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

MINERALS PROGRAM INSPECTION REPORT
PHONE: (303) 866-3567

The Division of Reclamation, Mining and Safety has conducted an inspection of the mining operation noted below. This report documents observations concerning compliance with the terms of the permit and applicable rules and regulations of the Mined Land Reclamation Board.

MINE NAME: McKenna Limestone Quarry	**MINE/PROSPECTING ID#:** M-2000-039	**MINERAL:** Limestone (general) and shale	**COUNTY:** Huerfano
INSPECTION TYPE: Monitoring	**WEATHER:** Clear	**INSP. DATE:** October 24, 2024	**INSP. TIME:** 08:40
OPERATOR: Delhur Industries, Inc.	**OPERATOR REPRESENTATIVE:** Rick Hurworth	**TYPE OF OPERATION:** 110c - Construction Limited Impact	

REASON FOR INSPECTION: Normal I&E Program	**BOND CALCULATION TYPE:** Partial Bond	**BOND AMOUNT:** $17,100.00
DATE OF COMPLAINT: NA	**POST INSP. CONTACTS:** None	**JOINT INSP. AGENCY:** None
INSPECTOR(S): Amber M. Gibson	**INSPECTOR'S SIGNATURE:** 	**SIGNATURE DATE:** November 1, 2024

The following inspection topics were identified as having Problems or Possible Violations. OPERATORS SHOULD READ THE FOLLOWING PAGES CAREFULLY IN ORDER TO ASSURE COMPLIANCE WITH THE TERMS OF THE PERMIT AND APPLICABLE RULES AND REGULATIONS. If a Possible Violation is indicated, you will be notified under separate cover as to when the Mined Land Reclamation Board will consider possible enforcement action.

INSPECTION TOPIC: Reclamation Success
PROBLEM: Reclamation has not been carried to completion within five years of last mining activity at the site as required by Rule 3.1.3.
CORRECTIVE ACTIONS: The Operator shall, conduct final backfilling and grading, seed with the approved seed mixture, and suitably restrict grazing during the seeding's initial establishment at the site. The Operator shall submit documentation that final reclamation has been completed by the corrective action date.
CORRECTIVE ACTION DUE DATE: 3/15/25

INSPECTION TOPIC: Other
PROBLEM: There are state-listed noxious weeds present on site. This is a problem for failure to employ weed control methods for a state listed noxious weed species within the permitted area, and to reduce the spread of weeds to nearby areas as required by Section 3.1.10 (6) of the Rule.
CORRECTIVE ACTIONS: The Operator shall implement the existing weed control plan described in Exhibit D of the approved reclamation plan and provide the Division with evidence that this has been completed by the corrective action date.
CORRECTIVE ACTION DUE DATE: 3/15/25

INSPECTION TOPIC: Signs & Markers
PROBLEM: The mine identification sign was not posted at the entrance of the mine site. This is a problem for failure to post a mine identification sign as required by Section 3.1.12(1) of the rule. The Operator shall, at the entrance of the mine site post a sign, which shall be clearly visible from the access road, with a minimum size equaling one hundred and eighty-seven (187) square inches, such as eleven (11) inches in height and seventeen (17) inches in width, with appropriate font size, with the following: the name of the Operator, a statement that a reclamation permit for the operation has been issued by the Colorado Mined Land Reclamation Board; and the permit number.
CORRECTIVE ACTIONS: The Operator shall, at the entrance of the mine site, post a sign which shall be clearly visible from the access road with the following: the name of the Operator, a statement that a reclamation permit for the operation has been issued by the Colorado Mined Land Reclamation Board; and the permit number. The Operator shall submit photo documentation that a proper sign has been posted by the corrective action date.
CORRECTIVE ACTION DUE DATE: 3/15/25

OBSERVATIONS

The McKenna Limestone Quarry was inspected by Amber Gibson with the Division of Reclamation, Mining and Safety (Division/DRMS). The inspection was completed as part of the Division's routine monitoring inspection program. The site was previously inspected by the Division on February 20, 2019. Rick Hurworth with Delhur Industries, Inc. (representing the Operator) was present during the inspection. The weather was warm, and the skies were clear.

The McKenna Limestone Quarry is located approximately 3.5 miles southeast of the intersection of Colorado Highway 10 and County Road (CR) 210, which is about 8 miles northeast of Walsenburg, Colorado. The mine entrance road is approximately 1.5 miles southeast of the intersection of CR 210 and CR 211. The quarry is a 110c Construction Materials mining operation. The approved post-mining land use is rangeland.

