COLORADO
Division of Reclamation, Mining and Safety
Department of Natural Resources

1313 Sherman Street, Room 215
Denver, CO 80203

September 6, 2017

Mr. Kirk Daehling
Natural Soda LLC
3200 CR 31
Rifle, CO 81650

Re: Nahcolite Project, Permit No. M-1983-194, Amendment Approval and Updated Reclamation Cost Estimate, Revision No. AM-4

Dear Mr. Daehling:
On September 6, 2017 the Division of Reclamation, Mining and Safety (DRMS) approved the Amendment application submitted to the Division on May 23, 2017, addressing the following:

- *Amendment to increase the permit acreage to 12,248 acres to be consistent with the EPA UIC permit area. Also to allow for construction of a new loadout area which includes a new elevator, conveyance system, a new electrical room and a baghouse. Amendment also incorporates a total of seven new wells. Total allowed maximum disturbance remains at 260 acres.*

The terms of the Amendment No. 4 approved by the Division are hereby incorporated into Permit No. M-1983-194. All other conditions and requirements of Permit No. M-1983-194 remain in full force and effect.

If the revised liability amount exceeds the performance bond currently held (see below), please submit additional bond. The revision will not be final until the bond is approved by the Division.

Bond Held:	$4,158,340.68
Prior Liability:	$4,158,340.68
Change in Liability:	$469,149.61
Revised Liability:	**$4,627,490.29**

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,

Travis Marshall
Environmental Protection Specialist

Enclosure - Updated Reclamation Cost Estimate

cc: Paul Daggett
BLM - White River Field Office
220 East Market Street
Meeker, CO 81641

Gerald Daub
Daub & Associates, Inc.
1985 ½ South Broadway
Grand Junction, CO 81507

COST SUMMARY WORK

Task description: **Final Reclamation Cost Estimate**

Site: **Nahcolite Project** Permit Action: AM-4 Permit/Job#: M1983194

PROJECT IDENTIFICATION

Task #: 001 State: Colorado Abbreviation: None
Date: 9/7/2017 County: Rio Blanco Filename: M194-001
User: THM

Agency or organization name: DRMS

TASK LIST (DIRECT COSTS)

Task	Description	Form Used	Fleet Size	Task Hours	Cost
01a	Demo. of NSI Plant, Pipelines and Powerlines and Parking Lot	DEMOLISH	1	160.00	$1,738,278.58
02a	Borehole P&A	BOREHOLE	1	460.00	$1,526,114.17
03a	Re-grade Process Ponds	DOZER	2	141.43	$54,261.00
04a	Re-grade Plant Area	DOZER	2	83.95	$32,206.00
05a	Re-grade Well Pads	DOZER	2	117.84	$45,210.00
06a	Distribute 6" of topsoil over 8 acre process pond area	DOZER	2	5.92	$2,271.00
07a	Distribute 6" topsoil over 16 acre plant/process area	DOZER	2	11.84	$4,541.00
08a	Replace topsoil over re-graded well pads and access roads	DOZER	2	28.50	$10,933.00
09a	Rip compacted areas	RIPPER	2	20.87	$8,623.00
10a	Distribute 6" topsoil over 27.7 acres of de-compacted area	DOZER	2	15.22	$5,838.00
11a	Revegetate 90.5 acres	REVEGE	1	87.76	$186,285.00
12a	Mobilization	MOBILIZE	1	8.00	$6,307.00
			SUBTOTALS:	**1141.33**	**$3,620,868**

INDIRECT COSTS

OVERHEAD AND PROFIT:

Liability insurance:	2.02	Total =	$73,141.53
Performance bond:	1.05	Total =	$38,019.11
Job superintendent:	570.67	Total =	$41,687.08
Profit:	10.00	Total =	$362,086.80
		TOTAL O & P =	$514,934.52
		CONTRACT AMOUNT (direct + O & P) =	$4,135,802.52

LEGAL - ENGINEERING - PROJECT MANAGEMENT:

Financial warranty processing (legal/related costs):	500.00	Total =	500.00
Engineering work and/or contract/bid preparation:	4.25	Total =	$175,771.61
Reclamation management and/or administration:	5.00		$206,790.13
CONTINGENCY:	3.00	Total =	$108,626.04
		TOTAL INDIRECT COST =	$1,006,622.29

TOTAL BOND AMOUNT (direct + indirect) = $4,627,490.29

DEMOLITION WORK

Task description: **Demo. of NSI Plant, Pipelines and Powerlines and Parking Lot**

Site: **Nahcolite Project** Permit Action: AM-4 Permit/Job#: M1983194

PROJECT IDENTIFICATION

Task #: 01A State: Colorado Abbreviation: None
Date: 9/6/2017 County: Rio Blanco Filename: 01aRemoval of 16"
User: THM

