ADDENDUM TO AMENDED AND RESTATED AGREEMENT FOR THE PURCHASE OF WATER

THIS ADDENDUM TO AMENDED AND RESTATED AGREEMENT FOR THE PURCHASE OF WATER, hereinafter called the "Addendum," is made and entered into on the dates set forth below, by and between Colorado Springs Utilities, an enterprise of the City of Colorado Springs, a Colorado home-rule city and municipal corporation, hereinafter called "UTILITIES," and the Cripple Creek and Victor Gold Mining Company, hereinafter called "CC&V."

RECITALS

A. UTILITIES and CC&V entered into an Amended and Restated Agreement for the Purchase of Water dated May 31, 2000, hereinafter called the "Agreement," under which UTILITIES sells CC&V 300 acre feet with an option for up to 600 acre feet of water annually that CC&V uses for CC&V's Cresson Mine located in Teller County, CO.

B. The term of the Agreement expired on April 30, 2015.

C. Paragraph 1 of the Agreement provides that the Agreement "may be renewed for a period of 10 years upon the mutual agreement of the parties with the approval of [Utilities] Utilities Board."

D. UTILITIES desires to renew the term of the Agreement in order to continue selling water to CC&V.

E. CC&V desires to renew the term of the Agreement in order to continue purchasing water from UTILITIES and to secure a source of supply for the renewal term of the Agreement.

F. UTILITIES and CC&V desire to renew the term of the Agreement for a period of 10 years that begins on May 1, 2015 and expires on April 30, 2025.

G. UTILITIES and CC&V have determined that renewal of the term of the Agreement for a period of 10 years that begins on May 1, 2015 and expires on April 30, 2025 through this Addendum is in their respective best interests.

H. By Resolution 15-06, the Utilities Board of Colorado Springs Utilities approved the renewal of the term of the Agreement for the period of May 1, 2015 through April 30, 2025.

NOW, THEREFORE, FOR $10 AND OTHER GOOD AND VALUABLE CONSIDERATION, INCLUDING THE FOREGOING REPRESENTATIONS, THE RECEIPT AND BENEFIT OF WHICH ARE HEREBY ACKNOWLEDGED, IT IS AGREED AS FOLLOWS:

1. The term of the Agreement is extended for the 10 year period of May 1, 2015 through April 30, 2025.

2. Except to the extent as amended hereby, all other terms of the Agreement shall remain the same and are hereby ratified and affirmed by the parties.

3. In the event of a conflict between the Agreement and this Addendum, the terms and conditions of this Addendum shall prevail.

IN WITNESS WHEREOF, the parties hereto have executed this Addendum on the dates set forth below.

COLORADO SPRINGS UTILITIES

By: _____

Name: Jerry Forte

Title: Chief Executive Officer

Date: 6/1/2015

Approved as to form: _____

CRIPPLE CREEK AND VICTOR GOLD MINING COMPANY

By: AngloGold Ashanti (Colorado) Corp., a Delaware corporation, ~~its Manager~~

By: _____

Name: Lowe Billingsley

Title: Vice President & General Manager

Date: May 29, 2015

Attest: _____

Meghan Martelon

ORIGINAL Copy

RESOLUTION No. 2010.11.18.01

CITY OF VICTOR

A RESOLUTION APPROVING AN AMENDMENT TO AGREEMENTS FOR WATER BETWEEN THE CITY OF VICTOR AND THE CRIPPLE CREEK & VICTOR GOLD MINING COMPANY

WHEREAS, the City of Victor (the "City") and the Cripple Creek & Victor Gold Mining Company ("CC&V") desire to amend their agreements relating to the price of delivery of water by the City to CC&V.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF VICTOR, COLORADO, THAT:

1. The agreement attached hereto as **Exhibit A** is hereby approved and the Mayor is authorized to execute the same.

ADOPTED at Victor, Colorado, this 18th day of November, 2010.

Byron L. Hakes, Jr., Mayor

ATTEST:

Sandy Honeycutt, City Clerk

APPROVED AS TO FORM:

Jefferson H. Parker, City Attorney

AMENDMENT TO AGREEMENTS FOR WATER

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CRIPPLE CREEK & VICTOR GOLD MINING COMPANY, whose address is 100 N. 3rd Street, Victor, Colorado 80860 (hereinafter "CC&V");

and

THE CITY OF VICTOR, whose address is 500 Victor Avenue, Post Office Box 86, Victor, Colorado 80860 (hereinafter "The City") agree as follows:

WHEREAS, there are several applications and agreements extant between the parties with regards to the sale and purchase of water, to include

- Application for Use of Water dated 14 June 1999 (7 pages)
- Amendment dated June 8, 2006 (3 pages)
- Operating and Maintenance Agreement dated August 1, 1999 (7 pages plus exhibits)
- Supplemental Water Supply Agreement dated November 20, 2003 (signed on or about February 17, 2004) regarding the purchase of water from the City of Cripple Creek, and
- Amendments and Additions to Agreements for Water dated TBS (TBD pages);

WHEREAS, the City of Cripple Creek (hereinafter "Cripple Creek") has previously entered into an agreement with the City wherein Cripple Creek provides the City with up to 172 acre feet of water, primarily by and through a pipeline and well field located in Gillette (the "Victor Agreement"), and the parties have subsequently amended the Victor Agreement; and

WHEREAS, CC&V has a requirement for additional water supplies for its operation of the Cresson Mine and Cripple Creek is the owner certain of water rights and water facilities that will enable it to sell and deliver water to CC&V for use at the Cresson Mine, and CC&V and Cripple Creek have entered into an agreement for the purchase of additional water.

AGREEMENT

NOW, THEREFORE, in consideration of the mutual covenants and agreements contained herein, The City and CC&V agree as follows:

1. Acre Foot Charge. The price for all water delivered by Victor to CC&V under all of the agreements in CY 2010, after the August 6, 2010 Third Amendment to Water Purchase Agreement between the City and Cripple Creek, shall be $700.00 per acre foot. Payment annually for the 172 acre feet of water under the Victor Agreement shall be made in twelve (12) equal monthly payments, regardless of delivery schedule. For all other water delivered to CC&V, the City will provide CC&V with a monthly invoice and payment shall be due and payable 30 days after the date of the invoice. The base rate, starting with $700 in CY 2010, shall be adjusted upward by 3.5% each year to reflect any increase in the fair market value of the water and costs to provide the legal and physical supply of water. In addition to the adjusted

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annual base rate, a premium may be paid which shall be determined on the basis of the annual average Price of Gold, per ounce, as defined below, for the immediately preceding calendar year. When the annual average Price of Gold for the preceding year is in the range set forth in the left hand column of the table below, a premium shall be paid, in addition to the base rate, for each acre foot of water leased in the following year:

Price of Gold (U.S.$)	Adjustment
0-1,200.00	0%
1,200.01 - 1,399.99	1.5%
1,400.00 - 1,599.99	3.5%
1,600.00 - 1,799.99	5.5%
1,800.00 - 1,999.99	6.5%
2,00.00 - 2,199.99	8.5%
2,200.00 and above	11.5%

By way of example, in year three of this amendment, the base rate for the delivery of water will be $749.86 (i.e. $700 x 1.035 x 1.035). If the annual average Price of Gold as defined herein for year two of the amendment is between $1200.01 and $1,399.99, the actual rate paid per acre foot in year three will be $761.11 (i.e. $749.86 x 1.015). The term "Price of Gold" shall mean the average of the daily London gold Quotations (aka "P.M. Fix") as published in *The Wall Street Journal* and at www.kitco.com for one troy ounce of refined gold stated in United States dollars. If the London Final Gold Quotation should cease to be published, the Parties shall agree upon a replacement quotation that most nearly approximates the London Final Gold Quotation to be used as a substitute. The water rate shall be adjusted annually as of the meter reading dates immediately after January 1st of each calendar year. In no instance, during the term of this agreement, shall CC&V be required to pay more than $1200 per acre feet for water leased from the City.

2. Take or Pay. CC&V shall pay for 172 acre feet of water annually whether or not it takes any water under this amendment. In the event the City is unable to deliver in whole or in part the purchase amount under this Take or Pay provisions due to physical, legal, or administrative limitations, CC&V shall not be responsible for payment for that portion not delivered.

3. Points of Delivery. The water to be delivered to CC&V by virtue of the agreement between Victor and the City of Cripple Creek will be primarily from Cripple Creek's municipal water transmission line from Reservoir No. 2 at or near the intersection of such transmission line with the West Fork of West Beaver Creek, however, CC&V agrees to accept water delivered at an alternate point of delivery to the extent practicable, including but not limited to Gillette Well No. 5, as may be necessary for the maximum beneficial use of Cripple Creek's water system and water rights, upon reasonable advance notice by Cripple Creek. Any decision to deliver water out of Gillette Well No. 5 must be approved, in advance, by CC&V, which approval will not be unreasonably withheld.

4. Bison Reservoir. In order to allow CC&V to better manage and plan its water needs and usage, the parties agree that Bison Reservoir may be used by CC&V for the storage and release of water, in coordination with the City. For the purposes of this agreement, "storage

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and release" may include either: (a) a physical capture, storage and release of water in Bison reservoir or (b) an administrative transfer of water that may include the taking of water from Reservoir #2. Regardless, at no time may the physical use of Bison for storage and release result in the water level in Bison dropping below 50% of the reservoir's capacity. CC&V will develop and deliver to the City annually a plan for Bison Reservoir usage, along with an estimate of CC&V's expected needs (for storage and release) for that year. As part of any plan for Bison Reservoir, CC&V will notify the City in advance of any planned storage or release, and shall work with the City to ensure that CC&V usage does not unreasonably impede or impair use of the reservoir by other City or private entities.

5. Governing Law. This Agreement shall be construed in accordance with the laws of the State of Colorado. Any and all disputes concerning this matter shall be decided in any court of competent jurisdiction for Teller County, Colorado.

6. Severability. Unenforceability of any provision contained in this Agreement shall not effect or impair the validity of any other provision of this Agreement, so long as the primary purpose(s) of this Agreement are effectuated by the remaining terms.

7. Counterparts. This Agreement may be signed in counterparts.

8. Binding Effect. This Agreement shall be binding upon the parties hereto and their successors and assigns.

9. This Agreement amends the agreements between the City and CC&V recited above to the extent stated herein. All other provisions of those agreements shall remain in effect as written or specifically amended.

IN WITNESS WHEREOF, the authorized representatives of the City of Victor and CC&V have executed this Agreement the day and year first set forth above.

ATTEST:

VICTOR

APPROVED AS TO FORM

ATTEST:

CRIPPLE CREEK & VICTOR GOLD MINING COMPANY, a Joint Venture

Anglo Gold (Colorado) Corp.
Manager

By: Raymond L. DuBois
Title: VP & GM
Nov. 16, 2010

CITY OF VICTOR
APPLICATION FOR USE OF WATER OUTSIDE CORPORATE LIMITS

TO THE CITY COUNCIL OF THE CITY OF VICTOR, COLORADO

Cripple Creek & Victor Gold Mining Company ("Applicant") hereby applies, pursuant to the terms and limitations of the Code and Ordinances of the City of Victor ("City"), as amended from time to time, for water service outside the corporate limits of the City, and respectfully requests that the Council adopt a Resolution approving the following conditions:

1. Service shall be furnished at the City's facilities located at the following points:

    a. At a 3-inch tap at Victor Mine Pump Station in Grassy Valley, more specifically described as the point on the City's raw water transmission line from the City's reservoirs, where Applicant's line taps on, north of Goldfield in Section 16, Township 15 South, Range 69 West, 6th P. M. (this tap will provide raw water); and

    b. At an 9-inch tap near the City's Water Treatment Plant near the top of Victor Pass in Section 21, Township 15 South, Range 69 West, 6th P. M. (this tap will supply raw water).

2. All facilities beyond such points shall be constructed, maintained, and repaired by Applicant.

3. Water shall be used only for the following purposes and shall not, in any event, be resold to others:

Purposes: Use in mining and processing, including mineral extraction, ore processing, dust control, mined land reclamation, replacement and augmentation, and all incidental uses related to Applicant's mining and processing operations.

4. For both taps - payment terms:

"Water Plant Investment Fee"	(Already paid)
"Physical Connection Fee"	(Already paid for both taps)

Water rate (for both taps combined):
(Minimum use for both taps combined shall be 4,073,000 gallons per month.)

$3.10 per 1,000 gallons (for the first 4,073,000 gallons per month)

Water Rate (for use over 4,073,000 gallons per month):

$0.75 per 1,000 gallons

In consideration of the favorable rate for untreated (raw) water above 4,073,000 gallons per month. Applicant shall have the option to make a guarantee on or before July 1 of each calendar year that a monthly amount of $19,170.00 will be paid in the following calendar year.

If no such guarantee is made, or if Applicant fails timely to pay (as set forth in Section 20, Ordinance No. 338) the monthly amount after making such guarantee, the charge for untreated (raw) water, in any volume whatsoever, shall thereafter revert for the month(s) of such failure to $3.10 per 1,000 gallons, or such other rate as may be established by Ordinance. For any month in which Applicant has paid the monthly amount of $19,170.00, but does not use at least 4,073,000 gallons due to reasons described in paragraph 10, below, Applicant shall receive a credit against future water bills for such amounts paid when water use commences again, at a rate not to exceed $5,000 per month, subject to the terms of said paragraph 10.

Beginning with calendar year 2000, the above "Base Rates" shall be subject to adjustment at the beginning of each calendar year during which Applicant continues to purchase water from City under this Application. Each adjustment shall apply for that calendar year and adjustments shall not be cumulative. The adjustment shall be determined by the Price of Gold, as hereinbelow defined, for the immediately preceding calendar year. When the Price of Gold is in the range set forth in the left hand column on the table below, the Base Rates for the calendar year shall be increased as set forth in the right hand column on the table below.

Price of Gold (U.S. $)	Adjustment
0 - 349.00	No adjustment
350.00 - 374.99	1% increase
375.00 - 399.99	2% increase
400.00 - 424.99	3% increase
425.00 - 449.99	5% increase
450.00 - 474.99	7% increase
475.00 - 599.99	9 % increase
600.00 and above	12% increase

The term "Price of Gold" shall mean the average of the daily London Final Gold Quotations (aka "P. M. fix") as published in *The Wall Street Journal* for one troy ounce of refined gold stated in United States dollars. If the London Final Gold Quotation should cease to be published, Applicant and City shall agree upon a replacement quotation that most nearly approximates the London Final Gold Quotation to be used as a substitute.

The "Base Rates" shall be changed, if applicable, as of the meter reading dates immediately after January first of each calendar year.

5. Subject to Applicant's right of extension described in this paragraph 5, the obligation of the City to supply water to Applicant at both taps shall terminate on December 31, 2024. Unless extended by Applicant, Applicant's obligation to make any payments hereunder shall also expire on December 31, 2024. Applicant shall have the right to extend the City's supply of water at both taps for "Base Rates" to be negotiated in good faith, based upon comparable rates in the market at that time for comparable water for an additional term of up to 25 years beginning on January 1, 2025 upon written notice delivered to the City on or before July 1, 2023.

6. The City shall not be required to supply more than 800 gallons per minute nor more than 1300 acre feet per year. If Applicant requires more than 800 gallons per minute, or more than 1300 acre feet per year, and the City, after good faith negotiation, does not wish to or cannot supply such excess needs, or in the event the City cannot supply 800 gallons per minute and/or 1300 acre feet per year because of limitations, then and in either event, the City will allow Applicant to "wheel" (transport) water acquired from third parties through the Altman Pump Station and the pipeline from the Altman Pump Station to Applicant's meter at the top of Victor Pass, for a charge of $0.08 per 1,000 gallons plus all direct costs of electrical, operations and maintenance, associated with that usage. This "wheeling" right shall not apply to Applicant's interest in the Altman Water Rights, only to water purchased from third parties. The City and Applicant agree to cooperate in a fair and prompt manner to enable Applicant to obtain one or more contracts for water and water rights from third parties suitable to provide a reliable water supply for Applicant's purposes. This supply shall only be used if and to the extent the City does not wish to or cannot provide the full amount of water requested by Applicant. Water purchased from third parties is intended to be carried through the City's Altman Pump Station and pipeline under the "wheeling" provisions of this paragraph 6.

7. The City's obligation to sell and deliver water hereunder shall be suspended to the extent and for that period that a foreseeable water shortage exists within the City and such water is required to supply the needs of the City residents serviced by the City. A foreseeable water shortage is defined as a shortage in the City's available water supplies resulting from circumstances and causes beyond the City's control and such shortage causes the City to impose stringent water use restrictions upon City residents in order to preserve the public health. The City shall notify Applicant promptly whenever such foreseeable water shortage appears to be reasonably foreseeable. The City shall

be relieved of its delivery obligations pursuant to the terms of this paragraph only upon at least thirty (30) days' prior written notice to Applicant. If the City does not deliver water to Applicant pursuant to the terms of this paragraph and Applicant has made payment to the City for the delivery of water, the City shall refund to Applicant the full amount paid for such undelivered water. If the City is unable to deliver water for the reasons stated above, Applicant shall be entitled to use the City's facilities to deliver water purchased from third parties for its purposes upon the same terms as set forth in paragraph 6, above.

8. Applicant shall be responsible for its use of the water and the effects thereof on third parties, if any, including, but not limited to, the effects of discharges and changes in the quality of the water.

9. The City makes no warranty of the quality of the water delivered to Applicant. The City agrees that Applicant may monitor the quality of the water at facilities owned by the City that are used to deliver water to Applicant.

10. Except as set forth below, the obligation of the parties hereunder shall be suspended to the extent and for that period that performance is prevented by any cause beyond the parties' reasonable control, including, without limitations, acts of God, acts of war, fire, explosion, earthquake, storm, flood, economic conditions or circumstances that make it infeasible to continue operations, and material and substantial breakdown of equipment, machinery, or facilities provided, however, that Applicant shall have no obligation to pay for water that the City was unable to deliver or make available for delivery and that the City shall have no obligation to refund payments already made by Applicant for such undelivered water. Exceptions to this suspension are as follows:

a. The obligation of Applicant to pay the monthly amount of $19,170.00 shall not be suspended during the calendar year for which Applicant has made the guarantee as set forth in paragraph 4, above;

b. The "wheeling" right set forth in paragraph 6, above, shall not be suspended unless this Agreement is terminated or canceled;

c. This Agreement may be terminated by the City, and all obligations hereunder shall then end, if any suspension under this paragraph 10 lasts longer than the end of any 6-month period during which Applicant has made no monthly payments of $19,170.00. The City shall give Applicant written notice of any decision to terminate at least ten (10) days before the effective date of said termination. Whether or not this Agreement is terminated or canceled, the City shall have the right and option to seek to recover all billed, due, and unpaid

amounts through any lawful means.

11. In consideration of the mutual undertakings hereunder, and as part of the consideration to be exchanged, the parties are entering into an Agreement for Operation, Maintenance, and Repair, of the City's Altman Pump Station whereby the Applicant will contract to operate, maintain, and repair, the same, in return for payment as provided in the attached Agreement, marked Exhibit One and by this reference incorporated herein as if fully set forth. Although contained in two separate documents, this Application and that Agreement shall be part and parcel of the same transaction between the parties.

12. The City and Applicant agree that non-performance by the City of its obligations to deliver water under this Agreement shall result in damages to Applicant which will be difficult to calculate and for which there may not be adequate remedy by law. Therefore, in the event of non-performance by the City, in addition to all of its other remedies at law or in equity, Applicant shall have the right to a remedy of specific performance to require the City to perform its obligation as set forth herein.

13. The City shall not furnish fire protection nor sewer services unless provided by separate written contract. Applicant agrees to conform to all health laws and regulations of the applicable governmental entity, and to take reasonable precautions against fires.

14. Applicant acknowledges notice of the Code and Ordinances of the City, and Applicant is subject to and governed by the Code and Ordinances, and Applicant agrees to abide thereby. Approval of this Application by the City Council shall form a binding contract and Applicant agrees to abide by and be bound by the terms of this Application. The terms provided for in this Application, as approved, are not meant to limit, but to supplement the City's Code and Ordinances. Applicant agrees that neither the approval of this Application, nor use for any period of time, shall give Applicant any vested right to continue such use.

15. This Agreement supersedes and replaces all other agreements between the City and Applicant for the purchase of water EXCEPT that relating to the 3/4 inch tap at Victor Pump Station and Wastewater Treatment Plant (augmentation taps), which shall remain effective and separate and apart from this Agreement. This Agreement constitutes the entire agreement between parties with respect to the subject matter hereof. This Agreement shall not be modified, amended, supplemented, extended, or altered except as the parties may from time to time agree in writing executed by their authorized officers or representatives.

16. This Agreement shall be binding on the parties and their successors in interest. Applicant may freely assign this Agreement to its successor in operating its mining properties, joint venturer, parent company, sister company or subsidiary company, and such assignee may in turn reassign this Agreement in accordance with this provision.

Applicant or its assignees shall give the City at least thirty (30) days prior written notice of such assignment or reassignment of this Agreement. Applicant or its assignees shall not otherwise assign this Agreement without the express written consent of the City, which consent shall not be unreasonably withheld.

17. If any provision of this Agreement is held invalid or unenforceable by the final, non-appealable decision of a court of competent jurisdiction, the provision that is so held invalid or unenforceable shall be stricken from this Agreement and the remaining provisions hereof shall continue in full force and effect.

Application made at Victor, Teller County, Colorado this 14th day of June, 1999.

Name of Applicant: Cripple Creek and Victor Gold Mining Company

Name of Owner of Premises to be Served: Cripple Creek and Victor Gold Mining Company

Billing Address: 100 North Third Street, Victor, CO 80860

AGREED:

CRIPPLE CREEK AND VICTOR GOLD MINING COMPANY, a joint venture
By: Pikes Peak Mining Company, Manager

By: _____
Title: Vice President & Gen'l Manager
Date: 6/2/99

RESOLUTION

BE IT RESOLVED, by the City Council of the City of Victor, that the foregoing "Application for Use of Water Outside Corporate Limits" submitted by Cripple Creek & Victor Gold Mining Company, a joint venture, shall be and is hereby approved.

Adopted this 14th day of June, 1999.

Mayor

ATTEST:

City Clerk

Approved by Water Attorney:

M.E. MacDougall, #956
MacDougall, Woldridge & Worley, PC
102 North Cascade, Suite 400
Colorado Springs, CO 80903
Telephone: (719) 520-9288

ADDENDUM TO AMENDED AND RESTATED AGREEMENT FOR THE PURCHASE OF WATER

THIS ADDENDUM TO AMENDED AND RESTATED AGREEMENT FOR THE PURCHASE OF WATER, hereinafter called the "Addendum," is made and entered into on the dates set forth below, by and between Colorado Springs Utilities, an enterprise of the City of Colorado Springs, a Colorado home-rule city and municipal corporation, hereinafter called "UTILITIES," and the Cripple Creek and Victor Gold Mining Company, hereinafter called "CC&V."

RECITALS

A. UTILITIES and CC&V entered into an Amended and Restated Agreement for the Purchase of Water dated May 31, 2000, hereinafter called the "Agreement," under which UTILITIES sells CC&V 300 acre feet with an option for up to 600 acre feet of water annually that CC&V uses for CC&V's Cresson Mine located in Teller County, CO.

B. The term of the Agreement expired on April 30, 2015.

C. Paragraph 1 of the Agreement provides that the Agreement "may be renewed for a period of 10 years upon the mutual agreement of the parties with the approval of [Utilities] Utilities Board."

D. UTILITIES desires to renew the term of the Agreement in order to continue selling water to CC&V.

E. CC&V desires to renew the term of the Agreement in order to continue purchasing water from UTILITIES and to secure a source of supply for the renewal term of the Agreement.

F. UTILITIES and CC&V desire to renew the term of the Agreement for a period of 10 years that begins on May 1, 2015 and expires on April 30, 2025.

G. UTILITIES and CC&V have determined that renewal of the term of the Agreement for a period of 10 years that begins on May 1, 2015 and expires on April 30, 2025 through this Addendum is in their respective best interests.

H. By Resolution 15-06, the Utilities Board of Colorado Springs Utilities approved the renewal of the term of the Agreement for the period of May 1, 2015 through April 30, 2025.

NOW, THEREFORE, FOR $10 AND OTHER GOOD AND VALUABLE CONSIDERATION, INCLUDING THE FOREGOING REPRESENTATIONS, THE RECEIPT AND BENEFIT OF WHICH ARE HEREBY ACKNOWLEDGED, IT IS AGREED AS FOLLOWS:

1. The term of the Agreement is extended for the 10 year period of May 1, 2015 through April 30, 2025.

2. Except to the extent as amended hereby, all other terms of the Agreement shall remain the same and are hereby ratified and affirmed by the parties.

3. In the event of a conflict between the Agreement and this Addendum, the terms and conditions of this Addendum shall prevail.

IN WITNESS WHEREOF, the parties hereto have executed this Addendum on the dates set forth below.

COLORADO SPRINGS UTILITIES

By: _____

Name: Jerry Forte

Title: Chief Executive Officer

Date: 6/1/2015

Approved as to form: _____

CRIPPLE CREEK AND VICTOR GOLD MINING COMPANY

By: AngloGold Ashanti (Colorado) Corp., a Delaware corporation, ~~its Manager~~

By: _____

Name: Lowe Billingsley

Title: Vice President & General Manager

Date: May 29, 2015

Attest: _____

Meghan Martelon

COPY

AGREEMENT FOR LEASE OF WATER
(CRIPPLE CREEK & CC&V)

THIS AGREEMENT FOR LEASE OF WATER ("Agreement") is made and entered effective the 1st day of January, 2015 ("Effective Date"), by and between the City of Cripple Creek, through its utility enterprise ("Cripple Creek") and the Cripple Creek & Victor Gold Mining Company, a Colorado joint venture and AngloGold Ashanti (Colorado) Corp., its manager (collectively "CC&V"), Cripple Creek and CC&V shall be referred to herein collectively, the "Parties" or individually as, a "Party".

RECITALS

WHEREAS, CC&V and Cripple Creek entered into that certain Agreement for the Lease of Water (Cripple Creek & CC&V) dated July 7, 2010 ("Original Lease") primarily for the purpose of supplying water for CC&V's mining operations in Teller County, Colorado (the "Cresson Mine"); and

WHEREAS, the Original Agreement expired on or about May 31, 2014: and

WHEREAS, Cripple Creek entered into that certain agreement with the City of Victor dated February 17, 2004, as amended December 16, 2004, and as further amended August 6, 2010, (the "Victor Agreement"), wherein, for the benefit of CC&V, Cripple Creek provides Victor with up to 172 acre feet of water, primarily by and through a pipeline and well field located in Gillette; and

WHEREAS, CC&V continues to require additional water supplies for its operation of the Cresson Mine; and

WHEREAS, CC&V and Cripple Creek desire to enter into a new agreement for the lease of water from Cripple Creek to CC&V pursuant to the terms and conditions set forth below; and

WHEREAS, CC&V acknowledges the execution of this Agreement will require an amendment of the Victor Agreement.

NOW, THEREFORE, in consideration of the mutual covenants and agreements contained herein, Cripple Creek and CC&V agree as follows:

AGREEMENT

1. Volumes of Water and Term of Agreement. Subject to the provisions of this Agreement, Cripple Creek agrees to lease to CC&V up to 250 acre feet per year of raw water as requested by CC&V ("Cripple Creek Water") for use in its operations at the Cresson Mine on an as available basis, up to 172 acre feet of which is delivered to

CC&V by the City of Victor and subject to the Victor Agreement, as amended from time to time. The term of this Agreement shall be three (3) years commencing on the Effective Date and ending on December 31, 2017. CC&V acknowledges and agrees that Cripple Creek's obligations to provide the Cripple Creek Water are subject to the limitations set forth in Paragraph 12.

2. Uses of Water by CC&V. The Cripple Creek Water shall be raw water, not treated to meet human drinking water quality standards. CC&V's use of the Cripple Creek Water shall be limited to mining and mining related purposes associated with the activities of the Cresson Mine, including without limitation mineral extraction, ore processing, dust control, mined land reclamation, replacement and augmentation, and other incidental uses. Cripple Creek shall not be deemed to be an owner or operator of the Cresson Mine nor a partner, joint venture partner, or agent of CC&V by virtue of this Agreement, and shall have no responsibility to ensure regulatory compliance by CC&V. Similarly, CC&V shall not be deemed to be the owner of or have a real property interest in any of Cripple Creek's water rights. The Cripple Creek Water shall not be used by CC&V for potable uses other than at the mine site without the written permission of Cripple Creek, which permission shall not be unreasonably withheld. If any potable use is made at the mine site, CC&V shall be solely responsible for all treatment, testing, and reporting, as now or hereafter may be required, for such potable water uses.

3. Consideration and Payment Terms. The consideration for the Cripple Creek Water provided pursuant to this Agreement shall be as follows:

3.A. Infrastructure. CC&V, pursuant to the terms of the Original Lease, purchased, installed and constructed various infrastructure improvements for Cripple Creek, all of which were designed to facilitate the delivery of the Cripple Creek Water to CC&V (collectively, the "Infrastructure"). CC&V shall maintain, as necessary, the Infrastructure in reasonably good order, repair and condition and to Cripple Creek's reasonable satisfaction. In the event that the Parties mutually determine additional infrastructure is necessary to continue to facilitate the delivery of the Cripple Creek Water to CC&V ("Additional Infrastructure"), the Additional Infrastructure shall be developed, constructed and installed at CC&V's sole cost and expense. CC&V shall consult with and obtain Cripple Creek's prior approval, which approval shall not be unreasonably withheld, with respect to the design, specifications, and equipment related to the Additional Infrastructure. The Parties acknowledge that, as of the Effective Date, no such Additional Infrastructure is currently known or anticipated by either Party and Additional Infrastructure shall not include any storage facilities contemplated by Paragraph 3.D.

3.B. Acre-Foot Charge. The lease price for the Cripple Creek Water in the first year of this Agreement shall be $864.64 per acre-foot (the "Base Rate"), representing a 4% increase to the price of water that was paid to Cripple Creek by CC&V in late-2014 during the negotiation of this Agreement. The Base Rate shall be adjusted upward by 4% each year of this Agreement effective upon the anniversary date of the Effective Date. Cripple Creek shall provide CC&V with a monthly invoice for all water furnished hereunder and shall be due and payable by CC&V thirty (30) days after the date of the invoice.

3.C. Operation and Maintenance. In addition to the costs related to the Infrastructure and any Additional Infrastructure, CC&V shall pay all associated utility costs, operation and maintenance costs for any pumping of the Cripple Creek Water ("Additional Costs") delivered from the Gillette Well Field or any other facilities of Cripple Creek where Additional Costs are incurred. Additional Costs may include, but are not limited to utility and maintenance costs for the Turnout and Well Field, labor costs associated with the delivery of water to CC&V and the City of Victor, pursuant to the Victor Agreement, including but not limited to the City of Cripple Creek Public Works' labor costs in monitoring and maintaining the Turnout, Well Field, and delivery system, administrative costs associated with water delivery to CC&V and/or the City of Victor, and related accounting costs. To the extent any of the Additional Costs represent "reimbursable costs" associated with the delivery of the Cripple Creek Water from all such facilities, CC&V shall only be charged for such reimbursable costs in proportion to the quantity of water produced by Cripple Creek for use by CC&V (including the Cripple Creek Water provided to CC&V pursuant to the Victor Agreement), as compared to all quantities of water produced for use in Cripple Creek's municipal system; *i.e.* CC&V shall be invoiced for its pro-rata share of such costs, only. Additional Costs shall be billed monthly pursuant to Paragraph 3.B.

3.D. Storage Surcharge. Cripple Creek has to date conducted preliminary studies related to potential storage facilities and projects; however, no such storage facilities or projects have been concretely identified, nor have plans for such storage facilities been fully developed. CC&V recognizes that a storage facility may also benefit CC&V by ensuring sufficient water supplies for Cripple Creek. CC&V is committed to partnering with Cripple Creek when and if a storage facility or facilities are more particularly identified and to the extent that such storage facility or facilities benefit CC&V; provided, however, any agreement as to the extent of CC&V's involvement in the development and construction of a storage facility or facilities shall be pursuant to a separate written agreement between the Parties.

3.E. Take or Pay. CC&V shall pay for 78 acre-feet of the Cripple Creek Water annually whether or not it takes any water under this Agreement, and shall pay for the entirety of any water leased under the Victor Agreement, as amended (i.e. up to 172 acre-feet), annually whether or not it takes any water under the Victor Agreement. This combined 250 acre-feet shall be considered the base purchase amount ("Base Amount"). CC&V shall make payments for the Base Amount, *i.e.* 250 acre-feet, in twelve (12) equal monthly installments, regardless of the schedule for delivery, pursuant to Paragraph 3B. Subject to availability and in addition to the Base Amount, CC&V shall have the right to request additional amounts of water from Cripple Creek ("Additional Water") by placing an additional water order with Cripple Creek. The purchase of any Addition Water remains subject to the limitations set forth in Paragraph 2.

CC&V shall be deemed to have purchased the Cripple Creek Water and the Additional Water ordered on a take-or-pay basis, unless Cripple Creek is unable to deliver the water ordered. In the event Cripple Creek is unable to deliver, in whole or in part, the Base Amount and/or Additional Water to CC&V due to physical, legal, or administrative limitations, CC&V shall not be responsible for payment for that portion

which Cripple Creek is not able to deliver ("Undeliverable Water"). In the event CC&V has paid for any Undeliverable Water, Cripple Creek will refund to CC&V that portion of monies paid for the Undeliverable Water ("Refund"). Any Refund due to CC&V shall be made annually, based on annual accountings, on or before February 28 of the year following the year in which the Undeliverable Water was paid for but not delivered. CC&V may, in its sole discretion, elect to apply any such Refund to the following year's water purchase by advising Cripple Creek of the same in writing on or before the February 28 deadline.

4. Storage of Water. In order to make deliveries to CC&V at a time when the Water, defined below, furnished hereunder is needed and efficient, Cripple Creek shall make available 250 acre feet annually of water stored in Cripple Creek Reservoir No. 2 and/or Cripple Creek Reservoir No. 3 (collective, the "Cripple Creek Reservoirs"), or in Cripple Creek's discretion, from Cripple Creek's interests in the Gillette Well Field. Deliveries from storage shall be to the West Fork of West Beaver Creek as it passes under Teller County Road 81 and measurement of deliveries shall be at the Point of Delivery. All storage water shall be delivered by December 31st of each year.

A. The parties acknowledge that Cripple Creek may from time to time make repairs to the valving and water release mechanisms or other structures associated with the Cripple Creek Reservoirs, which may require draining of all or a portion of the Cripple Creek Reservoirs. CC&V shall have a right of first refusal for the purchase of any water released for the purpose of making such repairs ("Released Water"), at the lease rate set forth in Paragraph 3.B and pursuant to the limitation set forth in Paragraph 2. If CC&V exercises this right of first refusal and takes delivery of Released Water, then CC&V shall not be entitled to request further releases from storage until such time as the Cripple Creek Reservoirs have recovered, in Cripple Creek's reasonable discretion, to acceptable levels. Released Water will likely be released to the West Fork of West Beaver Creek at the drain between April 15 and July 15 of the year in which such construction is commenced. Cripple Creek shall provide CC&V with sufficient advance notice, to the extent reasonably practicable, of its anticipated drainage schedules so that CC&V may take such efforts as it deems necessary for the exchange and storage of the Released Water into other vessels owned or controlled by CC&V or the City of Victor, or to advise Cripple Creek that it will not be purchasing the Released Water.

5. Procedure for Delivery of Water. The Parties agree that the lease of Cripple Creek Water, Additional Water and Released Water (collectively, the "Water"), as applicable, to CC&V will take place within the supply limitations of the Cripple Creek water system, and that those limitations vary by season. The Parties shall develop an annual delivery schedule based on hydrologic conditions and consultation with the Parties' engineers, all as constrained by Paragraph 12 hereof, and Cripple Creek shall provide delivery of the water subject of this Agreement at the time and in the amount requested by CC&V subject to the limitations of the Cripple Creek water system.

6. Points of Delivery. Water to be delivered to CC&V will be primarily from Cripple Creek's municipal water transmission line from Reservoir No. 2 at or near the intersection of such transmission line with the West Fork of West Beaver Creek ("Point

of Delivery"). The Parties agree to develop a plan for utilization of the Point of Delivery that is reasonably satisfactory to both Cripple Creek and CC&V, and CC&V agrees to accept water delivered at an alternate point of delivery to the extent practicable, including but not limited to Gillette Well No. 5, as may be necessary for the maximum beneficial use of Cripple Creek's water system and water rights, in Cripple Creek's discretion.

7. Measurement of Deliveries and Title Thereto. All Water delivered shall be measured at the Point of Delivery. CC&V agrees to ensure that measurement devices at the Point of Delivery accurately measure the amounts of water delivered. Title to the Water delivered under this Agreement shall pass to CC&V when it is released at the Point of Delivery, and CC&V shall be solely responsible for any and all transit losses or other reductions in water supply as delivered to the Point of Delivery prior to CC&V's pumping of such delivered water at the Altman Pump Station downstream on the West Fork of West Beaver Creek.

8. Modification of Delivery Schedule. As circumstances require, CC&V may request a modification of the delivery schedule submitted to Cripple Creek. Cripple Creek shall accept such modification and deliver water in accordance with the modified delivery schedule, provided Cripple Creek determines, in its reasonable judgment, that it has sufficient water supply to accommodate the modified delivery schedule, that the modified delivery schedule is operationally feasible and consistent with other operational needs, and that the modified delivery schedule does not result in the delivery of water in excess of the amount of the water available under this Agreement.

9. Amendment to Cripple Creek and Victor Agreement. The Parties acknowledge that certain provisions of the Victor Agreement may require amendment to reflect the change of rates paid by CC&V to Cripple Creek for Water as set forth in Paragraph 3.B. The Parties agree to use its best efforts to facilitate any necessary amendments to the Victor Agreement ("Amendment"). Further, CC&V acknowledges the importance of an Amendment for Cripple Creek to recognize the full revenue contemplated by this Agreement. Therefore, until an Amendment is executed between the City of Victor and Cripple Creek and assuming best efforts on the part of Cripple Creek, CC&V shall make Cripple Creek whole to the extent that the terms of the current Victor Agreement do not result in Cripple Creek realizing the revenue amount it would otherwise receive pursuant to the terms of this Agreement.

10. CC&V Responsibilities. In addition to the other requirements set forth in this Renewal Agreement, CC&V shall be responsible for the following:

A. All conveyance and use of the Water furnished hereunder downstream of the Point of Delivery, and CC&V shall bear all risk of loss, including, but not limited to, transit charges as determined by the Colorado State Engineer or the Division Engineer.

B. Should a dispute arise with administrative or governmental entities concerning the applicability of Cripple Creek's water rights as herein discussed or proposed methods of delivery, Cripple Creek, through its staff and counsel, shall take

such action as deemed reasonable and necessary to overcome such dispute and obtain any necessary approvals from administrative or governmental agencies. CC&V agrees to reimburse Cripple Creek for the first $10,000.00 of legal expense incurred by Cripple Creek in such efforts, as reasonably itemized and documented by Cripple Creek. Such reimbursement shall be due upon demand by Cripple Creek. Should efforts resulting in expenses beyond CC&V's preliminary $10,000.00 contribution be deemed necessary in Cripple Creek's reasonable judgment and discretion, Cripple Creek may (1) elect to incur such costs itself; or (2) provide CC&V a written request for additional contribution, which request may be honored in the sole discretion of CC&V. The extent to which such efforts at dispute resolution are reasonable, necessary and appropriate shall be in the sole and complete discretion of Cripple Creek, and Cripple Creek shall have no obligation to make any efforts for the resolution of such disputes, nor shall CC&V have any obligation to pay for water not delivered as a result of the same.

C. CC&V's use of the Water and the effects thereof on third parties, if any, including, but not limited to, the effects of diversion, discharges, and changes in quantity and the quality of said water.

11. Cripple Creek Warranties. Cripple Creek warrants that:

A. Cripple Creek expects to have, and will make reasonable efforts to provide an adequate physical supply of water to furnish water to CC&V under this Agreement, except in times of water shortages as defined in Paragraph 12.A. below.

B. The Water delivered to CC&V hereunder shall be legally under Cripple Creek's dominion and control at the Point of Delivery. No representation or warranty is made as to fitness for the proposed use of the water furnished hereunder. CC&V acknowledges it has performed its own diligence with respect to all legal and administrative matters involving the Cripple Creek water rights and will accept any water in an as is condition.

C. Cripple Creek makes no warranty as to the quality of the Water delivered to CC&V. Cripple Creek agrees that CC&V may monitor the quality of the Water at facilities owned by Cripple Creek that are utilized to deliver said Water to CC&V. CC&V shall contact the Cripple Creek Public Utilities Director in order to arrange for access to monitor Water at such facilities. A mutually acceptable plan for monitoring the water furnished hereunder shall be developed by CC&V in cooperation with the Cripple Creek Water Rights Administrator.

12. Suspension of Obligations.

A. Interruption of Water Supply. While it is the intent of Cripple Creek to maintain the delivery of the Water to CC&V in accordance with the terms of this Agreement, there are certain elements that may make it uncertain as to whether the physical supply of Water can always be produced in the agreed volume and at the

agreed rate. Cripple Creek and CC&V agree that Cripple Creek shall be relieved from its obligation to deliver the Water at the agreed volume and rate for the following reasons:

(1) The reasonable and prudent maintenance, repair or enlargement of Cripple Creek's reservoirs, water transmission facilities, and wells;

(2) Cripple Creek's need to use the Water for delivery to its citizens and customers other than CC&V for their use at Cripple Creek's sole discretion;

(3) The inability to deliver the Water due to surface water shortages, aquifer conditions, well cave-in or blockage, out of priority rights, administrative regulation or water court action, or other occurrence beyond the reasonable control of Cripple Creek, including, but not limited to, an act of God, strike, war, insurrection or inability to provide the Water arising out of the order of any court or the lawful order of any governmental administrative body or agency with authority to regulate matters pertaining to water produced from the Cripple Creek water system, public utilities, public health or pollution control.

B. Force Majeure. The obligations of the parties under this Agreement, including the payment obligations set forth in Paragraph 3., shall be suspended to the extent and for that period that performance is prevented by any cause beyond either party's reasonable control, including, without limitation, acts of God, acts of war, fire, explosion, earthquake, storm, flood, economic conditions or circumstances that make it infeasible to continue operations, and material and substantial breakdown of equipment, machinery, or facilities; provided, however, that CC&V shall have no obligation to pay for the Water that Cripple Creek was unable to deliver or make available for delivery and that Cripple Creek shall have an obligation to refund payments already made by CC&V for such undelivered water. Nothing herein shall relieve CC&V of its obligation to pay for the Water actually delivered.

13. Default, Right to Cure. If either party believes that the other is in default under this Agreement, that party shall give written notice to the other immediately. Within 15 days of receiving a notice of default, the party accused of the default shall either cure or deliver a written response explaining why there has been no default. If the party accused of the default does not respond or cure within said 15 days, then that party shall be deemed to be in default, and the non-defaulting party shall have the right to terminate this Agreement, or in the case of nonpayment, Cripple Creek may interrupt delivery of the water furnished hereunder until the payment default is cured. If more than one payment default occurs, Cripple Creek may require payment for water in advance of delivery, subject to refund if the water is not made available.

14. Written Notice. Whenever written notice is required under this Agreement, it shall be sent by U.S. Mail, First Class, postage prepaid, addressed to the parties as follows:

To Cripple Creek:
Cripple Creek City Administrator
337 E. Bennett Ave.
Cripple Creek, CO 80813

To CC&V:
Cripple Creek & Victor Gold Mining Company
Attn: General Manager
100 North 3rd Street
Victor, CO 80860

With a copy to:
Felt, Monson & Culichia, LLC
319 N. Weber Street
Colorado Springs, CO 80903

With a copy to:
AngloGold Ashanti (Colorado) Corp.
Attn: General Counsel
6300 S. Syracuse Way, Suite 500
Centennial, CO 80111

Any address for notice may be changed by written notice to the other party as provided in this Paragraph 16.

15. Merger. This Agreement constitutes the entire agreement between the parties with respect to the subject matter hereof, excepting complimentary provisions under the Victor Agreement, as amended. This Agreement shall not be modified, amended, supplemented, extended, or altered except as the parties may from time to time agree in writing executed by their authorized officers or representatives.

16. Assignability. This Agreement shall be binding on the parties and their successors in interest. So long as the uses of the water remain the same as provided in Paragraph 2 above, CC&V may freely assign this Agreement to its successor, joint venturer, parent company, sister company, or subsidiary company, and such assignee may in turn reassign this Agreement in accordance with this provision. CC&V or its assignees shall give Cripple Creek at least (30) days prior written notice of such assignment or reassignment of this Agreement. CC&V or its assignees shall not otherwise assign this Agreement without the express prior written consent of Cripple Creek. Cripple Creek may not assign this Agreement without the prior written consent of CC&V.

17. Attorney's Fees. In the event of any dispute between the parties concerning this Agreement or in the event of any action to enforce this Agreement or to collect damages on account of any breach of the obligations provided for herein, the prevailing party shall be entitled to recover from the other party, all costs and expenses, including reasonable attorney's fees, incurred in such litigation as well as all additional such costs and expenses incurred in enforcing and collecting any judgment rendered in such action.

18. Authority. All parties to this Agreement represent that they have the full power and authority to enter into and perform this Agreement.

IN WITNESS WHEREOF, the authorized representatives of Cripple Creek and CC&V have executed this Agreement the day and year first set forth above.

CITY OF CRIPPLE CREEK

Raymond G. DuBois

By : Raymond G. DuBois
Title: City Administrator

CRIPPLE CREEK & VICTOR GOLD MINING COMPANY, a Joint Venture
By: AngloGold Ashanti (Colorado) Corp.

By: Lowe J. Billingsley
Title: General Manager

ATTEST:

Debra Bowins

Clerk, City of Cripple Creek

AGREEMENT FOR THE LEASE OF WATER
(CRIPPLE CREEK & CC&V)

THIS AGREEMENT FOR THE LEASE OF WATER ("Agreement") is made and entered this 7th day of July, 2010, by and between the City of Cripple Creek, through its utility enterprise ("Cripple Creek") and the Cripple Creek & Victor Gold Mining Company ("CC&V"), herein collectively, the "Parties".

RECITALS

WHEREAS, CC&V operates the Cresson Mine (herein after the "Cresson Mine" or the "mine site") located in Teller County, Colorado, in the vicinity of Cripple Creek and the City of Victor; and

WHEREAS, CC&V has entered into a water supply contract with the City of Victor to provide the primary water supply for the Cresson Mine. The contract expresses the joint desire of CC&V and the City of Victor for CC&V to obtain one or more backup water supply contracts to be used by CC&V in the event, and to the extent, that the City of Victor does not wish to or cannot provide the full amount of water requested by CC&V for the Cresson Mine; and

WHEREAS, Cripple Creek has previously entered into an agreement with the City of Victor wherein Cripple Creek provides Victor with up to 172 acre feet of water, primarily by and through a pipeline and well field located in Gillette (the "Victor Agreement"). In connection with that agreement, Cripple Creek has completed Water Division 2, Case No. 05CW25. Cripple Creek desires to amend the Victor Agreement and CC&V desires to facilitate that amendment; and

WHEREAS, CC&V has a requirement for additional water supplies for its operation of the Cresson Mine; and

WHEREAS, Cripple Creek is the owner certain of water rights and water facilities that will enable it to sell and deliver water to CC&V for use at the Cresson Mine.

AGREEMENT

NOW, THEREFORE, in consideration of the mutual covenants and agreements contained herein, Cripple Creek and CC&V agree as follows:

1. Volumes of Water and Term of Agreement. Subject to the other provisions of this Agreement, Cripple Creek agrees to lease to CC&V, in addition to the 172 acre feet that are the subject of the Victor Agreement, up to 200 acre feet per year of raw water requested by CC&V for the Cresson Mine on an as available basis. The term of this Agreement shall begin on the date of this Agreement and end on May __, 2014. This Agreement may be renewed on terms acceptable to the Parties by express written agreement, however, the Parties acknowledge that any such renewal may be for a longer term than reflected in this Agreement, and will require contribution by CC&V to water infrastructure necessary for the maximization of Cripple Creek's water resources to make such long-term water available for lease. CC&V acknowledges and

agrees that Cripple Creek's obligation to provide water under this Agreement is based upon circumstances now existing and expected to exist over the term of this Agreement. Hereinafter, the water furnished under this Agreement shall be referred to as "the Cripple Creek Water" or "the water furnished hereunder." All obligations of the parties under this Agreement are expressly subject to a mutually satisfactory amendment of the Victor Agreement, as discussed in further detail below.

2. Uses of Water by CC&V. The water furnished hereunder shall be raw water, not treated to meet human drinking water quality standards. CC&V shall use the Cripple Creek Water for mining and mining related purposes associated with the activities of the Cresson Mine, including without limitation mineral extraction, ore processing, dust control, mined land reclamation, replacement and augmentation, and other incidental uses. Cripple Creek shall not be deemed to be an owner or operator of the Cresson Mine nor a partner, joint venture partner, or agent of CC&V by virtue of this Agreement, and shall have no responsibility to ensure regulatory compliance by CC&V. Similarly, CC&V shall not be deemed to be the owner of or have any real estate interest in the water rights of Cripple Creek. The Cripple Creek Water shall not be used by CC&V for potable uses other than at the mine site without the written permission of Cripple Creek, which permission shall not be unreasonably withheld. If any potable use is made at the mine site, CC&V shall be solely responsible for all treatment, testing, and reporting, as now or hereafter may be required for such potable water uses.

3. Consideration and Payment Terms. The consideration for the Cripple Creek Water covered by this Agreement shall be as follows:

3A. Infrastructure. CC&V shall purchase, install or otherwise construct the following infrastructure improvements for Cripple Creek, all of which are designed to make the water furnished hereunder deliverable to CC&V:

(1) Design, construction, and installation of a tap from Cripple Creek's existing transmission line from Reservoir No. 2 at a point nearest to the West Fork of West Beaver Creek to be agreed upon by the Parties, as necessary to deliver water stored by Cripple Creek in Reservoir No. 2 to the West Fork of West Beaver Creek for eventual diversion by CC&V at the Altman Pump Station further downstream.

(2) Such other infrastructure as the Parties mutually agree may be necessary to facilitate Cripple Creek's delivery of water to CC&V pursuant to this Agreement.

CC&V must consult with Cripple Creek regarding the design, specifications, and equipment related to such infrastructure and receive approval from Cripple Creek for the design and construction plans prior to installation of the infrastructure, which approval will not be unreasonably withheld.

3B. Acre Foot Charge. The lease price for the Cripple Creek Water leased by CC&V in the first year of this Agreement shall be $700.00 per acre foot. Cripple Creek will provide CC&V with a monthly invoice for all water furnished hereunder and the purchase price shall be due and payable 30 days after the date of the invoice. This $700.00 base rate shall be adjusted upward by 3.5% each year, in years two through four of this Agreement, to reflect any increase in the fair market value of the Cripple Creek Water and costs to provide the legal and

physical supply of water. In addition to the adjusted annual base rate, a premium may be paid which shall be determined on the basis of the annual average Price of Gold, per ounce, as defined below, for the immediately preceding calendar year. When the annual average Price of Gold for the preceding year is in the range set forth in the left hand column of the table below, a premium shall be paid, in addition to the base rate, for each acre foot of water leased in the following year:

Price of Gold (U.S.$)	Adjustment
0-1,200.00	0%
1,200.01 - 1,399.99	1.5%
1,400.00 - 1,599.99	3.5%
1,600.00 - 1,799.99	5.5%
1,800.00 - 1,999.99	6.5%
2,00.00 - 2,199.99	8.5%
2,200.00 and above	11.5%

By way of example, in year three of this Agreement, the base rate for the lease of water will be $749.86 (i.e. $700 x 1.035 x 1.035). If the annual average Price of Gold as defined herein for year two of the Agreement is between $1200.01 and $1,399.99, the actual rate paid per acre foot in year three will be $761.11 (i.e. $749.86 x 1.015). The term "Price of Gold" shall mean the average of the daily London gold Quotations (aka "P.M. Fix") as published in *The Wall Street Journal* and at www.kitco.com for one troy ounce of refined gold stated in United States dollars. If the London Final Gold Quotation should cease to be published, the Parties shall agree upon a replacement quotation that most nearly approximates the London Final Gold Quotation to be used as a substitute. The water rate shall be adjusted annually as of the meter reading dates immediately after January 1st of each calendar year.

3C. Operation and Maintenance. CC&V shall pay all operation and maintenance costs during the term of this agreement for the infrastructure identified in Paragraph 3A above, including, metering and the reporting thereof, repair and utilities necessary for the delivery of the Cripple Creek Water, if any.

3D. Take or Pay. CC&V shall pay for 28 acre feet of the Cripple Creek Water annually whether or not it takes any water under this Agreement, and shall pay for the entirety of water leased under the Victor Agreement, as amended (i.e. 172 acre feet), annually whether or not it takes any water under that agreement. This combined 200 acre feet shall be considered the base purchase amount. CC&V shall make payments for the base purchase amount, i.e. 200 acre feet, in 12 equal monthly installments, regardless of the schedule for delivery. Subject to Cripple Creek having available water to lease under this Agreement, CC&V shall have the right to request Cripple Creek Water in addition to the base purchase amount by placing an additional water order with Cripple Creek. CC&V shall be deemed to have purchased the amount of Cripple Creek Water ordered on a take-or-pay basis, unless Cripple Creek is unable to deliver the water ordered. In the event Cripple Creek is unable to deliver in whole or in part the base purchase amount under this Agreement and/or the Victor Agreement, as amended, and/or additional amounts of Cripple Creek Water ordered by CC&V due to physical, legal, or administrative limitations, CC&V shall not be responsible for payment for that portion not delivered. Any payments made under this Agreement, for water ordered in CY 2010, shall be prorated based on the actual date on which the parties sign the Agreement.

4. Storage of Water. In order to make deliveries to CC&V at a time when the water furnished hereunder is needed and efficient, Cripple Creek shall make available 200 acre feet annually of water stored in Cripple Creek Reservoir No. 2 and Cripple Creek Reservoir No. 3. Deliveries from storage shall be to the West Fork of West Beaver Creek as it passes under Teller County Road 81 and measurement of deliveries shall be at the Point of Delivery. All storage water shall be delivered by December 31st of each year.

A. The parties acknowledge that Cripple Creek must make repairs to the valving and water release mechanism in Cripple Creek Reservoir No. 2 that will require draining of the reservoir, anticipated in the Summer of 2010 or Spring of 2011. CC&V shall have a right of first refusal for the purchase of the water released for the purpose of making the repairs, at the lease rate set forth in Paragraph 3B. If CC&V exercises the right of first refusal and takes delivery of said water, then CC&V will request no further releases from storage until such time as Cripple Creek Reservoir No. 2 has recovered its storage to historic March 15th levels. Releases will be made to the West Fork of West Beaver Creek at the drain between April 15 and July 15 of the year in which such construction is commenced. Cripple Creek shall provide CC&V with specific advance notice, to the extent reasonably practicable of its anticipated drainage schedules so that CC&V may take such efforts as it deems necessary for the exchange and storage of such drainage releases into other vessels owned or controlled by CC&V or the City of Victor, or to advise Cripple Creek that it will not be purchasing such releases.

5. Procedure for Delivery of Water. The parties agree that the lease of Cripple Creek Water to CC&V will take place within the supply limitations of the Cripple Creek water system, and that those limitations vary by season. The Parties will develop an annual delivery schedule based on hydrologic conditions and consultation with the Parties' engineers, all as constrained by Paragraph 12 hereof, and Cripple Creek shall provide delivery of the water subject of this agreement at the time and in the amount requested by CC&V subject to the limitations of the Cripple Creek water system and Paragraph 12.

6. Points of Delivery. The Cripple Creek Water to be delivered to CC&V will be primarily from Cripple Creek's municipal water transmission line from Reservoir No. 2 at or near the intersection of such transmission line with the West Fork of West Beaver Creek ("Point of Delivery"). The Parties agree to develop a plan for utilization of the Point of Delivery that is reasonably satisfactory to both Cripple Creek and CC&V, and CC&V agrees to accept water delivered at an alternate point of delivery to the extent practicable, including but not limited to Gillette Well No. 5, as may be necessary for the maximum beneficial use of Cripple Creek's water system and water rights, upon reasonable advance notice by Cripple Creek. Any decision to deliver water out of Gillette Well No. 5 must be approved, in advance, by CC&V, which approval will not be unreasonably withheld.

7. Measurement of Deliveries and Title Thereto. All of the Cripple Creek Water delivered shall be measured at the Point of Delivery. CC&V agrees to ensure that measurement devices at the Point of Delivery accurately measure the amounts of water delivered. Title to the Cripple Creek Water delivered under this Agreement shall pass to CC&V when it is released at the Point of Delivery, and CC&V shall be solely responsible for any and all transit losses or other reductions in water supply as delivered to the Point of Delivery prior to CC&V's pumping

of such delivered water at the Altman Pump Station downstream on the West Fork of West Beaver Creek.

8. Modification of Delivery Schedule. As circumstances require, CC&V may request a modification of the delivery schedule submitted to Cripple Creek. Cripple Creek shall accept such modification and deliver water in accordance with the modified delivery schedule, provided Cripple Creek determines, in its reasonable judgment, that it has sufficient water supply to accommodate the modified delivery schedule, that the modified delivery schedule is operationally feasible and consistent with other operational needs, and that the modified delivery schedule does not result in the delivery of water in excess of the amount of the water available under this Agreement.

9. Amendment to Cripple Creek and Victor Agreement. The Parties acknowledge that certain provisions of the agreement between Cripple Creek and the City of Victor, dated February 17, 2004, as amended December 16, 2004, (the "Victor Agreement") need to be amended to reflect the new location of Gillette Well No. 5, the "as built" specifications for the wells and their production rates, and the change of rates to be paid for water commensurate with the rates set forth in Paragraph 3B hereof, as well as potential changes in the terms of delivery under the Victor Agreement to mirror those contained herein. Such amendments, satisfactory to Cripple Creek, are conditions precedent to the enforceability of this Agreement. CC&V agrees to use its best efforts to facilitate the amendments proposed by Cripple Creek to Victor.

10. CC&V Responsibilities. In addition to the other requirements set forth in this agreement, CC&V shall be responsible for the following:

A. All conveyance and use of the water furnished hereunder downstream of the Point of Delivery, and CC&V shall bear all risk of loss, including, but not limited to, transit charges as determined by the Colorado State Engineer or the Division Engineer.

B. Should a dispute arise with administrative or governmental entities concerning the applicability of Cripple Creek's water rights as herein discussed or proposed methods of delivery, Cripple Creek, through its staff and counsel, shall take such action as deemed reasonable and necessary to overcome such dispute and obtain any necessary approvals from administrative or governmental agencies. CC&V agrees to reimburse Cripple Creek for the first $10,000.00 of legal expense incurred by Cripple Creek in such efforts, as reasonably itemized and documented by Cripple Creek. Such reimbursement shall be due upon demand by Cripple Creek. Should efforts resulting in expenses beyond CC&V's preliminary $10,000.00 contribution be deemed necessary in Cripple Creek's reasonable judgment and discretion, Cripple Creek may (1) elect to incur such costs itself; or (2) provide CC&V a written request for additional contribution, which request may be honored in the sole discretion of CC&V. The extent to which such efforts at dispute resolution are reasonable, necessary and appropriate shall be in the sole and complete discretion of Cripple Creek, and Cripple Creek shall have no obligation to make any efforts for the resolution of such disputes, nor shall CC&V have any obligation to pay for water not delivered as a result of the same.

C. CC&V's use of the Cripple Creek Water and the effects thereof on third parties, if any, including, but not limited to, the effects of diversion, discharges, and changes in quantity and the quality of said water.

11. Cripple Creek Warranties. Cripple Creek warrants that:

A. Cripple Creek expects to have, and will make reasonable efforts to provide an adequate physical supply of water to furnish water to CC&V under this Agreement, except in times of water shortages as defined in Paragraph 12.A below.

B. The water delivered to CC&V hereunder shall be legally under Cripple Creek's dominion and control at the Point of Delivery. No representation or warranty is made as to fitness for the proposed use or place of use of the water furnished hereunder. CC&V acknowledges it has performed its own diligence with respect to all legal and administrative matters involving the Cripple Creek water rights and will accept any water in an as is condition.

C. Cripple Creek makes no warranty as to the quality of the Cripple Creek Water delivered to CC&V. Cripple Creek agrees that CC&V may monitor the quality of the Cripple Creek Water at facilities owned by Cripple Creek that are utilized to deliver said water to CC&V. CC&V shall contact the Cripple Creek Public Utilities Director in order to arrange for access to monitor water at such facilities. A mutually acceptable plan for monitoring the water furnished hereunder shall be developed by CC&V in cooperation with the Cripple Creek Water Rights Administrator.

12. Suspension of Obligations.

A. Interruption of Water Supply. While it is the intent of Cripple Creek to maintain the delivery of the Cripple Creek Water to CC&V in accordance with the terms of this Agreement, there are certain elements that may make it uncertain as to whether the physical supply of Cripple Creek Water can always be produced in the agreed volume and at the agreed rate. Cripple Creek and CC&V agree that Cripple Creek shall be relieved from its obligation to deliver the Cripple Creek Water at the agreed volume and rate for the following reasons:

(1) The reasonable and prudent maintenance, repair or enlargement of Cripple Creek's reservoirs, water transmission facilities, and wells;

(2) Cripple Creek's need to use the Cripple Creek Water for delivery to its citizens and customers other than CC&V for their use at Cripple Creek's sole discretion;

(3) The inability to deliver the Cripple Creek Water due to surface water shortages, aquifer conditions, well cave-in or blockage, out of priority rights, administrative regulation or water court action, or other occurrence beyond the reasonable control of Cripple Creek, including, but not limited to, an act of God, strike, war, insurrection or inability to provide the Cripple Creek Water arising out of the order of any court or the lawful order of any governmental administrative body or agency with authority to regulate matters pertaining to water produced from the Cripple Creek water system, public utilities, public health or pollution control.

B. Force Majeure. The obligations of the parties under this Agreement, including the payment obligations set forth in Paragraph 3.B., shall be suspended to the extent and for that period that performance is prevented by any cause beyond either party's reasonable

control, including, without limitation, acts of God, acts of war, fire, explosion, earthquake, storm, flood, economic conditions or circumstances that make it infeasible to continue operations, and material and substantial breakdown of equipment, machinery, or facilities; provided, however, that CC&V shall have no obligation to pay for the Cripple Creek Water that Cripple Creek was unable to deliver or make available for delivery and that Cripple Creek shall have an obligation to refund payments already made by CC&V for such undelivered water. Nothing herein shall relieve CC&V of its obligation to pay for the Cripple Creek Water actually delivered.

13. Default, Right to Cure. If either party believes that the other is in default under this Agreement, that party shall give written notice to the other immediately. Within 15 days of receiving a notice of default, the party accused of the default shall either cure or deliver a written response explaining why there has been no default. If the party accused of the default does not respond or cure within said 15 days, then that party shall be deemed to be in default, and the non-defaulting party shall have the right to terminate this Agreement, or in the case of nonpayment, Cripple Creek may interrupt delivery of the water furnished hereunder until the payment default is cured. If more than one payment default occurs, Cripple Creek may require payment for water in advance of delivery, subject to refund if the water is not made available.

14. Written Notice. Whenever written notice is required under this Agreement, it shall be sent by U.S. Mail, First Class, postage prepaid, addressed to the parties as follows:

To Cripple Creek:
Cripple Creek City Administrator
337 E. Bennett Ave.
Cripple Creek, CO 80813

To CC&V:
Cripple Creek and Victor Gold Mining Company
Attn: General Manager
100 North 3rd Street
Victor, CO 80860

With a copy to:
Felt, Monson & Culichia, LLC
319 N. Weber Street
Colorado Springs, CO 80903

With a copy to:
AngloGold (Colorado) Corp.
Attn: General Counsel
7400 East Orchard Road, Suite 350
Greenwood Village, CO 80111

Any address for notice may be changed by written notice to the other party as provided in this Paragraph 16.

15. Merger. This Agreement constitutes the entire agreement between the parties with respect to the subject matter hereof, excepting complimentary provisions under the Victor Agreement, as amended. This Agreement shall not be modified, amended, supplemented, extended, or altered except as the parties may from time to time agree in writing executed by their authorized officers or representatives.

16. Assignability. This Agreement shall be binding on the parties and their successors in interest. So long as the uses of the water remain the same as provided in Paragraph 2 above, CC&V may freely assign this Agreement to its successor, joint venturer, parent company, sister company, or subsidiary company, and such assignee may in turn reassign this Agreement in accordance with this provision. CC&V or its assignees shall give Cripple Creek at

least (30) days prior written notice of such assignment or reassignment of this Agreement. CC&V or its assignees shall not otherwise assign this Agreement without the express prior written consent of Cripple Creek. Cripple Creek may not assign this Agreement without the prior written consent of CC&V.

17. Attorney's Fees. In the event of any dispute between the parties concerning this Agreement or in the event of any action to enforce this Agreement or to collect damages on account of any breach of the obligations provided for herein, the prevailing party shall be entitled to recover from the other party, all costs and expenses, including reasonable attorney's fees, incurred in such litigation as spring as all additional such costs and expenses incurred in enforcing and collecting any judgment rendered in such action.

18. Authority. All parties to this Agreement represent that they have the full power and authority to enter into and perform this Agreement.

19. Governing Law. This Agreement shall be construed in accordance with the laws of the State of Colorado. Any and all disputes concerning this matter shall be decided in any court of competent jurisdiction for Teller County, Colorado.

20. Severability. Unenforceability of any provision contained in this Agreement shall not effect or impair the validity of any other provision of this Agreement, so long as the primary purpose(s) of this Agreement are effectuated by the remaining terms.

21. Counterparts. This Agreement may be signed in counterparts.

22. Binding Effect. This Agreement shall be binding upon the parties hereto and their successors and assigns.

IN WITNESS WHEREOF, the authorized representatives of Cripple Creek and CC&V have executed this Agreement the day and year first set forth above.

ATTEST:

Debra Blevins, City Clerk

APPROVED AS TO FORM

Lee Phillips, Attorney

CRIPPLE CREEK

Bruce Brown, Mayor

ATTEST:

_____

CRIPPLE CREEK & VICTOR GOLD MINING COMPANY, a Joint Venture

Anglo Gold (Colorado) Corp.
Manager

By: Raymond G. DuBois

Title: V.P. & Gen. Mgr.

Design Report for Storm Water Management - Amendment No. 11

AT THE

Cresson Project

Cripple Creek & Victor Gold Mining Co.

Victor, CO

PREPARED BY:

Steffens and Associates, Inc.

Arvada, CO

steffensinc@msn.com

December 2015

TABLE OF CONTENTS

TABLES

FIGURES

REFERENCE FILES AND DOCUMENT REVISIONS

This report is a supplemental report to two previous documents. It addresses changes related to Amendment No. 11 as compared to the two previously reviewed permits listed below

- ***Storm Water Management Plan for Mine- Life-Extension 2, Amendment 10 , at the Cresson Project, Steffens and Associates, Inc., Cripple Creek & Victor Gold Mining Co., January 2012***

- ***Design Report for Storm Water Management at the Chicago Tunnel Site, Cripple Creek & Victor Gold Mining Co., August 2014.***

The substance and hydrology for the Cresson Mine as presented in the Mine Life Extension No. 2 / Amendment 10 (MLE2/Amendment 10) report and for the Chicago Tunnel Site as presented in the Design Report have not changed. Rather, the storm water management practices have been integrated and combined. The only significant changes are modifications to the alignments or configurations of hydraulic structures and changes to the preliminary design that were made during construction to achieve the intended function provided in MLE2/Amendment 10. Accordingly, this report is a supplement to the two previous reports referenced above and will provide the necessary information required to assess the Amendment No. 11 permit application. The reader should reference those original documents for additional hydrology and hydraulic details that are not reiterated herein.

The following page lists the revised drawing numbers along with the original drawing number for ease in reference between the documents.

DRAWINGS LIST

Table I - Revised Drawings for Amendment No. 11

DRAWING NO.	PREVIOUS DRAWING NO.	TITLE	DESCRIPTION
CCVSA11-6	CCV-Ct1	Chicago Tunnel SWMP, Drainage Basins	Storm Water Basins of Poverty Gulch
CCVSA11-7	CCV-CT2	Chicago Tunnel SWMP Drainage Plan	Drainage Plan for Chicago Tunnel Site
CCVSA11-8 AND CCVSA11-9	Replaces MLE2/Amendment 10 Drawing CCV10-SA6	North Cresson Stormwater Ponds – EMP9 and EMP21	Details of pond construction in 2015 with revisions to MLE2/Amendment 10 Design
CCVSA11-10	MLE2/AMENDMENT 10 DRAWING CCV10-SA5	North Cresson And Poverty Gulch Plans And Schematics	General stormwater management concept, flow schematic, progression of development, and pond sizes
'CCVSA11-11	Replaces MLE2/Amendment 10 Drawing CCV10-SA3	Storm Water Plan, Grassy Valley and Vindicator Valley	Channels and sediment ponds during mining and post-reclamation

Table II - Orignal Drawings, Not Revised - Included in MLE2/Amendment 10

DRAWING NO.	PREVIOUS DRAWING NO.	TITLE	DESCRIPTION
CCV10-SA1	Same	Grassy Creek And Vindicator Management Areas	Grassy creek basin and channel capacities
CCV10-SA2	Same	Poverty Gulch Basins And Summary Table	Poverty gulch basin and channel capacities and reproduction of Table I of this report
CCV10-SA4	Same	Grassy Ck & Vindicator EMP Ponds Plans And Profiles	Details of EMP ponds and channels, flow schematic, and general specifications

STORMWATER MANAGEMENT DESIGN CHANGES FROM MLE2/AMENDMENT 10 AND CHICAGO TUNNEL

The proposed Amendment No. 11 for the Cresson Project will require some changes to stormwater management that was presented in MLE2/Amendment No. 10[1] and in the Design Report for Storm Water Management for the Chicago Tunnel Site[2]. The design procedures that were employed in the formulation of both plans were the same, and include the following criteria.

- Hydrologic parameters used for flood routing, such as SCS Curve Numbers and routing methods were the same as for both previous studies as well as for MLE1 Amendment No. 9
- SEDCAD4 was used to compute the routing and provide channel and sediment basin sizing criteria
- Sediment ponds will be sized for two times the volume resulting from a 10-year/24-hour precipitation event
- Channels are sized for the computed discharge resulting from a 100-year/24-hour precipitation event.
- Basins have not significantly changed for Amendment No. 11, nor have the terrain parameters used for computing infiltration and times of concentration. If anything, the basins are somewhat smaller because more area will be tributary to the mine and the diatreme for Amendment No. 11 compared to MLE2/Amendment 10.

Accordingly, the significant changes are primarily related to revised alignments of channels, revised design of dikes around sediment ponds, and revised design concepts of storm water conveyance structures.

The changes discussed in this updated report relate to Grassy Valley, North Cresson Mine, and Poverty Gulch Chicago Tunnel. No other basins will be affected by Amendment No. 11.

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[1] *Storm Water Management Plan for Mine- Life-Extension 2, Amendment 10 , at the Cresson Project, Steffens and Associates, Inc., Cripple Creek & Victor Gold Mining Co., January 2012*

[2] *Design Report for Storm Water Management at the Chicago Tunnel Site, Cripple Creek & Victor Gold Mining Co., August 2014.*

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CHICAGO TUNNEL SITE

OVERVIEW OF STORM WATER MANAGEMENT FOR AMENDMENT NO. 11

The Chicago Tunnel Site has been characterized as having three flow streams – 1)Poverty Gulch stream, 2) a lower stormwater conveyance channel that is essentially a natural runoff channel with minimal impact from the facility, and 3) an upper stormwater conveyance channel that drains the three areas of highest non-sediment pollution potential. Those areas are the fuel storage tanks, the portal of the Chicago Tunnel, and the maintenance shop.

Poverty Gulch stream is an intermittent stream that is already separated from the Chicago Tunnel site by an earthen dike. The estimated 10-year and 100-year discharge rates of the stream are 17 cfs and 34 cfs, respectively. An existing 18-inch culvert beneath the Cripple Creek access road will be replaced with a 24-inch culvert that can discharge the 10-year flow. Excess flow above 17-cfs will spill over a constructed riprap spillway and flow across the access road in an armored swale.

Drawing CCVSA11-7 shows the extent of drainage basins that are tributary to the Chicago Tunnel site and contribute stormwater runoff. The overall basin area is 312 acres. However, only 13.74 acres are tributary to the Chicago Tunnel site and need to be managed. The remaining 298.7 acres provide runoff to the stream channel of Poverty Gulch. The basin area named Lower South on Drawing CT-1 is shown in detail on Drawing CCVSA11-6, the facility and drainage map.

The lower stormwater conveyance will include natural runoff from the hillside northeast of the site as well as runoff from within the west side of the site. The estimated peak flow through that channel is about 0.4 cfs. A small (10ft x 30ft) sediment trap will be constructed at its junction with Poverty Gulch stream. The sediment trap will remove all sand and 20% of silt from the runoff, down to about 20 micron size. The sediment trap is necessary because the 24-inch road culvert will only convey the 10-year discharge and stream flows exceeding 17cfs will be comingled with some stormwater from the site. CC&V will evaluate whether the culvert can be increased to 30-inch diameter, the small sediment trap eliminated, and all site storm water flow diverted into the larger sediment pond described below.

There will be a separation of that basin from the upper stormwater conveyance on the north side of the fuel storage (at the Divide shown on the drawing). That upper conveyance will divert southward,

in front of the tunnel portal, behind the maintenance shop and down to a terminal sediment pond that is sized for the volume of the 10-year/24-hour storm (0.46 acre feet). The pond will not be lined, nor will it have a direct connection to Poverty Gulch stream. By that means, any fuel spills, any sediment from the tunnel, and any impacts from the maintenance shop will all be contained in the sediment pond. The estimated flow discharge for the basin that is tributary to the site is 2.64 cfs for the 10-yr/24-hr event. The upper channel has been designed for that flow. A triangular swale with 6H:1V side slopes and 6-inches deep or a trapezoidal ditch with 3H:1V side slopes, 2 ft bottom width, and 6-inch depth will carry that flow rate.

The pond for removing sediment from the upper stormwater conveyance has been constructed at a nominal size of 137 ft. x 55 feet wide and 6 feet deep, with a maximum settling area of 6,285 square feet when full. It will remove all sand from runoff and 60% of silt down to a size of about 10 microns.

The principal downstream BMP to be employed at the Chicago Tunnel site will be a detention pond designed to have a holding capacity of the volume of runoff resulting from twice the volume of a 10-year, 24-hour precipitation event. A 5-feet wide overflow spillway will be provided to protect the structural integrity of the embankment as well as avoid excessive erosion of the downstream streambed in the event that the pond overflows. The spillway or water release structure will be designed to pass the peak flows from a 100-year, 24-hour storm event. The flow will be very small at only about 1 cfs during that storm based on a pond capacity of only 0.46 acre feet.

INTEGRATION OF CHICAGO TUNNEL SITE INTO THE CRESSON MINE STORM WATER DESIGN

A Design Report for Storm Water Management was prepared for the Chicago Tunnel Site in 2014. The purpose of that plan was to provide a drainage plan and a design for structures and Best Management Practices (BMPs) that would facilitate the use of the Chicago Tunnel underground facilities for exploration tasks. Those tasks and activities were anticipated and are a fundamental objective of Amendment No. 11.

Drawing Nos. CCVSA11-6 and CCVSA11-7 show the details of the drainage design for the site and the hydrologic basins contributing to the flow of Poverty Gulch. Drawing CCVSA11-7 also shows storm water structures related to the North Cresson Mine such as the location of the EMPs and other facilities. The hydrology calculations for Poverty Gulch include overlaps with the calculations for North

Cresson. For example the Mine Flank Basin and the Poverty Gulch Upper Basin shown on the drawing will be intercepted by the Globe Hill mine and therefore the calculated flow from those basins is overstated and conservative. Because of that interception the peak 100-year discharge of Poverty Gulch into the Chicago Tunnel site will be somewhat less than the projected 35 to 38 cfs flow in the streambed adjacent to the Chicago Tunnel.

The Chicago Tunnel storm water design included the construction of a sedimentation basin with a capacity of at least twice the 10-year volume, or about 0.97 acre feet, that would contain sediment associated with the exploration activities, impacts from maintenance of equipment, and unanticipated fuel spills. The site already has enclosed buildings housing gasoline and diesel storage tanks with adequate sumps to contain at least 150% of the tank contents.

The sedimentation basin was originally designed to contain one volume of the design storm (0.47 acre feet, the volume from a 10-year/24-hour storm) plus any contaminants contained therein. The pond was constructed to a larger volume of almost one acre feet and therefore meets the design requirement of two times that volume.

The storm water design also included specific requirements for channel sizing and armoring of the channels. Those criteria are described in the Design Report and most of the facilities have been constructed to meet those criteria.

NORTH CRESSON AND POVERTY GULCH STORM WATER MANAGEMENT

OVERVIEW OF STORM WATER MANAGEMENT FOR AMENDMENT NO. 11

Storm water management on the west side of the mine, above the Town of Cripple Creek, provides special challenges to ensure that facilities are effective, that they are aesthetically acceptable, that they will conform to the dynamic nature of mine progression, and that they will meet specific negotiated permit criteria. The plan described in MLE2/Amendment 10 and revised as shown on Drawings CCVSA11-8 through CCVSA11-10 has been formulated to meet all of those requirements.

Flow Schematic

Figure 2 shows the schematic of storm water flow for the Poverty Gulch Storm Water Management Area. The figure shows the same general schematic as was presented in MLE2/Amendment 10 plus the method that the Chicago Tunnel basins will be integrated.

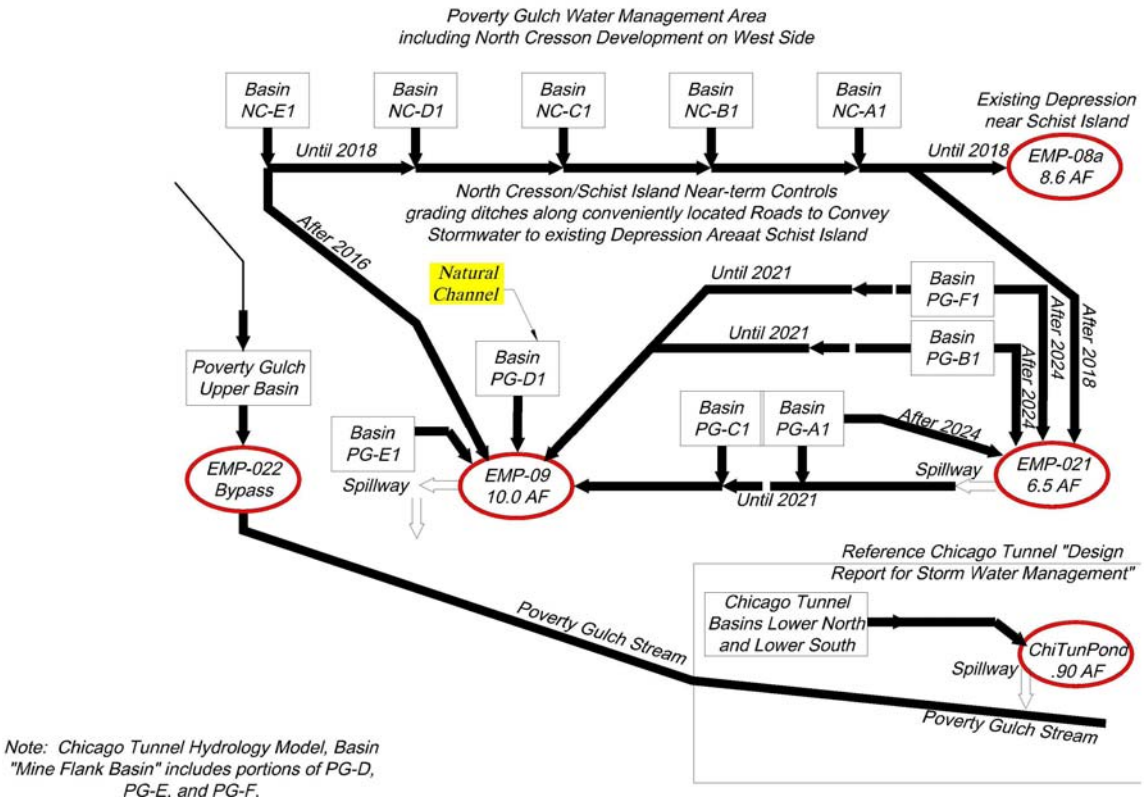


Figure 1 - Poverty Gulch and North Cresson, Storm Water Flow Schematic

System Configuration

Existing roadways and depression areas will be used for the storm water facilities to minimize the extent of additional impacts and to provide expedient means for storm water management. The initial use of existing, and previously disturbed corridors allows time to build new storm water structures while mining proceeds so that enhanced protection measures will be functional and in place when needed.

The North Cresson storm water drainage system will consist of three tiers of channels and sedimentation ponds that generally reflect and are constructed in response to the plan for mine development. The upper tier intercepts and manages storm water during initial preparation of the North Cresson mining pits. The middle tier provides replacement of those functions by intercepting runoff from disturbed areas as the mine develops and obliterates those upper basins. And finally, the lowest tier provides continuous and in most cases redundant interception capabilities through the life of the mine and after reclamation.

The upper tier has been constructed in accordance with MLE2/Amendment 10 and consists of channels along existing access roads that will convey storm water south to EMP-8a as shown on Detail 1 of Drawing CCVSA11-8. EMP-8a is an existing depression area on the flank of the Schist Island pit of North Cresson that is low enough in elevation and accessible to receive runoff from the higher terrain of the North Cresson hillside. It will drain by percolation into the diatreme.

EMP-09 and EMP-21 were constructed in 2015 to replace the function of EMP-08a when it is obliterated by mining. The final design of those sedimentation structures is shown on Drawings CCVSA11-9 and -10. Those facilities are key to the function of the middle and lower tiers of storm water interception. Collection ditches will be constructed before the upper tier is obliterated by mining in 2018. At that time EMP-009 and EMP-021 will be commissioned.

The lower north and south ditches and EMP-022 were part of the lowest tier of the MLE2/Amendment 10 design, and that will still be the case. There will be differences in their construction, described in the next subsection. Those facilities collect storm water from the lowest basing and convey it, generally to either EMP-021 or to EMP-009. Those ponds have been designed for zero discharge, with twice the 10-year flood volume as the capacity criteria. Should the ponds spill

the outflow from EMP-021 would report to EMP-009a. EMP-009a has been constructed with an armored spillway that will convey discharges exceeding twice the 10-year flood volume to Poverty Gulch Stream.

NORTH CRESSON MINE CHANGES IN STORM WATER MANAGEMENT COMPARED TOMLE2/AMENDMENT 10 AND THE CHICAGO TUNNEL STORM WATER DESIGN

The primary changes in storm water management for Amendment No. 11 compared to MLE2/Amendment 10 are the following:

- The timing of the mining processes for the Schist Island and the Globe Hill orebodies has changed, which only affects which channels must be built in a sequence. The schematic in Figure 2 shows the general construction sequence. Details 5 through 13 on Drawing CCVSA11-10 show how the schedule relates to the geographic sequence of the mining. It is important to note that the three key sedimentation ponds are already constructed and ready for use. Those include EMP-008a, EMP009, and EMP021. Most of the conveyance channels to those ponds were either pre-existing or will be constructed as needed for their use.

- The exploration activities at Chicago Tunnel will necessitate the haulage and removal of development rock to the Cresson Mine. An existing access road from Chicago Tunnel to the Squaw Gulch area of the mine will be improved as needed for use with 40 Ton Articulated Trucks. In MLE2/Amendment 10, that route was to be designed for 22 to 24 cfs (Channels PG-A and PG-C) with 3 to 6-inch riprap armoring. The haul road design will include provisions for that storm water flow.

- The revised Globe Hill mine perimeter has been extended northwest up to the permit boundary, leaving little room for the EMP022 sediment pond that was part of the MLE2/Amendment 10 design. In addition, the Globe Hill mine will cut off the Poverty Gulch streambed in the location shown on Detail 1 of Drawing CCVSA11-10. The terrain is relatively steep in that area And there will not be enough physical space for construction of a pond such as was proposed for EMP-022. CC&V is evaluating an alternative design for a stream bypass system that will intercept the flow in Poverty Gulch above that location, convey it around the mine to the Poverty Gulch streambed and discharge the flow into Poverty Gulch using a suitable energy dissipation structure.

- EMP sedimentation ponds were constructed in early 2015 to comply with the MLE2/Amendment 10 requirements. Drawings CCVSA11-8 and 9 show the revised design of EMP009 and EMP021. The storage requirements prescribed by MLE2/Amendment 10 were attained, but significant revisions were necessary because of the steep and undulating terrain.
- EMP009a extends into the Historic Buffer Zone as was expected and proposed in MLE2/Amendment 10. The permit boundary for Amendment 11 has been extended outward to encompass the entire EMP-009a pond and dike.

STORM WATER MANAGEMENT IN GRASSY VALLEY

OVERVIEW OF STORM WATER MANAGEMENT FOR AMENDMENT NO. 11

The proposed arrangement of storm water management facilities for expected conditions is illustrated on Drawing CCVSA11-11. That drawing shows the storm water management system through the course of mine development (Details 1 and 3) and after reclamation (Details 2 and 4). The views are separated by location in the basin with the upper basin area influenced by the WHEX mine shown on Details 1 and 2, and the lower basin influenced by ECOSA on Details 3 and 4.

Flow Schematic

Figure 2 shows the schematic of storm water flow through the progression of WHEX and ECOSA development. Vindicator Storm Water Management Area is an existing storm water system on the south side of ECOSA and includes EMP-13, which was sized for the storm water criteria as part of DRMS Permit M-1980-244 Amendment No. 8 and its use will not appreciably change by implementation of Amendment No. 11.

