

## Dave Kubeczko - DNR

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**From:** Dave Kubeczko - DNR  
**Sent:** Monday, May 09, 2016 9:14 AM  
**To:** Dave Kubeczko  
**Subject:** FW: Anderson C2 / C3 Noise Evaluation  
**Attachments:** Seibel A2 Noise Survey FINAL.PDF

Scan No. 2107813 NOISE EVALUATION AND MITIGATION INFORMATION 2A#400950178

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**From:** Azulai, Naomi [mailto:[Naomi.Azulai@bp.com](mailto:Naomi.Azulai@bp.com)]  
**Sent:** Thursday, April 14, 2016 2:44 PM  
**To:** Dave Kubeczko - DNR  
**Subject:** Anderson C2 / C3 Noise Evaluation

Dave,

Per your request from our phone conversations earlier this week, I am providing information and data regarding the anticipated noise levels near the Anderson C 2 and C 3 site during the drilling operations. The landowner has the option of staying in a hotel during the drilling and completion operations at BP's expense. The closest adjacent landowner has already been generously compensated specifically for visual and noise mitigation. The next closest occupied structure is approximately 722' away, and after that, the next closest occupied structure is about 888' away from where the operations are planned (as shown on the 1000' Buffer Zone Measurements Exhibit submitted with the Form 2A).

Drilling operations are anticipated to last a total of five to seven days of 24hr operations for the pad (two to three days for each of the two wells). Frac operations are anticipated to last one to two days total for the site. Other completions operations take place only between 7am and 7pm. Completions operations last approximately 14 days of intermittent work of which the completions rig is present for about 4 days per well.

Per COGCC Rule 802, "the use of a drilling rig, completion rig, workover rig, or stimulation is subject to the maximum permissible noise levels for industrial zones." The attached report shows the noise produced by the rig stays within these limits specified in the rule. In addition, the calculation below reflects an extrapolated estimate of the noise levels that would be experienced at the occupied structures located at about 722' and 888' away. The rig used on the wells in the attached report is the same or similar to the rig planned for the Andersons C2 and C3 drilling.

$$\text{db[A] DISTANCE 2} = \text{db[A] DISTANCE 1} - 20 \log_{10}[\text{distance 2} / \text{distance 1}]$$

$$\text{db[A] @ 722'} = 64.15\text{db (from survey)} - 20 \log_{10}[722' / 350'] = 57.86 \text{ db}$$

$$\text{db[A] @ 888'} = 64.15\text{db (from survey)} - 20 \log_{10}[888' / 350'] = 56.06 \text{ db}$$

Attached to this email is the Noise Level Survey from the Seibel A2 by LTE.

I am working on the BMPs that you have requested and will follow up shortly with an additional email.

**Naomi Azulai**  
Well Permitting Analyst  
BP L48  
Tel: 970.375.7511  
[Naomi.Azulai@bp.com](mailto:Naomi.Azulai@bp.com)

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October 23, 2015

Mr. Tankard Floyd  
Field Environmental Advisor  
San Juan Basin  
BP America Production Company  
380 Airport Road  
Durango, Colorado 81301

**RE: Noise Level Survey  
Drilling Operations  
Seibel A2  
BP America Production Company  
Archuleta County, Colorado**

Dear Mr. Floyd:

LT Environmental, Inc. (LTE) was retained by BP America Production Company (BP) to conduct a noise level survey during drilling operations at the Seibel A2 natural gas well (Site) in Archuleta County, Colorado (Figure 1). The purpose of the survey was to determine representative noise levels for current and future drilling projects. As a reference, LTE compared the measured noise levels to noise abatement rules set forth in the Colorado Oil and Gas Conservation Commission (COGCC) 800 series regulations. The Site is located southeast of the town of Arboles and is accessed from the north side of San Juan Marina Road, approximately 1,000 feet west of the Navajo Reservoir. The scope of work consisted of area sound level monitoring to measure the volume of decibels (dB) emitted during drilling operations at the Site.

