STONE & WEBSTER ENGINEERING CORPORATION
CALCULATION TITLE PAGE

5010.66

CLIENT & PROJECT: Private Fuel Storage, LLC- Private Fuel Storage Facility	PAGE 1 Total Pages: w/attachments 100 pages
CALCULATION TITLE: The PMF and The 100-yr Flood Flow at the Access Road Crossing and the PFSF Site	QA CATEGORY (✓) ✓ I - NUCLEAR SAFETY RELATED; ☐ II; ☐ III; ☐ (other) N/A

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PREPARES(S) / DATE(S)	REVIEWER(S) / DATES(S)	INDEPENDENT REVIEWER(S) / DATE(S)			YES	NO
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Attachment A - Hydrological Computations-HEC-1 Inputs & Outputs 48pp
Attachment B - Hydraulic Backwater Calculation -HEC-RAS Output 5pp
10pp

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CALCULATION SHEET

CALCULATION IDENTIFICATION NUMBER				
J.O. or W.O. No. 05996.01	Discipline G(B)	CALCULATION NO. 02	OPTIONAL TASK CODE N/A	PAGE 3___

HISTORICAL DATA REVISION

REASON FOR CHANGE & SOURCE OF INFORMATION

PAGES AFFECTED

PAGE	DESCRIPTION
1	Page No changed
4	Added statement regarding microcomputer qualification.
5	Added references
Att. B.	Added HEC RAS output (P 6B-10B)

1. Objectives

This calculation is conducted to determine the PMF and the 100-yr flood flows at the access road crossing and the PFSF site. The flood elevation in the vicinity of the site is determined to verify the site is a flood -dry site (Ref RG 3.48, Sect 2.4.2).

2. Methodology

The PMP was estimated based on HMR NO. 49 (1977). The PMPs induced by the general storm and local thunderstorm were evaluated. The general-storm PMP was determined as the sum of convergence and orographic PMP components. Comparison between general and local PMF was made to select a greater PMF as a design discharge.

The 100-yr precipitation was evaluated based on NOAA Atlas No. 2 (1973). The basin precipitation was computed based on spatial distribution of the 100-yr precipitation weighted by the subbasin area ratio.

The SCS curve number method was used to estimate the infiltration losses (SCS TR-55, 1986).

The Kirpich Method was used to determine the time of concentrations for an overland flow (Chow,1964).

Corps of Engineer Flood Hydrograph Package (HEC-1, 1990) model was used to route the runoff over the drainage basin . The SCS dimensionless unit hydrograph was employed to transform the excess to outflow.

Corps of Engineer River Analysis System (HEC-RAS, 1995) was used to compute the backwater elevation at the downstream of the access road resulted from the PMF and the 100-yr flood. The combing peak discharge flow for both at the site and the access road was used the backwater computation.

Both HEC-1 and HEC-RAS programs have independently been verified, cal. 05996.01-G(B)-08 (1997) and cal. 05996.01-G(B)-10 (1997) documented program qualifications. 1

3. References

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, 1977, "Probable Maximum Precipitation Estimates, Colorado River and Great Basin Drainage," Hydrometrological Report No. 49 (HMR 49).

U.S. Department of Agriculture, Soil Conservation Service, Engineering Division, 1973, "Precipitation-Frequency Atlas of the Western United Stated, Volume IV, Utah," NOAA Atlas 2.

U.S. Army Corps of Engineers, Office of the Chief of Engineers, 1990, "Flood Hydrograph Package, HEC-1," Hydrologic Engineering Center.

U.S. Army Corps of Engineers, Hydrologic Center, 1995, "River Analysis System," HEC-RAS.

U.S. Department of Agriculture, Soil Conservation Service, 1985, "National Engineering Handbook, Sect 4, Hydrology".

U.S. Geological Survey, 1994, "Methods for Estimating Magnitude and Frequency of Floods in the Southwestern United States," U.S.G.S. Open File Report 93-419.

U.S. Department of Agriculture, Soil Conservation Service, 1986, "Urban Hydrology for Small Watersheds," TR-55.

USDA, Unpublished Report.

Chow, V.T., 1964, " Handbook of Applied Hydrology," Mcgraw-Hill Book Company.

Hood,J.W., and Waddell,K.M., 1968, "Hydrologic Reconnaissance of Skull Valley, Tooele County, Utah," DNR Tech Pub. No. 18, 57pp.

U.S. Department of Army, 1952, "Standard Project Flood Determinations," Civil Engineer Bulletin, No 52-8.

Sack,D., 1993, "Quaternary Geologic Map of Skull Valley, Tooele County, Utah".

Cal. 05996.01-G(B)-08, Rev. 1 " HEC-1 Flood Hydrograph Package. Microcomputer (V.4.0) Software Test. QS 2-7", dated 05-20-97. 1

Cal. 05996.01-G(B)-10, Rev. 0, " HEC-RAS Micro computer Version 1.2 Software Test", dated 5-20-97 1

4. Calculations

4.1 Drainage Basins

Drainage basins which contribute its runoff to the location of the access road crossing and the PFSF site are shown in Figure 1.

The runoff to the access road crossing originates from the upland of Stansbury Mountains. A perennial Indian Hickman Canyon and an intermittent Dry Canyon flow westery through mountain slope and alluvial fans and turn northward on the Skull Valley toward Salt Lake. The stream reach is approximately 10.26 mi. The watershed area is approximately 25.97 square mile.

The watershed basin at the access road consists of three subbasins, i.e., subbasin I, II, and III. The mountain slope subbasin as designated as subbasin I consists of sedimentary rocks (Sack, 1993) which are exposed from the upland of the Mountain to the edge of the Valley. The slope of subbasin is steep, approximately 19.7 %. The reach is approximately 4.26 mi. The rock has a low bulk permeability (Hood and Waddell, 1968). Precipitation mainly runs off to the alluvial fans with a minimum loss.

The alluvial fans as designated as subbasin II located on the upper and middle plain of Skull Valley floor contain poorly sorted coarse to fine grained deposit. The slope is milder, approximately 3.9 %. The reach is approximately 4.73 mi. The permeability is high, ranging from 2-6 in/hr (USDA, Unpublished Report). The fans are a main area of recharge entering into the subsurface groundwater flow (Hood & Waddell, 1968).

In the lowlands of the valley designated as subbasin III, the deposits mainly are fine grained. The sedimentary rocks crop out at a few places. The slope of the lowlands is approximately 1.4 %. The reach length is approximately 1.27 mi. The permeability ranges from 0.2-0.6 in/hr (USDA, Unpublished Report).

The drainage basin at PFSF site designated as basin IV, heads from Hickman Knolls. The northward runoff flows mainly through the deposited fine grained valley and a few sedimentary outcrops. The drainage area is approximately 0.93 square miles. The reach length is approximately 1.86 mi. Average basin slope is approximately 3.7 %.

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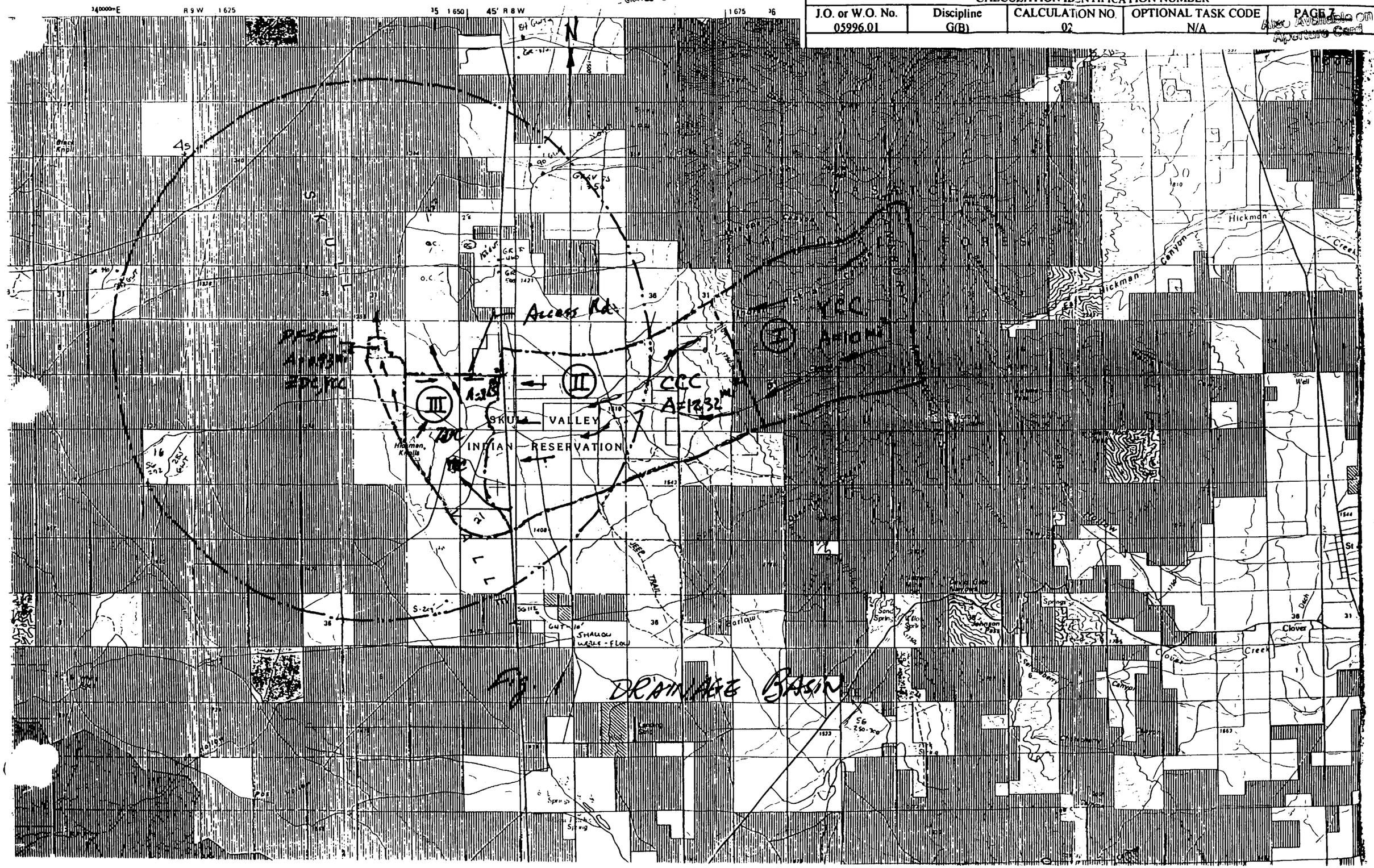
Also Available on Aperture Card



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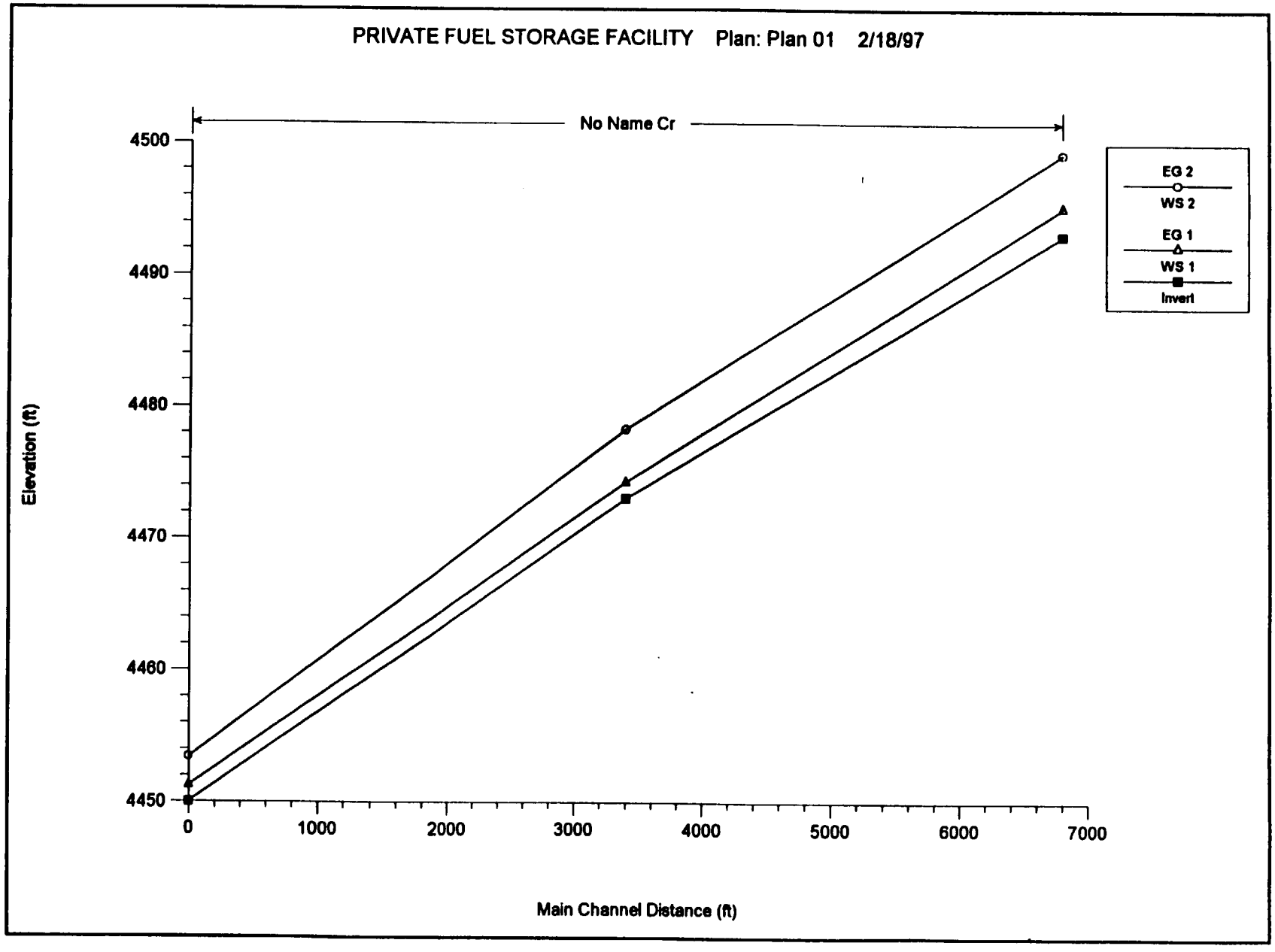
PRIVATE FUEL STORAGE FACILITY Plan: Plan 01 2/18/97
No Name Cr
Elevation (ft)
4500
4490
4480
4470
4460
4450
0
1000
2000
3000
4000
5000
6000
7000
Main Channel Distance (ft)
EG 2
WS 2
EG 1
WS 1
Invert

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A

```
                    HEC-RAS Version 1.2 April 1996
                     U.S. Army Corp of Engineers
                    Hydrologic Engineering Center
                      609 Second Street, Suite D
                     Davis, California 95616-4687
                           (916) 756-1104

          X     X  XXXXXX    XXXX        XXXX       XX      XXXX
          X     X  X        X    X       X   X     X  X    X
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          X     X  X        X    X       X   X    X    X        X
          X     X  XXXXXX    XXXX        X    X   X    X   XXXXX

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

PROJECT DATA
Project Title: PRIVATE FUEL STORAGE FACILITY
Project File : pfsf.prj
Run Date and Time: 2/18/97 10:50:58 AM

Project in English units

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

PLAN DATA

Plan Title: Plan 01
Plan File : c:\hec\ras\pfsf.p01

          Geometry Title: Plan 01
          Geometry File : c:\hec\ras\pfsf.p01

          Flow Title    : Plan 01
          Flow File     : c:\hec\ras\pfsf.p01

Plan Summary Information:
Number of:  Cross Sections =    3    Mulitple Openings =    0
            Culverts       =    0    Inline Weirs      =    0
            Bridges        =    0

Computational Information
```

Water surface calculation tolerance = .01
Critical depth calculaton tolerance = .01
Maximum number of interations = 20
Maximum difference tolerance = .3
Flow tolerance factor = .001

Computational Flow Regime: Subcritical Flow

Encroachment Data: None

Flow Distribution Locations: None

****

FLOW DATA

Flow Title: PFSF
Flow File : c:\hec\ras\pfsf.f01

Flow Data (cfs)

Reach	Riv Sta	PF#1	PF#2	PF#3	PF#4
No Name Cr	6.5	2247	34577	2065	31934

Boundary Conditions

Reach	Profile	Upstream	Downstream
No Name Cr	1		Normal S = .0059
No Name Cr	2		Normal S = .0059
No Name Cr	3		Normal S = .0059
No Name Cr	4		Normal S = .0059

****

GEOMETRY DATA

Geometry Title: PFSF No named Creak Backwater
Geometry File : c:\hec\ras\pfsf.g01

CROSS SECTION INPUT Reach: No Name Cr River Station: 6.5
Description: Access Road Crossing-6500 ft

Station Elevation Data, num = 7

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Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
0	4505	1000	4500	3500	4500	4700	4493	5800	4500
7000	4510	8000	4520						

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
0	.035	3500	.035	5800	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
3500	5800	3400	3400	3400	.1	.3

CROSS SECTION INPUT Reach: No Name Cr River Station: 3.4
Description: Downstream Road Crossing-3400 ft

Station Elevation Data, num = 7

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
0	4480	2500	4480	3000	4473	3400	4473	3500	4480
4000	4480	5300	4500						

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
0	.035	2500	.035	3500	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2500	3500	3400	3400	3400	.1	.3

CROSS SECTION INPUT Reach: No Name Cr River Station: .1
Description: Creek Crossing near site

Station Elevation Data, num = 9

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
0	4460	1300	4460	2200	4455	3000	4450	4000	4452
5000	4450	5500	4455	5900	4460	7000	4470		

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
0	.035	1300	.035	5900	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1300	5900	0	0	0	.1	.3

****

SUMMARY OF MANNING'S N VALUES

****

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Reach	River Sta.	n1	n2	n3
No Name Cr	6.5	.035	.035	.035
No Name Cr	3.4	.035	.035	.035
No Name Cr	.1	.035	.035	.035

SUMMARY OF REACH LENGTHS

Reach	River Sta.	Left	Channel	Right
No Name Cr	6.5	3400	3400	3400
No Name Cr	3.4	3400	3400	3400
No Name Cr	.1	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

Reach	River Sta.	Contr.	Expan.
No Name Cr	6.5	.1	.3
No Name Cr	3.4	.1	.3
No Name Cr	.1	.1	.3

Profile Output Table - Standard Table 1

River Sta.	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
6.5	2247.00	4493.00	4495.10	4494.63	4495.25	0.004938	3.09	727.94	691.64	0.53
6.5	34577.00	4493.00	4499.19		4499.66	0.003720	5.50	6289.70	2033.04	0.55
6.5	2065.00	4493.00	4495.04	4494.58	4495.18	0.004961	3.03	682.08	669.50	0.53
6.5	31934.00	4493.00	4498.99		4499.44	0.003776	5.42	5892.17	1967.74	0.55
3.4	2247.00	4473.00	4474.24		4474.49	0.007812	4.01	559.79	505.93	0.67
3.4	34577.00	4473.00	4478.27	4478.07	4479.98	0.010059	10.49	3294.96	851.38	0.94
3.4	2065.00	4473.00	4474.18		4474.41	0.007820	3.90	529.81	500.82	0.67
3.4	31934.00	4473.00	4478.07	4477.85	4479.69	0.009941	10.21	3127.05	834.31	0.93
.1	2247.00	4450.00	4451.23	4450.96	4451.32	0.005896	2.36	953.10	1549.78	0.53

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.1	34577.00	4450.00	4453.40	4452.80	4453.87	0.005901	5.49	6298.29	2883.59	0.65
.1	2065.00	4450.00	4451.19	4450.93	4451.27	0.005902	2.31	894.25	1501.17	0.53
.1	31934.00	4450.00	4453.29	4452.71	4453.73	0.005902	5.34	5980.27	2854.78	0.65

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Based on USDA's unpublished report, the soil type and its corresponding hydrological group, CN (TR-55), subbasin area can be described as tabulated in Table 1 and 2. The average runoff curve number (CN) for the drainage basins at the access road crossing and the PFSF site are calculated as shown in Table 1 and 2:

Table 1 The runoff curve number for basin at the access road crossing

Subbasin No.	Soil (Hydrological Group)	CN	Area mi^2	Product
I	Sedimentary Rock(D)	98	10	980
II	CCC(A)	48	12.32	591
III	ZDC(C)	77	3.29	253
	Sedimentary Rock(D)	98	0.36	35
Sum			25.97	1860
Average CN				72

Table 2 The runoff curve number for basin at the PFSF site,

Basin No.	Soil (Hydrological Group)	CN	Area mi^2	Product
IV	Sedimentary Rock(D)	98	.08	8
	ZDC(C)	77	.85	65
Sum			.93	73
Average CN				79

4.2 Time of Concentration

The time of concentration (T_c) is the amount of time required for runoff to reach the outlet of a drainage basin from the most remote point of the basin. The Kirpich formula (Chow, 1964) was used to estimate the time of concentration for overland flow on grassed surface. Watershed length, the high and the low point elevation measured from USGS map, and the slope and the travel time computed are shown in Table 3 for the access road location and Table 4 for the site.

Table 3 Time of concentration at the access road crossing

Basin	Length(ft)	HP(ft)	LP(ft)	Slope	T_c (hr)
I	22500	10004	5576	0.197	1.09
II	24970	5576	4592	0.039	2.20
III	6703	4592	4495	0.014	1.17
Sum	54173				4.46

Table 4 Time of concentration at the PFSF site

Basin	Length(ft)	HP(ft)	LP(ft)	Slope	T_c (hr)
IV	9800	4820	4460	.037	1.10
Sum	9800				1.10

4.3 Precipitation

4.3.1 The 100-yr precipitation at the access road crossing basin

Because of the wide range of altitude as described in section 4.1, the climate in Skull Valley is semiarid, whereas on the uppermost slopes of the Stansbury Mountains it is humid to subalpine. The upland receives a considerably range of precipitation. As a result, a single precipitation reading can not represented the subbasin. An average value over the basin is assumed.

Furthermore, by inspection , the precipitation over the valley extends approximately one half of the total basin area. The remaining mountain slope area, the precipitation ranges from the lowest value at the floor to the highest value at the uppermost of mountain. The basin precipitation was computed based on the weighted area ratio of the mountain slope precipitation and the precipitation in the valley area. The maximum, the minimum precipitation of the mountain slope subbasin , the mean precipitation of the valley for 2, 10, 25, and 100 year for 6 and 24 hours duration storm are read from Figures 19-30 of NOAA Atlas No. 2 . Average precipitation calculated are shown in Table 5.

Table 5 Precipitation at the basin of the access road crossing

Return period (yr)/ Duration (hr)	Mountain Slope(in) Maximum	Minimum	Average	Valley(in)	Average (in)
2/24	2	1.2	1.6	1.05	1.33
10/24	2.6	1.8	2.2	1.75	1.98
25/24	3.2	2.2	2.7	2.15	2.43
100/24	4	2.8	3.4	2.7	3.05
2/6	1.2	0.9	1.05	0.89	0.97
10/6	1.7	1.4	1.55	1.3	1.43
25/6	2	1.6	1.8	1.55	1.68
100/6	2.4	2	2.2	1.9	2.05

The computed average precipitation of the above table was input in Table 6. The 10-yr 24 hr value appears somewhat below the line of best fit return-period normograph. A corrected value is shown in Table 6. The 100 -yr 1-hr , 2-hr, and 3-hr values were computed by the procedures of NOAA Atlas No. 2 (1973) as demonstrated in Table 6.

Aerial correction based on Figure 14 of the NOAA (1973) report was incorporated. The 100-yr precipitation for various duration are show on the bottom line of Table 6. The depth-duration curve was plotted in Figure 2.

4.3.2 The 100-yr precipitation at the PFSF site basin

The PFSF site is located over a gentle slope plain . The mean precipitation of the valley area as shown on column 5 of the Table 5 are used.

NOAA Atlas No 2 procedures were followed. The 100-yr rainfalls at PFSF site are tabulated in Table 7. The depth-duration curve at site was plotted in Figure 3.

Table 6- 100 year Rainfall at the Access Road						
Precipitation Data for Depth-Frequency Atlas Computed for Access Road Crossing, Utah						
Return Period	0.5	1	2	3	6	24
year		hr	hr	hr	hr	hr
					Table 5	Table 5
2					0.97	1.33
10					1.43	1.98
25					1.68	2.43
100	1.11	1.41	1.60	1.75	2.05	3.05
Area Correction	0.75	0.86		0.93	0.95	0.97
(Fig 14 p13)						
100-yr Precipitation	0.83	1.21		1.62	1.95	2.96
Based on NOAA Atlas No 2 (1973)						
Y_{100}=0.322+.789*X_3*(X_3/X_4) (equation 2, p15)						
2-hr=.299(6-hr)+.701(1-hr) (region 2, p16)						
3-hr=.526(6-hr)+.474(1-hr) (region 2, p16)						
Where, X_3= 100-yr 6-hr value from precipitation-frequency maps						
X_4= 100-yr 24-hr value from precipitation-frequency maps						

Depth-Duration Curve at the Access Road

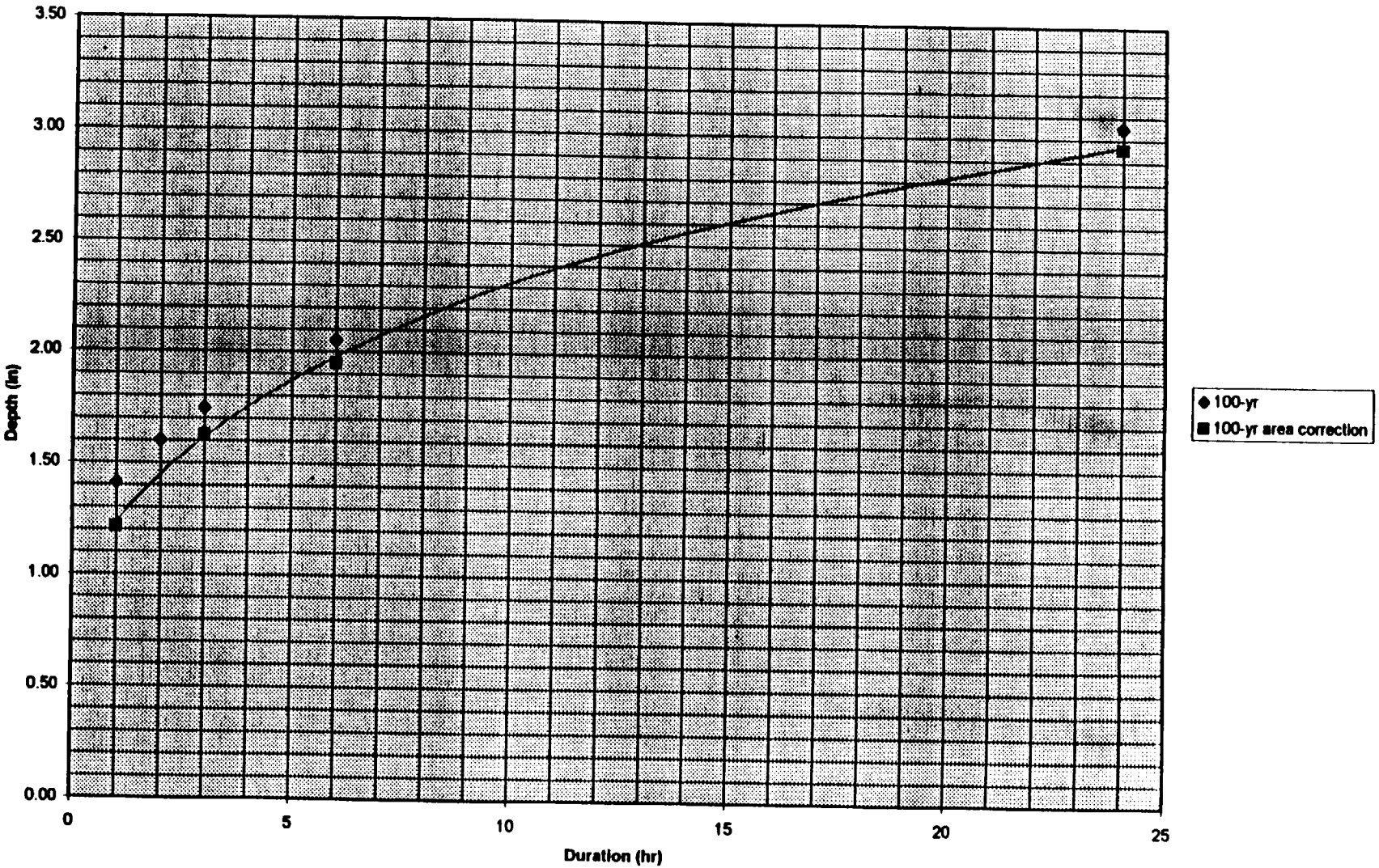

Figure 2

Table 7- 100 year Rainfall at PFSF Site Computation						
Precipitation Data for Depth-Frequency Atlas Computed for PFSF, Utah						
Return Period	0.5	1	2	3	6	24
year		hr	hr	hr	hr	hr
					Col 4,Table 5	Col 4,Table 5
2					0.89	1.05
10					1.30	1.75
25					1.55	2.15
100	1.09	1.38	1.53	1.65	1.90	2.70
Area Correction	1	1.00		1.00	1.00	1.00
(Fig 14 p13)						
100-yr Precipitation	1.09	1.38		1.65	1.90	2.70
Based on NOAA Atlas NO 2						
Y_{100}=0.322+.789*X_3*(X_3/X_4) (equation 2, p15)						
2-hr=.299(6-hr)+.701(1-hr) (region 2, p16)						
3-hr=.526(6-hr)+.474(1-hr) (region 2, p16)						
Where, X_3= 100-yr 6-hr value from precipitation-frequency maps						
X_4= 100-yr 24-hr value from precipitation-frequency maps						

