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STATE OF UTAH
NATURAL RESOURCES & ENERGY
Oil, Gas & Mining

Scott M. Matheson, Governor
Temple A. Reynolds, Executive Director
Cleon B. Feight, Division Director

4241 State Office Building • Salt Lake City, UT 84114 • 801-533-5771

March 10, 1983

Mr. Allen Klein, Administrator
Western Technical Center
Office of Surface Mining
Brooks Towers
1020 Fifteenth Street
Denver, Colorado 80202

Attention: Ms. Shirley Lindsay

RE: Abatement plans re: NOV 83-4-1-1
Utah Power & Light Co.
Deer Creek Mine
ACT/015/018A
Folders 3 & 7
Emery County, Utah

Dear Mr. Klein:

Enclosed for your records are plans submitted by Utah Power & Light Company to modify the present surface drainage situation at the transfer point between sections C1 and C2 of the overland conveyor, to abate Notice of Violation #83-4-1-1.

Should you have any questions regarding this submittal, please contact Tom Munson or Dave Lof of the Division.

Sincerely,

Mary M. Boucek

MARY M. BOUCEK
RECLAMATION BIOLOGIST

MMB/mn

cc: Jim Smith
Tom Munson
Dave Lof

UTAH POWER & LIGHT COMPANY
1407 WEST NORTH TEMPLE STREET
P. O. BOX 899
SALT LAKE CITY, UTAH 84110

March 4, 1983

Mr. Ronald W. Daniels
Administrative Assistant
State of Utah
Department of Natural Resources
Division of Oil, Gas & Mining
4241 State Office Building
Salt Lake City, Uah 84114

Dear Mr. Daniels:

Attached are the plans for abatement of NOV83-4-1-1. If you require further information, please contact this office.

Sincerely,

C. E. Shingleton

C. E. Shingleton
Director of Services
Mining and Exploration

CES:bb:3788
Encl.

DRAINAGE AT C1 AND C2 TRANSFER POINT AT DEER CREEK MINE

In response to the Notice of Violation No. N83-4-1-1 issued on January 13, 1983, the following report of corrective action is presented will satisfy the requirements of the Division of Oil, Gas and Mining.

A system of inlets, culverts, detention basins and earth berms is proposed (Drawing DS648E, Exhibit I) which will collect the surface runoff and convey it back to the natural stream channel in such a manner as to minimize the possibility of erosion and sedimentation. The disturbed area runoff will be passed through a detention basin with a straw filter on the discharge end to reduce the suspended solids before discharging back into the stream.

UNDISTURBED RUNOFF

The canyon west of the transfer point shown on the attached topographic map, Exhibit II, was determined by planimeter to have an area of 64.4 acres. The design precipitation event for temporary structures is the 10 year, 24 hour rainfall. The amount of rainfall for this storm at the Deer Creek mine is 2.2 inches, according to the U.S. Weather Bureau Isohyetal map (Exhibit III).

Using the Soil Conservation Service (SCS) method of determining runoff quantities, the soil group selected for the canyon was D, due to the numerous rockledges and thin soil cover in the area (Exhibit IV). The Curve Number selected is 83, for forest lands with poor cover and no mulch (Exhibit V).

The SCS equation for accumulated runoff volume is:

$$Q = \frac{(P-0.2S)^2}{P+0.8S}$$

Where P = Accumulated Precipitation

$$S = \frac{1000}{CN} - 10$$

Therefore

$$S = \frac{1000}{83} - 10 = 2.048$$

$$Q = \frac{[2.2 - 0.2(2.048)]^2}{2.2 + 0.8(2.048)}$$

$$= \frac{3.205}{3.838} = 0.835 \text{ inches}$$

The longest path for run-off in the canyon is 2,760 feet with an average slope at 65% (Exhibit II). The velocity of the run-off for this slope is 8 feet per second, using Exhibit VI and the curve for overland flow on bare and untilled land. The time of concentration is then calculated.

