



OGMCOAL DNR <ogmcoal@utah.gov>

Crandall Canyon Mine- Final Reclamation Plan

Steve Christensen <stevechristensen@utah.gov>

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To: Daniel Luke <dLuke@fs.fed.us>, kboyer@fs.fed.us, Wes Sherlock <wsherlock@fs.fed.us>, Arati Umarvadia <aumarvadia@utah.gov>, Dana Dean <danadean@utah.gov>, Daron Haddock <daronhaddock@utah.gov>, darren olsen <dgolsen@fs.fed.us>, David Hibbs <dhibbs@coalsource.com>, Jeff A -FS Jewkes <jjewkes@fs.fed.us>, Jeff Salow <jsalow@fs.fed.us>, "Jeff_McKenzie@blm.gov" <jeff_mckenzie@blm.gov>, Joe Helfrich <JOEHELFRICH@utah.gov>, Justin Eatchel <jeatchel@utah.gov>, Karin Madsen <kmadsen@coalsource.com>, Lynn Sitterud <lynns@emery.utah.gov>, Makeda Trujillo Hanson <makedatrujillo@utah.gov>, Marc Stilson <MARCSTILSON@utah.gov>, Mark Pentecost <bpentecost@fs.fed.us>, PJ Jensen <pjensen@coalsource.com>, Priscilla Burton <priscillaburton@utah.gov>, "ray@co.emery.ut.us" <rayp@emery.utah.gov>, Stephen Falk <sfalk@blm.gov>, "SWRigby@blm.gov" <SWRigby@blm.gov>, OGMCOAL DNR <ogmcoal@utah.gov>

Good morning,

As I indicated at the Crandall Canyon Final Reclamation Plan revision meeting on July 26th, I have drafted meeting minutes (see attached). Additionally, I've provided the sign-in sheet from the meeting and a PDF of the presentation made by Mr. Jensen (Utah American Energy).

At this point, I'd like to solicit comments and feed back from the group on what was presented and discussed. As we explore and weigh the various options and ideas for the final reclamation plan at the mine, it's imperative that we hear from all affected stake-holders. The final reclamation plan is the final stage of mining in that canyon. Whatever form the reclamation plan takes is what the mine site will ultimately look like when the mining activity ends. As such, our goal here is to get to a general consensus/comfort level.

That said, please provide me with your comments and feedback by September 22th, 2017. At that point, I foresee a follow-up meeting to advance the discussion. In your comments, please articulate your preferred option. If another design option or idea came to mind after the meeting, that's fine. Let me know. If there are elements to a final reclamation design that are show stoppers for you or your respective agency, we need to know that as well.

I appreciate everyone's participation at the meeting. If there are others who you feel should be part of this discussion, please let me know.