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Depth-Duration Curve at Site

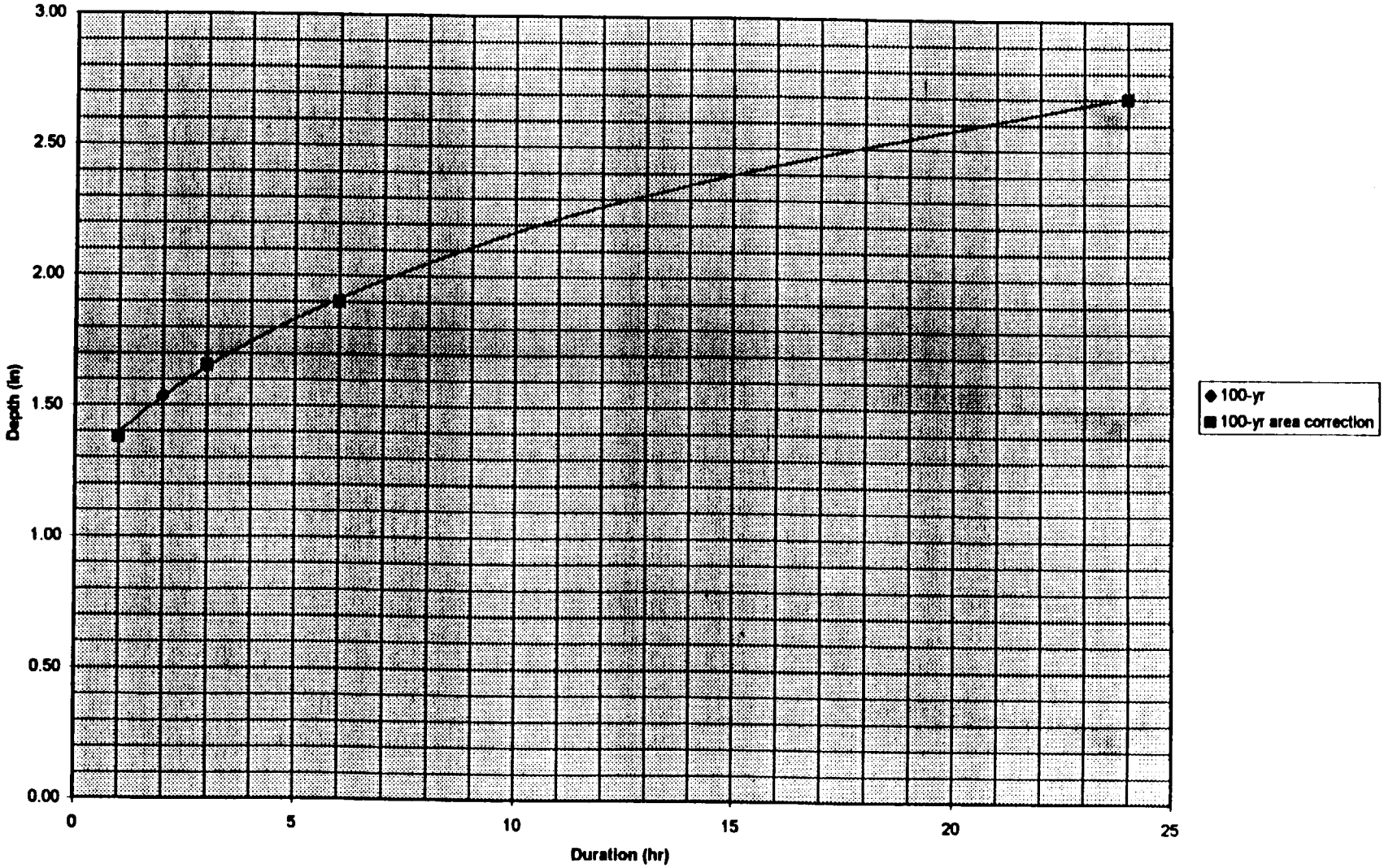


Figure 3

4.3.3 General-storm PMP and local storm PMP for the basin at the access road crossing

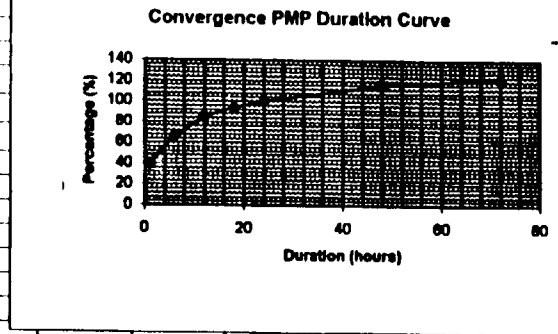
The computation for general storm PMP and the local storm PMP were followed the procedures described in HMR 49 (USDC, 1977). Step by step procedure were tabulated in the table 6.1 and 6.3 of HMR 49 report and are attached as part of the computation on Tables 8b and 9b. By inspection of general PMP through months shown in HMR 49 (1977), the most intense precipitation occurs on August. The month of August was calculated. Tables 8a , 8b and 9a, 9b are computations corresponding to general PMP and local PMP computations respectively. The depth-duration curves are shown in Figures 4 and 5 for general and local PMP respectively.

Table 8a PFSF- General -Storm PMP at Access Road Crossing

Private Fuel Storage Facility- Utah

Drainage	PFSF			Area	25.97	mi^2		
Latitude	40°24'30"N							
Longitude	112°47'30"W							
Month	August							
A. Convergence PMP								
	Duration (hr)	1	6	12	18	24	48	72
1	Drainage Value	11.3	in					
2	Reduction for El	50	%					
3	Reducded PMP	5.65	in					
4	Duration Variation	40	67	85	94	100	116	123
5	Convergence PMP	2.26	3.79	4.80	5.31	5.65	6.55	6.95
6	Incr. 10 mi^2 PMP		3.79	1.02	0.51	0.34	0.90	0.40
7	Area Reduction		98	100	100	100	100	100
8	Area Reduced PMP	2.21	3.71	1.02	0.51	0.34	0.90	0.40
9	Drainage Avg PMP	2.42	3.71	4.73	5.24	5.57	6.48	6.87
B. Orographic PMP								
1	Orographic Index	4	in					
2	Area Reduction	98	%					
3	Month Adjustment	100	%					
4	Area Adjustment	3.92	in					
5	Duration Variation	8	30	57	80	100	159	187
6	Orographic PMP	0.31	1.18	2.23	3.14	3.92	6.23	7.33
C. Total PMP								
1	Add A11+B8	2.73	4.89	6.96	8.37	9.49	12.71	14.20

Based on HMR 49 (1977), See Table 8b for step by step method.



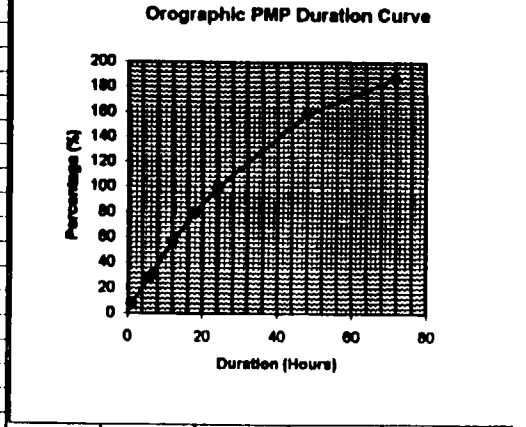


Table 86

Table 6.1.--General-storm PMP computations for the Colorado River and Great basin

Drainage PFSF

Latitude 40° 24', Longitude 124° 01' of basin center

Area 25.97 mi² (km²)

Month August

Step		Duration (hrs) 6	12	18	24	48	72
A.	Convergence PMP						
1.	Drainage average value from one of figures 2.5 to 2.16	11.3 in.					
2.	Reduction for barrier-elevation [fig. 2.18]	50 %					
3.	Barrier-elevation reduced PMP [step 1 X step 2]	5.65 in.					
4.	Durational variation [figs. 2.25 to 2.27 and table 2.7]	67	85	94	106	116	123 %
5.	Convergence PMP for indicated durations [steps 3 X 4]	3.79	4.80	5.31	5.65	6.55	6.95 in.
6.	Incremental 10 mi² (26 km²) PMP [successive subtraction in step 5]	3.79	1.02	0.51	0.34	0.90	0.4 in.
7.	Areal reduction [select from figs. 2.25 and 2.29]	98	100	100	100	100	100 %
8.	Areally reduced PMP [step 6 X step 7]	3.71	1.02	0.51	0.34	0.90	0.4 in.
9.	Drainage average PMP [accumulated values of step 8]	3.71	4.73	5.24	5.57	6.48	6.87 in.
B.	Orographic PMP						
1.	Drainage average orographic index from figure 3.11a to d. (revised)	4 in.					
2.	Areal reduction [figure 3.20]	98 %					
3.	Adjustment for month [one of figs. 3.12 to 3.17]	100 %					
4.	Areally and seasonally adjusted PMP [steps 1 X 2 X 3]	3.92 in.					
5.	Durational variation [table 3.4]	30	57	80	100	159	187 %
6.	Orographic PMP for given durations [steps 4 X 5]	1.18	2.23	3.14	3.92	6.23	7.33 in.
C.	Total PMP						
1.	Add steps A9 and B6	4.89	6.96	8.37	9.49	12.71	14.29 in.
2.	PMP for other durations from smooth curve fitted to plot of computed data.						
3.	Comparison with local-storm PMP (see sec. 6.3).						

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05996.01	G(B)	02	N/A	

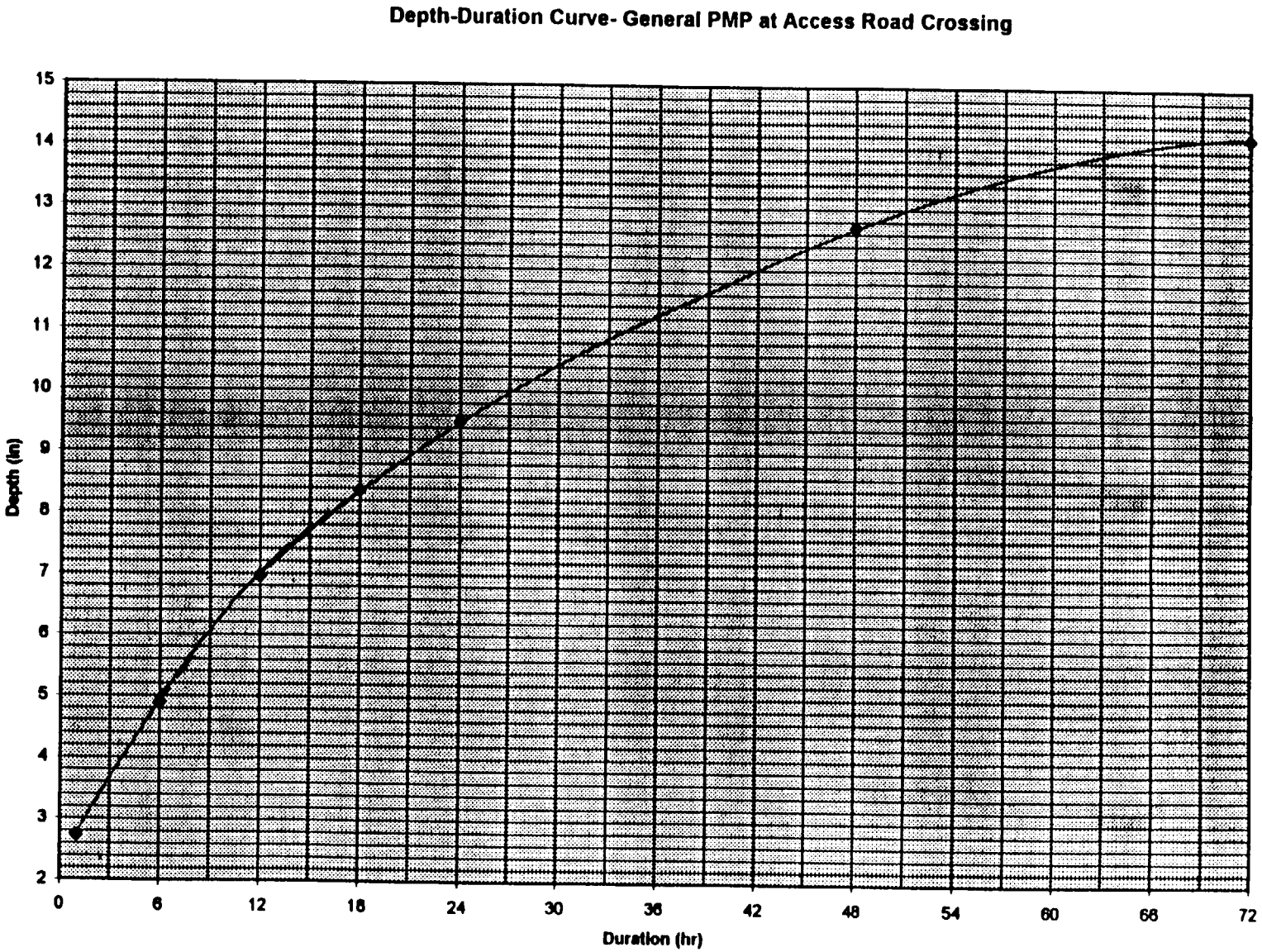

Figure 4

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05996.01	G(B)	02	N/A

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Table 9a Local-Storm PMP at Access Road Crossing

PFSF- Private Fuel Storage Facility- Utah

Drainage	PFSF			Area	25.97	mi^2					
Latitude	40°24'30"N			Elevation	4460	ft					
Longitude	112°47'30"W										
	Duration (hr)	0.25	0.5	0.75	1	2	3	4	5	6	
1	1-hr 1-mi^2 PMP	10	in								
2	Reduction for El	100	%								
	Reducded PMP	10	in								
3	6/1-hr Ratio	1.325									
4	Duration Variation	72	88	95	100	115	122	127	130	132	
5	1-mi^2 PMP	7.20	8.80	9.50	10.00	11.50	12.20	12.70	13.00	13.20	
6	Area Reduction	74	78	80	83	85	86	87	88	89	
7	Area Reduced PMP	5.33	6.86	7.60	8.30	9.78	10.49	11.05	11.44	11.75	
8	Incremental PMP				8.30	1.48	0.72	0.56	0.39	0.31	
		5.33	1.54	0.74	0.70						
9	Time Sequence										
	Hourly Incr				0.39	0.72	8.3	1.48	0.56	0.31	HMR-5
	Largeest 15 min.	5.33	1.54	0.74	0.7						

Based on HMR 49 (1977). See Table 9b for step by step method.

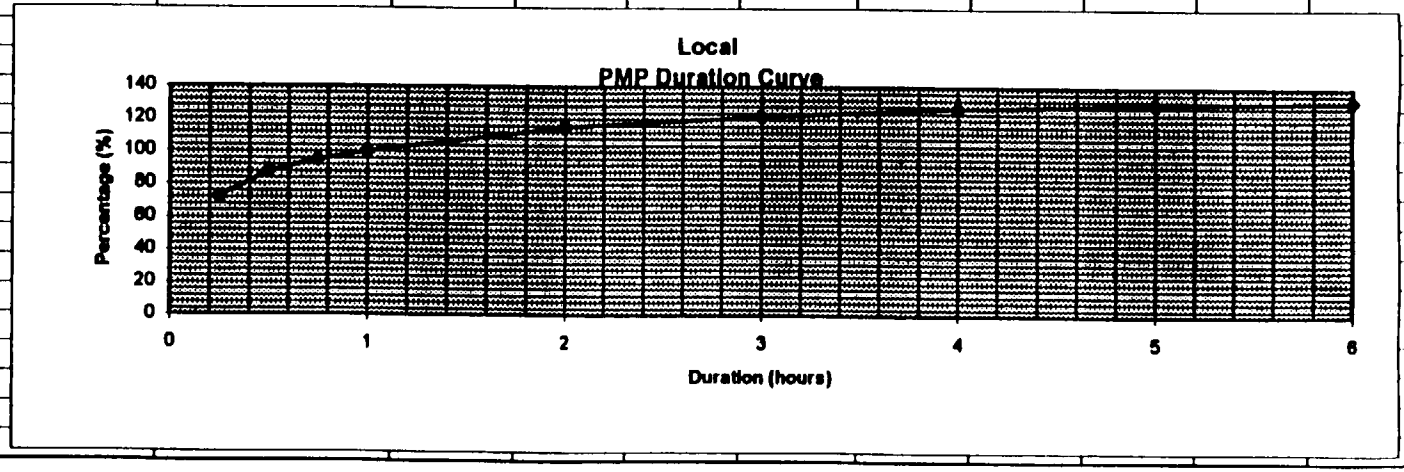

Table 9b

Table 6.3A.--Local-storm PMP computation, Colorado River, Great Basin and California drainages. For drainage average depth PMP. Go to table 6.3B if areal variation is required.

Drainage PFSF, Utah Area 25.97 mi^2 ~~km²~~
Latitude 40°24' Longitude 112°47' Minimum Elevation 4460 ft ~~m~~

Steps correspond to those in sec. 6.3A.

1. Average 1-hr 1-mi^2 (2.6-km^2) PMP for drainage [fig. 4.5]. 10 in. ~~(mm)~~

2. a. Reduction for elevation. [No adjustment for elevations up to 5,000 feet (1,524 m): 5% decrease per 1,000 feet (305 m) above 5,000 feet (1,524 m)]. 100 %

   b. Multiply step 1 by step 2a. 10 in. ~~(mm)~~

3. Average 6/1-hr ratio for drainage [fig. 4.7]. 1.325

	Duration (hr)								
	1/4	1/2	3/4	1	2	3	4	5	6
4. Durational variation for 6/1-hr ratio of step 3 [table 4.4].	72	88	95	100	115	122	127	130	132 %
5. 1-mi^2 (2.6-km^2) PMP for indicated durations [step 2b X step 4].	7.2	8.8	9.5	10.	11.5	12.2	12.7	13	13.2 in. ~~(mm)~~
6. Areal reduction [fig. 4.9].	74	78	80	83	85	86	87	88	89 %
7. Areal reduced PMP [steps 5 X 6].	5.33	6.86	7.60	8.3	9.78	10.49	11.05	11.44	11.75 in. ~~(mm)~~
8. Incremental PMP [successive subtraction in step 7].				8.3	1.48	0.72	0.56	0.39	0.31 in. ~~(mm)~~
	5.33	1.54	0.74	0.7	} 15-min. increments				

9. Time sequence of incremental PMP according to:

   Hourly increments [table 4.7]. 0.39 0.72 8.3 1.48 0.56 0.31 in. ~~(mm)~~

   Four largest 15-min. increments [table 4.8]. 5.33 1.54 0.74 0.7 in. ~~(mm)~~

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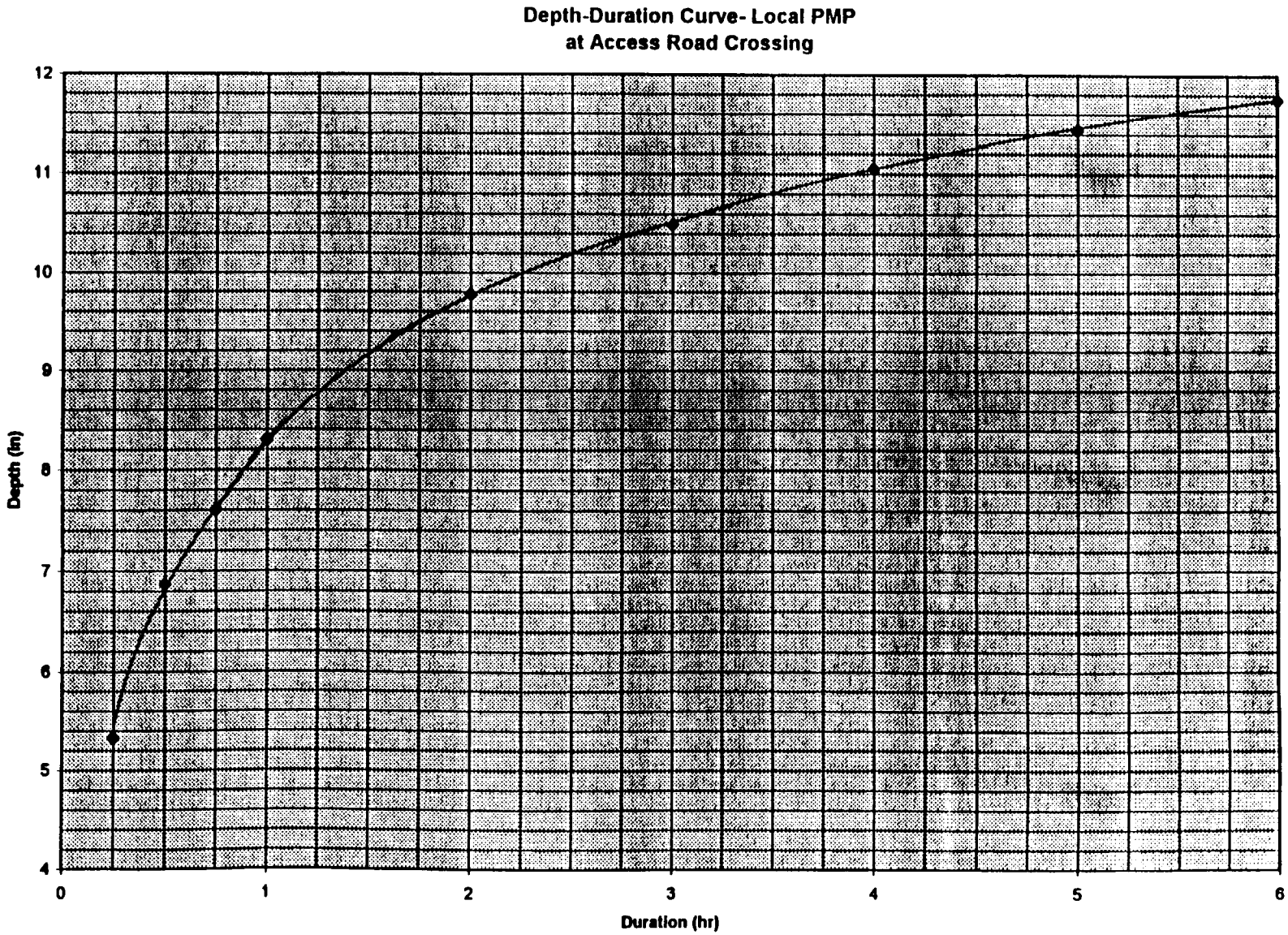

Figure 5

5010.55

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05996.01	G(B)	02	N/A	

4.3.4 General-storm PMP and local storm PMP for the basin at the PFSF site.

Same procedures have been employed for the PMP at the PFSF site. Tables 10a , 10b and 11a, 11b are computations corresponding to general PMP and local PMP computations respectively. The depth-duration curves are shown in Figures 6 and 7 for general and local PMP respectively.

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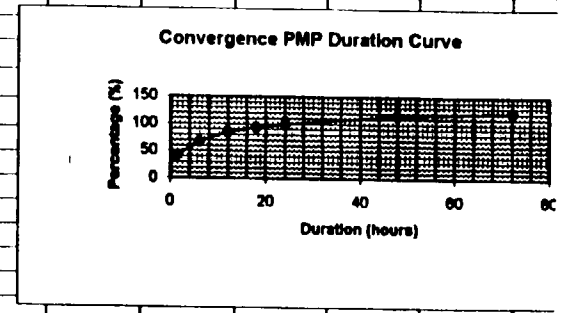
05996.01	G(B)	02	N/A	

CALCULATION IDENTIFICATION NUMBER

Table 10a The General-Storm PMP at PFSF site

PFSF- Private Fuel Storage Facility- Utah								
Drainage	PFSF			Area	0.93	mi^2		
Latitude	40°24'30"N							
Longitude	112°47'30"W							
Month	August							
A. Convergence PMP								
	Duration (hr)	1	6	12	18	24	48	72
1	Drainage Value	11.3	in					
2	Reduction for El	50	%					
3	Reduced PMP	5.65	in					
4	Duration Variation	40	67	85	94	100	116	123
5	Convergence PMP	2.26	3.79	4.80	5.31	5.65	6.55	6.95
6	Incr. 10 mi^2 PMP		3.79	1.02	0.51	0.34	0.90	0.40
7	Area Reduction		100	100	100	100	100	100
8	Area Reduced PMP	2.26	3.79	1.02	0.51	0.34	0.90	0.40
9	Drainage Avg PMP	2.26	3.79	4.80	5.31	5.65	6.55	6.95
B. Orographic PMP								
1	Orographic Index	4	in					
2	Area Reduction	100	%					
3	Month Adjustment	100	%					
4	Area Adjustment	4	in					
5	Duration Variation	8	30	57	80	100	159	187
6	Orographic PMP	0.32	1.20	2.28	3.20	4.00	6.36	7.48
C. Total PMP								
1	Add A11+B8	2.58	4.99	7.08	8.51	9.65	12.91	14.43

Based on HMR 49 (1977). See Table 10b for step by step method.



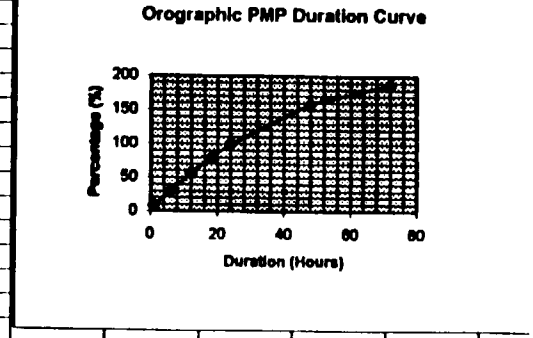


Table 10b.

