



August 1, 2017

Mr. Rob Young  
Northeast Region Environmental Protection Specialist  
Colorado Oil and Gas Conservation Commission  
1120 Lincoln Street, Suite 801  
Denver, CO 80203

**RE: Miller Rediess 1A; Remediation Project**

Mr. Young;

Lesair Environmental, Inc. (Lesair) submits this remediation plan for the potential salt impacted soil near the Miller Rediess 1A on behalf of our client, PADCO. This remediation plan is to address the salt impacted soil associated with COGCC document number 678200383. The facility is located in the SESE of Section 23, T3N, R54W of Washington County Colorado.

The areas of concern are outlined in the attached diagrams and labeled as 7C, 4B, and 5B (corresponding to the sample locations).

**Overview**

The Miller Rediess 1A production facility has nearby land surfaces that appear to be potentially impacted from historic produced water releases. The potentially impacted land surfaces are void of vegetation, have EC values ranging from 3.4 – 10.6 mmhos/cm, Sodium Absorption Ratios (SAR) of 3.3 – 11.4, and pH values of 9.4 – 10. See attached Sample Analysis Summary table.

It should be noted that there are numerous nearby areas, ranging from 0.25 to 1.5 miles West of the Miller Rediess, that exhibit similar visual characteristics to the potentially impacted areas (see attached diagram). A common characteristic, besides lack of vegetation, is the alkaline nature of the soil (high pH). The EC and SAR values of these areas range from 1.7 to 7.9 and 1.6 to 6.7 respectively. Sampling from several different control areas indicated soils with alkaline characteristics (pH 8.6 – 9.6) but with EC and SAR values less than 1.

PADCO proposes to focus remediation efforts immediately adjacent to the Miller Rediess produced water impoundment and two (2) areas approximately 600 feet West (total area of approximately 1 acre). The soil is comprised of clayey/silty soil and the terrain associated with the remediation area is flat, with slight depressions associated with the potentially impacted areas.

**Action Plan**

1. Plow affected areas in cross pattern
2. Incorporate gypsum, mulch, compost
  - a. Apply gypsum at ~8 lbs/100ft
    - i. 4,000 lbs total
  - b. Apply mulch material (straw) based on a coverage of ~4”
    - i. approximately 33 tons
  - c. Apply organic fertilizer based on a coverage of ~1”
    - i. Approximately 4,000 ft<sup>3</sup>

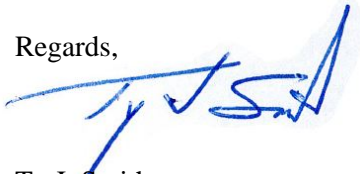
3. Pulse Flood areas with clean water
  - a. Three (3) 500 bbl treatments approximately 1 week apart
  - b. Approximately 1,500 bbls total
  - c. Monitor EC before each treatment
4. Check soil conditions for EC, SAR, and pH
5. If soil indicates acceptability, seed with alkaline mix native grass seed
  - a. Seed between November and May
  - b. Seed Mix
    - i. (25%) Western Wheatgrass
    - ii. (20%) Alkaligrass
    - iii. (20%) Alkali Sacaton
    - iv. (10%) Blue Grama
    - v. (10%) Bottlebrush Squirrealtail
    - vi. (10%) Galleta
    - vii. (5%) Inland Saltgrass

This remediation plan has been designed to flush the salt impacted soil areas, driving the salinity to below the root zone. Then condition the soil to improve the alkaline soil characteristics to facilitate vegetation growth. PADCO proposes to seed plant the area with a seed mix that is salt/alkaline tolerant in an attempt to improve vegetation growth.

PADCO and Lesair Environmental believe that this remediation plan should have a positive impact on the remediation of this potential soil impacted area. PADCO would like to get COGCC approval to move forward with this plan and would be interested in discussing this project with you at your convenience.

If you have any questions or concerns regarding this project please contact Dan Richmond (PADCO representative) at [dan@dsrinc.net](mailto:dan@dsrinc.net) or (918) 630-9912 or Ty Smith (Lesair) at [tysmith@lesair.com](mailto:tysmith@lesair.com) or (303) 904-2525.

Regards,



Ty J. Smith  
Sr. Environmental Engineer

enclosures:



### Miller Rediess 1A

Yellow outlined areas denote the suggested remediation areas.

