

STATE OF COLORADO

DIVISION OF RECLAMATION, MINING AND SAFETY
Department of Natural Resources

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John W. Hickenlooper
Governor

Mike King
Executive Director

Loretta Piñeda
Director

May 22, 2013

Mr. Ed Cooley
Shale Tech International Services L.L.C.
1354 County Road 246
Rifle, CO 81650

**Re: Duck Creek Mine, Permit No. M-2013-022, 110(2) Reclamation Permit Application Package,
Second Adequacy Review.**

Dear Mr. Cooley:

The Division of Reclamation, Mining and Safety has finished the review process for the above referenced reclamation permit application. The application proposes to extract oil shale for offsite experimental purposes. Please review the final issue that needs to be addressed.

- 1) Please review the enclosed reclamation cost estimate. Notify me immediately if any calculations appear to be inaccurate. Also, the significant portion of the cost estimate reflects the proposed importation of topsoil and the proposed methods to revegetate the site.

Other issues may arise from other agency comments, and as more information is supplied. This application cannot be approved until all issues brought forth by Division staff are adequately addressed. Please submit a response to the following issues as soon as possible, but no later than May 28, 2013 so the decision due date set May 31, 2013 can be met. If your response or a written extension request are not received by May 28, 2013 this application may be denied.

If you need additional information, please contact me at the Division of Reclamation, Mining and Safety, Grand Junction Field Office, 101 S. 3rd St., Suite 301, Grand Junction, Colorado 81501, telephone no. (970) 241-2042.

Sincerely,

A handwritten signature in black ink, appearing to read "Travis Marshall".

Travis Marshall
Environmental Protection Specialist

Enclosure(s): Final Reclamation Cost estimate

ec: Russ Means, DRMS

COST SUMMARY WORK

Task description: _____

Site: Duck Creek Mine Permit Action: Reclamation
Cost Estimate Permit/Job#: M2013022

PROJECT IDENTIFICATION

Task #: 001 State: Colorado Abbreviation: None
Date: 5/22/2013 County: Rio Blanco Filename: M022-001
User: THM

Agency or organization name: DRMS

TASK LIST (DIRECT COSTS)

Task	Description	Form Used	Fleet Size	Task Hours	Cost
01a	Transport and place 6,618 LCY of backfill in Area 1	LOADER	1	18.13	\$2,783.00
02a	Place and grade backfill in Area 1	EXCAVATE	1	7.57	\$1,574.00
03a	Place topsoil over Area 1	EXCAVATE	1	0.95	\$198.00
04a	Backfill Area 2	EXCAVATE	1	10.93	\$2,272.00
05a	Transport topsoil 500' to Area 2	LOADER	1	1.59	\$244.00
05b	Place topsoil on Area 2	EXCAVATE	1	0.86	\$179.00
06a	Backfill Area 3	DOZER	1	45.65	\$9,045.30
07a	Contour backfilled slope in Area 3	EXCAVATE	1	55.15	\$11,459.00
08a	Purchase 1,800 CY topsoil and deliver to site	TRUCK1	1	415.58	\$162,098.07
09a	Transport 1,800 CY topsoil 300, from dump location to Area 3	LOADER	1	5.71	\$876.00
10a	Distribute 1,800 CY topsoil in Area 3	EXCAVATE	1	4.08	\$848.00
11a	Revegetate 5 acres disturbance	REVEGE	1	24.00	\$108,171.75
12a	Mobilization	MOBILIZE	1	10.00	\$8,139.72
<u>SUBTOTALS:</u>				600.2	\$307,887.84

INDIRECT COSTS

OVERHEAD AND PROFIT:

Liability insurance:	2.02%	Total =	\$6,219.33
Performance bond:	1.05%	Total =	\$3,232.82
Job superintendent:	300.10 hrs	Total =	\$19,629.54
Profit:	10.00%	Total =	\$30,788.78
		TOTAL O & P =	\$59,870.47
		CONTRACT AMOUNT (direct + O & P) =	\$367,758.31

LEGAL - ENGINEERING - PROJECT MANAGEMENT:

Financial warranty processing (legal/related costs):	500.00	Total =	500.00
Engineering work and/or contract/bid preparation:	0.00%	Total =	\$0.00
Reclamation management and/or administration:	5.00%		\$18,387.92

CONTINGENCY: 3.00 Total = \$9,236.64

TOTAL INDIRECT COST = \$87,995.02

TOTAL BOND AMOUNT (direct + indirect) = \$395,882.86

WHEEL LOADER – LOAD AND CARRY WORKTask description: **Transport and place 6,618 LCY of backfill in Area 1**Site: **Duck Creek Mine**Permit Action: **Reclamation Cost Estimate**Permit/Job#: **M2013022****PROJECT IDENTIFICATION**Task #: **01A**
Date: **5/16/2013**
User: **THM**State: **Colorado**
County: **Rio Blanco**Abbreviation: **None**
Filename: **M022-01a**Agency or organization name: **DRMS****HOURLY EQUIPMENT COST**Basic Machine: **CAT 980H**
Attachment 1: **ROPS Cab**Horsepower: **315**
Shift Basis: **1 per day**
Data Source: **(CRG)****Cost Breakdown:**

		Utilization %
Ownership Cost/Hour:	\$43.47	NA
Operating Cost/Hour:	\$74.19	100
Operator Cost/Hour:	\$35.82	NA
Total Unit Cost/Hour:	\$153.47	
Total Fleet Cost/Hour:	\$153.47	