Table 6.1.--General-storm PMP computations for the Colorado River and Great basin

Drainage at site Area 0.93 mi² (km²)

Latitude 40°24', Longitude 120°47' of basin center

Month August

Step	Duration (hrs) 6	12	18	24	48	72
A. Convergence PMP						
1. Drainage average value from one of figures 2.5 to 2.16	1.3 in. (mm)					
2. Reduction for barrier-elevation [fig. 2.16]	50 %					
3. Barrier-elevation reduced PMP [step 1 X step 2]	5.65 in. (mm)					
4. Durational variation [figs. 2.25 to 2.27 and table 2.7]	67	85	94	100	116	123 %
5. Convergence PMP for indicated durations [steps 3 X 4]	3.79	4.8	5.31	5.65	6.55	6.95 in. (mm)
6. Incremental 10 mi² (26 km²) PMP [successive subtraction in step 5]	3.79	1.02	0.51	0.34	0.9	0.4 in. (mm)
7. Areal reduction [select from figs. 2.25 and 2.29]	100	100	100	100	100	100 %
8. Areally reduced PMP [step 6 X step 7]	3.79	1.02	0.51	0.34	0.9	0.4 in. (mm)
9. Drainage average PMP [accumulated values of step 8]	3.79	4.8	5.31	5.65	6.55	6.95 in. (mm)
B. Orographic PMP						
1. Drainage average orographic index from figure 3.11a to d.	4 in. (mm)					
2. Areal reduction [figure 3.20]	100 %					
3. Adjustment for month [one of figs. 3.12 to 3.17]	100 %					
4. Areally and seasonally adjusted PMP [steps 1 X 2 X 3]	4 in. (mm)					
5. Durational variation [table 3.9]	30	57	80	100	159	187 %
6. Orographic PMP for given durations [steps 4 X 5]	1.2	2.28	3.2	4	6.36	7.48 in. (mm)
C. Total PMP						
1. Add steps A9 and B6	4.99	7.08	8.51	9.65	12.91	14.43 in. (mm)

2. PMP for other durations from smooth curve fitted to plot of computed data.

3. Comparison with local-storm PMP (see sec. 6.4).

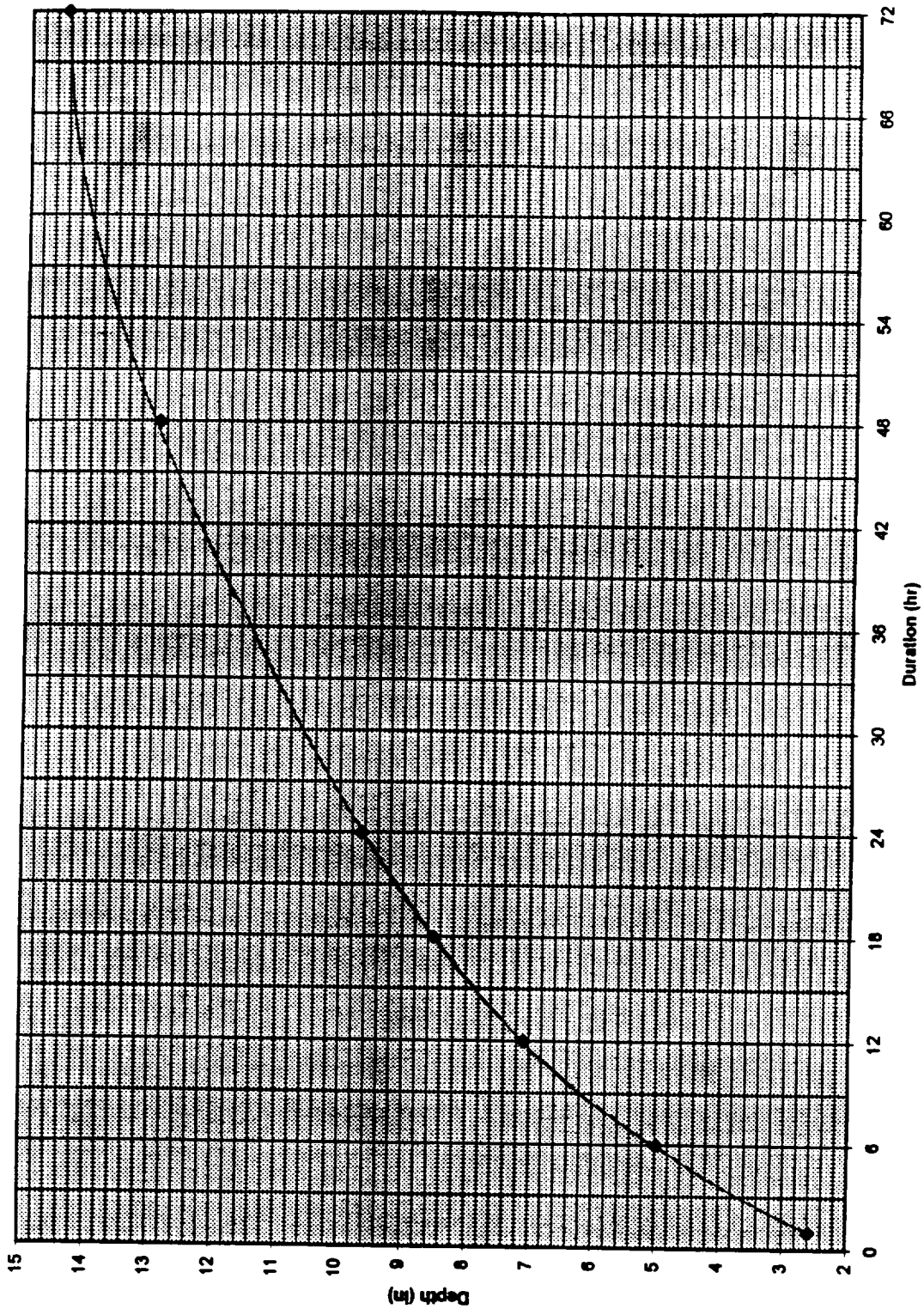

Depth-Duration Curve- General PMP at Site
Depth (in)
15
14
13
12
11
10
9
8
7
6
5
4
3
2
Duration (hr)
0
6
12
18
24
30
36
42
48
54
60
66
72

Figure 6

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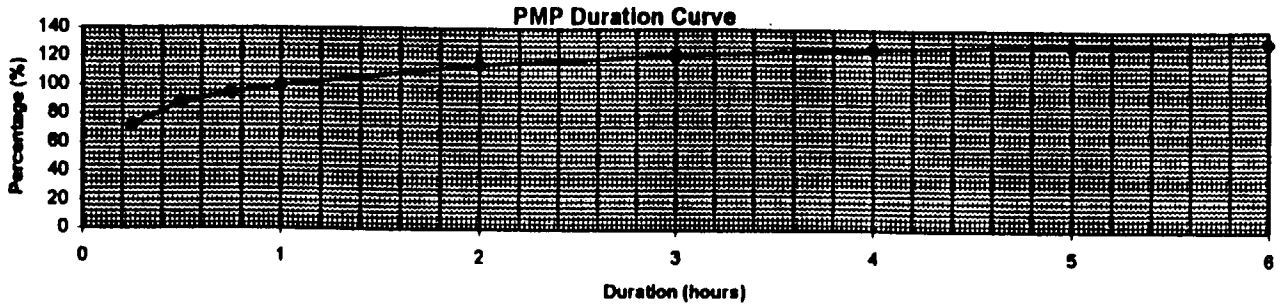
05996.01	GB)	02	N/A	

Table 11a The Local PMP at PFSF site

PFSF- Private Fuel Storage Facility- Utah

Drainage	PFSF			Area	0.93	mi^2					
Latitude	40°24'30"N			Elevatio	4460	ft					
Longitude	112°47'30"W										
	Duration (hr)	0.25	0.5	0.75	1	2	3	4	5	6	
1	1-hr 1-mi^2 PMP	10	in								
2	Reduction for El	100	%								
	Reducded PMP	10	in								
3	6/1-hr Ratio	1.325									
4	Duration Variation	72	88	95	100	115	122	127	130	132	
5	1-mi^2 PMP	7.20	8.80	9.50	10.00	11.50	12.20	12.70	13.00	13.20	
6	Area Reduction	100	100	100	100	100	100	100	100	100	
7	Area Reduced PMP	7.20	8.80	9.50	10.00	11.50	12.20	12.70	13.00	13.20	
8	Incremental PMP				10.00	1.50	0.70	0.50	0.30	0.20	
		7.20	1.60	0.70	0.50						
9	Time Sequence										
	Hourly Incr				0.30	0.70	10.00	1.50	0.50	0.20	HMR-5
	Largeest 15 min.	7.2	1.6	0.7	0.5						

Based on HMR 49 (1977). See Table 11b for step by step method.



CALCULATION IDENTIFICATION NUMBER				
J.O. or W.O. No. 05996.01	Discipline G(B)	CALCULATION NO. 02	OPTIONAL TASK CODE N/A	PAGE 27

Table 6.3A.--Local-storm PMP computation, Colorado River, Great Basin and California drainages. For drainage average depth PMP, go to table 6.3B if areal variation is required. Table 11 b

Drainage at site Area 0.93 mi² (km²)
Latitude 40°24' Longitude 112°47' Minimum Elevation 4460 ft (m)

Steps correspond to these in sec. 6.3A.

1. Average 1-hr 1-mi² (2.6-km²) PMP for drainage [fig. 4.5]. 10 in. (mm)

2. a. Reduction for elevation. [No adjustment for elevations up to 5,000 feet (1,524 m): 5% decrease per 1,000 feet (305 m) above 5,000 feet (1,524 m)]. 100 %

   b. Multiply step 1 by step 2a. 10 in. (mm)

3. Average 6/1-hr ratio for drainage [fig. 4.7]. 1.325

	Duration (hr)								
	1/4	1/2	3/4	1	2	3	4	5	6
4. Durational variation for 6/1-hr ratio of step 3 [table 4.4].	72	88	95	100	115	122	127	130	132 %
5. 1-mi² (2.6-km²) PMP for indicated durations [step 2b X step 4].	7.2	8.8	9.5	10.	11.5	12.2	12.7	13	13.2 in. (mm)
6. Areal reduction [fig. 4.9].	100	100	100	110	100	100	100	100	100 %
7. Areal reduced PMP [steps 5 X 6].	7.2	8.8	9.5	10.	11.5	12.2	12.7	13	13.2 in. (mm)
8. Incremental PMP [successive subtraction in step 7].				1.0	1.5	0.7	0.5	0.3	0.2 in. (mm)
	2.2	1.6	0.7	0.5	} 15-min. increments				

9. Time sequence of incremental PMP according to:

   Hourly increments [table 4.7]. 0.3 0.7 1.0 1.5 0.5 0.2 in. (mm)

   Four largest 15-min. increments [table 4.8]. 2.2 1.6 0.7 0.5 in. (mm)

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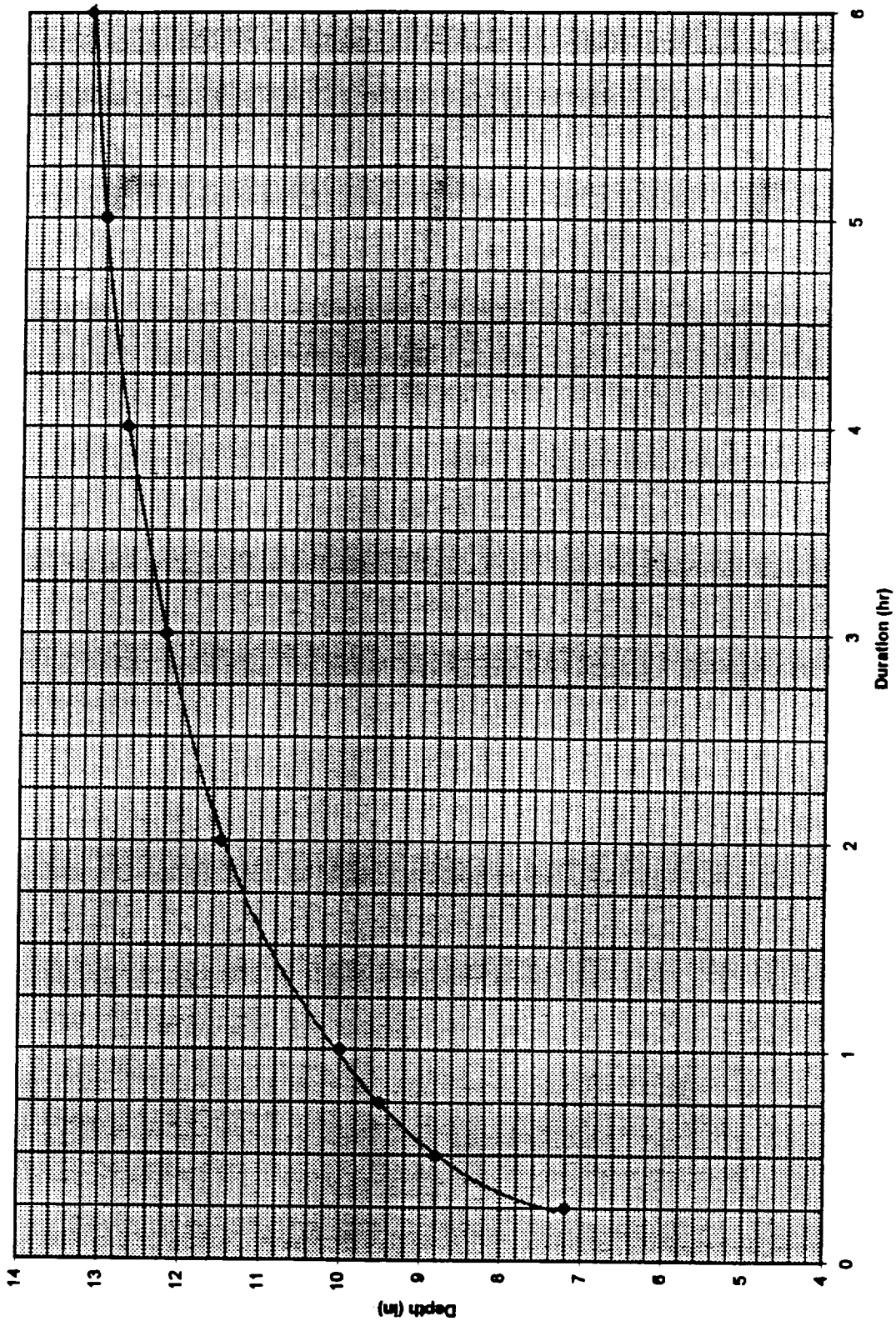

Figure 7

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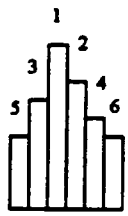
4.4 Time distribution of incremental storm (PMF)

4.4.1 Time distribution for local PMP

The duration of the local storm was divided into six incremental. From Table 9a, the depths of local PMP at 1-hr duration at the access road crossing are summarized as follows:

	1st	2nd	3rd	4th	5th	6th	Total
Depth (in)	8.3	1.48	0.72	0.56	0.39	0.31	11.75

The sequence of hourly incremental PMP for local thunderstorm is arranged in accord with HMR No 5 as described in HMR 49 (1977). The largest hourly amount is placed at the third. The second largest, the fourth, and the last are placed after. The third largest, and the fifth largest are placed before as shown in the following sketch.



The PMP depths at 15-min interval for the first hour were determined by HMR 49 (1977) as shown in Table 9a. The remaining 15-min interval at the access road can be found from the fitted curve shown in Figure 5. The sequence of four 15-min incremental PMP is the greatest intensity in the first 15-min interval. The second, the third and the fourth largest are placed after. The PMP at 15-min interval at access road crossing are tabulated in Table 12.

Table 12 The Local PMP at 15-min Interval at Access Road Crossing

					1-hr increment Subtotal (in)
1	0.7	0.74	1.53	5.33	8.3
2	0.33	0.35	0.38	0.42	1.48
3	0.17	0.17	0.17	0.2	0.71
4	0.12	0.13	0.15	0.16	0.56
5	0.09	0.1	0.1	0.1	0.39
6	0.07	0.07	0.08	0.09	0.31
			Total		11.75

Using the same time distribution, the depths at 1-hr duration at the PFSF site are summarized as follows as shown in Table 11a,:

	1st	2nd	3rd	4th	5th	6th	Total
Depth (in)	10.0	1.50	0.70	0.50	0.30	0.30	13.2

The PMP depths at 15-min interval for the first hour were determined by HMR 49 (1977) as shown in Table 11a. The remaining 15-min interval at the PFSF site can be found from the fitted curve shown in Figure 7. The PMP at 15-min interval at PFSF site are tabulated In Table 13.

Table 13 The Local PMP at 15-min Interval at PFSF site

					1-hr increment Subtotal (in)
1	0.5	0.70	1.60	7.2	10.
2	0.3	0.35	0.4	0.45	1.5
3	0.15	0.15	0.2	0.2	0.7
4	0.1	0.1	0.15	0.15	0.5
5	0.05	0.05	0.1	0.1	0.3
6	0.05	0.05	0.05	0.05	0.2
				Total	13.2

4.4.2 Time distribution for all other storms

Time distribution for all other storms except local PMP is followed by Corps of Engineers, EM1110-2-1411 (1952). The 100-yr storm of 6-hr increments are arranged in a sequence with the largest one at middle and decrease progressively to either side of the greatest 6-hr increment as shown below,

The duration of the 100-yr storm was divided into four incremental. From Table 6 and Figure 2, the depths at 6-hr duration at the access road crossing are summarized as follows:

	1st	2nd	3rd	4th	Total
Depth (in)	1.95	0.48	0.29	0.24	2.96

Where, the 100-yr depths at 1-hr, 2-hr and 3-hr were determined by NOAA Atlas No 2 (1973) as described in Table 6. The remaining 1-hr interval at the access road crossing can be found from the fitted curve of Figure 2. The depths of the 100-yr storm at access road at 1-hr interval are tabulated in Table 14.

Table 14 The 100-yr storm at 1-hr interval at access road crossing

							6-hr increment Subtotal (in)
1	.1	.11	.12	.2	.21	1.21	1.95
2	.06	.07	.08	.08	.09	.1	.48
3	.04	.04	.05	.05	.05	.06	.29
4	.04	.04	.04	.04	.04	.04	.24
						Total	2.96

Based on Table 7 and Figure 5, the depths of a 100-yr storm at 6-hr duration at the PFSF site are summarized as follows:

	1st	2nd	3rd	4th	Total
Depth (in)	1.9	0.36	0.24	0.2	2.7

The 100-yr depths at 1-hr, 2-hr and 3-hr at site were determined by NOAA Atlas No 2 (1973) as shown in Table 7. The remaining 1-hr interval at site can be found from the fitted curve of Figure 3. The depths of the 100-yr storm at access road at 1-hr interval are tabulated in Table 15.

Table 15 The 100-yr storm at 1-hr interval at PFSF site

							6-hr increment Subtotal (in)
1	.08	.08	.09	.12	.15	1.38	1.9
2	.05	.05	.06	.06	.07	.07	.36
3	.035	.035	.04	.04	.04	.05	.24
4	.03	.03	.035	.035	.035	.035	.2
						Total	2.7

The general PMP depths at 1st, 6th, 12th, 18th, 24th, 48th, and 72nd at the access road were determined by HMR 49 (1977) as shown in Table 8a The remaining 3-hr increments can be found from the fitted curve shown in Figure 4.

Based on Table 8a and Figure 4, the depths at 18-hr duration at the access road crossing are summarized as follows:

	1st	2nd	3rd	4th	Total
Depth (in)	8.37	2.93	1.90	1.00	14.2

The depths of the general PMP at the access road at 3-hr interval are tabulated in Table 16.

Table 16 The general PMP at 3-hr interval at the access road crossing

							18-hr increment Subtotal (in)
1	.67	.74	.96	1.11	1.19	3.7	8.37
2	0.4	.45	.45	.51	.54	.58	2.93
3	.20	.29	.31	.35	.35	.4	1.90
4	.15	.15	.15	.15	.2	.2	1.00
						Total	14.2

The general PMP depths at 1st, 6th, 12th, 18th, 24th, 48th, and 72nd at PFSF site were determined by HMR 49 (1977) as shown in Table 10a. The remaining 3-hr increments can be found from the fitted curve shown in Figure 6.

Based on Table 10a and Figure 6, the depths at 18-hr duration at the access road crossing are summarized as follows:

	1st	2nd	3rd	4th	Total
Depth (in)	8.51	3.09	1.8	1.03	14.43

The depths of the general PMP at the access road at 3-hr interval are tabulated in Table 17.

Table 17 The general PMP at 3-hr interval at PFSF site

							18-hr increment Subtotal (in)
1	.71	.72	.98	1.11	1.29	3.7	8.51
2	0.4	.5	.5	.55	.55	.59	3.09
3	.24	.25	.26	.3	.35	.4	1.8
4	.13	.15	.15	.2	.2	.2	1.03
						Total	14.43

4.5 Hydrological Analyses

HEC-1 computer program (1990) was based to determine the peak discharges of a 100-yr storm flood and the PMF at the access road and the PFSF site. The SCS curve number as described in Section 4.1 was used for estimating rainfall loss rate. The SCS dimensionless unit hydrography parameter entitled SCS lag time which was approximated by the relationship of $0.6xT_c$ (USDA,1985), where, T_c is the time of concentration.

Input and output of computer runs for the following cases are attached in Attachment A:

1 The 100-yr storm at access road (p. 1-6)
2 The general PMP at access road (p. 7-12)
3 The local PMP at access road (p. 13-18)
4 The 100-yr storm at PFSF site (p.19-24)
5 The general PMP at PFSF site (p.25-30)
6 The local PMP at PFSF site (P.31-36)

Results of peak discharges corresponding to the 100-yr storm and the PMP at the access road and the site were tabulated in Table 18.

Table 18 Summary of Peak Discharges

Location	Drainage Area (square miles)	Peak Discharge 100-yr (cfs)	General PMP (cfs)	Local PMP (cfs)
At Access Road	25.97	2065	13093	31934
At PFSF Site	0.92	182	492	2643

The computed peak discharges of a 100-yr storm were compared to those estimated by a regression method employed in the region (USGS, Open file 93-419, 1994). A reasonable agreement was demonstrated as shown in Figure 8.

As results of the computation, it shows that the peak discharge estimated based on the general PMP is less than that estimated based on the local PMP. The peak discharge estimated based on the local PMP is used as a design discharge for the project.

The hydrographs generated by HEC-1 for the 100-yr storm and the PMF at the access road and the site are shown in Figures 9-12.

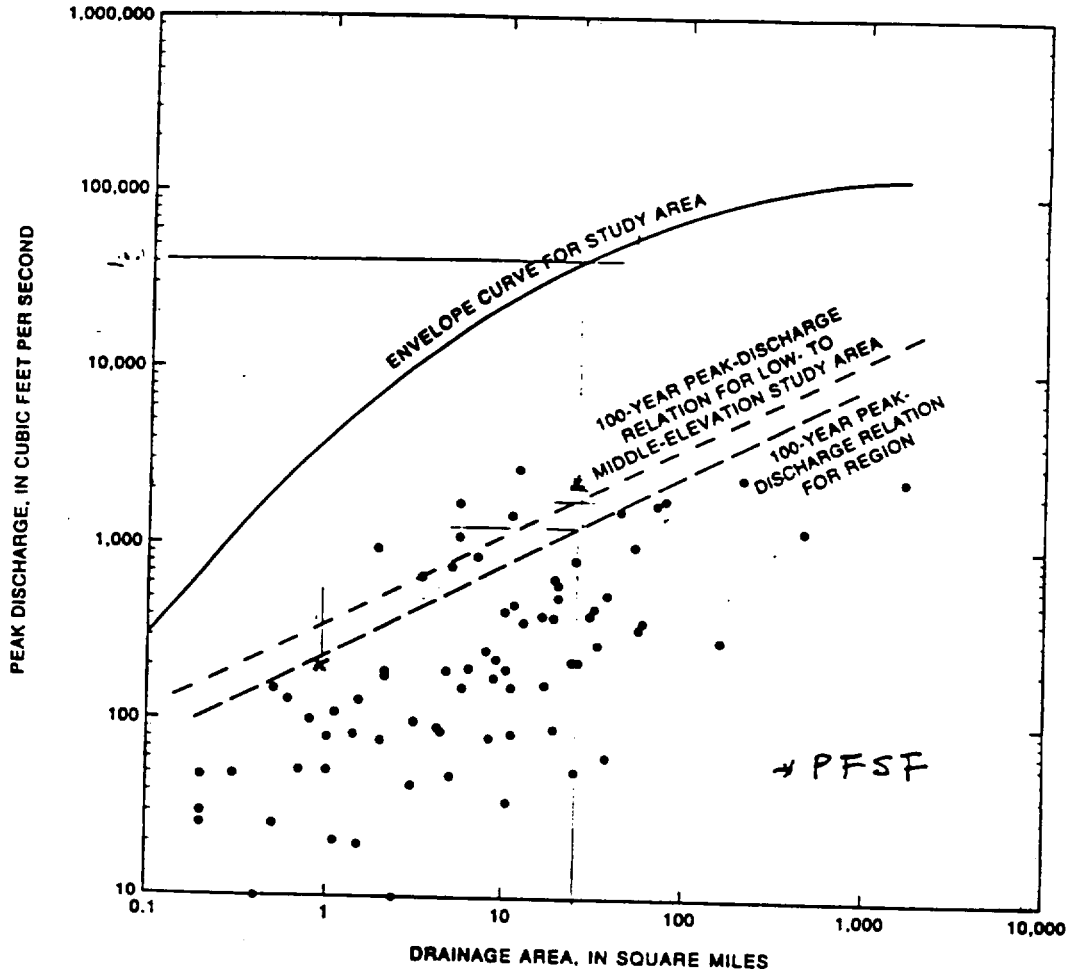


Figure 8 Relations between 100-year peak discharge and drainage area and plot of maximum peak discharge of record and drainage area for gaged sites in the Northern Great Basin Region 6.

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CALCULATION SHEET

5010.65

CALCULATION IDENTIFICATION NUMBER				
J.O. or W.O. No. 05996.01	Discipline G(B)	CALCULATION NO. 02	OPTIONAL TASK CODE N/A	PAGE 35___

Sheet Chart 1

100-yr Hydrograph at Access Road

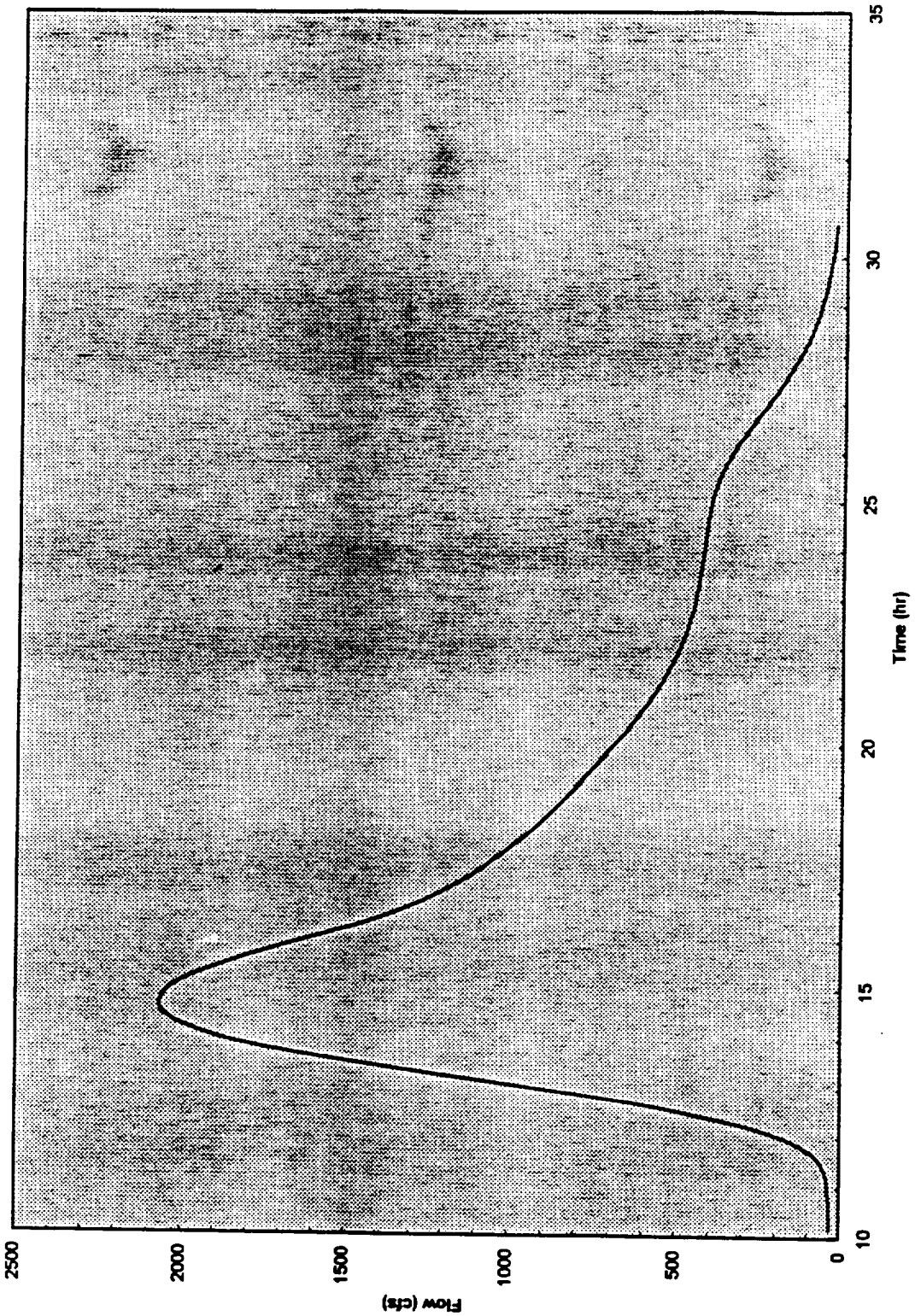

Figure 9

Shee Chart 1

PMF Hydrograph at Access Road

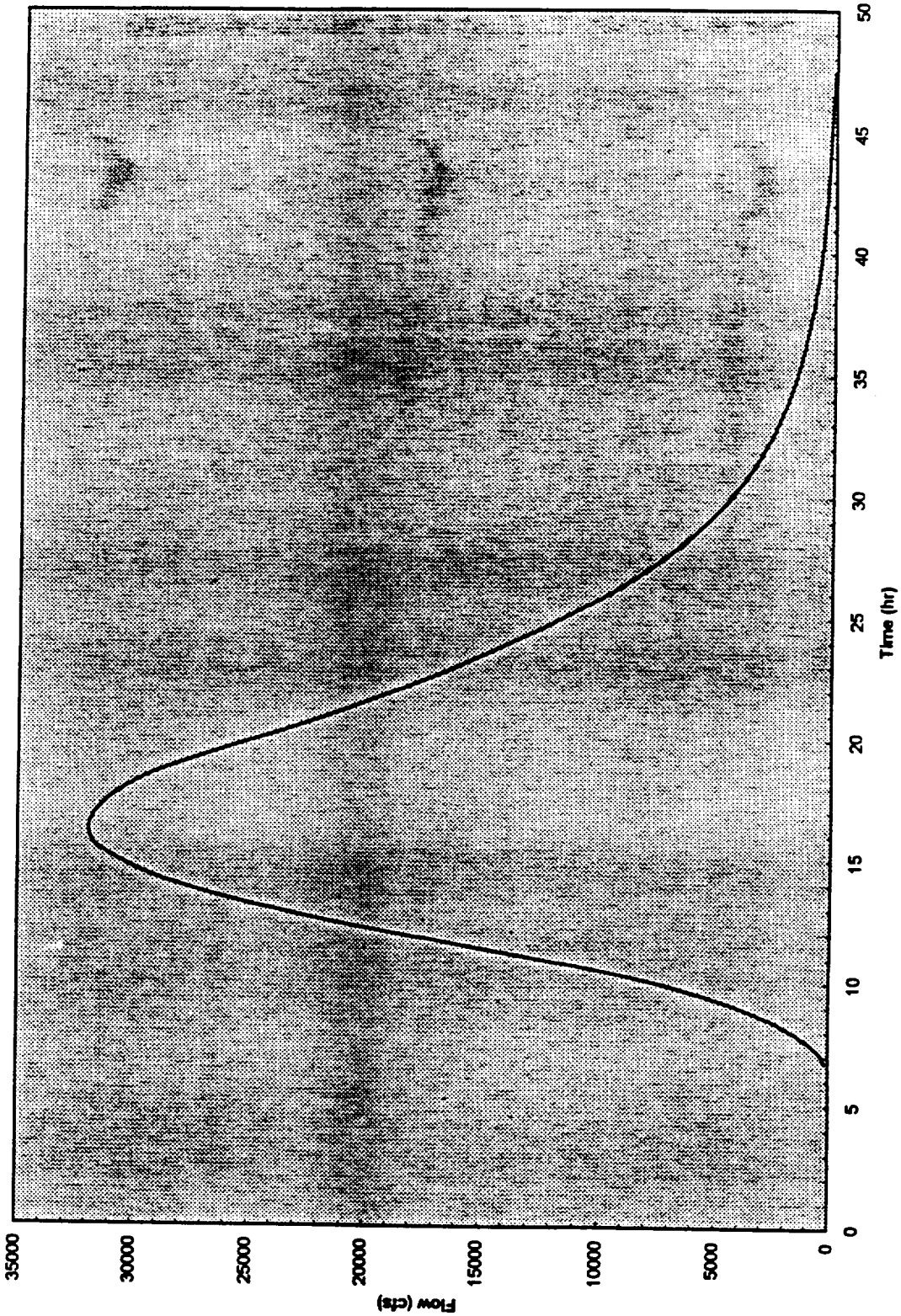

Figure 10

STONE & WEBSTER ENGINEERING CORPORATION

5010.65 **CALCULATION SHEET**

CALCULATION IDENTIFICATION NUMBER				
J.O. or W.O. No. 05996.01	Discipline G(B)	CALCULATION NO. 02	OPTIONAL TASK CODE N/A	PAGE 37___