## **METHODS**

On October 12, 2015, LTE recorded noise levels per COGCC 800 series regulations during active drilling at the Site. A Quest sound level meter was used for the measurements. The sound level meter was calibrated prior to data acquisition. Measurements were taken at a distance of 350 feet from the source in each cardinal direction (North, East, South, and West) (Figure 2). Measurement locations are depicted in Figure 2. A measurement was recorded every minute for a 15-minute period for the A frequency band, slow response; and the C frequency band, slow response. These readings were averaged to determine the sound level compared to the COGCC rules. Wind speed measurements were collected using a Kestrel 1000 Pocket Wind Meter and were recorded at the same time interval as sound measurements. An initial survey was conducted from 7:30 a.m. until 8:45 a.m., followed by a duplicate survey that occurred from 9:55 a.m. until 11:15 a.m. Temperatures during the initial survey ranged from 42 degrees Fahrenheit (<sup>0</sup>F) to 49 <sup>0</sup>F. Temperatures ranged from 55 <sup>0</sup>F to 67 <sup>0</sup>F during the duplicate survey. The purpose of the duplicate survey was to demonstrate repeatability and investigate potential changes based on temperature.



## RESULTS

Wind was less than 5 miles per hour and no precipitation was observed at the time of the noise survey. The average A frequency, B frequency, and wind speed measurements over the 15-minute period for the initial 350-foot distance and duplicate surveys are summarized in Table 1. Raw data for the 350 foot distance survey and the duplicate survey are presented in Tables 2 and 3, respectively. Please note that the C frequency range can be highly affected with minimal wind (defined as greater than 5 miles per hour).

Average A frequency levels were compared to the COGCC compliance level for light industrial zones (70 dB 7:00 a.m. – 7:00 p.m.). Based on the values measured, the A frequency compliance level for light industrial zones was not exceeded in any cardinal direction during the initial 350-foot distance survey, or during the duplicate survey. Average C frequency levels were compared against the COGCC enforceable level of 65 dB, as stated in the series 800 rules, section 2.d. Based on the values measured, the allowable 65 dB level was exceeded in all cardinal directions for the C frequency range during both the initial 350-foot distance survey and the duplicate survey. It should be noted that the 65 dB level for C frequency only applies if there is a receptor in close proximity to the source. It should be noted that residences exist approximately 625 feet east of the Site and approximately 1,500 feet northwest of the Site. No other exceedances were observed during the noise survey.

LTE has performed the tasks set forth above in a thorough and professional manner consistent with industry standards. The data generated during this noise survey are only representative of the operations at the conditions during which LTE was on Site. If additional changes are made to the drilling program, additional monitoring will be required to adequately characterize the noise impact. LTE cannot guarantee and does not warrant that the observations made revealed all adverse environmental, health, or safety conditions affecting the Site. Nor can LTE warrant that the observations and opinions requested will satisfy the dictates of or provide a legal defense in connection with any environmental law or regulation.

We look forward to working with you in the future. Please contact us at 303-433-9788 if you have any additional questions.

Sincerely,

LT ENVIRONMENTAL, INC.

A blue ink signature of Sean Strong, written in a cursive style.

Sean Strong  
Project Environmental Scientist

A blue ink signature of Ashley L. Ager, written in a cursive style.

Ashley L. Ager  
Senior Geologist/Office Manager



#### Attachments

Figure 1	Site Location Map
Figure 2	Site Map
Table 1	Average Sound Level Measurements
Table 2	Sound Level Measurements – 350 Foot Distance
Table 3	Sound Level Measurements – Duplicate Survey