Agency or organization name: DRMS

UNIT COSTS **Location adjustment: 91.30 %**

Structure or Item Description	Dimensions	Demolition Menu Selection	Quantity	Unit	Unit Cost	Total Cost
NSI Plant	200'L x 175'W x 50'H	Plant (3S) demo./on-site disposal in excavated pit - Max. 200 ft. push	1,750,000.00	CF	$0.24	$425,250.00
Product Storage Dome	100'L x 100'W x 50'H	Plant (3S) demo./on-site disposal in excavated pit - Max. 200 ft. push	500,000.00	CF	$0.24	$121,500.00
Removal of NSI Plant Slab	200'L x 175'W	Demo. and on-site disposal in excavated pit, 8 in. thick - Max. 200 ft. push	35,000.00	SF	$0.87	$30,415.00
Removal of Storage Dome slab	100'L x 100'W	Demo. and on-site disposal in existing pit, 8 in. thick - Max. 200 ft. push	10,000.00	SF	$0.81	$8,140.00
Scale Building	20'W x 100'L x 15'H	Plant (1S) demo./on-site disposal in excavated pit - Max. 200 ft. push	30,000.00	CF	$0.22	$6,510.00
Removal of Scale Building Slab	20'W x 100'L	Demo. and on-site disposal in excavated pit, 6 in. thick - Max. 200 ft. push	2,000.00	SF	$0.65	$1,304.00
Removal of Conveyor System	200'L	OBSOLETE-Conveyor, elevated, including supports - 5 ft. W x 6 ft. H housing	200.00	LF	$44.51	$8,901.80
Removal of Overhead Powerline	2100'L	Powerline or utility line, overhead, wood - Double or "H" pole	2,100.00	LF	$0.23	$483.00
Tank Farm	30'W x 50'H	Haul tank to certified salvage dump - 3,000 to 5,000 gal. tank	5.00	EA	$760.00	$3,800.00
Removal of Pipeline	3600	Pipe, steel, welded connections - 10 in. diameter pipe	3,600.00	LF	$6.56	$23,616.00
Removal of Flagpoles/Monument	70 sq feet	USER PROVIDED ITEM	70.00	FT^2	$5.00	$350.00
Removal of 12" barren liquor pileline	5050 LF	Pipe, steel, welded connections - 10 in. diameter pipe	5,050.00	LF	$6.56	$33,128.00
TR-36 Process Building 1	165' x 79' x 60'	Plant (3S) demo./on-site disposal in existing pit or cut - Max. 200 ft. push	782,100.00	CF	$0.23	$178,318.80
TR-36 Process Building 2	105' x 36' x 170'	Plant (3S) demo./on-site disposal in existing pit or	642,600.00	CF	$0.23	$146,512.80

		cut - Max. 200 ft. push				
TR-36 Dry handling, Screening and Storage	90' x 65' x 160'	Plant (3S) demo./on-site disposal in existing pit or cut - Max. 200 ft. push	936,000.00	CF	$0.23	$213,408.00
TR-36 Warehouse and Packaging Building	70' x 65' x 60'	Plant (3S) demo./on-site disposal in existing pit or cut - Max. 200 ft. push	273,000.00	CF	$0.23	$62,244.00
TR-36 Warehouse Building	400' x 150' x 22'	Plant (1C) demo./on-site disposal in existing pit or cut - Max. 200 ft. push	1,320,000.00	CF	$0.27	$353,760.00
TR-36 Removal of concrete foundations	101285 sq. ft	Demo. and on-site disposal in existing pit, 6 in. thick - Max. 200 ft. push	101,285.00	SF	$0.61	$61,885.14
TR-36 Asphalt Paarking Removal	133' x 182'	Pavement, bituminous, demolition only - 4 in. to 6 in. thick	897.00	SY	$7.12	$6,386.64
Removal of 2 x 16" Production Pipelines	8,340 LF	Pipe, steel, welded connections - 10 in. diameter pipe	8,340.00	LF	$6.56	$54,710.40
Demolition of Screening and Magnet System	120'x160'x40'	Plant (3S) demo./on-site disposal in excavated pit - Max. 200 ft. push	672,000.00	CF	$0.24	$163,296.00

Job Hours: 160.00 **Subtotal (unadjusted):** $1,903,919.58 **Total Cost (adjusted for location):** $1,738,278.58

BOREHOLE SEALING WORK

Task description: **Borehole P&A**

Site: **Nahcolite Project** Permit Action: AM-4 Permit/Job#: M1983194

PROJECT IDENTIFICATION

Task #: 02A State: Colorado Abbreviation: None
Date: 9/6/2017 County: Rio Blanco Filename: 02a
User: THM

