March 13, 2003

TO: Internal File

THRU: Daron R. Haddock, Permit Supervisor

FROM: Gregg A. Galecki, Reclamation Specialist

RE: 2002 Third Quarter Water Monitoring, Canyon Fuel Company, LLC, Dugout Mine, C/007/039-WQ02-3

1. Was data submitted for all of the MRP required sites? YES ☒ NO ☐
Identify sites not monitored and reason why, if known:

2. On what date does the MRP require a five-year resampling of baseline water data.
See Technical Directive 004 for baseline resampling requirements. Consider the five-year baseline resubmittal when responding to question one above. Indicate if the MRP does not have such a requirement.

Resampling due date

Low-flow 2002 (third quarter). Baseline sampling was conducted at the required sites during this quarter.

3. Were all required parameters reported for each site? YES __ NO _X_
Comments, including identity of monitoring site:

Due to low snowpack conditions (<70%) as measured on March 1, a special hydrograph monitoring program was initiated in the 2nd quarter, as outlined in the MRP. The special sampling program included both high-flow and low-flow water quality analysis of selected streams and springs, in conjunction with weekly flow-only monitoring of the sites. This information has yet to be prepared and submitted by the Operator; but the commitment is to have the information submitted by the end of March 2003.

4. Were irregularities found in the data? YES X NO _

Comments, including identity of monitoring site:

Of 10 total samples sites sent to the lab, all ten (10) sites had ionic balances less than 5 percent. This is a significantly better performance from the lab than last quarter, where 12 of 13 samples collected were out of range (greater than 5 percent).

Another irregularity noted was elevated Specific Conductivity values. Seven of the ten (10) sites sampled showed increases ranging from approximately 30 percent to 90 percent (MD-1). This will continue to be monitored however, since the majority of samples showed the increase, it is anticipated that a calibration problem may have been involved. The personnel conducting field-tests was questioned, but the issue was not resolved. This will continue to be monitored in the future.

Water quality at site MD-1 changed significantly during the quarter. However, it is believed that the change is directly related to the de-watering of old mine workings that was conducted in August 2002. MD-1 was sampled on August 8, and was dry by the end of the month. This coincided with the de-watering of old mine-workings which was completed by the end of the month.

At DC-1, parameters that were abnormally high during 1st quarter sampling that rebounded close to normal limits during the 2nd quarter are elevated again. Elevated parameters were for the 3rd quarter include Specific Conductivity 1360 umhos (496 ave.), dissolved calcium 111 mg/l (59.6 ave.), dissolved magnesium 93.7 mg/l (46.8 ave.), dissolved sodium 36.7 mg/l (21.8 ave.), chloride 21 mg/l (5.7 ave.), sulfate 440 mg/l (78 ave.), and total dissolved solids 920 mg/l (389 ave.). The quality at this site will continue to be monitored.

5. Were DMR forms submitted for all required sites?

1st month, YES ☒ NO ☐
2nd month, YES ☒ NO ☐
3rd month, YES ☒ NO ☐

6. Were all required DMR parameters reported? YES ☒ NO ☐

Comments, including identity of monitoring site:

7. Were irregularities found in the DMR data? YES ☐ NO ☒

Comments, including identity of monitoring site:

Due to emergency conditions that were encountered in the mine, the de-watering of old mine-workings occurred in August. The water was discharged directly into Dugout Creek beginning August 5, and continued through August 31, 2002. The average flow was 1,424,048 gallons/day (approx. 2 cfs) with a maximum daily discharge of 2,520,000 gallons/day (1750 gpm). A total of six (6) pH samples were collected ranging from 6.52 to 7.65 pH-units. Four (4) Total Suspended Solids (TSS) samples were collected with a low of 12 mg/l and a high of 24 mg/l. Four (4) of a total six (6) samples collected for Total Iron exceeded the 1.0 mg/l daily maximum, with the highest being 5.0 mg/l. The most significant parameter analyzed was Total Dissolved Solids (TDS), which exceeded the daily limit of 2000 lb/day all six (6) times samples; the maximum being 30,764 lb/day (1730 mg/l max, 1460 mg/l ave.). No visible oil or grease were detected during any of the discharges.