Sheet Chart 1

100-yr Hydrograph at Site

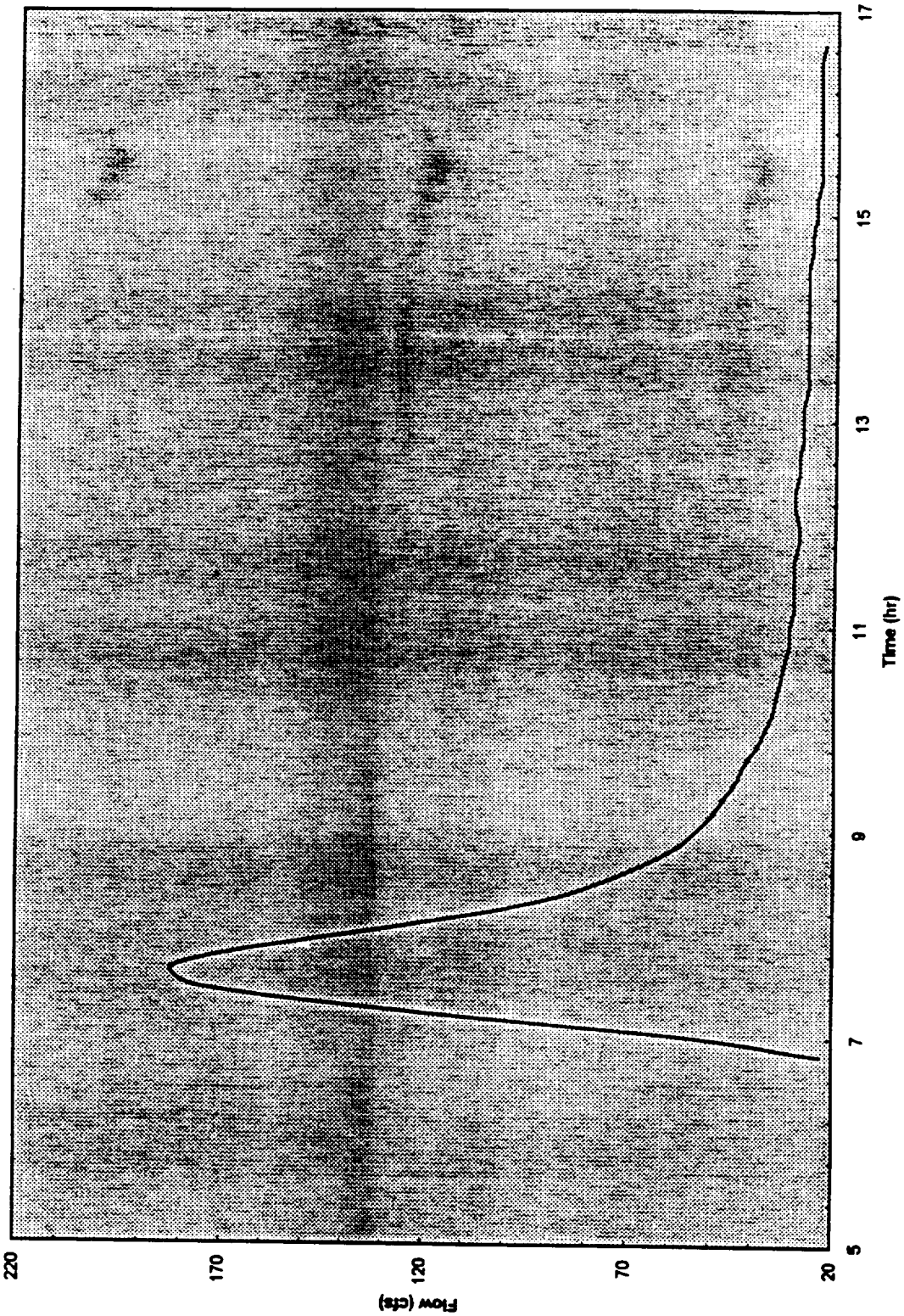

Figure 11

Sheet__ Chart 1

PMF Hydrograph at Site

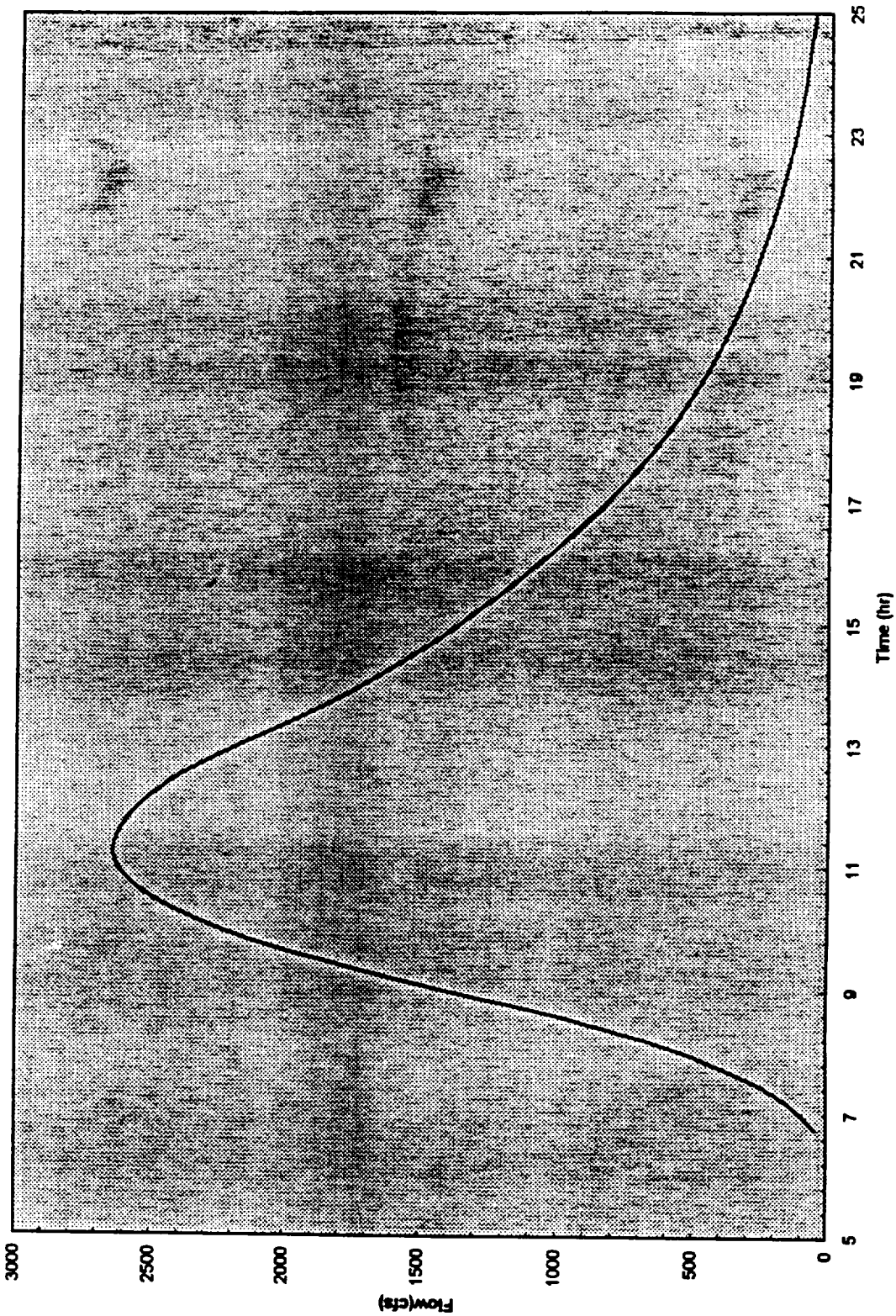

Figure 12

4.6 Hydraulic Analyses

Backwater profiles at the downstream of the access road crossing was computed by using computer program entitled " River Analysis System, " (HEC-RAS, 1995). Geometric cross sections were based on USGS Hickman Knolls, Utah (1993) map which has a 10 ft interval contour line. The Manning's coefficients used were 0.03 in the channel and 0.04 on the bank. The locations of the cross section used for analysis are shown in Figure 13. Plots of cross section are attached at Attachment B.

The geologic map of Skull Valley (Sack, 1993), shows that the mud flat of the valley extends to the downstream approximately 9 miles north from the site. It suggests that there is no impact of backwater flooding from downstream to the site. A normal flow depth, therefore was assumed in the backwater computation. The average stream slope is approximately 0.59%.

The PFSF site is located approximately at a high plateau of the Skull Valley. Currently, the storm water drained from the Hickman Knolls conveys northward toward Salt Lake. With installation of canisters, the flow could be partial or total diverted into the vicinity no named stream. For a conservative consideration, the peak discharges at site and the access road were superimposed for backwater profile computation. The peak discharges used for analysis are 2247 cfs and 34577 cfs for the 100-yr and the PMF respectively. Computational results are attached in Attachment B and are summarized in the following Table 19.

The flood elevation at the PFSF site was computed based on the Manning formula. It is assumed that an overland flow prevails over the site and the width of the opening space is approximately 1250 ft. The Manning's coefficient is 0.03. The induced velocities for a 100-yr storm and the PMF are shown in Table 19.

Table 19 Summary of Hydraulic Analysis

Location	Storm	Flow (cfs)	Elevation Water (ft)	Elevation Bank El. (ft)	Velocity (fps)
Access Road	100-yr	2247	4495.1		3.09
	PMF	34577	4499.19		5.50
Near Site (East)	100-yr	2247	4451.23	4460	2.36
	PMF	34577	4453.40	4460	5.49
At PFSF Site	100-yr	182	4460.14	4460	1
	PMF	2643	4460.7	4460	3

Results show the site is located above both the 100-yr storm and PMF flooding elevation. The approximately 100-yr flood location was sketched in Figure 13.

CALCULATION IDENTIFICATION NUMBER				
J.O. or W.O. No. 05996.01	Discipline G(B)	CALCULATION NO. 02	OPTIONAL TASK CODE N/A	PAGE 40

The hydraulic analysis for this calculation is based only on the existing conditions. The results are valid if hydraulic structures remained to be the same.

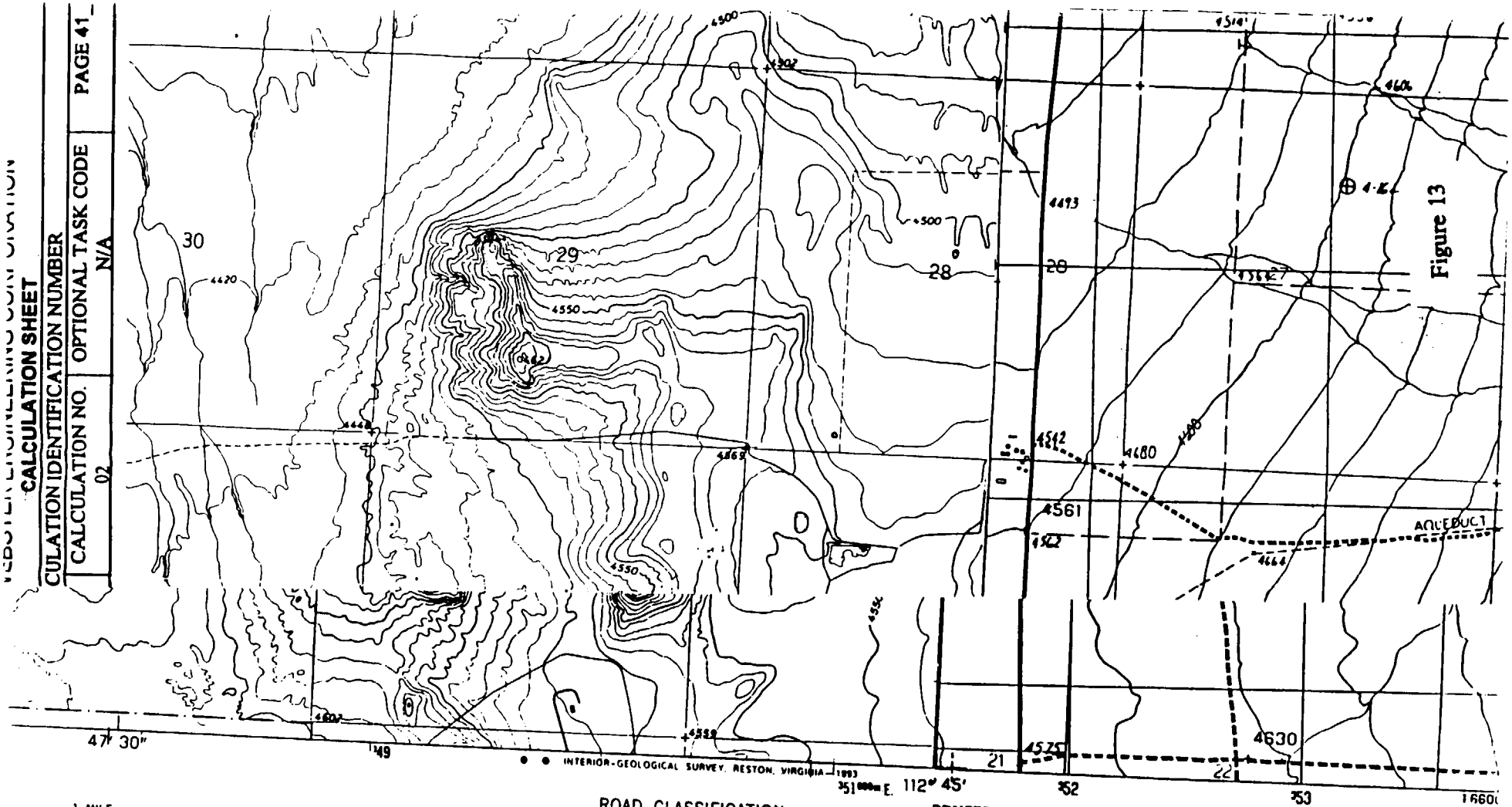

Figure 13

1 MILE

ROAD CLASSIFICATION

Primary highway, hard surface
Light-duty road, hard or improved surface
Secondary highway, hard surface
Unimproved road
Interstate Route
U. S. Route
State Route

UTAH

QUADRANGLE LOCATION

DDUCED BY THE UNITED STATES GEOLOGICAL SURVEY
NTROL BY USGS, NOS/NOAA
PILED FROM AERIAL PHOTOGRAPHS TAKEN 1980
LD CHECKED 1981 MAP EDITED 1985
JECTION LAMBERT CONFORMAL CONIC
D: 1000-METER UNIVERSAL TRANSVERSE MERCATOR ZONE 12
10,000-FOOT STATE GRID TICKS UTAH, CENTRAL ZONE
GRID DECLINATION 1°06' WEST
MAGNETIC NORTH DECLINATION 15° EAST
TICAL DATUM NATIONAL GEODETIC VERTICAL DATUM OF 1929
RIZONTAL DATUM 1927 NORTH AMERICAN DATUM
place on the predicted North American Datum of 1983, move
projection lines as shown by dashed corner ticks
meters north and 67 meters east)
ere may be private inholdings within the boundaries of any
deral and State Reservations shown on this map
ere omitted, land lines have not been established

1" = 2000'

HICKMAN KNOLLS, UTAH
40112-D7-TF-024
1993
DMA NE-SERIES V897

A 22092

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Produ
manu
matio
field c

5 Summary of Results and Conclusions

Results of hydrological study using HEC-1 computer program indicate peak discharges corresponding to the 100-yr storm and the PMP at the access road and the PFSF site are:

Summary of Peak Discharges

Location	Drainage Area (square miles)	Peak Discharge 100-yr (cfs)	Local PMP (cfs)
At Access Road	25.97	2065	31934
At PFSF Site	0.92	182	2643

The flood elevations in the downstream of access road were predicted utilized the combined peak flows at access road and at PFSF site and HEC-RAS (1995) computer program. At PFSF site, the flood elevation was approximated by using Manning formula. Results of hydraulic calculation are:

Summary of Hydraulic Analysis

Location	Storm	Flow (cfs)	Elevation Water (ft)	Bank El. (ft)	Velocity (fps)
Access Road	100-yr	2247	4495.10	4500	3.09
	PMF	34577	4499.19	4500	5.50
Near Site (East)	100-yr	2247	4451.23	4460	2.36
	PMF	34577	4453.40	4460	5.49
At PFSF Site	100-yr	182	4460.14	4460	1
	PMF	2643	4460.7	4460	3

The site is located approximately at the elevation 4460 ft. Based on the flood elevation determined by the HEC-RAS (1995), the flood elevations of the 100-yr and PMF are below the site elevation. The site is a flood dry site.

The soil in the vicinity of the site is a silty fine sand. It is anticipated soil erosion could be occurred under a storm severe than a 100-yr storm. Riprap protection could be a measure for soil protection if it is required.

05996.01-G(B)-02
ATTACHMENT A

```
HEC1 S/N: 1343001561        HMVersion: 6.33    Data File: a:h100scsn.dat

*  ************************************                    ************************************
*                                    *                    *                                  *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1) *                    *  U.S. ARMY CORPS OF ENGINEERS    *
*            MAY   1991              *                    *  HYDROLOGIC ENGINEERING CENTER   *
*          VERSION 4.0.1E            *                    *        609 SECOND STREET         *
*                                    *                    *     DAVIS, CALIFORNIA 95616      *
* RUN DATE  02/05/1997  TIME  11:27:19 *                   *        (916) 756-1104            *
*                                    *                    *                                  *
**************************************                    ************************************

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X     X  X       X    X        XX
X     X  X       X              X
XXXXXXX  XXXX    X       XXXXX  X
X     X  X       X              X
X     X  X       X    X         X
X     X  XXXXXXX  XXXXX        XXX

::::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::::
:::                                    :::
:::  Full Microcomputer Implementation :::
:::                by                  :::
:::        Haestad Methods, Inc.       :::
:::                                    :::
::::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::::

37 Brookside Road * Waterbury, Connecticut  06708 * (203) 755-1666
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

HEC-1 INPUT


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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1           ID          PRIVATE FUEL STORAGE FACILITY PROJECT
  2           ID          100-YR STORM AT ACCESS RD, Used SCS for loss
  3           ID          100-YR STORM BASED ON NOAA ATLAS 2
  4           ID          FILE=H100SCSn.DAT
  5           ID
  6           IT      10                      200
  7           IO       2
  8           PG      60
  9           IN      60
 10           PI    0.04    0.04    0.05    0.05    0.05    0.06    0.10    0.11    0.12    0.20
 11           PI    0.21    1.21    0.10    0.09    0.08    0.08    0.07    0.06    0.04    0.04
 12           PI    0.04    0.04    0.04    0.04

 13           KK     010
 14           KM          SCS DIMENSIONLESS UNIT HYDROGRAPH
 15           BA   25.97
 16           BF     -1            1.06
 17           PR      60
 18           LS       0      72       1
 19           UD    2.68
 20           ZZ
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HC1 S/N: 1343001561        HMVersion: 6.33    Data File: a:h100scsn.dat

*  ************************************                    ************************************
*                                    *                    *                                    *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1) *                    *  U.S. ARMY CORPS OF ENGINEERS      *
*             MAY  1991              *                    *  HYDROLOGIC ENGINEERING CENTER     *
*          VERSION 4.0.1E            *                    *        609 SECOND STREET           *
*                                    *                    *     DAVIS, CALIFORNIA 95616        *
* RUN DATE  02/05/1997  TIME  11:27:19 *                   *        (916) 756-1104              *
*                                    *                    *                                    *
************************************                    ************************************

                          PRIVATE FUEL STORAGE FACILITY PROJECT
                          100-YR STORM AT ACCESS RD, Used SCS for loss
                          100-YR STORM BASED ON NOAA ATLAS 2
                          FILE=H100SCSn.DAT

 7 IO        OUTPUT CONTROL VARIABLES
                  IPRNT          2  PRINT CONTROL
                  IPLOT          0  PLOT CONTROL
                  QSCAL         0.  HYDROGRAPH PLOT SCALE

 9 IN        TIME DATA FOR INPUT TIME SERIES
                  JXMIN         60  TIME INTERVAL IN MINUTES
                 JXDATE      1   0  STARTING DATE
                 JXTIME          0  STARTING TIME

 .T          HYDROGRAPH TIME DATA
                   NMIN         10  MINUTES IN COMPUTATION INTERVAL
                  IDATE      1   0  STARTING DATE
                  ITIME       0000  STARTING TIME
                     NQ        200  NUMBER OF HYDROGRAPH ORDINATES
                 NDDATE      2   0  ENDING DATE
                 NDTIME       0910  ENDING TIME
                 ICENT          19  CENTURY MARK

            COMPUTATION INTERVAL    0.17 HOURS
                 TOTAL TIME BASE   33.17 HOURS

      ENGLISH UNITS
           DRAINAGE AREA          SQUARE MILES
           PRECIPITATION DEPTH    INCHES
           LENGTH, ELEVATION      FEET
           FLOW                   CUBIC FEET PER SECOND
           STORAGE VOLUME         ACRE-FEET
           SURFACE AREA           ACRES
           TEMPERATURE            DEGREES FAHRENHEIT

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

          **************
          *            *
          *     010    *
          *            *
          **************
```

SCS DIMENSIONLESS UNIT HYDROGRAPH

SUBBASIN RUNOFF DATA

15 BA SUBBASIN CHARACTERISTICS
TAREA 25.97 SUBBASIN AREA

16 BF BASE FLOW CHARACTERISTICS
STRTQ 25.97 INITIAL FLOW
QRCSN 0.00 BEGIN BASE FLOW RECESSION
RTIOR 1.06000 RECESSION CONSTANT

PRECIPITATION DATA

17 PR RECORDING STATIONS 60
0 PW WEIGHTS 1.00

18 LS SCS LOSS RATE
STRTL 0.78 INITIAL ABSTRACTION
CRVNBR 72.00 CURVE NUMBER
RTIMP 1.00 PERCENT IMPERVIOUS AREA

19 UD SCS DIMENSIONLESS UNITGRAPH
TLAG 2.68 LAG

***

PRECIPITATION STATION DATA

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TEMPORAL DISTRIBUTIONS

STATION 60, WEIGHT = 1.00

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0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02
0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03
0.04	0.03	0.04	0.03	0.04	0.03	0.20	0.20	0.20	0.20
0.20	0.20	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01
0.02	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01
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1581.	1430.	1293.	1187.	1087.	987.	897.	815.	732.	656.
601.	546.	492.	449.	408.	367.	332.	302.	272.	244.
224.	203.	183.	167.	152.	137.	125.	114.	103.	93.
85.	76.	68.	63.	57.	52.	48.	44.	41.	38.
35.	31.	28.	25.	22.	19.	16.	13.	11.	8.
5.	2.								

HYDROGRAPH AT STATION 010

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1		0010	2	0.01	0.01	0.00	26.	1		1650	102	0.01	0.01	0.01	1198.
1		0020	3	0.01	0.01	0.00	25.	1		1700	103	0.01	0.01	0.01	1154.
1		0030	4	0.01	0.01	0.00	25.	1		1710	104	0.01	0.00	0.01	1113.
1		0040	5	0.01	0.01	0.00	25.	1		1720	105	0.01	0.00	0.01	1076.
1		0050	6	0.01	0.01	0.00	25.	1		1730	106	0.01	0.00	0.01	1042.
1		0100	7	0.01	0.01	0.00	25.	1		1740	107	0.01	0.00	0.01	1010.
1		0110	8	0.01	0.01	0.00	25.	1		1750	108	0.01	0.00	0.01	978.
1		0120	9	0.01	0.01	0.00	24.	1		1800	109	0.01	0.00	0.01	949.
1		0130	10	0.01	0.01	0.00	24.	1		1810	110	0.01	0.00	0.00	921.
1		0140	11	0.01	0.01	0.00	24.	1		1820	111	0.01	0.00	0.00	895.
1		0150	12	0.01	0.01	0.00	24.	1		1830	112	0.01	0.00	0.00	870.
1		0200	13	0.01	0.01	0.00	24.	1		1840	113	0.01	0.00	0.00	847.
1		0210	14	0.01	0.01	0.00	24.	1		1850	114	0.01	0.00	0.00	824.
1		0220	15	0.01	0.01	0.00	25.	1		1900	115	0.01	0.00	0.00	801.
1		0230	16	0.01	0.01	0.00	25.	1		1910	116	0.01	0.00	0.00	779.
1		0240	17	0.01	0.01	0.00	25.	1		1920	117	0.01	0.00	0.00	757.
1		0250	18	0.01	0.01	0.00	25.	1		1930	118	0.01	0.00	0.00	735.
1		0300	19	0.01	0.01	0.00	25.	1		1940	119	0.01	0.00	0.00	714.
1		0310	20	0.01	0.01	0.00	25.	1		1950	120	0.01	0.00	0.00	693.
1		0320	21	0.01	0.01	0.00	25.	1		2000	121	0.01	0.00	0.00	672.
1		0330	22	0.01	0.01	0.00	25.	1		2010	122	0.01	0.00	0.00	652.
1		0340	23	0.01	0.01	0.00	25.	1		2020	123	0.01	0.00	0.00	633.
1		0350	24	0.01	0.01	0.00	25.	1		2030	124	0.01	0.00	0.00	614.
1		0400	25	0.01	0.01	0.00	26.	1		2040	125	0.01	0.00	0.00	596.
1		0410	26	0.01	0.01	0.00	26.	1		2050	126	0.01	0.00	0.00	579.
1		0420	27	0.01	0.01	0.00	26.	1		2100	127	0.01	0.00	0.00	563.
1		0430	28	0.01	0.01	0.00	26.	1		2110	128	0.01	0.00	0.00	548.
1		0440	29	0.01	0.01	0.00	26.	1		2120	129	0.01	0.00	0.00	534.
1		0450	30	0.01	0.01	0.00	26.	1		2130	130	0.01	0.00	0.00	521.
1		0500	31	0.01	0.01	0.00	26.	1		2140	131	0.01	0.00	0.00	509.
1		0510	32	0.01	0.01	0.00	26.	1		2150	132	0.01	0.00	0.00	497.
1		0520	33	0.01	0.01	0.00	26.	1		2200	133	0.01	0.00	0.00	487.
1		0530	34	0.01	0.01	0.00	26.	1		2210	134	0.01	0.00	0.00	478.
1		0540	35	0.01	0.01	0.00	26.	1		2220	135	0.01	0.00	0.00	470.
1		0550	36	0.01	0.01	0.00	26.	1		2230	136	0.01	0.00	0.00	463.
1		0600	37	0.01	0.01	0.00	26.	1		2240	137	0.01	0.00	0.00	456.
1		0610	38	0.02	0.02	0.00	26.	1		2250	138	0.01	0.00	0.00	451.
1		0620	39	0.02	0.02	0.00	26.	1		2300	139	0.01	0.00	0.00	446.
1		0630	40	0.02	0.02	0.00	26.	1		2310	140	0.01	0.00	0.00	441.
1		0640	41	0.02	0.02	0.00	26.	1		2320	141	0.01	0.00	0.00	437.
1		0650	42	0.02	0.02	0.00	26.	1		2330	142	0.01	0.00	0.00	433.
1		0700	43	0.02	0.02	0.00	26.	1		2340	143	0.01	0.00	0.00	430.
1		0710	44	0.02	0.02	0.00	26.	1		2350	144	0.01	0.00	0.00	426.
1		0720	45	0.02	0.02	0.00	26.	2		0000	145	0.01	0.00	0.00	423.
1		0730	46	0.02	0.02	0.00	26.	2		0010	146	0.00	0.00	0.00	420.
1		0740	47	0.02	0.02	0.00	26.	2		0020	147	0.00	0.00	0.00	417.
1		0750	48	0.02	0.02	0.00	26.	2		0030	148	0.00	0.00	0.00	413.
1		0800	49	0.02	0.02	0.00	26.	2		0040	149	0.00	0.00	0.00	409.
1		0810	50	0.02	0.02	0.00	27.	2		0050	150	0.00	0.00	0.00	403.
1		0820	51	0.02	0.02	0.00	27.	2		0100	151	0.00	0.00	0.00	397.
1		0830	52	0.02	0.02	0.00	27.	2		0110	152	0.00	0.00	0.00	389.
1		0840	53	0.02	0.02	0.00	28.	2		0120	153	0.00	0.00	0.00	380.
1		0850	54	0.02	0.02	0.00	28.	2		0130	154	0.00	0.00	0.00	369.
1		0900	55	0.02	0.02	0.00	28.	2		0140	155	0.00	0.00	0.00	356.
		0910	56	0.03	0.03	0.00	29.	2		0150	156	0.00	0.00	0.00	342.
1		0920	57	0.03	0.03	0.00	29.	2		0200	157	0.00	0.00	0.00	327.

