	=	contact quality factor for a circular defect (dimensionless); coefficient for good contact equals 0.21
hw	=	head on top of geomembrane (meters; m); varied from 1 to 10 feet or 0.305 to 3.05 m
t_s	=	low-permeability soil liner thickness (meters; m); assumed 2 feet or 0.61 m
d	=	diameter of circular defect (meters; m); small hole diameter assumed to be 0.1 inch or 0.0025 m; large hole diameter assumed to be 0.5 inch or 0.0127 m
k_s	=	saturated hydraulic conductivity of the underlying compacted soil foundation (meters per second; m/s); assumed 1×10^{-8} m/s

Giroud's (1997) equation is a semi-empirical equation that must be used with the specified units. The total leakage discharge per acre was calculated by summing the leakage discharge estimates for each defect. The leakage rate was calculated by dividing the total leakage discharge by the area per acre.

1.3 HELP Model Results

The HELP modeling results are summarized in Table D1-1-1. The percolation rates for the as-built covers range from essentially zero for the RCRA prescriptive and RCRA hybrid covers, 0.49 to 3.60 inches per year (in/yr) for the RCRA equivalent covers, 0.49 to 1.28 in/yr for the ET covers, and 0.99 to 1.85 in/yr for the ECO-CAP covers. The varying percolation rates largely depend on the as-built soil permeabilities and the evaporative zone depth simulated in each design. The percolation rates for the aged covers range from near zero for the RCRA prescriptive and RCRA hybrid covers, 0.79 to 3.89 in/yr for the RCRA equivalent covers, 1.27 to 3.34 in/yr for the ET covers, and 1.82 to 2.14 in/yr for the ECO-CAP covers. The varying percolation rates largely depend on the increased soil permeabilities as the covers age and the evaporative zone depth simulated in each design. The HELP model is known to over predict percolation through evapotranspiration covers in semi-arid and arid environments (Scanlon et al. 2002; Hauser and Gimon 2004; Hauser et al 2005; and Scanlon et al. 2005), so the predicted percolation rates in Table D1-1-1 are likely overestimates. Table D1-1-2 provides cross references of the soil types, available water holding capacity estimates, permeabilities, and other soil properties for each of the simulations performed.

1.3.1 Evaporation Pond Results

The calculated leakage rates through the lined evaporation pond are summarized in Table D1-1-1. The predicted leakage rates for the as-built pond ranged from 2.24×10^{-3} in/yr for a 1-foot pond water depth to 2.48×10^{-2} in/yr for a 10-foot pond water depth. The predicted leakage

rates for an aged pond ranged from 1.23 x 10^{-2} inches per year for a 1-foot pond water depth to 1.36 x 10^{-1} in/yr for a 10-foot pond water depth. Leakage predictions using Giroud's equation have been evaluated using numerical simulations (Foose et al. 2001). The results of Foose et al. (2001) suggest that Giroud's (1997) equation generally overestimates leakage through a liner, particularly for composite liners (i.e., a geomembrane over a compacted soil foundation). Thus, the calculated leakage rates provided in Table D1-1-1 are considered conservative as they are likely over predicted.

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Table D1-1-1
Evaluation of Percolation Through Casmalia Engineered Cover Designs and Lined Evaporation Pond

Cover Type	Cover Description	Construction	Slope	Surface Vegetation	Evaporative Zone Depth (in)	HELP Default Soil Number(s)	Soil Layer 1 Permeability (cm/s)	Soil Layer 2 Permeability (cm/s)	Precipitation (in/yr)	Runoff (in/yr)	ET (in/yr)	Lateral Drainage (in/yr)	Percolation at Base (in/yr)	Run Name
ET	4 ft thick topsoil over 1 ft compacted clay	As Built	2:1	Fair Grass	36	14/28	2.50E-05	1.20E-06	13.73	1.64	11.31	-----	0.79	CAS_ET5
ET	4 ft thick topsoil over 1 ft compacted clay	Aged	2:1	Fair Grass	36	9/14	1.90E-04	2.50E-05	13.73	0.42	12.04	-----	1.27	CAS_ET8
ET	4 ft thick topsoil over 1 ft compacted clay	As Built	3:1	Fair Grass	36	14/28	2.50E-05	1.20E-06	13.73	1.62	11.32	-----	0.80	CAS_ET14
ET	4 ft thick topsoil over 1 ft compacted clay	Aged	3:1	Fair Grass	36	9/14	1.90E-04	2.50E-05	13.73	0.41	12.04	-----	1.28	CAS_ET15
ET	4 ft thick topsoil over 1 ft compacted clay	As Built	2:1	Fair Grass	36	9/23	1.90E-04	9.00E-06	13.73	0.42	12.04	-----	1.27	CAS_ET7
ET	4 ft thick topsoil over 1 ft compacted clay	Aged	2:1	Fair Grass	36	5/11	1.00E-03	6.40E-05	13.73	0.03	10.38	-----	3.33	CAS_ET9
ET	4 ft thick topsoil over 1 ft compacted clay	As Built	3:1	Fair Grass	36	9/23	1.90E-04	9.00E-06	13.73	0.41	12.04	-----	1.28	CAS_E10
ET	4 ft thick topsoil over 1 ft compacted clay	Aged	3:1	Fair Grass	36	5/11	1.00E-03	6.40E-05	13.73	0.03	10.36	-----	3.34	CAS_ET11
ET	3 ft thick topsoil over 2 ft compacted clay	As Built	2:1	Fair Grass	36	9/23	1.90E-04	9.00E-06	13.73	0.42	12.04	-----	1.27	CAS_ET6
RCRA Equivalent	5 ft thick compacted clay	As Built	2:1	Fair Grass	12	28	1.20E-06	-----	13.73	3.04	8.47	-----	2.22	CAS_REQ5
RCRA Equivalent	5 ft thick compacted clay	As Built	2:1	Fair Grass	24	28	1.20E-06	-----	13.73	3.11	9.62	-----	1.01	CAS_REQ6
RCRA Equivalent	5 ft thick compacted clay	As Built	2:1	Fair Grass	36	28	1.20E-06	-----	13.73	3.04	10.20	-----	0.49	CAS_REQ1
RCRA Equivalent	5 ft thick compacted clay	Aged	2:1	Fair Grass	36	14	2.50E-05	-----	13.73	1.64	11.31	-----	0.79	CAS_REQ3
RCRA Equivalent	5 ft thick compacted clay	As Built	3:1	Fair Grass	36	28	1.20E-06	-----	13.73	3.02	10.22	-----	0.50	CAS_REQ2
RCRA Equivalent	5 ft thick compacted clay	Aged	3:1	Fair Grass	36	14	2.50E-05	-----	13.73	1.62	11.32	-----	0.80	CAS_REQ4
RCRA Equivalent	1 ft thick topsoil over 4 ft compacted clay	As Built	2:1	Fair Grass	12	14/28	2.50E-05	1.20E-06	13.73	1.49	8.68	-----	3.58	CAS_REQ7
RCRA Equivalent	1 ft thick topsoil over 4 ft compacted clay	Aged	2:1	Fair Grass	12	9/14	1.90E-04	2.50E-05	13.73	0.44	9.43	-----	3.87	CASREQ10
RCRA Equivalent	1 ft thick topsoil over 4 ft compacted clay	As Built	2:1	Fair Grass	24	14/28	2.50E-05	1.20E-06	13.73	1.76	10.09	-----	1.89	CAS_REQ8
RCRA Equivalent	1 ft thick topsoil over 4 ft compacted clay	As Built	2:1	Fair Grass	36	14/28	2.50E-05	1.20E-06	13.73	1.84	11.12	-----	0.77	CAS_REQ9
RCRA Equivalent	1 ft thick topsoil over 4 ft compacted clay	As Built	3:1	Fair Grass	12	14/28	2.50E-05	1.20E-06	13.73	1.47	8.69	-----	3.60	CASREQ11
RCRA Equivalent	1 ft thick topsoil over 4 ft compacted clay	Aged	3:1	Fair Grass	12	9/14	1.90E-04	2.50E-05	13.73	0.43	9.43	-----	3.89	CASREQ12
RCRA Equivalent	1 ft thick topsoil over 4 ft compacted clay	As Built	3:1	Fair Grass	24	14/28	2.50E-05	1.20E-06	13.73	1.74	10.09	-----	1.92	CASREQ13
RCRA Hybrid	2 ft thick topsoil over geomet, FML, and 2 ft compacted clay	As Built	2:1	Fair Grass	24	9/23	1.90E-04	9.00E-06	13.73	0.45	9.57	3.73	0.00E+00	CAS_RHY1
RCRA Hybrid	2 ft thick topsoil over geomet, FML, and 2 ft compacted clay	Aged	2:1	Fair Grass	24	5/11	1.00E-03	6.40E-05	13.73	0.01	1.02	12.71	1.00E-05	CAS_RHY3
RCRA Hybrid	2 ft thick topsoil over geonet, FML, and 2 ft compacted clay	As Built	3:1	Fair Grass	24	9/23	1.90E-04	9.00E-06	13.73	0.45	10.87	2.42	0.00E+00	CAS_RHY2
RCRA Hybrid	2 ft thick topsoil over geomet, FML, and 2 ft compacted clay	Aged	3:1	Fair Grass	24	5/11	1.00E-03	6.40E-05	13.73	1.48	12.25		2.00E-05	CAS_RHY4
RCRA Prescriptive	Standard design	As Built	2:1	Fair Grass	24	9/28	1.90E-04	1.20E-06	13.73	0.44	11.66	1.64	0.00E+00	CAS_RP1
RCRA Prescriptive	Standard design	Aged	2:1	Fair Grass	24	5/28	1.00E-03	1.20E-06	13.73	0.01	1.32	12.41	3.00E-05	CAS_RP2
ECO-CAP	2 ft thick compacted clay	As Built	2:1	Fair Grass	24	14	2.50E-05	-----	13.73	1.67	10.25	-----	1.83	CAS_ECO3
ECO-CAP	2 ft thick compacted clay	Aged	2:1	Fair Grass	24	9	1.90E-04	-----	13.73	0.43	11.49	-----	1.82	CAS_ECO8
ECO-CAP	2 ft thick compacted clay	As Built	3:1	Fair Grass	24	14	2.50E-05	-----	13.73	1.64	10.26	-----	1.85	CAS_ECO4
ECO-CAP	2 ft thick compacted clay	Aged	3:1	Fair Grass	24	9	1.90E-04	-----	13.73	0.41	11.49	-----	1.83	CAS_ECO9
ECO-CAP	2 ft thick compacted clay	As Built	2:1	Fair Grass	24	23	9.00E-06	-----	13.73	2.08	10.67	-----	0.99	CAS_ECO5
ECO-CAP	2 ft thick compacted clay	Aged	2:1	Fair Grass	24	11	6.40E-05	-----	13.73	1.06	10.55	-----	2.14	CAS_ECO10
ECO-CAP	2 ft thick compacted clay	As Built	3:1	Fair Grass	24	23	9.00E-06	-----	13.73	2.05	10.69	-----	1.00	CAS_ECO7
ECO-CAP	2 ft thick compacted clay	Aged	3:1	Fair Grass	24	11	6.40E-05	-----	13.73	1.04	10.56	-----	2.14	CAS_ECO11
Open Lined Pond	FML over 2 ft thick compacted clay; 10 ft head on liner	As Built	-----	-----	-----	-----	1.00E-06	-----	-----	-----	-----	-----	2.48E-02	CALC
Open Lined Pond	FML over 2 ft thick compacted clay; 10 ft head on liner	Aged	-----	-----	-----	-----	1.00E-05	-----	-----	-----	-----	-----	1.23E-02	CALC
Open Lined Pond	FML over 2 ft thick compacted clay; 5 ft head on liner	As Built	-----	-----	-----	-----	1.00E-06	-----	-----	-----	-----	-----	1.13E-02	CALC
Open Lined Pond	FML over 2 ft thick compacted clay; 5 ft head on liner	Aged	-----	-----	-----	-----	1.00E-05	-----	-----	-----	-----	-----	6.18E-02	CALC
Open Lined Pond	FML over 2 ft thick compacted clay; 1 ft head on liner	As Built	-----	-----	-----	-----	1.00E-06	-----	-----	-----	-----	-----	2.24E-03	CALC
Open Lined Pond	FML over 2 ft thick compacted clay; 1 ft head on liner	Aged	-----	-----	-----	-----	1.00E-05	-----	-----	-----	-----	-----	1.36E-01	CALC

TABLE D1-1-2

CROSS REFERENCE OF SITE-WIDE REMEDIAL ALTERNATIVES WITH HELP MODEL RUNS

FS Area	Alternative 1 No Action	Alternative 2 Larger Evaporation Pond	Alternative 3 Smaller Evaporation Pond	Alternative 4 No Evaporation Pond	Alternative 5 Evaporation Pond plus P/S LF Dewatering	Alternative 6 Evaporation Pond plus Aggressive Site-wide Extraction	HELP MODEL RUN # [1]	SURFACE AREA APPLIED	AVERAGE SLOPE
Area 1 - Capped Landfills, PCB Landfill, BTA, and CDA									
Capped landfills (P/S, Metals, Caustics, Acids)	RCRA Cap (existing)	RCRA Cap (existing)	RCRA Cap (existing)	RCRA Cap (existing)	RCRA Cap (existing)	RCRA Cap (existing)	CAS_RP2	79.7 acres	3:1
PCB Landfill	-	RCRA Cap	RCRA Cap	RCRA Cap	RCRA Cap	RCRA Cap	CAS_RP2	4.4 acres	3:1
BTA	-	RCRA Cap	RCRA Cap	RCRA Cap	RCRA Cap	RCRA Cap	CAS_RP2	5.5 acres	3:1
CDA	-	RCRA Cap	RCRA Cap	RCRA Cap	RCRA Cap	RCRA Cap	CAS_RP2	18.8 acres	3:1
Area 2 - RCRA Canyon/WCSA [4]									
8.4-acre RCRA Canyon	-	ET Cap	ET Cap	ET Cap	ET Cap	ET Cap	AVG CAS_ET8 and CAS_ET15	8.4 acres	2:1
5.5-acre WCSA	-	Excavate/Backfill	ET Cap	ET Cap	ET Cap	ET Cap	AVG CAS_ET8 and CAS_ET15	5.5 acres	2:1
19.3-acre other areas	-	Stormwater BMPs	ET Cap	ET Cap	ET Cap	ET Cap	AVG CAS_ET8 and CAS_ET15	19.3 acres	2:1
Area 3 - Former Ponds/Pads, Roadways, Remaining Onsite Areas, MSA, LTA									
MSA (Location 2)	-	RCRA Cap	RCRA Cap	RCRA Cap	RCRA Cap	RCRA Cap	CAS_RP2	79.7 acres	3:1
LTA (Location 1)	-	Excavate/Asphalt cap	Excavate/Asphalt cap	Excavate/Asphalt cap	Excavate/Asphalt cap	Excavate/Asphalt cap	NA	-	3:1
Ponds A/B (Location 3)	-	Excavate/PCB LF disposal	Excavate/PCB LF disposal	Excavate/PCB LF disposal	Excavate/PCB LF disposal	Excavate/PCB LF disposal	NA	-	3:1
South of PSCT-1 (Location 4)	-	Excavate/PCB LF disposal	Excavate/PCB LF disposal	Excavate/PCB LF disposal	Excavate/PCB LF disposal	Excavate/PCB LF disposal	NA	-	3:1
RISBON-59 (Location 10)	-	Groundwater Monitoring	Groundwater Monitoring	Groundwater Monitoring	Excavate/PCB LF disposal	Excavate/PCB LF disposal	NA	-	3:1
Area 4 - Ponds									
Pond 18	-	RCRA Cap	RCRA Cap	RCRA Cap	RCRA Cap	RCRA Cap	CAS_RP2	2.8 acres	3:1
Pond A-5	-	Lined Retention Basin	Lined Retention Basin	Lined Retention Basin	Lined Retention Basin	Lined Retention Basin	CALC (1.36e-1)	2.5 acres	3:1
Pond 13		Lined Retention Basin	Lined Retention Basin	Lined Retention Basin	Lined Retention Basin	Lined Retention Basin	CALC (1.36e-1)	1.9 acres	3:1
A-Series	-	Evaporation Pond	Eco-Cap/Evaporation Pond	Eco-Cap	Eco-Cap/Evaporation Pond	Eco-Cap	CALC (1.36e-1)	8 acres (evap pond)	na
RCF	-	Eco-Cap	Eco-Cap	Eco-Cap	Eco-Cap	Eco-Cap	CAS_ECO9	11 acres	3:1

Notes:

1. RCRA Cap includes 2-foot vegetative layer, geocomposite drainage layer, HDPE geomembrane, GCL, and foundation layer.
2. ET Cap is 1-foot compacted (90%) clay foundation and 4-foot vegetative layer that is lightly compacted and amended for vegetative growth
3. PCB Landfill has a storage capacity of 140,000 cubic yards for wastes from excavations.
4. For Area 2, Alternatives 3 through 6, the final cap may be an ET Cap or RCRA Hybrid Cap. The cap type and design for the 3 subareas in Area 2 will be determined during remedial design

Table D1-1-3
Summary of Soil Types and Water Holding Properties

Cover Type	Cover Description	Construction	HELP Run Name	HELP Default Soil Number	Soil Type	Total Porosity (v/v)[1]	Field Capacity (v/v)	Wilting Point (v/v)	Saturated Hydraulic Conductivity (cm/sec)[2]	Water-Holding Capacity (in/ft)[3]	HELP Default Soil Number	Soil Type	Total Porosity (v/v)	Field Capacity (v/v)	Wilting Point (v/v)	Saturated Hydraulic Conductivity (cm/sec)	Water-Holding Capacity (in/ft)
ET	4 ft thick topsoil over 1 ft compacted clay	As Built	CAS_ET5	14	Silty Clay	0.479	0.371	0.251	2.50E-05	4.45	28	Silty Clay	0.452	0.411	0.311	1.20E-06	4.93
ET	4 ft thick topsoil over 1 ft compacted clay	Aged	CAS_ET8	9	Silty Loam	0.501	0.284	0.135	1.90E-04	3.41	14	Silty Clay	0.479	0.371	0.251	2.50E-05	4.45
ET	4 ft thick topsoil over 1 ft compacted clay	As Built	CAS_ET14	14	Silty Clay	0.479	0.371	0.251	2.50E-05	4.45	28	Silty Clay	0.452	0.411	0.311	1.20E-06	4.93
ET	4 ft thick topsoil over 1 ft compacted clay	Aged	CAS_ET15	9	Silty Loam	0.501	0.284	0.135	1.90E-04	3.41	14	Silty Clay	0.479	0.371	0.251	2.50E-05	4.45
ET	4 ft thick topsoil over 1 ft compacted clay	As Built	CAS_ET7	9	Silty Loam	0.501	0.284	0.135	1.90E-04	3.41	23	Silty Loam	0.461	0.360	0.203	9.00E-06	4.32
ET	4 ft thick topsoil over 1 ft compacted clay	Aged	CAS_ET9	5	Loamy Fine Sand	0.457	0.131	0.058	1.00E-03	1.57	11	Clay	0.464	0.310	0.187	6.40E-05	3.72
ET	4 ft thick topsoil over 1 ft compacted clay	As Built	CAS_E10	9	Silty Loam	0.501	0.284	0.135	1.90E-04	3.41	23	Silty Loam	0.461	0.360	0.203	9.00E-06	4.32
ET	4 ft thick topsoil over 1 ft compacted clay	Aged	CAS_ET11	5	Loamy Fine Sand	0.457	0.131	0.058	1.00E-03	1.57	11	Clay	0.464	0.310	0.187	6.40E-05	3.72
ET	3 ft thick topsoil over 2 ft compacted clay	As Built	CAS_ET6	9	Silty Loam	0.501	0.284	0.135	1.90E-04	3.41	23	Silty Loam	0.461	0.360	0.203	9.00E-06	4.32
RCRA Equivalent	5 ft thick compacted clay	As Built	CAS_REQ5	28	Silty Clay	0.452	0.411	0.311	1.20E-06	4.93	-----	-----	-----	-----	-----	-----	-----
RCRA Equivalent	5 ft thick compacted clay	As Built	CAS_REQ6	28	Silty Clay	0.452	0.411	0.311	1.20E-06	4.93	-----	-----	-----	-----	-----	-----	-----
RCRA Equivalent	5 ft thick compacted clay	As Built	CAS_REQ1	28	Silty Clay	0.452	0.411	0.311	1.20E-06	4.93	-----	-----	-----	-----	-----	-----	-----
RCRA Equivalent	5 ft thick compacted clay	Aged	CAS_REQ3	14	Silty Clay	0.479	0.371	0.251	2.50E-05	4.45	-----	-----	-----	-----	-----	-----	-----
RCRA Equivalent	5 ft thick compacted clay	As Built	CAS_REQ2	28	Silty Clay	0.452	0.411	0.311	1.20E-06	4.93	-----	-----	-----	-----	-----	-----	-----
RCRA Equivalent	5 ft thick compacted clay	Aged	CAS_REQ4	14	Silty Clay	0.479	0.371	0.251	2.50E-05	4.45	-----	-----	-----	-----	-----	-----	-----
RCRA Equivalent	1 ft thick topsoil over 4 ft compacted clay	As Built	CAS_REQ7	14	Silty Clay	0.479	0.371	0.251	2.50E-05	4.45	28	Silty Clay	0.452	0.411	0.311	1.20E-06	4.93
RCRA Equivalent	1 ft thick topsoil over 4 ft compacted clay	Aged	CASREQ10	9	Silty Loam	0.501	0.284	0.135	1.90E-04	3.41	14	Silty Clay	0.479	0.371	0.251	2.50E-05	4.45
RCRA Equivalent	1 ft thick topsoil over 4 ft compacted clay	As Built	CAS_REQ8	14	Silty Clay	0.479	0.371	0.251	2.50E-05	4.45	28	Silty Clay	0.452	0.411	0.311	1.20E-06	4.93
RCRA Equivalent	1 ft thick topsoil over 4 ft compacted clay	As Built	CAS_REQ9	14	Silty Clay	0.479	0.371	0.251	2.50E-05	4.45	28	Silty Clay	0.452	0.411	0.311	1.20E-06	4.93
RCRA Equivalent	1 ft thick topsoil over 4 ft compacted clay	As Built	CASREQ11	14	Silty Clay	0.479	0.371	0.251	2.50E-05	4.45	28	Silty Clay	0.452	0.411	0.311	1.20E-06	4.93
RCRA Equivalent	1 ft thick topsoil over 4 ft compacted clay	Aged	CASREQ12	9	Silty Loam	0.501	0.284	0.135	1.90E-04	3.41	14	Silty Clay	0.479	0.371	0.251	2.50E-05	4.45
RCRA Equivalent	1 ft thick topsoil over 4 ft compacted clay	As Built	CASREQ13	14	Silty Clay	0.479	0.371	0.251	2.50E-05	4.45	28	Silty Clay	0.452	0.411	0.311	1.20E-06	4.93
RCRA Hybrid	2 ft thick topsoil over geomet, FML, and 2 ft compacted clay	As Built	CAS_RHY1	9	Silty Loam	0.501	0.284	0.135	1.90E-04	3.41	23	Silty Loam	0.461	0.360	0.203	9.00E-06	4.32
RCRA Hybrid	2 ft thick topsoil over geomet, FML, and 2 ft compacted clay	Aged	CAS_RHY3	5	Loamy Fine Sand	0.457	0.131	0.058	1.00E-03	1.57	11	Clay	0.464	0.310	0.187	6.40E-05	3.72
RCRA Hybrid	2 ft thick topsoil over geonet, FML, and 2 ft compacted clay	As Built	CAS_RHY2	9	Silty Loam	0.501	0.284	0.135	1.90E-04	3.41	23	Silty Loam	0.461	0.360	0.203	9.00E-06	4.32
RCRA Hybrid	2 ft thick topsoil over geomet, FML, and 2 ft compacted clay	Aged	CAS_RHY4	5	Loamy Fine Sand	0.457	0.131	0.058	1.00E-03	1.57	11	Clay	0.464	0.310	0.187	6.40E-05	3.72
RCRA Prescriptive	Standard design	As Built	CAS_RP1	9	Silty Loam	0.501	0.284	0.135	1.90E-04	3.41	28	Silty Clay	0.452	0.411	0.311	1.20E-06	4.93
RCRA Prescriptive	Standard design	Aged	CAS_RP2	5	Loamy Fine Sand	0.457	0.131	0.058	1.00E-03	1.57	28	Silty Clay	0.452	0.411	0.311	1.20E-06	4.93
ECO-CAP	2 ft thick compacted clay	As Built	CAS_ECO3	14	Silty Clay	0.479	0.371	0.251	2.50E-05	4.45	-----	-----	-----	-----	-----	-----	-----
ECO-CAP	2 ft thick compacted clay	Aged	CAS_ECO8	9	Silty Loam	0.501	0.284	0.135	1.90E-04	3.41	-----	-----	-----	-----	-----	-----	-----
ECO-CAP	2 ft thick compacted clay	As Built	CAS_ECO4	14	Silty Clay	0.479	0.371	0.251	2.50E-05	4.45	-----	-----	-----	-----	-----	-----	-----
ECO-CAP	2 ft thick compacted clay	Aged	CAS_ECO9	9	Silty Loam	0.501	0.284	0.135	1.90E-04	3.41	-----	-----	-----	-----	-----	-----	-----
ECO-CAP	2 ft thick compacted clay	As Built	CAS_ECO5	23	Silty Loam	0.461	0.360	0.203	9.00E-06	4.32	-----	-----	-----	-----	-----	-----	-----
ECO-CAP	2 ft thick compacted clay	Aged	CAS_ECO10	11	Clay	0.464	0.310	0.187	6.40E-05	3.72	-----	-----	-----	-----	-----	-----	-----
ECO-CAP	2 ft thick compacted clay	As Built	CAS_ECO7	23	Silty Loam	0.461	0.360	0.203	9.00E-06	4.32	-----	-----	-----	-----	-----	-----	-----
ECO-CAP	2 ft thick compacted clay	Aged	CAS_ECO11	11	Clay	0.464	0.310	0.187	6.40E-05	3.72	-----	-----	-----	-----	-----	-----	-----

[1] v/v = volume per volume

[2] cm/sec = centimeters per second

[3] water-holding capacity at field capacity; in/ft = inches of water per foot of soil

HELP MODEL RUN OUTPUT

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**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
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PRECIPITATION DATA FILE:    C:\HELP3\CAS_ET5.D4
TEMPERATURE DATA FILE:      c:\HELP3\CAS_ET5.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CAS_ET5.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CAS_ET5.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CAS_ET5.D10
OUTPUT DATA FILE:           C:\HELP3\CAS_ET5.OUT



TIME:  12: 6     DATE:   4/18/2012




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     TITLE:  As Built Casmalia Evapotranspiration Cover 2:1 Slope Fair Grass

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     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
              COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.
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                              LAYER  1
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              TYPE 1 - VERTICAL PERCOLATION LAYER
                  MATERIAL TEXTURE NUMBER  14
   THICKNESS                   =     48.00   INCHES
   POROSITY                    =      0.4790 VOL/VOL
   FIELD CAPACITY              =      0.3710 VOL/VOL
   WILTING POINT               =      0.2510 VOL/VOL
   INITIAL SOIL WATER CONTENT  =      0.3042 VOL/VOL
   EFFECTIVE SAT. HYD. COND.   =  0.249999994000E-04 CM/SEC
 NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
          FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.