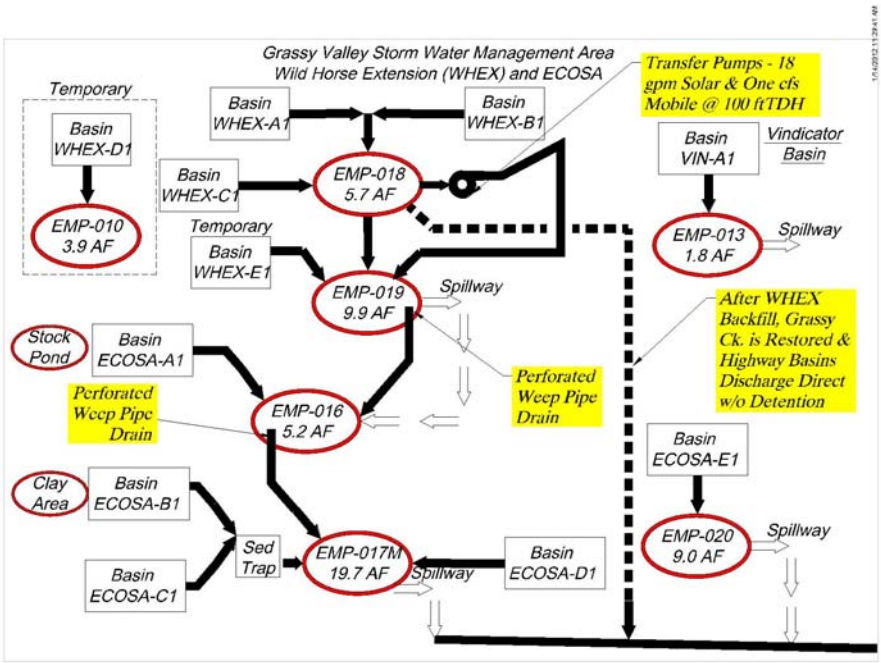


Figure 2 - Upper Grassy Valley and Vindicator Valley, Storm Water Flow Schematic

System Configuration

The Grassy Valley storm water management system consists of a number of sedimentation ponds in series and connected by channels. The uppermost pond is EMP-018 which collects runoff from the basin tributary to the County Road. It is located above the WHEX pit and positioned such that it cannot be drained by gravity. As storm water collects in the pond it is pumped through a pipeline to EMP-016. The MLE2/Amendment 10 design (shown on Figure 2) showed the discharge into EMP-019 but it was rerouted to EMP-016 when EMP-019 was impacted by the WHEX mining activities.

Runoff collected in EMP-016 and runoff from most of the basins tributary to ECOSA reports to EMP-017 which is a terminal structure. There is not a prescribed outlet from EMP-017 to Grassy Creek, but there is an emergency overflow spillway to protect the integrity of the dike. Water is occasionally withdrawn from EMP-017 to empty the structure and the water is used for dust control on roadways within the mining areas.

EMP-020 is located on the south flank of ECOSA to collect runoff that can't flow by gravity to EMP—017. It also has a spillway for releasing excess flow to Grassy Creek but is typically empty.

The upper basin of Grassy Creek will be modified in future years as the WHEX mine is developed and partially backfilled. The configuration of the channel in that area is shown on Details 1 and 2 of Drawing CCVSA11-11.

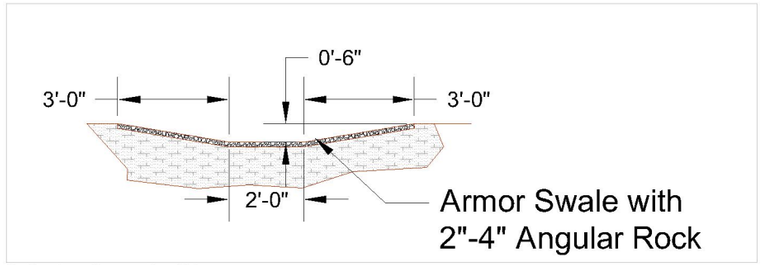
Additional drawings showing the hydrology and structure designs can be found in the MLE2/Amendment 10 storm water design report. Those drawings are listed on Table II.

GRASSY VALLEY, WHEX MINE AND ECOSA CHANGES

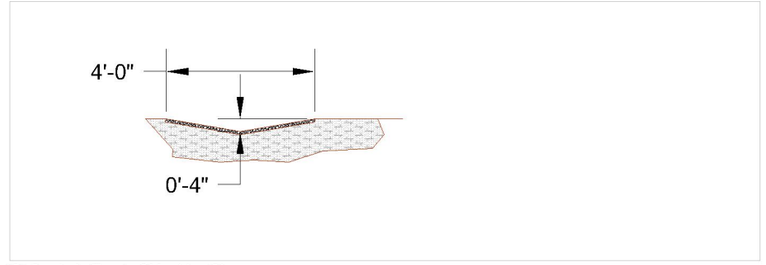
All of the sedimentation ponds in Grassy Valley have been constructed and are functional. The primary change in Storm Water Management related to Amendment No. 11 relates to the backfill of the north side of the WHEX Mine. In MLE2/Amendment 10 there was to be a partial backfill of the mine along with the reconstruction of the Grassy Creek channel along the north perimeter of WHEX. The volume of backfill was sufficient that a ridgeline and valley could be constructed to restore the Grassy Valley streambed.

The backfill volume for Amendment No. 11 is lower than was available for the MLE2/Amendment 10 plan. Consequently the resulting terrain will be a flat plain as is shown on Details 1 and 2 of Drawing CCFSA11-11. The stream channel will hug the north abutment of the plain and will discharge into EMP019 as was planned in MLE2/Amendment 10. There will be no significant change in the design flow rate or the channel configuration.

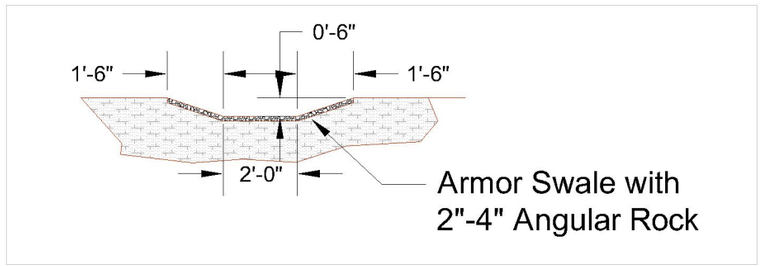
The ECOSA storage area will be higher in elevation for Amendment No. 11 than was planned in MLE2/Amendment 10. However, the final configuration of the basins will be somewhat smaller than for MLE2/Amendment 10. Consequently, the MLE2/Amendment 10 design specifications will be adequate and require no modifications.



2 Swale at Access Road Entrance
Section A



4 Swale in Front of Machine Shop
Section C



3 Main Channel behind Machine Shop
Section B

Note: Alternative Design is to replace the culver: with a 30-inch pipe to increase its capacity to 35 cfs (100-yr. discharge), eliminate the smaller sediment trap, and bring all flow from the site to the large sediment pond.

10'w x 30'L x 24"D
Sediment Trap

24" HDPE
Culvert -
Q10=17 cfs
(10-yr Flow)

Site Boundary
3.5 Acres

Ditch along Road
6"Deep x 24" Wide

Access Road from
Cripple Creek

Stormwater
Discharge "A"

Poverty Gulch Stream

3:1
Slopes

15.0 '

Q10=2.6 cfs

136.8 '

53.0 '

6" x 6'w Swale
w/3" Riprap

Swale across Road
6"D x 24" bottom width
w/6:1 Approach Slopes

Armored Chute
for Stormwater along
Access Road

Sediment Pond
5 ft. Deep, 0.45 Acre Ft

Supplies
Storage

Divide

Equipment
Parking

Fuel
Storage

Shallow
(4"deep)Swale

Chicago
Tunnel
Portal

Office

Maintenance
Shop

Swale
4"Deep

Old
Mill

Proposed
Dry-change

Primary Drainage
Channel on Back Side
of Shop - 2'W x 8" Deep

REVISIONS	NO.	DATE	MADE BY	CKD. BY	REMARKS
	0	11/24/15	SDS		Original Issue
	1	12/3/2015	SDS		For Review
	2	12/9/2015	SDS		Alternative to second Sediment Trap Added - Replacing culvert
	△				
	△				
	△				
	△				

Cresson Mine
Victor, CO

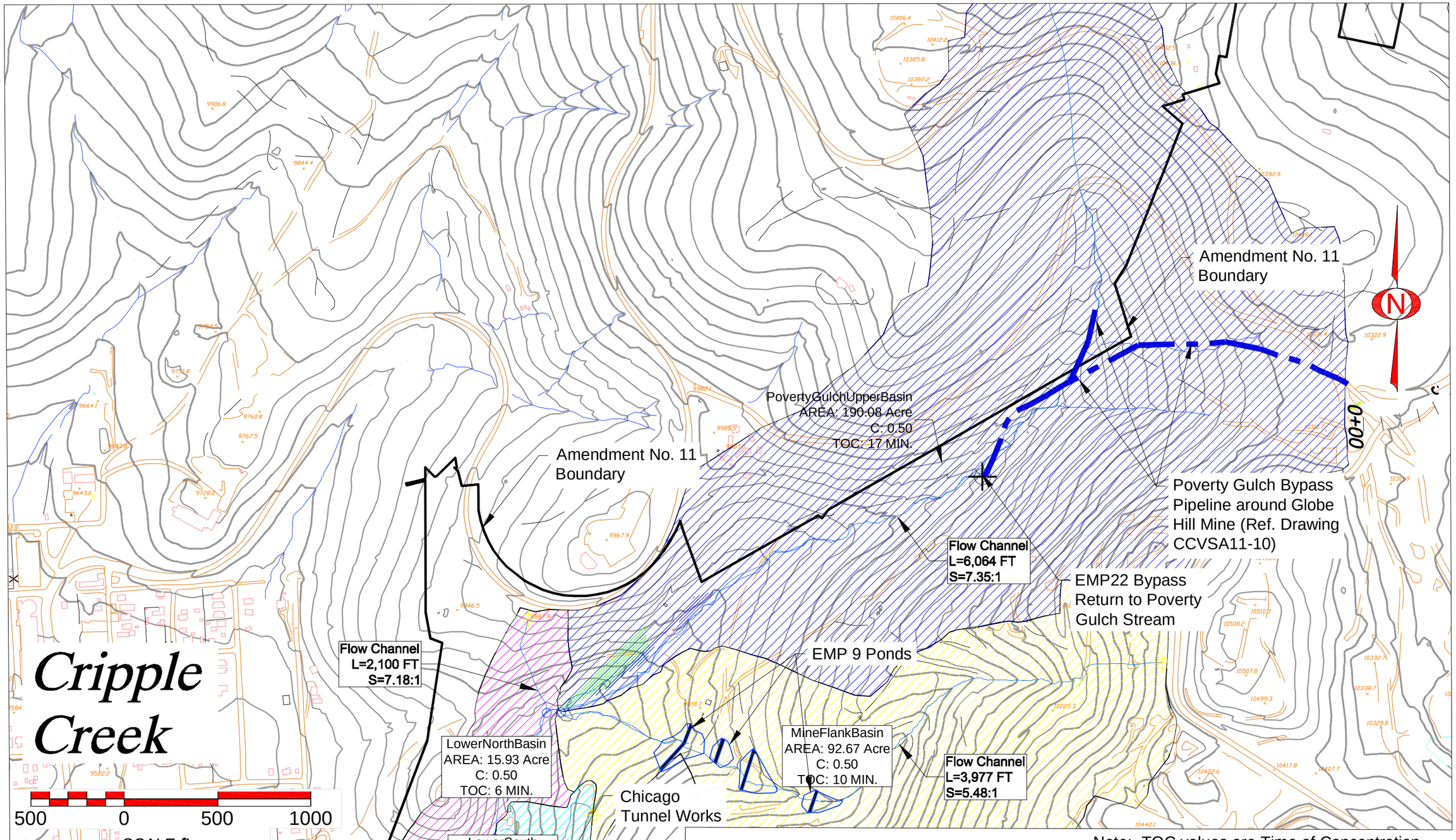
Amend No. 11 - Chicago Tunnel Site
Drainage Plan
Plan View

Steffens and Associates, Inc.
Water Resources - Environmental - Mining Engineering
Arvada CO - steffensinc@msn.com - 303.378.8181

CLIENT: CC&V Gold Mining Co.

Alt. Drawing Number	Scale	DRAWING NO.
CCV-CT2	Noted	CCVSA11-6

2



Note: TOC values are Time of Concentration for Sheet Flow Only, not including channel flow.

REVISIONS	NO.	DATE	MADE BY	CKD. BY	REMARKS
	0	11/24/15	SDS		Original Issue
	1				
	2				
	3				
	4				
	5				
	6				

Cresson Mine
Victor, CO

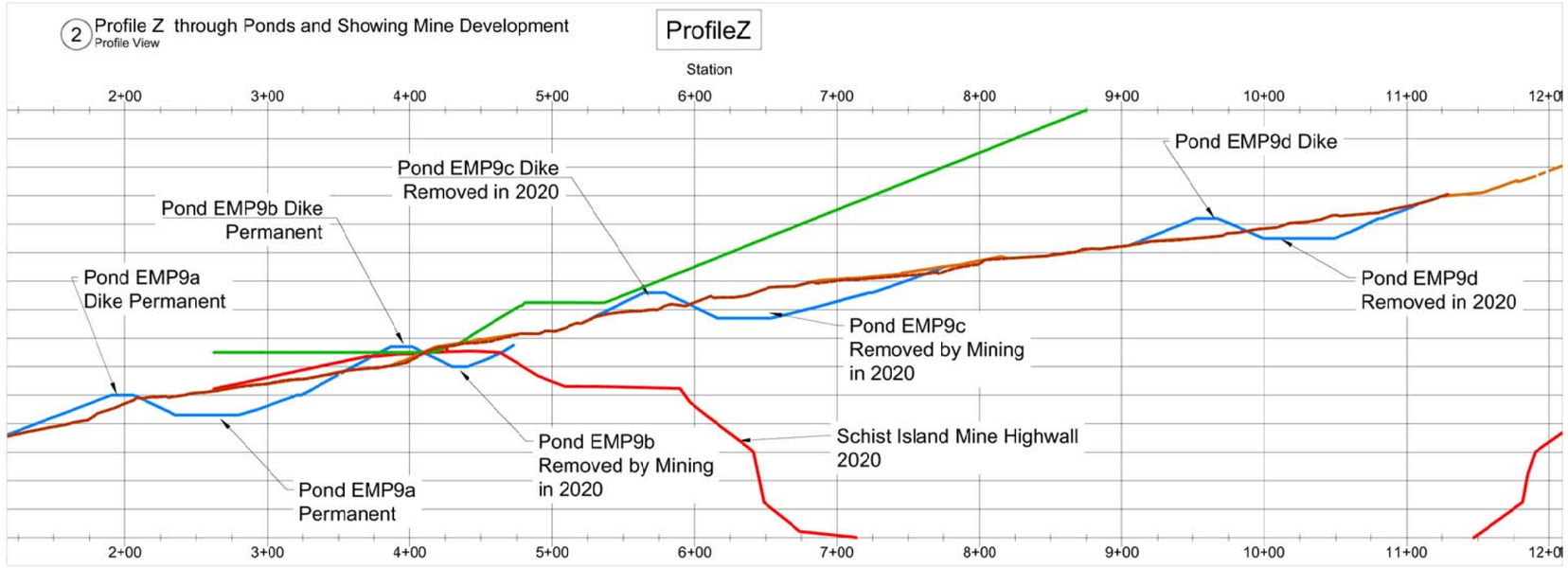
Amend No. 11 - Chicago Tunnel
Poverty Gulch Drainage Basin
Plan View

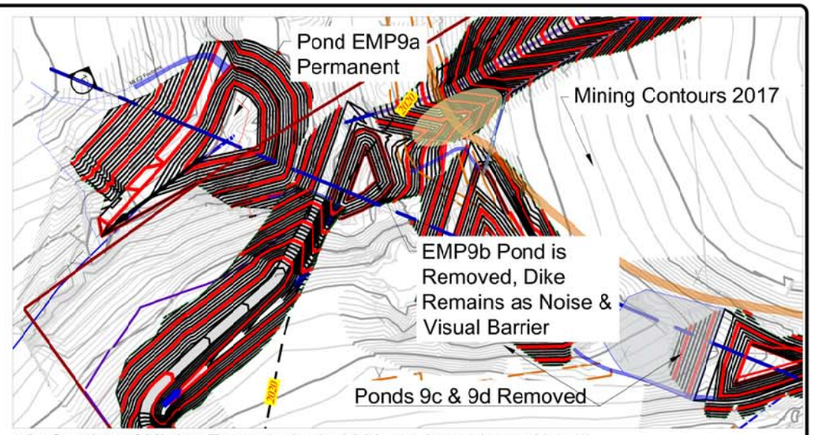
Steffens and Associates, Inc.
Water Resources - Environmental - Mining Engineering
Arvada CO - steffensinc@msn.com - 303.378.8181

CLIENT: CC&V Gold Mining Co.

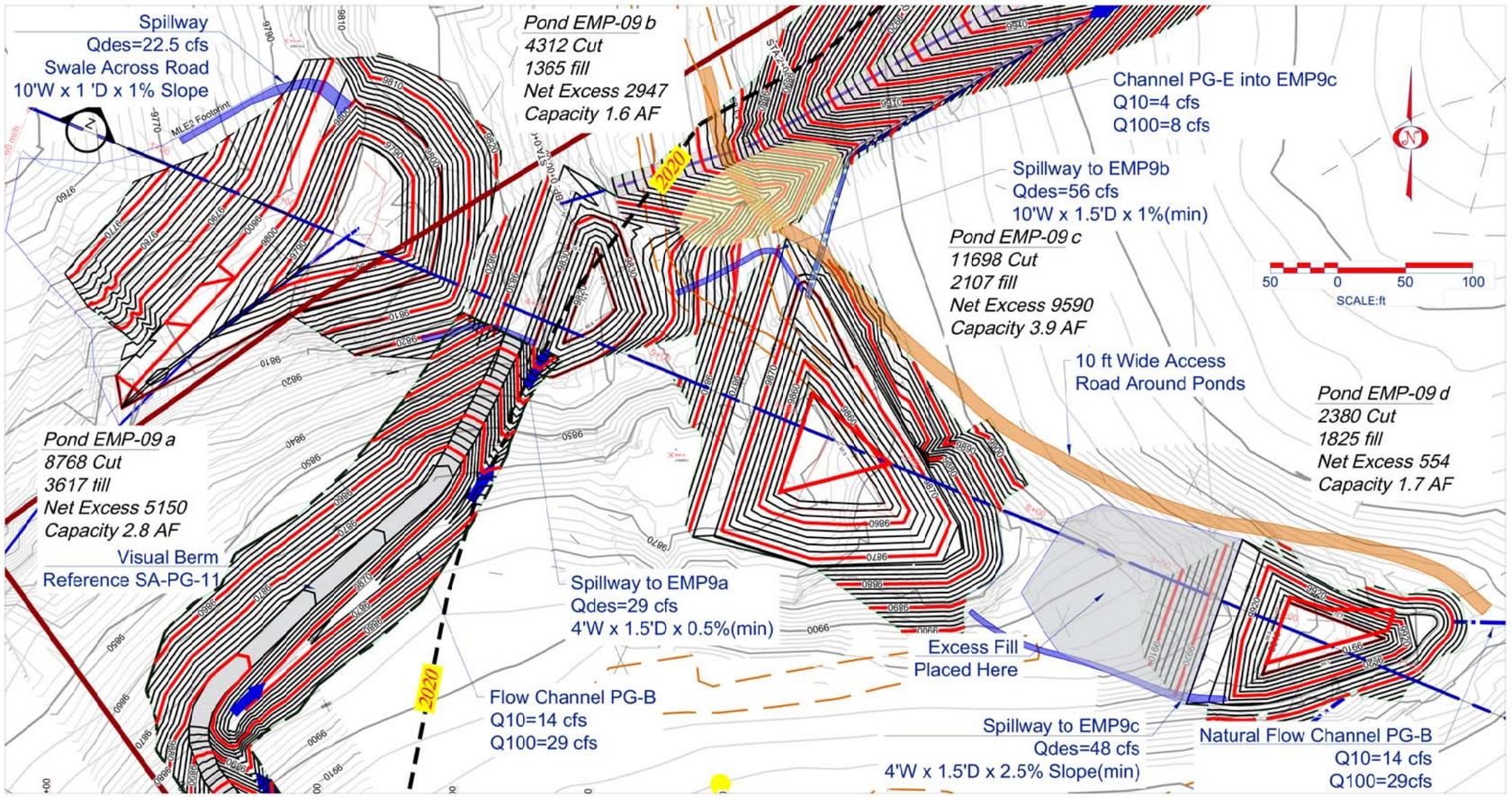
Alt. Drawing Number	Scale	DRAWING NO.
	Noted	CCVSA11-7 0

2 Profile Z through Ponds and Showing Mine Development
Profile View





2 Overlay of Mining Topography in 2020 per Amendment No. 11
Plan View
1"=100' (24x36 Sheet)



1 Ponds EMP9a, 9b, 9c, and 9d
Plan View
1"=50' (24x36 Sheet)

REVISIONS

NO.	DATE	MADE BY	CKD. BY	REMARKS
0	1/1/15	SDS		Original Design for Review
1	12/5/14	SDS		Added Visual Berms
2	2/12/15	SDS		Revised Visua Berm Design, Added Spillway Design Criteria
3	11/28/15	SDS		Revised for Proposed Mining Sequence of Amendment 11
4				
5				
6				

Cresson Mine
near Cripple Creek, CO

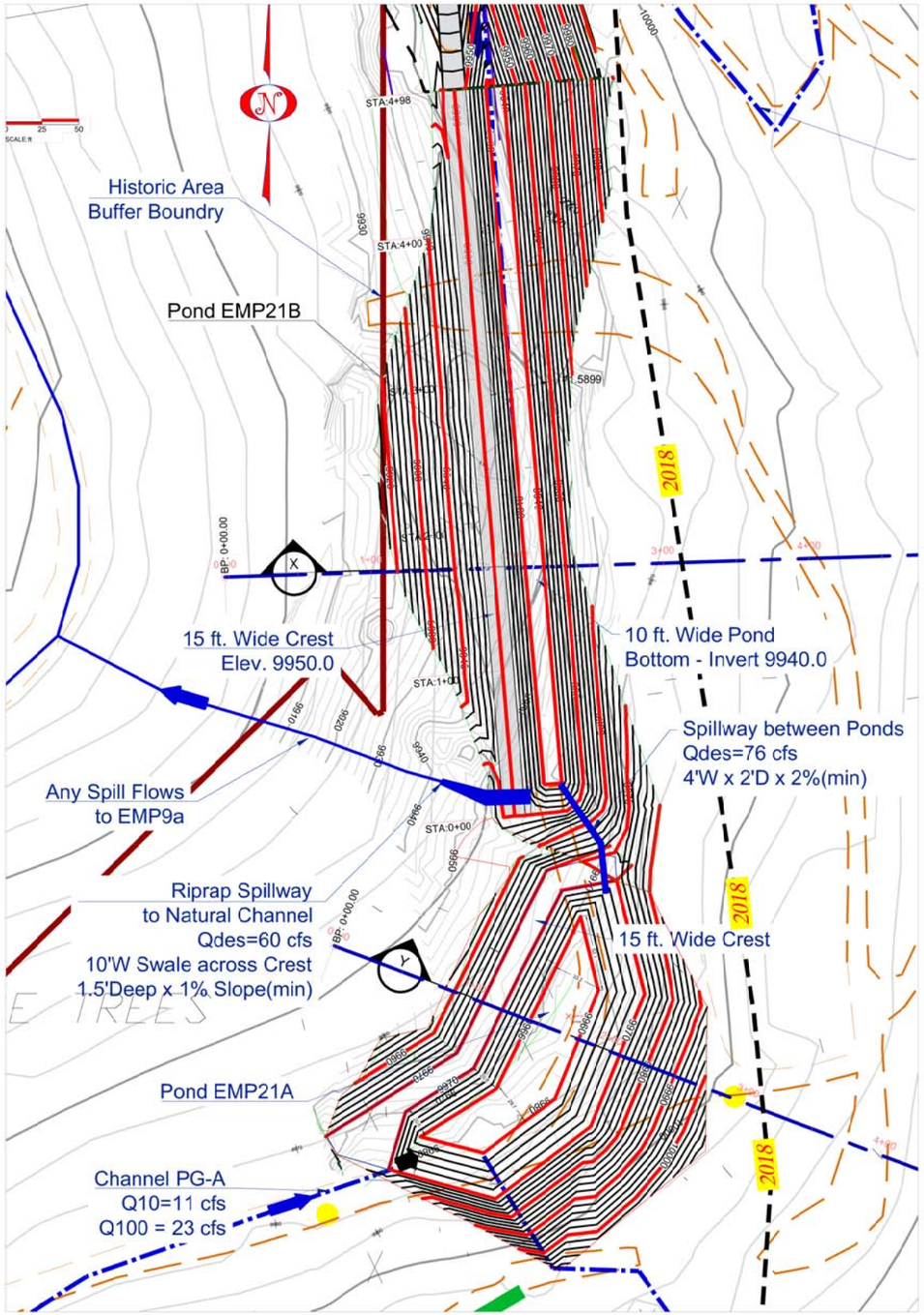
Steffens and Associates, Inc.
Water Resources - Environmental - Mining Engineering
Golden CO 80403 - O: 303.216.1801 - C: 303.378.8181

North Cresson Stormwater Ponds
EMP9- Dike and Pond Construction Plans and Profiles

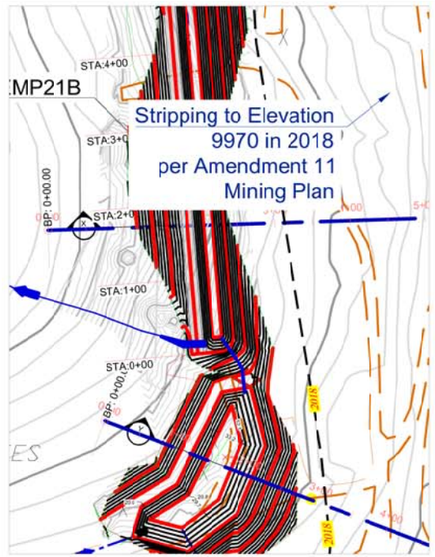
CLIENT: CC&V Gold Mining Co.

Alt. Drawing Number	Scale	DRAWING NO.
SAI-PG-9	Noted	CCVSA11-8

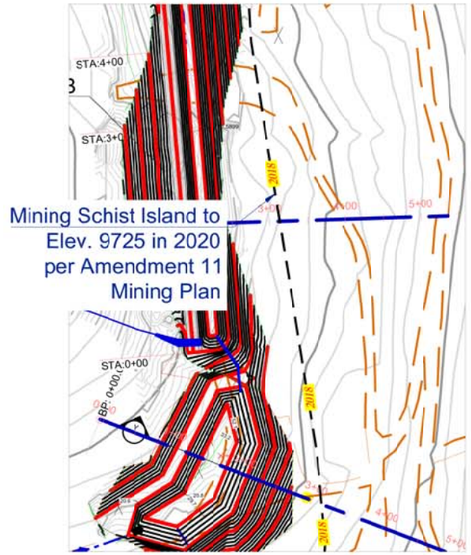
3



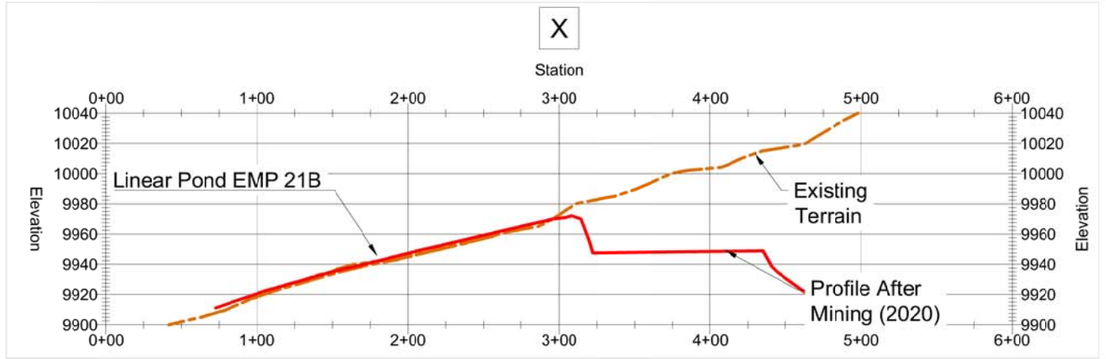
1 Ponds EMP21a & EMP21b
Plan View
1"=50' (24x36 Sheet)



2 Mining Topo in 2018
Plan View
1"=100' (24x36 Sheet)



3 2nd Phase of Mining in 2020
Plan View
1"=100' (24x36 Sheet)



4 Profile through Linear Pond EMP21b
Profile View
1"=50' (24x36 Sheet)

REVISIONS

NO.	DATE	MADE BY	CKD. BY	REMARKS
0	1/1/15	SDS		Original Design for Review
1	12/5/14	SDS		Added Visual Berms
2	2/2/15	SDS		Moved Pond 21B about 10 feet inward to avoid Buffer
3	2/12/15	SDS		Revised South Berrr, Addec Details
4	11/29/15	SDS		Revised to Show Amendment No. 11 Mining Plan

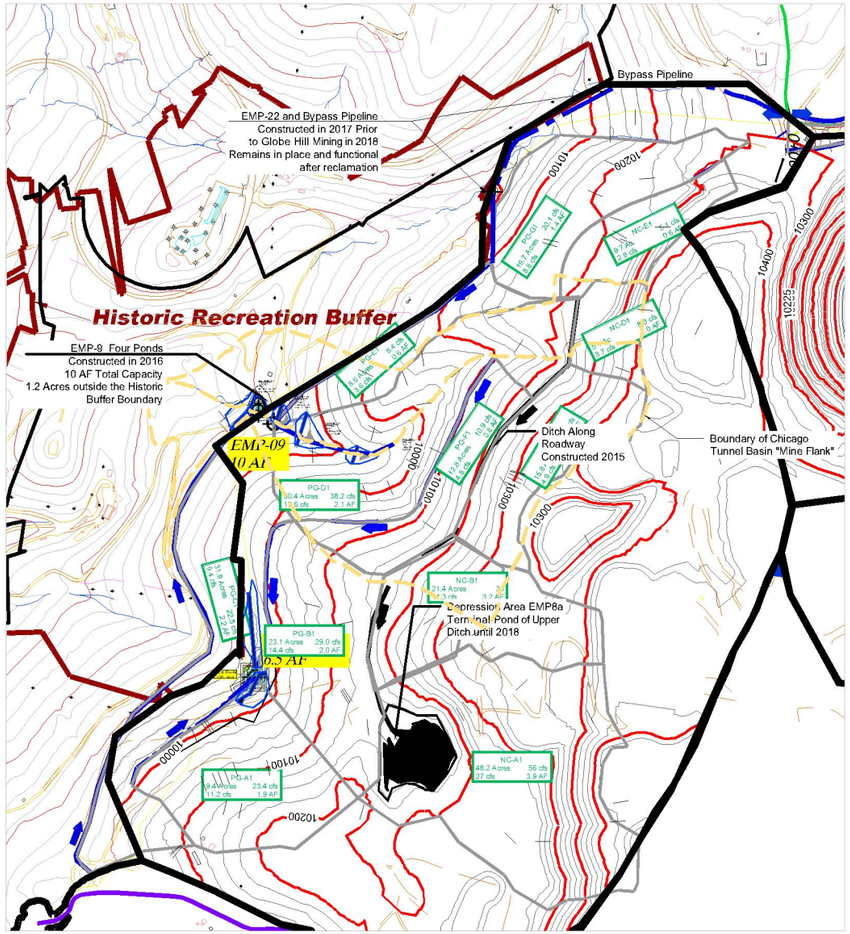
Cresson Mine
near Cripple Creek, CO

North Cresson Stormwater Ponds
EMP21 Dike and Pond Construction
Plans and Profiles

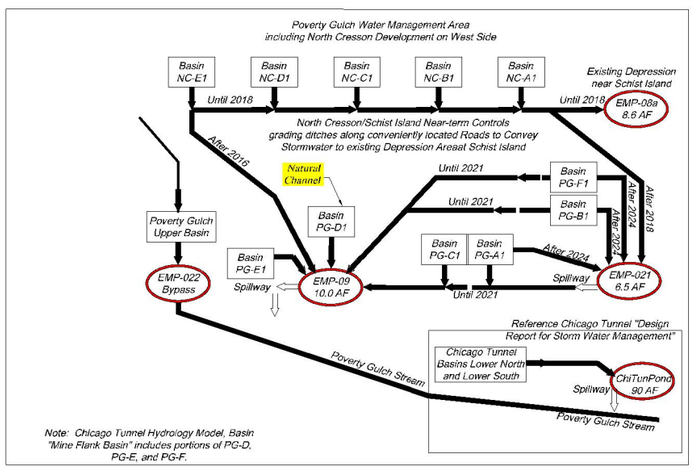
Steffens and Associates, Inc.
Water Resources - Environmental - Mining Engineering
Golden CO 80403 - O: 363.216.1801 - C: 303.378.8181

CLIENT: CC&V Gold Mining Co.

Alt. Drawing Number	Scale	DRAWING NO.
SAi-PG-10	Noted	CCVSA11-9 4



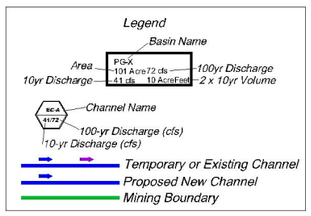
1 Poverty Gulch Stormwater Management Area (2016 Contours Displayed)
Plan View
1"=500 ft (DSize)

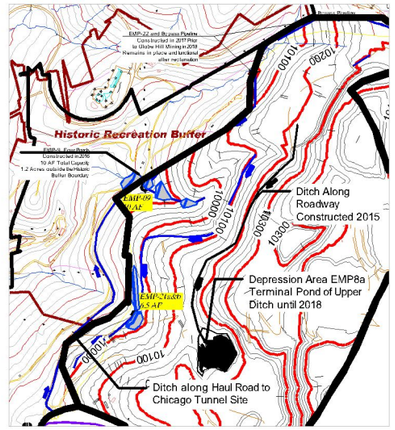


2 Poverty Gulch Stormwater Management Area
Schematic

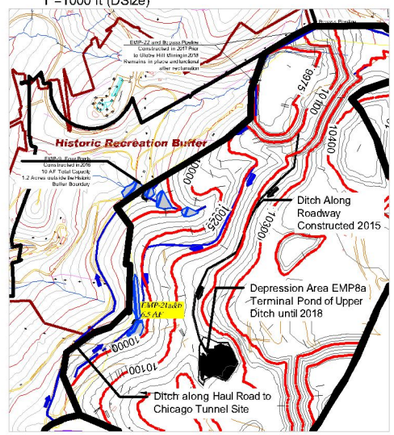
Notes:

1. The hydrology calculations for the storm water system shown on this drawing have not changed from MLE2 to this Amendment No. 11. The SEDCAD modeling from MLE2 can be referenced for those calculations.
2. The hydrology and storm water management for the Chicago Tunnel is shown on Drawing CCVSA11-6 and 7. Except for flow along the access roadway to Chicago Tunnel Site those systems are independent.

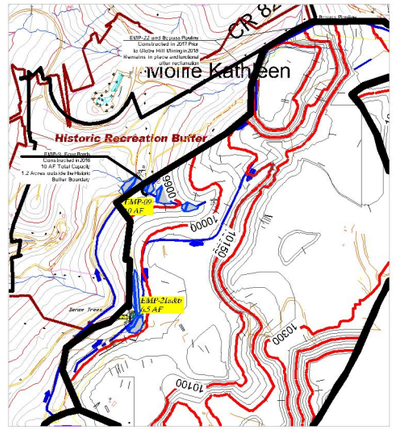




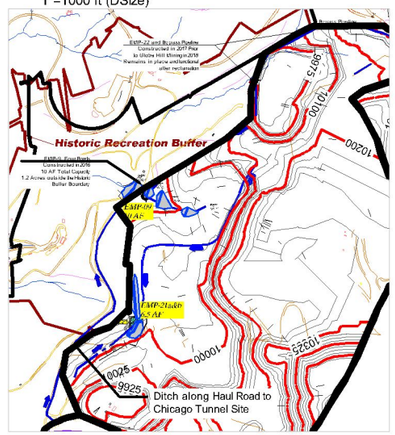
5 Current Conditions 2016
Plan View
1"=1000 ft (DSize)



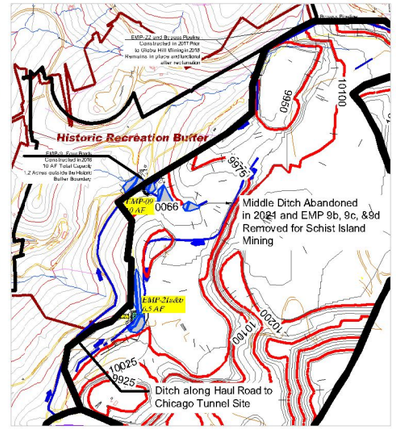
6 End of Year 2017
Plan View
1"=1000 ft (DSize)



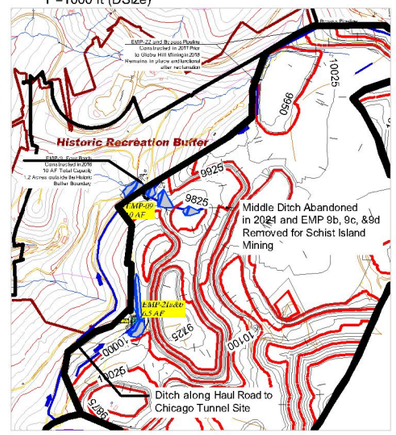
7 End of Year 2018
Plan View
1"=1000 ft (DSize)



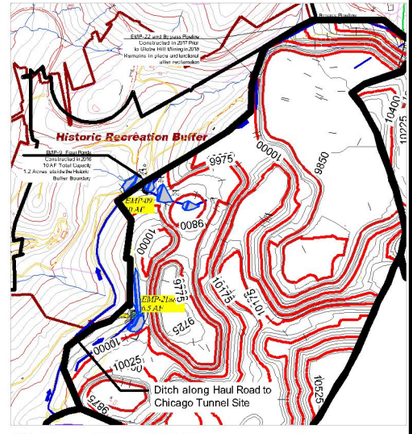
8 End of Year 2019
Plan View
1"=1000 ft (DSize)



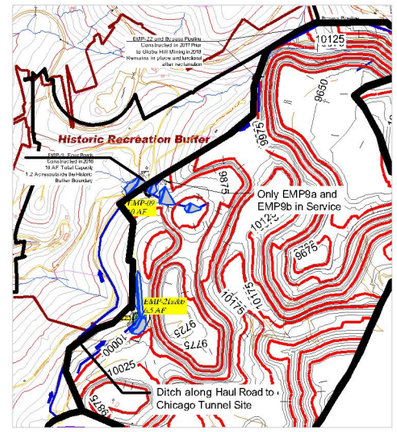
9 End of Year 2020
Plan View
1"=1000 ft (DSize)



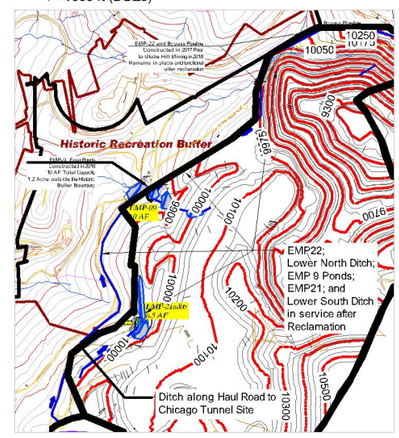
10 End of Year 2021
Plan View
1"=1000 ft (DSize)



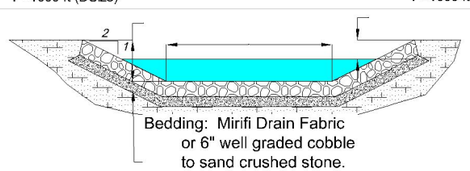
11 End of Year 2022
Plan View
1"=1000 ft (DSize)



12 End of Year 2023
Plan View
1"=1000 ft (DSize)



13 Post Reclamation
Plan View
1"=1000 ft (DSize)



Channel Dimensions

SEDCAD Model & Channel ID	Channel Name	10-Yr Flow (cfs)	100-yr Flow (cfs)	Avg. Slope (%)	Bottom Width (ft)	Flow Depth (ft)	Chan. Depth (ft)	RipRap D50(nom)
North Cresson 1	NC-E	2.8	5.1	3.5	0	1.5	2.0	Grass
North Cresson 16	NC-C	4.9	14.6	3.5	0	1.3	2.0	Grass
North Cresson 17	NC-B	14.3	34.0	2.5	0	1.7	2.5	3"
North Cresson 18	NC-A	27.1	56.7	50	6.0	0.7	3.0	6"
North Cresson 20	NC-D	3.7	8.3	4.6	0	1.5	2.0	Grass
Poverty Gl 1	PG-A	11.2	23.4	8.1	0	1.3	2.5	6"
Poverty Gl 2	PG-B	14.4	29.0	.7	4.0	1.2	2	3"
Poverty Gl 3	PG-C	9.4	22.5	3.4	0	1.4	2.5	3"
Poverty Gl 4	PG-D	17.6	38.2	15.5	4.0	0.8	2.5	3"
Poverty Gl 6	PG-E	3.6	8.4	14.4	0	0.8	2.0	3"
Poverty Gl 17	PG-F	4.8	10.9	20	0	01.0	2.0	3"
Poverty Gl 18	PG-G	8.8	20.1	5	0	0.6	1.8	6"

3 Channel Dimensions
Table

REVISIONS	NO.	DATE	MADE BY	CKD. BY	REMARKS
	0	12/1/11	SDS		Preliminary Issue For Review
	1	1/7/12	SDS		Revised SEDCAD Tables - For Final Review

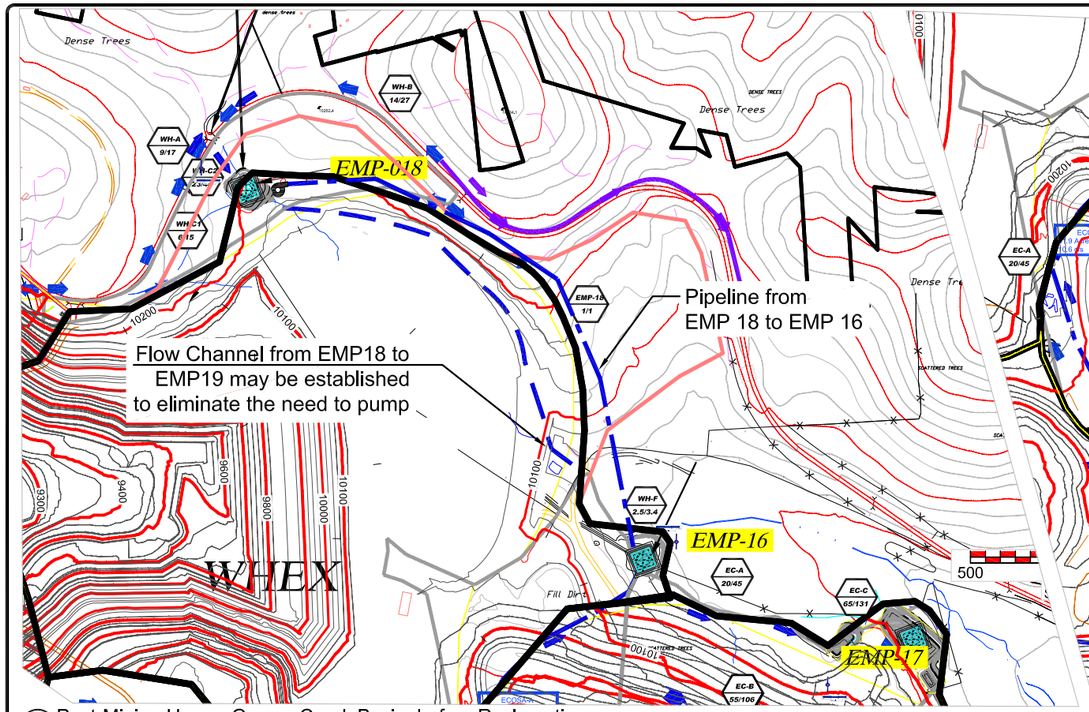
Cresson Mine
Near Victor CO

Amendment 11 Storm Water Plan
NorthCresson and Poverty Gl
Plans and System Development

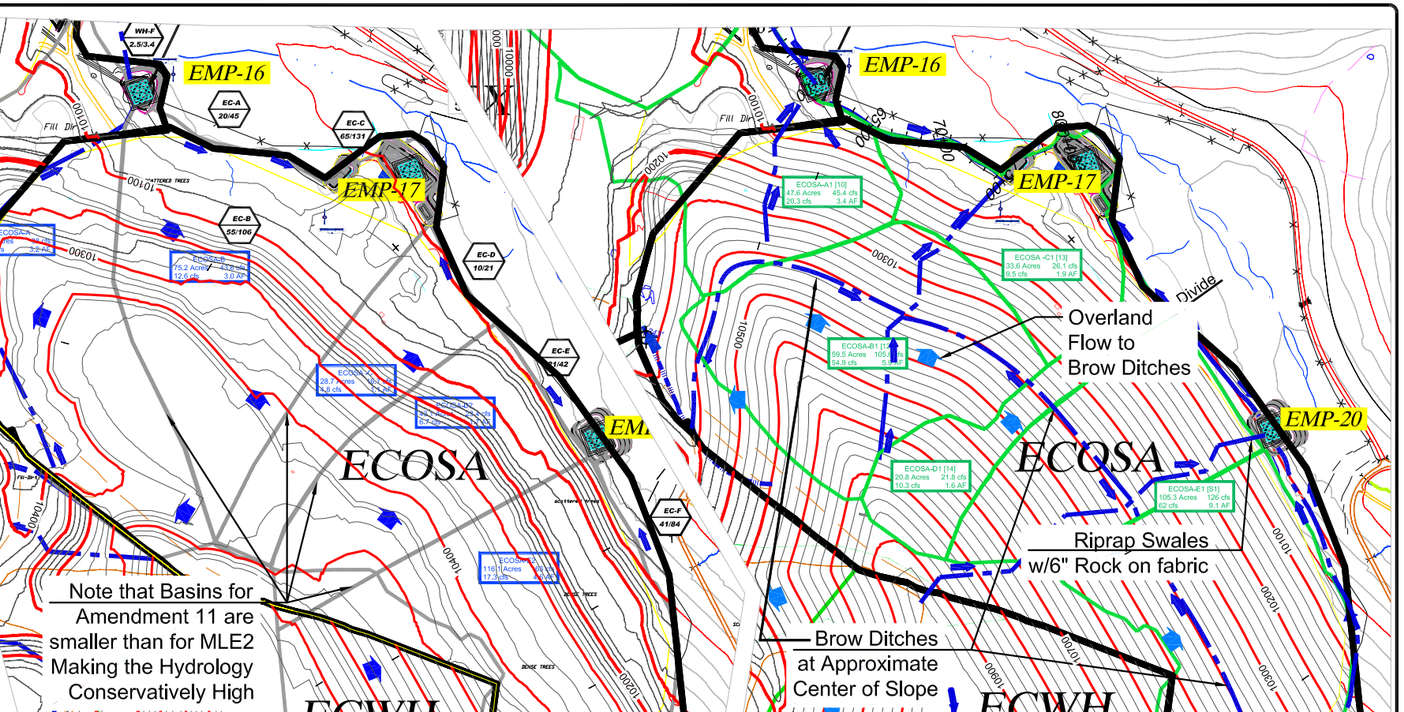
Steffens and Associates, Inc.
Water Resources - Environmental - Mining Engineering
Arvada, CO - steffensinc@msn.com - 303.378.8181

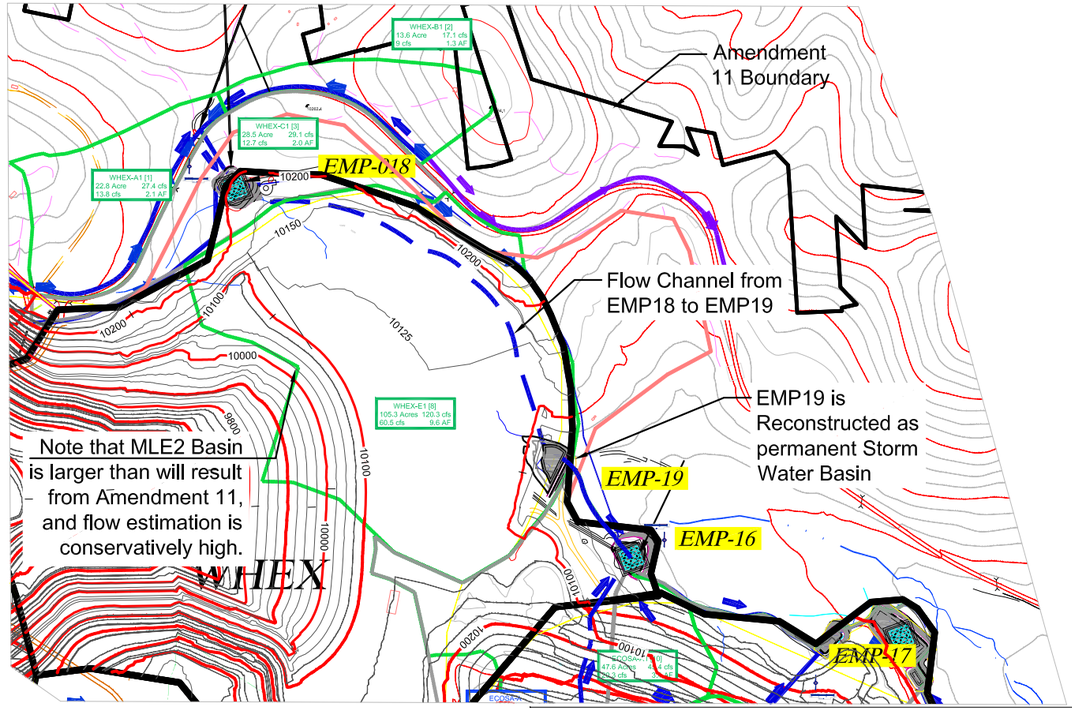
CLIENT: CC&V Gold Mining Co.

Alt. Drawing Number	Scale	DRAWING NO.
Sht. 5 of 5	Noted	CCVSA11-10 0

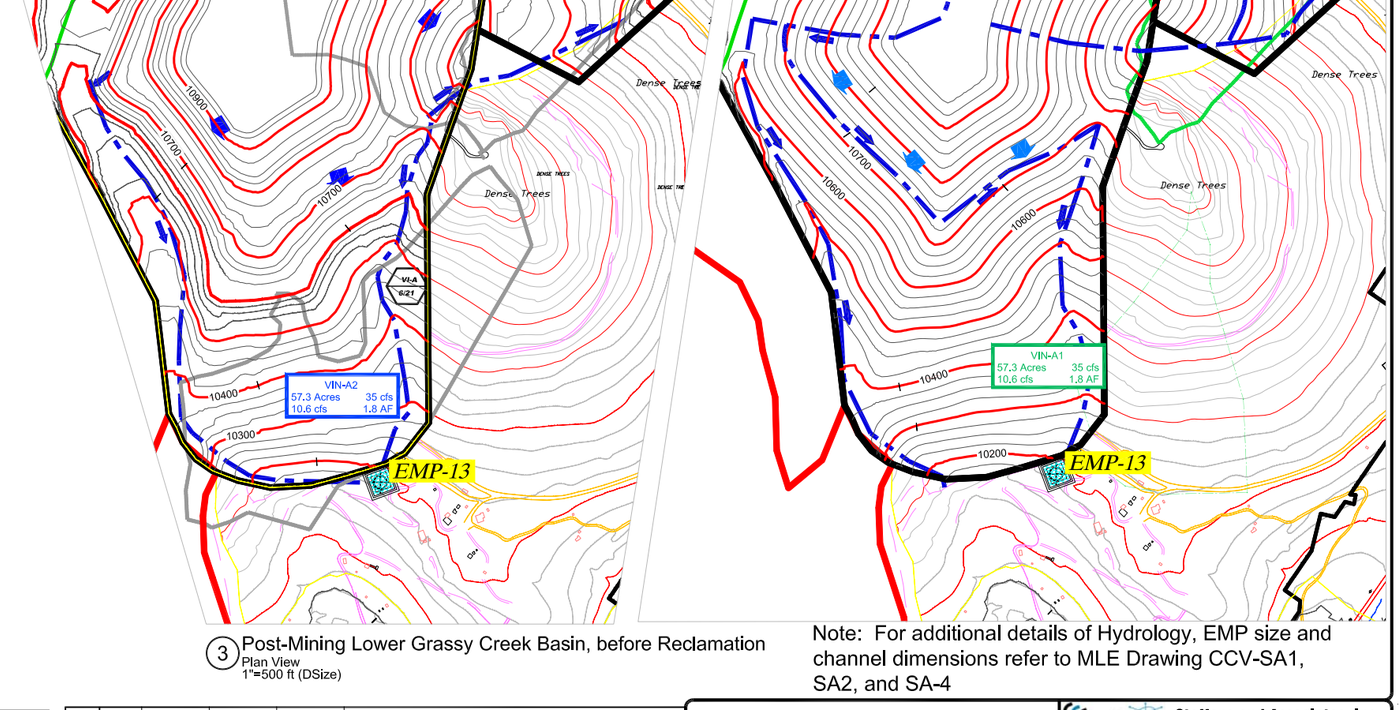


1 Post-Mining Upper Grassy Creek Basin, before Reclamation
Plan View
1"=500 ft (DSize)





2 Final Surface Configuration -Upper Grassy Creek
Plan View
1"=500 ft (DSize)



3 Post-Mining Lower Grassy Creek Basin, before Reclamation
Plan View
1"=500 ft (DSize)

Note: For additional details of Hydrology, EMP size and channel dimensions refer to MLE Drawing CCV-SA1, SA2, and SA-4

Basin Name
Area — ECOSA-2 — 101 Acre 72 cfs — 100yr Discharge
10yr Discharge — 41 cfs — 10 AcreFeet — 2 x 10yr Volume
Channel Name
100-yr Discharge (cfs)
10-yr Discharge (cfs)

Legend
Flow Path & Basin during Mining
Flow Path & Basin after Reclamation

REVISIONS

NO.	DATE	MADE BY	CKD. BY	REMARKS
1	12/1/11	SDS		Preliminary Issue For Review
2	1/7/12	SDS		Added Details, End of Mining, and Post Reclamation Views
3	8/15/2012	SDS		Added North Arrow and Scale Bar
4	11/30/15	SDS		Updated MLE2 Drawing for Amendment No. 11, Added Views for Upper/Lower Basins
5				
6				
7				

Cresson Mine
Near Victor CO

MLE2 - Stormwater Plan
Grassy Creek& Vindicator
Current -End-of-Mining - Post-Reclamation

Steffens and Associates, Inc.
Water Resources - Environmental - Mining Engineering
Arvada, CO - steffensinc@msn.com - 303.378.8181

CLIENT: CC&V Gold Mining Co.

Alt. Drawing Number	Scale	DRAWING NO.
CCV10-SA3	Noted	CCVSA11-11 3

Design Report for Storm Water Management

AT THE

Chicago Tunnel Site

Cripple Creek & Victor Gold Mining Co.

Victor, CO

PREPARED BY:

Steffens and Associates, Inc.
Golden, CO 303.378.8181

August 2014

TABLE OF CONTENTS

TABLES

FIGURES

PHOTOS

DRAWINGS

SCOPE

A Stormwater Management Plan (SWMP) has been prepared for the Chicago Tunnel Site on the west flank of the Cresson Mine and adjacent to the southeast boundary of the City of Cripple Creek. The SWMP Provides management guidelines for ongoing inspection, maintenance, and management of the stormwater that is associated with the Chicago Tunnel area.

This report provides the technical basis for the design of the structural stormwater management facilities.

NARRATIVE DESCRIPTION OF MINING ACTIVITIES

CC&V is the owner of the Chicago Tunnel Site (the Site), located east of the Town of Cripple Creek. The Site is currently in care and maintenance status with no active mining activities. The Site is occupied by an earthwork contractor who provides services to CC&V. CC&V has delegated responsibility for the management of stormwater to that contractor.

The Mining District, in which the Chicago Tunnel is located, has been mined since the 1890's. Most of the mining was conducted underground until the early 1940's. Hence, the Mining District is characterized by historic exploration pits, mine shafts, and adits that connect to abandoned underground workings.

The Chicago Tunnel is one of those historical structures. It was constructed in the late 1890's and is located below and south of the C.O.D. mine and the Gold King Mine. The alignment of the Chicago Tunnel places it below the Cresson Mine and it is, indeed, owned by CC&V. In 1988 CC&V applied for a Conditional Use Permit from Teller County for limited mining from the Proper Mine and delivery of ore through the Chicago Tunnel. Subsequent to that application it was decided to forego mine production from the Proper Mine and Chicago Tunnel when the current open pit Cresson Mine was developed.

CC&V constructed a new portal at the entrance to the Chicago Tunnel to provide security and stability of the entryway. Photo 1 shows that portal in 2002. As is shown on the photograph there was no drainage from the tunnel or evidence that drainage

occurred. It has been inspected on a regular basis by CC&V personnel and no measureable or reported discharge has occurred from the tunnel.

Photo 1 - Chicago Tunnel Portal – 2003

In 2003 the portal was backfilled with soil and the soils were re-vegetated as shown in Photo 2.

Since 2003 there has been some settling of the soils at the previous portal location, but otherwise the portal is currently stable with no known buildup of water within the workings or discharge from the tunnel. Therefore, there is not a demonstrable need to address or facilitate collection of non-stormwater discharges from the portal. If any discharges occur it will likely be the result of near-surface percolation of storm water into the soils from above the portal, which meets the regulatory definition of stormwater.

Photo 2 - Chicago Tunnel Portal after Backfill and Reclamation (2014)

Access to the Chicago Tunnel Site is either from the City of Cripple Creek to the northwest, or from the Cresson Mine located south of the site. The Chicago Tunnel workings are currently part of a proposed surface drilling program to determine the future feasibility of advanced mineral exploration at the Cresson Mine. The Chicago Tunnel is a permitted mining facility since the tunnel was actively used for mining access in the late 1980's by Texas Gulf, and because it is currently an exploration target for CC&V. There may be reason to reopen the Chicago Tunnel for exploration drilling of the Cresson ore-body in the future. Accordingly, the design of the drainage system described in this report facilitates the collection of sediment associated with exploration activities that may occur.

STORM WATER HYDROLOGY

Methodology and Basin Descriptions

The drainage design methodologies for the Chicago Tunnel site have been adopted from the general practices used for drainage design at the Cresson Mine. Those methods are described below.

The SEDCAD4 computer program was used to model the hydrology because of its ease of use in modeling the system and summarizing results and because it has previously been an accepted modeling tool by State regulatory agencies.

Four catchment basins were identified that provide stormwater runoff to either the occupied site of the Chicago Tunnel or and stream channel of Poverty Gulch. Those basins and their descriptors are illustrated on Drawing CT-1. (Note that the drawing labels show the time of concentration for just overland sheet flow at the headwaters of each basin. The overall time of concentration, that includes both sheet flow and channel flow, is described below).

- The largest basin is named the Poverty Gulch Upper Basin on the Drawing, with a tributary area of 190.1 acres. It is mostly a natural basin, but includes some historical mining impacts that are not associated with any current mining. The longest flow path is about 6,000 feet at an average slope of 7.35 percent. The calculated time of concentration is 2.5 hours.
- The next largest basin is the west flank of the Cresson Mine, so named on the drawing as the Mine Flank Basin. The basin area is 92.7 acres. The maximum flow path is 3,980 feet long with an average slope of 5.5 percent. The calculated time of concentration for that basin is 1.8 hours.
- A small basin north of the Chicago Tunnel (Lower North Basin) is the third basin that contributes flow to Poverty Gulch, the receiving stream, but not to the basin of the occupied Chicago Tunnel site. Its area is 15.9 acres and the flow path is 2,100 feet at a slope of 7.2 percent. The calculated time of concentration is 0.9 hours.
- The occupied site at the Chicago Tunnel and the area south and up-gradient from the site that provides runoff to the occupied area is a 13.7 acre basin. The

portion of that basin that is occupied by the Contractor is 3.5 acres. The longest flow path is 1,570 feet at an average slope of 8.2 percent. The calculated time of concentration is 0.6 hours.

Inflow Design Storms and Design Criteria

Three Inflow Design Floods were used for this analysis. The actual design of the structures is based on A NOAA 10-year/24-hour storm, with its depth of 2.7 inches. In addition to that design storm a 5-year/24-hour storm (2.2 inches) and a 100-year/24-hour storm (3.5 inches) was also modeled using SEDCAD to determine the sensitivity of the stormwater structures to storm magnitude. The SEDCAD results are included as an attachment to this report.

Runoff Coefficients

The runoff coefficients used in the SEDCAD4 model were consistent with those incorporated in previous evaluations for the adjacent Cresson Project. A summary of the CN values is as follows:

- Existing wooded areas with no underlying low-permeability sub-soil component, Curve Number 66
- Closure areas with no underlying low-permeability component, Curve Number 71.
- Existing grassed areas and re-vegetated ground with low-permeability sub-soils, Curve Number 75
- Rock Fill Slopes, Curve Number 50
- Roads and compacted stockpiles with limited permeability, Curve Number 90.

Hydrology Calculations for Design Storms (SEDCAD4)

Runoff estimates were calculated for the three storms, but also for several channel design scenarios. Drawing CT-2 shows the site drainage map and various structures that were sized using the SEDCAD results.

- The Baseline condition of a 10-year/24-hour storm. The volume of the sediment pond and the size of the stream culvert were determined from that calculation.
- Three swale and ditch configurations for the main channels that flow through the occupied site, and are shown on the drawing.

RESULTS OF STORM ROUTING

The key runoff discharge rates used for the design are summarized on Table 1.

Table I Results of SEDCAD4 Calculations

Runoff Scenario	Inflow Design Storm	Runoff Value, SEDCAD4 Result	Use in Design
Baseline	10-yr/24-hr	17 cfs in Poverty Gulch Streambed 0.47 acre foot Pond 2.64 cfs discharge from occupied site to Poverty Gulch	Determine size of culvert where Poverty Gulch flows beneath access road. 24-inch CMP required for d/D depth of 130% Used to size BMP pond to contain baseline storm shown on CT-2 Used to size swales in occupied site area. Used to estimate flow in lower conveyance channel
Low Flow	5-yr/24-hr	8.25 cfs in Poverty Gulch Streambed	Defines that existing 18-inch culvert will discharge 5-yr storm with d/D depth of 130% and that a larger culvert is required for baseline condition
Baseline Partial Basin	10-yr/24-hr	0.4 cfs	Determination that lower stormwater conveyance drains 14% of basin so that peak flow will only be about 0.4 cfs
High Flow	100-yr/24-hr	37.5 cfs	Peak flow in Poverty Gulch during 100-year flood. The armored swale for the lower stormwater conveyance must handle about 15-20 cfs. The swale will flow about 8-inches deep.

The three swale designs shown on Drawing CT-1 depict the geometry of the ditches required to discharge the Baseline storm. The objective was to design the ditches based on the following parameters:

- For swales that will be traversed by vehicles, to make the slope of the approaches a 6H:1V (16.7%) slope
- For swales that will not be traversed by vehicles, the side slopes should be 3H:1V.

- The maximum depth of flow during the baseline storm should be no greater than 6-inches. The swales and ditches were designed for that flow depth. No freeboard is required since they are in the travelled roadways.
- The geometry of traversed swales should be convenient for grading and designed so that they can be reshaped with relative ease using a grader or excavator. The 6H:1V slopes were chosen for that reason.
- The calculated maximum "rip rap" size of less than 3-inches, which is a typical natural size for gravel in the area. That way, special materials will not be required to armor the conveyance structures.
- Removal of all sand-sized sediment and significant portions of silt-sized sediment.

STORMWATER DIVERSION AND GENERAL DRAINAGE CONCEPT

The Chicago Tunnel Site has been characterized as having three flow streams – 1)Poverty Gulch stream, 2) a lower stormwater conveyance channel that is essentially a natural runoff channel with minimal impact from the facility, and 3) an upper stormwater conveyance channel that drains the three areas of highest non-sediment pollution potential. Those areas are the fuel storage tanks, the portal of the Chicago Tunnel, and the maintenance shop.

Poverty Gulch stream is an intermittent stream that is already separated from the Chicago Tunnel site by an earthen dike. The estimated 10-year and 100-year discharge rates of the stream are 17 cfs and 34 cfs, respectively. An existing 18-inch culvert beneath the Cripple Creek access road will be replaced with a 24-inch culvert that can discharge the 10-year flow. Excess flow above 17-cfs will spill over a constructed riprap spillway and flow across the access road in an armored swale.

Drawing CT-1 shows the extent of drainage basins that are tributary to the Chicago Tunnel site and contribute stormwater runoff. The overall basin area is 312 acres. However, only 13.74 acres are tributary to the occupied site and need to be managed. The remaining 298.7 acres provide runoff to the stream channel of Poverty Gulch. The basin area named Lower South on Drawing CT-1 is shown in detail on Drawing CT-2, the facility and drainage map.

The lower stormwater conveyance will include natural runoff from the hillside northeast of the site as well as runoff from within the west side of the site. The estimated peak flow through that channel is about 0.4 cfs. A small (10ft x 30ft) sediment

trap will be constructed at its junction with Poverty Gulch stream. The sediment trap will remove all sand and 20% of silt from the runoff, down to about 20 micron size.

There will be a separation of that basin from the upper stormwater conveyance on the north side of the fuel storage (at the Divide shown on the drawing). That upper conveyance will divert southward, in front of the tunnel portal, behind the maintenance shop and down to a terminal sediment pond that is sized for the volume of the 10-year/24-hour storm (0.46 acre feet). The pond will not be lined, nor will it have a direct connection to Poverty Gulch stream. By that means, any fuel spills, any sediment from the tunnel, and any impacts from the maintenance shop will all be contained in the sediment pond. The estimated flow discharge for the basin that is tributary to the site is 2.64 cfs for the 10-yr/24-hr event. The upper channel has been designed for that flow. A triangular swale with 6H:1V side slopes and 6-inches deep or a trapezoidal ditch with 3H:1V side slopes, 2 ft bottom width, and 6-inch depth will carry that flow rate.

The pond for removing sediment from the upper stormwater conveyance will be 130 ft. x 50 ft wide, with a maximum settling area of 6,285 square feet when full. It will remove all sand from runoff and 60% of silt down to a size of about 10 microns.

The principal downstream BMP to be employed at the Chicago Tunnel site will be a detention pond designed to have a holding capacity of the volume of runoff resulting from a 10-year, 24-hour precipitation event. A 5-feet wide overflow spillway will be provided to protect the structural integrity of the embankment as well as avoid excessive erosion of the downstream streambed in the event that the pond overflows. The spillway or water release structure will be designed to pass the peak flows from a 100-year, 24-hour storm event. The flow will be very small at only about 1 cfs during that storm and with a pond capacity of only 0.46 acre feet.

POND SIZING AND EXPECTED PERFORMANCE

Both the pond volume and the pond surface area are important metrics that determine the suitability of a settling pond. As was previously noted, the main sediment pond was designed to store the entire volume of runoff from the baseline, 10-yr/24-hr storm. Even though there would be no discharge from that storm, the effectiveness of the pond in settling sediment has been estimated as is described below.

The following graph shows the calculated trap efficiency for various pond loading rates. It was prepared for determining performance-based pond sizing whereby the sediment removal effectiveness is estimated as a function of the characteristics of local soils and the basin discharge rate. The dashed brown line shows the gradation of soils collected from water pools along roadway ditches in Grassy Creek, northeast of Poverty Gulch. The soils were collected and analyzed to determine the expected size distribution in natural stormwater sediments near the mine. The series of profiles near the center of the plot show the expected removal efficiency as a function of sediment size for various loading rates. The loading rate units are square feet of pond surface area per cubic feet per second of inflow.

The loading rate for the main sediment pond at Chicago Tunnel will be about 2,420 sf/cfs. Therefore, its efficiency will be approximated by the line for 2,000 sf/cfs. That pond will remove all sand and 60% of silt down to a size of about 10 microns.

The loading rate for the 10 x 30 ft sediment trap at the end of the lower conveyance will be about 750 sf/cfs. It will remove all sand and about 20% of silt sediment down to a size of 20 microns.

The natural sediment that was collected from the Grassy Creek ditches contained less than 20% silt and small amounts of clay. Therefore, the two sediment removal structures included in the design (the main pond and the 10x30 sediment trap) should be capable of removing over 80% of the sediment carried by stormwater.

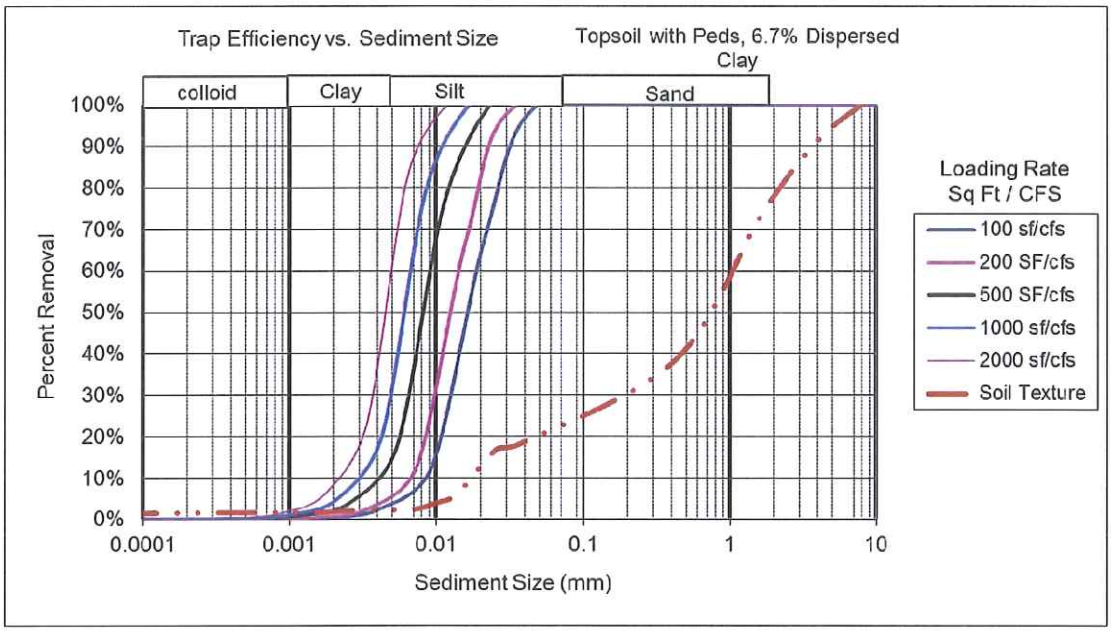


Figure 1 - Residence Time and Settling Efficiency of EMPs

CHANNEL GEOMETRY AND STRUCTURE ARMORING

The SEDCAD program provides recommendations for riprap size using the PADER method for steep slopes. For each of the flow scenarios the riprap size was noted and the channel reconfigured such that the average riprap size would be 3-inches or less. That was a subjective determination of size based solely on the observation that natural gravel sizes If approximately that size are prevalent in the area. By controlling the fluid shear and armoring requirement by channel geometry the channels will not require special materials.

The stream channel of Poverty Gulch will discharge approximately 17.4 cfs during the 10-yr/24-hr event, or 8.25 cfs during a 5-yr/24-hr event. The existing channel does not show evidence of instability, even during intense rains. At the 10-year flow rate the channel will flow about 9-inches deep with a top width of about 6 feet. The flow depth and width during a 5-yr event will be 6-inches deep and 4 ft wide. Both of those estimates are consistent with field observations of the channel shown on Photos 3 and 4.

Photo 3 Poverty Gulch Stream-bed - Lower End of Site

Photo 4 - Poverty Gulch Streambed, Upper End of Site

Since the existing channel is stable, there should be no need for larger riprap and the objective size less than 3-inches should be valid for the swales as well.

SEDCAD4 MODEL RESULTS

CCV PovertyGulch

10-yr/24 hr Storm for Chicago Tunnel

Steven Steffens

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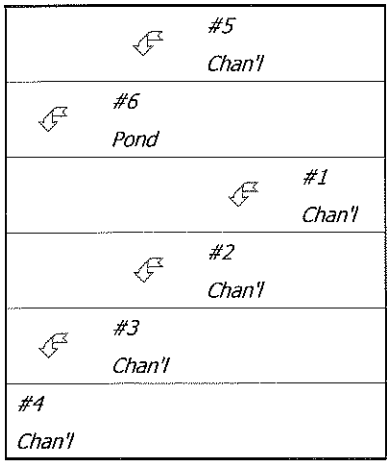
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 24 hr
Rainfall Depth:	2.700 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Channel	#1	==>	#2	2.477	0.143	PovertyGulchUpperBasin
Channel	#2	==>	#3	1.872	0.129	MineFlankBasin
Channel	#3	==>	#4	0.870	0.141	LowerNorthBasin
Channel	#4	==>	End	0.000	0.000	PovertyGulchStrem
Channel	#5	==>	#6	0.605	0.149	LowerSouthBasin
Pond	#6	==>	#4	0.000	0.000	ChicagoTunnelPond



Structure Routing Details:

Stru #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1. Forest with heavy ground litter	7.35	445.70	6,063.94	0.68	2.477
#1	**Muskingum K:**					**2.477**
#2	1. Forest with heavy ground litter	5.48	217.93	3,976.82	0.59	1.872
#2	**Muskingum K:**					**1.872**
#3	1. Forest with heavy ground litter	7.18	150.78	2,100.00	0.67	0.870
#3	**Muskingum K:**					**0.870**
#5	1. Forest with heavy ground litter	8.17	128.18	1,569.00	0.72	0.605
#5	**Muskingum K:**					**0.605**

Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#5		13.740	13.740	2.64	0.47
#6	In	0.000	13.740	2.41	0.47
	Out			0.00	0.00
#1		190.100	190.100	15.63	6.42
#2		92.670	282.770	17.54	9.55
#3		15.930	298.700	17.46	10.09
#4		2.000	314.440	17.36	10.16

Structure Detail:

Structure #5 (Riprap Channel)

LowerSouthBasin

Triangular Riprap Channel Inputs:

Material: Riprap

Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
6.0:1	6.0:1	2.0			

Riprap Channel Results:

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	2.64 cfs	
Depth:	0.42 ft	
Top Width:	5.00 ft	
Velocity:	2.53 fps	
X-Section Area:	1.04 sq ft	
Hydraulic Radius:	0.206 ft	
Froude Number:	0.98	
Manning's n:	0.0290	
Dmin:	1.00 in	
D50:	1.50 in	
Dmax:	3.00 in	

Structure #6 (Pond)

ChicagoTunnelPond

Pond Inputs:

Initial Pool Elev:	0.01 ft
Initial Pool:	0.00 ac-ft

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
4.00	5.00	2.00:1	2.00:1	5.00

Pond Results:

Peak Elevation:	4.00 ft
Dewater Time:	0.00 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
0.00	0.000	0.000	0.000		
0.01	0.080	0.000	0.000		
2.00	0.106	0.185	0.000		
3.00	0.120	0.298	0.000		
4.00	0.220	0.465	0.000		Spillway #1
4.00	0.185	0.465	0.001	0.00	Peak Stage
5.00	0.250	0.700	17.713		

Detailed Discharge Table

Elevation (ft)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
0.00	0.000	0.000
0.01	0.000	0.000
2.00	0.000	0.000
3.00	0.000	0.000
4.00	0.000	0.000
5.00	17.713	17.713

Structure #1 (Riprap Channel)

PovertyGulchUpperBasin

Trapezoidal Riprap Channel Inputs:

Material: Riprap

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
3.00	2.0:1	2.0:1	7.3			

Riprap Channel Results:

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	15.63 cfs	

	w/o Freeboard	w/ Freeboard
Depth:	0.63 ft	
Top Width:	5.54 ft	
Velocity:	5.77 fps	
X-Section Area:	2.71 sq ft	
Hydraulic Radius:	0.464 ft	
Froude Number:	1.45	
Manning's n:	0.0420	
Dmin:	2.00 in	
D50:	3.00 in	
Dmax:	4.50 in	

Structure #2 (Riprap Channel)

MineFlankBasin

Trapezoidal Riprap Channel Inputs:

Material: Riprap

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
3.00	2.0:1	2.0:1	5.5			

Riprap Channel Results:

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	17.54 cfs	
Depth:	0.72 ft	
Top Width:	5.89 ft	
Velocity:	5.47 fps	
X-Section Area:	3.21 sq ft	
Hydraulic Radius:	0.515 ft	
Froude Number:	1.31	
Manning's n:	0.0410	
Dmin:	2.00 in	
D50:	3.00 in	
Dmax:	4.50 in	

Structure #3 (Riprap Channel)

LowerNorthBasin

Trapezoidal Riprap Channel Inputs:

Material: Riprap

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
3.00	2.0:1	2.0:1	7.2			

Riprap Channel Results:

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	17.46 cfs	
Depth:	0.67 ft	
Top Width:	5.68 ft	
Velocity:	6.01 fps	
X-Section Area:	2.90 sq ft	
Hydraulic Radius:	0.485 ft	
Froude Number:	1.48	
Manning's n:	0.0410	
Dmin:	2.00 in	
D50:	3.00 in	
Dmax:	4.50 in	

Structure #4 (Riprap Channel)

PovertyGulchStrem

Trapezoidal Riprap Channel Inputs:

Material: Riprap

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
3.00	2.0:1	2.0:1	4.0			

Riprap Channel Results:

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	17.36 cfs	
Depth:	0.77 ft	
Top Width:	6.08 ft	
Velocity:	4.96 fps	
X-Section Area:	3.50 sq ft	
Hydraulic Radius:	0.543 ft	
Froude Number:	1.15	
Manning's n:	0.0400	

	w/o Freeboard	w/ Freeboard
Dmin:	2.00 in	
D50:	3.00 in	
Dmax:	4.50 in	

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#5	1	13.740	0.605	0.605	0.149	66.000	TR55	3.01	0.465
	Σ	**13.740**						**2.64**	**0.465**
#6	Σ	**13.740**						**2.41**	**0.465**
#1	1	190.100	2.477	2.477	0.143	66.000	TR55	16.11	6.421
	Σ	**190.100**						**15.63**	**6.421**
#2	1	92.670	1.872	1.872	0.129	66.000	TR55	9.45	3.131
	Σ	**282.770**						**17.54**	**9.551**
#3	1	15.930	0.870	0.870	0.141	66.000	TR55	2.73	0.538
	Σ	**298.700**						**17.46**	**10.090**
#4	1	2.000	0.009	0.009	0.390	66.000	TR55	1.16	0.068
	Σ	**314.440**						**17.36**	**10.158**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	1. Forest with heavy ground litter	7.35	445.70	6,063.94	0.680	2.477
#1	**1**	**Time of Concentration:**					**2.477**
#2	1	1. Forest with heavy ground litter	5.48	217.93	3,977.00	0.590	1.872
#2	**1**	**Time of Concentration:**					**1.872**
#3	1	1. Forest with heavy ground litter	7.18	150.78	2,100.00	0.670	0.870
#3	**1**	**Time of Concentration:**					**0.870**
#4	1	8. Large gullies, diversions, and low flowing streams	4.00	8.00	200.00	6.000	0.009
#4	**1**	**Time of Concentration:**					**0.009**
#5	1	1. Forest with heavy ground litter	8.17	128.17	1,568.78	0.720	0.605
#5	**1**	**Time of Concentration:**					**0.605**

Subwatershed Muskingum Routing Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	1. Forest with heavy ground litter	7.35	445.70	6,063.94	0.680	2.477
#1	**1**	**Muskingum K:**					**2.477**
#2	1	1. Forest with heavy ground litter	5.48	217.93	3,976.82	0.590	1.872
#2	**1**	**Muskingum K:**					**1.872**

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#3	1	1. Forest with heavy ground litter	7.18	150.78	2,100.00	0.670	0.870
#3	**1**	**Muskingum K:**					**0.870**
#4	1	8. Large gullies, diversions, and low flowing streams	4.00	8.00	200.00	6.000	0.009
#4	**1**	**Muskingum K:**					**0.009**
#5	1	1. Forest with heavy ground litter	8.17	128.17	1,568.78	0.720	0.605
#5	**1**	**Muskingum K:**					**0.605**

CCV PovertyGulch

5-yr/24 hr Storm for Chicago Tunnel

Steven Steffens

Steffens and Associates, Inc.
420 Aspen Place
Golden, CO 80403

Phone: 303.216.1801
Email: steffensinc@msn.com

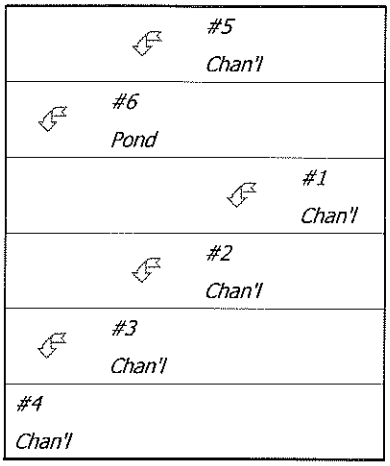
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	5 yr - 24 hr
Rainfall Depth:	2.200 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Channel	#1	==>	#2	2.477	0.143	PovertyGulchUpperBasin
Channel	#2	==>	#3	1.872	0.129	MineFlankBasin
Channel	#3	==>	#4	0.870	0.141	LowerNorthBasin
Channel	#4	==>	End	0.000	0.000	PovertyGulchStrem
Channel	#5	==>	#6	0.605	0.149	LowerSouthBasin
Pond	#6	==>	#4	0.000	0.000	ChicagoTunnelPond



Structure Routing Details:

Stru #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1. Forest with heavy ground litter	7.35	445.70	6,063.94	0.68	2.477
#1	**Muskingum K:**					**2.477**
#2	1. Forest with heavy ground litter	5.48	217.93	3,976.82	0.59	1.872
#2	**Muskingum K:**					**1.872**
#3	1. Forest with heavy ground litter	7.18	150.78	2,100.00	0.67	0.870
#3	**Muskingum K:**					**0.870**
#5	1. Forest with heavy ground litter	8.17	128.18	1,569.00	0.72	0.605
#5	**Muskingum K:**					**0.605**

Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#5		13.740	13.740	1.06	0.25
#6	In	0.000	13.740	0.98	0.25
	Out			0.00	0.00
#1		190.100	190.100	7.03	3.40
#2		92.670	282.770	8.25	5.06
#3		15.930	298.700	8.29	5.34
#4		2.000	314.440	8.25	5.38

Structure Detail:

Structure #5 (Riprap Channel)

LowerSouthBasin

Trapezoidal Riprap Channel Inputs:

Material: Riprap

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
2.00	3.0:1	3.0:1	0.8			

Riprap Channel Results:

PADER Method - Mild Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	1.06 cfs	
Depth:	0.25 ft	
Top Width:	3.52 ft	
Velocity:	1.51 fps	
X-Section Area:	0.70 sq ft	
Hydraulic Radius:	0.194 ft	
Froude Number:	0.60	
Manning's n:	0.0300	
Dmin:	0.50 in	
D50:	0.75 in	
Dmax:	1.50 in	

Structure #6 (Pond)

ChicagoTunnelPond

Pond Inputs:

Initial Pool Elev:	0.01 ft
Initial Pool:	0.00 ac-ft

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
4.00	5.00	2.00:1	2.00:1	5.00

Pond Results:

Peak Elevation:	2.55 ft
Dewater Time:	0.00 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
0.00	0.000	0.000	0.000		
0.01	0.080	0.000	0.000		
2.00	0.106	0.185	0.000		
2.55	0.114	0.246	0.000	0.00	Peak Stage
3.00	0.120	0.298	0.000		
4.00	0.220	0.465	0.000		Spillway #1
5.00	0.250	0.700	17.713		

Detailed Discharge Table

Elevation (ft)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
0.00	0.000	0.000
0.01	0.000	0.000
2.00	0.000	0.000
3.00	0.000	0.000
4.00	0.000	0.000
5.00	17.713	17.713

Structure #1 (Riprap Channel)

PovertyGulchUpperBasin

Trapezoidal Riprap Channel Inputs:

Material: Riprap

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
3.00	2.0:1	2.0:1	7.3			

Riprap Channel Results:

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	7.03 cfs	

	w/o Freeboard	w/ Freeboard
Depth:	0.41 ft	
Top Width:	4.63 ft	
Velocity:	4.52 fps	
X-Section Area:	1.56 sq ft	
Hydraulic Radius:	0.322 ft	
Froude Number:	1.38	
Manning's n:	0.0420	
Dmin:	2.00 in	
D50:	3.00 in	
Dmax:	4.50 in	

Structure #2 (Riprap Channel)

MineFlankBasin

Trapezoidal Riprap Channel Inputs:

Material: Riprap

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
3.00	2.0:1	2.0:1	5.5			

Riprap Channel Results:

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	8.25 cfs	
Depth:	0.46 ft	
Top Width:	4.86 ft	
Velocity:	4.52 fps	
X-Section Area:	1.83 sq ft	
Hydraulic Radius:	0.359 ft	
Froude Number:	1.30	
Manning's n:	0.0390	
Dmin:	2.00 in	
D50:	3.00 in	
Dmax:	4.50 in	

Structure #3 (Riprap Channel)

LowerNorthBasin

Trapezoidal Riprap Channel Inputs:

Material: Riprap

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
3.00	2.0:1	2.0:1	7.2			

Riprap Channel Results:

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	8.29 cfs	
Depth:	0.47 ft	
Top Width:	4.87 ft	
Velocity:	4.50 fps	
X-Section Area:	1.84 sq ft	
Hydraulic Radius:	0.361 ft	
Froude Number:	1.29	
Manning's n:	0.0450	
Dmin:	2.00 in	
D50:	3.00 in	
Dmax:	4.50 in	

Structure #4 (Riprap Channel)

PovertyGulchStrem

Trapezoidal Riprap Channel Inputs:

Material: Riprap

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
3.00	6.0:1	6.0:1	1.0			

Riprap Channel Results:

PADER Method - Mild Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	8.25 cfs	
Depth:	0.53 ft	
Top Width:	9.34 ft	
Velocity:	2.53 fps	
X-Section Area:	3.26 sq ft	
Hydraulic Radius:	0.346 ft	
Froude Number:	0.76	
Manning's n:	0.0290	

	w/o Freeboard	w/ Freeboard
Dmin:	1.00 in	
D50:	1.50 in	
Dmax:	3.00 in	

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#5	1	13.740	0.605	0.605	0.149	66.000	TR55	1.16	0.246
	Σ	**13.740**						**1.06**	**0.246**
#6	Σ	**13.740**						**0.98**	**0.246**
#1	1	190.100	2.477	2.477	0.143	66.000	TR55	7.18	3.400
	Σ	**190.100**						**7.03**	**3.400**
#2	1	92.670	1.872	1.872	0.129	66.000	TR55	4.09	1.658
	Σ	**282.770**						**8.25**	**5.058**
#3	1	15.930	0.870	0.870	0.141	66.000	TR55	1.08	0.285
	Σ	**298.700**						**8.29**	**5.343**
#4	1	2.000	0.009	0.009	0.390	66.000	TR55	0.55	0.036
	Σ	**314.440**						**8.25**	**5.379**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	1. Forest with heavy ground litter	7.35	445.70	6,063.94	0.680	2.477
#1	**1**	**Time of Concentration:**					**2.477**
#2	1	1. Forest with heavy ground litter	5.48	217.93	3,977.00	0.590	1.872
#2	**1**	**Time of Concentration:**					**1.872**
#3	1	1. Forest with heavy ground litter	7.18	150.78	2,100.00	0.670	0.870
#3	**1**	**Time of Concentration:**					**0.870**
#4	1	8. Large gullies, diversions, and low flowing streams	4.00	8.00	200.00	6.000	0.009
#4	**1**	**Time of Concentration:**					**0.009**
#5	1	1. Forest with heavy ground litter	8.17	128.17	1,568.78	0.720	0.605
#5	**1**	**Time of Concentration:**					**0.605**

Subwatershed Muskingum Routing Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	1. Forest with heavy ground litter	7.35	445.70	6,063.94	0.680	2.477
#1	**1**	**Muskingum K:**					**2.477**
#2	1	1. Forest with heavy ground litter	5.48	217.93	3,976.82	0.590	1.872
#2	**1**	**Muskingum K:**					**1.872**

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#3	1	1. Forest with heavy ground litter	7.18	150.78	2,100.00	0.670	0.870
#3	**1**	**Muskingum K:**					**0.870**
#4	1	8. Large gullies, diversions, and low flowing streams	4.00	8.00	200.00	6.000	0.009
#4	**1**	**Muskingum K:**					**0.009**
#5	1	1. Forest with heavy ground litter	8.17	128.17	1,568.78	0.720	0.605
#5	**1**	**Muskingum K:**					**0.605**

CCV PovertyGulch

100-yr/24 hr Storm for Chicago Tunnel

Steven Steffens

Steffens and Associates, Inc.
420 Aspen Place
Golden, CO 80403

Phone: 303.216.1801
Email: steffensinc@msn.com

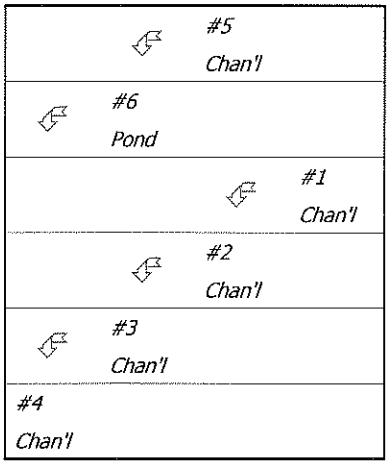
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	100 yr - 24 hr
Rainfall Depth:	3.500 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Channel	#1	==>	#2	2.477	0.143	PovertyGulchUpperBasin
Channel	#2	==>	#3	1.872	0.129	MineFlankBasin
Channel	#3	==>	#4	0.870	0.141	LowerNorthBasin
Channel	#4	==>	End	0.000	0.000	PovertyGulchStrem
Channel	#5	==>	#6	0.605	0.149	LowerSouthBasin
Pond	#6	==>	#4	0.000	0.000	ChicagoTunnelPond



Structure Routing Details:

Stru #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1. Forest with heavy ground litter	7.35	445.70	6,063.94	0.68	2.477
#1	**Muskingum K:**					**2.477**
#2	1. Forest with heavy ground litter	5.48	217.93	3,976.82	0.59	1.872
#2	**Muskingum K:**					**1.872**
#3	1. Forest with heavy ground litter	7.18	150.78	2,100.00	0.67	0.870
#3	**Muskingum K:**					**0.870**
#5	1. Forest with heavy ground litter	8.17	128.18	1,569.00	0.72	0.605
#5	**Muskingum K:**					**0.605**

Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#5		13.740	13.740	6.29	0.91
#6	In	0.000	13.740	5.71	0.91
	Out			1.05	0.45
#1		190.100	190.100	34.97	12.57
#2		92.670	282.770	37.89	18.70
#3		15.930	298.700	37.47	19.76
#4		2.000	314.440	37.49	20.34

Structure Detail:

Structure #5 (Riprap Channel)

LowerSouthBasin

Trapezoidal Riprap Channel Inputs:

Material: Riprap

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
2.00	2.0:1	2.0:1	8.2			

Riprap Channel Results:

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	6.29 cfs	
Depth:	0.47 ft	
Top Width:	3.87 ft	
Velocity:	4.57 fps	
X-Section Area:	1.38 sq ft	
Hydraulic Radius:	0.336 ft	
Froude Number:	1.35	
Manning's n:	0.0450	
Dmin:	2.00 in	
D50:	3.00 in	
Dmax:	4.50 in	

Structure #6 (Pond)

ChicagoTunnelPond

Pond Inputs:

Initial Pool Elev:	0.01 ft
Initial Pool:	0.00 ac-ft

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
4.00	5.00	2.00:1	2.00:1	5.00

Pond Results:

Peak Elevation:	4.06 ft
Dewater Time:	0.48 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
0.00	0.000	0.000	0.000		
0.01	0.080	0.000	0.000		
2.00	0.106	0.185	0.000		
3.00	0.120	0.298	0.000		
4.00	0.220	0.465	0.000		Spillway #1
4.06	0.189	0.479	1.047	11.45	Peak Stage
5.00	0.250	0.700	17.713		

Detailed Discharge Table

Elevation (ft)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
0.00	0.000	0.000
0.01	0.000	0.000
2.00	0.000	0.000
3.00	0.000	0.000
4.00	0.000	0.000
5.00	17.713	17.713

Structure #1 (Riprap Channel)

PovertyGulchUpperBasin

Trapezoidal Riprap Channel Inputs:

Material: Riprap

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
3.00	2.0:1	2.0:1	7.3			

Riprap Channel Results:

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	34.97 cfs	

	w/o Freeboard	w/ Freeboard
Depth:	1.04 ft	
Top Width:	7.17 ft	
Velocity:	6.59 fps	
X-Section Area:	5.31 sq ft	
Hydraulic Radius:	0.692 ft	
Froude Number:	1.35	
Manning's n:	0.0480	
Dmin:	3.00 in	
D50:	6.00 in	
Dmax:	9.00 in	

Structure #2 (Riprap Channel)

MineFlankBasin

Trapezoidal Riprap Channel Inputs:

Material: Riprap

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
3.00	2.0:1	2.0:1	5.5			

Riprap Channel Results:

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	37.89 cfs	
Depth:	1.11 ft	
Top Width:	7.43 ft	
Velocity:	6.56 fps	
X-Section Area:	5.78 sq ft	
Hydraulic Radius:	0.726 ft	
Froude Number:	1.31	
Manning's n:	0.0430	
Dmin:	3.00 in	
D50:	6.00 in	
Dmax:	9.00 in	

Structure #3 (Riprap Channel)

LowerNorthBasin

Trapezoidal Riprap Channel Inputs:

Material: Riprap

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
3.00	2.0:1	2.0:1	7.2			

Riprap Channel Results:

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	37.47 cfs	
Depth:	1.09 ft	
Top Width:	7.35 ft	
Velocity:	6.66 fps	
X-Section Area:	5.63 sq ft	
Hydraulic Radius:	0.716 ft	
Froude Number:	1.34	
Manning's n:	0.0480	
Dmin:	3.00 in	
D50:	6.00 in	
Dmax:	9.00 in	

Structure #4 (Riprap Channel)

PovertyGulchStrem

Triangular Riprap Channel Inputs:

Material: Riprap

Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
2.0:1	2.0:1	4.0			

Riprap Channel Results:

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	37.49 cfs	
Depth:	1.70 ft	
Top Width:	6.78 ft	
Velocity:	6.52 fps	
X-Section Area:	5.75 sq ft	
Hydraulic Radius:	0.758 ft	
Froude Number:	1.25	
Manning's n:	0.0380	

	w/o Freeboard	w/ Freeboard
Dmin:	3.00 in	
D50:	6.00 in	
Dmax:	9.00 in	

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#5	1	13.740	0.605	0.605	0.149	66.000	TR55	7.18	0.911
	Σ	**13.740**						**6.29**	**0.911**
#6	Σ	**13.740**						**5.71**	**0.911**
#1	1	190.100	2.477	2.477	0.143	66.000	TR55	36.48	12.573
	Σ	**190.100**						**34.97**	**12.573**
#2	1	92.670	1.872	1.872	0.129	66.000	TR55	21.84	6.130
	Σ	**282.770**						**37.89**	**18.703**
#3	1	15.930	0.870	0.870	0.141	66.000	TR55	6.53	1.054
	Σ	**298.700**						**37.47**	**19.758**
#4	1	2.000	0.009	0.009	0.390	66.000	TR55	2.51	0.133
	Σ	**314.440**						**37.49**	**20.337**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	1. Forest with heavy ground litter	7.35	445.70	6,063.94	0.680	2.477
#1	**1**	**Time of Concentration:**					**2.477**
#2	1	1. Forest with heavy ground litter	5.48	217.93	3,977.00	0.590	1.872
#2	**1**	**Time of Concentration:**					**1.872**
#3	1	1. Forest with heavy ground litter	7.18	150.78	2,100.00	0.670	0.870
#3	**1**	**Time of Concentration:**					**0.870**
#4	1	8. Large gullies, diversions, and low flowing streams	4.00	8.00	200.00	6.000	0.009
#4	**1**	**Time of Concentration:**					**0.009**
#5	1	1. Forest with heavy ground litter	8.17	128.17	1,568.78	0.720	0.605
#5	**1**	**Time of Concentration:**					**0.605**

Subwatershed Muskingum Routing Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	1. Forest with heavy ground litter	7.35	445.70	6,063.94	0.680	2.477
#1	**1**	**Muskingum K:**					**2.477**
#2	1	1. Forest with heavy ground litter	5.48	217.93	3,976.82	0.590	1.872
#2	**1**	**Muskingum K:**					**1.872**

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#3	1	1. Forest with heavy ground litter	7.18	150.78	2,100.00	0.670	0.870
#3	**1**	**Muskingum K:**					**0.870**
#4	1	8. Large gullies, diversions, and low flowing streams	4.00	8.00	200.00	6.000	0.009
#4	**1**	**Muskingum K:**					**0.009**
#5	1	1. Forest with heavy ground litter	8.17	128.17	1,568.78	0.720	0.605
#5	**1**	**Muskingum K:**					**0.605**

Structure Detail:

Structure #5 (Riprap Channel) Ditch along Lower Conveyance Road

LowerSouthBasin

Triangular Riprap Channel Inputs:

Material: Riprap

Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
5.0:1	2.0:1	2.0			

Riprap Channel Results:

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	2.64 cfs	
Depth:	0.54 ft	
Top Width:	3.77 ft	
Velocity:	2.60 fps	
X-Section Area:	1.02 sq ft	
Hydraulic Radius:	0.259 ft	
Froude Number:	0.88	
Manning's n:	0.0330	
Dmin:	1.00 in	
D50:	1.50 in	
Dmax:	3.00 in	

Structure Detail:

Structure #4 (Riprap Channel)

PovertyGulchStrem

Swale Parallel to 18 or 24-inch CMP at 17 cfs

Trapezoidal Riprap Channel Inputs:

Material: Riprap

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
3.00	6.0:1	6.0:1	2.0			

Riprap Channel Results:

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	17.36 cfs	
Depth:	0.67 ft	
Top Width:	11.03 ft	
Velocity:	3.70 fps	
X-Section Area:	4.69 sq ft	
Hydraulic Radius:	0.421 ft	
Froude Number:	1.00	
Manning's n:	0.0320	
Dmin:	1.00 in	
D50:	1.50 in	
Dmax:	3.00 in	

Structure Detail:

Structure #5 (Riprap Channel)

LowerSouthBasin

Ditch Behind Maintenance Shop - Full Basin Discharge

Trapezoidal Riprap Channel Inputs:

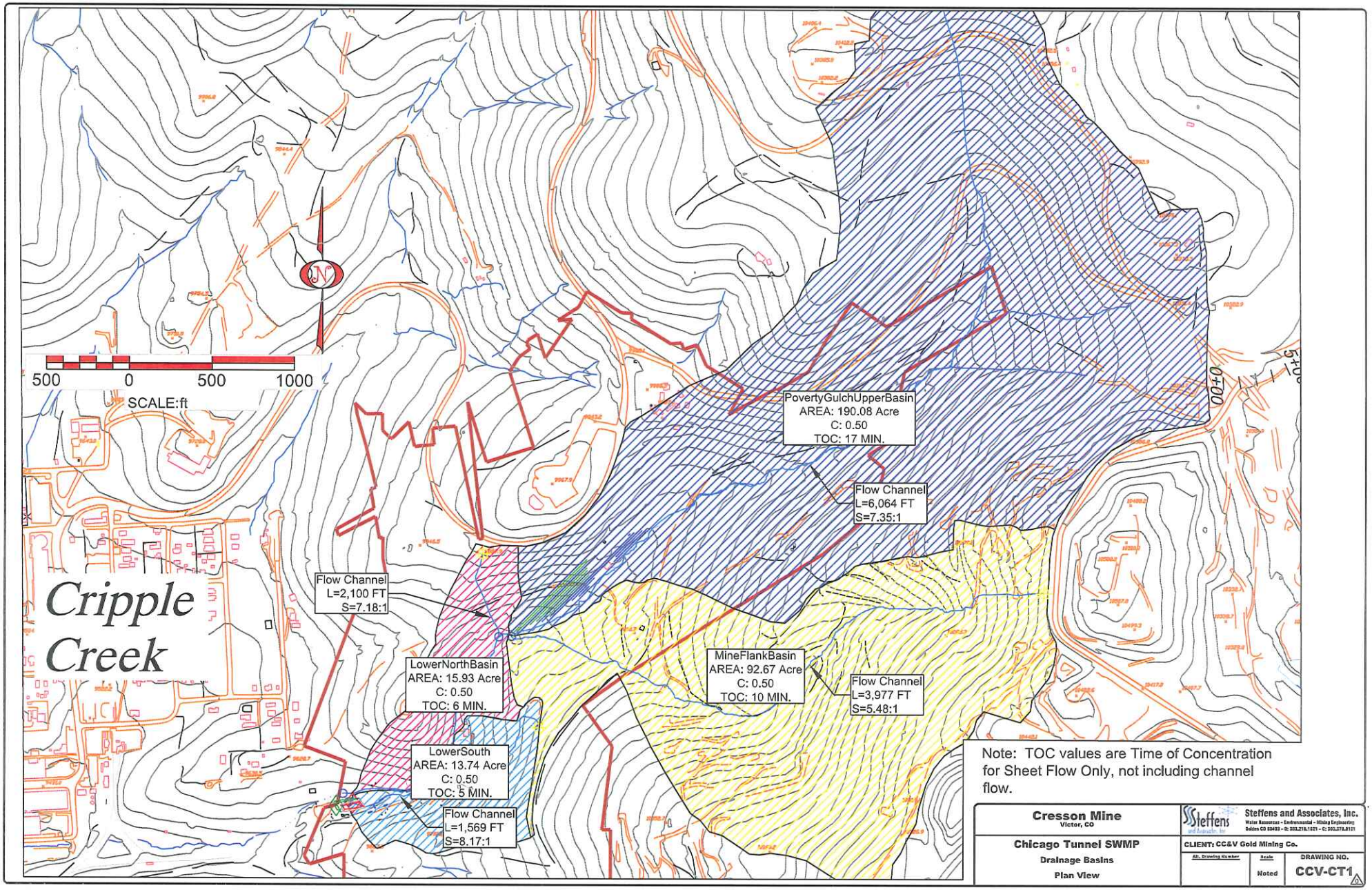
Material: Riprap

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
1.00	3.0:1	3.0:1	0.8			

Riprap Channel Results:

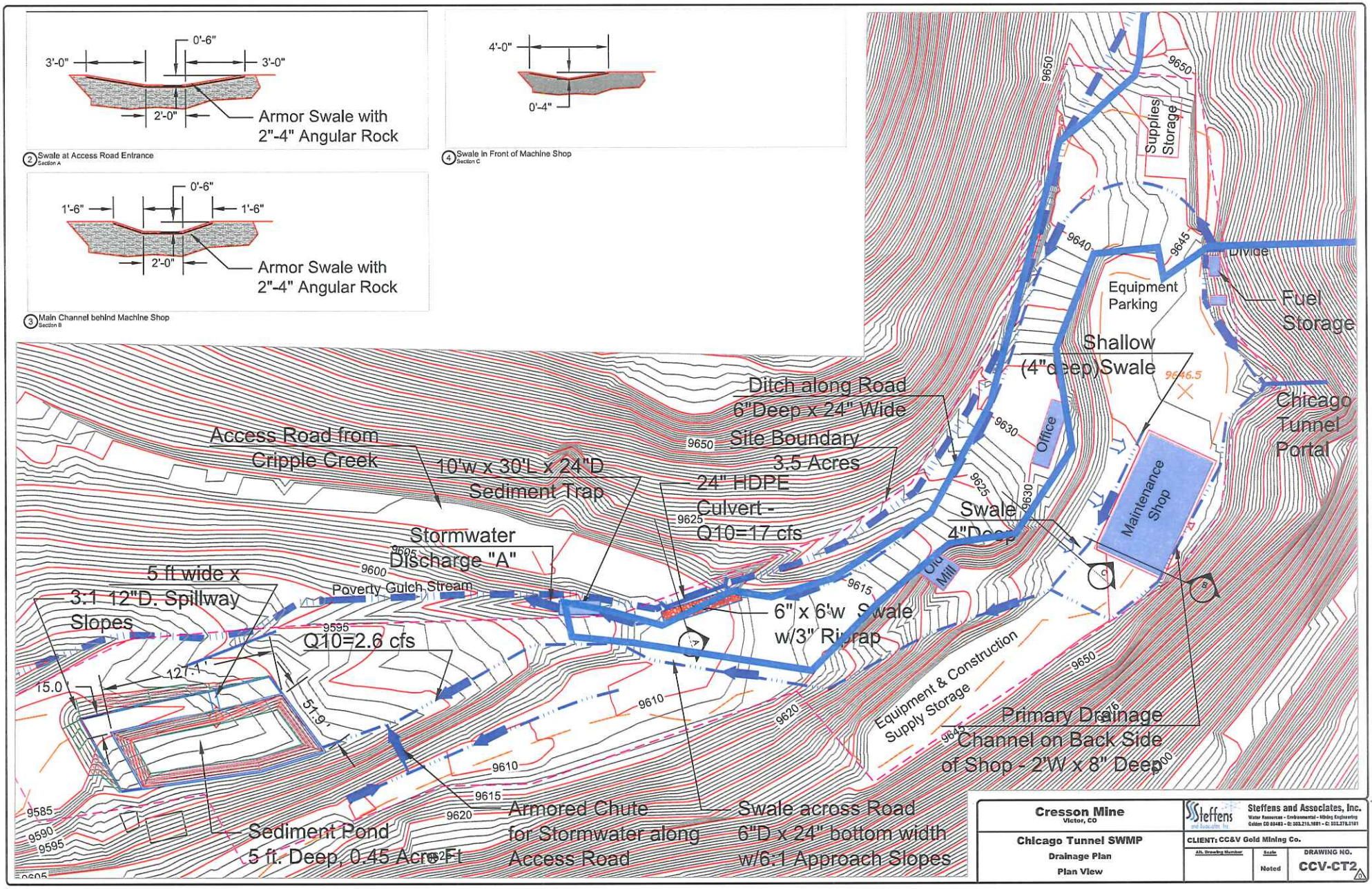
PADER Method - Mild Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	2.64 cfs	
Depth:	0.49 ft	
Top Width:	3.96 ft	
Velocity:	2.16 fps	
X-Section Area:	1.22 sq ft	
Hydraulic Radius:	0.297 ft	
Froude Number:	0.68	
Manning's n:	0.0280	
Dmin:	0.50 in	
D50:	0.75 in	
Dmax:	1.50 in	



Note: TOC values are Time of Concentration for Sheet Flow Only, not including channel flow.

Cresson Mine Victor, CO	Steffens and Associates, Inc. Water Resources - Environmental - Mining Engineering Golden CO 80403 - O: 303.216.1601 - C: 303.270.8101	
Chicago Tunnel SWMP	CLIENT: CC&V Gold Mining Co.	
Drainage Basins	Alt. Drawing Number	Scale: Noted
Plan View		DRAWING NO. **CCV-CT1**


0'-6"
3'-0"
3'-0"
2'-0"
Armor Swale with
2"-4" Angular Rock
2 Swale at Access Road Entrance
Section A
4'-0"
0'-4"
4 Swale In Front of Machine Shop
Section C
0'-6"
1'-6"
1'-6"
2'-0"
Armor Swale with
2"-4" Angular Rock
3 Main Channel behind Machine Shop
Section B
Access Road from
Cripple Creek
10'w x 30'L x 24"D
Sediment Trap
Ditch along Road
6"Deep x 24" Wide
Site Boundary
3.5 Acres
24" HDPE
Culvert -
Q10=17 cfs
Stormwater
Discharge "A"
Q10=2.6 cfs
5 ft wide x
3:1 12"D. Spillway
Slopes
Poverty Gulch Stream
6" x 6'w Swale
w/3" Riprap
Swale
4"Deep
Shallow
(4" deep) Swale
Supplies
Storage
Divide
Equipment
Parking
Fuel
Storage
Office
Maintenance
Shop
Chicago
Tunnel
Portal
Old
Mill
Equipment & Construction
Supply Storage
Primary Drainage
Channel on Back Side
of Shop - 2'W x 8" Deep
Sediment Pond
5 ft. Deep, 0.45 Acre-Ft
Armored Chute
for Stormwater along
Access Road
Swale across Road
6"D x 24" bottom width
w/6:1 Approach Slopes
9646.5
9650
9640
9645
9630
9625
9615
9610
9620
9600
9595
9590
9585
127.1'
51.9'
15.0
Cresson Mine
Victor, CO
Chicago Tunnel SWMP
Drainage Plan
Plan View
Steffens and Associates, Inc.
CLIENT: CC&V Gold Mining Co.
Scale
Noted
DRAWING NO.
CCV-CT2

CRIPPLE CREEK & VICTOR GOLD MINING COMPANY

RECLAMATION COST MODEL TO SUPPORT

Cresson Mine Amendment No. 11

Date this model was developed originally is February 2008

Prepared by:
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Model was updated 2010 & 2011 to reflect changes and was adapted for use in the MLE2 Project by:

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TABLE OF CONTENTS
CRIPPLE CREEK & VICTOR (CC&V) GOLD MINING COMPANY MINE LIFE EXTENSION
AMENDMENT NO. 11 RECLAMATION COST ESTIMATE

Sheet **Note: The TAB Numbers are used for Indexing. They can be selected as Bookmarks on the left margin of the Adobe**

Sheet **Note: The TAB Numbers are used for Indexing. They can be selected as Bookmarks on the left margin of the Adobe**

Legend for Cell Colors and Calculations

3335	Cost or Quantity Data Entries that reflect either current 2015 costs or revised units used for Amendment 11. (yellow background cells are numerical entries)
22245	Blue background generally refers to intermediate spreadsheet calculation cells that depend on precedent cost or quantity values in other cells.
$ 1,256,789.00	Light Purple/Gray background shows the results of calculations, representing Amendment 11 quantity or cost totals

The date listed in the lower right corner of each page is the date that the calculations on that TAB were last updated (i.e. not the date that the Tabs were assembled for publication).

All of the calculations are internal to this model such that no external hyperlinks or linked programs are used

By	Description of Changes
SDS	The FINAL Version of the Amendment No. 11 Cost Model was prepared by Steffens and Associates, Inc. for the permit application. The Cost Model includes all additions and modifications that have been made up to the date of submittal and reflects the results of reviews by CC&V (12-10-2015). The modifications include both changes in construction quantities related to the mining plan as well as improvements in the techniques for estimating the reclamation costs.

ASSUMPTIONS and PROCEDURES

CRIPPLE CREEK & VICTOR (CC&V) GOLD MINING COMPANY AMENDMENT NO. 11

Drawings & Autocad files of facilities were provided by CC&V staff . AutoCAD Civil3D Version 2015 was used to determine earthwork and reclamation quantities from those files. The processing of those drawings was perfomed as follows:

The End-of-Mining configuration and Post-Reclamation terrain contours were used to determine the quantities for re-grading over-steep slopes, to determine quantities of Growth Media required, and to determine the average haul distance for earthwork transportation.. End-of-mining terrain is shown on Drawing CCVSA11-1. Post-reclamation terrain is shown on Drawing CCVSA11-2.

Digital surfaces (TINs) were prepared from the contours of pre- and post- reclamation configurations from which cut and fill quantities were determined. Those quantities were modified as needed to classify the earthwork as heavy-grading tasks or mass-haulage tasks. The cost for heavy-grading is based on Caterpillar D10 dozers. The cost for hass-haulage is based on the use of either CAT777 Mining Trucks or CAT740 Articulated Trucks, whichever is appropriate and less expensive. The volume of earthwork for all areas of cut or fill are shown on Drawing CCVSA11-4. The color legend was chosen to portray areas with less than 5 feet of cut/fill and areas where heavy grading will occur and areas with greater than 5 feet of cut/fill where a combination of grading and mass-haulage will be required.

Growth Media distribution costs are based on the location of topsoil stockpiles, the area on which topsoil is to be distributed, and the expected haul distance and slope to travel between the stockpile and distribution area. The costs are based on using either CAT777 Mining Trucks, CAT740 Articulated Trucks, or CAT 623G Scrapers, whichever equipment set is most appropriate for the conditions. The Growth Media distribution plan is shown on Drawing CCVSA11-5.

Areas that will be planted with trees include North and East Facing slopes. Those areas were delimited on the drawings and the surface area was extracted. The results are shown on Drawing CCVSA11-3.. Also shown on that drawing are High-wall areas that are to be fenced and steep areas (exclusion areas) below the fences where growth media will not be distributed.

No salvage value for equipment, buildings, or tanks has been included in the reclamation cost model.

It has been assumed that no liming will be required to enhance the revegetation success.

The present model assumes there will be no off-load storage of leach material

The costs are based on information obtained from Wagner Equipment (rental rates), Means Construction Estimating manual, Colorado Dept. of Labor Statistics, and Escalated Cost data from the US Commerce websites. Other site-specific costs have been provided by suppliers to CC&V and/or historical experience.

The cost for chemical closure of the VLF is based on the same procedures used in the MLE2 Estimate.

De-nitrification of the spent ore is *not* included, as in previous cost estimates.

Public Liability Allowance - Estimate includes 1.55% of Labor and Equipment for the Public Liability Allowance required under DRMS Rule 6.

Contractor Performance Bond - Estimate include 1% for Performance Bonding (Ref. Tab 6).

Contractors Overhead and Profit - Estimate includes 5% of Labor and Equipment costs for Contractor's Overhead and Profit..

DRMS Construction Management -A 5% construction management fee on Labor and Equipment is included

Contingency - A contingency allowance of 10 percent is believed to be adequate and appropriate for this estimate. That's because the substantial percentage of costs are attributable to Earthwork and Growth Media placement. The calculation of those quantities is relatively fixed for growth media (disturbed area times average depth), and the quantities of Earthwork have been calculated in a conservative manner such that the quantities are not likely to be exceeded by significant amounts.

CC&V RECLAMATION AND CLOSURE COST SUMMARY
Amendment No. 11

	Direct Costs	Life of Mine Cost for Amendment No. 11			
	Reclamation Area or Closure Task	Equipmt Cost	Labor Cost	Materials Cost	Total Cost
11.1 and 11.2	**Building and Fixture Demolition**	*(Based on Means 2015 Total Costs per Unit)*			**$ 7,684,384**
4.0.1	**East Cresson Wild Horse**	$ 3,010,617	$ 365,874	$ 317,299	$ 3,693,790
4.0.2	**WHEX-Grassy Valley - Phase I**				
4.0.2	**WHEX Final Reclamation**	$ 2,238,789	$ 329,941	$ 128,682	$ 2,705,362
4.0.3	**North Cresson Mine Area**	**$ 2,224,623**	**$ 312,459**	**$ 188,752**	**$ 2,725,834**
4.0.4	**Main Cresson Mine Area**	**$ 1,414,795**	**$ 234,710**	**$ 326,047**	**$ 1,975,553**
8.1	**E. Cresson Overburden Storage Area**	**$ 2,612,590**	**$ 366,816**	**$ 435,342**	**$ 3,414,748**
8.2	**Squaw Gulch Overburden Storage Area**	**$ 1,233,646**	**$ 223,315**	**$ 201,128**	**$ 1,658,090**
6.1.2	**SGVLF Chemical Closure**	$ 3,172,435	$ 563,026	$ 13,157,696	$ 16,893,156
7.2	**SGVLF Reclamation**	**$ 34,559,020**	**$ 3,068,749**	**$ 297,511**	**$ 37,925,281**
6.1.1	**AGVLF Chemical Closure**	$ 5,997,725	$ 1,063,588	$ 23,102,540	$ 30,163,853
7.1	**AGVLF Reclamation**	**$ 54,818,653**	**$ 5,318,940**	**$ 590,180**	**$ 60,727,773**
7.4	**Ajax Area and #3-4 Pads**	**$ 53,556**	**$ 11,528**	**$ 17,247**	**$ 82,332**
8.3	**Ironclad Corridor (fmrly Victor Pads)**	**$ 119,272**	**$ 27,367**	**$ 62,819**	**$ 209,458**
5	**Basins and Sediment Ponds**	$ 268,310	$ 112,814	$ 264,804	$ 645,929
3	**Monitoring Wells and Piezometers**	$ 7,887	$ 19,130	$ 82,420	**$ 109,436**
8.4	**Growth Medium Piles**	$ 19,807	$ 19,842	$ 116,898	**$ 156,547**
1	**Roads (All within other Rec. Areas)**	$ -	$ -	$ -	**$ -**
11.3	**Powerlines**	*(Based on CC&V Real Life Total Costs per Unit)*			**$ 74,086**
11.4	**Building Footprints**	$ 179,118	$ 43,251	$ 148,522	**$ 369,653**
4.0.5	**Mine Area Fencing**	*(Based on Means 2015 Total Costs per Unit)*			**$ 1,188,000**
11.5	**Clean-Up and Miscellaneous**	$ 57,090	$ 45,852	$ 89,206	**$ 297,149**
18.3	**Revegetation Repairs and Maintenance**	$ 23,806	$ 45,634	$ 436,766	$ 506,205
15.1	**Ancillary (excluding Chicago & Providence)**	$ 243,594	$ 212,966	$ 1,587,571	$ 2,044,131
4.1	**Chicago Tunnel and Providence**	$ 35,682	$ 10,195	$ 5,097	$ 50,974
15.2	**Viewshed Conservation**	$ 536,233	$ 489,044	$ 226,500	$ 1,251,777
7.3	**Mill Platform Reclamation**	$ 155,178	$ 53,236	$ 76,929	$ 285,343
14.1	**Post-reclamation Monitoring**	$ 37,749	$ 228,984	$ 270,226	$ 536,959
	Sub Total	***$ 113,020,176***	***$ 13,167,261***	***$ 42,130,183***	**$ 177,375,803**
19	**Mobilization & Demobilization**	*<- 1%of Subtotal Equipment and Labor ->*			**$ 1,126,027**
				Subtotal =	**$ 178,501,830**

Indirect Costs per DRMS Rule 6	% per Rule 6	Applies To:	Amount
Public Liability	1.55%	$ 126,187,437	$ 1,955,905
Contractor's Performance Bond	1.00%	$ 126,187,437	$ 1,261,874
Contractor's Overhead and Profit	5.00%	$ 126,187,437	$ 6,309,372
DRMS Management Fee	5.00%	$ 126,187,437	$ 6,309,372
Contingency	10.00%	$ 126,187,437	$ 12,618,744
Subtotals for Indirect Costs =	22.55%		**$ 28,455,267**

GRAND TOTAL RECLAMATION AND CLOSURE COSTS PER AMENDMENT NO. 11 **$ 206,957,097**

Unit Costs Used for all Cost Calculations

REVISED LABOR COSTS FOR 2015 COST UPDATE

Worker Classification	Am#10 Warranty 2011$ Base Rate	SAInc 2015 Update 2015$ Base Rate[1]	Increase or Decrease Difference	Comments
Dozer Operator	$ 20.68	$ *21.09*	$ 0.41	
Loader Operator	$ 20.68	$ *21.09*	$ 0.41	
Scraper Operator	$ 20.68	$ *21.09*	$ 0.41	
Grader Operator	$ 20.68	$ *21.09*	$ 0.41	The ***italicized*** and yellow highlighted numbers
Backhoe Operator	$ 20.68	$ *21.09*	$ 0.41	are used to update the labor costs shown in the
Water Truck Driver	$ 19.85	$ *16.18*	$ (3.67)	8-Labor Tab for the 2015 DRMS Warranty Update
Truck Driver	$ 19.85	$ *16.18*	$ (3.67)	
Laborer	$ 14.71	$ *19.31*	$ 4.60	
Mechanic	$ 23.48	$ *23.10*	$ (0.38)	
Foreman	$ 31.30	$ *32.01*	$ 0.71	

1.01450677 This number is a ratio used to calculate truck driver costs as these are not listed on CDLE's website.

[1]Latest Data Available from Colorado Labor and Employment Department's Website at http//www.colorado.gov/cs/Satellite/CDLE-Main/CDLE/1248095317589

MDE (10-27-14)

Major Equipment Rental Costs per Month for 2015 Cost Update

Major Equipment in Cost Est.	Accessory Cost as Rental	2015	2014	2013	2013	2012	2015 References	Use in 2015 Update 2015 3-Yr Avg.
D9 Dozer		$ 25,940	$ 23,870	$ 23,870	$ 23,870	$ 22,620	Wagner's Website 2015	$ 24,560
D10 Dozer		$ 38,500	$ 29,890	$ 29,890	$ 29,890	$ 28,370	Wagner's Website 2015	$ 32,760
D11 Dozer		$ 72,462	$ 69,675	$ 66,350	$ 66,350	$ 63,190	Mike Glen's Email of 2-28-14	$ 69,496
D8 Dozer		$ 19,300	$ 17,670	$ 17,670	$ 17,670	$ 16,720	Wagner's Website 2015	$ 18,213
D8 Dozer w/ hopper-seeder		$ 19,665	$ 18,025	$ 17,973	$ 17,973	$ 17,021	Wagner's Website 2015 + Ag Attachment Costs (see below)	$ 18,554
D8 Dozer w/ harrow		$ 19,590	$ 17,936	$ 18,386	$ 18,386	$ 17,345	Wagner's Website 2015 + Ag Attachment Costs (see below)	$ 18,637
D8 Dozer w/chain		$ 19,835	$ 18,205	$ 18,550	$ 18,550	$ 17,598	Wagner's Website 2015 + Ag Attachment Costs (see below)	$ 18,863
D4 Dozer w/ hopper-seeder		$ 4,665	$ 4,265	$ 4,023	$ 4,023	$ 3,757	Wagner's Website 2015 + Ag Attachment Costs (see below)	$ 4,318
D4 Dozer w/ harrow		$ 4,590	$ 4,176	$ 4,436	$ 4,436	$ 4,095	Wagner's Website 2015 + Ag Attachment Costs (see below)	$ 4,401
D4 Dozer w/chain		$ 4,835	$ 4,445	$ 4,600	$ 4,600	$ 4,335	Wagner's Website 2015 + Ag Attachment Costs (see below)	$ 4,627
D4 Dozer		$ 4,300	$ 3,910	$ 3,720	$ 3,720	$ 3,470	Wagner's Website 2015	$ 3,977
623 Scraper		$ 22,000	$ 19,870	$ 19,870	$ 19,870	$ 18,800	Wagner's Website 2015	$ 20,580
14 M Grader		$ 13,500	$ 12,710	$ 12,100	$ 12,100	$ 11,420	Wagner's Website 2015	$ 12,770
Water Truck, 8000 gal		$ 14,300	$ 13,990	$ 13,320	$ 13,320	$ 11,304	Mike Glen's Email of 2-28-14	$ 13,870
740 Art.Truck/Formerly773 B Truck		$ 18,000	$ 18,000	$ 18,000	$ 18,000	$ 18,000	Wagner's Website 2015	$ 18,000
777F Truck		$ 54,491	$ 52,395	$ 49,845	$ 49,845	$ 47,520	Mike Glen's Email of 2-28-14	$ 52,244
988 B Loader		$ 24,770	$ 22,460	$ 22,460	$ 22,460	$ 21,280	Wagner's Website 2015	$ 23,230
972 G (F.E.L. 270HP)		$ 12,900	$ 12,210	$ 12,210	$ 12,210	$ 11,530	Wagner's Website 2015	$ 12,440
992 Loader		$ 77,392	$ 74,415	$ 70,875	$ 70,875	$ 67,500	Mike Glen's Email of 2-28-14	$ 74,227
385 Excavator		$ 34,000	$ 30,260	$ 30,260	$ 30,260	$ 28,670	Wagner's Website 2015	$ 31,507
HydroMulcher, 3000 gal on Flatbed Truck		$ 3,320	$ 3,110	$ 3,400	$ 3,400	$ 3,400	Flatbed (Means 2015, p. 703) and Hydromulcher (Means, 2015, p.707)	$ 3,277
Pickup Truck 4x4		$ 660	$ 660	$ 660	$ 660	$ 675	Means 2015, p. 703	$ 660
	Herd Broadcast Seeder	$ 365	$ 355				Costs from www.kascomfg.com (2015$) x 10% per month	
	Flexible Tine Harrow	$ 290	$ 266				Costs from www.wingfields.com (2015$) x 10%	
	Drag Chain	$ 535	$ 535				Costs from www.tulsachain.com (2015$)	
80 HP Backhoe		$ 2,800	$ 2,800					

Mike Glen's (Wagner) Quotes - Recommended adding 4% to 2015 Costs for 777, D11, and 992 equipme
Wagner's Website
Means 2015
Combination of Wagner's Website and Attachment Costs from other websites above

MDE (10-27-14)
SAInc (9/15)

Major Equipment Operating Costs per Hour for 2015 Cost Update

		2015	2014	2013	Change
D9 Dozer		$ 110.70	$ 111.03	$ 113.87	$ (3.17)
D10 Dozer		$ 145.53	$ 145.86	$ 149.06	$ (3.53)
D11 Dozer		$ 235.36	$ 235.65	$ 213.49	$ 21.87
D8 Dozer		$ 84.84	$ 85.11	$ 85.58	$ (0.74)
D8 Dozer w/ hopper-seeder		$ 89.84	$ 90.11	$ 90.58	$ (0.74)
D8 Dozer w/ harrow		$ 85.28	$ 85.54	$ 85.98	$ (0.70)
D8 Dozer w/chain		$ 85.34	$ 85.61	$ 86.08	$ (0.74)
D4 Dozer w/ hopper-seeder		$ 30.70	$ 29.68	$ 25.05	$ 5.65
D4 Dozer w/ harrow		$ 26.14	$ 25.11	$ 26.77	$ (0.63)
D4 Dozer w/chain		$ 26.20	$ 25.18	$ 25.45	$ 0.75
D4 Dozer		$ 25.70	$ 24.68	$ 25.05	$ 0.65
623 Scraper		$ 110.57	$ 110.96	$ 110.81	$ (0.24)
14 M Grader		$ 58.12	$ 58.22	$ 53.00	$ 5.12
Water Truck, 8000 gal		$ 112.70	$ 113.25	$ 115.60	$ (2.90)
740 Articulated Truck		$ 70.72	$ 70.72	$ 70.72	$ -
777 F Truck		$ 146.90	$ 147.29	$ 150.26	$ (3.36)
988 B Loader		$ 105.16	$ 105.37	$ 107.66	$ (2.50)
972 G (F.E.L. 270HP)		$ 61.37	$ 61.58	$ 47.84	$ 13.53
992 Loader		$ 187.31	$ 187.61	$ 187.89	$ (0.58)
385 Excavator		$ 157.35	$ 158.00	$ 161.50	$ (4.15)
HydroMulcher, 3000 gal on Flatbed Truck		$ 45.10	$ 58.30	$ 46.10	$ (1.00)
Pickup Truck 4x4		$ 13.95	$ 15.55	$ 27.02	$ (13.07)
80 HP Backhoe		25.6	26.05	$ 26.05	$ (0.45)
Herd Broadcast Seeder	5	$ 5.00	$ 5.00	Use in 2015 Update Cost Estimates	Estimated by MDE (3-3-14)
Flexible Tine Harrow	0.44	$ 0.44	$ 0.43		Means 2015, p. 701
Drag Chain	0.5	$ 0.50	$ 0.50		Estimated by MDE (3-3-14)

2015 References

Cost Reference Guide for Construction Equipment
First Half of 2015, Second Half of 2014
Equipment Watch
Primedia Business Directories and Book Group
1735 Technology Drive, suite 410
San Jose, CA 95110

Flatbed Truck $21.70 (Means 2015, p.703) + Hydromulcher $23.40 (Means 2015, p. 707)

Means 2015, p. 703

SAInc (6-23-15)

Materials Cost Updates forAM11 Warranty Cost Estimate

CPI Inflation Factors for Materials and Services Updates

CPI inflation data comes from www.InflationData.com

Year	CPI	Ratios	Comment or Use for these Ratios
2009	214.537	1.1034	Inflating 2009 costs to 2015 Dollars
2010	218.056	1.0856	Inflating 2010 costs to 2015 Dollars
2011	224.939	1.0524	Inflating 2011 costs to 2015 Dollars
2012	229.594	1.0311	Inflating 2012 costs to 2015 Dollars
2013	232.96	1.0162	Inflating 2013 costs to 2015 Dollars
2014.5	238.340	0.9932	Inflating 2014 costs to 2015 Dollars
2015	236.730	1.0000	Inflating 2015 costs to 2015 Dollars

Material Item or Service	2013 Estimated $	2015 Update Estimated $	Units	Explanation or Comment
Fertilizer (18-46-0)	$ 0.704	$ 0.443	$/pound	New Cost from 2014 Ark Valley Seed
Seed Mix	$ 2.279	$ 2.32	$/pound	Inflated 2013$ to 2015$ by CPI ratio
Gooseberry Currant	$ 6.67	$ 6.78	$/plant	Inflated 2013$ to 2015$ by CPI ratio
Rosa Woodsii (Wild Rose)	$ 4.04	$ 4.11	$/plant	Inflated 2013$ to 2015$ by CPI ratio
Engleman Spruce	$ 5.73	$ 5.82	$/plant	Inflated 2013$ to 2015$ by CPI ratio
Bristlecone Pine	$ 9.09	$ 9.24	$/plant	Inflated 2013$ to 2015$ by CPI ratio
Wood Fiber Hydromulch	$ 594.72	$ 520.00	$/ton	Average of 2 Quotes 2015 (Ark Valley + Hanes)
Water for Hydroseeding	$ 0.0023	$ 0.00247	$/gallon	Actual water costs to CC&V per Kevin Riley (2-24-14)
Fencing (6 ft high industrial chain link, 6 gage steel)	$ 28.51	$ 30.00	$/foot	Means 2015, p. 647
Quikcrete or Sakrete	$ 2.77	$ 4.38	$/60 lb bag	Average of 4 prices from websites (Feb 2014)
Sand	$ 27.74	$ 29.19	$/cu yd	Inflated 2013$ to 2015$ by CPI ratio
Bentonite Chips	$ 0.32	$ 0.33	$/pound	CETCO 2013$ inflated to 2015$ by CPI
Soil Sample Lab Services	$ 22.56	$ 116.80	$/sample	Quote from ACZ 10-29-14
Heap Leach Effluent Sampling	$ 182.22	$ 191.78	$/sample	Inflated 2011$ to 2015$ by CPI ratio
Ground Water Samples	$ 425.17	$ 447.45	$/sample	Inflated 2011$ to 2015$ by CPI ratio
Surface Water Samples	$ 425.17	$ 447.45	$/sample	Inflated 2011$ to 2015$ by CPI ratio
Heap Leach Monitoring	$ 18,221.20	$ 19,176	$/year	Inflated 2011$ to 2015$ by CPI ratio
Professional Travel	$ 91.11	$ 95.88	$/day	Inflated 2011$ to 2015$ by CPI ratio
Prof. Travel Room & Board	$ 129.98	$ 136.79	$/day	Inflated 2011$ to 2015$ by CPI ratio
Water Sample Supplies	$ 121.47	$ 127.84	$/trip	Inflated 2011$ to 2015$ by CPI ratio
Tire Disposal	$ 326.03	$ 331.31	$/trip	Inflated 2013$ to 2015$ by CPI ratio
Peroxide costs*	$ 2.80	$ 6.50	$/gallon	Based on 2014 quote from Univar to A. Iverson 10-15-14

*Peroxide costs are from a 2014 quote by Univar's Curt Brown in email to A. Iverson 10-15-14

Use these costs in 2015 Cost Update

See MT email of 10-27-14

SAInc 6/15

Revised Demolition Costs for 2015 Update to the Cost Estimate

[All costs are dollars per cubic foot]

Buildings & Structural Demo Year	Steel	Concrete	Masonry	Buildings & Structural Demo Mixture
1994	0.16	0.22	0.17	0.21
1999	0.18	0.25	0.19	0.19
2003	0.19	0.27	0.21	0.21
2005	0.20	0.27	0.21	0.21
2006	0.20	0.29	0.22	0.22
2007	0.22	0.30	0.23	0.23
2008	0.23	0.32	0.24	0.24
2010	0.33	0.46	0.35	0.35
2011	0.31	0.44	0.33	0.33
2012	0.33	0.46	0.35	0.35
2013	0.35	0.49	0.37	0.37
2014	0.36	0.50	0.38	0.38
Means 2015, Page 30	0.36	0.51	0.39	0.39

Means costs for building and structural demolition include operating costs and profits for a third party specialty contractor, and therefore on the summary sheet there is no breakdown for labor, materials, and equipment, and it is not necessary to apply any administrative costs to these items.

Certain specific demolition

Selective Items Demolition	2011 Costs	2015 Update Int Costs	Units	Current 2015$ Using Demolition Cost Ratios	Check Using CPI
Conveyor Demolition Costs	$ 21.80	$ 25.32	$/linear foot	2015 calc = ($21.80)x(0.36/0.31) = $25.32 / lin. Ft.	$ 22.94
Stem Wall Demolition Costs	$ 14.03	$ 16.26	$/sq ft.	2015 calc = ($14.03)x(0.51/0.44) = $15.94 / sq ft.	$ 14.77
				Explanation or Source of Data	
Demo of Pipes/ VLF Lines 30"	$ 28.15	$ 29.15	$/linear foot	Means 2015, p. 29 No O&P	
Demo of Pipes/ VLF Lines 24"	$ 21.15	$ 21.85	$/linear foot	Means 2015, p. 29 No O&P	
Fence Removal Costs	$ 2.74	$ 3.05	$/linear foot	Means 2015, p. 30 No O&P	**Check**
Powerline Removal Cost	$ 458.00	$ 497.22	$/linear foot	Costs basis: Actual CC&V Experience on Removal of Phase 5 Powerline (2010); 2015$ = ($458) x (2015 CPI Ratio)	Means 2015, p. 36: $350 Poles + $128 Appurtenances =

2015 CC&V Reclamation Labor Rates

Source of Base Rates: Colorado Labor Market Information for Occupational Wages for Year 2012 (Statewide inflated to 2015)
(http://www.colmigateway.com/lmi/occ.occcomparedata)

Worker Classification	Base Rate	Fringes[1]	FICA[2]	SIIS[3]	Unemploy[4]	Workers Comp[5]	Total-2015 Dollars	Inflation Factor[6]	**Labor 2015 Dollars**
Dozer Operator	**$ 21.09**	$ 4.64	$ 1.31	$ 1.33	$ 0.80	$ 3.37	$ 32.55	1.0856	**$ 35.34**
Loader Operator	**$ 21.09**	$ 4.64	$ 1.31	$ 1.33	$ 0.80	$ 3.37	$ 32.55	1.0856	**$ 35.34**
Scraper Operator	**$ 21.09**	$ 4.01	$ 1.31	$ 1.33	$ 0.80	$ 3.37	$ 31.92	1.0856	**$ 34.65**
Grader Operator	**$ 21.09**	$ 4.43	$ 1.31	$ 1.33	$ 0.80	$ 3.37	$ 32.34	1.0856	**$ 35.11**
Backhoe Operator	**$ 21.09**	$ 4.43	$ 1.31	$ 1.33	$ 0.80	$ 3.37	$ 32.34	1.0856	**$ 35.11**
Water Truck Driver	**$ 16.18**	$ 3.07	$ 1.00	$ 1.02	$ 0.61	$ 2.59	$ 24.49	1.0856	**$ 26.58**
Truck Driver	**$ 16.18**	$ 3.56	$ 1.00	$ 1.02	$ 0.61	$ 2.59	$ 24.97	1.0856	**$ 27.11**
Laborer	**$ 19.31**	$ 4.25	$ 1.20	$ 1.22	$ 0.73	$ 3.09	$ 29.80	1.0856	**$ 32.35**
Mechanic	**$ 23.10**	$ 5.08	$ 1.43	$ 1.46	$ 0.88	$ 3.70	$ 35.65	1.0856	**$ 38.70**
Foreman	**$ 32.01**	$ 10.88	$ 1.98	$ 2.03	$ 1.22	$ 5.12	$ 53.24	1.0856	**$ 57.80**

[1]Fringes, % of Base Rate = Varies--> Dozer, Loader, Laborer, Mechanic = 22%; Scraper & Water Truck = 19%; Grader & Backhoe = 21%; Laborer & Truck Driver = 22%; Foreman = 34% [Avg of Colorado Contractor's Assn. 1999 & 2001 Surveys + Davis Bacon Wage Rate Decision for Colorado SUC D2001-016 12/20/2001]

[2]FICA, % of Base Rate = **6.20** Source: www.ssa.gov/OACT/ProgData/TasRates.html

[3]SIIS, % of Base Rate = **6.33** Source: [Avg of Colorado Contractor's Assn. 1999 & 2001 Surveys + Previous CC&V Cost Model Updates]

[4]Unemployment, % of Base Rate = **3.80** Source: www.coworkforce.com - Colorado Department of Labor and Employment

[5]Workers Comp, % of Base Rate = **16.00** Source: [Avg of Colorado Contractor's Assn. 1999 & 2001 Surveys + Previous CC&V Cost Model Updates]

Footnote 6: **1.0856** Inflation Factor based on Consumer Price Index, assuming straight line increase, from inputs below:

Annual CPI for 2015 = **236.73** Source: InflationData.com website; historical Consumer Price Index values from the Bureau of Labor Statistics.

Annual CPI for 2013= **218.06** Source: InflationData.com website; historical Consumer Price Index values from the Bureau of Labor Statistics.

SAInc 6-15)

2015 Costs for Selected Materials and Services to Accomplish Reclamation and Closure for CC&V

Note: Unit Costs are Linked in from Tab 7, Application Rates are displayed here in yellow

Material Item or Service	Quoted Cost	Units	Inflation Factor	Linked Cost ('15$)	Application Rate	Units	2015 Total Cost per Unit	Comment or Source
Fertilizer (18-46-0)				$ 0.443	400	lbs/acre	$ 177.20	New Cost from 2014 Ark Valley Seed
Seed Mix				$ 2.316	25.02	lbs/acre	$ 57.94	Inflated 2013$ to 2015$ by CPI ratio
Shrubs and Trees								
Gooseberry Currant				$ 6.78	50	per acre	$ 338.90	Golder Associates Memo Letter from Mandel 8/1/2011
Rosa Woodsii (wild rose)				$ 4.11	50	per acre	$ 205.27	Inflated 2013$ to 2015$ by CPI ratio
Englemann Spruce				$ 5.82	25	per acre	$ 145.57	Inflated 2013$ to 2015$ by CPI ratio
Bristlecone Pine				$ 9.24	25	per acre	$ 230.93	Inflated 2013$ to 2015$ by CPI ratio
				Cost of Shrub/Tree Planting per acre =			$ 920.66	
Hydromulch (Silva Fiber)				$ 520.00	1.0	ton/acre	$ 520.00	Average of 2 Quotes 2015 (Ark Valley + Hanes)
Water for Hydromulching & Rinsing				$ 0.002470	2400	gal/acre	$ 5.93	Actual water costs to CC&V per Kevin Riley (2-24-14)
Agricultural Limestone Application	$ 67.18	per ton		$ -	15	ton/acre	$ -	Not used in this model
Fencing and Installation [6 ft high industrial 6 gage steel chain link]				$ 30.00		$/foot	$ 30.00	Means 2015, p. 647
Plugging Drill Holes								
Quikrete or Sacrete (60 lb bags)		per bag		$ 4.38	350	bags	$ 1,533.00	Average of 4 prices from websites (Feb 2014)
Sand		per cy		$ 29.19	1	cy/hole	$ 29.19	Inflated 2013$ to 2015$ by CPI Ratio
Bentonite Chips (Cetco Product)		per lb		$ 0.33	14	lbs/ft	$ 4.55	CETCO 2013$ inflated to 2015$ by CPI
Soil Sample Lab Services		/sample		$ 116.80			$ 116.80	Quote from ACZ 10-29-14
Heap Leach Effluent Sampling		/sample		$ 191.78			$ 191.78	Inflated 2011$ to 2015$ by CPI ratio
Ground Water Samples		/sample		$ 447.45			$ 447.45	Inflated 2011$ to 2015$ by CPI ratio
Surface Water Samples		/sample		$ 447.45			$ 447.45	Inflated 2011$ to 2015$ by CPI ratio
Heap Leach Monitoring		/year		$ 19,176.33			$ 19,176	Inflated 2011$ to 2015$ by CPI ratio
Professional Travel		/day		$ 95.88			$ 95.88	Inflated 2011$ to 2015$ by CPI ratio
Professional Travel Room & Board		/day		$ 136.79			$ 136.79	Inflated 2011$ to 2015$ by CPI ratio
Water Sample Supplies		/trip		$ 127.84			$ 127.84	Inflated 2011$ to 2015$ by CPI ratio
Tire Disposal		/trip		$ 331.31			$ 331.31	Inflated 2013$ to 2015$ by CPI ratio

2015 CC&V Reclamation Equipment Rates

Sources: (1) Cost Reference Guide for Construction Equipment, EquipmentWatch, Primedia Business Directories and Book Group, 1735 Technology Drive, Ste 410, San Jose, CA 95110 (2nd Half 2015 Update); (2) Means Heavy Construction Cost Data (2013); (3) Wagner 2011-2015 Rental Rates at www.wagnerequipment.cat.com; (4) Phone conversation with and emails from Mike Glen of Wagner Equipment

Equipment	Equip. Rent Rate/Month[1]	Hours per Month	Colorado Factor[2]	Cost/Hour Rental[3]	Means 2015 Operating Cost/Hour[4]	Equipment Watch Operating Cost/Hour[4A]	Tot. Equip Cost 2015 $/Hr[5]	Labor Cost 2015 $/Hr6	**Total Cost 2015 $/Hr7**
D11 Dozer	$ 69,496	176	1.05	$ 414.60	$ 266.29	$ 235.36	$ 649.96	**$ 35.34**	**$ 685.30**
D10 Dozer	$ 32,760	176	1.05	$ 195.44	$ 162.25	$ 145.53	$ 340.97	**$ 35.34**	**$ 376.31**
D9 Dozer	$ 24,560	176	1.05	$ 146.52	$ 125.70	$ 110.70	$ 257.22	**$ 35.34**	**$ 292.56**
D8 Dozer	$ 18,213	176	1.05	$ 108.66	$ 95.42	$ 84.84	$ 193.50	**$ 35.34**	**$ 228.83**
D8 Dozer w/hopper	$ 18,554	176	1.05	$ 110.69	Not Available	$ 89.84	$ 200.53	**$ 35.34**	**$ 235.87**
D8 Dozer w/harrow	$ 18,637	176	1.05	$ 111.19	$ 95.80	$ 85.28	$ 196.47	**$ 35.34**	**$ 231.80**
D4 Dozer	$ 3,977	176	1.05	$ 23.72	$ 27.54	$ 25.70	$ 49.42	**$ 35.34**	**$ 84.76**
D4 Dozer w/seeder	$ 4,318	176	1.05	$ 25.76	Not Available	$ 30.70	$ 56.46	**$ 35.34**	**$ 91.79**
D4 Dozer w/harrow	$ 4,401	176	1.05	$ 26.25	$ 27.92	$ 26.14	$ 52.39	**$ 35.34**	**$ 87.73**
D4 Dozer w/chain	$ 4,627	176	1.05	$ 27.60	Not Available	$ 26.20	$ 53.80	**$ 35.34**	**$ 89.14**
972 Loader	$ 12,440	176	1.05	$ 74.22	$ 63.99	$ 61.37	$ 135.59	**$ 35.34**	**$ 170.92**
988 Loader	$ 23,230	176	1.05	$ 138.59	$ 108.12	$ 105.16	$ 243.75	**$ 35.34**	**$ 279.08**
992 Loader[1A]	$ 74,227	176	1.05	$ 442.83	$ 152.20	$ 187.31	$ 630.14	**$ 35.34**	**$ 665.48**
Water Truck, 8000 gal	$ 13,870	176	1.05	$ 82.75	$ 83.57	$ 112.70	$ 195.45	**$ 26.58**	**$ 222.03**
740 Articulated Truck	$ 18,000	176	1.05	$ 107.39	$ 78.21	$ 70.72	$ 178.11	**$ 27.11**	**$ 205.22**
777 Haul Truck[1A]	$ 52,244	176	1.05	$ 311.68	$ 143.53	$ 146.90	$ 458.58	**$ 27.11**	**$ 485.69**
623 Scraper	$ 20,580	176	1.05	$ 122.78	$ 132.29	$ 110.57	$ 233.35	**$ 34.65**	**$ 268.00**
385 Excavator	$ 31,507	176	1.05	$ 187.97	$ 164.38	$ 157.35	$ 345.32	**$ 35.11**	**$ 380.42**
14 Grader	$ 12,770	176	1.05	$ 76.18	$ 61.53	$ 58.12	$ 134.30	**$ 35.11**	**$ 169.41**
Hydro-seeder/mulcher	$ 3,277	176	1.05	$ 19.55	$ 35.46	$ 45.10	$ 55.00	**$ 27.11**	**$ 82.11**
Pick-up Truck 4WD	$ 660	176	1.05	$ 3.94	$ 12.94	$ 13.95	$ 16.88	**$ 57.80**	**$ 74.68**

[1]Average of Wagner 2013, 2014, and 2015 Equipment Monthly Rental Rates (www.wagnerequipment.com/rentals) or from Means (2015)

[1A]Cat 777, Cat D11, and Cat 992 Costs from Mike Glen, Wagner Eqpt.

[2]Adjustment factor for Colorado (High Altitude Work and Difficult Conditions)

[3]Equipment Rental Rate per Month divided by Hours per Month X CO Adjustment Factor = Rental Cost/Hour

[4]Most recent operating costs from Means (2015) time city index of 94.8% for ColoSpgs Shown for comparison only.

4AMost recent costs (labor, parts, fuel, lube, tires,GEC) Cost Ref. Guide for Construction Equipment (2nd Half 2015)

52015 Rental Cost per Hour + 2015 Operating Cost per Hour

[6]Labor costs are from the Labor Worksheet and are inflated Colorado Labor Market Rates

[7]Total Cost per Hour is the Equipment Rental Cost + Equipment Operating Cost + Operating Labor Cost

Note: Herd Seeder #2440 + Hydraulic Motor #248 -> cost = $3445
(Reference: Phone conversation with Steve of Herd Seeder, Logansport, IN)
Assume Seeder Life = 1 year = 2000 operating hours; therefore, $3445 / 2000 = $1.72/hr
Harrow is $640/month or $640/176 = 3.64/hr + $0.43 oper/hr = $4.07/hr Means 2013, p. 523
Assume Drag Chain = $5/hr (EEE Estimate)
Seeder = 176 hrs x $1.72/hr = $303/month
Drag Chain = 176 hrs x $5/hr = $880 / month
Harrow = $4.07 per hr x 176 hrs/month = $716.32 / month

Note: Some equipment which is used on a limited basis shows up only on the individual facility worksheets.

MDE (10-28-14)

Section 11.0 Demolition Summary

Sub Heading	Management Area	Grand Total Cost	Life-of-Mine Requirement for Amendment No. 11
11a	Building Demolition	$ 6,797,893	
11b	Non-mechanical Fixture Demo	$ 886,491	
26	Powerline Removal	$ 74,086	
27	Building Footprint Reclamation	$ 369,653	
29	Clean-up (misc. Decommissioning)	$ 297,149	
11	Total All Areas	$ 8,425,272	New TAB Created SAInc (10/15)

TAB 11A/Section 11.1 - Demolition of Structures, excluding interior mechanical (Process equipment) or non-mechanical fixtures (tanks)

Summary

Area of Facility	Total Amendment 11 Building Demolition		Remarks
Cresson Plant	$ 570,919		
Laboratory	$ 210,593		
Carlton Trailers and Substation	$ 16,214		
AGADR Processing Plant	$ 776,512		
Victor Plant	$ 1,024,869		
Bulk Emulsion Facility (aka Buckley Plant)	$ 69,956		Note: For warranty estimates of 2015 and subsequent years the demolition of buildings has been separated from the demo of tanks, conveyors, and other fixtures that are structures. Costs for the Demo of fixtures are in Tab 11b.
ETRAIN Project	$ 151,308		
Ajax Exploration Building	$ 66,690		
Squaw Gulch Valley Leach Facility	$ 1,050,167		
High Grade Mill Facility at SGVLF	$ 2,126,327		
Process Solution Enhancement ("PSE") Facility	$ 393,372		
Future Ironclad Facility	$ 117,207		
New MLE2 Building in 2014	$ 223,759		
Amendment No. 11 Buildings	$ 28,699		
Total Structure Demolition	$ 6,797,893		

Building or Structure	No.	Length	Width	Height	Cu.Ft.	$/Cu.Ft. [1]	Cost
Cresson Plant							
Primary Crusher Building	1	78.0	48.0	112.0	419,328	$ 0.36	$ 150,958
Secondary Crusher MCC	1	53.0	21.0	15.0	16,695	$ 0.36	$ 6,010
Secondary Crushers	1	120.0	67.0	107.0	860,280	$ 0.36	$ 309,701
Screen Bldg	1	72.0	32.0	86.0	198,144	$ 0.36	$ 71,332
Screen MCC Building	1	40.0	18.0	15.0	10,800	$ 0.36	$ 3,888
Crusher Maint. Bldg.	1	40.0	40.0	17.0	27,200	$ 0.39	$ 10,608
Security Bldg.	1	65.0	40.0	10.0	26,000	$ 0.36	$ 9,360
MCC Building for Phase II Pumps	1	21.0	11.0	12.0	2,772	$ 0.36	$ 998
Crusher Maintenance Building - October 1999							
Addition	1	25.0	40.0	17.4	17,400	$ 0.36	$ 6,264
Lean to	1	10.0	40.0	12.5	5,000	$ 0.36	$ 1,800
						SUBTOTAL	**$ 570,919**
Laboratory							
Laboratory Building	1	150.0	68.7	52.4	539,982	$ 0.39	**$ 210,593**
Carlton Trailers and Substation							
Project Manager Trailer	1	57.0	12.0	10	6,840	$ 0.36	$ 2,462
Project Trailer	1	40.0	53.0	10	21,200	$ 0.36	$ 7,632
FileTrailer	1	20.0	10.0	10	2,000	$ 0.36	$ 720
Process Maintenance Trailer	1	60.0	25.0	10	15,000	$ 0.36	$ 5,400
						SUBTOTAL	**$ 16,214**
AGADR Processing Plant							
Building - AGADR 1995	1	165	100	51.5	849,750	$ 0.36	$ 305,910
Pipe Access Gallery 1995	1	60	10	10	6,000	$ 0.36	$ 2,160
Carbon Strip & Regen Equip 1995	1	107	25	45	120,375	$ 0.36	$ 43,335
Process Maintenance Trailer	1	60	25	12	18,000	$ 0.36	$ 6,480
AGADR Addition North 1999	1	165	43	44	312,180	$ 0.36	$ 112,385
AGADR Addition South 2002	1	108	70	56.9275	430,372	$ 0.36	$ 154,934
Etrain Expansion of AGADR Building	1	142	42	53	316,092	$ 0.36	$ 113,793
MCC $ Fume Scrubber Room	1	37	16	16	9,472	$ 0.36	$ 3,410
Enrichment Pump Station	1	60	30	38	68,400	$ 0.36	$ 24,624
Ph. V Preg Pump Electrical MCC Bldg.	1	22	22	17	8,228	$ 0.36	$ 2,962
Ph. V Preg & Enrich MCC Bldg	1	42	22	17	15,708	$ 0.36	$ 5,655
Ph. V Preg & Enrich LVSC Pump Shed	1	20	10	12	2,400	$ 0.36	$ 864
						SUBTOTAL	**$ 776,512**

[1] 2015 Means Heavy Construction Cost Data, **02 41 16.13-0020/0100** - This footnote applies to all sheets within this TAB

[2] Pro-rated cost for conveyor demolition based on historic costs and Means.

[1] 2015 Means Heavy Construction Cost Data, **02 41 16.13-0020/0100** - This footnote applies to all sheets within this TAB

Building	Length	Width	Peak	Eave	Cu.Ft.	$/Cu.Ft.[1]	Cost
Victor Plant							
Maintenance							
Light Vehicle Shop - Ironclad	80	56.0	13.0	12.0	56,000	$ 0.36	$ 20,160
Truck Wash Facility - Ironclad	75	45.0	44.0	40.5	142,594	$ 0.36	$ 51,334
Truck Shop - Ironclad	305	95.0	65.0		1,883,375	$ 0.36	$ 678,015
Mill							
Maint. Warehouse	57	200.0	46.5		530,100	$ 0.36	$ 190,836
Agglomerator	20	76.0	34.0		51,680	$ 0.36	$ 18,605
Sump/pump	16	15.0	13.0		3,120	$ 0.36	$ 1,123
Conveyor Shed	85	13.0	21.0		23,205	$ 0.36	$ 8,354
Process Corridor	15	175.0	24.0		63,000	$ 0.36	$ 22,680
						SUBTOTAL	**$ 991,107**

Victor Plant Retaining and Stem Walls	**Length**	**Height**	**Sq.Ft.**	**$ / Sq Ft.[2]**	**Cost**
Maintenance/Warehouse	220	6.0	1,320	$ 16.26	$ 21,468
Conveyor Recess	63	12.0	756	$ 16.26	$ 12,295
				SUBTOTAL	**$ 33,763**

[2]Means for 8" Walls and footers

Bulk Emulsion Facility (aka Buckley Plant)

Building	Length	Width	Peak	Eave	Cu.Ft.	$/Cu.Ft.[1]	Cost
Main Building	60	40.0	17.0	12.0	34,800	$ 0.36	$ 12,528
			Height				
Small Bulk Bin	10	10.0	20.0		2,000	$ 0.36	$ 720
Stem Walls					**Sq. Ft.**	**$ / Sq Ft.[2]**	
Building	140		2.0		280	$ 15.94	$ 4,463
Solution Tank Containment	96		2.0		192	$ 15.94	$ 3,060
Fuel Tank Containment	56		2.0		112	$ 15.94	$ 1,785
Outside Fuel Tank Containment	42		2.0		84	$ 15.94	$ 1,339
Engineering Facility							
New Engineering Building (2007)	9,324	sf = footprint area		13.0	121,212	$ 0.38	$ 46,061
						SUBTOTAL	**$ 69,956**

[1] 2015 Means Heavy Construction Cost Data, **02 41 16.13-0020/0100** - This footnote applies to all sheets within this TAB

[2]Pro-rated using historic costs and increase in Mixed Means Cost from 2011 to 2013

ETRAIN Project

Name of Structure	Type of Structure	Length (feet)	Width (feet)	Height (feet)	Volume (cu ft)	[1]Cost per cu ft	Total Cost ($)
AGADR Building Expansion Area for New (2010) E-Train	Steel and Concrete	142	42	53	316,092	$ 0.36	$ 113,793
MCC & Fume Scrubber Room	Steel and Concrete	37	16	16	9,472	$ 0.36	$ 3,410
Enrichment Pump Station	Steel and Concrete	60	30	38	68,400	$ 0.36	$ 24,624
Phase 5 - Preg Pump Electrical MCC Bldg.	Steel and Concrete	22	22	17	8,228	$ 0.36	$ 2,962
Phase 5 - Preg & Enrichment Pumping Electrical MCC Bldg.	Steel and Concrete	42	22	17	15,708	$ 0.36	$ 5,655
Phase 5 - Preg & Enrichment Pumping LVSC Pump Control Shed	Steel and Concrete	20	10	12	2,400	$ 0.36	$ 864
						SUBTOTAL	**$ 151,308**

[1] 2015 Means Heavy Construction Cost Data, **02 41 16.13-0020/0100** - This footnote applies to all sheets within this TAB

[2]Note: Building dimensions are from FLSmidth / Centry Drawings provided by M. Jahraus (February 2010)

Ajax Exploration Building	Steel and Concrete	150	65	18	175,500	**$ 0.38**	**$ 66,690**

Squaw Gulch Valley Leach Facility

Name of Structure	Type of Structure	Length (feet)	Width (feet)	Height (feet)	Volume (cu ft)	[1]Cost per cu ft	Total Cost ($)
		[some dimensions in sq ft]					
MCC Building	Steel & Concrete	1,620 sq ft		12	19,440	$ 0.36	$ 6,998
Squaw Warehouse	Steel & Concrete	8,320 sq ft		32	266,240	$ 0.36	$ 95,846
Low Volume Solution Collection (LVSC) Pump Shed	Wood & Steel	1,510 sq ft		12	18,120	$ 0.36	$ 6,523
SGADR Building	Steel & Concrete	164.5	200	62	2,039,800	$ 0.36	$ 734,328
SGADR Utility Bldg (S. Side of ADR attached)	Steel & Concrete	60.0	30	17	30,600	$ 0.36	$ 11,016
Squaw Security Building	Steel & Concrete	2,860 sq ft		10	28,600	$ 0.36	$ 10,296
Squaw Modular Office Building #1	Steel & Concrete	60.0	66	10	39,600	$ 0.36	$ 14,256
Squaw Modular Office Building #2	Steel & Concrete	60.0	66	10	39,600	$ 0.36	$ 14,256
Squaw Modular Office Building #3	Steel & Concrete	12.0	66	10	7,920	$ 0.36	$ 2,851
Squaw Electrical Substation (only 40% of the area will have structures)	Steel	26,728 sq ft		15	400,920	$ 0.36	$ 144,331
Squaw Auxiliary Building "B"	Steel & Concrete	918 sq ft		10	9,180	$ 0.36	$ 3,305
Squaw Auxiliary Building "C"	Steel & Concrete	400 sq ft		10	4,000	$ 0.36	$ 1,440
Squaw Auxiliary Building "A"	Steel & Concrete	1,311 sq ft		10	13,110	$ 0.36	$ 4,720
						SUBTOTAL SGVLF Buildings	**$ 1,050,167**

[1] 2015 Means Heavy Construction Cost Data, **02 41 16.13-0020/0100** - This footnote applies to all sheets within this TAB

Note: Dimensions for these facilities were from FLSmidth / CEntry drawings 20-641-02 and 03 for the ADR Building and from

Drawing C4 Proposed Facilities Map for MLE2 with ACAD measurements provided by J. Snyder of Norwest (1-12-12)

High Grade Mill Facility at SGVLF

Name of Structure	No. of Tanks or Structure Type	Length (feet) [some dimensions in gallons; others in square feet]	Width (feet)	Height (feet)	Volume (cu ft)	[1]Cost per cu ft	Total Cost ($)
Mill Building Main Structure (includes whse, milling area, shop, electrical, and interior offices)	Steel and Concrete	67,053 sq ft		86	5,766,558	$ 0.36	$ 2,075,961
Mill Substation (NW corner of Mill Bldg)	St & Conc	4,207 sq ft		15	63,105	$ 0.36	$ 22,718
Project Office A	ST & Wood	3,000 sq ft		10	30,000	$ 0.36	$ 10,800
Project Office B	ST & Wood	1,440 sq ft		10	14,400	$ 0.36	$ 5,184
Project Office C	ST & Wood	900 sq ft		10	9,000	$ 0.36	$ 3,240
Project Office D	ST & Wood	1,440 sq ft		10	14,400	$ 0.36	$ 5,184
Project Office E	ST & Wood	900 sq ft		10	9,000	$ 0.36	$ 3,240
					Subtotal Mill Bldg, Conveyors, and Tanks		**$ 2,126,327**

Note: Dimensions and information for Mill Bldg, Tanks and Appurtenances Table are from Drawings Provided by D. Larson plus
email from M. Jahraus to M. Ellis (1-12-12) and personal consultation with CC&V Processing Manager, K. Riley (1-12-12)

[1] 2015 Means Heavy Construction Cost Data, **02 41 16.13-0020/0100** - This footnote applies to all sheets within this TAB

Future Ironclad Facility

Name of Structure	Structure Type	Length (feet)	Width (feet)	Height (feet)	Volume (cu ft)	[1]Cost per cu ft	Total Cost ($)
Buckley Explosives Truck Garage (new bldg)	7,600	sf = footprint area		18.0	136,800	$ 0.36	$ 49,248
Ironclad Office Annex (add-on to existing bldg)	4,800	sf = footprint area		13.0	62,400	$ 0.36	$ 22,464
Maintenance Department Annex (add-on to existing)		75	25.0	65.0	121,875	$ 0.36	$ 43,875
Laboratory Addition (add-on to existing bldg)	Steel	30	15	10	4,500	$ 0.36	$ 1,620
					Subtotal Miscellaneous Structures		**$ 117,207**

New MLE2 Building in 2014

(This Table is based on data from Dean Waters and Marc Tidquist Supplied to Mike Ellis 6-28-13)

Name of Structure	Structure Type	Length (feet) (or Footprint Area in sf)	Width (feet)	Height (feet)	Volume (cu ft)	[1]Cost per cu ft	Total Cost ($)
Modular Office at Mill Platform - Support Structure #1	Steel & Concrete		3,960	12	47,520	$ 0.36	$ 17,107
Modular Office at Mill Platform - Support Structure #2	Steel & Concrete		3,960	12	47,520	$ 0.36	$ 17,107
Modular Office at Mill Platform - Support Structure #3	Steel & Concrete		924	12	11,088	$ 0.36	$ 3,992
Warehouse #1 on Dump 4	Steel & Concrete	42	80	22	73,920	$ 0.36	$ 26,611
Warehouse #2 on Dump 4	Steel & Concrete	72	90	22	142,560	$ 0.36	$ 51,322
Warehouse #3 at Mill Platform	Steel & Concrete	72	166	22	262,944	$ 0.36	$ 94,660
Buckley Quonset Style Bldg North of Main Plant	Steel & Concrete	40	50	18	36,000	$ 0.36	$ 12,960
					Subtotal of MLE2 Buildings Constructed as of July 1, 2014 for MLE2		**$ 223,759**

Process Solution Enhancement ("PSE") Facility

Description of Structure	Type of Structure	Length (feet)	Width (feet)	Height (feet)	Volume (cu ft)	[1]Cost per cu ft	Total Cost ($)
Main PSE Building	Steel	180	108	55	1,069,200	$ 0.36	$ 384,912
Walkways, stairs, platforms and other appurtenances	Steel	Assume Lump Sum to cover demolition & removal					$ 5,000
						[2]Cost / sq. ft.	
Demolition of Concrete Pad on East Side with Channel and "Lip" Curb around Perimeter	Concrete	Perimeter Square Footage =			474	$ 6.55	$ 3,105
Demolition of "Lip" Curb around Perimeter	Concrete	Cross Section 6" x 6" around Perimeter (108.4 ft x 0.5 ft)			54	$ 6.55	$ 355
						Total =	**$ 393,372**

Amendment 11 Chicago Tunnel Buildings

These Structures were depicted on a Project Drawing, showing the intended additional structures at Chicago Tunnel that would be demoished as part of Amendment 11

Name of Structure	Structure Type	Length (feet) (or Footprint Area in sf)	Width (feet)	Height (feet)	Volume (cu ft)	[1]Cost per cu ft	Total Cost ($)
Maintenance Shop - Quonset Building	Steel & Concrete	80	40	20	64,000	$ 0.36	$ 23,040
Site Office	Steel & Concrete	40	15	12	7,200	$ 0.36	$ 2,592
Chicago Tunnel Dry Change Building	Steel & Concrete	40	15	12	7,200	$ 0.36	$ 2,592
Diesel Fuel Tank Enclosure	Steel & Concrete	10	20	5	1,000	$ 0.36	$ 360
Gasoline Fuel Tank Enclosure	Steel & Concrete	8	8	5	320	$ 0.36	$ 115
					Subtotal of Amendment 11 Additional Buildings		**$ 28,699**

11.2 - Demolition of Fixtures (tanks, conveyors, etc.), excluding interior mechanical (Process equipment)
Summary

Area of Facility	Total Fixture Demolition		Remarks
Cresson Plant	$ 217,525		Note: For warranty cost estimates in 2015 and subsequent years the cost for demolition of buildings has been separated from the cost for demolition of fixtures such as tanks, conveyors, and other non-structural facilities. Building demolition costs are in TAB 11a.
Water Tanks	$ 26,765		
Midway Fuel Island Storage Tanks	$ 116,200		
AGADR Process Tanks	$ 26,867		
Victor Plant Process Area	$ 16,807		
Bulk Emulsion Facility (aka Buckley Plant)	$ 14,424		
SGADR Facility	$ 32,413		
High Grade Mill Facility	$ 212,061		
Process Solution Enhancement ("PSE") Facility	$ 223,185		
Amendment 11 - Chicago Tunnel Tanks	$ 244		
Total Fixture Demolition	$ 886,491		

Building Number	Building or Structure	No.	Length	Width	Height	Cu.Ft.	$/Cu.Ft. [1]	Cost
	Cresson Plant							
B6	Loadout Bin	1		21.85	36.0	13,492	$ 0.36	$ 4,857
B4	Lime Silo	1		84.0	21.5	119,088	$ 0.36	$ 42,872
B5	Conveyor		**Length**				**$/Lin Ft [2]**	
	Screen Feed	1	587.0				$ 25.32	$ 14,863
	Crushed Ore	1	1,243.0				$ 25.32	$ 31,473
	Second Crusher Feeder	1	843.0				$ 25.32	$ 21,345
	Shuttle	2	111.0				$ 25.32	$ 5,621
	Screen Undersize	1	620.0				$ 25.32	$ 15,698
	Screen Oversize	1	555.0				$ 25.32	$ 14,053
	Product to LOB (load-out bin)	1	586.0				$ 25.32	$ 14,838
	LOB Relocation Phase IV (2008)	1	2,050.0				$ 25.32	$ 51,906
							SUBTOTAL	**$ 217,525**
	Water Tanks	**No.**		**Diameter**	**Height**	**Cu.Ft.**	**$/Cu.Ft. [1]**	**Cost**
T1	Water Tanks	2		25.0	28.0	27,475	$ 0.36	$ 9,891
T2	Water Tanks - Fire Water	1		16.0	26.6	5,346	$ 0.36	$ 1,924
T3 TR76	Water Tank Squaw- TR76	1		46.0	30.0	49,832	$ 0.18	$8,970
	Regrade Pad and Remove Manhole	3.0				1,300	$4.60	$5,980
							SUBTOTAL	**$ 26,765**

[1] 2015 Means Heavy Construction Cost Data, **02 41 16.13-0020/0100** - This footnote applies to all sheets within this TAB

[2] Pro-rated cost for conveyor demolition based on historic costs and Means.

	Midway Fuel Island Storage Tanks	No.	Diameter	Height	Cu.Ft.	Lump Sum	Cost
T4	30,000 Off-road diesel tanks	6				$ 1,000	$ 6,000
T5	1000 gallon kerosene tank	1				$ 500	$ 500
T6	1000 gallon on-road diesel tank	1				$ 500	$ 500
T7	1000 gallon fuel additive (Anti-Gel) tank	1				$ 500	$ 500
T8	1000 gallon gasoline tank	1				$ 500	$ 500
T9	750 gallon antifreeze tank	2				$ 300	$ 600
T10	750 gallon hydraulic oil (10 wt) tank	2				$ 300	$ 600
T11	500 gallon 30 wt motor oil	2				$ 250	$ 500
T12	500 gallon 15/40 wt motor oil	2				$ 1,000	$ 2,000
T13	4000 gallon oil water separator tank	1				$ 1,500	$ 1,500
	Piping, pumps, appurtenances removal	L.S.				$ 3,000	$ 3,000
	Disposal of Contaminated Soils and misc.					$ 100,000	$ 100,000
						SUBTOTAL	**$ 116,200**

Midway fuel island tanks were new in November 2012 and the costs for demolition reflect consideration for the fact that they have retained almost all of their original value and could be salvaged and re-used at another site. Indeed, the salvage value is probably much greater than demolition costs for Midway fuel island plus the Crusher fuel island combined.

[2] Storage tank demolition is based on torch cutting sides of tanks, excavator and D9 dozer handling tanks + 2 laborers

[3] Based on experience with Crusher Fuel Island Tank Removal in 2012/2013 must account for $100K remediation costs.

T14

AGADR Process Tanks	No.		Diameter	Height	Cu.Ft.	$/Cu.Ft. [1]	Cost
Carbon Columns 1995	10		12.5	11	13,492	$ 0.36	$ 4,857
Intermediate Solution Tank 1995	1		16	40	8,038	$ 0.36	$ 2,894
Solution Tanks Addition 1999	2		12.75	30	7,657	$ 0.36	$ 2,756
Carbon Columns North Addition 1999	5		12.5	11	6,746	$ 0.36	$ 2,429
Carbon Regeneration Kiln 2002	1		3.3	34	291	$ 0.36	$ 105
Carbon Feed Tank 2002	1		10	16	1,256	$ 0.36	$ 452
Carbon Quench Tank 2002	1		9	11.1	706	$ 0.36	$ 254
Carbon Strip Vessel 2002	1		5	30.8	604	$ 0.36	$ 218
Cyanide Mixing Tank 2002	2		12	29.3	6,624	$ 0.36	$ 2,385
Train D Carbon Columns 2002	5		13	11.75	7,794	$ 0.36	$ 2,806
Pregnant Solution Tank 2002	1		22	14	5,319	$ 0.36	$ 1,915
Train D Head Tank 2002	1		10.675	9	805	$ 0.36	$ 290
Train D Transfer Tank 2002	1		20.687	7	2,352	$ 0.36	$ 847
Carbon Pre-Dryer 2002	1		20.687	26	8,734	$ 0.36	$ 3,144
Train E Facilities - Skid	1	70.0	24.0	1.5	2,520	$ 0.36	$ 907
Train E Facilities - Carbon Columns		5.0	6.0	8.5	1,201	$ 0.36	$ 432
Train E Facilities - Barren Tank		1.0	9.6	6.8	492	$ 0.36	$ 177
						SUBTOTAL	$ 26,867

[1] 2015 Means Heavy Construction Cost Data, **02 41**

T15

Victor Plant Process Area	No.	Diameter	Radius	Height	Cu.Ft.	$/Cu.Ft.[1]	Cost
Fresh Water	1	22	11.0	18.0	6,839	$ 0.36	$ 2,462
Detox	1	10	5.0	18.0	1,413	$ 0.36	$ 509
Preg	4	22	11.0	18.0	27,356	$ 0.36	$ 9,848
Fire Water	1	28	14.0	18.0	11,078	$ 0.36	$ 3,988
						SUBTOTAL	$ 16,807

1 2015 Means Heavy Construction Cost Data, p. 38

[2]Means for 8" Walls and footers

T16

Bulk Emulsion Facility (aka Buckley Plant)

	No.	Diameter	Radius	Height	Cu.Ft.	$/Cu.Ft. [1]	Cost
Bulk Storage Bins (1 Anfo, 3 Emulsion)	4				9,482	$ 0.36	$ 3,414
SST Solution Tanks	2	12	6.0	15.0	3,391	$ 0.36	$ 1,221
Fuel Holding Tank	1	10	5.0	10.0	785	$ 0.36	$ 283
Fuel Holding Tank	1	8	4.0	10.0	502	$ 0.36	$ 181
Outside Fuel Holding Tank	1	10	5.0	10.0	785	$ 0.36	$ 283
Prill Silo	4		10.0	20	25,120	$ 0.36	$ 9,043
						SUBTOTAL	$ 14,424

[1] 2015 Means Heavy Construction Cost Data, **02 41 16.13-0020/0100** - This footnote applies to all sheets within this TAB

[2]Pro-rated using historic costs and increase in Mixed Means Cost from 2011 to 2013

SGADR Facility

	Name of Structure	Number of Tanks	Length (feet) [some dimensions in gallons]	Width or Dia(feet)	Height (feet)	Volume (cu ft)	[1]Cost per cu ft	Total Cost ($)
	Carbon Columns	20		12.5	11	26,984	$ 0.36	$ 9,714
	Intermediate Solution Tank	1		16	40	8,038	$ 0.36	$ 2,894
	Barren Solution Tanks (N of Bldg)	2	110,000			29412	$ 0.36	$ 10,588
	Acid Mix Tank (W of Bldg)	1	8,000			1,070	$ 0.36	$ 385
	Acid Neutralization Tank (W of Bldg)	1	8,000			1,070	$ 0.36	$ 385
	Acid Neutralization / Scrubber Tank (W of Bldg)	1	8,000			1,070	$ 0.36	$ 385
	Concentrated Acid Storage Tank (W of Bldg)	1	7,000			936	$ 0.36	$ 337
	Sodium Hydroxide Tank (W of Bldg)	1	20,000			2,674	$ 0.36	$ 963
	Carbon Regeneration Kiln	1		3.3	34	291	$ 0.36	$ 105
T17	Carbon Feed Tank (All Tanks are Steel)	1		10	16	1,256	$ 0.36	$ 452
	Carbon Quench Tank	1		9	11.1	706	$ 0.36	$ 254
	Carbon Strip Vessel	1		5	30.8	604	$ 0.36	$ 218
	Pregnant Solution Tanks	2	20,000			5,348	$ 0.36	$ 1,925
	Blowcase Vessel (Cost Estimated by MDE)	1						300
	Carbon Fines Tank (Cost Est. by MDE)	1						500
	Transfer Water Tank	1	5,000			668	$ 0.36	$ 241
	Pretreatment Solution Tank	1	4,500			602	$ 0.36	$ 217
	NaCN Storage Tanks (two at 25K gallons)	2	25,000			6,684	$ 0.36	$ 2,406
	New Carbon Attrition Tank	1	1,000			134	$ 0.36	$ 48
	Electrolytic Cell Tanks (2)	2	1,000			267	$ 0.36	$ 96
						Subtotal for SGADR Tanks		**$ 32,413**

[1] 2014 Means Heavy Construction Cost Data, p. 38.

