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EnCana

P&A Reclamation Plan

Rangely Area

Well No. Federal 13-4

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Legal Description: Colorado, Sixth Principal Meridian, T2S, R102W, Sec. 13

Typical Environmental Conditions

The site lies within the Rentsac-Moyerson-Rock Outcrop complex mapping unit No. 74, 5 to 65 percent slopes. Dominate herbaceous species of these soil mapping units includes beardless wheatgrass, Indian ricegrass, Sandberg bluegrass, bottlebrush squirreltail, prairie junegrass, and galleta grass.

Existing Site Conditions

This well site is split by an access road that serves other areas of BLM ground. The fill material from the original cut is currently part of the road design. Existing vegetative cover is rated fair to good in terms of canopy cover and density on both sides of the road. There is a small drainage on the slope above the site that is eroded.

Areas to Reclaim

This site will be reclaimed back to Approximate Original Contour (AOC) minus soils used for a vehicle right of way.

Backfilling and Grading Recommendations

Backfilling and grading will be required on the site bring back to AOC. Topsoil will be salvaged and stockpiled prior to contouring slopes to approximate original contour. Subsoils will be rough graded back to the surrounding contour. An eighteen ft. wide vehicle right of way will be graded approximately fifteen feet from the toe of the existing cut slope. Restore the drainage from inside the cut slope to the streambed and create a drainage dip in access road to allow natural drainage to function. Topsoil will then be evenly spread on slopes to achieve final grade. New road will be graveled and compacted. Care should be used to preserve junipers and shrubs on the outside edges of the site and access road boundaries. Restore the drainage from inside the cut slope to into the streambed (across the road) and dip the road down into the drainage.

Soil Preparation

Rip soils to a depth of 6" to 8" and dozer track all slope faces on contour

Soil Amendments

Sustane Organic Fertilizer has been used by EnCana in the Piceance Basin with good success in increasing vegetative cover as compared to other organic soil amendments. EnCana's environmental consultant and contractors have documented better revegetation results on areas treated with Sustane as compared to non-treated areas. Organic fertilizers and soil conditions are known to help stimulate soil aggregation over time. Soil aggregation is important for proper air and water exchange through the soil profile for enhanced plant growth. The application rate chosen for this site is based on EnCana's consulting soil scientist review of the existing soil mapping unit information and existing environmental conditions. Broadcast apply Sustane 3.7.2 at 2,000 lbs per acre equivalent on entire site and access road to increase foliage production of existing and seeded vegetation. Sustane 3.7.2 can be hand or machine broadcasted separately or included in hydroseed/hydromulch slurry.

Seeding Requirements and Methods

Drill seed all slopes flatter than 2:5 to 1 apply 2 tons per acre of weed free certified straw mulch followed by mechanical crimping. Crimper should have approximately 6-inch cleats with perpendicular, dull, disc blades. If a crimper is unavailable or conditions do not allow the contractor shall use a hydromulcher to apply guar tackifier at 80 lbs per acre. Use hydraulic amendments, seed, and erosion control mulch applications on remaining areas and any areas found to be deficient. Harrowing or raking hydroseeded areas will be required if seed cannot be shot beneath the soil for proper seed to soil contact. Wood slash and on-site rock will be placed back onto the reclaimed areas where it is available immediately after seeding and mulching is completed.

Seed Mixture

Seed Mix			
Variety	Species	Scientific Name	Lbs. PLS per Acre
Rosanna	Western wheatgrass	<i>Pascopyrum smithii</i>	5
Bozoisky-Select	Russian Wildrye	<i>Psathyrostachys juncea</i>	3
Hycrest	Crested Wheatgrass	<i>Agropyron cristatum</i>	3
	Annual Sunflower	<i>Helianthus annuus</i>	5
			16.0 Total

*Total PLS seed rate given is for drill seeding application. Double PLS seed rate for all broadcast and hydroseed applications.

Mulching Materials

2 tons per acre of weed free certified straw mulch and/or Flexterra Flexible Growth Medium (FGM) at 3,000 lbs per acre to reclaimed slopes.

