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## **GCC ENERGY MINE WATER SUPPLY SAFE YIELD ANALYSIS**

November 16, 2015

### **1. Plan Summary**

Harris Water Engineering, Inc. (HWE) prepared a safe yield analysis report as requested by La Plata County. This report demonstrates the water supply available to GCC Energy, LLC (GCC) based upon their water rights portfolio and facilities.

GCC has been operating the King Coal II Mine (Mine) in Hay Gulch since 2009 and based on that operation it was found that the water demand estimated in 2009 is not adequate for current operations and additional supply is necessary. To provide the additional water, GCC has made arrangements with Huntington Ranches, LLC (Huntington) using Class A shares in the Hay Gulch Ditch (HGD) to supply the additional water through temporary (until the Mine is no longer in operation) dry up of an additional 44 acres.

A water court application was prepared and filed on September 30, 2015; the application is Case No. 2015CW3059. While the permanent water court application is processed, a Substitute Water Supply Plan (SWSP) was prepared and filed on October 11, 2015. The SWSP involves a change of irrigation water to use at the Mine that will be nearly identical to the conversion of the previous 9 acres in Water Court Case No. 2007CW100. There are a few exceptions between the two cases, such as the 44 acres has been historically sprinkler irrigated, water has been provided through the Huntington lateral of the HGD, and the land is further from Hay Gulch requiring analysis of lagged return flows.

As with the Case No. 2007CW100 change of water right, the consumptive use that would have occurred on the dry up land each day will be either conveyed to the Mine for use directly by the Mine or stored in an impoundment structure (pond) on the Huntington property for use at a later time. The consumptive use from the dry up land will be based on either the calculated full supply amount from the modified Blaney-Criddle formula or the available water supply, whichever is less. The change does not involve use of the historic consumptive use but the actual consumptive use that would occur on the dry up land.

The following report describes GCC's water demand, analysis necessary to determine available water supply, and the safe yield available based on GCC's water rights.

### **2. Water Demand**

The Water Court Decree in Case No. 2007CW100 assumed the water demand for the Mine would be approximately 13 acre-feet (AF) per year, based on 20,000 gallons per day with four day work weeks. HWE prepared a report for the Case No. 2007CW100 to describe the technical basis; titled "GCC Energy Mine Demand – November 8, 2010".

The 20,000 gallons per day was estimated based on experience at the King I Mine because the King II Mine was not yet fully developed. The portion of the water used in the mining facility for the primary industrial purpose (i.e. dust suppression), will be fully consumed and the portion used for domestic water will be treated by underground leach field(s) and will be 10% consumed.

The most recent records of water use during current operation of the Mine show an increase in water demand. The water demand for the Mine in 2014 is shown below in Table A when approximately 1 million tons of coal was produced. The water demand increased from an estimated 13 AF per year to the current demand of approximately 30 AF per year. As explained below the additional dry up of 44 acres will provide a significant amount of water estimated to be well above the current demand, in order to satisfy existing demand and serve increased demand.

**TABLE A. GCC ENERGY MINE WATER USAGE FOR 2014**

	<b>HAULED MINE WATER</b>	<b>HUNTINGTON DRY UP LAND</b>	<b>HAULED POTABLE WATER</b>	<b>TOTAL WATER USE</b>	<b>TOTAL TONS MINED</b>
<b>MONTH</b>	<b>(AF)</b>	<b>(AF)</b>	<b>(AF)</b>	<b>(AF)</b>	<b>(AF)</b>
<b>JANUARY</b>	2.67		*	2.67	80,298
<b>FEBRUARY</b>	2.23		*	2.23	84,633
<b>MARCH</b>	2.35		*	2.35	68,341
<b>APRIL</b>	2.31		*	2.31	69,595
<b>MAY</b>		2.29	0.18	2.47	95,147
<b>JUNE</b>		2.04	0.14	2.18	69,034
<b>JULY</b>		2.12	0.2	2.32	85,842
<b>AUGUST</b>		2.27	0.12	2.39	78,778
<b>SEPTEMBER</b>		2.13	0.16	2.29	76,585
<b>OCTOBER</b>	2.49		*	2.49	88,654
<b>NOVEMBER</b>	3.14		*	3.14	95,470
<b>DECEMBER</b>	3.33		0.1	3.43	78,413
<b>TOTAL</b>	<b>18.52</b>	<b>10.85</b>	<b>0.9</b>	<b>30.27</b>	<b>970,790</b>

