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DIVISION OF
OIL, GAS & MINING

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April 17, 1986

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APR 21 1986
MINING AND
EXPLORATION

Mr. Chris Shingleton
Utah Power & Light Company
P. O. Box 899
Salt Lake City, Ut 84110

Dear Chris:

In light of the new federal regulations which indicate that (with the exception of volume requirements for sedimentation ponds) the peak storm design requirement for runoff conveyance facilities has been changed from a 24-hour to a 6-hour precipitation event; we have reanalyzed the adequacy of the existing 30-inch diameter CMP pipeline in Elk Canyon to convey the discharge from a 10 year - 6 hour precipitation event.

In a previous letter addressed to you dated October 2, 1984, we indicated that: "The existing drawings show that the pipeline in Elk Canyon consists of a 30" diameter CMP with no manholes. Since no manholes exist, this pipe can be pressurized slightly to allow a greater flow rate to pass. The grade of the pipeline is also steeper than that found for the Deer Drainage pipeline. Because of these factors, the existing pipeline will carry approximately 70 cfs if the inlet structure is modified. Modification to the inlet structure would require the installation of a 36" diameter opening which would transition to the existing 30" CMP at a point 10 feet downstream. The HW/D ratio was calculated to be 2.0."

We have recomputed the hydrograph for Elk Canyon for the 10 year - 6 hour precipitation event that the 30-inch pipeline would be required to pass (see the attachment). The peak discharge from the 10 year - 6 hour precipitation event using the SCS 6-hour distribution was calculated to be 30 cfs. Based on inlet control and assuming the worst case inlet control conditioning (i.e. projecting pipe) the existing 30-inch CMP can carry 30 cfs with a headwater to diameter ratio (HW/D) of 1.5 and 40 cfs with a HW/D of 2.0. As I recall, the plans indicate that the pipe has a headwall which improves its inlet flow characteristics. With a headwall the existing pipe can carry 30 cfs with a HW/D of 1.3 and 45 cfs with a HW/D of 2.0. Therefore, as long as the pipe

has a minimum HW/D of 1.5 for a projecting inlet condition or 1.3 for a headwall inlet condition, it is capable of passing the peak discharge from the 10 year - 6 hour event of 30 cfs without any modification.

As you are aware, the State of Utah has not yet adopted this new regulation. However, if the State does adopt this regulation, then the existing pipe is adequate without modification unless the minimum HW/D indicated above cannot be met.

If there are further questions concerning this matter, please call.

Sincerely,

Marvin E. Allen

Marvin E. Allen, P.E.
Executive Vice President

MEA/lv

Enclosure

PROJECT : ELK CREEK AREA VI 10-YEAR 6-HOUR PEAK DISCHARGE

AREA= 452.0 ACRES
AVERAGE BASIN SLOPE= 49.2 PERCENT
CURVE NUMBER= 76.
DESIGN STORM= 1.50 INCHES
STORM DURATION= 6.0 HOURS
HYDRAULIC LENGTH= 7200. FEET
MINIMUM INFILTRATION RATE= .00 IN/HR