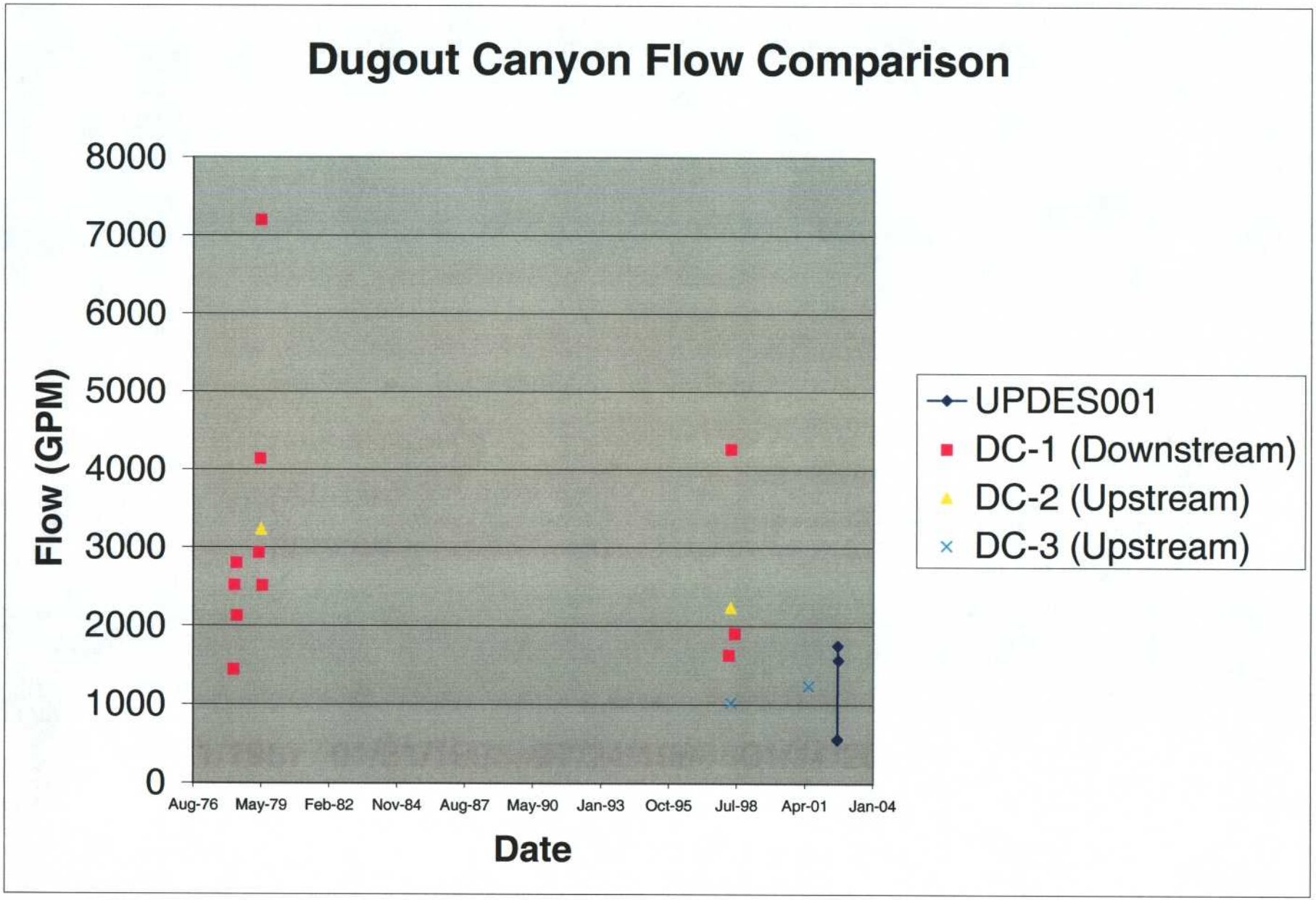
Although this was a significant exceedance of TDS, it actually had a positive affect due to the beneficial uses downstream. The attached spreadsheets, graphs, and photos illustrate and support these affects. Due to the ephemeral nature Dugout Creek, it was able to handle the flow, and the other parameters sampled were not out of acceptable limits. The water was put to beneficial use by filling stock ponds and irrigating newly planted fields. The discharge also did not flow into a perennial receiving-stream.