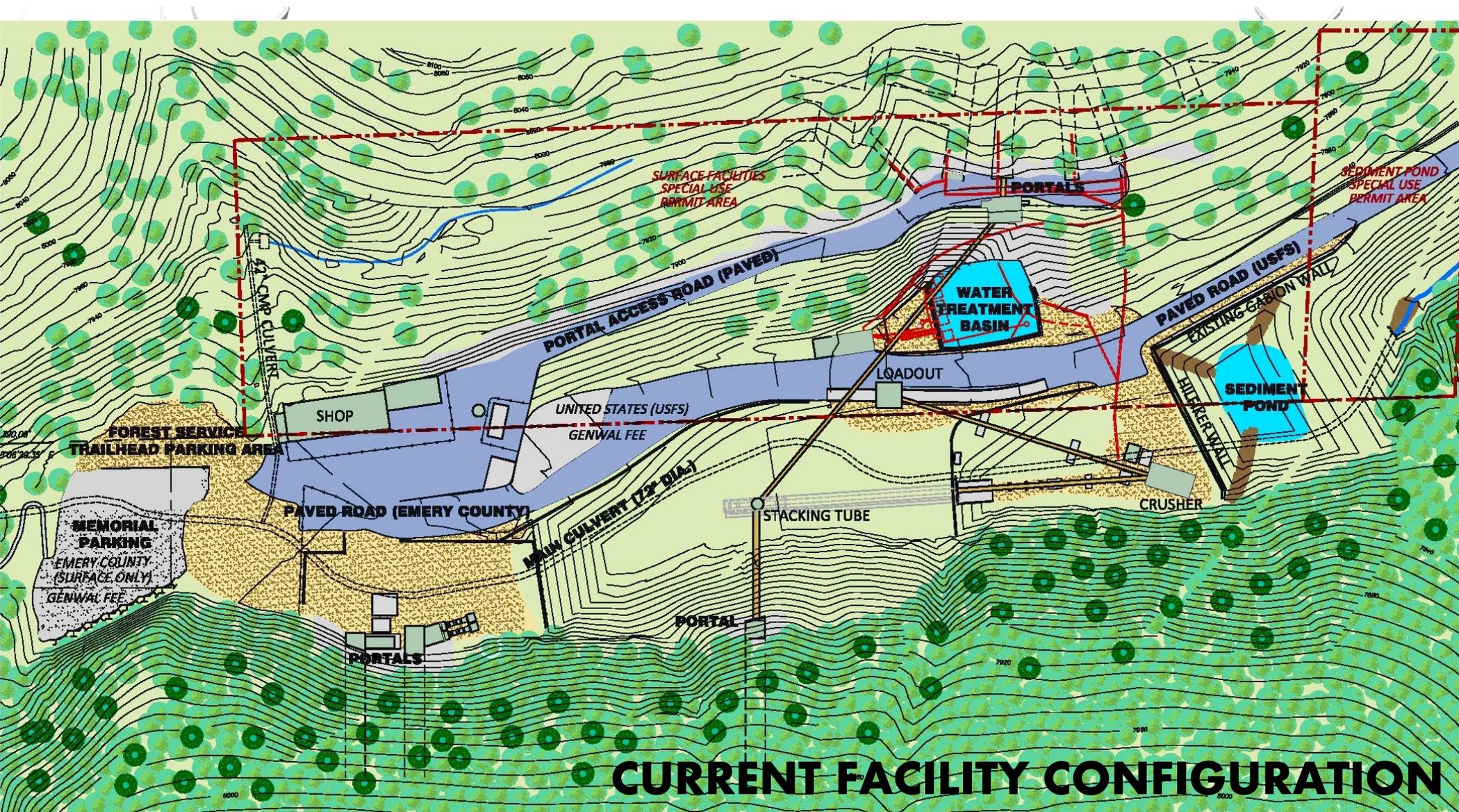
Regards,
Steve

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Steve Christensen
Utah Division of Oil, Gas and Mining
1594 W North Temple, Suite 1210
Salt Lake City, Utah 84116
(801) 538-5350
stevechristensen@utah.gov

3 attachments

-  **Crandall Canyon Reclamation.pdf**
8792K
-  **CrandCyn_ReclPlanMtg_Minutes07262017.pdf**
193K
-  **CrandCyn_ReclPlanMtg_SignInSheet_07262016.pdf**
102K