$$tc = \frac{\text{length}}{\text{velocity}} = \frac{2760 \text{ feet}}{8 \text{ fps}} \times \frac{1 \text{ hour}}{3600 \text{ seconds}} = 0.10 \text{ hours}$$

The peak discharge for a tc of 0.10 hours is 1000 cfs per square mile per inch of run-off (Exhibit VII). Therefore, the peak run-off for the 10 year 24 hour storm is

$$Qp = \frac{1000 \text{ cfs}}{(\text{mile})^2 (\text{inch})} \times \frac{64.4 \text{ acres}}{640 \text{ acre/mile}^2} \times 0.835 \text{ inches run-off}$$

$$Qp = 84.0 \text{ cfs}$$

CULVERT DESIGN

A corrugated metal pipe culvert will be used to convey the collected run-off down to and under the paved road and then into the natural stream channel. Mannings equation is used to determine the size of pipe needed. Manings Equation for open channel flow is:

$$Q = \frac{1.49}{n} AR^{2/3}S^{1/2}$$

Where Q = Volume of flow

N = Roughness coefficient, depends on diameter of CMP

A = Cross sectional area = $\frac{\pi D^2}{4}$

R = Wetted Perimeter = $\frac{\pi D^2}{4} \div \pi D$

D = Diameter of pipe, feet

S = Slope

Therefore

$$Q = \frac{1.49}{n} \times \frac{\pi D^2}{4} \times \left(\frac{\pi D^2}{4(\pi D)}\right)^{2/3} S^{1/2}$$

$$Q = \frac{0.46644 D^{2.667} S^{1/2}}{n}$$

The minimum slope of cultert will be 0.07.

The volume of flow for a 36 inch diameter pipe with n = 0.019 is

$$Q = \frac{0.4644 \ \frac{36}{12}^{2.667} \ 0.07}{0.019} = 121 \text{ cfs}$$

The capacity of the 36 inch pipe is greater than the design flow of 84.0 cfs.

The outlet of the 36 inch pipe will be cantilevered passed the embankment and a layer of rocks set in concrete will be placed below the pipe to dissipate the energy of the falling water and prevent erosion.

DISTURBED AREA RUNOFF

The disturbed areas consist of the transfer tower and the surrounding area, and the area adjacent to the conveyor which drains into the transfer area. The disturbed area runoff is split into two drainages, each of which is routed through a detention basin and then through a straw filter to reduce the suspended solids to an acceptable level before discharge. The disturbed area run-off south of the transfer tower itself is routed down the slope in a rock lined channel, then through a 24 inch diameter culvert and finally into a small detention basin with a straw filter on the discharge end. The effluent from this basin goes into the ditch along the mine access road and eventually ends up in the natural stream channel.

This basin is constructed such that the sediment deposited in it can be cleaned out easily with a backhoe.

The area north of the transfer tower drains into a depression, which discharges into the ditch adjacent to the mine road. This area is also designed such that clean-out of deposited sediments can be accomplished easily.

February 24, 1983

PROJECT: Drainage at C1 & C2 Belt Transfer at Deer Creek Mine

SCOPE: Construct a drop inlet for undisturbed runoff in the mouth of the canyon adjacent to the belt transfer, and run the water in a buried 36 inch diameter pipe down the slope and under the road and discharge into the stream channel.

Repair the existing culvert to take the disturbed runoff across the access road and into the sediment pond adjacent to the road.

COST ESTIMATE:

Labor	$ 6,923
Equipment	5,704
Materials	9,185
TOTAL	$21,812

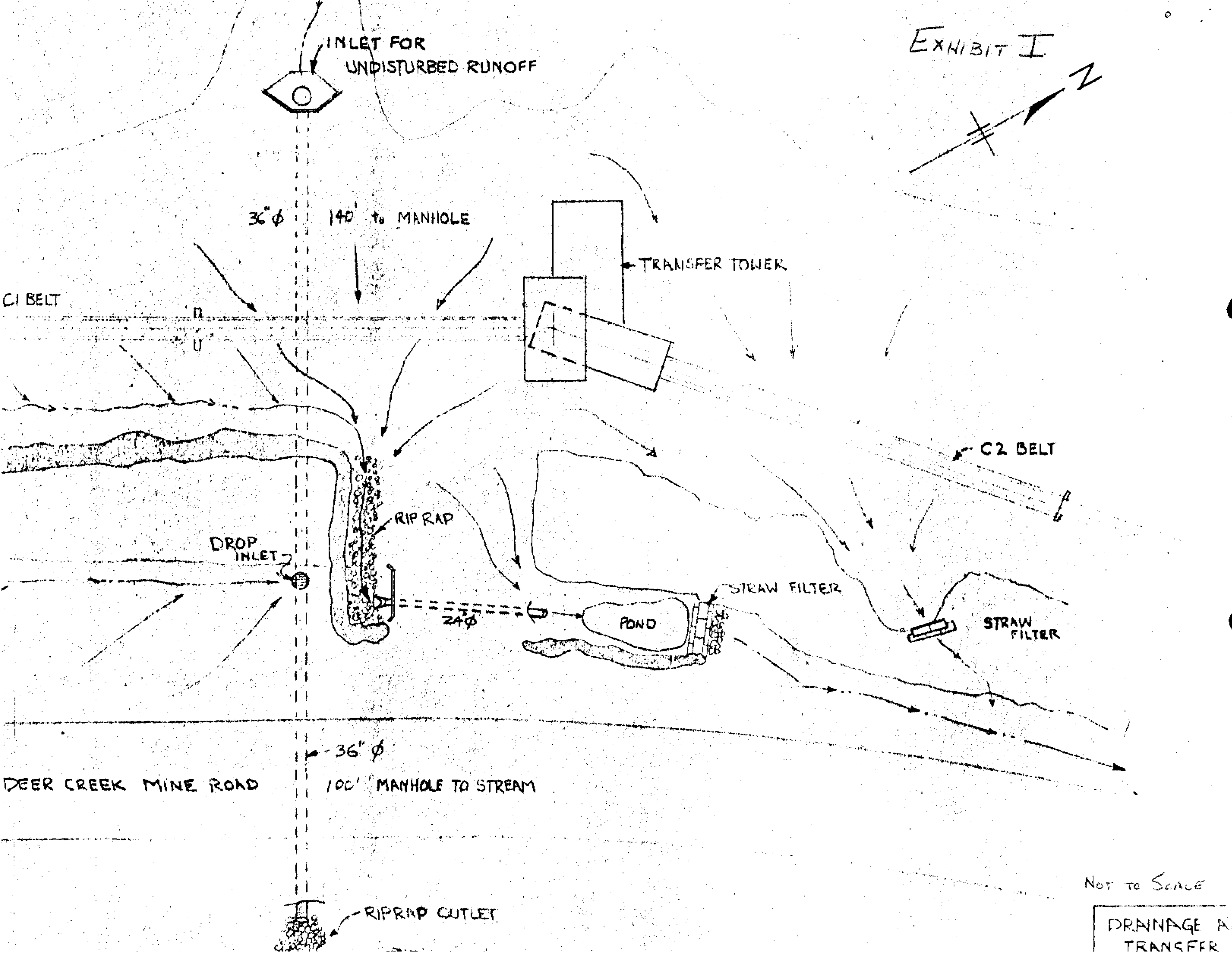
EXHIBIT I
N
INLET FOR
UNDISTURBED RUNOFF
36"ø
140' to MANHOLE
TRANSFER TOWER
C1 BELT
C2 BELT
RIP RAP
DROP
INLET
24ø
POND
STRAW FILTER
STRAW
FILTER
36"ø
DEER CREEK MINE ROAD
100' MANHOLE TO STREAM
RIPRAP OUTLET
NOT TO SCALE
DRAINAGE A
TRANSFER