MATERIAL QUANTITIESInitial volume: **6,618** CCY
Loose volume: **6,618** LCYSwell factor: **1.000**Source of estimated volume: **Division of Reclamation, Mining & Safety**
Source of estimated swell factor: **Cat Handbook****HOURLY PRODUCTION**Loader Cycle Time: Unadjusted Basic Cycle Time (load, dump, maneuver): **0.550** minutes

Cycle Time Factors		Factor (min.)	Source
Material:	Material 3/4" to 6" diameter 0.00	0.000	(Cat HB)
Stockpile:	Conveyor or dozer piled 10 ft. high or less 0.01	0.010	(Cat HB)
Truck Ownership:	Independently owned trucks 0.04	0.040	(Cat HB)
Operation:	Constant operation -0.04	-0.040	(Cat HB)
Dump Target:	Fragile target 0.05	0.050	(Cat HB)
Net Cycle Time Adjustment:		0.060	minutes
Adjusted Basic Cycle Time:		0.610	minutes

Rolling Resistance – Road ConditionsHaul: **Rutted dirt, little maintenance, no water, 2" tire penetration 5.0**
Return: **Rutted dirt, little maintenance, no water, 2" tire penetration 5.0****Haul and Return Time**

	Length (feet)	Grade Res. (%)	Rolling Res. (%)	Total Res. (%)	Travel Time (minutes)	Source
Haul Route:	200	0.00	5.00	5.00	0.1768	(Cat HB)
Return Route:	200	0.00	5.00	5.00	0.1599	(Cat HB)

Total Travel Time: 0.3367 minutes
 Total Cycle Time: 0.9467 minutes

Load Bucket Capacity

Rated Capacity: 7.50 LCY (heaped)
 Bucket Fill Factor: 0.925 Shale, Sandstone-Standing Bank (85%-100%) 0.925
 Adjusted Capacity: 6.94 LCY

Job Condition Correction Factors

Site Altitude: 7350 feet

		Source
Altitude Adj:	<u>1.00</u>	(CAT HB)
Job Efficiency:	<u>0.83</u>	(1 shift/day)
Net Correction:	<u>0.83</u>	multiplier

Unadjusted Hourly Unit Production: 439.70 LCY/Hour
 Adjusted Hourly Unit Production: 364.95 LCY/Hour
 Adjusted Hourly Fleet Production: 364.95 LCY/Hour

JOB TIME AND COST

Fleet size:	<u>1</u>	Loader(s)	Total job time:	<u>18.13</u>	Hours
Unit cost:	<u>\$0.421</u>	/LCY	Total job cost:	<u>\$2,783.00</u>	

HYDRAULIC EXCAVATOR WORK

Task description: Place and grade backfill in Area 1

Site: Duck Creek Mine Permit Action: Reclamation Cost Update Permit/Job#: M2013022

PROJECT IDENTIFICATION

Task #: 02A State: Colorado Abbreviation: None
Date: 5/20/2013 County: Rio Blanco Filename: M022-02a
User: THM

Agency or organization name: DRMS

HOURLY EQUIPMENT COST

Basic Machine: Cat 345D L 12'-10" Stick Horsepower: 380
Attachment 1: ROPS Cab Weight (MT): 49.37
Shift Basis: 1 per day
Data Source: (CRG)

Cost Breakdown:

		Utilization %
Ownership Cost/Hour:	\$62.38	NA
Operating Cost/Hour:	\$111.43	100
Operator Cost/Hour:	\$33.94	NA
Total Unit Cost/Hour:	\$207.76	
Total Fleet Cost/Hour:	\$207.76	

MATERIAL QUANTITIES

Initial volume: 2,978 CCY Swell factor: 1.000
Loose volume: 2,978 LCY

Source of estimated volume: Division of Reclamation, Mining & Safety
Source of estimated swell factor: Cat Handbook

HOURLY PRODUCTION

Excavator Cycle Time (load bucket, swing loaded, dump bucket, swing empty):

Basic Job Condition Description: AVERAGE
Secondary Job Condition within Basic Description: AVERAGE
Cycle Time Value: 0.315 minutes

Load Bucket Capacity

Rated Capacity: 3.14 LCY (heaped) Bucket Size Class: Medium
Bucket Fill Factor: 0.825 Blasted rock - avg. blasted (75 - 90%) 0.825
Adjusted Capacity: 2.59 LCY

Job Condition Correction Factors

Site Altitude: 7350 feet

		Source
Altitude Adj:	<u>0.96</u>	(CAT HB)
Job Efficiency:	<u>0.83</u>	(1 shift/day)
Net Correction:	<u>0.80</u>	multiplier

Unadjusted Hourly Unit Production: 493.43 LCY/Hour
Adjusted Hourly Unit Production: 393.16 LCY/Hour
Adjusted Hourly Fleet Production: 393.16 LCY/Hour

JOB TIME AND COST

Fleet size: 1 Excavator Total job time: 7.58 Hours
Unit cost: \$0.528 /LCY Total job cost: \$1,574.00

HYDRAULIC EXCAVATOR WORK

Task description: Place topsoil over Area 1

Site: Duck Creek Mine Permit Action: Reclamation Cost Estimate Permit/Job#: M2013022

PROJECT IDENTIFICATION

Task #: 03A State: Colorado Abbreviation: None
Date: 5/20/2013 County: Rio Blanco Filename: M022-03a
User: THM

Agency or organization name: DRMS

HOURLY EQUIPMENT COST

Basic Machine: Cat 345D L 12'-10" Stick Horsepower: 380
Attachment 1: ROPS Cab Weight (MT): 49.37
Shift Basis: 1 per day
Data Source: (CRG)