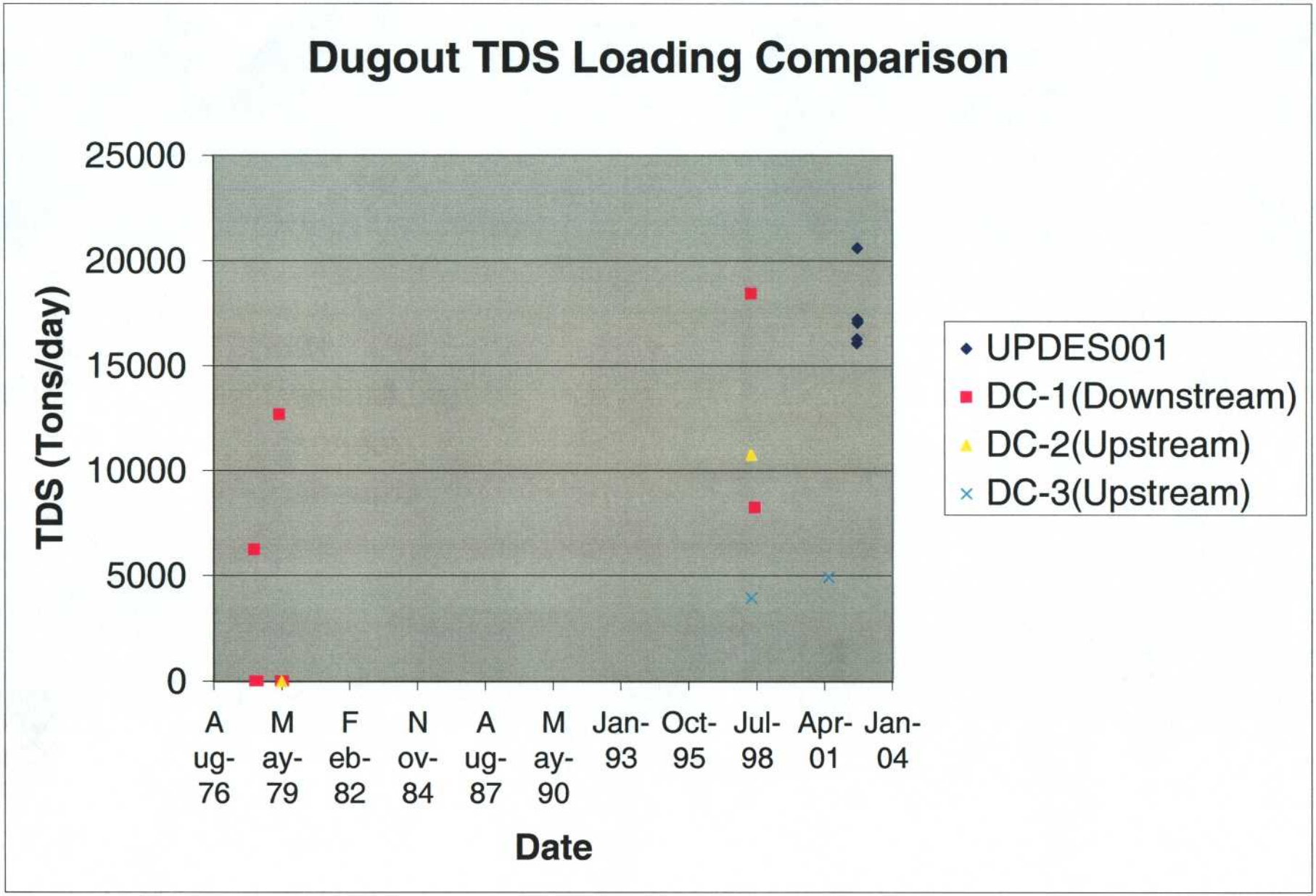
8. Based on your review, what further actions, if any, do you recommend?