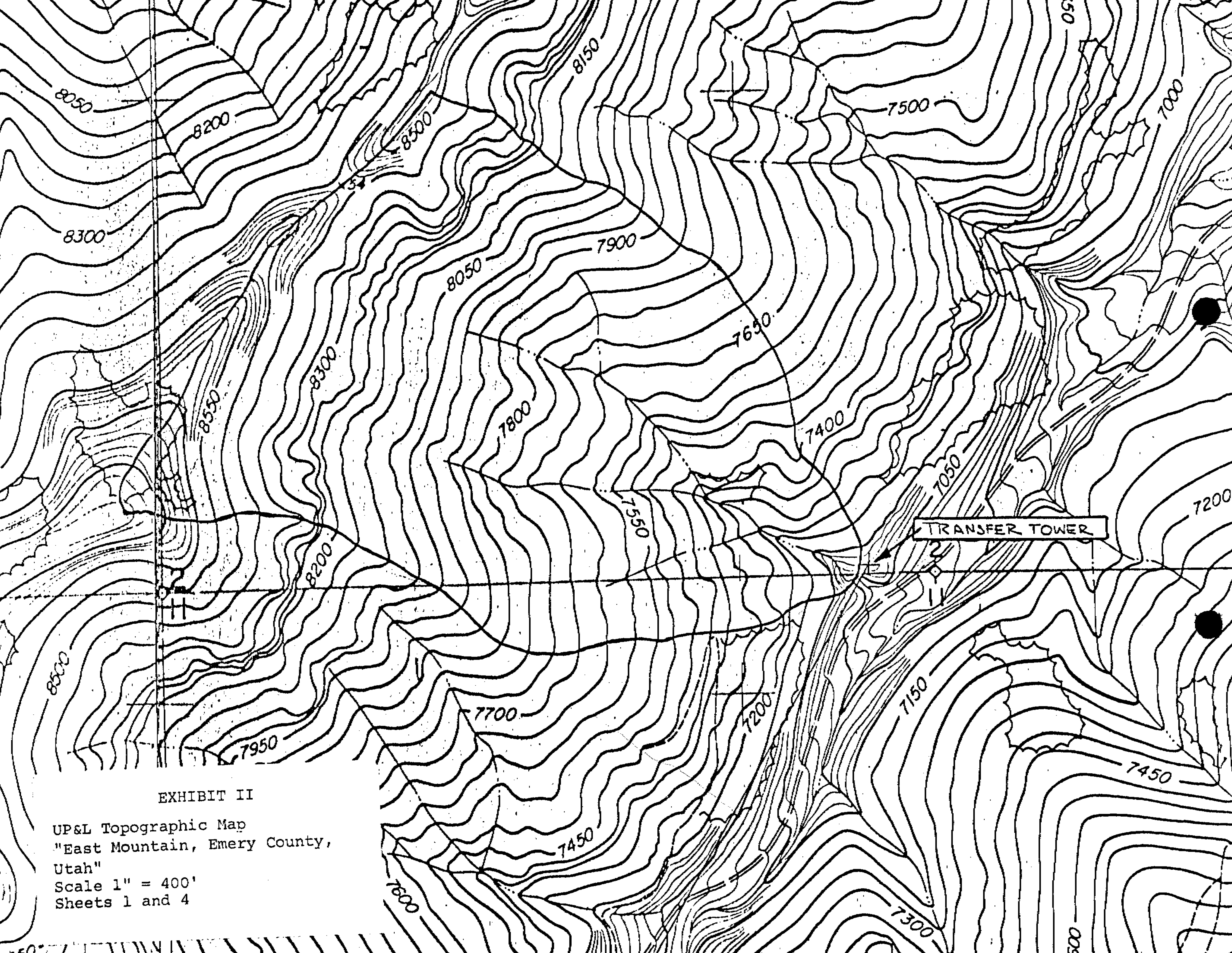

EXHIBIT II

UP&L Topographic Map
"East Mountain, Emery County, Utah"
Scale 1" = 400'
Sheets 1 and 4