BMP's

Slash and native rock will be placed on the reclaimed access road where it is available. Mulching materials will provide a high level of erosion control on the reclaimed site and access road. EnCana personnel may decide to utilize non-structural BMP's such as erosion logs, erosion blanket, straw dikes, etc. as the reclamation process is completed and it is determined that more erosion protection is required. All BMP's will follow Encana's Surface Management Guidelines.

Weed Control

The reclaimed site will be checked twice during the 2011 and 2012 growing season for the presence of any noxious/invasive weeds. Weed control will consist of either mechanical control or chemical control. Mechanical weed control will be utilized if it is felt, by EnCana's weed control specialist, that germination of some grass species has not occurred and/or grasses are not mature enough to withstand chemical herbicide applications without the risk of damage.

Fencing Recommendations

There is no evidence of grazing; site-boundary perimeter fencing is not necessary.

Maintenance and Monitoring Procedures

Monitoring and maintenance efforts should be completed for two growing seasons after final reclamation. The site should be inspected during the last two weeks of May (2011 & 2012) and again during the first two weeks of August (2011 & 2012) to check for the presence of any noxious/invasive weeds (especially halogeton) and check for any spots greater than one foot square which are void of desirable grass species.

Previous research indicates that one seedling per square foot in the intermountain west can be considered successful revegetation after one year of revegetation (Vallentine, 1989). EnCana's consulting soil scientist and reclamation specialist feels that the current grass and shrub cover is approaching both the density and canopy cover of vegetation required to meet final reclamation sign off.

Follow discussion of **Weed Control Section** for control of noxious/invasive weeds during two year monitoring and maintenance period.

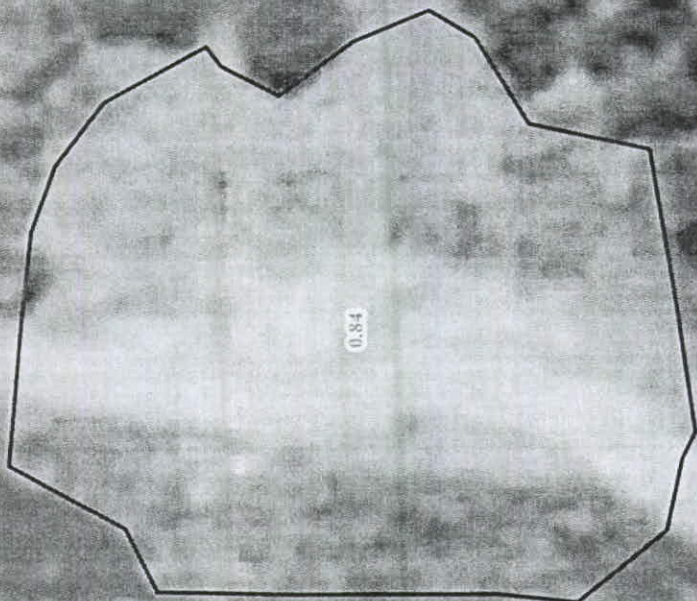
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Vallentine, John F. (1989). *Range Development and Improvements*. San Diego, CA: Academic Press.

Whiteley, Bryan (2009). *Surface Management Guidelines, Expectations and Specifications*. Piceance Basin, CO: Encana USA Division.

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*Known Worldwide
For Being Simply
the **Best...**
Natural Fertilizers
& Soil Builders*

Recommended Uses:

Sustane 3-7-2 is the preferred all natural organic choice for customizable fertilizer blends. Providing a complete nutrient package for long term soil building.

Description:

Sustane® 3-7-2 Natural Organic Fertilizer is derived solely from biologically stable compost.

Sustane® 3-7-2 provides a rich supply of humus with all of the essential nutrients. Used as a stand alone or base material for any professional fertilizer blend. Sustane® Natural Fertilizers provide beneficial microbial diversity improving the ecosystem of your soil. The power of compost concentrated.