                              LAYER  2
                              --------

              TYPE 1 - VERTICAL PERCOLATION LAYER
                  MATERIAL TEXTURE NUMBER  28
   THICKNESS                   =     12.00   INCHES
   POROSITY                    =      0.4520 VOL/VOL
   FIELD CAPACITY              =      0.4110 VOL/VOL
   WILTING POINT               =      0.3110 VOL/VOL
   INITIAL SOIL WATER CONTENT  =      0.4110 VOL/VOL
   EFFECTIVE SAT. HYD. COND.   =  0.120000004000E-05 CM/SEC


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

 NOTE:  SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT
          SOIL DATA BASE USING SOIL TEXTURE #14 WITH A
          FAIR STAND OF GRASS, A SURFACE SLOPE OF 50.%
          AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER             =     90.20
FRACTION OF AREA ALLOWING RUNOFF    =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE  =    100.000  ACRES
EVAPORATIVE ZONE DEPTH              =     36.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE   =     10.153  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE  =     17.244  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE  =      9.036  INCHES
INITIAL SNOW WATER                  =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS    =     19.536  INCHES
TOTAL INITIAL WATER                 =     19.536  INCHES
TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR


             EVAPOTRANSPIRATION AND WEATHER DATA
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 NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
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SANTA MARIA CALIFORNIA

STATION LATITUDE	=	35.00 DEGREES
MAXIMUM LEAF AREA INDEX	=	2.00
START OF GROWING SEASON (JULIAN DATE)	=	85
END OF GROWING SEASON (JULIAN DATE)	=	338
EVAPORATIVE ZONE DEPTH	=	36.0 INCHES
AVERAGE ANNUAL WIND SPEED	=	7.00 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	73.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	74.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	76.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	70.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SAN DIEGO CALIFORNIA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 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	2.88	2.82	2.44	1.19	0.36	0.10

```
                          0.01     0.03     0.18     0.75     1.09     1.89

    STD. DEVIATIONS       1.87     2.33     1.56     0.82     0.35     0.15
                          0.03     0.09     0.36     0.98     0.87     1.48

  RUNOFF
  ------
    TOTALS                0.400    0.630    0.254    0.036    0.001    0.000
                          0.000    0.000    0.006    0.089    0.019    0.207

    STD. DEVIATIONS       0.548    0.982    0.368    0.083    0.003    0.000
                          0.000    0.000    0.035    0.237    0.045    0.379

  EVAPOTRANSPIRATION
  ------------------
    TOTALS                1.155    1.614    2.208    1.638    1.887    0.791
                          0.017    0.031    0.143    0.448    0.565    0.806

    STD. DEVIATIONS       0.200    0.241    0.584    0.682    0.535    0.660
                          0.044    0.092    0.296    0.565    0.371    0.293

  PERCOLATION/LEAKAGE THROUGH LAYER  2
  -------------------------------------
    TOTALS                0.0332   0.1728   0.3104   0.1783   0.0821
    0.0131
                          0.0005   0.0000   0.0001   0.0002   0.0002
                          0.0000

    STD. DEVIATIONS       0.1760   0.4383   0.5785   0.2989   0.1433
    0.0293
                          0.0051   0.0002   0.0003   0.0005   0.0005
                          0.0003


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

-----------------------------------------------------------------------------
--
                                      INCHES            CU. FEET       PERCENT
                                 -------------------   -------------
                                 ---------
 PRECIPITATION                    13.73    (   3.589)    4985733.0     100.00

 RUNOFF                            1.642   (  1.1770)     595869.87     11.951

 EVAPOTRANSPIRATION               11.305   (  1.9002)    4103549.00     82.306

 PERCOLATION/LEAKAGE THROUGH       0.79100 (  1.24921)    287134.344
 5.75912
   LAYER  2

 CHANGE IN WATER STORAGE          -0.002   (  1.6379)       -821.38     -0.016
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                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ---------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     3.137      1138905.2500

      PERCOLATION/LEAKAGE THROUGH LAYER  2       0.332206    120590.91400

      SNOW WATER                                 0.14         50934.3281

      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.4425

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.2510

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                    FINAL WATER STORAGE AT END OF YEAR  100
    ---------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1           14.3776         0.2995

                       2            4.9320         0.4110

                   SNOW WATER       0.000


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**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
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PRECIPITATION DATA FILE:    C:\HELP3\CAS_ET8.D4
TEMPERATURE DATA FILE:      c:\HELP3\CAS_ET8.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CAS_ET8.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CAS_ET8.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CAS_ET8.D10
OUTPUT DATA FILE:           C:\HELP3\CAS_ET8.OUT



TIME:  17:29     DATE:   4/19/2012




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     TITLE:  Aged Casmalia Evapotranspiration Cover 2:1 Slope Fair Grass

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     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
              COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.
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```
                              LAYER  1
                              --------

              TYPE 1 - VERTICAL PERCOLATION LAYER
                  MATERIAL TEXTURE NUMBER   9
   THICKNESS                   =     48.00   INCHES
   POROSITY                    =      0.5010 VOL/VOL
   FIELD CAPACITY              =      0.2840 VOL/VOL
   WILTING POINT               =      0.1350 VOL/VOL
   INITIAL SOIL WATER CONTENT  =      0.1925 VOL/VOL
   EFFECTIVE SAT. HYD. COND.   =  0.190000006000E-03 CM/SEC
 NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
          FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.


                              LAYER  2
                              --------

              TYPE 1 - VERTICAL PERCOLATION LAYER
                  MATERIAL TEXTURE NUMBER  14
   THICKNESS                   =     12.00   INCHES
   POROSITY                    =      0.4790 VOL/VOL
   FIELD CAPACITY              =      0.3710 VOL/VOL
   WILTING POINT               =      0.2510 VOL/VOL
   INITIAL SOIL WATER CONTENT  =      0.3710 VOL/VOL
   EFFECTIVE SAT. HYD. COND.   =  0.249999994000E-04 CM/SEC


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

 NOTE:  SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT
          SOIL DATA BASE USING SOIL TEXTURE # 9 WITH A
          FAIR STAND OF GRASS, A SURFACE SLOPE OF 50.%
          AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER             =     82.70
FRACTION OF AREA ALLOWING RUNOFF    =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE  =    100.000  ACRES
EVAPORATIVE ZONE DEPTH              =     36.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE   =      5.834  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE  =     18.036  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE  =      4.860  INCHES
INITIAL SNOW WATER                  =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS    =     13.691  INCHES
TOTAL INITIAL WATER                 =     13.691  INCHES
TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR


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

 NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
```

SANTA MARIA CALIFORNIA

STATION LATITUDE	=	35.00 DEGREES
MAXIMUM LEAF AREA INDEX	=	2.00
START OF GROWING SEASON (JULIAN DATE)	=	85
END OF GROWING SEASON (JULIAN DATE)	=	338
EVAPORATIVE ZONE DEPTH	=	36.0 INCHES
AVERAGE ANNUAL WIND SPEED	=	7.00 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	73.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	74.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	76.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	70.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SAN DIEGO CALIFORNIA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 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	2.88	2.82	2.44	1.19	0.36	0.10

```
                          0.01     0.03     0.18     0.75     1.09     1.89

    STD. DEVIATIONS       1.87     2.33     1.56     0.82     0.35     0.15
                          0.03     0.09     0.36     0.98     0.87     1.48

  RUNOFF
  ------
    TOTALS                0.092    0.210    0.045    0.003    0.000    0.000
                          0.000    0.000    0.001    0.023    0.001    0.050

    STD. DEVIATIONS       0.178    0.463    0.117    0.014    0.000    0.000
                          0.000    0.000    0.005    0.085    0.004    0.131

  EVAPOTRANSPIRATION
  ------------------
    TOTALS                1.102    1.547    2.191    1.688    1.985    1.459
                          0.016    0.031    0.148    0.475    0.598    0.799

    STD. DEVIATIONS       0.191    0.219    0.543    0.691    0.567    0.877
                          0.042    0.092    0.309    0.607    0.383    0.278

  PERCOLATION/LEAKAGE THROUGH LAYER  2
  -------------------------------------
    TOTALS                0.0524   0.2929   0.4934   0.3102   0.1126
    0.0094
                          0.0000   0.0000   0.0000   0.0000   0.0000
                          0.0000

    STD. DEVIATIONS       0.2667   0.7282   0.9311   0.4739   0.1984
    0.0186
                          0.0000   0.0000   0.0000   0.0000   0.0003
                          0.0000


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

-----------------------------------------------------------------------------
--
                                      INCHES            CU. FEET       PERCENT
                                 -------------------   -------------
                                 ---------
 PRECIPITATION                    13.73    (   3.589)    4985733.0     100.00

 RUNOFF                            0.424   (  0.4968)     153789.56      3.085

 EVAPOTRANSPIRATION               12.039   (  2.0219)    4370337.00     87.657

 PERCOLATION/LEAKAGE THROUGH       1.27087 (  1.92042)    461324.187
 9.25289
   LAYER  2

 CHANGE IN WATER STORAGE           0.001   (  2.0265)        281.12      0.006
```

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                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     1.892       686701.7500

      PERCOLATION/LEAKAGE THROUGH LAYER  2       0.492383    178734.87500

      SNOW WATER                                 0.14         50934.3281

      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.3868

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.1350

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                    FINAL WATER STORAGE AT END OF YEAR  100
    ---------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1            9.3169         0.1941

                       2            4.4520         0.3710

                   SNOW WATER       0.000


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**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
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PRECIPITATION DATA FILE:    C:\HELP3\CAS_ET7.D4
TEMPERATURE DATA FILE:      c:\HELP3\CAS_ET7.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CAS_ET7.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CAS_ET7.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CAS_ET7.D10
OUTPUT DATA FILE:           C:\HELP3\CAS_ET7.OUT


TIME:  13:52     DATE:   4/18/2012




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     TITLE:  As Built Casmalia Evapotranspiration Cover 2:1 Slope Fair Grass

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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   9
   THICKNESS                   =     48.00   INCHES
   POROSITY                    =      0.5010 VOL/VOL
   FIELD CAPACITY              =      0.2840 VOL/VOL
   WILTING POINT               =      0.1350 VOL/VOL
   INITIAL SOIL WATER CONTENT  =      0.1923 VOL/VOL
   EFFECTIVE SAT. HYD. COND.   =  0.190000006000E-03 CM/SEC
 NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
          FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.


                              LAYER  2
                              --------

              TYPE 1 - VERTICAL PERCOLATION LAYER
                  MATERIAL TEXTURE NUMBER  23
   THICKNESS                   =     12.00   INCHES
   POROSITY                    =      0.4610 VOL/VOL
   FIELD CAPACITY              =      0.3600 VOL/VOL
   WILTING POINT               =      0.2030 VOL/VOL
   INITIAL SOIL WATER CONTENT  =      0.3593 VOL/VOL
   EFFECTIVE SAT. HYD. COND.   =  0.900000032000E-05 CM/SEC


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

 NOTE:  SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT
          SOIL DATA BASE USING SOIL TEXTURE # 9 WITH A
          FAIR STAND OF GRASS, A SURFACE SLOPE OF 50.%
          AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER             =     82.70
FRACTION OF AREA ALLOWING RUNOFF    =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE  =    100.000  ACRES
EVAPORATIVE ZONE DEPTH              =     36.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE   =      5.834  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE  =     18.036  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE  =      4.860  INCHES
INITIAL SNOW WATER                  =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS    =     13.542  INCHES
TOTAL INITIAL WATER                 =     13.542  INCHES
TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR


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

 NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
```

SANTA MARIA CALIFORNIA

STATION LATITUDE	=	35.00 DEGREES
MAXIMUM LEAF AREA INDEX	=	2.00
START OF GROWING SEASON (JULIAN DATE)	=	85
END OF GROWING SEASON (JULIAN DATE)	=	338
EVAPORATIVE ZONE DEPTH	=	36.0 INCHES
AVERAGE ANNUAL WIND SPEED	=	7.00 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	73.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	74.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	76.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	70.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SAN DIEGO CALIFORNIA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 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	2.88	2.82	2.44	1.19	0.36	0.10

```
                          0.01     0.03     0.18     0.75     1.09     1.89

    STD. DEVIATIONS       1.87     2.33     1.56     0.82     0.35     0.15
                          0.03     0.09     0.36     0.98     0.87     1.48

  RUNOFF
  ------
    TOTALS                0.092    0.210    0.045    0.003    0.000    0.000
                          0.000    0.000    0.001    0.023    0.001    0.050

    STD. DEVIATIONS       0.178    0.463    0.117    0.014    0.000    0.000
                          0.000    0.000    0.005    0.085    0.004    0.131

  EVAPOTRANSPIRATION
  ------------------
    TOTALS                1.102    1.547    2.189    1.693    1.982    1.456
                          0.017    0.031    0.148    0.478    0.598    0.799

    STD. DEVIATIONS       0.190    0.218    0.545    0.690    0.572    0.879
                          0.042    0.092    0.309    0.609    0.383    0.278

  PERCOLATION/LEAKAGE THROUGH LAYER  2
  -------------------------------------
    TOTALS                0.0498   0.2906   0.5018   0.3196   0.1035
    0.0046
                          0.0000   0.0000   0.0000   0.0000   0.0000
                          0.0000

    STD. DEVIATIONS       0.2563   0.7187   0.9367   0.5003   0.1994
    0.0111
                          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                    13.73    (   3.589)    4985733.0     100.00

 RUNOFF                            0.424   (  0.4968)     153760.30      3.084

 EVAPOTRANSPIRATION               12.040   (  2.0289)    4370663.50     87.663

 PERCOLATION/LEAKAGE THROUGH       1.26989 (  1.91494)    460969.094
 9.24576
   LAYER  2

 CHANGE IN WATER STORAGE           0.001   (  2.0312)        340.05      0.007
```

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                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ---------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     1.892       686683.8750

      PERCOLATION/LEAKAGE THROUGH LAYER  2       0.398745    144744.35900

      SNOW WATER                                 0.14         50934.3281

      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.3868

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.1350

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                    FINAL WATER STORAGE AT END OF YEAR  100
    ---------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1            9.3160         0.1941

                       2            4.3197         0.3600

                   SNOW WATER       0.000


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**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
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PRECIPITATION DATA FILE:    C:\HELP3\CAS_ET9.D4
TEMPERATURE DATA FILE:      c:\HELP3\CAS_ET9.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CAS_ET9.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CAS_ET9.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CAS_ET9.D10
OUTPUT DATA FILE:           C:\HELP3\CAS_ET9.OUT



TIME:  17:33     DATE:   4/19/2012




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     TITLE:  Aged Casmalia Evapotranspiration Cover 2:1 Slope Fair Grass

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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   5
   THICKNESS                   =     48.00   INCHES
   POROSITY                    =      0.4570 VOL/VOL
   FIELD CAPACITY              =      0.1310 VOL/VOL
   WILTING POINT               =      0.0580 VOL/VOL
   INITIAL SOIL WATER CONTENT  =      0.1047 VOL/VOL
   EFFECTIVE SAT. HYD. COND.   =  0.100000005000E-02 CM/SEC
 NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
          FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.


                         LAYER  2
                         --------

            TYPE 1 - VERTICAL PERCOLATION LAYER
                MATERIAL TEXTURE NUMBER  11
   THICKNESS                   =     12.00   INCHES
   POROSITY                    =      0.4640 VOL/VOL
   FIELD CAPACITY              =      0.3100 VOL/VOL
   WILTING POINT               =      0.1870 VOL/VOL
   INITIAL SOIL WATER CONTENT  =      0.2811 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 # 5 WITH A
          FAIR STAND OF GRASS, A SURFACE SLOPE OF 50.%
          AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER             =     66.60
FRACTION OF AREA ALLOWING RUNOFF    =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE  =    100.000  ACRES
EVAPORATIVE ZONE DEPTH              =     36.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE   =      3.314  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE  =     16.452  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE  =      2.088  INCHES
INITIAL SNOW WATER                  =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS    =      8.399  INCHES
TOTAL INITIAL WATER                 =      8.399  INCHES
TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR


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

 NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
```

SANTA MARIA CALIFORNIA

STATION LATITUDE	=	35.00 DEGREES
MAXIMUM LEAF AREA INDEX	=	2.00
START OF GROWING SEASON (JULIAN DATE)	=	85
END OF GROWING SEASON (JULIAN DATE)	=	338
EVAPORATIVE ZONE DEPTH	=	36.0 INCHES
AVERAGE ANNUAL WIND SPEED	=	7.00 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	73.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	74.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	76.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	70.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SAN DIEGO CALIFORNIA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 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	2.88	2.82	2.44	1.19	0.36	0.10

```
                          0.01     0.03     0.18     0.75     1.09     1.89

    STD. DEVIATIONS       1.87     2.33     1.56     0.82     0.35     0.15
                          0.03     0.09     0.36     0.98     0.87     1.48

  RUNOFF
  ------
    TOTALS                0.003    0.022    0.001    0.000    0.000    0.000
                          0.000    0.000    0.000    0.000    0.000    0.001

    STD. DEVIATIONS       0.014    0.081    0.012    0.000    0.000    0.000
                          0.000    0.000    0.000    0.002    0.000    0.009

  EVAPOTRANSPIRATION
  ------------------
    TOTALS                1.066    1.370    1.724    1.280    1.854    1.335
                          0.015    0.030    0.141    0.404    0.459    0.699

    STD. DEVIATIONS       0.237    0.323    0.601    0.571    0.481    0.633
                          0.039    0.089    0.295    0.534    0.346    0.346

  PERCOLATION/LEAKAGE THROUGH LAYER  2
  -------------------------------------
    TOTALS                0.1366   0.5193   0.7381   0.4986   0.3359
    0.3111
                          0.2962   0.1759   0.1189   0.0860   0.0597
                          0.0514

    STD. DEVIATIONS       0.4040   1.0427   1.0882   0.4686   0.2104
    0.1628
                          0.0948   0.0342   0.0163   0.0133   0.0156
                          0.0253


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

-------------------------------------------------------------------------------
--
                                      INCHES            CU. FEET       PERCENT
                                 -------------------   -------------
                                 ---------
 PRECIPITATION                    13.73    (   3.589)    4985733.0     100.00

 RUNOFF                            0.028   (  0.0817)      10112.81      0.203

 EVAPOTRANSPIRATION               10.376   (  1.8048)    3766354.75     75.543

 PERCOLATION/LEAKAGE THROUGH       3.32787 (  2.48641)   1208015.620
 24.22945
   LAYER  2

 CHANGE IN WATER STORAGE           0.003   (  2.0452)       1248.57      0.025
```

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                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ---------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     0.529       191916.2970

      PERCOLATION/LEAKAGE THROUGH LAYER  2       1.544008    560474.81200

      SNOW WATER                                 0.14         50934.3281

      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.3175

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.0580

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                    FINAL WATER STORAGE AT END OF YEAR  100
    ---------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1            5.1415         0.1071

                       2            3.6016         0.3001

                   SNOW WATER       0.000


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**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
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PRECIPITATION DATA FILE:    C:\HELP3\CAS_ET10.D4
TEMPERATURE DATA FILE:      c:\HELP3\CAS_ET10.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CAS_ET10.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CAS_ET10.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CAS_ET10.D10
OUTPUT DATA FILE:           C:\HELP3\CAS_ET10.OUT


TIME:  17:39     DATE:   4/19/2012




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     TITLE:  As Built Casmalia Evapotranspiration Cover 3:1 Slope Fair Grass

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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   9
   THICKNESS                   =     48.00   INCHES
   POROSITY                    =      0.5010 VOL/VOL
   FIELD CAPACITY              =      0.2840 VOL/VOL
   WILTING POINT               =      0.1350 VOL/VOL
   INITIAL SOIL WATER CONTENT  =      0.1924 VOL/VOL
   EFFECTIVE SAT. HYD. COND.   =  0.190000006000E-03 CM/SEC
 NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
          FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.


                          LAYER  2
                          --------

             TYPE 1 - VERTICAL PERCOLATION LAYER
                 MATERIAL TEXTURE NUMBER  23
   THICKNESS                   =     12.00   INCHES
   POROSITY                    =      0.4610 VOL/VOL
   FIELD CAPACITY              =      0.3600 VOL/VOL
   WILTING POINT               =      0.2030 VOL/VOL
   INITIAL SOIL WATER CONTENT  =      0.3594 VOL/VOL
   EFFECTIVE SAT. HYD. COND.   =  0.900000032000E-05 CM/SEC


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

 NOTE:  SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT
          SOIL DATA BASE USING SOIL TEXTURE # 9 WITH A
          FAIR STAND OF GRASS, A SURFACE SLOPE OF 33.%
          AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER             =     82.50
FRACTION OF AREA ALLOWING RUNOFF    =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE  =    100.000  ACRES
EVAPORATIVE ZONE DEPTH              =     36.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE   =      5.834  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE  =     18.036  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE  =      4.860  INCHES
INITIAL SNOW WATER                  =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS    =     13.547  INCHES
TOTAL INITIAL WATER                 =     13.547  INCHES
TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR


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

 NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
```

SANTA MARIA CALIFORNIA

STATION LATITUDE	=	35.00 DEGREES
MAXIMUM LEAF AREA INDEX	=	2.00
START OF GROWING SEASON (JULIAN DATE)	=	85
END OF GROWING SEASON (JULIAN DATE)	=	338
EVAPORATIVE ZONE DEPTH	=	36.0 INCHES
AVERAGE ANNUAL WIND SPEED	=	7.00 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	73.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	74.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	76.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	70.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SAN DIEGO CALIFORNIA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 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	2.88	2.82	2.44	1.19	0.36	0.10

```
                          0.01     0.03     0.18     0.75     1.09     1.89

    STD. DEVIATIONS       1.87     2.33     1.56     0.82     0.35     0.15
                          0.03     0.09     0.36     0.98     0.87     1.48

  RUNOFF
  ------
    TOTALS                0.089    0.205    0.044    0.003    0.000    0.000
                          0.000    0.000    0.001    0.022    0.000    0.048

    STD. DEVIATIONS       0.174    0.455    0.114    0.014    0.000    0.000
                          0.000    0.000    0.004    0.083    0.004    0.127

  EVAPOTRANSPIRATION
  ------------------
    TOTALS                1.103    1.548    2.190    1.692    1.983    1.456
                          0.017    0.031    0.148    0.478    0.598    0.800

    STD. DEVIATIONS       0.188    0.219    0.546    0.690    0.572    0.876
                          0.042    0.092    0.309    0.609    0.384    0.278

  PERCOLATION/LEAKAGE THROUGH LAYER  2
  -------------------------------------
    TOTALS                0.0504   0.2935   0.5048   0.3213   0.1039
    0.0060
                          0.0000   0.0000   0.0000   0.0000   0.0000
                          0.0000

    STD. DEVIATIONS       0.2598   0.7249   0.9417   0.5005   0.1991
    0.0126
                          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                    13.73    (   3.589)    4985733.0     100.00

 RUNOFF                            0.411   (  0.4877)     149085.28      2.990

 EVAPOTRANSPIRATION               12.043   (  2.0273)    4371746.00     87.685

 PERCOLATION/LEAKAGE THROUGH       1.27985 (  1.92823)    464585.219
 9.31829
   LAYER  2

 CHANGE IN WATER STORAGE           0.001   (  2.0341)        315.74      0.006
```

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                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ---------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     1.869       678283.6870

      PERCOLATION/LEAKAGE THROUGH LAYER  2       0.500162    181558.81200

      SNOW WATER                                 0.14         50934.3281

      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.3876

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.1350

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                    FINAL WATER STORAGE AT END OF YEAR  100
    ---------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1            9.3141         0.1940

                       2            4.3197         0.3600

                   SNOW WATER       0.000

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**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
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PRECIPITATION DATA FILE:    C:\HELP3\CAS_ET11.D4
TEMPERATURE DATA FILE:      c:\HELP3\CAS_ET11.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CAS_ET11.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CAS_ET11.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CAS_ET11.D10
OUTPUT DATA FILE:           C:\HELP3\CAS_ET11.OUT


TIME:  17:40     DATE:   4/19/2012




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     TITLE:  Aged Casmalia Evapotranspiration Cover 3:1 Slope Fair Grass

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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   5
   THICKNESS                   =     48.00   INCHES
   POROSITY                    =      0.4570 VOL/VOL
   FIELD CAPACITY              =      0.1310 VOL/VOL
   WILTING POINT               =      0.0580 VOL/VOL
   INITIAL SOIL WATER CONTENT  =      0.1047 VOL/VOL
   EFFECTIVE SAT. HYD. COND.   =  0.100000005000E-02 CM/SEC
 NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
          FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.


                          LAYER  2
                          --------

             TYPE 1 - VERTICAL PERCOLATION LAYER
                 MATERIAL TEXTURE NUMBER  11
   THICKNESS                   =     12.00   INCHES
   POROSITY                    =      0.4640 VOL/VOL
   FIELD CAPACITY              =      0.3100 VOL/VOL
   WILTING POINT               =      0.1870 VOL/VOL
   INITIAL SOIL WATER CONTENT  =      0.2811 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 # 5 WITH A
          FAIR STAND OF GRASS, A SURFACE SLOPE OF 33.%
          AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER             =     66.20
FRACTION OF AREA ALLOWING RUNOFF    =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE  =    100.000  ACRES
EVAPORATIVE ZONE DEPTH              =     36.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE   =      3.314  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE  =     16.452  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE  =      2.088  INCHES
INITIAL SNOW WATER                  =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS    =      8.399  INCHES
TOTAL INITIAL WATER                 =      8.399  INCHES
TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR


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

 NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
```

SANTA MARIA CALIFORNIA

STATION LATITUDE	=	35.00 DEGREES
MAXIMUM LEAF AREA INDEX	=	2.00
START OF GROWING SEASON (JULIAN DATE)	=	85
END OF GROWING SEASON (JULIAN DATE)	=	338
EVAPORATIVE ZONE DEPTH	=	36.0 INCHES
AVERAGE ANNUAL WIND SPEED	=	7.00 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	73.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	74.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	76.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	70.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SAN DIEGO CALIFORNIA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 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	2.88	2.82	2.44	1.19	0.36	0.10

```
                            0.01     0.03     0.18     0.75     1.09     1.89

    STD. DEVIATIONS         1.87     2.33     1.56     0.82     0.35     0.15
                            0.03     0.09     0.36     0.98     0.87     1.48

  RUNOFF
  ------
    TOTALS                  0.002    0.020    0.001    0.000    0.000    0.000
                            0.000    0.000    0.000    0.000    0.000    0.001

    STD. DEVIATIONS         0.013    0.076    0.010    0.000    0.000    0.000
                            0.000    0.000    0.000    0.002    0.000    0.008

  EVAPOTRANSPIRATION
  ------------------
    TOTALS                  1.070    1.366    1.716    1.281    1.851    1.344
                            0.014    0.030    0.140    0.406    0.455    0.689

    STD. DEVIATIONS         0.239    0.322    0.597    0.576    0.472    0.607
                            0.038    0.088    0.294    0.537    0.343    0.341

  PERCOLATION/LEAKAGE THROUGH LAYER  2
  -------------------------------------
    TOTALS                  0.1332   0.5258   0.7247   0.5077   0.3410
    0.3179
                            0.2972   0.1764   0.1192   0.0854   0.0600
                            0.0538

    STD. DEVIATIONS         0.4028   1.0373   1.1099   0.4752   0.2099
    0.1613
                            0.0928   0.0338   0.0165   0.0143   0.0158
                            0.0285


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

-----------------------------------------------------------------------------
--
                                       INCHES            CU. FEET       PERCENT
                                  -------------------   -------------
                                  ---------
 PRECIPITATION                     13.73    (   3.589)    4985733.0     100.00

 RUNOFF                             0.025   (  0.0770)       9251.20      0.186

 EVAPOTRANSPIRATION                10.363   (  1.7974)    3761866.50     75.453

 PERCOLATION/LEAKAGE THROUGH        3.34253 (  2.49842)   1213337.620
 24.33619
   LAYER  2

 CHANGE IN WATER STORAGE            0.004   (  2.0579)       1275.92      0.026
```

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                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ----------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     0.510       185023.9370

      PERCOLATION/LEAKAGE THROUGH LAYER  2       1.566743    568727.75000

      SNOW WATER                                 0.14         50934.3281

      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.3182

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.0580

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                    FINAL WATER STORAGE AT END OF YEAR  100
    ---------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1            5.1483         0.1073

                       2            3.6024         0.3002

                   SNOW WATER       0.000


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**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
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PRECIPITATION DATA FILE:    C:\HELP3\CAS_ET6.D4
TEMPERATURE DATA FILE:      c:\HELP3\CAS_ET6.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CAS_ET6.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CAS_ET6.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CAS_ET6.D10
OUTPUT DATA FILE:           C:\HELP3\CAS_ET6.OUT


TIME:  13:51     DATE:   4/18/2012




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     TITLE:  As Built Casmalia Evapotranspiration Cover 2:1 Slope Fair Grass

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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   9
   THICKNESS                   =     36.00   INCHES
   POROSITY                    =      0.5010 VOL/VOL
   FIELD CAPACITY              =      0.2840 VOL/VOL
   WILTING POINT               =      0.1350 VOL/VOL
   INITIAL SOIL WATER CONTENT  =      0.1621 VOL/VOL
   EFFECTIVE SAT. HYD. COND.   =  0.190000006000E-03 CM/SEC
 NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
          FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.