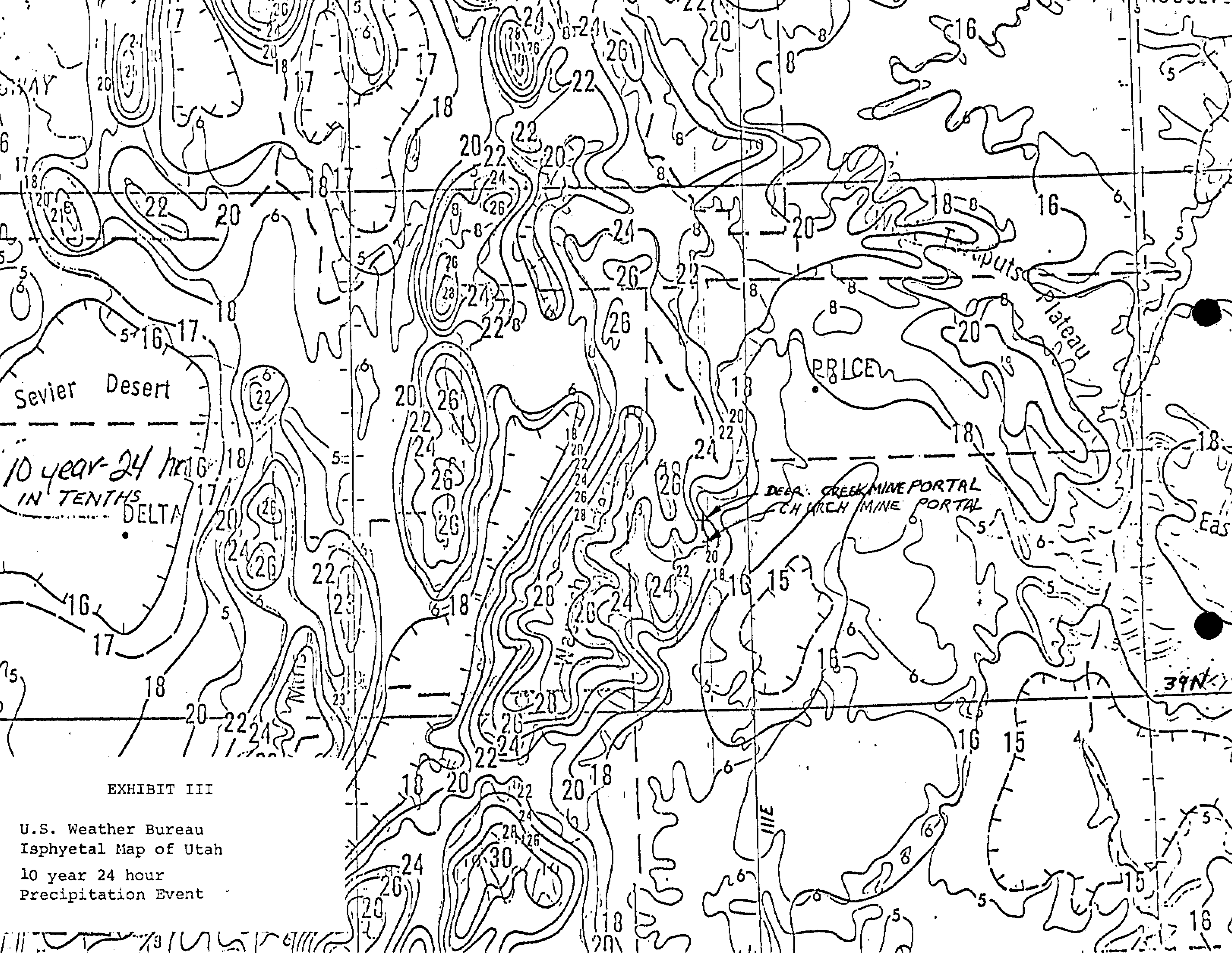

EXHIBIT III

U.S. Weather Bureau
Isphyetal Map of Utah

10 year 24 hour
Precipitation Event

Table 2.19 Definition of SCS Hydrologic Soil Groups

A. These soils have a high infiltration rate. They are chiefly deep, well-drained sands or gravels. (Low runoff potential).