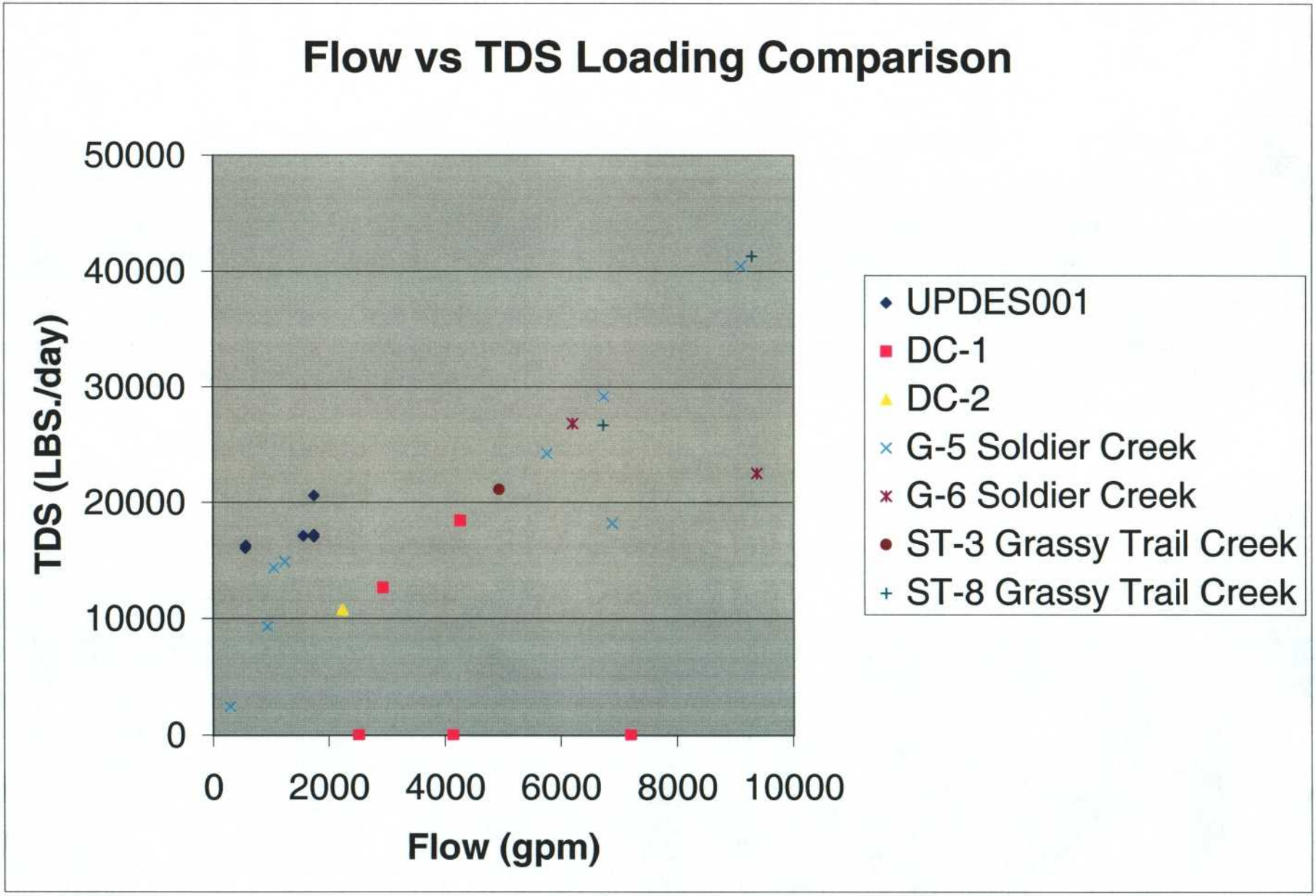
Supplemental information for the 02-2 (2nd) quarter 2002 will be submitted by the end of March 2003. No additional information is required for the 02-2 (2^{nd}) quarter.

