Sound Survey

PDC Energy Inc/Caerus Piceance LLC
Metcalf Soil Treatment Facility

OA Project No. 013-0036

760 Horizon Drive, Suite 102 | Grand Junction, CO 81506 | TEL 970.263.7800 | FAX 970.263.7456

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August 22, 2013

Mr. Terry Tracey
Caerus Piceance LLC
120 N Railroad Avenue, Suite D
Parachute, Colorado 81635

Subject: Sound Survey and Analysis – Proposed Metcalf Soil Treatment Facility Garfield County, Colorado

Dear Mr. Tracey

At the request of Caerus Piceance LLC (Caerus) Olsson Associates (Olsson) conducted an initial (pre-installation) sound survey of the proposed equipment associated with the **Metcalf Soil Treatment Facility (MSTF)**, in Garfield County, Colorado. The intent of this survey was to determine compliance with the noise limits set in Colorado Oil and Gas Conservation Commission (COGCC) Rule 802 and Section 25-12-103 of the Colorado Revised Statutes (CRS). The COGCC and CRS limits are the same for general noise measurements. The protocol outlined in COGCC Rule 802 was followed for the execution of this sound survey. Sound measurements were collected using a RION NL-21 sound level meter set to collect general noise measurements (A-weighted or dB(A)). The primary focus of this noise survey and analysis is to assess the potential sound impacts from daylight operation of the pugmill during soil remediation at the Metcalf facility.

Sound Survey

This survey was conducted on July 25, 2013 between the hours of 9:30 a.m. and 2:30 p.m. The Rion NL-21 was calibrated at 9:35 a.m. on July 25, 2013 with an Extech external sound level calibrator to 94 dB(A).

The pug mill is intended for transport and use exclusively during daytime hours and will be utilized at multiple facilities. As such, it will not be installed permanently at the proposed MSTF. The noise data for this analysis was collected at a site that provided representative samples closely approximating sound impacts for the proposed use. Additionally, in order to accommodate a potential worst case scenario for noise impacts, the highest average dB(A) value (52.6 dB(A)) was utilized to extrapolate potential impacts at the proposed property boundary (Figure 2).

A total of three sample locations were selected for noise measurement recording at distances ranging from 140 feet to 350 feet. A map identifying the sampling locations is provided in **Figure NS-1**. Every effort was made to collect data that would reflect the sound impacts of the

pugmill exclusively, but the operation of other mechanized equipment and truck traffic may have contributed to higher dB(A) readings.

A total of 15 measurements were recorded for dB(A), at consecutive 1-minute intervals, for each sample location north, south and west. Wind speeds were below 5 miles per hour during measurement collection. All measurements were collected at a distance of approximately 4 feet from the ground.

The average noise level was calculated for each location using the minute-to-minute recorded measurements. The average noise levels measured at the sample locations were as follows:

- 49.3 dB(A) approximately 140 feet to the north of the pugmill.
- 42.6 dB(A) approximately 350 feet to the west of the pugmill.
- 52.6 dB(A) approximately 281 feet to the south of the pugmill.

The individual measurements for this survey are provided in Figure 1. Figure 2 provides details of the extrapolated noise levels at the property boundary for the proposed facility.

The COGCC daytime noise limit for land that is considered Residential/Agricultural/Rural is 55 dB(A). The calculations to assess the sound impacts at the property boundary have determined the total noise output for the facility will be at or below 50 dB(A). Based on the noise levels measured during this survey and the distances to the property boundaries at the Metcalf location, as shown on Figure DP-1, the noise created by the operation of the pugmill will be in compliance with the applicable rules listed above.

If you have any questions regarding this survey, please contact me at 970-263-7800.