B. These soils have a moderate infiltration rate when thoroughly wet. They are chiefly moderately deep, well-drained soils of moderately fine to moderately course texture.

C. These soils have a slow infiltration rate when wet. They are chiefly moderately deep, well-drained soils of moderately fine to moderately course texture.

D. These soils have a very slow infiltration rate. They are chiefly clay soils with a high swelling potential, soils with a permanently high water table, soils with a clay pan at or near the surface and shallow soils over nearly impervious materials. (High run-off potential).

EXHIBIT IV

Page 81

Barfield, B.J., Werner, R.C., Haan, C.T., APPLIED Hydrology and Sedimentology for Disturbed Areas Oklahoma Technical Press, Stillwater, OK. 1981

Table 2.20 Runoff Curve Numbers for Selected Agricultural, Suburban, and Urban Land Use. (Antecedent Moisture Condition II).

LAND USE DESCRIPTION		HYDROLOGIC SOIL GROUP			
		A	B	C	D
Cultivated land[1]: without conservation treatment		72	81	88	91
: with conservation treatment		62	71	78	81
Pasture or range land: poor condition		68	79	86	89
good condition		39	61	74	80
Meadow: good condition		30	58	71	78
Wood or Forest land: thin stand, poor cover, no mulch		45	66	77	83
good cover[2]		25	55	70	77
Open Spaces, lawns, parks, golf courses, cemeteries, etc.					
good condition: grass cover on 75% or more of the area		39	61	74	80
fair condition: grass cover on 50% to 75% of the area		49	69	79	84
Commercial and business areas (85% impervious)		89	92	94	95
Industrial districts (72% impervious).		81	88	91	93
Residential:[3]					
Average lot size	Average % Impervious[4]				
1/8 acre or less	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
Paved parking lots, roofs, driveways, etc.[5]		98	98	98	98
Streets and roads:					
paved with curbs and storm sewers[5]		98	98	98	98
gravel		76	85	89	91
dirt		72	82	87	89

[1] For a more detailed description of agricultural land use curve numbers refer to National Engineering Handbook, Section 4, Hydrology, Chapter 9, Aug. 1972.

[2] Good cover is protected from grazing and litter and brush cover soil.

[3] Curve numbers are computed assuming the runoff from the house and driveway is directed towards the street with a minimum of roof water directed to lawns where additional infiltration could occur.

[4] The remaining pervious areas (lawn) are considered to be in good pasture condition for these curve numbers.

[5] In some warmer climates of the country a curve number of 95 may be used.