CURRENT FACILITY CONFIGURATION



07/10/2017

WATER PIPE AND SETTLING POND



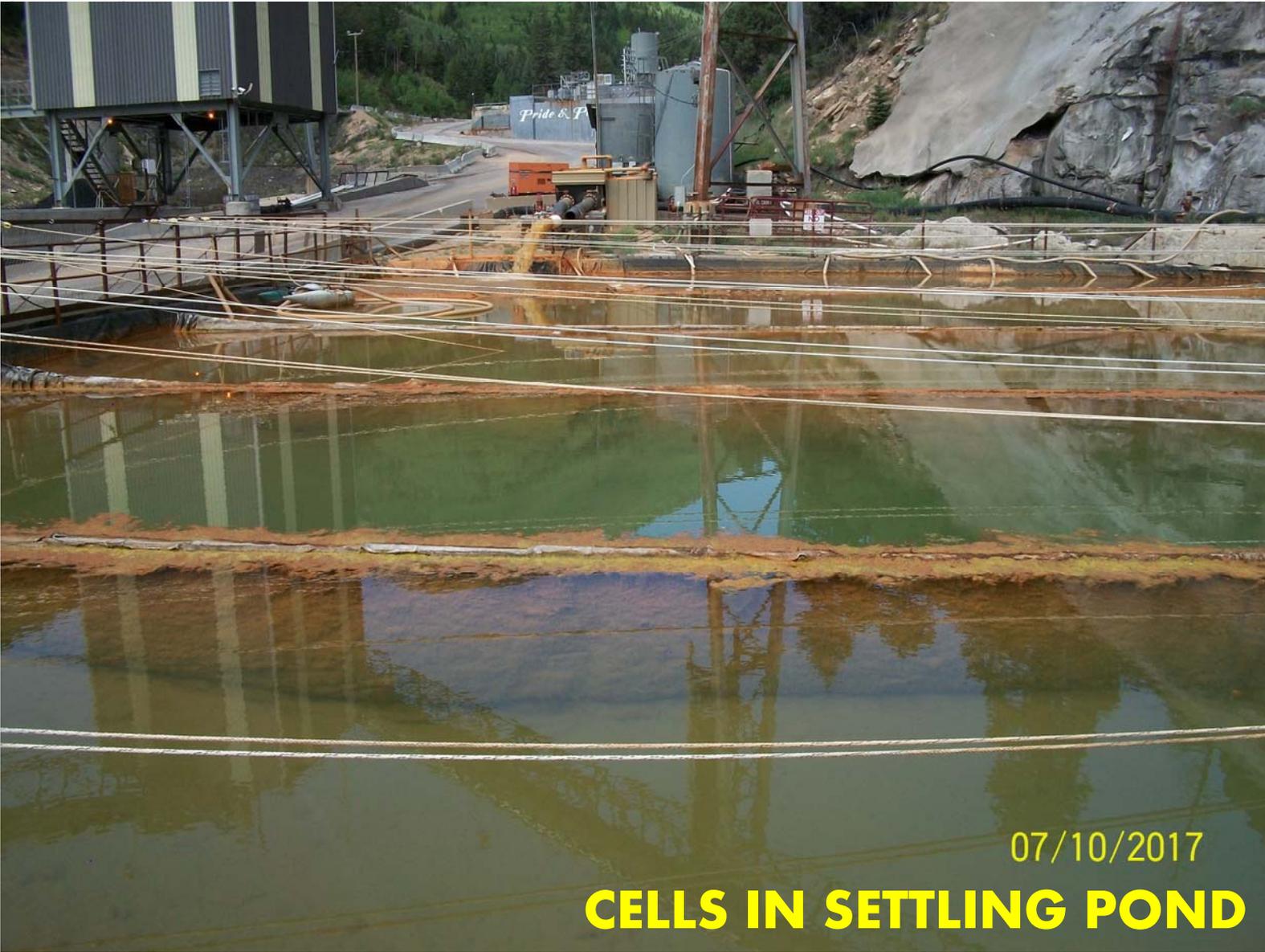
07/10/2017

MAELSTROM UNIT



07/10/2017

WATER DISCHARGE FROM MAELSTROM UNIT



07/10/2017

CELLS IN SETTLING POND

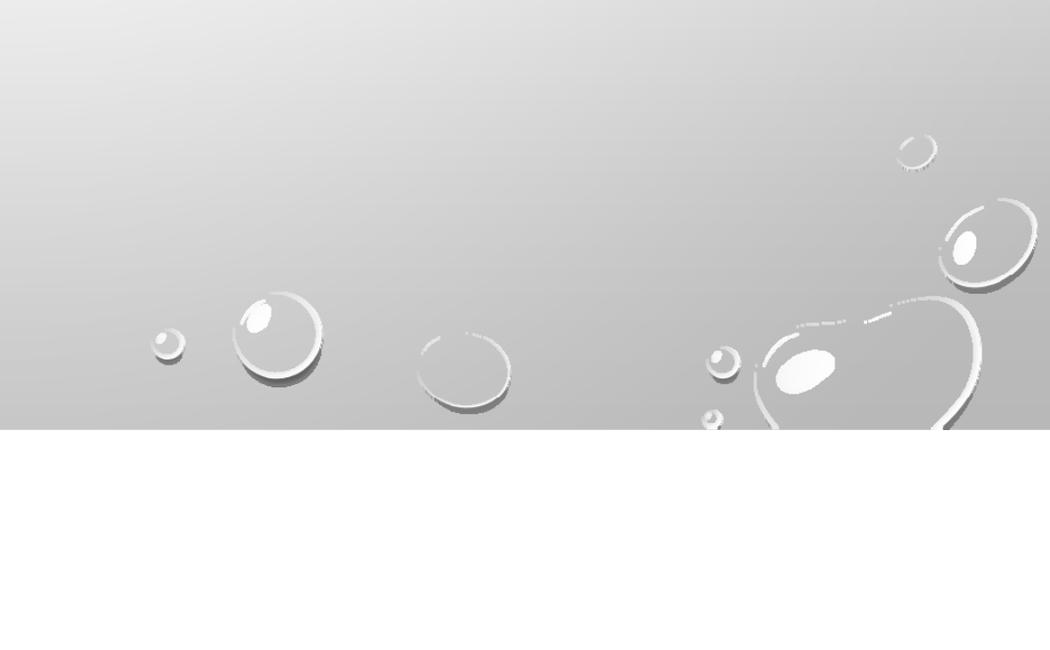


MAIN CULVERT DISCHARGE

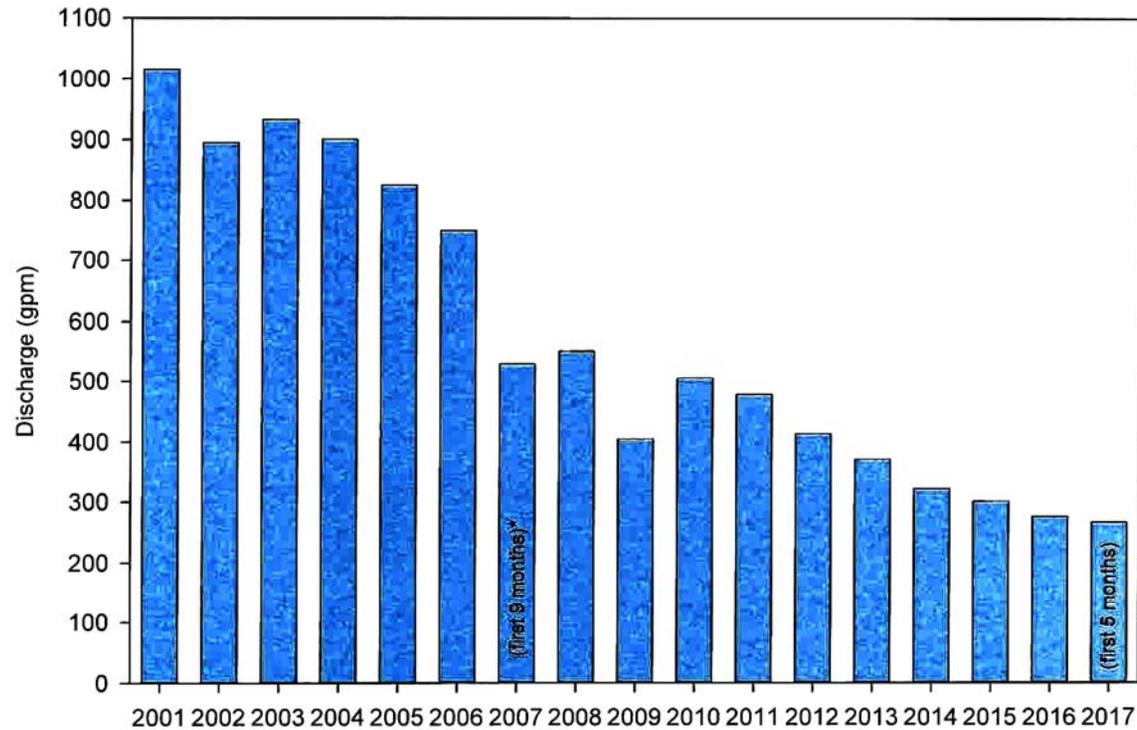


**CRANDALL CANYON MINE WATER
DISCHARGE FLOW AND IRON CONTENT**

➤ *Flow rate gradually slowing*



Crandall Canyon Mine Average yearly mine discharge rate



*The average discharge rate for the first 9 months of 2007 is plotted because during the last 3 months of 2007 the mine pumps had been shut off but gravity discharge of mine water to the surface had not yet occurred.

Figure 5 Average yearly mine water discharge rates for the Crandall Canyon Mine.