                              LAYER  2
                              --------

              TYPE 1 - VERTICAL PERCOLATION LAYER
                  MATERIAL TEXTURE NUMBER  23
   THICKNESS                   =     24.00   INCHES
   POROSITY                    =      0.4610 VOL/VOL
   FIELD CAPACITY              =      0.3600 VOL/VOL
   WILTING POINT               =      0.2030 VOL/VOL
   INITIAL SOIL WATER CONTENT  =      0.3593 VOL/VOL
   EFFECTIVE SAT. HYD. COND.   =  0.900000032000E-05 CM/SEC


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

 NOTE:  SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT
          SOIL DATA BASE USING SOIL TEXTURE # 9 WITH A
          FAIR STAND OF GRASS, A SURFACE SLOPE OF 50.%
          AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER             =     82.70
FRACTION OF AREA ALLOWING RUNOFF    =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE  =    100.000  ACRES
EVAPORATIVE ZONE DEPTH              =     36.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE   =      5.834  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE  =     18.036  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE  =      4.860  INCHES
INITIAL SNOW WATER                  =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS    =     14.459  INCHES
TOTAL INITIAL WATER                 =     14.459  INCHES
TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR


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

 NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
```

SANTA MARIA CALIFORNIA

```
STATION LATITUDE                        =  35.00 DEGREES
MAXIMUM LEAF AREA INDEX                 =   2.00
START OF GROWING SEASON (JULIAN DATE)   =     85
END OF GROWING SEASON (JULIAN DATE)     =    338
EVAPORATIVE ZONE DEPTH                  =  36.0  INCHES
AVERAGE ANNUAL WIND SPEED               =   7.00 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY   =  73.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY   =  74.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY   =  76.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY   =  70.00 %
```

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SAN DIEGO CALIFORNIA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 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	2.88	2.82	2.44	1.19	0.36	0.10

```
                          0.01     0.03     0.18     0.75     1.09     1.89

    STD. DEVIATIONS       1.87     2.33     1.56     0.82     0.35     0.15
                          0.03     0.09     0.36     0.98     0.87     1.48

  RUNOFF
  ------
    TOTALS                0.092    0.210    0.045    0.003    0.000    0.000
                          0.000    0.000    0.001    0.023    0.001    0.050

    STD. DEVIATIONS       0.178    0.463    0.117    0.014    0.000    0.000
                          0.000    0.000    0.005    0.085    0.004    0.131

  EVAPOTRANSPIRATION
  ------------------
    TOTALS                1.102    1.547    2.192    1.687    1.986    1.457
                          0.016    0.031    0.148    0.474    0.598    0.799

    STD. DEVIATIONS       0.191    0.219    0.543    0.691    0.569    0.876
                          0.042    0.092    0.309    0.607    0.383    0.278

  PERCOLATION/LEAKAGE THROUGH LAYER  2
  -------------------------------------
    TOTALS                0.0505   0.2929   0.5029   0.3191   0.1006
    0.0046
                          0.0000   0.0001   0.0001   0.0003   0.0005
                          0.0001

    STD. DEVIATIONS       0.2591   0.7231   0.9379   0.4998   0.1949
    0.0108
                          0.0000   0.0005   0.0006   0.0009   0.0012
                          0.0006


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

-----------------------------------------------------------------------------
--
                                     INCHES            CU. FEET       PERCENT
                                 -------------------   -------------
                                 ---------
 PRECIPITATION                    13.73    (   3.589)    4985733.0     100.00

 RUNOFF                            0.424   (  0.4968)     153779.17      3.084

 EVAPOTRANSPIRATION               12.039   (  2.0206)    4370071.00     87.652

 PERCOLATION/LEAKAGE THROUGH       1.27150 (  1.91754)    461554.625
 9.25751
   LAYER  2

 CHANGE IN WATER STORAGE           0.001   (  2.0266)        327.64      0.007
```

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                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ---------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     1.892       686634.6870

      PERCOLATION/LEAKAGE THROUGH LAYER  2       0.579392    210319.18700

      SNOW WATER                                 0.14         50934.3281

      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.3868

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.1350

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                    FINAL WATER STORAGE AT END OF YEAR  100
    ---------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1            5.9117         0.1642

                       2            8.6370         0.3599

                   SNOW WATER       0.000


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**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
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PRECIPITATION DATA FILE:    C:\HELP3\CAS_REQ1.D4
TEMPERATURE DATA FILE:      c:\HELP3\CAS_REQ1.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CAS_REQ1.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CAS_REQ1.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CAS_REQ1.D10
OUTPUT DATA FILE:           C:\HELP3\CAS_REQ1.OUT


TIME:   8:16     DATE:   4/20/2012




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     TITLE:  As Built Casmalia RCRA-Equivalent Mono Soil Slope 2:1 Fair Grass

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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  28
   THICKNESS                    =     60.00   INCHES
   POROSITY                     =      0.4520 VOL/VOL
   FIELD CAPACITY               =      0.4110 VOL/VOL
   WILTING POINT                =      0.3110 VOL/VOL
   INITIAL SOIL WATER CONTENT   =      0.3738 VOL/VOL
   EFFECTIVE SAT. HYD. COND.    =  0.120000004000E-05 CM/SEC
 NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
          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 #28 WITH A
          FAIR STAND OF GRASS, A SURFACE SLOPE OF 50.%
          AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER             =     90.70
FRACTION OF AREA ALLOWING RUNOFF    =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE  =    100.000  ACRES
EVAPORATIVE ZONE DEPTH              =     36.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE   =     12.565  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE  =     16.272  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE  =     11.196  INCHES
INITIAL SNOW WATER                  =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS    =     22.428  INCHES
TOTAL INITIAL WATER                 =     22.428  INCHES
TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR


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

 NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
          SANTA MARIA           CALIFORNIA

     STATION LATITUDE                       =  35.00 DEGREES
     MAXIMUM LEAF AREA INDEX                =   2.00
     START OF GROWING SEASON (JULIAN DATE)  =     85
     END OF GROWING SEASON (JULIAN DATE)    =    338
     EVAPORATIVE ZONE DEPTH                 =  36.0  INCHES
     AVERAGE ANNUAL WIND SPEED              =   7.00 MPH
     AVERAGE 1ST QUARTER RELATIVE HUMIDITY  =  73.00 %
     AVERAGE 2ND QUARTER RELATIVE HUMIDITY  =  74.00 %
     AVERAGE 3RD QUARTER RELATIVE HUMIDITY  =  76.00 %
     AVERAGE 4TH QUARTER RELATIVE HUMIDITY  =  70.00 %
```

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SAN DIEGO CALIFORNIA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 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	2.88	2.82	2.44	1.19	0.36	0.10
	0.01	0.03	0.18	0.75	1.09	1.89
STD. DEVIATIONS	1.87	2.33	1.56	0.82	0.35	0.15
	0.03	0.09	0.36	0.98	0.87	1.48
RUNOFF						
TOTALS	0.803	1.053	0.572	0.096	0.004	0.000
	0.000	0.000	0.007	0.110	0.042	0.355
STD. DEVIATIONS	1.001	1.459	0.719	0.178	0.016	0.000
	0.000	0.000	0.039	0.279	0.083	0.564
EVAPOTRANSPIRATION						

```
     TOTALS                 1.032    1.350    1.711    1.244    1.920    1.290
                            0.016    0.031    0.142    0.392    0.416    0.660

     STD. DEVIATIONS        0.255    0.333    0.605    0.563    0.441    0.571
                            0.041    0.092    0.289    0.487    0.311    0.326

   PERCOLATION/LEAKAGE THROUGH LAYER  1
   -------------------------------------
     TOTALS                 0.0062   0.0545   0.1555   0.1403   0.0948
     0.0382
                            0.0011   0.0000   0.0001   0.0002   0.0002
                            0.0001

     STD. DEVIATIONS        0.0359   0.1644   0.2820   0.2262   0.1344
     0.0590
                            0.0069   0.0002   0.0003   0.0004   0.0004
                            0.0003


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

-----------------------------------------------------------------------------
--
                                      INCHES            CU. FEET       PERCENT
                                 -------------------   -------------
                                 ---------
 PRECIPITATION                    13.73    (   3.589)    4985733.0     100.00

 RUNOFF                            3.041   (  1.8430)    1104039.00     22.144

 EVAPOTRANSPIRATION               10.204   (  1.6459)    3704131.75     74.295

 PERCOLATION/LEAKAGE THROUGH       0.49098 (  0.68404)    178226.453
 3.57473
   LAYER  1

 CHANGE IN WATER STORAGE          -0.002   (  1.3010)       -664.71     -0.013


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                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ---------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     3.830      1390238.2500

      PERCOLATION/LEAKAGE THROUGH LAYER  1       0.084613     30714.66600

      SNOW WATER                                 0.14         50934.3281

      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.4508

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.3110

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                    FINAL WATER STORAGE AT END OF YEAR  100
    -------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1           22.2449         0.3707

                   SNOW WATER       0.000


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**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
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PRECIPITATION DATA FILE:    C:\HELP3\CAS_REQ3.D4
TEMPERATURE DATA FILE:      c:\HELP3\CAS_REQ3.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CAS_REQ3.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CAS_REQ3.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CAS_REQ3.D10
OUTPUT DATA FILE:           C:\HELP3\CAS_REQ3.OUT


TIME:   8:20     DATE:   4/20/2012




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     TITLE:  Aged Casmalia RCRA-Equivalent Mono Soil Slope 2:1 Fair Grass

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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  14
   THICKNESS                    =     60.00   INCHES
   POROSITY                     =      0.4790 VOL/VOL
   FIELD CAPACITY               =      0.3710 VOL/VOL
   WILTING POINT                =      0.2510 VOL/VOL
   INITIAL SOIL WATER CONTENT   =      0.3176 VOL/VOL
   EFFECTIVE SAT. HYD. COND.    =  0.249999994000E-04 CM/SEC
 NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
          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 #14 WITH A
          FAIR STAND OF GRASS, A SURFACE SLOPE OF 50.%
          AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER             =     90.20
FRACTION OF AREA ALLOWING RUNOFF    =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE  =    100.000  ACRES
EVAPORATIVE ZONE DEPTH              =     36.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE   =     10.153  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE  =     17.244  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE  =      9.036  INCHES
INITIAL SNOW WATER                  =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS    =     19.056  INCHES
TOTAL INITIAL WATER                 =     19.056  INCHES
TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR


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

 NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
          SANTA MARIA           CALIFORNIA

     STATION LATITUDE                       =  35.00 DEGREES
     MAXIMUM LEAF AREA INDEX                =   2.00
     START OF GROWING SEASON (JULIAN DATE)  =     85
     END OF GROWING SEASON (JULIAN DATE)    =    338
     EVAPORATIVE ZONE DEPTH                 =  36.0  INCHES
     AVERAGE ANNUAL WIND SPEED              =   7.00 MPH
     AVERAGE 1ST QUARTER RELATIVE HUMIDITY  =  73.00 %
     AVERAGE 2ND QUARTER RELATIVE HUMIDITY  =  74.00 %
     AVERAGE 3RD QUARTER RELATIVE HUMIDITY  =  76.00 %
     AVERAGE 4TH QUARTER RELATIVE HUMIDITY  =  70.00 %
```

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SAN DIEGO CALIFORNIA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 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	2.88	2.82	2.44	1.19	0.36	0.10
	0.01	0.03	0.18	0.75	1.09	1.89
STD. DEVIATIONS	1.87	2.33	1.56	0.82	0.35	0.15
	0.03	0.09	0.36	0.98	0.87	1.48
RUNOFF						
TOTALS	0.400	0.630	0.254	0.036	0.001	0.000
	0.000	0.000	0.006	0.089	0.019	0.207
STD. DEVIATIONS	0.548	0.982	0.368	0.083	0.003	0.000
	0.000	0.000	0.035	0.237	0.045	0.379
EVAPOTRANSPIRATION						

```
     TOTALS                 1.155    1.614    2.208    1.638    1.887    0.791
                            0.017    0.031    0.143    0.448    0.565    0.806

     STD. DEVIATIONS        0.200    0.241    0.584    0.682    0.535    0.660
                            0.044    0.092    0.296    0.565    0.371    0.293

   PERCOLATION/LEAKAGE THROUGH LAYER  1
   -------------------------------------
     TOTALS                 0.0274   0.1669   0.3138   0.1902   0.0820
     0.0099
                            0.0003   0.0000   0.0001   0.0002   0.0002
                            0.0001

     STD. DEVIATIONS        0.1452   0.4323   0.5847   0.3280   0.1498
     0.0240
                            0.0028   0.0003   0.0003   0.0005   0.0006
                            0.0004


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

-----------------------------------------------------------------------------
--
                                      INCHES            CU. FEET       PERCENT
                                 -------------------   -------------
                                 ---------
 PRECIPITATION                    13.73    (   3.589)    4985733.0     100.00

 RUNOFF                            1.642   (  1.1770)     595869.87     11.951

 EVAPOTRANSPIRATION               11.305   (  1.9002)    4103549.00     82.306

 PERCOLATION/LEAKAGE THROUGH       0.79100 (  1.24930)    287134.344
 5.75912
   LAYER  1

 CHANGE IN WATER STORAGE          -0.002   (  1.6379)       -821.38     -0.016


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                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     3.137      1138905.2500

      PERCOLATION/LEAKAGE THROUGH LAYER  1       0.249681     90634.06250

      SNOW WATER                                 0.14         50934.3281

      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.4425

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.2510

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                    FINAL WATER STORAGE AT END OF YEAR  100
    -------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1           18.8294         0.3138

                   SNOW WATER       0.000


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**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
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PRECIPITATION DATA FILE:    C:\HELP3\CAS_REQ2.D4
TEMPERATURE DATA FILE:      c:\HELP3\CAS_REQ2.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CAS_REQ2.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CAS_REQ2.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CAS_REQ2.D10
OUTPUT DATA FILE:           C:\HELP3\CAS_REQ2.OUT


TIME:   8:18     DATE:   4/20/2012




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     TITLE:  As Built Casmalia RCRA-Equivalent Mono Soil Slope 3:1 Fair Grass

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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  28
   THICKNESS                    =     60.00   INCHES
   POROSITY                     =      0.4520 VOL/VOL
   FIELD CAPACITY               =      0.4110 VOL/VOL
   WILTING POINT                =      0.3110 VOL/VOL
   INITIAL SOIL WATER CONTENT   =      0.3738 VOL/VOL
   EFFECTIVE SAT. HYD. COND.    =  0.120000004000E-05 CM/SEC
 NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
          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 #28 WITH A
          FAIR STAND OF GRASS, A SURFACE SLOPE OF 33.%
          AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER             =     90.60
FRACTION OF AREA ALLOWING RUNOFF    =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE  =    100.000  ACRES
EVAPORATIVE ZONE DEPTH              =     36.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE   =     12.565  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE  =     16.272  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE  =     11.196  INCHES
INITIAL SNOW WATER                  =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS    =     22.428  INCHES
TOTAL INITIAL WATER                 =     22.428  INCHES
TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR


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

 NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
          SANTA MARIA           CALIFORNIA

     STATION LATITUDE                      =  35.00 DEGREES
     MAXIMUM LEAF AREA INDEX               =   2.00
     START OF GROWING SEASON (JULIAN DATE) =     85
     END OF GROWING SEASON (JULIAN DATE)   =    338
     EVAPORATIVE ZONE DEPTH                =  36.0  INCHES
     AVERAGE ANNUAL WIND SPEED             =   7.00 MPH
     AVERAGE 1ST QUARTER RELATIVE HUMIDITY =  73.00 %
     AVERAGE 2ND QUARTER RELATIVE HUMIDITY =  74.00 %
     AVERAGE 3RD QUARTER RELATIVE HUMIDITY =  76.00 %
     AVERAGE 4TH QUARTER RELATIVE HUMIDITY =  70.00 %
```

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SAN DIEGO CALIFORNIA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 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	2.88	2.82	2.44	1.19	0.36	0.10
	0.01	0.03	0.18	0.75	1.09	1.89
STD. DEVIATIONS	1.87	2.33	1.56	0.82	0.35	0.15
	0.03	0.09	0.36	0.98	0.87	1.48
RUNOFF						
TOTALS	0.796	1.047	0.568	0.095	0.004	0.000
	0.000	0.000	0.007	0.108	0.041	0.351
STD. DEVIATIONS	0.998	1.455	0.715	0.176	0.016	0.000
	0.000	0.000	0.038	0.277	0.081	0.560
EVAPOTRANSPIRATION						

```
     TOTALS                 1.034    1.355    1.710    1.243    1.928    1.294
                            0.016    0.031    0.142    0.390    0.416    0.659

     STD. DEVIATIONS        0.257    0.330    0.605    0.564    0.454    0.576
                            0.041    0.092    0.289    0.487    0.313    0.330

   PERCOLATION/LEAKAGE THROUGH LAYER  1
   -------------------------------------
     TOTALS                 0.0069   0.0573   0.1574   0.1425   0.0971
     0.0354
                            0.0004   0.0000   0.0000   0.0002   0.0002
                            0.0001

     STD. DEVIATIONS        0.0396   0.1678   0.2853   0.2271   0.1346
     0.0568
                            0.0030   0.0001   0.0002   0.0004   0.0004
                            0.0003


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

-----------------------------------------------------------------------------
--
                                      INCHES            CU. FEET       PERCENT
                                 -------------------   -------------
                                 ---------
 PRECIPITATION                    13.73    (   3.589)    4985733.0     100.00

 RUNOFF                            3.016   (  1.8354)    1094934.87     21.961

 EVAPOTRANSPIRATION               10.219   (  1.6572)    3709328.75     74.399

 PERCOLATION/LEAKAGE THROUGH       0.49742 (  0.68909)    180564.250
 3.62162
   LAYER  1

 CHANGE IN WATER STORAGE           0.002   (  1.3044)        904.23      0.018


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                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ---------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     3.823      1387741.6200

      PERCOLATION/LEAKAGE THROUGH LAYER  1       0.086283     31320.79690

      SNOW WATER                                 0.14         50934.3281

      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.4509

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.3110

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                    FINAL WATER STORAGE AT END OF YEAR  100
    -------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1           22.6770         0.3779

                   SNOW WATER       0.000


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**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
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PRECIPITATION DATA FILE:    C:\HELP3\CAS_REQ4.D4
TEMPERATURE DATA FILE:      c:\HELP3\CAS_REQ4.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CAS_REQ4.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CAS_REQ4.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CAS_REQ4.D10
OUTPUT DATA FILE:           C:\HELP3\CAS_REQ4.OUT



TIME:   8:22     DATE:   4/20/2012




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     TITLE:  Aged Casmalia RCRA-Equivalent Mono Soil Slope 3:1 Fair Grass

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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  14
   THICKNESS                    =     60.00   INCHES
   POROSITY                     =      0.4790 VOL/VOL
   FIELD CAPACITY               =      0.3710 VOL/VOL
   WILTING POINT                =      0.2510 VOL/VOL
   INITIAL SOIL WATER CONTENT   =      0.3176 VOL/VOL
   EFFECTIVE SAT. HYD. COND.    =  0.249999994000E-04 CM/SEC
 NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
          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 #14 WITH A
          FAIR STAND OF GRASS, A SURFACE SLOPE OF 33.%
          AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER             =     90.10
FRACTION OF AREA ALLOWING RUNOFF    =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE  =    100.000  ACRES
EVAPORATIVE ZONE DEPTH              =     36.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE   =     10.156  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE  =     17.244  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE  =      9.036  INCHES
INITIAL SNOW WATER                  =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS    =     19.058  INCHES
TOTAL INITIAL WATER                 =     19.058  INCHES
TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR


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

 NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
          SANTA MARIA           CALIFORNIA

     STATION LATITUDE                       =  35.00 DEGREES
     MAXIMUM LEAF AREA INDEX                =   2.00
     START OF GROWING SEASON (JULIAN DATE)  =     85
     END OF GROWING SEASON (JULIAN DATE)    =    338
     EVAPORATIVE ZONE DEPTH                 =  36.0  INCHES
     AVERAGE ANNUAL WIND SPEED              =   7.00 MPH
     AVERAGE 1ST QUARTER RELATIVE HUMIDITY  =  73.00 %
     AVERAGE 2ND QUARTER RELATIVE HUMIDITY  =  74.00 %
     AVERAGE 3RD QUARTER RELATIVE HUMIDITY  =  76.00 %
     AVERAGE 4TH QUARTER RELATIVE HUMIDITY  =  70.00 %
```

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SAN DIEGO CALIFORNIA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 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	2.88	2.82	2.44	1.19	0.36	0.10
	0.01	0.03	0.18	0.75	1.09	1.89
STD. DEVIATIONS	1.87	2.33	1.56	0.82	0.35	0.15
	0.03	0.09	0.36	0.98	0.87	1.48
RUNOFF						
TOTALS	0.394	0.623	0.249	0.035	0.001	0.000
	0.000	0.000	0.006	0.087	0.018	0.203
STD. DEVIATIONS	0.541	0.975	0.363	0.082	0.003	0.000
	0.000	0.000	0.034	0.233	0.044	0.374
EVAPOTRANSPIRATION						

```
     TOTALS                 1.156    1.620    2.206    1.635    1.896    0.792
                            0.017    0.031    0.143    0.456    0.564    0.806

     STD. DEVIATIONS        0.203    0.242    0.588    0.681    0.551    0.667
                            0.045    0.092    0.297    0.577    0.371    0.294

   PERCOLATION/LEAKAGE THROUGH LAYER  1
   -------------------------------------
     TOTALS                 0.0286   0.1700   0.3179   0.1914   0.0810
     0.0095
                            0.0000   0.0000   0.0001   0.0002   0.0002
                            0.0001

     STD. DEVIATIONS        0.1523   0.4378   0.5914   0.3286   0.1506
     0.0229
                            0.0003   0.0003   0.0004   0.0005   0.0006
                            0.0004


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

-----------------------------------------------------------------------------
--
                                      INCHES            CU. FEET       PERCENT
                                 -------------------   -------------
                                 ---------
 PRECIPITATION                    13.73    (   3.589)    4985733.0     100.00

 RUNOFF                            1.616   (  1.1658)     586737.81     11.768

 EVAPOTRANSPIRATION               11.322   (  1.9071)    4109759.25     82.430

 PERCOLATION/LEAKAGE THROUGH       0.79907 (  1.26174)    290063.219
 5.81786
   LAYER  1

 CHANGE IN WATER STORAGE          -0.002   (  1.6463)       -827.57     -0.017


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                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ----------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     3.125      1134309.2500

      PERCOLATION/LEAKAGE THROUGH LAYER  1       0.254260     92296.41410

      SNOW WATER                                 0.14         50934.3281

      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.4427

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.2510

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                    FINAL WATER STORAGE AT END OF YEAR  100
    -------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1           18.8303         0.3138

                   SNOW WATER       0.000


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**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
**
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PRECIPITATION DATA FILE:    C:\HELP3\CAS_RHY1.D4
TEMPERATURE DATA FILE:      c:\HELP3\CAS_RHY1.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CAS_RHY1.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CAS_RHY1.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CAS_RHY1.D10
OUTPUT DATA FILE:           C:\HELP3\CAS_RHY1.OUT


TIME:  21:34     DATE:   4/23/2012




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     TITLE:  As Built Casmalia RCRA Equivalent Hybrid Cap 2:1 Slope

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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   9
  THICKNESS                   =     24.00   INCHES
  POROSITY                    =      0.5010 VOL/VOL
  FIELD CAPACITY              =      0.2840 VOL/VOL
  WILTING POINT               =      0.1350 VOL/VOL
  INITIAL SOIL WATER CONTENT  =      0.1726 VOL/VOL
  EFFECTIVE SAT. HYD. COND.   =  0.190000006000E-03 CM/SEC
NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
         FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.


                         LAYER  2
                         --------

            TYPE 2 - LATERAL DRAINAGE LAYER
              MATERIAL TEXTURE NUMBER  34
  THICKNESS                   =      0.06   INCHES
  POROSITY                    =      0.8500 VOL/VOL
  FIELD CAPACITY              =      0.0100 VOL/VOL
  WILTING POINT               =      0.0050 VOL/VOL
  INITIAL SOIL WATER CONTENT  =      0.0103 VOL/VOL
  EFFECTIVE SAT. HYD. COND.   =   33.0000000000     CM/SEC
  SLOPE                       =     50.00   PERCENT
  DRAINAGE LENGTH             =    500.0    FEET


                         LAYER  3
                         --------

            TYPE 4 - FLEXIBLE MEMBRANE LINER
              MATERIAL TEXTURE NUMBER  35
  THICKNESS                   =      0.04   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.   =  0.199999996000E-12 CM/SEC
  FML PINHOLE DENSITY         =      1.00   HOLES/ACRE
  FML INSTALLATION DEFECTS    =      4.00   HOLES/ACRE
  FML PLACEMENT QUALITY       =  3 - GOOD


                         LAYER  4
                         --------

              TYPE 1 - VERTICAL PERCOLATION LAYER
                  MATERIAL TEXTURE NUMBER  23
  THICKNESS                   =     24.00   INCHES
  POROSITY                    =      0.4610 VOL/VOL
  FIELD CAPACITY              =      0.3600 VOL/VOL
```

```
WILTING POINT                =      0.2030 VOL/VOL
INITIAL SOIL WATER CONTENT   =      0.3599 VOL/VOL
EFFECTIVE SAT. HYD. COND.    =  0.900000032000E-05 CM/SEC
```

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

```
NOTE:  SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT
         SOIL DATA BASE USING SOIL TEXTURE # 9 WITH A
         FAIR STAND OF GRASS, A SURFACE SLOPE OF 50.%
         AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER             =     82.70
FRACTION OF AREA ALLOWING RUNOFF    =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE  =    100.000  ACRES
EVAPORATIVE ZONE DEPTH              =     24.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE   =      4.142  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE  =     12.024  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE  =      3.240  INCHES
INITIAL SNOW WATER                  =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS    =     12.779  INCHES
TOTAL INITIAL WATER                 =     12.779  INCHES
TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR
```