MINE	SITE TYPE	SITE NAME	SITE DESCRIP	DATE	Flow GPM	TDS mg/l	T-Fe mg/l	TSS mg/l	LBS./ Day
SOLDIER (	Stream	G-10	(CC-5)	06/12/2001	27.28704	690			226
SOLDIER (	Stream	G-10	(CC-5)	03/07/2001	0.004488	2710			0
SOLDIER (	Stream	G-10	(CC-5)	03/29/2000	0.018	2530			1
SOLDIER (	Stream	G-10	(CC-5)	06/08/1999	3.00696	1520	0.26	6	55
SOLDIER (	Stream	G-10	(CC-5)	03/08/1999	8.44	1340	0.38	<20.	136
SOLDIER (	Stream	G-10	(CC-5)	03/25/1998	23.7864	1540			440
SOLDIER (	Stream	G-5	SOLDIER (	08/22/2002	15	480	14.3		87
SOLDIER (	Stream	G-5	SOLDIER (	06/12/2001	850	370			3779
SOLDIER (	Stream	G-5	SOLDIER (	06/08/1999	1043	420	0.4	30	5262
SOLDIER (	Stream	G-5	SOLDIER (	03/08/1999	1536	560	2.45	112	10336
SOLDIER (	Stream	G-5	SOLDIER (	06/11/1998	5768	350	0.38		24258
SOLDIER (	Stream	G-5	SOLDIER (	03/24/1998	6886	220			18205
SOLDIER (	Stream	G-5	SOLDIER (	05/12/1997	6744	360		310	29174
SOLDIER (	Stream	G-5	SOLDIER (	02/21/1997	942	823		140	9321
SOLDIER (	Stream	G-5	SOLDIER (	05/23/1995	9102	370	0.7	70	40469
SOLDIER (	Stream	G-5	SOLDIER (	02/22/1995	298.0032	690		62	2471
SOLDIER (	Stream	G-5	SOLDIER (	02/27/1992	1051	1136		32	14348
SOLDIER (	Stream	G-5	SOLDIER (	08/21/1991	1243	998		20	14907
SOLDIER (	Stream	G-5	SOLDIER (	02/27/1989	1091	728		<2.	9544
SOLDIER (	Stream	G-5	SOLDIER (	11/11/1987	1086	606		26	7909
SOLDIER (	Stream	G-6	(proposed	06/08/1999	1224.461	380	0.34	24	5591
SOLDIER (	Stream	G-6	(proposed	03/08/1999	1104.452	490	0.97	158	6503
SOLDIER (	Stream	G-6	(proposed	08/10/1998	1150.633	410	0.16		5669
SOLDIER (	Stream	G-6	(proposed	06/11/1998	6202.865	360	0.44		26834
SOLDIER (	Stream	G-6	(proposed	03/24/1998	9375.432	200			22533
SOLDIER (	Stream	G-6	(proposed	08/06/1997	933.504	380	0.91	40	4263
WEST RID	Stream	ST-3	Grassy Tra	05/22/2001	4936.8	356	1.6		21120
WEST RID	Stream	ST-3	Grassy Tra	07/28/1998	987.36				0