CRANDALL CANYON MINE WATER DISCHARGE FLOW AND IRON CONTENT

- *Flow rate gradually slowing*
 - *Suspended iron content decreasing*
- 

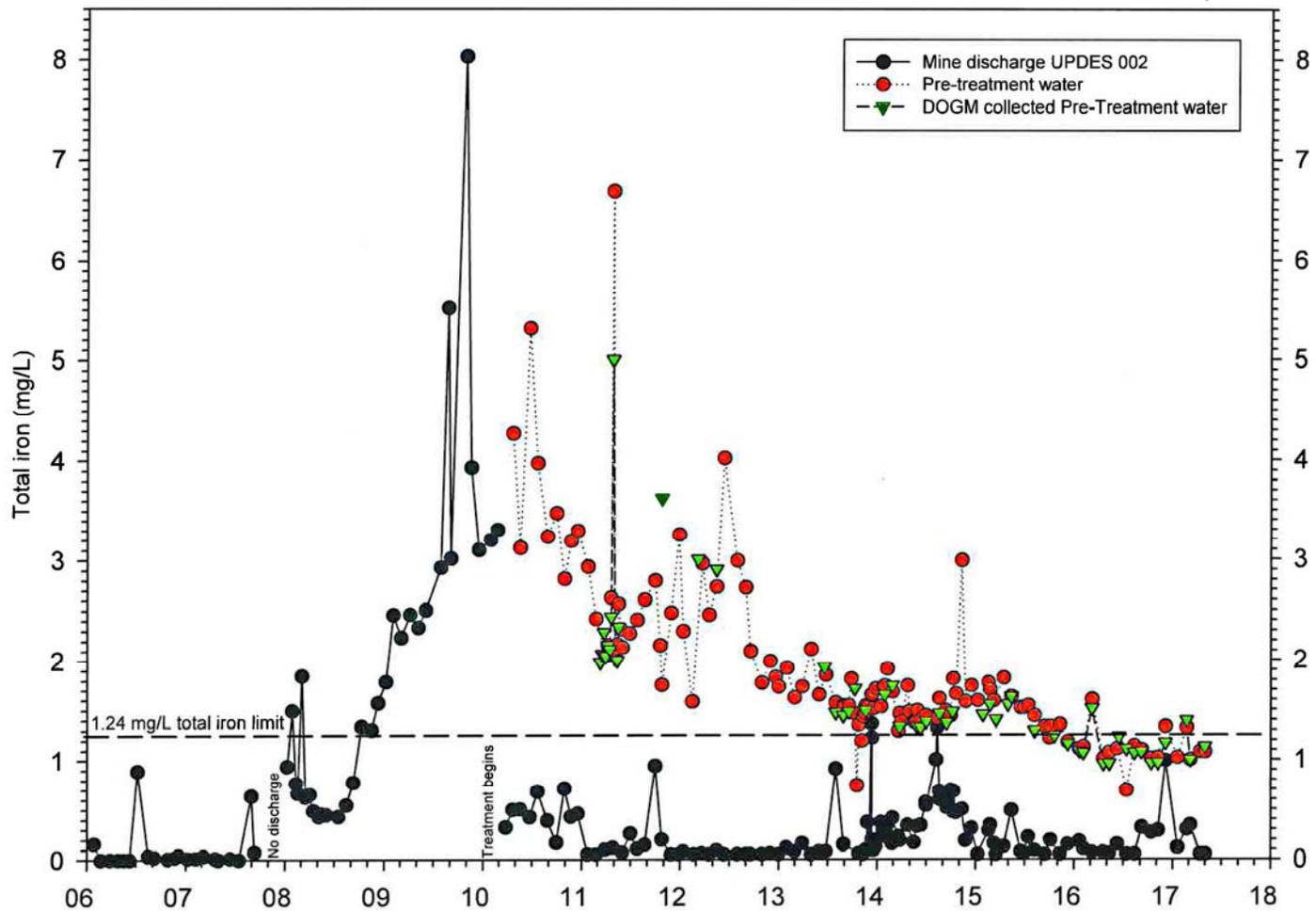


Figure 1 Plots of total iron concentrations in Crandall Canyon Mine discharge water and treated mine discharge water.

CRANDALL CANYON MINE WATER DISCHARGE FLOW AND IRON CONTENT

- *Flow rate gradually slowing*
- *Pre-treatment suspended iron content decreasing*
 - *Pre-treatment iron content projected to fall below the UPDES limit of 1.24 mg/L relatively soon*
 - *This will remove need for water treatment in perpetuity*



***HOW TO MANAGE CONTINUED MINE
WATER DISCHARGE FROM THE CRANDALL
CANYON MINE PORTALS AT FINAL
RECLAMATION OF THE SITE?***