Availability of Records:
The annual report, map, and fee are paid through April 18, 2025. The site was granted Temporary Cessation (TC1) beginning April 2013 and the five-year term expired in April 2018. The Operator had not applied for a second term of Temporary Cessation. A second term would have been backdated to the date that the first term of Temporary Cessation expired. During the Division's 2019 inspection, the Operator and the Division had a discussion regarding entering the site into final reclamation. The Operator was told that at that time, the site was considered active and the Operator should either resume mining or commence with reclamation. The Operator sent follow-up correspondence in response to the Division's inspection report, stating that they would enter final reclamation.

Pursuant to Rule 3.1.3, the Operator has five years to complete reclamation at the site from the date the Operator informs the Board or [Division] that such phase has commenced. The Division received the follow-up correspondence, stating that final reclamation will begin, on March 15, 2019. As of the October 24, 2024 inspection, final reclamation has not occurred. Per Rule 3.1.3, the Operator was to complete reclamation by March 15, 2024. **This has been cited as a problem above** for failure to complete reclamation within five years. The Operator shall provide proof to the Division that final reclamation has been completed by the corrective action date.

Financial Warranty:
The Division has estimated the reclamation liability at the site based on what is currently disturbed and found it to be $22,153-- a difference of $5,053 from the bond currently held. The Division's cost estimate is enclosed with this report. The Operator will have until the **March 15, 2025**, to submit any evidence that substantial reclamation has occurred. If the Division does not receive evidence of the completion of final reclamation, or at least the required backfilling and grading, the Division may issue a surety increase notice for the difference. The Operator will have 60 days from the date of the notice to submit and obtain acceptance of the increase in financial warranty from the Division in accordance with Rule 4.2.1(2).

General Compliance with the Mine Plan:
The disturbed area consists of a pit highwall located in the southern portion of the site that is 6-12 feet high and is approximately 350 feet long (see Figure 1 at the end of this report; Photo 1). In the central part of the area there are two stockpiles of dimensional stone in a matrix of fine-grained material (Photos 2 and 3). To the north there is a large stockpile of dimensional stone similar to the other piles (Photo 4). The Operator confirmed that the limestone was mined in support of remediation efforts at the Summitville Mine Superfund Site.

The site decreases in elevation from the north portion to the south. The highwall exists in the lower-most portion, and the topsoil is located at the highest elevation along the northern border. The disturbance occurs in tiers, and the stockpiles are placed throughout. See Photo 5 for the view looking east upon entering the main site area, and Photo 6 to see how the disturbance area is tiered. When looking at the approved mine plan map, it appears that mining ceased between highwall stages 1 and 2 (see Figure 1). The Operator stated that for the foreseeable future, mining has ceased at this site because beyond use for increasing pH as part of passive treatment at the Summitville Mine Superfund Site, the limestone material at this location has little-to-no other profitable use at this time.

The State C listed noxious weed Mullein was observed along the access road near the entrance to the pit. **This has been cited as a problem above**. There is a basic weed plan included within the Operator's approved reclamation plan, but enclosed is a fact sheet for Mullein that provides additional information on recommended treatment practices. The Operator shall provide evidence to the Division that the weeds have been treated by the corrective action date.

Hydrologic Balance:
No standing water was observed onsite during the inspection. The storm water berms shown on the Operator's mining map (see Figure 1) were observed around the pit disturbance, ensuring stormwater runs to the southwest corner of the pit and separate from the arroyo adjacent to the site (Photo 4).

Roads:
The haul/access road is in a 30-foot easement and is approximately 0.3 miles long from CR 211 that is allowed to remain in place after mining is complete (Photo 7).

Reclamation Success:
As stated in the Availability of Records section above, a problem has been cited for failure to complete final reclamation within five years of providing notice to the Division that final reclamation has begun. During the inspection, the Operator asked to be sent the approved reclamation plan materials to ensure final reclamation is conducted as approved. On October 25, 2024, the Division emailed the Operator the approved reclamation plans as requested.

Signs and Markers:
The mine sign that had been posted following the Division's 2019 inspection is missing and needs to be replaced. **This has been cited as a problem above.** The Operator shall replace the mine sign with a sign that complies with the requirements of Rule 3.1.12(1) by the corrective action date.