Note: Dimensions and information for this SGADR Tanks and Appurtenances Table are from FLSmidth / CEntry Drawing No. 20-641-02 plus email from M. Jahraus to M. Ellis (1-12-12) and personal consultation with CC&V Processing Manager, K. Riley (1-12-12)

High Grade Mill Facility

	Name of Structure	No. of Tanks or Structure Type	Length (feet) [some dimensions in gallons; others in square feet]	Width (feet)	Height (feet)	Volume (cu ft)	[1]Cost per cu ft	Total Cost ($)
B50	Mill West Tank Farm	St & Conc	14,721 sq ft		8	117,768	$ 0.36	$ 42,396
B51	Mill East Tank Farm	St & Conc	13,855 sq ft		8	110,840	$ 0.36	$ 39,902
B58	High pH Thickener (SW of Mill) (All Tanks are Steel)	1	64,000 gal			8,556	$ 0.36	$ 3,080
B59	Concentrate Thickener (W of Mill)	1	64,000 gal			8,556	$ 0.36	$ 3,080
B60	Process Water Tank (SE of Mill)	1	415,000 gal			55,481	$ 0.36	$ 19,973
B61	Processed Ore Thickener (SE of Mill Bldg)	1	360,000 gal			48,128	$ 0.36	$ 17,326
B62	NaCN Storage Tanks (2)	2	25,000 gal			6,684	$ 0.36	$ 2,406
B63	Leach Tanks (6)	6	173,000 gal			138,770	$ 0.36	$ 49,957
B64	Conveyor for Agglomerator Discharge	St & Conc	1,000	4	6	24,000	$ 0.36	$ 8,640
B65	Conveyor for Rod Mill Feed	St & Conc	250	4	6	6,000	$ 0.36	$ 2,160
						Subtotal Mill Bldg, Conveyors, and Tanks		**$ 188,922**

Note: Dimensions and information for Mill Bldg, Tanks and Appurtenances Table are from Drawings Provided by D. Larson plus email from M. Jahraus to M. Ellis (1-12-12) and personal consultation with CC&V Processing Manager, K. Riley (1-12-12)

[1] 2015 Means Heavy Construction Cost Data, **02 41 16.13-0020/0100** - This footnote applies to all sheets within this TAB

T18

Process Solution Enhancement ("PSE") Facility

Description of Structure	Type of Structure	Length (feet)	Width (feet)	Height (feet)	Volume (cu ft)	[1]Cost per cu ft	Total Cost ($)
PS Stabilization Tank (outside bldg)	Concrete	(95 ft dia x 23 ft high)			162,946	$ 0.50	$ 81,473
CoMag Clarifier Tank (outside bldg)	Concrete	(70 ft dia x 23 ft high)			88,470	$ 0.50	$ 44,235
Coagulant Storage Tank (outside bldg)	Fiberglass	(50 ft dia x 23 ft high)			2,713	$ 0.20	$ 543
Precoat Silo (outside bldg)	Steel	(50 ft dia x 23 ft high)			6,154	$ 0.36	$ 2,215
CoMag Train Process Tanks (inside bldg) x 8 tanks	Concrete	17.25	15.5	17	36,363	$ 0.50	$ 18,182
Wet Wells (inside bldg) x 2 wells	Concrete	32	16	24	24,576	$ 0.50	$ 12,288
Soda Ash Mix Tank (inside bldg)	Steel	(8 ft dia x 8 ft high)			402	$ 0.36	$ 145
Precoat Mix Tank (inside bldg)	Steel	(6 ft dia x 6 ft high)			170	$ 0.36	$ 61
PSE Thickener Polymer Mix Tank (inside bldg)	Steel	(7 ft dia x 9 ft high)			346	$ 0.36	$ 125
PSE Conditioning Tank (inside bldg)	Steel	(6 ft dia x 8 ft high)			226	$ 0.36	$ 81
Polymer Storage Tank (inside bldg)	Fiberglass	(12 ft dia x 24 ft high)			2,713	$ 0.20	$ 543
Magnetite Silo (inside bldg)	Steel	(8 ft dia x 8 ft high)			402	$ 0.36	$ 145
Waste Holding Tank - aka Gravity Thickener / Solids Storage Tank (outside bldg)	Concrete	(50 ft dia x 26 ft high)			51,025	$ 0.50	$ 25,513

	Type	Length (feet)	[3]Cost per Lin. Ft.	Total Cost ($)
Piping (external to the ADR and PSE buildings)				
•North Side from ADR to PSE (6 lines @ 715 ft each)	Varies	4,290	$ 8.20	$ 35,178
•South Side from CoMag Clarifier to PSE (3 @ 100 ft)	Varies	300	$ 8.20	$ 2,460

Total = $ 223,185

[1]R.S. *Means Heavy Construction Cost Data for 2014* page 38 for steel and concrete demolition; $0.20/cu ft for fiberglass estimated by MDE.

[2]R.S. *Means Heavy Construction Cost Data for 2014* page 38.

[3]R.S. *Means Heavy Construction Cost Data for 2014* page 31.

Note: Means costs include labor, materials, operating costs, overhead, and profit.

Prepared by MDE (10-5-12)

Revised by MDE (11-18-12)

Revised by MDE (8-16-13) (11-5-14)

TR76 Barren Pipeline Estimate

Scope of Work: Remove 300 feet of 14" Carbon Steel Pipeline on Top of Ground except for a 50 foot Sleeved section beneath a bench access. Assume that the pipeline can be pulled out

Item	Description	Units	Quantity	Material	Labor	Equipment	O&P	Total cost
1	Remove 14" Dia Pipeline	Feet	300	$ -	$ 2,325	$ 3,510	$ 1,365	**$ 7,200**

TR76 Tank Removal Estimate

Scope of Work: Remove 300 feet of 14" Carbon Steel Pipeline on Top of Ground except for a 50 foot Sleeved section beneath a bench access. Assume that the pipeline can be pulled out of the sleeve. Therefore, there will be no excavation cost

Item	Size	Quantity	Cost/Unit	Total Cost	Source
Steel Storage	46'Dia x 30'H	49,860 cf	$0.18/cuft	$8,975	Means 2015 02-
Regrade Site	0.4 Acres	1300 cy	$5.14/cy	$6,690	Means 2015
Abandon Manhole	10 ft dia x 6' D	Ea	$274	$274	Means 02-41-13.23
		DRMS Administrative Fee	22.55%	$3,594	
		Grand Total Demolition Cost		**$19,533**	

Total TR76 **$23,139**

Amendment No. 11 - Fuel Tank Demo

	No.	Diameter	Radius	Height	Cu.Ft.	$/Cu.Ft.[1]	Cost
Diesel Fuel Storage	1	6	3.0	18.0	509	$ 0.36	$ 183
SST Solution Tanks	1	6	3.0	6.0	170	$ 0.36	$ 61
						SUBTOTAL	**$ 244**

[1] 2015 Means Heavy Construction Cost Data, **02 41 16.13-0020/0100** - This footnote applies to all sheets within this TAB

East Cresson - Wild Horse - Altman Mine Reclamation Costs Amendment 11

Reclamation Units Input Table

Reclamation Units (Growth Media, Seeding, Fencing and Trees)

Area	Values Remaining after 12/31 of Calendar Year	LOM Values	Units
Total Area (SF and Acres)	16,073,273	**369.0**	Acres
Area not reseeded or treated with GM (Not including undisturbed areas or previously reclaimed areas)	0	**0**	Acres
Net Area of Life-of-Mine to be reseed	**Life-of-Mine Area --->**	**369.0**	Acres
Area Already Reseeded as of 12/31 of this calendar year or Credit for Natural Undisturbed Areas	Enter Value at Right, in Acres	68.6	Acres
Net Area to be reclaimed		300.4	Acres
Remaining and LOM Total Area of Tree Planting		**88.7**	Acres
Remaining and LOM Total Fencing Length above Mine Area		0	Feet
Acreage to receive fertilizing and ripping simultaneously with a D4 dozer? (Enter if different from default)		300.4	acres
Acreage to receive seeding & harrowing simultaneousy with a D4 dozer? (Enter if different from default)		300.4	acres
Light Grading Area (enter if > zero)		0	Acres

Regrading Units including Leveling Dump-piles and Mass Hauling)

	End-of-Mine Quantities for Amendment 11	
Total Volume of Cut -	3,307,864	Cu yd
Total Volume of Fill-	3,527,033	Cu yd
Area requiring Mass Haul	369	Acres
Area requiring Pile-leveling and Grading (Total minus area of Mass Haul)	69	Acres
Volume of Pile Leveling and Grading	0	Cu yd
Volume of Mass Dozing (minimum of Cut/Fill for each Unit)	3,417,449	Cu Yd
Total Volume that must be Dozed (not including Light Grading)	3,307,864	Cu Yd
Average Push Distance for Dozer Leveling (100 ft used for Pile Leveling)	450	Ft
Volume that must be Hauled (cut/fill imbalance)	**109,585**	Cy Yd
Weighted HD Mass Excavation	**2,000**	ft

Cost Summary - Details are listed below

Life-of-Mine Cost Amendment No. 11

Item	Equipment	Quantity	Eqmt Cost	Labor Cost	Material Cost	Total Cost	Unit Cost
Heavy Dozing to Level Piles and Balanced Cut/fill	D10	3,307,864	$ 2,267,150	$ 234,948		**$ 2,502,098**	$ 0.76
Mass Haul to Balance Cut/Fill	CAT777	109,585	$ 190,278	$ 13,991		**$ 204,270**	$ 1.86
SubTotal ReGrading and Contouring		3,417,449	$ 2,457,429	$ 248,940		$ 2,706,368	
Growth Media Distribution from Stockpiles	CAT777	242,323	$ 407,836	$ 29,988		$ 437,824	$ 1.81
Total Seeding, Fine Grading, Trees, and Supervision			$ 145,353	$ 86,946	$ 317,299	$ 549,598	
Grand Total for Management Unit			**$ 3,010,617**	**$ 365,874**	**$ 317,299**	**$ 3,693,790**	

East Cresson - Wild Horse - Altman Mine Reclamation Costs Amendment 11

Cost Development for Regrading - Includes Pile Leveling, Dozer Cut/Fill Balanced, and Haulage from Neighboring Units

Dozer Productivity Calculation for Heavy Grading

Life of Mine Amendment No. 11

	Comment	Quantity
What is the volume cut/fill Dozed and leving piles	**Cut/Fill Balanced Volumes plus leveling piles**	3,307,864
What is the expected average push distance for leveling piles?	**Short Doze to level out end-dumped truck loads**	450
What is the overall Job Correction Factor for D10 Dozing?	Dozer Productivity Tab	1.08
What is unadjusted production based on push distance for a D10?	**cu yds/hr from Regression Equation Developed from Cat Handbook Version 39**	**462**
Calculated adjusted production based on job factors =	cu yds/hr calculated	497.5
Calculated D10 Dozer hours in grading =	hours	**6649.06**

LEGEND	
	Maunal Entry
	Life-of-mine

Estimated Unit Cost for D10 Dozer	Eqmt Cost	Labor Cost	Total Cost	UnitCost($/cy)
	$ 2,267,150	$ 234,948	$2,502,098	**$ 0.76**

	Comment	Quantity
What is the overall Job Correction Factor for D11 Dozing?	Dozer Productivity Tab	1.08
What is unadjusted production based on push distance for a D11?	**cu yds/hr from Regression Equation Developed from Cat Handbook Version 39**	**718**
Calculated adjusted production based on job factors =	cu yds/hr calculated	772.6
Calculated D11 Dozer hours in grading =	hours	**4281.59**

Estimated Unit Cost for D11 Dozer	Eqmt Cost	Labor Cost	Total Cost	UnitCost($/cy)
	$ 2,782,886	$ 151,293	$2,934,178	**$ 0.89**

Mass Haul of Material Between Units to Achieve Earthwork Balance

Additional Volume that will be truck hauled	109,585	cy
What is the weighted average Haul Distance for the truck haul?	2,000	Feet
What is the Estimated Total Resistance Loaded (Grade Plus 5%)?	10%	Grade+RR
What is the Total Resistance Empty Return (Grade plus 5%)	5%	Grade+RR

CAT 777 Trucks

What is loaded travel time based on haul distance & rolling resistance (min)?		2.8	Minutes			
What is empty travel time based on haul distance & rolling resistance (min)?		1.2	Minutes			
What is the Fixed Time for CAT777 Trucks?		4.7	Minutes			
Total Trip Time for CAT777 Trucks		8.7	Minutes			
Calculated Productivity of Loader/Truck Combination (cu yd/hr)		402	cy/hr			
		Hours	Eqmt Cost	Labor Cost	Total Cost	
777 Truck (cy/hr)		272	$ 124,912	$ 7,384	$ 132,297	
992 Loader (cy/hr)		68	$ 42,911	$ 2,406	$ 45,317	
14 H Grader	Fleet hrs=#Trucks per loader	68	$ 9,146	$ 2,391	$ 11,536	
5K gal H_20 Truck	Fleet hrs=#Trucks per loader	68	$ 13,309	$ 1,810	$ 15,120	
Total Fleet Cost and Unit Cost			$ 190,278	$ 13,991	$ 204,270	
				$ 1.86	**per CY**	

Articulated Trucks

What is loaded travel time based on haul distance & rolling resistance (min)?		2.9	Minutes			
What is empty travel time based on haul distance & rolling resistance (min)?		0.8	Minutes			
What is the Fixed Time for Articulated Trucks?		4.8	Minutes			
Total Trip Time for Articulated Trucks		8.5	Minutes			
Calculated Productivity of Loader/Truck Combination (cu yd/hr)		181	cy/hr			
		Hours	Eqmt Cost	Labor Cost	Total Cost	
Articulated Truck (cy/hr)	498,633	605	$ 107,789	$ 16,406	$ 124,195	
988 Loader	498,633	151	$ 36,879	$ 5,346	$ 42,225	
14 H Grader	Fleet hrs=#Trucks per loader	151	$ 20,320	$ 5,312	$ 25,632	
5K gal H_20 Truck	Fleet hrs=#Trucks per loader	151	$ 29,571	$ 4,022	$ 33,593	
Total Fleet Cost and Unit Cost			$ 194,558	$ 31,086	$ 225,644	
				$ 2.06	**per CY**	

East Cresson - Wild Horse - Altman Mine Reclamation Costs Amendment 11

Summary of Growth Media Haulage Costs for LOM

Growth Media Distribution Area

Growth Media Equipment	CAT 777 Haul Trucks Volume (cy)	Work Hours	Total GM Req'd. 242,323 Eqmt Cost	Labor Cost	Total Cost
ECWH1	102,608	358	$ 164,257	$ 9,710	$ 173,967
ECWH2	89,137	121	$ 55,460	$ 3,279	$ 58,739
ECWH3	50,578	105	$ 48,015	$ 2,838	$ 50,853
0	-	-	$ -	$ -	$ -
CAT 992 Loader	Truck Hours/(Trucks per Loader)	145.96	$ 91,974	$ 5,157	$ 97,131
14 H Grader	Fleet hrs/4	145.96	$ 19,603	$ 5,124	$ 24,727
5K gal H_20 Truck	Fleet hrs/4	145.96	$ 28,527	$ 3,880	$ 32,407
Total Cost			**$ 407,836**	**$ 29,988**	**$ 437,824**
Cost per CY					**$ 1.81**

LEGEND
- Maunal Entry
- Life-of-mine

Growth Media Distribution Area

Growth Media Equipment	CAT 740 Articulated Trucks Volume (cy)	Work Hours	Total GM Req'd. 242,323 Eqmt Cost	Labor Cost	Total Cost
ECWH1	102,608	854	$ 152,164	$ 23,160	$ 175,325
ECWH2	89,137	289	$ 51,550	$ 7,846	$ 59,397
ECWH3	50,578	255	$ 45,430	$ 6,915	$ 52,344
0	-	-	$ -	$ -	$ -
CAT 988 Loader	Truck Hours/(Trucks per Loader)	349.71	$ 85,242	$ 12,357	$ 97,599
14 H Grader	Fleet hrs/4	349.71	$ 46,968	$ 12,277	$ 59,245
5K gal H20 Truck	Fleet hrs/4	349.71	$ 68,350	$ 9,296	$ 77,647
Total Cost			**$ 449,705**	**$ 71,852**	**$ 521,557**
Cost per CY					**$ 2.15**

Growth Media Distribution Area

Growth Media Equipment	Cat 623 Scrapers Volume (cy)	Work Hours	Total GM Req'd. 242,323 Eqmt Cost	Labor Cost	Total Cost
ECWH1	102,608	885	$ 206,428	$ 30,651	$ 237,079
ECWH2	89,137	187	$ 43,713	$ 6,491	$ 50,203
ECWH3	50,578	217	$ 50,656	$ 7,522	$ 58,177
0	-	-	$ -	$ -	$ -
14 H Grader	Fleet hrs/4	322.26	$ 43,281	$ 11,313	$ 54,595
5K gal H20 Truck	Fleet hrs/4	322.26	$ 62,985	$ 8,566	$ 71,551
Total Cost			**$ 407,062**	**$ 64,544**	**$ 471,606**
Cost per CY					**$ 1.95**

	Units (cy or ac) or Rate per hour	Work Hours	Equipment	Labor	Materials	Total
[4]Spread Growth Medium (cy)	242,323	341.5	$ 87,833	$ 12,066	included	$ 99,899
D9 Rate(cy/hr)	710					
[5]Soil Analyses (#)	60.08		included	included	$ 7,017	$ 7,017
Rate (ac / sample)	5					
[6]Rip & Fertilize (ac)	300	175.7	$ 9,207	$ 6,209	$ 53,229	$ 68,646
D4 Rate (ac/hr)	1.7					
[7]Seed & Harrow (ac)	300	128.7	$ 7,264	$ 4,547	$ 17,406	$ 29,217
D4 Rate (ac/hr)	2.3					
[9]Hydro-Mulching (ac)	300	500.7	$ 27,538	$ 13,572	$ 157,984	$ 199,094
Rate (ac/hr)	0.60					
[10]Plant Trees (ac)	88.7	132.4	N/A	$ 4,283	$ 81,663	$ 85,946
Rate (ac/hr)	0.67					
Total Work Hours =		3,201.9				
[11]Supervisor	(work hrs/4)	800.5	$ 13,510	$ 46,269	included	$ 59,779
Total Miscellaneous Costs for Seeding, Trees, and Supervision			**$ 145,353**	**$ 86,946**	**$ 317,299**	**$ 549,598**

Footnotes for summary cost table:

[1]Assumes heavy grading will be done with conventional D10 or D11dozers with U blades where the push distances are practical

[2]Assumes light grading will be done with a D9 dozer on the backfilled areas in Wildhorse Extension area (rate = 2 hrs/acre)

[3]Growth Medium Replacement fleet will consist of three 623 Scrapers

[4]Growth Medium will be spread using a D-9 dozer to a depth of 6 inches

[5]Soil analyses will be run on samples of the reclaimed areas to determine optimum fertilizer rates

[6]Ripping and fertilizing will be conducted on the replaced growth medium using a conventional D4 dozer with a cyclone spreader

[7]Seeding and harrowing will be conducted on all replaced growth medium that is traversible with conventional equipment

[9]Mulching will be conducted using conventional hydro-seeder/hydro-mulcher

[10]Trees and shrubs will be planted on north and east-facing slopes

[11]Supervisor costs are figured at 25 percent of the total work hours to accomplish the reclamation effort

East Cresson - Wild Horse - Altman Mine Reclamation Costs Amendment 11

ECWH Truck Haulage of Overburden for Re-contouring

		ECWH1	ECWH2	ECWH3			No Growth Media	Total
Elev at Dump Pt. Centroid		10570	10850	10600	10650	10165		
Sub-Unit Area (Acres)		127.2	110.5	62.7			0	300.4
Sub-Unit Volume (Cubic Yards)		102,608	89,137	50,578	0	0		242,323
Source Distribution		Sub-unit						
Source 1	GM6-7	127.2						127.2
Source 2	GM11	1	110.5	62.7				174.2
Source 3	Null							0
Source 4								0
Source 5								0
Source 6								0

Wild Horse Expansion and Grassy Valley Mine Reclamation Costs Amendment 11

Reclamation Units Input Table

Reclamation Units (Growth Media, Seeding, Fencing and Trees				Regrading Units including Leveling Dump-piles and Mass Hauling			
Area	Values Remaining after 12/31 of Calendar Year	LOM Values	Units			End-of-Mine Quantities from Amendment 11	
Total Area (SF and Acres)	12,844,577	**294.9**	Acres	Total Volume of Cut -		1,564,305	Cu yd
Area not reseeded or treated with GM (Includes Fenced Highwalls, Does not include undisturbed or previously reclaimed Areas)		**84**	Acres	Total Volume of Fill-		2,330,393	Cu yd
Net Area of Life-of-Mine to be reseed	**Life-of-Mine Area --->**	**211.2**	Acres				
Area Already Reseeded as of 12/31 of this calendar year	Enter Value at Right, in Acres	**0**	Acres	Total Area requiring Pile-leveling and Grading (Total minus area of Mass Haul)		0.0	Acres
Net Area to be reclaimed		211.2	Acres	Volume of Pile Leveling and Grading		0	Cu yd
Remaining and LOM Total Area of Tree Planting			Acres	Volume of Mass Dozing (minimum of Cut/Fill for each Unit)		1,564,305	Cu Yd
Remaining and LOM Total Fencing Length above Mine Area		9300	Feet	Total Volume that must be Dozed (not including Light Grading)		1,564,305	Cu Yd
Acreage to receive fertilizing and ripping simultaneously with a D4 dozer? (Enter if different from default)		211.2	acres	Average Push Distance for Dozer Leveling (100 ft used for Pile Leveling)		600	Ft
Acreage to receive seeding & harrowing simultaneousy with a D4 dozer? (Enter if different from default)		211.2	acres	Volume that must be Hauled (cut/fill imbalance)		**383,044**	Cy Yd
Light Grading Area (enter if > zero)		0	Acres	Weighted HD Mass Excavation		**1,000**	ft

Cost Summary - Details are listed below

Item	Life-of-Mine Cost (Amendment No. 11)						
	Equipment	Quantity	Eqmt Cost	Labor Cost	Material Cost	Total Cost	**Unit Cost**
Heavy Dozing to Level Piles and Balanced Cut/fill	D10	1,564,305	$ 1,384,442	$ 143,472		**$ 1,527,913**	$ 0.98
Mass Haul to Balance Cut/Fill	CAT777	383,044	$ 511,190	$ 37,588		**$ 548,778**	$ 1.43
Stream Restoration through WHEX		2,778	$ 40,688	$ 38,818	$ -	$ 87,456	
SubTotal ReGrading and Contouring		1,947,349	$ 1,895,631	$ 181,060		$ 2,164,147	
Growth Media Distribution from Stockpiles	CAT777	153,670	$ 200,509	$ 14,744		$ 215,252	$ 1.40
Total Seeding, Fine Grading, Trees, and Supervision			$ 101,961	$ 95,320	$ 128,682	$ 325,963	
Grand Total for Management Unit			**$ 2,238,789**	**$ 329,941**	**$ 128,682**	**$ 2,705,362**	

Wild Horse Expansion and Grassy Valley Mine Reclamation Costs Amendment 11

Reclamation Units Input Table

Cost Development for Regrading - Includes Pile Leveling, Dozer Cut/Fill Balanced, and Haulage from Neighboring Units

Dozer Productivity Calculation for Heavy Grading

	Comment	Life of Mine Amendment 11 Quantity
What is the volume cut/fill Dozed and leving piles	**Cut/Fill Balanced Volumes plus leveling piles**	1,564,305
What is the expected average push distance for leveling piles?	**Short Doze to level out end-dumped truck loads**	600
What is the overall Job Correction Factor for D10 Dozing?	Dozer Productivity Tab	1.08
What is unadjusted production based on push distance for a D10?	**cu yds/hr from Regression Equation Developed**	**358**
Calculated adjusted production based on job factors =	cu yds/hr calculated	385.3
Calculated D10 Dozer hours in grading =	hours	**4060.27**

LEGEND: Maunal Entry; Life-of-mine

Estimated Unit Cost for D10 Dozer	Eqmt Cost	Labor Cost	Total Cost	UnitCost($/cy)
	$ 1,384,442	$ 143,472	$ 1,527,913	**$ 0.98**

What is the overall Job Correction Factor for D11 Dozing?	Dozer Productivity Tab	1.08
What is unadjusted production based on push distance for a D11?	**cu yds/hr from Regression Equation Developed**	**556**
Calculated adjusted production based on job factors =	cu yds/hr calculated	598.5
Calculated D11 Dozer hours in grading =	hours	**2613.51**

Estimated Unit Cost for D11 Dozer	Eqmt Cost	Labor Cost	Total Cost	UnitCost($/cy)
	$ 1,698,693	$ 92,350	$ 1,791,043	**$ 1.14**

Mass Haul of Material Between Units to Achieve Earthwork Balance

Additional Volume that will be truck hauled	383,044	cy
What is the weighted average Haul Distance for the truck haul?	1,000	Feet
What is the Estimated Total Resistance Loaded (Grade Plus 5%)?	10%	Grade+RR
What is the Total Resistance Empty Return (Grade plus 5%)	5%	Grade+RR

CAT 777 Trucks

What is loaded travel time based on haul distance & rolling resistance (min)?	1.4	Minutes
What is empty travel time based on haul distance & rolling resistance (min)?	0.6	Minutes
What is the Fixed Time for CAT777 Trucks?	4.7	Minutes
Total Trip Time for CAT777 Trucks	6.7	Minutes
Calculated Productivity of Loader/Truck Combination (cu yd/hr)	523	cy/hr

		Hours	Eqmt Cost	Labor Cost	Total Cost
777 Truck (cy/hr)		732	$ 335,581	$ 19,838	$ 355,419
992 Loader (cy/hr)		183	$ 115,282	$ 6,464	$ 121,746
14 H Grader	Fleet hrs=#Trucks per loader	183	$ 24,570	$ 6,423	$ 30,993
5K gal H_20 Truck	Fleet hrs=#Trucks per loader	183	$ 35,756	$ 4,863	$ 40,619
Total Fleet Cost and Unit Cost			$ 511,190	$ 37,588	$ 548,778
				$ 1.43	**per CY**

Articulated Trucks

What is loaded travel time based on haul distance & rolling resistance (min)?	1.5	Minutes
What is empty travel time based on haul distance & rolling resistance (min)?	0.4	Minutes
What is the Fixed Time for Articulated Trucks?	4.8	Minutes
Total Trip Time for Articulated Trucks	6.7	Minutes
Calculated Productivity of Loader/Truck Combination (cu yd/hr)	231	cy/hr

		Hours	Eqmt Cost	Labor Cost	Total Cost
Articulated Truck (cy/hr)	1	1,655	$ 294,705	$ 44,856	$ 339,561
988 Loader	1	414	$ 100,830	$ 14,617	$ 115,447
14 H Grader	Fleet hrs=#Trucks per loader	414	$ 55,557	$ 14,522	$ 70,079
5K gal H_20 Truck	Fleet hrs=#Trucks per loader	414	$ 80,849	$ 10,996	$ 91,845
Total Fleet Cost and Unit Cost			$ 531,941	$ 84,992	$ 616,932
				$ 1.61	**per CY**

Stream Restoration on North side of WHEX across the backfill (3000 ft x 25 ft wide x 12" layer)

		Hours	Eqmt Cost	Labor Cost	Materials	Total Cost	Productivity	
12"thick x 25'W Clay Stream Lining (cy)	2,778							
Haul Clay from Clay Stockpile - 1 mile@20mph	2,778	47.2	$ 6,222	$ 2,278		$ 9,350	59 cy/hr	Means 2015
Load Clay into Truck	2,778		$ 1,445	$ 4,084		$ 6,081		Means 2015
Place and Compact onto Stream Bed	2,778		$ 4,579	$ 3,429		$ 8,808		Means 2015
Riprap Line Channel	1,861		$ 25,672	$ 25,897		$ 56,726		Means 2015
8-inches Bedding	1,861		$ 2,770	$ 3,130		$ 6,490		Means 2015
Subtotal Stream Restoration			**$ 40,688**	**$ 38,818**		**$ 87,456**		**Means 2015 - To**

Summary of Growth Media Haulage Costs for LOM

Wild Horse Expansion and Grassy Valley Mine Reclamation Costs Amendment 11

Reclamation Units Input Table

Growth Media Distribution Area

Growth Media Equipment	CAT 777 Haul Trucks Volume (cy)	Work Hours	Total GM Req'd. 153,670 Eqmt Cost	Labor Cost	Total Cost
WHEX1	10,487	32	$ 14,772	$ 873	$ 15,645
WHEX2	143,183	255	$ 116,857	$ 6,908	$ 123,765
0	0	-	$ -	$ -	$ -
0	0	-	$ -	$ -	$ -
CAT 992 Loader	Truck Hours/(Trucks per Loader)	71.76	$ 45,218	$ 2,536	$ 47,754
14 H Grader	Fleet hrs/4	71.76	$ 9,638	$ 2,519	$ 12,157
5K gal H_20 Truck	Fleet hrs/4	71.76	$ 14,025	$ 1,907	$ 15,932
Total Cost			**$ 200,509**	**$ 14,744**	**$ 215,252**
Cost per CY					**$ 1.40**

Growth Media Distribution Area

Growth Media Equipment	CAT 740 Articulated Trucks Volume (cy)	Work Hours	Total GM Req'd. 153,670 Eqmt Cost	Labor Cost	Total Cost
WHEX1	10,487	77	$ 13,712	$ 2,087	$ 15,799
WHEX2	143,183	630	$ 112,283	$ 17,090	$ 129,373
0	0	-	$ -	$ -	$ -
0	0	-	$ -	$ -	$ -
CAT 988 Loader	Truck Hours/(Trucks per Loader)	176.85	$ 43,108	$ 6,249	$ 49,357
14 H Grader	Fleet hrs/4	176.85	$ 23,752	$ 6,209	$ 29,961
5K gal H20 Truck	Fleet hrs/4	176.85	$ 34,565	$ 4,701	$ 39,267
Total Cost			**$ 227,420**	**$ 36,336**	**$ 263,756**
Cost per CY					**$ 1.72**

Growth Media Distribution Area

Growth Media Equipment	Cat 623 Scrapers Volume (cy)	Work Hours	Total GM Req'd. 153,670 Eqmt Cost	Labor Cost	Total Cost
WHEX1	10,487	71	$ 16,564	$ 2,460	$ 19,023
WHEX2	143,183	503	$ 117,322	$ 17,421	$ 134,743
0	0	-	$ -	$ -	$ -
0	0	-	$ -	$ -	$ -
14 H Grader	Fleet hrs/4	143.44	$ 19,265	$ 5,036	$ 24,300
5K gal H20 Truck	Fleet hrs/4	143.44	$ 28,035	$ 3,813	$ 31,848
Total Cost			**$ 181,186**	**$ 28,729**	**$ 209,915**
Cost per CY					**$ 1.37**

	Units (cy or ac) or Rate per hour	Work Hours	Equipment	Labor	Materials	Total
[4]Spread Growth Medium (cy)	153,670	216.5	$ 55,700	$ 7,652	included	$ 63,352
D9 Rate(cy/hr)	710					
[5]Soil Analyses (#)	28.77		included	included	$ 3,361	$ 3,361
Rate (ac / sample)	5					
[6]Rip & Fertilize (ac)	211	123.5	$ 6,472	$ 4,365	$ 37,419	$ 48,257
D4 Rate (ac/hr)	1.7					
[7]Seed & Harrow (ac)	211	90.5	$ 5,107	$ 3,196	$ 12,236	$ 20,539
D4 Rate (ac/hr)	2.3					
[9]Hydro-Mulching (ac)	144	239.8	$ 13,189	$ 6,500	$ 75,666	$ 95,355
Rate (ac/hr)	0.60					
[10]Plant Trees (ac)	-	-	N/A	$ -	$ -	$ -
Rate (ac/hr)	0.67					
Total Work Hours =		5,093.7				
[11]Supervisor	(work hrs/4)	1,273.4	$ 21,493	$ 73,607	included	$ 95,099
Total Miscellaneous Costs for Seeding, Trees, and Supervision			**$ 101,961**	**$ 95,320**	**$ 128,682**	**$ 325,963**

Footnotes for summary cost table:

[1]Assumes heavy grading will be done with conventional D10 or D11dozers with U blades where the push distances are practica

[2]Assumes light grading will be done with a D9 dozer on the backfilled areas in Wildhorse Extension area (rate = 2 hrs/acre)

[3]Growth Medium Replacement fleet will consist of three 623 Scrapers

[4]Growth Medium will be spread using a D-9 dozer to a depth of 6 inches

[5]Soil analyses will be run on samples of the reclaimed areas to determine optimum fertilizer rates

[6]Ripping and fertilizing will be conducted on the replaced growth medium using a conventional D4 dozer with a cyclone spreade

[7]Seeding and harrowing will be conducted on all replaced growth medium that is traversible with conventional equipment

[9]Mulching will be conducted using conventional hydro-seeder/hydro-mulcher

[10]Trees and shrubs will be planted on north and east-facing slopes

[11]Supervisor costs are figured at 25 percent of the total work hours to accomplish the reclamation effort

Wild Horse Expansion and Grassy Valley Mine Reclamation Costs Amendment 11

Reclamation Units Input Table

Growth Media Source and Deployment Distribution (Note: This Table can be used to assess and compare performance of 777 Trucks, Scrapers, or Articulated Trucks)

		WHEX1	WHEX2				No Growth	Total
Elev at Dump Pt. Centroid		10450	10125	10110	10000	10000		
Sub-Unit Area (Acres)		13	177.5	0			0	190.5
Sub-Unit Volume (Cubic Yards)		10,487	143,183	0	0	0		153,670
Source Distribution		Sub-unit Area/Source (Acres)						
Source 1	GM6-7	13						13
Source 2	GM6-7		122.3					122.3
Source 3	GM38		55.2					55.2
Source 4								0
Source 5								0
Source 6								0

North Cresson Mine Reclamation - Mass Earthwork, Growth Media Placement, and Revegetation

Reclamation Units Input Table

Reclamation Units (Growth Media, Seeding, Fencing and Trees				Regrading Units including Leveling Dump-piles and Mass Hauling			
Area	Values Remaining after 12/31 of Calendar Year	LOM Values	Units			End-of-Mine Quantities from Amendment 11	
Total Area (SF and Acres)	16,135,209	**370.4**	Acres	Total Volume of Cut -		781,676	Cu yd
Area not reseeded or treated with GM	0	**170**	Acres	Total Volume of Fill-		1,988,003	Cu yd
Net Area of Life-of-Mine to be reseed	**Life-of-Mine Area --->**	**200.1**	Acres	Area requiring Mass Haul		0	Acres
Area Already Reseeded or undisturbed as of 12/31 of this calendar year			Acres	Area requiring Pile-leveling and Grading (Total minus area of Mass Haul)		200	Acres
Net Area to be reclaimed		200.1	Acres	Volume of Pile Leveling and Grading		0	Cu yd
Remaining and LOM Total Area of Tree Planting		**23.0**	Acres	Volume of Mass Dozing (minimum of Cut/Fill for each Unit)		781,676	Cu Yd
Remaining and LOM Total Fencing Length above Mine Area		9200	Feet	Total Volume that must be Dozed (not including Light Grading)		781,676	Cu Yd
Acreage to receive fertilizing and ripping simultaneously with a D4 dozer? (Enter if different from default)		200.1	acres	Average Push Distance for Dozer Leveling (100 ft used for Pile Leveling)		600	Ft
Acreage to receive seeding & harrowing simultaneousy with a D4 dozer? (Enter if different from default)		200.1	acres	Volume that must be Hauled (cut/fill imbalance)		**603,164**	Cy Yd
Light Grading Area (enter if > zero)		0	Acres	Weighted HD Mass Excavation		**2,000**	ft

Cost Summary - Details are listed below

Item	Equipment	Quantity	Life-of-Mine Cost (Amendment 11) Eqmt Cost	Labor Cost	Material Cost	Total Cost	Unit Cost
Heavy Dozing to Level Piles and Balanced Cut/fill	D10	781,676	$ 691,799	$ 71,692		**$ 763,491**	$ 0.98
Mass Haul to Balance Cut/Fill	CAT777	603,164	$ 1,047,311	$ 77,009		**$ 1,124,320**	$ 1.86
SubTotal ReGrading and Contouring		1,384,840	$ 1,739,110	$ 148,702		$ 1,887,812	
Growth Media Distribution from Stockpiles	CAT623	298,789	$ 373,032	$ 59,148		$ 432,179	$ 1.45
Total Seeding, Fine Grading, Trees, and Supervision			$ 112,482	$ 104,610	$ 188,752	$ 405,843	
Grand Total for Management Unit			**$ 2,224,623**	**$ 312,459**	**$ 188,752**	**$ 2,725,834**	

LEGEND	
	Maunal Entry
	Life-of-mine

North Cresson Mine Reclamation - Mass Earthwork, Growth Media Placement, and Revegetation

Cost Development for Regrading - Includes Pile Leveling, Dozer Cut/Fill Balanced, and Haulage from Neighboring Units

Dozer Productivity Calculation for Heavy Grading — **Life of Mine Amendment 11**

		Comment	Quantity
What is the volume cut/fill Dozed and leving piles		**Cut/Fill Balanced Volumes plus leveling piles**	781,676
What is the expected average push distance for leveling piles?		**Short Doze to level out end-dumped truck loads**	600
What is the overall Job Correction Factor for D10 Dozing?		Dozer Productivity Tab	1.08
What is unadjusted production based on push distance for a D10?		**cu yds/hr from Regression Equation Developed from**	**358**
Calculated adjusted production based on job factors =		cu yds/hr calculated	385.3
Calculated D10 Dozer hours in grading =		hours	**2028.90**

LEGEND	
	Maunal Entry
	Life-of-mine

Estimated Unit Cost for D10 Dozer	Eqmt Cost	Labor Cost	Total Cost	UnitCost($/cy)
	$ 691,799	$ 71,692	$ 763,491	**$ 0.98**

		Comment	Quantity
What is the overall Job Correction Factor for D11 Dozing?		Dozer Productivity Tab	1.08
What is unadjusted production based on push distance for a D11?		**cu yds/hr from Regression Equation Developed from**	**556**
Calculated adjusted production based on job factors =		cu yds/hr calculated	598.5
Calculated D11 Dozer hours in grading =		hours	**1305.96**

Estimated Unit Cost for D11 Dozer	Eqmt Cost	Labor Cost	Total Cost	UnitCost($/cy)
	$ 848,829	$ 46,147	$ 894,976	**$ 1.14**

Mass Haul of Material Between Units to Achieve Earthwork Balance

Additional Volume that will be truck hauled	603,164	cy
What is the weighted average Haul Distance for the truck haul?	2,000	Feet
What is the Estimated Total Resistance Loaded (Grade Plus 5%)?	10%	Grade+RR
What is the Total Resistance Empty Return (Grade plus 5%)	5%	Grade+RR

CAT 777 Trucks

What is loaded travel time based on haul distance & rolling resistance (min)?	2.8	Minutes	
What is empty travel time based on haul distance & rolling resistance (min)?	1.2	Minutes	
What is the Fixed Time for CAT777 Trucks?	4.7	Minutes	
Total Trip Time for CAT777 Trucks	8.7	Minutes	
Calculated Productivity of Loader/Truck Combination (cu yd/hr)	402	cy/hr	

		Hours	Eqmt Cost	Labor Cost	Total Cost
777 Truck (cy/hr)		1,499	$ 687,529	$ 40,643	$ 728,173
992 Loader (cy/hr)		375	$ 236,186	$ 13,244	$ 249,430
14 H Grader	Fleet hrs=#Trucks per loader	375	$ 50,339	$ 13,158	$ 63,498
5K gal H_20 Truck	Fleet hrs=#Trucks per loader	375	$ 73,256	$ 9,963	$ 83,220
Total Fleet Cost and Unit Cost			$ 1,047,311	$ 77,009	$ 1,124,320
				$ 1.86	**per CY**

Articulated Trucks

What is loaded travel time based on haul distance & rolling resistance (min)?	2.9	Minutes	
What is empty travel time based on haul distance & rolling resistance (min)?	0.8	Minutes	
What is the Fixed Time for Articulated Trucks?	4.8	Minutes	
Total Trip Time for Articulated Trucks	8.5	Minutes	
Calculated Productivity of Loader/Truck Combination (cu yd/hr)	181	cy/hr	

		Hours	Eqmt Cost	Labor Cost	Total Cost
Articulated Truck (cy/hr)	0	3,331	$ 593,280	$ 90,301	$ 683,581
988 Loader	0	833	$ 202,984	$ 29,426	$ 232,410
14 H Grader	Fleet hrs=#Trucks per loader	833	$ 111,844	$ 29,235	$ 141,079
5K gal H_20 Truck	Fleet hrs=#Trucks per loader	833	$ 162,761	$ 22,137	$ 184,897
Total Fleet Cost and Unit Cost			$ 1,070,868	$ 171,099	$ 1,241,968
				$ 2.06	**per CY**

North Cresson Mine Reclamation - Mass Earthwork, Growth Media Placement, and Revegetation

Summary of Growth Media Haulage Costs for LOM

CAT 777 Haul Trucks — **Growth Media Distribution Area**

Growth Media Equipment	CAT 777 Haul Trucks Volume (cy)	Work Hours	Total GM Req'd. 298,789 Eqmt Cost	Labor Cost	Total Cost
NC1	53,482	169	$ 77,727	$ 4,595	$ 82,322
0	1	-	$ -	$ -	$ -
NC3	41,382	136	$ 62,197	$ 3,677	$ 65,874
NC4	66,550	211	$ 96,719	$ 5,718	$ 102,437
CAT 992 Loader	Truck Hours/(Trucks per Loader)	129.01	$ 81,294	$ 4,559	$ 85,852
14 H Grader	Fleet hrs/4	129.01	$ 17,326	$ 4,529	$ 21,856
5K gal H_20 Truck	Fleet hrs/4	129.01	$ 25,214	$ 3,429	$ 28,644
Total Cost			**$ 360,478**	**$ 26,506**	**$ 386,984**
Cost per CY					**$ 1.30**

CAT 740 Articulated Trucks — **Growth Media Distribution Area**

Growth Media Equipment	CAT 740 Articulated Trucks Volume (cy)	Work Hours	Total GM Req'd. 298,789 Eqmt Cost	Labor Cost	Total Cost
NC1	53,482	411	$ 73,252	$ 11,149	$ 84,401
0	1	-	$ -	$ -	$ -
NC3	41,382	329	$ 58,633	$ 8,924	$ 67,557
NC4	66,550	512	$ 91,150	$ 13,874	$ 105,024
CAT 988 Loader	Truck Hours/(Trucks per Loader)	313.06	$ 76,309	$ 11,062	$ 87,371
14 H Grader	Fleet hrs/4	313.06	$ 42,046	$ 10,991	$ 53,037
5K gal H20 Truck	Fleet hrs/4	313.06	$ 61,188	$ 8,322	$ 69,510
Total Cost			**$ 402,578**	**$ 64,322**	**$ 466,900**
Cost per CY					**$ 1.56**

CAT 623 Scraper — **Growth Media Distribution Area**

Growth Media Equipment CAT 623 Scraper	Cat 623 Scrapers Volume (cy)	Work Hours	Total GM Req'd. 298,789 Eqmt Cost	Labor Cost	Total Cost
NC1	53,482	387	$ 90,279	$ 13,405	$ 103,685
0	1	-	$ -	$ -	$ -
NC3	41,382	313	$ 73,031	$ 10,844	$ 83,875
NC4	66,550	481	$ 112,339	$ 16,681	$ 129,019
14 H Grader	Fleet hrs/4	295.32	$ 39,663	$ 10,368	$ 50,030
5K gal H20 Truck	Fleet hrs/4	295.32	$ 57,719	$ 7,850	$ 65,570
Total Cost			**$ 373,032**	**$ 59,148**	**$ 432,179**
Cost per CY					**$ 1.45**

LEGEND	
	Maunal Entry
	Life-of-mine

	Units (cy or ac) or Rate	per hour	Work Hours	Equipment	Labor	Materials	Total
[4]Spread Growth Medium (cy)	161,415		227.5	$ 58,507	$ 8,037	included	$ 66,544
D9 Rate(cy/hr)		710					
[5]Soil Analyses (#)	43.88			included	included	$ 5,125	$ 5,125
Rate (ac / sample)		5					
[6]Rip & Fertilize (ac)	200		117.1	$ 6,134	$ 4,137	$ 35,460	$ 45,730
D4 Rate (ac/hr)		1.7					
[7]Seed & Harrow (ac)	200		85.7	$ 4,839	$ 3,029	$ 11,595	$ 19,463
D4 Rate (ac/hr)		2.3					
[9]Hydro-Mulching (ac)	219		365.7	$ 20,114	$ 9,913	$ 115,396	$ 145,423
Rate (ac/hr)		0.60					
[10]Plant Trees (ac)	23.0		34.3	N/A	$ 1,111	$ 21,175	$ 22,286
Rate (ac/hr)		0.67					
Total Work Hours =			5,424.2				
[11]Supervisor	(work hrs/4)		1,356.1	$ 22,887	$ 78,383	included	$ 101,270
Total Miscellaneous Costs for Seeding, Trees, and Supervision				**$ 112,482**	**$ 104,610**	**$ 188,752**	**$ 405,843**

Footnotes for summary cost table:

[1]Assumes heavy grading will be done with conventional D10 or D11dozers with U blades where the push distances are practical

[2]Assumes light grading will be done with a D9 dozer on the backfilled areas in Wildhorse Extension area (rate = 2 hrs/acre)

[3]Growth Medium Replacement fleet will consist of three 623 Scrapers

[4]Growth Medium will be spread using a D-9 dozer to a depth of 6 inches

[5]Soil analyses will be run on samples of the reclaimed areas to determine optimum fertilizer rates

[6]Ripping and fertilizing will be conducted on the replaced growth medium using a conventional D4 dozer with a cyclone spreader

[7]Seeding and harrowing will be conducted on all replaced growth medium that is traversible with conventional equipment

[9]Mulching will be conducted using conventional hydro-seeder/hydro-mulcher

[10]Trees and shrubs will be planted on north and east-facing slopes

[11]Supervisor costs are figured at 25 percent of the total work hours to accomplish the reclamation effort

North Cresson Mine Reclamation - Mass Earthwork, Growth Media Placement, and Revegetation

Growth Media Source and Deployment Distribution (Note: This Table can be used to assess and compare performance of 777 Trucks, Scrapers, or Articulated Trucks)

		NC1		NC3	NC4		No Growth Media	Total
Elev at Dump Pt. Centroid		10175	10025	10175	10175	10000		
Sub-Unit Area (Acres)		66.3	.	51.3	82.5		170.3	370.4
Sub-Unit Volume (Cubic Yards)		53,482	1	41,382	66,550	0		298,789
Source Distribution		Sub-unit Area/Source (Acres)						
Source 1	GM6-7							0
Source 2								0
Source 3	GM1	66.3		51.3	82.5			200.1
Source 4								0
Source 5								0
Source 6								0

Main Cresson Mine Reclamation - Mass Earthwork, Growth Media Haul/Place, and Revegetation

Reclamation Units Input Table

Reclamation Units (Growth Media, Seeding, Fencing and Trees				Regrading Units including Leveling Dump-piles and Mass Hauling			
Area	Values Remaining after 12/31 of Calendar Year	LOM Values	Units			End-of-Mine Quantities from Amendment 11	
Total Area (SF and Acres)	26,589,092	**610.4**	Acres	Total Volume of Cut -		1,173,385	Cu yd
Area not reseeded or treated with GM	0	**264**	Acres	Total Volume of Fill-		1,245,913	Cu yd
Net Area of Life-of-Mine to be reseed	**Life-of-Mine Area --->**	**346.4**	Acres	Area requiring Mass Haul		0	Acres
Area Already Reseeded as of 12/31 of this calendar year	Enter Value at Right, in Acres	0	Acres	Area requiring Pile-leveling and Grading (Total minus area of		346.4	Acres
Net Area to be reclaimed		346.4	Acres	Volume of Pile Leveling and Grading		0	Cu yd
Remaining and LOM Total Area of Tree Planting		**59.0**	Acres	Volume of Mass Dozing (minimum of Cut/Fill for each		1,173,385	Cu Yd
Remaining and LOM Total Fencing Length above Mine Area		19800	Feet	Total Volume that must be Dozed (not including Light Grading)		1,173,385	Cu Yd
Acreage to receive fertilizing and ripping simultaneously with a D4 dozer? (Enter if different from default)		346.4	acres	Average Push Distance for Dozer Leveling (100 ft used for Pile Leveling)		450	Ft
Acreage to receive seeding & harrowing simultaneousy with a D4 dozer? (Enter if different from default)		346.4	acres	Volume that must be Hauled (cut/fill imbalance)		**72,528**	Cy Yd
Light Grading Area (enter if > zero)		0	Acres	Weighted HD Mass Excavation		**2,000**	ft

Cost Summary - Details are listed below

Life-of-Mine Cost (Amendment 11)							
Item	**Equipment**	Quantity	Eqmt Cost	Labor Cost	Material Cost	Total Cost	**Unit Cost**
Heavy Dozing to Level Piles and Balanced Cut/fill	D10	1,173,385	$ 804,217	$ 83,342		**$ 887,559**	$ 0.76
Mass Haul to Balance Cut/Fill	CAT777	72,528	$ 125,935	$ 9,260		**$ 135,195**	$ 1.86
SubTotal ReGrading and Contouring		1,245,913	$ 930,152	$ 92,602		$ 1,022,754	
Growth Media Distribution from Stockpiles	CAT740Art	279,429	$ 395,978	$ 60,843		$ 456,821	$ 1.63
Total Seeding, Fine Grading, Trees, and Supervision			$ 88,666	$ 81,264	$ 326,047	$ 495,977	
Grand Total for Management Unit			**$ 1,414,795**	**$ 234,710**	**$ 326,047**	**$ 1,975,553**	

Main Cresson Mine Reclamation - Mass Earthwork, Growth Media Haul/Place, and Revegetation

Cost Development for Regrading - Includes Pile Leveling, Dozer Cut/Fill Balanced, and Haulage from Neighboring Units

Dozer Productivity Calculation for Heavy Grading — **Life of Mine Amendment 11**

		Comment	Quantity
What is the volume cut/fill Dozed and leving piles		**Cut/Fill Balanced Volumes plus leveling piles**	1,173,385
What is the expected average push distance for leveling piles?		**Short Doze to level out end-dumped truck loads**	450
What is the overall Job Correction Factor for D10 Dozing?		Dozer Productivity Tab	1.08
What is unadjusted production based on push distance for a D10?		**cu yds/hr from Regression Equation Developed from Cat Handbook Version 39**	**462**
Calculated adjusted production based on job factors =		cu yds/hr calculated	497.5
Calculated D10 Dozer hours in grading =		hours	**2358.59**

LEGEND: Maunal Entry; Life-of-mine

Estimated Unit Cost for D10 Dozer	Eqmt Cost	Labor Cost	Total Cost	UnitCost($/cy)
	$ 804,217	$ 83,342	$ 887,559	**$ 0.76**

What is the overall Job Correction Factor for D11 Dozing?	Dozer Productivity Tab	1.08	
What is unadjusted production based on push distance for a D11?	**cu yds/hr from Regression Equation Developed from Cat Handbook Version 39**	**718**	
Calculated adjusted production based on job factors =	cu yds/hr calculated	772.6	
Calculated D11 Dozer hours in grading =	hours	**1518.79**	

Estimated Unit Cost for D11 Dozer	Eqmt Cost	Labor Cost	Total Cost	UnitCost($/cy)
	$ 987,162	$ 53,667	$ 1,040,829	**$ 0.89**

Mass Haul of Material Between Units to Achieve Earthwork Balance

Additional Volume that will be truck hauled	72,528	cy	
What is the weighted average Haul Distance for the truck haul?	2,000	Feet	
What is the Estimated Total Resistance Loaded (Grade Plus 5%)?	10%	Grade+RR	
What is the Total Resistance Empty Return (Grade plus 5%)	5%	Grade+RR	

CAT 777 Trucks

What is loaded travel time based on haul distance & rolling resistance (min)?	2.8	Minutes	
What is empty travel time based on haul distance & rolling resistance (min)?	1.2	Minutes	
What is the Fixed Time for CAT777 Trucks?	4.7	Minutes	
Total Trip Time for CAT777 Trucks	8.7	Minutes	
Calculated Productivity of Loader/Truck Combination (cu yd/hr)	402	cy/hr	

		Hours	Eqmt Cost	Labor Cost	Total Cost
777 Truck (cy/hr)		180	$ 82,673	$ 4,887	$ 87,560
992 Loader (cy/hr)		45	$ 28,400	$ 1,593	$ 29,993
14 H Grader	Fleet hrs=#Trucks per loader	45	$ 6,053	$ 1,582	$ 7,635
5K gal H_20 Truck	Fleet hrs=#Trucks per loader	45	$ 8,809	$ 1,198	$ 10,007
Total Fleet Cost and Unit Cost			$ 125,935	$ 9,260	$ 135,195
				$ 1.86	**per CY**

Articulated Trucks

What is loaded travel time based on haul distance & rolling resistance (min)?	2.9	Minutes	
What is empty travel time based on haul distance & rolling resistance (min)?	0.8	Minutes	
What is the Fixed Time for Articulated Trucks?	4.8	Minutes	
Total Trip Time for Articulated Trucks	8.5	Minutes	
Calculated Productivity of Loader/Truck Combination (cu yd/hr)	181	cy/hr	

		Hours	Eqmt Cost	Labor Cost	Total Cost
Articulated Truck (cy/hr)	72,528	401	$ 71,340	$ 10,858	$ 82,198
988 Loader	72,528	100	$ 24,408	$ 3,538	$ 27,946
14 H Grader	Fleet hrs=#Trucks per loader	100	$ 13,449	$ 3,515	$ 16,964
5K gal H_20 Truck	Fleet hrs=#Trucks per loader	100	$ 19,571	$ 2,662	$ 22,233
Total Fleet Cost and Unit Cost			$ 128,768	$ 20,574	$ 149,342
				$ 2.06	**per CY**

Main Cresson Mine Reclamation - Mass Earthwork, Growth Media Haul/Place, and Revegetation

Summary of Growth Media Haulage Costs for LOM

Growth Media Distribution Area

Growth Media Equipment	CAT 777 Haul Trucks Volume (cy)	Work Hours	Total GM Req'd. 279,429 Eqmt Cost	Labor Cost	Total Cost
MC1	7,986	10	$ 4,549	$ 269	$ 4,818
MC2	25,249	33	$ 15,215	$ 899	$ 16,114
MC3	9,519	15	$ 6,658	$ 394	$ 7,052
MC4	23,958	42	$ 19,290	$ 1,140	$ 20,430
MC5	116,644	551	$ 252,540	$ 14,929	$ 267,469
MC6	96,074	162	$ 74,443	$ 4,401	$ 78,844
CAT 992 Loader	Truck Hours/(Trucks per Loader)	24.92	$ 15,703	$ 881	$ 16,584
14 H Grader	Fleet hrs/4	24.92	$ 3,347	$ 875	$ 4,222
5K gal H_20 Truck	Fleet hrs/4	24.92	$ 4,871	$ 662	$ 5,533
Total Cost			**$ 396,616**	**$ 24,450**	**$ 421,066**
Cost per CY					**$ 1.51**

LEGEND
- Maunal Entry
- Life-of-mine

Growth Media Distribution Area

Growth Media Equipment	CAT 740 Articulated Trucks Volume (cy)	Work Hours	Total GM Req'd. 279,429 Eqmt Cost	Labor Cost	Total Cost
MC1	7,986	23	$ 4,181	$ 636	$ 4,818
MC2	25,249	78	$ 13,897	$ 2,115	$ 16,013
MC3	9,519	34	$ 6,095	$ 928	$ 7,022
MC4	23,958	100	$ 17,741	$ 2,700	$ 20,441
MC5	116,644	1,397	$ 248,758	$ 37,863	$ 286,621
MC6	96,074	402	$ 71,564	$ 10,893	$ 82,457
CAT 988 Loader	Truck Hours/(Trucks per Loader)	58.83	$ 14,341	$ 2,079	$ 16,419
14 H Grader	Fleet hrs/4	58.83	$ 7,902	$ 2,065	$ 9,967
5K gal H20 Truck	Fleet hrs/4	58.83	$ 11,499	$ 1,564	$ 13,063
Total Cost			**$ 395,978**	**$ 60,843**	**$ 456,821**
Cost per CY					**$ 1.63**

Growth Media Distribution Area

Growth Media Equipment	Cat 623 Scrapers Volume (cy)	Work Hours	Total GM Req'd. 279,429 Eqmt Cost	Labor Cost	Total Cost
MC1	7,986	13	$ 3,006	$ 446	$ 3,452
MC2	25,249	45	$ 10,563	$ 1,568	$ 12,131
MC3	9,519	23	$ 5,462	$ 811	$ 6,273
MC4	23,958	74	$ 17,342	$ 2,575	$ 19,917
MC5	116,644	1,766	$ 411,978	$ 61,172	$ 473,150
MC6	96,074	325	$ 75,786	$ 11,253	$ 87,039
14 H Grader	Fleet hrs/4	38.97	$ 5,234	$ 1,368	$ 6,602
5K gal H20 Truck	Fleet hrs/4	38.97	$ 7,616	$ 1,036	$ 8,652
Total Cost			**$ 536,986**	**$ 80,230**	**$ 617,216**
Cost per CY					**$ 2.21**

	Units (cy or ac) or Rate per hour	Work Hours	Equipment	Labor	Materials	Total
[4]Spread Growth Medium (cy)	66,711	94.0	$ 24,180	$ 3,322	included	$ 27,502
D9 Rate(cy/hr)	710					
[5]Soil Analyses (#)	69.28		included	included	$ 8,092	$ 8,092
Rate (ac / sample)	5					
[6]Rip & Fertilize (ac)	346	202.6	$ 10,617	$ 7,161	$ 61,382	$ 79,160
D4 Rate (ac/hr)	1.7					
[7]Seed & Harrow (ac)	346	148.4	$ 8,377	$ 5,243	$ 20,072	$ 33,692
D4 Rate (ac/hr)	2.3					
[9]Hydro-Mulching (ac)	346	577.3	$ 31,755	$ 15,651	$ 182,182	$ 229,589
Rate (ac/hr)	0.60					
[10]Plant Trees (ac)	59.0	88.1	N/A	$ 2,849	$ 54,319	$ 57,168
Rate (ac/hr)	0.67					
Total Work Hours =		3,255.2				
[11]Supervisor	(work hrs/4)	813.8	$ 13,735	$ 47,039	included	$ 60,774
Total Miscellaneous Costs for Seeding, Trees, and Supervision			**$ 88,666**	**$ 81,264**	**$ 326,047**	**$ 495,977**

Footnotes for summary cost table:

[1]Assumes heavy grading will be done with conventional D10 or D11dozers with U blades where the push distances are practica

[2]Assumes light grading will be done with a D9 dozer on the backfilled areas in Wildhorse Extension area (rate = 2 hrs/acre)

[3]Growth Medium Replacement fleet will consist of three 623 Scrapers

[4]Growth Medium will be spread using a D-9 dozer to a depth of 6 inches

[5]Soil analyses will be run on samples of the reclaimed areas to determine optimum fertilizer rates

[6]Ripping and fertilizing will be conducted on the replaced growth medium using a conventional D4 dozer with a cyclone spreade

[7]Seeding and harrowing will be conducted on all replaced growth medium that is traversible with conventional equipment

[9]Mulching will be conducted using conventional hydro-seeder/hydro-mulcher

[10]Trees and shrubs will be planted on north and east-facing slopes

[11]Supervisor costs are figured at 25 percent of the total work hours to accomplish the reclamation effort

Main Cresson Mine Reclamation - Mass Earthwork, Growth Media Haul/Place, and Revegetation

ECWH Truck Haulage of Overburden for Re-contouring

		MC1	MC2	MC3	MC4	MC5	MC6	No Growth Media	Total
Elev at Dump Pt. Centroid		10175	10150	10170	10200	9770	10100		
Sub-Unit Area (Acres)		9.9	31.3	11.8	29.7	144.6	119.1	264	610.4
Sub-Unit Volume (Cubic Yards)		7,986	25,249	9,519	23,958	116,644	96,074		279,429
Source Distribution		Sub-unit Area/Source (Acres)							
Source 1	GM30	9.9	11.8						21.7
Source 2	GM14		19.5						19.5
Source 3	GM37			11.8	29.7				41.5
Source 4	GM11					144.6			144.6
Source 5	GM27						119.1		119.1
Source 6									0

Amendment No. 11 - East Cresson Overburden Storage Area

Reclamation Units Input Table

Reclamation Units (Growth Media, Seeding, Fencing and Trees				Regrading Units including Leveling Dump-piles and Mass Hauling			
Area	Values Remaining after 12/31 of Calendar Year	LOM Values	Units			End-of-Mine Quantities from Amendment 11	
Total Area (SF and Acres)	12,467,212	**286.2**	Acres	Total Volume of Cut -		3,027,772	Cu yd
Area not reseeded or treated with GM (Not including Undisturbed or previously reclaimed areas)	0	0	Acres	Total Volume of Fill-		3,167,743	Cu yd
Net Area of Life-of-Mine to be reseed	**Life-of-Mine Area --->**	**286.2**	Acres	Area requiring Mass Haul		286	Acres
Area Already Reseeded as of 12/31/2015 or otherwise currently undisturbed, requiring no reclamation	Enter Value at Right, in Acres	0	Acres	Area requiring Pile-leveling and Grading (Total minus area of Mass Haul)		286	Acres
Net Area to be reclaimed		286.2	Acres	Volume of Pile Leveling and Grading		0	Cu yd
Remaining and LOM Total Area of Tree Planting		**229**	Acres	Volume of Mass Dozing (minimum of Cut/Fill for each Unit)		3,097,758	Cu Yd
Remaining and LOM Total Fencing Length above Mine Area		0	Feet	Total Volume that must be Dozed (not including Light Grading)		3,097,758	Cu Yd
Acreage to receive fertilizing and ripping simultaneously with a D4 dozer? (Enter if different from default)		286.2	acres	Average Push Distance for Dozer Leveling (100 ft used for Pile Leveling)		450	Ft
Acreage to receive seeding & harrowing simultaneousy with a D4 dozer? (Enter if different from default)		286.2	acres	Volume that must be Hauled (cut/fill imbalance)		**69,985**	Cy Yd
Light Grading Area (enter if > zero)		0	Acres	Weighted HD Mass Excavation		**2,000**	ft

Cost Summary - Details are listed below

	Life-of-Mine Cost (Amendment 11)						
	Equipment	Quantity	Eqmt Cost	Labor Cost	Material Cost	Total Cost	**Unit Cost**
Item							
Heavy Dozing to Level Piles and Balanced Cut/fill	D10	3,097,758	$ 2,123,147	$ 220,025		**$ 2,343,172**	$ 0.76
Mass Haul to Balance Cut/Fill	CAT777	69,985	$ 121,519	$ 8,935		**$ 130,455**	$ 1.86
SubTotal ReGrading and Contouring		3,167,743	$ 2,244,666	$ 228,960		$ 2,473,627	
	CAT623	226,351	$ 257,035	$ 40,755		$ 297,790	$ 1.32
Growth Media Distribution from Stockpiles			$ 110,890	$ 97,100	$ 435,342	$ 643,332	
Total Seeding, Fine Grading, Trees, and Supervision			**$ 2,612,590**	**$ 366,816**	**$ 435,342**	**$ 3,414,748**	
Grand Total for Management Unit							

Amendment No. 11 - East Cresson Overburden Storage Area

Cost Development for Regrading - Includes Pile Leveling, Dozer Cut/Fill Balanced, and Haulage from Neighboring Units

Dozer Productivity Calculation for Heavy Grading	Annual Regrade	Life of Mine Amendment 11
	Comment	Quantity
What is the volume cut/fill Dozed and leving piles	**Cut/Fill Balanced Volumes plus leveling piles**	3,097,758
What is the expected average push distance for leveling piles?	**Short Doze to level out end-dumped truck loads**	450
What is the overall Job Correction Factor for D10 Dozing?	Dozer Productivity Tab	1.08
What is unadjusted production based on push distance for a D10?	**cu yds/hr from Regression Equation Developed**	**462**
Calculated adjusted production based on job factors =	cu yds/hr calculated	497.5
Calculated D10 Dozer hours in grading =	hours	**6226.73**

LEGEND: Maunal Entry; Life-of-mine

Estimated Unit Cost for D10 Dozer	Eqmt Cost	Labor Cost	Total Cost	UnitCost($/cy)
	$ 2,123,147	$ 220,025	$ 2,343,172	**$ 0.76**

What is the overall Job Correction Factor for D11 Dozing?	Dozer Productivity Tab	1.08
What is unadjusted production based on push distance for a D11?	**cu yds/hr from Regression Equation Developed**	**718**
Calculated adjusted production based on job factors =	cu yds/hr calculated	772.6
Calculated D11 Dozer hours in grading =	hours	**4009.64**

Estimated Unit Cost for D11 Dozer	Eqmt Cost	Labor Cost	Total Cost	UnitCost($/cy)
	$ 2,606,124	$ 141,683	$ 2,747,807	**$ 0.89**

Mass Haul of Material Between Units to Achieve Earthwork Balance

Additional Volume that will be truck hauled	69,985	cy
What is the weighted average Haul Distance for the truck haul?	2,000	Feet
What is the Estimated Total Resistance Loaded (Grade Plus 5%)?	10%	Grade+RR
What is the Total Resistance Empty Return (Grade plus 5%)	5%	Grade+RR

CAT 777 Trucks

What is loaded travel time based on haul distance & rolling resistance (min)?		2.8	Minutes			
What is empty travel time based on haul distance & rolling resistance (min)?		1.2	Minutes			
What is the Fixed Time for CAT777 Trucks?		4.7	Minutes			
Total Trip Time for CAT777 Trucks		8.7	Minutes			
Calculated Productivity of Loader/Truck Combination (cu yd/hr)		402	cy/hr			
		Hours	Eqmt Cost	Labor Cost	Total Cost	
777 Truck (cy/hr)		174	$ 79,774	$ 4,716	$ 84,490	
992 Loader (cy/hr)		43	$ 27,405	$ 1,537	$ 28,941	
14 H Grader	Fleet hrs=#Trucks per loader	43	$ 5,841	$ 1,527	$ 7,368	
5K gal H_20 Truck	Fleet hrs=#Trucks per loader	43	$ 8,500	$ 1,156	$ 9,656	
Total Fleet Cost and Unit Cost			$ 121,519	$ 8,935	$ 130,455	
				$ 1.86	**per CY**	

Articulated Trucks

What is loaded travel time based on haul distance & rolling resistance (min)?		2.9	Minutes			
What is empty travel time based on haul distance & rolling resistance (min)?		0.8	Minutes			
What is the Fixed Time for Articulated Trucks?		4.8	Minutes			
Total Trip Time for Articulated Trucks		8.5	Minutes			
Calculated Productivity of Loader/Truck Combination (cu yd/hr)		181	cy/hr			
		Hours	Eqmt Cost	Labor Cost	Total Cost	
Articulated Truck (cy/hr)	721,313	387	$ 68,838	$ 10,478	$ 79,316	
988 Loader	721,313	97	$ 23,552	$ 3,414	$ 26,967	
14 H Grader	Fleet hrs=#Trucks per loader	97	$ 12,977	$ 3,392	$ 16,369	
5K gal H_20 Truck	Fleet hrs=#Trucks per loader	97	$ 18,885	$ 2,568	$ 21,454	
Total Fleet Cost and Unit Cost			$ 124,253	$ 19,853	$ 144,105	
				$ 2.06	**per CY**	

Amendment No. 11 - East Cresson Overburden Storage Area

Summary of Growth Media Haulage Costs for LOM

Growth Media Distribution Area

Growth Media Equipment	CAT 777 Haul Trucks Volume (cy)	Work Hours	Total GM Req'd. Eqmt Cost	226,351 Labor Cost	Total Cost
0	-	-	$ -	$ -	$ -
0	-	-	$ -	$ -	$ -
ECOSA3	48,723	85	$ 38,930	$ 2,301	$ 41,231
ECOSA4	96,719	247	$ 113,181	$ 6,691	$ 119,871
CAT 992 Loader	Truck Hours/(Trucks per Loader)	82.92	$ 52,254	$ 2,930	$ 55,185
14 H Grader	Fleet hrs/4	82.92	$ 11,137	$ 2,911	$ 14,048
5K gal H_20 Truck	Fleet hrs/4	82.92	$ 16,207	$ 2,204	$ 18,412
Total Cost			**$ 231,710**	**$ 17,038**	**$ 248,747**
Cost per CY					**$ 1.10**

Growth Media Distribution Area

Growth Media Equipment	CAT 740 Articulated Trucks Volume (cy)	Work Hours	Total GM Req'd. Eqmt Cost	226,351 Labor Cost	Total Cost
0	-	-	$ -	$ -	$ -
0	-	-	$ -	$ -	$ -
ECOSA3	48,723	206	$ 36,733	$ 5,591	$ 42,324
ECOSA4	96,719	610	$ 108,680	$ 16,542	$ 125,222
CAT 988 Loader	Truck Hours/(Trucks per Loader)	204.11	$ 49,752	$ 7,212	$ 56,964
14 H Grader	Fleet hrs/4	204.11	$ 27,413	$ 7,166	$ 34,579
5K gal H20 Truck	Fleet hrs/4	204.11	$ 39,893	$ 5,426	$ 45,318
Total Cost			**$ 262,471**	**$ 41,937**	**$ 304,407**
Cost per CY					**$ 1.34**

Growth Media Distribution Area

Growth Media Equipment	Cat 623 Scrapers Volume (cy)	Work Hours	Total GM Req'd. Eqmt Cost	226,351 Labor Cost	Total Cost
0	-	-	$ -	$ -	$ -
0	-	-	$ -	$ -	$ -
ECOSA3	48,723	176	$ 41,019	$ 6,091	$ 47,110
ECOSA4	96,719	638	$ 148,915	$ 22,112	$ 171,026
14 H Grader	Fleet hrs/4	203.49	$ 27,329	$ 7,144	$ 34,473
5K gal H20 Truck	Fleet hrs/4	203.49	$ 39,771	$ 5,409	$ 45,180
Total Cost			**$ 257,035**	**$ 40,755**	**$ 297,790**
Cost per CY					**$ 1.32**

	Units (cy or ac) or Rate per hour	Work Hours	Equipment	Labor	Materials	Total
[4]Spread Growth Medium (cy)	145,442	204.9	$ 52,718	$ 7,242	included	$ 59,960
D9 Rate(cy/hr)	710					
[5]Soil Analyses (#)	57.24		included	included	$ 6,686	$ 6,686
Rate (ac / sample)	5					
[6]Rip & Fertilize (ac)	286	167.4	$ 8,772	$ 5,916	$ 50,716	$ 65,405
D4 Rate (ac/hr)	1.7					
[7]Seed & Harrow (ac)	286	122.6	$ 6,921	$ 4,332	$ 16,584	$ 27,837
D4 Rate (ac/hr)	2.3					
[9]Hydro-Mulching (ac)	286	477.0	$ 26,237	$ 12,931	$ 150,525	$ 189,693
Rate (ac/hr)	0.60					
[10]Plant Trees (ac)	229.0	341.8	N/A	$ 11,058	$ 210,832	$ 221,890
Rate (ac/hr)	0.67					
Total Work Hours =		3,849.1				
[11]Supervisor	(work hrs/4)	962.3	$ 16,241	$ 55,621	included	$ 71,862
Total Miscellaneous Costs for Seeding, Trees, and Supervision			**$ 110,890**	**$ 97,100**	**$ 435,342**	**$ 643,332**

Footnotes for summary cost table:

[1]Assumes heavy grading will be done with conventional D10 or D11dozers with U blades where the push distances are practica

[2]Assumes light grading will be done with a D9 dozer on the backfilled areas in Wildhorse Extension area (rate = 2 hrs/acre)

[3]Growth Medium Replacement fleet will consist of three 623 Scrapers

[4]Growth Medium will be spread using a D-9 dozer to a depth of 6 inches

[5]Soil analyses will be run on samples of the reclaimed areas to determine optimum fertilizer rates

[6]Ripping and fertilizing will be conducted on the replaced growth medium using a conventional D4 dozer with a cyclone spreade

[7]Seeding and harrowing will be conducted on all replaced growth medium that is traversible with conventional equipment

[9]Mulching will be conducted using conventional hydro-seeder/hydro-mulche

[10]Trees and shrubs will be planted on north and east-facing slopes

[11]Supervisor costs are figured at 25 percent of the total work hours to accomplish the reclamation effor

ECWH Truck Haulage of Overburden for Re-contouring

LEGEND	
	Maunal Entry
	Life-of-mine

Amendment No. 11 - East Cresson Overburden Storage Area

				ECOSA3	ECOSA4	ECOSA5	No Growth	Total
Elev at Dump Pt. Centroid		10700	10700	10700	10450	10180		
Sub-Unit Area (Acres)				60.4	119.9	100.3	0	280.6
Sub-Unit Volume (Cubic Yards)		0	0	48,723	96,719	80,909		226,351
Source Distribution		Sub-unit Area/Source (Acres)						
Source 1	GM11			60.4	119.9			180.3
Source 2	GM6/7					100.3		100.3
Source 3								0
Source 4								0
Source 5								0
Source 6								0

Squaw Gulch Overburden Storage Area - Mass Earthwork, Growth Medium Haulage/Placement, and Revegetation

Reclamation Units Input Table

Reclamation Units (Growth Media, Seeding, Fencing and Trees				Regrading Units including Leveling Dump-piles and Mass Hauling			
Area	Values Remaining after 12/31 of Calendar Year	LOM Values	Units			End-of-Mine Quantities from Amendment 11	
Total Area (SF and Acres)	9,680,056	222.22	Acres	Total Volume of Cut -		2,152,599	Cu yd
Area not reseeded or treated with GM	0	15	Acres	Total Volume of Fill-		1,863,909	Cu yd
Net Area of Life-of-Mine to be reseed	**Life-of-Mine Area --->**	**207.2**	Acres	Area requiring Mass Haul		0	Acres
Area Already Reseeded as of 12/31 of this calendar year	Enter Value at Right, in Acres	0	Acres	Area requiring Pile-leveling and Grading (Total minus area of		0	Acres
Net Area to be reclaimed		207.2	Acres	Volume of Pile Leveling and Grading		1,863,909	Cu yd
Remaining and LOM Total Area of Tree Planting		**41.9**	Acres	Volume of Mass Dozing (minimum of Cut/Fill for each			Cu Yd
Remaining and LOM Total Fencing Length above Mine Area		0	Feet	Total Volume that must be Dozed (not including Light		1,863,909	Cu Yd
Acreage to receive fertilizing and ripping simultaneously with a D4 dozer? (Enter if different from default)		207.2	acres	Average Push Distance for Dozer Leveling (100 ft used for Pile Leveling)		450	Ft
Acreage to receive seeding & harrowing simultaneousy with a D4 dozer? (Enter if different from default)		207.2	acres	Volume that must be Hauled (cut/fill imbalance)		**144,345**	Cy Yd
Light Grading Area (enter if > zero)		0	Acres	Weighted HD Mass Excavation		**2,000**	ft

Cost Summary - Details are listed below

Item	Equipment	Quantity	Life-of-Mine Cost (Amendment 11) Eqmt Cost	Labor Cost	Material Cost	Total Cost	Unit Cost
Heavy Dozing to Level Piles and Balanced Cut/fill	D10	1,863,909	$ 335,670	$ 34,786		**$ 370,456**	$ 0.20
Mass Haul to Balance Cut/Fill	CAT777	144,345	$ 250,635	$ 18,429		**$ 269,065**	$ 1.86
SubTotal ReGrading and Contouring		2,008,254	$ 586,305	$ 53,215		$ 639,521	
Growth Media Distribution from Stockpiles	CAT777	179,088	$ 525,711	$ 38,656		$ 564,367	$ 3.15
Total Seeding, Fine Grading, Trees, and Supervision			$ 121,629	$ 131,444	$ 201,128	$ 454,202	
Grand Total for Management Unit			**$ 1,233,646**	**$ 223,315**	**$ 201,128**	**$ 1,658,090**	

Squaw Gulch Overburden Storage Area - Mass Earthwork, Growth Medium Haulage/Placement, and Revegetation

Cost Development for Regrading - Includes Pile Leveling, Dozer Cut/Fill Balanced, and Haulage from Neighboring Units

Dozer Productivity Calculation for Heavy Grading — **Life of Mine Amendment 11**

	Comment	Quantity
What is the volume cut/fill Dozed and leving piles	**Cut/Fill Balanced Volumes plus leveling piles**	1,863,909
What is the expected average push distance for leveling piles?	**Short Doze to level out end-dumped truck loads**	100
What is the overall Job Correction Factor for D10 Dozing?	Dozer Productivity Tab	1.08
What is unadjusted production based on push distance for a D10?	**cu yds/hr from Regression Equation Developed**	**1,760**
Calculated adjusted production based on job factors =	cu yds/hr calculated	1893.4
Calculated D10 Dozer hours in grading =	hours	**984.45**

LEGEND: Maunal Entry; Life-of-mine

Estimated Unit Cost for D10 Dozer	Eqmt Cost	Labor Cost	Total Cost	UnitCost($/cy)
	$ 335,670	$ 34,786	$ 370,456	**$ 0.20**

	Comment	Quantity
What is the overall Job Correction Factor for D11 Dozing?	Dozer Productivity Tab	1.08
What is unadjusted production based on push distance for a D11?	**cu yds/hr from Regression Equation Developed**	**2,728**
Calculated adjusted production based on job factors =	cu yds/hr calculated	2934.1
Calculated D11 Dozer hours in grading =	hours	**635.26**

Estimated Unit Cost for D11 Dozer	Eqmt Cost	Labor Cost	Total Cost	UnitCost($/cy)
	$ 412,898	$ 22,447	$ 435,345	**$ 0.23**

Mass Haul of Material Between Units to Achieve Earthwork Balance

Additional Volume that will be truck hauled	144,345	cy
What is the weighted average Haul Distance for the truck haul?	2,000	Feet
What is the Estimated Total Resistance Loaded (Grade Plus 5%)?	10%	Grade+RR
What is the Total Resistance Empty Return (Grade plus 5%)	5%	Grade+RR

CAT 777 Trucks

What is loaded travel time based on haul distance & rolling resistance (min)?	2.8	Minutes
What is empty travel time based on haul distance & rolling resistance (min)?	1.2	Minutes
What is the Fixed Time for CAT777 Trucks?	4.7	Minutes
Total Trip Time for CAT777 Trucks	8.7	Minutes
Calculated Productivity of Loader/Truck Combination (cu yd/hr)	402	cy/hr

		Hours	Eqmt Cost	Labor Cost	Total Cost
777 Truck (cy/hr)		359	$ 164,535	$ 9,726	$ 174,261
992 Loader (cy/hr)		90	$ 56,522	$ 3,170	$ 59,692
14 H Grader	Fleet hrs=#Trucks per loader	90	$ 12,047	$ 3,149	$ 15,196
5K gal H_20 Truck	Fleet hrs=#Trucks per loader	90	$ 17,531	$ 2,384	$ 19,916
Total Fleet Cost and Unit Cost			$ 250,635	$ 18,429	$ 269,065
				$ 1.86	**per CY**

Articulated Trucks

What is loaded travel time based on haul distance & rolling resistance (min)?	2.9	Minutes
What is empty travel time based on haul distance & rolling resistance (min)?	0.8	Minutes
What is the Fixed Time for Articulated Trucks?	4.8	Minutes
Total Trip Time for Articulated Trucks	8.5	Minutes
Calculated Productivity of Loader/Truck Combination (cu yd/hr)	181	cy/hr

		Hours	Eqmt Cost	Labor Cost	Total Cost
Articulated Truck (cy/hr)	178,622	797	$ 141,980	$ 21,610	$ 163,590
988 Loader	178,622	199	$ 48,577	$ 7,042	$ 55,619
14 H Grader	Fleet hrs=#Trucks per loader	199	$ 26,766	$ 6,996	$ 33,762
5K gal H_20 Truck	Fleet hrs=#Trucks per loader	199	$ 38,951	$ 5,298	$ 44,248
Total Fleet Cost and Unit Cost			$ 256,273	$ 40,946	$ 297,219
				$ 2.06	**per CY**

Squaw Gulch Overburden Storage Area - Mass Earthwork, Growth Medium Haulage/Placement, and Revegetation

Summary of Growth Media Haulage Costs for LOM

Growth Media Distribution Area

Growth Media Equipment	CAT 777 Haul Trucks		Total GM Req'd.	179,088	
	Volume (cy)	Work Hours	Eqmt Cost	Labor Cost	Total Cost
SGOSA1	167,787	753	$ 345,114	$ 20,401	$ 365,516
0	8	-	$ -	$ -	$ -
0	0	-	$ -	$ -	$ -
0	0	-	$ -	$ -	$ -
CAT 992 Loader	k Hours/(Trucks per Loa	188.14	$ 118,557	$ 6,648	$ 125,205
14 H Grader	Fleet hrs/4	188.14	$ 25,268	$ 6,605	$ 31,873
5K gal H_20 Truck	Fleet hrs/4	188.14	$ 36,772	$ 5,001	$ 41,773
Total Cost			**$ 525,711**	**$ 38,656**	**$ 564,367**
Cost per CY					**$ 3.15**

LEGEND	
	Maunal Entry
	Life-of-mine

Growth Media Distribution Area

Growth Media Equipment	AT 740 Articulated Trucks		Total GM Req'd.	179,088	
	Volume (cy)	Work Hours	Eqmt Cost	Labor Cost	Total Cost
SGOSA1	167,787	1,840	$ 327,788	$ 49,892	$ 377,680
0	8	-	$ -	$ -	$ -
0	0	-	$ -	$ -	$ -
0	0	-	$ -	$ -	$ -
CAT 988 Loader	k Hours/(Trucks per Loa	460.10	$ 112,149	$ 16,258	$ 128,407
14 H Grader	Fleet hrs/4	460.10	$ 61,794	$ 16,153	$ 77,946
5K gal H20 Truck	Fleet hrs/4	460.10	$ 89,926	$ 12,230	$ 102,156
Total Cost			**$ 591,657**	**$ 94,533**	**$ 686,189**
Cost per CY					**$ 3.83**

Growth Media Distribution Area

Growth Media Equipment	Cat 623 Scrapers		Total GM Req'd.	179,088	
	Volume (cy)	Work Hours	Eqmt Cost	Labor Cost	Total Cost
SGOSA1	167,787	1,852	$ 432,257	$ 64,184	$ 496,441
0	8	-	$ -	$ -	$ -
0	0	-	$ -	$ -	$ -
0	0	-	$ -	$ -	$ -
14 H Grader	Fleet hrs/4	463.10	$ 62,197	$ 16,258	$ 78,455
5K gal H20 Truck	Fleet hrs/4	463.10	$ 90,512	$ 12,310	$ 102,822
Total Cost			**$ 584,967**	**$ 92,752**	**$ 677,718**
Cost per CY					**$ 3.78**

	Units (cy or ac) or Rate per	Work Hours	Equipment	Labor	Materials	Total
[4]Spread Growth Medium (cy)	167,795	236.4	$ 60,820	$ 8,355	included	$ 69,175
D9 Rate(cy/hr)	710					
[5]Soil Analyses (#)	41.44		included	included	$ 4,841	$ 4,841
Rate (ac / sample)	5					
[6]Rip & Fertilize (ac)	207	121.2	$ 6,351	$ 4,284	$ 36,720	$ 47,355
D4 Rate (ac/hr)	1.7					
[7]Seed & Harrow (ac)	207	88.8	$ 5,011	$ 3,136	$ 12,007	$ 20,155
D4 Rate (ac/hr)	2.3					
[9]Hydro-Mulching (ac)	207	345.4	$ 18,997	$ 9,363	$ 108,985	$ 137,344
Rate (ac/hr)	0.60					
[10]Plant Trees (ac)	41.9	62.5	N/A	$ 2,023	$ 38,576	$ 40,599
Rate (ac/hr)	0.67					
Total Work Hours =		7,216.6				
[11]Supervisor	(work hrs/4)	1,804.2	$ 30,450	$ 104,283	included	$ 134,733
Total Miscellaneous Costs for Seeding, Trees, and Supervision			**$ 121,629**	**$ 131,444**	**$ 201,128**	**$ 454,202**

Footnotes for summary cost table:

[1]Assumes heavy grading will be done with conventional D10 or D11dozers with U blades where the push distances are practical

[2]Assumes light grading will be done with a D9 dozer on the backfilled areas in Wildhorse Extension area (rate = 2 hrs/acre)

[3]Growth Medium Replacement fleet will consist of three 623 Scrapers

[4]Growth Medium will be spread using a D-9 dozer to a depth of 6 inches

[5]Soil analyses will be run on samples of the reclaimed areas to determine optimum fertilizer rates

[6]Ripping and fertilizing will be conducted on the replaced growth medium using a conventional D4 dozer with a cyclone spreader

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[9]Mulching will be conducted using conventional hydro-seeder/hydro-mulcher

[10]Trees and shrubs will be planted on north and east-facing slopes

[11]Supervisor costs are figured at 25 percent of the total work hours to accomplish the reclamation effort

Squaw Gulch Overburden Storage Area - Mass Earthwork, Growth Medium Haulage/Placement, and Revegetation
SGOSA Truck Haulage of Overburden for Re-contouring

		SGOSA1					No Growth Media	Total
Elev at Dump Pt. Centroid		10600	10175	10000	10000	10000		
Sub-Unit Area (Acres)		208	0.01	0			14	222.01
Sub-Unit Volume (Cubic Yards)		167,787	8	0	0	0		179,088
Source Distribution		Sub-unit Area/Source (Acres)						
Source 1	GM27	208						208
Source 2	GM1							0
Source 3								0
Source 4								0
Source 5								0
Source 6								0

Amendment No. 11 - Arequa Gulch VLF - Chemical Closure Costs

AGVLF Rinsing and Chemical Closure Cost Estimate

Closure criteria

Based upon Golder/Smith Williams design the completed 412 million ton pad (Phases 1-5) will result in 285.2 million cy of ore

At average density of 110 pounds per cu.ft. the average porosity is 32%

Total volume of voids (285.2 X 0.32) = 91.2 million cu. yds in one pore volume.