**\*TOTAL POTABLE GALLONS INCLUDED IN HAULED MINE WATER TOTAL**

The water demand at the Mine is dependent upon a number of factors, including: numbers of days in operation per week, employees on site each day, tons of coal mined daily, and the air moisture content inside the Mine. The Mine is permitted to produce 1.3 million tons of coal per year. Based on 2014 records of usage and production, about 43 percent of the water use is not dependent on amount of production. Whereas 57 percent of the water use has a linear relationship with tons of coal mined. Using these known relationships, the estimated amount of water needed to produce 1.3 million tons of coal per year is 40.52 AF, including water use in the Mine and domestic water use.

Table B below shows the actual water diversion records to GCC from 2011 through 2014 as allowed by the Decree in Case No. 2007CW100.

**TABLE B. GCC WATER DIVERSIONS**

<i>(AF)</i>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>AVERAGE</b>
<b>MAY</b>	2.22	2.37	2.30	2.30
<b>JUNE</b>	2.24	3.47	2.09	2.60
<b>JULY</b>	2.06	2.31	2.36	2.24
<b>AUGUST</b>	2.36	2.49	2.19	2.35
<b>SEPTEMBER</b>	1.39	1.70	1.87	1.65
<b>TOTALS</b>	10.28	12.34	10.81	11.14

### **3. Water Supply**

The Decree in Case No. 07CW100 includes three sources of water: Huntington irrigation dry-up, diversion from the La Plata River for storage, and well water. The Case No. 2015CW3029 source of water is Huntington irrigation dry up. All of the sources require the use of an impoundment structure (pond) on the Huntington property that is able to store water for usage month-to-month and year-to-year. These sources will provide water supply for primarily dust control inside the Mine and at the entrance but also domestic use for the Mine employees. Descriptions for each type of water supply used by the Mine are provided below; these included existing decreed water rights and proposed new water rights.

#### ***3.1 Well Water***

Well water is not currently being used and no wells have been drilled. GCC has no plans at this time to utilize the wells to meet water demands. No potential well water was not included in the safe yield analysis.

#### ***3.2 La Plata River***

Case No. 2007CW100 includes a direct flow diversion from the La Plata River, through the Hay Gulch Ditch for storage in the underground reservoir not to exceed 34.07 AF per year after ditch losses. Diversions from the La Plata under this water right are not considered in the Safe Yield Analysis and is considered a redundant supply for GCC. If water becomes available GCC will divert and store water that is in priority and use as decreed in Case No. 2007CW100.

#### ***3.3 Huntington Irrigation Dry Up***

##### **3.3.1 Historically Irrigated Land**

The 9 acres currently utilized and the 44 acres to be dried up are shown on Figure 1. The 9 acres were historically flooded irrigated. The 9 acres was historically irrigated through the valley segment of HGD and the main HGD segment from the La Plata River to the Huntington Lateral. The 44 acres has been historically irrigated through the Huntington Lateral of the HGD from the La Plata River. The Huntington Lateral changes from open ditch to a pipeline which delivers pressurized water to the 44 acres to sprinkler irrigate the land. The 44 acres are separated from the other Huntington irrigated land. The total land irrigated by Huntington is estimated to be 237 acres.

### 3.3.2 Crop Consumptive Use

Table C below shows the available yield from the 9 and 44 acres of dry up land. The crop consumptive use (CCU) was estimated using the same method as for Case No. 2007CW100. The State of Colorado Crop Consumptive Use model (StateCU) within the CDSS was used to determine the CCU for the dry up lands. The modified Blaney-Criddle method was utilized. The Fort Lewis climate station was selected for temperature and precipitation data because of its similar characteristics to the land in question. The growing season was initially estimated to be May 1 through October 31; however, the model results showed there was no CCU in October which was subsequently removed. The mean temperature for the pasture grass was kept at the standard rate of 45 degrees Fahrenheit. The high elevation crop coefficients determined by the Colorado Water Conservation Board (CWCB) and described in a July 10, 2006 memo to the CWCB Board of Directors were used. Temperature data from 1950 to 2004 was evaluated. Effective precipitation is included in the model results.