EVAPOTRANSPIRATION AND WEATHER DATA

```
NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
         SANTA MARIA          CALIFORNIA

    STATION LATITUDE                       =  35.00 DEGREES
    MAXIMUM LEAF AREA INDEX                =   2.00
    START OF GROWING SEASON (JULIAN DATE)  =     85
    END OF GROWING SEASON (JULIAN DATE)    =    338
    EVAPORATIVE ZONE DEPTH                 =  24.0  INCHES
    AVERAGE ANNUAL WIND SPEED              =   7.00 MPH
    AVERAGE 1ST QUARTER RELATIVE HUMIDITY  =  73.00 %
    AVERAGE 2ND QUARTER RELATIVE HUMIDITY  =  74.00 %
    AVERAGE 3RD QUARTER RELATIVE HUMIDITY  =  76.00 %
    AVERAGE 4TH QUARTER RELATIVE HUMIDITY  =  70.00 %
```

```
NOTE:  PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
         COEFFICIENTS FOR    SAN DIEGO           CALIFORNIA

         NORMAL MEAN MONTHLY PRECIPITATION (INCHES)
```

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 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	2.88	2.82	2.44	1.19	0.36	0.10
	0.01	0.03	0.18	0.75	1.09	1.89
STD. DEVIATIONS	1.87	2.33	1.56	0.82	0.35	0.15
	0.03	0.09	0.36	0.98	0.87	1.48
RUNOFF						
TOTALS	0.099	0.216	0.048	0.003	0.000	0.000
	0.000	0.000	0.001	0.025	0.001	0.055
STD. DEVIATIONS	0.188	0.473	0.128	0.017	0.000	0.000
	0.000	0.000	0.005	0.092	0.005	0.138
EVAPOTRANSPIRATION						
TOTALS	1.102	1.530	2.090	1.577	0.990	0.194
	0.020	0.029	0.139	0.459	0.622	0.819
STD. DEVIATIONS	0.225	0.308	0.624	0.692	0.705	0.259
	0.048	0.087	0.292	0.563	0.388	0.298
LATERAL DRAINAGE COLLECTED FROM LAYER 2						
TOTALS	0.9748	1.0850	0.7757	0.1665	0.0678	
0.0152						
	0.0017	0.0011	0.0075	0.0817	0.1007	
	0.4474					

```
    STD. DEVIATIONS        0.9745   1.0086   0.8439   0.2052   0.0773
    0.0327
                           0.0073   0.0034   0.0192   0.2087   0.2190
                           0.6384

  PERCOLATION/LEAKAGE THROUGH LAYER  3
  -------------------------------------
    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  4
  -------------------------------------
    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


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

-----------------------------------------------------------------------------
--


  DAILY AVERAGE HEAD ON TOP OF LAYER  3
  -------------------------------------
    AVERAGES               0.0002   0.0003   0.0002   0.0000   0.0000
    0.0000
                           0.0000   0.0000   0.0000   0.0000   0.0000
                           0.0001

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


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

 ---------------------------------------------------------------------------
 --
                                       INCHES            CU. FEET       PERCENT
                                 -------------------   -------------
                                 ---------
  PRECIPITATION                   13.73    (   3.589)    4985733.0     100.00

  RUNOFF                           0.446   (  0.5107)     162036.97      3.250

  EVAPOTRANSPIRATION               9.571   (  1.9351)    3474323.50     69.685

  LATERAL DRAINAGE COLLECTED       3.72510 (  1.89866)   1352212.370   27.12164
    FROM LAYER  2

  PERCOLATION/LEAKAGE THROUGH      0.00000 (  0.00000)         1.659
  0.00003
    LAYER  3

  AVERAGE HEAD ON TOP              0.000 (    0.000)
    OF LAYER  3

  PERCOLATION/LEAKAGE THROUGH      0.00000 (  0.00000)         0.000
  0.00000
    LAYER  4

  CHANGE IN WATER STORAGE         -0.008   (  1.1434)      -2839.94     -0.057


 ***************************************************************************
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                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ---------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     2.014       731064.2500

      DRAINAGE COLLECTED FROM LAYER  2           1.34975     489959.40600

      PERCOLATION/LEAKAGE THROUGH LAYER  3       0.000001         0.38822

      AVERAGE HEAD ON TOP OF LAYER  3            0.009

      MAXIMUM HEAD ON TOP OF LAYER  3            0.265

      LOCATION OF MAXIMUM HEAD IN LAYER  2
            (DISTANCE FROM DRAIN)                0.0 FEET

      PERCOLATION/LEAKAGE THROUGH LAYER  4       0.000000         0.00000

      SNOW WATER                                 0.14         50934.3281


      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.4019

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.1350

       ***  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.


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                    FINAL WATER STORAGE AT END OF YEAR  100
    ---------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1            3.3590         0.1400

                       2            0.0006         0.0100

                       3            0.0000         0.0000

                       4            8.6372         0.3599

                   SNOW WATER       0.000

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**
**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
**
**
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PRECIPITATION DATA FILE:    C:\HELP3\CAS_RHY3.D4
TEMPERATURE DATA FILE:      C:\HELP3\CAS_RHY3.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CAS_RHY3.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CAS_RHY3.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CAS_RHY3.D10
OUTPUT DATA FILE:           C:\HELP3\CAS_RHY3.OUT



TIME:  15: 0     DATE:   4/22/2012




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     TITLE:  Aged Casmalia RCRA Equivalent Hybrid Cap 2:1 Slope

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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   5
  THICKNESS                   =     24.00   INCHES
  POROSITY                    =      0.4570 VOL/VOL
  FIELD CAPACITY              =      0.1310 VOL/VOL
  WILTING POINT               =      0.0580 VOL/VOL
  INITIAL SOIL WATER CONTENT  =      0.0811 VOL/VOL
  EFFECTIVE SAT. HYD. COND.   =  0.100000005000E-02 CM/SEC
NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
         FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.


                         LAYER  2
                         --------

              TYPE 2 - LATERAL DRAINAGE LAYER
                MATERIAL TEXTURE NUMBER  34
  THICKNESS                   =      0.06   INCHES
  POROSITY                    =      0.8500 VOL/VOL
  FIELD CAPACITY              =      0.0100 VOL/VOL
  WILTING POINT               =      0.0050 VOL/VOL
  INITIAL SOIL WATER CONTENT  =      0.0109 VOL/VOL
  EFFECTIVE SAT. HYD. COND.   =   33.0000000000     CM/SEC
  SLOPE                       =     50.00   PERCENT
  DRAINAGE LENGTH             =    500.0    FEET


                         LAYER  3
                         --------

              TYPE 4 - FLEXIBLE MEMBRANE LINER
                MATERIAL TEXTURE NUMBER  35
  THICKNESS                   =      0.04   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.   =  0.199999996000E-12 CM/SEC
  FML PINHOLE DENSITY         =      1.00   HOLES/ACRE
  FML INSTALLATION DEFECTS    =      4.00   HOLES/ACRE
  FML PLACEMENT QUALITY       =  3 - GOOD


                         LAYER  4
                         --------

            TYPE 1 - VERTICAL PERCOLATION LAYER
                MATERIAL TEXTURE NUMBER  23
  THICKNESS                   =     24.00   INCHES
  POROSITY                    =      0.4610 VOL/VOL
  FIELD CAPACITY              =      0.3600 VOL/VOL
```

```
WILTING POINT                =      0.2030 VOL/VOL
INITIAL SOIL WATER CONTENT   =      0.3599 VOL/VOL
EFFECTIVE SAT. HYD. COND.    =  0.900000032000E-05 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
         FAIR STAND OF GRASS, A SURFACE SLOPE OF 50.%
         AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER             =     66.60
FRACTION OF AREA ALLOWING RUNOFF    =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE  =    100.000  ACRES
EVAPORATIVE ZONE DEPTH              =     24.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE   =      1.946  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE  =     10.968  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE  =      1.392  INCHES
INITIAL SNOW WATER                  =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS    =     10.583  INCHES
TOTAL INITIAL WATER                 =     10.583  INCHES
TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR
```

EVAPOTRANSPIRATION AND WEATHER DATA

```
NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
         SANTA MARIA          CALIFORNIA

    STATION LATITUDE                       =  35.00 DEGREES
    MAXIMUM LEAF AREA INDEX                =   2.00
    START OF GROWING SEASON (JULIAN DATE)  =     85
    END OF GROWING SEASON (JULIAN DATE)    =    338
    EVAPORATIVE ZONE DEPTH                 =  24.0  INCHES
    AVERAGE ANNUAL WIND SPEED              =   7.00 MPH
    AVERAGE 1ST QUARTER RELATIVE HUMIDITY  =  73.00 %
    AVERAGE 2ND QUARTER RELATIVE HUMIDITY  =  74.00 %
    AVERAGE 3RD QUARTER RELATIVE HUMIDITY  =  76.00 %
    AVERAGE 4TH QUARTER RELATIVE HUMIDITY  =  70.00 %

NOTE:  PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
         COEFFICIENTS FOR    SAN DIEGO          CALIFORNIA

         NORMAL MEAN MONTHLY PRECIPITATION (INCHES)
```

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 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	2.88	2.82	2.44	1.19	0.36	0.10
	0.01	0.03	0.18	0.75	1.09	1.89
STD. DEVIATIONS	1.87	2.33	1.56	0.82	0.35	0.15
	0.03	0.09	0.36	0.98	0.87	1.48
RUNOFF						
TOTALS	0.000	0.007	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.001
STD. DEVIATIONS	0.001	0.035	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.002	0.000	0.004
EVAPOTRANSPIRATION						
TOTALS	0.152	0.170	0.191	0.148	0.062	0.022
	0.007	0.012	0.022	0.055	0.077	0.101
STD. DEVIATIONS	0.098	0.196	0.125	0.109	0.053	0.024
	0.008	0.017	0.039	0.062	0.062	0.083
LATERAL DRAINAGE COLLECTED FROM LAYER 2						
TOTALS	2.6692	2.6664	2.2996	1.0382	0.4008	
0.1302						
	0.0517	0.0358	0.1296	0.6155	0.9162	
	1.7552					

```
    STD. DEVIATIONS        1.7489   2.0679   1.4295   0.6841   0.2948
    0.1214
                           0.0403   0.0581   0.2706   0.8727   0.7747
                           1.3206

  PERCOLATION/LEAKAGE THROUGH LAYER  3
  -------------------------------------
    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  4
  -------------------------------------
    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


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

-----------------------------------------------------------------------------
--


  DAILY AVERAGE HEAD ON TOP OF LAYER  3
  -------------------------------------
    AVERAGES               0.0006   0.0006   0.0005   0.0002   0.0001
    0.0000
                           0.0000   0.0000   0.0000   0.0001   0.0002
                           0.0004

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


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

 ------------------------------------------------------------------------------
 --
                                       INCHES            CU. FEET       PERCENT
                                 -------------------   -------------
                                 ---------
  PRECIPITATION                   13.73    (   3.589)    4985733.0     100.00

  RUNOFF                           0.008   (  0.0355)       2941.45      0.059

  EVAPOTRANSPIRATION               1.019   (  0.2924)     369787.44      7.417

  LATERAL DRAINAGE COLLECTED      12.70837 (  3.36143)   4613138.000   92.52677
    FROM LAYER  2

  PERCOLATION/LEAKAGE THROUGH      0.00001 (  0.00000)         5.223
  0.00010
    LAYER  3

  AVERAGE HEAD ON TOP              0.000 (    0.000)
    OF LAYER  3

  PERCOLATION/LEAKAGE THROUGH      0.00000 (  0.00000)         0.000
  0.00000
    LAYER  4

  CHANGE IN WATER STORAGE          0.000   (  0.2329)       -134.48     -0.003


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                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     0.255        92630.8828

      DRAINAGE COLLECTED FROM LAYER  2           3.74165    1358218.37000

      PERCOLATION/LEAKAGE THROUGH LAYER  3       0.000003         0.94250

      AVERAGE HEAD ON TOP OF LAYER  3            0.025

      MAXIMUM HEAD ON TOP OF LAYER  3            0.040

      LOCATION OF MAXIMUM HEAD IN LAYER  2
            (DISTANCE FROM DRAIN)                0.0 FEET

      PERCOLATION/LEAKAGE THROUGH LAYER  4       0.000000         0.00000

      SNOW WATER                                 0.14         50934.3281


      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.2027

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.0701

       ***  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.


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                    FINAL WATER STORAGE AT END OF YEAR  100
    -------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1            1.9073         0.0795

                       2            0.0006         0.0107

                       3            0.0000         0.0000

                       4            8.6381         0.3599

                   SNOW WATER       0.000

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**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
**
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PRECIPITATION DATA FILE:    C:\HELP3\CAS_RHY2.D4
TEMPERATURE DATA FILE:      c:\HELP3\CAS_RHY2.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CAS_RHY2.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CAS_RHY2.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CAS_RHY2.D10
OUTPUT DATA FILE:           C:\HELP3\CAS_RHY2.OUT



TIME:  21:38     DATE:   4/23/2012




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     TITLE:  As Built Casmalia RCRA Equivalent Hybrid Cap 3:1 Slope

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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   9
  THICKNESS                   =     24.00   INCHES
  POROSITY                    =      0.5010 VOL/VOL
  FIELD CAPACITY              =      0.2840 VOL/VOL
  WILTING POINT               =      0.1350 VOL/VOL
  INITIAL SOIL WATER CONTENT  =      0.1727 VOL/VOL
  EFFECTIVE SAT. HYD. COND.   =  0.190000006000E-03 CM/SEC
NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
         FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.


                         LAYER  2
                         --------

              TYPE 2 - LATERAL DRAINAGE LAYER
                MATERIAL TEXTURE NUMBER  34
  THICKNESS                   =      0.06   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.   =   33.0000000000     CM/SEC
  SLOPE                       =     33.00   PERCENT
  DRAINAGE LENGTH             =    500.0    FEET


                         LAYER  3
                         --------

              TYPE 4 - FLEXIBLE MEMBRANE LINER
                MATERIAL TEXTURE NUMBER  35
  THICKNESS                   =      0.04   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.   =  0.199999996000E-12 CM/SEC
  FML PINHOLE DENSITY         =      1.00   HOLES/ACRE
  FML INSTALLATION DEFECTS    =      4.00   HOLES/ACRE
  FML PLACEMENT QUALITY       =  3 - GOOD


                         LAYER  4
                         --------

            TYPE 1 - VERTICAL PERCOLATION LAYER
                MATERIAL TEXTURE NUMBER  23
  THICKNESS                   =     24.00   INCHES
  POROSITY                    =      0.4610 VOL/VOL
  FIELD CAPACITY              =      0.3600 VOL/VOL
```

```
WILTING POINT               =      0.2030 VOL/VOL
INITIAL SOIL WATER CONTENT  =      0.3599 VOL/VOL
EFFECTIVE SAT. HYD. COND.   =  0.900000032000E-05 CM/SEC
```

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

```
NOTE:  SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT
         SOIL DATA BASE USING SOIL TEXTURE # 9 WITH A
         FAIR STAND OF GRASS, A SURFACE SLOPE OF 33.%
         AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER             =     82.50
FRACTION OF AREA ALLOWING RUNOFF    =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE  =    100.000  ACRES
EVAPORATIVE ZONE DEPTH              =     24.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE   =      4.144  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE  =     12.024  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE  =      3.240  INCHES
INITIAL SNOW WATER                  =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS    =     12.781  INCHES
TOTAL INITIAL WATER                 =     12.781  INCHES
TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR
```

EVAPOTRANSPIRATION AND WEATHER DATA

```
NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
         SANTA MARIA          CALIFORNIA

    STATION LATITUDE                       =  35.00 DEGREES
    MAXIMUM LEAF AREA INDEX                =   2.00
    START OF GROWING SEASON (JULIAN DATE)  =     85
    END OF GROWING SEASON (JULIAN DATE)    =    338
    EVAPORATIVE ZONE DEPTH                 =  24.0  INCHES
    AVERAGE ANNUAL WIND SPEED              =   7.00 MPH
    AVERAGE 1ST QUARTER RELATIVE HUMIDITY  =  73.00 %
    AVERAGE 2ND QUARTER RELATIVE HUMIDITY  =  74.00 %
    AVERAGE 3RD QUARTER RELATIVE HUMIDITY  =  76.00 %
    AVERAGE 4TH QUARTER RELATIVE HUMIDITY  =  70.00 %

NOTE:  PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
         COEFFICIENTS FOR    SAN DIEGO           CALIFORNIA

         NORMAL MEAN MONTHLY PRECIPITATION (INCHES)
```

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 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	2.88	2.82	2.44	1.19	0.36	0.10
	0.01	0.03	0.18	0.75	1.09	1.89
STD. DEVIATIONS	1.87	2.33	1.56	0.82	0.35	0.15
	0.03	0.09	0.36	0.98	0.87	1.48
RUNOFF						
TOTALS	0.098	0.222	0.048	0.003	0.000	0.000
	0.000	0.000	0.001	0.024	0.001	0.053
STD. DEVIATIONS	0.189	0.490	0.125	0.016	0.000	0.000
	0.000	0.000	0.004	0.090	0.005	0.136
EVAPOTRANSPIRATION						
TOTALS	1.227	1.718	2.219	1.606	1.558	0.349
	0.017	0.031	0.139	0.486	0.624	0.895
STD. DEVIATIONS	0.265	0.316	0.705	0.691	0.653	0.385
	0.043	0.090	0.292	0.625	0.412	0.338
LATERAL DRAINAGE COLLECTED FROM LAYER 2						
TOTALS	0.5755	0.8394	0.5303	0.0873	0.0475	
0.0128						
	0.0005	0.0004	0.0042	0.0341	0.0613	
	0.2286					

```
    STD. DEVIATIONS        0.7695   1.0706   0.7738   0.1738   0.0713
    0.0265
                           0.0016   0.0017   0.0174   0.0774   0.1311
                           0.3340

  PERCOLATION/LEAKAGE THROUGH LAYER  3
  -------------------------------------
    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  4
  -------------------------------------
    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


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

-----------------------------------------------------------------------------
--


  DAILY AVERAGE HEAD ON TOP OF LAYER  3
  -------------------------------------
    AVERAGES               0.0002   0.0003   0.0002   0.0000   0.0000
    0.0000
                           0.0000   0.0000   0.0000   0.0000   0.0000
                           0.0001

    STD. DEVIATIONS        0.0002   0.0003   0.0002   0.0001   0.0000
    0.0000
                           0.0000   0.0000   0.0000   0.0000   0.0000
                           0.0001


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



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```

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

 ---------------------------------------------------------------------------
 --
                                       INCHES            CU. FEET       PERCENT
                                 -------------------   -------------
                                 ---------
  PRECIPITATION                   13.73    (   3.589)    4985733.0     100.00

  RUNOFF                           0.449   (  0.5246)     162952.70      3.268

  EVAPOTRANSPIRATION              10.869   (  1.9765)    3945320.75     79.132

  LATERAL DRAINAGE COLLECTED       2.42189 (  1.78625)    879145.562   17.63322
    FROM LAYER  2

  PERCOLATION/LEAKAGE THROUGH      0.00000 (  0.00000)         1.379
  0.00003
    LAYER  3

  AVERAGE HEAD ON TOP              0.000 (    0.000)
    OF LAYER  3

  PERCOLATION/LEAKAGE THROUGH      0.00000 (  0.00000)         0.000
  0.00000
    LAYER  4

  CHANGE IN WATER STORAGE         -0.005   (  1.4595)      -1686.93     -0.034


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                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     1.973       716274.6870

      DRAINAGE COLLECTED FROM LAYER  2           1.15873     420618.40600

      PERCOLATION/LEAKAGE THROUGH LAYER  3       0.000001         0.43017

      AVERAGE HEAD ON TOP OF LAYER  3            0.010

      MAXIMUM HEAD ON TOP OF LAYER  3            0.186

      LOCATION OF MAXIMUM HEAD IN LAYER  2
            (DISTANCE FROM DRAIN)                0.0 FEET

      PERCOLATION/LEAKAGE THROUGH LAYER  4       0.000000         0.00000

      SNOW WATER                                 0.14         50934.3281


      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.4174

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.1350

       ***  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.


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                    FINAL WATER STORAGE AT END OF YEAR  100
    -------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1            3.6788         0.1533

                       2            0.0006         0.0101

                       3            0.0000         0.0000

                       4            8.6371         0.3599

                   SNOW WATER       0.000

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**
**
**
**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
**
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PRECIPITATION DATA FILE:    C:\HELP3\CAS_RHY4.D4
TEMPERATURE DATA FILE:      C:\HELP3\CAS_RHY4.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CAS_RHY4.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CAS_RHY4.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CAS_RHY4.D10
OUTPUT DATA FILE:           C:\HELP3\CAS_RHY4.OUT



TIME:  15:11     DATE:   4/22/2012




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     TITLE:  Aged Casmalia RCRA Equivalent Hybrid Cap 3:1 Slope

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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   5
  THICKNESS                   =     24.00   INCHES
  POROSITY                    =      0.4570 VOL/VOL
  FIELD CAPACITY              =      0.1310 VOL/VOL
  WILTING POINT               =      0.0580 VOL/VOL
  INITIAL SOIL WATER CONTENT  =      0.0819 VOL/VOL
  EFFECTIVE SAT. HYD. COND.   =  0.100000005000E-02 CM/SEC
NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
         FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.


                         LAYER  2
                         --------

              TYPE 2 - LATERAL DRAINAGE LAYER
                MATERIAL TEXTURE NUMBER  34
  THICKNESS                   =      0.06   INCHES
  POROSITY                    =      0.8500 VOL/VOL
  FIELD CAPACITY              =      0.0100 VOL/VOL
  WILTING POINT               =      0.0050 VOL/VOL
  INITIAL SOIL WATER CONTENT  =      0.0121 VOL/VOL
  EFFECTIVE SAT. HYD. COND.   =   33.0000000000     CM/SEC
  SLOPE                       =     33.00   PERCENT
  DRAINAGE LENGTH             =    500.0    FEET


                         LAYER  3
                         --------

              TYPE 4 - FLEXIBLE MEMBRANE LINER
                MATERIAL TEXTURE NUMBER  35
  THICKNESS                   =      0.04   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.   =  0.199999996000E-12 CM/SEC
  FML PINHOLE DENSITY         =      1.00   HOLES/ACRE
  FML INSTALLATION DEFECTS    =      4.00   HOLES/ACRE
  FML PLACEMENT QUALITY       =  3 - GOOD


                         LAYER  4
                         --------

            TYPE 1 - VERTICAL PERCOLATION LAYER
                MATERIAL TEXTURE NUMBER  23
  THICKNESS                   =     24.00   INCHES
  POROSITY                    =      0.4610 VOL/VOL
  FIELD CAPACITY              =      0.3600 VOL/VOL
```

```
WILTING POINT                =      0.2030 VOL/VOL
INITIAL SOIL WATER CONTENT   =      0.3599 VOL/VOL
EFFECTIVE SAT. HYD. COND.    =  0.900000032000E-05 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
         FAIR STAND OF GRASS, A SURFACE SLOPE OF 33.%
         AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER             =     66.20
FRACTION OF AREA ALLOWING RUNOFF    =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE  =    100.000  ACRES
EVAPORATIVE ZONE DEPTH              =     24.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE   =      1.966  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE  =     10.968  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE  =      1.392  INCHES
INITIAL SNOW WATER                  =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS    =     10.603  INCHES
TOTAL INITIAL WATER                 =     10.603  INCHES
TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR
```

EVAPOTRANSPIRATION AND WEATHER DATA

```
NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
         SANTA MARIA          CALIFORNIA

    STATION LATITUDE                       =  35.00 DEGREES
    MAXIMUM LEAF AREA INDEX                =   2.00
    START OF GROWING SEASON (JULIAN DATE)  =     85
    END OF GROWING SEASON (JULIAN DATE)    =    338
    EVAPORATIVE ZONE DEPTH                 =  24.0  INCHES
    AVERAGE ANNUAL WIND SPEED              =   7.00 MPH
    AVERAGE 1ST QUARTER RELATIVE HUMIDITY  =  73.00 %
    AVERAGE 2ND QUARTER RELATIVE HUMIDITY  =  74.00 %
    AVERAGE 3RD QUARTER RELATIVE HUMIDITY  =  76.00 %
    AVERAGE 4TH QUARTER RELATIVE HUMIDITY  =  70.00 %

NOTE:  PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
         COEFFICIENTS FOR    SAN DIEGO           CALIFORNIA

         NORMAL MEAN MONTHLY PRECIPITATION (INCHES)
```

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 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	2.88	2.82	2.44	1.19	0.36	0.10
	0.01	0.03	0.18	0.75	1.09	1.89
STD. DEVIATIONS	1.87	2.33	1.56	0.82	0.35	0.15
	0.03	0.09	0.36	0.98	0.87	1.48
RUNOFF						
TOTALS	0.000	0.007	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATIONS	0.001	0.035	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.002	0.000	0.004
EVAPOTRANSPIRATION						
TOTALS	0.213	0.289	0.332	0.175	0.088	0.028
	0.009	0.013	0.029	0.069	0.099	0.138
STD. DEVIATIONS	0.180	0.352	0.405	0.131	0.146	0.039
	0.015	0.020	0.060	0.087	0.080	0.129
LATERAL DRAINAGE COLLECTED FROM LAYER 2						
TOTALS	2.5661	2.4635	2.2477	1.0300	0.3965	
0.1274						
	0.0502	0.0342	0.1196	0.5961	0.8883	
	1.7259					

```
    STD. DEVIATIONS        1.6440   1.7864   1.4012   0.6762   0.2833
    0.1222
                           0.0413   0.0548   0.2469   0.8366   0.7553
                           1.3065

  PERCOLATION/LEAKAGE THROUGH LAYER  3
  -------------------------------------
    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  4
  -------------------------------------
    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


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

-----------------------------------------------------------------------------
--


  DAILY AVERAGE HEAD ON TOP OF LAYER  3
  -------------------------------------
    AVERAGES               0.0007   0.0008   0.0007   0.0003   0.0001
    0.0000
                           0.0000   0.0000   0.0000   0.0002   0.0003
                           0.0005

    STD. DEVIATIONS        0.0005   0.0006   0.0004   0.0002   0.0001
    0.0000
                           0.0000   0.0000   0.0001   0.0002   0.0002
                           0.0004


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

 ------------------------------------------------------------------------------
 --
                                       INCHES            CU. FEET       PERCENT
                                 -------------------   -------------
                                 ---------
  PRECIPITATION                   13.73    (   3.589)    4985733.0     100.00

  RUNOFF                           0.008   (  0.0348)       2866.38      0.057

  EVAPOTRANSPIRATION               1.482   (  0.8201)     537975.94     10.790

  LATERAL DRAINAGE COLLECTED      12.24544 (  3.10435)   4445096.000   89.15631
    FROM LAYER  2

  PERCOLATION/LEAKAGE THROUGH      0.00002 (  0.00000)         6.358
  0.00013
    LAYER  3

  AVERAGE HEAD ON TOP              0.000 (    0.000)
    OF LAYER  3

  PERCOLATION/LEAKAGE THROUGH      0.00000 (  0.00000)         0.000
  0.00000
    LAYER  4

  CHANGE IN WATER STORAGE         -0.001   (  0.2503)       -206.20     -0.004


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                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     0.239        86938.4375

      DRAINAGE COLLECTED FROM LAYER  2           2.58917     939869.31200

      PERCOLATION/LEAKAGE THROUGH LAYER  3       0.000002         0.90499

      AVERAGE HEAD ON TOP OF LAYER  3            0.024

      MAXIMUM HEAD ON TOP OF LAYER  3            0.042

      LOCATION OF MAXIMUM HEAD IN LAYER  2
            (DISTANCE FROM DRAIN)                0.0 FEET

      PERCOLATION/LEAKAGE THROUGH LAYER  4       0.000000         0.00000

      SNOW WATER                                 0.14         50934.3281


      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.3045

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.0580

       ***  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.


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                    FINAL WATER STORAGE AT END OF YEAR  100
    -------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1            1.9073         0.0795

                       2            0.0007         0.0110

                       3            0.0000         0.0000

                       4            8.6385         0.3599

                   SNOW WATER       0.000

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**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
**
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PRECIPITATION DATA FILE:    C:\HELP3\CAS_RP1.D4
TEMPERATURE DATA FILE:      c:\HELP3\CAS_RP1.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CAS_RP1.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CAS_RP1.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CAS_RP1.D10
OUTPUT DATA FILE:           C:\HELP3\CAS_RP1.OUT


TIME:  17:12     DATE:   4/19/2012




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     TITLE:  As Built Casmalia RCRA Prescriptive Cover

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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   9
  THICKNESS                   =     24.00   INCHES
  POROSITY                    =      0.5010 VOL/VOL
  FIELD CAPACITY              =      0.2840 VOL/VOL
  WILTING POINT               =      0.1350 VOL/VOL
  INITIAL SOIL WATER CONTENT  =      0.1570 VOL/VOL
  EFFECTIVE SAT. HYD. COND.   =  0.190000006000E-03 CM/SEC
NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
         FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.


                         LAYER  2
                         --------

              TYPE 2 - LATERAL DRAINAGE LAYER
                MATERIAL TEXTURE NUMBER  34
  THICKNESS                   =      0.25   INCHES
  POROSITY                    =      0.8500 VOL/VOL
  FIELD CAPACITY              =      0.0100 VOL/VOL
  WILTING POINT               =      0.0050 VOL/VOL
  INITIAL SOIL WATER CONTENT  =      0.1344 VOL/VOL
  EFFECTIVE SAT. HYD. COND.   =   33.0000000000     CM/SEC
  SLOPE                       =     50.00   PERCENT
  DRAINAGE LENGTH             =    500.0    FEET


                         LAYER  3
                         --------

              TYPE 4 - FLEXIBLE MEMBRANE LINER
                MATERIAL TEXTURE NUMBER  35
  THICKNESS                   =      0.06   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.   =  0.199999996000E-12 CM/SEC
  FML PINHOLE DENSITY         =      1.00   HOLES/ACRE
  FML INSTALLATION DEFECTS    =      4.00   HOLES/ACRE
  FML PLACEMENT QUALITY       =  3 - GOOD


                         LAYER  4
                         --------

            TYPE 1 - VERTICAL PERCOLATION LAYER
                MATERIAL TEXTURE NUMBER  28
  THICKNESS                   =     24.00   INCHES
  POROSITY                    =      0.4520 VOL/VOL
  FIELD CAPACITY              =      0.4110 VOL/VOL
```

```
WILTING POINT               =      0.3110 VOL/VOL
INITIAL SOIL WATER CONTENT  =      0.4109 VOL/VOL
EFFECTIVE SAT. HYD. COND.   =  0.120000004000E-05 CM/SEC
```