Topsoil:
Topsoil is stockpiled along the northern boundary of the disturbance area (Figure 1; Photos 8 and 9). The topsoil piles both have volunteer native grasses growing on them and appear to be stable at this time. To the west of the western portion of the stockpile, woody vegetation that had been stripped prior to disturbance has also been stockpiled (Photo 10). During the inspection, the Operator stated that they will mulch and bury that material. The Division reminded the Operator that per Rule 3.1.9(2), woody debris must be appropriately incorporated into the existing topsoil/growth material. The Division also stated that the burial of woody debris is allowed if it is mulched and evenly distributed so as not to create slope stability and/or compaction issues upon reclamation.

Conclusion:
This concludes the Division's Inspection Report; a figure displaying topics discussed in the report, and a subset of corresponding photographs that were taken during the time of the inspection, are included below. If you need

additional information or have any questions, please contact me by email at amber.gibson@state.co.us or by telephone at (720) 836-0967.

Inspection Contact Address
Rick Hurworth
Delhur Industries, Inc.
P.O. Box 883
Hermiston, OR 97838

Enclosures: *2024 Reclamation Cost Estimate*
State C Listed Weed – Mullein Fact Sheet

EC: Jared Ebert, DRMS

GENERAL INSPECTION TOPICS

The following list identifies the environmental and permit parameters inspected and gives a categorical evaluation of each:

(AR) RECORDS---------- Y	**(FN) FINANCIAL WARRANTY-------- Y**	**(RD) ROADS---------- Y**
(HB) HYDROLOGIC BALANCE---------- Y	**(BG) BACKFILL & GRADING---------- Y**	**(EX) EXPLOSIVES--------- N**
(PW) PROCESSING WASTE/TAILING---- N	**(SF) PROCESSING FACILITIES------- N**	**(TS) TOPSOIL---------- Y**
(MP) GENL MINE PLAN COMPLIANCE- Y	**(FW) FISH & WILDLIFE---------- N**	**(RV) REVEGETATION---- N**
(SM) SIGNS AND MARKERS---------- PB	**(SP) STORM WATER MGT PLAN---- N**	**(RS) RECL PLAN/COMP-- PB**
(ES) OVERBURDEN/DEV. WASTE--------- N	**(SC) EROSION/SEDIMENTATION--- N**	**(ST) STIPULATIONS------- N**
(AT) ACID OR TOXIC MATERIALS------- N	**(OD) OFF-SITE DAMAGE----------N**	**OTHER---------- Y**

Y = Inspected / N = Not inspected / NA = Not applicable to this operation / PB = Problem cited / PV = Possible violation cited

PHOTOGRAPHS

Photo 1: Looking southeast at the highwall located within the southern portion of the permit area.

Photo 2: Looking southeast at the small material stockpile (southern-most brown polygon on Figure 1 below). The east side of the highwall is seen in the background.

Photo 3: Looking south towards the highwall. The product stockpile circled is indicated by the middle brown polygon on Figure 1. The red arrow indicates the stockpile represented by the southern brown polygon on Figure 1.