1	0930	58	0.03	0.03	0.00	29.	*	2	0210	158	0.00	0.00	0.00	310.
1	0940	59	0.03	0.03	0.00	30.	*	2	0220	159	0.00	0.00	0.00	293.
1	0950	60	0.03	0.03	0.00	30.	*	2	0230	160	0.00	0.00	0.00	275.
1	1000	61	0.03	0.03	0.00	30.	*	2	0240	161	0.00	0.00	0.00	257.
1	1010	62	0.04	0.03	0.00	31.	*	2	0250	162	0.00	0.00	0.00	238.
1	1020	63	0.03	0.03	0.00	32.	*	2	0300	163	0.00	0.00	0.00	220.
1	1030	64	0.04	0.03	0.00	33.	*	2	0310	164	0.00	0.00	0.00	203.
1	1040	65	0.03	0.03	0.00	35.	*	2	0320	165	0.00	0.00	0.00	186.
1	1050	66	0.04	0.03	0.00	37.	*	2	0330	166	0.00	0.00	0.00	170.
1	1100	67	0.03	0.03	0.00	41.	*	2	0340	167	0.00	0.00	0.00	155.
1	1110	68	0.20	0.17	0.03	47.	*	2	0350	168	0.00	0.00	0.00	141.
1	1120	69	0.20	0.15	0.05	60.	*	2	0400	169	0.00	0.00	0.00	128.
1	1130	70	0.20	0.14	0.06	83.	*	2	0410	170	0.00	0.00	0.00	115.
1	1140	71	0.20	0.13	0.07	120.	*	2	0420	171	0.00	0.00	0.00	105.
1	1150	72	0.20	0.12	0.08	173.	*	2	0430	172	0.00	0.00	0.00	95.
1	1200	73	0.20	0.11	0.09	249.	*	2	0440	173	0.00	0.00	0.00	86.
1	1210	74	0.02	0.01	0.01	344.	*	2	0450	174	0.00	0.00	0.00	79.
1	1220	75	0.02	0.01	0.01	460.	*	2	0500	175	0.00	0.00	0.00	72.
1	1230	76	0.02	0.01	0.01	595.	*	2	0510	176	0.00	0.00	0.00	65.
1	1240	77	0.02	0.01	0.01	750.	*	2	0520	177	0.00	0.00	0.00	60.
1	1250	78	0.02	0.01	0.01	923.	*	2	0530	178	0.00	0.00	0.00	55.
1	1300	79	0.02	0.01	0.01	1107.	*	2	0540	179	0.00	0.00	0.00	50.
1	1310	80	0.02	0.01	0.01	1295.	*	2	0550	180	0.00	0.00	0.00	45.
1	1320	81	0.01	0.01	0.01	1476.	*	2	0600	181	0.00	0.00	0.00	41.
1	1330	82	0.02	0.01	0.01	1639.	*	2	0610	182	0.00	0.00	0.00	38.
1	1340	83	0.01	0.01	0.01	1775.	*	2	0620	183	0.00	0.00	0.00	35.
1	1350	84	0.02	0.01	0.01	1886.	*	2	0630	184	0.00	0.00	0.00	32.
1	1400	85	0.01	0.01	0.01	1969.	*	2	0640	185	0.00	0.00	0.00	29.
1	1410	86	0.01	0.01	0.01	2024.	*	2	0650	186	0.00	0.00	0.00	27.
1	1420	87	0.01	0.01	0.01	2057.	*	2	0700	187	0.00	0.00	0.00	24.
1	1430	88	0.01	0.01	0.01	2065.	*	2	0710	188	0.00	0.00	0.00	22.
1	1440	89	0.01	0.01	0.01	2056.	*	2	0720	189	0.00	0.00	0.00	21.
1	1450	90	0.01	0.01	0.01	2030.	*	2	0730	190	0.00	0.00	0.00	19.
1	1500	91	0.01	0.01	0.01	1986.	*	2	0740	191	0.00	0.00	0.00	18.
1	1510	92	0.01	0.01	0.01	1931.	*	2	0750	192	0.00	0.00	0.00	16.
1	1520	93	0.01	0.01	0.01	1866.	*	2	0800	193	0.00	0.00	0.00	15.
1	1530	94	0.01	0.01	0.01	1791.	*	2	0810	194	0.00	0.00	0.00	14.
1	1540	95	0.01	0.01	0.01	1708.	*	2	0820	195	0.00	0.00	0.00	13.
1	1550	96	0.01	0.01	0.01	1619.	*	2	0830	196	0.00	0.00	0.00	12.
1	1600	97	0.01	0.01	0.01	1530.	*	2	0840	197	0.00	0.00	0.00	11.
1	1610	98	0.01	0.01	0.01	1444.	*	2	0850	198	0.00	0.00	0.00	10.
1	1620	99	0.01	0.01	0.01	1369.	*	2	0900	199	0.00	0.00	0.00	10.
1	1630	100	0.01	0.01	0.01	1304.	*	2	0910	200	0.00	0.00	0.00	9.
							*							

****

TOTAL RAINFALL = 2.96, TOTAL LOSS = 2.15, TOTAL EXCESS = 0.81

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW					
		6-HR	24-HR	72-HR	33.17-HR	(CFS)	(HR)
(CFS)		2065.	14.50	1447.	570.	419.	419.
(INCHES)		0.518	0.816	0.828	0.828		
(AC-FT)		718.	1130.	1147.	1147.		

CUMULATIVE AREA = 25.97 SQ MI

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
6-HOUR	24-HOUR	72-HOUR							
HYDROGRAPH AT			010	2065.	14.50	1447.	570.	419.	25.97

*** NORMAL END OF HEC-1 ***

05996.01-G(B)-02
ATTACHMENT A

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HEC1 S/N: 1343001561        HMVersion: 6.33    Data File: a:rpmpgenn.dat

*  ************************************                  ************************************
*                                    *                  *                                  *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1) *                  *  U.S. ARMY CORPS OF ENGINEERS    *
*            MAY   1991              *                  *  HYDROLOGIC ENGINEERING CENTER   *
*          VERSION 4.0.1E            *                  *        609 SECOND STREET         *
*                                    *                  *     DAVIS, CALIFORNIA 95616      *
*  RUN DATE  02/14/1997  TIME  14:06:46 *                *        (916) 756-1104           *
*                                    *                  *                                  *
**************************************                  ************************************

X     X  XXXXXXX   XXXXX          X
X     X  X       X     X        XX
X     X  X       X              X
XXXXXXX  XXXX    X       XXXXX  X
X     X  X       X              X
X     X  X       X     X        X
X     X  XXXXXXX   XXXXX        XXX

::::::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::::::
:::                                      :::
:::  Full Microcomputer Implementation   :::
:::                by                    :::
:::        Haested Methods, Inc.         :::
:::                                      :::
::::::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::::::

37 Brookside Road * Waterbury, Connecticut  06708 * (203) 755-1666

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM
```

HEC-1 INPUT


```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1           ID          PRIVATE FUEL STORAGE FACILITY PROJECT
  2           ID          GENERAL PMP AT ACCESS RD, Used SCS for loss
  3           ID          PMP BASED ON HMR 49
  4           ID          FILE=RPMPGENn.DAT
  5           ID
  6           IT      60                      200
  7           IO       2
  8           PG      60
  9           IN     180
 10           PI    0.20    0.29    0.31    0.35    0.35    0.40    0.67    0.74    0.96    1.11
 11           PI    1.19    3.70    0.58    0.54    0.51    0.45    0.45    0.40    0.20    0.20
 12           PI    0.15    0.15    0.15    0.15

 13           KK     010
 14           KM          SCS DIMENSIONLESS UNIT HYDROGRAPH
 15           BA   25.97
 16           BF     -1              1.06
 17           PR     60
 18           LS      0      72       1
 19           UD   2.68
 20           ZZ
```

```
FF1 S/N: 1343001561        HMVersion: 6.33    Data File: a:rpmpgenn.dat

*  ************************************
*                                    *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1) *
*              MAY   1991            *
*           VERSION 4.0.1E           *
*                                    *
* RUN DATE  02/14/1997  TIME  14:06:46 *
*                                    *
**************************************

**************************************
*                                    *
*   U.S. ARMY CORPS OF ENGINEERS     *
*   HYDROLOGIC ENGINEERING CENTER    *
*         609 SECOND STREET          *
*       DAVIS, CALIFORNIA 95616      *
*          (916) 756-1104            *
*                                    *
**************************************

                    PRIVATE FUEL STORAGE FACILITY PROJECT
                    GENERAL PMP AT ACCESS RD, Used SCS for loss
                    PMP BASED ON HMR 49
                    FILE=RPMPGENn.DAT

  7 IO        OUTPUT CONTROL VARIABLES
                  IPRNT          2  PRINT CONTROL
                  IPLOT          0  PLOT CONTROL
                  QSCAL         0.  HYDROGRAPH PLOT SCALE

  9 IN        TIME DATA FOR INPUT TIME SERIES
                  JXMIN        180  TIME INTERVAL IN MINUTES
                 JXDATE      1    0  STARTING DATE
                 JXTIME           0  STARTING TIME

  1T          HYDROGRAPH TIME DATA
                   NMIN         60  MINUTES IN COMPUTATION INTERVAL
                  IDATE      1    0  STARTING DATE
                  ITIME       0000  STARTING TIME
                     NQ        200  NUMBER OF HYDROGRAPH ORDINATES
                 NDDATE      9    0  ENDING DATE
                 NDTIME       0700  ENDING TIME
                  ICENT         19  CENTURY MARK

            COMPUTATION INTERVAL    1.00 HOURS
                 TOTAL TIME BASE  199.00 HOURS

      ENGLISH UNITS
          DRAINAGE AREA          SQUARE MILES
          PRECIPITATION DEPTH    INCHES
          LENGTH, ELEVATION      FEET
          FLOW                   CUBIC FEET PER SECOND
          STORAGE VOLUME         ACRE-FEET
          SURFACE AREA           ACRES
          TEMPERATURE            DEGREES FAHRENHEIT

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

          **************
          *            *
          *     010    *
          *            *
          **************
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SCS DIMENSIONLESS UNIT HYDROGRAPH

SUBBASIN RUNOFF DATA

15 BA SUBBASIN CHARACTERISTICS
TAREA 25.97 SUBBASIN AREA

16 BF BASE FLOW CHARACTERISTICS
STRTQ 25.97 INITIAL FLOW
QRCSN 0.00 BEGIN BASE FLOW RECESSION
RTIOR 1.06000 RECESSION CONSTANT

PRECIPITATION DATA

17 PR RECORDING STATIONS 60
0 PW WEIGHTS 1.00

18 LS SCS LOSS RATE
STRTL 0.78 INITIAL ABSTRACTION
CRVNBR 72.00 CURVE NUMBER
RTIMP 1.00 PERCENT IMPERVIOUS AREA

19 UD SCS DIMENSIONLESS UNITGRAPH
TLAG 2.68 LAG

***

PRECIPITATION STATION DATA

STATION	TOTAL	AVG. ANNUAL	WEIGHT
60	14.20	0.00	1.00

TEMPORAL DISTRIBUTIONS

STATION 60, WEIGHT = 1.00

0.07	0.07	0.07	0.10	0.10	0.10	0.10	0.10	0.10	0.12
0.12	0.12	0.12	0.12	0.12	0.13	0.13	0.13	0.22	0.22
0.22	0.25	0.25	0.25	0.32	0.32	0.32	0.37	0.37	0.37
0.40	0.40	0.40	1.23	1.23	1.23	0.19	0.19	0.19	0.18
0.18	0.18	0.17	0.17	0.17	0.15	0.15	0.15	0.15	0.15
0.15	0.13	0.13	0.13	0.07	0.07	0.07	0.07	0.07	0.07
0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
0.05	0.05								

UNIT HYDROGRAPH
15 END-OF-PERIOD ORDINATES

820.	2793.	3932.	3517.	2346.	1336.	817.	490.	291.	175.
105.	62.	39.	24.	11.					

****

HYDROGRAPH AT STATION 010

****

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1		0000	1	0.00	0.00	0.00	26.	*	5		0400	101	0.00	0.00	0.00	0.
1		0100	2	0.07	0.07	0.00	25.	*	5		0500	102	0.00	0.00	0.00	0.
1		0200	3	0.07	0.07	0.00	26.	*	5		0600	103	0.00	0.00	0.00	0.
1		0300	4	0.07	0.07	0.00	27.	*	5		0700	104	0.00	0.00	0.00	0.
1		0400	5	0.10	0.10	0.00	28.	*	5		0800	105	0.00	0.00	0.00	0.
		0500	6	0.10	0.10	0.00	29.	*	5		0900	106	0.00	0.00	0.00	0.
1		0600	7	0.10	0.10	0.00	30.	*	5		1000	107	0.00	0.00	0.00	0.

1	0700	8	0.10	0.10	0.00	31.	*	5	1100	108	0.00	0.00	0.00	0.
1	0800	9	0.10	0.10	0.00	31.	*	5	1200	109	0.00	0.00	0.00	0.
1	0900	10	0.10	0.10	0.00	31.	*	5	1300	110	0.00	0.00	0.00	0.
1	1000	11	0.12	0.11	0.01	35.	*	5	1400	111	0.00	0.00	0.00	0.
1	1100	12	0.12	0.10	0.01	53.	*	5	1500	112	0.00	0.00	0.00	0.
1	1200	13	0.12	0.10	0.02	93.	*	5	1600	113	0.00	0.00	0.00	0.
1	1300	14	0.12	0.09	0.02	154.	*	5	1700	114	0.00	0.00	0.00	0.
1	1400	15	0.12	0.09	0.03	228.	*	5	1800	115	0.00	0.00	0.00	0.
1	1500	16	0.12	0.08	0.03	306.	*	5	1900	116	0.00	0.00	0.00	0.
1	1600	17	0.13	0.09	0.04	390.	*	5	2000	117	0.00	0.00	0.00	0.
1	1700	18	0.13	0.09	0.05	482.	*	5	2100	118	0.00	0.00	0.00	0.
1	1800	19	0.13	0.08	0.05	581.	*	5	2200	119	0.00	0.00	0.00	0.
1	1900	20	0.22	0.13	0.10	710.	*	5	2300	120	0.00	0.00	0.00	0.
1	2000	21	0.22	0.12	0.11	916.	*	6	0000	121	0.00	0.00	0.00	0.
1	2100	22	0.22	0.11	0.12	1176.	*	6	0100	122	0.00	0.00	0.00	0.
1	2200	23	0.25	0.11	0.14	1447.	*	6	0200	123	0.00	0.00	0.00	0.
1	2300	24	0.25	0.10	0.15	1708.	*	6	0300	124	0.00	0.00	0.00	0.
2	0000	25	0.25	0.09	0.15	1950.	*	6	0400	125	0.00	0.00	0.00	0.
2	0100	26	0.32	0.11	0.21	2206.	*	6	0500	126	0.00	0.00	0.00	0.
2	0200	27	0.32	0.10	0.22	2527.	*	6	0600	127	0.00	0.00	0.00	0.
2	0300	28	0.32	0.09	0.23	2886.	*	6	0700	128	0.00	0.00	0.00	0.
2	0400	29	0.37	0.10	0.27	3247.	*	6	0800	129	0.00	0.00	0.00	0.
2	0500	30	0.37	0.09	0.28	3618.	*	6	0900	130	0.00	0.00	0.00	0.
2	0600	31	0.37	0.08	0.29	3978.	*	6	1000	131	0.00	0.00	0.00	0.
2	0700	32	0.40	0.08	0.32	4309.	*	6	1100	132	0.00	0.00	0.00	0.
2	0800	33	0.40	0.07	0.32	4615.	*	6	1200	133	0.00	0.00	0.00	0.
2	0900	34	0.40	0.07	0.33	4891.	*	6	1300	134	0.00	0.00	0.00	0.
2	1000	35	1.23	0.17	1.06	5716.	*	6	1400	135	0.00	0.00	0.00	0.
2	1100	36	1.23	0.14	1.09	7943.	*	6	1500	136	0.00	0.00	0.00	0.
2	1200	37	1.23	0.11	1.12	11030.	*	6	1600	137	0.00	0.00	0.00	0.
2	1300	38	0.19	0.02	0.18	13093.	*	6	1700	138	0.00	0.00	0.00	0.
2	1400	39	0.19	0.02	0.18	12433.	*	6	1800	139	0.00	0.00	0.00	0.
2	1500	40	0.19	0.02	0.18	9898.	*	6	1900	140	0.00	0.00	0.00	0.
2	1600	41	0.18	0.01	0.17	7292.	*	6	2000	141	0.00	0.00	0.00	0.
2	1700	42	0.18	0.01	0.17	5480.	*	6	2100	142	0.00	0.00	0.00	0.
2	1800	43	0.18	0.01	0.17	4432.	*	6	2200	143	0.00	0.00	0.00	0.
2	1900	44	0.17	0.01	0.16	3769.	*	6	2300	144	0.00	0.00	0.00	0.
2	2000	45	0.17	0.01	0.16	3350.	*	7	0000	145	0.00	0.00	0.00	0.
2	2100	46	0.17	0.01	0.16	3082.	*	7	0100	146	0.00	0.00	0.00	0.
2	2200	47	0.15	0.01	0.14	2898.	*	7	0200	147	0.00	0.00	0.00	0.
2	2300	48	0.15	0.01	0.14	2744.	*	7	0300	148	0.00	0.00	0.00	0.
3	0000	49	0.15	0.01	0.14	2610.	*	7	0400	149	0.00	0.00	0.00	0.
3	0100	50	0.15	0.01	0.14	2502.	*	7	0500	150	0.00	0.00	0.00	0.
3	0200	51	0.15	0.01	0.14	2434.	*	7	0600	151	0.00	0.00	0.00	0.
3	0300	52	0.15	0.01	0.14	2398.	*	7	0700	152	0.00	0.00	0.00	0.
3	0400	53	0.13	0.01	0.13	2371.	*	7	0800	153	0.00	0.00	0.00	0.
3	0500	54	0.13	0.01	0.13	2319.	*	7	0900	154	0.00	0.00	0.00	0.
3	0600	55	0.13	0.01	0.13	2254.	*	7	1000	155	0.00	0.00	0.00	0.
3	0700	56	0.07	0.00	0.06	2146.	*	7	1100	156	0.00	0.00	0.00	0.
3	0800	57	0.07	0.00	0.06	1934.	*	7	1200	157	0.00	0.00	0.00	0.
3	0900	58	0.07	0.00	0.06	1666.	*	7	1300	158	0.00	0.00	0.00	0.
3	1000	59	0.07	0.00	0.06	1432.	*	7	1400	159	0.00	0.00	0.00	0.
3	1100	60	0.07	0.00	0.06	1277.	*	7	1500	160	0.00	0.00	0.00	0.
3	1200	61	0.07	0.00	0.06	1189.	*	7	1600	161	0.00	0.00	0.00	0.
3	1300	62	0.05	0.00	0.05	1123.	*	7	1700	162	0.00	0.00	0.00	0.
3	1400	63	0.05	0.00	0.05	1047.	*	7	1800	163	0.00	0.00	0.00	0.
3	1500	64	0.05	0.00	0.05	966.	*	7	1900	164	0.00	0.00	0.00	0.
3	1600	65	0.05	0.00	0.05	899.	*	7	2000	165	0.00	0.00	0.00	0.
3	1700	66	0.05	0.00	0.05	856.	*	7	2100	166	0.00	0.00	0.00	0.
3	1800	67	0.05	0.00	0.05	831.	*	7	2200	167	0.00	0.00	0.00	0.
3	1900	68	0.05	0.00	0.05	816.	*	7	2300	168	0.00	0.00	0.00	0.
3	2000	69	0.05	0.00	0.05	807.	*	8	0000	169	0.00	0.00	0.00	0.
	2100	70	0.05	0.00	0.05	801.	*	8	0100	170	0.00	0.00	0.00	0.
3	2200	71	0.05	0.00	0.05	799.	*	8	0200	171	0.00	0.00	0.00	0.

3	2300	72	0.05	0.00	0.05	798.	*	8	0300	172	0.00	0.00	0.00	0.
4	0000	73	0.05	0.00	0.05	797.	*	8	0400	173	0.00	0.00	0.00	0.
4	0100	74	0.00	0.00	0.00	757.	*	8	0500	174	0.00	0.00	0.00	0.
4	0200	75	0.00	0.00	0.00	625.	*	8	0600	175	0.00	0.00	0.00	0.
4	0300	76	0.00	0.00	0.00	438.	*	8	0700	176	0.00	0.00	0.00	0.
4	0400	77	0.00	0.00	0.00	271.	*	8	0800	177	0.00	0.00	0.00	0.
4	0500	78	0.00	0.00	0.00	159.	*	8	0900	178	0.00	0.00	0.00	0.
4	0600	79	0.00	0.00	0.00	96.	*	8	1000	179	0.00	0.00	0.00	0.
4	0700	80	0.00	0.00	0.00	57.	*	8	1100	180	0.00	0.00	0.00	0.
4	0800	81	0.00	0.00	0.00	34.	*	8	1200	181	0.00	0.00	0.00	0.
4	0900	82	0.00	0.00	0.00	20.	*	8	1300	182	0.00	0.00	0.00	0.
4	1000	83	0.00	0.00	0.00	12.	*	8	1400	183	0.00	0.00	0.00	0.
4	1100	84	0.00	0.00	0.00	7.	*	8	1500	184	0.00	0.00	0.00	0.
4	1200	85	0.00	0.00	0.00	4.	*	8	1600	185	0.00	0.00	0.00	0.
4	1300	86	0.00	0.00	0.00	2.	*	8	1700	186	0.00	0.00	0.00	0.
4	1400	87	0.00	0.00	0.00	1.	*	8	1800	187	0.00	0.00	0.00	0.
4	1500	88	0.00	0.00	0.00	0.	*	8	1900	188	0.00	0.00	0.00	0.
4	1600	89	0.00	0.00	0.00	0.	*	8	2000	189	0.00	0.00	0.00	0.
4	1700	90	0.00	0.00	0.00	0.	*	8	2100	190	0.00	0.00	0.00	0.
4	1800	91	0.00	0.00	0.00	0.	*	8	2200	191	0.00	0.00	0.00	0.
4	1900	92	0.00	0.00	0.00	0.	*	8	2300	192	0.00	0.00	0.00	0.
4	2000	93	0.00	0.00	0.00	0.	*	9	0000	193	0.00	0.00	0.00	0.
4	2100	94	0.00	0.00	0.00	0.	*	9	0100	194	0.00	0.00	0.00	0.
4	2200	95	0.00	0.00	0.00	0.	*	9	0200	195	0.00	0.00	0.00	0.
4	2300	96	0.00	0.00	0.00	0.	*	9	0300	196	0.00	0.00	0.00	0.
5	0000	97	0.00	0.00	0.00	0.	*	9	0400	197	0.00	0.00	0.00	0.
5	0100	98	0.00	0.00	0.00	0.	*	9	0500	198	0.00	0.00	0.00	0.
5	0200	99	0.00	0.00	0.00	0.	*	9	0600	199	0.00	0.00	0.00	0.
5	0300	100	0.00	0.00	0.00	0.	*	9	0700	200	0.00	0.00	0.00	0.
							*							

****

AL RAINFALL = 14.20, TOTAL LOSS = 3.76, TOTAL EXCESS = 10.44

PEAK FLOW TIME

MAXIMUM AVERAGE FLOW

	6-HR	24-HR	72-HR	199.00-HR	(CFS)	(HR)	
(CFS)	13093.	37.00		10150.	5346.	2433.	882.
(INCHES)	3.634	7.655	10.454	10.471			
(AC-FT)	5033.	10603.	14480.	14504.			