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

```
NOTE:  SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT
         SOIL DATA BASE USING SOIL TEXTURE # 9 WITH A
         FAIR STAND OF GRASS, A SURFACE SLOPE OF 50.%
         AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER             =     82.70
FRACTION OF AREA ALLOWING RUNOFF    =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE  =    100.000  ACRES
EVAPORATIVE ZONE DEPTH              =     24.2    INCHES
INITIAL WATER IN EVAPORATIVE ZONE   =      3.802  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE  =     12.236  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE  =      3.241  INCHES
INITIAL SNOW WATER                  =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS    =     13.664  INCHES
TOTAL INITIAL WATER                 =     13.664  INCHES
TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR
```

EVAPOTRANSPIRATION AND WEATHER DATA

```
NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
         SANTA MARIA          CALIFORNIA

    STATION LATITUDE                       =  35.00 DEGREES
    MAXIMUM LEAF AREA INDEX                =   2.00
    START OF GROWING SEASON (JULIAN DATE)  =     85
    END OF GROWING SEASON (JULIAN DATE)    =    338
    EVAPORATIVE ZONE DEPTH                 =  24.2  INCHES
    AVERAGE ANNUAL WIND SPEED              =   7.00 MPH
    AVERAGE 1ST QUARTER RELATIVE HUMIDITY  =  73.00 %
    AVERAGE 2ND QUARTER RELATIVE HUMIDITY  =  74.00 %
    AVERAGE 3RD QUARTER RELATIVE HUMIDITY  =  76.00 %
    AVERAGE 4TH QUARTER RELATIVE HUMIDITY  =  70.00 %

NOTE:  PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
         COEFFICIENTS FOR    SAN DIEGO           CALIFORNIA

         NORMAL MEAN MONTHLY PRECIPITATION (INCHES)
```

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 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	2.88	2.82	2.44	1.19	0.36	0.10
	0.01	0.03	0.18	0.75	1.09	1.89
STD. DEVIATIONS	1.87	2.33	1.56	0.82	0.35	0.15
	0.03	0.09	0.36	0.98	0.87	1.48
RUNOFF						
TOTALS	0.097	0.216	0.046	0.003	0.000	0.000
	0.000	0.000	0.001	0.025	0.001	0.051
STD. DEVIATIONS	0.190	0.479	0.118	0.016	0.000	0.000
	0.000	0.000	0.005	0.092	0.005	0.133
EVAPOTRANSPIRATION						
TOTALS	1.395	1.883	2.272	1.540	1.731	0.417
	0.019	0.031	0.147	0.520	0.679	1.020
STD. DEVIATIONS	0.342	0.401	0.836	0.706	0.543	0.422
	0.049	0.091	0.309	0.671	0.479	0.429
LATERAL DRAINAGE COLLECTED FROM LAYER 2						
TOTALS	0.3948	0.7040	0.4284	0.0514	0.0083	
0.0003						
	0.0000	0.0000	0.0000	0.0000	0.0000	
	0.0552					

```
    STD. DEVIATIONS        0.8708   1.1624   0.7435   0.1419   0.0246
    0.0020
                           0.0000   0.0000   0.0000   0.0000   0.0000
                           0.2583

  PERCOLATION/LEAKAGE THROUGH LAYER  3
  -------------------------------------
    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  4
  -------------------------------------
    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


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

-----------------------------------------------------------------------------
--


  DAILY AVERAGE HEAD ON TOP OF LAYER  3
  -------------------------------------
    AVERAGES               0.0014   0.0027   0.0015   0.0002   0.0000
    0.0000
                           0.0000   0.0000   0.0000   0.0000   0.0000
                           0.0002

    STD. DEVIATIONS        0.0030   0.0045   0.0026   0.0005   0.0001
    0.0000
                           0.0000   0.0000   0.0000   0.0000   0.0000
                           0.0009


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

 ---------------------------------------------------------------------------
 --
                                       INCHES            CU. FEET       PERCENT
                                 -------------------   -------------
                                 ---------
  PRECIPITATION                   13.73    (   3.589)    4985733.0     100.00

  RUNOFF                           0.440   (  0.5122)     159595.44      3.201

  EVAPOTRANSPIRATION              11.655   (  2.0076)    4230660.00     84.855

  LATERAL DRAINAGE COLLECTED       1.64234 (  1.88840)    596170.250   11.95752
    FROM LAYER  2

  PERCOLATION/LEAKAGE THROUGH      0.00000 (  0.00001)         1.702
  0.00003
    LAYER  3

  AVERAGE HEAD ON TOP              0.000 (    0.001)
    OF LAYER  3

  PERCOLATION/LEAKAGE THROUGH      0.00000 (  0.00000)         0.000
  0.00000
    LAYER  4

  CHANGE IN WATER STORAGE         -0.002   (  1.5093)       -692.71     -0.014


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*

                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     1.875       680756.7500

      DRAINAGE COLLECTED FROM LAYER  2           1.34760     489179.43700

      PERCOLATION/LEAKAGE THROUGH LAYER  3       0.000003         1.05643

      AVERAGE HEAD ON TOP OF LAYER  3            0.146

      MAXIMUM HEAD ON TOP OF LAYER  3            0.120

      LOCATION OF MAXIMUM HEAD IN LAYER  2
            (DISTANCE FROM DRAIN)               242.0 FEET

      PERCOLATION/LEAKAGE THROUGH LAYER  4       0.000000         0.00000

      SNOW WATER                                 0.14         50934.3281


      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.4008

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.1337

       ***  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.


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                    FINAL WATER STORAGE AT END OF YEAR  100
    ---------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1            3.5587         0.1483

                       2            0.0516         0.2063

                       3            0.0000         0.0000

                       4            9.8632         0.4110

                   SNOW WATER       0.000

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**
**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
**
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PRECIPITATION DATA FILE:    C:\HELP3\CAS_RP2.D4
TEMPERATURE DATA FILE:      c:\HELP3\CAS_RP2.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CAS_RP2.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CAS_RP2.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CAS_RP2.D10
OUTPUT DATA FILE:           C:\HELP3\CAS_RP2.OUT



TIME:  17:10     DATE:   4/19/2012




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     TITLE:  Aged Casmalia RCRA Prescriptive Cover

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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   5
  THICKNESS                   =     24.00   INCHES
  POROSITY                    =      0.4570 VOL/VOL
  FIELD CAPACITY              =      0.1310 VOL/VOL
  WILTING POINT               =      0.0580 VOL/VOL
  INITIAL SOIL WATER CONTENT  =      0.0684 VOL/VOL
  EFFECTIVE SAT. HYD. COND.   =  0.100000005000E-02 CM/SEC
NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
         FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.


                         LAYER  2
                         --------

            TYPE 2 - LATERAL DRAINAGE LAYER
              MATERIAL TEXTURE NUMBER  34
  THICKNESS                   =      0.25   INCHES
  POROSITY                    =      0.8500 VOL/VOL
  FIELD CAPACITY              =      0.0100 VOL/VOL
  WILTING POINT               =      0.0050 VOL/VOL
  INITIAL SOIL WATER CONTENT  =      0.1235 VOL/VOL
  EFFECTIVE SAT. HYD. COND.   =   33.0000000000     CM/SEC
  SLOPE                       =     50.00   PERCENT
  DRAINAGE LENGTH             =    500.0    FEET


                         LAYER  3
                         --------

            TYPE 4 - FLEXIBLE MEMBRANE LINER
              MATERIAL TEXTURE NUMBER  35
  THICKNESS                   =      0.06   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.   =  0.199999996000E-12 CM/SEC
  FML PINHOLE DENSITY         =      1.00   HOLES/ACRE
  FML INSTALLATION DEFECTS    =      4.00   HOLES/ACRE
  FML PLACEMENT QUALITY       =  3 - GOOD


                         LAYER  4
                         --------

              TYPE 1 - VERTICAL PERCOLATION LAYER
                  MATERIAL TEXTURE NUMBER  28
  THICKNESS                   =     24.00   INCHES
  POROSITY                    =      0.4520 VOL/VOL
  FIELD CAPACITY              =      0.4110 VOL/VOL
```

```
WILTING POINT               =      0.3110 VOL/VOL
INITIAL SOIL WATER CONTENT  =      0.4109 VOL/VOL
EFFECTIVE SAT. HYD. COND.   =  0.120000004000E-05 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
         FAIR STAND OF GRASS, A SURFACE SLOPE OF 50.%
         AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER             =     66.60
FRACTION OF AREA ALLOWING RUNOFF    =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE  =    100.000  ACRES
EVAPORATIVE ZONE DEPTH              =     24.2    INCHES
INITIAL WATER IN EVAPORATIVE ZONE   =      1.671  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE  =     11.181  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE  =      1.393  INCHES
INITIAL SNOW WATER                  =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS    =     11.534  INCHES
TOTAL INITIAL WATER                 =     11.534  INCHES
TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR
```

EVAPOTRANSPIRATION AND WEATHER DATA

```
NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
         SANTA MARIA          CALIFORNIA

    STATION LATITUDE                       =  35.00 DEGREES
    MAXIMUM LEAF AREA INDEX                =   2.00
    START OF GROWING SEASON (JULIAN DATE)  =     85
    END OF GROWING SEASON (JULIAN DATE)    =    338
    EVAPORATIVE ZONE DEPTH                 =  24.2  INCHES
    AVERAGE ANNUAL WIND SPEED              =   7.00 MPH
    AVERAGE 1ST QUARTER RELATIVE HUMIDITY  =  73.00 %
    AVERAGE 2ND QUARTER RELATIVE HUMIDITY  =  74.00 %
    AVERAGE 3RD QUARTER RELATIVE HUMIDITY  =  76.00 %
    AVERAGE 4TH QUARTER RELATIVE HUMIDITY  =  70.00 %
```

```
NOTE:  PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
         COEFFICIENTS FOR    SAN DIEGO           CALIFORNIA

         NORMAL MEAN MONTHLY PRECIPITATION (INCHES)
```

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 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	2.88	2.82	2.44	1.19	0.36	0.10
	0.01	0.03	0.18	0.75	1.09	1.89
STD. DEVIATIONS	1.87	2.33	1.56	0.82	0.35	0.15
	0.03	0.09	0.36	0.98	0.87	1.48
RUNOFF						
TOTALS	0.000	0.008	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.001
STD. DEVIATIONS	0.001	0.036	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.002	0.000	0.004
EVAPOTRANSPIRATION						
TOTALS	0.187	0.236	0.292	0.160	0.087	0.027
	0.008	0.013	0.024	0.070	0.094	0.119
STD. DEVIATIONS	0.158	0.251	0.283	0.106	0.125	0.044
	0.008	0.017	0.045	0.090	0.080	0.083
LATERAL DRAINAGE COLLECTED FROM LAYER 2						
TOTALS	2.6746	2.5210	2.2239	1.0375	0.2962	
0.0732						
	0.0063	0.0221	0.1536	0.6672	0.9778	
	1.7562					

```
    STD. DEVIATIONS        1.7141   1.9821   1.3864   0.7254   0.2938
    0.1257
                           0.0225   0.0758   0.3149   0.8984   0.7878
                           1.3592

  PERCOLATION/LEAKAGE THROUGH LAYER  3
  -------------------------------------
    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  4
  -------------------------------------
    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        0.0001   0.0000   0.0000   0.0000   0.0000
    0.0000
                           0.0000   0.0000   0.0000   0.0000   0.0000
                           0.0001


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

-----------------------------------------------------------------------------
--


  DAILY AVERAGE HEAD ON TOP OF LAYER  3
  -------------------------------------
    AVERAGES               0.0093   0.0096   0.0077   0.0037   0.0010
    0.0003
                           0.0000   0.0001   0.0006   0.0023   0.0035
                           0.0061

    STD. DEVIATIONS        0.0060   0.0076   0.0048   0.0026   0.0010
    0.0005
                           0.0001   0.0003   0.0011   0.0031   0.0028
                           0.0047


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

 ---------------------------------------------------------------------------
 --
                                       INCHES            CU. FEET       PERCENT
                                 -------------------   -------------
                                 ---------
  PRECIPITATION                   13.73    (   3.589)    4985733.0     100.00

  RUNOFF                           0.008   (  0.0360)       3053.81      0.061

  EVAPOTRANSPIRATION               1.317   (  0.5746)     478059.81      9.589

  LATERAL DRAINAGE COLLECTED      12.40939 (  3.30519)   4504607.500   90.34995
    FROM LAYER  2

  PERCOLATION/LEAKAGE THROUGH      0.00003 (  0.00001)        11.044
  0.00022
    LAYER  3

  AVERAGE HEAD ON TOP              0.004 (    0.001)
    OF LAYER  3

  PERCOLATION/LEAKAGE THROUGH      0.00002 (  0.00017)         8.909
  0.00018
    LAYER  4

  CHANGE IN WATER STORAGE          0.000   (  0.1782)          1.72      0.000


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                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ---------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     0.251        91081.2422

      DRAINAGE COLLECTED FROM LAYER  2           3.10634    1127603.00000

      PERCOLATION/LEAKAGE THROUGH LAYER  3       0.000006         2.22319

      AVERAGE HEAD ON TOP OF LAYER  3            0.335

      MAXIMUM HEAD ON TOP OF LAYER  3            0.642

      LOCATION OF MAXIMUM HEAD IN LAYER  2
            (DISTANCE FROM DRAIN)                0.0 FEET

      PERCOLATION/LEAKAGE THROUGH LAYER  4       0.001227       445.43240

      SNOW WATER                                 0.14         50934.3281


      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.2450

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.0575

       ***  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.


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                    FINAL WATER STORAGE AT END OF YEAR  100
    ---------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1            1.6404         0.0684

                       2            0.0309         0.1235

                       3            0.0000         0.0000

                       4            9.8634         0.4110

                   SNOW WATER       0.000

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**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
**
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PRECIPITATION DATA FILE:    C:\HELP3\CAS_ECO3.D4
TEMPERATURE DATA FILE:      c:\HELP3\CAS_ECO3.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CAS_ECO3.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CAS_ECO3.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CAS_ECO3.D10
OUTPUT DATA FILE:           C:\HELP3\CAS_ECO3.OUT


TIME:  16:36     DATE:   4/17/2012




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     TITLE:  As Built Casmalia ECO-CAP Slope 2:1 Fair Grass

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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  14
   THICKNESS                   =     24.00   INCHES
   POROSITY                    =      0.4790 VOL/VOL
   FIELD CAPACITY              =      0.3710 VOL/VOL
   WILTING POINT               =      0.2510 VOL/VOL
   INITIAL SOIL WATER CONTENT  =      0.3208 VOL/VOL
   EFFECTIVE SAT. HYD. COND.   =  0.249999994000E-04 CM/SEC
 NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
          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 #14 WITH A
          FAIR STAND OF GRASS, A SURFACE SLOPE OF 50.%
          AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER             =     90.20
FRACTION OF AREA ALLOWING RUNOFF    =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE  =    100.000  ACRES
EVAPORATIVE ZONE DEPTH              =     24.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE   =      7.700  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE  =     11.496  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE  =      6.024  INCHES
INITIAL SNOW WATER                  =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS    =      7.700  INCHES
TOTAL INITIAL WATER                 =      7.700  INCHES
TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR



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

 NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
          SANTA MARIA           CALIFORNIA

     STATION LATITUDE                      =  35.00 DEGREES
     MAXIMUM LEAF AREA INDEX               =   2.00
     START OF GROWING SEASON (JULIAN DATE) =     85
     END OF GROWING SEASON (JULIAN DATE)   =    338
     EVAPORATIVE ZONE DEPTH                =  24.0  INCHES
     AVERAGE ANNUAL WIND SPEED             =   7.00 MPH
     AVERAGE 1ST QUARTER RELATIVE HUMIDITY =  73.00 %
     AVERAGE 2ND QUARTER RELATIVE HUMIDITY =  74.00 %
     AVERAGE 3RD QUARTER RELATIVE HUMIDITY =  76.00 %
     AVERAGE 4TH QUARTER RELATIVE HUMIDITY =  70.00 %
```

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SAN DIEGO CALIFORNIA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 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	2.88	2.82	2.44	1.19	0.36	0.10
	0.01	0.03	0.18	0.75	1.09	1.89
STD. DEVIATIONS	1.87	2.33	1.56	0.82	0.35	0.15
	0.03	0.09	0.36	0.98	0.87	1.48
RUNOFF						
TOTALS	0.431	0.610	0.231	0.038	0.001	0.000
	0.000	0.000	0.006	0.094	0.025	0.232
STD. DEVIATIONS	0.559	0.958	0.332	0.092	0.004	0.000
	0.000	0.000	0.035	0.249	0.054	0.401
EVAPOTRANSPIRATION						

```
     TOTALS                 1.240    1.837    2.254    1.520    1.568    0.196
                            0.017    0.030    0.138    0.348    0.368    0.733

     STD. DEVIATIONS        0.458    0.439    0.807    0.699    0.504    0.267
                            0.046    0.091    0.290    0.462    0.360    0.500

   PERCOLATION/LEAKAGE THROUGH LAYER  1
   -------------------------------------
     TOTALS                 0.5644   0.7350   0.3901   0.0304   0.0052
     0.0020
                            0.0000   0.0000   0.0000   0.0000   0.0000
                            0.1015

     STD. DEVIATIONS        0.8739   0.9036   0.5957   0.0851   0.0105
     0.0107
                            0.0000   0.0000   0.0000   0.0000   0.0002
                            0.3317


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

-----------------------------------------------------------------------------
--
                                      INCHES            CU. FEET       PERCENT
                                 -------------------   -------------
                                 ---------
 PRECIPITATION                    13.73    (   3.589)    4985733.0     100.00

 RUNOFF                            1.667   (  1.1186)     605192.75     12.138

 EVAPOTRANSPIRATION               10.250   (  1.8320)    3720866.75     74.630

 PERCOLATION/LEAKAGE THROUGH       1.82861 (  1.52764)    663786.000
 13.31371
   LAYER  1

 CHANGE IN WATER STORAGE          -0.011   (  1.2120)      -4112.09     -0.082


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                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     3.005      1090780.3700

      PERCOLATION/LEAKAGE THROUGH LAYER  1       1.270200    461082.53100

      SNOW WATER                                 0.14         50934.3281

      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.4339

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.2510

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                    FINAL WATER STORAGE AT END OF YEAR  100
    -------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1            6.5669         0.2736

                   SNOW WATER       0.000


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**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
**
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PRECIPITATION DATA FILE:    C:\HELP3\CAS_ECO8.D4
TEMPERATURE DATA FILE:      c:\HELP3\CAS_ECO8.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CAS_ECO8.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CAS_ECO8.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CAS_ECO8.D10
OUTPUT DATA FILE:           C:\HELP3\CAS_ECO8.OUT


TIME:   8:42     DATE:   4/20/2012




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     TITLE:  Aged Casmalia ECO-CAP Slope 2:1 Fair Grass

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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   9
   THICKNESS                   =     24.00   INCHES
   POROSITY                    =      0.5010 VOL/VOL
   FIELD CAPACITY              =      0.2840 VOL/VOL
   WILTING POINT               =      0.1350 VOL/VOL
   INITIAL SOIL WATER CONTENT  =      0.1588 VOL/VOL
   EFFECTIVE SAT. HYD. COND.   =  0.190000006000E-03 CM/SEC
 NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
          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 # 9 WITH A
          FAIR STAND OF GRASS, A SURFACE SLOPE OF 50.%
          AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER             =     82.70
FRACTION OF AREA ALLOWING RUNOFF    =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE  =    100.000  ACRES
EVAPORATIVE ZONE DEPTH              =     24.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE   =      3.810  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE  =     12.024  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE  =      3.240  INCHES
INITIAL SNOW WATER                  =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS    =      3.810  INCHES
TOTAL INITIAL WATER                 =      3.810  INCHES
TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR


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

 NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
          SANTA MARIA           CALIFORNIA

     STATION LATITUDE                      =  35.00 DEGREES
     MAXIMUM LEAF AREA INDEX               =   2.00
     START OF GROWING SEASON (JULIAN DATE) =     85
     END OF GROWING SEASON (JULIAN DATE)   =    338
     EVAPORATIVE ZONE DEPTH                =  24.0  INCHES
     AVERAGE ANNUAL WIND SPEED             =   7.00 MPH
     AVERAGE 1ST QUARTER RELATIVE HUMIDITY =  73.00 %
     AVERAGE 2ND QUARTER RELATIVE HUMIDITY =  74.00 %
     AVERAGE 3RD QUARTER RELATIVE HUMIDITY =  76.00 %
     AVERAGE 4TH QUARTER RELATIVE HUMIDITY =  70.00 %
```

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SAN DIEGO CALIFORNIA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 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	2.88	2.82	2.44	1.19	0.36	0.10
	0.01	0.03	0.18	0.75	1.09	1.89
STD. DEVIATIONS	1.87	2.33	1.56	0.82	0.35	0.15
	0.03	0.09	0.36	0.98	0.87	1.48
RUNOFF						
TOTALS	0.095	0.207	0.044	0.003	0.000	0.000
	0.000	0.000	0.001	0.024	0.001	0.051
STD. DEVIATIONS	0.184	0.457	0.115	0.016	0.000	0.000
	0.000	0.000	0.005	0.088	0.005	0.132
EVAPOTRANSPIRATION						

```
     TOTALS                 1.311    1.806    2.260    1.606    1.796    0.411
                            0.018    0.031    0.147    0.506    0.642    0.957

     STD. DEVIATIONS        0.277    0.315    0.737    0.701    0.563    0.428
                            0.047    0.091    0.308    0.655    0.441    0.382

   PERCOLATION/LEAKAGE THROUGH LAYER  1
   -------------------------------------
     TOTALS                 0.4351   0.7734   0.4858   0.0489   0.0067
     0.0035
                            0.0000   0.0000   0.0000   0.0000   0.0003
                            0.0682

     STD. DEVIATIONS        0.9092   1.2501   0.7946   0.1498   0.0172
     0.0122
                            0.0000   0.0000   0.0000   0.0001   0.0021
                            0.2768


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

-----------------------------------------------------------------------------
--
                                      INCHES            CU. FEET       PERCENT
                                 -------------------   -------------
                                 ---------
 PRECIPITATION                    13.73    (   3.589)    4985733.0     100.00

 RUNOFF                            0.425   (  0.4924)     154392.48      3.097

 EVAPOTRANSPIRATION               11.490   (  1.9311)    4170871.25     83.656

 PERCOLATION/LEAKAGE THROUGH       1.82173 (  2.04208)    661288.062
 13.26361
   LAYER  1

 CHANGE IN WATER STORAGE          -0.002   (  1.6042)       -817.72     -0.016


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                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ---------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     1.883       683360.1250

      PERCOLATION/LEAKAGE THROUGH LAYER  1       1.806305    655688.68700

      SNOW WATER                                 0.14         50934.3281

      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.3993

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.1350

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                    FINAL WATER STORAGE AT END OF YEAR  100
    ---------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1            3.5851         0.1494

                   SNOW WATER       0.000


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**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
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PRECIPITATION DATA FILE:    C:\HELP3\CAS_ECO4.D4
TEMPERATURE DATA FILE:      c:\HELP3\CAS_ECO4.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CAS_ECO4.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CAS_ECO4.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CAS_ECO4.D10
OUTPUT DATA FILE:           C:\HELP3\CAS_ECO4.OUT



TIME:  16:32     DATE:   4/17/2012




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     TITLE:  Aged Casmalia ECO-CAP Slope 3:1 Fair Grass

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     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
              COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.
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                          LAYER  1
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            TYPE 1 - VERTICAL PERCOLATION LAYER
                MATERIAL TEXTURE NUMBER  14
   THICKNESS                   =     24.00   INCHES
   POROSITY                    =      0.4790 VOL/VOL
   FIELD CAPACITY              =      0.3710 VOL/VOL
   WILTING POINT               =      0.2510 VOL/VOL
   INITIAL SOIL WATER CONTENT  =      0.3209 VOL/VOL
   EFFECTIVE SAT. HYD. COND.   =  0.249999994000E-04 CM/SEC
 NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
          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 #14 WITH A
          FAIR STAND OF GRASS, A SURFACE SLOPE OF 33.%
          AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER             =     90.10
FRACTION OF AREA ALLOWING RUNOFF    =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE  =    100.000  ACRES
EVAPORATIVE ZONE DEPTH              =     24.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE   =      7.700  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE  =     11.496  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE  =      6.024  INCHES
INITIAL SNOW WATER                  =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS    =      7.700  INCHES
TOTAL INITIAL WATER                 =      7.700  INCHES
TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR


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

 NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
          SANTA MARIA           CALIFORNIA

     STATION LATITUDE                      =  35.00 DEGREES
     MAXIMUM LEAF AREA INDEX               =   2.00
     START OF GROWING SEASON (JULIAN DATE) =     85
     END OF GROWING SEASON (JULIAN DATE)   =    338
     EVAPORATIVE ZONE DEPTH                =  24.0  INCHES
     AVERAGE ANNUAL WIND SPEED             =   7.00 MPH
     AVERAGE 1ST QUARTER RELATIVE HUMIDITY =  73.00 %
     AVERAGE 2ND QUARTER RELATIVE HUMIDITY =  74.00 %
     AVERAGE 3RD QUARTER RELATIVE HUMIDITY =  76.00 %
     AVERAGE 4TH QUARTER RELATIVE HUMIDITY =  70.00 %
```