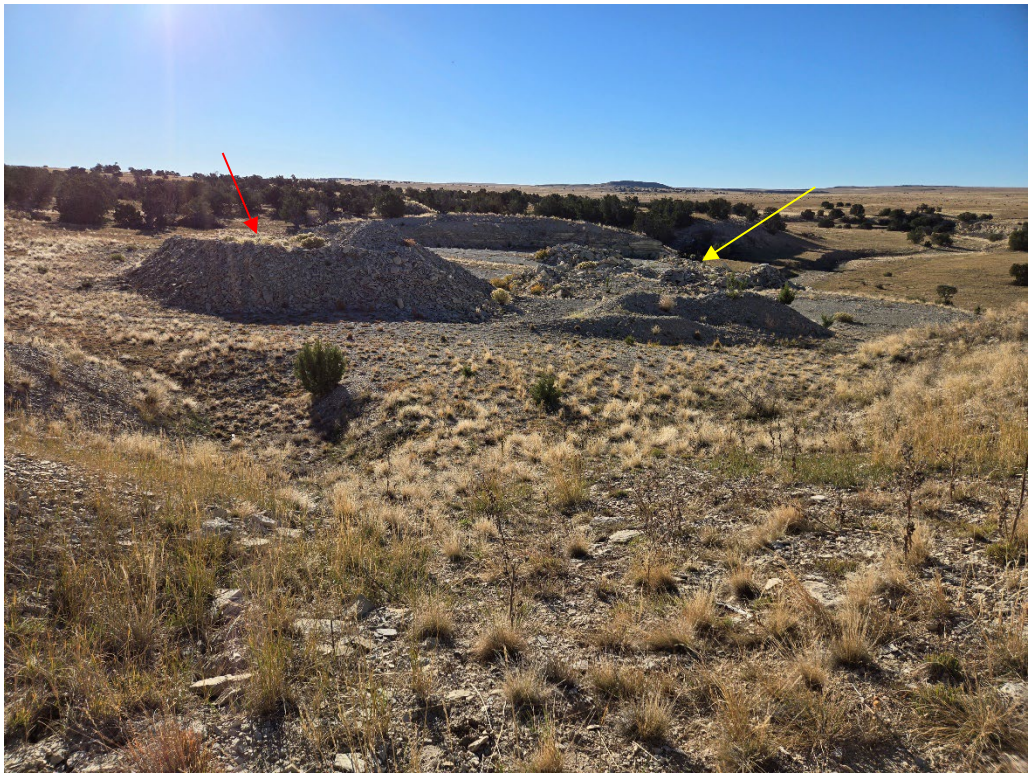

Photo 4: Looking south across the disturbed area from atop the topsoil pile. The red arrow points to the large stockpile indicated by the northern brown polygon on Figure 1. The yellow arrow points to the location of the stormwater berm along the west side of the pit. The arroyo is seen to the right of the stormwater berm in this image.

Photo 5: Looking east from the entrance to the pit. The red arrow points the west side of the stormwater berm/western portion of the pit. The yellow arrow points to the highwall along the south side of the pit.

Photo 6: Looking east across the pit.

Photo 7: Looking east at the access/haul road leading to the pit. The mine sign had been posted on one of the stones, but the Operator believes that it has been stolen. The road leading off to the right in this image is County Road 211.

Photo 8: Looking east across the eastern portion of the topsoil stockpile.

Photo 9: Looking south along the western portion of the topsoil stockpile.

Photo 10: Looking northwest at the western portion of the topsoil stockpile, and at the stockpiled woody vegetation piled on the west side of the topsoil pile.