CUMULATIVE AREA = 25.97 SQ MI

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
6-HOUR	24-HOUR	72-HOUR								
	HYDROGRAPH AT			010	13093.	37.00	10150.	5346.	2433.	25.97

*** NORMAL END OF HEC-1 ***

05996.01-G(B)-02
ATTACHMENT A

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HEC1 S/N: 1343001561        HMVersion: 6.33    Data File: a:rpmplocn.dat

 ***********************************                 ***********************************
 *                                 *                 *                                 *
 *  FLOOD HYDROGRAPH PACKAGE (HEC-1)*                 *  U.S. ARMY CORPS OF ENGINEERS   *
 *            MAY  1991            *                 *  HYDROLOGIC ENGINEERING CENTER  *
 *         VERSION 4.0.1E          *                 *       609 SECOND STREET         *
 *                                 *                 *     DAVIS, CALIFORNIA 95616     *
 * RUN DATE 02/05/1997  TIME 11:28:18*                *        (916) 756-1104           *
 *                                 *                 *                                 *
 ***********************************                 ***********************************

X     X  XXXXXXX  XXXXX          X
X     X  X       X    X        XX
X     X  X       X              X
XXXXXXX  XXXX    X       XXXXX  X
X     X  X       X              X
X     X  X       X    X         X
X     X  XXXXXXX  XXXXX        XXX

::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::
:::                                  :::
:::  Full Microcomputer Implementation :::
:::                by                :::
:::       Haestad Methods, Inc.      :::
:::                                  :::
::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::

37 Brookside Road * Waterbury, Connecticut  06708 * (203) 755-1666

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM
```

HEC-1 INPUT


```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1           ID          PRIVATE FUEL STORAGE FACILITY PROJECT
  2           ID          LOCAL PMP AT ACCESS RD, Used SCS for loss
  3           ID          PMP BASED ON HMR 49
  4           ID          FILE=RPMPLOCn.DAT
  5           ID
  6           IT       5                    200
  7           IO       2
  8           PG      60
  9           IN      15
 10           PI    0.10    0.10    0.10    0.09    0.20    0.17    0.17    0.17    5.33    1.53
 11           PI    0.74    0.70    0.42    0.38    0.35    0.33    0.16    0.15    0.13    0.12
 12           PI    0.09    0.08    0.07    0.07

 13           KK     010
 14           KM          SCS DIMENSIONLESS UNIT HYDROGRAPH
 15           BA   25.97
 16           BF     -1            1.06
 17           PR      60
 18           LS       0      72       1
 19           UD    2.68
 20           ZZ
```

```
HEC1 S/N: 1343001561        HMVersion: 6.33    Data File: a:rpmplocn.dat

 ***************************************
 *                                     *
 *  FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
 *            MAY   1991               *
 *         VERSION 4.0.1E              *
 *                                     *
 * RUN DATE  02/05/1997  TIME  11:28:18 *
 *                                     *
 ***************************************

 ***************************************
 *                                     *
 *   U.S. ARMY CORPS OF ENGINEERS      *
 *   HYDROLOGIC ENGINEERING CENTER     *
 *         609 SECOND STREET           *
 *      DAVIS, CALIFORNIA 95616        *
 *          (916) 756-1104             *
 *                                     *
 ***************************************

                    PRIVATE FUEL STORAGE FACILITY PROJECT
                    LOCAL PMP AT ACCESS RD, Used SCS for loss
                    PMP BASED ON HMR 49
                    FILE=RPMPLOCn.DAT

  7 IO        OUTPUT CONTROL VARIABLES
                    IPRNT          2  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE

  9 IN        TIME DATA FOR INPUT TIME SERIES
                    JXMIN         15  TIME INTERVAL IN MINUTES
                   JXDATE      1   0  STARTING DATE
                   JXTIME          0  STARTING TIME

    IT        HYDROGRAPH TIME DATA
                     NMIN          5  MINUTES IN COMPUTATION INTERVAL
                    IDATE      1   0  STARTING DATE
                    ITIME       0000  STARTING TIME
                       NQ        200  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE      1   0  ENDING DATE
                   NDTIME       1635  ENDING TIME
                    ICENT         19  CENTURY MARK

              COMPUTATION INTERVAL    0.08 HOURS
                   TOTAL TIME BASE   16.58 HOURS

        ENGLISH UNITS
            DRAINAGE AREA          SQUARE MILES
            PRECIPITATION DEPTH    INCHES
            LENGTH, ELEVATION      FEET
            FLOW                   CUBIC FEET PER SECOND
            STORAGE VOLUME         ACRE-FEET
            SURFACE AREA           ACRES
            TEMPERATURE            DEGREES FAHRENHEIT

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

          **************
          *            *
          *     010    *
          *            *
          **************
```

SCS DIMENSIONLESS UNIT HYDROGRAPH

SUBBASIN RUNOFF DATA

15 BA SUBBASIN CHARACTERISTICS

TAREA	25.97	SUBBASIN AREA

16 BF BASE FLOW CHARACTERISTICS

STRTQ	25.97	INITIAL FLOW
QRCSN	0.00	BEGIN BASE FLOW RECESSION
RTIOR	1.06000	RECESSION CONSTANT

PRECIPITATION DATA

17 PR	RECORDING STATIONS	60
0 PW	WEIGHTS	1.00

18 LS SCS LOSS RATE

STRTL	0.78	INITIAL ABSTRACTION
CRVNBR	72.00	CURVE NUMBER
RTIMP	1.00	PERCENT IMPERVIOUS AREA

19 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	2.68	LAG

***

PRECIPITATION STATION DATA

STATION	TOTAL	AVG. ANNUAL	WEIGHT
60	11.75	0.00	1.00

TEMPORAL DISTRIBUTIONS

STATION 60, WEIGHT = 1.00

0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
0.03	0.03	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06
0.06	0.06	0.06	0.06	1.78	1.78	1.78	0.51	0.51	0.51
0.25	0.25	0.25	0.23	0.23	0.23	0.14	0.14	0.14	0.13
0.13	0.13	0.12	0.12	0.12	0.11	0.11	0.11	0.05	0.05
0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.04	0.04
0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02
0.02	0.02								

UNIT HYDROGRAPH
163 END-OF-PERIOD ORDINATES

42.	85.	127.	211.	310.	408.	520.	647.	774.	910.
1079.	1249.	1418.	1640.	1866.	2092.	2346.	2614.	2882.	3133.
3359.	3585.	3801.	3956.	4111.	4267.	4360.	4445.	4530.	4572.
4586.	4600.	4604.	4590.	4576.	4557.	4472.	4388.	4303.	4207.
4108.	4009.	3903.	3790.	3677.	3556.	3415.	3274.	3133.	2963.
2794.	2625.	2476.	2335.	2194.	2073.	1974.	1875.	1780.	1695.
1610.	1526.	1454.	1384.	1313.	1256.	1204.	1153.	1101.	1050.
998.	948.	906.	863.	821.	778.	736.	694.	660.	632.
604.	575.	547.	519.	491.	470.	449.	428.	407.	386.
364.	346.	331.	315.	300.	284.	269.	253.	243.	232.
222.	211.	200.	190.	181.	173.	165.	157.	150.	142.
134.	128.	123.	117.	111.	106.	100.	95.	91.	87.
82.	78.	74.	70.	67.	64.	61.	58.	55.	53.
50.	48.	47.	45.	43.	42.	40.	38.	37.	35.
33.	31.	30.	28.	26.	25.	23.	22.	20.	19.
17.	16.	15.	13.	12.	10.	9.	7.	6.	5.
3.	2.	0.							

HYDROGRAPH AT STATION 010

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1		0000	1	0.00	0.00	0.00	26.	1		0820	101	0.00	0.00	0.00	11113.
1		0005	2	0.03	0.03	0.00	26.	1		0825	102	0.00	0.00	0.00	10631.
1		0010	3	0.03	0.03	0.00	26.	1		0830	103	0.00	0.00	0.00	10160.
1		0015	4	0.03	0.03	0.00	26.	1		0835	104	0.00	0.00	0.00	9702.
1		0020	5	0.03	0.03	0.00	26.	1		0840	105	0.00	0.00	0.00	9266.
1		0025	6	0.03	0.03	0.00	26.	1		0845	106	0.00	0.00	0.00	8854.
1		0030	7	0.03	0.03	0.00	26.	1		0850	107	0.00	0.00	0.00	8460.
1		0035	8	0.03	0.03	0.00	26.	1		0855	108	0.00	0.00	0.00	8078.
1		0040	9	0.03	0.03	0.00	26.	1		0900	109	0.00	0.00	0.00	7708.
1		0045	10	0.03	0.03	0.00	26.	1		0905	110	0.00	0.00	0.00	7349.
1		0050	11	0.03	0.03	0.00	26.	1		0910	111	0.00	0.00	0.00	7004.
1		0055	12	0.03	0.03	0.00	26.	1		0915	112	0.00	0.00	0.00	6676.
1		0100	13	0.03	0.03	0.00	27.	1		0920	113	0.00	0.00	0.00	6366.
1		0105	14	0.07	0.07	0.00	27.	1		0925	114	0.00	0.00	0.00	6067.
1		0110	15	0.07	0.07	0.00	27.	1		0930	115	0.00	0.00	0.00	5778.
1		0115	16	0.07	0.07	0.00	28.	1		0935	116	0.00	0.00	0.00	5499.
1		0120	17	0.06	0.06	0.00	29.	1		0940	117	0.00	0.00	0.00	5229.
1		0125	18	0.06	0.06	0.00	29.	1		0945	118	0.00	0.00	0.00	4972.
1		0130	19	0.06	0.06	0.00	30.	1		0950	119	0.00	0.00	0.00	4729.
1		0135	20	0.06	0.06	0.00	31.	1		0955	120	0.00	0.00	0.00	4499.
1		0140	21	0.06	0.05	0.00	32.	1		1000	121	0.00	0.00	0.00	4277.
1		0145	22	0.06	0.05	0.00	34.	1		1005	122	0.00	0.00	0.00	4065.
1		0150	23	0.06	0.05	0.01	36.	1		1010	123	0.00	0.00	0.00	3860.
1		0155	24	0.06	0.05	0.01	38.	1		1015	124	0.00	0.00	0.00	3666.
1		0200	25	0.06	0.05	0.01	41.	1		1020	125	0.00	0.00	0.00	3485.
1		0205	26	1.78	1.05	0.72	74.	1		1025	126	0.00	0.00	0.00	3317.
1		0210	27	1.78	0.57	1.20	160.	1		1030	127	0.00	0.00	0.00	3158.
1		0215	28	1.78	0.36	1.42	305.	1		1035	128	0.00	0.00	0.00	3006.
1		0220	29	0.51	0.08	0.43	499.	1		1040	129	0.00	0.00	0.00	2861.
1		0225	30	0.51	0.07	0.44	773.	1		1045	130	0.00	0.00	0.00	2721.
1		0230	31	0.51	0.07	0.44	1143.	1		1050	131	0.00	0.00	0.00	2589.
1		0235	32	0.25	0.03	0.22	1570.	1		1055	132	0.00	0.00	0.00	2465.
1		0240	33	0.25	0.03	0.22	2059.	1		1100	133	0.00	0.00	0.00	2348.
1		0245	34	0.25	0.03	0.22	2619.	1		1105	134	0.00	0.00	0.00	2236.
1		0250	35	0.23	0.02	0.21	3237.	1		1110	135	0.00	0.00	0.00	2129.
1		0255	36	0.23	0.02	0.21	3924.	1		1115	136	0.00	0.00	0.00	2026.
1		0300	37	0.23	0.02	0.21	4697.	1		1120	137	0.00	0.00	0.00	1927.
1		0305	38	0.14	0.01	0.13	5549.	1		1125	138	0.00	0.00	0.00	1834.
1		0310	39	0.14	0.01	0.13	6481.	1		1130	139	0.00	0.00	0.00	1747.
1		0315	40	0.14	0.01	0.13	7522.	1		1135	140	0.00	0.00	0.00	1664.
1		0320	41	0.13	0.01	0.12	8678.	1		1140	141	0.00	0.00	0.00	1585.
1		0325	42	0.13	0.01	0.12	9909.	1		1145	142	0.00	0.00	0.00	1508.
1		0330	43	0.13	0.01	0.12	11236.	1		1150	143	0.00	0.00	0.00	1435.
1		0335	44	0.12	0.01	0.11	12670.	1		1155	144	0.00	0.00	0.00	1365.
1		0340	45	0.12	0.01	0.11	14160.	1		1200	145	0.00	0.00	0.00	1299.
1		0345	46	0.12	0.01	0.11	15664.	1		1205	146	0.00	0.00	0.00	1237.
1		0350	47	0.11	0.01	0.10	17166.	1		1210	147	0.00	0.00	0.00	1177.
1		0355	48	0.11	0.01	0.10	18661.	1		1215	148	0.00	0.00	0.00	1120.
1		0400	49	0.11	0.01	0.10	20121.	1		1220	149	0.00	0.00	0.00	1065.
1		0405	50	0.05	0.00	0.05	21512.	1		1225	150	0.00	0.00	0.00	1013.
1		0410	51	0.05	0.00	0.05	22829.	1		1230	151	0.00	0.00	0.00	964.
1		0415	52	0.05	0.00	0.05	24093.	1		1235	152	0.00	0.00	0.00	918.
1		0420	53	0.05	0.00	0.05	25265.	1		1240	153	0.00	0.00	0.00	875.
1		0425	54	0.05	0.00	0.05	26325.	1		1245	154	0.00	0.00	0.00	834.
		0430	55	0.05	0.00	0.05	27315.	1		1250	155	0.00	0.00	0.00	794.
1		0435	56	0.04	0.00	0.04	28201.	1		1255	156	0.00	0.00	0.00	756.

1	0440	57	0.04	0.00	0.04	28959.	*	1	1300	157	0.00	0.00	0.00	720.
1	0445	58	0.04	0.00	0.04	29635.	*	1	1305	158	0.00	0.00	0.00	687.
1	0450	59	0.04	0.00	0.04	30239.	*	1	1310	159	0.00	0.00	0.00	657.
1	0455	60	0.04	0.00	0.04	30759.	*	1	1315	160	0.00	0.00	0.00	628.
1	0500	61	0.04	0.00	0.04	31211.	*	1	1320	161	0.00	0.00	0.00	600.
1	0505	62	0.03	0.00	0.03	31570.	*	1	1325	162	0.00	0.00	0.00	574.
1	0510	63	0.03	0.00	0.03	31800.	*	1	1330	163	0.00	0.00	0.00	549.
1	0515	64	0.03	0.00	0.03	31901.	*	1	1335	164	0.00	0.00	0.00	524.
1	0520	65	0.03	0.00	0.02	31934.	*	1	1340	165	0.00	0.00	0.00	501.
1	0525	66	0.03	0.00	0.02	31888.	*	1	1345	166	0.00	0.00	0.00	479.
1	0530	67	0.03	0.00	0.02	31764.	*	1	1350	167	0.00	0.00	0.00	457.
1	0535	68	0.02	0.00	0.02	31586.	*	1	1355	168	0.00	0.00	0.00	436.
1	0540	69	0.02	0.00	0.02	31347.	*	1	1400	169	0.00	0.00	0.00	415.
1	0545	70	0.02	0.00	0.02	31047.	*	1	1405	170	0.00	0.00	0.00	396.
1	0550	71	0.02	0.00	0.02	30689.	*	1	1410	171	0.00	0.00	0.00	377.
1	0555	72	0.02	0.00	0.02	30263.	*	1	1415	172	0.00	0.00	0.00	358.
1	0600	73	0.02	0.00	0.02	29762.	*	1	1420	173	0.00	0.00	0.00	340.
1	0605	74	0.00	0.00	0.00	29195.	*	1	1425	174	0.00	0.00	0.00	323.
1	0610	75	0.00	0.00	0.00	28563.	*	1	1430	175	0.00	0.00	0.00	306.
1	0615	76	0.00	0.00	0.00	27857.	*	1	1435	176	0.00	0.00	0.00	290.
1	0620	77	0.00	0.00	0.00	27074.	*	1	1440	177	0.00	0.00	0.00	274.
1	0625	78	0.00	0.00	0.00	26261.	*	1	1445	178	0.00	0.00	0.00	259.
1	0630	79	0.00	0.00	0.00	25436.	*	1	1450	179	0.00	0.00	0.00	245.
1	0635	80	0.00	0.00	0.00	24609.	*	1	1455	180	0.00	0.00	0.00	230.
1	0640	81	0.00	0.00	0.00	23783.	*	1	1500	181	0.00	0.00	0.00	216.
1	0645	82	0.00	0.00	0.00	22977.	*	1	1505	182	0.00	0.00	0.00	202.
1	0650	83	0.00	0.00	0.00	22210.	*	1	1510	183	0.00	0.00	0.00	188.
1	0655	84	0.00	0.00	0.00	21463.	*	1	1515	184	0.00	0.00	0.00	175.
1	0700	85	0.00	0.00	0.00	20726.	*	1	1520	185	0.00	0.00	0.00	161.
1	0705	86	0.00	0.00	0.00	20007.	*	1	1525	186	0.00	0.00	0.00	148.
1	0710	87	0.00	0.00	0.00	19304.	*	1	1530	187	0.00	0.00	0.00	135.
1	0715	88	0.00	0.00	0.00	18611.	*	1	1535	188	0.00	0.00	0.00	122.
1	0720	89	0.00	0.00	0.00	17936.	*	1	1540	189	0.00	0.00	0.00	110.
1	0725	90	0.00	0.00	0.00	17281.	*	1	1545	190	0.00	0.00	0.00	100.
1	0730	91	0.00	0.00	0.00	16638.	*	1	1550	191	0.00	0.00	0.00	92.
1	0735	92	0.00	0.00	0.00	16019.	*	1	1555	192	0.00	0.00	0.00	85.
1	0740	93	0.00	0.00	0.00	15428.	*	1	1600	193	0.00	0.00	0.00	78.
1	0745	94	0.00	0.00	0.00	14851.	*	1	1605	194	0.00	0.00	0.00	73.
1	0750	95	0.00	0.00	0.00	14282.	*	1	1610	195	0.00	0.00	0.00	67.
1	0755	96	0.00	0.00	0.00	13721.	*	1	1615	196	0.00	0.00	0.00	62.
1	0800	97	0.00	0.00	0.00	13169.	*	1	1620	197	0.00	0.00	0.00	58.
1	0805	98	0.00	0.00	0.00	12629.	*	1	1625	198	0.00	0.00	0.00	54.
1	0810	99	0.00	0.00	0.00	12107.	*	1	1630	199	0.00	0.00	0.00	50.
1	0815	100	0.00	0.00	0.00	11604.	*	1	1635	200	0.00	0.00	0.00	47.
							*							

****

TOTAL RAINFALL = 11.75, TOTAL LOSS = 3.61, TOTAL EXCESS = 8.14

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW						
		6-HR	24-HR	72-HR	16.58-HR	(CFS)	(HR)	
(CFS)		31934.	5.33		20410.	8239.	8239.	8239.
(INCHES)		7.307	8.152	8.152	8.152			
(AC-FT)		10120.	11291.	11291.	11291.			

CUMULATIVE AREA = 25.97 SQ MI

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
6-HOUR	24-HOUR	72-HOUR								
	HYDROGRAPH AT			010	31934.	5.33	20410.	8239.	8239.	25.97

*** NORMAL END OF HEC-1 ***

ATTACHMENT A

```
1 S/N: 1343001561        HMVersion: 6.33    Data File: a:site100.dat

*   ************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              MAY   1991              *
*           VERSION 4.0.1E             *
*                                      *
*  RUN DATE  02/14/1997  TIME  14:07:18 *
*                                      *
****************************************

****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104             *
*                                      *
****************************************

X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X       XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX        XXX

::::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::::
:::                                    :::
:::  Full Microcomputer Implementation :::
:::                by                  :::
:::        Haestad Methods, Inc.       :::
:::                                    :::
::::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::::

37 Brookside Road * Waterbury, Connecticut  06708 * (203) 755-1666


THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM
```

HEC-1 INPUT


```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1           ID          PRIVATE FUEL STORAGE FACILITY PROJECT
  2           ID          100-YR STORM AT PFSF Site, Used SCS for loss
  3           ID          100-YR STORM BASED ON NOAA ATLAS 2
  4           ID          FILE=SITE100.DAT
  5           ID
  6           IT      10                      200
  7           IO       2
  8           PG      60
  9           IN      60
 10           PI   0.035   0.035    0.04    0.04   0.040   0.050    1.38    0.15    0.12    0.09
 11           PI    0.08    0.08    0.07    0.07    0.06    0.06    0.05    0.05   0.035   0.035
 12           PI   0.035   0.035    0.03    0.03

 13           KK     010
 14           KM          SCS DIMENSIONLESS UNIT HYDROGRAPH
 15           BA    0.93
 16           BF      -1            1.06
 17           PR      60
 18           LS       0      79       1
 19           UD    0.66
 20           ZZ
```

```
'1 S/N: 1343001561        HMVersion: 6.33    Data File: a:site100.dat

*************************************
*                                   *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)*
*            MAY   1991             *
*          VERSION 4.0.1E           *
*                                   *
* RUN DATE  02/14/1997  TIME  14:07:18 *
*                                   *
*************************************

*************************************
*                                   *
*   U.S. ARMY CORPS OF ENGINEERS    *
*   HYDROLOGIC ENGINEERING CENTER   *
*         609 SECOND STREET         *
*      DAVIS, CALIFORNIA 95616      *
*          (916) 756-1104           *
*                                   *
*************************************

                    PRIVATE FUEL STORAGE FACILITY PROJECT
                    100-YR STORM AT PFSF Site, Used SCS for loss
                    100-YR STORM BASED ON NOAA ATLAS 2
                    FILE=SITE100.DAT

 7 IO        OUTPUT CONTROL VARIABLES
                 IPRNT          2  PRINT CONTROL
                 IPLOT          0  PLOT CONTROL
                 QSCAL         0.  HYDROGRAPH PLOT SCALE

 9 IN        TIME DATA FOR INPUT TIME SERIES
                 JXMIN         60  TIME INTERVAL IN MINUTES
                JXDATE     1    0  STARTING DATE
                JXTIME          0  STARTING TIME

 1T          HYDROGRAPH TIME DATA
                  NMIN         10  MINUTES IN COMPUTATION INTERVAL
                 IDATE     1    0  STARTING DATE
                 ITIME        0000  STARTING TIME
                    NQ         200  NUMBER OF HYDROGRAPH ORDINATES
                NDDATE     2    0  ENDING DATE
                NDTIME        0910  ENDING TIME
                 ICENT          19  CENTURY MARK

            COMPUTATION INTERVAL    0.17 HOURS
                 TOTAL TIME BASE   33.17 HOURS

      ENGLISH UNITS
          DRAINAGE AREA          SQUARE MILES
          PRECIPITATION DEPTH    INCHES
          LENGTH, ELEVATION      FEET
          FLOW                   CUBIC FEET PER SECOND
          STORAGE VOLUME         ACRE-FEET
          SURFACE AREA           ACRES
          TEMPERATURE            DEGREES FAHRENHEIT

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

          **************
          *            *
          *     010    *
          *            *
          **************
```

SCS DIMENSIONLESS UNIT HYDROGRAPH

SUBBASIN RUNOFF DATA

15 BA SUBBASIN CHARACTERISTICS
TAREA 0.93 SUBBASIN AREA

16 BF BASE FLOW CHARACTERISTICS
STRTQ 0.93 INITIAL FLOW
QRCSN 0.00 BEGIN BASE FLOW RECESSION
RTIOR 1.06000 RECESSION CONSTANT

PRECIPITATION DATA

17 PR RECORDING STATIONS 60
0 PW WEIGHTS 1.00

18 LS SCS LOSS RATE
STRTL 0.53 INITIAL ABSTRACTION
CRVNBR 79.00 CURVE NUMBER
RTIMP 1.00 PERCENT IMPERVIOUS AREA

19 UD SCS DIMENSIONLESS UNITGRAPH
TLAG 0.66 LAG

***

PRECIPITATION STATION DATA

STATION	TOTAL	AVG. ANNUAL	WEIGHT
60	2.70	0.00	1.00

TEMPORAL DISTRIBUTIONS

STATION 60, WEIGHT = 1.00

0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.01	0.01	0.01	0.01	0.01	0.01	0.23	0.23	0.23	0.23
0.23	0.23	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02
0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.01	0.01	0.01
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.01	0.01	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00
0.01	0.00	0.01	0.00						

UNIT HYDROGRAPH
22 END-OF-PERIOD ORDINATES

74.	234.	469.	597.	590.	497.	360.	238.	165.	117.
81.	56.	39.	27.	19.	13.	9.	6.	5.	3.
2.	0.								

****

HYDROGRAPH AT STATION 010

****

DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q

							*							
1	0000	1	0.00	0.00	0.00	1.	*	1	1640	101	0.01	0.00	0.01	23.
1	0010	2	0.01	0.01	0.00	1.	*	1	1650	102	0.01	0.00	0.01	22.
1	0020	3	0.01	0.01	0.00	1.	*	1	1700	103	0.01	0.00	0.01	21.
1	0030	4	0.01	0.01	0.00	1.	*	1	1710	104	0.01	0.00	0.01	21.
1	0040	5	0.01	0.01	0.00	1.	*	1	1720	105	0.01	0.00	0.01	21.
1	0050	6	0.01	0.01	0.00	1.	*	1	1730	106	0.01	0.00	0.01	21.
1	0100	7	0.01	0.01	0.00	1.	*	1	1740	107	0.01	0.00	0.01	21.
1	0110	8	0.01	0.01	0.00	1.	*	1	1750	108	0.01	0.00	0.01	20.
1	0120	9	0.01	0.01	0.00	1.	*	1	1800	109	0.01	0.00	0.01	20.
1	0130	10	0.01	0.01	0.00	1.	*	1	1810	110	0.01	0.00	0.00	20.
1	0140	11	0.01	0.01	0.00	1.	*	1	1820	111	0.01	0.00	0.00	20.
1	0150	12	0.01	0.01	0.00	1.	*	1	1830	112	0.01	0.00	0.00	19.
1	0200	13	0.01	0.01	0.00	1.	*	1	1840	113	0.01	0.00	0.00	18.
1	0210	14	0.01	0.01	0.00	1.	*	1	1850	114	0.01	0.00	0.00	17.
1	0220	15	0.01	0.01	0.00	1.	*	1	1900	115	0.01	0.00	0.00	16.
1	0230	16	0.01	0.01	0.00	1.	*	1	1910	116	0.01	0.00	0.00	16.
1	0240	17	0.01	0.01	0.00	1.	*	1	1920	117	0.01	0.00	0.00	15.
1	0250	18	0.01	0.01	0.00	1.	*	1	1930	118	0.01	0.00	0.00	15.
1	0300	19	0.01	0.01	0.00	1.	*	1	1940	119	0.01	0.00	0.00	15.
1	0310	20	0.01	0.01	0.00	1.	*	1	1950	120	0.01	0.00	0.00	15.
1	0320	21	0.01	0.01	0.00	1.	*	1	2000	121	0.01	0.00	0.00	15.
1	0330	22	0.01	0.01	0.00	1.	*	1	2010	122	0.01	0.00	0.00	15.
1	0340	23	0.01	0.01	0.00	1.	*	1	2020	123	0.01	0.00	0.00	15.
1	0350	24	0.01	0.01	0.00	1.	*	1	2030	124	0.01	0.00	0.00	15.
1	0400	25	0.01	0.01	0.00	1.	*	1	2040	125	0.01	0.00	0.00	15.
1	0410	26	0.01	0.01	0.00	1.	*	1	2050	126	0.01	0.00	0.00	15.
1	0420	27	0.01	0.01	0.00	1.	*	1	2100	127	0.01	0.00	0.00	15.
1	0430	28	0.01	0.01	0.00	1.	*	1	2110	128	0.01	0.00	0.00	15.
1	0440	29	0.01	0.01	0.00	1.	*	1	2120	129	0.01	0.00	0.00	15.
1	0450	30	0.01	0.01	0.00	1.	*	1	2130	130	0.01	0.00	0.00	15.
1	0500	31	0.01	0.01	0.00	1.	*	1	2140	131	0.01	0.00	0.00	15.
1	0510	32	0.01	0.01	0.00	1.	*	1	2150	132	0.01	0.00	0.00	15.
1	0520	33	0.01	0.01	0.00	1.	*	1	2200	133	0.01	0.00	0.00	15.
1	0530	34	0.01	0.01	0.00	1.	*	1	2210	134	0.01	0.00	0.00	15.
1	0540	35	0.01	0.01	0.00	1.	*	1	2220	135	0.00	0.00	0.00	15.
1	0550	36	0.01	0.01	0.00	1.	*	1	2230	136	0.01	0.00	0.00	14.
1	0600	37	0.01	0.01	0.00	1.	*	1	2240	137	0.00	0.00	0.00	14.
1	0610	38	0.23	0.23	0.00	1.	*	1	2250	138	0.01	0.00	0.00	14.
1	0620	39	0.23	0.22	0.01	2.	*	1	2300	139	0.00	0.00	0.00	13.
1	0630	40	0.23	0.19	0.04	8.	*	1	2310	140	0.01	0.00	0.00	13.
1	0640	41	0.23	0.16	0.07	23.	*	1	2320	141	0.00	0.00	0.00	13.
1	0650	42	0.23	0.14	0.09	53.	*	1	2330	142	0.01	0.00	0.00	13.
1	0700	43	0.23	0.12	0.11	97.	*	1	2340	143	0.00	0.00	0.00	13.
1	0710	44	0.02	0.01	0.01	144.	*	1	2350	144	0.01	0.00	0.00	13.
1	0720	45	0.02	0.01	0.01	177.	*	2	0000	145	0.00	0.00	0.00	13.
1	0730	46	0.03	0.01	0.01	182.	*	2	0010	146	0.00	0.00	0.00	13.
1	0740	47	0.02	0.01	0.01	165.	*	2	0020	147	0.00	0.00	0.00	12.
1	0750	48	0.02	0.01	0.01	138.	*	2	0030	148	0.00	0.00	0.00	10.
1	0800	49	0.02	0.01	0.01	111.	*	2	0040	149	0.00	0.00	0.00	8.
1	0810	50	0.02	0.01	0.01	90.	*	2	0050	150	0.00	0.00	0.00	6.
1	0820	51	0.02	0.01	0.01	77.	*	2	0100	151	0.00	0.00	0.00	4.
1	0830	52	0.02	0.01	0.01	67.	*	2	0110	152	0.00	0.00	0.00	3.
1	0840	53	0.02	0.01	0.01	59.	*	2	0120	153	0.00	0.00	0.00	2.
1	0850	54	0.02	0.01	0.01	54.	*	2	0130	154	0.00	0.00	0.00	2.
1	0900	55	0.02	0.01	0.01	50.	*	2	0140	155	0.00	0.00	0.00	1.
1	0910	56	0.01	0.01	0.01	47.	*	2	0150	156	0.00	0.00	0.00	1.
1	0920	57	0.01	0.01	0.01	44.	*	2	0200	157	0.00	0.00	0.00	1.
1	0930	58	0.02	0.01	0.01	42.	*	2	0210	158	0.00	0.00	0.00	0.
1	0940	59	0.01	0.01	0.01	39.	*	2	0220	159	0.00	0.00	0.00	0.
1	0950	60	0.01	0.01	0.01	37.	*	2	0230	160	0.00	0.00	0.00	0.
1	1000	61	0.01	0.01	0.01	35.	*	2	0240	161	0.00	0.00	0.00	0.
	1010	62	0.01	0.01	0.01	34.	*	2	0250	162	0.00	0.00	0.00	0.
1	1020	63	0.01	0.01	0.01	33.	*	2	0300	163	0.00	0.00	0.00	0.

1	1030	64	0.01	0.01	0.01	32.	*	2	0310	164	0.00	0.00	0.00	0.
1	1040	65	0.01	0.01	0.01	31.	*	2	0320	165	0.00	0.00	0.00	0.
1	1050	66	0.01	0.01	0.01	31.	*	2	0330	166	0.00	0.00	0.00	0.
1	1100	67	0.01	0.01	0.01	30.	*	2	0340	167	0.00	0.00	0.00	0.
1	1110	68	0.01	0.01	0.01	30.	*	2	0350	168	0.00	0.00	0.00	0.
1	1120	69	0.01	0.01	0.01	30.	*	2	0400	169	0.00	0.00	0.00	0.
1	1130	70	0.01	0.01	0.01	30.	*	2	0410	170	0.00	0.00	0.00	0.
1	1140	71	0.01	0.01	0.01	29.	*	2	0420	171	0.00	0.00	0.00	0.
1	1150	72	0.01	0.01	0.01	29.	*	2	0430	172	0.00	0.00	0.00	0.
1	1200	73	0.01	0.01	0.01	30.	*	2	0440	173	0.00	0.00	0.00	0.
1	1210	74	0.01	0.00	0.01	30.	*	2	0450	174	0.00	0.00	0.00	0.
1	1220	75	0.01	0.00	0.01	29.	*	2	0500	175	0.00	0.00	0.00	0.
1	1230	76	0.01	0.00	0.01	29.	*	2	0510	176	0.00	0.00	0.00	0.
1	1240	77	0.01	0.00	0.01	28.	*	2	0520	177	0.00	0.00	0.00	0.
1	1250	78	0.01	0.00	0.01	28.	*	2	0530	178	0.00	0.00	0.00	0.
1	1300	79	0.01	0.00	0.01	28.	*	2	0540	179	0.00	0.00	0.00	0.
1	1310	80	0.01	0.00	0.01	27.	*	2	0550	180	0.00	0.00	0.00	0.
1	1320	81	0.01	0.00	0.01	27.	*	2	0600	181	0.00	0.00	0.00	0.
1	1330	82	0.01	0.00	0.01	27.	*	2	0610	182	0.00	0.00	0.00	0.
1	1340	83	0.01	0.00	0.01	27.	*	2	0620	183	0.00	0.00	0.00	0.
1	1350	84	0.01	0.00	0.01	27.	*	2	0630	184	0.00	0.00	0.00	0.
1	1400	85	0.01	0.00	0.01	27.	*	2	0640	185	0.00	0.00	0.00	0.
1	1410	86	0.01	0.00	0.01	27.	*	2	0650	186	0.00	0.00	0.00	0.
1	1420	87	0.01	0.00	0.01	27.	*	2	0700	187	0.00	0.00	0.00	0.
1	1430	88	0.01	0.00	0.01	26.	*	2	0710	188	0.00	0.00	0.00	0.
1	1440	89	0.01	0.00	0.01	26.	*	2	0720	189	0.00	0.00	0.00	0.
1	1450	90	0.01	0.00	0.01	25.	*	2	0730	190	0.00	0.00	0.00	0.
1	1500	91	0.01	0.00	0.01	25.	*	2	0740	191	0.00	0.00	0.00	0.
1	1510	92	0.01	0.00	0.01	24.	*	2	0750	192	0.00	0.00	0.00	0.
1	1520	93	0.01	0.00	0.01	24.	*	2	0800	193	0.00	0.00	0.00	0.
1	1530	94	0.01	0.00	0.01	24.	*	2	0810	194	0.00	0.00	0.00	0.
1	1540	95	0.01	0.00	0.01	24.	*	2	0820	195	0.00	0.00	0.00	0.
1	1550	96	0.01	0.00	0.01	24.	*	2	0830	196	0.00	0.00	0.00	0.
1	1600	97	0.01	0.00	0.01	24.	*	2	0840	197	0.00	0.00	0.00	0.
1	1610	98	0.01	0.00	0.01	24.	*	2	0850	198	0.00	0.00	0.00	0.
1	1620	99	0.01	0.00	0.01	24.	*	2	0900	199	0.00	0.00	0.00	0.
1	1630	100	0.01	0.00	0.01	23.	*	2	0910	200	0.00	0.00	0.00	0.
							*							

****

TOTAL RAINFALL = 2.70, TOTAL LOSS = 1.71, TOTAL EXCESS = 0.99

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW						
		6-HR	24-HR	72-HR	33.17-HR	(CFS)	(HR)	
(CFS)		182.	7.50		61.	25.	18.	18.
(INCHES)		0.608	1.009	1.014	1.014			
(AC-FT)		30.	50.	50.	50.			

CUMULATIVE AREA = 0.93 SQ MI

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
6-HOUR	24-HOUR	72-HOUR								
	HYDROGRAPH AT			010	182.	7.50	61.	25.	18.	0.93

*** NORMAL END OF HEC-1 ***

05996.01-G(B)-02
ATTACHMENT A