Agency or organization name: DRMS

UNIT COSTS

Borehole Description	Sealing/Item Method	Diameter	Length	Quantity	Unit	Unit Cost	Total Cost
3M-TDR	Portland cement grout - 4 in. (labor, equip, materials)	4.5"	1876	1,876.00	LF	$7.69	$14,426.44
89-1	Portland cement grout - 4 in. (labor, equip, materials)	4.5"	1627	1,627.00	LF	$7.69	$12,511.63
89-2	Portland cement grout - 4 in. (labor, equip, materials)	4.5"	1417	1,417.00	LF	$7.69	$10,896.73
89-3	Portland cement grout - 4 in. (labor, equip, materials)	4.5"	347	347.00	LF	$7.69	$2,668.43
90-1	Portland cement grout - 10 in. (labor, equip, materials)	9.625"	1417	1,417.00	LF	$16.68	$23,640.09
90-3	Portland cement grout - 4 in. (labor, equip, materials)	4.5"	1627	1,627.00	LF	$7.69	$12,511.63
90-4	Portland cement grout - 4 in. (labor, equip, materials)	4.5"	1417	1,417.00	LF	$7.69	$10,896.73
94-1M	Portland cement grout - 6 in. (labor, equip, materials)	5"	2200	2,200.00	LF	$10.65	$23,430.00
BG-1	Portland cement grout - 4 in. (labor, equip, materials)	4.5"	1627	1,627.00	LF	$7.69	$12,511.63
BG-4	Portland cement grout - 4 in. (labor, equip, materials)	4.5	1627	1,627.00	LF	$7.69	$12,511.63
DS-2	Portland cement grout - 4 in. (labor, equip, materials)	4.5"	1876	1,876.00	LF	$7.69	$14,426.44
DS-3	Portland cement grout - 4 in. (labor, equip, materials)	4.5"	1876	1,876.00	LF	$7.69	$14,426.44
EX-2	Portland cement grout - 4 in. (labor, equip, materials)	4.5"	1876	1,876.00	LF	$7.69	$14,426.44
IRI-1	Portland cement grout - 4 in. (labor, equip, materials)	4"	347	347.00	LF	$7.69	$2,668.43

IRI-4	Portland cement grout - 4 in. (labor, equip, materials)	4"	1417	1,417.00	LF	$7.69	$10,896.73
IRI-5	Portland cement grout - 4 in. (labor, equip, materials)	4.625"	347	347.00	LF	$7.69	$2,668.43
IRI-6	Portland cement grout - 4 in. (labor, equip, materials)	4"	1627	1,627.00	LF	$7.69	$12,511.63
IRI-7	Portland cement grout - 4 in. (labor, equip, materials)	4.5"	1876	1,876.00	LF	$7.69	$14,426.44
IRI-8	Portland cement grout - 4 in. (labor, equip, materials)	4.5"	347	347.00	LF	$7.69	$2,668.43
MU-2	Portland cement grout - 6 in. (labor, equip, materials)	5"	1876	1,876.00	LF	$10.65	$19,979.40
MWA-2	Portland cement grout - 8 in. (labor, equip, materials)	7.625"	347	347.00	LF	$11.21	$3,889.87
MWB-2	Portland cement grout - 6 in. (labor, equip, materials)	5"	1627	1,627.00	LF	$10.65	$17,327.55
MWD-1	Portland cement grout - 6 in. (labor, equip, materials)	5"	1876	1,876.00	LF	$10.65	$19,979.40
MWD-2	Portland cement grout - 6 in. (labor, equip, materials)	5"	1876	1,876.00	LF	$10.65	$19,979.40
12H-I	Portland cement grout - 8 in. (labor, equip, materials)	7.625"	1935	1,935.00	LF	$11.21	$21,691.35
12H-R	Portland cement grout - 8 in. (labor, equip, materials)	7.625"	1935	1,935.00	LF	$11.21	$21,691.35
10H-I	Portland cement grout - 8 in. (labor, equip, materials)	7.625"	1935	1,935.00	LF	$11.21	$21,691.35
10H-R	Portland cement grout - 8 in. (labor, equip, materials)	7.625"	1935	1,935.00	LF	$11.21	$21,691.35
BG-5	Portland cement grout - 4 in. (labor, equip, materials)	4.5"	1645	1,645.00	LF	$7.69	$12,650.05
DS-5	Portland cement grout - 4 in. (labor, equip, materials)	4.5"	1902	1,902.00	LF	$7.69	$14,626.38
BG-6	Portland cement grout - 4 in. (labor, equip, materials)	4.5"	1639	1,639.00	LF	$7.69	$12,603.91
WSW-2	Portland cement grout - 8 in. (labor, equip, materials)	7.625"	1460	1,460.00	LF	$11.21	$16,366.60
DVPW-1(A)	Portland cement grout - 8 in. (labor, equip, materials)	7"	2350	2,350.00	LF	$11.21	$26,343.50
DVPW-(B)	Portland cement grout - 8	7"	2350	2,350.00	LF	$11.21	$26,343.50