EXHIBIT V

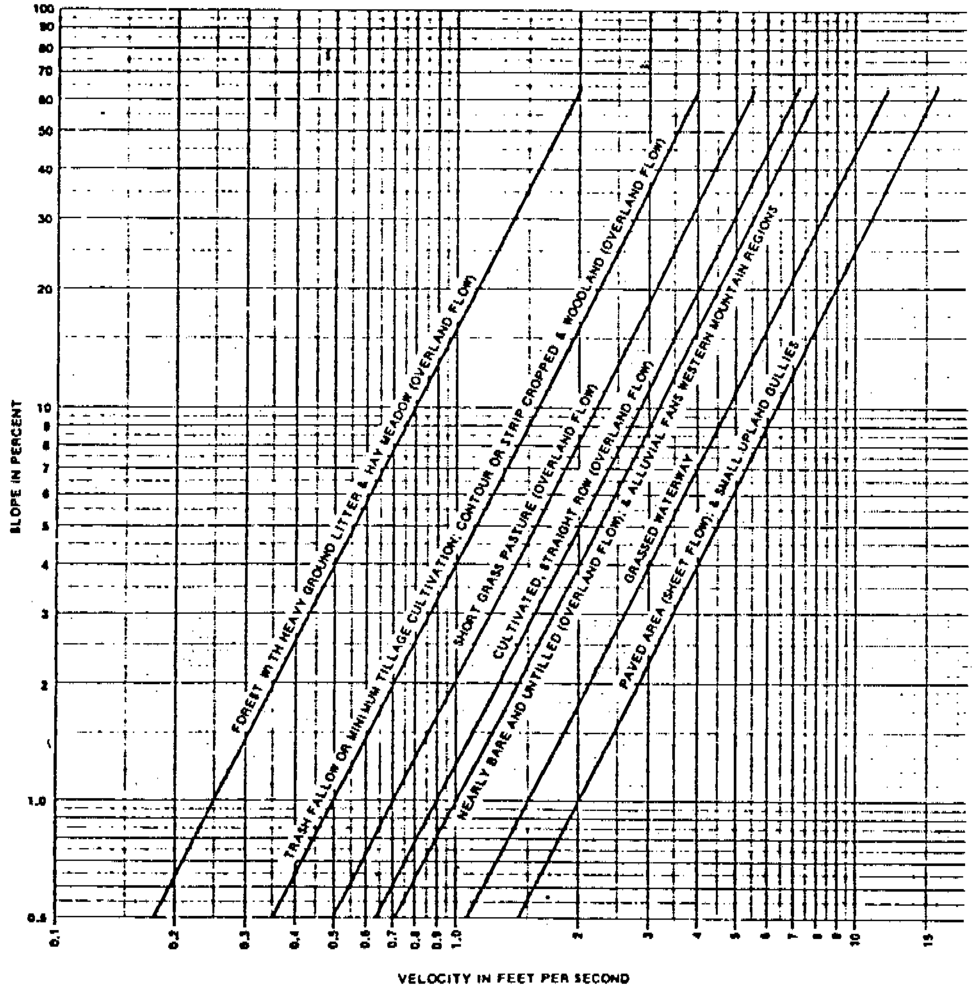

Figure 2.34. Velocities for upland method of estimating t_c.

EXHIBIT VI

Page 100 Barfield

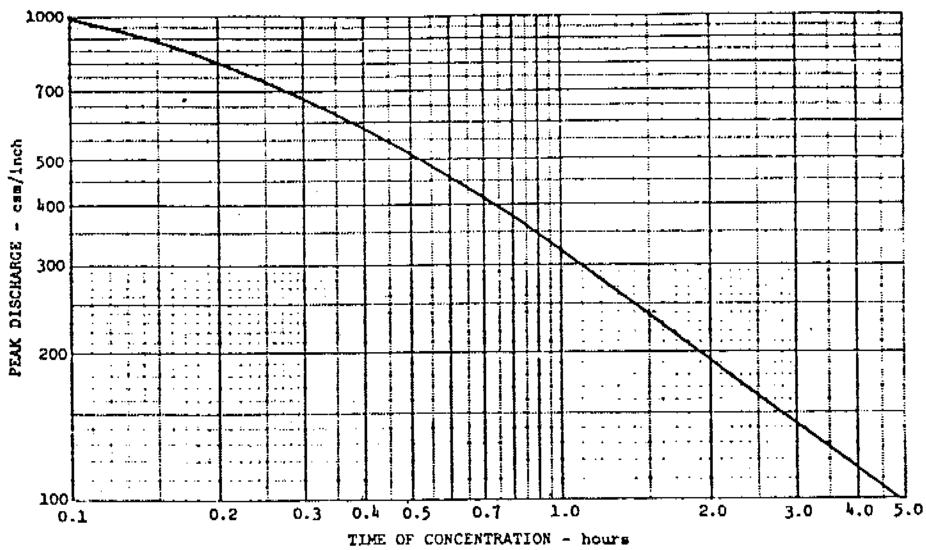

Figure 2.40. Peak discharge in csm per inch of runoff versus time of concentration (t_c) for 24-hour, type II storm distribution.

EXHIBIT VII

Page 115 Barfield