Sincerely,

Olsson Associates

Ken Kreie
Senior Scientist

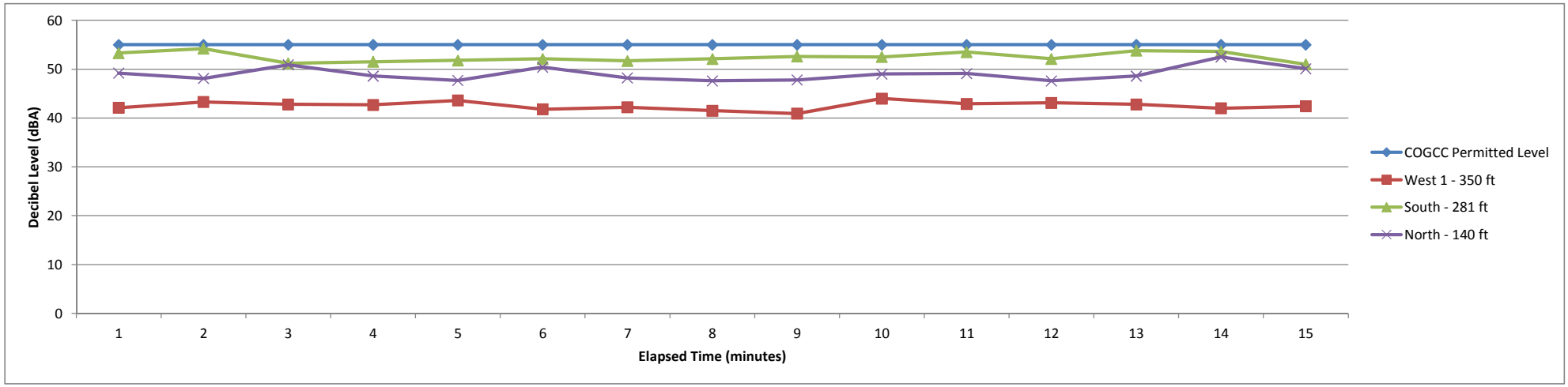
Cc: Project File 013-0036

Figure 1
Metcalf Soil Treatment Facility
PDC Energy/Caerus Piceance

Background Noise Survey - July 25, 2013

Meter Reading (A-weighting)

1 Minute Leq Measurement Location	Location Code	Collection Date	$M1_{1\text{-min}}$ L_A (dB(A))	$M2_{1\text{-min}}$ L_A (dB(A))	$M3_{1\text{-min}}$ L_A (dB(A))	$M4_{1\text{-min}}$ L_A (dB(A))	$M5_{1\text{-min}}$ L_A (dB(A))	$M6_{1\text{-min}}$ L_A (dB(A))	$M7_{1\text{-min}}$ L_A (dB(A))	$M8_{1\text{-min}}$ L_A (dB(A))	$M9_{1\text{-min}}$ L_A (dB(A))	$M10_{1\text{-min}}$ L_A (dB(A))	$M11_{1\text{-min}}$ L_A (dB(A))	$M12_{1\text{-min}}$ L_A (dB(A))	$M13_{1\text{-min}}$ L_A (dB(A))	$M14_{1\text{-min}}$ L_A (dB(A))	$M15_{1\text{-min}}$ L_A (dB(A))	Average L_A (dB(A))
COGCC Permitted Level	C01		55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	**55.0**
West 1 - 350 ft	W01	7/25/2013	42.1	43.3	42.8	42.7	43.6	41.8	42.2	41.5	40.9	44	42.9	43.1	42.8	42	42.4	**42.6**
South - 281 ft	S01	7/25/2013	53.3	54.2	51.2	51.5	51.8	52.1	51.7	52.1	52.6	52.5	53.5	52.1	53.8	53.6	51.0	**52.6**
North - 140 ft	N01	7/25/2013	49.2	48.1	50.9	48.6	47.7	50.4	48.2	47.6	47.8	49.0	49.1	47.6	48.6	52.5	50.1	**49.3**



Notes:

- No recordable wind speeds during survey.
- Attenuated noise distance is estimated to the property line to ensure compliance with the Colorado Noise Statute (25-12-103).

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Figure 2
Metcalf Soil Treatment Facility
PDC Energy/Caerus Piceance

Distance Extrapolation Worksheet, Pugmill Impacts

Extrapolation to North 785 ft.	$dB(A)_1$ =	53	dB(A)	*Actual output (dB(A)) from noise source*
	D_1 =	281	ft.	*Measured distance from noise source*
	D_2 =	785	ft.	*Projected distance from noise source to property line*
	$dB(A)_2$ =	**44**	**dB(A)**	***Calculated dB(A) at Property Line***

Extrapolation to West 414 ft.	$dB(A)_1$ =	53	dB(A)	*Actual output (dB(A)) from noise source*
	D_1 =	281	ft.	*Measured distance from noise source*
	D_2 =	414	ft.	*Projected distance from noise source to property line*
	$dB(A)_2$ =	**49**	**dB(A)**	***Calculated dB(A) at Property Line***

Extrapolation to South 523 ft.	$dB(A)_1$ =	53	dB(A)	*Actual output (dB(A)) from noise source*
	D_1 =	281	ft.	*Measured distance from noise source*
	D_2 =	523	ft.	*Projected distance from noise source to property line*
	$dB(A)_2$ =	**47**	**dB(A)**	***Calculated dB(A) at Property Line***

Extrapolation to East 396 ft.	$dB(A)_1$ =	53	dB(A)	*Actual output (dB(A)) from noise source*
	D_1 =	281	ft.	*Measured distance from noise source*
	D_2 =	396	ft.	*Projected distance from noise source to property line*
	$dB(A)_2$ =	**50**	**dB(A)**	***Calculated dB(A) at Property Line***

as publlished in COGCC Rule 802.c.(1) $dB(A)_{Distance\ 2} = dB(A)_{Distance\ 1} - 20 \times \log_{10}(Distance_2/Distance_1)$

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Aerial Source: 2011 NAIP Aerial Photograph, Rio Blanco County