```
`1 S/N: 1343001561        HMVersion: 6.33    Data File: a:sitepmpg.dat

*  ************************************                    ************************************
*                                    *                    *                                  *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1) *                    *  U.S. ARMY CORPS OF ENGINEERS    *
*             MAY   1991             *                    *  HYDROLOGIC ENGINEERING CENTER   *
*           VERSION 4.0.1E           *                    *        609 SECOND STREET         *
*                                    *                    *     DAVIS, CALIFORNIA 95616      *
*  RUN DATE  02/14/1997  TIME  14:07:56 *                 *        (916) 756-1104            *
*                                    *                    *                                  *
**************************************                    ************************************

X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X       XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX

::::::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::::::
:::                                      :::
:::  Full Microcomputer Implementation   :::
:::                by                    :::
:::        Haestad Methods, Inc.         :::
:::                                      :::
::::::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::::::

37 Brookside Road * Waterbury, Connecticut  06708 * (203) 755-1666


THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM
```

HEC-1 INPUT


```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1           ID          PRIVATE FUEL STORAGE FACILITY PROJECT
  2           ID          GENERAL PMP AT PFSF Site, Used SCS for loss
  3           ID          PMP BASED ON HMR 49
  4           ID          FILE=SITEPMPG.DAT
  5           ID
  6           IT     60                     200
  7           IO      2
  8           PG     60
  9           IN    180
 10           PI   0.24    0.25    0.26    0.30    0.35    0.40    3.70    1.29    1.11    0.98
 11           PI   0.72    0.71    0.59    0.55    0.55    0.50    0.50    0.40    0.20    0.20
 12           PI   0.20    0.15    0.15    0.13

 13           KK    010
 14           KM          SCS DIMENSIONLESS UNIT HYDROGRAPH
 15           BA   0.93
 16           BF     -1            1.06
 17           PR     60
 18           LS      0      79       1
 19           UD   1.34
 20           ZZ
```

```
S/N: 1343001561        HMVersion: 6.33    Data File: a:sitepmpg.dat

 ************************************
 *                                  *
 *  FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
 *            MAY  1991             *
 *         VERSION 4.0.1E           *
 *                                  *
 * RUN DATE  02/14/1997  TIME  14:07:56 *
 *                                  *
 ************************************

 ************************************
 *                                  *
 *   U.S. ARMY CORPS OF ENGINEERS   *
 *   HYDROLOGIC ENGINEERING CENTER  *
 *         609 SECOND STREET        *
 *      DAVIS, CALIFORNIA 95616     *
 *          (916) 756-1104          *
 *                                  *
 ************************************

                    PRIVATE FUEL STORAGE FACILITY PROJECT
                    GENERAL PMP AT PFSF Site, Used SCS for loss
                    PMP BASED ON HMR 49
                    FILE=SITEPMPG.DAT

  7 IO        OUTPUT CONTROL VARIABLES
                  IPRNT          2  PRINT CONTROL
                  IPLOT          0  PLOT CONTROL
                  QSCAL         0.  HYDROGRAPH PLOT SCALE

  9 IN        TIME DATA FOR INPUT TIME SERIES
                  JXMIN        180  TIME INTERVAL IN MINUTES
                 JXDATE      1    0  STARTING DATE
                 JXTIME           0  STARTING TIME

    IT        HYDROGRAPH TIME DATA
                   NMIN         60  MINUTES IN COMPUTATION INTERVAL
                  IDATE      1    0  STARTING DATE
                  ITIME       0000  STARTING TIME
                     NQ        200  NUMBER OF HYDROGRAPH ORDINATES
                 NDDATE      9    0  ENDING DATE
                 NDTIME       0700  ENDING TIME
                  ICENT         19  CENTURY MARK

            COMPUTATION INTERVAL    1.00 HOURS
                 TOTAL TIME BASE  199.00 HOURS

        ENGLISH UNITS
            DRAINAGE AREA          SQUARE MILES
            PRECIPITATION DEPTH    INCHES
            LENGTH, ELEVATION      FEET
            FLOW                   CUBIC FEET PER SECOND
            STORAGE VOLUME         ACRE-FEET
            SURFACE AREA           ACRES
            TEMPERATURE            DEGREES FAHRENHEIT

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

          **************
          *            *
          *     010    *
          *            *
          **************
```

SCS DIMENSIONLESS UNIT HYDROGRAPH

SUBBASIN RUNOFF DATA

15 BA SUBBASIN CHARACTERISTICS
TAREA 0.93 SUBBASIN AREA

16 BF BASE FLOW CHARACTERISTICS
STRTQ 0.93 INITIAL FLOW
QRCSN 0.00 BEGIN BASE FLOW RECESSION
RTIOR 1.06000 RECESSION CONSTANT

PRECIPITATION DATA

17 PR RECORDING STATIONS 60
0 PW WEIGHTS 1.00

18 LS SCS LOSS RATE
STRTL 0.53 INITIAL ABSTRACTION
CRVNBR 79.00 CURVE NUMBER
RTIMP 1.00 PERCENT IMPERVIOUS AREA

19 UD SCS DIMENSIONLESS UNITGRAPH
TLAG 1.34 LAG

***

PRECIPITATION STATION DATA

STATION	TOTAL	AVG. ANNUAL	WEIGHT
60	14.43	0.00	1.00

TEMPORAL DISTRIBUTIONS

STATION 60, WEIGHT = 1.00

0.08	0.08	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.10
0.10	0.10	0.12	0.12	0.12	0.13	0.13	0.13	1.23	1.23
1.23	0.43	0.43	0.43	0.37	0.37	0.37	0.33	0.33	0.33
0.24	0.24	0.24	0.24	0.24	0.24	0.20	0.20	0.20	0.18
0.18	0.18	0.18	0.18	0.18	0.17	0.17	0.17	0.17	0.17
0.17	0.13	0.13	0.13	0.07	0.07	0.07	0.07	0.07	0.07
0.07	0.07	0.07	0.05	0.05	0.05	0.05	0.05	0.05	0.04
0.04	0.04								

UNIT HYDROGRAPH
9 END-OF-PERIOD ORDINATES

136. 244. 130. 53. 22. 9. 4. 2. 0.

****

HYDROGRAPH AT STATION 010

****

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1		0000	1	0.00	0.00	0.00	1.	*	5		0400	101	0.00	0.00	0.00	0.
1		0100	2	0.08	0.08	0.00	1.	*	5		0500	102	0.00	0.00	0.00	0.
1		0200	3	0.08	0.08	0.00	1.	*	5		0600	103	0.00	0.00	0.00	0.
1		0300	4	0.08	0.08	0.00	1.	*	5		0700	104	0.00	0.00	0.00	0.
1		0400	5	0.08	0.08	0.00	1.	*	5		0800	105	0.00	0.00	0.00	0.
1		0500	6	0.08	0.08	0.00	1.	*	5		0900	106	0.00	0.00	0.00	0.
		0600	7	0.08	0.08	0.00	1.	*	5		1000	107	0.00	0.00	0.00	0.
1		0700	8	0.09	0.09	0.00	1.	*	5		1100	108	0.00	0.00	0.00	0.

1	0800	9	0.09	0.08	0.01	2.	*	5	1200	109	0.00	0.00	0.00	0.
1	0900	10	0.09	0.08	0.01	4.	*	5	1300	110	0.00	0.00	0.00	0.
1	1000	11	0.10	0.08	0.02	7.	*	5	1400	111	0.00	0.00	0.00	0.
1	1100	12	0.10	0.08	0.02	10.	*	5	1500	112	0.00	0.00	0.00	0.
1	1200	13	0.10	0.07	0.03	13.	*	5	1600	113	0.00	0.00	0.00	0.
1	1300	14	0.12	0.08	0.04	17.	*	5	1700	114	0.00	0.00	0.00	0.
1	1400	15	0.12	0.07	0.04	21.	*	5	1800	115	0.00	0.00	0.00	0.
1	1500	16	0.12	0.07	0.05	25.	*	5	1900	116	0.00	0.00	0.00	0.
1	1600	17	0.13	0.07	0.06	29.	*	5	2000	117	0.00	0.00	0.00	0.
1	1700	18	0.13	0.07	0.07	34.	*	5	2100	118	0.00	0.00	0.00	0.
1	1800	19	0.13	0.06	0.07	38.	*	5	2200	119	0.00	0.00	0.00	0.
1	1900	20	1.23	0.43	0.81	141.	*	5	2300	120	0.00	0.00	0.00	0.
1	2000	21	1.23	0.26	0.97	344.	*	6	0000	121	0.00	0.00	0.00	0.
1	2100	22	1.23	0.18	1.06	492.	*	6	0100	122	0.00	0.00	0.00	0.
1	2200	23	0.43	0.05	0.38	482.	*	6	0200	123	0.00	0.00	0.00	0.
1	2300	24	0.43	0.04	0.39	354.	*	6	0300	124	0.00	0.00	0.00	0.
2	0000	25	0.43	0.04	0.39	282.	*	6	0400	125	0.00	0.00	0.00	0.
2	0100	26	0.37	0.03	0.34	247.	*	6	0500	126	0.00	0.00	0.00	0.
2	0200	27	0.37	0.03	0.34	224.	*	6	0600	127	0.00	0.00	0.00	0.
2	0300	28	0.37	0.03	0.34	213.	*	6	0700	128	0.00	0.00	0.00	0.
2	0400	29	0.33	0.02	0.30	203.	*	6	0800	129	0.00	0.00	0.00	0.
2	0500	30	0.33	0.02	0.31	192.	*	6	0900	130	0.00	0.00	0.00	0.
2	0600	31	0.33	0.02	0.31	187.	*	6	1000	131	0.00	0.00	0.00	0.
2	0700	32	0.24	0.01	0.23	175.	*	6	1100	132	0.00	0.00	0.00	0.
2	0800	33	0.24	0.01	0.23	154.	*	6	1200	133	0.00	0.00	0.00	0.
2	0900	34	0.24	0.01	0.23	144.	*	6	1300	134	0.00	0.00	0.00	0.
2	1000	35	0.24	0.01	0.22	139.	*	6	1400	135	0.00	0.00	0.00	0.
2	1100	36	0.24	0.01	0.23	137.	*	6	1500	136	0.00	0.00	0.00	0.
2	1200	37	0.24	0.01	0.23	136.	*	6	1600	137	0.00	0.00	0.00	0.
2	1300	38	0.20	0.01	0.19	131.	*	6	1700	138	0.00	0.00	0.00	0.
2	1400	39	0.20	0.01	0.19	121.	*	6	1800	139	0.00	0.00	0.00	0.
2	1500	40	0.20	0.01	0.19	116.	*	6	1900	140	0.00	0.00	0.00	0.
2	1600	41	0.18	0.01	0.18	113.	*	6	2000	141	0.00	0.00	0.00	0.
2	1700	42	0.18	0.01	0.18	109.	*	6	2100	142	0.00	0.00	0.00	0.
2	1800	43	0.18	0.01	0.18	107.	*	6	2200	143	0.00	0.00	0.00	0.
2	1900	44	0.18	0.01	0.18	106.	*	6	2300	144	0.00	0.00	0.00	0.
2	2000	45	0.18	0.01	0.18	106.	*	7	0000	145	0.00	0.00	0.00	0.
2	2100	46	0.18	0.01	0.18	106.	*	7	0100	146	0.00	0.00	0.00	0.
2	2200	47	0.17	0.01	0.16	104.	*	7	0200	147	0.00	0.00	0.00	0.
2	2300	48	0.17	0.01	0.16	100.	*	7	0300	148	0.00	0.00	0.00	0.
3	0000	49	0.17	0.01	0.16	98.	*	7	0400	149	0.00	0.00	0.00	0.
3	0100	50	0.17	0.01	0.16	97.	*	7	0500	150	0.00	0.00	0.00	0.
3	0200	51	0.17	0.01	0.16	97.	*	7	0600	151	0.00	0.00	0.00	0.
3	0300	52	0.17	0.01	0.16	97.	*	7	0700	152	0.00	0.00	0.00	0.
3	0400	53	0.13	0.00	0.13	93.	*	7	0800	153	0.00	0.00	0.00	0.
3	0500	54	0.13	0.00	0.13	85.	*	7	0900	154	0.00	0.00	0.00	0.
3	0600	55	0.13	0.00	0.13	81.	*	7	1000	155	0.00	0.00	0.00	0.
3	0700	56	0.07	0.00	0.06	70.	*	7	1100	156	0.00	0.00	0.00	0.
3	0800	57	0.07	0.00	0.06	54.	*	7	1200	157	0.00	0.00	0.00	0.
3	0900	58	0.07	0.00	0.06	45.	*	7	1300	158	0.00	0.00	0.00	0.
3	1000	59	0.07	0.00	0.06	41.	*	7	1400	159	0.00	0.00	0.00	0.
3	1100	60	0.07	0.00	0.06	40.	*	7	1500	160	0.00	0.00	0.00	0.
3	1200	61	0.07	0.00	0.06	39.	*	7	1600	161	0.00	0.00	0.00	0.
3	1300	62	0.07	0.00	0.06	39.	*	7	1700	162	0.00	0.00	0.00	0.
3	1400	63	0.07	0.00	0.06	39.	*	7	1800	163	0.00	0.00	0.00	0.
3	1500	64	0.07	0.00	0.06	39.	*	7	1900	164	0.00	0.00	0.00	0.
3	1600	65	0.05	0.00	0.05	37.	*	7	2000	165	0.00	0.00	0.00	0.
3	1700	66	0.05	0.00	0.05	33.	*	7	2100	166	0.00	0.00	0.00	0.
3	1800	67	0.05	0.00	0.05	31.	*	7	2200	167	0.00	0.00	0.00	0.
3	1900	68	0.05	0.00	0.05	30.	*	7	2300	168	0.00	0.00	0.00	0.
3	2000	69	0.05	0.00	0.05	29.	*	8	0000	169	0.00	0.00	0.00	0.
	2100	70	0.05	0.00	0.05	29.	*	8	0100	170	0.00	0.00	0.00	0.
	2200	71	0.04	0.00	0.04	28.	*	8	0200	171	0.00	0.00	0.00	0.
3	2300	72	0.04	0.00	0.04	27.	*	8	0300	172	0.00	0.00	0.00	0.

4	0000	73	0.04	0.00	0.04	26.	*	8	0400	173	0.00	0.00	0.00	0.
4	0100	74	0.00	0.00	0.00	20.	*	8	0500	174	0.00	0.00	0.00	0.
4	0200	75	0.00	0.00	0.00	9.	*	8	0600	175	0.00	0.00	0.00	0.
4	0300	76	0.00	0.00	0.00	4.	*	8	0700	176	0.00	0.00	0.00	0.
4	0400	77	0.00	0.00	0.00	2.	*	8	0800	177	0.00	0.00	0.00	0.
4	0500	78	0.00	0.00	0.00	1.	*	8	0900	178	0.00	0.00	0.00	0.
4	0600	79	0.00	0.00	0.00	0.	*	8	1000	179	0.00	0.00	0.00	0.
4	0700	80	0.00	0.00	0.00	0.	*	8	1100	180	0.00	0.00	0.00	0.
4	0800	81	0.00	0.00	0.00	0.	*	8	1200	181	0.00	0.00	0.00	0.
4	0900	82	0.00	0.00	0.00	0.	*	8	1300	182	0.00	0.00	0.00	0.
4	1000	83	0.00	0.00	0.00	0.	*	8	1400	183	0.00	0.00	0.00	0.
4	1100	84	0.00	0.00	0.00	0.	*	8	1500	184	0.00	0.00	0.00	0.
4	1200	85	0.00	0.00	0.00	0.	*	8	1600	185	0.00	0.00	0.00	0.
4	1300	86	0.00	0.00	0.00	0.	*	8	1700	186	0.00	0.00	0.00	0.
4	1400	87	0.00	0.00	0.00	0.	*	8	1800	187	0.00	0.00	0.00	0.
4	1500	88	0.00	0.00	0.00	0.	*	8	1900	188	0.00	0.00	0.00	0.
4	1600	89	0.00	0.00	0.00	0.	*	8	2000	189	0.00	0.00	0.00	0.
4	1700	90	0.00	0.00	0.00	0.	*	8	2100	190	0.00	0.00	0.00	0.
4	1800	91	0.00	0.00	0.00	0.	*	8	2200	191	0.00	0.00	0.00	0.
4	1900	92	0.00	0.00	0.00	0.	*	8	2300	192	0.00	0.00	0.00	0.
4	2000	93	0.00	0.00	0.00	0.	*	9	0000	193	0.00	0.00	0.00	0.
4	2100	94	0.00	0.00	0.00	0.	*	9	0100	194	0.00	0.00	0.00	0.
4	2200	95	0.00	0.00	0.00	0.	*	9	0200	195	0.00	0.00	0.00	0.
4	2300	96	0.00	0.00	0.00	0.	*	9	0300	196	0.00	0.00	0.00	0.
5	0000	97	0.00	0.00	0.00	0.	*	9	0400	197	0.00	0.00	0.00	0.
5	0100	98	0.00	0.00	0.00	0.	*	9	0500	198	0.00	0.00	0.00	0.
5	0200	99	0.00	0.00	0.00	0.	*	9	0600	199	0.00	0.00	0.00	0.
5	0300	100	0.00	0.00	0.00	0.	*	9	0700	200	0.00	0.00	0.00	0.
							*							

****

TAL RAINFALL = 14.43, TOTAL LOSS = 2.74, TOTAL EXCESS = 11.69

K FLOW	TIME		MAXIMUM AVERAGE FLOW					
		6-HR	24-HR	72-HR	199.00-HR	(CFS)	(HR)	
	(CFS)	492.	21.00		358.	205.	98.	35.
	(INCHES)	3.580	8.208	11.711	11.721			
	(AC-FT)	178.	407.	581.	581.			

CUMULATIVE AREA = 0.93 SQ MI

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT			010	492.	21.00	358.	205.	98.	0.93

*** NORMAL END OF HEC-1 ***

05996.01-G(B)-02
ATTACHMENT A

```
"1 S/N: 1343001561        HMVersion: 6.33    Data File: a:sitepmpl.dat

*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              MAY   1991               *
*           VERSION 4.0.1E              *
*                                       *
*  RUN DATE  02/14/1997  TIME  14:08:31 *
*                                       *
*****************************************

*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************

X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX        XXX

::::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::::
:::                                    :::
:::  Full Microcomputer Implementation :::
:::                by                  :::
:::       Haestad Methods, Inc.        :::
:::                                    :::
::::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::::

37 Brookside Road * Waterbury, Connecticut  06708 * (203) 755-1666


THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM
```

HEC-1 INPUT


```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1           ID          PRIVATE FUEL STORAGE FACILITY PROJECT
  2           ID          LOCAL PMP AT PFSF Site, USED SCS for loss
  3           ID          PMP BASED ON HMR 49
  4           ID          FILE=SITEPMPL.DAT
  5           ID
  6           IT       5                     200
  7           IO       2
  8           PG      60
  9           IN      15
 10           PI    0.10    0.10    0.05    0.05    0.20    0.20    0.15    0.15    7.20    1.60
 11           PI    0.70    0.50    0.45    0.40    0.35    0.30    0.15    0.15    0.10    0.10
 12           PI    0.05    0.05    0.05    0.05

 13           KK     010
 14           KM          SCS DIMENSIONLESS UNIT HYDROGRAPH
 15           BA    0.93
 16           BF      -1            1.06
 17           PR      60
 18           LS       0      79       1
 19           UD    1.34
 20           ZZ
```

```
** S/N: 1343001561        HMVersion: 6.33    Data File: a:sitepmpl.dat

*.  ************************************                  ****************************************
*                                      *                  *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                  *   U.S. ARMY CORPS OF ENGINEERS       *
*              MAY   1991              *                  *   HYDROLOGIC ENGINEERING CENTER      *
*           VERSION 4.0.1E             *                  *         609 SECOND STREET            *
*                                      *                  *      DAVIS, CALIFORNIA 95616         *
*  RUN DATE  02/14/1997  TIME  14:08:31 *                  *          (916) 756-1104              *
*                                      *                  *                                      *
****************************************                  ****************************************


                                PRIVATE FUEL STORAGE FACILITY PROJECT
                                LOCAL PMP AT PFSF Site, USED SCS for loss
                                PMP BASED ON HMR 49
                                FILE=SITEPMPL.DAT

  7 IO          OUTPUT CONTROL VARIABLES
                      IPRNT          2  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE

  9 IN          TIME DATA FOR INPUT TIME SERIES
                      JXMIN         15  TIME INTERVAL IN MINUTES
                     JXDATE      1    0  STARTING DATE
                     JXTIME          0  STARTING TIME

    IT          HYDROGRAPH TIME DATA
                       NMIN          5  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1    0  STARTING DATE
                      ITIME       0000  STARTING TIME
                         NQ        200  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      1    0  ENDING DATE
                     NDTIME       1635  ENDING TIME
                     ICENT         19  CENTURY MARK

                 COMPUTATION INTERVAL    0.08 HOURS
                      TOTAL TIME BASE   16.58 HOURS

        ENGLISH UNITS
            DRAINAGE AREA          SQUARE MILES
            PRECIPITATION DEPTH    INCHES
            LENGTH, ELEVATION      FEET
            FLOW                   CUBIC FEET PER SECOND
            STORAGE VOLUME         ACRE-FEET
            SURFACE AREA           ACRES
            TEMPERATURE            DEGREES FAHRENHEIT