## FIGURES



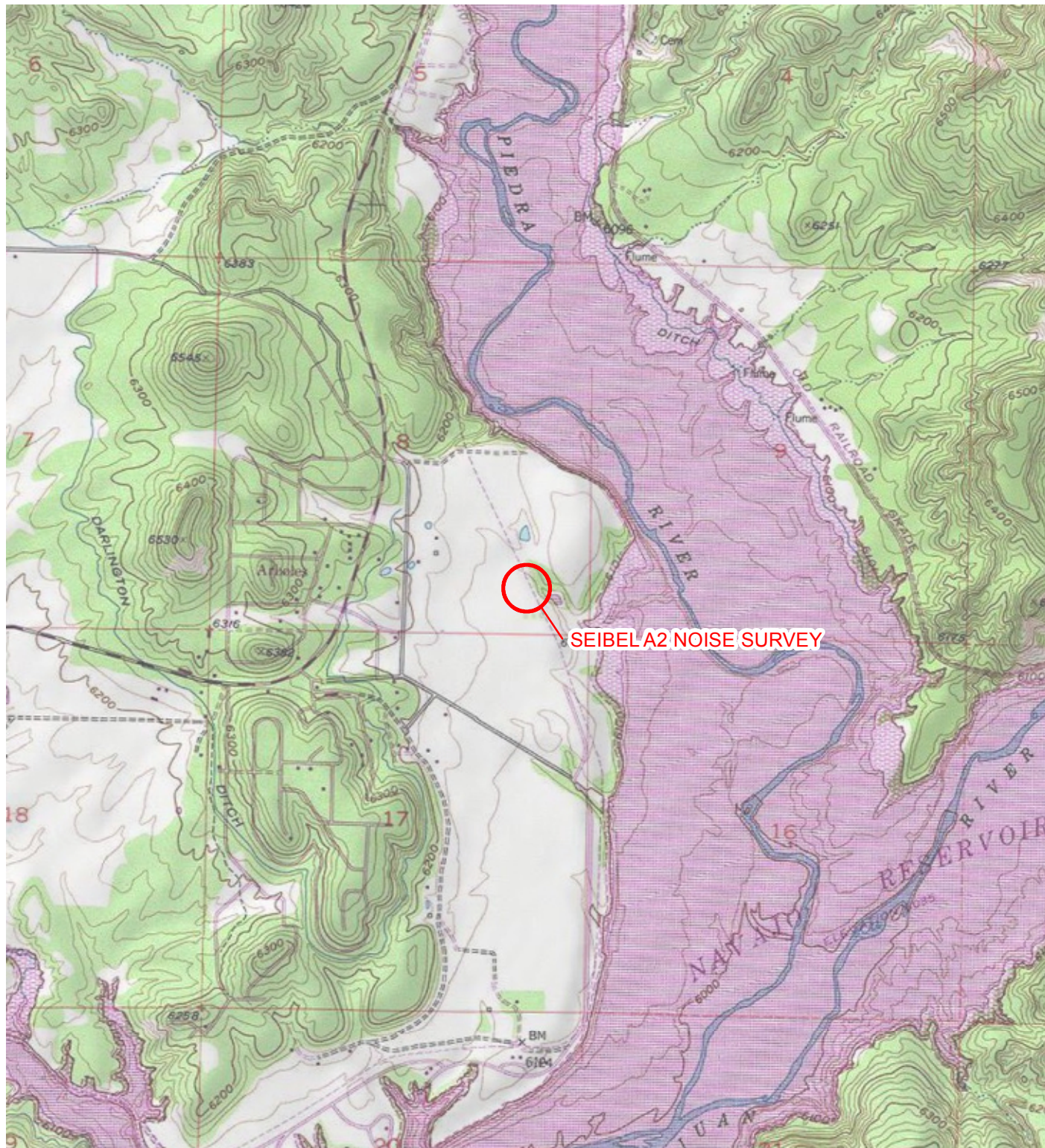


IMAGE COURTESY OF ESRI/USGS

# LEGEND

○ SITE LOCATION

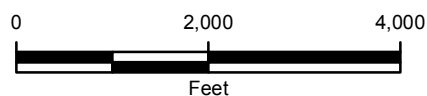


FIGURE 1  
SITE LOCATION MAP  
SEIBEL A2 NOISE SURVEY  
ARCHULETA COUNTY, COLORADO

BP AMERICA PRODUCTION COMPANY







IMAGE COURTESY OF ESRI

## LEGEND

- SAMPLE LOCATION
- WELLHEAD

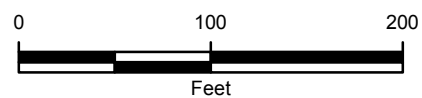


FIGURE 2  
SITE MAP  
SEIBEL A2 NOISE SURVEY  
ARCHULETA COUNTY, COLORADO

BP AMERICA PRODUCTION COMPANY





## TABLES

**TABLE 1**  
**AVERAGE SOUND LEVEL MEASUREMENTS**  
**350 FOOT DISTANCE & DUPLICATE SURVEYS**  
**SEIBEL A2**  
**ARCHULETA, COLORADO**  
**BP AMERICA PRODUCTION COMPANY**

		North	West	South	East	COGCC Compliance Level
350 Foot Distance Survey	Average A Frequency (dB)	60.42	62.39	64.15	58.53	70
	Average	73.16	70.55	79.77	72.47	65*
	Average Wind Speed (mph)	0.09	1.19	2.63	0.62	N/A
Duplicate Survey	Average A Frequency (dB)	60.61	62.73	63.40	58.24	70
	Average C Frequency (dB)	73.71	76.13	79.43	73.23	65*
	Average Wind Speed (mph)	0.95	2.54	0.73	0.82	N/A

**Notes:**

COGCC - Colorado Oil and Gas Conservation Commission

dB - decibels

mph - miles per hour

\* Compliance to this level only applies if there is a receptor in close proximity

N/A - not applicable



**TABLE 2**  
**SOUND LEVEL MEASUREMENTS**

**350 FOOT DISTANCE**  
**SEIBEL A2**  
**ARCHULETA COUNTY, COLORADO**  
**BP AMERICA PRODUCTION COMPANY**

North				East			