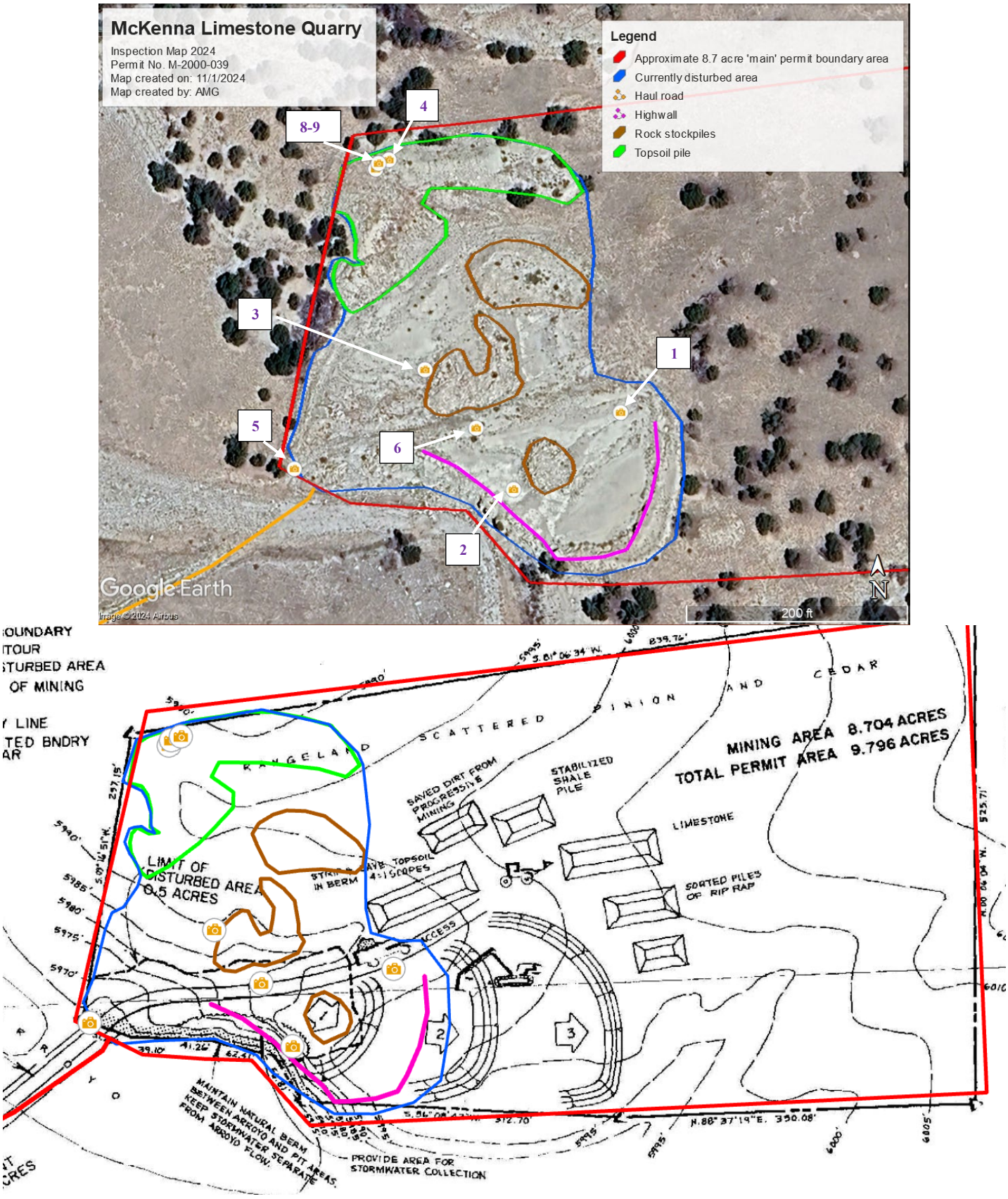

Figure 1: Inspection maps created to display the approximate permit boundary (red), the approximate disturbance boundary (blue), the topsoil pile locations (green), the product stockpile locations (brown), and the highwall location (pink) over ariel imagery (top

image) and overlain on the Operator's mining plan map (bottom image). The camera icons indicate locations where photos were captured during the inspection and correspond with the inspection photos within this report. Photo 7 is located outside of the view of the images in the figure, to the west where the haul road intersects with County Road 211.

COST SUMMARY WORK

Task description: **Reclamation Cost Summary**

Site: **McKenna Limestone Quarry** Permit Action: 2024 Inspection Permit/Job#: M2000039

PROJECT IDENTIFICATION

Task #: 000 State: Colorado Abbreviation: None
Date: 11/1/2024 County: Huerfano Filename: M039-000
User: AMG

Agency or organization name: DRMS

TASK LIST (DIRECT COSTS)

Task	Description	Form Used	Fleet Size	Task Hours	Cost
001	Grade waste rock to highwall	DOZER	1	28.84	$6,259
002	Spread 6-inches of topsoil over 2.4 acres	DOZER	1	12.57	$2,728
003	Revegetation of 2.4 acres	REVEGE	1	3.00	$4,733
004	Mob/DeMob	MOBILIZE	1	3.86	$2,117
	SUBTOTALS:			**48.27**	**$15,837**

INDIRECT COSTS

OVERHEAD AND PROFIT:

Liability insurance:	2.02	Total =	$320
Performance bond:	1.05	Total =	$166
Job superintendent:	24.14	Total =	$1,913
Profit:	10.00	Total =	$1,584
		TOTAL O & P =	$3,983
		CONTRACT AMOUNT (direct + O & P) =	$19,820

LEGAL - ENGINEERING - PROJECT MANAGEMENT:

Financial warranty processing (legal/related costs):	$500	Total =	$500
Engineering work and/or contract/bid preparation:	4.25	Total =	$842
Reclamation management and/or administration:	5.00		$991
CONTINGENCY:	0.00	Total =	$0
		TOTAL INDIRECT COST =	$6,316
		TOTAL BOND AMOUNT (direct + indirect) =	**$22,153**

BULLDOZER WORK

Task description: **Grade waste rock to highwall**

Site: **McKenna Limestone Quarry** Permit Action: 2024 Inspection Permit/Job#: M2000039

PROJECT IDENTIFICATION

Task #: 001 State: Colorado Abbreviation: None
Date: 11/1/2024 County: Huerfano Filename: 1
User: AMG