	in. (labor, equip, materials)						
10H-1V	Portland cement grout - 8 in. (labor, equip, materials)	7"	2010	2,010.00	LF	$11.21	$22,532.10
13H-I	Portland cement grout - 8 in. (labor, equip, materials)	8"	2335	2,335.00	LF	$11.21	$26,175.35
13H-R	Portland cement grout - 8 in. (labor, equip, materials)	8"	2310	2,310.00	LF	$11.21	$25,895.10
8H-I	Portland cement grout - 8 in. (labor, equip, materials)	7"	2110	2,110.00	LF	$11.21	$23,653.10
8H-R	Portland cement grout - 8 in. (labor, equip, materials)	7"	2110	2,110.00	LF	$11.21	$23,653.10
14H-I	Portland cement grout - 8 in. (labor, equip, materials)	7"	2110	2,110.00	LF	$11.21	$23,653.10
14H-R	Portland cement grout - 8 in. (labor, equip, materials)	7"	2110	2,110.00	LF	$11.21	$23,653.10
WSW-3	Portland cement grout - 8 in. (labor, equip, materials)	7"	1420	1,431.00	LF	$11.21	$16,041.51
WSW-4	Portland cement grout - 8 in. (labor, equip, materials)	7"	1431	1,431.00	LF	$11.21	$16,041.51
A (Phase 1)	Portland cement grout - 8 in. (labor, equip, materials)	6.5"	1844	1,844.00	LF	$11.21	$20,671.24
B (Phase 1)	Portland cement grout - 8 in. (labor, equip, materials)	6.5"	1879	1,879.00	LF	$11.21	$21,063.59
C (Phase 1)	Portland cement grout - 8 in. (labor, equip, materials)	6.5"	1898	1,898.00	LF	$11.21	$21,276.58
D (Phase 1)	Portland cement grout - 8 in. (labor, equip, materials)	6.5"	1949	1,949.00	LF	$11.21	$21,848.29
E (Phase 1)	Portland cement grout - 8 in. (labor, equip, materials)	6.5"	1967	1,967.00	LF	$11.21	$22,050.07
F (Phase 1)	Portland cement grout - 8 in. (labor, equip, materials)	6.5"	1933	1,933.00	LF	$11.21	$21,668.93
G (Phase 1)	Portland cement grout - 8 in. (labor, equip, materials)	6.5"	2012	2,012.00	LF	$11.21	$22,554.52
H (Phase 1)	Portland cement grout - 8 in. (labor, equip, materials)	6.5"	1983	1,983.00	LF	$11.21	$22,229.43
I (Phase 1)	Portland cement grout - 8 in. (labor, equip, materials)	6.5"	1986	1,986.00	LF	$11.21	$22,263.06
J (Phase 1)	Portland cement grout - 8 in. (labor, equip,	6.5"	2038	2,038.00	LF	$11.21	$22,845.98

	materials)						
K (Phase 1)	Portland cement grout - 8 in. (labor, equip, materials)	6.5"	1963	1,963.00	LF	$11.21	$22,005.23
L (Phase 1)	Portland cement grout - 8 in. (labor, equip, materials)	6.5"	1901	1,901.00	LF	$11.21	$21,310.21
M (Phase 1)	Portland cement grout - 8 in. (labor, equip, materials)	6.5"	1917	1,917.00	LF	$11.21	$21,489.57
DS-7 (Phase 1)	Portland cement grout - 8 in. (labor, equip, materials)	6.5"	1897	1,897.00	LF	$11.21	$21,265.37
N (Phase 2)	Portland cement grout - 8 in. (labor, equip, materials)	6.5	1859	1,859.00	LF	$11.21	$20,839.39
O (Phase 2)	Portland cement grout - 8 in. (labor, equip, materials)	6.5	1807	1,807.00	LF	$11.21	$20,256.47
P (Phase 2)	Portland cement grout - 8 in. (labor, equip, materials)	6.5"	1817	1,817.00	LF	$11.21	$20,368.57
Q (Phase 2)	Portland cement grout - 8 in. (labor, equip, materials)	6.5"	1836	1,836.00	LF	$11.21	$20,581.56
R (Phase 2)	Portland cement grout - 8 in. (labor, equip, materials)	6.5"	1835	1,835.00	LF	$11.21	$20,570.35
S (Phase 2)	Portland cement grout - 8 in. (labor, equip, materials)	6.5"	1744	1,744.00	LF	$11.21	$19,550.24
T (Phase 2)	Portland cement grout - 8 in. (labor, equip, materials)	6.5"	1739	1,739.00	LF	$11.21	$19,494.19
U (Phase 2)	Portland cement grout - 8 in. (labor, equip, materials)	6.5"	1694	1,694.00	LF	$11.21	$18,989.74
DS-6 (Phase 3)	Portland cement grout - 4 in. (labor, equip, materials)	4"	1882	1,882.00	LF	$7.69	$14,472.58
9H-I	Portland cement grout - 8 in. (labor, equip, materials)	7"	2110	2,110.00	LF	$11.21	$23,653.10
9H-R	Portland cement grout - 8 in. (labor, equip, materials)	7"	2110	2,110.00	LF	$11.21	$23,653.10
15H-I	Portland cement grout - 8 in. (labor, equip, materials)	7"	1960	1,960.00	LF	$11.21	$21,971.60
15H-R	Portland cement grout - 8 in. (labor, equip, materials)	7"	1960	1,960.00	LF	$11.21	$21,971.60
16H-I	Portland cement grout - 8 in. (labor, equip, materials)	7"	1960	1,960.00	LF	$11.21	$21,971.60
16H-R	Portland cement grout - 8 in. (labor, equip, materials)	7"	1960	1,960.00	LF	$11.21	$21,971.60