Time	A(dB)	C(dB)	Wind Speed (mph)	Time	A(dB)	C(dB)	Wind Speed (mph)
7:31	58.3	72.8	0.0	8:31	58.3	71.9	0.0
7:32	59.3	72.1	0.0	8:32	57.6	73.8	0.0
7:33	60.0	74.4	0.0	8:33	59.0	74.1	2.0
7:34	61.0	72.3	0.0	8:34	57.2	72.8	0.6
7:35	62.5	73.6	0.0	8:35	60.0	73.0	0.0
7:36	62.0	73.1	1.3	8:36	61.1	73.3	0.0
7:37	55.6	75.0	0.0	8:37	59.5	71.4	1.5
7:38	58.8	73.0	0.0	8:38	57.6	71.5	0.0
7:39	60.5	73.0	0.0	8:39	58.5	71.8	1.1
7:40	61.7	72.9	0.0	8:40	56.3	73.2	0.8
7:41	62.5	73.6	0.0	8:41	57.1	71.2	0.0
7:42	59.8	72.5	0.0	8:42	57.2	71.5	1.5
7:43	62.8	72.9	0.0	8:43	60.0	72.1	0.0
7:44	60.1	73.7	0.0	8:44	61.1	73.3	0.7
7:45	61.5	72.5	0.0	8:45	57.4	72.1	1.1
<b>AVERAGE</b>	60.42	73.16	0.09	<b>AVERAGE</b>	58.53	72.47	0.62

South				West			
Time	A(dB)	C(dB)	Wind Speed (mph)	Time	A(dB)	C(dB)	Wind Speed (mph)
8:11	62.0	80.4	3.1	7:51	60.8	69.1	0.0
8:12	62.3	80.2	4.0	7:52	60.9	70.7	0.0
8:13	65.1	80.5	3.1	7:53	63.7	71.2	2.8
8:14	62.4	79.3	2.2	7:54	64.1	69.0	1.9
8:15	72.6	79.2	1.9	7:55	61.8	68.7	2.0
8:16	63.4	79.3	2.9	7:56	63.2	71.7	2.5
8:17	62.0	80.4	3.6	7:57	61.7	71.0	0.8
8:18	59.8	80.0	2.3	7:58	61.8	71.3	0.9
8:19	65.2	79.6	2.6	7:59	62.0	73.0	0.0
8:20	64.5	79.4	2.1	8:00	64.4	71.3	0.0
8:21	67.2	79.1	2.5	8:01	61.8	73.0	0.0
8:22	63.2	79.6	2.7	8:02	63.1	68.6	0.8
8:23	65.1	80.1	2.1	8:03	61.8	71.4	3.0
8:24	62.4	79.9	2.5	8:04	61.7	69.8	1.5
8:25	65.1	79.6	1.9	8:05	63.1	68.5	1.7
<b>AVERAGE</b>	64.15	79.77	2.63	<b>AVERAGE</b>	62.39	70.55	1.19