The model creates tables detailing each year's CCU and all values needed (e.g. inputs) to run the Blaney-Criddle method and the output for each month. Monthly CCU was determined for each month and year from 1950 to 2004 and the total annual CCU, for one acre of grass is 18.76 inches per year.

**TABLE C. AVAILABLE CCU TO DRY UP LANDS**

<i>(AF)</i>	<b>44 ACRES</b>	<b>9 ACRES</b>	<b>TOTAL</b>
<b>1999</b>	56.38	7.04	63.42
<b>2000</b>	50.27	6.24	56.51
<b>2001</b>	51.69	6.36	58.06
<b>2002</b>	33.20	4.16	37.37
<b>2003</b>	48.22	6.08	54.30
<b>2004</b>	41.22	5.14	46.36
<b>2005</b>	47.74	5.86	53.60
<b>2006</b>	43.24	5.43	48.67
<b>2007</b>	42.41	5.32	47.74
<b>2008</b>	43.33	5.38	48.71
<b>2009</b>	40.52	5.05	45.58
<b>2010</b>	51.62	6.35	57.96
<b>2011</b>	49.27	6.05	55.32
<b>2012</b>	44.45	5.49	49.94
<b>2013</b>	50.44	6.29	56.73
<b>2014</b>	49.31	6.22	55.53
<b>AVERAGE</b>	<b>46.46</b>	<b>5.70</b>	<b>51.49</b>

The water supply plan for the Mine is not to transfer the historic consumptive use but to estimate the actual CCU each month based on water availability and that amount is then conveyed to the Mine or stored. Rather than attempt to calculate the CCU each year, the analysis herein uses the average monthly CCU for the past 54 years for easier administration.

### 3.3.3 Dry Up Land as a Portion of Huntington Shares

The HGD has a decreed water right for 10.5 cubic feet per second (cfs), which is the No. 3 priority in the La Plata River. Of the 10.5 cfs, 2.625 cfs is used by the Fort Lewis Research Center. The remaining 7.875 cfs is owned by the HGD Corp. (The Research Center water is not part of the HGD Corporation). The HGD Corporation has allocated 1 cfs per 16 shares; there are 126 shares.

Huntington owns 63 shares of Class A stock (half of the 7.875 cfs of Priority No. 3 in the HGD Corporation), which are used to irrigate a total of 237 acres. Therefore, Huntington's share ownership entitles it to 37.5% (3.94 cfs of the 10.5 cfs) of the No. 3 priority.

The 9 acres dried up in Case No. 2007CW100 is 3.8% of the total acreage of Huntington's irrigated lands while the amount of water allocated to these lands is 1.58% of the Huntington's water supply. The 44 acres to be dried up in this SWSP is 18.6% of the total acreage of Huntington's irrigated lands while the amount of water allocated to these lands is 8.07% of the Huntington's water supply. The combined dry up land is 22.4% of the total acreage.

### 3.3.4 Huntington Share of the HGD

The following summarizes the Huntington share of the HGD.

Hay Gulch Ditch Senior Priority	10.5 cfs
Fort Lewis Research Center	2.625 cfs
Hay Gulch Ditch Corp. (126 shares)	7.875 cfs
Huntington Share of HGD (63 shares)	3.94 cfs
% Huntington Share of HGD Diversions	37.5%
Huntington Irrigation Land	237 acres
Gross Acres No Longer Irrigated	53 acres
Net Dry Up Land for CCU	53 acres
Conveyance Loss HGD to Huntington Lateral	7%
Conveyance Loss HGD along Hay Gulch	30%
Conveyance Loss in Huntington Lateral	3%
9 Acre Dry Up Land Irrigation Efficiency	60%
44 Acre Dry Up Land Irrigation Efficiency	70%
% of Huntington Share Allocated for Dry Up	25.73%
% of Huntington's Share of HGD for Dry Up	9.65% (25.73% times 37.5%)

### 3.3.5 On-Field Irrigation Efficiency and Return Flow

In Case No. 2007CW100, the on-field irrigation efficiency used was 60% which is used by the crop and 40% which flows from the field either surface or subsurface.