Total gallons required per one pore volume rinse (91.2 million cu.yds.X 27 cu. ft./cu. yd X 7.48 gal/cu.ft.) = 18,420,000,000 gallons

One Peroxide rinse and two water rinses included in costs

Total Volume Impounded 12/31/15 = 372462157 cy Capacity of 402149401 Percent Liab= **93%**

Detail for calculating First and Second Rinse Costs

Avg. circulation during rinse = **28,000 gpm**

Time to complete each rinse (18,420,000,000 gallons/ 28,000 gpm) = 457 days **say 15.2 months**

Since the water rinsing will be conducted as part of normal operations in the period 2024 through 2026, for annual cost calculations the water rinsing costs are not included and the Annual costs only include Peroxide Treatment. The Life of Mine costs do include both rinsing and Peroxide Treatment

Revised by MDE (12-5-12) Lined up the headings; corrected cell refs

Associated cost items

							Equipmt	Labor	Materials	Total
15.2	48000		$ 729,600	Materials	Purchase make up water (assume 900 avg gpm for 15.2 months)@$48,000/month				$ 729,600	$ 729,600
9	457	300	$ 1,233,900	Labor	Nine operator shifts /24 hours X 457 daysX$300 per shift			$ 1,233,900		$ 1,233,900
2	457	320	$ 292,480	Labor	Two mechanics shifts/24 hours X 457 days X $320 pr shift			$ 292,480	$ 6,135,571	$ 6,428,051
15.2	403656		$ 6,135,571	Matls = Power	Pumping costs (power) current costs $403656/mo X 15.2 months					$ -
15.2	15000		$ 228,000	Equipment	Pump maintenance and replacement per 15.2 months ($15,000/mo)		$ 228,000			$ 228,000
15.2	750		$ 11,400	Equipment	Backup generator maintenance per 15.2 months ($750/mo)		$ 11,400			$ 11,400
3	600	15.2	$ 27,360	Equipment	3 Support vehicles X $600/mo X 15.2 months		$ 27,360		$ 304,800	$ 332,160
1.27	240000		$ 304,800	Materials	Drip irrigation supplies cost $240,000/yr X 1.27 yrs.					
			$ 8,963,111		Estimate per each pore volume rinse					$ -
						Subtotals =	$ 266,760	$ 1,526,380	$ 7,169,971	$ 8,963,111
			$17,926,222		**Estimate for two pore volume rinses**	Rinse 2 Pore Volumes =	**$ 533,520**	**$ 3,052,760**	**$ 14,339,942**	**$ 17,926,222**

Third Rinse and Peroxide Treatment

Flow rate starts at 28,000 gpm and ends at 0 gpm, no fresh water makeup, H_2O_2 additions during initial phase, followed by straight evaporation last 15 months, spray irrigation practices employed

Time to complete rinse and treatments (18,420,000,000 gallons / 14,000 gpm average flow = 914 days **say 30.5 months**

Associated Cost Items

Revised by MDE (11-4-14)

This will take place in 2024 through 2030

18,420,000,000

							Equipmt	Labor	Materials	Total
9	457	$ 300.00	$ 1,233,900	Labor	Nine operators shifts / 24 hours X 457 days X $300 per shift (during peroxide additions)			$ 1,233,900		$ 1,233,900
6	457	$ 320.00	$ 877,440	Labor	Six mechanic shifts / 24 hours X 457 days X $320 per shift (during peroxide additions)			$ 877,440		$ 877,440
3	457	$ 300.00	$ 411,300	Labor	Three operator shifts/ 24 hours X 457 days X $300 per shift (during biological treatments)			$ 411,300		$ 411,300
1	457	$ 320.00	$ 146,240	Labor	One mechanic shift /24 hours X 457 days X $320 per shift (during biological treatments)			$ 146,240	$ 6,161,000	$ 6,307,240
30.5	202000		$ 6,161,000	Matls = Power	Pumping costs (power) 14,000 average gpm @ $202,000/month for 30.5 months					$ -
30.5	15000		$ 457,500	Equipment	Pump maintenance and replacement for 30.5 months ($15,000/mo)		$ 457,500			$ 457,500
30.5	750		$ 22,875	Equipment	Backup generator maintenance for 30.5 months ($750/mo)		$ 22,875		$ 600,000	$ 622,875
			$ 600,000	Materials	Spray irrigation system maintenance and parts (lump sum from GWG)				$ 1,180,120	$ 1,180,120
362000	$ 3.26		$ 1,180,120	Materials	H_2O_2 costs $0.3556/lb x 9.175 lb/gal = 3.26/gal					**$ 11,090,375**
Per A Iverson 8-13-2015 for 31% Solution						Subtotals =	$ 480,375	$ 2,668,880	$ 7,941,120	**110%**
			$ 11,090,375		**Estimate for H_2O_2 pore volume rinse over 30.5 months**				**Escalation factor 2009$ to 2015$**	**$ 12,237,630**
						Rinse 3, Evap and Peroxide Treatment =	**$ 530,068**	**$ 2,944,965**	**$ 8,762,597**	**$ 12,237,630**

110.34% Escalation Factor 2009 to 2015

		Total Equipmt	Total Labor	Total Materials	Grand Total
$ 12,237,630	**Estimate for H_2O_2 pore volume rinse over 30.5 months**				
$ 30,163,853	**Estimate for Total AGVLF Detoxification and Rinsing**	**$ 1,063,588**	**$ 5,997,725**	**$ 23,102,540**	**$ 30,163,853**

Amendment No. 11 - AGVLF Reclamation Costs (2015)

Reclamation Units Input Table

Reclamation Units (Growth Media, Seeding, Fencing and Trees				Regrading Units including Leveling Dump-piles and Mass Hauling			
Area	Values Remaining after 12/31 of Calendar Year	LOM Values	Units			End-of-Mine Quantities from Amendment 11	
Total Area (SF and Acres)	28,579,516	**656.1**	Acres	Total Volume of Cut -		27,386,563	Cu yd
Deduct area not Disturbed		**39**	Acres	Total Volume of Fill-		36,673,278	Cu yd
Net Area of Life-of-Mine to be reseed		**617.4**	Acres	Area requiring Mass Haul		656	Acres
Area Already Reseeded as of 12/31 of this calendar year		0	Acres	Area requiring Pile-leveling and Grading (Total minus area of Mass Haul)		39	Acres
Net Area to be reclaimed		617.4	Acres	Volume of Pile Leveling and Grading		4,980,323	Cu yd
Remaining and LOM Total Area of Tree Planting		115	Acres	Volume of Mass Dozing (minimum of Cut/Fill for each Unit)			Cu Yd
Remaining and LOM Total Fencing Length above Mine Area		0	Feet	Total Volume that must be Dozed (not including Light Grading)		4,980,323	Cu Yd
Acreage to receive fertilizing and ripping simultaneously with a D4 dozer? (Enter if		617.3954086	acres	Average Push Distance for Dozer Leveling (100 ft used for Pile		700	Ft
Acreage to receive seeding & harrowing simultaneousy with a D4 dozer? (Enter if different from default)		617.3954086	acres	Volume that must be Hauled (cut/fill imbalance)		**22,406,240**	Cy Yd
Light Grading Area (enter if > zero)		0	Acres	Weighted HD Mass Excavation		**3,000**	ft

Cost Summary - Details are listed below

	Life-of-Mine Cost (Amendment 11)						
Item	**Equipment**	Quantity	Eqmt Cost	Labor Cost	Material Cost	Total Cost	**Unit Cost**
Heavy Dozing to Level Piles and Balanced Cut/fill	D10	4,980,323	$ 5,054,749	$ 523,831		**$ 5,578,581**	$ 1.12
Mass Haul to Balance Cut/Fill	CAT777	22,406,240	$ 47,908,586	$ 3,522,747		**$ 51,431,333**	$ 2.30
SubTotal ReGrading and Contouring		27,386,563	$ 52,963,336	$ 4,046,578		$ 57,009,914	
Growth Media Distribution from Stockpiles	CAT777	529,254	$ 1,477,068	$ 107,651		$ 1,584,719	$ 2.99
Fence and Pipe Removal; Load Out Bin Extension				$ 649,488		$ 649,488	
Total Seeding, Fine Grading, Trees, and Supervision			$ 378,249	$ 515,223	$ 590,180	$ 1,483,652	
Grand Total for Management Unit			**$ 54,818,653**	**$ 5,318,940**	**$ 590,180**	**$ 60,727,773**	

Cost Development for Regrading - Includes Pile Leveling, Dozer Cut/Fill Balanced, and Haulage from Neighboring Units

Dozer Productivity Calculation for Heavy Grading — **Life of Mine Amendment 11**

	Comment	Quantity
What is the volume cut/fill Dozed and leving piles	**Cut/Fill Balanced Volumes plus leveling piles**	4,980,323
What is the expected average push distance for leveling piles?	**Short Doze to level out end-dumped truck loads**	700
What is the overall Job Correction Factor for D10 Dozing?	Dozer Productivity Tab	1.08
What is unadjusted production based on push distance for a D10?	**cu yds/hr from Regression Equation Developed from**	**312**
Calculated adjusted production based on job factors =	cu yds/hr calculated	336.0
Calculated D10 Dozer hours in grading =	hours	**14824.48**

LEGEND: Maunal Entry; Life-of-mine

Estimated Unit Cost for D10 Dozer	Eqmt Cost	Labor Cost	Total Cost	UnitCost($/cy)
	$ 5,054,749	$ 523,831	$ 5,578,581	**$ 1.12**

	Comment	Quantity
What is the overall Job Correction Factor for D11 Dozing?	Dozer Productivity Tab	1.08
What is unadjusted production based on push distance for a D11?	**cu yds/hr from Regression Equation Developed from**	**485**
Calculated adjusted production based on job factors =	cu yds/hr calculated	522.0
Calculated D11 Dozer hours in grading =	hours	**9540.17**

Estimated Unit Cost for D11 Dozer	Eqmt Cost	Labor Cost	Total Cost	UnitCost($/cy)
	$ 6,200,776	$ 337,107	$ 6,537,884	**$ 1.31**

Mass Haul of Material Between Units to Achieve Earthwork Balance

Additional Volume that will be truck hauled	22,406,240	cy
What is the weighted average Haul Distance for the truck haul?	3,000	Feet
What is the Estimated Total Resistance Loaded (Grade Plus 5%)?	10%	Grade+RR
What is the Total Resistance Empty Return (Grade plus 5%)	5%	Grade+RR

CAT 777 Trucks

What is loaded travel time based on haul distance & rolling resistance (min)?	4.2	Minutes
What is empty travel time based on haul distance & rolling resistance (min)?	1.8	Minutes
What is the Fixed Time for CAT777 Trucks?	4.7	Minutes
Total Trip Time for CAT777 Trucks	10.8	Minutes
Calculated Productivity of Loader/Truck Combination (cu yd/hr)	327	cy/hr

		Hours	Eqmt Cost	Labor Cost	Total Cost
777 Truck (cy/hr)		68,582	$ 31,450,597	$ 1,859,205	$ 33,309,802
992 Loader (cy/hr)		17,146	$ 10,804,189	$ 605,850	$ 11,410,040
14 H Grader	Fleet hrs=#Trucks per loader	17,146	$ 2,302,737	$ 601,925	$ 2,904,662
5K gal H_20 Truck	Fleet hrs=#Trucks per loader	17,146	$ 3,351,063	$ 455,766	$ 3,806,829
Total Fleet Cost and Unit Cost			$ 47,908,586	$ 3,522,747	$ 51,431,333
				$ 2.30	**per CY**

Articulated Trucks

What is loaded travel time based on haul distance & rolling resistance (min)?	4.4	Minutes
What is empty travel time based on haul distance & rolling resistance (min)?	1.2	Minutes
What is the Fixed Time for Articulated Trucks?	4.8	Minutes
Total Trip Time for Articulated Trucks	10.4	Minutes
Calculated Productivity of Loader/Truck Combination (cu yd/hr)	149	cy/hr

		Hours	Eqmt Cost	Labor Cost	Total Cost
Articulated Truck (cy/hr)	13,542,612	150,693	$ 26,839,375	$ 4,085,141	$ 30,924,516
988 Loader	13,542,612	37,673	$ 9,182,779	$ 1,331,206	$ 10,513,985
14 H Grader	Fleet hrs=#Trucks per loader	37,673	$ 5,059,692	$ 1,322,580	$ 6,382,272
5K gal H_20 Truck	Fleet hrs=#Trucks per loader	37,673	$ 7,363,128	$ 1,001,433	$ 8,364,560
Total Fleet Cost and Unit Cost			$ 48,444,974	$ 7,740,360	$ 56,185,333
				$ 2.51	**per CY**

Summary of Growth Media Haulage Costs for LOM

LEGEND	
	Maunal Entry
	Life-of-mine

Growth Media Distribution Area

Growth Media Equipment	CAT 777 Haul Trucks Volume (cy)	Work Hours	Total GM Req'd. Eqmt Cost	529,254 Labor Cost	Total Cost
AG1	60,984	100	$ 45,759	$ 2,705	$ 48,464
AG2	118,338	472	$ 216,541	$ 12,801	$ 229,342
AG3	78,973	393	$ 180,398	$ 10,664	$ 191,062
AG4	183,113	1,059	$ 485,512	$ 28,701	$ 514,213
Crusher	56,628	102	$ 46,987	$ 2,778	$ 49,765
CAT 992 Loader	Truck Hours/(Trucks per Loader)	531.64	$ 335,009	$ 18,786	$ 353,794
14 H Grader	Fleet hrs/4	506.02	$ 67,961	$ 17,765	$ 85,726
5K gal H_20 Truck	Fleet hrs/4	506.02	$ 98,901	$ 13,451	$ 112,352
Total Cost			**$ 1,477,068**	**$ 107,651**	**$ 1,584,719**
Cost per CY					**$ 2.99**

$ 1,386,641 **2.62**

Growth Media Distribution Area

Growth Media Equipment	CAT 740 Articulated Trucks Volume (cy)	Work Hours	Total GM Req'd. Eqmt Cost	529,254 Labor Cost	Total Cost
AG1	60,984	248	$ 44,083	$ 6,710	$ 50,793
AG2	118,338	1,132	$ 201,535	$ 30,675	$ 232,210
AG3	78,973	956	$ 170,264	$ 25,915	$ 196,180
AG4	183,113	2,541	$ 452,591	$ 68,888	$ 521,479
	56,628	63	$ 11,234	$ 1,710	$ 12,944
CAT 988 Loader	Truck Hours/(Trucks per Loader)	1,234.81	$ 300,982	$ 43,633	$ 344,614
14 H Grader	Fleet hrs/4	1,219.04	$ 163,722	$ 42,796	$ 206,519
5K gal H20 Truck	Fleet hrs/4	1,219.04	$ 238,257	$ 32,405	$ 270,662
Total Cost			**$ 1,582,668**	**$ 252,731**	**$ 1,835,399**
Cost per CY					**$ 3.47**

Growth Media Distribution Area

Growth Media Equipment	Cat 623 Scrapers Volume (cy)	Work Hours	Total GM Req'd. Eqmt Cost	529,254 Labor Cost	Total Cost
AG1	60,984	192	$ 44,691	$ 6,636	$ 51,327
AG2	118,338	1,167	$ 272,410	$ 40,449	$ 312,859
AG3	78,973	974	$ 227,289	$ 33,749	$ 261,038
AG4	183,113	2,755	$ 642,829	$ 95,450	$ 738,279
	56,628	216	$ 50,385	$ 7,481	$ 57,866
14 H Grader	Fleet hrs/4	1,325.92	$ 178,077	$ 46,549	$ 224,626
5K gal H20 Truck	Fleet hrs/4	1,271.94	$ 248,597	$ 33,811	$ 282,408
Total Cost			**$ 1,664,278**	**$ 264,125**	**$ 1,928,403**
Cost per CY					**$ 3.64**

Removal Item	**Length (Feet)**	**Unit Cost**		
Technical Revision 59		Additional Cost for Load Out Bin Extension (Lump Sum)	$ 17,207	
$ Breakdown for Technical Revision 59 Load-out Bin Ext				
Fence Removal (lin ft)	3,450	(Using a unit cost per foot from Means 2014, p. 33)	$ 10,281	2.98 $/ft
Pipe Removal (30" dia)	6,900		$ 213,900	31.00 $/ft
		(Using a unit cost per foot from Means 2014, p. 31)		
Pipe Removal (24" dia)	21,200		$ 408,100	19.25 $/ft
Subtotal Fence and Pipe Removal			$ 649,488	

	Units (cy or ac) or Rate per hour	Work Hours	Equipment	Labor	Materials	Total
[4]Spread Growth Medium (cy)	441,408	622.0	$ 159,995	$ 21,979	included	$ 181,974
D9 Rate(cy/hr)	710					
[5]Soil Analyses (#)	123.48		included	included	$ 14,422	$ 14,422
Rate (ac / sample)	5					
[6]Rip & Fertilize (ac)	617	361.2	$ 18,923	$ 12,762	$ 109,402	$ 141,088
D4 Rate (ac/hr)	1.7					
[7]Seed & Harrow (ac)	617	264.5	$ 14,931	$ 9,345	$ 35,774	$ 60,049
D4 Rate (ac/hr)	2.3					
[9]Hydro-Mulching (ac)	617	1,029.0	$ 56,598	$ 27,895	$ 324,706	$ 409,199
Rate (ac/hr)	0.60					
[10]Plant Trees (ac)	115.0	171.6	N/A	$ 5,553	$ 105,876	$ 111,429
Rate (ac/hr)	0.67					
Total Work Hours =		30,288.9				
[11]Supervisor	(work hrs/4)	7,572.2	$ 127,802	$ 437,689	included	$ 565,491
Total Miscellaneous Costs for Seeding, Trees, and Supervision			**$ 378,249**	**$ 515,223**	**$ 590,180**	**$ 1,483,652**

Footnotes for summary cost table:

[1]Assumes heavy grading will be done with conventional D10 or D11dozers with U blades where the push distances are practical
[2]Assumes light grading will be done with a D9 dozer on the backfilled areas in Wildhorse Extension area (rate = 2 hrs/acre)
[3]Growth Medium Replacement fleet will consist of three 623 Scrapers
[4]Growth Medium will be spread using a D-9 dozer to a depth of 6 inches
[5]Soil analyses will be run on samples of the reclaimed areas to determine optimum fertilizer rates
[6]Ripping and fertilizing will be conducted on the replaced growth medium using a conventional D4 dozer with a cyclone spreader
[7]Seeding and harrowing will be conducted on all replaced growth medium that is traversible with conventional equipment
[9]Mulching will be conducted using conventional hydro-seeder/hydro-mulcher
[10]Trees and shrubs will be planted on north and east-facing slopes
[11]Supervisor costs are figured at 25 percent of the total work hours to accomplish the reclamation effort

Growth Media Source and Deployment Distribution (Note: This Table can be used to assess and compare performance of 777 Trucks, Scrapers, or Articulated Trucks)

		AG1	AG2	AG3	AG4	Crusher	No Growth Media	Total
Elev at Dump Pt. Centroid		9670	10033	10086	10300	10000		
Sub-Unit Area (Acres)		75.6	146.7	97.9	227	70.2	38.7	656.1
Sub-Unit Volume (Cubic Yards)		60,984	118,338	78,973	183,113	56,628		529,254
Source Distribution		Sub-unit Area/Source (Acres)						
Source 1	GM13	75.6						75.6
Source 2	GM19		146.7	97.9	227			471.6
Source 3	GM30					22.9		22.9
Source 4	GM32					27.3		27.3
Source 5	GM33					8.7		8.7
Source 6	GM27					11.3		11.3

Amendment No. 11 - Squaw Gulch VLF Chemical Closure Costs
2015 Calculation of the SGVLF Rinsing and Chemical Closure Cost Estimate

Closure criteria

			Check		
The Total In-place volume of SGVLF comparing PMT and current terrain is:	154,366,302	cubic yards	220,000,000	Tons	
			152,291,262	cy	1.3%
At an average porosity of 32% the pore volume is -	49,397,217	cubic yards			
Total volume for one pore volume in gallons =	9,977,595,597	gallons			
Time to complete one rinse at 28,000 gpm =	247	Days			
The Costs include One Rinse with peroxide and Two Water Rinses	8.2	Months			

Detail for calculating First and Second Rinse Costs

Volume Impounded = 0
Total Design Volume - 154,366,302
Percent Impounded 0%

Associated cost items

						Equipmt	Labor	Materials	Total
8.2	48000		$395,936	Purchase make up water (assume 900 avg gpm for 8.2 months)@$48,000/month			$395,936	$ 395,936
9	247	300	$668,143	Nine operator shifts /24 hours X 247 daysX$300 per shift		$668,143		$ 668,143
2	247	320	$158,375	Two mechanics shifts/24 hours X 247 days X $320 pr shift		$158,375		$ 158,375
8.2	403656		$3,329,627	Pumping costs (power) current costs $403656/mo X 8.2 months			$3,329,627	$ 3,329,627
8.2	15000		$123,730	Pump maintenance and replacement per 15.2 months ($15,000/mo)	$123,730			$ 123,730
8.2	750		$6,187	Backup generator maintenance per 8.2 months ($750/mo)	$6,187			$ 6,187
3	600	8.2	$14,848	3 Support vehicles X $600/mo X 8.2 months	$14,848			$ 14,848
0.68	240000		$162,714	Drip irrigation supplies cost $240,000/yr X .67 yrs.			$162,714	$ 162,714
			$4,859,558	Estimate per each pore volume rinse				$ -
				Subtotals =	$ 144,764	$ 826,517	$ 3,888,276	$ 4,859,558
			$9,719,116	**Estimate for two pore volume rinses**	**Two Pore Volumes =**	**$ 289,528**	**$ 1,653,034**	**$ 7,776,553**	**$ 9,719,116**
					Check =	$ 9,719,116			
					One Pore Volume =	**$ 144,764**	**$ 826,517**	**$ 3,888,276**	**$ 4,859,558**
					Check =	$ 4,859,558			

Third Rinse and Peroxide Treatment

Flow rate starts at 28,000 gpm and ends at 0 gpm, no fresh water makeup, H_2O_2 additions during initial phase, followed by
H2O2 additions during initial phase, followed by straight evaporation last 15 months, spray irrigation practices employed

16.5
Time to complete rinse and treatments (18,420,000,000 gallons / 14,000 gpm average flow = 914 days say 16.5 months

Since the water rinsing will be conducted as part of normal operations in the period 2033 through 2035, for annual cost calculations the water rinsing costs are not included and the Annual costs only include Peroxide Treatment. The Life of Mine costs do in clude both rinsing and Peroxide Treatment

Associated Cost Items

18,420,000,000

Revised by MDE (11-4-14)

						Equipmt	Labor	Materials	Total
9.0	247	$ 300.00	$ 668,143	Nine operators shifts / 24 hours X 247 days X $300 per shift (during peroxide additions)		$668,143		$ 668,143
6.0	247	$ 320.00	$ 474,240	Six mechanic shifts / 24 hours X 247 days X $320 per shift (during peroxide additions)		$474,240		$ 474,240
3.0	247	$ 300.00	$ 222,300	Three operator shifts/ 24 hours X 247 days X $300 per shift (during biological treatments)		$222,300		$ 222,300
1.0	247	$ 320.00	$ 79,040	One mechanic shift /24 hours X 247 days X $320 per shift (during biological treatments)		$79,040		$ 79,040
16.5	202000		$ 3,333,000	Pumping costs (power) 14,000 average gpm @ $202,000/month for 16.5 months			$3,333,000	$ 3,333,000
16.5	15000		$ 247,500	Pump maintenance and replacement for 16.5 months ($15,000/mo)	$247,500			$ 247,500
16.5	750		$ 12,375	Backup generator maintenance for 16.5 months ($750/mo)	$12,375			$ 12,375
			$ 600,000	Spray irrigation system maintenance and parts (lump sum from GWG)			$600,000	$ 600,000
362,000	$ 3.26		$ 1,180,120	H_2O_2 costs $6.50 per gal X 362,000 gallons			$1,180,120	$ 1,180,120
	Per A Iverson 8-13-2015 for 31% Solution				$ 259,875	$ 1,443,723	$ 5,113,120	$ 6,816,718
			$ 6,816,718	**Estimate for H2O2 pore volume rinse over 16.5 months**			Escalate 2011 to 2015	05%
					2015Cost ▶	$273,497	$ 1,519,401	$ 5,381,143	**$ 7,174,041**

			Equipmt	**Labor**	**Materials**	**Total**
$16,535,833	**Estimate for Total SGVLF Detoxification and Rinsing**		**$ 549,403**	**$ 3,096,757**	**$ 12,889,673**	**$ 16,535,833**

Amendment No. 11 - SGVLF-Squaw Gulch - Mass Earthwork, Growth Media Placement, and Reclamation

Reclamation Units Input Table

Reclamation Units (Growth Media, Seeding, Fencing and Trees				Regrading Units including Leveling Dump-piles and Mass Hauling			
Area	Values Remaining after 12/31 of Calendar Year	LOM Values	Units			End-of-Mine Quantities from Amendment 11	
Total Area (SF and Acres)	15,728,074	**365.0**	Acres	Total Volume of Cut -		19,418,776	Cu yd
Deduct Mill Platform Area & No GM Area	57	**85**	Acres	Total Volume of Fill-		23,710,025	Cu yd
Net Area of Life-of-Mine to be reseed	**Life-of-Mine Area --->**	**279.5**	Acres	Area requiring Mass Haul		140	Acres
Area Already Reseeded as of 12/31 of this calendar year	Enter Value at Right, in Acres	0	Acres	Area requiring Pile-leveling and Grading (Total minus area of Mass Haul)		280	Acres
Net Area to be reclaimed		279.5	Acres	Volume of Pile Leveling and Grading		2,254,702	Cu yd
Remaining and LOM Total Area of Tree Planting		85	Acres	Volume of Mass Dozing (minimum of Cut/Fill for each Unit)			Cu Yd
Remaining and LOM Total Fencing Length above Mine Area		0	Feet	Total Volume that must be Dozed (not including Light Grading)		2,254,702	Cu Yd
Acreage to receive fertilizing and ripping simultaneously with a D4 dozer? (Enter if different from default)		279.5	acres	Average Push Distance for Dozer Leveling (100 ft used for Pile Leveling)		100	Ft
Acreage to receive seeding & harrowing simultaneousy with a D4 dozer? (Enter if different from default)		279.5	acres	Volume that must be Hauled (cut/fill imbalance)		**19,309,699**	Cy Yd
Light Grading Area (enter if > zero)		0	Acres	Weighted HD Mass Excavation		**2,000**	ft

Cost Summary - Details are listed below

Life-of-Mine Cost (Amendment 11)							
Item	**Equipment**	Quantity	Eqmt Cost	Labor Cost	Material Cost	Total Cost	**Unit Cost**
Heavy Dozing to Level Piles and Balanced Cut/fill	D10	2,254,702	$ 406,048	$ 42,079		**$ 448,127**	$ 0.20
Mass Haul to Balance Cut/Fill	CAT777	19,309,699	$ 33,528,651	$ 2,465,382		**$ 35,994,033**	$ 1.86
SubTotal ReGrading and Contouring		21,564,401	$ 33,934,699	$ 2,507,461		$ 36,442,160	
Growth Media Distribution from Stockpiles	CAT777	294,433	$ 462,252	$ 33,990		$ 496,242	$ 1.69
Fence and Pipe Removal; Load Out Bin Extension				$ 409,193		$ 409,193	
Total Seeding, Fine Grading, Trees, and Supervision			$ 162,069	$ 118,106	$ 297,511	$ 577,687	
Grand Total for Management Unit			**$ 34,559,020**	**$ 3,068,749**	**$ 297,511**	**$ 37,925,281**	

Cost Development for Regrading - Includes Pile Leveling, Dozer Cut/Fill Balanced, and Haulage from Neighboring Units

Dozer Productivity Calculation for Heavy Grading — **Life of Mine Amendment 11**

	Comment	Quantity
What is the volume cut/fill Dozed and leving piles	**Cut/Fill Balanced Volumes plus leveling piles**	2,254,702
What is the expected average push distance for leveling piles?	**Short Doze to level out end-dumped truck loads**	100
What is the overall Job Correction Factor for D10 Dozing?	Dozer Productivity Tab	1.08
What is unadjusted production based on push distance for a D10?	**cu yds/hr from Regression Equation Developed from**	**1,760**
Calculated adjusted production based on job factors =	cu yds/hr calculated	1893.4
Calculated D10 Dozer hours in grading =	hours	**1190.85**

LEGEND: Maunal Entry; Life-of-mine

Estimated Unit Cost for D10 Dozer	Eqmt Cost	Labor Cost	Total Cost	UnitCost($/cy)
	$ 406,048	$ 42,079	$ 448,127	**$ 0.20**

	Comment	Quantity
What is the overall Job Correction Factor for D11 Dozing?	Dozer Productivity Tab	1.08
What is unadjusted production based on push distance for a D11?	**cu yds/hr from Regression Equation Developed from**	**2,728**
Calculated adjusted production based on job factors =	cu yds/hr calculated	2934.1
Calculated D11 Dozer hours in grading =	hours	**768.45**

Estimated Unit Cost for D11 Dozer	Eqmt Cost	Labor Cost	Total Cost	UnitCost($/cy)
	$ 499,467	$ 27,154	$ 526,621	**$ 0.23**

Mass Haul of Material Between Units to Achieve Earthwork Balance

Additional Volume that will be truck hauled	19,309,699	cy
What is the weighted average Haul Distance for the truck haul?	2,000	Feet
What is the Estimated Total Resistance Loaded (Grade Plus 5%)?	10%	Grade+RR
What is the Total Resistance Empty Return (Grade plus 5%)	5%	Grade+RR

CAT 777 Trucks

What is loaded travel time based on haul distance & rolling resistance (min)?	2.8	Minutes
What is empty travel time based on haul distance & rolling resistance (min)?	1.2	Minutes
What is the Fixed Time for CAT777 Trucks?	4.7	Minutes
Total Trip Time for CAT777 Trucks	8.7	Minutes
Calculated Productivity of Loader/Truck Combination (cu yd/hr)	402	cy/hr

		Hours	Eqmt Cost	Labor Cost	Total Cost
777 Truck (cy/hr)		47,997	$ 22,010,587	$ 1,301,158	$ 23,311,745
992 Loader (cy/hr)		11,999	$ 7,561,273	$ 424,002	$ 7,985,275
14 H Grader	Fleet hrs=#Trucks per loader	11,999	$ 1,611,562	$ 421,255	$ 2,032,817
5K gal H_20 Truck	Fleet hrs=#Trucks per loader	11,999	$ 2,345,229	$ 318,966	$ 2,664,196
Total Fleet Cost and Unit Cost			$ 33,528,651	$ 2,465,382	$ 35,994,033
				$ 1.86	**per CY**

Articulated Trucks

What is loaded travel time based on haul distance & rolling resistance (min)?	2.9	Minutes
What is empty travel time based on haul distance & rolling resistance (min)?	0.8	Minutes
What is the Fixed Time for Articulated Trucks?	4.8	Minutes
Total Trip Time for Articulated Trucks	8.5	Minutes
Calculated Productivity of Loader/Truck Combination (cu yd/hr)	181	cy/hr

		Hours	Eqmt Cost	Labor Cost	Total Cost
Articulated Truck (cy/hr)	399,362	106,640	$ 18,993,291	$ 2,890,912	$ 21,884,203
988 Loader	399,362	26,660	$ 6,498,333	$ 942,048	$ 7,440,381
14 H Grader	Fleet hrs=#Trucks per loader	26,660	$ 3,580,568	$ 935,944	$ 4,516,511
5K gal H_20 Truck	Fleet hrs=#Trucks per loader	26,660	$ 5,210,629	$ 708,679	$ 5,919,308
Total Fleet Cost and Unit Cost			$ 34,282,820	$ 5,477,583	$ 39,760,403
				$ 2.06	**per CY**

Summary of Growth Media Haulage Costs for LOM

Growth Media Distribution Area

Growth Media Equipment	CAT 777 Haul Trucks Volume (cy)	Work Hours	Total GM Req'd. 294,433 Eqmt Cost	Labor Cost	Total Cost		
SGVLF1	100,027	250	$ 114,718	$ 6,782	$ 121,499		
SGVLF2	102,205	114	$ 52,499	$ 3,103	$ 55,602		
SGVLF3	69,212	297	$ 136,239	$ 8,054	$ 144,292		
0	0	-	$ -	$ -	$ -		
Crusher	0	-	$ -	$ -	$ -		
CAT 992 Loader	Truck Hours/(Trucks per Loader)	165.43	$ 104,246	$ 5,846	$ 110,091	$ 431,485	**1.47**
14 H Grader	Fleet hrs/4	165.43	$ 22,218	$ 5,808	$ 28,026		
5K gal H_20 Truck	Fleet hrs/4	165.43	$ 32,333	$ 4,398	$ 36,731		
Total Cost			**$ 462,252**	**$ 33,990**	**$ 496,242**		
Cost per CY					**$ 1.69**		

Growth Media Distribution Area

Growth Media Equipment	CAT 740 Articulated Trucks Volume (cy)	Work Hours	Total GM Req'd. 294,433 Eqmt Cost	Labor Cost	Total Cost
SGVLF1	100,027	597	$ 106,318	$ 16,182	$ 122,500
SGVLF2	102,205	288	$ 51,217	$ 7,796	$ 59,013
SGVLF3	69,212	711	$ 126,705	$ 19,285	$ 145,991
0	0	-	$ -	$ -	$ -
	0	-	$ -	$ -	$ -
CAT 988 Loader	Truck Hours/(Trucks per Loader)	398.97	$ 97,249	$ 14,098	$ 111,347
14 H Grader	Fleet hrs/4	398.97	$ 53,584	$ 14,007	$ 67,591
5K gal H20 Truck	Fleet hrs/4	398.97	$ 77,979	$ 10,606	$ 88,584
Total Cost			**$ 513,052**	**$ 81,974**	**$ 595,026**
Cost per CY					**$ 2.02**

LEGEND	
	Maunal Entry
	Life-of-mine

Growth Media Distribution Area

Growth Media Equipment	Cat 623 Scrapers Volume (cy)	Work Hours	Total GM Req'd. 294,433 Eqmt Cost	Labor Cost	Total Cost
SGVLF1	100,027	542	$ 126,407	$ 18,770	$ 145,177
SGVLF2	102,205	248	$ 57,922	$ 8,600	$ 66,522
SGVLF3	69,212	744	$ 173,716	$ 25,794	$ 199,510
0	0	-	$ -	$ -	$ -
	0	-	$ -	$ -	$ -
14 H Grader	Fleet hrs/4	383.60	$ 51,519	$ 13,467	$ 64,985
5K gal H20 Truck	Fleet hrs/4	383.60	$ 74,973	$ 10,197	$ 85,169
Total Cost			**$ 484,536**	**$ 76,828**	**$ 561,364**
Cost per CY					**$ 1.91**

Removal Item	**Length (Feet)**	**Unit Cost**		
Technical Revision 59		Additional Cost for Load Out Bin Extension (Lump Sum)	$ 17,207	
$ Breakdown for Technical Revision 59 Load-out Bin Ext				
Fence Removal (lin ft)	8,835	(Using a unit cost per foot from Means 2014, p. 33)	$ 26,328	2.98 $/ft
Pipe Removal (30" dia)	4,082	(Using a unit cost per foot from Means 2014, p. 31)	$ 126,529	31.00 $/ft
Pipe Removal (24" dia)	12,422		$ 239,128	19.25 $/ft
Subtotal Fence and Pipe Removal			$ 409,193	

	Units (cy or ac) or Rate per hour	Work Hours	Equipment	Labor	Materials	Total
[4]Spread Growth Medium (cy)	271,443	382.5	$ 98,388	$ 13,516	included	$ 111,904
D9 Rate(cy/hr)	710					
[5]Soil Analyses (#)	55.90		included	included	$ 6,529	$ 6,529
Rate (ac / sample)	5					
[6]Rip & Fertilize (ac)	280	163.5	$ 8,567	$ 5,778	$ 49,529	$ 63,874
D4 Rate (ac/hr)	1.7					
[7]Seed & Harrow (ac)	280	119.7	$ 6,759	$ 4,230	$ 16,196	$ 27,186
D4 Rate (ac/hr)	2.3					
[9]Hydro-Mulching (ac)	280	465.8	$ 25,623	$ 12,629	$ 147,001	$ 185,253
Rate (ac/hr)	0.60					
[10]Plant Trees (ac)	85.0	126.9	N/A	$ 4,105	$ 78,256	$ 82,361
Rate (ac/hr)	0.67					
Total Work Hours =		5,387.3				
[11]Supervisor	(work hrs/4)	1,346.8	$ 22,731	$ 77,849	included	$ 100,580
Total Miscellaneous Costs for Seeding, Trees, and Supervision			**$ 162,069**	**$ 118,106**	**$ 297,511**	**$ 577,687**

Footnotes for summary cost table:

[1]Assumes heavy grading will be done with conventional D10 or D11dozers with U blades where the push distances are practical

[2]Assumes light grading will be done with a D9 dozer on the backfilled areas in Wildhorse Extension area (rate = 2 hrs/acre)

[3]Growth Medium Replacement fleet will consist of three 623 Scrapers

[4]Growth Medium will be spread using a D-9 dozer to a depth of 6 inches

[5]Soil analyses will be run on samples of the reclaimed areas to determine optimum fertilizer rates

[6]Ripping and fertilizing will be conducted on the replaced growth medium using a conventional D4 dozer with a cyclone spreader

[7]Seeding and harrowing will be conducted on all replaced growth medium that is traversible with conventional equipment

[9]Mulching will be conducted using conventional hydro-seeder/hydro-mulcher

[10]Trees and shrubs will be planted on north and east-facing slopes

[11]Supervisor costs are figured at 25 percent of the total work hours to accomplish the reclamation effort

Growth Media Source and Deployment Distribution (Note: This Table can be used to assess and compare performance of 777 Trucks, Scrapers, or Articulated Trucks)

		SGVLF1	SGVLF2	SGVLF3			No Growth Media	Total
Elev at Dump Pt. Centroid		10070	10130	10370	10000	10000		
Sub-Unit Area (Acres)		124	126.7	85.8			28.5	365
Sub-Unit Volume (Cubic Yards)		100,027	102,205	69,212	0	0		294,433
Source Distribution		Sub-unit Area/Source (Acres)						
Source 1	GM34	124		85.8				209.8
Source 2	GM27		69.7					69.7
Source 3								0
Source 4								0
Source 5								0
Source 6								0

Amendment No. 11 - Ajax Area and Former Pads 3 and 4 - Growth Media Placement and Reclamation

Reclamation Units Input Table

Reclamation Units (Growth Media, Seeding, Fencing and Trees				Regrading Units including Leveling Dump-piles and Mass Hauling			
Area	Values Remaining after 12/31 of Calendar Year	LOM Values	Units			End-of-Mine Quantities from Amendment 11	
Total Area (SF and Acres)	957,753	**22.0**	Acres	Total Volume of Cut -		5,033	Cu yd
Area not reseeded or treated with GM	0	**0**	Acres	Total Volume of Fill-		0	Cu yd
Net Area of Life-of-Mine to be reseed	**Life-of-Mine Area --->**	**22.0**	Acres	Area requiring Mass Haul		0	Acres
Area Already Reseeded as of 12/31 of this calendar year	Enter Value at Right, in Acres	0	Acres	Area requiring Pile-leveling and Grading (Total minus area		0	Acres
Net Area to be reclaimed		22.0	Acres	Volume of Pile Leveling and Grading		177,362	Cu yd
Remaining and LOM Total Area of Tree Planting			Acres	Volume of Mass Dozing (minimum of Cut/Fill for each			Cu Yd
Remaining and LOM Total Fencing Length above Mine Area		0	Feet	Total Volume that must be Dozed (not including Light Grading)		177,362	Cu Yd
Acreage to receive fertilizing and ripping simultaneously with a D4 dozer? (Enter if different from default)		22.0	acres	Average Push Distance for Dozer Leveling (100 ft used for Pile Leveling)		100	Ft
Acreage to receive seeding & harrowing simultaneousy with a D4 dozer? (Enter if different from default)		22.0	acres	Volume that must be Hauled (cut/fill imbalance)		**0**	Cy Yd
Light Grading Area (enter if > zero)		22	Acres	Weighted HD Mass Excavation		**0**	ft

Cost Summary - Details are listed below

Item	Equipment	Quantity	Life-of-Mine Cost (Amendment 11) Eqmt Cost	Labor Cost	Material Cost	Total Cost	Unit Cost
Heavy Dozing to Level Piles and Balanced Cut/fill	D10	177,362	$ 31,941	$ 3,310		**$ 35,251**	$ 0.20
Mass Haul to Balance Cut/Fill	CAT777	0	$ 0	$ 0		**$ 0**	$ 1.00
SubTotal ReGrading and Contouring		177,362	$ 31,941	$ 3,310		$ 35,251	
Growth Media Distribution from Stockpiles	CAT623	17,747	$ 9,039	$ 1,433		$ 10,472	$ 0.59
Total Seeding, Fine Grading, Trees, and Supervision			$ 12,577	$ 6,785	$ 17,247	$ 36,609	
Grand Total for Management Unit			**$ 53,556**	**$ 11,528**	**$ 17,247**	**$ 82,332**	

Amendment No. 11 - Ajax Area and Former Pads 3 and 4 - Growth Media Placement and Reclamation

Cost Development for Regrading - Includes Pile Leveling, Dozer Cut/Fill Balanced, and Haulage from Neighboring Units

Dozer Productivity Calculation for Heavy Grading

	Comment	Life of Mine Amendment 11 Quantity
What is the volume cut/fill Dozed and leving piles	**Cut/Fill Balanced Volumes plus leveling piles**	177,362
What is the expected average push distance for leveling piles?	**Short Doze to level out end-dumped truck loads**	100
What is the overall Job Correction Factor for D10 Dozing?	Dozer Productivity Tab	1.08
What is unadjusted production based on push distance for a D10?	**cu yds/hr from Regression Equation Developed**	**1,760**
Calculated adjusted production based on job factors =	cu yds/hr calculated	1893.4
Calculated D10 Dozer hours in grading =	hours	**93.68**

LEGEND: Maunal Entry; Life-of-mine

Estimated Unit Cost for D10 Dozer	Eqmt Cost	Labor Cost	Total Cost	UnitCost($/cy)
	$ 31,941	$ 3,310	$ 35,251	**$ 0.20**

	Comment	Quantity
What is the overall Job Correction Factor for D11 Dozing?	Dozer Productivity Tab	1.08
What is unadjusted production based on push distance for a D11?	**cu yds/hr from Regression Equation Developed**	**2,728**
Calculated adjusted production based on job factors =	cu yds/hr calculated	2934.1
Calculated D11 Dozer hours in grading =	hours	**60.45**

Estimated Unit Cost for D11 Dozer	Eqmt Cost	Labor Cost	Total Cost	UnitCost($/cy)
	$ 39,290	$ 2,136	$ 41,426	**$ 0.23**

Mass Haul of Material Between Units to Achieve Earthwork Balance

Additional Volume that will be truck hauled	0	cy
What is the weighted average Haul Distance for the truck haul?	0	Feet
What is the Estimated Total Resistance Loaded (Grade Plus 5%)?	10%	Grade+RR
What is the Total Resistance Empty Return (Grade plus 5%)	5%	Grade+RR

CAT 777 Trucks

What is loaded travel time based on haul distance & rolling resistance	0.0	Minutes
What is empty travel time based on haul distance & rolling resistance	0.0	Minutes
What is the Fixed Time for CAT777 Trucks?	4.7	Minutes
Total Trip Time for CAT777 Trucks	4.7	Minutes
Calculated Productivity of Loader/Truck Combination (cu yd/hr)	749	cy/hr

		Hours	Eqmt Cost	Labor Cost	Total Cost
777 Truck (cy/hr)		0	$ 0	$ 0	$ 0
992 Loader (cy/hr)		0	$ 0	$ 0	$ 0
14 H Grader	Fleet hrs=#Trucks per loader	0	$ 0	$ 0	$ 0
5K gal H_20 Truck	Fleet hrs=#Trucks per loader	0	$ 0	$ 0	$ 0
Total Fleet Cost and Unit Cost			$ 0	$ 0	$ 0
				$ 1.00	**per CY**

Articulated Trucks

What is loaded travel time based on haul distance & rolling resistance	0.0	Minutes
What is empty travel time based on haul distance & rolling resistance	0.0	Minutes
What is the Fixed Time for Articulated Trucks?	4.8	Minutes
Total Trip Time for Articulated Trucks	4.8	Minutes
Calculated Productivity of Loader/Truck Combination (cu yd/hr)	321	cy/hr

		Hours	Eqmt Cost	Labor Cost	Total Cost
Articulated Truck (cy/hr)	1	0	$ 0	$ 0	$ 0
988 Loader	1	0	$ 0	$ 0	$ 0
14 H Grader	Fleet hrs=#Trucks per loader	0	$ 0	$ 0	$ 0
5K gal H_20 Truck	Fleet hrs=#Trucks per loader	0	$ 0	$ 0	$ 0
Total Fleet Cost and Unit Cost			$ 0	$ 0	$ 0
				$ 1.16	**per CY**

Amendment No. 11 - Ajax Area and Former Pads 3 and 4 - Growth Media Placement and Reclamation

Summary of Growth Media Haulage Costs for LOM

LEGEND	
	Maunal Entry
	Life-of-mine

Growth Media Distribution Area

Growth Media Equipment	CAT 777 Haul Trucks Volume (cy)	Work Hours	Total GM Req'd. 17,747 Eqmt Cost	Labor Cost	Total Cost
AJAX1	17,747	22	$ 10,110	$ 598	$ 10,707
0	-	-	$ -	$ -	$ -
0	0	-	$ -	$ -	$ -
0	0	-	$ -	$ -	$ -
CAT 992 Loader	uck Hours/(Trucks per Load	5.51	$ 3,473	$ 195	$ 3,668
14 H Grader	Fleet hrs/4	5.51	$ 740	$ 193	$ 934
5K gal H_20 Truck	Fleet hrs/4	5.51	$ 1,077	$ 147	$ 1,224
Total Cost			**$ 15,400**	**$ 1,132**	**$ 16,532**
Cost per CY					**$ 0.93**

Growth Media Distribution Area

Growth Media Equipment	CAT 740 Articulated Trucks Volume (cy)	Work Hours	Total GM Req'd. 17,747 Eqmt Cost	Labor Cost	Total Cost
AJAX1	17,747	52	$ 9,291	$ 1,414	$ 10,706
0	-	-	$ -	$ -	$ -
0	0	-	$ -	$ -	$ -
0	0	-	$ -	$ -	$ -
CAT 988 Loader	uck Hours/(Trucks per Load	13.04	$ 3,179	$ 461	$ 3,640
14 H Grader	Fleet hrs/4	13.04	$ 1,752	$ 458	$ 2,209
5K gal H20 Truck	Fleet hrs/4	13.04	$ 2,549	$ 347	$ 2,896
Total Cost			**$ 16,771**	**$ 2,680**	**$ 19,451**
Cost per CY					**$ 1.10**

Growth Media Distribution Area

Growth Media Equipment	Cat 623 Scrapers Volume (cy)	Work Hours	Total GM Req'd. 17,747 Eqmt Cost	Labor Cost	Total Cost
AJAX1	17,747	29	$ 6,679	$ 992	$ 7,671
0	-	-	$ -	$ -	$ -
0	0	-	$ -	$ -	$ -
0	0	-	$ -	$ -	$ -
14 H Grader	Fleet hrs/4	7.16	$ 961	$ 251	$ 1,212
5K gal H20 Truck	Fleet hrs/4	7.16	$ 1,399	$ 190	$ 1,589
Total Cost			**$ 9,039**	**$ 1,433**	**$ 10,472**
Cost per CY					**$ 0.59**

	Units (cy or ac) or Rate per hc	Work Hours	Equipment	Labor	Materials	Total	
[2]Light Grading/Shaping D9 (ac)	22	44	$ 2,173	$ 1,554	included	$ 3,727	2 hrs/ac
[4]Spread Growth Medium (cy)	17,747	25.0	$ 6,433	$ 884	included	$ 7,316	
D9 Rate(cy/hr)	710						
[5]Soil Analyses (#)	4.40		included	included	$ 514	$ 514	
Rate (ac / sample)	5						
[6]Rip & Fertilize (ac)	22	12.9	$ 674	$ 454	$ 3,896	$ 5,025	
D4 Rate (ac/hr)	1.7						
[7]Seed & Harrow (ac)	22	9.4	$ 532	$ 333	$ 1,274	$ 2,138	
D4 Rate (ac/hr)	2.3						
[9]Hydro-Mulching (ac)	22	36.6	$ 2,016	$ 993	$ 11,564	$ 14,573	
Rate (ac/hr)	0.60						
[10]Plant Trees (ac)	-	-	N/A	$ -	$ -	$ -	
Rate (ac/hr)	0.67						
Total Work Hours =		177.6					
[11]Supervisor	(work hrs/4)	44.4	$ 749	$ 2,567	included	$ 3,316	
Total Miscellaneous Costs for Seeding, Trees, and Supervision			**$ 12,577**	**$ 6,785**	**$ 17,247**	**$ 36,609**	

Footnotes for summary cost table:

[1]Assumes heavy grading will be done with conventional D10 or D11dozers with U blades where the push distances are practica

[2]Assumes light grading will be done with a D9 dozer on the backfilled areas in Wildhorse Extension area (rate = 2 hrs/acre)

[3]Growth Medium Replacement fleet will consist of three 623 Scrapers

[4]Growth Medium will be spread using a D-9 dozer to a depth of 6 inches

[5]Soil analyses will be run on samples of the reclaimed areas to determine optimum fertilizer rates

[6]Ripping and fertilizing will be conducted on the replaced growth medium using a conventional D4 dozer with a cyclone spreade

[7]Seeding and harrowing will be conducted on all replaced growth medium that is traversible with conventional equipment

[9]Mulching will be conducted using conventional hydro-seeder/hydro-mulcher

[10]Trees and shrubs will be planted on north and east-facing slopes

[11]Supervisor costs are figured at 25 percent of the total work hours to accomplish the reclamation effort

Amendment No. 11 - Ajax Area and Former Pads 3 and 4 - Growth Media Placement and Reclamation

Growth Media Source and Deployment Distribution (Note: This Table can be used to assess and compare performance of 777 Trucks, Scrapers, or Articulated Trucks)

		AJAX1					No Growth Media	Total
Elev at Dump Pt. Centroid		10175	10000	10000	10000	10000		
Sub-Unit Area (Acres)		22	0	0				22
Sub-Unit Volume (Cubic Yards)		17,747	0	0	0	0		17,747
Source Distribution		Sub-unit Area/Source (Acres)						
Source 1	GM30	22						22
Source 2	GM6-7		0					0
Source 3								0
Source 4								0
Source 5								0
Source 6								0

Amendment No. 11 - Victor and Ironclad Area - Reclamation

Reclamation Units Input Table

Reclamation Units (Growth Media, Seeding, Fencing and Trees				Regrading Units including Leveling Dump-piles and Mass Hauling			
Area	Values Remaining after 12/31 of Calendar Year	LOM Values	Units			End-of-Mine Quantities from Amendment 11	
Total Area (SF and Acres)	1,699,088	**39.0**	Acres	Total Volume of Cut -		14,865	Cu yd
Area not reseeded or treated with GM	0	**8**	Acres	Total Volume of Fill-		955	Cu yd
Net Area of Life-of-Mine to be reseed	**Life-of-Mine Area --->**	**30.9**	Acres	Area requiring Mass Haul		0	Acres
Area Already Reseeded as of 12/31 of this calendar year	Enter Value at Right, in Acres	0	Acres	Area requiring Pile-leveling and Grading (Total minus area of Mass Haul)		39	Acres
Net Area to be reclaimed		30.9	Acres	Volume of Pile Leveling and Grading		249,306	Cu yd
Remaining and LOM Total Area of Tree Planting		**41.9**	Acres	Volume of Mass Dozing			Cu Yd
Remaining and LOM Total Fencing Length above Mine		1300	Feet	Total Volume that must be		249,306	Cu Yd
Acreage to receive fertilizing and ripping simultaneously with a D4 dozer? (Enter if different from default)		30.9	acres	Average Push Distance for Dozer Leveling (100 ft used for Pile Leveling)		100	Ft
Acreage to receive seeding & harrowing simultaneousy with a D4 dozer? (Enter if different from default)		30.9	acres	Volume that must be Hauled (cut/fill imbalance)		**0**	Cy Yd
Light Grading Area (enter if > zero)		0	Acres	Weighted HD Mass Excavation		**2,400**	ft

Cost Summary - Details are listed below

Item	Equipment	Quantity	Life-of-Mine Cost (Amendment 11) Eqmt Cost	Labor Cost	Material Cost	Total Cost	Unit Cost
Heavy Dozing to Level Piles and Balanced Cut/fill	D10	249,306	$ 44,897	$ 4,653		**$ 49,550**	$ 0.20
Mass Haul to Balance Cut/Fill	CAT777	0	$ 0	$ 0		**$ 0**	$ 2.04
SubTotal ReGrading and Contouring		249,306	$ 44,897	$ 4,653		$ 49,550	
Growth Media Distribution from Stockpiles	CAT623	31,460	$ 58,575	$ 9,288		$ 67,863	$ 2.16
Total Seeding, Fine Grading, Trees, and Supervision			$ 15,799	$ 13,426	$ 62,819	$ 92,044	
Grand Total for Management Unit			**$ 119,272**	**$ 27,367**	**$ 62,819**	**$ 209,458**	

Amendment No. 11 - Victor and Ironclad Area - Reclamation

Cost Development for Regrading - Includes Pile Leveling, Dozer Cut/Fill Balanced, and Haulage from Neighboring Units

Dozer Productivity Calculation for Heavy Grading

Life of Mine Amendment 11

		Comment	Quantity
What is the volume cut/fill Dozed and leving piles		**Cut/Fill Balanced Volumes plus leveling piles**	249,306
What is the expected average push distance for leveling piles?		**Short Doze to level out end-dumped truck**	100
What is the overall Job Correction Factor for D10 Dozing?		Dozer Productivity Tab	1.08
What is unadjusted production based on push distance for a D10?		**cu yds/hr from Regression Equation Developed from Cat Handbook Version 39**	**1,760**
Calculated adjusted production based on job factors =		cu yds/hr calculated	1893.4
Calculated D10 Dozer hours in grading =		hours	**131.67**

LEGEND: Maunal Entry; Life-of-mine

Estimated Unit Cost for D10 Dozer	Eqmt Cost	Labor Cost	Total Cost	UnitCost($/cy)
	$ 44,897	$ 4,653	$ 49,550	**$ 0.20**

What is the overall Job Correction Factor for D11 Dozing?	Dozer Productivity Tab	1.08	
What is unadjusted production based on push distance for a D11?	**cu yds/hr from Regression Equation Developed**	**2,728**	
Calculated adjusted production based on job factors =	cu yds/hr calculated	2934.1	
Calculated D11 Dozer hours in grading =	hours	**84.97**	

Estimated Unit Cost for D11 Dozer	Eqmt Cost	Labor Cost	Total Cost	UnitCost($/cy)
	$ 55,227	$ 3,002	$ 58,229	**$ 0.23**

Mass Haul of Material Between Units to Achieve Earthwork Balance

Additional Volume that will be truck hauled		0	cy
What is the weighted average Haul Distance for the truck haul?		2,400	Feet
What is the Estimated Total Resistance Loaded (Grade Plus 5%)?		10%	Grade+RR
What is the Total Resistance Empty Return (Grade plus 5%)		5%	Grade+RR

CAT 777 Trucks

What is loaded travel time based on haul distance & rolling resistance (min)?		3.4	Minutes
What is empty travel time based on haul distance & rolling resistance (min)?		1.5	Minutes
What is the Fixed Time for CAT777 Trucks?		4.7	Minutes
Total Trip Time for CAT777 Trucks		9.6	Minutes
Calculated Productivity of Loader/Truck Combination (cu yd/hr)		368	cy/hr

		Hours	Eqmt Cost	Labor Cost	Total Cost
777 Truck (cy/hr)		0	$ 0	$ 0	$ 0
992 Loader (cy/hr)		0	$ 0	$ 0	$ 0
14 H Grader	Fleet hrs=#Trucks per loader	0	$ 0	$ 0	$ 0
5K gal H_20 Truck	Fleet hrs=#Trucks per loader	0	$ 0	$ 0	$ 0
Total Fleet Cost and Unit Cost			$ 0	$ 0	$ 0
				$ 2.04	**per CY**

Articulated Trucks

What is loaded travel time based on haul distance & rolling resistance (min)?		3.5	Minutes
What is empty travel time based on haul distance & rolling resistance (min)?		0.9	Minutes
What is the Fixed Time for Articulated Trucks?		4.8	Minutes
Total Trip Time for Articulated Trucks		9.2	Minutes
Calculated Productivity of Loader/Truck Combination (cu yd/hr)		167	cy/hr

		Hours	Eqmt Cost	Labor Cost	Total Cost
Articulated Truck (cy/hr)	0	0	$ 0	$ 0	$ 0
988 Loader	0	0	$ 0	$ 0	$ 0
14 H Grader	Fleet hrs=#Trucks per loader	0	$ 0	$ 0	$ 0
5K gal H_20 Truck	Fleet hrs=#Trucks per loader	0	$ 0	$ 0	$ 0
Total Fleet Cost and Unit Cost			$ 0	$ 0	$ 0
				$ 2.24	**per CY**

Amendment No. 11 - Victor and Ironclad Area - Reclamation

Summary of Growth Media Haulage Costs for LOM

Growth Media Distribution Area

Growth Media Equipment	CAT 777 Haul Trucks Volume (cy)	Work Hours	Total GM Req'd. 31,460 Eqmt Cost	Labor Cost	Total Cost
Ironclad1	24,926	81	$ 36,930	$ 2,183	$ 39,113
0	0	-	$ -	$ -	$ -
0	0	-	$ -	$ -	$ -
0	0	-	$ -	$ -	$ -
CAT 992 Loader	Truck Hours/(Trucks per Loader)	20.13	$ 12,686	$ 711	$ 13,398
14 H Grader	Fleet hrs/4	20.13	$ 2,704	$ 707	$ 3,411
5K gal H_20 Truck	Fleet hrs/4	20.13	$ 3,935	$ 535	$ 4,470
Total Cost			**$ 56,255**	**$ 4,136**	**$ 60,392**
Cost per CY					**$ 1.92**

LEGEND
- Maunal Entry
- Current Year
- Life-of-mine

Growth Media Distribution Area

Growth Media Equipment	CAT 740 Articulated Trucks Volume (cy)	Work Hours	Total GM Req'd. 31,460 Eqmt Cost	Labor Cost	Total Cost
Ironclad1	24,926	195	$ 34,682	$ 5,279	$ 39,960
0	0	-	$ -	$ -	$ -
0	0	-	$ -	$ -	$ -
0	0	-	$ -	$ -	$ -
CAT 988 Loader	Truck Hours/(Trucks per Loader)	48.68	$ 11,866	$ 1,720	$ 13,586
14 H Grader	Fleet hrs/4	48.68	$ 6,538	$ 1,709	$ 8,247
5K gal H20 Truck	Fleet hrs/4	48.68	$ 9,515	$ 1,294	$ 10,809
Total Cost			**$ 62,600**	**$ 10,002**	**$ 72,602**
Cost per CY					**$ 2.31**

Growth Media Distribution Area

Growth Media Equipment	Cat 623 Scrapers Volume (cy)	Work Hours	Total GM Req'd. 31,460 Eqmt Cost	Labor Cost	Total Cost
Ironclad1	24,926	185	$ 43,284	$ 6,427	$ 49,711
0	0	-	$ -	$ -	$ -
0	0	-	$ -	$ -	$ -
0	0	-	$ -	$ -	$ -
14 H Grader	Fleet hrs/4	46.37	$ 6,228	$ 1,628	$ 7,856
5K gal H20 Truck	Fleet hrs/4	46.37	$ 9,063	$ 1,233	$ 10,296
Total Cost			**$ 58,575**	**$ 9,288**	**$ 67,863**
Cost per CY					**$ 2.16**

	Units (cy or ac) or Rate	per hour	Work Hours	Equipment	Labor	Materials	Total
[4]Spread Growth Medium (cy)	24,926		35.1	$ 9,035	$ 1,241	included	$ 10,276
D9 Rate(cy/hr)		710					
[5]Soil Analyses (#)	6.18			included	included	$ 722	$ 722
Rate (ac / sample)	5						
[6]Rip & Fertilize (ac)	31		18.1	$ 947	$ 639	$ 5,476	$ 7,063
D4 Rate (ac/hr)		1.7					
[7]Seed & Harrow (ac)	31		13.2	$ 747	$ 468	$ 1,791	$ 3,006
D4 Rate (ac/hr)		2.3					
[9]Hydro-Mulching (ac)	31		51.5	$ 2,833	$ 1,396	$ 16,254	$ 20,484
Rate (ac/hr)		0.60					
[10]Plant Trees (ac)	41.9		62.5	N/A	$ 2,023	$ 38,576	$ 40,599
Rate (ac/hr)		0.67					
Total Work Hours =			530.0				
[11]Supervisor	(work hrs/4)		132.5	$ 2,236	$ 7,659	included	$ 9,895
Total Miscellaneous Costs for Seeding, Trees, and Supervision				**$ 15,799**	**$ 13,426**	**$ 62,819**	**$ 92,044**

Footnotes for summary cost table:

[1]Assumes heavy grading will be done with conventional D10 or D11dozers with U blades where the push distances are practical

[2]Assumes light grading will be done with a D9 dozer on the backfilled areas in Wildhorse Extension area (rate = 2 hrs/acre)

[3]Growth Medium Replacement fleet will consist of three 623 Scrapers

[4]Growth Medium will be spread using a D-9 dozer to a depth of 6 inches

[5]Soil analyses will be run on samples of the reclaimed areas to determine optimum fertilizer rates

[6]Ripping and fertilizing will be conducted on the replaced growth medium using a conventional D4 dozer with a cyclone spreader

[7]Seeding and harrowing will be conducted on all replaced growth medium that is traversible with conventional equipment

[9]Mulching will be conducted using conventional hydro-seeder/hydro-mulcher

[10]Trees and shrubs will be planted on north and east-facing slopes

[11]Supervisor costs are figured at 25 percent of the total work hours to accomplish the reclamation effort

Amendment No. 11 - Victor and Ironclad Area - Reclamation

Ironclad Corridor Truck Haulage of Overburden for Re-contouring

		Ironclad1					No Growth Media	Total
Elev at Dump Pt. Centroid		10400	10000	10000	10000	10000		
Sub-Unit Area (Acres)		30.9	0.0001	0			8.1	39.0
Sub-Unit Volume (Cubic Yards)		24,926	0	0	0	0		31,460
Source Distribution		Sub-unit Area/Source (Acres)						
Source 1	GM6-7	22.2						22.2
Source 2	GM21	8.7						8.7
Source 3								0
Source 4								0
Source 5								0
Source 6								0

Amendment 11 - VLF Ponds, Sediment Ponds, and Storm Water Control Basins Reclamation Costs - 2015

Summary

	Equipment Cost	Labor Cost	Material Cost	Total
Sediment and Storm Water Ponds	$ 8,600	$ 3,546	$ 11,624	$ 23,770
EMP Pond Reclamation	$ 171,659	$ 36,784	$ 36,784	$ 245,228
Fresh Water Pond at Crusher Fuel Island	$ 2,443	$ 524	$ 524	$ 3,490
External Storage Pond at Arequa ADR	$ 73,924	$ 45,250	$ 159,162	$ 278,336
Seepage Collection Pond Below Squaw VLF/Highway	$ 11,683	$ 26,710	$ 56,710	$ 95,104
Total All Ponds	$ 268,310	$ 112,814	$ 264,804	$ 645,929

Sediment and Storm Water Ponds

	Eqmt Cost	Labor Cost	Material Cost	Total Cost	Comment
What are costs from the 2006 DRMS updated version?	$ 7,324	$ 3,020	$ 9,899	$ 20,243	see below
What is the inflation factor to use to adjust to 2015?	**1.17426**	**1.17426**	**1.17426**		
Calculated 2015 costs =	$ 8,600	$ 3,546	$ 11,624	$ 23,770	

EMP Pond Reclamation

	Capacities		
What is total volume to fill the basins at reclamation?	92,283	cu yds	Amendment 11 Storm Water Drawings Plus New EMPs
What is the total volume of growth media required?	5,736	cu yds	Amendment 11 Storm Water Drawings Plus New EMPs
What is the cost to haul fill and growth media?	$ 2.50	$/cy	Similar to SGOSA costs
What is the cost to revegetate the pond area?	$ 120	$/acre	Similar to SGOSA costs hand seeding
Total Cost for Reclamation of Pond Areas =	$ 245,228		

	Eqmt Cost	Labor Cost	Material Cost	Total Cost

Based on similar projects divide total cost as follows

Basin	Area	Capacity	Capacity (CY)	Total GM Volume
		(70% of total)	(15% of total)	(15% of total)
EMP 9	24,800	5.7	9,196	9,655
EMP 16	21,400	4.8	7,744	8,140
EMP 17	41,000	10.2	16,456	17,215
EMP 18	24,700	5.7	9,196	9,653
EMP 19	31,600	7.6	12,261	12,847
EMP 20	36,290	9.0	14,520	15,192
EMP 21	32,921	3.9	6,292	6,902
EMP 22	8,095	1.3	2,097	2,247
EMP 23	14,600	0.7	1,129	1,400
UD Pond	11,250	0.6	968	1,176
Total	246,656	49.5	79,860	84,428
Acres	*5.66*	$ 171,659	$ 36,784	$ 36,784 $ 245,228

Fresh Water Pond at Crusher Fuel Island (added to model 4-28-09)

What is total volume to fill the hole at reclamation?		1,217	cu yds	Pond dwg provided by Comer (3-25-09)
What is the toal volume of growth media required?		169	cu yds	Pond dwg provided by Comer (3-25-09)
What is the cost to haul fill and growth media?	$	2.50	$/cy	Similar to SGOSA costs
What is the cost to revegetate the pond area?	$	120	$/acre	Similar to SGOSA costs hand seeding
Total Cost for Reclamation of Pond Area =	$	3,490		

Based on similar projects divide total cost as follows	Eqmt Cost (70% of total)	Labor Cost (15% of total)	Material Cost (15% of total)	Total Cost
	$ 2,443	$ 524	$ 524	$ 3,490

External Storage Ponds for Arequa VLF

	Eqmt Cost	Labor Cost	Material Cost	Total Cost	Comment
Detox, Dewater, Sludge Removal from ponds	$ 16,270	$ 27,843	$ 110,496	$ 154,609	
Reclamation of depressions	$ 46,684	$ 10,692	$ 25,047	$ 82,423	
Subtotal =	$ 62,954	$ 38,535	$ 135,543	$ 237,032	
What is the inflation factor to use to adjust to 2015?	**117%**	**117%**	**117%**		
Calculated 2015 costs =	$ 73,924	$ 45,250	$ 159,162	$ 278,336	

Seepage Ponds (EMP 23 & UD Pond) below Squaw VLF (added to model 9-4-13)

Detox, Dewater, Sludge Removal from ponds	$ 10,000	$ 15,000	$ 45,000	$ 70,000	Est by MDE
What is total volume to fill the holes at reclamation?	2,097	cu yds	Amendment 11 Storm Water Drawings Plus Ames Dwgs		
What is the toal volume of growth media required?	2,576	cu yds	Amendment 11 Storm Water Drawings Plus Ames Dwgs		
What is the cost to haul fill and growth media?	$ 2.50	$/cy	Similar to SGOSA costs		
What is the cost to revegetate the pond area?	$ 120	$/acre	Similar to SGOSA costs hand seeding		
Total Cost Squaw VLF sed Pond Areas =	$ 11,683	$ 26,710	$ 56,710	$ 95,104	$ 645,929
					check
Total $ VLF + Sed Basins + F.W. Old Fuel Island Ponds	**$ 268,310**	**$ 112,814**	**$ 264,804**	**$ 645,929**	$ 645,929

Amendment No. 11 Estimate of Monitoring Well and Piezometer Closure Costs

Per information provided by Jeff Campbell to M. Ellis on February 18, 2008, there are 49 monitoring wells ranging in diameter from 4 to 6 inches and from 50 to 250 feet deep. There are also 15 piezometers that are shallow (20- 40 ft deep) and they are mostly 3 inch diameter holes. Following recent additional monitoring well additions to support MLE2 there are now 80 wells. ***The number of wells was confirmed by MDE on August 9, 2013 w M. Tidquist; used 80 in 2014 ICE update..***
Assumptions: (1) the closure of the monitoring wells involves cutting conduits off at ground level, (2) filling with bentonite chips from bottom of the well to within five feet of the surface, and (3) putting in a plug of concrete of 5 feet depth on top of the bentonite and extending to the surface to create the necessary seal and closure of the hole.
This procedure would comply with Colorado State Engineer's Office Rule 16--Standards for the Plugging, Sealing, and Abandoning Wells and Boreholes.

To be conservative, assume each of the monitoring wells is 250 feet deep and 6 inches diameter.
To be conservative, assume each of the piezometers is 40 feet deep and 3 inches diameter.

Monitoring Wells			
Number of Wells?	**80**	wells	Provided by CC&V Env Staff
Well Depth bentonite chips (ft)=	**227**	ft	Assumed conservatively for each well
Well Diameter (ft) =	0.5	ft	Measured
Calculated volume chips (cu ft) =	44.5	cu ft	Diameter x Depth
Density of bentonie chips (pcf)	69.25	lbs/cu ft	Cetco Volclay Medium Bentonite Chips
Pounds of chips required =	3085	lbs/well	Volume x Density
Depth of Concrete Plug (ft) =	5	ft	Required by Rule 16 State Engineer's Office
How many bags concrete?	2	bags/well	Enough to make 1 cu ft of plug + small cap
How many yards of sand?	1	cy/hole	Estimated by MDE
Backhoe hours per hole =	2	hrs/well	Estimated by MDE
Laborer hours per hole	4	hrs/well	Estimated by MDE

Piezometers			
Number of Piezometers?	15	piezometers	Provided by CC&V Env Staff
Piez Depth bentonite chips (ft)=	35	ft	Assumed conservatively for each piezometer
Piezometer Diameter (ft) =	0.25	ft	Measured
Calculated volume chips (cu ft) =	1.7	cu ft	Diameter x Depth
Density of bentonite chips (pcf)	69.25	lbs/cu ft	Cetco Volclay Medium Bentonite Chips
Pounds of chips required =	119	lbs/piezo	Volume x Density
Depth of Concrete Plug (ft) =	5	ft	Required by Rule 16 State Engineer's Office
How many bags concrete?	2	bags/piezo	Enough to make 1 cu ft of plug + small cap
How many yards of sand?	1	cy/hole	Estimated by MDE
Backhoe hours per hole =	2	hrs/piezo	Estimated by MDE
Laborer hours per hole	4	hrs/piezo	Estimated by MDE

Activity	Work Hours	Eqmt Cost	Labor Cost	Material Cost	Total Cost
Monitoring Well Closure					
Cut-off pipe, capping, and plugging with backhoe*	160	$ 6,641	$ 5,617	$ 81,589	$ 93,848
Labor for plugging & capping	320	N/A	$ 10,353	N/A	$ 10,353
Piezometer Closure					
Cut-off pipe, capping, and plugging with backhoe*	30	$ 1,245	$ 1,053	$ 830	$ 3,129
Labor for plugging & capping	60	N/A	$ 2,106	N/A	$ 2,106
Subtotals =		$ 7,887	$ 19,130	$ 82,420	$ 109,436

Well and Piezometer Closure Total Cost =	**$ 109,436**

	Rental Monthly	Hrs/month	Rental Cost $/hour	Operating $/hr	Labor $/hr
*80 H.P. Backhoe (2015 Means)	$ 2,800	176	$ 15.91	$ 25.60	$ 35.11

Revised 8-27-13 by MDE

Amendment No. 11 - Estimated Growth Medium Stockpiles Reclamation Costs

	Eqmt Cost	Labor Cost	Material Cost	Total Cost	Comment
What are costs from the 2006 DRMS updated version?	$ 9,002	$ 9,018	$ 53,128	$ 71,148	see below
What is the inflation factor to use to adjust?	1.1743	1.1743	1.1743		
Calculated 2015 costs =	$ 10,571	$ 10,589	$ 62,386	$ 83,546	
Total Acres 96.5 acres					
Calculated cost per acre (2015 dollars) =	$ 205	$ 206	$ 1,211	$ 1,622	

List of Stockpiles and Areas outside of otherwise disturbed lands

Growth Media Storage ID	Area	Comment or Description
Part of GM6/GM7	15.30	Big Pile between WHEX and ECOSA
GM38	13.30	Grassy Valley
GM19	17.00	Huge Pile South of Arequa VLF
GM13	2.90	NW Corner of Arequa VLF
GM34	3.00	West of Squaw VLF
GM37	1.50	Rubey Road
GM1 North Cresson Visual Berm	13.60	Area on GM map
GM14	2.10	AJAX
GM21	1.30	North Cresson near Ironclad
GM27	19.00	Central Between Main Cresson and SGOSA
GM30	1.30	AJAX / South Cresson
GM32	2.70	Between Main Cresson and AGVLF
GM33	3.50	Between Main Cresson and AGVLF
Total	96.50	

CPI 2006	201.6
CPI 2015	236.73
Ratio	117%

0.500 fraction of piles not built out as of 7-1-13

GM stockpile acres in 2015 96.5 acres $ 78,274

$ 78,274 0.50000 Fraction for % remaining

Calculated costs based on new acreage =	**$ 19,807**	**$ 19,842**	**$ 116,898**	**$ 156,547**

Note: Assumes the treatment for reclamation will consist of ripping, fertilizing, seeding, and hydromulching.

MDE (9-4-13); (10-31-14)

Reasonableness Check	Production	Units	D4 cost / hr	Labor $ / hr	Materials	Acres	Cost
What is cost ripping & fert?	1.7	hrs/ac	$ 56.46	$ 35.34	see below	96.5	$ 8,858
What is cost seeding/harrowing?	2.3	hrs/ac	$ 52.39	$ 35.34	see below	96.5	$ 8,466
What is cost per acre fertilizer?					$ 177.20	96.5	$ 17,100
What is cost per acre seed?					$ 57.94	96.5	$ 5,592
What is cost per acre mulch?					$ 520.00	96.5	$ 50,180
What is cost per acre water?					$ 5.93	96.5	$ 572
			$ 10,504	$ 6,820	$ 73,443		$ 90,767
					Check	$ 90,767	

MDE (10-31-14)

Updated Areas SAInc (8/15)

12/3/2015

Amendment No. 11 - Estimate of Road Reclamation Costs

Assumptions

1. Only those roads that are "outside" the footprint of another facility as shown the Reclamation Map (only one road - East Cresson to Main Cresson Haul Rd)
2. Roads that serve as access to the Mine Areas will not be shown in this exercise, because they will be reclaimed as part of the backfilling effort.
3. Road reclamation consists of grading the disturbed area, growth medium replacement to a depth of 6 inches, simultaneous fertilizing and ripping, and revegetation.
4. Revegetation will consist of handseeding and hydroseeding. The steeper slopes will be hydromulched.
5. It has been assumed that all of the areas under "road reclamation" will be subject to the tree planting effort.

For MLE2 and Amendment 11 all of the road disturbance is otherwise inluded within boundaries of other units. Therefore there will be no associated costs for external road reclamation. These costs are for reference only and are not included in the summaries

Activity	Units	Work Hours	Eqmt Cost	Labor Cost	Material Cost	Total Cost	Verifications / Checks
[1]Grading Road Areas (cy)	484,222	1,212.4	$ 413,387	$ 42,840	included	$ 456,227	$ 0.94 $/cy
D10 Rate (cy/hr)	399.4						
[2]Haul Growth Medium (cy)	12,259	53.3	$ 14,284	$ 1,847	included	$ 16,131	$ 1.32 $/cy
623 Scraper (cy/hr)	230						
[3]Spread Growth Medium (cy)	12,259	17.3	$ 5,054	$ 610	included	$ 5,664	$ 0.46 $/cy
D9 Rate(cy/hr)	**710**						
[4]Rip & Fertilize (ac)	32.0	18.7	$ 1,057	$ 661	$ 5,670	$ 7,389	$ 230.90 $/ac
D4 Rate (ac/hr)	**1.7**						
[5]Seed & Harrow (ac)	28.8	12.3	$ 646	$ 436	$ 1,669	$ 2,751	$ 95.52 $/ac
D4 Rate (ac/hr)	**2.3**						
[6]Hand Seed (ac)	3.2	3.2	N/A	$ 104	$ 185	$ 289	$ 90.30 $/ac
Rate (ac/hr)	**1.0**						
[7]Hydro-Mulching (ac)	32.0	53.3	$ 2,934	$ 1,446	$ 16,830	$ 21,209	$ 662.78 $/ac
Rate (ac/hr)	**0.6**						
[8]Plant Trees (ac)	32.0	47.8	N/A	$ 1,545	$ 29,461	$ 31,006	$ 968.95 $/ac
Rate (ac/hr)	**0.67**						
Total Work Hours =		1,418.3					
[9]Supervisor	(work hrs/4)	354.6	$ 5,984	$ 20,495	included	$ 26,479	
Road Reclamation Costs =			**$ 443,346**	**$ 69,984**	**$ 53,815**	**$ 567,146**	$ 17,723 $/ac

[1]Assumes grading will be done with conventional D10 dozer
[2]Growth Medium Replacement fleet will consist of 623 scrapers (3)
[3]Growth Medium will be spread using a D-9 dozer to a depth of 6 inches
[4]Ripping & fertilizing will be conducted using a conventional D4 dozer with a cyclone spreader
[5]Seeding & harrowing will be conducted on all regraded area traversible with conventional equipment
[6]Assumes minimal amount of the area will require hand-seeding to achieve revegetation
[7]Mulching will be conducted using conventional hydro-seeder/hydro-mulcher
[8]Trees and shrubs will be planted on all areas of reclaimed roadways
[9]Supervisor costs are figured at 25 % of the total work hours to accomplish the reclamation effort

Road Segment	Dozer Work cu yds (1)	Push Distance feet (2)	Unadjusted D10 Production cu yds/hr (3)	Time
Haul Rd between Main Cresson E. Cresson	172,222	270	750	230
Delivery Rd between Main Cresson & VLF	312,000	364	364	857
Totals =	484,222		445.6	1086.8

What is Am #9 area of mine haul roads outside other disturbances? 15.2 acres
Source: Operating Disturbance Areas Table by A. Baldrige (4-1-08)
What is the area of disturbance for Delivery Road (4400' x 166')? 16.8
Total Road Reclamation Area (acres) = 32.0

MDE (3-3-08) Rev (4-3-08)
Rev (5-22-09) Rev (6-24-09)

Road Reclamation Costs

Back-up Calculations

What is unadjusted dozer production for New Victor Road?	1,760	(Based on push distance and Cat Handbook Chart)
What is unadjusted dozer production for Main Haul Road?	750	(Based on push distance and Cat Handbook Chart)
What is unadjusted dozer production for Delivery Road?	364	(Based on push distance and Cat Handbook Chart)
Caclculated weighted average production for Both Roads =	445.6	Calculated based on dozer work qty and unadjusted production rates
What is the job correction factor for the operator?	0.75	Job Correction Factors on Page 1-42, Cat Handbook, Edition 36
What is the job correction factor for the material condition?	1.0	Job Correction Factors on Page 1-42, Cat Handbook, Edition 36
What is the job correction factor for job efficiency?	0.83	Job Correction Factors on Page 1-42, Cat Handbook, Edition 36
What is the job correction factor for downhill grade pushing?	1.2	Job Correction Factors on Page 1-42, Cat Handbook, Edition 36
What is the job correction factor for side by side dozing?	1.2	Job Correction Factors on Page 1-42, Cat Handbook, Edition 36
What is the dozer unit and blade type selected?	D10 U-Blade	Selected based on judgment of Mike Ellis
Calculated adjusted production based on job factors =	**399.4**	Calculated from Wtd Avg Production x job correction factors

Amendment No. 11 - MLE2 Estimated Powerline Removal Costs

Using Actual Costs at CC&V for retiring power lines in the Phase V area of the AGVLF

2010 Cost =	$ 458.00	per pole	CPI 2010	218.06	
2015 Cost =	$ 497.22	per pole	CPI 2015	236.73	
			Ratio =	1.0856386	

According to Marc Tidquist of CC&V the MLE Project will eventually utilize 99 poles of which approx. **74** poles were built

Based On 2010 Actual Costs for Retiring Power Lines for Amendment No. 9 in VLF Phase V area. Information Provided by Mike Jahraus, Projects Manager for CC&V (2010 costs inflated to 2015$).

2015 Costs for Retiring Poles 114 Poles at **$ 497.22** Based on actual cost/pole in 2010 inflated to 2015$

114 comes from 40 existing in 2007 + 74 for MLE Project

74 comes from 18,500 ft of powerline divided by 250 ft spacing. Information provided by M. Tidquist (1-12-12)

Additional poles from South Substation to Crusher (Spring 2014)	**35 poles**	$	17,403	(MEllis Communication w/ M. Tidquist (5-14-14)
Additional poles at Squaw Gulch Area TR77	**16 Poles**	$	7,956	SAInc Email Request from M. Tidquist (8/12/2015)
Grand Total No. of Poles in MLE 2 (2015)	**149 poles total**	$	74,086	New Total

Grand Total Powerline Removal Costs (2015) $ 74,086

Costs basis: Actual CC&V Experience on Removal of Phase 5 Powerline (2010); 2014$ = $458. X 1.0856 CPI Ratio = $497.22 per Pole

Means 2014, p. 36: $350 Poles + $128 Appputenances = $478

MLE2 Poles added by MDE 1-23-12
Revised by MDE (3-10-14 and 10-29-14)
Updated by SAInc (6/25/15)

Amendment No. 11 - Estimate for Reclamation of Building Footprint Areas

Reclamation Area	Acres	Dozer Push Yardage	Truck Haul Fill Yardage	Scraper Haul TS Yardage	Productivity (cy/hr) of Scraper Haul	Vol x Prod.	Weighted Avg Productivity
ADR Footprint Area	4.0			3,226	300	967,800	
Crusher Area	70.0	282,333			150	-	
Crusher Ponds (#1, #2, #011)	incl abv		8,691	incl abv			
Victor Plantsite	8.0			6,452	150	967,800	
Emulsion Plant	1.0			807	217	175,011	
Engineering Pkg Lot + Bldg Footprint	1.0			807	200	161,400	
New Ajax Exploration Building (Added 2011)	1.0			800	200	160,000	
PSES Building, Mill Platform Bldgs, Others	2.1			1,694	200	338,730	
Underground Mine Facilities				-		-	
Total =	87.1	282,333	8,691	12,092		2,770,741	229.15 cy/hr

Activity	Units	Work Hours	Eqmt Cost	Labor Cost	Material Cost	Total Cost	Verifications / Checks
[1]Grading ADR Footprint Area (ac)	4.0	8.00	$ 514	$ 71	included	$ 585	$ 146.28 $/ac
D9 Rate (hrs/ac)	2						
[1]Grading Crusher Footprint Area (cy)	282,333	389.66	$ 132,862	$ 13,769	included	$ 146,631	$ 0.52 $/cy
D10 Rate (cy/hr)	724.57	with experienced operator, level push, and 83% job efficiency					
[2]Filling Crusher Ponds (#1, #2, #011) w/ Clean Fill	8,691						
	1000 ft haul		5%	**total Grade**	5.20	minutes per cyc	323 cy/hr
Art Truck	323	26.88	$ 4,788	$ 729	included	$ 5,517	$ 0.63 $/cy
988 Loader (cy/hr)	647	13.44	$ 3,276	$ 364	included	$ 3,641	$ 0.42 $/cy
14 H Grader	Truck Hrs/4	6.72	$ 903	$ 236	included	$ 1,139	$ 0.13 $/cy
5K gal H20 Truck	Truck Hrs/4	6.72	$ 1,314	$ 179	included	$ 1,492	$ 0.17 $/cy
D4 Dozer	Truck Hrs/1.5	17.92	$ 886	$ 633	included	$ 1,519	$ 0.17 $/cy
[1]Grading Victor Plantsite Footprint Area	8.0	16.00	$ 4,116	$ 565	included	$ 4,681	$ 585.12 $/ac
D9 Rate (hrs/ac)	2						
[1]Grading Emulsion Plantsite Footprint Area	1.0	2.00	$ 514	$ 71	included	$ 585	$ 585.12 $/ac
D9 Rate (hrs/ac)	2						
[1]Grading Engineering Bldg + Pkg Lot	1.0	2.00	$ 514	$ 71	included	$ 585	$ 585.12 $/ac
D9 Rate (hrs/ac)	2						
[1]Grading PSES, Mill Bldgs and Support Structures	2.1	4.20	$ 1,080	$ 148			
D9 Rate (hrs/ac)	2.0						
	1000 ft haul		5%	**total Grade**	2.71	minutes per cyc	510 cy/hr
[3]Haul Growth Medium to All Footprint Areas Except Crusher Included with AGVLF(cy)	12,092	23.72	$ 5,534	$ 822	included	$ 6,356	$ 0.53 $/cy
623 Scraper (cy/hr)	509.82						
14 H Grader	Scraper Hrs/4	5.93	$ 796	$ 208	included	$ 1,004	$ 0.08 $/cy
5K gal H20 Truck	Scraper Hrs/4	5.93	$ 1,159	$ 158	included	$ 1,316	$ 0.11 $/cy
[4]Spread growth medium (cy)	12,092	17.03	$ 4,381	$ 602	included	$ 4,982	$ 0.41 $/cy
D9 Rate(cy/hr)	710						
[5]Soil Analyses (#)	17		included	included	$ 2,035	$ 2,035	$ 1.13
Rate (ac / sample)	5						

Footnotes are at the bottom of the second page

MDE (9-5-13); Rev 10-29-14
Updated SAInc 10/15

Amendment No. 11 - Estimate for Reclamation of Building Footprint Areas

Activity		Units	Work Hours	Eqmt Cost	Labor Cost	Material Cost	Total Cost	Verifications / Checks
[6]Rip & Fertilize (ac)		87.1	50.95	$ 2,877	$ 1,800	$ 15,434	$ 20,111	$ 230.90 $/ac
	D4 Rate (ac/hr)	1.7						
[7]Seed & Harrow (ac)		78.4	33.58	$ 1,759	$ 1,186	$ 4,542	$ 7,488	$ 95.52 $/ac
	D4 Rate (ac/hr)	2.3						
[8]Hand Seed (ac)		8.7	8.71	N/A	$ 282	$ 505	$ 786	$ 90.30 $/ac
	Rate (ac/hr)	1.0						
[9]Hydro-Mulching (ac)		87.1	145.17	$ 7,985	$ 3,935	$ 45,808	$ 57,728	$ 662.78 $/ac
	Rate (ac/hr)	0.6						
[10]Plant Trees (ac)		87.1	130.00	N/A	$ 4,206	$ 80,190	$ 84,396	$ 968.95 $/ac
	Rate (ac/hr)	0.67						
	Total Work Hours =		914.56					
[11]Supervisor		(work hrs/4)	228.64	$ 3,859	$ 13,216	included	$ 17,075	
Reclamation of Building Footprint Areas =				**$ 179,118**	**$ 43,251**	**$ 148,522**	**$ 369,653**	$ 4,244 $/ac

[1]Assumes grading will be done with conventional D9 dozer

[2] Truck Fleet (Articulated Trucks) will haul fill to fill in ponds and complete the recontouring effort

[3]Growth Medium Replacement will be done with a 623 scraper fleet

[4]Growth Medium will be spread using a D-9 dozer to a depth of 6 inches

[5]Soil analyses will be run on samples of the reclaimed areas to determine optimum fertilizer rates

[6]Ripping and fertilizing will be conducted on the replaced growth medium using a conventional D4 dozer with a cyclone spreader

[7]Seeding and harrowing will be conducted on all replaced growth medium that is traversible with conventional equipment

[8]Assumes minimal amount of the area will require hand-seeding to achieve revegetation

[9]Mulching will be conducted using conventional hydro-seeder/hydro-mulcher

[10]Trees and shrubs will be planted on north and east-facing slopes

[11]Supervisor costs are figured at 25 percent of the total work hours to accomplish the reclamation effort

MDE (9-5-13); Rev 10-29-14

Updated SAInc 10/15

Amendment No. 11 - Mine Area FENCING FOR FINAL CLOSURE

Assumptions: (1) Mine Area fencing will be required wherever a steep, unsafe slope over 100' High exists (Mine Area highwalls).
(2) Mine Area fencing will consist of 6 foot high, 6 gage wire, with galvanized steel posts, chain link style.
(3) Fence construction costs are from Means Heavy Construction Cost Data for 2015, page 647.