Cost Breakdown:

		Utilization %
Ownership Cost/Hour:	<u>\$62.38</u>	<u>NA</u>
Operating Cost/Hour:	<u>\$111.43</u>	<u>100</u>
Operator Cost/Hour:	<u>\$33.94</u>	<u>NA</u>
Total Unit Cost/Hour:	<u>\$207.76</u>	
Total Fleet Cost/Hour:	<u>\$207.76</u>	

MATERIAL QUANTITIES

Initial volume: 443 CCY Swell factor: 1.000
Loose volume: 443 LCY

Source of estimated volume: Division of Reclamation, Mining & Safety
Source of estimated swell factor: Cat Handbook

HOURLY PRODUCTION

Excavator Cycle Time (load bucket, swing loaded, dump bucket, swing empty):

Basic Job Condition Description: AVERAGE
Secondary Job Condition within Basic Description: AVERAGE
Cycle Time Value: 0.315 minutes

Load Bucket Capacity

Rated Capacity: 3.14 LCY (heaped) Bucket Size Class: Medium
Bucket Fill Factor: 0.975 Loose material - mixed moist aggregates (95-100%) 0.975
Adjusted Capacity: 3.06 LCY

Job Condition Correction Factors

Site Altitude: 7350 feet

		Source
Altitude Adj:	<u>0.96</u>	<u>(CAT HB)</u>
Job Efficiency:	<u>0.83</u>	<u>(1 shift/day)</u>
Net Correction:	<u>0.80</u>	<u>multiplier</u>

Unadjusted Hourly Unit Production: 583.14 LCY/Hour
Adjusted Hourly Unit Production: 464.65 LCY/Hour
Adjusted Hourly Fleet Production: 464.65 LCY/Hour

JOB TIME AND COST

Fleet size: 1 Excavator Total job time: 0.95 Hours
Unit cost: \$0.447 /LCY Total job cost: \$198.00

HYDRAULIC EXCAVATOR WORK

Task description: Backfill Area 2

Site: Duck Creek Mine Permit Action: Reclamation Cost Estimate Permit/Job#: M2013022

PROJECT IDENTIFICATION

Task #: 04A State: Colorado Abbreviation: None
Date: 5/21/2013 County: Rio Blanco Filename: M022-04a
User: THM

Agency or organization name: DRMS

HOURLY EQUIPMENT COST

Basic Machine: Cat 345D L 12'-10" Stick Horsepower: 380
Attachment 1: ROPS Cab Weight (MT): 49.37
Shift Basis: 1 per day
Data Source: (CRG)

Cost Breakdown:

		Utilization %
Ownership Cost/Hour:	<u>\$62.38</u>	<u>NA</u>
Operating Cost/Hour:	<u>\$111.43</u>	<u>100</u>
Operator Cost/Hour:	<u>\$33.94</u>	<u>NA</u>
Total Unit Cost/Hour:	<u>\$207.76</u>	
Total Fleet Cost/Hour:	<u>\$207.76</u>	

MATERIAL QUANTITIES

Initial volume: 5,082 CCY Swell factor: 1.000
Loose volume: 5,082 LCY

Source of estimated volume: Division of Reclamation, Mining & Safety
Source of estimated swell factor: Cat Handbook

HOURLY PRODUCTION

Excavator Cycle Time (load bucket, swing loaded, dump bucket, swing empty):

Basic Job Condition Description: AVERAGE
Secondary Job Condition within Basic Description: AVERAGE
Cycle Time Value: 0.315 minutes

Load Bucket Capacity

Rated Capacity: 3.14 LCY (heaped) Bucket Size Class: Medium
Bucket Fill Factor: 0.975 Loose material - mixed moist aggregates (95-100%) 0.975
Adjusted Capacity: 3.06 LCY

Job Condition Correction Factors

Site Altitude: 7350 feet

		Source
Altitude Adj:	<u>0.96</u>	<u>(CAT HB)</u>
Job Efficiency:	<u>0.83</u>	<u>(1 shift/day)</u>
Net Correction:	<u>0.80</u>	<u>multiplier</u>

Unadjusted Hourly Unit Production: 583.14 LCY/Hour
Adjusted Hourly Unit Production: 464.65 LCY/Hour
Adjusted Hourly Fleet Production: 464.65 LCY/Hour

JOB TIME AND COST

Fleet size: 1 Excavator Total job time: 10.94 Hours
Unit cost: \$0.447 /LCY Total job cost: \$2,272.00

WHEEL LOADER – LOAD AND CARRY WORKTask description: Transport topsoil 500' to Area 2Site: Duck Creek MinePermit Action: Reclamation Cost EstimatePermit/Job#: M2013022**PROJECT IDENTIFICATION**Task #: 05AState: ColoradoAbbreviation: NoneDate: 5/21/2013County: Rio BlancoFilename: M022-05aUser: THMAgency or organization name: DRMS**HOURLY EQUIPMENT COST**Basic Machine: CAT 980HHorsepower: 315Attachment 1: ROPS CabShift Basis: 1 per dayData Source: (CRG)**Cost Breakdown:**

		Utilization %
Ownership Cost/Hour:	\$43.47	NA
Operating Cost/Hour:	\$74.19	100
Operator Cost/Hour:	\$35.82	NA
Total Unit Cost/Hour:	\$153.47	
Total Fleet Cost/Hour:	\$153.47	

MATERIAL QUANTITIESInitial volume: 380

CCY

Swell factor: 1.000Loose volume: 380

LCY

Source of estimated volume: Division of Reclamation, Mining & SafetySource of estimated swell factor: Cat Handbook**HOURLY PRODUCTION**Loader Cycle Time: Unadjusted Basic Cycle Time (load, dump, maneuver): 0.550 minutes

