

Prepared for the Colorado Oil and Gas Conservation Commission

December 9, 2019

Extraction Oil & Gas
Attn: Mr. Jeffrey Rickard
Regulatory Compliance Coordinator
370 17th Street #5300
Denver, Colorado 80202

**RE: Extraction Oil & Gas
 Livingston Padsite
 Livingston – North Noise Monitoring Terminal
 24-Hour Compliance Noise Level Survey & Report
 December 3 - 4, 2019**

Summary: It is ENRG's opinion based on the 24-hour compliance noise level results measured at the Livingston – North Noise Monitoring Terminal from December 3 – 4, 2019, that the COGCC nighttime allowable of 75.0 dBA was met 100% of the time.

Dear Mr. Rickard:

Per your request, ENRG is submitting this 24-hour compliance noise level survey report for the Extraction Oil & Gas Livingston drilling location in the City and County of Broomfield (CCOB), Colorado. This compliance noise level report from Dec 3 – 4, 2019, was prepared to conform to the Colorado Oil & Gas Conservation Commission (COGCC) regulations regarding noise in Ordinance #1R-99 Aesthetic and Noise Control Regulations.

The Livingston padsite is located in the County of Broomfield at approximately Latitude 39.978049 Longitude -105.039407 (Figure 1). According to Google Earth maps and visual observation, the drill site is located west of Lowell Blvd and south of Northwest Pkwy at 15505 Sheridan Parkway in Broomfield County, Colorado (SE ¼, Sec 7, T1S, R68W) within an undeveloped area in the CCOB open lands and public facility district. The surrounding properties are primarily utilized for oil and gas or residential development. Within ¼ mile the well site consists of relatively undisturbed uplands. At the time of the compliance noise level survey, the well pad had been constructed with ongoing drilling activities onsite.

ENRG's Noise Monitoring Terminal (NMT), which is equipped with a Type I Bruel & Kjaer (B&K) 3639-E noise level meter, was calibrated, programmed for decibel (dB) readings and "A" frequency weighting (human ear) and installed at the site by ENRG personnel before 07:00 on Tuesday, December 3, 2019. Monthly calibration is conducted by ENRG to ensure accuracy of the meter. The last calibration was conducted on November 20, 2019. The objective of this compliance noise survey was to measure and document the site's completions operations noise levels until 06:59 on Wednesday, December 4, 2019. The NMT was located approximately 1,000 feet north from the edge of the drilling location and approximately 100 feet south from the nearest protected use property boundary approximately Latitude 39.981658 and Longitude -105.039988. (Figure 1). This location

was previously approved by the CCOB and the COGCC. The NMT was placed where no obstructions were allowed to block the meter from measuring and recording accurate ambient noise levels (Photograph 1).

Conclusions

The results of the 24-hour compliance noise level survey are attached as Figure 2, Figure 3, and Table 1. Figure 2 shows the graphical results of the average of the hourly 24-hour noise levels. Figure 3 indicates the hourly 24-hour dBA averages and maximum hourly wind speed. A summary of the 24-hour hourly noise level averages is shown on Table 1. The Leq results from the compliance noise level survey are summarized below:

24-hour compliance noise level: 60.2 dBA

Pursuant to the COGCC Form 2A Document Number – 401477000, a 72-hour baseline noise survey was conducted from January 18 – 21, 2019. The purpose of the ambient noise level survey was to monitor and record noise levels prior to the construction or installation of any new equipment on the Livingston location. The results are shown below:

72-hour ambient noise level: 58.5 dBA

The noise level allowable for industrial zones per the COGCC Aesthetic and Noise Control Regulations – 802.B is 80.0 dBA for daytime hours and 75.0 dBA for nighttime hours. The 12-hour daytime (07:00 – 18:59) noise level average from December 3 – 4, 2019, measured by ENRG was 61.8 dBA, which is 18.2 dBA below the allowable. The 12-hour nighttime (19:00 – 06:59) noise level average from December 3 – 4, 2019, was 57.4 dBA, which is 17.6 dBA below the allowable. During the 72-hour ambient noise level survey mentioned above, the 36-hour daytime average was 60.1 dBA, while the 36-hour nighttime average was 56.0 dBA. Both the ambient survey and the compliance noise level survey were taken from approximately the same location, as is normal practice for ENRG.