17H-I	Portland cement grout - 8 in. (labor, equip, materials)	7"	1960	1,960.00	LF	$11.21	$21,971.60
17R-1	Portland cement grout - 8 in. (labor, equip, materials)	7"	1960	1,960.00	LF	$11.21	$21,971.60
401H-I SHL	Portland cement grout - 8 in. (labor, equip, materials)	6.366"	2094	2,094.00	LF	$11.21	$23,473.74
401H-R SHL	Portland cement grout - 8 in. (labor, equip, materials)	8.835	2094	2,094.00	LF	$11.21	$23,473.74
402H-I SHL	Portland cement grout - 8 in. (labor, equip, materials)	6.366	2097	2,097.00	LF	$11.21	$23,507.37
402H-R	Portland cement grout - 8 in. (labor, equip, materials)	8.835	2097	2,097.00	LF	$11.21	$23,507.37
403H-I SHL	Portland cement grout - 8 in. (labor, equip, materials)	6.366	2095	2,095.00	LF	$11.21	$23,484.95
403H-R SHL	Portland cement grout - 8 in. (labor, equip, materials)	8.835	2095	2,095.00	LF	$11.21	$23,484.95
12H-IR SHL	Portland cement grout - 8 in. (labor, equip, materials)	8.835	2061	2,061.00	LF	$11.21	$23,103.81

Job Hours: **460.00** **Total Cost:** **$1,526,114.00**

BULLDOZER WORK

Task description: **Re-grade Process Ponds**

Site: **Nahcolite Project** Permit Action: AM-4 Permit/Job#: M1983194

PROJECT IDENTIFICATION

Task #: 03A
Date: 9/7/2017
User: THM
State: Colorado
County: Rio Blanco
Abbreviation: None
Filename: 03a

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:

		Utilization %
Ownership Cost/Hour:	$83.81	NA
Operating Cost/Hour:	$66.17	100
Ripper own. Cost/Hour:	$0.00	NA
Ripper op. Cost/Hour:	$0.00	0
Operator Cost/Hour:	$41.85	NA

Total unit Cost/Hour: $191.83
Total Fleet Cost/Hour: **$383.65**

MATERIAL QUANTITIES

Initial Volume: 52,723
Swell factor: 1.110
Loose volume: **58,523** LCY

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

HOURLY PRODUCTION

Average push distance: 175 feet
Unadjusted hourly production: 562.2 LCY/hr

Materials consistency description: Compacted fill or embankment 0.9

Average push gradient: 0 %
Average site altitude: 6,600 feet

Material weight: 2,800 lbs/LCY

Weight description: Clay - Natural bed

Job Condition Correction Factor		Source
Operator Skill:	0.750	(AVG.)
Material consistency:	0.900	(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:	1.000	(CAT HB)
Altitude:	1.000	(CAT HB)
Material Weight:	0.821	(CAT HB)
Blade type:	1.000	(PAT)

Net correction: 0.3680

Adjusted unit production: 206.89 LCY/hr
Adjusted fleet production: **413.78** LCY/hr

JOB TIME AND COST

Fleet size: 2 Dozer(s)
Unit cost: $0.927/LCY

Total job time: **141.43** Hours
Total job cost: **$54,261**

BULLDOZER WORK

Task description: **Re-grade Plant Area**

Site: **Nahcolite Project** Permit Action: AM-4 Permit/Job#: M1983194

PROJECT IDENTIFICATION

Task #: 04A State: Colorado Abbreviation: None
Date: 9/7/2017 County: Rio Blanco Filename: 04a
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:

		Utilization %
Ownership Cost/Hour:	$83.81	NA
Operating Cost/Hour:	$66.17	100
Ripper own. Cost/Hour:	$0.00	NA
Ripper op. Cost/Hour:	$0.00	0
Operator Cost/Hour:	$41.85	NA

Total unit Cost/Hour: $191.83
Total Fleet Cost/Hour: **$383.65**

MATERIAL QUANTITIES

Initial Volume: 39,364
Swell factor: 1.110
Loose volume: **43,694** LCY

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

HOURLY PRODUCTION

Average push distance: 150 feet
Unadjusted hourly production: 634.3 LCY/hr

Materials consistency description: Compacted fill or embankment 0.9

Average push gradient: -5 %
Average site altitude: 6,600 feet

Material weight: 2,800 lbs/LCY

Weight description: Clay - Natural bed

Job Condition Correction Factor		Source
Operator Skill:	0.750	(AVG.)
Material consistency:	0.900	(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:	1.115	(CAT HB)
Altitude:	1.000	(CAT HB)
Material Weight:	0.821	(CAT HB)
Blade type:	1.000	(PAT)

Net correction: 0.4103

Adjusted unit production: 260.25 LCY/hr
Adjusted fleet production: **520.5** LCY/hr