Cycle Time Factors		Factor (min.)	Source
Material:	Material 1/8" to 3/4" diameter -0.02	-0.020	(Cat HB)
Stockpile:	Dumped by truck 0.02	0.020	(Cat HB)
Truck Ownership:	No adjustment - factor not applicable 0.00	0.000	(Cat HB)
Operation:	Constant operation -0.04	-0.040	(Cat HB)
Dump Target:	Fragile target 0.05	0.050	(Cat HB)
Net Cycle Time Adjustment:		0.010	minutes
Adjusted Basic Cycle Time:		0.560	minutes

Rolling Resistance – Road ConditionsHaul: Rutted dirt, little maintenance, no water, 2" tire penetration 5.0Return: Rutted dirt, little maintenance, no water, 2" tire penetration 5.0**Haul and Return Time**

	Length (feet)	Grade Res. (%)	Rolling Res. (%)	Total Res. (%)	Travel Time (minutes)	Source
Haul Route:	500	-5.00	5.00	0.00	0.3218	(Cat HB)
Return Route:	500	5.00	5.00	10.00	0.5644	(Cat HB)

Total Travel Time: 0.8862 minutes
 Total Cycle Time: 1.4462 minutes

Load Bucket Capacity

Rated Capacity: 7.50 LCY (heaped)
 Bucket Fill Factor: 0.925 Loose material - 1/8" to 3/8" (90 - 95%) 0.925
 Adjusted Capacity: 6.94 LCY

Job Condition Correction Factors

Site Altitude: 7350 feet

		Source
Altitude Adj:	<u>1.00</u>	(CAT HB)
Job Efficiency:	<u>0.83</u>	(1 shift/day)
Net Correction:	<u>0.83</u>	multiplier

Unadjusted Hourly Unit Production: 287.83 LCY/Hour
 Adjusted Hourly Unit Production: 238.90 LCY/Hour
 Adjusted Hourly Fleet Production: 238.90 LCY/Hour

JOB TIME AND COST

Fleet size: 1 Loader(s) Total job time: 1.59 Hours
 Unit cost: \$0.642 /LCY Total job cost: \$244.00

HYDRAULIC EXCAVATOR WORK

Task description: Place topsoil on Area 2

Site: Duck Creek Mine

Permit Action: Reclamation Cost Estimate

Permit/Job#: M2013022

PROJECT IDENTIFICATION

Task #: 05B

State: Colorado

Abbreviation: None

Date: 5/21/2013

County: Rio Blanco

Filename: M022-05b

User: THM

Agency or organization name: DRMS

HOURLY EQUIPMENT COST

Basic Machine: Cat 345D L 12'-10" Stick

Attachment 1: ROPS Cab

Horsepower: 380

Weight (MT): 49.37

Shift Basis: 1 per day

Data Source: (CRG)

Cost Breakdown:

		Utilization %
Ownership Cost/Hour:	\$62.38	NA
Operating Cost/Hour:	\$111.43	100
Operator Cost/Hour:	\$33.94	NA
Total Unit Cost/Hour:	\$207.76	
Total Fleet Cost/Hour:	\$207.76	

MATERIAL QUANTITIES

Initial volume: 380

CCY

Swell factor: 1.000

Loose volume: 380

LCY

Source of estimated volume: Division of Reclamation, Mining & Safety

Source of estimated swell factor: Cat Handbook

HOURLY PRODUCTION

Excavator Cycle Time (load bucket, swing loaded, dump bucket, swing empty):

Basic Job Condition Description: AVERAGE
Secondary Job Condition within Basic Description: AVERAGE
Cycle Time Value: 0.315 minutes

Load Bucket Capacity

Rated Capacity: 3.14 LCY (heaped)
Bucket Fill Factor: 0.925 Loose material - 1/8" to 3/8" (90 - 95%) 0.925
Adjusted Capacity: 2.90 LCY

Bucket Size Class: Medium

Job Condition Correction Factors

Site Altitude: 7350 feet

Altitude Adj:	<u>0.96</u>	Source
Job Efficiency:	<u>0.83</u>	(CAT HB)
Net Correction:	<u>0.80</u>	(1 shift/day)
		multiplier

Unadjusted Hourly Unit Production:	<u>553.24</u>	LCY/Hour
Adjusted Hourly Unit Production:	<u>440.82</u>	LCY/Hour
Adjusted Hourly Fleet Production:	<u>440.82</u>	LCY/Hour

JOB TIME AND COST

Fleet size: 1 Excavator Total job time: 0.86 Hours

Unit cost: \$0.471 /LCY Total job cost: \$179.00

BULLDOZER WORKTask description: **Backfill Area 3**

Site: **Duck Creek Mine** Permit Action: **Reclamation Cost Estimate** Permit/Job#: **M2013022**

PROJECT IDENTIFICATION

Task #: **06A** State: **Colorado** Abbreviation: **None**
 Date: **5/21/2013** County: **Rio Blanco** Filename: **M022-06a**
 User: **THM**

Agency or organization name: **DRMS****HOURLY EQUIPMENT COST**

Basic Machine: **Cat D8T - 8SU**
 Horsepower: **310**
 Blade Type: **Semi-Universal**
 Attachment: **NA**
 Shift Basis: **1 per day**
 Data Source: **(CRG)**

Cost Breakdown:

		<u>Utilization %</u>
Ownership Cost/Hour:	\$56.69	NA
Operating Cost/Hour:	\$104.03	100
Ripper op. Cost/Hour:	\$0.00	0
Operator Cost/Hour:	\$37.41	NA
Total unit Cost/Hour:	\$198.13	
Total Fleet Cost/Hour:	\$198.13	

MATERIAL QUANTITIES

Initial Volume: **23,000**
 Swell factor: **1.000**
 Loose volume: **23,000 LCY**

Source of estimated volume: **Division of Reclamation, Mining & Safety**
 Source of estimated swell factor: **Cat Handbook**

HOURLY PRODUCTION

Average push distance: **100 feet**
 Unadjusted hourly production: **852.6 LCY/hr**

Materials consistency description: **Loose stockpile 1.2**

Average push gradient: **5 %**
 Average site altitude: **7,350 feet**

Material weight: **2,100 lbs/LCY**Weight description: **Shale****Job Condition Correction Factor**

		<u>Source</u>
Operator Skill:	0.750	(AVG.)
Material consistency:	1.200	(CAT HB)

Dozing method:	1.000	(GEN.)
Visibility:	1.000	(AVG.)
Job efficiency:	0.830	(1 SHIFT/DAY)
Spoil pile:	0.800	(FND-RF)
Push gradient:	0.903	(CAT HB)
Altitude:	1.000	(CAT HB)
Material Weight:	1.095	(CAT HB)
Blade type:	1.000	(PAT)

Net correction: 0.5909

Adjusted unit production: 503.80 LCY/hr

Adjusted fleet production: 503.8 LCY/hr

JOB TIME AND COST

Fleet size: 1 Dozer(s)

Unit cost: \$0.393/LCY

Total job time: 45.65 Hours

Total job cost: \$9,045.30

HYDRAULIC EXCAVATOR WORK

Task description: Contour backfilled slope in Area 3

Site: Duck Creek Mine Permit Action: Reclamation Cost Estimate Permit/Job#: M2013022

PROJECT IDENTIFICATION

Task #: 07A State: Colorado Abbreviation: None
Date: 5/21/2013 County: Rio Blanco Filename: M022-07a
User: THM

Agency or organization name: DRMS

HOURLY EQUIPMENT COST

Basic Machine: Cat 345D L 12'-10" Stick
Attachment 1: ROPS Cab

Horsepower: 380
Weight (MT): 49.37
Shift Basis: 1 per day
Data Source: (CRG)

Cost Breakdown:

		Utilization %
Ownership Cost/Hour:	\$62.38	NA
Operating Cost/Hour:	\$111.43	100
Operator Cost/Hour:	\$33.94	NA
Total Unit Cost/Hour:	\$207.76	

Total Fleet Cost/Hour: \$207.76

MATERIAL QUANTITIES

Initial volume: 23,000 CCY Swell factor: 1.000
Loose volume: 23,000 LCY

Source of estimated volume: Division of Reclamation, Mining & Safety
Source of estimated swell factor: Cat Handbook

HOURLY PRODUCTION

Excavator Cycle Time (load bucket, swing loaded, dump bucket, swing empty):

Basic Job Condition Description: AVERAGE
Secondary Job Condition within Basic Description: AVERAGE
Cycle Time Value: 0.315 minutes

Load Bucket Capacity

Rated Capacity: 3.14 LCY (heaped) Bucket Size Class: Medium
Bucket Fill Factor: 0.875 Loose material - 1" and over (85 - 90%) 0.875
Adjusted Capacity: 2.75 LCY

Job Condition Correction Factors

Site Altitude: 7350 feet

Altitude Adj: 0.96 Source
Job Efficiency: 0.83 (CAT HB)
Net Correction: 0.80 (1 shift/day)
multiplier

Unadjusted Hourly Unit Production: 523.33 LCY/Hour
Adjusted Hourly Unit Production: 416.99 LCY/Hour
Adjusted Hourly Fleet Production: 416.99 LCY/Hour

JOB TIME AND COST

Fleet size: 1 Excavator Total job time: 55.16 Hours

Unit cost: \$0.498 /LCY Total job cost: \$11,459.00

TRUCK/LOADER TEAM WORKTask description: Purchase 1,800 CY topsoil and deliver to site

Site: Duck Creek Mine Permit Action: Reclamation Cost Estimate Permit/Job#: M2013022

PROJECT IDENTIFICATION

Task #: 08A State: Colorado Abbreviation: None
 Date: 5/22/2013 County: Rio Blanco Filename: M022-08a
 User: THM

Agency or organization name: DRMS**HOURLY EQUIPMENT COST**Shift basis: 1 per day

Equipment Description	
Truck Loader Team -Truck:	Generic 15-18 cy, 6x4
-Loader:	CAT 980H
Support Equipment -Load Area:	NA
-Dump Area:	NA
Road Maintenance -Motor Grader:	NA
-Water Truck:	NA

Cost Breakdown:	Truck/Loader Team		Support Equipment		Maintenance Equipment	
	Truck	Loader	Load Area	Dump Area	Motor Grader	Water Truck
%Utilization-machine:	100	100	NA	NA	NA	NA
Ownership cost/hour:	\$17.98	\$43.47	NA	NA	NA	NA
Operating cost/hour:	\$74.65	\$74.19	NA	NA	NA	NA
Ripper op. cost/hour:	NA	\$0.00	NA	NA	NA	NA
Operator cost/hour:	\$25.66	\$35.82	NA	NA	NA	NA
Unit Subtotals:	\$118.29	\$153.47	NA	NA	NA	NA
Number of Units:	2	1	0	0	0	0
Group Subtotals:	Work:	\$390.05	Support:	\$0.00	Maint:	\$0.00