It is ENRG's opinion based on the 24-hour compliance noise level results measured at the Livingston – North Noise Monitoring Terminal from December 3 – 4, 2019, that the COGCC daytime and nighttime allowables of 80 dBA and 75.0 dBA were met 100% of the time as indicated above, as well as, on Table 1, Figure 2, and Figure 3. Please keep in mind that the study takes into account any potential location noise, as well as, any noise from sources surrounding the location including air traffic, highway traffic, and wildlife to name a few. As a reminder, Extraction was performing onsite pre-spud activities during the time of the study.

Please call us direct at the numbers below if you have any questions or comments.

Sincerely,



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**FIGURE 1. EXTRACTION OIL & GAS – LIVINGSTON PADSITE
NOISE MONITORING TERMINAL (NMT) LOCATION
LIVINGSTON - NORTH NMT 502**



**PHOTOGRAPH 1. EXTRACTION OIL & GAS – LIVINGSTON PADSITE
NOISE MONITORING TERMINAL (NMT) LOCATION
LIVINGSTON - NORTH NMT 502**

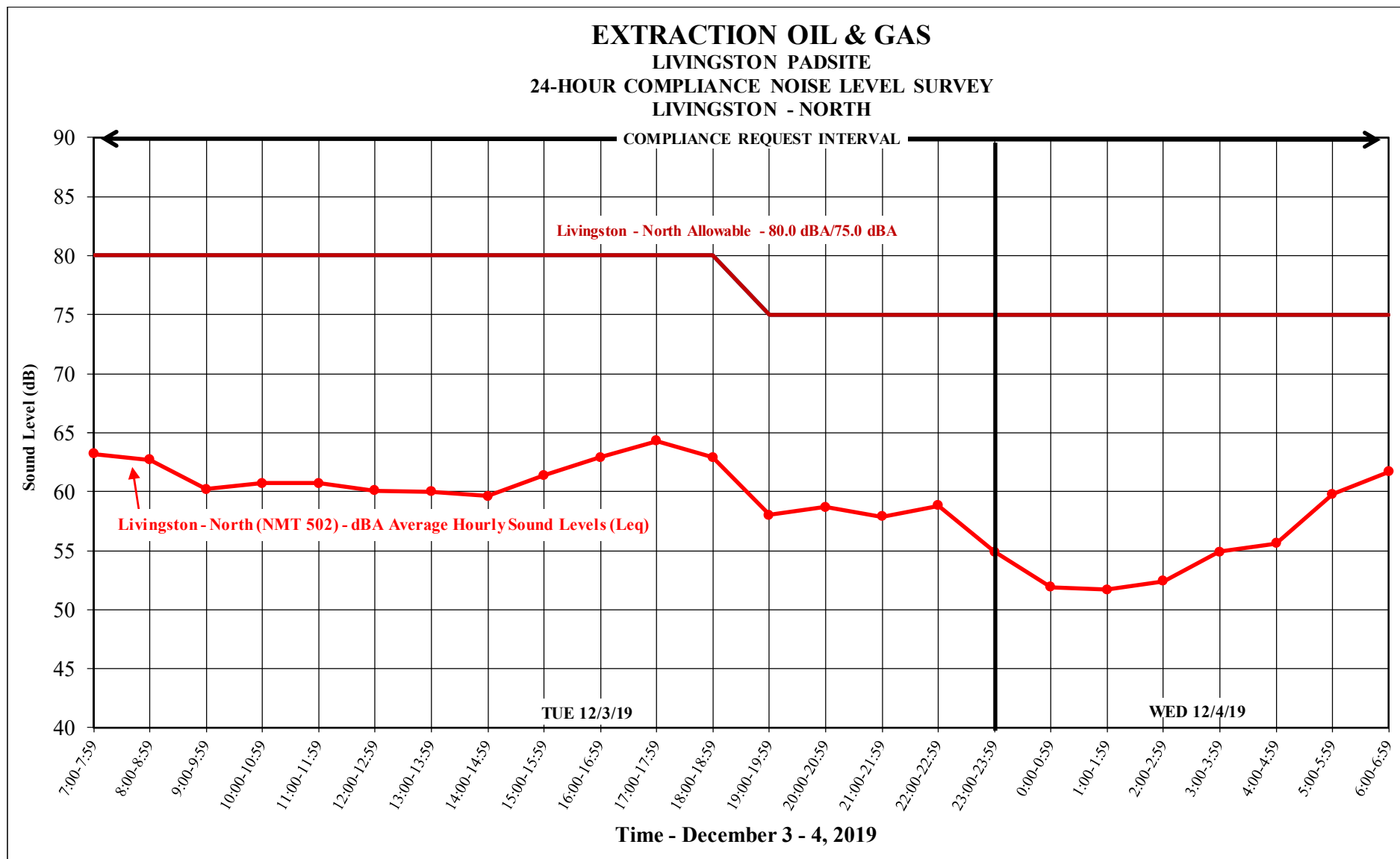
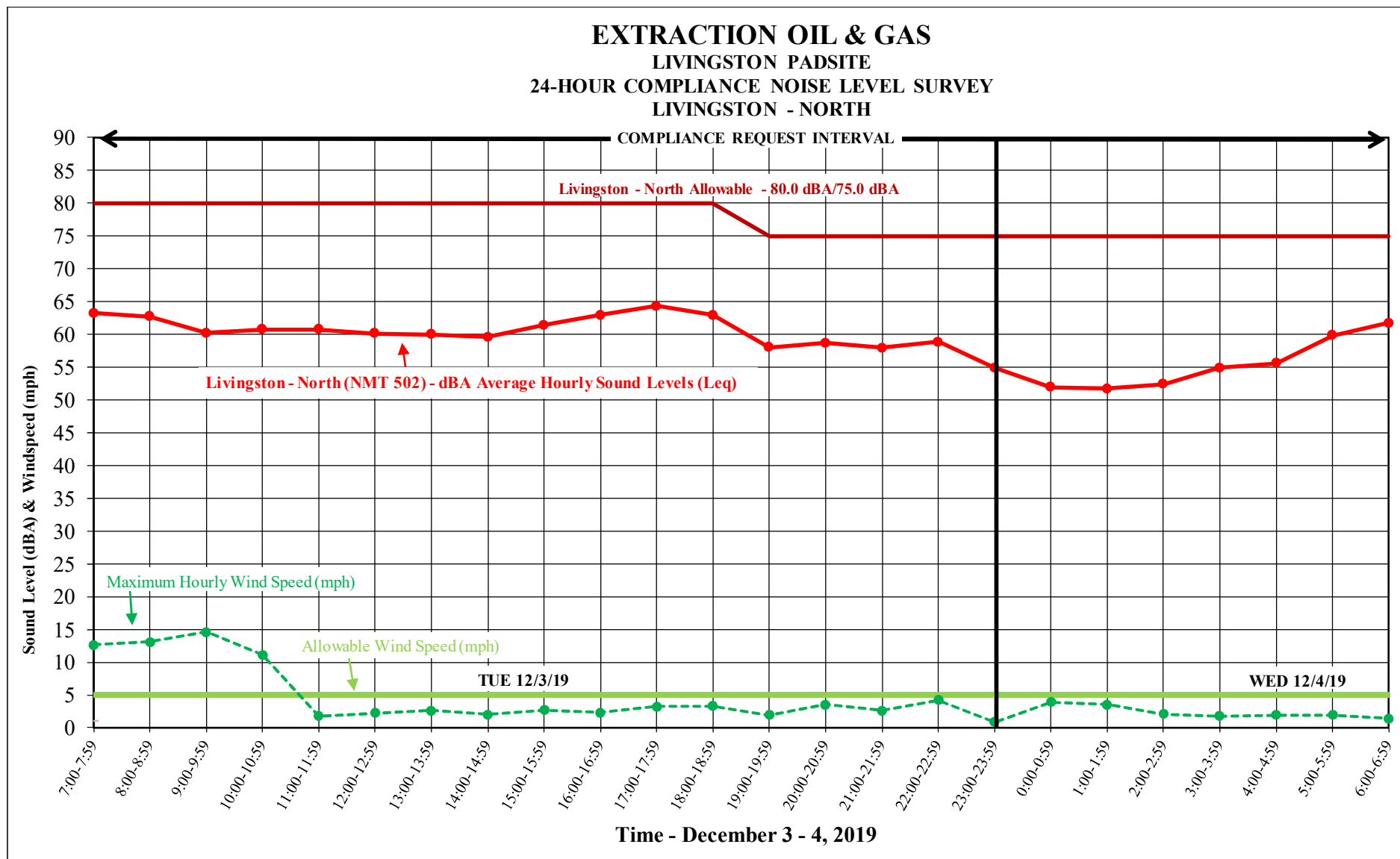