What is the Means 2015 cost / ft to construct fence? **$ 30.00** per foot
What is the estimated length of fencing for the project? **33,420**

		Life of Mine (feet)		
		Length		Cost
North Cresson		**9,200**	$	276,000
Main Cresson		**19,800**	$	594,000
IOronClad Pit Edge		**1,300**	$	39,000
WHEX		**9,300**	$	279,000
Total		39,600	$	1,188,000

What is the Means 2015 cost / ft to construct fence?

Calculated Total Cost for Mine Area Fencing =	**$ 1,188,000**

Linked to Materials and Services Cost Sheet

Revised 92015 by SAInc

Amendment No. 11 - Clean-Up and Miscellaneous Costs Associated with Closure

Tire Disposal Costs

		Equipment 40%	Labor 60%	Materials
Total number of tires to be disposed	50	(estimated by MDE 8-27-14)		
Disposal cost per tire	$ 900	(Real life cost confirmed by Gary Horton, 10-29-14)		
Total 2015 Costs based on Real Life Current Numbers =		$ 18,000	$ 27,000	0 **$ 45,000**

Septic System Closure	Inputs Quantities	Units	Comments	Equipmt Cost	Labor Cost	Materials Costs	Total Cost
Number of hours of backhoe* work for accessing system?	30	hrs	Assumed by MDE	$ 32.95	$ 35.11	included	$ 2,042
D4 dozer hrs covering exposed system with clean fill?	10	hrs	Assumed by MDE	$ 49.42	$ 35.34	included	$ 848
Number of supervisor hours for oversight?	30	hrs	Assumed by MDE	$ 16.88	$ 57.80	included	$ 2,240
Labor hours for hand-work plugging pipes and lines?	56	hrs	Assumed by MDE	$ 16.88	$ 32.35	included	$ 2,757
***Assume 1.5 cy backhoe, 112 HP, Means 2014, p.525**	***$32.95/hr rental***						

"Hazard" Sign Placement (around Mine Areas)	Quantities	Units		
What is the site's perimeter length for sign placement?	33,420	ft	Map measurement matches Tab 28 Mine Area Fencing	
What is the spacing for signs?	300	ft	111	Number of signs required
What is the material cost per sign (post & sign)?	$ 180.26	dollars	$ 20,081	Material cost for signs based on MDE's Horizon Mine experience in NM
What is the labor cost for sign placement?	$ 40.19	dollars	$ 4,477	Labor $ for sign placement
			$ 24,558	Total cost of sign placement

Disposal of Hazardous Materials during Demolition (This item includes haz waste such as asbestos, solvents, metals contaminated sludges, etc.)

What is the estimated number of truckloads to be hauled off to a disposal site?	100	loads	Assumes 30 loads per year
How many drums per truckload will be sent offsite?	80		
What is the cost per transportation (hauling) to disp site?	$ 3.95	$/mile	Means, 2014, p. 44
What is the distance from Victor to Deer Trail Hwy 36 site?	175	miles	Google Maps (the Hwy 36 Landfill in Deer Trail is a licensed haz-waste landfill)
What is the labor cost to load a truck?	$ 35.34	$/hr	Operator for the 972 loader
What is the equipment cost to load a truck (FEL)	$ 135.59	$/hr	Assume 972 loader
How long to load 80 drums on a truck @2 min/drum?	2.67	hrs/truck	Total hours for haz-waste disposal= 266.7 hours

Disposal of Petroleum Contaminated Soils ***(This item was added in 2013 as a result of experience with PCS at the Crusher Fuel Island Demo Project)***

			Equipmt	Labor	Materials	Total
What is a typical real life cost for disp of PCS for remediation of fuel island tanks at CC&V?	$ 105,000	Lump Sum				
		Fractional Breakdown Percentage =	70	20	10	100
			$ 73,500	$ 21,000	$ 10,500	$ 105,000

	Equipmt Cost	Labor Cost	Materials Costs	Total Cost
Tire Disposal Costs	$ 18,000	$ 27,000	0	$ 45,000
Septic System Closure Costs				
Backhoe	$ 989	$ 1,053	included	$ 2,042
D4 Dozer	$ 494	$ 353	included	$ 848
Supervisor	$ 506	$ 1,734	included	$ 2,240
Laborer	$ 945	$ 1,812	included	$ 2,757
Sign Placement on Mine Area Fences		$ 4,477	$ 20,081	$ 24,558
Haz Waste Disposal During Demolition	$ 36,156	$ 9,423	$ 69,125	$ 114,704
Disposal of Petroleum Contaminated Soils	$ 73,500	$ 21,000	$ 10,500	$ 105,000
Total Costs for Clean-Up and Miscellaneous =	**$ 57,090**	**$ 45,852**	**$ 89,206**	**$ 297,149**

Revised 8-27-13, 9-6-13 and 10-29-14 MDE
Checked, No Changes by SAINC 9/2015

Amendment No. 11 - Revegetation Repairs and Maintenance for CC&V

Inputs	Qty	Units	
What is the total area of revegetation sitewide?	3,721.6	acres	Total area revegetated
What is the percent that will require re-fertilization?	15	percent	Estimated by MDE
What is the percent that will require re-seeding?	17	percent	Estimated by MDE
What is the total area to be planted in trees & shrubs?	1636	acres	North and east-facing slopes
What is the percent that will require re-planting?	20	percent	Estimated by MDE

Linked to | Linked to | Linked to

Calculations			Rate	Units	Hours	Equipmt Cost	Labor Cost	Material Cost	Total Cost
Calculated Area for re-fertilization	558.2451033	acres	1.00	acre/hr	558.2	$ 9,422	$ 18,061	$ 98,921	$ 126,404
Calculated Area for re-seeding	632.6777837	acres	1.00	acre/hr	632.7	$ 10,678	$ 20,469	$ 36,659	$ 67,807
Calculated Area for re-planting	327.14	acres	1.49	acre/hr	219.6	$ 3,706	$ 7,103	$ 301,185	$ 311,994
				Total =	1410.5				
					Subtotals	$ 23,806	$ 45,634	$ 436,766	$ 506,205

Total Cost for Revegetation Repair and Maintenance = $ 506,205

	MLE2 Area from Section TABS	Affected as of 7-1-14?	Comment
Main Cresson Mine Area	346.4	346.4	From MLE2
East Cresson Mine Area	369.0	300.4	From MLE2
North Cresson Mine Area	200.1	50.0	Drill pads and roads
Squaw OSA	207.2	207.2	From MLE2
ECOSA	286.2	286.2	From MLE2
AGVLF	617.4	617.4	From MLE2
SGVLF	279.5	279.5	From MLE2
Crusher Area	70.0	70.0	From MLE2
Ironclad Corridor	30.9	30.9	From MLE2
ADR/Carlton	6.1	6.1	From MLE2
Growth Media Piles Outside other disturbance	96.5	96.5	From MLE2
Ancillary Disturbance	1,431.0	1,431.0	From MLE2
	1,431.0	**3,721.6**	
	acres	acres	

MDE (8-30-13)(10-29-14)
Areas Updated SAInc (10/15)

Amendment No. 11 - ANCILLARY AREAS RECLAMATION

Tree Hill Repeater Site (TR69) was added to the Ancillary Category in 2014.

What is total area referred to as Ancillary? 1431 acres — Revised for Am. No. 10 MLE2; See Tab 51 Area Table
How many acres receive tree planting? 850.1 acres — Assumed planting on north and east-facing slopes

Activity	Quantities	Work Hours	Eqmt Cost	Labor Cost	Material Cost	Total Cost	Verifications/Checks
Rip & Fertilize (ac)	1,431.0	837.1	$ 43,861	$ 29,581	$ 253,573	$ 327,015	$ 228.52 $/acre
D4 Rate (ac/hr)	**1.7**						
Seed & Harrow (ac)	1,431.0	612.9	$ 34,606	$ 21,659	$ 82,917	$ 139,182	$ 97.26 $/acre
D4 Rate (ac/hr)	**2.3**						
Hydro-Mulching (ac)	1,431.0	2,385.0	$ 131,183	$ 64,655	$ 752,603	$ 948,441	$ 662.78 $/acre
Rate (ac/hr)	**0.60**						
Plant Trees (ac)	850.1	850.1	N/A	$ 27,503	$ 498,212	$ 525,715	$ 618.42 $/acre
Rate (ac/hr)	**0.6700**						
Total Work Hours =		4,685.2					
Supervisor	(work hrs/4)	1,171.3	$ 19,769	$ 67,703	included	$ 87,472	
Subtotals =			$ 229,419	$ 211,101	$ 1,587,305	$ 2,027,825	$ 2,027,825 Check
		Estimate for Ancillary Areas in Amendment 10 =				**$ 2,027,825**	

Tree Hill Repeater Site		Equipmt	Labor	Materials	Total
Demo Tower and Remove Powerline	0.66 Acres	$ 945	$ 405	$ -	$ 1,350
Pad Area grading and growth media	0.66 Acres	$ 1,373	$ 127	$ -	$ 1,500
Access Rd grading and growth media	0.66 Acres	$ 11,858	$ 1,147	$ -	$ 13,004
Revegetation (Hand-seeding)	0.66 Acres	$ -	$ 186	$ 266	$ 452
Tree Hill Repeater Site Reclamation (TR-69)		**$ 14,175**	**$ 1,865**	**$ 266**	**$ 16,306**

Grand Total Ancillary incl Tree Hill	**$ 243,594**	**$ 212,966**	**$ 1,587,571**	**$ 2,044,131**

Revised MDE (8-29-13); Revised MDE (11-6-14)
Updated SAInc 7-15

North Cresson Viewshed Conservation Plan

This is the "Old" plan developed for MLE1 in approximately 2008; it has been revised. See below.

Inputs, Calculations, and Assumptions

Qty	Units	Mature Tree Transplanting	Equipmt Costs	Labor Costs	Material Cost	Total Costs
435	#/acre	Trees / acre (based on 1 tree / 100 sq. ft.)				
10	#/bucket	Trees per 988 loader bucket (assumption)				
43.5	loads/ac	Bucket loads per acre				
0.5	hrs/load	(dig hole, get transplants, tram back, & place in hole).				
21.75	hours	Hours for equipment and operator per acre				
15	acres	Acres for transplants				
326.25	hours	Hours equip and operator for 988 loader	$ 79,523	$ 11,528		$ 91,051
2	#	Laborers				
652.5	man-hrs	Total laborer man-hours		$ 21,110		$ 21,110
1	#	Light vehicle				
326.25	hrs/load	Light vehicle hours	$ 5,506			$ 5,506
1	#	Supervisor				
81.56	hrs	Supervisor hours	$ 1,377	$ 4,714		$ 6,091
2,000	$	Lump Sum Estimate for Supplies and Tools			$ 2,000	$ 2,000
		Supervisor's Pick-up truck				
		Total for Transplanting Trees =	**$ 86,406**	**$ 37,353**	**$ 2,000**	**$ 125,759**
					chk	$ 125,759

Qty	Units	Irrigation for two years (summers)				
1	#	Laborer				
3	months	Months each summer				
176	hrs/month	Hours per month				
2	years	Years committed irrigation				
1056	hours	Total labor hours		$ 34,165		$ 34,165
1	#	Truck mounted hydromulcher for watering				
6	months	Hydromulcher duration (in months)	$ 58,084			$ 58,084
2000	$	Supplies and Tools ($1000/year)			$ 2,000	$ 2,000
528000	gallons	Est water usage / summer (max = 8000 gal/day for 66 days/summer)				
1056000	gallons	Total water usage ($1.23 per 1000 gallons for cost)			$ 2,608	$ 2,608
1	#	Supervisor				
264	hours	Supervisor hours	$ 4,456	$ 15,260		$ 19,715
		Supervisor's Pick-up truck				
		Total For Irrigation of Trees =	**$ 62,539**	**$ 49,425**	**$ 4,608**	**$ 116,572**
					chk	$ 116,572

Qty	Units	Tree Thinning				
100	acres	Acres requiring thinning of evergreens to promote aspen				
0.5	acres/hr	Assume 1 laborer can thin 0.5 acre per hour				
2	#	Laborers				
1	acres/hr	Total productivity for crew in acres per hour				
200	man-hrs	Man-hours for thinning		$ 6,471		$ 6,471
1	#	Light vehicle for thinning crew				
50	hours	Light vehicle hours for thinning crew	$ 844			$ 844
1	#	Supervisor				
50	hours	Supervisor hours	$ 844	$ 2,890		$ 3,734
		Supervisor's Pick-up truck				
		Total for Tree Thinning to Promote Aspen =	**$ 1,688**	**$ 9,361**	**$ -**	**$ 11,049**
					chk	$ 11,049

Grand Totals for Viewshed Conservation =	**$ 150,633**	**$ 96,139**	**$ 6,608**	**$ 253,380**

Revised Viewshed Cost Estimate by Mike Ellis (May 2013)

32 Viewshed (15.2)

3.1 Tree Thinning Cost Estimate

35 days for thinning (assumed) and 8 hours per day in the field
Total Time needed = 8 x 35 = 280 hours with each machine and an operator

Feller Buncher ($112.50/hr machine rental + $25/hr operator + $50/hr maintenance and fuel + $20/hr profit) = $207.50/hr times 280 hrs = $58,100

Skidder (Assume $100/hr machine rental + $25/hr operator + $50/hr maintenance and fuel + $15/hr profit) = $190/hr times 280 hrs = $53,200

Truck to Haul Trees = (35 Ton Haul Truck @ $120/hr including operator, maintenance, fuel, and profit (this is Conley's charge to CC&V for work in 2012) times 280 hrs = $33,600

Road Building and Maintenance (Assume D7 Dozer @$90/hr incl operator and 140 hours) = $12,600

Supervisor Costs = $50/hr for construction supervision of crew times 280 hrs =$14,000

Contractor's Thinning Costs = $58,100 + $53,200 + $33,600 + $12,600 + $14,000 = $171,500

Oversight and Direction of Field Activities by Mandel and/or Ellis = assume 10% of Contractor's Costs = $17,150

Contingency (assumed to be 15% of Contractor's Costs) = (0.15 x $171,500) = $25,725

Total Tree Thinning Costs = $171,500 + $17,150 + $25,725 = $ 214,375

Conley accomplished some thinning in 2014. Assume 20% completed in this effort; therefore, reduce costs in table at right by 20% in next year's model.

Tree Thinning

	Equipmt	Labor	Material
	$ 58,100		
	$ 53,200		
	$ 33,600		
	$ 12,600		
	$ 25,725		
Sub-Total	$ 183,225	$ 31,150	$ -
2014 Chk =	$ 214,375		

3.2 Harvesting of Salvageable Trees and Hauling to Nursery

Based on Randy Mandel's experience with similar projects:
3000 Trees Total to be harvested (3000 additional trees will be purchased or dug up elsewhere to make the total of 6000 trees needed)
Dig up trees with a mini-excavator *(not proposing to use a conventional tree spade)*
$5 per tree for containers and supplies like burlap and ties
40 trees can be harvested per day with the mini-excavator and a two man crew
Shipping offsite to a nursery in either Colorado Springs or Canon City for care until needed in reclamation
Mini-excavator from Wagner (315D) at $5,310 / month = $5,310 / 160 hrs = $33.20 per hour
Operator for excavator @ $25/hr + fuel and maintenance@ $20/hr + profit @ $10/hr
Total cost for mini-ex = 33.20+25+20+10 = $88.20/hr
3000 trees / 40 trees per day = 75 days x 8 hrs/day = 600 hours
600 hrs x $88.20 / hr = $52,920 for Mini-Ex + operator digging trees
Extra field hand at $25/hr for 600 hrs = $15,000 (holding tree & wrapping with burlap)
Truck to haul trees at $120 / hr = 300 hrs x $120/hr = $36,000 (assume truck needed about half-time)
Supervisor cost = $50/hr x 600 hrs = $30,000
Supplies @ $5/tree for burlap and plastic containers: 3000 x $5 = $15,000
Contingency figured at 15% of contractor's costs = [$52,920 + $36,000 + $30,000 + $15,000] x 0.15 = $20,088

Harvesting and Hauling Trees

	Equipmt	Labor	Material
	$ 52,920		$ 15,000
	$ 36,000		
	$ 20,088		
Sub-Total	$ 109,008	$ 45,000	$ 15,000
chk =	$ 169,008		

Therefore the total harvesting cost would be on the order of: $52,920 digging + $15,000 field hand + $36,000 hauling + $30,000 supervisor + $15,000 supplies + $20,088 contingency =

$ 169,008

3.3 Maintenance of Trees at Nursery

Assume trees can be "cared for" at a cost of approximately $10 / yr per tree for a total of 4 yrs (arbitrary), then the cost of maintenance would be 3000 trees x $10 / yr x 4 yrs = $120,000.

Total Maint. $ for Harvested Trees at Commercial Nursery = $ 120,000

Nursery Maintenance

	Equipmt	Labor	Material
	$ 80,000	$ 25,000	$ 15,000
Sub-Total chk=	$ 120,000		

3.4 Retrieving Trees from Nursery, Hauling to Site, and Installing Gator Bags (water release), Buying 3000 additional trees from Nursery, Re-planting in Reclaimed Areas

Buying 3000 nursery trees at $18 each + $2 shipping = $20 / tree x 3000 trees = $60,000
Planting rate for trees is 4 trees per hour for salvaged trees and 5 trees per hour for purchased trees.
Therefore, it will take (3000 trees / 4 per hour) + (3000 trees / 5 per hour) = 1350 hours with a 4 man crew and an excavator to dig holes and a truck to haul them to the site.
Excavator – assume Larry Conley's John Deere Trackhoe will be used at $100/hr (Altman backfill project 2011)
Truck – assume truck at $120/hr for half the total hours or roughly 700 hours
2 Extra Hands on Ground to Plant and Position Trees @ $25/hr
Supervisor @$50/hr
Gator Bag Cost ($20 each) from Sprinkler Supply Store at www.sprinklersupplystore.com.
Cost Estimate = (3000 new trees x $20/tree) + (1350 hrs x $100/hr planting) + (700 hrs x $120 trucking) + (1350 x $50 field hands) + (1350 x $50 supervisor) + ($20 each gator bags x 6000 trees) + (water truck to charge gator bags at 700 @$50/hr) = $548,750

Planting = $135,000
Trucking = $84,000
Field Labor = $67,500
Supervision = $67,500
Gator Bags = $120,000
New Trees = $60,000
Water Truck = $35,000
Contingency @15% = ($569,000 x 0.15) = $85,350

Planting on Reclaimed Areas

	Equipmt	Labor	Material
	$ 84,000	$ 135,000	$ 60,000
	$ 35,000	$ 67,500	$ 120,000
	$ 45,000	$ 67,500	
		$ 40,350	
Sub-Total =	$ 164,000	$ 310,350	$ 180,000
chk =	$ 654,350		

Total Tree Planting Cost & Purchasing All Supplies & Watering = $ 654,350

4.1 Consultation and Oversight of Tree Planting Effort

Assume a professional (like Golder's Randy Mandel) will need to be consulted and be in the field a total of 50 days during the required 1350 man-hours for planting to provide guidance and oversight.

Cost of consultation = (50 days x 8 hrs/day x $150/hr labor) + ($250/day x 50 days expenses) = $72,500 **$ 72,500**

Oversight of Planting Effort

	Equipmt	Labor	Material
	$ -	$ 60,000	$ 12,500
Sub-Total =	$ -	$ 60,000	$ 12,500
chk =	$ 72,500		

4.2 Re-planting at 10% of 6000 Trees

Using the above cost per tree for planting and watering for 60 trees (10% of 6000 originally planted) =
60 x $109.06 = $6,544 **$ 6,544**

Re-Planting Effort

	Equipmt	Labor	Material
	$ -	$ 2,544	$ 4,000
Sub-Total =	$ -	$ 2,544	$ 4,000
chk =	$ 6,544		

4.3 Evaluation of Tree Stands, Meetings with DRMS, and Report Preparation

Assume a professional (like Randy Mandel) will need 100 hours of additional work time to prepare reports and meet with DRMS in the field to evaluate and explain the tree planting exercise.
100 hours x $150/hour = $15,000 **$ 15,000**

Evaluation, Meetings, and Reports

	Equipmt	Labor	Material
	$ -	$ 15,000	
Sub-Total =	$ -	$ 15,000	$ -
chk =	$ 15,000		

	Equipment	Labor	Materials	Total	Chk Total
Grand Total Viewshed Conservation Plan =	**$ 536,233**	**$ 489,044**	**$ 226,500**	**$ 1,251,777**	$ 1,251,777

TAB 33 (Section 19.0) Amendment No. 11 - MOBILIZATION AND DEMOBILIZATION

CALCULATED AT 2% OF THE THE EQUIPMENT COSTS + LABOR COSTS FOR EARTHMOVING PROJECTS

Section	Management Unit	Equipment Cost	Labor Cost	Total Eqpt and Labor
4.0.1	ECWH	$ 3,010,617	$ 365,874	$ 3,376,491
4.0.2	WHEX	$ 2,238,789	$ 329,941	$ 2,568,730
4.0.3	North Cresson	$ 2,098,768	$ 341,882	$ 2,440,650
4.0.4	Main Cresson	$ 1,286,661	$ 222,798	$ 1,509,459
4.1.1	Chicago Tunnel	$ 17,523	$ 5,007	$ 22,530
4.1.2	Providence	$ 18,159	$ 5,188	$ 23,347
7.1	AGVLF	$ 54,818,653	$ 5,318,940	$ 60,137,593
7.2	SGVLF	$ 34,559,020	$ 3,068,749	$ 37,627,770
7.3	Mill Platform	$ 155,178	$ 53,236	$ 208,414
7.4	AJAX Pads3&4	$ 53,556	$ 11,528	$ 65,085
8.1	ECOSA	$ 2,612,590	$ 366,816	$ 2,979,406
8.2	SGOSA	$ 1,233,646	$ 223,315	$ 1,456,961
8.3	Ironclad Corridor	$ 119,272	$ 27,367	$ 146,638
8.4	GM Piles	$ 19,807	$ 19,842	$ 39,649
	Total	$ 102,242,239	$ 10,360,484	`
	Mobilization	$ 1,022,422.39	$ 103,604.84	**$ 1,126,027**

Amendment No. 11 - POST CLOSURE MONITORING OF HEAP EFFLUENT, GROUND WATER, SURFACE WATER, AND VEGETATION

Detoxification Sampling	VLF	Ext Ponds	Total	Source
What is number of samples per year for each of the facilities?	85	0		CC&V Staff recommendation
What is the cost per sample for testing?	$ 191.78	$ 191.78		Am 8 Estimate inflated to 2015 dollars
How many years for detoxification monitoring?	5	0		CC&V Staff recommendation
What is estimated cost per year to collect samples?	$ 17,614	$ 17,614		Am 8 Estimate
What is the inflation factor based on CPI?	117%	117%		Am 8 Estimate inflated to 2015dollars
Total Detoxification Sampling Costs =	**$ 169,574**	**$ -**	**$ 169,574**	

Ground and Surface Water Monitoring		Quantity	Calculation	Units	Equipment Cost (per year)	Labor Cost (per year)	Mat'ls/Supplies & Expenses (per year)	Total Cost (per year)
What is the estimated frequency of monitoring per year?		4						
How many samplers will be required each collection event?		1						
How many hours for each person per sampling event?		40	160	hours		$ 16,000		$ 16,000
How many days per year will travel expenses apply to?		20					$ 1,918	$ 1,918
What is the hourly cost for a technician to collect samples?	$	100.00						
What is the cost for use of a pick-up truck per hour?	$	16.88			$ 1,350			$ 1,350
How many surface water collection points will be monitored?		4						
How many surface samples will be collected in a year?		4	16	surf samples			$ 7,159	$ 7,159
How many wells will be monitored?		10						
How many well samples will be collected in a year?		4	40	well samples			$ 17,898	$ 17,898
[1]What is cost/trip for a pump to collect well water samples?	$	618.33			$ 2,473			$ 2,473
What is cost/trip for a suppies to collect water samples?	$	100					$ 400	$ 400
What is the inflation factor based on CPI?		116%						
How many years will the monitoring program be needed?		5						
				Subtotals =	$ 3,824	$ 16,000	$ 27,375	$ 47,198
				Total GW & Surface Water Monitoring =	**$ 19,118**	**$ 80,000**	**$ 136,875**	**$ 235,992**
				Fraction to use to pro-rate monitoring costs	0.081009558	0.338993837	0.579996605	

[1]Cost of pump in Am 8 = $2140 inflated to 2008 dollars divided by number of sampling events per year

Vegetation Monitoring	Quantity	Calculation	Units	Equipment Cost (per year)	Labor Cost (per year)	Mat'ls/Supplies & Expenses (per year)	Total Cost (per year)
What is the estimated frequency of monitoring per year?	1						
How many samplers will be required each collection event?	2						
How many hours for each person per sampling event?	40	80	hours		$ 7,200		$ 7,200
How many days per year will travel expenses apply to?	10					$ 959	$ 959
What is the hourly cost for a technician to evaluate vegetation?	$ 90.00						
What is the cost for use of a pick-up truck per hour?	$ 16.88			$ 675			$ 675
How many years will the monitoring program be needed?	5					Subtotal =	$ 8,834
Revised by MDE (8-30-13)			**Total Cost Vegetation Monitoring =**	**$ 3,376**	**$ 36,000**	**$ 4,794**	**$ 44,170**

CARLTON TUNNEL AREA

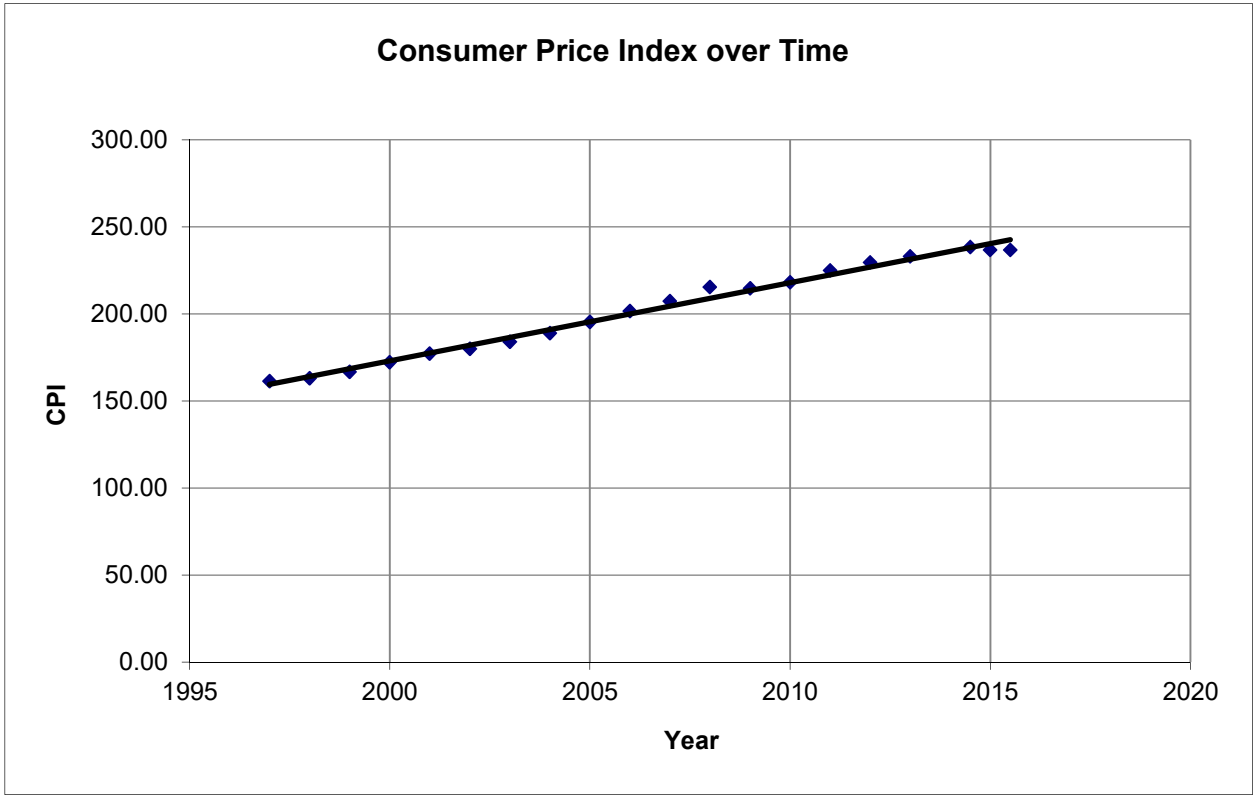
Carlton Tunnel Water Monitoring and Site Maintenance		Quantity	Calculation	Units	Equipment Cost (per year)	Labor Cost (per year)	Mat'ls/Supplies & Expenses (per year)	Total Cost (per year)
What is the estimated frequency of monitoring per year?		12						
How many samplers will be required each collection event?		1						
How many hours for each person per sampling event?		3	36	hours		$ 3,600		$ 3,600
How many days per year will travel expenses apply to?		4.5					$ 431	$ 431
What is the hourly cost for a technician to collect samples?	$	100.00						
What is the cost for use of a pick-up truck per hour?	$	16.88			$ 304			$ 304
How many surface water collection points will be monitored?		1						
How many surface samples will be collected in a year?		12	12	surf samples			$ 5,369	$ 5,369
How many wells will be monitored?		0						
How many well samples will be collected in a year?		0	0	well samples			$ -	$ -
[1]What is cost/trip for a pump to collect well water samples?	$	-			$ -			$ -
What is cost/trip for a suppies to collect water samples?	$	20					$ 240	$ 240
What is the inflation factor based on CPI?		116%						
How many years will the monitoring program be needed?		5						
Carlton Tunnel Care and Maintenance								
Pond and Ditch Maintenance						$ 5,000		$ 5,000
Miscellaneous Site Maintenance						$ 2,500		$ 2,500
				Subtotals =	$ 304	$ 11,100	$ 6,041	$ 17,445
	Total Carlton Tunnel Monitoring & Maint.=				**$ 1,519**	**$ 55,500**	**$ 30,204**	**$ 87,223**
From Above pro-rated by typical GW and SW Fractions →	**Total Cost Heap Effluent Monitoring =**				**$ 13,737**	**$ 57,484**	**$ 98,352**	**$ 169,574**
							check =	$ 536,959
	Grand Total Cost of Monitoring Efforts =				**$ 37,749**	**$ 228,984**	**$ 270,226**	**$ 536,959**

Revised by MDE (8-30-13)

Checked by SAInc 7/2015 - No Changes made since CPI is neutral

Amendment No. 11 - Cost Adjustments Using the Consumer Price Index

Beginning of Year	CPI	Multipliers	
1997	161.40	1.33395	
1998	163.00	1.32086	
1999	166.60	1.29232	
2000	172.20	1.25029	
2001	177.10	1.21570	
2002	179.88	1.19691	
2003	183.96	1.17036	
2004	188.90	1.13976	
2005	195.30	1.10241	
2006	201.60	1.06796	
2007	207.32	1.03849	
2008	215.30	0.99646	
2009	214.54	1.01640	**1.0642**
2010	218.06	1.03157	**1.0816**
2011	224.94	1.02069	**1.1158**
2012	229.59	1.01466	
2013	232.96	1.02309	**1.1556**
2014.5	238.34	0.99324	
2015	236.73	1.00000	
2015.5	236.73		
2016	236.73		
2016.5	236.73		
2017	236.73		
2017.5	236.73		
2018	236.73		



Reference U.S. Bureau of Labor Statistics at *www.inflationdata.com (7/29/2011)*
Assuming a straight line increase in inflation as shown, the multipliers can be used to inflate a cost in any given year to 2013 dollars.
Example: A piece of equipment rental rate in 1999 was $150 / hr. What is this rental rate in 2013 dollars? Calculation: ($150) x (233/166.6 x 150) = $209.78

Revised by SAInc 4/13/2015

Select Category

INFLATIONDATA.COM

CURRENT CONSUMER PRICE INDEX

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVE
2015	233.707	234.722	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2014	233.916	234.781	236.293	237.072	237.900	238.343	238.250	237.852	238.031	237.433	236.151	234.812	**236.736**
2013	230.280	232.166	232.773	232.531	232.945	233.504	233.596	233.877	234.149	233.546	233.069	233.049	**232.957**
2012	226.665	227.663	229.392	230.085	229.815	229.478	229.104	230.379	231.407	231.317	230.221	229.601	**229.594**
2011	220.223	221.309	223.467	224.906	225.964	225.722	225.922	226.545	226.889	226.421	226.230	225.672	**224.939**
2010	216.687	216.741	217.631	218.009	218.178	217.965	218.011	218.312	218.439	218.711	218.803	219.179	**218.056**
2009	211.143	212.193	212.709	213.240	213.856	215.693	215.351	215.834	215.969	216.177	216.330	215.949	**214.537**
2008	211.080	211.693	213.528	214.823	216.632	218.815	219.964	219.086	218.783	216.573	212.425	210.228	**215.303**
2007	202.416	203.499	205.352	206.686	207.949	208.352	208.299	207.917	208.490	208.936	210.177	210.036	**207.342**
2006	198.300	198.700	199.800	201.500	202.500	202.900	203.500	203.900	202.900	201.800	201.500	201.800	**201.600**
2005	190.700	191.800	193.300	194.600	194.400	194.500	195.400	196.400	198.800	199.200	197.600	196.800	**195.300**
2004	185.200	186.200	187.400	188.000	189.100	189.700	189.400	189.500	189.900	190.900	191.000	190.300	**188.900**
2003	181.700	183.100	184.200	183.800	183.500	183.700	183.900	184.600	185.200	185.000	184.500	184.300	**183.960**
2002	177.100	177.800	178.800	179.800	179.800	179.900	180.100	180.700	181.000	181.300	181.300	180.900	**179.880**
2001	175.100	175.800	176.200	176.900	177.700	178.000	177.500	177.500	178.300	177.700	177.400	176.700	**177.070**
2000	168.800	169.800	171.200	171.300	171.500	172.400	172.800	172.800	173.700	174.000	174.100	174.000	**172.200**

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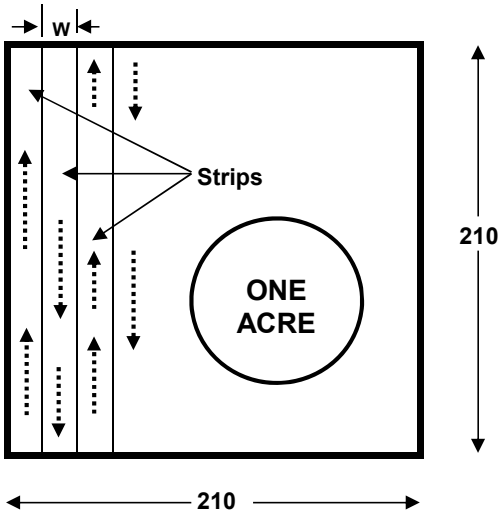
Dozer Productivity Calculations in Reclamation Operations at CC&V



Width, W (feet)	Strips	Distance (feet)	1 mph	1.5 mph	2 mph	2.5 mph	3 mph	3.5 mph	4 mph
			88	132	176	220	264	308	352
			(feet/min)						
			Travel ~~Time, minutes~~						
12	17.5	3675	41.8	27.8	20.9	16.7	13.9	11.9	10.4
11	19.1	4009	45.6	30.4	22.8	18.2	15.2	13.0	11.4
10	21.0	4410	50.1	33.4	25.1	20.0	16.7	14.3	12.5
9	23.3	4900	55.7	37.1	27.8	22.3	18.6	15.9	13.9
8	26.3	5513	62.6	41.8	31.3	25.1	20.9	17.9	15.7
7	30.0	6300	71.6	47.7	35.8	28.6	23.9	20.5	17.9
6	35.0	7350	83.5	55.7	41.8	33.4	27.8	23.9	20.9
5	42.0	8820	100.2	66.8	50.1	40.1	33.4	28.6	25.1
4	52.5	11025	125.3	83.5	62.6	50.1	41.8	35.8	31.3

INPUT QUESTIONS	INPUTS			PRODUCTIVITY CALCULATIONS
What is the strip width, W, for **D4 dozer ripping and fertilizing**?	8 feet	Assumed		
What is the estimated time for loading hopper with fertilizer?	10 min/Ac	Assumed		
What is the estimated speed in fertilizing and ripping simultaneously?	2.5 mph	Assumed		
What is the selected travel time for D4 dozer based on assumed speed?	25.1 min	Table	35.1 min/Ac	**D4 Dozer** **1.7 Ac/hr** D4 ripping & fertilizing
What is the strip width, W, for **D4 dozer seeding and harrowing**?	8 feet	Assumed		^^This Value Used as Source & Linked^^
What is the estimated time for loading hopper with seed?	10 min/Ac	Assumed		
What is the estimated speed in seeding and harrowing?	4 mph	Assumed		
What is the selected travel time for D4 dozer based on assumed speed?	15.7 min	Table	25.7 min/Ac	**D4 Dozer** **2.3 Ac/hr** D4 seeding & harrowing
What is the strip width, W, for **D8 dozer ripping?**	8.5 feet	Assumed		^^This Value Used as Source & Linked^^
What is the estimated speed in ripping with D8 dozer?	1 mph	Assumed		
What is the selected travel time for D8 dozer based on assumed speed?	59.2 min	Table	59.2 min/Ac	**D8 Dozer** **1.0 Ac/hr** D8 ripping
What is the strip width, W, for **D8 dozer in liming operations?**	12 feet	Assumed		
What is the estimated time for loading hopper with lime?	17 min/Ac	Assumed		
What is the estimated speed in liming with D8 dozer?	1 mph	Assumed		
What is the selected travel time for D8 dozer based on assumed speed?	62.8 min	Table	79.8 min/Ac	**D8 Dozer** **0.75 Ac/hr** D8 liming
				^^This Value Used as Source & Linked^^

MDE 12-9-04; revised 2-19-08

Dozer Work Spreading Growth Medium or Fill in Reclamation at CC&V

What is the machine that will be spreading fill and/or growth medium?	D9	
What is the typical push distance for spreading fill and/or growth medium?	150	feet
What is the selected dozer productivity from p1-39 Cat Handbook?	950	cu yds/hr
What is the skill level of the operator and its job correction value?	0.75	Average Operator
What is the anticipated efficiency?	0.83	50 minutes per hour
What is the adjustment factor for material condition?	1.2	Loose
What grade adjustment factor will be used?	1.0	Flat Grade or Slightly Downhill

Calculated D9 Dozer Productivity in Speading Fill or Growth Medium = 710 cu yds/hr **<-----This Value Used as Source & Linked**

Hydroseeding and Hydromulching Productivities at CC&V

Assumptions and Background Information

1 3000 gallon hydroseeder/hydromulcher will be used

2 Productivity depends on how far water source is located from the jobsite

3 Assume 2000 lbs/Ac hydromulch will be used

4 Assume 50 lbs/Ac seed will be used to be consistent with cost of $224/Ac Wind River Seed (2003)

5 According to a personal communication between MDE and Western States Reclamation in March 2004, it is possible to do as much as 4 acres of seeding per hour if water is close by, and assuming no hydromulch is used. Hydromulching greatly reduces productivity due to the much higher rate per acre for mulch.

6 According to a personal communication between MDE and Phillips Seeding in March 2004, hydromulching at 8 to 10 acres per day can be achieved if water is nearby and roads are good.

Hydroseeding Rate = **3** **acres per hour** based on a conservative approach (4 acres/hr max as above)

^^This Value Used as Source & Linked^^

Hydromulching Rate = **0.6** **acres per hour** based on a conservative approach **<-----This Value Used as Source & Linked**

Assume 9 acres/day and 10 hr shift and conservatively assume 65% of the time
Calculation: (0.65) x (9 acres/day) x (day/10 hrs) = 0.59 acres/hr

MDE 12-9-04; revised 2-19-08

Hand Seeding and Hand Tree Planting Productivities at CC&V

Assumptions and Background Information

1 150 tree and shrub seedlings per acre will be used (J. Campbell, CC&V, personal communication 2008)

2 50 lbs per acre seed will be used (previous reclamation cost estimates in Amendment #8)

3 Ellis Environmental Engineering, Inc. personal experience with tree-planting at minesites in Indiana, Illinois, Kentucky, and Colorado indicates a rate of approximately 100 trees per hour (slightly less than 2 trees per minute) is a reasonable productivity for hand planting with a dibble bar or spade.

4 Ellis Environmental Engineering, Inc. experience with hand-seeding (cyclone seeder) at minesites in Indiana, Illinois, Kentucky, New Mexico, Texas, and Colorado indicates a rate of approximately 1 acre per hour is a reasonable productivity for hand seeding with a cyclone spreader.

5 Recent 2004 work at Climax Mine by Bitterroot Restoration, Inc. resulted in the planting of 1600 shrubs and trees at the John Reed reclamation project on August 10th and 11th. 1600 trees were planted in 8 hours by two laborers. Therefore the rate was 100 trees per hour per planter.

6 Recent 2004-2007 work at Climax Mine by Ellis Environmental Engineering, Inc. involved hand-seeding sloping areas (2.5H to 1V) at the Storke reclamation site. Four acres were seeded in 3.5 hours using about 80 pounds of the Climax seed mixture in a cyclone seeder. Therefore the rate was approximately 1.14 acres/hour.

7 Assuming 55% of the trees initially planted will survive, then the number of trees to re-plant per acre will be 150 - (0.55 x 150 trees/acre) =150-83 = 67 trees per acre to be re-planted.

Determination of Productivities

Tree Planting Rate = (Acre/150 trees) x (100 trees /hr) / laborer = 0.67 acre/hour for each laborer	**0.67**	acre/hr
	^^This Value Used as Source & Linked^^	
Re-planting Trees Rate = (Acre/67 trees) x (100 trees/ hr) / laborer = 1.49 acre/hour for each laborer	**1.49**	acre/hr
	^^This Value Used as Source & Linked^^	
Hand Seeding Rate = 1 acre per hour based on experience as stated above	**1.0**	acre/hr
	^^This Value Used as Source & Linked^^	
Hand Fertilizing Rate = 1 acre per hour based on experience as stated above	**1.0**	acre/hr
	^^This Value Used as Source & Linked^^	

MDE 12-9-04; revised 2-19-08

Cubic Yards per Acre Constant 807

Area	Volume	Area of Application	Mean Stockpile Elevation
Units	CY	Acres	ft.
GM1	222,000	275.2	9,950
GM6-7	455,300	564.4	10,130
GM11	500,000	619.8	10,900
GM13	87,049	107.9	9,820
GM14	25,000	31.0	10,100
GM19	519,161	643.6	9,550
GM21	7,000	8.7	10,200
GM27	415,404	515.0	10,180
GM30	61,097	75.7	10,175
GM32-33	29,000	36.0	10,000
GM34	599,859	743.6	9,850
GM37	49,450	61.3	10,100
GM38	44,500	55.2	10,165
Verified with Mine Dept 2015 SAInc.			
Total	3,014,820.0	2,781.3	

Constants:			
	GM Depth	6.0	Inches
	Vol per Acre	806.7	cy/Ac

Application Requirements				Source Distribution By Volume (Cubic Yards)														Material Balance	
Area	Mean Estimated Elevation	Area of Application	Volume	GM1	GM6-7	GM11	GM13	GM14	GM19	GM21	GM27	GM30	GM32-33	GM34	GM37	GM38	Future Comments	Source	Volume Available
Units	at Centroid	Acres	CY	222,000	455,300	500,000	87,049	25,000	519,161	7,000	415,404	61,097	29,000	599,859	49,450	44,500		Total Volume	3,014,820
			Area of App->	275	55	620	108	31	644	9	515	76	36	744	61	55		Area Coverage	
			Elevation ->	9,950	10,165	10,900	9,820	10,100	9,550	10,200	10,180	10,175	10,000	9,850	10,100	10,165			Deficit
WHEX-South	10100	***13.0***	10,487		10,490													10,490	
WHEX Main	10200	***177.5***	143,183		98,684											44,500		143,184	
ECME-Altman-WH	10900	***300.4***	242,316		102,608	139,770												242,378	
Total ECME		490.9	395,986		211,782	139,770										44,500		396,052	
North Cresson	10100	***200.1***	161,425	161,450														161,450	
Main Cresson Truck	9600	***346.4***	279,431			116,642		15,700			96,070	17,540			33,480			279,432	
Main Cresson Total		346.4	279,431			116,642		15,700			96,070	17,540			33,480			279,432	
ECOSA	10450	***286.2***	230,874		80,930	149,945												230,875	
SGOSA	10200	***207.2***	167,160								167,162							167,162	
SGVLF incl. Mill Platform	10100	***336.5***	271,443								102,235			169,210				271,445	
AGVLF	10100	***547.2***	441,404				60,984		380,660									441,644	
Ajax Area	10100	***22.0***	17,736									18,876						18,876	
Haul Roads	10000		0																
Buildings	9850	***87.1***	70,261		35,000	35,270			14,117									84,387	
Ironclad/Victor	10400	***30.9***	24,931		17,960					7,000								24,960	
Ponds	9850	5.66	169			169												169	
Crusher Area	9900	***70***	56,467								10,180	18,500	29,000					57,680	
Total		2,630	2,117,287	60,550	109,628	58,204	26,065	9,300	124,384		39,757	6,181		430,649	15,970			Remaining	897,533

Amendment No. 11 - TREE PLANTING AREAS

(North and East-Facing Slopes)

Facility	Life of Mine	Comment
East Cresson - Wildhorse Reclamation	88.7	
WHEX - Grassy Valley Reclamation	-	
North Cresson Mine Area Reclamation	23.0	Revised by ratio of (4,670 / 4,200) = 1.11
Main Cresson Mine Area Reclamation	59.0	based on increase in permitted acreage
E. Cresson Overburden Storage Area	229.0	from Amendment No. 9 to Amendment No. 10
Squaw Gulch Overburden Storage Area	41.9	These numbers are linked to the individual
Arequa VLF	115.0	Spreadsheets for the facilities in question.
Squaw VLF	85.0	
Pads 3, 4 and Ajax	-	
Ironclad and Access Road	41.9	
Building Footprints	87.1	Trees planted on all these areas
Roads		Roads are within other boundaries included elsewhere
Viewshed Conservation Area	15.0	N. Cresson tree transplanting at build-out
Ancillary Areas	850.1	Assumed by MDE; consistent with other models
Totals =	1,635.7	

Revised by MDE 8-29-13; confirmed 10-31-14

Checked SAInc 7/15

Jump to TOC

Dozer Cost Increases Over Time 2000 - 2015

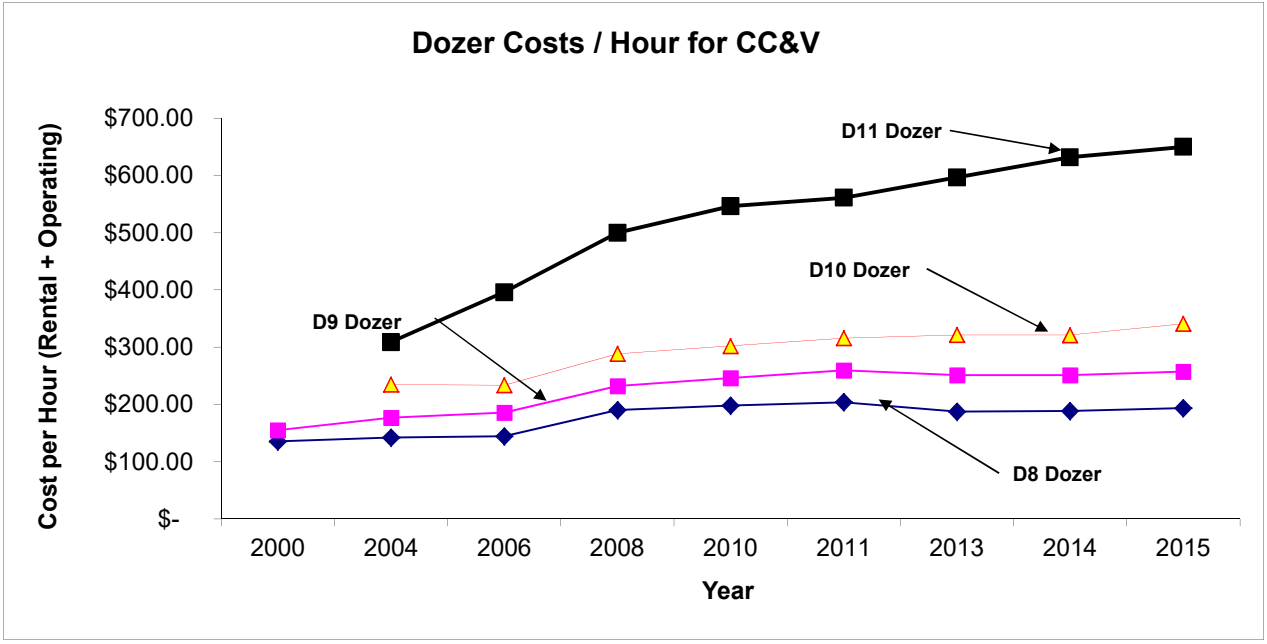
Year	D8	D9	D10	D11
2000	$ 135.34	$ 155.14		
2004	$ 142.01	$ 176.59	$ 234.82	$ 308.71
2006	$ 144.58	$ 185.87	$ 233.75	$ 396.12
2008	$ 190.00	$ 232.11	$ 288.52	$ 499.77
2010	$ 197.86	$ 246.25	$ 302.13	$ 546.52
2011	$ 203.96	$ 259.47	$ 315.73	$ 561.08
2013	$ 187.22	$ 251.30	$ 321.34	$ 596.76
2014	$ 188.64	$ 250.95	$ 321.16	$ 631.82
2015	$ 193.50	$ 257.22	$ 340.97	$ 649.96

Dozer Hourly Costs Used in CC&V Reclamation Cost Estimates

2004, 2006, 2008, and 2010 thru 2014 Costs are based on:
Rental Rates of Wagner Equipment Company and
Cost Reference Guide for Construction Equipment by EquipmentWatch, Primedia Business Directories and Book Group
1735 Technology Drive, San Jose, California

2000 Costs are from the Amendment #8 Permit Document

Revised (10-31-14)



Global Push Distance for Leveling 5 foot high Piles	*100*	*ft*
Pile Level Depth	5	ft
Volume per Acre	8,066.7	cy/Ac

Regression Equation Predictions

Dozer Lookup Table

8	D8	155,000	-1.1361
9	D9	125,771	-1.0012
10	D10	105,378	-0.8886
11	D11	162,252	-0.8872

Form of Equation - $Prod=aDist^b$

D8R Dozer

Coef.-->	a	b
	155000	-1.1361

L	P_{graph}	P_{calc}
49	1596	1863
76	1150	1131
100	920	828
155	650	503
200	500	377
300	312	238
400	171	171
500	136	133
600	100	108
650	99	99

D9R Dozer

Coef.-->	a	b
	125771	-1.00123

L	P_{graph}	P_{calc}
50	2182	2503
71	1653	1762
103	1277	1214
145	972	862
200	713	625
300	453	416
400	324	312
500	242	250
600	183	208
650	180	192

D10U Dozer

Coef.-->	a	b
	105377.8	-0.8886

L	P_{graph}	P_{calc}
50	3009	3259
87	2010	1992
136	1422	1339
200	1023	951
300	678	663
400	513	514
500	408	421
600	349	358
650	325	334

D11U Dozer

Coef.-->	a	b
	162251.7	-0.8872

L	P_{graph}	P_{calc}
53	4590	4791
61	4092	4229
80	3386	3325
120	2458	2320
179	1694	1627
260	1200	1168
312	1007	994
432	737	745
524	608	627
652	502	517

Model for Sloped Production of D10

What is the job correction factor for the operator?	**0.75**	Average Operator, Cat Hdbk, 39 Ed, p1-42
What is job correction factor for the material condition?	**1.2**	Waste rock is loose, Cat Hdbk, 39 Ed, p1-42
What is the job correction factor for job efficiency?	**0.83**	50 minutes operating per hour, Cat Hdbk, 39 Ed, p1-42
What is job correction factor for downhill grade pushing?	**1.2**	Assume conservatively 10% grade, Cat Hdbk, 39 Ed, p1-42
What is the correction factor for side by side dozing?	**1.2**	Cat Handbook, p 1-42 for multiple dozers
What is the dozer unit and blade type selected?	**D10, U-Blade**	
What is unadjusted production based on push length?	**542**	
Total Correction	**1.1**	yd^3/hr calculated

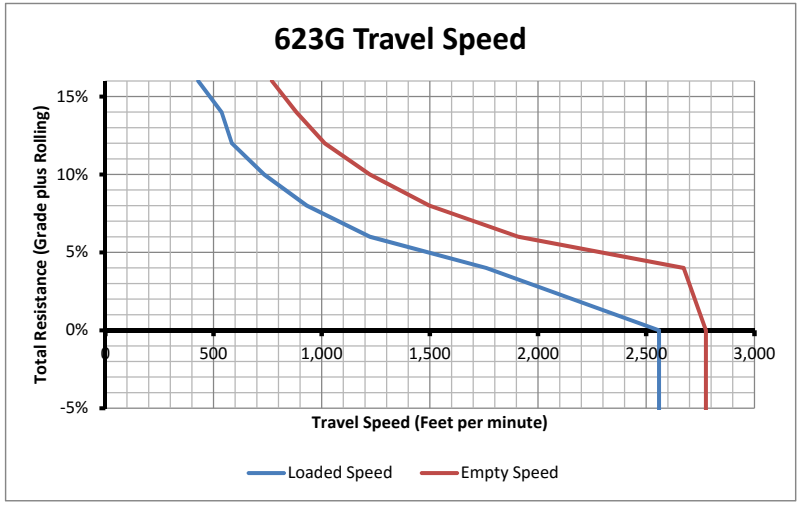
Model for Sloped Production of D11

What is the job correction factor for the operator?	0.75	Average Operator, Cat Hdbk, 39 Ed, p1-42
What is job correction factor for the material condition?	1.2	Waste rock is loose, Cat Hdbk, 39 Ed, p1-42
What is the job correction factor for job efficiency?	0.83	50 minutes operating per hour, Cat Hdbk, 39 Ed, p1-42
What is job correction factor for downhill grade pushing?	1.2	Assume conservatively 10% grade, Cat Hdbk, 39 Ed, p1-42
What is the correction factor for side by side dozing?	1.2	Cat Handbook, p 1-42 for multiple dozers
What is the dozer unit and blade type selected?	**D11, U-Blade**	
What is unadjusted production based on push length?	**542**	
Total Correction	**1.1**	yd^3/hr calculated

Truck Haulage Parameters Used for GrowthMedia and Fill Hauling by CAT 623G Self Loading Scraper

EXAMPLE for 2000 foot Haul

Example Haul Distance	2000	feet
What is the anticipated grade resistance for scraper?	5%	Site Specific
What is the rolling resistance for the scrapers in percent?	3%	Reference CAT Handbook Typical Rolling Resistence Factors
Calculated total resistance for the scraper in percent =	8%	Sum of Rolling and Grade Resistance
What is loaded travel time based on haul distance & rolling resistance (min)?	2.1	Minutes - Calculated from Loaded Table at Right
What is empty travel time based on haul distance & rolling resistance (min)?	0.7	Minutes - Calculated from Loaded Table at Right
What is the Loading time for scrapers at the loading area (min)?	0.90	Minutes
What is the length of time it takes a scraper to dump (min)?	0.70	Minutes
What is the capactiy of the selected scraper (avg cu yds)?	23	CY- CAT Handbook Page 8-4
Speed Loaded for Average Grade and RR=	931	fpm
Speed Empty for Average Grade and RR=	2776.1	fpm
Average Efficiency of scrapers (minutes per hour)=	55	**min/hr**



Travel Speed for Caterpiller 623 Scraper (Ref. Cat Handbook Ver. 39, Page8-22, 8-23)

Note : Revision 6/2015 The tables at right are from the CAT Handbook Version 39 and are used in conjunction with the Interpolate2 function to determine haul speed as a function of grade. The trip time is therefore the distance divided by the value looked up from the table. And example is provided below.

	Loaded			
Grade	Distance (m)	Distance (ft)	Time (min)	Speed (ft/min)
-16%	2,200	7,218	2.82	2,560
0%	2,200	7,218	2.82	2,560
4%	2,200	7,218	4.10	1,760
6%	2,050	6,726	5.50	1,223
8%	1,560	5,118	5.50	931
10%	1,230	4,035	5.50	734
12%	980	3,215	5.50	585
14%	900	2,953	5.50	537
16%	720	2,362	5.50	429

	Empty			
Grade	Distance (m)	Distance (ft)	Time (min)	Speed (ft/min)
-16%	2,200	7,218	2.60	2,776
0%	2,200	7,218	2.60	2,776
4%	2,200	7,218	2.70	2,673
6%	2,200	7,218	3.78	1,909
8%	2,200	7,218	4.82	1,497
10%	2,050	6,726	5.50	1,223
12%	1,700	5,577	5.50	1,014
14%	1,480	4,856	5.50	883
16%	1,290	4,232	5.50	770

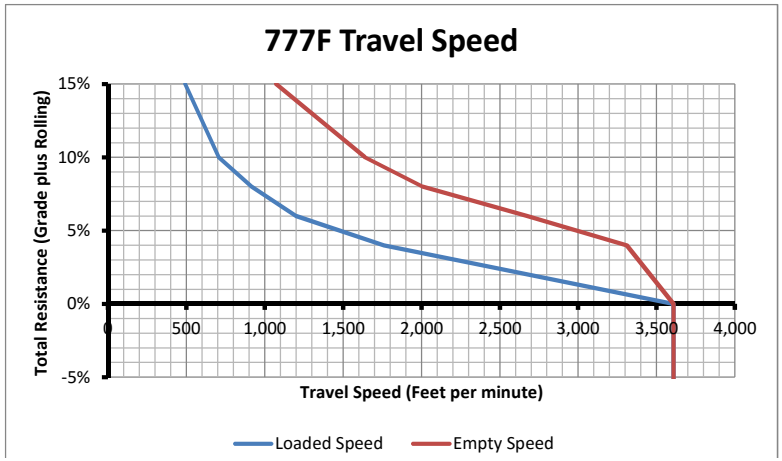
Trip Times for Select Distances

Loaded Haul					
Distance	1,500	2,000	3,000	4,000	5,000
Assumed Slope	5.00%	5.00%	5.00%	5.00%	5.00%
HR1 Loaded Trip Time	1.01	1.34	2.01	2.68	3.35
Return Empty					
Distance	1,500	2,000	3,000	4,000	5,000
Assumed Slope	-5.00%	-5.00%	-5.00%	-5.00%	-5.00%
HR3 Loaded Trip Time	0.54	0.72	1.08	1.44	1.80
Fixed Cycle Time	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**
Total Cycle Time	3.1	3.7	4.7	5.7	6.8
Truckloads per hour	19.1	16.4	12.8	10.5	8.9
Productivity (cy/hr)	402.1	345.5	269.6	221.1	187.3

Truck Haulage Parameters Used for GrowthMedia and Fill Hauling by CAT 777F loaded by CAT 992 Loader

EXAMPLE for 2000 foot Haul

	2000	feet
What is the anticipated grade resistance for trucks?	5%	Site Specific
What is the rolling resistance for the trucks in percent?	3%	Reference CAT Handbook Typical Rolling Resistence Factors
Calculated total resistance for the trucks in percent =	8%	Sum of Rolling and Grade Resistance
What is loaded travel time based on haul distance & rolling resistance (min)?	2.2	Minutes - Calculated from Loaded Table at Right
What is empty travel time based on haul distance & rolling resistance (min)?	1.0	
What is the manuever time for trucks at the loading area (min)?	0.70	Minutes
What is the length of time it takes a truck to dump (min)?	1.00	Minutes
What is the bucket capacity of the selected loader (cu yds)?	16	
What is the capactiy of the selected truck (avg cu yds)?	64	Note: Use Struck Capacity (54.8) with 988 Loader or 64 average with 992 Loader
Calculated number of loader buckets to fill the selected truck =	4.0	
How long does it take to fill loader bucket & dump into the truck (min)?	0.75	
Calculated time for loading a truck (min) =	3.00	**Includes Maneuver Time for Loader**
Speed Loaded for Average Grade and RR=	915	fpm
Speed Empty for Average Grade and RR=	2005.0	fpm
Average Efficiency of Trucks (minutes per hour)=	55	**min/hr**
Total Fixed Time (Linked into Sheets)	4.70	Minutes
Number of Trucks per Loader	4	each



Note : Revision 6/2015 -The tables at right are from the CAT Handbook Version 39 and are used in conjunction with the Interpolate2 function to determine haul speed as a function of grade. The trip time is therefore the distance divided by the value looked up from the table. And example is provided below.

Travel Speed for Caterpiller 777F (Ref. Cat Handbook Ver. 39, Page 9-33)

Grade	Loaded Distance (m)	Distance (ft)	Time (min)	Speed (ft/min)
-15%	2200	7218	2	3609
0%	2200	7218	2	3609
4%	2200	7218	4.1	1760
6%	1900	6234	5.2	1199
8%	1450	4757	5.2	915
10%	1120	3675	5.2	707
15%	780	2559	5.2	492

Grade	Empty Distance (m)	Distance (ft)	Time (min)	Speed (ft/min)
-15%	2200	7218	2	3609
0%	2200	7218	2	3609
4%	2200	7218	2.18	3311
6%	2200	7218	2.7	2673
8%	2200	7218	3.6	2005
10%	2200	7218	4.4	1640
15%	1700	5577	5.2	1073

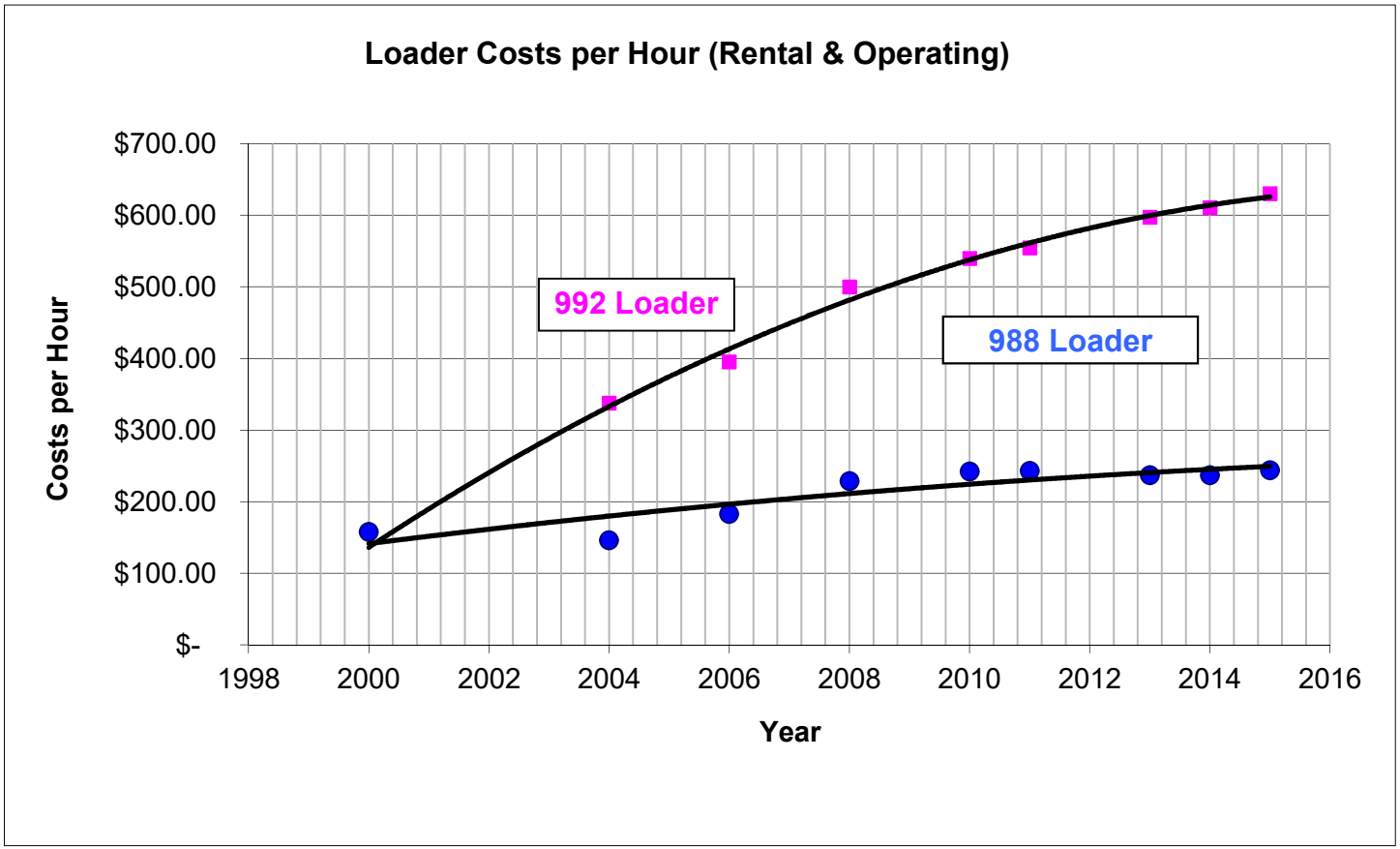
Trip Times for Select Distances

Loaded Haul					
Distance	1,500	2,000	3,000	4,000	5,000
Assumed Slope	5.00%	5.00%	5.00%	5.00%	5.00%
HR1 Loaded Trip Time	1.01	1.35	2.03	2.70	3.38
Return Empty					
Distance	1,500	2,000	3,000	4,000	5,000
Assumed Slope	-5.00%	-5.00%	-5.00%	-5.00%	-5.00%
HR3 Loaded Trip Time	0.42	0.55	0.83	1.11	1.39
Fixed Cycle Time	**4.0**	**4.0**	**4.0**	**4.0**	**4.0**
Total Cycle Time	5.4	5.9	6.9	7.8	8.8
Truckloads per hour	11.1	10.2	8.7	7.7	6.8
Productivity (cy/hr)	648.3	596.0	513.2	450.6	401.6

Year	988	992
2000	$ 157.82	
2004	$ 145.82	$ 337.90
2006	$ 182.70	$ 395.05
2008	$ 228.72	$ 500.18
2010	$ 241.98	$ 539.74
2011	$ 243.06	$ 554.69
2013	$ 236.96	$ 597.30
2014	$ 237.02	$ 610.77
2015	$ 243.75	$ 630.14

Loader Hourly Costs Used in CC&V Reclamation Cost Estimates

2004, 2006, 2008, and 2010 thru 2014 Costs are based on:
Rental Rates of Wagner Equipment Company and
Cost Reference Guide for Construction Equipment by
EquipmentWatch, Primedia Business Directories and Book Group
1735 Technology Drive, San Jose, California
2000 Costs are from the Amendment #8 Permit Document



MDE (9-5-13); (10-31-14)

Mining Disturbance per 1988 Plan of Operations and Reclamation Plan - Updated for Amendment No. 11

Assumptions: (1) Exhibit D - Reclamation Plan in the Limited Impact Operation 110 Form from 1988 commits to securing the adit, backfilling adit after mining ceases, grading, scarifying, seeding and hauling off any refuse (trash and debris) generated during mining. (2) The acreage inside the permit area for the Chicago site is 4.75 per CC&V files. (3) This cost estimate assumes 100% disturbance by mining operations except building footprints. (4) Two acres will be revegetated with grasses and forbs; trees will be planted on a portion of area. (5) Historic Structures to Remain. (6) All roads will be used to facilitate industrial use; therefore, assume no road reclamation required.

Amendment 11 Additional Assumptions - Costs are included under the Building Demolition TAB 11.1 for removal of the Additional Facilities at Chicago Tunnel to Support the Amendment 11 Actions

Inputs:		Quantity	Units	**Source or Explanation**
What is the estimated time for an excavator to backfill the adit and clean up site?		30	hrs	Estimated by MDE from site visit (5-8-14) and follow-up conversation with C. Hanks (8-28-14)
What is the third party contractor rental rate for a track hoe excavator?	$	100	per hr	Conley Construction 2013 Rate Sheet (incl. operator)
What is the estimated time for a dozer to grade / scarify disturbance to 3H to 1V?		30	hrs	Estimated by MDE from site visit (5-8-14)
What is the third party contractor rental rate for a D7 dozer?	$	85	per hr	Conley Construction 2013 Rate Sheet (incl. operator)
What is the estimated cost to remove culvert serving as stormwater control?	$	1,000	L.S.	Assume 8 hrs track hoe + $200 for labor + supervision
What is the estimated amount of growth media needed for reclamation?		1,614	cy	Calc: (2 ac x 807 cy /ac) = 1614 cy
What is the estimated cost of purchasing growth media for reclamation?	$	4.00	per cy	Based on Conley's Ma Beard Project
What is the estimated number of acres to be revegetated?		2.00	acres	Estimated by MDE from site visit (5-8-14)
What is the cost per acre for revegetion (seeding and mulching)?	$	1,200	$/ac	Consistent with recent projects at CC&V
What is the number of trees[1] to be planted based on a 10 x 10 ft spacing?		207	trees	Calc: (4.75 ac x 0.1)x(43560)/(10x10)=414; plant 1/2 of area
What is the cost of purchasing a tree seedling from a commercial nursery?	$	20.00	$/tree	Randy Mandel, formerly of Rocky Mtn.
What is the cost of planting a tree seedling?	$	22.50	$/tree	Native Plants in Rifle, CO (2013)

	Distribution->	CPI Adj. 2015/2014	Equipmt	Labor	Materials	Total	
Cost Calculations:			70%	20%	10%	100%	
Backfilling Chicago Adit	$ 3,000	$ 2,980	$ 2,085.81	$ 595.95	$ 297.97	$ 2,980	
Grading and Scarifying	$ 2,550	$ 2,533	$ 1,772.94	$ 506.55	$ 253.28	$ 2,533	
Removal of Culvert	$ 1,000	$ 993	$ 695.27	$ 198.65	$ 99.32	$ 993	
Growth Media Placement	$ 6,456	$ 6,412	$ 4,488.67	$ 1,282.48	$ 641.24	$ 6,412	
Revegetation	$ 2,400	$ 2,384	$ 1,668.65	$ 476.76	$ 238.38	$ 2,384	
Tree Planting on 10% of disturbed area	$ 8,798	$ 8,738	$ 6,116.65	$ 1,747.61	$ 873.81	$ 8,738	
Hauling / Disposal Refuse (trash)	$ 1,000	$ 993	$ 695.27	$ 198.65	$ 99.32	$ 993	
Total Cost for Reclamation =	$ 25,204		**$ 17,523**	**$ 5,007**	**$ 2,503**	**$ 25,033**	chk

[1]Trees will be a mixture of Englemann Spruce and Douglas Fir (Bristlecone Pines may be added if available) and will be planted on 10% of the area in select locations.

Prepared by MDE (5-16-14); Revised 8-28-14; 10-31-14
Costs updated to CPI SAInc 7/2015

Reclamation Cost Estimate for the Sangre De Cristo Adit, Providence Mining Company

Assumptions: (1) Closure requirements will be securing the adit, demolition and removal of buildings and structures onsite, removal of fencing, grading, scarifying, seeding disturbed areas and hauling off any refuse (trash and debris) generated during mining. (2) The disturbed acreage inside the permit area for the site is as follows: waste rock dump (0.6 ac.), office/storage yard (1.0 ac.), access road (0.11 ac.), and explosive storage areas (0.18 ac.). (3) There has been no topsoil salvaged for reclamation. (4) The adit will be closed per DRMS grated adit specifications. (5) The waste rock dump will be graded to 2.5H to 1V to facilitate revegetation. (6) All buildings will be removed from the site. (7) The fencing around explosive storage areas will be removed. (8) The existing gate will secure trespass.

Inputs:	Quantity	Units	**Source or Explanation**
What is the estimated cost to close the adit per DRMS Specs for a grated adit closure? Reference: General Bid Specifications of the DRMS March 2009 Publication for Closure of Inactive Mines in the State of Colorado, Section 11 and Standard Drawing No. 6 for Grated Adit Closures.	$ 4,000	L.S.	Estimated by Dan Hinds of Frontier Environmental from discussions w/ M. Ellis using drawings, measurements, and photos collected by Ellis during site visit on 10-16-14
What is estimated cost to remove fencing? (480 lineal feet at $2.98 / ft, Means 2014, p. 233)	$ 1,430	L.S.	Both explosive storage areas are surrunded by chain link
What is the estimated cost to remove the portable office building?	$ 1,500	L.S.	Based on similar experiences at other minesites
What is the cost to remove the temporary buildings housing the rock drill shop, pipe shop, change room / dry, tool shed, generator bldg.?	$ 3,750	L.S.	These building are mostly Connex boxes that have value in similar applications at other minesites. Therefore assume $750 per structure to relocate offsite.
What is the estimated cost to remove the fuel tank, generator, and clean up the storage yards around the site?	$ 3,000	L.S.	Based on similar experiences at other minesites
What is the estimated number of acres to be revegetated?	1.89	acres	Estimated - air photo (0.6 WR+1.0 yard+0.11 road+0.18 expl)
What is the cost per acre for revegetion (seeding and mulching)?	$ 1,200	$/ac	Consistent with recent projects at CC&V
Estimated time for a dozer to grade / scarify the access road and storage yard?	10	hrs	Estimated by MDE from site visit (10-16-14)
Estimated time for a dozer to grade / scarify waste rock dump disturbance to 2.5H to 1V?	25	hrs	Estimated by MDE from site visit (10-16-14)
What is the third party contractor rental rate for a D7 dozer?	$ 228.83	per hr	This cost includes rental, supplies, repairs, fuel, and operator

Cost Calculations:		CPI Adjust 2014 to 2015	Equipmt 70%	Labor 20%	Materials 10%	Total
Adit Closure per DRMS Specs	$ 4,000	$ 3,973	$ 2,781	$ 795	$ 397	$ 3,973
Fence Removal	$ 1,430	$ 1,420	$ 994	$ 284	$ 142	$ 1,420
Portable Office Removal	$ 1,500	$ 1,490	$ 1,043	$ 298	$ 149	$ 1,490
Main Structures Removal	$ 3,750	$ 3,725	$ 2,607	$ 745	$ 372	$ 3,725
Clean up; Removal of Generator, Fuel Tank	$ 3,000	$ 2,980	$ 2,086	$ 596	$ 298	$ 2,980
Grading Waste Rock Dump to 2.5:1	$ 5,721	$ 5,682	$ 3,978	$ 1,136	$ 568	$ 5,682
Grading and Scarifying Road and Yard	$ 2,288	$ 2,273	$ 1,591	$ 455	$ 227	$ 2,273
Revegetation	$ 2,268	$ 2,253	$ 1,577	$ 451	$ 225	$ 2,253
Foreman (40 hrs at $54 per hour)	$ 2,160	$ 2,145	$ 1,502	$ 429	$ 215	$ 2,145
Total Estimated Cost for Reclamation =	**$ 26,117**	$ 25,941	$ 18,159	$ 5,188	$ 2,594	$ 25,941

Prepared by MDE (10-31-14)
Updated CPI by SAInc (7/2015)

Amendment No. 11 - Mill Platform Reclamation Costs

Reclamation Units Input Table

Reclamation Units (Growth Media, Seeding, Fencing and Trees

Area	Values Remaining after 12/31 of Calendar Year	LOM Values	Units
Total Area (SF and Acres)	2,482,551	**57.0**	Acres
Area not reseeded or treated with GM	0	**0**	Acres
Net Area of Life-of-Mine to be reseed	**Life-of-Mine Area --->**	**57.0**	Acres
Area Already Reseeded as of 12/31 of this calendar year	Enter Value at Right, in Acres	0	Acres
Net Area Requiring Reclamation		57.0	Acres
Remaining and LOM Total Area of Tree Planting		**35.0**	Acres
Remaining and LOM Total Fencing Length above Mine Area		0	Feet
Acreage to receive fertilizing and ripping simultaneously with a D4 dozer? (Enter if different from default)		57.0	acres
Acreage to receive seeding & harrowing simultaneousy with a D4 dozer? (Enter if		57.0	acres
Light Grading Area (enter if > zero)		0	Acres

Regrading Units including Leveling Dump-piles and Mass Hauling

	End-of-Mine Quantities from Amendment 11	
Total Volume of Cut - Total Volume of Fill-		Cu yd Cu yd
Area requiring Mass Haul	57	Acres
Area requiring Pile-leveling and Grading (Total minus area of Mass Haul)	0	Acres
Volume of Pile Leveling and	459,732	Cu yd
Volume of Mass Dozing (minimum of Cut/Fill for each Unit)	0	Cu Yd
Total Volume that must be Dozed (not including Light Grading)	459,732	Cu Yd
Average Push Distance for Dozer Leveling (100 ft used for Pile Leveling)	100	Ft
Volume that must be Hauled (cut/fill imbalance)	**0**	Cy Yd
Weighted HD Mass Excavation	**785**	ft

Cost Summary - Details are listed below

Life-of-Mine Cost (Amendment 11)

Item	Equipment	Quantity	Eqmt Cost	Labor Cost	Material Cost	Total Cost	Unit Cost
Heavy Dozing to Level Piles and Balanced Cut/fill	D10	459,732	$ 82,793	$ 8,580		**$ 91,373**	$ 0.20
Mass Haul to Balance Cut/Fill	CAT777	0	$ 0	$ 0		**$ 0**	$ 1.34
SubTotal ReGrading and Contouring		459,732	$ 82,793	$ 8,580		$ 91,373	
Growth Media Distribution from Stockpiles	CAT623	45,983	$ 38,628	$ 6,125		$ 44,752	$ 0.97
Total Seeding, Fine Grading, Trees, and Supervision			$ 33,758	$ 38,531	$ 76,929	$ 149,218	
Grand Total for Management Unit			**$ 155,178**	**$ 53,236**	**$ 76,929**	**$ 285,343**	

Cost Development for Regrading - Includes Pile Leveling, Dozer Cut/Fill Balanced, and Haulage from Neighboring Units

Dozer Productivity Calculation for Heavy Grading	Annual Regrade Quantity	Comment	Life of Mine Amendment 11 Quantity
What is the volume cut/fill Dozed and leving piles	750,000	**Cut/Fill Balanced Volumes plus leveling piles**	459,732
What is the expected average push distance for leveling piles?	550	**Short Doze to level out end-dumped truck loads**	100
What is the overall Job Correction Factor for D10 Dozing?	1.08	Dozer Productivity Tab	1.08
What is unadjusted production based on push distance for a D10?	387	**cu yds/hr from Regression Equation Developed from**	**1,760**
Calculated adjusted production based on job factors =	416.2	cu yds/hr calculated	1893.4
Calculated D10 Dozer hours in grading =	1801.84	hours	**242.81**

LEGEND: Maunal Entry; Life-of-mine

Estimated Unit Cost for D10 Dozer	Eqmt Cost	Labor Cost	Total Cost	UnitCost($/cy)	Eqmt Cost	Labor Cost	Total Cost	UnitCost($/cy)
	$ 614,373	$ 63,659	$ 678,047	**$ 0.90**	$ 82,793	$ 8,580	$ 91,373	**$ 0.20**

What is the overall Job Correction Factor for D11 Dozing?	1.08	Dozer Productivity Tab	1.08	
What is unadjusted production based on push distance for a D11?	601	**cu yds/hr from Regression Equation Developed from**	**2,728**	
Calculated adjusted production based on job factors =	646.6	cu yds/hr calculated	2934.1	
Calculated D11 Dozer hours in grading =	1159.95	hours	**156.69**	

Estimated Unit Cost for D11 Dozer	Eqmt Cost	Labor Cost	Total Cost	UnitCost($/cy)	Eqmt Cost	Labor Cost	Total Cost	UnitCost($/cy)
	$ 753,926	$ 40,987	$ 794,913	**$ 1.06**	$ 101,841	$ 5,537	$ 107,377	**$ 0.23**

Mass Haul of Material Between Units to Achieve Earthwork Balance

Additional Volume that will be truck hauled	0	cy
What is the weighted average Haul Distance for the truck haul?	785	Feet
What is the Estimated Total Resistance Loaded (Grade Plus 5%)?	10%	Grade+RR
What is the Total Resistance Empty Return (Grade plus 5%)	5%	Grade+RR

CAT 777 Trucks

What is loaded travel time based on haul distance & rolling resistance (min)?	1.1	Minutes
What is empty travel time based on haul distance & rolling resistance (min)?	0.5	Minutes
What is the Fixed Time for CAT777 Trucks?	4.7	Minutes
Total Trip Time for CAT777 Trucks	6.3	Minutes
Calculated Productivity of Loader/Truck Combination (cu yd/hr)	[illegible]	cy/hr

		Hours	Eqmt Cost	Labor Cost	Total Cost
777 Truck (cy/hr)		0	$ 0	$ 0	$ 0
992 Loader (cy/hr)		0	$ 0	$ 0	$ 0
14 H Grader	Fleet hrs=#Trucks per loader	0	$ 0	$ 0	$ 0
5K gal H_20 Truck	Fleet hrs=#Trucks per loader	0	$ 0	$ 0	$ 0
Total Fleet Cost and Unit Cost			$ 0	$ 0	$ 0
				$ 1.34	**per CY**

Articulated Trucks

What is loaded travel time based on haul distance & rolling resistance (min)?	1.1	Minutes
What is empty travel time based on haul distance & rolling resistance (min)?	0.3	Minutes
What is the Fixed Time for Articulated Trucks?	4.8	Minutes
Total Trip Time for Articulated Trucks	6.3	Minutes
Calculated Productivity of Loader/Truck Combination (cu yd/hr)	246	cy/hr

		Hours	Eqmt Cost	Labor Cost	Total Cost
Articulated Truck (cy/hr)	0	0	$ 0	$ 0	$ 0
988 Loader	0	0	$ 0	$ 0	$ 0
14 H Grader	Fleet hrs=#Trucks per loader	0	$ 0	$ 0	$ 0
5K gal H_20 Truck	Fleet hrs=#Trucks per loader	0	$ 0	$ 0	$ 0
Total Fleet Cost and Unit Cost			$ 0	$ 0	$ 0
				$ 1.51	**per CY**

Summary of Growth Media Haulage Costs for LOM

LEGEND	
	Maunal Entry
	Life-of-mine

Growth Media Distribution Area

Growth Media Equipment	CAT 777 Haul Trucks Volume (cy)	Work Hours	Total GM Req'd. 45,983 Eqmt Cost	Labor Cost	Total Cost
Mill Platform	45,980	69	$ 31,737	$ 1,876	$ 33,613
0	1	-	$ -	$ -	$ -
0	1	-	$ -	$ -	$ -
0	1	-	$ -	$ -	$ -
CAT 992 Loader	Truck Hours/(Trucks per Loader)	17.30	$ 10,903	$ 611	$ 11,514
14 H Grader	Fleet hrs/4	17.30	$ 2,324	$ 607	$ 2,931
5K gal H_20 Truck	Fleet hrs/4	17.30	$ 3,382	$ 460	$ 3,841
Total Cost			**$ 48,345**	**$ 3,555**	**$ 51,900**
Cost per CY					**$ 1.13**

Growth Media Distribution Area

Growth Media Equipment	CAT 740 Articulated Trucks Volume (cy)	Work Hours	Total GM Req'd. 45,983 Eqmt Cost	Labor Cost	Total Cost
Mill Platform	45,980	169	$ 30,095	$ 4,581	$ 34,675
0	1	-	$ -	$ -	$ -
0	1	-	$ -	$ -	$ -
0	1	-	$ -	$ -	$ -
CAT 988 Loader	Truck Hours/(Trucks per Loader)	42.24	$ 10,297	$ 1,493	$ 11,789
14 H Grader	Fleet hrs/4	42.24	$ 5,673	$ 1,483	$ 7,156
5K gal H20 Truck	Fleet hrs/4	42.24	$ 8,256	$ 1,123	$ 9,379
Total Cost			**$ 54,321**	**$ 8,679**	**$ 63,000**
Cost per CY					**$ 1.37**

Growth Media Distribution Area

Growth Media Equipment	Cat 623 Scrapers Volume (cy)	Work Hours	Total GM Req'd. 45,983 Eqmt Cost	Labor Cost	Total Cost
Mill Platform	45,980	122	$ 28,544	$ 4,238	$ 32,782
0	1	-	$ -	$ -	$ -
0	1	-	$ -	$ -	$ -
0	1	-	$ -	$ -	$ -
14 H Grader	Fleet hrs/4	30.58	$ 4,107	$ 1,074	$ 5,181
5K gal H20 Truck	Fleet hrs/4	30.58	$ 5,977	$ 813	$ 6,790
Total Cost			**$ 38,628**	**$ 6,125**	**$ 44,752**
Cost per CY					**$ 0.97**

	Units (cy or ac) or Rate per hour	Work Hours	Equipment	Labor	Materials	Total
[4]Spread Growth Medium (cy)	45,982	64.8	$ 16,667	$ 2,290	included	$ 18,957
D9 Rate(cy/hr)	710					
[5]Soil Analyses (#)	11.40		included	included	$ 1,331	$ 1,331
Rate (ac / sample)	5					
[6]Rip & Fertilize (ac)	57	33.3	$ 1,747	$ 1,178	$ 10,099	$ 13,024
D4 Rate (ac/hr)	1.7					
[7]Seed & Harrow (ac)	57	24.4	$ 1,378	$ 863	$ 3,302	$ 5,543
D4 Rate (ac/hr)	2.3					
[9]Hydro-Mulching (ac)	57	95.0	$ 5,225	$ 2,575	$ 29,973	$ 37,773
Rate (ac/hr)	0.60					
[10]Plant Trees (ac)	35.0	52.2	N/A	$ 1,690	$ 32,223	$ 33,913
Rate (ac/hr)	0.67					
Total Work Hours =		2,071.6				
[11]Supervisor (work hrs/4)		517.9	$ 8,741	$ 29,936	included	$ 38,677
Total Miscellaneous Costs for Seeding, Trees, and Supervision			**$ 33,758**	**$ 38,531**	**$ 76,929**	**$ 149,218**

Footnotes for summary cost table:

[1]Assumes heavy grading will be done with conventional D10 or D11dozers with U blades where the push distances are practical

[2]Assumes light grading will be done with a D9 dozer on the backfilled areas in Wildhorse Extension area (rate = 2 hrs/acre)

[3]Growth Medium Replacement fleet will consist of three 623 Scrapers

[4]Growth Medium will be spread using a D-9 dozer to a depth of 6 inches

[5]Soil analyses will be run on samples of the reclaimed areas to determine optimum fertilizer rates

[6]Ripping and fertilizing will be conducted on the replaced growth medium using a conventional D4 dozer with a cyclone spreader

[7]Seeding and harrowing will be conducted on all replaced growth medium that is traversible with conventional equipment

[9]Mulching will be conducted using conventional hydro-seeder/hydro-mulcher

[10]Trees and shrubs will be planted on north and east-facing slopes

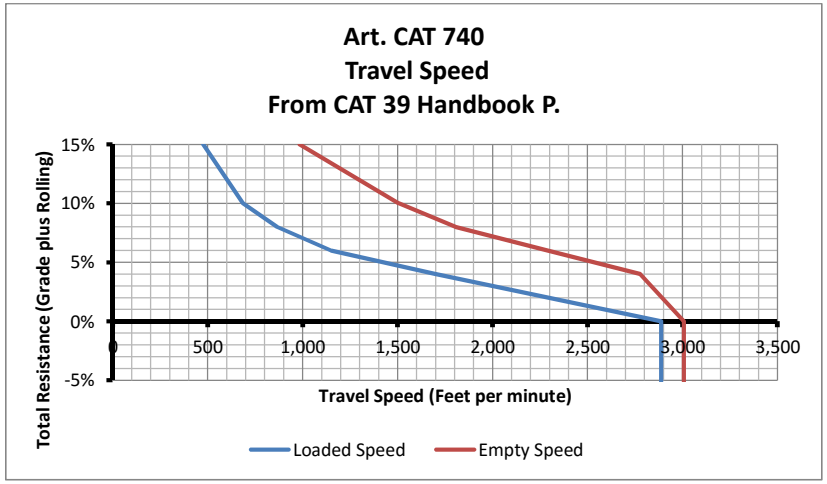
[11]Supervisor costs are figured at 25 percent of the total work hours to accomplish the reclamation effort

ECWH Truck Haulage of Overburden for Re-contouring

		Mill Platform					No Growth Media	Total
Elev at Dump Pt. Centroid		10130						
Sub-Unit Area (Acres)		57	0.001	0.001	0.001	0.001	0	57.004
Sub-Unit Volume (Cubic Yards)		45,980	1	1	1	1		45,983
Source Distribution		Sub-unit Area/Source (Acres)						
Source 1	GM27	57						57
Source 2								0
Source 3	Null							0
Source 4								0
Source 5								0
Source 6								0

Truck Haulage Parameters Used for GrowthMedia Hauling by Articulated Truck Loaded with 988

EXAMPLE for 2000 foot Haul		
Example Haul Distance	2000	feet
What is the anticipated grade resistance for trucks?	5%	Site Specific
What is the rolling resistance for the trucks in percent?	3%	Reference CAT Handbook Typical Rolling Resistence Factors
Calculated total resistance for the trucks in percent =	8%	Sum of Rolling and Grade Resistance
What is loaded travel time based on haul distance & rolling resistance (min)?	2.3	Minutes - Calculated from Loaded Table at Right
What is empty travel time based on haul distance & rolling resistance (min)?	0.7	Minutes - Calculated from Loaded Table at Right
What is the manuever time for trucks at the loading area (min)?	0.70	Minutes
What is the length of time it takes a truck to dump (min)?	1.00	Minutes
What is the bucket capacity of the selected loader (cu yds)?	8	
What is the capactiy of the selected truck (avg cu yds)?	28	
Calculated number of loader buckets to fill the selected truck =	4.0	
How long does it take to fill loader bucket & dump into the truck (min)?	0.6	
Calculated time formaneuver & loading a truck (min) =	3.10	
Speed Loaded for Average Grade and RR=	865	fpm
Speed Empty for Average Grade and RR=	3007.4	fpm
Average Efficiency of Trucks (minutes per hour)=	55	**min/hr**
Total Fixed Time (Linked into Sheets)	4.80	Minutes
Number of Trucks per Loader	4	each



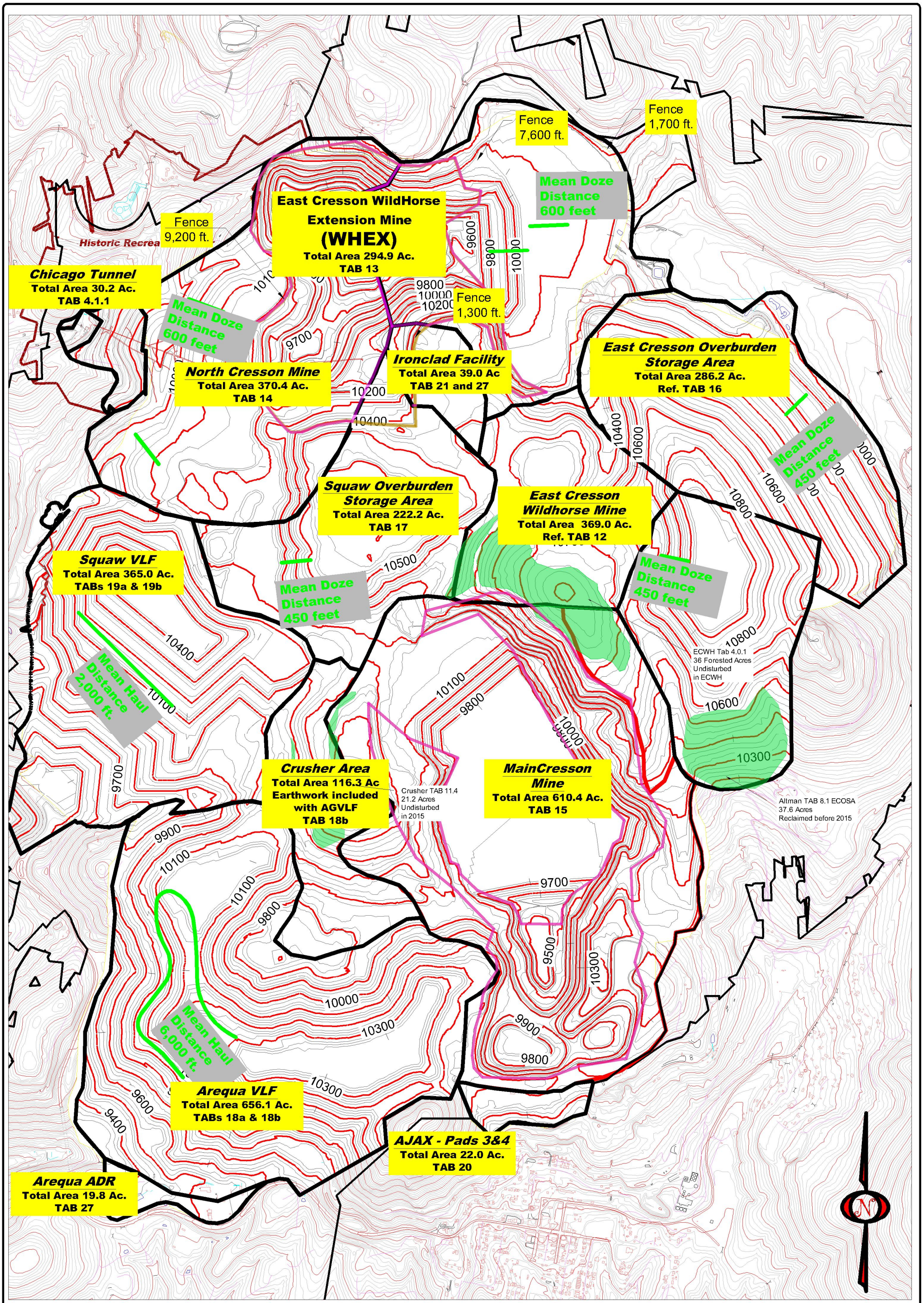
Travel Speed for Caterpiller Art 740 (Ref. Cat Handbook Ver. 39, Page 10-22)

Note : Revision 6/2015 - The tables at right are from the CAT Handbook Version 39 and are used in conjunction with the Interpolate2 function to determine haul speed as a function of grade. The trip time is therefore the distance divided by the value looked up from the table. And example is provided below.