Total work team cost/hour: \$390.05**MATERIAL QUANTITIES**

Initial volume: 1,800 CCY Swell factor: 1.000
 Loose volume: 1,800 LCY

Source of estimated volume: Division of Reclamation, Mining & Safety
 Source of estimated swell factor: Cat Handbook
 Material Purchase Cost: \$10.00
 Total Cost: \$18,000.00

HOURLY PRODUCTION**Truck Capacity:****Truck Payload (weight) Basis:**

Material weight: 1,600 Pounds/LCY
 Description: Top Soil
 Rated Payload: 63,980 Pounds
 Payload Capacity: 39.99 LCY

Truck Bed (volume) Basis:

Struck Volume:	15.00	LCY
Heaped Volume:	18.00	LCY
Average Volume:	16.50	LCY
Adjusted Volume:	18.00	LCY

Final Truck Volume Based on Number of Loader Passes: 13.13 LCY**Loading Tool Capacity**Bucket Size Class: NA

Rated Capacity:	7.500	LCY (heaped)
Bucket Fill Factor:	0.875	Loose material - 1/2" to 3/4" (85 - 90%) 0.875
Adjusted Capacity:	6.563	LCY

Job Condition Corrections:Site Altitude (ft.): 6500 feet

	Truck	Loader	Source
Altitude Adj:	1.000	1.000	(CAT HB)
Job Efficiency:	0.830	0.830	(CAT HB)

Net Correction: 0.830 0.830**Loading Tool Cycle Time:** Number of Loading Tool Passes Required to Fill Truck: 2 passes**Excavators and Front Shovels:**Machine Cycle Time vs. Job Condition Rating: NA
Selected Value within this Basic Rating: NA

Track Loaders – Material Description: _____

Cycle Time Elements (min.):Load: NA Maneuver: NA Dump: 0.100Wheel and Track Loaders - Unadjusted Basic Loader Cycle Time (load, dump, maneuver): 0.550 minutes

Cycle Time Factors		Factor (min.)	Source
Material:	Material 1/8" to 3/4" diameter -0.02	-0.020	(Cat HB)
Stockpile:	Dumped by truck 0.02	0.020	(Cat HB)
Truck Ownership:	Independently owned trucks 0.04	0.040	(Cat HB)
Operation:	Constant operation -0.04	-0.040	(Cat HB)
Dump Target:	Nominal target 0.00	0.000	(Cat HB)

Net Cycle Time Adjustment:	0.000	minutes
Adjusted Loader Cycle Time:	0.550	minutes
Net Load Time per Truck:	0.650	minutes

Truck Cycle Time:

Truck Exchange Time:	0.50	Minutes	Adjusted for site altitude:	0.500	Minutes
Truck Load Time:	0.650	Minutes	Adjusted for site altitude:	0.650	Minutes
Truck Maneuver and Dump Time:	0.90	Minutes	Adjusted for site altitude:	0.900	Minutes

Truck Travel (Haul & Return) Time:
maintained 3.0Road Condition: Firm, smooth, rolling, dirt/lt. surfaced, watered,

Haul Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	343200.00	2.00	3.00	5.00	1867	183.905

Haul Time: **183.905** minutes

Return Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	343200.00	-2.00	3.00	1.00	2963	115.862

Return Time: **115.862** minutesTotal Truck Cycle Time: **301.817** minutes

Loading Tool unit
 Production 684.78 LCY/Hour Adjusted for job efficiency: 568.37 LCY/Hour
 Truck Unit Production
 2.61 LCY/Hour Adjusted for job efficiency: 2.17 LCY/Hour
 Optimal No. of Trucks: 262 Truck(s) Selected Number of Trucks: 2 Truck(s)

Adjusted hourly truck team production: 4.33 LCY/Hour
 Adjusted single truck/loader team production: 4.33 LCY/Hour
 Adjusted multiple truck/loader team production: 4.33 LCY/Hour

JOB TIME AND COSTFleet size: 1 Team(s) Total job time: **415.58** HoursUnit cost: \$90.054 /LCY Total job cost: **\$162,098.07**

WHEEL LOADER – LOAD AND CARRY WORKTask description: Transport 1,800 CY topsoil 300, from dump location to Area 3Site: Duck Creek MinePermit Action: Reclamation Cost EstimatePermit/Job#: M2013022**PROJECT IDENTIFICATION**Task #: 09A
Date: 5/22/2013
User: THMState: Colorado
County: Rio BlancoAbbreviation: None
Filename: M022-09aAgency or organization name: DRMS**HOURLY EQUIPMENT COST**Basic Machine: CAT 980H
Attachment 1: ROPS CabHorsepower: 315
Shift Basis: 1 per day
Data Source: (CRG)**Cost Breakdown:**

		Utilization %
Ownership Cost/Hour:	\$43.47	NA
Operating Cost/Hour:	\$74.19	100
Operator Cost/Hour:	\$35.82	NA
Total Unit Cost/Hour:	\$153.47	
Total Fleet Cost/Hour:	\$153.47	

MATERIAL QUANTITIESInitial volume: 1,800 CCY Swell factor: 1.000
Loose volume: 1,800 LCYSource of estimated volume: Division of Reclamation, Mining & Safety
Source of estimated swell factor: Cat Handbook**HOURLY PRODUCTION**Loader Cycle Time: Unadjusted Basic Cycle Time (load, dump, maneuver): 0.550 minutes