TP= .2755 HOURS QPCFS= 1240.81 CFS QPIN= 2.7224 INCHES
C3= 13.4186 ITERATIONS= 8 SCS 6-hour

TIME HOURS	ACCUMULATED RAINFALL INCHES	RUNOFF INCHES	RAINFALL EXCESS INCHES	UNIT HYDROGRAPH CFS	OUTFLOW HYDROGRAPH CFS
.00	.0000	.0000	.0000	.0	.00
.06	.0058	.0000	.0000	.0	.00
.11	.0116	.0000	.0000	.0	.00
.17	.0174	.0000	.0000	.0	.00
.22	.0231	.0000	.0000	.0	.00
.28	.0289	.0000	.0000	.0	.00
.33	.0347	.0000	.0000	.0	.00
.39	.0405	.0000	.0000	.0	.00
.44	.0463	.0000	.0000	.0	.00
.50	.0521	.0000	.0000	.0	.00
.55	.0594	.0000	.0000	.0	.00
.61	.0668	.0000	.0000	.0	.00
.66	.0743	.0000	.0000	.0	.00
.72	.0817	.0000	.0000	.0	.00
.77	.0891	.0000	.0000	.0	.00
.83	.0966	.0000	.0000	.0	.00
.88	.1040	.0000	.0000	.0	.00
.94	.1114	.0000	.0000	.0	.00
.99	.1189	.0000	.0000	.0	.00
1.05	.1277	.0000	.0000	.0	.00
1.10	.1368	.0000	.0000	.0	.00
1.16	.1459	.0000	.0000	.0	.00
1.21	.1550	.0000	.0000	.0	.00
1.27	.1641	.0000	.0000	.0	.00
1.32	.1732	.0000	.0000	.0	.00
1.38	.1823	.0000	.0000	.0	.00
1.43	.1914	.0000	.0000	.0	.00
1.49	.2005	.0000	.0000	.0	.00
1.54	.2147	.0000	.0000	.0	.00
1.60	.2304	.0000	.0000	.0	.00
1.65	.2461	.0000	.0000	.0	.00
1.71	.2618	.0000	.0000	.0	.00
1.76	.2775	.0000	.0000	.0	.00
1.82	.2932	.0000	.0000	.0	.00
1.87	.3089	.0000	.0000	.0	.00

PROJECT : ELK CREEK AREA VI 10-YEAR 6-HOUR PEAK DISCHARGE
(Continued)

TIME HOURS	ACCUMULATED RAINFALL INCHES	RUNOFF INCHES	RAINFALL EXCESS INCHES	UNIT HYDROGRAPH CFS	OUTFLOW HYDROGRAPH CFS
1.93	.3246	.0000	.0000	.0	.00
1.98	.3403	.0000	.0000	.0	.00
2.04	.3878	.0000	.0000	.0	.00
2.09	.4490	.0000	.0000	.0	.00
2.15	.5102	.0000	.0000	.0	.00
2.20	.5713	.0000	.0000	.0	.00
2.26	.6325	.0000	.0000	62.3	.00
2.31	.6936	.0012	.0012	385.4	.07
2.37	.7548	.0046	.0034	823.7	.67
2.42	.8159	.0102	.0055	1139.1	2.65
2.48	.8771	.0177	.0075	1240.8	6.79
2.53	.9103	.0226	.0049	1162.3	13.17
2.59	.9269	.0253	.0026	981.1	20.23
2.64	.9434	.0280	.0028	767.4	25.86
2.70	.9599	.0309	.0029	566.3	29.09
2.75	.9765	.0340	.0030	399.1	30.19
2.81	.9930	.0371	.0032	271.0	29.96
2.87	1.0095	.0404	.0033	178.5	29.16
2.92	1.0260	.0438	.0034	114.6	28.33
2.98	1.0426	.0473	.0035	71.9	27.75
3.03	1.0573	.0506	.0032	44.3	27.48
3.09	1.0705	.0536	.0030	26.9	27.40
3.14	1.0837	.0566	.0031	16.0	27.28
3.20	1.0970	.0598	.0031	9.5	27.07
3.25	1.1102	.0630	.0032	5.5	26.81
3.31	1.1234	.0663	.0033	3.2	26.59
3.36	1.1366	.0696	.0034	1.8	26.49
3.42	1.1498	.0731	.0034	1.0	26.52
3.47	1.1631	.0766	.0035	.6	26.69
3.53	1.1743	.0796	.0030	.3	26.95
3.58	1.1834	.0821	.0025	.2	27.08
3.64	1.1925	.0846	.0025	.1	26.85
3.69	1.2016	.0872	.0026	.0	26.21
3.75	1.2107	.0897	.0026	.0	25.32
3.80	1.2198	.0924	.0026	.0	24.39
3.86	1.2289	.0950	.0026	.0	23.57
3.91	1.2380	.0977	.0027	.0	22.93
3.97	1.2471	.1004	.0027	.0	22.51
4.02	1.2558	.1030	.0026	.0	22.26
4.08	1.2641	.1055	.0025	.0	22.12
4.13	1.2723	.1081	.0025	.0	22.01
4.19	1.2806	.1107	.0026	.0	21.87
4.24	1.2889	.1132	.0026	.0	21.72
4.30	1.2971	.1159	.0026	.0	21.59
4.35	1.3054	.1185	.0026	.0	21.51

