

Coal Bed Methane & Integrated Acoustic Building Design

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Introduction

Coal bed methane (CBM) and other tight gas reservoirs require closely spaced wells, thereby increasing landowner proximity. Noise Solutions has developed a CBM compressor integrated acoustic building that enables coal bed methane producers to operate their facilities with minimal acoustic impact on landowners. The design integrates acoustic ventilation, engine exhaust silencing and engine & compressor casing silencing, with easy operational access and transportability. The result is an extremely quiet and compact building that keeps residents happy and ensures smooth operations for coal bed methane producers.

Coal Bed Methane Drive Mechanism

Coal bed methane reservoirs typically consist of methane interstitially bound within the coal matrix. The typical reservoir drive mechanism is migration of the methane through the coal matrix to fractures, then along the fractures to the wellbore. This is an inefficient process, frequently compounded by low reservoir pressures. This situation requires very low wellhead pressures to maximize CBM well flow rates.

CBM Compression Development Approach

Because of the tight reservoir matrix and low pressures, drainage areas for CBM wells can be as 40 acres or less, compared to 640 acres for conventional gas wells. As a result, a typical CBM play could require 16 or more wells per section of land.

The high well density and low flow rates place a lot of pressure on Producers to keep their per-well costs as low as possible to ensure acceptable economics for these plays.

CBM Landowner Issues

CBM development schemes create several landowner environmental issues. There is significant surface disturbance because of the higher well densities. Water disposal is another concern as coal seams frequently require dewatering before commercial gas production can occur.

Noise issues are more common because of the proliferation of compressors, especially when an operator's strategy is to place a compressor at each CBM wellhead. The higher density also means more compressors are close, sometimes very close, to occupied dwellings.

CBM Compression Acoustic Treatment

Noise Solutions has developed an acoustic enclosure for a wellhead-based CBM compressor package that fully encloses both the driver and compressor. Drivers are typically industrial water-glycol cooled car engines. To comply with Canadian Electrical Code Class 1 (Flammable Gases), Division 2 (Contained Hydrocarbons) classifications, a partitioned acoustic building has been developed which keeps the potential vapor releases from the compressor side isolated from the operating engine.

The acoustic building incorporates acoustic insulation enclosed in a perforated liner, mounted on the compressor skid. To minimize costs, the building is extremely compact. Routine engine operating access is accommodated through an acoustic access panel. Compressor and engine servicing is accomplished through a design which enables either side of the building to be opened by a single operator.

Acoustic ventilation is incorporated into both compartments for engine radiator cooling on the driver side and compressor cooling on the process side. The compact style makes the units light and very maneuverable, enabling their relocation from site to site by the operator with no installation or relocation service necessary from the acoustic building manufacturer.

Several of these units have now been deployed in the Alberta oilpatch with impressive results, enabling placement of these units very close to occupied dwellings.

Figure 1 – CBM Acoustic Enclosure