**Notes:**

dB - decibels

mph - miles per hour



**TABLE 3**  
**SOUND LEVEL MEASUREMENTS**

**DUPLICATE SURVEY**  
**SEIBEL A2**  
**ARCHULETA COUNTY, COLORADO**  
**BP AMERICA PRODUCTION COMPANY**

North				East			
Time	A(dB)	C(dB)	Wind Speed (mph)	Time	A(dB)	C(dB)	Wind Speed (mph)
9:56	59.3	72.0	2.6	11:01	57.9	74.3	0.0
9:57	59.4	75.7	0.0	11:02	56.8	72.6	1.2
9:58	60.0	72.9	0.0	11:03	57.4	73.8	0.0
9:59	61.0	75.1	0.0	11:04	58.5	73.5	0.8
10:00	60.1	72.2	0.0	11:05	57.4	74.1	1.2
10:01	63.5	76.2	0.0	11:06	57.6	73.7	0.7
10:02	60.0	72.0	0.8	11:07	58.3	73.8	0.9
10:03	62.5	72.5	3.0	11:08	59.0	71.6	0.7
10:04	62.0	73.9	1.4	11:09	58.2	72.6	0.3
10:05	55.6	70.3	2.5	11:10	57.6	73.0	1.2
10:06	61.0	74.6	1.7	11:11	57.1	73.3	1.0
10:07	58.8	75.1	0.8	11:12	57.2	72.7	0.8
10:08	60.5	75.3	0.0	11:13	60.0	73.2	1.2
10:09	62.7	74.3	0.7	11:14	61.1	73.4	1.1
10:10	61.0	73.5	0.8	11:15	59.5	72.9	1.2
<b>AVERAGE</b>	60.61	73.71	0.95	<b>AVERAGE</b>	58.24	73.23	0.82

South				West			
Time	A(dB)	C(dB)	Wind Speed (mph)	Time	A(dB)	C(dB)	Wind Speed (mph)
10:36	61.9	80.4	1.9	10:16	63.2	76.0	0.6
10:37	63.2	80.1	0.0	10:17	63.1	75.5	0.0
10:38	64.4	79.9	0.0	10:18	65.5	76.4	1.3
10:39	62.3	80.1	0.0	10:19	61.7	75.8	12.0
10:40	63.7	79.5	0.0	10:20	60.8	77.1	1.6
10:41	64.5	80.2	0.5	10:21	64.4	76.9	2.0
10:42	64.4	80.0	0.0	10:22	61.7	75.3	2.0
10:43	62.3	76.3	1.5	10:23	62.6	75.9	4.0
10:44	62.0	79.0	1.1	10:24	61.8	76.3	3.4
10:45	67.2	80.9	0.0	10:25	62.0	77.0	2.0
10:46	65.1	79.4	0.0	10:26	60.9	75.9	0.0
10:47	63.2	80.3	0.5	10:27	63.7	76.1	2.4
10:48	62.4	80.6	1.9	10:28	63.7	76.2	1.8
10:49	63.4	79.1	2.5	10:29	64.1	75.7	2.0
10:50	62.0	75.7	1.0	10:30	61.8	75.8	3.0
<b>AVERAGE</b>	63.40	79.43	0.73	<b>AVERAGE</b>	62.73	76.13	2.54

**Notes:**

dB - decibels

mph - miles per hour