WEST RID	Stream	ST-3	Grassy Tra	06/22/1998	1974.72	363	0.4	26	8614
WEST RID	Stream	ST-3	Grassy Tra	05/19/1998	17952				0
WEST RID	Stream	ST-3	Grassy Tra	04/28/1998	1705.44	355	1	48	7275
WEST RID	Stream	ST-3	Grassy Tra	06/25/1997	942.48	360	0.6	53	4077
WEST RID	Stream	ST-3	Grassy Tra	05/05/1997	2064.48	350	4.2	209	8683
WEST RID	Stream	ST-5	B & C Can	11/11/2002		216	64.1	4084	0
WEST RID	Stream	ST-5	B & C Can	08/21/2002		1121	344.5	58240	0
WEST RID	Stream	ST-5	B & C Can	07/17/2001	0.5	880	259	16831	5
WEST RID	Stream	ST-5	B & C Can	07/17/2001	0.5	840	405.4	28007	5
WEST RID	Stream	ST-5	B & C Can	07/15/2001		774	447.5	27896	0
WEST RID	Stream	ST-5	B & C Can	07/15/2001	0.5	542	477.1	39648	3
WEST RID	Stream	ST-5	B & C Can	06/27/2001		674	404.4	20776	0
WEST RID	Stream	ST-5	B & C Can	06/27/2001		546	441.3	25720	0
WEST RID	Stream	ST-5	B & C Can	05/30/2001		1046	92	4088	0
WEST RID	Stream	ST-5	B & C Can	05/30/2001		1142	271	10456	0
WEST RID	Stream	ST-5	B & C Can	05/30/2001		1030	210	9484	0
WEST RID	Stream	ST-5	B & C Can	09/03/1999		526	107	5540	0
WEST RID	Stream	ST-5	B & C Can	09/03/1999		446	105	6460	0
WEST RID	Stream	ST-5	B & C Can	09/03/1999		360	110	7020	0
WEST RID	Stream	ST-5	B & C Can	09/03/1999		450	155	10320	0
WEST RID	Stream	ST-5	B & C Can	08/12/1999		484	338	31000	0
WEST RID	Stream	ST-5	B & C Can	08/12/1999		433	498	31300	0
WEST RID	Stream	ST-5	B & C Can	08/12/1999		427	331	42850	0
WEST RID	Stream	ST-5	B & C Can	07/29/1999	15	1293	381	20580	233
WEST RID	Stream	ST-5	B & C Can	07/19/1999		195	446	42790	0
WEST RID	Stream	ST-5	B & C Can	07/19/1999		330	235	12010	0
WEST RID	Stream	ST-5	B & C Can	07/30/1998		448	920	92972	0
WEST RID	Stream	ST-5	B & C Can	07/30/1998		416	228	157624	0
WEST RID	Stream	ST-5	B & C Can	07/30/1998		412	688	54724	0
WEST RID	Stream	ST-5	B & C Can	09/20/1997		350	401	26520	0
WEST RID	Stream	ST-5	B & C Can	09/20/1997		500	233	44880	0