JOB TIME AND COST

Fleet size: 2 Dozer(s)
Unit cost: $0.737/LCY

Total job time: **83.95** Hours
Total job cost: **$32,206**

BULLDOZER WORK

Task description: **Re-grade Well Pads**

Site: **Nahcolite Project** Permit Action: AM-4 Permit/Job#: M1983194

PROJECT IDENTIFICATION

Task #: 05A State: Colorado Abbreviation: None
Date: 9/7/2017 County: Rio Blanco Filename: 05a
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:

		Utilization %
Ownership Cost/Hour:	$83.81	NA
Operating Cost/Hour:	$66.17	100
Ripper own. Cost/Hour:	$0.00	NA
Ripper op. Cost/Hour:	$0.00	0
Operator Cost/Hour:	$41.85	NA

Total unit Cost/Hour: $191.83
Total Fleet Cost/Hour: **$383.65**

MATERIAL QUANTITIES

Initial Volume: 87,700
Swell factor: 1.110
Loose volume: **97,347** LCY

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

HOURLY PRODUCTION

Average push distance: 75 feet
Unadjusted hourly production: 1,017.1 LCY/hr

Materials consistency description: Partly consolidated stockpile 1.1

Average push gradient: 5 %
Average site altitude: 6,600 feet

Material weight: 2,800 lbs/LCY

Weight description: Clay - Natural bed

Job Condition Correction Factor		Source
Operator Skill:	0.750	(AVG.)
Material consistency:	1.100	(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:	0.821	(CAT HB)
Blade type:	1.000	(PAT)

Net correction: 0.4061

Adjusted unit production: 413.04 LCY/hr
Adjusted fleet production: **826.08** LCY/hr

JOB TIME AND COST

Fleet size: 2 Dozer(s)
Unit cost: $0.464/LCY

Total job time: **117.84** Hours
Total job cost: **$45,210**

BULLDOZER WORK

Task description: **Distribute 6" of topsoil over 8 acre process pond area**

Site: **Nahcolite Project** Permit Action: AM-4 Permit/Job#: M1983194

PROJECT IDENTIFICATION

Task #:	06A	State:	Colorado	Abbreviation:	None
Date:	9/7/2017	County:	Rio Blanco	Filename:	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:

		Utilization %
Ownership Cost/Hour:	$83.81	NA
Operating Cost/Hour:	$66.17	100
Ripper own. Cost/Hour:	$0.00	NA
Ripper op. Cost/Hour:	$0.00	0
Operator Cost/Hour:	$41.85	NA

Total unit Cost/Hour: $191.83
Total Fleet Cost/Hour: **$383.65**

MATERIAL QUANTITIES

Initial Volume:	6,453
Swell factor:	1.000
Loose volume:	**6,453** LCY

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

HOURLY PRODUCTION

Average push distance: 150 feet
Unadjusted hourly production: 634.3 LCY/hr

Materials consistency description: Loose stockpile 1.2

Average push gradient: 0 %
Average site altitude: 6,600 feet

Material weight: 1,600 lbs/LCY

Weight description: Top Soil

Job Condition Correction Factor		Source
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:	1.000	(CAT HB)
Altitude:	1.000	(CAT HB)
Material Weight:	1.438	(CAT HB)
Blade type:	1.000	(PAT)

Net correction: 0.8593

Adjusted unit production: 545.05 LCY/hr
Adjusted fleet production: **1090.1** LCY/hr

JOB TIME AND COST

Fleet size: 2 Dozer(s)
Unit cost: $0.352/LCY

Total job time: **5.92** Hours
Total job cost: **$2,271**

BULLDOZER WORK

Task description: **Distribute 6" topsoil over 16 acre plant/process area**

Site: **Nahcolite Project** Permit Action: AM-4 Permit/Job#: M1983194

PROJECT IDENTIFICATION

Task #:	07A	State:	Colorado	Abbreviation:	None
Date:	9/7/2017	County:	Rio Blanco	Filename:	07a
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:

		Utilization %
Ownership Cost/Hour:	$83.81	NA
Operating Cost/Hour:	$66.17	100
Ripper own. Cost/Hour:	$0.00	NA
Ripper op. Cost/Hour:	$0.00	0
Operator Cost/Hour:	$41.85	NA

Total unit Cost/Hour: $191.83
Total Fleet Cost/Hour: **$383.65**

MATERIAL QUANTITIES

Initial Volume:	12,903
Swell factor:	1.000
Loose volume:	**12,903** LCY

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

HOURLY PRODUCTION

Average push distance: 150 feet
Unadjusted hourly production: 634.3 LCY/hr

Materials consistency description: Loose stockpile 1.2

Average push gradient: 0 %
Average site altitude: 6,600 feet

Material weight: 1,600 lbs/LCY

Weight description: Top Soil

Job Condition Correction Factor		Source
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:	1.000	(CAT HB)
Altitude:	1.000	(CAT HB)
Material Weight:	1.438	(CAT HB)
Blade type:	1.000	(PAT)