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SAN DIEGO CALIFORNIA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 DEGREES

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 100

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	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	2.88	2.82	2.44	1.19	0.36	0.10
	0.01	0.03	0.18	0.75	1.09	1.89
STD. DEVIATIONS	1.87	2.33	1.56	0.82	0.35	0.15
	0.03	0.09	0.36	0.98	0.87	1.48
RUNOFF						
TOTALS	0.423	0.603	0.227	0.037	0.001	0.000
	0.000	0.000	0.006	0.093	0.024	0.228
STD. DEVIATIONS	0.550	0.950	0.329	0.090	0.003	0.000
	0.000	0.000	0.034	0.246	0.053	0.396
EVAPOTRANSPIRATION						

```
     TOTALS                 1.240    1.838    2.250    1.523    1.570    0.199
                            0.017    0.030    0.139    0.350    0.373    0.727

     STD. DEVIATIONS        0.457    0.437    0.808    0.700    0.496    0.276
                            0.046    0.091    0.290    0.464    0.363    0.500

   PERCOLATION/LEAKAGE THROUGH LAYER  1
   -------------------------------------
     TOTALS                 0.5733   0.7405   0.3964   0.0321   0.0054
     0.0008
                            0.0000   0.0000   0.0000   0.0000   0.0000
                            0.1003

     STD. DEVIATIONS        0.8733   0.9042   0.6067   0.0871   0.0110
     0.0050
                            0.0000   0.0000   0.0000   0.0001   0.0001
                            0.3311


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

-----------------------------------------------------------------------------
--
                                      INCHES            CU. FEET       PERCENT
                                 -------------------   -------------
                                 ---------
 PRECIPITATION                    13.73    (   3.589)    4985733.0     100.00

 RUNOFF                            1.641   (  1.1085)     595602.69     11.946

 EVAPOTRANSPIRATION               10.257   (  1.8390)    3723119.00     74.675

 PERCOLATION/LEAKAGE THROUGH       1.84885 (  1.53827)    671131.875
 13.46105
   LAYER  1

 CHANGE IN WATER STORAGE          -0.011   (  1.2218)      -4121.65     -0.083


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                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     2.960      1074424.8700

      PERCOLATION/LEAKAGE THROUGH LAYER  1       1.249768    453665.71900

      SNOW WATER                                 0.14         50934.3281

      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.4339

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.2510

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                    FINAL WATER STORAGE AT END OF YEAR  100
    ---------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1            6.5650         0.2735

                   SNOW WATER       0.000


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**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
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PRECIPITATION DATA FILE:    C:\HELP3\CAS_ECO9.D4
TEMPERATURE DATA FILE:      c:\HELP3\CAS_ECO9.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CAS_ECO9.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CAS_ECO9.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CAS_ECO9.D10
OUTPUT DATA FILE:           C:\HELP3\CAS_ECO9.OUT


TIME:   8:44     DATE:   4/20/2012




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     TITLE:  Aged Casmalia ECO-CAP Slope 3:1 Fair Grass

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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   9
  THICKNESS                   =     24.00   INCHES
  POROSITY                    =      0.5010 VOL/VOL
  FIELD CAPACITY              =      0.2840 VOL/VOL
  WILTING POINT               =      0.1350 VOL/VOL
  INITIAL SOIL WATER CONTENT  =      0.1588 VOL/VOL
  EFFECTIVE SAT. HYD. COND.   =  0.190000006000E-03 CM/SEC
NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
         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 # 9 WITH A
         FAIR STAND OF GRASS, A SURFACE SLOPE OF 33.%
         AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER            =     82.50
FRACTION OF AREA ALLOWING RUNOFF   =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE =    100.000  ACRES
EVAPORATIVE ZONE DEPTH             =     24.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE  =      3.810  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE =     12.024  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE =      3.240  INCHES
INITIAL SNOW WATER                 =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS   =      3.810  INCHES
TOTAL INITIAL WATER                =      3.810  INCHES
TOTAL SUBSURFACE INFLOW            =      0.00   INCHES/YEAR



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

NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
         SANTA MARIA           CALIFORNIA

    STATION LATITUDE                      =  35.00 DEGREES
    MAXIMUM LEAF AREA INDEX               =   2.00
    START OF GROWING SEASON (JULIAN DATE) =     85
    END OF GROWING SEASON (JULIAN DATE)   =    338
    EVAPORATIVE ZONE DEPTH                =  24.0  INCHES
    AVERAGE ANNUAL WIND SPEED             =   7.00 MPH
    AVERAGE 1ST QUARTER RELATIVE HUMIDITY =  73.00 %
    AVERAGE 2ND QUARTER RELATIVE HUMIDITY =  74.00 %
    AVERAGE 3RD QUARTER RELATIVE HUMIDITY =  76.00 %
    AVERAGE 4TH QUARTER RELATIVE HUMIDITY =  70.00 %
```

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SAN DIEGO CALIFORNIA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 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	2.88	2.82	2.44	1.19	0.36	0.10
	0.01	0.03	0.18	0.75	1.09	1.89
STD. DEVIATIONS	1.87	2.33	1.56	0.82	0.35	0.15
	0.03	0.09	0.36	0.98	0.87	1.48
RUNOFF						
TOTALS	0.092	0.202	0.042	0.003	0.000	0.000
	0.000	0.000	0.001	0.023	0.001	0.049
STD. DEVIATIONS	0.179	0.449	0.112	0.015	0.000	0.000
	0.000	0.000	0.004	0.086	0.004	0.128
EVAPOTRANSPIRATION						

```
     TOTALS                 1.309    1.802    2.263    1.604    1.792    0.415
                            0.018    0.031    0.148    0.506    0.642    0.961

     STD. DEVIATIONS        0.277    0.320    0.736    0.701    0.565    0.429
                            0.047    0.091    0.309    0.655    0.441    0.380

   PERCOLATION/LEAKAGE THROUGH LAYER  1
   -------------------------------------
     TOTALS                 0.4381   0.7783   0.4876   0.0494   0.0084
     0.0036
                            0.0000   0.0000   0.0000   0.0000   0.0001
                            0.0689

     STD. DEVIATIONS        0.9132   1.2555   0.7973   0.1492   0.0204
     0.0128
                            0.0000   0.0000   0.0000   0.0000   0.0008
                            0.2790


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

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--
                                      INCHES            CU. FEET       PERCENT
                                 -------------------   -------------
                                 ---------
 PRECIPITATION                    13.73    (   3.589)    4985733.0     100.00

 RUNOFF                            0.412   (  0.4836)     149656.23      3.002

 EVAPOTRANSPIRATION               11.491   (  1.9356)    4171067.50     83.660

 PERCOLATION/LEAKAGE THROUGH       1.83423 (  2.04841)    665825.312
 13.35461
   LAYER  1

 CHANGE IN WATER STORAGE          -0.002   (  1.6086)       -816.23     -0.016


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                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ---------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     1.861       675566.1250

      PERCOLATION/LEAKAGE THROUGH LAYER  1       1.829313    664040.50000

      SNOW WATER                                 0.14         50934.3281

      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.4002

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.1350

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                    FINAL WATER STORAGE AT END OF YEAR  100
    ---------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1            3.5856         0.1494

                   SNOW WATER       0.000


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**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
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PRECIPITATION DATA FILE:    C:\HELP3\CAS_ECO5.D4
TEMPERATURE DATA FILE:      c:\HELP3\CAS_ECO5.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CAS_ECO5.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CAS_ECO5.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CAS_ECO5.D10
OUTPUT DATA FILE:           C:\HELP3\CAS_ECO5.OUT


TIME:  13:59     DATE:   4/18/2012




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     TITLE:  As Built Casmalia ECO-CAP Slope 2:1 Fair Grass

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     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
              COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.
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                          LAYER  1
                          --------

             TYPE 1 - VERTICAL PERCOLATION LAYER
                 MATERIAL TEXTURE NUMBER  23
   THICKNESS                   =     24.00   INCHES
   POROSITY                    =      0.4610 VOL/VOL
   FIELD CAPACITY              =      0.3600 VOL/VOL
   WILTING POINT               =      0.2030 VOL/VOL
   INITIAL SOIL WATER CONTENT  =      0.2709 VOL/VOL
   EFFECTIVE SAT. HYD. COND.   =  0.900000032000E-05 CM/SEC
 NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
          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 #23 WITH A
          FAIR STAND OF GRASS, A SURFACE SLOPE OF 50.%
          AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER            =     90.70
FRACTION OF AREA ALLOWING RUNOFF   =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE =    100.000  ACRES
EVAPORATIVE ZONE DEPTH             =     24.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE  =      6.502  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE =     11.064  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE =      4.872  INCHES
INITIAL SNOW WATER                 =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS   =      6.502  INCHES
TOTAL INITIAL WATER                =      6.502  INCHES
TOTAL SUBSURFACE INFLOW            =      0.00   INCHES/YEAR



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

 NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
          SANTA MARIA           CALIFORNIA

     STATION LATITUDE                      =  35.00 DEGREES
     MAXIMUM LEAF AREA INDEX               =   2.00
     START OF GROWING SEASON (JULIAN DATE) =     85
     END OF GROWING SEASON (JULIAN DATE)   =    338
     EVAPORATIVE ZONE DEPTH                =  24.0  INCHES
     AVERAGE ANNUAL WIND SPEED             =   7.00 MPH
     AVERAGE 1ST QUARTER RELATIVE HUMIDITY =  73.00 %
     AVERAGE 2ND QUARTER RELATIVE HUMIDITY =  74.00 %
     AVERAGE 3RD QUARTER RELATIVE HUMIDITY =  76.00 %
     AVERAGE 4TH QUARTER RELATIVE HUMIDITY =  70.00 %
```

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SAN DIEGO CALIFORNIA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 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	2.88	2.82	2.44	1.19	0.36	0.10
	0.01	0.03	0.18	0.75	1.09	1.89
STD. DEVIATIONS	1.87	2.33	1.56	0.82	0.35	0.15
	0.03	0.09	0.36	0.98	0.87	1.48
RUNOFF						
TOTALS	0.539	0.765	0.319	0.048	0.001	0.000
	0.000	0.000	0.007	0.102	0.029	0.273
STD. DEVIATIONS	0.696	1.134	0.443	0.112	0.005	0.000
	0.000	0.000	0.039	0.264	0.062	0.462
EVAPOTRANSPIRATION						

```
     TOTALS                 1.121    1.732    2.236    1.568    1.902    0.561
                            0.017    0.031    0.140    0.346    0.364    0.654

     STD. DEVIATIONS        0.409    0.384    0.720    0.691    0.458    0.496
                            0.044    0.091    0.288    0.440    0.306    0.423

   PERCOLATION/LEAKAGE THROUGH LAYER  1
   -------------------------------------
     TOTALS                 0.2305   0.4297   0.2728   0.0306   0.0060
     0.0046
                            0.0000   0.0000   0.0000   0.0000   0.0000
                            0.0175

     STD. DEVIATIONS        0.5256   0.6808   0.4605   0.0892   0.0115
     0.0138
                            0.0000   0.0000   0.0000   0.0000   0.0001
                            0.0873


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

-----------------------------------------------------------------------------
--
                                      INCHES            CU. FEET       PERCENT
                                 -------------------   -------------
                                 ---------
 PRECIPITATION                    13.73    (   3.589)    4985733.0     100.00

 RUNOFF                            2.082   (  1.3521)     755718.31     15.158

 EVAPOTRANSPIRATION               10.671   (  1.7805)    3873398.00     77.690

 PERCOLATION/LEAKAGE THROUGH       0.99168 (  1.20973)    359978.625
 7.22017
   LAYER  1

 CHANGE IN WATER STORAGE          -0.009   (  1.4120)      -3362.96     -0.067


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                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     3.291      1194786.3700

      PERCOLATION/LEAKAGE THROUGH LAYER  1       0.514382    186720.67200

      SNOW WATER                                 0.14         50934.3281

      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.4386

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.2030

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                    FINAL WATER STORAGE AT END OF YEAR  100
    ---------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1            5.5758         0.2323

                   SNOW WATER       0.000


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**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
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PRECIPITATION DATA FILE:    C:\HELP3\CAS_EC10.D4
TEMPERATURE DATA FILE:      C:\HELP3\CAS_EC10.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CAS_EC10.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CAS_EC10.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CAS_EC10.D10
OUTPUT DATA FILE:           C:\HELP3\CAS_EC10.OUT



TIME:  15:21     DATE:   4/22/2012




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     TITLE:  Aged Casmalia ECO-CAP Slope 2:1 Fair Grass

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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  11
   THICKNESS                   =     24.00   INCHES
   POROSITY                    =      0.4640 VOL/VOL
   FIELD CAPACITY              =      0.3100 VOL/VOL
   WILTING POINT               =      0.1870 VOL/VOL
   INITIAL SOIL WATER CONTENT  =      0.2564 VOL/VOL
   EFFECTIVE SAT. HYD. COND.   =  0.639999998000E-04 CM/SEC
 NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
          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 #11 WITH A
          FAIR STAND OF GRASS, A SURFACE SLOPE OF 50.%
          AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER            =     87.50
FRACTION OF AREA ALLOWING RUNOFF   =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE =    100.000  ACRES
EVAPORATIVE ZONE DEPTH             =     24.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE  =      6.155  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE =     11.136  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE =      4.488  INCHES
INITIAL SNOW WATER                 =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS   =      6.155  INCHES
TOTAL INITIAL WATER                =      6.155  INCHES
TOTAL SUBSURFACE INFLOW            =      0.00   INCHES/YEAR


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

 NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
          SANTA MARIA           CALIFORNIA

     STATION LATITUDE                      =  35.00 DEGREES
     MAXIMUM LEAF AREA INDEX               =   2.00
     START OF GROWING SEASON (JULIAN DATE) =     85
     END OF GROWING SEASON (JULIAN DATE)   =    338
     EVAPORATIVE ZONE DEPTH                =  24.0  INCHES
     AVERAGE ANNUAL WIND SPEED             =   7.00 MPH
     AVERAGE 1ST QUARTER RELATIVE HUMIDITY =  73.00 %
     AVERAGE 2ND QUARTER RELATIVE HUMIDITY =  74.00 %
     AVERAGE 3RD QUARTER RELATIVE HUMIDITY =  76.00 %
     AVERAGE 4TH QUARTER RELATIVE HUMIDITY =  70.00 %
```

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SAN DIEGO CALIFORNIA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 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	2.88	2.82	2.44	1.19	0.36	0.10
	0.01	0.03	0.18	0.75	1.09	1.89
STD. DEVIATIONS	1.87	2.33	1.56	0.82	0.35	0.15
	0.03	0.09	0.36	0.98	0.87	1.48
RUNOFF						
TOTALS	0.266	0.425	0.137	0.018	0.000	0.000
	0.000	0.000	0.003	0.059	0.009	0.140
STD. DEVIATIONS	0.392	0.742	0.237	0.054	0.000	0.000
	0.000	0.000	0.019	0.175	0.027	0.279
EVAPOTRANSPIRATION						

```
     TOTALS                 1.242    1.787    2.169    1.505    1.803    0.319
                            0.017    0.031    0.143    0.372    0.420    0.742

     STD. DEVIATIONS        0.388    0.403    0.797    0.685    0.456    0.375
                            0.044    0.091    0.298    0.501    0.382    0.464

   PERCOLATION/LEAKAGE THROUGH LAYER  1
   -------------------------------------
     TOTALS                 0.6080   0.8745   0.4709   0.0717   0.0093
     0.0022
                            0.0000   0.0000   0.0000   0.0000   0.0001
                            0.1033

     STD. DEVIATIONS        0.9567   1.0844   0.6682   0.1366   0.0288
     0.0085
                            0.0000   0.0000   0.0000   0.0000   0.0009
                            0.3662


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

-----------------------------------------------------------------------------
--
                                      INCHES            CU. FEET       PERCENT
                                 -------------------   -------------
                                 ---------
 PRECIPITATION                    13.73    (   3.589)    4985733.0     100.00

 RUNOFF                            1.055   (  0.8401)     383033.31      7.683

 EVAPOTRANSPIRATION               10.550   (  1.8050)    3829570.75     76.811

 PERCOLATION/LEAKAGE THROUGH       2.13994 (  1.80288)    776799.125
 15.58044
   LAYER  1

 CHANGE IN WATER STORAGE          -0.010   (  1.3059)      -3670.67     -0.074


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                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     2.610       947436.5620

      PERCOLATION/LEAKAGE THROUGH LAYER  1       1.373967    498750.09400

      SNOW WATER                                 0.14         50934.3281

      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.3897

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.1870

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                    FINAL WATER STORAGE AT END OF YEAR  100
    ---------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1            5.1434         0.2143

                   SNOW WATER       0.000


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**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
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PRECIPITATION DATA FILE:    C:\HELP3\CAS_ECO7.D4
TEMPERATURE DATA FILE:      c:\HELP3\CAS_ECO7.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CAS_ECO7.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CAS_ECO7.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CAS_ECO7.D10
OUTPUT DATA FILE:           C:\HELP3\CAS_ECO7.OUT


TIME:  17:24     DATE:   4/19/2012




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     TITLE:  As Built Casmalia ECO-CAP Slope 3:1 Fair Grass

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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  23
   THICKNESS                   =     24.00   INCHES
   POROSITY                    =      0.4610 VOL/VOL
   FIELD CAPACITY              =      0.3600 VOL/VOL
   WILTING POINT               =      0.2030 VOL/VOL
   INITIAL SOIL WATER CONTENT  =      0.2709 VOL/VOL
   EFFECTIVE SAT. HYD. COND.   =  0.900000032000E-05 CM/SEC
 NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
          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 #23 WITH A
          FAIR STAND OF GRASS, A SURFACE SLOPE OF 33.%
          AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER            =     90.60
FRACTION OF AREA ALLOWING RUNOFF   =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE =    100.000  ACRES
EVAPORATIVE ZONE DEPTH             =     24.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE  =      6.501  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE =     11.064  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE =      4.872  INCHES
INITIAL SNOW WATER                 =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS   =      6.501  INCHES
TOTAL INITIAL WATER                =      6.501  INCHES
TOTAL SUBSURFACE INFLOW            =      0.00   INCHES/YEAR


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

 NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
          SANTA MARIA           CALIFORNIA

     STATION LATITUDE                      =  35.00 DEGREES
     MAXIMUM LEAF AREA INDEX               =   2.00
     START OF GROWING SEASON (JULIAN DATE) =     85
     END OF GROWING SEASON (JULIAN DATE)   =    338
     EVAPORATIVE ZONE DEPTH                =  24.0  INCHES
     AVERAGE ANNUAL WIND SPEED             =   7.00 MPH
     AVERAGE 1ST QUARTER RELATIVE HUMIDITY =  73.00 %
     AVERAGE 2ND QUARTER RELATIVE HUMIDITY =  74.00 %
     AVERAGE 3RD QUARTER RELATIVE HUMIDITY =  76.00 %
     AVERAGE 4TH QUARTER RELATIVE HUMIDITY =  70.00 %
```

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SAN DIEGO CALIFORNIA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 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	2.88	2.82	2.44	1.19	0.36	0.10
	0.01	0.03	0.18	0.75	1.09	1.89
STD. DEVIATIONS	1.87	2.33	1.56	0.82	0.35	0.15
	0.03	0.09	0.36	0.98	0.87	1.48
RUNOFF						
TOTALS	0.533	0.757	0.314	0.046	0.001	0.000
	0.000	0.000	0.006	0.100	0.028	0.268
STD. DEVIATIONS	0.691	1.128	0.439	0.109	0.005	0.000
	0.000	0.000	0.038	0.260	0.061	0.456
EVAPOTRANSPIRATION						

```
     TOTALS                 1.122    1.737    2.232    1.571    1.905    0.565
                            0.017    0.031    0.140    0.346    0.365    0.657

     STD. DEVIATIONS        0.406    0.380    0.720    0.690    0.458    0.500
                            0.044    0.091    0.289    0.440    0.307    0.425

   PERCOLATION/LEAKAGE THROUGH LAYER  1
   -------------------------------------
     TOTALS                 0.2344   0.4328   0.2773   0.0312   0.0045
     0.0049
                            0.0000   0.0000   0.0000   0.0000   0.0000
                            0.0184

     STD. DEVIATIONS        0.5300   0.6850   0.4659   0.0901   0.0097
     0.0146
                            0.0000   0.0000   0.0000   0.0000   0.0000
                            0.0908


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

-----------------------------------------------------------------------------
--
                                      INCHES            CU. FEET       PERCENT
                                 -------------------   -------------
                                 ---------
 PRECIPITATION                    13.73    (   3.589)    4985733.0     100.00

 RUNOFF                            2.054   (  1.3439)     745675.12     14.956

 EVAPOTRANSPIRATION               10.686   (  1.7796)    3879115.00     77.804

 PERCOLATION/LEAKAGE THROUGH       1.00354 (  1.22040)    364283.937
 7.30653
   LAYER  1

 CHANGE IN WATER STORAGE          -0.009   (  1.4108)      -3341.00     -0.067


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                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ----------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     3.277      1189544.8700

      PERCOLATION/LEAKAGE THROUGH LAYER  1       0.522643    189719.29700

      SNOW WATER                                 0.14         50934.3281

      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.4389

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.2030

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                    FINAL WATER STORAGE AT END OF YEAR  100
    ---------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1            5.5811         0.2325

                   SNOW WATER       0.000


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**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
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PRECIPITATION DATA FILE:    C:\HELP3\CAS_EC11.D4
TEMPERATURE DATA FILE:      C:\HELP3\CAS_EC11.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CAS_EC11.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CAS_EC11.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CAS_EC11.D10
OUTPUT DATA FILE:           C:\HELP3\CAS_EC11.OUT



TIME:  15:21     DATE:   4/22/2012




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     TITLE:  Aged Casmalia ECO-CAP Slope 3:1 Fair Grass

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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  11
   THICKNESS                    =     24.00   INCHES
   POROSITY                     =      0.4640 VOL/VOL
   FIELD CAPACITY               =      0.3100 VOL/VOL
   WILTING POINT                =      0.1870 VOL/VOL
   INITIAL SOIL WATER CONTENT   =      0.2564 VOL/VOL
   EFFECTIVE SAT. HYD. COND.    =  0.639999998000E-04 CM/SEC
 NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
          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 #11 WITH A
          FAIR STAND OF GRASS, A SURFACE SLOPE OF 33.%
          AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER             =     87.40
FRACTION OF AREA ALLOWING RUNOFF    =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE  =    100.000  ACRES
EVAPORATIVE ZONE DEPTH              =     24.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE   =      6.154  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE  =     11.136  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE  =      4.488  INCHES
INITIAL SNOW WATER                  =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS    =      6.154  INCHES
TOTAL INITIAL WATER                 =      6.154  INCHES
TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR


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

 NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
          SANTA MARIA           CALIFORNIA

     STATION LATITUDE                       =  35.00 DEGREES
     MAXIMUM LEAF AREA INDEX                =   2.00
     START OF GROWING SEASON (JULIAN DATE)  =     85
     END OF GROWING SEASON (JULIAN DATE)    =    338
     EVAPORATIVE ZONE DEPTH                 =  24.0  INCHES
     AVERAGE ANNUAL WIND SPEED              =   7.00 MPH
     AVERAGE 1ST QUARTER RELATIVE HUMIDITY  =  73.00 %
     AVERAGE 2ND QUARTER RELATIVE HUMIDITY  =  74.00 %
     AVERAGE 3RD QUARTER RELATIVE HUMIDITY  =  76.00 %
     AVERAGE 4TH QUARTER RELATIVE HUMIDITY  =  70.00 %
```

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SAN DIEGO CALIFORNIA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 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	2.88	2.82	2.44	1.19	0.36	0.10
	0.01	0.03	0.18	0.75	1.09	1.89
STD. DEVIATIONS	1.87	2.33	1.56	0.82	0.35	0.15
	0.03	0.09	0.36	0.98	0.87	1.48
RUNOFF						
TOTALS	0.261	0.421	0.134	0.017	0.000	0.000
	0.000	0.000	0.003	0.058	0.009	0.137
STD. DEVIATIONS	0.386	0.740	0.234	0.053	0.000	0.000
	0.000	0.000	0.019	0.173	0.026	0.275
EVAPOTRANSPIRATION						

```
     TOTALS                 1.243    1.787    2.171    1.502    1.805    0.325
                            0.017    0.031    0.143    0.372    0.421    0.745

     STD. DEVIATIONS        0.386    0.403    0.796    0.686    0.459    0.376
                            0.044    0.091    0.298    0.501    0.382    0.466

   PERCOLATION/LEAKAGE THROUGH LAYER  1
   -------------------------------------
     TOTALS                 0.6114   0.8824   0.4635   0.0720   0.0100
     0.0027
                            0.0000   0.0000   0.0000   0.0000   0.0000
                            0.1016

     STD. DEVIATIONS        0.9658   1.0777   0.6630   0.1369   0.0323
     0.0087
                            0.0000   0.0000   0.0000   0.0000   0.0002
                            0.3536


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

-----------------------------------------------------------------------------
--
                                      INCHES            CU. FEET       PERCENT
                                 -------------------   -------------
                                 ---------
 PRECIPITATION                    13.73    (   3.589)    4985733.0     100.00

 RUNOFF                            1.040   (  0.8367)     377555.56      7.573

 EVAPOTRANSPIRATION               10.561   (  1.8198)    3833735.00     76.894

 PERCOLATION/LEAKAGE THROUGH       2.14373 (  1.80571)    778174.312
 15.60802
   LAYER  1

 CHANGE IN WATER STORAGE          -0.010   (  1.3254)      -3733.44     -0.075


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*

                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ----------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     2.596       942402.8750

      PERCOLATION/LEAKAGE THROUGH LAYER  1       1.388291    503949.62500

      SNOW WATER                                 0.14         50934.3281

      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.3914

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.1870

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                    FINAL WATER STORAGE AT END OF YEAR  100
    -------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1            5.1256         0.2136

                   SNOW WATER       0.000


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**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
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PRECIPITATION DATA FILE:    C:\HELP3\CASREQ12.D4
TEMPERATURE DATA FILE:      c:\HELP3\CASREQ12.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CASREQ12.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CASREQ12.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CASREQ12.D10
OUTPUT DATA FILE:           C:\HELP3\CASREQ12.OUT



TIME:  15:42     DATE:  10/14/2012




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     TITLE:  Casmalia RCRA-Equivalent Aged 2-Layer 3:1 CAP Fair Grass

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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   9
   THICKNESS                   =     12.00   INCHES
   POROSITY                    =      0.5010 VOL/VOL
   FIELD CAPACITY              =      0.2840 VOL/VOL
   WILTING POINT               =      0.1350 VOL/VOL
   INITIAL SOIL WATER CONTENT  =      0.2751 VOL/VOL
   EFFECTIVE SAT. HYD. COND.   =  0.190000006000E-03 CM/SEC
 NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
          FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.


                              LAYER  2
                              --------

              TYPE 1 - VERTICAL PERCOLATION LAYER
                  MATERIAL TEXTURE NUMBER  14
   THICKNESS                   =     48.00   INCHES
   POROSITY                    =      0.4790 VOL/VOL
   FIELD CAPACITY              =      0.3710 VOL/VOL
   WILTING POINT               =      0.2510 VOL/VOL
   INITIAL SOIL WATER CONTENT  =      0.3710 VOL/VOL
   EFFECTIVE SAT. HYD. COND.   =  0.249999994000E-04 CM/SEC


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

 NOTE:  SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT
          SOIL DATA BASE USING SOIL TEXTURE # 9 WITH A
          FAIR STAND OF GRASS, A SURFACE SLOPE OF 33.%
          AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER             =     82.50
FRACTION OF AREA ALLOWING RUNOFF    =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE  =    100.000  ACRES
EVAPORATIVE ZONE DEPTH              =     12.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE   =      3.301  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE  =      6.012  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE  =      1.620  INCHES
INITIAL SNOW WATER                  =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS    =     21.107  INCHES
TOTAL INITIAL WATER                 =     21.107  INCHES
TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR


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

 NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
```