Agency or organization name: DRMS

HOURLY EQUIPMENT COST

Basic Machine: Cat D7R DS XR Series II
Horsepower: 240
Blade Type: Semi-Universal
Attachment: 3-shank ripper
Shift Basis: 1 per day
Data Source: (CRG)

Cost Breakdown:

		Utilization %
Ownership Cost/Hour:	$90.24	NA
Operating Cost/Hour:	$78.95	100
Ripper own. Cost/Hour:	$9.25	NA
Ripper op. Cost/Hour:	$0.00	0
Operator Cost/Hour:	$38.59	NA

Total unit Cost/Hour: $217.03
Total Fleet Cost/Hour: **$217.03**

MATERIAL QUANTITIES

Initial Volume: 4,500
Swell factor: 1.000
Loose volume: **4,500** 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: 518.9 LCY/hr

Materials consistency description: Rock, avg. ripped or blasted 0.7

Average push gradient: 0 %
Average site altitude: 6,000 feet

Material weight: 3,300 lbs/LCY

Weight description: Decomposed rock - 75% Rock, 25% Earth

Job Condition Correction Factor		Source
Operator Skill:	0.750	(AVG.)

Material consistency:	0.700	(CAT HB)
Dozing method:	1.100	(50% SL)
Visibility:	1.000	(AVG.)
Job efficiency:	0.830	(1 SHIFT/DAY)
Spoil pile:	0.900	(SSD-FC)
Push gradient:	1.000	(CAT HB)
Altitude:	1.000	(CAT HB)
Material Weight:	0.697	(CAT HB)
Blade type:	1.000	(PAT)

Net correction: 0.3007

Adjusted unit production: 156.03 LCY/hr

Adjusted fleet production: **156.03** LCY/hr

JOB TIME AND COST

Fleet size: 1 Dozer(s)
Unit cost: $1.391/LCY

Total job time: **28.84** Hours
Total job cost: **$6,259**

BULLDOZER WORK

Task description: **Spread 6-inches of topsoil over 2.4 acres**

Site: **McKenna Limestone Quarry** Permit Action: 2024 Inspection Permit/Job#: M2000039

PROJECT IDENTIFICATION

Task #: 002 State: Colorado Abbreviation: None
Date: 11/1/2024 County: Huerfano Filename: 2
User: AMG

Agency or organization name: DRMS

HOURLY EQUIPMENT COST

Basic Machine: Cat D7R DS XR Series II
Horsepower: 240
Blade Type: Semi-Universal
Attachment: 3-shank ripper
Shift Basis: 1 per day
Data Source: (CRG)

Cost Breakdown:

		Utilization %
Ownership Cost/Hour:	$90.24	NA
Operating Cost/Hour:	$78.95	100
Ripper own. Cost/Hour:	$9.25	NA
Ripper op. Cost/Hour:	$0.00	0
Operator Cost/Hour:	$38.59	NA

Total unit Cost/Hour: $217.03
Total Fleet Cost/Hour: **$217.03**

MATERIAL QUANTITIES

Initial Volume: 1,661
Swell factor: 1.165
Loose volume: **1,935** LCY

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

HOURLY PRODUCTION

Average push distance: 250 feet
Unadjusted hourly production: 350.0 LCY/hr

Materials consistency description: Compacted fill or embankment 0.9

Average push gradient: 0 %
Average site altitude: 6,000 feet

Material weight: 2,900 lbs/LCY

Weight description: Decomposed rock - 50% Rock, 50% Earth

Job Condition Correction Factor		Source
Operator Skill:	0.750	(AVG.)

Material consistency:	0.900	(CAT HB))
Dozing method:	1.100	(50% SL)
Visibility:	1.000	(AVG.)
Job efficiency:	0.830	(1 SHIFT/DAY)
Spoil pile:	0.900	(SSD-FC)
Push gradient:	1.000	(CAT HB)
Altitude:	1.000	(CAT HB)
Material Weight:	0.793	(CAT HB)
Blade type:	1.000	(PAT)

Net correction: 0.4398

Adjusted unit production: 153.93 LCY/hr

Adjusted fleet production: **153.93** LCY/hr

JOB TIME AND COST

Fleet size: 1 Dozer(s)
Unit cost: $1.410/LCY

Total job time: **12.57** Hours
Total job cost: **$2,728**

REVEGETATION WORK

Task description: **Revegetation of 2.4 acres**

Site: **McKenna Limestone Quarry** Permit Action: 2024 Inspection Permit/Job#: M2000039