FIGURE 2. EXTRACTION OIL & GAS – LIVINGSTON PADSITE
12 – HOUR COMPLIANCE NOISE LEVEL SURVEY (Leq)
LIVINGSTON - NORTH NMT 502



**FIGURE 3. EXTRACTION OIL & GAS – LIVINGSTON PADSITE
12 – HOUR COMPLIANCE NOISE LEVEL SURVEY (Leq) WITH WIND SPEED
LIVINGSTON - NORTH NMT 502**

**TABLE 1
EXTRACTION OIL & GAS
LIVINGSTON PADSITE
LIVINGSTON - NORTH NMT
24-HOUR NOISE LEVEL AVERAGES
DECEMBER 3 - 4, 2019**

| Time | Average dBA/Hr (Leq) | Minimum dBA/Hr (LAFmin) | Maximum dBA/Hr (LAFmax) | Allowable dBA/Hr (Leq) | |
|-------------|-------------------------|----------------------------|----------------------------|---------------------------|--------------------|
| 7:00-7:59 | 63.2 | 54.3 | 72.9 | 80.0 | Daytime Range |
| 8:00-8:59 | 62.7 | 53.7 | 73.1 | 80.0 | |
| 9:00-9:59 | 60.2 | 45.2 | 68.9 | 80.0 | |
| 10:00-10:59 | 60.7 | 44.9 | 67.9 | 80.0 | |
| 11:00-11:59 | 60.7 | 50.9 | 68.1 | 80.0 | |
| 12:00-12:59 | 60.1 | 44.5 | 68.6 | 80.0 | |
| 13:00-13:59 | 60.0 | 48.2 | 66.6 | 80.0 | |
| 14:00-14:59 | 59.6 | 47.9 | 69.4 | 80.0 | |
| 15:00-15:59 | 61.4 | 49.0 | 68.6 | 80.0 | |
| 16:00-16:59 | 62.9 | 53.1 | 69.7 | 80.0 | |
| 17:00-17:59 | 64.3 | 54.8 | 69.7 | 80.0 | |
| 18:00-18:59 | 62.9 | 50.5 | 69.8 | 80.0 | |
| 19:00-19:59 | 58.0 | 46.9 | 64.9 | 75.0 | Nighttime Range |
| 20:00-20:59 | 58.7 | 48.4 | 65.7 | 75.0 | |
| 21:00-21:59 | 57.9 | 44.9 | 65.6 | 75.0 | |
| 22:00-22:59 | 58.8 | 46.6 | 66.2 | 75.0 | |
| 23:00-23:59 | 54.9 | 40.2 | 65.4 | 75.0 | |
| 0:00-0:59 | 51.9 | 39.1 | 64.2 | 75.0 | |
| 1:00-1:59 | 51.7 | 38.5 | 62.9 | 75.0 | |
| 2:00-2:59 | 52.4 | 40.8 | 64.1 | 75.0 | |
| 3:00-3:59 | 54.9 | 43.9 | 66.5 | 75.0 | |
| 4:00-4:59 | 55.6 | 43.6 | 71.9 | 75.0 | |
| 5:00-5:59 | 59.8 | 51.2 | 66.3 | 75.0 | |
| 6:00-6:59 | 61.7 | 51.3 | 69.8 | 75.0 | |

| | |
|----------------------------|-------------|
| 24-Hr dBA Avg (Leq) | 60.2 |
|----------------------------|-------------|