MINE	SITE TYPE	SITE NAME	SITE DESCRIP	DATE	Flow GPM	TDS mg/l	T-Fe mg/l	TSS mg/l	LBS./ Day
WEST RID	Stream	ST-5	B & C Can	06/11/1997		780	236	110856	0
WEST RID	Stream	ST-5	B & C Can	06/11/1997		500	87	66756	0
WEST RID	Stream	ST-5	B & C Can	06/11/1997		160	118	2724	0
WEST RID	Stream	ST-5	B & C Can	06/11/1997		170	169	13520	0
WEST RID	Stream	ST-5	B & C Can	05/21/1997		310	12.1	15552	0
WEST RID	Stream	ST-5	B & C Can	05/21/1997		100	9.7	17776	0
WEST RID	Stream	ST-5	B & C Can	05/21/1997		80	30.4	23916	0
WEST RID	Stream	ST-7	A Canyon I	09/20/1997		260	53	3660	0
WEST RID	Stream	ST-8	Grassy Tra	08/15/2001	1166.88	346	0.2	<5.	4852
WEST RID	Stream	ST-8	Grassy Tra	03/23/2001	2692.8	374	<0.1	<5.	12102
WEST RID	Stream	ST-8	Grassy Tra	05/26/1999	4577.76				0
WEST RID	Stream	ST-8	Grassy Tra	04/22/1999	1974.72				0
WEST RID	Stream	ST-8	Grassy Tra	10/13/1998	1974.72	412	<0.1	<5.	9777
WEST RID	Stream	ST-8	Grassy Tra	07/28/1998	3590.4				0
WEST RID	Stream	ST-8	Grassy Tra	06/22/1998	6732	330	<0.1	13	26696
WEST RID	Stream	ST-8	Grassy Tra	05/19/1998	26928				0
WEST RID	Stream	ST-8	Grassy Tra	04/28/1998	26928	355	0.2	11	114876
WEST RID	Stream	ST-8	Grassy Tra	06/25/1997	9290.16	370	0.1	8	41307
WEST RID	Stream	ST-8	Grassy Tra	05/28/1997	9290.16				0
WEST RID	Stream	ST-8	Grassy Tra	05/05/1997	2199.12	430	<0.1	<5.	11364
Dugout	UPDES001			08/05/2002	555	1352			16067
Dugout	UPDES001			08/08/2002	565	1370			16281
Dugout	UPDES001			08/13/2002	1750	1734			20607
Dugout	UPDES001			08/13/2002	1750	1449			17220
Dugout	UPDES001			08/13/2002	1750	1434			17041
Dugout	UPDES001			08/22/2002	1566	1440			17113
Dugout	Stream	DC-1	(G-11) DU	06/23/1998	1905.605	360	0.08	<5.	8244
Dugout	Stream	DC-1	(G-11) DU	04/27/1998	4263.6	360	3.13	182	18445
Dugout	Stream	DC-1	(G-11) DU	03/30/1998	1632.286			#REF!	
Dugout	Stream	DC-1	(G-11) DU	06/08/1979	2513.28				0
Dugout	Stream	DC-1	(G-11) DU	05/23/1979	7198.752				0
Dugout	Stream	DC-1	(G-11) DU	05/09/1979	4137.936				0
Dugout	Stream	DC-1	(G-11) DU	04/18/1979	2930.664	360	5.06	343	12678
Dugout	Stream	DC-1	(G-11) DU	06/02/1978	2127.312			45	0
Dugout	Stream	DC-1	(G-11) DU	05/25/1978	2800.512			221	0
Dugout	Stream	DC-1	(G-11) DU	04/26/1978	2517.768			3290	0
Dugout	Stream	DC-1	(G-11) DU	04/13/1978	1445.136	360		526	6252
Dugout	Stream	DC-2	(G-12) L FI	04/27/1998	2238.166	400	1.94	126	10758
Dugout	Stream	DC-2	(G-12) L FI	05/23/1979	3231.36				0
Dugout	Stream	DC-3	(G-13) R F	06/13/2001	1237.566	330	0.03	<5.	4908
Dugout	Stream	DC-3	(G-13) R F	04/27/1998	1025.508	320	1.15	92	3944
Dugout	Stream	PC-1A	PACE CRE	04/09/2002	20	430	6.72	80	103


Dugout Canyon Flow Comparison
Flow (GPM)
8000
7000
6000
5000
4000
3000
2000
1000
0
Aug-76
May-79
Feb-82
Nov-84
Aug-87
May-90
Jan-93
Oct-95
Jul-98
Apr-01
Jan-04
Date
UPDES001
DC-1 (Downstream)
DC-2 (Upstream)
DC-3 (Upstream)


Dugout TDS Loading Comparison
TDS (Tons/day)
25000
20000
15000
10000
5000
0
Aug-76
May-79
Feb-82
Nov-84
Aug-87
May-90
Jan-93
Oct-95
Jul-98
Apr-01
Jan-04
Date
UPDES001
DC-1(Downstream)
DC-2(Upstream)
DC-3(Upstream)


Flow vs TDS Loading Comparison
TDS (LBS./day)
50000
40000
30000
20000
10000
0
0
2000
4000
6000
8000
10000
Flow (gpm)
UPDES001
DC-1
DC-2
G-5 Soldier Creek
G-6 Soldier Creek
ST-3 Grassy Trail Creek
ST-8 Grassy Trail Creek

08/05

08/05/2002

08/05/2002

08/05/2002


08/04/2002


08/05/2002