PROJECT IDENTIFICATION

Task #: 003 State: Colorado Abbreviation: None
Date: 11/1/2024 County: Huerfano Filename: 3
User: AMG

Agency or organization name: DRMS

FERTILIZING

Materials

Description	Units / Acre	Unit	Cost / Unit	Cost /Acre
Ammonium nitrate, 33-0-0	120.00	pound	$0.64	$77.04
Triple superphosphate, 0-46-0	87.00	pound	$0.92	$79.75
			Total Fertilizer Materials Cost/Acre	**$156.79**

Application

Description	Cost /Acre
Tractor towed spreader (MEANS 32 01 90.13 0120)	$43.12
Total Fertilizer Application Cost/Acre	**$43.12**

TILLING

Description	Cost /Acre
Disc harrowing, 6" deep (MEANS 32 91 13.23 6100)	$117.61
Total Tilling Cost/Acre	**$117.61**

SEEDING

Seed Mix	Rate – PLS LBS / Acre	Seeds per SQ. FT	Cost /Acre
Little Bluestem - Cimarron	3.50	20.89	$47.46
Sideoats Grama - Vaughn	4.50	14.77	$110.66
Western Wheatgrass - Arriba	8.00	20.20	$72.27
Totals Seed Mix	16.00	55.87	**$230.39**

Application

Description	Cost /Acre
Drill Seeding (DRMS Survey Cost)	$236.64

Total Seed Application Cost/Acre	**$236.64**

MULCHING and MISCELLANEOUS

Materials

Description	Units / Acre	Unit	Cost / Unit	Cost /Acre
Straw, delivered {MEANS 31 25 14.16 1200}	2.00	TON	$492.78	$985.56
Total Mulch Materials Cost/Acre				**$985.56**

Application

Description	Cost /Acre
Crimping, with tractor {DMG survey data}	$85.37
Total Mulch Application Cost/Acre	**$85.37**

JOB TIME AND COST

No. of Acres: 2.4 Cost /Acre: $1,855.48
Estimated Failure Rate: 25% Cost /Acre*: $467.03
*Selected Replanting Work Items: SEEDING

Initial Job Cost: **$4,453.15**
Reseeding Job Cost: **$280.22**
Total Job Cost: **$4,733**
Job Hours: **3.00**

EQUIPMENT MOBILIZATION/DEMOBILIZATION

Task description: **Mob/DeMob**

Site: **McKenna Limestone Quarry** Permit Action: 2024 Inspection Permit/Job#: M2000039

PROJECT IDENTIFICATION

Task #: 004 State: Colorado Abbreviation: None
Date: 11/1/2024 County: Huerfano Filename: 4
User: AMG

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:	$10.44	$22.18	$23.94
Operating Cost/Hour:	$26.48	$54.55	$55.65
Operator Cost/Hour:	$22.52	$22.52	$22.52
Helper Cost/Hour:	$0.00	$23.53	$23.53
Total Unit Cost/Hour:	$59.44	$122.78	$125.64

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 D7R DS XR Series II	35.93	$99.49	$122.78	1	$222.27	$122.78	$250.00
Drill/Broadcast Seeder with Tractor	25.00	$41.02	$59.44	1	$100.46	$59.44	$250.00
Subtotals:					**$322.73**	**$182.22**	**$500.00**

EQUIPMENT HAUL DISTANCE and Time

Nearest Major City or Town within project area region: WALSENBURG
Total one-way travel distance: 14.00 miles
Average Travel Speed: 30.00 mph

Total Non-Roadable Mob/Demob Cost *
'* two round trips with haul rig: $2,116.75

Total Roadable Mob/Demob Cost **
** one round trip, no haul rig: $0.00

Transportation Cycle Time:

Non-Roadable Equipment	Roadable Equipment

Haul Time (Hours):	0.47	0.47
Return Time (Hours):	0.47	0.47
Loading Time (Hours):	0.50	NA
Unloading Time (Hours):	0.50	NA
Subtotals:	1.93	0.93