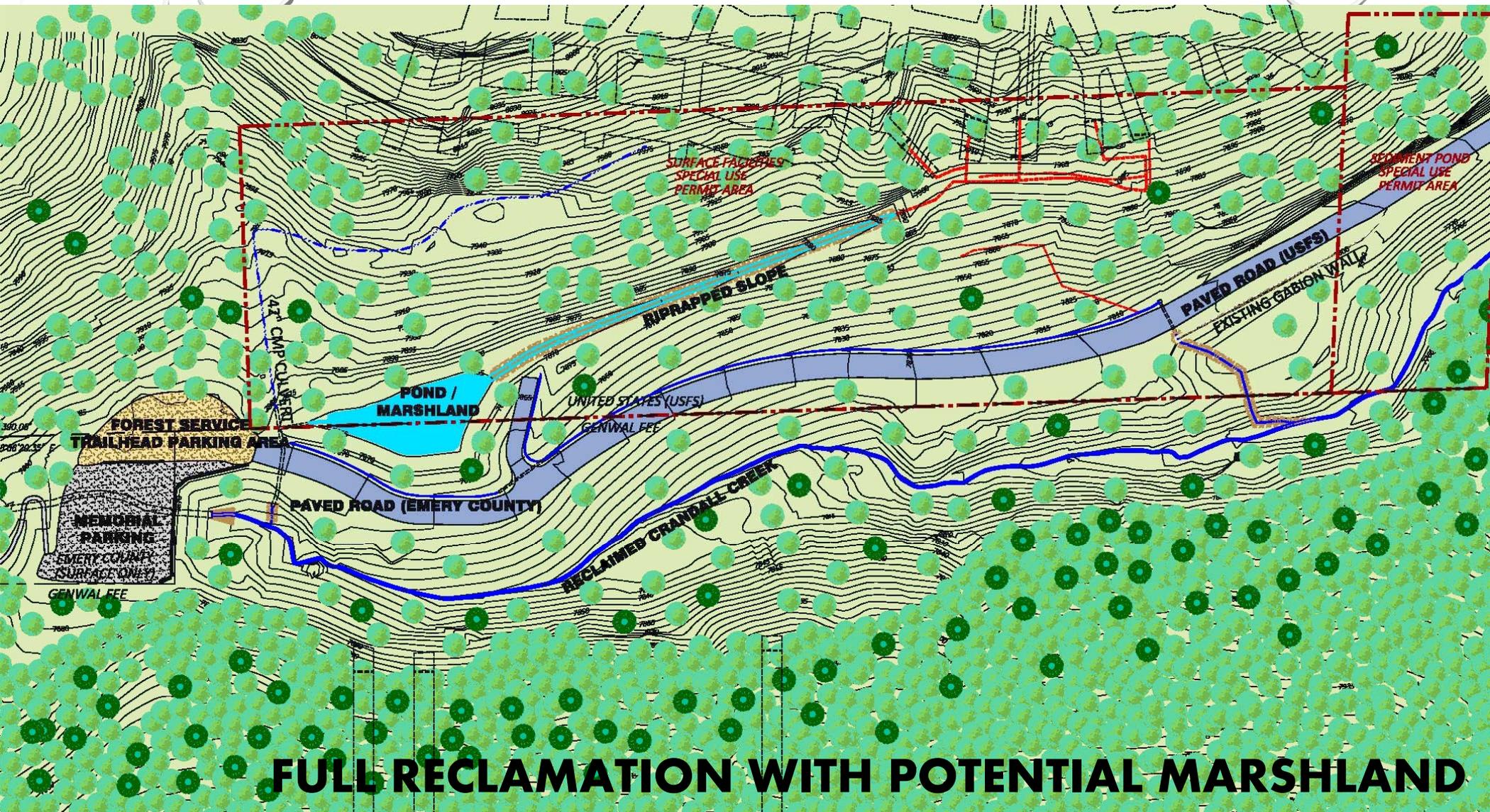
➤ ***Option #1***

➤ ***Discharge directly to Crandall Creek***

➤ ***Option #2***

➤ ***Utilize water to benefit wildlife and for
site beautification***

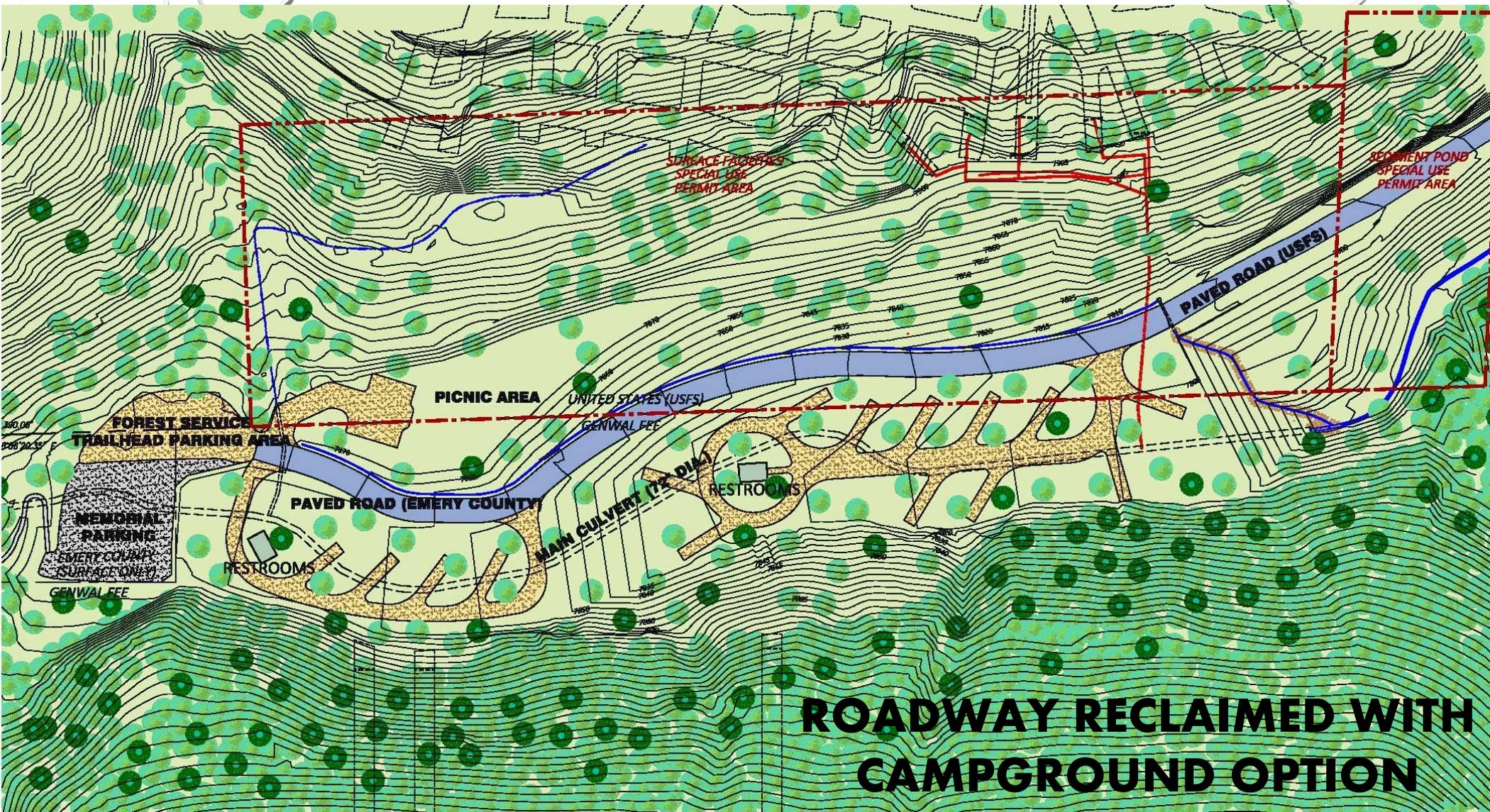




FULL RECLAMATION WITH POTENTIAL MARSHLAND



***POTENTIAL POST-
MINING LAND USE
CHANGE UPON FINAL
RECLAMATION***



**ROADWAY RECLAIMED WITH
CAMPGROUND OPTION**

Crandall Canyon Mine: Final Reclamation Plan Revision- Meeting Minutes
Department of Natural Resources- Price Field Office
July 26th, 2017

On July 26th, 2017, a meeting was held at the Department of Natural Resources Price Field Office to discuss proposed revisions to the final reclamation plan of the Crandall Canyon Mine. The meeting was initiated by the Division of Oil, Gas and Mining (DOG M) in conjunction with the Crandall Canyon Mine staff. Stakeholders from the USDA Forest Service (the Forest), Bureau of Land Management (BLM), Emery County, Utah Division of Water Rights (DWRi) and Utah Division of Wildlife Resources (DWR) were present. The U.S. Fish and Wildlife Service were invited to the meeting, but were unable attend.

The purpose of the meeting was to discuss a revision to the Crandall Canyon Mine's final reclamation plan. The Surface Mining Control and Reclamation Act (SMCRA) require that all coal mines have a final reclamation plan in place that will be initiated upon the termination of coal mining activity. The current SMCRA permit with the Division did not contemplate a mine water discharge. It's generally agreed upon that the mine water currently discharging from the Crandall Canyon Mine portals will continue for some time. As such, the SMCRA permit needs to be revised to account for this mine discharge during the final reclamation phase.

Following introductions of those in attendance, Mr. P.J. Jensen (Utah American Energy) provided a presentation of the history of the Crandall Canyon Mine and the mine water discharge. Mr. Jensen discussed that following the mine tragedy in August of 2007, the mine portals were sealed shortly thereafter. Following the closure of the portals, the mine water began to build up and began to gravity discharge from the portals a few months later. The mine water had elevated concentrations of total iron (T-Fe). The concentrations were not compliant with the mine's Utah Pollutant Discharge Elimination System (UPDES) permit. As a result, a mine water treatment system was designed/constructed and is still being effectively operated to this day. The T-Fe concentrations have dropped significantly since the mine water initially began to discharge. Concentrations as high as 7 parts per million (ppm) were recorded in the 2009-2010 time-frame. Since late 2015, the T-Fe concentrations in the pre-treatment mine water discharge have, in large measure, been in compliance with the UPDES permit limit of 1.24 ppm. It's important to note that one of the underlying assumptions of the revised final reclamation plan for the mine site is that treatment of the mine discharge will not be necessary prior to it reporting to Crandall Creek.