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SUSTANE®

All Natural Fertilizer w/Mycorrhizae & Humates



Benefits of Sustane®

3•7•2 Natural Organic

- Increases the nutrient and water holding capacity of the soil
- Strengthens plants tolerance against hot dry conditions
- Greater root development
- Improves buffering against changes in soil pH
- Increases the soil's ability to suppress plant pathogens
- Increased soil porosity and stability for greater root development and water holding capacity

Stabilized Organic Matter

Sustane 3-7-2 Blender's Choice was designed with an ongoing commitment to protecting the environment while supplying your soil with a rich supply of essential nutrients. Our organic compost provides the tools and systems for optimum soil and plant health conditions. While synthetic fertilizers supply plant growth nutrients, they do not supply the organic matter required to maintain quality plant life.

Microbial Diversity

The use of fully composted natural fertilizers increases the levels of beneficial microbial activity that increase nutrient conversion to plant available forms. Microbial diversity has a far-reaching effect on soil ecosystems including decomposition of organic matter, nutrient cycling and soil fertility. Increasing the nutrient availability of both synthetic and organic nutrient sources. While minimizing nutrient loss through leaching.

QUALITY GROWN THROUGH HEALTHY SOIL

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Sustane 3-7-2

Mycorrhizae & Humates

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Product Specifications

Applications:

Sustane® 3-7-2 Natural Organic is an all purpose professional fertilizer designed to provide slow release fertilization without causing excessive growth or burn potential. Sustane® 3-7-2 Natural Organic provides the best source of stabilized humus and chelated nutrients. Because Sustane® is derived from aerobically composted turkey litter, the fertilizer is high in beneficial microbial content.

Total Plant Nutrition

A complete package containing slow release nitrogen, chelated micro nutrients, organic phosphorus, potassium and humic substances. Not all "organics" are the same. Many sewage sludge, meal products and manure-based products undergo high heat sterilization treatments. This process can kill off most of the beneficial and natural microorganisms. Sustane has been demonstrated time and again to surpass and enhance synthetic fertilizers.

Sustane® 3-7-2 Natural Organic Fertilizer is allowed for use in production of certified organic food and fiber crops.

Turf Coverage

50 lbs. covers 2000 sq. ft. @ 1 lb N per 1000 sq. ft. (44 lbs. N per acre)

22.67 kg. covers 186 sq. meters @ 0.5 kg. N per 100 sq. meters (50 kg. N per hectare)

25 lbs. per 1000 sq. ft.
125 g. per 1 sq. m.

Available particle sizes:

Medium Grade, 200 SGN (2.8mm - 1.4 mm)
Fine Grade, 100 SGN (1.4mm - 0.6 mm)

Guaranteed Analysis

Total Nitrogen (N)	3%
0.2% Ammoniacal Nitrogen	
0.2% Water Soluble Organic Nitrogen	
2.6% Water Insoluble Organic Nitrogen*	
Available Phosphate (P ₂ O ₅)	7%
Soluble Potash (K ₂ O)	2%
Calcium (Ca)	4%
Humates	17%

Derived from aerobically composted turkey litter, hydrolyzed feather meal sulfate of potash.

*2.6% slowly available nitrogen from aerobically composted turkey litter and hydrolyzed feather meal.

Non-Plant Food Ingredients

**Humates	17%
Derived from lignite and aerobically composted turkey litter.	
Arbuscular Mycorrhizae	2.32 propagules
1.16 propagules Glomus Intraradices	
0.58 propagules Glomus Etunicatum	
0.58 propagules Glomus Deserticola	
50% Glomus Intraradices (Utah isolate)	
25% Glomus Deserticola (Mojave isolate)	
25% Glomus Etunicatum (Colorado isolate)	

Total Plant Nutrition

Magnesium	1.00%	Copper	0.05%
Sulfur	3.00%	Molybdenum	0.05%
Iron	0.50%	Boron	0.05%
Manganese	0.05%	Humic Acid	13.0%
Zinc	0.05%	Organic Matter	50.0%
pH	6.8	Carbon:Nitrogen(C:N)	4:1
Bulk Density lb./cu. ft.	44 lb.	Salt Index (scale 1-100)	4
C.E.C. Cation Exchange Capacity			104 meq/cm
% of Total N as Slow Release			80%

(507) 361-3003 | Sustane Natural Fertilizer Inc.
(800) 352-8245 | 310 Holiday Avenue
(507) 361-3029 FAX | P.O. Box 12
www.sustane.com | Cannon Falls, Minnesota 55009



QUALITY GROWTH THROUGH HEALTHY SOIL™

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Flexterra® Flexible Growth Medium™ (FGM™)



Setting a new standard of excellence for erosion control and growth establishment.