Legend

- GPS Points
- Noise Lines

0 100 200 400 Feet

N W E S

PROJECT NO:	013-0036
DRAWN BY:	Jenna Muhlbach
DATE:	8/21/2013

NOISE STUDY MAP
PDC ENERGY
METCALF SOIL TREATMENT FACILITY

OLSSON ASSOCIATES
760 HORIZON DRIVE, SUITE 102
GRAND JUNCTION, CO 81505
TEL 970.263.7800
FAX 970.263.7456

FIGURE

NS - 1

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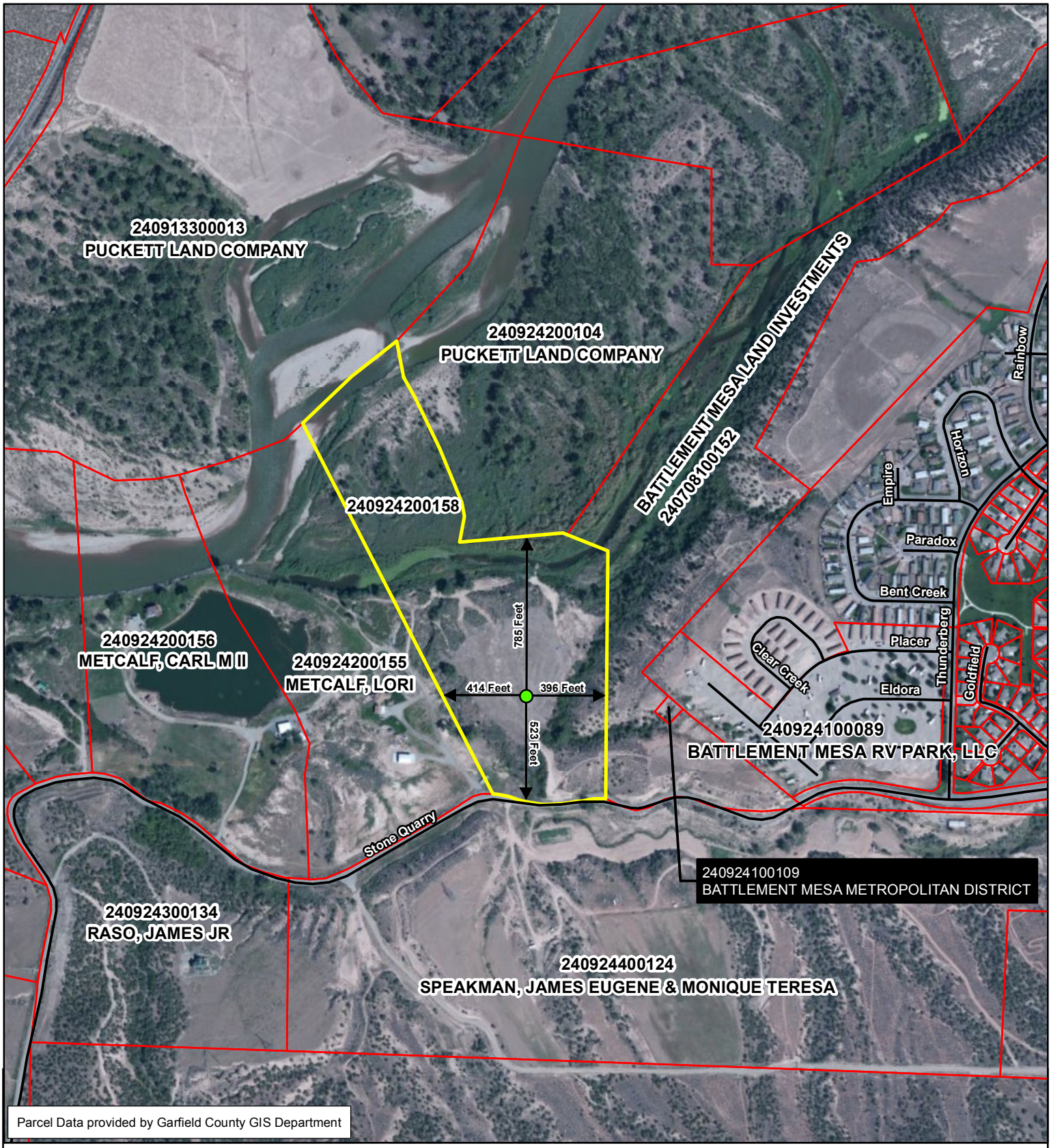

Legend

- Affected Parcel
- Parcels
- Highway/Interstate
- County Roads

0 325 650 1,300 Feet

N W E S

PROJECT NO:	013-0036
DRAWN BY:	Jenna Muhlbach
DATE:	7/26/2013

DISTANCES TO PARCELS MAP
PDC ENERGY
METCALF SOIL TREATMENT FACILITY
GARFIELD COUNTY, COLORADO

OLSSON ASSOCIATES
760 HORIZON DRIVE, SUITE 102
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FIGURE

DP - 1

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