Cycle Time Factors		Factor (min.)	Source
Material:	Material 1/8" to 3/4" diameter -0.02	-0.020	(Cat HB)
Stockpile:	Dumped by truck 0.02	0.020	(Cat HB)
Truck Ownership:	No adjustment - factor not applicable 0.00	0.000	(Cat HB)
Operation:	Inconsistent operation 0.04	0.040	(Cat HB)
Dump Target:	Nominal target 0.00	0.000	(Cat HB)
Net Cycle Time Adjustment:		0.040	minutes
Adjusted Basic Cycle Time:		0.590	minutes

Rolling Resistance – Road ConditionsHaul: Rutted dirt, little maintenance, no water, 2" tire penetration 5.0
Return: Rutted dirt, little maintenance, no water, 2" tire penetration 5.0**Haul and Return Time**

	Length (feet)	Grade Res. (%)	Rolling Res. (%)	Total Res. (%)	Travel Time (minutes)	Source
Haul Route:	300	-3.00	5.00	2.00	0.2190	(Cat HB)
Return Route:	300	3.00	5.00	8.00	0.2870	(Cat HB)

Total Travel Time: 0.5060 minutes
 Total Cycle Time: 1.0960 minutes

Load Bucket Capacity

Rated Capacity: 7.50 LCY (heaped)
 Bucket Fill Factor: 0.925 Loose material - 1/8" to 3/8" (90 - 95%) 0.925
 Adjusted Capacity: 6.94 LCY

Job Condition Correction Factors

Site Altitude: 7350 feet

		Source
Altitude Adj:	<u>1.00</u>	(CAT HB)
Job Efficiency:	<u>0.83</u>	(1 shift/day)
Net Correction:	<u>0.83</u>	multiplier

Unadjusted Hourly Unit Production: 379.79 LCY/Hour
 Adjusted Hourly Unit Production: 315.22 LCY/Hour
 Adjusted Hourly Fleet Production: 315.22 LCY/Hour

JOB TIME AND COST

Fleet size: 1 Loader(s) Total job time: 5.71 Hours
 Unit cost: \$0.487 /LCY Total job cost: \$876.00

HYDRAULIC EXCAVATOR WORK

Task description: Distribute 1,800 CY topsoil in Area 3

Site: Duck Creek Mine Permit Action: Reclamation Cost Estimate Permit/Job#: M2013022

PROJECT IDENTIFICATION

Task #: 10A State: Colorado Abbreviation: None
Date: 5/22/2013 County: Rio Blanco Filename: M022-10a
User: THM

Agency or organization name: DRMS

HOURLY EQUIPMENT COST

Basic Machine: Cat 345D L 12'-10" Stick Horsepower: 380
Attachment 1: ROPS Cab Weight (MT): 49.37
Shift Basis: 1 per day
Data Source: (CRG)

Cost Breakdown:

		Utilization %
Ownership Cost/Hour:	\$62.38	NA
Operating Cost/Hour:	\$111.43	100
Operator Cost/Hour:	\$33.94	NA
Total Unit Cost/Hour:	\$207.76	
Total Fleet Cost/Hour:	\$207.76	

MATERIAL QUANTITIES

Initial volume: 1,800 CCY Swell factor: 1.000
Loose volume: 1,800 LCY

Source of estimated volume: Division of Reclamation, Mining & Safety
Source of estimated swell factor: Cat Handbook

HOURLY PRODUCTION

Excavator Cycle Time (load bucket, swing loaded, dump bucket, swing empty):

Basic Job Condition Description: AVERAGE
Secondary Job Condition within Basic Description: AVERAGE
Cycle Time Value: 0.315 minutes

Load Bucket Capacity

Rated Capacity: 3.14 LCY (heaped) Bucket Size Class: Medium
Bucket Fill Factor: 0.925 Loose material - 1/8" to 3/8" (90 - 95%) 0.925
Adjusted Capacity: 2.90 LCY

Job Condition Correction Factors

Site Altitude: 7350 feet

Altitude Adj:	<u>0.96</u>	Source
Job Efficiency:	<u>0.83</u>	(CAT HB)
Net Correction:	<u>0.80</u>	(1 shift/day)
		multiplier

Unadjusted Hourly Unit Production: 553.24 LCY/Hour
Adjusted Hourly Unit Production: 440.82 LCY/Hour
Adjusted Hourly Fleet Production: 440.82 LCY/Hour

JOB TIME AND COST

Fleet size: 1 Excavator Total job time: 4.08 Hours
Unit cost: \$0.471 /LCY Total job cost: \$848.00

REVEGETATION WORKTask description: Revegetate 5 acres disturbance

Site: Duck Creek Mine Permit Action: Reclamation Cost Estimate Permit/Job#: M2013022

PROJECT IDENTIFICATION

Task #: 11A State: Colorado Abbreviation: None
 Date: 5/22/2013 County: Rio Blanco Filename: M022-11a
 User: THM

Agency or organization name: DRMS**FERTILIZING****Materials**

Description	Units / Acre	Unit	Cost / Unit	Cost /Acre
			\$	\$
			Total Fertilizer Materials Cost/Acre	\$0.00

Application

Description	Cost /Acre
	\$
Total Fertilizer Application Cost/Acre	\$0.00

TILLING

Description	Cost /Acre
Hand raking (MEANS 32 91 13.23 0250)	\$1,219.68
Total Tilling Cost/Acre	\$1,219.68