It is also noteworthy that the mine water discharge volume has dropped fairly significantly. During active mining operations, mine water discharges as high as 1,000 gallons per minute (gpm) were noted. In recent years, the mine water discharge appears to have stabilized in the 300 gpm range.

Following the historical/contextual discussion of the mine site and discharge, Mr. Jensen proceeded to lay out 3 potential options for the final reclamation of the Crandall Canyon Mine. They are as follows:

- I. Option 1: Discharge Directly to Crandall Creek- With this option, a buried pipeline would be constructed from the mine portals to Crandall Creek. The mine water would then discharge directly to Crandall Creek. The approximate original contour would be re-established in the area of the highwall cut directly adjacent to the treatment pond. Additionally, the mine portal access road would be reclaimed back to the original contour. The undisturbed by-pass culvert that routes Crandall Creek water from upstream of the mine site would be removed and the stream channel restored. The exception to this would be the upper pad area where a segment of by-pass culvert would need to be retained in order to facilitate the retention of the Crandall Canyon Memorial parking lot.
- II. Option 2: Utilize Mine Water for Wildlife Benefit and Site Beautification- As with Option 1, this final reclamation plan would include the re-establishment of the original contour in the highwall area below the mine portals and the removal of the by-pass culvert (with the exception of the segment required for the parking lot). The access road to the mine portals would be retained. The access road would be altered to allow for the mine water discharge to run down it prior to reporting to a constructed pond/marshland area. The benefits of the pond/marshland area would essentially be three-fold: it would provide a beneficial water source for area wildlife, would function as a finishing/polishing wetland for any potential increases in T-Fe that could occur over time and thirdly it would provide an aesthetic benefit to the site. The mine portal access road would be rip rapped and could be revised to mimic the appearance of a natural drainage.
- III. Option 3: Post-Mining Land Use Change, Camping Area- With this option, the highwall area and mine portal access road would again be reclaimed to their approximate original contour. However the undisturbed culvert that runs the length of the mine site would remain in place with the mine water discharge being routed

to it via a buried culvert. The upper pad areas on the north and south side of the access road would be converted into a camping and picnic area.

- IV. Other Potential Design Considerations- Following Mr. Jensen's presentation, the floor was open for discussion and other potential final reclamation design considerations were discussed. One such design option was the removal of the parking lot area south of the main access road. Currently, this parking area is designated for the Crandall Canyon Memorial. By removing this parking area, the undisturbed by-pass culvert could be removed in its entirety and the pre-mining, natural drainage pattern of Crandall Creek could be restored. It was discussed that by retaining the Crandall Canyon Memorial parking lot, a segment of by-pass culvert must be retained. By retaining this segment of culvert, the pre-mining gradient of Crandall Creek cannot be achieved. Makeda Hanson (Division of Wildlife Resources-DWR) indicated it was likely that DWR's position would be to remove the by-pass culvert in its entirety due to aquatic concerns.

Another design option that was discussed was a potential water fall originating from the mine portal area.

SUMMARY-

At the conclusion of the meeting, Steve Christensen (Division of Oil, Gas and Mining) indicated that he would draft meeting minutes and distribute them to the group. Upon review of the options presented during the meeting, Mr. Christensen discussed how comments/feed-back from the group would be requested from the various agencies and stakeholders. Upon receipt of those comments, a follow up meeting would be conducted.

Crandall Canyon Mine- Final Reclamation Plan Meeting
July 26th, 2017

Name	Organization	E-mail/Contact Info
Steve Christensen	DOGEM	stuechristensen@utah.gov
Joel Heufreich	"	joelheufreich@utah.gov
Arati Umarvadia	DOGEM	aumarvadia@utah.gov
Justin Etchel	DOGEM	jeatchel@utah.gov
Makeda Hanson	DWR	makedatrujillo@utah.gov
Priscilla Burton	DOGEM	priscillaburton@utah.gov
Stephen Falk	BLM - Price	sfalk@blm.gov
Steve Rigby	BLM - Price	swrigby@blm.gov
Daniel Luke	FS - Price	dluke@fs.fed.us
Marc Stilson	Water Rights	marcstilson@utah.gov
Ray Peterson	Emery County	RayP@emery.utah.gov
Lynn Sitterud	Emery County Commission	lynsat@emery.utah.gov
Karl Boyer	USFS	kboyer@fs.fed.us
David Hibbs	UET	dhibbs@coalsource.com
Karin Madsen	UET	kmadsen@coalsource.com
PJ Jensen	UET	pjensen@coalsource.com
Wes Sherlock	USFS	wsherlock@fs.fed.us
Daron Haddock	DOGEM	daronhaddock@utah.gov
phone - Jeff McKenzie	BLM	