Net correction: 0.8593

Adjusted unit production: 545.05 LCY/hr
Adjusted fleet production: **1090.1** LCY/hr

JOB TIME AND COST

Fleet size: 2 Dozer(s)
Unit cost: $0.352/LCY

Total job time: **11.84** Hours
Total job cost: **$4,541**

BULLDOZER WORK

Task description: **Replace topsoil over re-graded well pads and access roads**

Site: **Nahcolite Project** Permit Action: AM-4 Permit/Job#: M1983194

PROJECT IDENTIFICATION

Task #:	08A	State:	Colorado	Abbreviation:	None
Date:	9/7/2017	County:	Rio Blanco	Filename:	08a
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:

		Utilization %
Ownership Cost/Hour:	$83.81	NA
Operating Cost/Hour:	$66.17	100
Ripper own. Cost/Hour:	$0.00	NA
Ripper op. Cost/Hour:	$0.00	0
Operator Cost/Hour:	$41.85	NA

Total unit Cost/Hour: $191.83
Total Fleet Cost/Hour: **$383.65**

MATERIAL QUANTITIES

Initial Volume:	31,801
Swell factor:	1.000
Loose volume:	**31,801** 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: 0 %
Average site altitude: 6,600 feet

Material weight: 2,100 lbs/LCY

Weight description: Earth - Loam

Job Condition Correction Factor		Source
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:	1.000	(CAT HB)
Altitude:	1.000	(CAT HB)
Material Weight:	1.095	(CAT HB)
Blade type:	1.000	(PAT)

Net correction: 0.6544

Adjusted unit production: 557.94 LCY/hr
Adjusted fleet production: **1115.88** LCY/hr

JOB TIME AND COST

Fleet size: 2 Dozer(s)
Unit cost: $0.344/LCY

Total job time: **28.50** Hours
Total job cost: **$10,933**

BULLDOZER RIPPING WORK

Task description: **Rip compacted areas**

Site: **Nahcolite Project** Permit Action: AM-4 Permit/Job#: M1983194

PROJECT IDENTIFICATION

Task #: 09A State: Colorado Abbreviation: None
Date: 9/7/2017 County: Rio Blanco Filename: 09a
User: THM

Agency or organization name: DRMS

HOURLY EQUIPMENT COST

Basic Machine: Cat D8T - 8SU Horsepower: 310
Ripper Attachment: 3-Shank Ripper Shift Basis: 1 per day
Data Source: (CRG)

Cost Breakdown:

		Utilization %
Ownership Cost/Hour:	$83.81	NA
Operating Cost/Hour:	$66.17	100
Ripper Ownership Cost/Hour:	$7.55	NA
Ripper Operating Cost/Hour:	$7.21	100
Operator Cost/Hour:	$41.85	NA
Total Unit Cost/Hour:	$206.59	

Total Fleet Cost/Hour: **$413.17**

MATERIAL QUANTITIES

Selected estimating method: Area

Alternate Methods:

Seismic: NA Bank Volume: NA BCY NA
Area: 27.70 acres Rip Depth (ft): 2.00 Volume: 89,379 BCY or CCY

Source of estimated quantity: Staff Estimate

HOURLY PRODUCTION

Seismic:

Seismic Velocity: NA feet/second

Area:

Average Ripping Depth:	2.56	mph
Average Ripping Width:	7.08	degrees
Average Ripping Length:	300.00	feet
Average Dozer Speed:	88.00	feet
Average Maneuver Time:	0.25	feet
Production per unit area:	0.800	acres/hour

Job Condition Correction Factors

Unadjusted Hourly Unit Production:	0.800	Acres/hr
Site Altitude:	6,600	feet
Altitude Adj:	1.00	(CAT HB)
Job Efficiency:	0.83	(1 shift/day)
Net Correction:	0.83	multiplier
Adjusted Hourly Unit Production:	0.66	Acres/hr
Adjusted Hourly Fleet Production:	**1.33**	Acres/hr

JOB TIME AND COST

Fleet size: 2 Grader(s) Total job time: **20.87** Hours

Unit cost: $311.305 Per acre Total job cost: **$8,623**

BULLDOZER WORK

Task description: **Distribute 6" topsoil over 27.7 acres of decompacted area**

Site: **Nahcolite Project** Permit Action: AM-4 Permit/Job#: M1983194

PROJECT IDENTIFICATION

Task #:	10A	State:	Colorado	Abbreviation:	None
Date:	9/7/2017	County:	Rio Blanco	Filename:	10a
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:

		Utilization %
Ownership Cost/Hour:	$83.81	NA
Operating Cost/Hour:	$66.17	100
Ripper own. Cost/Hour:	$0.00	NA
Ripper op. Cost/Hour:	$0.00	0
Operator Cost/Hour:	$41.85	NA

Total unit Cost/Hour: $191.83
Total Fleet Cost/Hour: **$383.65**

MATERIAL QUANTITIES

Initial Volume:	22,297
Swell factor:	1.000
Loose volume:	**22,297** 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: 0 %
Average site altitude: 6,600 feet