SEEDING

Seed Mix	Rate – PLS LBS / Acre	Seeds per SQ. FT	Cost /Acre
Indian Ricegrass - Nespar	4.00	12.95	\$28.32
Bluebunch Wheatgrass - Secar	4.00	12.86	\$27.36
Bitterbrush, Antelope	2.00	0.62	\$40.52
Thickspike Wheatgrass - Critana	4.00	14.14	\$20.68
Sweetvetch, Utah or Northern	2.00	0.91	\$81.72
Western Wheatgrass - Rosanna	4.00	10.10	\$14.04
Prairie Junegrass	2.00	106.31	\$68.80
Sagebrush, Wyoming Big	4.00	236.55	\$141.00
Saltbush, Four Wing	2.00	2.75	\$21.46

Totals Seed Mix	28.00	397.18	\$443.90
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Application

Description	Cost /Acre
Broadcast seeding [DMG]	\$261.28
Total Seed Application Cost/Acre	\$261.28

MULCHING and MISCELLANEOUS**Materials**

Description	Units / Acre	Unit	Cost / Unit	Cost /Acre
Herbicide - 2,4D @ 1.0 pt/ac	6.00	ACRE	\$1.23	\$7.38
Jute mesh #2, stapled (MEANS 31 25 14.16 0300)	5.00	ACRE	\$2,226.40	\$11,132.00
Silt fence, adverse cond. (MEANS 31 25 14.16 1100)	2,400.00	LINEAR FOOT	\$0.84	\$2,016.00
Total Mulch Materials Cost/Acre				\$13,155.38

Application

Description	Cost /Acre
Jute mesh #2 (MEANS 31 25 14.16 0300)	\$2,226.40
Silt fence, adverse cond. (MEANS 32 25 14.16 1100)	\$0.84
Total Mulch Application Cost/Acre	\$2,227.24

NURSERY STOCK PLANTING

Common Name	No / Acre	Type and Size	Planting Cost	Fertilizer Pellet Cost	Cost /Acre
					\$
Totals Nursery Stock Cost / Acre					\$0.00

JOB TIME AND COST

No. of Acres:	5	Cost /Acre:	\$17,307.48
Estimated Failure Rate:	25%	Cost /Acre*:	\$17,307.48
*Selected Replanting Work Items:	TILLING,SEEDING,MULCHING		
Initial Job Cost:	\$86,537.40		
Reseeding Job Cost:	\$21,634.35		
Total Job Cost:	\$108,171.75		
Job Hours:	24.00		

EQUIPMENT MOBILIZATION/DEMOBILIZATIONTask description: **Mobilization**

Site: **Duck Creek Mine** Permit Action: **Reclamation Cost Estimate** Permit/Job#: **M2013022**

PROJECT IDENTIFICATION

Task #: **12A** State: **Colorado** Abbreviation: **None**
 Date: **5/22/2013** County: **Rio Blanco** Filename: **M022-12a**
 User: **THM**

Agency or organization name: **DRMS****EQUIPMENT TRANSPORT RIG COST**

Shift basis: **1 per day**
 Cost Data Source: **CRG Data**

Truck Tractor Description: **GENERIC ON-HIGHWAY TRUCK TRACTOR, 6X4, DIESEL POWERED, 400 HP (2ND HALF, 2006)**Truck Trailer Description: **GENERIC FOLDING GOOSENECK, DROP DECK EQUIPMENT TRAILER (25T, 50T, AND 100T)****Cost Breakdown:**

Available Rig Capacities	0-25 Tons	26-50 Tons	51+ Tons
Ownership Cost/Hour:	\$16.63	\$18.37	\$22.33
Operating Cost/Hour:	\$44.38	\$46.13	\$50.07
Operator Cost/Hour:	\$27.66	\$27.66	\$27.66
Helper Cost/Hour:	\$0.00	\$25.39	\$25.39
Total Unit Cost/Hour:	\$88.67	\$117.55	\$125.45

NON ROADABLE EQUIPMENT:

Machine Description	Weight/ Unit (TONS)	Owner ship Cost/hr/ unit	Haul Rig Cost/hr/unit	Fleet Size	Haul Trip Cost/hr/ fleet	Return Trip Cost/hr/ fleet	DOT Permit Cost/ fleet
Cat 345D L 12'-10" Stick	54.31	\$62.38	\$125.45	1	\$187.83	\$125.45	\$250.00
CAT 980H	33.12	\$43.47	\$117.55	2	\$322.03	\$235.10	\$500.00
Cat D8T - 8SU	47.71	\$56.69	\$117.55	1	\$174.24	\$117.55	\$250.00

Subtotals: **\$684.10** **\$478.10** **\$1,000.00**

ROADABLE EQUIPMENT:

Machine Description	Total Cost/hr/ unit	Fleet Size	Haul Trip Cost/hr/ fleet	Return Trip Cost/hr/ fleet
Light Duty Pickup, 4x4, 3/4 T.	\$15.34	2	\$30.68	\$30.68

Subtotals: **\$30.68** **\$30.68**

EQUIPMENT HAUL DISTANCE and Time

Nearest Major City or Town within project area region:	GRAND JUNCTION	
Total one-way travel distance:	90.00	miles
Average Travel Speed:	45.00	mph

Total Non-Roadable Mob/Demob Cost *	\$8,017.00
** two round trips with haul rig:	
Total Roadable Mob/Demob Cost **	\$122.72
** one round trip, no haul rig:	

Transportation Cycle Time:

	Non-Roadable Equipment	Roadable Equipment
Haul Time (Hours):	2.00	2.00
Return Time (Hours):	2.00	2.00
Loading Time (Hours):	0.50	NA
Unloading Time (Hours):	0.50	NA
Subtotals:	5.00	4.00

JOB TIME AND COST

Total job time:	10.00	Hours
Total job cost:	\$8,139.72	