Flexterra® Flexible Growth Medium™ (FGM™) is designed using patented technology that immediately bonds to the soil, providing superior slope protection to rolled Erosion Control Blankets (ECBs) and Bonded Fiber Matrix (BFM) products—with the speed and cost savings of hydraulic seeding. Demonstrating unprecedented performance levels when evaluated by the most prominent slope erosion testing laboratories in North America, as well as in a range of field applications, Flexterra is proven:

- Effective upon application—bonds directly to the soil
- Superior erosion control—99% effectiveness (near perfection) at all major testing laboratories
- Fastest turf establishment—grows vegetation eight times faster than bare soil and twice as fast as rolled blankets

Composition

Thermally Processed Wood Fibers	74.5% ± 3.5%
Proprietary Crosslinked Hydro-Colloid Tackifiers and Activators	10% ± 1%
Proprietary Crimped, Interlocking Fibers	5% ± 1%
Moisture Content	10.5% ± 1.5%

Application Rates

Slope Gradient/Condition	English	SI
≤ 3H to 1V	3000 lb/ac	3400 kg/ha
> 3H to 1V and ≤ 2H to 1V	3500 lb/ac	3900 kg/ha
> 2H to 1V and ≤ 1H to 1V	4000 lb/ac	4500 kg/ha
> 1H to 1V	4500 lb/ac	5100 kg/ha
Below ECB or TRM	1500 lb/ac	1700 kg/ha
As infill for TRM	3500 lb/ac	3900 kg/ha

Packaging

Bags: Net Weight—50 lb, UV and weather-resistant plastic film

Pallets: Weather-proof, stretch-wrapped with UV resistant pallet cover

40 bags/pallet or 1 ton/pallet

GENERAL

1.01 SUMMARY

(Section 32 92 13 – Hydromulching)

A. This section specifies a hydraulically applied Flexible Growth Medium™ (FGM™) composed of long strand, Thermally Refined™ wood fibers, crimped, interlocking man-made fibers and performance-enhancing additives. The FGM requires no curing period and upon application forms an intimate bond with the soil surface to create a continuous, porous, absorbent and flexible erosion resistant blanket that allows for rapid germination and accelerated plant growth.

B. Related Sections: Other Specification Sections, which directly relate to the work of this Section include, but are not limited to the following:

1. Section 01 57 00 - Temporary Erosion and Sediment Control
2. Section 31 20 00 - Earthwork; Establishment of Subgrade
3. Section 31 25 00 - Erosion and Sediment Control
4. Section 32 92 00 - Lawns and Gardens

1.02 SUBMITTALS

- A. Product Data: Submit manufacturer's product data and installation instructions. Include required substrate preparation, list of materials and application rate.
- B. Certifications: Manufacturer shall submit a letter of certification that the product meets or exceeds all physical property, endurance, performance and packaging requirements.

1.03 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials and products in UV and weather-resistant factory labeled packages. Store and handle in strict compliance with manufacturer's instructions and recommendations. Protect from damage, from weather, excessive temperatures and construction operations.

PRODUCTS

2.01 ACCEPTABLE MANUFACTURER

- A. PROFILE Products LLC
750 Lake Cook Road – Suite 440
Buffalo Grove, IL 60089
800-366-1180 (Fax 847-215-0577)
www.profileproducts.com

2.02 MATERIALS

- A. Flexible Growth Medium shall be Flexterra™ FGM™ and conform to the following property values when uniformly applied at a rate of 3500 pounds per acre (3900 kilograms/hectare) under laboratory conditions.