JOB TIME AND COST

Total job time: **3.87** Hours

Total job cost: **$2,117**

Common mullein

Colorado Department of Agriculture

305 Interlocken Pkwy
Broomfield, CO 80021

(303) 869-9030
weeds@state.co.us

Key ID Points

Updated on:
08/09

Identification and Management

Identification and Impacts

Common mullein (*Verbascum thapsus*) is a biennial forb native to Europe and Asia. The first year of the plant it produces a basal rosette. Basal rosettes can grow to 30 inches in diameter. The leaves are light-green in color and are covered in fine soft hairs. The woolly leaves are alternate and overlapping each other and can grow over a foot long. In spring of the second year the plant bolts an erect stem, that grows 2 to 6 feet tall. The flowers of the plant are borne in terminal spikes. These terminal spikes may reach up to 20 inches in length. The flowers are sulfur-yellow in color and have five petals. The flowers range from 3/4 of an inch to 1 1/2 inches in diameter. Numerous two chambered fruits produce 100,000 to 250,000 seeds per plant. Flowering and seed production typical occur from June to August. The plant has a deep taproot along with a fiberous root system.

Habitats for Common mullein are roadsides, waste places, right-of-ways, pastures, hay fields, and abandoned lands. It prefers gravelly soil types, but can grow in other soil types. Livestock will avoid eating Common mullein, due to the hairy leaves of the plants. The plants were originally introduced as a medicinal plant. The Europeans used the flowers for tea, and the leaves for many remedies like burns and rashes. Both the Europeans and the Indians smoked the dried leaves to treat bronchitis.

The key to effective control of Common mullein is preventing the production of seeds. This plant is difficult to control due to the large amount of seed produced and seed bank left in the soil. Mechanical, cultural, biological and chemical treatments can be successful if utilized together in an integrated weed management plan. Details on the back of this sheet can help to create a management plan compatible with your site ecology.

Common mullein is designated as a "List C" species on the Colorado Noxious Weed Act. It is required to be either eradicated, contained, or suppressed depending on the local jurisdictions managing this species. For more information, visit www.colorado.gov/ag/weeds or call the State Weed Coordinator at the Colorado Department of Agriculture, Conservation Services Division, 303-239-4100.

Photos © All Photos from Kelly Uhing, Department of Agriculture; Except Bottom left Mary Ellen (Mel) Harte, United States

Verbascum thapsus

Management Recommendations

Common mullein

CULTURAL
Cultural control can be effective in assistance with other treatment options. Once the parent plants have been removed, cultivating the area with desirable grasses and forbs may outcompete Common mullein seedlings. For specific seed recommendations contact your local Natural Resources Conservation Services for seed mixes.

BIOLOGICAL
Gymnetron tetrum, a seed eating weevil, biological control has been found in eastern Washington State and is currently working on populations there. The weevil has not yet been approved for use in Colorado. Contact the Palisade Insectary of the Colorado Department of Agriculture at 970-464-7916 for more information.

MECHANICAL
Hand pull or dig when soil is moist, prior to flowering and seed production can be effective. If flowers are present, bag specimens carefully so as not to scatter any potential seeds. The key to effective control is to prevent seed production and/or spread.

Integrated Weed Management:

Preventing the establishment and the seed production of Common mullein is key to controlling populations. If the population is established, using a combination of cultural, chemical, biological and mechanical treatments can aid in suppressing population size. Since plants produce thousands of seed treatments need to occur over an extended period of time.

HERBICIDES

NOTE: The following are recommendations for herbicides that can be applied to range and pasturelands. Rates are approximate and based on equipment with an output of 30 gal/acre. Please read label for exact rates. Always read, understand, and follow the label directions. The herbicide label is the LAW!

HERBICIDE	RATE	APPLICATION TIMING
Chlorsulfuron (Telar XP)	1-3 oz/acre	Apply to rosette stages in spring or fall prior to bolting. Add non-ionic surfactant @ 0.32 oz/gal water or 1 pt/100 gal water.
2,4-D Picloram (Grazon P+D *this is a Restricted Use Pesticide*)	4 pts/acre	Apply to rosette stages in spring or fall prior to bolting. Add non-ionic surfactant @ 0.32 oz/gal water or 1 pt/100 gal water. DO NOT apply near trees/shrubs/high water table.
Picloram (Tordon 22K *this is a Restricted Use Pesticide*)	1-2 qts/acre	Apply to rosette stages to early growth stages in spring or fall. Add non-ionic surfactant @ 0.32 oz/gal water or 1 pt/100 gal water. DO NOT Apply near trees/shrubs/high water table.
Metsulfuron (Cimmaron)	1.0 oz/acre	Apply to rosette stages in spring or fall. Add non-ionic surfactant @ 0.32 oz/gal water or 1 pt/100 gal water.

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