Loaded				
Grade	Distance (m)	Distance (ft)	Time (min)	Speed (ft/min)
-15%	2200	7218	2.5	2887
0%	2200	7218	2.5	2887
4%	2200	7218	4.25	1698
6%	1930	6332	5.5	1151
8%	1450	4757	5.5	865
10%	1150	3773	5.5	686
15%	800	2625	5.5	477

Empty				
Grade	Distance (m)	Distance (ft)	Time (min)	Speed (ft/min)
-15%	2200	7218	2.4	3007
0%	2200	7218	2.4	3007
4%	2200	7218	2.6	2776
6%	2200	7218	3.15	2291
8%	2200	7218	4	1804
10%	2200	7218	4.8	1504
15%	1650	5413	5.5	984

Loaded Haul		**Panel 2**			
Distance	1,500	2,000	3,000	4,000	5,000
Assumed Slope	5.00%	5.00%	5.00%	5.00%	5.00%
HR1 Loaded Trip Time	1.05	1.40	2.11	2.81	3.51
Return Empty					
Distance	1,500	2,000	3,000	4,000	5,000
Assumed Slope	-5.00%	-5.00%	-5.00%	-5.00%	-5.00%
HR3 Loaded Trip Time	0.50	0.67	1.00	1.33	1.66
Fixed Cycle Time	**4.1**	**4.1**	**4.1**	**4.1**	**4.1**
Total Cycle Time	5.7	6.2	7.2	8.2	9.3
Truckloads per hour	10.6	9.7	8.3	7.3	6.5
Productivity (cy/hr)	272.5	249.6	213.8	187.0	166.1



1 Configuration at End of Mining, Pre-Reclamation (PMT)
Plan View
1"=1340 ft - 1"=1/4 mile (Tabloid Size Drawing)

REVISIONS	NO.	DATE	MADE BY	CKD. BY	REMARKS
	0	11/24/15	SDS		Original Issue
	1	12/3/2015	SDS		For Review

Cresson Mine
near Victor CO

Amendment No. 11
Reclamation Cost Estimate
Post Mining Configuration (PMT)

Steffens and Associates, Inc.
Water Resources - Environmental - Mining Engineering
Arvada CO - steffensinc@msn.com - 303.378.8181

CLIENT: CC&V Gold Mining Co.

Alt. Drawing Number	Scale	DRAWING NO.
Sht 1 of 5	Noted	CCVSA11-1 1

Fence 7,600 ft.

Fence 1,700 ft.

Fence 9,200 ft.

Historic Recrea

East Cresson WildHorse Extension Mine (WHEX)
Total Area 294.9 Ac.
TAB 13

Chicago Tunnel
Total Area 30.2 Ac.
TAB 4.1.1

Fence 1,300 ft.

Ironclad Facility
Total Area 39.0 Ac
TAB 21 and 27

East Cresson Overburden Storage Area
Total Area 286.2 Ac.
Ref. TAB 16

North Cresson Mine
Total Area 370.4 Ac.
TAB 14

Squaw Overburden Storage Area
Total Area 222.2 Ac.
TAB 17

East Cresson Wildhorse Mine
Total Area 369.0 Ac.
Ref. TAB 12

Squaw VLF
Total Area 365.0 Ac.
TABs 19a & 19b

ECWH Tab 4.0.1
36 Forested Acres
Undisturbed
in ECWH

Crusher Area
Total Area 116.3 Ac
Earthwork included with AGVLF
TAB 18b

Crusher TAB 11.4
21.2 Acres
Undisturbed
in 2015

MainCresson Mine
Total Area 610.4 Ac.
TAB 15

Altman TAB 8.1 ECOSA
37.6 Acres
Reclaimed before 2015

Arequa VLF
Total Area 656.1 Ac.
TABs 18a & 18b

AJAX - Pads 3&4
Total Area 22.0 Ac.
TAB 20

Arequa ADR
Total Area 19.8 Ac.
TAB 27

1 Configuration after Reclamation, Final Surface Contours
Plan View
1"=1340 ft - 1"=1/4 mile (Tabloid Size Drawing)

REVISIONS	NO.	DATE	MADE BY	CKD. BY	REMARKS
	0	11/24/15	SDS		Original Issue
	1	12/3/2015	SDS		For Review

Cresson Mine
near Victor CO

Amendment No. 11
Reclmation Cost Estimate
Post-Reclamation / Final Surface Contours

Steffens and Associates, Inc.
Water Resources - Environmental - Mining Engineering
Arvada CO - steffensinc@msn.com - 303.378.8181

CLIENT: CC&V Gold Mining Co.

Alt. Drawing Number	Scale	DRAWING NO.
Sht 2 of 5	Noted	CCVSA11-2 1

East Cresson WildHorse Extension Mine (WHEX)
Total Area 294.9 Ac.
TAB 13

Fence 7,600 ft.

Fence 1,700 ft.

Fence 9,200 ft.

Historic Recrea

Chicago Tunnel
Total Area 30.2 Ac.
TAB 4.1.1

Fence 1,300 ft.

Ironclad Facility
Total Area 39.0 Ac
TAB 21 and 27

North Cresson Mine
Total Area 370.4 Ac.
TAB 14

East Cresson Overburden Storage Area
Total Area 286.2 Ac.
Ref. TAB 16

Trees 23 Ac

Trees 40.6 Ac

Trees 41.9 Ac

Trees 229 Ac

Squaw Overburden Storage Area
Total Area 222.2 Ac.
TAB 17

East Cresson Wildhorse Mine
Total Area 369.0 Ac.
Ref. TAB 12
88.7 Ac

Squaw VLF
Total Area 365.0 Ac.
TABs 19a & 19b

Trees 55 Ac

Trees 30 Ac Scattered Clumps

Fence 19,800 LF

ECWH Tab 4.0.1
36 Forested Acres
Undisturbed
in ECWH

Crusher Area
Total Area 116.3 Ac
Earthwork included with AGVLF
TAB 18b

Crusher TAB 11.4
21.2 Acres
Undisturbed
in 2015

MainCresson Mine
Total Area 610.4 Ac.
TAB 15

Altman TAB 8.1 ECOSA
37.6 Acres
Reclaimed before 2015

Trees 47 Ac

Trees 11 Ac

Trees 89 Ac

Trees 26 Ac

Trees 12 Ac

Arequa VLF
Total Area 656.1 Ac.
TABs 18a & 18b

AJAX - Pads 3&4
Total Area 22.0 Ac.
TAB 20

Arequa ADR
Total Area 19.8 Ac.
TAB 27

1 Fencing High-walls and Tree Planting
Plan View
1"=1340 ft - 1"=1/4 mile (Tabloid Size Drawing)

Notes:
1. Trees are to be planted on North and East Facing Slopes
2. High-walls greater than 100 feet will be fenced in lieu of backfill and grading.

LEGEND

- Chain-link Fencing above High-walls taller than 100 feet vertical
- Areas where Reclamation is not required - Forested, Natural, or Already Reclaimed
- Areas where Reclamation is not required - Forested, Natural, or Already Reclaimed
- Steep High-wall Areas with No Growth Media

REVISIONS	NO.	DATE	MADE BY	CKD. BY	REMARKS
	0	11/24/15	SDS		Original Issue
	1	12/3/2015	SDS		For Review

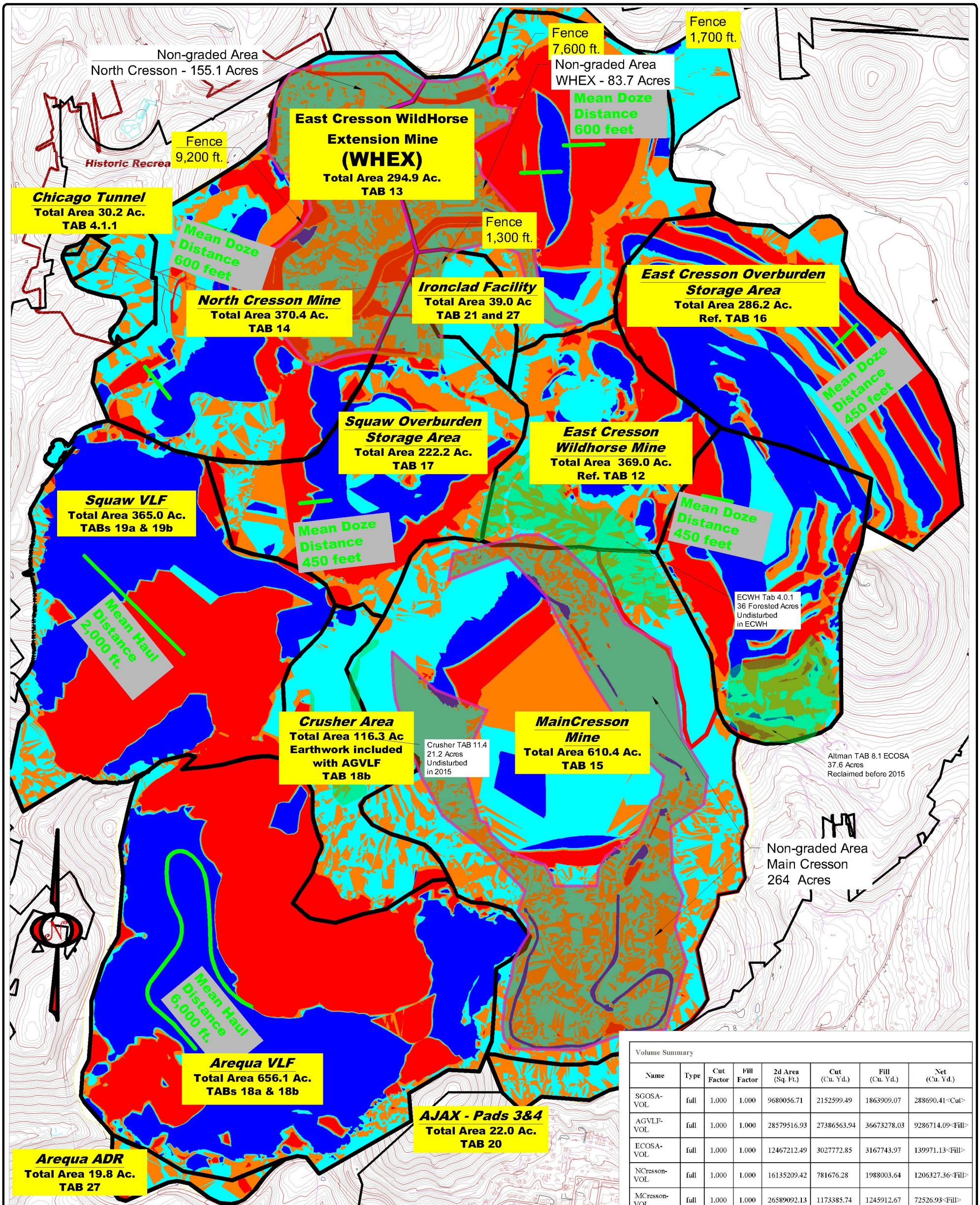
Cresson Mine
near Victor CO

Amendment No. 11
Reclamation Cost Estimate
Tree Planting - High-wall Fencing - Exclusions

Steffens and Associates, Inc.
Water Resources - Environmental - Mining Engineering
Arvada CO - steffensinc@msn.com - 303.378.8181

CLIENT: CC&V Gold Mining Co.

Alt. Drawing Number	Scale	DRAWING NO.
Sht 3 of 5	Noted	CCVSA11-3 1



1 Regrading Requirement
Plan View
1"=1340 ft - 1"=1/4 mile (Tabloid Size Drawing)

Elevations Table

Number	Minimum Elevation	Maximum Elevation	Area	Color
1	-231.73	-5.00	64853193.29	
2	-5.00	0.00	163434895.33	
3	0.00	5.00	96991870.67	
4	5.00	375.67	90293173.91	

Volume Summary

Name	Type	Cut Factor	Fill Factor	2d Area (Sq. Ft.)	Cut (Cu. Yd.)	Fill (Cu. Yd.)	Net (Cu. Yd.)
SGOSA-VOL	full	1.000	1.000	9680056.71	2152599.49	1863909.07	288690.41<Cut>
AGVLF-VOL	full	1.000	1.000	28579516.93	27386563.94	36673278.03	9286714.09<Fill>
ECOSA-VOL	full	1.000	1.000	12467212.49	3027772.85	3167743.97	139971.13<Fill>
NCresson-VOL	full	1.000	1.000	16135209.42	781676.28	1988003.64	1206327.36<Fill>
MCresson-VOL	full	1.000	1.000	26589092.13	1173385.74	1245912.67	72526.93<Fill>
AGADR-VOL	full	1.000	1.000	864594.84	17559.18	18655.24	1096.07<Fill>
IRONCLAD-VOL	full	1.000	1.000	1699088.73	14865.62	955.54	13910.08<Cut>
ECWH-VOL	full	1.000	1.000	16073273.83	3307864.70	3527033.09	219168.39<Fill>
SGVLF-VOL	full	1.000	1.000	15728074.76	19418776.46	23710025.07	4291248.60<Fill>
AJAX-VOL	full	1.000	1.000	957753.49	5033.17	0.46	5032.71<Cut>
WHEX-VOL	full	1.000	1.000	12844577.28	1564305.50	2330393.69	766088.19<Fill>

Totals

	2d Area (Sq. Ft.)	Cut (Cu. Yd.)	Fill (Cu. Yd.)	Net (Cu. Yd.)
Total	141618450.62	58850402.92	74525910.48	15675507.56<Fill>

REVISIONS

NO.	DATE	MADE BY	CKD. BY	REMARKS
0	11/24/15	SDS		Original Issue
1	12/3/2015	SDS		For Review

Cresson Mine
near Victor CO

Amendment No. 11
Reclamation Cost Estimate
Regrading Cut/Fill Quantities

Steffens and Associates, Inc.
Water Resources - Environmental - Mining Engineering
Arvada CO - steffensinc@msn.com - 303.378.8181

CLIENT: CC&V Gold Mining Co.

Alt. Drawing Number	Scale	DRAWING NO.
Sht 4 of 5	Noted	CCVSA11-4 1

1,700 ft

CR 82

Mollie Kathleen

GM1
275.2 Ac-9950
222,000 cy
NC4-82.5
NC3-51.3
NC1 - 66.3
Excess - 75 Ac

48,000 cy in Visual Berm (2015)

Proper Adit

North Cresson Mine
Ref. TAB 4.0.3

Chicago Tunnel Site

NC4-82.5Acres GM1-66590 Doze Up

NC3-51.3 Acres GM1>41400 623G/Dozer

NC1 - 66.3 Ac
GM1>53,460
623GScraper/Dozer
300

WHEX2-177.5 Acres
GM38 >44,500 cy
GM6-7>98,680 cy
777/Doze

GM38
55.2Ac-10165
44,500 cy
All WHEX2

East Cresson Wildhorse Extension (WHEX)
Ref. TAB 4.0.2

No Growth Media
311 Acres

AM11 Fence
18,000 ft

GM21
8.7 Ac-10200
7,000cy
All to Ironclad Corridor

10' Dia. Vent Raise

EX1-13.0Acres
6-7>10,500 cy
/Doze

Victor/Ironclad Facilities
Ref. TAB 8.3

Ironclad - 30.9 Acres
GM6-7>17960cy
GM21>7,000 cy
777/Doze

GM6&7
564.4 Ac-10130
455,300 cy
WHEX1-13.0
WHEX2-122.3
Ironclad-22.2
ECWH1-127.2
ECOSA5-100.3
Buildings 43.4
Excess-103.4

Upper Grassy Valley

Cameron

East Cresson Overburden Storage (ECOSA)
Ref. TAB 8.1

ECOSA5-100.3 Acres
GM67-80,930 cy
Scraper/Doze

ECOSA3 -65.9 Acres
GM11>53,189 cy
Scraper/Doze

ECOSA4-119.9 Acres
GM11-96,756 cy
Scraper/Doze

ECWH1-127.2 Acres
GM6->102,608 cy
777/Doze

SGOSA1-207Ac
GM27>166,730
777/Dozed

Squaw Gulch Overburden Storage (SGOSA)
Ref. TAB 8.2

East Cresson - Wildhorse Mine (ECWH)
Ref. TAB 4.0.1

ECWH Tab 4.0.1
52.3 Forested Acres
Undisturbed
in 2015

ECWH2-110.5 Acres
GM11-89,160 cy
Doze/Scraper

SGVLF3-85.8 Ac
GM34>69,210 cy
Art/Doze 350

Squaw VLF
Ref TAB 7.2

SGVLF1-124 Acres
GM34 - 100000 cy
Art/Doz 350

GM34
744Ac-9850
599,859 cy
SGVLF1>124Ac
SGVLF3-86Ac
Excess-533 Ac
Note: Can be exchanged with GM 27

Use One-way circular routes with GM34 and GM27 at each end, hauling

Mill Platform
Ref TAB 7.3

MC6-119.1 Acres
GM27>96,070 cy
777/Doze

Fence
19,800 LF

GM11
619.8 Ac-10700
500,000 cy
MC5-144.6
ECWH2-110.5
ECWH3-62.7
ECOSA3-60.4
ECOSA4-119.9
Buildings- 43.7
Ponds- 0.2
Excess-77.8

GM27
515.0 Ac-10180
415,404 cy
MC6-119.1
Crush-16.2.
SGVLF2-126.7
SGOSA1-207
Excess - 49.3 Ac

Crush2-16.2 Acres
GM27>13970 cy
777/Doz 200

SGVLF2-126.7 Acres
GM27 - 102270 cy
Art/Doz

Main Cresson Mine
Ref TAB 4.0.4

ECWH3 - 62.7 Acres
GM11>50,610 cy
Scraper/Doze

Dump Point for East Area

GM Complete
25.2 Acres

American Eagle Access Road

CR 831

Altman TAB 8.1 ECOSA
37.6 Acres
Reclaimed
before 2015

Crusher TAB 11.4
21.2 Acres
Undisturbed
in 2015

MC5-144.6 Acres
GM11-116,640 cy
Art/Doze 500

GM32
27.3Ac-10000
22,000 cy
All to Crusher

GM33
8.7Ac
7,000 cy
All to Crusher

MC4-29.7 Acres
GM37-23960 cy
777/Doze 400

GM37
61.3Ac-10100
49,450 cy
MC3-11.8
MC4-29.7
Excess 19.8 Ac

GM13
107.9Ac-9820
87,050 cy
All to AG1
32.3 Excess

Crusher Area
Ref TAB 11.3

Crush-60 Acres
GM32> 22000 cy
GM33> 7000 cy
GM30>18500 cy
777/Doz 200

No Growth Media
264 Acres

MC3-Rubey Road
11.8 Acres
GM37>9520 cy
Art/Doze

2nd Panel
AG2 -146.7 Acres
GM19>118,360 cy
777/Doze 500'

AG4-227 Acres
GM19>183,300 cy
777/Doz

Main Cresson Mine (South Cresson) TAB 4.0.4

MC2-31.3 Acres
GM14>15700 cy
GM30>9,520 cy
777/Doze

GM14
30.1Ac-10100
25,000 cy
MC2>19.5
Excess - 11.5 Ac.

GM30
75.7Ac-10175
61,097 cy
MC1-9.9
MC2 - 11.8
AJAX-22.7
Crush-22.9
7.7 Excess

Arequa VLF
Ref TAB 7.1

2nd and 3rd Panels from GM19

3rd Panel
AG3 - 97.9 Acres
GM19>79000 cy
777/Doz 800'

MC1 -9.9 Ac
GM30>8020 cy
777/Doze 50'

Ajax - Pad3&4
Ref TAB 7.6

AJAX-22.7 Acres
GM30>18880 cy
777/Doze 100'

Lower Panel
AG1-75.6 Acres
GM13>60970 cy
777/Doz 400

Carlton Security & Arequa ADR
Ref TAB 11.3

ArequaADR - 17.5 Acres
GM19>14100 cy
Art/Doz

GM19
643.6Ac-9550
519,161 cy
ArequaADR-17.5
AG2-146.7
AG3-97.9
AG4-227
Excess-154 Ac

HWY 67

Squaw Gulch

800 0 800 1600
SCALE: ft. (D-Size Dwg)

Victor

1 Reclamation Management Units
Plan View
1"=1320' (1/4 mile) Tabloid Size

LEGEND

Areas where Reclamation is not required - Forested, Natural, or Already Reclaimed

Steep High-wall Areas with No Growth Media

Stockpile Data
- Stockpile ID
- Area Covered with 6-inches
- Stockpile Volume
- Destination and Area Covered
- Elevation of Stockpile

GM19
649.6Ac-9660
619,161 cy
Arequa ADR-17.6

Application Area Data
- Unit ID & Area
- Source & Volume
- Equipment Set and Push Dist.

MC1-9.9 Ac
GM30>8020 cy
777/Doze 50'

Haulage Route - Road ID, Direction, and Width

2H
1 Way/30

REVISIONS	NO.	DATE	MADE BY	CKD. BY	REMARKS
	0	11/24/15	SDS		Original Issue
	1	12/4/2015	SDS		For Review

Cresson Mine
near Victor CO

Amendment No. 11
Reclamation Cost Estimate
Growth Media Stockpiles and Haulage Plan

Steffens and Associates, Inc.
Water Resources - Environmental - Mining Engineering
Arvada CO - steffensinc@msn.com - 303.378.8181

CLIENT: CC&V Gold Mining Co.

Alt. Drawing Number	Scale	DRAWING NO.
Sht 5 of 5	Noted	CCVSA11-5 1

SPILL RESPONSE PLAN
and
SPILL PREVENTION CONTROL AND COUNTERMEASURES PLAN for the CRESSON PROJECT

Cripple Creek & Victor Gold Mining Company
near Victor, Colorado

Prepared for:
Cripple Creek & Victor Gold Mining Company
P.O. Box 191
100 North 3rd Street
Victor, Colorado 80860

Prepared by:
Geosyntec Consultants

SPILL RESPONSE PLAN
and
SPILL PREVENTION, CONTROL, AND COUNTERMEASURES PLAN
for the
CRESSON PROJECT

Cripple Creek & Victor Gold Mining Company (Cresson Project)
1280 Highway 67
Carlton Security (719) 689-3995 – 24 hrs

LOCATION COORDINATES:
Legal Location: (Township, Range, Section, ¼ Section): T15S, R69W, Sec 31, NW1/4
Latitude and Longitude: Security Office - 38° 43'37"N & 105° 09'27"W

Administration (719) 689-2977
100 North Third Street (PO Box 191) Victor, Colorado 80860

SPILL RESPONSE GUIDELINES

FIRST LEVEL RESPONDERS (any Team Member knowledgeable of the safe handling of the spilled substance)

1. **Safety is the first consideration** when responding to a spill. Human life or health must not be jeopardized. Be sure the site of the spill/accident is safe before proceeding. Treatment of life threatening injuries takes precedence.
2. Use **common sense**.
3. **Notify** another Team Member, and call for help if needed.
4. **Stop spill** at source (if this can be done safely).
5. **Stop spread** of spill (if this can be done safely).
6. **Report incident** to supervisor as soon as reasonably possible.
7. **Recover spilled material** and place in a contained area or treat to neutralize material.
8. Complete **Internal Spill Report**, after incident is managed. (CC&V intranet Site in the Workforce Management database under "Environmental").

SECOND LEVEL RESPONDERS (Another Team Member or Supervisor)

1. **Provide** first level responders with everything they need to safely and effectively respond to the spill.
2. **Inform** Environmental Resources (719-689-4029) so that proper external notifications can be made per regulations.
3. **Notify** Safety.

ENVIRONMENTAL RESOURCES RESPONSE

1. **Verify** field procedures are properly followed.
2. **Determine** information and notification requirements.
3. **Notify** General Manager, if external notifications are required.
4. **Notify** appropriate external entities within regulatory timeframe. Record details of who was informed of what and when, in accordance with the notifications.
5. **Follow-up** with an inspection of the site. Sample as necessary. Complete documentation.
6. **Review** incident and implement remedial measures if needed.

OFF-SITE SPILL RESPONSE POLICY

Due to liability concerns, it is CC&V's policy not to respond to spills caused by other entities, including transporters, unless:

1. The spill is within the Cresson Project Area; or
2. CC&V has been requested to do so by the responsible party or the local emergency response team AND
3. A response is specifically authorized by the CC&V General Manager or his designee.

See "Vendor Contacts" tab located in the Emergency Response Procedures for telephone numbers of vendors that transport bulk materials to and from the Cresson Project.

BE SAFE - NOTIFY - MITIGATE - REPORT - REVIEW - IMPROVE
SAFETY AND SECURITY RADIO CALL NUMBERS: "BASE-1," "R-1," "R-2"
ENVIRONMENTAL RESOURCES RADIO CALL NUMBERS: "E-0," "E-1," "E-2," or "E-3"

LOCATIONS OF SPILL RESPONSE KITS

Spill Response Kits are supplied at the following locations:

- Ajax Exploration Building - Aerosol can puncturing station
- Secondary Crusher - Aerosol can puncturing station in the nearby Millwright Shop
- Truck Shop - Aerosol can puncturing station in the Southeast Corner of the Maintenance Bays
- Warehouse Area – Aerosol can puncturing station next to the cardboard baler and Bay 4
- Light Vehicle Shop – Northwest corner of building
- Hazardous Waste Accumulation - Storage room located behind the Light Vehicle Shop
- Carlton Security Office Access Gate – Furnace room located behind the Safety office and next to the back exit door
- Environmental Resources - Storage Area and Parking Lot
- All existing Ready Lines
- High Grade Mill North and South Entrances

Lube trucks are supplied with materials to contain small petroleum releases and can be called on the radio. Use call number J3 for assistance.

Both the Wet and the Metallurgical labs have spill response kits located:

- Wet Lab – Safety Shower in Wet Lab
- Metallurgical Lab – North side of central island; upper level

Spill Response Kits may contain:

- Petroleum absorbent materials
- Respirator
- Chemically resistant gloves
- Safety glasses
- Acid neutralizer
- Plastic containment bags

CC&V SPILL RESPONSE PLAN

including the

SPILL PREVENTION, CONTROL, AND COUNTERMEASURE PLAN (SPCC)

for the Cresson Project

Approved and Issued by _____ Date 9/22/15
Jack Henris General Manager

- **The Emergency Response Procedures (ERP) and associated Plans are controlled documents to avoid conflicting or duplicated information. Updates, edits, or additions to the ERP or this Plan shall be coordinated through the Safety Manager AND the Environmental Resources Manager.**

- **Employee and Third Party Contact information is found in the ERP under the CONTACTS tab. Contacts must be made in accordance with the ERP guidelines and ONLY by designated staff.**

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ATTACHMENTS

1.0 PURPOSE AND SCOPE

This Spill Response Plan ("SRP") is to be used by CC&V Team Members (all employees) of the Cripple Creek & Victor Gold Mining Company (CC&V) at the Cresson Project Operations, located in the Cripple Creek Mining District of Colorado. The procedures and policies described herein apply to the activities of all CC&V Team Members and to other persons on site under CC&V supervision or contract. Distribution of this Plan is to be restricted to CC&V employees, contractors, and applicable government agencies/organizations. This plan serves as the main SPCC plan for the Cripple Creek & Victor Gold Mining Company (CC&V) at the Cresson Project Operations, with location specific SPCC/SRP plans for the Adsorption Desorption Recovery (ADR) Plant, and the Process Solution Enhancement System (PSES) Facility, which are found in Attachments A and B, respectively. These location-specific plans are standalone SPCC plans with relevant chemical storage information and response procedures specific to the individual facilities. Although these are standalone plans, they are intended to be used alongside the guidelines set forth in this main plan.

It is CC&V's policy to prevent releases to the environment of petroleum products and hazardous substances that may pose a threat to human health and/or the environment. Any releases that do occur and which are not in compliance with applicable Federal and State requirements expressed in site-specific permits or applicable regulations must be appropriately contained, remediated, recorded and reported.

The purpose of this SRP is to provide guidance to protect water quality through containment of potential soil and water contaminants. The SRP assesses the potential for contaminant releases, describes the controls to prevent contaminant releases, and provides instruction for responding to contaminant releases. Federal and State Reportable Quantities ("RQs") are used to determine agency reporting and remediation requirements as appropriate. This SRP is a combined plan that also serves as CC&V's Spill Prevention, Control, and Countermeasure ("SPCC") Plan. This SRP is based on the requirements of 40 CFR (Code of Federal Regulations) Part 112 for CC&V's SPCC Plan and the requirements of the Colorado Division of Reclamation, Mining, and Safety ("DRMS"). This SRP has been prepared in accordance with the requirements of 40 CFR Part 110, 40 CFR Part 112, 40 CFR Part 116, 40 CFR Part 117, and 40 CFR Part 125. These references are on file with Environmental Resources. The scope of this SRP *goes beyond* the requirements of the SPCC regulations at 40 CFR Part 112 by not only addressing liquid petroleum products but also *other* hazardous substances that have been listed pursuant to the Clean Water Act (§311(b)(2)) per 40 CFR Part 125[1]) (references are on file with Environmental Resources):

- Petroleum Products - Diesel, gasoline, kerosene, lubricants, greases, oil-based solvents, fuel-additives, sludges, used-oil, and oil mixed with other substances as defined in 40 CFR 112.2, copies of which are available through Environmental Resources
- Sodium Hydroxide
- Hydrochloric Acid
- Sodium Cyanide Briquettes (dry form) and Cyanide Solutions
- Sodium Hypochlorite
- Calcium Hypochlorite

This Plan also applies to other hazardous and non-hazardous substances not listed in 40 CFR Part 125, but present at the Cresson Project operation. Major chemicals include:

- Antifreeze
- Antiscalant
- Ammonium Nitrate (blasting agent) and Blasting Emulsions
- Lime

[1] CWA hazardous substances subject to this SRP are listed in regulations in Table 116.4A (alphabetically) and Table 116.4B (by CAS number). Examples of listed substances are: Chlorine, Hydrochloric Acid, Hydrogen Cyanide, Nitrogen Dioxide, Sodium Cyanide, and Sulfuric Acid.

A more complete list of bulk products stored on site is included with this SRP in Appendix A. The substances listed in Appendix A must be managed based on the principles in this SRP and the specific characteristics of the substance.

This SRP is the guide for prevention and expedited control of "releases" of the above-listed substances to ground or waters when such releases are the responsibility of CC&V[2]. This SRP is to be used by CC&V Team Members to assist in responding to, containing, remediating and recording, and reporting responses to releases. Names and telephone numbers of CC&V Team Members and other persons to be notified are listed on the front cover and in the ERP under the CONTACTS tab. Transporter contacts are listed in the ERP under the CONTACTS tab. The external reporting contacts and agencies to which certain releases are to be reported by representatives of Environmental Resources are also listed in the ERP under the CONTACTS tab.

1.1 External Reporting – Reportable Quantities

Releases that occur out of doors *and* outside an engineered containment area *and* which meet or exceed the numeric thresholds known as "RQs as listed in Table 1, require reporting to appropriate county, State and/or Federal agencies. **Spills or releases of these substances should be immediately reported to Environmental Resources and CC&V Team supervisors.** Use the Internal Spill Report form (WMRS Site) provided on the CC&V company intranet to document the spill or release. Provide the Internal Spill Report to Environmental Resources as soon as possible within the same shift of the occurrence so that external reporting can be accomplished within the required 24 hours.

Table 1 Reportable Quantities if Released to Land [(1)]- Bulk Chemicals

Product Used at CC&V	Listed Chemical	RQ of listed Chemical (pounds)	Density of product (pounds/gallon)	Concentration of Listed Chemical (%)	RQ of Product (gallons)
Diesel or Gasoline	Diesel or Gasoline				1,000 [(2)]
Antifreeze	Ethylene Glycol	5,000	8.34	95.0%	631.07
Sodium Hydroxide	Sodium Hydroxide	1,000	12.71	50.0%	157.36
Hydrochloric Acid	Hydrochloric Acid	5,000	9.83	36.0%	1,412.91
Antiscalant	Phosphoric Acid	100	8.92	10.0%	112.11
Sodium Hypochlorite	Sodium Hypochlorite	100			
Calcium Hypochlorite	Calcium Hypochlorite	10			
Cyanide Solutions	Sodium Cyanide [(3)]	10	8.34	0.010%	11,990.41
Cyanide Solutions	Sodium Cyanide [(3)]	10	8.34	0.015%	7,993.61
Cyanide Solutions	Sodium Cyanide [(3)]	10	8.34	24.0%	5.00
Cyanide Solutions	Sodium Cyanide [(3)]	10	8.34	25.0%	4.80
Cyanide Solutions	Sodium Cyanide [(3)]	10	8.34	26.0%	4.61
Cyanide Solutions	Sodium Cyanide [(3)]	10	8.34	27.0%	4.44
Cyanide Solutions	Sodium Cyanide [(3)]	10	8.34	28.0%	4.28
Cyanide Solutions	Sodium Cyanide [(3)]	10	8.34	29.0%	4.13

[(1)] Discharge of oil in such quantities that result in exceedance of applicable receiving water quality standards or cause a film or sheen upon the surface of the receiving water must be reported to the National Response Center.
[(2)] Into or upon the navigable waters of the U. S. or shorelines in a single event
[(3)] The Cyanide Containment Policy is included as Appendix C of this Plan. Use Table 1 to calculate the amount of cyanide released from known quantities and concentrations.

[2] CC&V does not normally respond to releases that may occur as a result of a contractor or other activity conducted on CC&V property under a lease or contractual arrangement. Rather, any contractor or other authorized activity should include clear and enforceable requirements for that other entity to have an acceptable SPCC Plan and to have control and response procedures in place.

Spills to land that exceed the RQ volume criterion in any 24-hour period must be reported to external agencies in accordance with this SRP (see Section 6 for more details). A representative of Environmental Resources will complete external notification, if and when necessary. Table 1 lists RQs of chemicals that require external spill reporting. SDS's for specific products are contained in Appendix B.

1.2 General Location of CC&V Operations

CC&V's Cresson Project Operations are located within the Cripple Creek Mining District, generally between the Cities of Victor and Cripple Creek. The permitted mining operations occur within one to two miles of either city. For reporting purposes the CC&V site location, expressed as latitude and longitude at the Carlton Security Access is: Latitude is 38º 43' 37" North and Longitude 105º 09' 27" West.

The Project area, in southern Teller County, is accessible by Colorado State Highway 67 between Victor and Cripple Creek, Teller County Road (CR) 81 from State Highway 67 in Gillet Flats through Victor, from Teller CR 82/83 (Cameron Road) and from State Highway 67 (north of Cripple Creek). Figure 1 shows the general location of the site.

1.3 General Description of Mine Facilities

The mine facilities at the Cresson Project are shown on Figure 2. CC&V's gold mining activities use conventional surface mining and ore crushing methods. Mineral recovery is accomplished by valley leaching with dilute cyanide solutions, followed by solution enhancement, carbon adsorption, then desorption, and electrowinning. Valley Leach Facilities ("VLFs") and internal ponds containing cyanide solutions are double and triple lined with the incorporation of leak detection systems. The only operating leach facility, the VLF, is double-lined in areas where solution is not stored and triple lined where solution is collected and temporarily stored. The VLF systems are designed to contain the normal operating solution level, total drain-down, "wet season" precipitation, and the 100-year, 24-hour storm event. Mineral Beneficiation Facilities (also known as Adsorption Desorption Recovery or "ADR") are constructed and operated to provide containment and collection of any spills within the ADR buildings. The VLFs and ADR are "non-discharging" (zero-discharge) facilities. The ADR uses hydrochloric acid and sodium hydroxide in addition to sodium cyanide.

Major equipment maintenance is performed at the Ironclad Shop/Warehouse and the Truck Shop. Minor equipment maintenance operations and vehicle re-fueling occurs in selected field locations within the mining operation. Maintenance of mechanical equipment associated with the crushers takes place at the Primary and Secondary Crushers. The principal petroleum products used at the crushers are lubricants. Lime is stored and added to the crushed ore at the Secondary Crushers, the lime is utilized in processes at the High Grade Mill, which will begin full operation in 2015/2016.

1.4 General Description of Site Security at CC&V Operations

CC&V's properties are subject to the following general security measures: (1) a substantial portion of the property is fenced with barbed wire with chain link or wire mesh and barbed wire; (2) entrances to mine property are gated and locked; (3) the permit boundaries are staked and warning signs are posted; (4) most onsite facilities are staffed on all operating shifts, so that there is a company supervisor onsite 24 hours a day, 7 days a week (24/7); (5) security guards are on duty 24/7 at the Carlton Security Access entrance from State Highway 67; (6) security guards are on duty 24/7 at the Ironclad Security Access entrance from CR 82; (7) security guards are on duty dawn to dusk at the American Eagles guard shack; and (8) key portions of the site are lighted during the night-time hours. Individual facility security measures (barricades, bollards, poles, locked buildings, etc.) are discussed in other sections of this plan, as appropriate.

1.5 Drainage Description

The CC&V mine site is located on the topographic divide between Fourmile Creek and Beaver Creek drainages that are in the upper Arkansas River basin. Stormwater runoff, generated by intense rain and sleet events of short duration, and by rapid snowmelt, is diverted away from areas of disturbance, including storage areas for petroleum products and hazardous substances. Runoff from inside the disturbed area is directed through sediment control structures, which provide additional spill control in the event that a potential contaminant should move outside the immediate release area. Surface waters are monitored within the watershed and also downstream of the Cripple Creek Mining District.

Diversion of stormwater runoff and control of runoff from disturbed areas are conducted: (1) in accordance with the General Stormwater Permit issued to CC&V for its activities in the Cripple Creek Mining District; (2) in accordance with applicable provisions of the mining reclamation permits issued by the Department of Natural Resources, Division of Reclamation, Mining, and Safety (DRMS); and (3) in accordance with Conditional Use permits issued by Teller County.

Ground water in the area is almost always quite deep—on the order of 3,000 feet. Shallower perched water tables exist, but are small and discontinuous. Ground water is monitored at certain perimeter down gradient locations at the Cresson Project.

1.6 Spill History

There have been no reportable spills to waters of the State or U.S. during the past three years.

1.7 Certifications

1.7.1 Certification of the No Substantial Harm Criteria

Pursuant to the requirements of 40 CFR Part 112, Appendix C, this facility certifies the following:

- This facility ***does*** have oil storage capacity in excess of 42,000 gallons.
- This facility ***does not*** transfer oil over water to or from vessels.
- This facility ***does not*** have oil storage capacity $\geq$ 1,000,000 gallons.

Therefore, this facility does not meet the substantial harm criteria listed in 40 CFR 112 Appendix C, Attachment C-I.

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this Plan related to substantial harm, and, based on my inquiry of those individuals responsible for developing the information, I believe the information is true, accurate, and complete.

Jack Henris General Manager

9/22/15
Date

1.7.2 Professional Engineer's Certification

I, Ryan A. Wymore, P.E., hereby attest that I am familiar with the CC&V Facility and I also understand the Rules and Regulations promulgated under 40 CFR Part 112 Oil Pollution Prevention and how they apply. On July 17, 2002, EPA published a final rule that amended the SPCC regulations *(67 FR 47042)*, which became effective on August 16, 2002. The final rule included compliance dates in §112.3 for preparing, amending, and implementing SPCC Plans. The original compliance dates were amended on January 9, 2003 (68 FR 1348), again on April 17, 2003 (68 FR 18890), a third time on August 11, 2004 (69 FR 48794), a fourth time on February 17, 2006 (71 FR 8462), and a fifth time on May 16, 2007 (72 FR 27443). These extensions provided additional time for the regulated community to understand the 2002 SPCC amendments (67 FR 47042), the clarifications developed by EPA during the course of litigation settlement proceedings (69 FR 29728), and alleviated the need for individual extension requests. On June 19, 2009, EPA published in the *Federal Register* a SPCC compliance date extension for all facilities until ***November 10, 2010***. Facilities ***must amend or prepare, and implement*** SPCC Plans by the compliance date in accordance with revisions to the SPCC rule promulgated since 2002. This SPCC document was written to comply with all the new requirements (as amended) by the November 10, 2010 deadline.

I personally visited the site on March 9th and 10th, 2015 for the purposes of gathering information in order to prepare the *original* CC&V SPCC Plan.

The SPCC Plan has been prepared in accordance with good engineering practice, including considerations given for applicable industry standards as well as the requirements of 40 CFR Part 112. Procedures for inspecting and testing the tanks and containers have been established and are herein incorporated. Based on my professional engineering judgment, this SPCC Plan is adequate for the CC&V Facility.

This certification in no way relieves the owner or operator of the facility of his/her duty to prepare and fully implement this SPCC plan in accordance with the requirements of 40 CFR Part 112. This plan is valid only to the extent that the facility owner or operator maintains, tests, and inspects equipment, containment, and other devices as prescribed in this Plan.

Ryan A. Wymore, P.E. (Colorado P.E. Registration Number 39602)

Date: 07/09/2015

Seal:

1.7.3 Management Commitment

The CC&V facility management is committed to provide the necessary manpower, equipment, and materials to control and remove any quantity of oil discharged as outlined in this Spill Response Plan and Spill Prevention Control Countermeasures Plan per §112.7(d)(2) of 40 CFR Part 112.

Signed: _____ Title: General Manager

Printed Name: Jack Henris Date: 9/22/15

1.8 Plan Amendments, Record-keeping Requirements, and Plan Reviews

1.8.1 Plan Amendments

The SRP/SPCC Plan will be reviewed, and amended as necessary, whenever:

- There is a change in design, construction, operation, or maintenance at the site, which materially effects the potential for discharge from the facility;
- During inspections or investigations by site personnel or regulatory entities it is determined that the SPCC is ineffective; or if the general objectives of the plan are not being met;
- Upon receipt of notification from the U.S. EPA's Regional Director that the SPCC does not meet one or more of the minimum requirements of the permit, the required changes will be made and certification provided to the director;
- Commissioning or decommissioning of tanks;
- Replacement, reconstruction, or movement of tanks;
- Reconstruction, replacement, or installation of piping systems;
- Construction, or demolition that might structurally alter secondary containment structures;
- Changes of product or service; and
- Revision of standard operation or maintenance procedures at a facility that would have a material effect on containment.

Any amendment under this section must be prepared within six months, and implemented as soon as possible, but not later than six months following preparation of the amendment. Any technical amendments made to the SPCC plan must be reviewed and certified by a professional engineer.

1.8.2 Record-keeping and Making Plans Available

A complete copy of the SRP/SPCC Plan, including all attachments (reports, certifications, records, integrity testing, etc.) will be retained for a period of at least three years. A signed, current copy of this SRP/SPCC Plan, including all necessary attachments will be retained onsite as long as industrial activities occur at the CC&V Facility. The plan must be made available to the U.S. Environmental Protection Agency and the CDPHE (Colorado Department of Public Health and Environment) for onsite review during normal working hours.

1.8.3 Plan Review and Evaluation

In accordance with 40 CFR Part 112.5 (b) a complete review and evaluation of the SRP/SPCC Plan must be completed at least once every five years. Any necessary amendments, based on the review and evaluation, must be prepared within six months of the evaluation and implemented as soon as possible, but no later than six months following the preparation of the amendment. A signed statement must be prepared by the person conducting the evaluation, stating that a review and evaluation of the SRP/SPCC Plan was completed, and that the plan will or will not be amended as a result. This statement will be kept with the SRP/SPCC Plan as an attachment. A certified professional engineer must review and certify any technical amendments.

2.0 SPILL PREVENTION AND CONTROL

2.1 Engineering and Structural Controls to Guard Against Spills

The Cresson Project has been constructed with spill containment around fuel storage areas, chemical storage areas, maintenance areas, and the areas in which cyanide solutions are present. Secondary containment structures have been designed to prevent spilled materials from entering stream channels, escaping onto areas subject to stormwater runoff, and migrating off site. Such control features will be maintained and will function at their design capacity. To ensure that synthetically lined earthen containment berms are working properly, they will be inspected monthly, they will be cleaned out when foreign objects or trapped water threatens to diminish the containment capacity, and they will be repaired whenever cracks in the berm or tears in the liner compromise containment. Concrete containment structures will also be inspected, cleaned out, and repaired as required.

The mining areas, vehicle maintenance facilities, and leaching/processing facilities all have built-in protections against spills and leaks. Specific design criteria, which emphasize attention to spill and leak prevention, containment, chemical storage, and environmental monitoring, have been incorporated into the overall plan. Examples of specific facility designs that help control spills include: (1) high level alarms and continuous recording of tank volumes in the Truck Shop/Warehouse bulk oil storage facilities; (2) designed and constructed floor sumps in the Ironclad small vehicle shop and truck shop; (3) engineered oil skimmers and a water filtration system in the large truck wash bay; and (4) aerosol can depressurizing units mounted on used paint storage drums within over-pack drums at various locations throughout the site.

Certain facilities at the Cresson Project have been located to provide for optimum environmental control. Such facilities are located outside of drainages and flood plains or, surface water diversions have been installed to minimize surface water run-on and run-off.

Transfers of materials subject to control under this SRP/SPCC Plan will be conducted in accordance with CC&V procedures described in Section 5.1. CC&V Team Members assigned to operations involving transfer of chemicals or fuels and lubricants are responsible for implementing these procedures.

2.2 Management Controls to Guard Against Spills

The Cresson Project recognizes certain Best Management Practices (BMPs), which can prevent many spills from occurring. Among the more important BMPs employed at the Cresson Project are the following:

Good Housekeeping - This refers to the conscientious effort of employees to maintain work areas so that spilled materials are not allowed to be released into the environment. Clean, uncluttered work areas promote safety and help prevent spills.

Preventive Maintenance - CC&V personnel utilize the inspection and monitoring function as a means to identify where and when BMPs need to be updated. CC&V management is committed to updating and improving BMPs through periodic inspections (see below) and follow-up.

Material Handling Practices - Environmentally safe handling of materials which could be spilled is an important practice at the Cresson Project. Hazardous materials are stored inside curbed containments in the ADR plant, bulk oil is stored within concrete-walled or lined earthen berm containments described elsewhere in this plan, and employees are instructed in the environmentally safe handling of these products. These are some of the examples of materials storage practices utilized by CC&V team members to reduce the likelihood of material spills.

Visual Inspections - Visual inspections are conducted periodically and records are maintained onsite.

3.0 SPILL COUNTERMEASURES

CC&V recognizes that engineering, structural, and management controls are not always going to prevent the occurrence of spills. Therefore, the following narrative describes how a spill will be cleaned up (*general countermeasures*). For a detailed descriptions of spill response procedures see Section 5 of this SRP/SPCC Plan.

3.1 Responsibilities of Response Coordinator and CC&V Team Members

The Environmental Resources Manager will act as the Environmental Response Coordinator for CC&V under the auspices of this Plan. The Environmental Response Coordinator's responsibilities will include: (1) implementing this plan in the event a spill occurs, (2) coordinating the clean-up activities, (3) filling out the appropriate forms to document the spill, (4) ensuring compliance with all provisions of this plan, and (5) providing the required training for employees in the procedures defined in this plan.

It is the responsibility of each CC&V Team Member to ***prevent*** releases of fluids that might contaminate water draining from the site and to ***control*** such releases should they occur. However, in the event of a spill it is imperative that any Team Member with knowledge of a release immediately notifies his/her supervisor and then completes an Internal Spill Report form (CC&V Intranet site). Supervisors or second level responders are responsible for notifying Environmental Resources when releases occur. Releases exceeding the RQ listed in Section 1.1 of this SRP/SPCC Plan must be brought to the attention of Environmental Resources immediately.

3.2 General Spill Response Guidelines

Each CC&V Team Member will consider the ramifications of a spill or release whenever handling fluids or solids subject to this SRP/SPCC Plan. Individual and joint assessments of the risk for a spill, or, in other words, "awareness and common sense," are two of the most important spill prevention and countermeasure tools.

An outline of the procedures to be followed when a spill or release occurs is presented on the following page and on the document cover of this SRP and in the ERP under the SPILL RESPONSE tab. Detailed spill response guidelines and countermeasures are provided in Section 5. Each CC&V Team Member should think carefully when following this outline and steps will not be omitted unless they are clearly not applicable in a specific situation. Personal safety is the first consideration whenever responding to a spill or release subject to this SRP/SPCC Plan. The spill responder will have the appropriate training and expertise in spill control before commencing a clean-up operation.

3.3 Management of Containers, Stormwater, and Cleaned-Up Waste Materials

Containers and Drums

Containers of petroleum products should, whenever possible, be ordered only when the empty container can be returned to the supplier for reuse. In the event the container cannot be recycled with the same product or another compatible product and the container must be emptied, it needs to be drained of product. ***Draining of lubricants and mixing with oils destined for recycling may be acceptable but must not be done until Environmental Resources has approved the draining.*** Containers that contain product, product destined for recycling, or which are not yet "empty," are to be stored within lined areas or other acceptable containment areas.

Empty containers that have held fuels, oils, or antifreeze will be properly drained and returned to the supplier for reuse, when possible, if they are not going to be refilled with the identical product. Team Members using the products must be aware of which containers are to be sent back to a particular vendor for reuse. Residual fluids will be properly removed from containers in accordance with the next intended use of the barrel. Orderly storage and return to vendors reduces the potential for a release from these containers.

Stormwater

Stormwater and snowmelt accumulations will be removed from secondary containment structures to maintain the required storage volume. If water contained in a sump has an oily sheen, the oily layer can be pumped off into a temporary storage container. Typically a 5-gallon bucket or 55-gallon drum container is sufficient volume to collect the oily sheen layer and transport it to an oil-water separator located at the Truck Shop Wash Bay at the Ironclad Facilities or transfer it to a 55 gallon drum designated for off-site disposal. Other measures such as sorbent pads specifically designed for oil absorption on water may be used to remove the oily layer on the water.

Clear water in containment sumps and secondary containment can be pumped to the ground outside the containment if a responsible individual monitors the process to assure there is no oily sheen and the pumping effort is recorded on the form provided in Appendix F.

Clean-Up Waste Materials

Following a spill clean-up effort, there will be some used materials such as booms, pads, socks, rags, oil dry soaked with oil, oil-contaminated soils, etc. Such materials should be gathered up and placed in drums or clean containers for proper disposal. Depending on the nature of the contaminated materials, it may be possible for them to be placed in a dumpster for disposal in the local landfill or the materials may need to be shipped off-site to a licensed disposal facility. Sorbent pads that have been used to remove petroleum products, including fuels, antifreeze, and oils, may be disposed of as a conventional solid waste and placed into the commercial solid waste containers at various locations around the property, ***provided no solvents or other potentially hazardous wastes have been added and no oil is dripping from these pads.*** If the pads are dripping, the oil can be rung out and collected, or more pads can be used to absorb the free liquid, or the dripping pads can be containerized for off-site disposal.

In the case of oil-stained soils that are free of other contaminants, these materials may be stockpiled at the stemming stockpile for use as stemming in blast holes. Environmental Resources will make all decisions regarding the final disposition of any by-product wastes generated by clean-up operations.

4.0 INDIVIDUAL DESCRIPTIONS OF FACILITIES AT CC&V OPERATIONS

Individual chemical storage and use areas within the Cresson Project are described in this section. The descriptions of bulk storage areas are organized by chemical category and location. Individual **oil storage facilities** descriptions follow the detailed requirements of 40 CFR Part 112 in terms of quantity stored/used, potential spill volume, spill prevention and control procedures, spill countermeasures, security, visual inspections, integrity testing, and conformance with other laws or regulations. Appendix A provides an inventory of oil containing products stored and used at the Cresson Project. Individual **process reagents, explosive agents, refinery wastes, lime, and laboratory chemical** descriptions follow a slightly different outline for facility descriptions, although many of the same elements as for oil products do apply.

The categories of chemicals described in the following sections include:

- Petroleum Products
- Ammonium Nitrate, Emulsion, and ANFO
- Process Reagents for Beneficiation
- Lime
- Laboratory Chemicals

4.1 Petroleum-Based Products (fuel, lubricants) and Antifreeze

Fuels, oils, and antifreeze are stored in tanks, totes, and drums in several locations on the property. Refer to Figures 3, 4, and 5 for referenced locations of bulk storage areas.

Ironclad Shop/Warehouse - used oil, lubricants, and hydraulic oil are stored in above ground tanks in an interior area constructed to contain the products; antifreeze is stored in an above ground tank just outside the oil storage room; used oil and used antifreeze are stored in totes or drums on the shop floor; and propane are stored in above ground tanks outside the building.

Truck Shop – lubricants, hydraulic oil, antifreeze, and used oil are stored in above ground storage tanks in an interior area constructed to contain the products; small quantities of used oil, used antifreeze, and varieties of petroleum-based lubricants are stored in totes, large drip pans or drums, on the Truck Shop floor.

Fuel Farm - diesel fuel, gasoline, fuel additives, motor oil, antifreeze, and hydraulic oils are stored in above ground tanks within a lined secondary containment area. There is also a 1,000 gallon propane tank located to the north of the Fuel Farm.

Crushers (Primary and Secondary) – hydraulic oil and lubricants are stored either on a grate covered metal box over a concrete floor or within other secondary containment.

Mobile Fleet Maintenance anywhere on the Cresson Project – diesel fuel, lubricants and greases, hydraulic oil, and antifreeze are hauled in lube trucks to supply mine equipment.

Contractor Locations

There are several areas within the boundaries of the CC&V mine site where contractors perform construction, maintenance, or related operations and where petroleum products or other environmentally sensitive materials may be stored and used. Contractor operations include:

- Ironclad area – Buckley Powder's Bulk Emulsion Plant
- Western area (including Squaw Gulch) - Conley Construction and Ames Construction
- East of the VLF and SE of the Secondary Crusher – Various Contractors
- Contract exploratory drilling - A.K. Drilling throughout the minesite
- Seasonal Construction - locations vary
- Contract Maintenance (Power Motive, Wagner, et al) - locations vary

The details of storage, use and control measures at contractor sites are not presented here. Instead, these areas will be maintained by the identified contractors and will be periodically inspected by CC&V Environmental Resources to ensure compliance. Each of the identified operators is required to have appropriate spill prevention, control, and countermeasures in effect at each of their sites within CC&V property.

4.1.1 Ironclad Facility (aka "Old Truck Shop" or "Ironclad Shop/Warehouse")

The Ironclad Facility (Figure 3) consists of the Ironclad Shop/Warehouse with a bulk oil storage room, the old truck maintenance shop with a lube service bay, the small vehicle shop, the small vehicle wash bays, a Hazardous Materials Accumulation and Storage Room, and a bulk oil off-loading facility.

4.1.1.1 Storage and Use of Petroleum Products and Other Environmentally Sensitive Materials

Inside the Ironclad Shop/Warehouse

Table 2 depicts the above ground storage tanks (AST's) inside a concrete secondary containment structure at the Ironclad Shop/Warehouse. This large bulk oil storage room is located north of the maintenance bays and the room itself provides 25,700 gallons of secondary containment. A major upgrade to this storage area was completed in 2010, consisting of refurbishment of the floor with new concrete, cleaning and disposing of oil contaminated soils, and placement of drip pans in strategic locations where petroleum products are stored.

Table 2. Bulk Oil Storage Inside the Ironclad Shop/Warehouse

Tank Contents	Tank Label	Description	Capacity (gallons)
Rock Drill Oil	OTS1	Cylindrical Steel	658
Rock Drill Oil	OTS2	Cylindrical Steel	658
HD Transmission Oil	OTS3	Cylindrical Steel	1,248
Antifreeze/Ethylene Glycol	OTS4	Cylindrical Steel	1,248
Hydraulic Oil	OTS5	Cylindrical Steel	4,888
15W-40 Oil	OTS6	Cylindrical Steel	4,888
Used Oil	OTS7	Cylindrical Steel	11,844
Water for Fire Suppression system	OTS8	Cylindrical Steel	79,300
Drive Train 30W Oil	OTS9	Cylindrical Steel	658
E.P. 80W-90 Oil	OTS10	Cylindrical Steel	658
Compressor Oil, Transmission Fluid, Drive Train Oil in drums	Labeled with Tank Contents	Various 55 Gallon Steel Drums	Approx. 550

In addition to the materials and tanks listed in Table 2, there are various drums and totes of used greases, used oil ready for burning in on-site heaters, used antifreeze, ash products from burning used oil, and oily water from skimmers. These products for recycling are stored in the open area adjacent to the Ironclad Oil Room. Appendix A contains a complete list of materials, a description of containers, and containment methods. Spills from these containers would either report to the building sump or the secondary containment vat provided in the Oil Room.

Outside the Ironclad Shop/Warehouse

Table 3 depicts the above ground storage tanks located outside the Ironclad Shop/Warehouse. The 5,000-gallon propane tank is located east of the Warehouse and is surrounded by bollards for protection from vehicular traffic. Two 500-gallon propane tanks are located east of the Warehouse and on the NE corner of the Truck Shop. One 1,000 gallon propane tank and dispenser are located west of the Warehouse, along with a 500 gallon propane support tank.

Table 3. Storage Tanks Outside the Ironclad Shop/Warehouse

Tank Contents	Tank Label	Description	Capacity (gallons)
Propane (west of Warehouse) Tank and dispenser for filling cylinders	Propane	Cylindrical Steel	1,000
Propane (west of Warehouse)	Propane	Cylindrical Steel	500
Propane (east of Warehouse)	Propane	Cylindrical Steel	5,000
Propane (east of Warehouse)	Propane	Cylindrical Steel	500
Propane (NE corner of Truck Shop)	Propane	Cylindrical Steel	500

4.1.1.2 Quantities of Material Stored and Secondary Containment (Ironclad Facility)

By referring to Tables 2 and 3, above, and the tank inventory in Appendix A, it is evident that over 30,000 gallons of oil can be stored in the containers at the Ironclad Facility at any point in time. Approximately 7,500 gallons of propane capacity exists at the Ironclad Facility, and 2,000 gallons of antifreeze can be expected to be in storage. Smaller quantities of aerosol can residues (<55 gallons) may also be present. The tank inventory in Appendix A lists the volume of secondary containment for Ironclad storage and use areas. Adequate secondary containment exists for all containers, as discussed in section 4.1.1.4 below.

4.1.1.3 Spill Potential of Materials at the Ironclad Facility

The greatest potential for spills at the Ironclad Facility is in the transfer of used oil into the drip tray units when changing oil or the transfer of fluids in the drum and tote storage area of the warehouse. In either case, the quantities spilled would most likely be on the order of several gallons. In the unlikely event of a large tank rupture in the Oil Room, several hundred gallons could report to the secondary containment vat, but there is virtually no chance that oil spilled could escape containment in the covered and contained building. The overall spill potential is rated as low.

4.1.1.4 Spill Prevention and Control at the Ironclad Facility

Ironclad Shop/Warehouse (aka "Old Truck Shop")

The most important activity to prevent spills at the Ironclad Facility is operator care in the transfer of fluids, using common sense and diligence in making sure connections are secure, drip pans are in place, and containers are positioned to receive fluids properly.

Bulk storage of petroleum products is primarily ***inside*** the Ironclad Shop/Warehouse building in the Oil Room. The Oil Room floor consists of a concrete slab, overlaying a gravel bed, on top of a concrete-lined "vat". Spills from tanks in the Oil Room, whether from tank rupture, overfilling, or pump / piping leaks, will be contained ***inside*** the containment structure within the Oil Room containment area. The gravel fills a concrete-surfaced "vat" that was previously used for mineral beneficiation. Any spilled petroleum fluids would be captured on the floor or within the gravel layer inside this concrete-lined containment. The containment volume above the gravel fill is about 40,840 gallons (32.5'x84'x2'). Subtraction of the volumes occupied by the tanks themselves leaves about 25,700 gallons of available containment. Therefore, the containment structure is more than adequate to hold 110% of the volume of the largest tank (12,000 gallons; see Table 2 above).

There is a nine-connection fill manifold located outside the building on the west side of the Ironclad Shop/Warehouse. The nine off-loading connections on this manifold are directly linked to the tanks in the Oil Room. All fill lines are fitted with back-flow check valves located near the outside-terminus of the fill lines. Air vents from the top of the tanks are directed to the gravel underlying the tanks. A small

concrete pad provides minimal secondary containment at the off-loading area.

Some of the used oil may be burned in oil-fired furnaces that provide heat to the Ironclad Shop/Warehouse. Off-site recycling of used oil occurs on a regular basis in the summer months when there is a surplus of used oil. Prior to these transfers of used oil the volume of used oil remaining in the tank will be estimated using the tank's electronic level indicator. This indicator is located on the north wall of the tank farm. Any transfers of used oil from the storage tank to a transporter's truck will be attended by the transporter to monitor for leaks and/or spillage.

Old Truck Shop

Transfers of petroleum products and antifreeze from bulk tankers at the Old Truck Shop will occur on the North side of the building on a 14-foot concrete containment pad sloped towards a sump that can be pumped to the used oil storage tank. The fill lines are fitted with back-flow check valves located near the outside-terminus of the fill lines. A spill of antifreeze will be managed separately from used oil and will be placed in a container labeled "used antifreeze."

The majority of the used oil generated by oil changes in the Ironclad Facility is burned in oil-fired boilers that provide heat to the Truck Shop. Off-site disposal of used oil occurs on very irregular basis when there is a surplus of used oil. Prior to these transfers of used oil, the storage tank will be "stick-measured" to estimate the volume of used oil remaining in the tank. Any transfers of used oil from the storage tank to a transporter's truck will be attended by the transporter to monitor for leaks and/or spillage.

4.1.1.5 Spill Countermeasures (Clean-up Procedures) at the Ironclad Facility

Section 3.2 provides the **general spill response procedures** for use at the Ironclad Facility. The following narrative provides additional detail on spill clean-up.

Small Spills Outside of Containment Structures

Spills from drums or pails can be contained entirely within the Ironclad Facility building and relatively easily removed from the concrete floor. Material spilled within the building will be recovered with a sorbent material (sorbent pads, pillows, oil dry, bentonite, or "kitty litter"). Sorbent pads that have been used to remove materials such as fuels, antifreeze, and oils, can be disposed of as a conventional solid waste, and can be placed into the commercial solid waste containers (dumpsters) at various locations around the property, provided no solvents or other potentially hazardous wastes have been added. Sorbent materials that have been saturated with oil products can only be disposed as conventional solid waste if they are not dripping.

Leaks or spills of petroleum products during transport or during product transfer will create an oil stain on the ground surface. CC&V's clean-up policy is as follows: If the majority (>50%) of the area consisting of 9 square feet (3 feet by 3 feet) is affected (stained), then the affected area will be removed (i.e., the soil and oil mixture) and placed in the blast hole stemming material pile or as directed by Environmental Resources. Contaminated material less than 9 square feet shall be collected and disposed of in the Large TruckShop washbay settling pond located outside the shop.

Large Spills Outside of Containment Structures

Available earth-moving equipment will be used to excavate a trench and sump system to retain the spill in the immediate vicinity of the spill. Fluids should be recovered into barrels or tanks quickly to minimize seepage. Straw bales may be used to absorb the remaining fluid. Sorbent soils or commercial sorbents may also be used to absorb the fluid.

Spill Response Kits are supplied at the following locations within the mine site including:

- Ajax Exploration Building - Aerosol can puncturing station
- Secondary Crusher - Aerosol can puncturing station in the nearby Millwright Shop

- Truck Shop - Aerosol can puncturing station in the Southeast Corner of the Maintenance Bays
- Light Vehicle Shop Hazardous Waste Accumulation - Storage room located behind the Light Vehicle Shop
- Carlton Security Access - Furnace room located behind the Safety office and next to the back exit door
- Warehouse Area – adjacent to cardboard baler, in Bay 4, and near battery storage area
- Environmental Resources – Storage Area
- Fuel Island – adjacent to the gasoline pump
- High Grade Mill North and South Entrances
- Small portable spill kits are also located in many supervisor's trucks

Additionally, the CC&V mobile fuel/lubricant trucks are supplied with materials to contain small spills and can be called on the radio. Use call number *J3* on the mine radio for assistance. Both the Wet and the Metallurgical Laboratories have spill response kits for use in those areas.

Spill Response Kits may contain:

- Absorbent socks
- Respirator
- Chemically resistant gloves
- Copy of Waste Management Plan
- Acid neutralizer
- Safety glasses

4.1.1.6 Inspections and Tank Integrity Testing at the Ironclad Facility

Tanks and containers with >55 gallon capacity will be inspected on a monthly basis and the form in Appendix A will be used to document the inspection. Records of these inspections will be kept on file in Environmental Resources.

Tank integrity testing will be performed according to the plan provided in Appendix G. The first comprehensive round of integrity testing on 21 of CC&V's tanks was completed onsite in June 2011 by Acuren Inspection of Denver, Colorado. Results of the inspections are on-file in the Environmental Resources.

4.1.1.7 Conformance with Regulations at the Ironclad Facility

Applicable state and local guidelines are assumed to be the same as the Federal Regulations at 40 CFR Part 112, and therefore, under 40 CFR Part 112 the oil storage containers and the secondary containment at the Ironclad Facility meet the intent of the oil pollution prevention regulations.

4.1.2 Truck Shop Facility

The Truck Shop (Figure 3) consists of a large bulk oil storage room, the truck maintenance shop with a lube service bay, large vehicle wash bays, a burner room with heaters, and a bulk oil off-loading facility.

4.1.2.1 Storage and Use of Petroleum Products and Other Environmentally Sensitive Materials

Inside the Truck Shop

The following above ground bulk oil storage tanks are located inside the Truck Shop in a separate containment area at the east end of the building.

Table 4. Bulk Storage Tanks Inside the Truck Shop

Tank Contents	Tank Label	Tank Type	Capacity (gallons)
Used Oil	NTS1	Cylindrical Steel	12,000
30 Wt. Transmission Fluid	NTS2	Cylindrical Steel	6,000
Final Drive Oil	NTS3	Cylindrical Steel	6,000
XL400 15W-40 Oil	NTS4	Cylindrical Steel	6,000
HD Transmission 10 Oil	NTS5	Cylindrical Steel	6,000
Antifreeze Premix	NTS6	Cylindrical Steel	3,000

In addition to the above bulk oil storage areas, there are other petroleum storage containers located in the work areas of the Truck Shop as described in Table 5. Also there is an oil water separator and skimmer that holds oily water in the large vehicle wash bay.

Table 5. Other Storage Containers in the Truck Shop

Tank Description*	Tank Contents	Tank Type	Capacity (gallons)
Steel Tank Mounted on Rollers (Drip Tank)	Used Oil	Rectangular Steel	300
Steel Tank Mounted on Rollers (Drip Tank)	Used Oil	Rectangular Steel	119
Steel Tank Mounted on Rollers (Drip Tank)	Used Oil	Rectangular Steel	45
Steel Totes (2) at Hot Draining Device	HD30 Oil	Rectangular Steel	1000

***The number of steel roller tanks may vary inside of the Truck Shop**

4.1.2.2 Quantities of Material Stored and Secondary Containment (New Truck Shop)

By referring to Tables 4 and 5 above and the tank inventory in Appendix A, it is evident that as much as 40,000 gallons of petroleum products and used oil can be stored in the containers at the Truck Shop at any point in time. Three thousand gallons of antifreeze storage capacity also exists at the Truck Shop. The tank inventory table in Appendix A lists tank volumes and describes the secondary containment for the Truck Shop. Adequate secondary containment exists for all containers, as discussed in section 4.1.2.7 below.

4.1.2.3 Spill Potential of Materials at the Truck Shop

The greatest potential for spills at the Truck Shop is in the transfer of used oil into the drip tray units when changing oil. Another potential spill scenario is when fluids are off-loading of oil products from bulk tank trucks. In either case, the quantities spilled would most likely be on the order of several gallons. In the unlikely event of a large tank rupture in the Oil Room, several hundred gallons could report to secondary containment, but there is virtually no chance that oil spilled could escape containment in the covered and contained building. The overall spill potential is rated as low.

4.1.2.4 Spill Prevention and Control at the Truck Shop

The most important activity to prevent spills at the Truck Shop is operator care in the transfer of fluids, using common sense and diligence in making sure connections are secure, drip pans are in place, and containers are positioned to receive fluids properly.

Bulk storage of petroleum products is primarily ***inside*** the Truck Shop building in the Oil Room. The Truck Shop Oil Room is a secondary containment in itself, with a concrete floor and footings that extend up at least one foot from the floor in order to provide 43,000 gallons of containment capacity. Spills from tanks in the Oil Room, whether from tank rupture, overfilling, or pump / piping leaks, will be contained ***inside*** the containment structure. The containment structure is more than adequate to hold 110% of the volume of the largest tank (12,000 gallons; see Table 4 above). Mounted on the wall of the Truck Shop Oil Room is an electronic display panel that monitors the volume of materials in the various tanks.

There is an enclosed thirteen-connection fill manifold located outside the building on the north side of the Truck Shop. The 13 off-loading connections on this manifold are directly linked to the tanks in the Truck Shop Oil Room. All fill lines are fitted with back-flow check valves located near the outside-terminus of the fill lines. The off-loading area is built on a concrete containment pad that slopes inward to the building and there is a sump beneath the pad that will collect spills. Collected fluids in the sump can be pumped to the used oil storage tank. No overfill warning devices are installed.

The majority of the used oil is burned in oil-fired boilers that provide heat to the Truck Shop. Off-site disposal of used oil occurs on very irregular basis when there is a surplus of used oil. Prior to these transfers of used oil, tank readings will be obtained from the storage tank to estimate the volume of used oil remaining in the tank. Any transfers of used oil from the storage tank to a transporter's truck will be continually attended by the transporter to monitor for leaks and/or spillage. A spill of antifreeze will be managed separately from used oil and will be placed in a container labeled "used antifreeze."

4.1.2.5 Spill Countermeasures (Clean-up Procedures) at the Truck Shop

Section 3.2 provides the **general spill response procedures** for use at the Truck Shop. The following narrative provides additional detail on spill clean-up.

Small Spills Outside of Containment Structures

Spills from totes, drums, or pails can be contained entirely within the Truck Shop building and relatively easily removed from the concrete floor. Material spilled within the building will be recovered with a sorbent material (sorbent pads, pillows, oil dry, bentonite, or "kitty litter"). Sorbent pads that have been used to remove petroleum products, including fuels, antifreeze, and oils, can be disposed of as a conventional solid waste and can be placed into the commercial solid waste containers (dumpsters) at various locations around the property, provided no solvents or other potentially hazardous wastes have been added. Sorbent materials that have been saturated with oil but are not dripping can be disposed as conventional solid waste.

Leaks or spills of petroleum products during transport or during product transfer will create an oil stain on the ground surface. CC&V's clean-up policy is as follows: If the majority (>50%) of the area consisting of 9 square feet (3 feet by 3 feet) is affected (stained), then the affected area will be removed (i.e., the soil and oil mixture) and placed in the blast hole stemming material pile or as directed by Environmental Resources. Contaminated material less than 9 square feet shall be collected and disposed of in the Large TruckShop washbay settling pond located outside the shop.

Large Spills Outside of Containment Structures

Available earth-moving equipment will be used to excavate a trench and sump system to retain the spill in the immediate vicinity of the spill. Fluids should be recovered into barrels or tanks quickly to minimize seepage. Straw bales may be used to absorb the remaining fluid. Sorbent soils or commercial sorbents may also be used to absorb the fluid.

Spill Response Kits are supplied at the following locations within the mine site including:

- Ajax Exploration Building - Aerosol can puncturing station

- Secondary Crusher - Aerosol can puncturing station in the nearby Millwright Shop
- Truck Shop - Aerosol can puncturing station in the Southeast Corner of the Maintenance Bays
- Light Vehicle Shop Hazardous Waste Accumulation - Storage room located behind the Light Vehicle Shop
- Carlton Security Access - Furnace room located behind the Safety office and next to the back exit door
- Warehouse Area – adjacent to cardboard baler, in Bay 4, and near battery storage area
- Environmental Resources – Storage Area
- Fuel Island – adjacent to the gasoline pump
- High Grade Mill North and South Entrances
- Small portable spill kits are also located in many supervisor's trucks

Additionally, the CC&V mobile fuel/lubricant trucks are supplied with materials to contain small spills and can be called on the radio. Use call number *J3* for assistance. Both the Wet and the Metallurgical laboratories have spill response kits for use in those areas.

Spill Response Kits may contain:

- Absorbent socks
- Respirator
- Chemically resistant gloves
- Copy of Waste Management Plan
- Acid neutralizer
- Safety glasses

4.1.2.6 Inspections and Tank Integrity Testing at the Truck Shop

Tanks and containers with >55 gallon capacity will be inspected on a monthly basis and the form in Appendix A will be used to document the inspection. Records of these inspections will be kept on file in Environmental Resources.

Tank integrity testing will be performed according to the plan provided in Appendix G.

4.1.2.7 Conformance with Regulations at the New Truck Shop

Applicable state and local guidelines are assumed to be the same as the Federal Regulations at 40 CFR Part 112, and therefore, under 40 CFR Part 112 the oil storage containers and secondary containment at the Truck Shop meet the *intent* of the oil pollution prevention regulations.

4.1.3 Fuel Farms (aka "Fuel Islands")

The *new* Midway Fuel Farm is located south of Ironclad Shop Facilities as shown on Figure 4.

4.1.3.1 Storage and Use of Petroleum Products at the Midway Fuel Farm

Table 6. Midway Fuel Farm Petroleum Products in Tanks and Totes

Tank Description	Tank Contents	Tank Type	Capacity (gallons)
Horiz. Mounted Eaton Single Walled Tank Skid Mounted S/N 204259 (MWFF-1)	Off-Road Diesel Fuel	Steel	30,000
Horiz. Mounted Eaton Single Walled Tank Skid Mounted S/N 204260 (MWFF-2)	Off Road Diesel Fuel	Steel	30,000
Horiz. Mounted Eaton Single Walled Tank Skid Mounted S/N 204261 (MWFF-3)	Off Road Diesel Fuel	Steel	30,000
Horiz. Mounted Eaton Single Walled Tank Skid Mounted S/N 204262 (MWFF-4)	Off Road Diesel Fuel	Steel	30,000
Horiz. Mounted Eaton Single Walled Tank Skid Mounted S/N 204263 (MWFF-5)	Off Road Diesel Fuel	Steel	30,000
Horiz. Mounted Eaton Single Walled Tank Skid Mounted S/N 204264 (MWFF-6)	Off Road Diesel Fuel	Steel	30,000
Horiz. Mounted Eaton Double Walled Tank Skid Mounted S/N 208604 (MWFF-7)	Gasoline	Steel	12,000
Horiz. Mounted Eaton Double Walled Tank Skid Mounted S/N 208605 (MWFF-8)	DFO #1 Kerosene	Steel	1,000
Horiz. Mounted Eaton Double Walled Tank Skid Mounted S/N 208605 (MWFF-9)	DFO #2 Lt. Vehicle Diesel	Steel	1,000
Horiz. Mounted Eaton Double Walled Tank Skid Mounted S/N 208605 (MWFF-10)	Diesel Additive (Anti-Gel)	Steel	1,000
Two Single Walled Rectangular Tanks (MWFF-11&12)	Antifreeze	Steel	750
Two Single Walled Rectangular Tanks (MWFF-13&14)	10 Wt Oil (Hydraulic)	Steel	750
Two Single Walled Rectangular Tanks (MWFF-15&16)	30 Wt Oil	Steel	750
Two Single Walled Rectangular Tanks (MWFF-17&18)	15W40 Oil	Steel	750
Single Walled Rectangular Tank (MWFF-19) for Oil – Water Separator System	Oily Water	Steel	4,000

4.1.3.2 Quantities of Material Stored and Secondary Containment (Fuel Farms)

By referring to Table 6 above and the tank inventory in Appendix A, it is evident that over 200,000 gallons of petroleum products can be stored in the tanks and containers at any point in time. For the Midway Fuel Farm secondary containment is provided by an underground sump filled with coarse rock with a porosity of 20%. Since the volume of the sump is 13,850 cu yds, the calculated volume of containment considering porosity is 560,000 gallons – which is sufficient to contain the volume of the largest tank.