The water applied to the 44 acre field has been by sprinkler with an estimated efficiency of 70% which will be used by the crop and 30% will flow from the field; 15% is assumed to be surface runoff while the remaining 15% is assumed to be by subsurface given the distance to Hay Gulch and other surrounding drainages. The surface return flow volumes will be released to Hay Gulch. The historic subsurface return flow volumes will be replaced through construction of an underground infiltration gallery at the north edge of the 44 acre field to mimic historic return flows. The drainage field is sized for the maximum daily amount of return flows.

### 3.3.6 Conveyance Loss to Dry Up Land

Water is conveyed to the Huntington lands, including the 9 and 44 acres, through diversions into the Hay Gulch Ditch from the La Plata River near Hesperus. The conveyance to the 9 acres of dry up land utilizes 3 segments: (1) the main segment of HGD from the diversion from the La Plata River to the Huntington Lateral; (2) the Huntington Lateral; and (3) the valley segment of the HGD. The conveyance to the 44 acres of dry up land utilizes 2 segments: (1) the main segment of the HGD from the diversion from the La Plata River to Huntington Lateral; and (2) the Huntington Lateral. The conveyance loss through the Huntington Lateral is 3%, and the loss through the main segment to the Huntington Lateral was calculated to be 3% but the water court application is using 7% per the stipulation with other parties in Case No. 2007CW100. The conveyance losses in the main Hay Gulch Ditch and Huntington lateral were field measured for Case No. 2007CW100. The Ditch losses from the HGD Valley segment are 30% for the existing conditions and provide more return flow to downstream users.

### 3.3.7 Net La Plata River Diversion to Serve Dry Up Land

The following table summarizes the amount of water needed from the La Plata River diversion to provide a full water supply to the dry up lands and allow for on-field and conveyance losses. The amounts shown are the maximum and may be reduced if the La Plata River diversions do not provide a full supply.

Table D provides the maximum dry up land consumptive use and losses for the existing 9 acres of dry up; Table E describes these same consumptive use and losses for the additional 44 acres. The columns in Table D and E are described below for AF per month and per day:

- Column (1) – The May through September irrigation months.
- Column (2) – The monthly CCU for a full supply to irrigate the dry up land.
- Column (3) – The amount of water that will not be used by the crop. For the 9 acres all runoff returns to Hay Gulch at the same time and for the 44 acres, runoff returns Hay Gulch with half assumed to be through surface and half through subsurface return to Hay Gulch.
- Column (4) – For the 9 acres, the 30% ditch loss through the HGD valley segment will return to Hay Gulch as it has historically. For the 44 acres, the 3% ditch loss through the Huntington Lateral will return to Hay Gulch as it has historically.
- Column (5) – The 7% ditch loss through the main segment of the HGD from the La Plata River diversion to the Huntington Lateral will return to the La Plata River as it has historically.
- Column (6) – The diversion amount from the La Plata River that is needed to provide a full supply to the dry up 9 and 44 acres.

**TABLE D. 9 ACRES  
MAXIMUM DRY UP LAND CONSUMPTIVE USE AND LOSSES**

	<b>Bl-Cr Crop CU Dry Up 9 Acres (AF/Month)</b>	<b>Sprinkler On- Field Loss 40% (AF/Month)</b>	<b>Huntington Lateral Loss 30% (AF/Month)</b>	<b>La Plata HGD Loss 7% (AF/Month)</b>	<b>Full Supply La Plata Div. for Dry Up (AF/Month)</b>
(1)	(2)	(3)	(4)	(5)	(6)
<b>May</b>	2.37	1.58	1.69	0.42	6.06
<b>June</b>	3.78	2.52	2.70	0.68	9.68
<b>July</b>	3.47	2.31	2.48	0.62	8.87
<b>August</b>	2.59	1.72	1.85	0.46	6.62
<b>September</b>	1.87	1.25	1.33	0.33	4.78
<b>Totals</b>	<b>14.07</b>	<b>9.38</b>	<b>10.05</b>	<b>2.51</b>	<b>36.01</b>