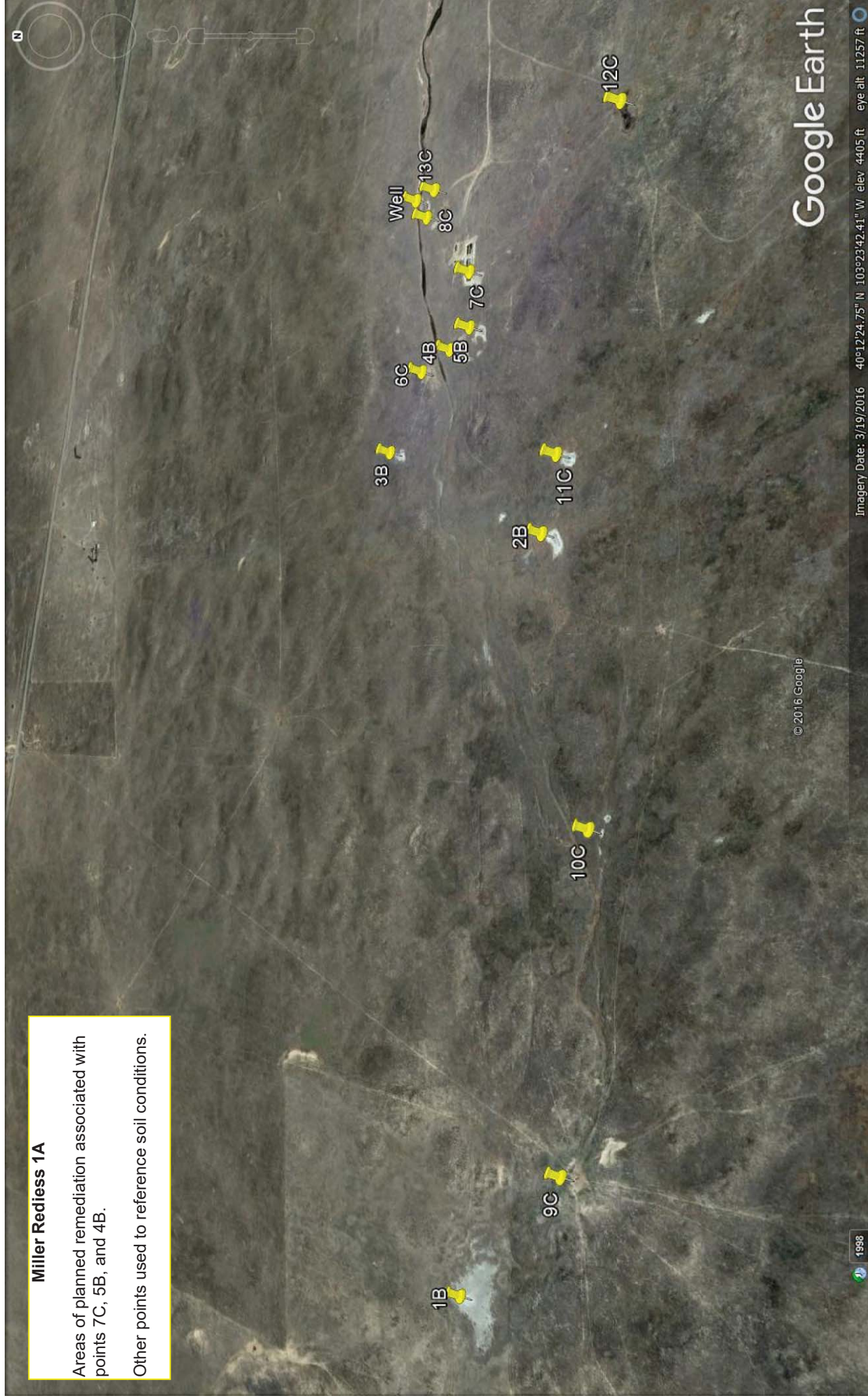




### Miller Rediess 1A

Areas of planned remediation associated with points 7C, 5B, and 4B.

Other points used to reference soil conditions.



**Miller Rediess 1A**  
**Soil Sample Analysis**

Sample Date	Sampled By	Soil Sample	Sample Depth (inches)	Sodium Adsorption Ratio	Specific Conductance (EC)	pH	% Solids	Calcium (mg/kg)	Magnesium (mg/kg)	Sodium (mg/kg)
---	---	Table 910	---	<12	<4 mmhos/cm	6-9	---	---	---	---
UNK	COGCC	SO1	0-4	98.00	2.60	9.77	---	---	---	---
10/25/2016	Lesair	1	6	3.72	3.54	9.72	78.90	15400	5150	2090
10/25/2016	Lesair	2A	6	11.40	10.60	9.97	84.80	8290	1750	4370
2/21/2017	Lesair	1B	6	1.93	1.73	9.98	96.0	3070	1190	498
2/21/2017	Lesair	2B	6	4.58	4.67	10.0	80.3	11800	4440	2300
2/21/2017	Lesair	3B	6	6.7	3.58	9.99	85.7	2360	1890	1800
2/21/2017	Lesair	4B	6	9.69	4.85	9.92	83.7	4070	1290	2770
2/21/2017	Lesair	5B	6	10.1	3.43	9.72	84.5	3740	1280	2810
2/21/2017	Lesair	6C	6	0.585	0.152	8.62	96.3	129	70.1	33.2
2/21/2017	Lesair	7C	6	6.41	5.28	9.85	86.2	8530	2160	2560
2/21/2017	Lesair	8C	6	2.71	2.39	9.65	86.7	2330	1200	646
2/21/2017	Lesair	9C	6	0.472	1.01	9.11	94.7	928	248	62.6
2/21/2017	Lesair	10C	6	2.17	1.74	9.67	87.8	5450	1340	690
2/21/2017	Lesair	11C	6	3.59	7.94	9.78	82.0	7410	6450	1750
2/21/2017	Lesair	12C	6	0.814	1.06	8.90	83.2	676	224	95.6
2/21/2017	Lesair	13C	6	4.45	0.928	9.67	95.0	186	175	352

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---	---	Table 910	---	<12	<4 mmhos/cm	6-9	---	---	---	---
10/25/2016	Lesair	2B	12-18	10.90	7.87	9.76	79.20	11000	3860	5220
2/21/2017	Lesair	1B	18	2.63	2.37	9.79	88.4	5820	2210	928
2/21/2017	Lesair	2B	18	1.57	3.36	10.0	83.5	63000	14400	1680
2/21/2017	Lesair	3B	18	1.93	2.82	9.80	87.4	12500	754	823
2/21/2017	Lesair	4B	18	7.98	4.16	9.44	87.7	2410	850	1790
2/21/2017	Lesair	5B	18	3.25	3.37	9.95	90.5	11400	893	1340

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---	---	Table 910	---	<12	<4 mmhos/cm	6-9	---	---	---	---
10/25/2016	Lesair	2C	24	8.48	5.54	9.72	78.9	13600	2830	4160