SANTA MARIA CALIFORNIA

STATION LATITUDE	=	35.00 DEGREES
MAXIMUM LEAF AREA INDEX	=	2.00
START OF GROWING SEASON (JULIAN DATE)	=	85
END OF GROWING SEASON (JULIAN DATE)	=	338
EVAPORATIVE ZONE DEPTH	=	12.0 INCHES
AVERAGE ANNUAL WIND SPEED	=	7.00 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	73.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	74.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	76.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	70.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SAN DIEGO CALIFORNIA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 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	2.88	2.82	2.44	1.19	0.36	0.10

```
                            0.01     0.03     0.18     0.75     1.09     1.89

    STD. DEVIATIONS         1.87     2.33     1.56     0.82     0.35     0.15
                            0.03     0.09     0.36     0.98     0.87     1.48

  RUNOFF
  ------
    TOTALS                  0.093    0.203    0.039    0.004    0.000    0.000
                            0.000    0.000    0.001    0.026    0.002    0.060

    STD. DEVIATIONS         0.168    0.454    0.105    0.020    0.000    0.000
                            0.000    0.000    0.004    0.096    0.008    0.152

  EVAPOTRANSPIRATION
  ------------------
    TOTALS                  1.345    1.905    2.229    1.318    0.701    0.169
                            0.020    0.030    0.125    0.341    0.432    0.818

    STD. DEVIATIONS         0.474    0.500    0.923    0.787    0.466    0.240
                            0.055    0.091    0.274    0.495    0.448    0.562

  PERCOLATION/LEAKAGE THROUGH LAYER  2
  -------------------------------------
    TOTALS                  0.6585   1.1511   0.9952   0.5419   0.2769
    0.0916
                            0.0038   0.0001   0.0001   0.0017   0.0265
                            0.1392

    STD. DEVIATIONS         0.9101   1.1304   0.7681   0.3593   0.2155
    0.1221
                            0.0207   0.0004   0.0005   0.0045   0.0857
                            0.3291


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

-----------------------------------------------------------------------------
--
                                       INCHES            CU. FEET       PERCENT
                                  -------------------   -------------
                                  ---------
 PRECIPITATION                     13.73    (   3.589)    4985733.0     100.00

 RUNOFF                             0.427   (  0.4821)     154999.28      3.109

 EVAPOTRANSPIRATION                 9.433   (  1.9260)    3424049.00     68.677

 PERCOLATION/LEAKAGE THROUGH        3.88658 (  2.17459)   1410826.750
 28.29728
   LAYER  2

 CHANGE IN WATER STORAGE           -0.011   (  1.4405)      -4142.67     -0.083
```

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                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     1.736       630227.7500

      PERCOLATION/LEAKAGE THROUGH LAYER  2       1.250500    453931.50000

      SNOW WATER                                 0.14         50934.3281

      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.4739

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.1350

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                    FINAL WATER STORAGE AT END OF YEAR  100
    ---------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1            2.1579         0.1798

                       2           17.8079         0.3710

                   SNOW WATER       0.000


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**                                                                          **
**                                                                          **
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE               **
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)                **
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY                   **
**                    USAE WATERWAYS EXPERIMENT STATION                     **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY              **
**                                                                          **
**                                                                          **
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PRECIPITATION DATA FILE:    C:\HELP3\CASREQ11.D4
TEMPERATURE DATA FILE:      c:\HELP3\CASREQ11.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CASREQ11.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CASREQ11.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CASREQ11.D10
OUTPUT DATA FILE:           C:\HELP3\CASREQ11.OUT



TIME:  15:34     DATE:  10/14/2012



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

     TITLE:  Casmalia RCRA-Equivalent 2-Layer 3:1 CAP Fair Grass

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



     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  14
          THICKNESS                   =     12.00   INCHES
          POROSITY                    =      0.4790 VOL/VOL
          FIELD CAPACITY              =      0.3710 VOL/VOL
          WILTING POINT               =      0.2510 VOL/VOL
          INITIAL SOIL WATER CONTENT  =      0.3760 VOL/VOL
          EFFECTIVE SAT. HYD. COND.   =  0.249999994000E-04 CM/SEC
        NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
                 FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.



                                   LAYER  2
                                   --------
```

```
              TYPE 1 - VERTICAL PERCOLATION LAYER
                  MATERIAL TEXTURE NUMBER  28
   THICKNESS                    =     48.00   INCHES
   POROSITY                     =      0.4520 VOL/VOL
   FIELD CAPACITY               =      0.4110 VOL/VOL
   WILTING POINT                =      0.3110 VOL/VOL
   INITIAL SOIL WATER CONTENT   =      0.4148 VOL/VOL
   EFFECTIVE SAT. HYD. COND.    =  0.120000004000E-05 CM/SEC
```

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

    NOTE:  SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT
             SOIL DATA BASE USING SOIL TEXTURE #14 WITH A
             FAIR STAND OF GRASS, A SURFACE SLOPE OF 33.%
             AND A SLOPE LENGTH OF  500. FEET.

  SCS RUNOFF CURVE NUMBER             =     90.10
  FRACTION OF AREA ALLOWING RUNOFF    =    100.0    PERCENT
  AREA PROJECTED ON HORIZONTAL PLANE  =    100.000  ACRES
  EVAPORATIVE ZONE DEPTH              =     12.0    INCHES
  INITIAL WATER IN EVAPORATIVE ZONE   =      4.513  INCHES
  UPPER LIMIT OF EVAPORATIVE STORAGE  =      5.748  INCHES
  LOWER LIMIT OF EVAPORATIVE STORAGE  =      3.012  INCHES
  INITIAL SNOW WATER                  =      0.000  INCHES
  INITIAL WATER IN LAYER MATERIALS    =     24.425  INCHES
  TOTAL INITIAL WATER                 =     24.425  INCHES
  TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR
```

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

    NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
             SANTA MARIA           CALIFORNIA

      STATION LATITUDE                        =  35.00 DEGREES
      MAXIMUM LEAF AREA INDEX                 =   2.00
      START OF GROWING SEASON (JULIAN DATE)   =     85
      END OF GROWING SEASON (JULIAN DATE)     =    338
      EVAPORATIVE ZONE DEPTH                  =  12.0  INCHES
      AVERAGE ANNUAL WIND SPEED               =   7.00 MPH
      AVERAGE 1ST QUARTER RELATIVE HUMIDITY   =  73.00 %
      AVERAGE 2ND QUARTER RELATIVE HUMIDITY   =  74.00 %
      AVERAGE 3RD QUARTER RELATIVE HUMIDITY   =  76.00 %
      AVERAGE 4TH QUARTER RELATIVE HUMIDITY   =  70.00 %


    NOTE:  PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
             COEFFICIENTS FOR    SAN DIEGO           CALIFORNIA

             NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

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

2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 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	2.88	2.82	2.44	1.19	0.36	0.10
	0.01	0.03	0.18	0.75	1.09	1.89
STD. DEVIATIONS	1.87	2.33	1.56	0.82	0.35	0.15
	0.03	0.09	0.36	0.98	0.87	1.48
RUNOFF						
TOTALS	0.364	0.515	0.196	0.035	0.001	0.000
	0.000	0.000	0.006	0.096	0.027	0.226
STD. DEVIATIONS	0.469	0.822	0.292	0.085	0.003	0.000
	0.000	0.000	0.035	0.252	0.058	0.394
EVAPOTRANSPIRATION						
TOTALS	1.306	1.785	2.028	1.086	0.637	0.183
	0.021	0.029	0.117	0.286	0.389	0.820
STD. DEVIATIONS	0.521	0.583	0.936	0.768	0.419	0.249
	0.056	0.091	0.253	0.384	0.426	0.547
PERCOLATION/LEAKAGE THROUGH LAYER 2						
TOTALS	0.7862	0.9783	0.7497	0.4382	0.2620	0.1224
	0.0221	0.0008	0.0005	0.0020	0.0269	0.2070

```
    STD. DEVIATIONS        0.8759   0.8566   0.5060   0.2231   0.1437   0.1160
                           0.0524   0.0046   0.0030   0.0075   0.0854   0.4377

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     AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS    1 THROUGH  100
-------------------------------------------------------------------------------
                                      INCHES            CU. FEET       PERCENT
                                 -------------------   -------------   ---------
 PRECIPITATION                    13.73    (   3.589)    4985733.0     100.00

 RUNOFF                            1.465   (  0.9753)     531809.62     10.667

 EVAPOTRANSPIRATION                8.686   (  1.8185)    3153003.50     63.241

 PERCOLATION/LEAKAGE THROUGH       3.59611 (  1.66130)   1305389.500    26.18250
   LAYER  2

 CHANGE IN WATER STORAGE          -0.012   (  1.1352)      -4470.48     -0.090

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                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ---------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     2.727       989727.5000

      PERCOLATION/LEAKAGE THROUGH LAYER  2       1.341781    487066.50000

      SNOW WATER                                 0.14         50934.3281

      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.4275

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.2510

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                    FINAL WATER STORAGE AT END OF YEAR  100
    ---------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1            3.1403         0.2617

                       2           20.0527         0.4178

                   SNOW WATER       0.000

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**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
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PRECIPITATION DATA FILE:    C:\HELP3\CASREQ10.D4
TEMPERATURE DATA FILE:      c:\HELP3\CASREQ10.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CASREQ10.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CASREQ10.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CASREQ10.D10
OUTPUT DATA FILE:           C:\HELP3\CASREQ10.OUT



TIME:  15:32     DATE:  10/14/2012




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     TITLE:  Casmalia RCRA-Equivalent Aged 2-Layer 2:1 CAP Fair Grass

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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   9
   THICKNESS                   =     12.00   INCHES
   POROSITY                    =      0.5010 VOL/VOL
   FIELD CAPACITY              =      0.2840 VOL/VOL
   WILTING POINT               =      0.1350 VOL/VOL
   INITIAL SOIL WATER CONTENT  =      0.2749 VOL/VOL
   EFFECTIVE SAT. HYD. COND.   =  0.190000006000E-03 CM/SEC
 NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
          FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.


                              LAYER  2
                              --------

              TYPE 1 - VERTICAL PERCOLATION LAYER
                  MATERIAL TEXTURE NUMBER  14
   THICKNESS                   =     48.00   INCHES
   POROSITY                    =      0.4790 VOL/VOL
   FIELD CAPACITY              =      0.3710 VOL/VOL
   WILTING POINT               =      0.2510 VOL/VOL
   INITIAL SOIL WATER CONTENT  =      0.3710 VOL/VOL
   EFFECTIVE SAT. HYD. COND.   =  0.249999994000E-04 CM/SEC


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

 NOTE:  SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT
          SOIL DATA BASE USING SOIL TEXTURE # 9 WITH A
          FAIR STAND OF GRASS, A SURFACE SLOPE OF 50.%
          AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER             =     82.70
FRACTION OF AREA ALLOWING RUNOFF    =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE  =    100.000  ACRES
EVAPORATIVE ZONE DEPTH              =     12.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE   =      3.299  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE  =      6.012  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE  =      1.620  INCHES
INITIAL SNOW WATER                  =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS    =     21.105  INCHES
TOTAL INITIAL WATER                 =     21.105  INCHES
TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR


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

 NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
```

SANTA MARIA CALIFORNIA

STATION LATITUDE	=	35.00 DEGREES
MAXIMUM LEAF AREA INDEX	=	2.00
START OF GROWING SEASON (JULIAN DATE)	=	85
END OF GROWING SEASON (JULIAN DATE)	=	338
EVAPORATIVE ZONE DEPTH	=	12.0 INCHES
AVERAGE ANNUAL WIND SPEED	=	7.00 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	73.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	74.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	76.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	70.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SAN DIEGO CALIFORNIA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 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	2.88	2.82	2.44	1.19	0.36	0.10

```
                            0.01     0.03     0.18     0.75     1.09     1.89

    STD. DEVIATIONS         1.87     2.33     1.56     0.82     0.35     0.15
                            0.03     0.09     0.36     0.98     0.87     1.48

  RUNOFF
  ------
    TOTALS                  0.097    0.208    0.041    0.004    0.000    0.000
                            0.000    0.000    0.001    0.027    0.002    0.062

    STD. DEVIATIONS         0.173    0.462    0.108    0.020    0.000    0.000
                            0.000    0.000    0.005    0.098    0.009    0.156

  EVAPOTRANSPIRATION
  ------------------
    TOTALS                  1.345    1.907    2.229    1.317    0.702    0.168
                            0.020    0.030    0.125    0.341    0.432    0.818

    STD. DEVIATIONS         0.474    0.500    0.922    0.788    0.466    0.240
                            0.055    0.091    0.274    0.493    0.448    0.562

  PERCOLATION/LEAKAGE THROUGH LAYER  2
  -------------------------------------
    TOTALS                  0.6559   1.1471   0.9905   0.5418   0.2763
    0.0916
                            0.0030   0.0001   0.0001   0.0016   0.0260
                            0.1384

    STD. DEVIATIONS         0.9063   1.1256   0.7636   0.3594   0.2153
    0.1217
                            0.0174   0.0005   0.0004   0.0046   0.0843
                            0.3272


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

-----------------------------------------------------------------------------
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                                       INCHES            CU. FEET       PERCENT
                                  -------------------   -------------
                                  ---------
 PRECIPITATION                     13.73    (   3.589)    4985733.0     100.00

 RUNOFF                             0.440   (  0.4906)     159716.44      3.203

 EVAPOTRANSPIRATION                 9.434   (  1.9250)    3424471.75     68.685

 PERCOLATION/LEAKAGE THROUGH        3.87240 (  2.16893)   1405680.500
 28.19406
   LAYER  2

 CHANGE IN WATER STORAGE           -0.011   (  1.4394)      -4135.75     -0.083
```

```
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**
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*

                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     1.759       638466.2500

      PERCOLATION/LEAKAGE THROUGH LAYER  2       1.228283    445866.84400

      SNOW WATER                                 0.14         50934.3281

      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.4724

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.1350

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                    FINAL WATER STORAGE AT END OF YEAR  100
    ---------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1            2.1580         0.1798

                       2           17.8079         0.3710

                   SNOW WATER       0.000


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**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
**
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PRECIPITATION DATA FILE:    C:\HELP3\CAS_REQ9.D4
TEMPERATURE DATA FILE:      C:\HELP3\CAS_REQ9.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CAS_REQ9.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CAS_REQ9.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CAS_REQ9.D10
OUTPUT DATA FILE:           C:\HELP3\CAS_REQ9.OUT



TIME:  12:12     DATE:  10/14/2012




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     TITLE:  Casmalia RCRA-Equivalent 2-Layer CAP Slope 2:1 Fair Grass

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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  14
   THICKNESS                   =     12.00   INCHES
   POROSITY                    =      0.4790 VOL/VOL
   FIELD CAPACITY              =      0.3710 VOL/VOL
   WILTING POINT               =      0.2510 VOL/VOL
   INITIAL SOIL WATER CONTENT  =      0.3433 VOL/VOL
   EFFECTIVE SAT. HYD. COND.   =  0.249999994000E-04 CM/SEC
 NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
          FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.


                          LAYER  2
                          --------

            TYPE 1 - VERTICAL PERCOLATION LAYER
                MATERIAL TEXTURE NUMBER  28
   THICKNESS                   =     48.00   INCHES
   POROSITY                    =      0.4520 VOL/VOL
   FIELD CAPACITY              =      0.4110 VOL/VOL
   WILTING POINT               =      0.3110 VOL/VOL
   INITIAL SOIL WATER CONTENT  =      0.3621 VOL/VOL
   EFFECTIVE SAT. HYD. COND.   =  0.120000004000E-05 CM/SEC


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

 NOTE:  SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT
          SOIL DATA BASE USING SOIL TEXTURE #14 WITH A
          FAIR STAND OF GRASS, A SURFACE SLOPE OF 50.%
          AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER             =     90.20
FRACTION OF AREA ALLOWING RUNOFF    =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE  =    100.000  ACRES
EVAPORATIVE ZONE DEPTH              =     36.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE   =     11.641  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE  =     16.596  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE  =     10.476  INCHES
INITIAL SNOW WATER                  =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS    =     21.499  INCHES
TOTAL INITIAL WATER                 =     21.499  INCHES
TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR


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

 NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
```

SANTA MARIA CALIFORNIA

STATION LATITUDE	=	35.00 DEGREES
MAXIMUM LEAF AREA INDEX	=	2.00
START OF GROWING SEASON (JULIAN DATE)	=	85
END OF GROWING SEASON (JULIAN DATE)	=	338
EVAPORATIVE ZONE DEPTH	=	36.0 INCHES
AVERAGE ANNUAL WIND SPEED	=	7.00 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	73.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	74.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	76.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	70.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SAN DIEGO CALIFORNIA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 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	2.88	2.82	2.44	1.19	0.36	0.10

```
                            0.01     0.03     0.18     0.75     1.09     1.89

    STD. DEVIATIONS         1.87     2.33     1.56     0.82     0.35     0.15
                            0.03     0.09     0.36     0.98     0.87     1.48

  RUNOFF
  ------
    TOTALS                  0.457    0.711    0.303    0.040    0.001    0.000
                            0.000    0.000    0.006    0.089    0.019    0.216

    STD. DEVIATIONS         0.632    1.091    0.432    0.089    0.004    0.000
                            0.000    0.000    0.035    0.236    0.046    0.397

  EVAPOTRANSPIRATION
  ------------------
    TOTALS                  1.160    1.624    2.132    1.541    1.905    0.722
                            0.017    0.031    0.143    0.464    0.565    0.817

    STD. DEVIATIONS         0.217    0.244    0.630    0.668    0.532    0.592
                            0.044    0.092    0.297    0.580    0.373    0.300

  PERCOLATION/LEAKAGE THROUGH LAYER  2
  -------------------------------------
    TOTALS                  0.0435   0.1825   0.2736   0.1674   0.0890
    0.0182
                            0.0001   0.0000   0.0001   0.0001   0.0003
                            0.0000

    STD. DEVIATIONS         0.2164   0.4028   0.4788   0.2491   0.1371
    0.0380
                            0.0008   0.0002   0.0003   0.0004   0.0006
                            0.0002


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

-----------------------------------------------------------------------------
--
                                      INCHES            CU. FEET       PERCENT
                                 -------------------   -------------
                                 ---------
 PRECIPITATION                    13.73    (   3.589)    4985733.0     100.00

 RUNOFF                            1.842   (  1.3420)     668575.62     13.410

 EVAPOTRANSPIRATION               11.121   (  1.8387)    4037052.25     80.972

 PERCOLATION/LEAKAGE THROUGH       0.77484 (  1.14727)    281267.469
 5.64145
   LAYER  2

 CHANGE IN WATER STORAGE          -0.003   (  1.5879)      -1163.34     -0.023
```

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

                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ---------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     3.353      1217219.8700

      PERCOLATION/LEAKAGE THROUGH LAYER  2       0.509192    184836.65600

      SNOW WATER                                 0.14         50934.3281

      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.4447

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.2910

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*

                    FINAL WATER STORAGE AT END OF YEAR  100
    ---------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1            3.6056         0.3005

                       2           17.5734         0.3661

                   SNOW WATER       0.000


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**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
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PRECIPITATION DATA FILE:    C:\HELP3\CAS_REQ8.D4
TEMPERATURE DATA FILE:      C:\HELP3\CAS_REQ8.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CAS_REQ8.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CAS_REQ8.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CAS_REQ8.D10
OUTPUT DATA FILE:           C:\HELP3\CAS_REQ8.OUT



TIME:  12:16     DATE:  10/14/2012




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*

     TITLE:  Casmalia RCRA-Equivalent 2-Layer CAP Slope 2:1 Fair Grass

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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  14
   THICKNESS                   =     12.00   INCHES
   POROSITY                    =      0.4790 VOL/VOL
   FIELD CAPACITY              =      0.3710 VOL/VOL
   WILTING POINT               =      0.2510 VOL/VOL
   INITIAL SOIL WATER CONTENT  =      0.3697 VOL/VOL
   EFFECTIVE SAT. HYD. COND.   =  0.249999994000E-04 CM/SEC
 NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
          FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.


                          LAYER  2
                          --------

             TYPE 1 - VERTICAL PERCOLATION LAYER
                 MATERIAL TEXTURE NUMBER  28
   THICKNESS                   =     48.00   INCHES
   POROSITY                    =      0.4520 VOL/VOL
   FIELD CAPACITY              =      0.4110 VOL/VOL
   WILTING POINT               =      0.3110 VOL/VOL
   INITIAL SOIL WATER CONTENT  =      0.3836 VOL/VOL
   EFFECTIVE SAT. HYD. COND.   =  0.120000004000E-05 CM/SEC


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

 NOTE:  SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT
          SOIL DATA BASE USING SOIL TEXTURE #14 WITH A
          FAIR STAND OF GRASS, A SURFACE SLOPE OF 50.%
          AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER             =     90.20
FRACTION OF AREA ALLOWING RUNOFF    =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE  =    100.000  ACRES
EVAPORATIVE ZONE DEPTH              =     24.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE   =      8.447  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE  =     11.172  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE  =      6.744  INCHES
INITIAL SNOW WATER                  =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS    =     22.847  INCHES
TOTAL INITIAL WATER                 =     22.847  INCHES
TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR


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

 NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
```

SANTA MARIA CALIFORNIA

```
STATION LATITUDE                        =  35.00 DEGREES
MAXIMUM LEAF AREA INDEX                 =   2.00
START OF GROWING SEASON (JULIAN DATE)   =     85
END OF GROWING SEASON (JULIAN DATE)     =    338
EVAPORATIVE ZONE DEPTH                  =  24.0  INCHES
AVERAGE ANNUAL WIND SPEED               =   7.00 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY   =  73.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY   =  74.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY   =  76.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY   =  70.00 %
```

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SAN DIEGO CALIFORNIA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 DEGREES

****
**

AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 100

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	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	2.88	2.82	2.44	1.19	0.36	0.10

```
                          0.01     0.03     0.18     0.75     1.09     1.89

    STD. DEVIATIONS       1.87     2.33     1.56     0.82     0.35     0.15
                          0.03     0.09     0.36     0.98     0.87     1.48

  RUNOFF
  ------
    TOTALS                0.459    0.645    0.248    0.039    0.001    0.000
                          0.000    0.000    0.006    0.095    0.025    0.243

    STD. DEVIATIONS       0.590    1.003    0.353    0.093    0.004    0.000
                          0.000    0.000    0.035    0.249    0.055    0.416

  EVAPOTRANSPIRATION
  ------------------
    TOTALS                1.274    1.839    2.225    1.496    1.435    0.161
                          0.018    0.030    0.134    0.342    0.386    0.750

    STD. DEVIATIONS       0.442    0.462    0.821    0.691    0.503    0.232
                          0.048    0.091    0.280    0.458    0.384    0.503

  PERCOLATION/LEAKAGE THROUGH LAYER  2
  -------------------------------------
    TOTALS                0.2276   0.5198   0.5266   0.3308   0.1666
    0.0538
                          0.0072   0.0056   0.0048   0.0074   0.0107
                          0.0318

    STD. DEVIATIONS       0.5197   0.7213   0.4819   0.2487   0.1258
    0.0610
                          0.0202   0.0168   0.0144   0.0172   0.0187
                          0.0735


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

-----------------------------------------------------------------------------
--
                                      INCHES            CU. FEET       PERCENT
                                 -------------------   -------------
                                 ---------
 PRECIPITATION                    13.73    (   3.589)    4985733.0     100.00

 RUNOFF                            1.760   (  1.1753)     638813.50     12.813

 EVAPOTRANSPIRATION               10.092   (  1.8303)    3663241.25     73.474

 PERCOLATION/LEAKAGE THROUGH       1.89264 (  1.48072)    687029.812
 13.77991
   LAYER  2

 CHANGE IN WATER STORAGE          -0.009   (  1.3320)      -3351.60     -0.067
```

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*

                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ----------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     3.110      1129047.6200

      PERCOLATION/LEAKAGE THROUGH LAYER  2       1.105040    401129.46900

      SNOW WATER                                 0.14         50934.3281

      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.4377

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.2810

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                    FINAL WATER STORAGE AT END OF YEAR  100
    ---------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1            3.1983         0.2665

                       2           18.7256         0.3901

                   SNOW WATER       0.000


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**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
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PRECIPITATION DATA FILE:    C:\HELP3\CAS_REQ7.D4
TEMPERATURE DATA FILE:      C:\HELP3\CAS_REQ7.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CAS_REQ7.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CAS_REQ7.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CAS_REQ7.D10
OUTPUT DATA FILE:           C:\HELP3\CAS_REQ7.OUT



TIME:  12:16     DATE:  10/14/2012




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*

     TITLE:  Casmalia RCRA-Equivalent 2-Layer CAP Slope 2:1 Fair Grass

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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  14
   THICKNESS                    =     12.00   INCHES
   POROSITY                     =      0.4790 VOL/VOL
   FIELD CAPACITY               =      0.3710 VOL/VOL
   WILTING POINT                =      0.2510 VOL/VOL
   INITIAL SOIL WATER CONTENT   =      0.3761 VOL/VOL
   EFFECTIVE SAT. HYD. COND.    =  0.249999994000E-04 CM/SEC
 NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
          FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.


                              LAYER  2
                              --------

              TYPE 1 - VERTICAL PERCOLATION LAYER
                  MATERIAL TEXTURE NUMBER  28
   THICKNESS                    =     48.00   INCHES
   POROSITY                     =      0.4520 VOL/VOL
   FIELD CAPACITY               =      0.4110 VOL/VOL
   WILTING POINT                =      0.3110 VOL/VOL
   INITIAL SOIL WATER CONTENT   =      0.4148 VOL/VOL
   EFFECTIVE SAT. HYD. COND.    =  0.120000004000E-05 CM/SEC


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

 NOTE:  SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT
          SOIL DATA BASE USING SOIL TEXTURE #14 WITH A
          FAIR STAND OF GRASS, A SURFACE SLOPE OF 50.%
          AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER             =     90.20
FRACTION OF AREA ALLOWING RUNOFF    =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE  =    100.000  ACRES
EVAPORATIVE ZONE DEPTH              =     12.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE   =      4.513  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE  =      5.748  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE  =      3.012  INCHES
INITIAL SNOW WATER                  =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS    =     24.425  INCHES
TOTAL INITIAL WATER                 =     24.425  INCHES
TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR


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

 NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
```

SANTA MARIA CALIFORNIA

```
STATION LATITUDE                        =  35.00 DEGREES
MAXIMUM LEAF AREA INDEX                 =   2.00
START OF GROWING SEASON (JULIAN DATE)   =     85
END OF GROWING SEASON (JULIAN DATE)     =    338
EVAPORATIVE ZONE DEPTH                  =  12.0  INCHES
AVERAGE ANNUAL WIND SPEED               =   7.00 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY   =  73.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY   =  74.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY   =  76.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY   =  70.00 %
```