	TEST METHOD	ENGLISH	SI
PHYSICAL			
Mass Per Unit Area	ASTM D6566 ¹	11.5 oz/yd ²	390 g/m ²
Thickness	ASTM D6525 ¹	0.19 in	4.8 mm
% Ground Cover	ASTM D6567 ¹	99%	99%
Water Holding Capacity	ASTM D7367	1500%	1500%
Flexural Rigidity (wet)	ASTM D6575	0.138 oz-in	10,000 mg-cm
Cure Time	Observed	< 2 hr	< 2 hr
Color (fugitive dye)	Observed	Green	Green
ENDURANCE			
Functional Longevity ²	Observed	≤ 18 months	≤ 18 months
PERFORMANCE			
Cover Factor ³ (6 in/hr event)	ASTM D7101 ¹	0.0066	0.0066
% Effectiveness ⁴	ASTM D7101 ¹	≥ 99%	≥ 99%
Cover Factor ³	Large Scale ⁵	≤ 0.01	≤ 0.01
% Effectiveness ⁴	Large Scale ⁵	≥ 99.0%	≥ 99.0%
Shear Stress	ASTM D7207 ¹	1 lb/ft ²	48 Pa
Vegetation Establishment	ASTM D7322 ¹	800%	800%

1. ASTM test methods developed for Rolled Erosion Control Products and have been modified to accommodate hydraulically applied erosion control products.
2. Functional longevity is an estimate of product functionality and is dependent upon moisture, light, microbial and other environmental conditions.
3. Cover Factor is calculated as soil loss ratio of treated surface versus an untreated control surface.
4. % Effectiveness = One minus Cover Factor multiplied by 100%.
5. Large scale testing conducted at Utah Water Research Laboratory, San Diego State University/Soil Research Laboratory, Texas Transportation Institute and TRU/Environmental, Inc. For specific testing information please contact a Profile technical service representative at 866-325-6262.

EXECUTION

3.01 SUBSTRATE AND SEEDBED PREPARATION

- A. Examine substrates and conditions where materials will be applied. Apply product to geotechnically stable slopes that have been designed and constructed to divert runoff away from the face of the slope. Do not proceed with installation until satisfactory conditions are established.
- B. Depending upon project sequencing and intended application, prepare seedbed in compliance with Section 1.01 B.

3.02 INSTALLATION

- A. Strictly comply with Manufacturer's installation instructions and recommendations. Use approved hydro-spraying machines with fan-type nozzle (50-degree tip) whenever possible to achieve best soil coverage. Apply FGM from opposing directions to assure 100% soil surface coverage. Slope interruption devices or water diversion techniques are recommended when slope lengths exceed 75 ft (23 m).
- B. Erosion Control and Revegetation: For maximum performance, apply FGM in a two-step process:
- Step One: Apply fertilizer, other soil amendments and 50% of seed with a small amount of FGM for visual metering.
- Step Two: Mix balance of seed and apply FGM at a rate of 50 lb per 125 gallons (23 kg/475 liters) of water over freshly seeded surfaces. Confirm loading rates with equipment manufacturer. Do not leave seeded surfaces unprotected, especially if precipitation is imminent.

Depending upon site conditions FGM may be applied in a one-step process where all components may be mixed together in single tank loads. Consult with Manufacturer for further details.

- C. Mixing: A mechanically agitated hydraulic application machine is recommended:
- i. Fill tank to middle of agitator shaft or tank about 1/3 full of water. Turn on pump to wet or purge lines. Begin agitating. Keep adding water slowly while adding the FGM at a steady rate.
 - ii. Consult application and loading charts to determine number of bags to be added. Mix at a rate of 50 lb of FGM per 125 gallons (23 kg/475 liters). Contact Equipment manufacturer to confirm optimum mixing rates.
 - iii. All FGM should be loaded when the tank is approximately 3/4 full.
 - iv. Fertilizer should be added once the tank is nearly full.
 - v. Before applying, mix the slurry for at least 10 minutes after adding the last amount of FGM. This is very important to fully activate the bonding additives and to attain proper viscosity.
 - vi. Turn off recirculation valve to minimize potential for air entrainment within the slurry.

3.03 CLEANING AND PROTECTION

- A. Clean spills promptly. Advise owner of methods for protection of treated areas. Do not allow treated areas to be trafficked or subjected to grazing.

An electronic text file of this CSI formatted specification can be obtained by contacting a technical service representative at 866-325-6262.

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