Material weight: 1,600 lbs/LCY

Weight description: Top Soil

Job Condition Correction Factor		Source
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:	1.000	(CAT HB)
Altitude:	1.000	(CAT HB)
Material Weight:	1.438	(CAT HB)
Blade type:	1.000	(PAT)

Net correction: 0.8593

Adjusted unit production: 732.64 LCY/hr
Adjusted fleet production: **1465.28** LCY/hr

JOB TIME AND COST

Fleet size: 2 Dozer(s)
Unit cost: $0.262/LCY

Total job time: **15.22** Hours
Total job cost: **$5,838**

REVEGETATION WORK

Task description: **Revegetate 87.76 acres**

Site: **Nahcolite Project** Permit Action: AM-4 Permit/Job#: M1983194

PROJECT IDENTIFICATION

Task #: 11A State: Colorado Abbreviation: None
Date: 9/7/2017 County: Rio Blanco Filename: 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
Disc harrowing, 6" deep (MEANS 32 91 13.23 6100)	$106.29
Weed control spraying (MEANS 31 31 16.13 3100)	$242.00
Total Tilling Cost/Acre	**$348.29**

SEEDING

Seed Mix	Rate – PLS LBS / Acre	Seeds per SQ. FT	Cost /Acre
Alkali Sacaton	0.10	3.90	$2.83
Crested Wheatgrass - Ephraim	4.00	18.37	$14.68
Blue Wildrye - Arlington or Elkton	1.50	5.17	$9.75
Russian Wildrye - Bozoisky	1.50	6.03	$9.50
Hard Fescue - Discovery	1.00	12.97	$3.71
Pubescent Wheatgrass - Luna	1.50	3.10	$6.11
Yellow Sweet Clover - Madrid	0.50	2.98	$1.42
Tall Wheatgrass - Jose	1.80	3.26	$4.36
Thickspike Wheatgrass - Critana	4.30	15.20	$24.68

Sweetvetch, Utah or Northern	0.10	0.05	$7.50
Western Wheatgrass - Barton	1.50	3.79	$11.39
Yarrow, Western	0.20	12.16	$8.36
Totals Seed Mix	18.00	86.97	**$104.27**

Application

Description	Cost /Acre
Drill seeding (MEANS 32 92 19.13 0020)	$438.00
Total Seed Application Cost/Acre	**$438.00**

MULCHING and MISCELLANEOUS

Materials

Description	Units / Acre	Unit	Cost / Unit	Cost /Acre
Herbicide - 2,4D @ 1.0 pt/ac	2.00	ACRE	$2.74	$5.48
Straw, delivered {MEANS 31 25 14.16 1200}	2.00	TON	$261.00	$522.00
Total Mulch Materials Cost/Acre				**$527.48**

Application

Description	Cost /Acre
Crimping, with tractor {DMG survey data}	$66.02
Power mulcher (MEANS 32 91 13.16 0350)	$99.32
Total Mulch Application Cost/Acre	**$165.34**

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: 90.5 Cost /Acre: $1,583.38
Estimated Failure Rate: 30% Cost /Acre*: $1,583.38
*Selected Replanting Work Items: TILLING,SEEDING,MULCHING

Initial Job Cost: **$143,295.89**
Reseeding Job Cost: **$42,988.77**
Total Job Cost: **$186,285**
Job Hours: **87.76**

EQUIPMENT MOBILIZATION/DEMOBILIZATION

Task description: **Mobilization**

Site: **Nahcolite Project** Permit Action: AM-4 Permit/Job#: M1983194

PROJECT IDENTIFICATION

Task #: 12A State: Colorado Abbreviation: None
Date: 9/7/2017 County: Rio Blanco Filename: 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 D8T - 8SU	47.71	$83.81	$117.55	2	$402.72	$235.10	$500.00
Drill/Broadcast Seeder with Tractor	25.00	$12.22	$88.67	1	$100.89	$88.67	$250.00
Power Mulcher (Bowie LD-90)	6.00	$7.03	$88.67	1	$95.70	$88.67	$250.00
Subtotals:					**$599.31**	**$412.44**	**$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.	$12.26	2	$24.52	$24.52
Subtotals:			**$24.52**	**$24.52**

EQUIPMENT HAUL DISTANCE and Time

Nearest Major City or Town within project area region:	RIFLE	
Total one-way travel distance:	60.00	miles
Average Travel Speed:	40.00	mph
Total Non-Roadable Mob/Demob Cost * '* two round trips with haul rig:	$6,233.87	
Total Roadable Mob/Demob Cost ** ** one round trip, no haul rig:	$73.56	

Transportation Cycle Time:

	Non-Roadable Equipment	Roadable Equipment
Haul Time (Hours):	1.50	1.50
Return Time (Hours):	1.50	1.50
Loading Time (Hours):	0.50	NA
Unloading Time (Hours):	0.50	NA
Subtotals:	4.00	3.00

JOB TIME AND COST

Total job time:	**8.00**	Hours
Total job cost:	**$6,307**	