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SAN DIEGO CALIFORNIA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 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	2.88	2.82	2.44	1.19	0.36	0.10

```
                            0.01     0.03     0.18     0.75     1.09     1.89

    STD. DEVIATIONS         1.87     2.33     1.56     0.82     0.35     0.15
                            0.03     0.09     0.36     0.98     0.87     1.48

  RUNOFF
  ------
    TOTALS                  0.368    0.523    0.199    0.037    0.001    0.000
                            0.000    0.000    0.006    0.098    0.029    0.227

    STD. DEVIATIONS         0.471    0.832    0.295    0.089    0.003    0.000
                            0.000    0.000    0.035    0.255    0.061    0.396

  EVAPOTRANSPIRATION
  ------------------
    TOTALS                  1.301    1.781    2.029    1.078    0.642    0.183
                            0.021    0.029    0.117    0.295    0.389    0.818

    STD. DEVIATIONS         0.523    0.589    0.938    0.762    0.426    0.249
                            0.056    0.091    0.254    0.398    0.424    0.546

  PERCOLATION/LEAKAGE THROUGH LAYER  2
  -------------------------------------
    TOTALS                  0.7835   0.9810   0.7379   0.4398   0.2618
    0.1211
                            0.0224   0.0007   0.0005   0.0022   0.0255
                            0.2012

    STD. DEVIATIONS         0.8738   0.8540   0.4850   0.2227   0.1433
    0.1159
                            0.0532   0.0044   0.0029   0.0092   0.0807
                            0.4324


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

-----------------------------------------------------------------------------
--
                                       INCHES            CU. FEET       PERCENT
                                  -------------------   -------------
                                  ---------
 PRECIPITATION                     13.73    (   3.589)    4985733.0     100.00

 RUNOFF                             1.487   (  0.9830)     539660.94     10.824

 EVAPOTRANSPIRATION                 8.683   (  1.8495)    3151859.25     63.218

 PERCOLATION/LEAKAGE THROUGH        3.57769 (  1.63442)   1298702.250
 26.04837
   LAYER  2

 CHANGE IN WATER STORAGE           -0.012   (  1.1235)      -4490.02     -0.090
```

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                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     2.739       994425.9370

      PERCOLATION/LEAKAGE THROUGH LAYER  2       1.312467    476425.56200

      SNOW WATER                                 0.14         50934.3281

      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.4272

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.2510

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                    FINAL WATER STORAGE AT END OF YEAR  100
    ---------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1            3.1513         0.2626

                       2           20.0366         0.4174

                   SNOW WATER       0.000

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**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
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PRECIPITATION DATA FILE:    C:\HELP3\CAS_REQ6.D4
TEMPERATURE DATA FILE:      C:\HELP3\CAS_REQ6.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CAS_REQ6.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CAS_REQ6.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CAS_REQ6.D10
OUTPUT DATA FILE:           C:\HELP3\CAS_REQ6.OUT



TIME:  12: 4     DATE:  10/14/2012




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     TITLE:  Casmalia RCRA-Equivalent Mono Soil CAP Slope 2:1 Fair Grass

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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  28
   THICKNESS                    =     60.00   INCHES
   POROSITY                     =      0.4520 VOL/VOL
   FIELD CAPACITY               =      0.4110 VOL/VOL
   WILTING POINT                =      0.3110 VOL/VOL
   INITIAL SOIL WATER CONTENT   =      0.3930 VOL/VOL
   EFFECTIVE SAT. HYD. COND.    =  0.120000004000E-05 CM/SEC
 NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
          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 #28 WITH A
          FAIR STAND OF GRASS, A SURFACE SLOPE OF 50.%
          AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER             =     90.70
FRACTION OF AREA ALLOWING RUNOFF    =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE  =    100.000  ACRES
EVAPORATIVE ZONE DEPTH              =     24.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE   =      8.786  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE  =     10.848  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE  =      7.464  INCHES
INITIAL SNOW WATER                  =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS    =     23.580  INCHES
TOTAL INITIAL WATER                 =     23.580  INCHES
TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR


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

 NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
          SANTA MARIA           CALIFORNIA

     STATION LATITUDE                       =  35.00 DEGREES
     MAXIMUM LEAF AREA INDEX                =   2.00
     START OF GROWING SEASON (JULIAN DATE)  =     85
     END OF GROWING SEASON (JULIAN DATE)    =    338
     EVAPORATIVE ZONE DEPTH                 =  24.0  INCHES
     AVERAGE ANNUAL WIND SPEED              =   7.00 MPH
     AVERAGE 1ST QUARTER RELATIVE HUMIDITY  =  73.00 %
     AVERAGE 2ND QUARTER RELATIVE HUMIDITY  =  74.00 %
     AVERAGE 3RD QUARTER RELATIVE HUMIDITY  =  76.00 %
     AVERAGE 4TH QUARTER RELATIVE HUMIDITY  =  70.00 %
```

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SAN DIEGO CALIFORNIA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 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	2.88	2.82	2.44	1.19	0.36	0.10
	0.01	0.03	0.18	0.75	1.09	1.89
STD. DEVIATIONS	1.87	2.33	1.56	0.82	0.35	0.15
	0.03	0.09	0.36	0.98	0.87	1.48
RUNOFF						
TOTALS	0.849	1.033	0.553	0.088	0.003	0.000
	0.000	0.000	0.009	0.123	0.056	0.392
STD. DEVIATIONS	1.034	1.441	0.717	0.182	0.016	0.000
	0.000	0.000	0.049	0.314	0.107	0.593
EVAPOTRANSPIRATION						

```
     TOTALS                 1.188    1.454    1.742    1.245    1.773    0.387
                            0.016    0.031    0.142    0.397    0.457    0.790

     STD. DEVIATIONS        0.318    0.411    0.690    0.575    0.390    0.367
                            0.043    0.091    0.288    0.506    0.393    0.420

   PERCOLATION/LEAKAGE THROUGH LAYER  1
   -------------------------------------
     TOTALS                 0.0510   0.1308   0.2684   0.2318   0.1844
     0.0827
                            0.0166   0.0078   0.0067   0.0069   0.0090
                            0.0125

     STD. DEVIATIONS        0.1308   0.2225   0.3184   0.2181   0.1310
     0.0744
                            0.0292   0.0192   0.0166   0.0136   0.0205
                            0.0239


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

 -------------------------------------------------------------------------------
 --
                                       INCHES            CU. FEET       PERCENT
                                 -------------------   -------------
                                 ---------
  PRECIPITATION                   13.73    (   3.589)    4985733.0     100.00

  RUNOFF                           3.107   (  1.8056)    1127876.75     22.622

  EVAPOTRANSPIRATION               9.623   (  1.6509)    3493001.25     70.060

  PERCOLATION/LEAKAGE THROUGH      1.00847 (  0.76892)    366076.312
  7.34248
    LAYER  1

  CHANGE IN WATER STORAGE         -0.003   (  1.0765)      -1222.46     -0.025


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                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ----------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     3.745      1359535.1200

      PERCOLATION/LEAKAGE THROUGH LAYER  1       0.136461     49535.33980

      SNOW WATER                                 0.14         50934.3281

      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.4520

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.3110

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                    FINAL WATER STORAGE AT END OF YEAR  100
    ---------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1           23.2434         0.3874

                   SNOW WATER       0.000


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**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
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PRECIPITATION DATA FILE:    C:\HELP3\CAS_REQ5.D4
TEMPERATURE DATA FILE:      C:\HELP3\CAS_REQ5.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CAS_REQ5.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CAS_REQ5.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CAS_REQ5.D10
OUTPUT DATA FILE:           C:\HELP3\CAS_REQ5.OUT



TIME:  12: 4     DATE:  10/14/2012




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     TITLE:  Casmalia RCRA-Equivalent Mono Soil CAP Slope 2:1 Fair Grass

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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  28
   THICKNESS                    =     60.00   INCHES
   POROSITY                     =      0.4520 VOL/VOL
   FIELD CAPACITY               =      0.4110 VOL/VOL
   WILTING POINT                =      0.3110 VOL/VOL
   INITIAL SOIL WATER CONTENT   =      0.4137 VOL/VOL
   EFFECTIVE SAT. HYD. COND.    =  0.120000004000E-05 CM/SEC
 NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
          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 #28 WITH A
          FAIR STAND OF GRASS, A SURFACE SLOPE OF 50.%
          AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER             =     90.70
FRACTION OF AREA ALLOWING RUNOFF    =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE  =    100.000  ACRES
EVAPORATIVE ZONE DEPTH              =     12.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE   =      4.700  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE  =      5.424  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE  =      3.732  INCHES
INITIAL SNOW WATER                  =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS    =     24.824  INCHES
TOTAL INITIAL WATER                 =     24.824  INCHES
TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR


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

 NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
          SANTA MARIA           CALIFORNIA

     STATION LATITUDE                       =  35.00 DEGREES
     MAXIMUM LEAF AREA INDEX                =   2.00
     START OF GROWING SEASON (JULIAN DATE)  =     85
     END OF GROWING SEASON (JULIAN DATE)    =    338
     EVAPORATIVE ZONE DEPTH                 =  12.0  INCHES
     AVERAGE ANNUAL WIND SPEED              =   7.00 MPH
     AVERAGE 1ST QUARTER RELATIVE HUMIDITY  =  73.00 %
     AVERAGE 2ND QUARTER RELATIVE HUMIDITY  =  74.00 %
     AVERAGE 3RD QUARTER RELATIVE HUMIDITY  =  76.00 %
     AVERAGE 4TH QUARTER RELATIVE HUMIDITY  =  70.00 %
```

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SAN DIEGO CALIFORNIA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 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	2.88	2.82	2.44	1.19	0.36	0.10
	0.01	0.03	0.18	0.75	1.09	1.89
STD. DEVIATIONS	1.87	2.33	1.56	0.82	0.35	0.15
	0.03	0.09	0.36	0.98	0.87	1.48
RUNOFF						
TOTALS	0.815	0.922	0.500	0.085	0.003	0.000
	0.000	0.000	0.012	0.150	0.097	0.460
STD. DEVIATIONS	0.940	1.302	0.674	0.205	0.015	0.000
	0.000	0.000	0.058	0.384	0.166	0.659
EVAPOTRANSPIRATION						

```
     TOTALS                 1.262    1.486    1.758    1.207    0.767    0.129
                            0.018    0.030    0.121    0.351    0.462    0.884

     STD. DEVIATIONS        0.370    0.461    0.730    0.593    0.410    0.186
                            0.052    0.091    0.246    0.464    0.454    0.488

   PERCOLATION/LEAKAGE THROUGH LAYER  1
   -------------------------------------
     TOTALS                 0.2557   0.5120   0.5468   0.3894   0.2731
     0.1478
                            0.0234   0.0006   0.0002   0.0015   0.0086
                            0.0584

     STD. DEVIATIONS        0.3865   0.4544   0.3374   0.2144   0.1324
     0.1117
                            0.0507   0.0048   0.0017   0.0050   0.0216
                            0.1424


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

-----------------------------------------------------------------------------
--
                                      INCHES            CU. FEET       PERCENT
                                 -------------------   -------------
                                 ---------
 PRECIPITATION                    13.73    (   3.589)    4985733.0     100.00

 RUNOFF                            3.044   (  1.6370)    1104856.75     22.160

 EVAPOTRANSPIRATION                8.473   (  1.6990)    3075825.50     61.693

 PERCOLATION/LEAKAGE THROUGH       2.21740 (  1.07115)    804917.687
 16.14442
   LAYER  1

 CHANGE IN WATER STORAGE           0.000   (  0.9122)        133.02      0.003


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                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ---------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     3.596      1305521.2500

      PERCOLATION/LEAKAGE THROUGH LAYER  1       0.883161    320587.53100

      SNOW WATER                                 0.14         50934.3281

      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.4520

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.3110

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                    FINAL WATER STORAGE AT END OF YEAR  100
    -------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1           24.8609         0.4143

                   SNOW WATER       0.000


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**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
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PRECIPITATION DATA FILE:    C:\HELP3\CAS_ET15.D4
TEMPERATURE DATA FILE:      c:\HELP3\CAS_ET15.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CAS_ET15.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CAS_ET15.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CAS_ET15.D10
OUTPUT DATA FILE:           C:\HELP3\CAS_ET15.OUT



TIME:  21: 9     DATE:  10/22/2012




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     TITLE:  Casmalia Evapotranspiration Cover Aged 3:1 Slope Fair Grass

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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   9
   THICKNESS                   =     48.00   INCHES
   POROSITY                    =      0.5010 VOL/VOL
   FIELD CAPACITY              =      0.2840 VOL/VOL
   WILTING POINT               =      0.1350 VOL/VOL
   INITIAL SOIL WATER CONTENT  =      0.1925 VOL/VOL
   EFFECTIVE SAT. HYD. COND.   =  0.190000006000E-03 CM/SEC
 NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
          FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.


                              LAYER  2
                              --------

              TYPE 1 - VERTICAL PERCOLATION LAYER
                  MATERIAL TEXTURE NUMBER  14
   THICKNESS                   =     12.00   INCHES
   POROSITY                    =      0.4790 VOL/VOL
   FIELD CAPACITY              =      0.3710 VOL/VOL
   WILTING POINT               =      0.2510 VOL/VOL
   INITIAL SOIL WATER CONTENT  =      0.3710 VOL/VOL
   EFFECTIVE SAT. HYD. COND.   =  0.249999994000E-04 CM/SEC


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

 NOTE:  SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT
          SOIL DATA BASE USING SOIL TEXTURE # 9 WITH A
          FAIR STAND OF GRASS, A SURFACE SLOPE OF 33.%
          AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER             =     82.50
FRACTION OF AREA ALLOWING RUNOFF    =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE  =    100.000  ACRES
EVAPORATIVE ZONE DEPTH              =     36.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE   =      5.834  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE  =     18.036  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE  =      4.860  INCHES
INITIAL SNOW WATER                  =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS    =     13.691  INCHES
TOTAL INITIAL WATER                 =     13.691  INCHES
TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR


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

 NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
```

SANTA MARIA CALIFORNIA

STATION LATITUDE	=	35.00 DEGREES
MAXIMUM LEAF AREA INDEX	=	2.00
START OF GROWING SEASON (JULIAN DATE)	=	85
END OF GROWING SEASON (JULIAN DATE)	=	338
EVAPORATIVE ZONE DEPTH	=	36.0 INCHES
AVERAGE ANNUAL WIND SPEED	=	7.00 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	73.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	74.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	76.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	70.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SAN DIEGO CALIFORNIA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 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	2.88	2.82	2.44	1.19	0.36	0.10

```
                            0.01     0.03     0.18     0.75     1.09     1.89

    STD. DEVIATIONS         1.87     2.33     1.56     0.82     0.35     0.15
                            0.03     0.09     0.36     0.98     0.87     1.48

  RUNOFF
  ------
    TOTALS                  0.089    0.205    0.044    0.003    0.000    0.000
                            0.000    0.000    0.001    0.022    0.000    0.048

    STD. DEVIATIONS         0.174    0.455    0.114    0.014    0.000    0.000
                            0.000    0.000    0.004    0.083    0.004    0.127

  EVAPOTRANSPIRATION
  ------------------
    TOTALS                  1.103    1.548    2.193    1.689    1.986    1.456
                            0.016    0.031    0.148    0.475    0.599    0.799

    STD. DEVIATIONS         0.191    0.219    0.543    0.694    0.567    0.876
                            0.042    0.092    0.309    0.607    0.383    0.278

  PERCOLATION/LEAKAGE THROUGH LAYER  2
  -------------------------------------
    TOTALS                  0.0533   0.2955   0.4959   0.3117   0.1133
    0.0105
                            0.0000   0.0000   0.0000   0.0000   0.0001
                            0.0000

    STD. DEVIATIONS         0.2707   0.7332   0.9358   0.4741   0.1993
    0.0204
                            0.0000   0.0000   0.0000   0.0000   0.0006
                            0.0000


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

-----------------------------------------------------------------------------
--
                                      INCHES            CU. FEET       PERCENT
                                 -------------------   -------------
                                 ---------
 PRECIPITATION                    13.73    (   3.589)    4985733.0     100.00

 RUNOFF                            0.411   (  0.4877)     149080.52      2.990

 EVAPOTRANSPIRATION               12.043   (  2.0186)    4371631.00     87.683

 PERCOLATION/LEAKAGE THROUGH       1.28027 (  1.92771)    464738.094
 9.32136
   LAYER  2

 CHANGE IN WATER STORAGE           0.001   (  2.0291)        282.94      0.006
```

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                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ---------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     1.868       678241.4370

      PERCOLATION/LEAKAGE THROUGH LAYER  2       0.604201    219324.79700

      SNOW WATER                                 0.14         50934.3281

      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.3876

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.1350

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                    FINAL WATER STORAGE AT END OF YEAR  100
    ---------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1            9.3174         0.1941

                       2            4.4520         0.3710

                   SNOW WATER       0.000


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**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
**
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PRECIPITATION DATA FILE:    C:\HELP3\CAS_ET14.D4
TEMPERATURE DATA FILE:      c:\HELP3\CAS_ET14.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CAS_ET14.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CAS_ET14.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CAS_ET14.D10
OUTPUT DATA FILE:           C:\HELP3\CAS_ET14.OUT


TIME:  21: 0     DATE:  10/22/2012




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     TITLE:  Casmalia Evapotranspiration Cover 3:1 Slope Fair Grass

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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  14
   THICKNESS                   =     48.00   INCHES
   POROSITY                    =      0.4790 VOL/VOL
   FIELD CAPACITY              =      0.3710 VOL/VOL
   WILTING POINT               =      0.2510 VOL/VOL
   INITIAL SOIL WATER CONTENT  =      0.3043 VOL/VOL
   EFFECTIVE SAT. HYD. COND.   =  0.249999994000E-04 CM/SEC
 NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
          FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.


                              LAYER  2
                              --------

              TYPE 1 - VERTICAL PERCOLATION LAYER
                  MATERIAL TEXTURE NUMBER  28
   THICKNESS                   =     12.00   INCHES
   POROSITY                    =      0.4520 VOL/VOL
   FIELD CAPACITY              =      0.4110 VOL/VOL
   WILTING POINT               =      0.3110 VOL/VOL
   INITIAL SOIL WATER CONTENT  =      0.4110 VOL/VOL
   EFFECTIVE SAT. HYD. COND.   =  0.120000004000E-05 CM/SEC


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

 NOTE:  SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT
          SOIL DATA BASE USING SOIL TEXTURE #14 WITH A
          FAIR STAND OF GRASS, A SURFACE SLOPE OF 33.%
          AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER             =     90.10
FRACTION OF AREA ALLOWING RUNOFF    =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE  =    100.000  ACRES
EVAPORATIVE ZONE DEPTH              =     36.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE   =     10.156  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE  =     17.244  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE  =      9.036  INCHES
INITIAL SNOW WATER                  =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS    =     19.539  INCHES
TOTAL INITIAL WATER                 =     19.539  INCHES
TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR


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

 NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
```

SANTA MARIA CALIFORNIA

```
STATION LATITUDE                        =  35.00 DEGREES
MAXIMUM LEAF AREA INDEX                 =   2.00
START OF GROWING SEASON (JULIAN DATE)   =     85
END OF GROWING SEASON (JULIAN DATE)     =    338
EVAPORATIVE ZONE DEPTH                  =  36.0  INCHES
AVERAGE ANNUAL WIND SPEED               =   7.00 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY   =  73.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY   =  74.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY   =  76.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY   =  70.00 %
```

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SAN DIEGO CALIFORNIA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 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	2.88	2.82	2.44	1.19	0.36	0.10

```
                          0.01     0.03     0.18     0.75     1.09     1.89

    STD. DEVIATIONS       1.87     2.33     1.56     0.82     0.35     0.15
                          0.03     0.09     0.36     0.98     0.87     1.48

  RUNOFF
  ------
    TOTALS                0.394    0.623    0.249    0.035    0.001    0.000
                          0.000    0.000    0.006    0.087    0.018    0.203

    STD. DEVIATIONS       0.541    0.975    0.363    0.082    0.003    0.000
                          0.000    0.000    0.034    0.233    0.044    0.374

  EVAPOTRANSPIRATION
  ------------------
    TOTALS                1.156    1.620    2.206    1.635    1.896    0.792
                          0.017    0.031    0.143    0.456    0.564    0.806

    STD. DEVIATIONS       0.203    0.242    0.588    0.681    0.551    0.667
                          0.045    0.092    0.297    0.577    0.371    0.294

  PERCOLATION/LEAKAGE THROUGH LAYER  2
  -------------------------------------
    TOTALS                0.0345   0.1762   0.3140   0.1799   0.0810
    0.0128
                          0.0000   0.0000   0.0001   0.0002   0.0002
                          0.0000

    STD. DEVIATIONS       0.1829   0.4440   0.5845   0.2997   0.1440
    0.0289
                          0.0002   0.0003   0.0004   0.0005   0.0005
                          0.0002


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

-----------------------------------------------------------------------------
--
                                      INCHES            CU. FEET       PERCENT
                                 -------------------   -------------
                                 ---------
 PRECIPITATION                    13.73    (   3.589)    4985733.0     100.00

 RUNOFF                            1.616   (  1.1658)     586737.81     11.768

 EVAPOTRANSPIRATION               11.322   (  1.9071)    4109759.25     82.430

 PERCOLATION/LEAKAGE THROUGH       0.79907 (  1.26173)    290063.156
 5.81786
   LAYER  2

 CHANGE IN WATER STORAGE          -0.002   (  1.6463)       -827.56     -0.017
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                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     3.125      1134309.2500

      PERCOLATION/LEAKAGE THROUGH LAYER  2       0.363541    131965.35900

      SNOW WATER                                 0.14         50934.3281

      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.4427

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.2510

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                    FINAL WATER STORAGE AT END OF YEAR  100
    ---------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1           14.3785         0.2996

                       2            4.9320         0.4110

                   SNOW WATER       0.000


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**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**
**                    USAE WATERWAYS EXPERIMENT STATION
**
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
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PRECIPITATION DATA FILE:    C:\HELP3\CASREQ13.D4
TEMPERATURE DATA FILE:      c:\HELP3\CASREQ13.D7
SOLAR RADIATION DATA FILE:  C:\HELP3\CASREQ13.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3\CASREQ13.D11
SOIL AND DESIGN DATA FILE:  C:\HELP3\CASREQ13.D10
OUTPUT DATA FILE:           C:\HELP3\CASREQ13.OUT


TIME:  18: 6     DATE:  10/15/2012




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     TITLE:  Casmalia RCRA-Equivalent 2-Layer 3:1 CAP Fair Grass

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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  14
   THICKNESS                    =     12.00   INCHES
   POROSITY                     =      0.4790 VOL/VOL
   FIELD CAPACITY               =      0.3710 VOL/VOL
   WILTING POINT                =      0.2510 VOL/VOL
   INITIAL SOIL WATER CONTENT   =      0.3697 VOL/VOL
   EFFECTIVE SAT. HYD. COND.    =  0.249999994000E-04 CM/SEC
 NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
          FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.


                              LAYER  2
                              --------

              TYPE 1 - VERTICAL PERCOLATION LAYER
                  MATERIAL TEXTURE NUMBER  28
   THICKNESS                    =     48.00   INCHES
   POROSITY                     =      0.4520 VOL/VOL
   FIELD CAPACITY               =      0.4110 VOL/VOL
   WILTING POINT                =      0.3110 VOL/VOL
   INITIAL SOIL WATER CONTENT   =      0.3805 VOL/VOL
   EFFECTIVE SAT. HYD. COND.    =  0.120000004000E-05 CM/SEC


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

 NOTE:  SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT
          SOIL DATA BASE USING SOIL TEXTURE #14 WITH A
          FAIR STAND OF GRASS, A SURFACE SLOPE OF 33.%
          AND A SLOPE LENGTH OF  500. FEET.

SCS RUNOFF CURVE NUMBER             =     90.10
FRACTION OF AREA ALLOWING RUNOFF    =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE  =    100.000  ACRES
EVAPORATIVE ZONE DEPTH              =     24.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE   =      8.447  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE  =     11.172  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE  =      6.744  INCHES
INITIAL SNOW WATER                  =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS    =     22.702  INCHES
TOTAL INITIAL WATER                 =     22.702  INCHES
TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR


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

 NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
```

SANTA MARIA CALIFORNIA

STATION LATITUDE	=	35.00 DEGREES
MAXIMUM LEAF AREA INDEX	=	2.00
START OF GROWING SEASON (JULIAN DATE)	=	85
END OF GROWING SEASON (JULIAN DATE)	=	338
EVAPORATIVE ZONE DEPTH	=	24.0 INCHES
AVERAGE ANNUAL WIND SPEED	=	7.00 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	73.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	74.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	76.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	70.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SAN DIEGO CALIFORNIA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.93	2.90	2.41	1.06	0.28	0.07
0.01	0.03	0.21	0.63	1.15	2.07

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	52.30	52.40	54.20	56.80	59.80
62.30	63.10	63.00	60.50	55.50	51.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SANTA MARIA CALIFORNIA
AND STATION LATITUDE = 35.00 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	2.88	2.82	2.44	1.19	0.36	0.10

```
                          0.01     0.03     0.18     0.75     1.09     1.89

    STD. DEVIATIONS       1.87     2.33     1.56     0.82     0.35     0.15
                          0.03     0.09     0.36     0.98     0.87     1.48

  RUNOFF
  ------
    TOTALS                0.453    0.641    0.243    0.038    0.001    0.000
                          0.000    0.000    0.006    0.093    0.024    0.240

    STD. DEVIATIONS       0.583    0.999    0.348    0.094    0.003    0.000
                          0.000    0.000    0.034    0.246    0.054    0.412

  EVAPOTRANSPIRATION
  ------------------
    TOTALS                1.275    1.840    2.225    1.495    1.430    0.159
                          0.018    0.030    0.136    0.339    0.388    0.754

    STD. DEVIATIONS       0.443    0.460    0.820    0.692    0.504    0.231
                          0.048    0.091    0.288    0.452    0.390    0.505

  PERCOLATION/LEAKAGE THROUGH LAYER  2
  -------------------------------------
    TOTALS                0.2399   0.5247   0.5337   0.3287   0.1657
    0.0517
                          0.0099   0.0070   0.0051   0.0106   0.0117
                          0.0277

    STD. DEVIATIONS       0.5402   0.7224   0.4851   0.2554   0.1247
    0.0573
                          0.0228   0.0177   0.0145   0.0205   0.0213
                          0.0674


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

-------------------------------------------------------------------------------
--
                                      INCHES            CU. FEET       PERCENT
                                 -------------------   -------------
                                 ---------
 PRECIPITATION                    13.73    (   3.589)    4985733.0     100.00

 RUNOFF                            1.737   (  1.1673)     630648.31     12.649

 EVAPOTRANSPIRATION               10.089   (  1.8303)    3662330.75     73.456

 PERCOLATION/LEAKAGE THROUGH       1.91632 (  1.49534)    695624.812
 13.95231
   LAYER  2

 CHANGE IN WATER STORAGE          -0.008   (  1.3123)      -2871.53     -0.058
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                PEAK DAILY VALUES FOR YEARS    1 THROUGH  100
   ---------------------------------------------------------------------------
                                                (INCHES)      (CU. FT.)
                                               ----------   -------------
      PRECIPITATION                              4.67       1695210.000

      RUNOFF                                     3.105      1127146.3700

      PERCOLATION/LEAKAGE THROUGH LAYER  2       1.106596    401694.18700

      SNOW WATER                                 0.14         50934.3281

      MAXIMUM VEG. SOIL WATER (VOL/VOL)                  0.4386

      MINIMUM VEG. SOIL WATER (VOL/VOL)                  0.2810

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                    FINAL WATER STORAGE AT END OF YEAR  100
    ---------------------------------------------------------------------
                     LAYER        (INCHES)       (VOL/VOL)
                     -----        --------       ---------
                       1            3.2000         0.2667

                       2           18.7108         0.3898

                   SNOW WATER       0.000


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