	<b>Bl-Cr Crop CU Dry Up 44 Acres (AF/Day)</b>	<b>Sprinkler On- Field Loss 40% (AF/Day)</b>	<b>Huntington Lateral Loss 30% (AF/Day)</b>	<b>La Plata HGD Loss 7% (AF/Day)</b>	<b>Full Supply La Plata Div. for Dry Up (AF/Day)</b>
(1)	(2)	(3)	(4)	(5)	(6)
<b>May</b>	0.076	0.051	0.055	0.014	0.195
<b>June</b>	0.126	0.084	0.090	0.023	0.323
<b>July</b>	0.112	0.075	0.080	0.020	0.286
<b>August</b>	0.083	0.055	0.060	0.015	0.213
<b>September</b>	0.062	0.042	0.044	0.011	0.159

**TABLE E. 44 ACRES  
MAXIMUM DRY UP LAND CONSUMPTIVE USE AND LOSSES**

	<b>Bl-Cr Crop CU Dry Up 44 Acres (AF/Month)</b>	<b>Sprinkler On- Field Loss 30% (AF/Month)</b>	<b>Huntington Lateral Loss 3% (AF/Month)</b>	<b>La Plata HGD Loss 7% (AF/Month)</b>	<b>Full Supply La Plata Div. for Dry Up (AF/Month)</b>
(1)	(2)	(3)	(4)	(5)	(6)
<b>May</b>	11.59	4.97	0.51	1.29	18.36
<b>June</b>	18.48	7.93	0.82	2.05	29.29
<b>July</b>	16.94	7.27	0.75	1.88	26.85
<b>August</b>	12.65	5.43	0.56	1.40	20.05
<b>September</b>	9.13	3.92	0.40	1.01	14.47
<b>Totals</b>	<b>68.79</b>	<b>29.50</b>	<b>3.04</b>	<b>7.63</b>	<b>109.01</b>

	<b>Bl-Cr Crop CU Dry Up 44 Acres (AF/Day)</b>	<b>Sprinkler On- Field Loss 30% (AF/Day)</b>	<b>Huntington Lateral Loss 3% (AF/Day)</b>	<b>La Plata HGD Loss 7% (AF/Day)</b>	<b>Full Supply La Plata Div. for Dry Up (AF/Day)</b>
(1)	(2)	(3)	(4)	(5)	(6)
<b>May</b>	0.374	0.160	0.017	0.041	0.592
<b>June</b>	0.616	0.264	0.027	0.068	0.976
<b>July</b>	0.546	0.234	0.024	0.061	0.866
<b>August</b>	0.408	0.175	0.018	0.045	0.646
<b>September</b>	0.304	0.131	0.013	0.034	0.482

In order to meet the Mine's water demand, 25.73% of Huntington's shares in the HGD will be used for irrigation of the dry up land.

An impoundment structure (pond) is necessary to store water in months and years there is excess water from the dry up land CCU for times when there is a reduced or no CCU water supply. The pond will be utilized to provide GCC's water supply during the non-irrigation season.

### 3.3.8 Evaporation

The Huntington Pond is proposed to have an estimated surface area of 3.33 acres and a total volume of up to 50 AF. The Huntington Pond will experience year around evaporation based on NOAA estimate of 43 inches (NOAA Technical Report NWS 33). See Table F below for the monthly distribution. The yearly evaporation losses are expected to be upwards of 12 AF with more evaporation occurring in the summer months than any other time of year.