4.1.3.3 Spill Potential of Materials at the Fuel Farms

There are several potential spill scenarios at the Fuel Farm including (but not limited to):

(1) Tank rupture within containment - very unlikely, but spill would be captured by containment
(2) Hose rupture during filling of vehicles - possible in fueling area on one of the pads
(3) Spillage during off-loading from tanker truck
(4) Spillage during the fueling of large mining equipment - likely if equipment moves during fueling operations or if operator does not pay attention to details such as replacing fill hoses and staying with vehicle during fueling

Should any of the above scenarios actually take place the volume of petroleum products or antifreeze is anticipated to be on the order of <5 to several hundred gallons.

4.1.3.4 Spill Prevention and Control at the Midway Fuel Farm

CC&V's Mine Maintenance Department has published a Standard Operating Procedure ("SOP") for the Midway Fuel Farm. This procedure includes a section for spill prevention and control.

4.1.3.5 Spill Countermeasures (Clean-up Procedures) at the Fuel Farm

Section 3.2 provides the **general spill response procedures** for use at the Fuel Farm. The following narrative provides additional detail on spill clean-up.

Clean-up of Small Spills
Clean up of small spills can be addressed with sorbent materials (pads, oil dry, "kitty litter", and/or sand) by placing these materials directly into the spilled pool of oil or antifreeze. Sorbent pads that have been used to remove petroleum products, including fuels, antifreeze, and oils, can be disposed of as a conventional solid waste and can be placed into the commercial solid waste containers (dumpsters) at various locations around the property, provided no solvents or other potentially hazardous wastes have been added. Sorbent materials that have been saturated with oil but are not dripping can be disposed as conventional solid waste.

Leaks or spills of petroleum products during transport or during product transfer will create an oil stain on the ground surface. CC&V's clean-up policy is as follows: If the majority (>50%) of the area consisting of 9 square feet (3 feet by 3 feet) is affected (stained), then the affected area will be removed (i.e., the soil and oil mixture) and placed in the blast hole stemming material pile or as directed by Environmental Resources.

Water captured inside the Fuel Farm secondary containment cells will be removed on a regular basis. If the water has an oily sheen, it will be removed and treated through the oil skimmer located at the Truck Shop Wash Bays. Absorbent pads are available in the warehouse and on mobile fuel/lubricant trucks to assist in cleaning up minor spills.

Free liquids with an oily sheen that are collected in the Fuel Farm sumps will be pumped into appropriate containers. Oily liquids will be hauled to the oil skimmer sump located at the Truck Shop Wash Bay or shipped off site for recycle.

Liquids that contain antifreeze will be place in totes or drums and shipped off site to a recycling facility.

Large Spills Outside of Containment Structures

Available earth-moving equipment will be used to excavate a trench and sump system to retain the spill in the immediate vicinity of the spill. Fluids should be recovered into barrels or tanks quickly to minimize seepage. Straw bales may be used to absorb the remaining fluid. Sorbent soils or commercial sorbents may also be used to absorb the fluid.

Spill Response Kits are supplied at the following locations within the mine site including:

- Ajax Exploration Building - Aerosol can puncturing station
- Secondary Crusher - Aerosol can puncturing station in the nearby Millwright Shop
- Truck Shop - Aerosol can puncturing station in the Southeast Corner of the Maintenance Bays
- Light Vehicle Shop
- Hazardous Waste Accumulation - Storage room located behind the Light Vehicle Shop
- Carlton Security Access - Furnace room located behind the Safety office and next to the back exit door
- Warehouse Area – adjacent to cardboard baler, in Bay 4, and near battery storage area
- Environmental Resources – Storage Area
- Midway Fuel Island – adjacent to the small building next to the concrete fueling pad
- High Grade Mill North and South Entrances
- Small portable spill kits are also located in many supervisor's trucks

Additionally, the CC&V mobile fuel/lubricant trucks are supplied with materials to contain small spills and can be called on the radio. Use call number *J3* for assistance. Both the Wet and the Metallurgical laboratories have spill response kits for use those areas.

Spill Response Kits contain:

- Absorbent socks
- Respirator
- Chemically resistant gloves
- Copy of Waste Management Plan
- Acid neutralizer
- Safety glasses

4.1.3.6 Inspections and Tank Integrity Testing at the Fuel Farm Facilities

All tanks, containers, piping, and sumps at the Fuel Farms will be inspected on a monthly (or more frequently if needed) basis and the form in Appendix A will be used to document the inspection. Records of these inspections will be kept on file in Environmental Resources.

Tank integrity testing will be performed according to the plan provided in Appendix G.

4.1.3.7 Conformance with Regulations at the Fuel Farm Facility

Applicable state and local guidelines are assumed to be the same as the Federal Regulations at 40 CFR Part 112, and therefore, under 40 CFR Part 112 the oil storage containers and secondary containment at the Fuel Farm Facility meet the intent of the oil pollution prevention regulations.

4.1.4 Crusher Facilities

Locations for the primary and secondary crushers, crusher oil storage shed, and the crusher maintenance shed are shown on Figure 5. A variety of greases and oil are stored and used in the crushing facilities, as discussed in the following narrative.

4.1.4.1 Storage and Use of Petroleum Products at the Crusher Facilities

The Crusher Oil Storage Shed serves as the primary facility for storing greases and oils used at the crushers. It is a roofed building on a concrete slab with an overhead door for entry and exit. Drums and totes of various greases and oils are stored here on the concrete floor. See the inventory table in Appendix A for a description of drums, totes, tanks, and secondary containment. Various drums and totes are also stored on grated steel pallets outside along the southeast wall of the Oil Storage Shed.

Hydraulic oil, greases, and lubricants used for maintenance of the crushers are stored in 55-gallon drums, five-gallon buckets, tanks, and totes near the Primary and Secondary Crushers. A portable lubricating unit (approx. 67 gallon capacity) operates throughout the Secondary Crusher building, and a variety of greases and oils are stored in totes and drums on the ground floor.

4.1.4.2 Quantities of Material Stored and Secondary Containment at the Crusher Facilities

Almost 6,000 gallons of storage capacity exists in the Crusher Oil Storage Shed and the adjacent open containment area. The shed and the adjacent storage area both have secondary containment structures with respective volumes of 2,000 gallons (concrete floor of shed), and 270 gallons (grated pallets). Although the grated palettes would not contain the entire spill of one of the 500 gallon totes stored on top of it, the palette along with on-site BMP's would ensure a spill would not leave the area. The steel aerosol can puncturing device mounted on a 55-gallon drum at the Crusher Maintenance Shop is contained within a 95-gallon over-pack drum.

Totes and drums, containing lubricants at the crusher buildings have no secondary containment other than the concrete slab floors of the buildings. Given the viscous nature of these lubricants, any spill would be contained within the building.

4.1.4.3 Spill Potential of Oils and Greases at the Crusher Facilities

Most of the greases used for lubricating the mechanical devices within the crushing facilities are heavy, viscous, dense greases that are unlikely to spill. In the unlikely event of a grease tote or tank rupture the grease is so resistant to flow that it would not migrate more than several feet from the storage vessel. Therefore, significant spillage of greases is not expected to be a problem.

Hydraulic oils used in the crushers represent a potential spill threat, although hydraulic oil is stored and used at locations that are underlain by a concrete slab, where the spill could be easily cleaned-up. The most likely amount spilled would be on the order of <10 to 100 gallons.

4.1.4.4 Spill Prevention and Control at the Crusher Facilities

Extensive use of hydraulic oil occurs in the Crusher areas. The most important activity to prevent spills of hydraulic oil at the Crusher Facilities is operator care in the transfer of fluids, using common sense and diligence in making sure connections are secure, drip pans are in place, and containers are positioned to receive fluids properly.

Runoff from areas surrounding the Crusher Facilities flows to holding ponds where any oil spilled can be skimmed prior to release. Even though catchment of runoff is provided, special care will be exercised to prevent hydraulic oils from migrating to areas outside the crushers.

Used oil generated at the Crushers are temporarily stored in drums or totes, and then hauled to the Ironclad Facilities for use as heating fuel or for shipment to an off-site disposal/recycling facility. Used greases stored in drums are hauled to the Ironclad Facilities for shipping to an off-site disposal facility.

4.1.4.5 Spill Countermeasures (Clean-up Procedures) at the Crusher Facilities

Section 3.2 provides the **general spill response procedures** for use at the Crushers. The following narrative provides additional detail on spill clean-up.

Clean-up of Spills at the Crusher Facilities

Clean up of spills can be addressed with sorbent materials (pads, oil dry, "kitty litter", and/or sand) by placing these materials directly into the spilled pool of oil or grease. Sorbent pads that have been used to remove petroleum products, including greases and oils, can be disposed of as a conventional solid waste and can be placed into the commercial solid waste containers (dumpsters) at various locations around the property, provided no solvents or other potentially hazardous wastes have been added. Sorbent materials that have been saturated with oil but are not dripping can be disposed as conventional solid waste.

Leaks or spills of petroleum products during transport or during product transfer will create an oil stain on the ground surface. CC&V's clean-up policy is as follows: If the majority (>50%) of the area consisting of 9 square feet (3 feet by 3 feet) is affected (stained), then the affected area will be removed (i.e., the soil and oil mixture) and placed in the blast hole stemming material pile or as directed by Environmental Resources.

Free liquids with an oily sheen that are collected at the Crusher Facilities will be pumped into appropriate containers. Oily liquids will be hauled to the oil skimmer sump located at the Truck Shop Wash Bay with the residual shipped off site for recycle.

4.1.4.6 Inspections and Tank Integrity Testing at the Crusher Facilities

All tanks and containers >55 gallons capacity at the Crusher Facilities will be inspected on a monthly basis and the form in Appendix A will be used to document the inspection. Records of these inspections will be kept on file in Environmental Resources.

Tank integrity testing will be performed according to the plan provided in Appendix G.

4.1.4.7 Conformance with Regulations at the Crusher Facilities

Applicable state and local guidelines are assumed to be the same as the Federal Regulations at 40 CFR Part 112, and therefore, under 40 CFR Part 112 the oil storage containers and secondary containment at the Crusher Facilities meet the *intent* of the oil pollution prevention regulations.

4.1.5 Mobile Maintenance and Mine Equipment Fleet

Fuel trucks and service trucks are used by CC&V at the Cresson Project to supply the mine's heavy equipment and earthmoving fleet with fuel and other petroleum products. In addition, other large machines operating onsite contain significant quantities of oil and fuel and therefore are covered in this section of the SRP/SPCC Plan. Operating equipment or mobile equipment, for inclusion in this SRP/SPCC Plan, will refer to those vehicles that have oil in individual tanks with capacities of 55 gallons or greater. This determination is based on page 47044 of the July 17, 2002 Federal Register "Summary of Major Revisions to the Current SPCC Rules" table which states that the threshold (1,320 gallons in containers greater than 55 gallons) applies to storage capacity contained in operating equipment as well as to storage capacity contained in tanks. Further definition and additional justification for this determination is found on page 47066 of the same Federal Register where it states that "You need only count containers of 55 gallons or greater in the calculation of the regulatory threshold." Various types of mobile equipment containing greater than 55 gallons of oil are used at the Cresson Project The table in Appendix A provides a list of the types of equipment and tank capacities for the equipment.

4.1.5.1 Storage and Use of Petroleum Products in Mobile Equipment

Service trucks haul petroleum products including diesel fuel, antifreeze, motor oil, lubricating greases, and hydraulic oil to supply mine operations equipment. Other mobile equipment such as dozers, loaders, haul trucks, drills, water trucks, graders, etc. store or use diesel fuel, hydraulic oil, motor oil, and antifreeze.

4.1.5.2 Quantities of Material Stored and Used in Mobile Equipment Tanks

Table 7. Mobile Fueling Equipment Products in Tanks

Tank Contents	Capacity (gallons, unless otherwise specified)
Unit LT 40102	
Evac Oil Storage	3000
Various oils	2765
Antifreeze	220
Unit LT 40103	
Diesel Fuel	8000
Various oils	2765
Antifreeze	220
Unit LT 40104	
Diesel Fuel	5500
Various Oils	2250
Antifreeze	250

4.1.5.3 Spill Potential of Mobile Equipment

The most likely amount of fuel or oil spilled from mobile equipment is on the order of 1 to 50 gallons. A typical spill might involve a hydraulic line break, and this could occur anywhere on the site. Flow direction is even more dependent on where the line break or spill occurs. In general, the site's ground surface is loose native soil or crushed rock, and flow-paths are typically directed to containments. These factors are helpful in spill containment, therefore it would be unlikely that a spill would report off the site before it could be properly cleaned up and disposed.

4.1.5.4 Spill Prevention and Control for Mobile Equipment

Where oil product or antifreeze transfers occur in the field (not inside secondary containment), field personnel will use containment buckets, drip trays, or absorbents will be used to catch any spillage. During these transfers of liquids, hoses, nozzles, pumps, flanges, tanks, and piping will be inspected and any significant deterioration will be reported to the maintenance department for repair or replacement as needed.

In the Preamble to 40 CFR Part 112 as given in the Federal Register, July 17, 2002, pages 47054-5, it states: "Facilities that use oil operationally include electrical substations, facilities containing electrical transformers, and certain hydraulic or manufacturing equipment. The requirements for bulk storage containers may not always apply to these facilities. ***"Facilities with equipment containing oil for ancillary purposes are not required to provide the secondary containment required for bulk storage facilities (§112.8(c))."*** Based on the preceding regulatory discussion, secondary containment is not required for mobile operating equipment. "The general requirement for secondary containment, which can be provided by various means including drainage systems, spill diversion ponds, etc., will provide for safety and also meet the needs of Section 311 (j)1(c) of the CWA" according to the discussion on page 47055 of the July 17, 2002 Federal Register. The containment structures described in other sections of this SRP/SPCC Plan plus drainage controls included in the site storm water pollution prevention plan (SWPPP) meet the intent of the general secondary containment requirement.

4.1.5.5 Spill Countermeasures (Clean-up Procedures) for Mobile Equipment

Section 3.2 provides the **general spill response procedures** for use involving spills around mobile equipment. The following narrative provides additional detail on spill clean-up.

Clean-up of Spills Around Mobile Equipment

Clean up of small spills can be addressed with sorbent materials (pads, oil dry, "kitty litter", and/or sand) by placing these materials directly into the spilled pool of oil or grease. Sorbent pads that have been used to remove petroleum products, including antifreeze, greases and oils, can be disposed of as a conventional solid waste and can be placed into the commercial solid waste containers (dumpsters) at various locations around the property, provided no solvents or other potentially hazardous wastes have been added. Sorbent materials that have been saturated with oil but are not dripping can be disposed as conventional solid waste. Mobile re-fuelers (for example, units LT401 and LT403) maintain a supply of clean-up materials—such as sorbent pads and oil dry—and these units are capable of spill clean-up near any piece of mine mobile equipment.

Leaks or spills of petroleum products during transport or during product transfer will create an oil stain on the ground surface. CC&V's clean-up policy is as follows: If the majority (>50%) of the area consisting of 9 square feet (3 feet by 3 feet) is affected (stained), then the affected area will be removed (i.e., the soil and oil mixture) and placed in the blast hole stemming material pile or as directed by Environmental Resources.

Free liquids with an oily sheen that are collected during mobile servicing in the field will be pumped or gravity fed into appropriate containers. Oils mixed with water will be hauled to the oil skimmer sump

located at the Truck Shop Wash Bay or shipped off site for recycle.

4.1.5.6 Inspections and Tank Integrity Testing for Mobile Equipment

Monthly visual inspections of the mobile equipment tanks will be conducted. Tanks on mobile operating equipment will not be subject to the integrity testing protocols

4.1.5.7 Conformance with Regulations for Mobile Equipment

Applicable state and local guidelines are assumed to be the same as the Federal Regulations at 40 CFR Part 112, and therefore, under §112.7(j) the tanks mounted on mobile equipment are in compliance with applicable requirements with respect to secondary containment.

4.1.6 Electrical Gear (Transformers and Substations)

On the CC&V property are a large number of electrical substations and transformers to supply power to buildings and process areas. The tank inventory table in Appendix A provides a description of the electrical gear and the volume of oil in each unit.

4.1.6.1 Storage and Use of Petroleum Products in Electrical Gear

Oil is used in transformers to prevent overheating. Various sizes of transformer units require different amounts of oil, as indicated in the inventory table in Appendix A.

4.1.6.2 Quantities of Material Stored and Secondary Containment for Electrical Gear

See the inventory table in Appendix A.

4.1.6.3 Spill Potential of Materials Contained in Electrical Gear

The overall spill potential for electrical transformers is low. Most of the units are new, modern installations, and are mounted on concrete slabs.

4.1.6.4 Spill Prevention and Control for Electrical Gear

In the Preamble to 40 CFR Part 112 as given in the Federal Register, July 17, 2002, pages 47054-5, it states: "Facilities that use oil operationally include *electrical substations*, facilities containing electrical transformers, and certain hydraulic or manufacturing equipment. The requirements for bulk storage containers may not always apply to these facilities. *Facilities with equipment containing oil for ancillary purposes are not required to provide the secondary containment required for bulk storage facilities (§112.8(c)).*" Based on the preceding regulatory discussion, secondary containment is not required for electrical transformers. However, most of the active (in service) transformers sit on elevated concrete pads. Typically, the transformers are labeled with signs, and are located in highly visible areas. In the unlikely event that a transformer should completely rupture the oil inside could conceivably report to the concrete elevated pads, or the ground surrounding the units. The most likely amount spilled is expected to be less than 10 gallons.

4.1.6.5 Spill Countermeasures (Clean-up Procedures) for Electrical Gear

Section 3.2 provides the **general spill response procedures** for use involving spills around electrical gear. The following narrative provides additional detail on spill clean-up.

Clean-up of Spills Around Electrical Gear

Clean up of oil spills can be addressed with sorbent materials (pads, oil dry, "kitty litter", and/or sand) by placing these materials directly into the spilled pool of oil or grease. Sorbent pads that have been used to remove petroleum products, including antifreeze, greases and oils, can be disposed of as a conventional solid waste and can be placed into the commercial solid waste containers (dumpsters) at

various locations around the property, provided no solvents or other potentially hazardous wastes have been added. Sorbent materials that have been saturated with oil but are not dripping can be disposed as conventional solid waste.

Leaks or spills of petroleum products during transport or during product transfer will create an oil stain on the ground surface. CC&V's clean-up policy is as follows: If the majority (>50%) of the area consisting of 9 square feet (3 feet by 3 feet) is affected (stained), then the affected area will be removed (i.e., the soil and oil mixture) and placed in the blast hole stemming material pile or as directed by Environmental Resources.

Free liquids with an oily sheen that are collected during mobile servicing in the field will be pumped or gravity fed into appropriate containers. Oils mixed with water will be hauled to the oil skimmer sump located at the Truck Shop Wash Bay or shipped off site for recycle.

4.1.6.6 Inspections and Tank Integrity Testing for Electrical Gear

Monthly visual inspections of electrical transformers will be conducted and documented on the form in Appendix A. Electrical gear will not be subject to the tank integrity testing protocols.

4.1.6.7 Conformance with Regulations for Electrical Gear

Applicable state and local guidelines are assumed to be the same as the Federal Regulations at 40 CFR Part 112, and therefore, under §112.7(j) the electrical transformer facilities discussed in this section are *in conformance* with applicable requirements.

4.1.7 Contractor's Oil Storage Facilities

There are several contractors that conduct operations within the boundaries of CC&V property including: Ames, A.K. Drilling, Conley Construction, and Buckley Powder. It is the policy of CC&V management to require contractors to maintain separate SPCC plans that meet the requirements of 40 CFR Part 112. Copies of SPCC Plans for each contractor are on file in Environmental Resources.

4.2 Ammonium Nitrate, Emulsion, and ANFO (Blasting Agents)

Ammonium nitrate and emulsion are commonly used for blasting. At the Cresson Project there is no bulk storage of "ammonium nitrate fuel oil" (ANFO). Instead, ammonium nitrate and fuel oil area mixed together at blast hole sites in the pit. Buckley Powder manufactures emulsion on site. Ammonium nitrate is stored in two 70-ton capacity silos located at the Bulk Emulsion Facility. Emulsion (commonly referred to as "prill") is also stored in two 70-ton capacity structures, or silos, in the same general area as ammonium nitrate. Buckley Powder is a contractor to CC&V, and therefore has its own Spill Response Plan / SPCC.

4.3 Process Reagents Used in Minerals Beneficiation

Process (minerals beneficiation) reagents include hydrochloric acid (HCl), sodium hydroxide (NaOH), sodium cyanide (NaCN), hydrogen peroxide (H_2O_2), and antiscalant.

4.3.1 Process Reagents at the ADR Plant ("Adsorption Desorption Recovery Plant") and VLF ("Valley Leach Fill")

The ADR Plant uses process (minerals beneficiation) reagents to recover precious metals from the ore. The location of the current ADR Plant is identified on Figures 2 and A1. Specific details for the ADR facility can be found in the site specific SPCC plan located in Attachment A. Diluted cyanide leach solution (typically 0.01% to 0.02% or 100 – 200 ppm) is directed to and from the VLF through an HDPE/steel piping system. Pregnant lines are steel and barren lines are steel/HDPE depending on location.

4.3.1.1 Spill Prevention, Control, and Countermeasures for Process Reagents

VLF – Dilute cyanide leach solution (typically 0.01% to 0.02% or 100 – 200 ppm) is directed to and from the VLF through an HDPE/steel piping system. Pregnant lines are steel and barren lines are steel/HDPE. The pipelines are also equipped with an automatic shut-off, triggered by flow or pressure differentials. In the unlikely event that solution drains or sprays off liner, spill response procedures described in section 5.2.3 of this SRP/SPCC Plan should be followed expeditiously. Pipes, drip lines, and conveyances that direct cyanide solution to and from the VLF are generally installed 15 feet between the conveyance and the edge of the liner. CC&V may also affix pieces of synthetic liner on the side of flanges and valves facing the edge of the liner to reduce the chance of off-pad spraying should a leak develop.

Bulk Cyanide Delivery, Storage, and Handling
The facilities for mixing, unloading, and storage of cyanide are located within the security perimeter of the mine, physically distant (2-5 miles) from any dwellings or communities. CC&V employs a cyanide producer-designed dissolution system [i.e., the CyPlus® SLS (Solid-to-Liquid System)]. The SLS system is connected to the supplier's stainless steel ISO delivery tanks, water and caustic soda introduced, and the solution cycled between a stationary mixing tank and the delivery tank until all solid cyanide is dissolved. The final solution is then transferred to CC&V's solution storage tank. The mixing and storage tanks are both fitted with audible high-level alarms, and tank levels are monitored remotely by process operators in the ADR control room.

During the SLS process the cyanide delivery tanks are staged on a concreted pad sloped to a sump within the containment for the stationary mixing and storage tanks. The cyanide storage and mixing tanks are both located within a dedicated concrete impoundment; the impoundment and the entire adjacent ADR building are also underlain by an HDPE barrier that is sloped to drain to the VLF.

CC&V does not handle empty cyanide containers as cyanide is only purchased and delivered to the site in dedicated, reusable stainless steel ISO containers. After mixing in the ISO container and transfer of the cyanide to the storage tank, the access port on top of the ISO container is opened and a visual inspection made to ensure that all tank contents have been dissolved and transferred; the port is then secured and the tank washed down as necessary prior to being returned to the production facility.

Detailed procedures are in place for operation of the SLS system. The two TriMac drivers are primarily responsible for mixing and transfer of cyanide between the ISO container and the storage tank. CC&V Team Members provide oversight at the beginning and end of each mix, and monitor tank volumes remotely from the ADR control room. The procedures detail safe operation of valves and couplings, precautionary inspections of all mixing connections for leaks, and for performing a wash-down of the ISO tank dome prior to disconnection, inspection of the interior of the container to ensure complete transfer of the reagent, and moving the trailer and tank off the mixing/offloading apron.

Sodium Hydroxide - NaOH liquid is stored directly west of the ADR in a 20,000-gallon tank within concrete secondary containment and within the tertiary containment of the lined area of the VLF. The concrete containment sump is equipped with a float-activated pump that would return fluid to the plant circuit in the event of a release. A release outside the concrete containment would remain on the VLF liner and migrate north toward the main liner system.

Hydrochloric Acid - HCl liquid is stored directly west of the ADR in an 8,200-gallon, double-walled tank within concrete containment and within the lined area. Releases outside the tank containment would flow north, completely contained within the liner.

Antiscalant - Antiscalant liquid is not a hazardous chemical. It is stored in various locations at the ADR Plant in poly-plastic 600 to 8,000 gallon capacity single-walled, foam-insulated tanks. The ADR is located on liner that drains to the VLF. Antiscalant is also stored within the VLF in poly plastic insulated tanks various sizes (see Appendix A for container sizes).

Release of Antiscalant should be controlled, even though the residue is not hazardous. Complete removal of impacted soils is not required. Contaminated soils may be placed on the VLF if desired.

Secondary and Tertiary Containment at the ADR Facility - Several redundant containment features exist at the ADR including: (1) liner extends under the building itself forming a continuous barrier to guard against spills reaching the ground water; (2) the ADR building has a concrete floor and curbing that provides secondary containment for spills from reagent tanks; and (3) some of the tanks are double walled construction.

4.4 Spent Carbon, Refinery Slag, and Used Furnace Crucibles

Spent carbon fines and used refinery furnace crucibles are generated from gold beneficiation and refining processes. These items are shipped off site for further gold recovery.

4.4.1 Storage of Spent Carbon, Refinery Slag, and Used Furnace Crucibles at ADR Plant

The spent carbon is collected in mesh sacks and stored on wooden pallets outside, west of the ADR building on the VLF lined area. The refinery slag and used furnace crucibles are stored in labeled drums in the refinery area.

4.4.1.1 Spill Prevention, Control, and Countermeasures for Spent Carbon, Slag, and Crucibles

Spent carbon sacks may release material during filling or when moved. During transfer from storage to a transport vehicle, spills may occur. A release of spent carbon will be scooped up and placed into a spent carbon sack.

Refinery slag and used furnace crucibles may be spilled if a drum tips over during transfer from the storage area to a transport vehicle. In the event of a release, the spilled materials will be scooped up and returned to the storage drum prior to transport.

4.5 Lime

Coarse (pebble) lime is used to prepare crushed Cresson Project ore for leaching.

4.5.1 Lime Silo

The pebble lime silo for the Cresson Project is located along the conveyor downstream of the secondary crusher.

4.5.1.1 Spill Prevention, Control, and Countermeasures at the Lime Silos

The silos are equipped with a bag-house to control lime dust. Lime is applied in a covered portion of the conveyor to enhance control of fugitive dust. Accumulation of lime at the base of the silos may occur during transfer from the bulk tankers.

A release of lime will be removed using a front-end loader or equivalent equipment. The material retrieved will either be placed on the VLF or incorporated into an overburden storage area. Lime will be distributed onto the pad surface only when the ambient winds are light and only when the lime will be rapidly mixed into the ore or overburden so as to avoid wind erosion.

4.6 Laboratory Chemicals

Small quantities of chemicals used in the laboratory are stored in designated areas within enclosed structures. All laboratory chemicals are handled in accordance with laboratory safety procedures and are used and stored indoors in small quantities. Spills are very unlikely to escape the laboratory facilities. However, spill response procedures are included in section 5.2.5 of this SRP/SPCC Plan. The laboratory (lab) is located west of the existing ADR as shown in Figure A1.

5.0 SPILL PREVENTION AND SPILL RESPONSE PROCEDURES

This section summarizes the routine operating procedures that must be followed to prevent releases of substances subject to control under this SRP/SPCC Plan. This Section also provides procedures to follow in the event of a specific type of chemical spill and procedures to monitor the potential migration of spilled materials. These procedures are the subject of training sessions for CC&V Team Members, and they apply to any activities conducted by CC&V at the Cresson Project.

5.1 General Spill Prevention Procedures

The following procedures primarily relate to on-site movement and use of chemicals. Team Members involved in chemical handling (including oils) will receive instruction on safe handling of storage containers and materials handling during product transfers:

- Storage Containers: (1) Driving vehicles (trucks and forklifts) carefully and in accordance with conditions to avoid collisions or ruptures of storage containers; and (2) constructing adequate berms and barriers to protect storage containers.

- Storage Containers: Making certain that there is adequate clearance when positioning a truck or equipment adjacent to storage areas or distribution points and ensuring that the operator has examined the surroundings to identify where a spill would go and how they would control it.

- Storage Containers: Checking to make sure containers are securely placed to prevent tipping and spilling and in a manner that prevents collisions with mobile equipment.

- Transfer of Materials: Examining fittings and transfer lines or hoses to be assured of tight-fits that will not come apart during transfer.

- Transfer of Materials: Examining fittings to assure they are in proper working order and do not leak or lose fluid during transfer.

- Transfer of Materials: Ensuring that valves are closed and transfer pipes are drained or contained prior to disconnect.

- Transfer of Materials: Examining the "weak spots" of any transfer procedure and visualizing where the substances would go and what control measures would be used should a transfer line break or leak. Taking a second look at these "weak points" to see if anything can be done to further prevent a release. "Cleaning up" spills.

Inspection of storage facilities is completed routinely (Appendix A). The NaCN, NaOH, and HCl storage facilities are checked during routine operations by Process Department personnel to identify and repair leaks and to maintain containment. Petroleum-based materials in the maintenance area are checked routinely to identify and repair leaks and maintain containment. The inspection includes checking for visible signs of leakage, checking containers and piping for any sign of weakness, tearing or rupturing, and checking for cracks or breaks in containment berms, as well as for any significant reduction in the capacity of the containment. Any observed problem would be immediately reported to a supervisor and repaired. Spillage will be cleaned up as appropriate for the substance involved. Inspections are recorded and the records retained.

Labels on storage containers are also part of the chemical spill prevention program and are posted at material storage areas. These labels identify the contents of the permanent storage vessels and applicable sections of the fire code. These labels are posted to remind team members of the nature of the material, to promote safe practices, and to provide clear direction about the spill prevention and control procedures to be employed.

5.2 Spill Response Procedures and Countermeasures for Specific Types of Chemicals

A spill of chemicals subject to this SRP/SPCC Plan will receive immediate and judicious action. This section outlines the step-by-step procedures to be followed in the event of an on-site (CC&V's Cresson Project) accident or spill resulting in a release of materials subject to this Plan.

5.2.1 Explosive Substances - Fuel (Diesel and Gasoline), Kerosene, and Ammonium Nitrate

IN THE EVENT OF AN ACCIDENT INVOLVING A SPILL OR LEAK, FOLLOW THESE STEPS:

- Immediately extinguish open flames and smoking in the general area (there will be no smoking when materials such as these are handled or when they are in close proximity).
- Notify immediate supervisor or Team Member by radio. Supervisors will immediately notify Safety and Environmental Resources (phone numbers are listed in section 6). The General Manager and Environmental Resources are authorized to make the necessary regulatory notifications.
- In the case of an injury to a person, make sure that Safety is notified. If qualified, and if necessary, administer first aid and medical treatment.
- Attempt to stop or contain the flow of material only if there is no danger of combustion. If there is a danger of combustion, immediately clear the area. In attempting to stop or contain ammonium nitrate, a dust respirator should be worn.
- Begin clean-up activities promptly. Fuels should be carefully pumped back into properly vented storage containers. Contaminated material should be collected in clean 55-gallon drums and disposed of in a manner and at a location specifically approved for that material by Environmental Resources.
- Complete an Internal Spill Report form in the WMRS and turn in to supervisor as soon as possible but in no case later than end of the shift.
- Conduct remedial and clean-up activities as required.

5.2.2 Petroleum-Based Oils and Antifreeze

IN THE EVENT OF AN ACCIDENT INVOLVING A SPILL OR LEAK, FOLLOW THESE STEPS:

- Attempt to stop or contain the flow of material.
- Notify immediate supervisor by radio. Supervisors are to immediately notify Environmental Resources (phone numbers are listed in section 6). Environmental Resources will make the necessary external notifications or will authorize them to be made by others.
- In the case of an injury to a person, ensure that Safety is notified. If qualified, and if necessary, administer first aid and medical treatment.
- Begin clean-up activities promptly. Spilled material should be pumped into approved containers. If pumping is not possible, sand, dirt, or absorbent material should be placed to absorb the oil or coolant. Once absorption is complete, contaminated material should be collected in barrels and disposed of in a manner and at a location specifically approved by Environment Resources for this material.
- Complete an Internal Spill Report form in the WMRS and turn in to supervisor as soon as possible but in no case later than end of the shift.

5.2.3 Cyanide Solutions, Sodium Hydroxide, and Hydrochloric Acid

IN THE EVENT OF AN ACCIDENT INVOLVING A SPILL OR LEAK, FOLLOW THESE STEPS:
(*If you are not familiar* with the chemicals and the appropriate responses do not attempt to respond but call immediately for help).

- Determine the nature and extent of the problem. DO NOT take any action until the proper course of action can be determined based on the nature and extent of the accident, spill, or leak.
- Notify immediate supervisor by radio. Supervisors are to immediately notify Safety and

Environmental Resources (phone numbers are listed in section 6). See Appendix D for neutralization of cyanide solution.

- Put on proper body and face protective gear, and breathing apparatus, if necessary.
- In the case of an accident, ensure that Safety is notified and, if qualified, administer first aid and medical treatment.
- Attempt to stop or contain the flow of material.
- **Do not use the following procedure for high concentration cyanide such as at the bulk delivery area.**

  Begin detoxification activities, if necessary. In the case of cyanide, if solution is released outside lined areas onto the ground, detoxification is required. If Calcium Hypochlorite is used for detoxification, it will be necessary to maintain elevated pH levels (8-11) for the reaction to occur. In addition, cyanogen chloride gas can be generated. This gas is highly toxic and the area should be well ventilated. Alkaline chlorination detoxification can be accomplished using beads or by making an aqueous solution. Monitoring of chlorine levels will occur during use of this method to ensure that solutions with potentially toxic chlorine levels are not released. The Reportable Quantity for Calcium Hypochlorite is 10 pounds as released to the ground.

- Begin clean-up activities.
- Implement spill and spill-path monitoring, if necessary (see section 5.3).
- Complete an Internal Spill Report form in the WMRS.

5.2.4 Laboratory Chemicals

The proper procedures for responding to the spill of a lab reagent is as follows:

Acids:

- An acid resistant suit (e.g. rubber apron, and complete protective equipment including rubber shoes, rubber over-boots, eye protection, face shield, rubber elbow length gloves and respirator with appropriate filtering protection) will be worn.
- Contain the spill using absorbent socks and dividers located in the spill kits in both the wet and metallurgical labs.
- Carefully, neutralize the spill using lime located in buckets in the work area or flush spill area with large amounts of water. These buckets are labeled for this application specifically. Provide for adequate ventilation as carbon dioxide gas may be generated by the reaction.
- Used absorbent socks should be disposed of in a sealable bucket and the mop and bucket used in the cleanup should be completely rinsed in the acid sink.

Bases:

- Wear a chemical resistant suit (e.g. rubber apron, and complete protective equipment including rubber shoes, rubber over-boots, eye protection, face shield, rubber elbow length gloves and a respirator with appropriate filtering protection).
- If the caustic soda (sodium hydroxide) is dry, shovel up any spill and dispose of the solid in the base sink with an excessive amount of water.
- If the caustic is in solution then use absorbent socks to contain the spill and add large amounts of water. After the water has been added, neutralize the solution with a dilute acid solution. Used, absorbent socks should be disposed of in a sealable bucket and the

mop and bucket used in the clean up should be completely rinsed and disposed of in an appropriate manner that complies with State and Federal Regulations.

Sodium Cyanide:

- If water is present, a self-containing breathing apparatus may be necessary.
- For a dry spill, shovel the contents into a sealable bucket and label appropriately. Remove the contents to ADR for disposal to the VLF.
- For liquid spills, contain the area with the absorbent socks and flush the spill area with Calcium Hypochlorite and large amounts of water. Used absorbent socks should be disposed of in a labeled sealable bucket and the mop and bucket used in the cleanup should be completely rinsed and disposed of in an appropriate manner that complies with State and Federal Regulations (contact Environmental Resources).

Cupels and Crucibles:

- The lab produces cupels and crucibles that contain recoverable metals, including lead. Cupels and crucibles are handled in a manner intended to minimize the potential for spillage.
- While the spillage would usually be within the laboratory facility, some debris could be released to the ground during transport to the storage area, or during transfer to trucks used for shipping of these materials to facilities for recovery of metals values. In the event of such a release, the material must be picked up in its entirety and placed with the materials to be recycled for metals recovery.

5.3 Spill Path Monitoring

If a spill or leak has the potential to migrate from the point of occurrence, spill monitoring will be implemented following clean up. Development of the monitoring plan will be determined by the nature and extent of the spill and the potential environmental hazards created by the spill.

The potential for spills of fuel, oil, coolants, or ANFO to migrate from the point of occurrence is minimal. These materials will be quickly absorbed into soil material. If a spill of these materials has the potential to migrate to surface water, a berm(s) will be placed upgradient of the potential point of entry to the water and surface water monitoring will be implemented downstream, if necessary.

Spill monitoring equipment is available on site. Soil along the spill pathway will be monitored and decontaminated and/or moved as necessary. If there is a potential for the spill to migrate off-site, samples will be obtained expeditiously from down-gradient, existing surface and groundwater stations and any additional water monitoring points deemed appropriate to monitor the potential migration pathways. The spilled material also may be tested to evaluate the effectiveness of mitigation.

6.0 EXTERNAL SPILL REPORTING PROCEDURES

Spill reporting is one the most critical elements in this SRP/SPCC Plan. It is CC&V's policy for the first responder to notify their Supervisor or contact Carlton Security on the radio as the first step in reporting. The next step is equally important and involves contacting Environmental Resources. The Environmental Manager will act as the Environmental Response Coordinator (ERC) for CC&V under the auspices of this Environmental Response Plan. As ERC, one of the Environmental Manager's duties is to make sure the external reporting is done in a timely manner in compliance with all permits and environmental regulations. The "External Agency Reporting Form" located in the ERP under the FORMS tab and section 6.2 of this Plan, will be filled out keeping in mind the "Reportable Quantities" as discussed in section 6.2 and Table 1 in section 1.1. The ERC or his designee will then follow through by contacting the appropriate agencies and any additional CC&V contacts or corporate contacts located in the ERP under the CONTACTS tab. In some instances, it may be appropriate for the ERC to contact people or governmental entities on the list located in the ERP under the CONTACTS tab.

6.1 Information for External Agency Reporting

1. NAME AND TELEPHONE NUMBER OF PERSON MAKING REPORT: _____
   DATE CALLED:_____ AGENCY CALLED _____
   WHOM CALLED:_____TIME CALLED_____

2. NAME AND MAILING ADDRESS OF COMPANY FOR WHOM REPORT IS BEING MADE:
   Physical Address: 1280 HWY 67 between Victor and Cripple Creek, Teller County, Colorado 80860
   Mailing Address: P.O. BOX 191, (100 North Third St), VICTOR, COLORADO 80860
   Location Coordinates: Latitude and Longitude: Security Office - 38° 43'37"N & 105° 09'27"W
   Legal Location: (Township, Range, Section, ¼ section): T15S, R69W, Sec 31,NW1/4,

3. COUNTY WHERE SPILL OCCURRED: **TELLER**

4. LOCATION WHERE SPILL OCCURRED (ADDRESS OR OTHER LOCATION INFORMATION): (Relate to Mining District, State or County Roads, Township, Section and Range
   _____

5. DATE AND TIME OF INCIDENT: (Time of start of release, times of control measures)
   Time of Spill: _____
   Time Spill Stopped or Contained: _____
   Time Cleanup Started: _____
   Time Cleanup Finished: _____

6. NAME OF MATERIALS SPILLED (CHEMICAL NAME IF POSSIBLE): _____
   _____
   _____

7. QUANTITY OF MATERIAL SPILLED (The accuracy of this information is important. Indicate whether the quantity is estimated or measured: _____
   _____

8. SOURCE AND CAUSE OF SPILL: _____

9. STATEMENT OF WHERE SPILL OCCURRED (IF INTO ANY STREAMS OR WATERWAYS, THE NAMES OF SUCH STREAMS OR WATERWAYS) (Use USGS Topographic Maps if possible) (If material did not reach a drainage, especially not Arequa Gulch, Squaw Gulch, Bateman Creek, or Grassy Valley, it likely did not enter a "stream".
   _____
   _____
   _____

10. DESCRIPTIONS OF ANY INJURIES, FATALITIES, EVACUATIONS OR PROPERTY DAMAGES (This must be cleared with Safety): _____
    _____
    _____

11. DESCRIPTION OF REMEDIAL ACTIONS OR CLEANUP TAKEN AND/OR TO BE TAKEN:
    _____
    _____

12. NAMES OF OTHER AGENCIES THAT HAVE BEEN OR ARE TO BE NOTIFIED: _____
    _____
    _____

13. INCIDENT NUMBER PROVIDED BY AGENCY: _____

14. WRITTEN REPORTS REQUIRED BY AGENCY: _____

6.2 Reportable Quantities

Reportable Quantities that require external reporting to environmental compliance agencies (pursuant to 40 CFR Part 116 and 117 or Colorado State guidelines) are listed in Table 1 of this SRP/SPCC Plan.

7.0 PLAN DISTRIBUTION, TRAINING, and TEAM MEMBER SAFETY

7.1 Distribution of SRP/SPCC

A copy of this SRP/SPCC Plan will be posted at the following locations:

Offices:

- Carlton Security Access
- Administration Bldg. – General Manager's Assistant's Office
- Ironclad Security Access
- Mine Rescue Team Van
- Cripple Creek Fire Department
- Teller County Local Emergency Planning Committee

A Copy of this plan as well as site specific SRP/SPCC plans will be located at the following facilities:

- PSES Facility
- ADR Facility

Team Members receive general instructions and training on the content of the plan, and periodic instruction on the nature, transportation, and handling of hazardous materials. Training is done as part of regular annual safety training and/or specifically held meetings. A record of these meetings is made and filed in the Safety Supervisor's office.

7.2 Training

The spill response program includes specific training in clean up and detoxification for selected team members. At least one of the specially trained Team Members will be on site 24 hours/day, 7 days/week. In the event of a spill, these specially trained Team Members will be immediately dispatched to the site to assist in clean up and detoxification efforts. Appropriate equipment will be available to detoxify solutions and to transport any spilled material for ultimate disposal in accordance with applicable laws and regulations.

In the event of a potentially hazardous material spill, the plan will be to contain, detoxify (if necessary), and clean up. Detoxifying agents for cyanide and acids will be kept available at the mine for use as needed.

Clean-up personnel are trained in the proper detoxification procedures for each type of material. Acids used on site can be neutralized with the addition of lime and water. Lime can be added directly to the spill area in the powder form.

For cyanide detoxification, Calcium Hypochlorite will typically be used.

7.3 Team Member Safety

Operating areas of the mine are subject to the Mine Safety and Health Administration ("MSHA") regulations and practices. MSHA requires mining companies to comply with the comprehensive law governing the health and safety of employees. In addition to MSHA regulations and inspections, CC&V has a Safety Department that provides safety and training courses to employees. This department also has the responsibility for the day-to-day inspection and correction of worker performance. Prior to an employee performing assigned duties, the person is trained to understand safety measures. In emergency situations, the rescuer can become a victim because the proper precautions have not been taken before attempting a rescue. With adequate training and knowledge of safety measures, most accidents can be avoided.

Safety conducts training for appropriate individuals concerning safe handling, clean up, and emergency medical treatment for the various materials used at the project. New employees are instructed upon hiring. Periodic refresher courses are given.

In case of a medical emergency, Team Members are trained to announce a "Code 90" on the mine radio. Safety, supervisors, and the Mine Rescue Team are trained in appropriate response procedures.

8.0 Plan Revision Log

Revision No	Revision Date	By Whom	Description
Revision No	Revision Date	By Whom	Description
01	May 2006	P. Roberts	Initial release of document
02	December 6, 2007	M. Ellis	External Review & Update of Plan
03	January 8, 2008	P. Roberts	Replace RWL w LN
04	October 15, 2009	M. Ellis	Plan updates
05	August 17, 2010	P Roberts	Change Guenther to DuBois
06	July 2011	M. Ellis	Narrative Changes in Several Sections +New Tanks Added at ADR and VLF
07	August 2011	M.Ellis	Integrity Testing Performed on Some Tanks; Changes in Transformers and Mobile Equipment; P.E. Review
08	Feb-Apr 2012	M. Ellis & G. Horton	Annual review and update of SPCC Plan; tanks added at ADR; map updates; general review / PE review, and minor changes in narrative
09	March-April-May 2013	M. Ellis & G. Horton	Annual review and update of SPCC Plan; new Midway Fuel Island added; map updates; general review / PE review, and minor changes in narrative
10	June 2014	M. Ellis & G. Horton	General Plan Updates
11	July 2015	R. Wymore	Separation of PSES and ADR facilities as separate SPCC plans. Review of entire plan, and incorporation of any recent changes

FIGURES

WOODLAND PARK

24

67

24

25

COLORADO SPRINGS

24

PARK COUNTY

Teller County 1

CRIPPLE CREEK

General Location of the Site

VICTOR

TELLER COUNTY

EL PASO COUNTY

FREMONT COUNTY

Wyoming

Nebraska

Colorado

Utah

Kansas

Location

Arizona

New Mexico

Oklahoma

N

Cripple Creek & Victor Gold Mining Co.
Victor, Colorado

Location Map

Geosyntec consultants

Figure 1	Jul. 2015
DE-0201	

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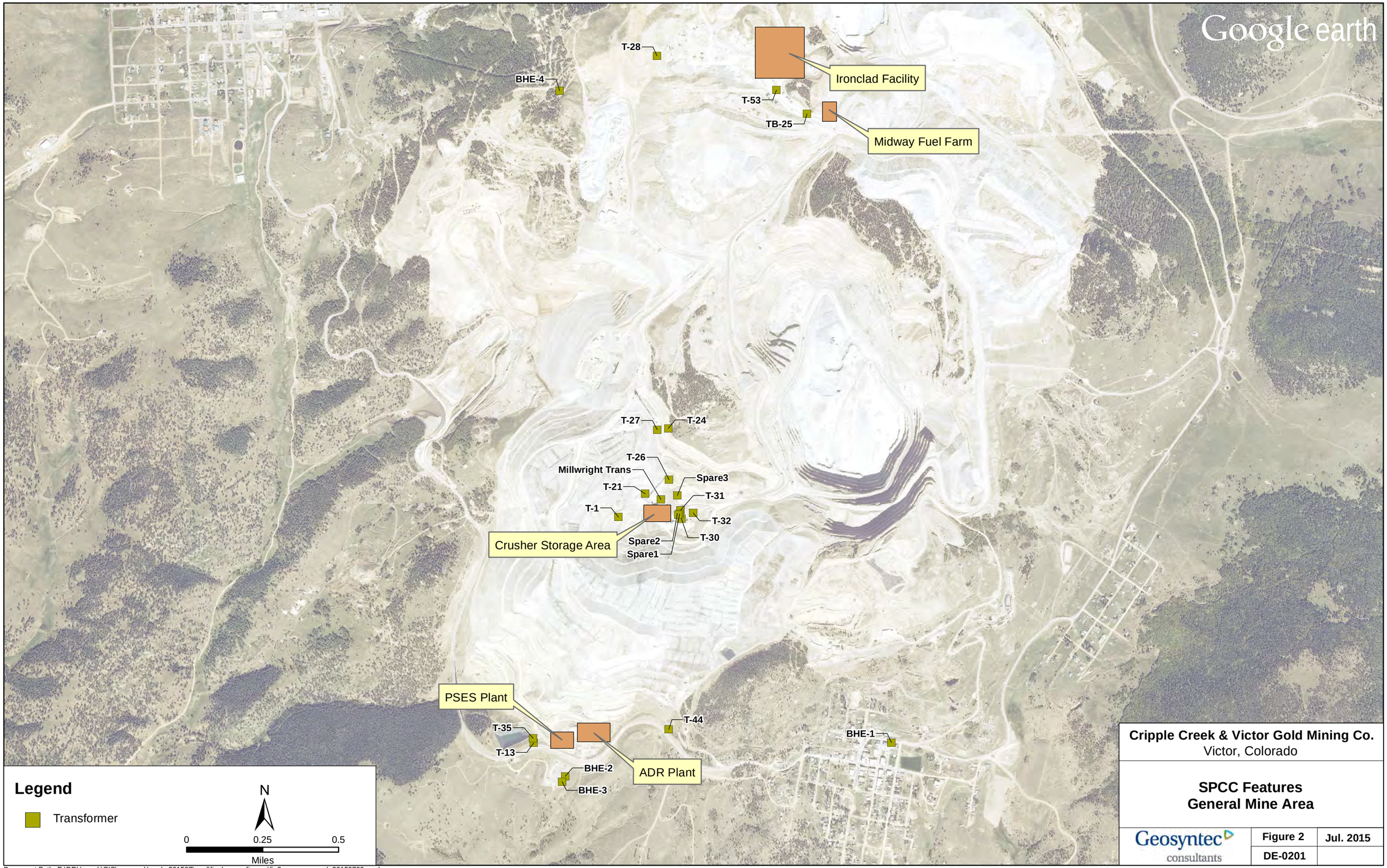

Cripple Creek & Victor Gold Mining Co.
Victor, Colorado

SPCC Features
General Mine Area

Geosyntec consultants

Figure 2	Jul. 2015
DE-0201	

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Google earth

existing tank

TI-22

Relocated Propane Tank (by mine operations)

OTS-4 / Anti-Freeze / 1,248 gal

Drum and Tote Storage Area

OTS-8 / Water for Fire Suppression / 79,300 gal

OTS-10 / E.P / 80W-90 / 658 gal

OTS-7 /Used Oil / 11,844 gal

OTS-9 / Oil / 30WT / 658 gal

OTS-2 / Rock Drill Oil / 658 gal

OTS-1 / Rock Drill Oil / 658 gal

OTS-3 / H.D. Trans Oil / 1,248 gal

OTS-5 / Hydraulic Oil / ISO 32 / 4,888 gal

OTS-6 / XL 400 / 15W-40 Oil / 4,888 gal

TI-21

OLD TRUCK SHOP

TI-20

TT-23

Propane Tank / 500 gal

TI-23

NTS-1 / Used Oil / 12,000 gal

NTS-2 / E.P. / 460 SYN / 6,000 gal

NTS-3 / Final Drive Oil / 6,000 gal

Floor Sump

NTS-4 / XL400 / 15W40 / 6,000 gal

NTS-5 / HD Trans 10 / 6,000 gal

Used Oil Tank / 82 gal

NTS-6 / Antifreeze / Premix / 3,000 gal

NEW TRUCK SHOP

Tote of DowTherm

Oil Water Separator (out of service)

Approx. 4-5 Rectangular Steel Tanks mounted on Rollers. 45-300 Gal.

Legend

- Transformer
- Regulated Tank
- Non-Regulated Tank

N

0 50 100

Feet

Cripple Creek & Victor Gold Mining Co.
Victor, Colorado

SPCC Features
Ironclad Facility

Geosyntec consultants

Figure 3	Jul. 2015
DE-0201	

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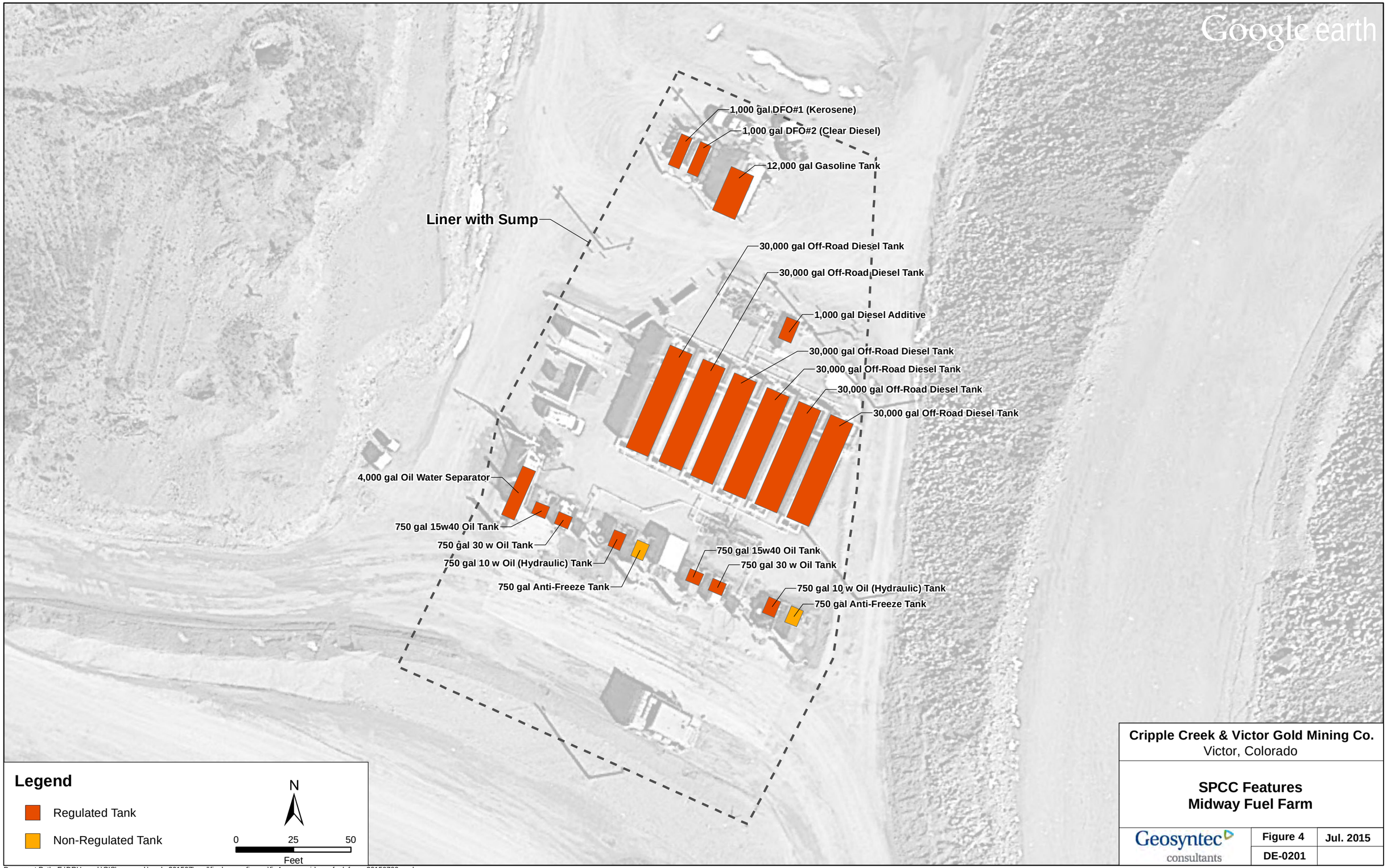

Cripple Creek & Victor Gold Mining Co.
Victor, Colorado

SPCC Features
Midway Fuel Farm

Geosyntec consultants

Figure 4	Jul. 2015
DE-0201	

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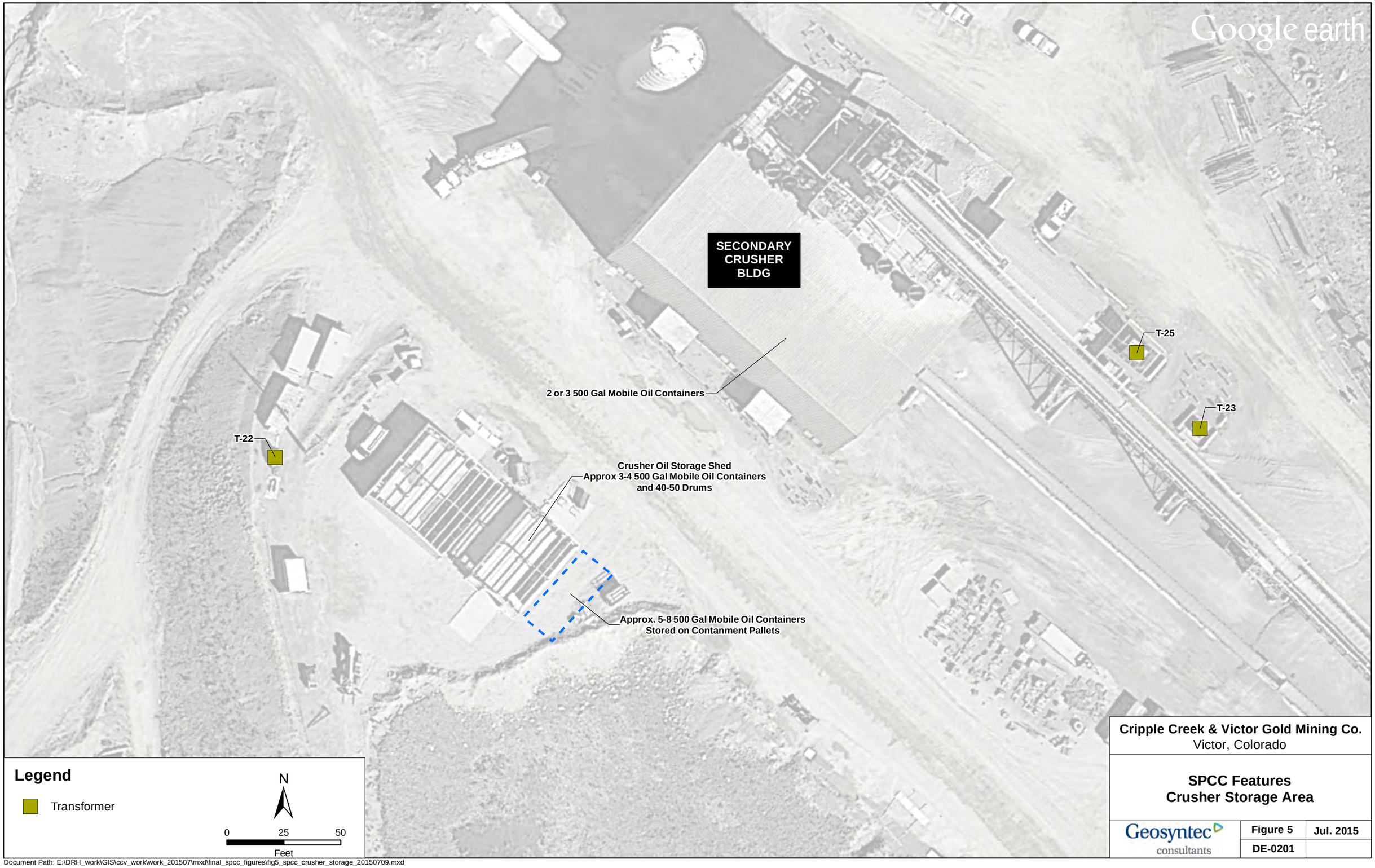

Cripple Creek & Victor Gold Mining Co.
Victor, Colorado

SPCC Features
Crusher Storage Area

Geosyntec consultants	Figure 5	Jul. 2015
	DE-0201	

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APPENDIX A

CC&V TANK INVENTORY/MONTHLY INSPECTION FORM

Appendix A - CC&V Monthly Inspection Form for the SRP/SPCC at the Ironclad Facility

Name: Date: Time: Weather:

Tank No. or Container	Tank / Container Material	Volume Tank	Units	Contents of Tank or Container	Location	Containment Type	Containment Volume (gallons)	Location, Comment or Evaluation	Product Contained?	Follow-up Required?	Required Action	When Completed	Containment OK?	Comments
Tanks and Containers INSIDE the Ironclad Oil Room Facility at Warehouse														
OTS-1	Cylindrical Steel Tank	658	gal	Rock Drill Oil	Oil Room	Concrete Vault[1]	25,700	Ironclad Facility - Old Truck Shop Oil Room	Y N	Y N			Y N	
OTS-2	Cylindrical Steel Tank	658	gal	Rock Drill Oil	Oil Room	Concrete Vault[1]	25,700	Ironclad Facility - Old Truck Shop Oil Room	Y N	Y N			Y N	
OTS-3	Cylindrical Steel Tank	1,248	gal	HD Transmission Oil	Oil Room	Concrete Vault[1]	25,700	Ironclad Facility - Old Truck Shop Oil Room	Y N	Y N			Y N	
OTS-4	Cylindrical Steel Tank	1,248	gal	Antifreeze/Ethylene Glycol	Oil Room	Concrete Vault[1]	25,700	Ironclad Facility - Old Truck Shop Oil Room	Y N	Y N			Y N	
OTS-5	Cylindrical Steel Tank	4,888	gal	Hydraulic Oil	Oil Room	Concrete Vault[1]	25,700	Ironclad Facility - Old Truck Shop Oil Room	Y N	Y N			Y N	
OTS-6	Cylindrical Steel Tank	4,888	gal	15W-40 Oil	Oil Room	Concrete Vault[1]	25,700	Ironclad Facility - Old Truck Shop Oil Room	Y N	Y N			Y N	
OTS-7	Cylindrical Steel Tank	11,844	gal	Used Oil	Oil Room	Concrete Vault[1]	25,700	Ironclad Facility - Old Truck Shop Oil Room	Y N	Y N			Y N	
OTS-8	Cylindrical Steel Tank	79,300	gal	Water for Fire Suppression system	Oil Room	N/A	Not Required	Ironclad Facility - Outside Oil Room in WHSE	Y N	Y N			Y N	
OTS-9	Cylindrical Steel Tank	658	gal	Drive Train 30W Oil	Oil Room	Concrete Vault[1]	25,700	Ironclad Facility - Old Truck Shop Oil Room	Y N	Y N			Y N	
OTS-10	Cylindrical Steel Tank	658	gal	E.P. 80W-90 Oil	Oil Room	Concrete Vault[1]	25,700	Ironclad Facility - Old Truck Shop Oil Room	Y N	Y N			Y N	
OTS-20 to 70	Steel 55 Gallon Drums (Approximately 40 to 50 drums of materials may be stored here at any given point in time)	2,750	gal	Used Greases, Skimmer Waste, Used Oil for Burning in Heaters, Ash from Burning Used Oil, Used Antifreeze	Next to Oil Room in Open Area of Warehouse	Concrete Floor Drains to Concrete Vat[1] Described Above	25,700	Ironclad Facility - Open Area of Warehouse Adjacent to the Oil Room Described Above	Y N	Y N			Y N	
OTS-80 to 85	Steel and Plastic Totes (300 and 500 gal capacity up to 5 totes at any given time)	2,500	gal	Used Oil, Used Antifreeze, Skimmer Waste, Grease	Next to Oil Room	Concrete Floor Drains to Concrete Vat[1]	25,700	Ironclad Facility - Open Area of Warehouse Adjacent to the Oil Room Described Above	Y N	Y N			Y N	
OTS-90	Rectangular Steel Tank Mounted on Rollers (aka "Drip Tank")	200	gal	Used Oil	Small Vehicle Shop	Floor Drains and Bldg Sump	90	Ironclad Facility - Old Truck Shop for Smaller Vehicle Servicing	Y N	Y N			Y N	
OTS-91	Concrete Oil/Water Separator	1,659	gal	Oily/Sediment laden Water	Wash Bay	Wash Sumps	1,659	Ironclad Wash Bay for Smaller Vehicles (Containment is the system itself)	Y N	Y N			Y N	
OTS-100 to 125	plastic 5 gal buckets on shelves	1,375	gal	Moly Grease (Meteor), EP Grease, and Gear Oil	Warehouse	Concrete Floor Inside Building	100 (estimated[2])	Ironclad Facility - Open Area of Warehouse	Y N	Y N			Y N	
OTS-126	Steel Rectangular Container	35	gal	Used Oil	Sm Veh Shop	Floor Sump	560	Ironclad Facility - Small Vehicle Shop	Y N	Y N			Y N	
OTS-128	Steel 55 Gallon Drum (1)	55	gal	Used Paint Residues (typical)	Warehouse	Plastic Overpack	95	Haz Mat Accumulation Area at Ironclad Facility	Y N	Y N			Y N	
Transformers Outside the Ironclad Warehouse														
TI-21	Steel Transformer	90	gal	Transformer Oil		Earthen Surface	Not Required[3]	Trans. Oil NE corner Warehouse (pole mount)	Y N	Y N			Y N	
TI-22	Steel Transformer	90	gal	Transformer Oil		Earthen Surface	Not Required[3]	Trans. Oil South of Light Vehicle (pole mount)	Y N	Y N			Y N	

Footnotes: [1]The Oil Room at the Old Shop is a gravel-lined concrete "vat" (prev. use=leaching) that has a capacity of 40,840 gal. Subtracting tank volumes results in 25,700 gal. of containment.
[2]Calculations indicate that if a 55 gallon drum of oil spills to a depth of 0.25 inches, it will only cover an area 19 ft by 19 ft square. Therefore, the flat concrete floor can easily contain 100 gallons where it can easily be cleaned-up with oil absorbents, pads, or pillows.
[3]On page 47141 of the Federal Register dated July 17, 2002, it states that "oil filled electrical, operating, or manufacturing equipment is not a bulk oil storage container." On page 47055 it states: "Facilities with equipment containing oil for ancillary purposes are not required to provide secondary containment required for bulk storage facilities."

Appendix A - CC&V Monthly Inspection Form for the SRP/SPCC at the Ironclad Facility

Name: Date: Time: Weather:

Tank No. or Container	Tank / Container Material	Volume Tank	Units	Contents of Tank or Container	Location	Containment Type	Containment Volume (gallons)	Location, Comment or Evaluation	Product Contained?	Follow-up Required?	Required Action	When Completed	Containment OK?	Comments
Tanks and Containers OUTSIDE the Ironclad Warehouse Oil Room Facility														
OTS-131	Steel Cylindrical Tank	5,000	gal	Propane	E. Side Whse.	None	Not Required	East of Ironclad Truck Shop	Y N	Y N			Y N	
OTS-132	Steel Cylindrical Tank	500	gal	Propane	E. Side Whse.	None	Not Required	Near HazMat Acummulation Area	Y N	Y N			Y N	
OTS-133	Steel Cylindrical Tank	500	gal	Propane	NE Cor NTS	None	Not Required	Northeast corner of New Truck Shop	Y N	Y N			Y N	
OTS-134	Steel Cylindrical Tank	500	gal	Propane	W. Side Whse.	None	Not Required	West Side of Warehouse	Y N	Y N			Y N	
OTS-135	Steel Cylindrical Tank	250	gal	Propane	W. Side Whse.	None	Not Required	West Side of Warehouse	Y N	Y N			Y N	
Tanks and Containers INSIDE the New Truck Shop (NTS)														
NTS-1	Steel Cylindrical Tank	12,000	gal	Used Oil	NTS Oil Room	Concrete Sump	20,252	New Truck Shop Oil Room	Y N	Y N			Y N	
NTS-2	Steel Cylindrical Tank	6,000	gal	Trans 30 wt	NTS Oil Room	Concrete Sump	20,252	Containment is provided by the below-grade	Y N	Y N			Y N	
NTS-3	Steel Cylindrical Tank	6,000	gal	Final Drive Oil	NTS Oil Room	Concrete Sump	20,252	structure itself, having dimensions of	Y N	Y N			Y N	
NTS-4	Steel Cylindrical Tank	6,000	gal	XL 400 Motor Oil 15W40	NTS Oil Room	Concrete Sump	20,252	28.5 ft L x 95 ft W x 1 ft Effective Depth	Y N	Y N			Y N	
NTS-5	Steel Cylindrical Tank	6,000	gal	HD Trans 10 Oil	NTS Oil Room	Concrete Sump	20,252	Volume = 28.5 x 95 x 1 x 7.48 = 20,252 gal	Y N	Y N			Y N	
NTS-6	Steel Cylindrical Tank	3,000	gal	Antifreeze Premix	NTS Oil Room	Concrete Sump	20,252	of secondary containment	Y N	Y N			Y N	
NTS-10	Rectangular Steel Tank Mounted on Rollers (aka "Drip Tank")	300	gal	Used Oil	NTS Service Area	Floor Drains and Bldg Sump	2,140	New Truck Shop Service Area Containment = Service Bay Sump + Floor Drains	Y N	Y N			Y N	
NTS-11	Rectangular Steel Tank Mounted on Rollers (aka "Drip Tank")	119	gal	Used Oil	NTS Service Area	Floor Drains and Bldg Sump	2,140	New Truck Shop Service Area Containment = Service Bay Sump + Floor Drains	Y N	Y N			Y N	
NTS-12	Rectangular Steel Tank Mounted on Rollers (aka "Drip Tank")	45	gal	Used Oil	NTS Service Area	Floor Drains and Bldg Sump	2,140	New Truck Shop Service Area Containment = Service Bay Sump + Floor Drains	Y N	Y N			Y N	
NTS-13	Steel Rectangular Totes (2)	1,000	gal	HD30 Transmission Oil	NTS Service Area	Floor Drains and Bldg Sump	2,140	New Truck Shop Service Area Containment = Service Bay Sump + Floor Drains	Y N	Y N			Y N	
NTS-14	Concrete Oil/Water Separator, Skimmer, & Filtration System (2011)	12,728	gal	Oily Water	Wash Bay	Wash Sumps	12,728	New Truck Shop Wash Bays (Containment is the system itself)	Y N	Y N			Y N	
NTS-15	Rectangular Steel Tank in NTS Heater/Burner Room	500	gal	Oil from Oil/Water Separator for Burning in Heaters	New Truck Shop	Concrete Floor & Bldg Footers	2,700	"Burner Bay Sump" = 202 gal; concrete floor[1] = 2500 gal; total = 2700 gal	Y N	Y N			Y N	
NTS-16	Rect. Steel Burner Feed Tank in NTS Heater/Burner Room	850	gal	Oil from Oil/Water Separator for Burning in Heaters	New Truck Shop	Concrete Floor & Bldg Footers	2,700	"Burner Bay Sump" = 202 gal; concrete floor[1] = 2500 gal; total = 2700 gal	Y N	Y N			Y N	
NTS-17	Steel Cylindrical Tanks (3) 12,600 gal each	37,800	gal	temporary storage for dust suppression	NTS Service Area	NA	NA		Y N	Y N			Y N	
Transformers Outside the New Truck Shop														
TI-20	Steel Transformer	90	gal	Transformer Oil		Earthen Surface	Not Required[2]	East of Ironclad Office (Pole Mounted)[3]	Y N	Y N			Y N	
TI-23	Steel Transformer	90	gal	Transformer Oil		Earthen Surface	Not Required[2]	East of Ironclad Office (Pole Mounted)[3]	Y N	Y N			Y N	
TT-23	Steel Transformer	225	gal	Transformer Oil		Concrete Slab[1]	Not Required[2]	North of Truck Shop Building (500 Kva)[3]	Y N	Y N			Y N	

[1]The Heater/Burner Room measures 170 ft x 95 ft; Assume a spill covered the floor to a depth of 0.25 inches; Volume = 170 x 95 x (0.25/12) x 7.48 = 2,517 gal (conservative)

[2]Most transformers are situated on concrete slabs or cribbing that provides some secondary containment in the event of a spill although it is not required (see also footnote 2).

[3]On page 47141 of the Federal Register dated July 17, 2002, it states that "oil filled electrical, operating, or manufacturing equipment is not a bulk oil storage container." On page 47055 it states:
"Facilities with equipment containing oil for ancillary purposes are not required to provide secondary containment required for bulk storage facilities."

Appendix A - CC&V MONTHLY INSPECTION FORM for the SRP/SPCC at the MIDWAY FUEL FARM

Name: Date: Time: Weather:

Tank No. or Container	Tank / Container Material	Volume Tank	Units	Contents of Tank or Container	Location	Containment Type	Containment Volume (gallons)	Location, Comment or Evaluation	Product Contained?	Follow-up Required?	Required Action	When Completed	Containment OK?	Comments
Tanks and Containers at the Fuel Farm														
MWFF- (1- 6)	Cylindrical Single Wall Steel Tanks Mounted Horizontally (6 tanks)	30,000	gal	Off-road Diesel Fuel	Central Portion	Buried Engineered Containment Sump	560,000		Y N	Y N			Y N	
MWFF-7	Cylindrical Double Wall Steel Tank Mounted Horizontally	12,000	gal	Gasoline	Northern Portion		560,000	Double Walled Tank	Y N	Y N			Y N	
MWFF-8	Cylindrical Double Wall Steel Tank Mounted Horizontally	1,000	gal	DFO#1 (Kerosene)	Northern Portion		560,000	Double Walled Tank	Y N	Y N			Y N	
MWFF-9	Cylindrical Double Wall Steel Tank Mounted Horizontally	1,000	gal	DFO#2 (Light Vehicle Diesel)	Northern Portion		560,000	Double Walled Tank	Y N	Y N			Y N	
MWFF-10	Cylindrical Double Wall Steel Tank Mounted Horizontally	1,000	gal	Diesel Additive (anti-gel)	NE Portion		560,000	Double Walled Tank	Y N	Y N			Y N	
MWFF-11&12	Rectangular Steel Single Wall Tanks (2)	750	gal	Antifreeze	Southern Portion		560,000		Y N	Y N			Y N	
MWFF-13&14	Rectangular Steel Single Wall Tanks (2)	750	gal	10 Wt Oil (Hydraulic)	Southern Portion		560,000		Y N	Y N			Y N	
MWFF-15&16	Rectangular Steel Single Wall Tanks (2)	750	gal	30 Wt OIl	Southern Portion		560,000		Y N	Y N			Y N	
MWFF-17&18	Rectangular Steel Single Wall Tanks (2)	750	gal	15W40 OIl	Southern Portion		560,000		Y N	Y N			Y N	
MWFF-19	Rectangular Steel Single Wall Tank for Oil Water Separator	4,000	gal	Oily Water	Northern Portion		560,000		Y N	Y N			Y N	
	Steel Rectangular Belly Tanks on Generator Units (1 @ 1,000)	1,000	gal	Diesel Fuel	East of ADR				Y N	Y N			Y N	

Evaluate the overall condition of containers during this inspection: (circle one and provide narrative) → Good Needs Work

Written Comments:

Be sure to check all drain valves to make sure locks are in-place and functional

Check to make sure all fill hoses are inside containment when not in use filling vehicles

Are bollards in good condition?

Check all containment aprons and berms.

Is there a spill kit nearby?

Are all signs and markers legible and in good condition?

CC&V MONTHLY INSPECTION FORM for the SRP/SPCC at the *ORIGINAL* FUEL FARM

Name: Date: Time: Weather:

Tank No. or Container	Tank / Container Material	Volume Tank	Units	Contents of Tank or Container	Location	Containment Type	Containment Volume (gallons)	Location, Comment or Evaluation	Product Contained?	Follow-up Required?	Required Action	When Completed	Containment OK?	Comments
FF-10	Steel Cylindrical Tank	1,000	gal	Propane	North of FF	None	N/A	Located North of the Fuel Farm	Y N	Y N			Y N	

Appendix A - CC&V Monthly Inspection Form for the SRP/SPCC at the Crusher Facilities

Name: _____ **Date:** _____ **Time:** _____ **Weather:** _____

Tank No. or Container	Tank / Container Material	Volume Tank	Units	Contents of Tank or Container	Location	Containment Type	Containment Volume (gallons)	Location, Comment or Evaluation	Product Contained?	Follow-up Required?	Required Action	When Completed	Containment OK?	Comments
Tanks and Containers in the Crusher Oil Storage Shed														
This area contains various drums, totes, and containers of petroleum products (total vol >2500 gallons)					Inside Shed				Y N	Y N			Y N	
CR-31	Steel Tote	500	gal	EP320 Grease	Ground Floor	Concrete Floor	2,000	25'x40'x3.5" building provides containment	Y N	Y N			Y N	
CR-32	Steel Tote	500	gal	Spartan EP150 Grease	Ground Floor	Concrete Floor	2,000	25'x40'x3.5" building provides containment	Y N	Y N			Y N	
CR-33	Steel Cylindrical Tank	500	gal	EP150 Grease	Ground Floor	Concrete Floor	2,000	25'x40'x3.5" building provides containment	Y N	Y N			Y N	
CR-34	Steel Drums (5 @ 55 gal)	275	gal	Lithium Grease	Ground Floor	Concrete Floor	2,000	25'x40'x3.5" building provides containment	Y N	Y N			Y N	
CR-35	Steel Drum	55	gal	Hydraulic Oil	Ground Floor	Concrete Floor	2,000	25'x40'x3.5" building provides containment	Y N	Y N			Y N	
Tanks and Containers at the Outside Storage Area near the Crusher Oil Storage Shed														
This area contains various drums, totes, and containers of petroleum products (total vol >3000 gallons) (See "Crusher Storage Area" Figure 5)					Outside of Shed	Synthetic Lined Earthen Berm	14,000 14,000	This storage facility is primarily for storing empty drums and totes.	Y N	Y N			Y N	
Crusher Maintenance Room														
CR-20	Steel Drum with Aerosol Puncture Device	55	gal	Aerosol Can Residues	Inside Shed				Y N	Y N			Y N	
Secondary Crusher Building														
CR-30	Steel Tote	500	gal	New Oil	Ground Floor	Concrete Floor	Footnote[1]	Ground Floor of Secondary Crusher Building	Y N	Y N			Y N	
Transformers in Crusher Storage Area														
T-22	Steel Transformer	235	gal	Transformer Oil	Belt Sampler	Concrete Slab[2]	Not Required[3]		Y N	Y N			Y N	
T-23	Steel Transformer	1,284	gal	Transformer Oil	Trans. Oil Loc E of Seco	Concrete Slab[2]	Not Required[3]	Located East of Secondary Crusher (T23)	Y N	Y N			Y N	
T-25	Steel Transformer	620	gal	Transformer Oil	Trans. Oil Loc E of Seco	Concrete Slab[2]	Not Required[3]	Located East of Secondary Crusher (T25)	Y N	Y N			Y N	

[1]A spill of viscous grease is not likely to migrate more than a few feet from the container. Hydraulic or used oil spilled would report to the concrete slab where it could easily be cleaned-up with oil abosorbent materials. Therefore, secondary containment is provided by the building floor.

[2]Most transformers are situated on concrete slabs or cribbing that provides some secondary containment in the event of a spill although it is not required (see also footnote 2).

[3]On page 47141 of the Federal Register dated July 17, 2002, it states that "oil filled electrical, operating, or manufacturing equipment is not a bulk oil storage container." On page 47055 it states: "Facilities with equipment containing oil for ancillary purposes are not required to provide secondary containment required for bulk storage facilities."

Appendix A - CC&V Monthly Inspection Form for the SRP/SPCC for the Mobile Re-Fuelers

Name: _____ Date: _____ Time: _____ Weather: _____

Tank No. or Container	Tank / Container Material	Volume Tank	Units	Contents of Tank or Container	Location	Containment Type	Containment Volume (gallons)	Location, Comment or Evaluation	Product Contained?	Follow-up Required?	Required Action	When Completed	Containment OK?	Comments
Mobile Re-fuelers														
Unit LT40102	On-Unit Steel Tank	3,000	gal	Evac Oil Storage	Lube Truck	None	Not Required[1]		Y N	Y N			Y N	
	On-Truck Unit	2,765	gal	Various Oils and Greases	Lube Truck	None	Not Required[1]		Y N	Y N			Y N	
	On-Truck Unit	220	gal	Antifreeze		None	Not Required[1]							
Unit Lt40103	On-Unit Steel Tank	8,000	gal	Diesel Fuel	Lube Truck	None	Not Required[1]		Y N	Y N			Y N	
	On-Truck Unit	2,765	gal	Various Oils and Greases	Lube Truck	None	Not Required[1]		Y N	Y N			Y N	
	On-Truck Unit	220	gal	Antifreeze	Lube Truck	None	Not Required[1]		Y N	Y N			Y N	
Unit Lt40104	On-Unit Steel Tank	8,000	gal	Diesel Fuel	Lube Truck	None	Not Required[1]		Y N	Y N			Y N	
	On-Truck Unit	2,765	gal	Various Oils and Greases	Lube Truck	None	Not Required[1]		Y N	Y N			Y N	
	On-Truck Unit	220	gal	Antifreeze	Lube Truck	None	Not Required[1]		Y N	Y N			Y N	

[1]On page 47141 of the Federal Register dated July 17, 2002, it states that "oil filled electrical, ***operating*** , or manufacturing ***equipment*** is not a bulk oil storage container." On page 47055 it states:
"Facilities with equipment containing oil for ancillary purposes are not required to provide secondary containment required for bulk storage facilities."

Appendix A - CC&V Monthly Inspection Form for the SRP/SPCC for the Electrical Transformers

Name: Date: Time: Weather:

Tank No. or Container	Tank / Container Material	Volume Tank	Units	Contents of Tank or Container	Location	Containment Type	Containment Volume (gallons)	Location, Comment or Evaluation	Product Contained?	Follow-up Required?	Required Action	When Completed	Containment OK?	Comments
Electrical Transformers														
Crushers, Belt Sampler, Millwright Shop, Conveyor Transfers, and LOB Areas														
T-1	Steel Transformer	357	gal	Transformer Oil		Concrete Slab[1]	Not Required[2]	Phase IV pumps	Y N	Y N			Y N	
T-30	Steel Transformer	456	gal	Transformer Oil		Concrete Slab[1]	Not Required[2]	Trans. Oil Loc W of Primary Crusher	Y N	Y N			Y N	
T-31	Steel Transformer	390	gal	Transformer Oil		Concrete Slab[1]	Not Required[2]	Trans. Oil Loc West of Primary Crusher	Y N	Y N			Y N	
T-32	Steel Transformer	390	gal	Transformer Oil		Concrete Slab[1]	Not Required[2]	Trans. Oil Loc. E of Screen MCC Bldg	Y N	Y N			Y N	
Spare	1 each Steel Transformer	1284	gal	Transformer Oil		Concrete Slab[1]	Not Required[2]	Transformer Oil at Primary Crusher	Y N	Y N			Y N	
Spare	1 each Steel Transformer	225	gal	Transformer Oil		Concrete Slab[1]	Not Required[2]	Transformer Oil at Primary Crusher	Y N	Y N			Y N	
Spare	1 each Steel Transformer	235	gal	Transformer Oil		Concrete Slab[1]	Not Required[2]	Transformer Oil at Primary Crusher	Y N	Y N			Y N	
T-21	Steel Transformer	325	gal	Transformer Oil		Concrete Slab[1]	Not Required[2]	Transformer Oil at Primary Crusher	Y N	Y N			Y N	
Millwright Trans	Steel Transformer	229	gal	Transformer Oil		Concrete Slab[1]	Not Required[2]	Mineral Oil Millwright Shop Bldg near Crusher	Y N	Y N			Y N	
T-24	Steel Transformer	511	gal	Transformer Oil		Concrete Slab[1]	Not Required[2]	Mineral Oil LOB Transfer 4 MCC 2	Y N	Y N			Y N	
T-26	Steel Transformer	203	gal	Transformer Oil		Concrete Slab[1]	Not Required[2]	Beta Fluid LOB Transfer 4 MVCC2	Y N	Y N			Y N	
T-27	Steel Transformer	511	gal	Transformer Oil		Concrete Slab[1]	Not Required[2]	Beta Fluid LOB Transfer 6 MVCC 12	Y N	Y N			Y N	
T-28	Steel Transformer	203	gal	Transformer Oil		Concrete Slab[1]	Not Required[2]	Beta Fluid LOB Transfer 6 MCC 12	Y N	Y N			Y N	
T-33				Transformer Oil		Concrete Slab[1]	Not Required[2]	ADR water Tank	Y N	Y N			Y N	
Ironclad Office, Truck Shops, and Warehouse Area														
TI-24	Steel Transformer			Transformer Oil		Concrete Slab[1]	Not Required[2]	Midway Fuel Island	Y N	Y N			Y N	
TT-24	Steel Transformer	<55	gal	Transformer Oil		Concrete Slab[1]	Not Required[2]	Trans. Oil North of Truck Ready Line	Y N	Y N			Y N	
TB-25	Steel Transformer	150	gal	Transformer Oil		Concrete Slab[1]	Not Required[2]	Trans. Oil North of Bulk Emulsion Plan	Y N	Y N			Y N	
Carlton Security, Lab, Projects Laydown, ADR, VLF, and BHE Substation Areas														
T-35	Steel Transformer	180	gal	Transformer Oil		Concrete Slab[1]	Not Required[2]	Located East of External Pond	Y N	Y N			Y N	
T-13	Steel Transformer	225	gal	Transformer Oil		Concrete Slab[1]	Not Required[2]	Located South of Phase I Pumps	Y N	Y N			Y N	
T-33	Steel Transformer	25	gal	Transformer Oil		Concrete Slab[1]	Not Required[2]	FR3 Fluid ADR Water Tank	Y N	Y N			Y N	
T-44	Steel Transformer	214	gal	Transformer Oil		Concrete Slab[1]	Not Required[2]	FR3 Fluid VLF Phase 5	Y N	Y N			Y N	
T-49	Steel Transformer	227	gal	Transformer Oil		Concrete Slab[1]	Not Required[2]	FR3 Fluid E-Train MCC (at ADR Facility)	Y N	Y N			Y N	
BHE-1	Steel Transformer	187	gal	Transformer Oil		Concrete Slab[1]	Not Required[2]	FR3 Fluid at Ajax Exploradion Bldg.	Y N	Y N			Y N	
BHE-2	Steel Transformer	4632	gal	Transformer Oil		Concrete Slab[1]	Not Required[2]	FR3 Fluid Arequa Substation S. of Hwy 67	Y N	Y N			Y N	
BHE-3	Steel Transformer	7140	gal	Transformer Oil		Concrete Slab[1]	Not Required[2]	FR3 Fluid Arequa Substation S. of Hwy 67	Y N	Y N			Y N	
BHE-4	Steel Transformer	7140	gal	Transformer Oil		Concrete Slab[1]	Not Required[2]	FR3 Fluid Arequa Substation S. of Hwy 67	Y N	Y N			Y N	
Spare	3 @ 22.4 gal Steel Transformers	67	gal	Transformer Oil		Concrete Slab[1]	Not Required[2]	Trans. Oil at Carlton in Projects Laydown Yard	Y N	Y N			Y N	
Spare	1@ 41 gal Steel Transformers	82	gal	Transformer Oil		Concrete Slab[1]	Not Required[2]	Trans. Oil at Carlton in Projects Laydown Yard	Y N	Y N			Y N	
Spare	1 each Steel Transformer	27	gal	Transformer Oil		Concrete Slab[1]	Not Required[2]	Trans. Oil at Carlton in Projects Laydown Yard	Y N	Y N			Y N	

[1]Most transformers are situated on concrete slabs or cribbing that provides some secondary containment in the event of a spill although it is not required (see also footnote 2).

[2]On page 47141 of the Federal Register dated July 17, 2002, it states that "oil filled electrical, operating, or manufacturing equipment is not a bulk oil storage container." On page 47055 it states:

"Facilities with equipment containing oil for ancillary purposes are not required to provide secondary containment required for bulk storage facilities."