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


          **************
          *            *
          *     010    *
          *            *
          **************
```

SCS DIMENSIONLESS UNIT HYDROGRAPH

SUBBASIN RUNOFF DATA

15 BA SUBBASIN CHARACTERISTICS
TAREA 0.93 SUBBASIN AREA

16 BF BASE FLOW CHARACTERISTICS
STRTQ 0.93 INITIAL FLOW
QRCSN 0.00 BEGIN BASE FLOW RECESSION
RTIOR 1.06000 RECESSION CONSTANT

PRECIPITATION DATA

17 PR RECORDING STATIONS 60
0 PW WEIGHTS 1.00

18 LS SCS LOSS RATE
STRTL 0.53 INITIAL ABSTRACTION
CRVNBR 79.00 CURVE NUMBER
RTIMP 1.00 PERCENT IMPERVIOUS AREA

19 UD SCS DIMENSIONLESS UNITGRAPH
TLAG 1.34 LAG

***

PRECIPITATION STATION DATA

STATION	TOTAL	AVG. ANNUAL	WEIGHT
60	13.20	0.00	1.00

TEMPORAL DISTRIBUTIONS

STATION 60, WEIGHT = 1.00

0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02
0.02	0.02	0.07	0.07	0.07	0.07	0.07	0.07	0.05	0.05
0.05	0.05	0.05	0.05	2.40	2.40	2.40	0.53	0.53	0.53
0.23	0.23	0.23	0.17	0.17	0.17	0.15	0.15	0.15	0.13
0.13	0.13	0.12	0.12	0.12	0.10	0.10	0.10	0.05	0.05
0.05	0.05	0.05	0.05	0.03	0.03	0.03	0.03	0.03	0.03
0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
0.02	0.02								

UNIT HYDROGRAPH
82 END-OF-PERIOD ORDINATES

6.	14.	28.	45.	62.	86.	112.	144.	179.	216.
248.	275.	297.	311.	322.	324.	324.	322.	313.	301.
287.	273.	257.	238.	218.	195.	173.	153.	138.	125.
113.	102.	93.	85.	78.	71.	64.	58.	52.	47.
43.	39.	35.	32.	29.	26.	24.	22.	19.	18.
16.	15.	13.	12.	11.	10.	9.	8.	7.	7.
6.	5.	5.	4.	4.	4.	3.	3.	3.	3.
2.	2.	2.	2.	2.	1.	1.	1.	1.	1.
0.	0.								

****

HYDROGRAPH AT STATION 010

****

MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q

1	0000	1	0.00	0.00	0.00	1.	*	1	0820	101	0.00	0.00	0.00	57.
1	0005	2	0.03	0.03	0.00	1.	*	1	0825	102	0.00	0.00	0.00	51.
1	0010	3	0.03	0.03	0.00	1.	*	1	0830	103	0.00	0.00	0.00	46.
1	0015	4	0.03	0.03	0.00	1.	*	1	0835	104	0.00	0.00	0.00	41.
1	0020	5	0.03	0.03	0.00	1.	*	1	0840	105	0.00	0.00	0.00	37.
1	0025	6	0.03	0.03	0.00	1.	*	1	0845	106	0.00	0.00	0.00	33.
1	0030	7	0.03	0.03	0.00	1.	*	1	0850	107	0.00	0.00	0.00	29.
1	0035	8	0.02	0.02	0.00	1.	*	1	0855	108	0.00	0.00	0.00	25.
1	0040	9	0.02	0.02	0.00	1.	*	1	0900	109	0.00	0.00	0.00	22.
1	0045	10	0.02	0.02	0.00	1.	*	1	0905	110	0.00	0.00	0.00	19.
1	0050	11	0.02	0.02	0.00	1.	*	1	0910	111	0.00	0.00	0.00	17.
1	0055	12	0.02	0.02	0.00	1.	*	1	0915	112	0.00	0.00	0.00	15.
1	0100	13	0.02	0.02	0.00	1.	*	1	0920	113	0.00	0.00	0.00	14.
1	0105	14	0.07	0.07	0.00	1.	*	1	0925	114	0.00	0.00	0.00	12.
1	0110	15	0.07	0.07	0.00	1.	*	1	0930	115	0.00	0.00	0.00	11.
1	0115	16	0.07	0.07	0.00	2.	*	1	0935	116	0.00	0.00	0.00	10.
1	0120	17	0.07	0.07	0.00	2.	*	1	0940	117	0.00	0.00	0.00	9.
1	0125	18	0.07	0.06	0.00	2.	*	1	0945	118	0.00	0.00	0.00	8.
1	0130	19	0.07	0.06	0.01	2.	*	1	0950	119	0.00	0.00	0.00	7.
1	0135	20	0.05	0.04	0.01	2.	*	1	0955	120	0.00	0.00	0.00	6.
1	0140	21	0.05	0.04	0.01	3.	*	1	1000	121	0.00	0.00	0.00	6.
1	0145	22	0.05	0.04	0.01	3.	*	1	1005	122	0.00	0.00	0.00	5.
1	0150	23	0.05	0.04	0.01	4.	*	1	1010	123	0.00	0.00	0.00	5.
1	0155	24	0.05	0.04	0.01	5.	*	1	1015	124	0.00	0.00	0.00	4.
1	0200	25	0.05	0.04	0.01	6.	*	1	1020	125	0.00	0.00	0.00	4.
1	0205	26	2.40	0.97	1.43	16.	*	1	1025	126	0.00	0.00	0.00	3.
1	0210	27	2.40	0.38	2.02	42.	*	1	1030	127	0.00	0.00	0.00	3.
1	0215	28	2.40	0.21	2.19	93.	*	1	1035	128	0.00	0.00	0.00	3.
1	0220	29	0.53	0.03	0.50	168.	*	1	1040	129	0.00	0.00	0.00	2.
1	0225	30	0.53	0.03	0.50	266.	*	1	1045	130	0.00	0.00	0.00	2.
1	0230	31	0.53	0.03	0.51	388.	*	1	1050	131	0.00	0.00	0.00	2.
1	0235	32	0.23	0.01	0.22	535.	*	1	1055	132	0.00	0.00	0.00	2.
1	0240	33	0.23	0.01	0.22	714.	*	1	1100	133	0.00	0.00	0.00	2.
1	0245	34	0.23	0.01	0.22	923.	*	1	1105	134	0.00	0.00	0.00	1.
1	0250	35	0.17	0.01	0.16	1161.	*	1	1110	135	0.00	0.00	0.00	1.
1	0255	36	0.17	0.01	0.16	1413.	*	1	1115	136	0.00	0.00	0.00	1.
1	0300	37	0.17	0.01	0.16	1661.	*	1	1120	137	0.00	0.00	0.00	1.
1	0305	38	0.15	0.01	0.14	1891.	*	1	1125	138	0.00	0.00	0.00	1.
1	0310	39	0.15	0.01	0.14	2095.	*	1	1130	139	0.00	0.00	0.00	1.
1	0315	40	0.15	0.01	0.14	2269.	*	1	1135	140	0.00	0.00	0.00	1.
1	0320	41	0.13	0.01	0.13	2405.	*	1	1140	141	0.00	0.00	0.00	1.
1	0325	42	0.13	0.00	0.13	2510.	*	1	1145	142	0.00	0.00	0.00	1.
1	0330	43	0.13	0.00	0.13	2583.	*	1	1150	143	0.00	0.00	0.00	1.
1	0335	44	0.12	0.00	0.11	2628.	*	1	1155	144	0.00	0.00	0.00	1.
1	0340	45	0.12	0.00	0.11	2643.	*	1	1200	145	0.00	0.00	0.00	1.
1	0345	46	0.12	0.00	0.11	2627.	*	1	1205	146	0.00	0.00	0.00	1.
1	0350	47	0.10	0.00	0.10	2593.	*	1	1210	147	0.00	0.00	0.00	1.
1	0355	48	0.10	0.00	0.10	2543.	*	1	1215	148	0.00	0.00	0.00	1.
1	0400	49	0.10	0.00	0.10	2476.	*	1	1220	149	0.00	0.00	0.00	1.
1	0405	50	0.05	0.00	0.05	2392.	*	1	1225	150	0.00	0.00	0.00	0.
1	0410	51	0.05	0.00	0.05	2287.	*	1	1230	151	0.00	0.00	0.00	0.
1	0415	52	0.05	0.00	0.05	2168.	*	1	1235	152	0.00	0.00	0.00	0.
1	0420	53	0.05	0.00	0.05	2040.	*	1	1240	153	0.00	0.00	0.00	0.
1	0425	54	0.05	0.00	0.05	1919.	*	1	1245	154	0.00	0.00	0.00	0.
1	0430	55	0.05	0.00	0.05	1807.	*	1	1250	155	0.00	0.00	0.00	0.
1	0435	56	0.03	0.00	0.03	1705.	*	1	1255	156	0.00	0.00	0.00	0.
1	0440	57	0.03	0.00	0.03	1609.	*	1	1300	157	0.00	0.00	0.00	0.
1	0445	58	0.03	0.00	0.03	1518.	*	1	1305	158	0.00	0.00	0.00	0.
1	0450	59	0.03	0.00	0.03	1433.	*	1	1310	159	0.00	0.00	0.00	0.
1	0455	60	0.03	0.00	0.03	1355.	*	1	1315	160	0.00	0.00	0.00	0.
1	0500	61	0.03	0.00	0.03	1281.	*	1	1320	161	0.00	0.00	0.00	0.
1	0505	62	0.02	0.00	0.02	1208.	*	1	1325	162	0.00	0.00	0.00	0.
	0510	63	0.02	0.00	0.02	1138.	*	1	1330	163	0.00	0.00	0.00	0.
1	0515	64	0.02	0.00	0.02	1070.	*	1	1335	164	0.00	0.00	0.00	0.

1	0520	65	0.02	0.00	0.02	1003.	*	1	1340	165	0.00	0.00	0.00	0.
1	0525	66	0.02	0.00	0.02	940.	*	1	1345	166	0.00	0.00	0.00	0.
1	0530	67	0.02	0.00	0.02	880.	*	1	1350	167	0.00	0.00	0.00	0.
1	0535	68	0.02	0.00	0.02	825.	*	1	1355	168	0.00	0.00	0.00	0.
1	0540	69	0.02	0.00	0.02	771.	*	1	1400	169	0.00	0.00	0.00	0.
1	0545	70	0.02	0.00	0.02	721.	*	1	1405	170	0.00	0.00	0.00	0.
1	0550	71	0.02	0.00	0.02	673.	*	1	1410	171	0.00	0.00	0.00	0.
1	0555	72	0.02	0.00	0.02	628.	*	1	1415	172	0.00	0.00	0.00	0.
1	0600	73	0.02	0.00	0.02	585.	*	1	1420	173	0.00	0.00	0.00	0.
1	0605	74	0.00	0.00	0.00	546.	*	1	1425	174	0.00	0.00	0.00	0.
1	0610	75	0.00	0.00	0.00	509.	*	1	1430	175	0.00	0.00	0.00	0.
1	0615	76	0.00	0.00	0.00	474.	*	1	1435	176	0.00	0.00	0.00	0.
1	0620	77	0.00	0.00	0.00	442.	*	1	1440	177	0.00	0.00	0.00	0.
1	0625	78	0.00	0.00	0.00	412.	*	1	1445	178	0.00	0.00	0.00	0.
1	0630	79	0.00	0.00	0.00	384.	*	1	1450	179	0.00	0.00	0.00	0.
1	0635	80	0.00	0.00	0.00	358.	*	1	1455	180	0.00	0.00	0.00	0.
1	0640	81	0.00	0.00	0.00	333.	*	1	1500	181	0.00	0.00	0.00	0.
1	0645	82	0.00	0.00	0.00	310.	*	1	1505	182	0.00	0.00	0.00	0.
1	0650	83	0.00	0.00	0.00	287.	*	1	1510	183	0.00	0.00	0.00	0.
1	0655	84	0.00	0.00	0.00	266.	*	1	1515	184	0.00	0.00	0.00	0.
1	0700	85	0.00	0.00	0.00	246.	*	1	1520	185	0.00	0.00	0.00	0.
1	0705	86	0.00	0.00	0.00	227.	*	1	1525	186	0.00	0.00	0.00	0.
1	0710	87	0.00	0.00	0.00	209.	*	1	1530	187	0.00	0.00	0.00	0.
1	0715	88	0.00	0.00	0.00	192.	*	1	1535	188	0.00	0.00	0.00	0.
1	0720	89	0.00	0.00	0.00	176.	*	1	1540	189	0.00	0.00	0.00	0.
1	0725	90	0.00	0.00	0.00	161.	*	1	1545	190	0.00	0.00	0.00	0.
1	0730	91	0.00	0.00	0.00	147.	*	1	1550	191	0.00	0.00	0.00	0.
1	0735	92	0.00	0.00	0.00	135.	*	1	1555	192	0.00	0.00	0.00	0.
1	0740	93	0.00	0.00	0.00	123.	*	1	1600	193	0.00	0.00	0.00	0.
1	0745	94	0.00	0.00	0.00	112.	*	1	1605	194	0.00	0.00	0.00	0.
1	0750	95	0.00	0.00	0.00	102.	*	1	1610	195	0.00	0.00	0.00	0.
1	0755	96	0.00	0.00	0.00	93.	*	1	1615	196	0.00	0.00	0.00	0.
1	0800	97	0.00	0.00	0.00	85.	*	1	1620	197	0.00	0.00	0.00	0.
1	0805	98	0.00	0.00	0.00	77.	*	1	1625	198	0.00	0.00	0.00	0.
1	0810	99	0.00	0.00	0.00	69.	*	1	1630	199	0.00	0.00	0.00	0.
1	0815	100	0.00	0.00	0.00	63.	*	1	1635	200	0.00	0.00	0.00	0.
							*							

****

TOTAL RAINFALL = 13.20, TOTAL LOSS = 2.70, TOTAL EXCESS = 10.50

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW					
			6-HR	24-HR	72-HR	16.58-HR	(CFS)	(HR)
		(CFS)	2643.	3.67		1042.	381.	381.
		(INCHES)	10.414	10.515	10.515	10.515		
		(AC-FT)	517.	522.	522.	522.		

CUMULATIVE AREA = 0.93 SQ MI

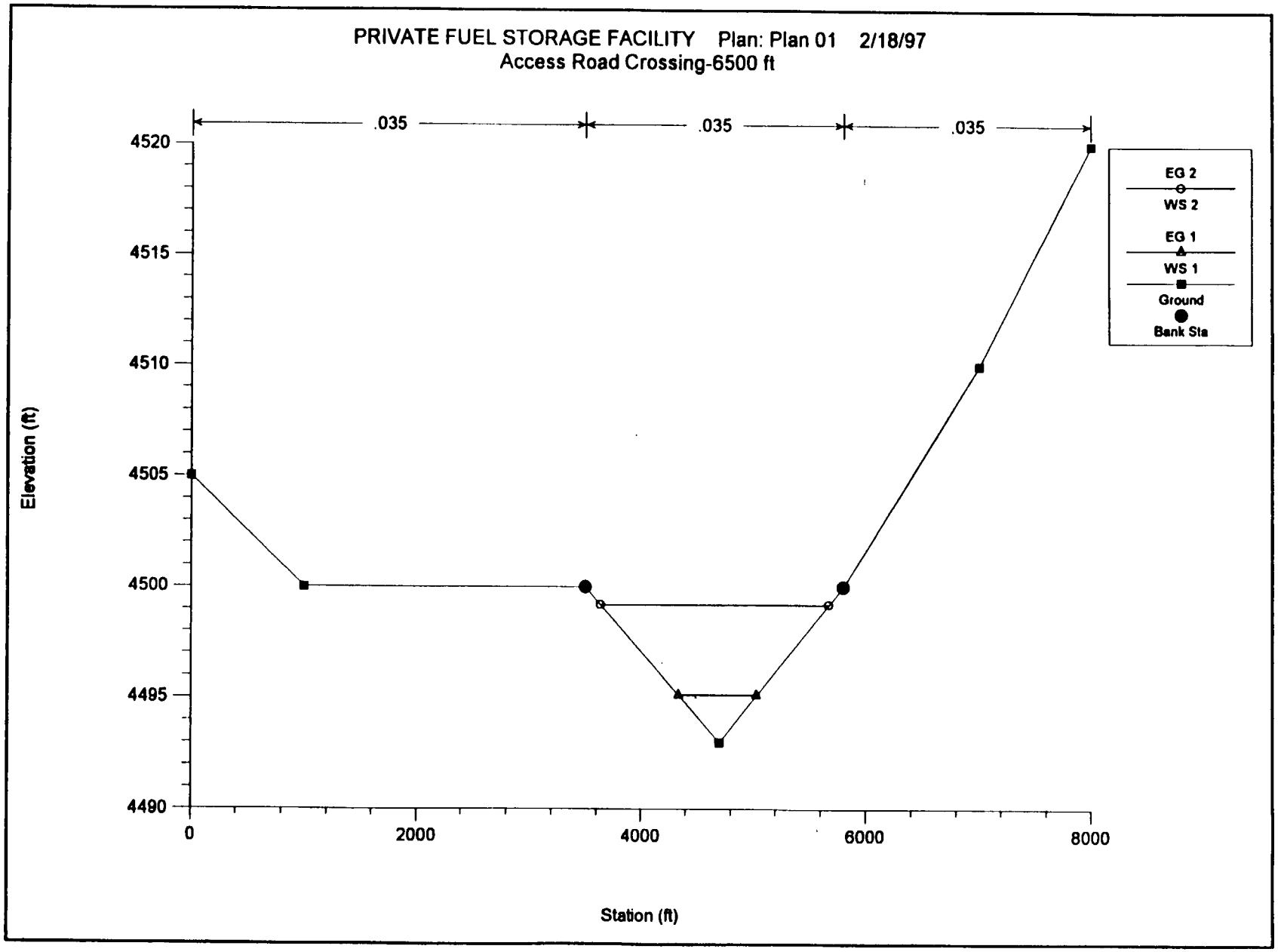
RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

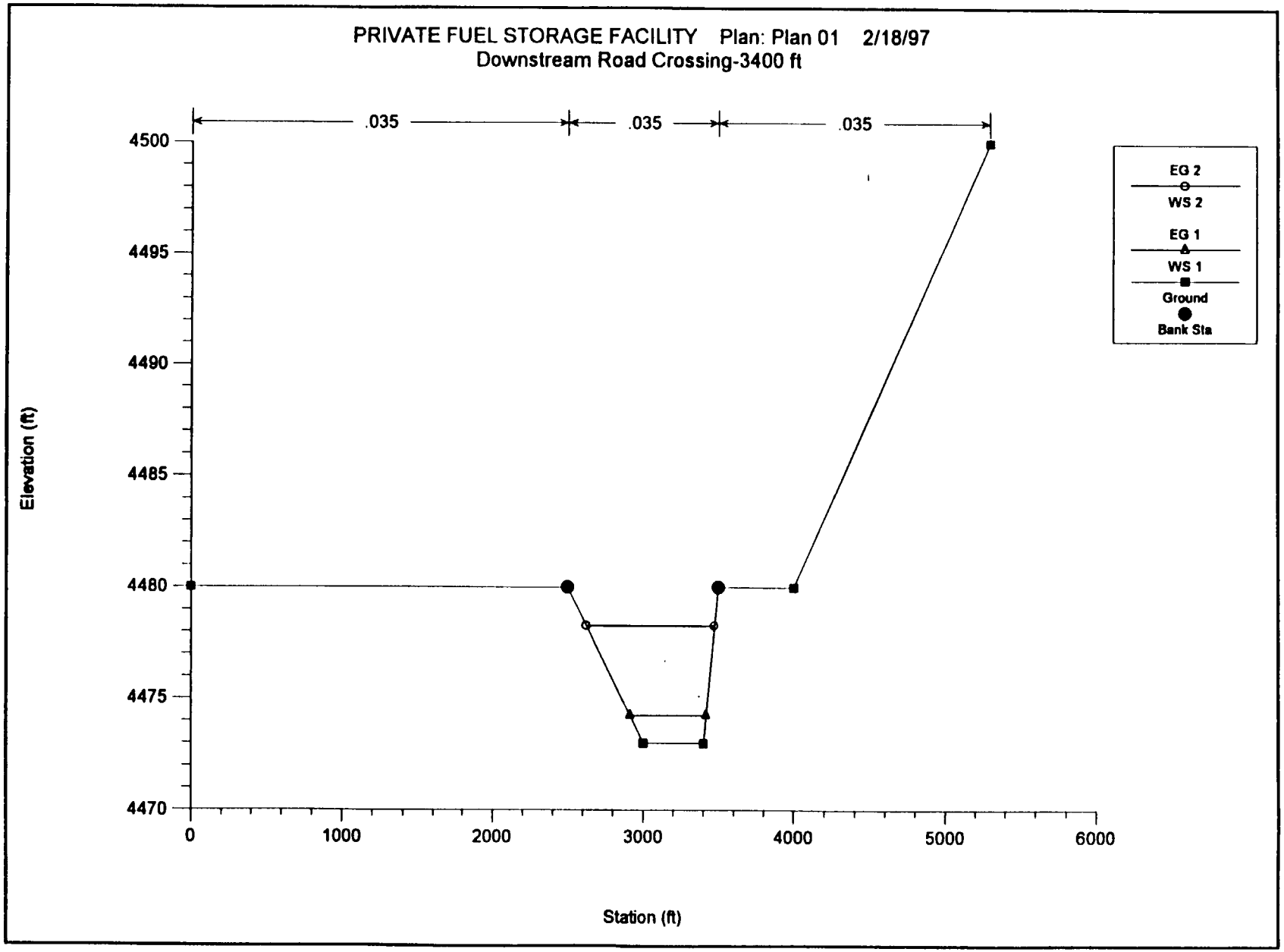
	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
6-HOUR	24-HOUR	72-HOUR								
	HYDROGRAPH AT			010	2643.	3.67	1042.	381.	381.	0.93

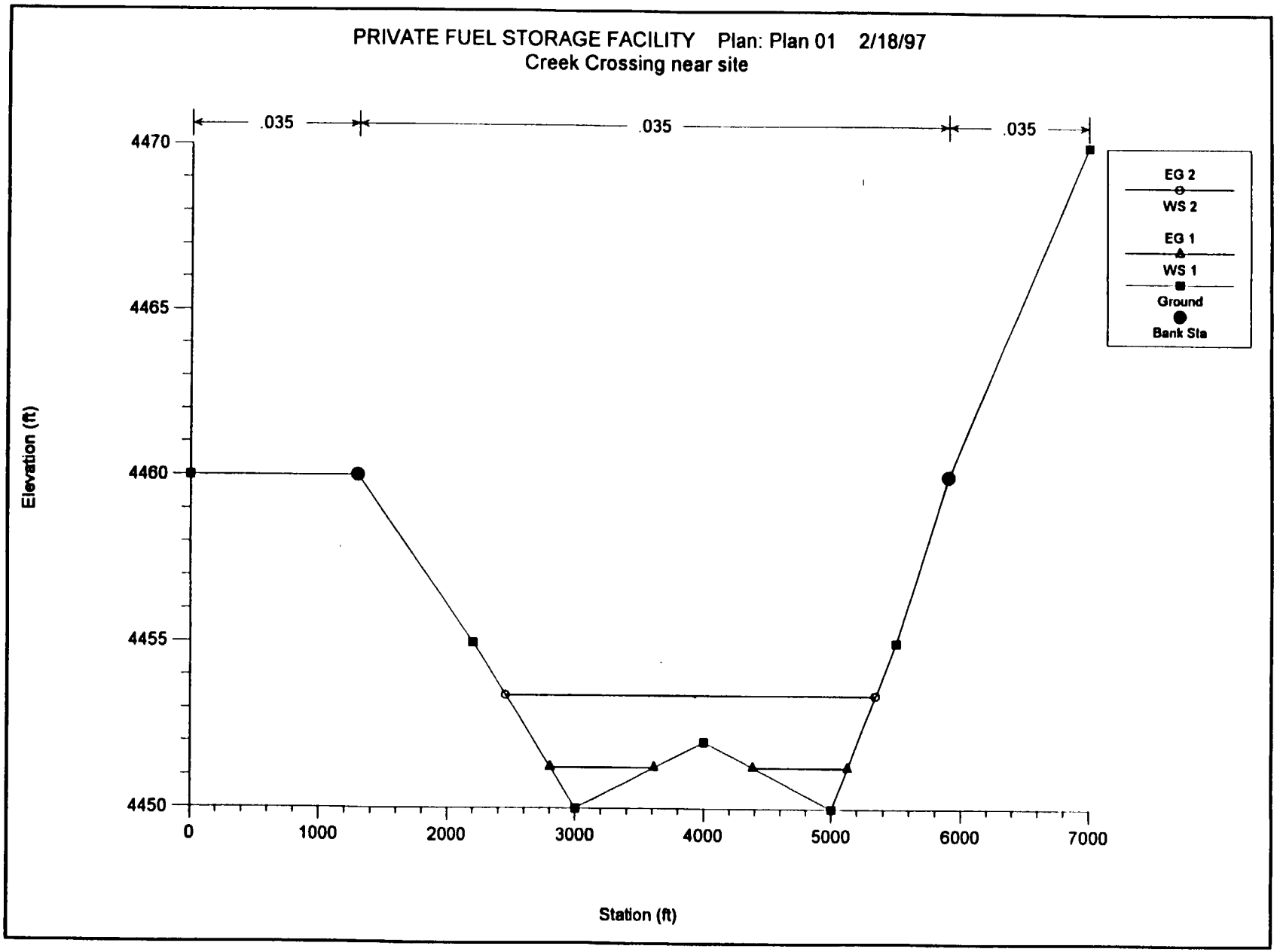
*** NORMAL END OF HEC-1 ***

HEC-RAS Plan: Plan 01 Reach: No Name Cr 2/18/97

River Sta.	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
[illegible]	2247.00	4493.00	4495.10	4494.63	4495.25	0.004938	3.09	727.94	691.64	0.53
[illegible]	34577.00	4493.00	4499.19		4499.66	0.003720	5.50	6289.70	2033.04	0.55
[illegible]	2247.00	4473.00	4474.24		4474.49	0.007812	4.01	559.79	505.93	0.67
[illegible]	34577.00	4473.00	4478.27	4478.07	4479.98	0.010059	10.49	3294.96	851.38	0.94
[illegible]	2247.00	4450.00	4451.23	4450.96	4451.32	0.005896	2.36	953.10	1549.78	0.53
[illegible]	34577.00	4450.00	4453.40	4452.80	4453.87	0.005901	5.49	6298.29	2883.59	0.65


PRIVATE FUEL STORAGE FACILITY Plan: Plan 01 2/18/97
Access Road Crossing-6500 ft
.035
.035
.035
4520
4515
4510
4505
4500
4495
4490
Elevation (ft)
0
2000
4000
6000
8000
Station (ft)
EG 2
WS 2
EG 1
WS 1
Ground
Bank Sta


PRIVATE FUEL STORAGE FACILITY Plan: Plan 01 2/18/97
Downstream Road Crossing-3400 ft
.035
.035
.035
4500
4495
4490
4485
4480
4475
4470
Elevation (ft)
0
1000
2000
3000
4000
5000
6000
Station (ft)
EG 2
WS 2
EG 1
WS 1
Ground
Bank Sta


PRIVATE FUEL STORAGE FACILITY Plan: Plan 01 2/18/97
Creek Crossing near site
.035
.035
.035
4470
4465
4460
4455
4450
Elevation (ft)
0
1000
2000
3000
4000
5000
6000
7000
Station (ft)
EG 2
WS 2
EG 1
WS 1
Ground
Bank Sta

Private Fuel Storage L.L.C.

Calculation Package

Volume II

Private Fuel Storage Facility

Docket No. 72-22

Skull Valley Indian Reservation
Tooele County, Utah

Table 1

CALCULATION PACKAGE - VOL I

Storage Pad Parameters and Storage Cask Stability Calculations:

1. **Development of Soil and Foundation Parameters in Support of Dynamic SSI Analysis**
   Geomatrix Calculation No. 05996.01-G(P05)-1; 3/31/97; QA Cat. I

2. **Deterministic Ground Motion Calculations for Skull Valley, UT**
   Geomatrix Calculation No. 05996.01-G(P05)-2; 3/31/97; QA Cat. I

3. **Storage Pad Analysis and Design**
   International Civil Engineering Consultants Calculation No. 05996.01- SC(PO17)-1; 6/20/97; QA Cat. I

4 **3-D Time Histories for Private Storage Facility**
   Holtec Calculation No. HI-961556; 11/8/96; QA Cat. I

5. **Evaluation of Concrete Pad Target Hardness**
   SWEC Calculation No. 05996.01-SC-1; 6/9/97; QA Cat. I

6. **Calculation of Holtec Cask Impact Load and Sliding Distance**
   SWEC Calculation No. 05996.01-SC-2; 6/20/97; QA Cat. I

Geotechnical Calculations:

7. **Document Bases for Recommended Values of Dynamic Soil Properties and Coefficient of Subgrade Reaction**
   SWEC Calculation No. 05996.01-G(B)-01-2; 6/4/97; QA Cat. I

8. **The PMF and the 100-yr Flood Flow at the Access Road Crossing and the PFSF Site**
   SWEC Calculation No. 05996.01-G(B)-02-1; 6/17/97; QA Cat. I

CALCULATION PACKAGE - VOL II

9. **Estimate Static Settlement of Storage Pads**
   SWEC Calculation No. 05996.01-G(B)-03-1; 5/13/97; QA Cat. I

10. **Stability Analyses of Storage Pads**
    SWEC Calculation No. 05996.01-G(B)-04-1; 5/8/97; QA Cat. I

11. **Document Bases for Geotechnical Parameters Provided in Geotechnical Design Criteria**
    SWEC Calculation No. 05996.01-G(B)-05-0; 5/8/97; QA Cat. I

12. **Evaluate the Liquefaction Potential of the Soils Underlying the Proposed Site**
    SWEC Calculation No. 05996.01-G(B)-06-1; 5/13/97; QA Cat. I

13. **Allowable Bearing Capacity and Static Settlement of Strip and Square Footings**
    SWEC Calculation No. 05996.01-G(B)-07-1; 5/19/97; QA Cat. I

14. **Dynamic Settlements of the Soils Underlying the Site**
    SWEC Calculation No. 05996.01-G(B)-11-0; 5/20/97; QA Cat. I

Meteorological Data and Tornado Probability Calculations:

15. **Tornado Strike Probability Calculation**
    SWEC Calculation No. 05996.01-E(B)-001; 6/20/97; QA Cat. I

16. **Summary of On-Site Meteorological Data**
    SWEC Calculation No. 05996.01-E(B)-002; 6/20/97; QA Cat. III

Radiation Protection Calculations:

17. **Accident χ/Qs for the Private Fuel Storage Facility (PFSF)**
    SWEC Calculation No. 05996.01-UR-1; QA Cat. I

18. **Doses From Hypothetical Loss of Canister Confinement Accident**
    SWEC Calculation No. 05996.01-UR-2; 6/10/97; QA Cat. I

19. **Postulated Release of Removable Contamination from Canister Outer Surfaces - Dose Consequences**
    SWEC Calculation No. 05996.01-UR-3; QA Cat. I

20. **Dose Calculations to Offsite Personnel from Intermodal Transfer Point**
    SWEC Calculation No. 05996.01-UR-4; QA Cat. I

21. **PFSF Transportation Impacts**
    SWEC Calculation No. 05996.01-P-001; 5/12/97; QA Cat. III

22. **Private Fuel Storage SKYSHINE II ISFSI Dose Rate Calculation (4,000 Casks)**
    SNC Calculation No. PFS01.10.02.03, Rev. 0; 4/10/97; QA Cat. I