**TABLE F. MONTHLY EVAPORATION LOSSES**

<b>MONTH</b>	<b>INCHES</b>	<b>FEET</b>
<b>JANUARY</b>	0.45	0.04
<b>FEBRUARY</b>	1.30	0.11
<b>MARCH</b>	2.60	0.22
<b>APRIL</b>	3.89	0.32
<b>MAY</b>	5.40	0.45
<b>JUNE</b>	6.65	0.55
<b>JULY</b>	6.85	0.57
<b>AUGUST</b>	5.60	0.47
<b>SEPTEMBER</b>	4.75	0.40
<b>OCTOBER</b>	3.23	0.27
<b>NOVEMBER</b>	1.70	0.14
<b>DECEMBER</b>	0.65	0.05
<b>YEARLY</b>	43.07	3.59



GCC received a junior storage right in Case No. 2007CW100 that will divert water from the La Plata River to an underground reservoir in the Mine. However, the reservoir in the Mine is no longer viable and the storage right in Case No. 2007CW100 will be changed to the Huntington Pond. Additional storage amount will be sought in a new application to allow up to 50 AF of storage in the Huntington Pond. Storage in the Pond will be CCU from the dry up lands and water diverted from the La Plata River under the diversion right in Case No. 2007CW100. The water under Case No. 2007CW100 water right is conveyed through an agreement with the HGD Corporation. Physically the water will be conveyed through the HGD and Huntington Lateral to the Huntington Pond for storage.

#### **4. Facilities to Convey the Water Supplies to the Mine**

GCC has extended the Huntington Lateral pipeline to the Mine. The pipeline is gravity pressurized. Turnouts have been installed in the pipeline to: (1) release water to Hay Gulch for irrigation return flows; (2) release water to an infiltration gallery for subsurface irrigation return flows. The pipeline is 6 inch diameter. Surface and subsurface return flows associated the 9 acres and surface return flows associated with the 44 acres, will be released to Hay Gulch in the same manner and location as decreed in Case No. 2007CW100. Subsurface return flows associated with the 44 acres will be delivered to the infiltration gallery on the edge of the 44 dry up land.

The pipeline delivers water into a 100,000 gallon steel covered tank (Tank) where the water volumes are also measured. Water immediately needed for the Mine's operations is pumped from the Tank. If the available water supply is greater than the Mine's immediate demand, the water will be stored in the Huntington Pond for future use. If the water supply through the pipeline is not adequate, water previously stored in the Huntington Pond will be conveyed into the Tank via the pipeline delivery system.

The Huntington Pond constructed at the inlet to the pipeline to Huntington irrigated land and the Mine is an important component of the water supply plan in order to store the CCU from the dry up land during the irrigation season that is not immediately needed. The Tank is the central facility at the Mine with all water going through the Tank for dust control and/or treatment for domestic use. The Tank is an enclosed structure where no evaporation occurs.

Measurement devices are located throughout the water distribution system for current operations and administration. In addition to those, another meter will be installed on the pipeline that delivers the subsurface return flows to the infiltration gallery.

#### **Safe Yield Analysis**

A simulation from 1999 through 2014 using the Huntington Pond and the dry up water was developed to estimate the available water and is shown on Table 1. The simulation includes actual Division of Water Resources (DWR) diversion data for HGD, GCC demand estimates, information approved in the Case No. 2007CW100, and information in GCC's 2016 SWSP application. Table 1 estimates the available water for the total 53 acres of dry up land. Column descriptions are provided for Table 1 at the end of the table.

The volume of water delivered to GCC's existing raw water storage tank (100,000 gallons) or stored each day from the dry up land will be limited by available CCU shown in Table C or the actual diversion from the La Plata River into the HGD, whichever is less. The releases to compensate for return flows and conveyance losses will be administered in a similar manner. Determination of the amount of water that can be delivered to the Mine and the amount to be released to Hay Gulch is described below. The safe yield of the available water supply is not based on diverting the historic CCU every month, but is based on the actual monthly CCU for the dry up land based on water availability. If the 25.73% of the actual HGD diversions would not provide a full water supply, the water delivery to the Mine will be reduced.

