

Keene Oil Gathering Pipeline Conversion-Noise Study

Public Service Commission Certification of Corridor Compatibility and Route Permit Application

April 16,2018

KOG Booster Pump Skid

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Sound Level Meter

Scope

The purpose of this report is to provide noise level approximations that will be produced by the proposed Keene Oil Gathering (KOG) booster pump skid building located at the Midway Booster Pump Station.

Calculations for estimating sound levels at 100 feet and 200 feet from the buildings will be compared to noise reference levels. Formulas are approved by American Board of Industrial Hygienist. A sound level meter was used to take decibel readings in the A-weighted scale to determine the sound level reduction of the building covering the booster pumps.

Many factors affect sound levels such as wind and terrain. The calculation applied does not account for weather, wind or terrain. These factors generally reduce observation of sound.

Summary

The manufacture’s specification state noise levels of the booster pump is 85 dBA at 1 meter. With two pumps the noise level would reach 88 dBA inside the building. After applying the measured attenuation drop outside noise levels 1.5 ft. from the building are estimated to be at 66 dBA. Noise levels 100 feet from the building are calculated at 30 dBA. Noise levels of 30 dBA would be compared to a “Quiet Rural, Nighttime”.

Back ground noise levels would make the sound undetectable to the sound level meter at 200 feet away from the building. Calculation suggest noise levels would reach the surrounding area at a distance between 100 to 200 feet away from the building. The nearest residence is over a mile away.

Calculated noise levels are comparable to the actual measured values from a comparable booster pump skid. The measured noise level reading is 95 dBA inside the building and 73 dBA outside the building. Using the 73 dBA reading, noise levels would drop to 30 dBA at 200 feet from the building.

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Sampling Method

The noise readings were taken with a 3M / Quest Sound Level Meter.

Serial Number: DAJ040033

Calibration Date: September 1, 2017

Meter Setup: A-weight scale measuring dBA

The readings were taken by holding out the sound level meter 20 inches from the body. A foam cover was used as a wind shield.

Results

A noise level of 30 dBA would be compared to a "Quiet Rural, Nighttime". See the attached loudness comparison chart (dBA). To reach sound level criteria for "Quiet Rural, Nighttime" the following calculations were applied.

Distance is a key factor in sound attenuation. As distance doubles sound levels decrease by 6 dB.

$$\text{Adding dB for the two pump configuration, } L_{pt} = 10 \log \left(\sum_{i=1}^n 10^{\frac{L_{pi}}{10}} \right) = \left(10^{\frac{85 \text{ dB}}{10}} + 10^{\frac{85 \text{ dB}}{10}} \right) = 88.01 \text{ dB}$$

$$\text{Field method for understanding building attenuation, } BA = \text{Measured dBA inside} - \text{Measured dBA outside} \\ = 95 \text{ dBA} - 73 \text{ dBA} = 22 \text{ dBA}$$

$$\text{A-weight Scale} - \text{Sound level outside after applying building attenuation} - 88.01 \text{ dBA} - 22 \text{ dBA} = 66 \text{ dBA}$$

$$\text{Specification, } SPL_2 = SPL_1 + 20 \log \left(\frac{d_1}{d_2} \right) = 66 \text{ dBA} + 20 \log \left(\frac{1.5 \text{ ft}}{100 \text{ ft}} \right) = 30 \text{ dBA}$$

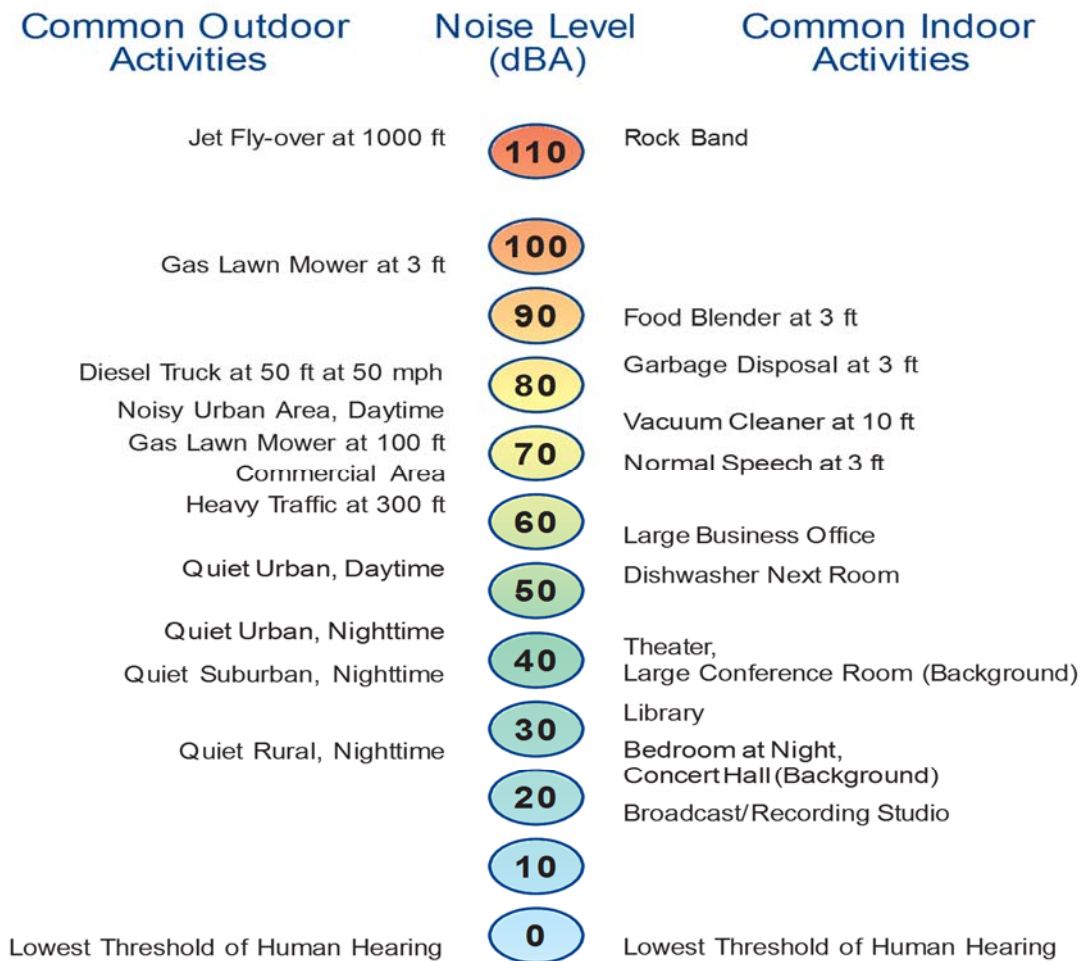
$$\text{Measured @ 73 dBA, } SPL_2 = SPL_1 + 20 \log \left(\frac{d_1}{d_2} \right) = 73 \text{ dBA} + 20 \log \left(\frac{1.5 \text{ ft}}{200 \text{ ft}} \right) = 30 \text{ dBA}$$

Using the 73 dBA readings noise levels would drop to 30 dBA at 200 feet from the pump skid. Applying a pump specification of 66 dBA noise levels would drop to 30 dBA at 100 feet from the pump skid

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LOUDNESS COMPARISON CHART (dBA)



An increase of 3 dBA is barely perceptible to the human ear.

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