PROJECT : ELK CREEK AREA VI 10-YEAR 6-HOUR PEAK DISCHARGE
(Continued)

TIME HOURS	ACCUMULATED RAINFALL INCHES	RUNOFF INCHES	RAINFALL EXCESS INCHES	UNIT HYDROGRAPH CFS	OUTFLOW HYDROGRAPH CFS
4.41	1.3137	.1212	.0027	.0	21.48
4.46	1.3219	.1238	.0027	.0	21.52
4.52	1.3297	.1264	.0025	.0	21.58
4.57	1.3363	.1286	.0022	.0	21.61
4.63	1.3429	.1308	.0022	.0	21.46
4.68	1.3495	.1330	.0022	.0	21.11
4.74	1.3561	.1352	.0022	.0	20.63
4.79	1.3627	.1375	.0022	.0	20.13
4.85	1.3693	.1397	.0023	.0	19.68
4.90	1.3759	.1420	.0023	.0	19.32
4.96	1.3825	.1443	.0023	.0	19.08
5.01	1.3892	.1466	.0023	.0	18.94
5.07	1.3958	.1489	.0023	.0	18.87
5.12	1.4024	.1512	.0023	.0	18.87
5.18	1.4090	.1536	.0023	.0	18.91
5.23	1.4156	.1559	.0024	.0	18.98
5.29	1.4222	.1583	.0024	.0	19.06
5.34	1.4288	.1607	.0024	.0	19.16
5.40	1.4354	.1631	.0024	.0	19.27
5.45	1.4421	.1655	.0024	.0	19.38
5.51	1.4485	.1679	.0024	.0	19.49
5.56	1.4543	.1700	.0021	.0	19.57
5.62	1.4601	.1722	.0021	.0	19.55
5.68	1.4659	.1744	.0022	.0	19.39
5.73	1.4717	.1765	.0022	.0	19.15
5.79	1.4774	.1787	.0022	.0	18.88
5.84	1.4832	.1809	.0022	.0	18.64
5.90	1.4890	.1831	.0022	.0	18.45
5.95	1.4948	.1853	.0022	.0	18.32
6.01	1.4948	.1853	.0000	.0	18.11
6.06	1.4948	.1853	.0000	.0	17.22
6.12	1.4948	.1853	.0000	.0	15.40
6.17	1.4948	.1853	.0000	.0	12.89
6.23	1.4948	.1853	.0000	.0	10.16
6.28	1.4948	.1853	.0000	.0	7.61
6.34	1.4948	.1853	.0000	.0	5.45
6.39	1.4948	.1853	.0000	.0	3.76
6.45	1.4948	.1853	.0000	.0	2.52
6.50	1.4948	.1853	.0000	.0	1.64
6.56	1.4948	.1853	.0000	.0	1.04
6.61	1.4948	.1853	.0000	.0	.65
6.67	1.4948	.1853	.0000	.0	.40
6.72	1.4948	.1853	.0000	.0	.24
6.78	1.4948	.1853	.0000	.0	.14
6.83	1.4948	.1853	.0000	.0	.08

PROJECT : ELK CREEK AREA VI 10-YEAR 6-HOUR PEAK DISCHARGE
(Continued)

TIME HOURS	ACCUMULATED RAINFALL INCHES	RUNOFF INCHES	RAINFALL EXCESS INCHES	UNIT HYDROGRAPH CFS	OUTFLOW HYDROGRAPH CFS
6.89	1.4948	.1853	.0000	.0	.05
6.94	1.4948	.1853	.0000	.0	.03
7.00	1.4948	.1853	.0000	.0	.02
7.05	1.4948	.1853	.0000	.0	.01
7.11	1.4948	.1853	.0000	.0	.00
7.16	1.4948	.1853	.0000	.0	.00
7.22	1.4948	.1853	.0000	.0	.00
7.27	1.4948	.1853	.0000	.0	.00
7.33	1.4948	.1853	.0000	.0	.00

HYDROGRAPH PEAK= 30.19 cfs
TIME TO PEAK= 2.75 Hours
RUNOFF VOLUME= 6.98 Acre-Feet