Column 9 in Table 1, shows the amount of water needed to be diverted from the La Plata River each day or month (day/month) to provide a full irrigation supply to the dry up land. If 9.65% of the total HGD diversion each day/month is equal to, or more than Column 9 then:

- (1) the total amount in Column 4 can be delivered to the Mine, and
- (2) the total surface runoff amount in Column 12 will be released to Hay Gulch from the pipeline,
- (3) and the total subsurface amount in Column 13 will be released into the underground infiltration gallery.

If 9.65% the HGD diversion each day/month is less than the amount shown in Column 9 then:

- (1) the total amount delivered to the Mine will be reduced proportionally based on the actual 9.65% of the HGD diversion divided by the amount in Column 9 for the appropriate month, and
- (2) the total surface and subsurface return flow amounts released to Hay Gulch or to the infiltration gallery will be reduced by the same proportion as the water to the Mine is reduced.

The administration for the proposed Case No. 2015CW3029 will be the same administration as in Case 2007CW100; it will be on a daily basis with monthly adjustments if needed. Please see the attached Safe Yield Analysis in Tables 1, 2, and 3 along with their column descriptions.

#### **Safe Yield Analysis Conclusion**

Table 1 provides the Safe Yield Analysis for the total acreage of dry up land (53 acres) to meet the demand for producing 1.3 million tons of coal per year. The following are inputs to the analysis: actual Division of Water Resources (DWR) diversion data for HGD, GCC demand estimates, information approved in the Case No. 2007CW100, and information in GCC's 2016 SWSP application. For the maximum 1.3 million tons per year, the pond's capacity is 100% utilized (e.g. April of 2010 where the pond is emptied on the 30<sup>th</sup> and begins to fill again on May 1, 2010). For current operations of 1 million tons per year, the supply exceeds the demand (this analysis is not included but available on request).



## 53 Acres of Dry Up Land Safe Yield Analysis Column Descriptions

	<i>Column Name</i>	<i>Descriptions</i>
12a	Unlagged Releases to the Creek (AF)	Amount of water released to Hay Gulch stream channel is 50% of the maximum amount in column 5a if there is full CCU, if not a proportional reduction is done the same way as in column 10a
12b	Unlagged Releases to the Creek (AF)	Amount of water released to Hay Gulch stream channel is the maximum amount of the of sum of columns 5b and 6b if there is full CCU, if not a proportional reduction is done the same way as in column 10b
13	Releases to the Infiltration Gallery (AF) (44 acres)	Amount of water released to the infiltration gallery is 50% of the maximum amount in column 5a if there is full CCU, if not a proportional reduction the same as in column 10a
15a	Available CCU Water to GCC (AF)	Equal to column 10a; its is the total CCU to dry up lands determined by the available water supply and reduce proportionally from the maximum when necessary
15b	Available CCU Water to GCC (AF)	Equal to column 10b; its is the total CCU to dry up lands determined by the available water supply and reduce proportionally from the maximum when necessary
16a	On-Field Losses	Equal to column 16a; it is the total on-field losses determined by the available water supply and reduce proportionally from the maximum when necessary
16b	On-Field Losses	Equal to column 16b; it is the total on-field losses determined by the available water supply and reduce proportionally from the maximum when necessary
17	HGD Valley Seg. Losses (AF)	Equal to column 6b; the HGD Valley segment losses determined by the available water supply and reduce proportionally from the maximum when necessary
19	Total Inflow	The sum of columns 15a, 15b, 16, 17, and 18; total inflow into the pond
20	GCC Water Demand (AF)	Monthly water demand at the Mine
21	Evaporation Loss (AF)	The monthly evaporation losses; based on a surface area of 4 acres; Refer to Table F
22a	Releases to the Creek (AF)	Equal to column 16a divided by 2; monthly releases to the creek
22b	Releases to the Creek (AF)	Equal to the sums of column 17 and column 16b; monthly releases to the creek
23	Releases to the Infiltration Gallery (AF)	Equal to column 16a divided by 2; monthly release to the infiltration gallery
24	Total Outflow	Equal to the sum of columns 20, 21, 22a, 22c, and 23
25	Huntington Pond EOM Content (AF)	The end of month content of the pond







