

Section 6

Oil Batteries, Gas Compressors and Other Facilities



photo: Róberta Franchuk, Pembina Institute

6. Oil Batteries, Gas Compressors and Other Facilities

In previous sections, we looked at the issues that arise with the development of new wells and pipelines. This section will briefly describe batteries, compressor stations, gas processing plants and large production facilities, and outline the regulatory requirements for these facilities. It also provides important questions to ask when a company approaches you to place these facilities on or near your land.

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The AER approval process and many of the issues for batteries, compressors and gas plants are similar to those discussed with respect to wells in Section 4. AER Directive 056: Energy Development Applications and Schedules sets out the requirements that a company must meet, including the consultation or notification of those who may be affected.¹

Batteries, compressors and gas plants go hand in hand with oil and gas wells, and sometimes a company may wish to build these facilities on the wellpad, or nearby as a collection point for other nearby operations. When a company applies for an approval for a facility, they are required to advertise their application and the Alberta Energy Regulator (AER) posts the application on their website. Specific consultation and notification requirements for facilities are noted in Section 2.1.1 .

After the application is submitted to the Regulator, you can file a *statement of concern* to the AER prior to the deadline indicated on the notice of application outlining any concerns you may have with how the project adversely affects you (See Section 2.5 and Section 11.1.3 for more information about submitting a statement of concern).²

Additionally, you should send your concerns directly to the company, although they will be notified of a statement of concern. Normally, the company will contact you and seek to resolve your concerns. If the company resolves your concerns by answering your questions or agreeing to a set of actions then you should contact the AER in writing indicating that you no longer have concerns about the project and what commitments the company has made to you. This may help ensure that the AER is aware of, and incorporates, these commitments in advance of approval of the facility. If the AER grants an approval it will set out requirements with respect to air emissions, handling of waste, protection of *surface water* and *groundwater*, etc. If you disagree with the Regulator’s decision on an application (if it was made without a *hearing*), you can appeal

¹ AER, Directive 056: Energy Development Applications and Schedules (2014), section 5.4 and table 5.1 set out the minimum consultation and notification requirements for facilities. Section 2 of this guide gives the general requirements for participant involvement, with the full process described in Appendix 11. AER Directives are available at AER, “Directives.” <http://www.aer.ca/rules-and-regulations/directives/>

² You have the time limit set out in the Notice of Application to submit your statement of concern, which may be less than 30 days.

the decision. The Regulator has discretion whether it will hear an appeal, and can confirm, vary, suspend, or revoke any of its own decisions.³

If you are involved with a proposal to build a compressor, pumping station or gas processing plant you may wish to consult the Alberta Government’s Code of Practice for Compressors and Pumping Stations and Sweet Gas Processing Plants.⁴ This sets requirements for air pollution control technology to limit emissions of nitrogen oxides, and for the management of wastewater and runoff.⁵

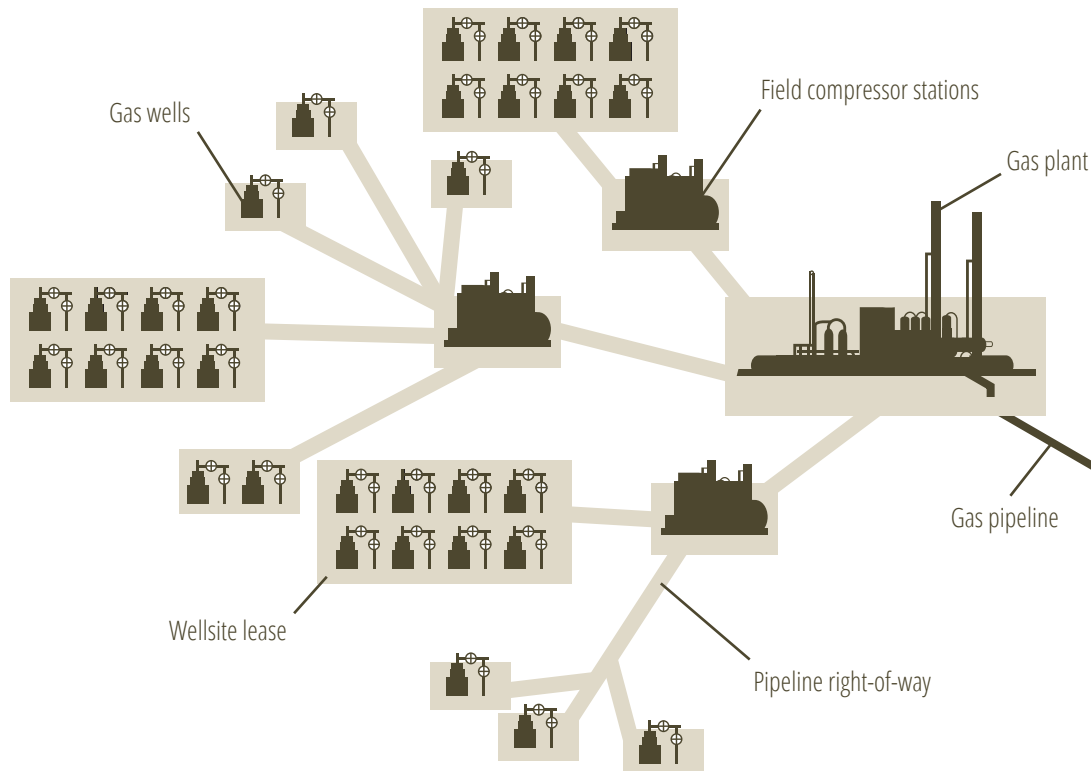


Figure 5. Schematic of well batteries, compressors and plants

³ Alberta, Responsible Energy Development Act, SA 2012 c R-17.3, s 42. Alberta government acts and regulations are available at Alberta Queen’s Printer, “Laws Online/Catalogue.”

http://www.qp.alberta.ca/Laws_Online.cfm

⁴ Alberta, Code of Practice for Compressors and Pumping Stations and Sweet Gas Processing Plants; issued under the Substance Release Regulation (AR 124/93).

<http://www.qp.alberta.ca/documents/codes/COMPRESS.PDF>

⁵ If a facility is not regulated under Alberta’s Environmental Protection and Enhancement Act (RSA 2000, c E-12), it must meet the AER requirements for air emissions.

6.1 Oil and gas batteries

An oil battery is a facility that collects oil from one or more wells and passes it through equipment to separate out the entrained gas, water and other impurities before piping the oil. There may be *flaring* from an oil battery and fugitive emissions/odours from the process and tanks. To prevent any oil leaks from spreading, the site will be surrounded by a berm or other containment equipment and surface water will be collected and tested before it is discharged. In some circumstances *groundwater* may also be monitored.

Information about possible environmental issues with the operation of batteries is dealt with in Section 8. It will be helpful to review this information if a battery is to be built on or near your land.

The AER approval process is similar to that for oil and gas wells, which involves consultation with you as the *landowner* as well as local *residents* prior to submitting an application. The procedures a company must follow are set out in AER Directive 056.⁶ The AER can impose any conditions it considers appropriate on the licence.

As with wells and pipelines, a company is required to inform you of your rights by providing you with the AER information package (Section 2.1). The company must also inform adjacent residents of the proposed development and ensure that all parties understand the nature of the development and the equipment that they intend to use.

If people within the vicinity of the facility have any concerns or if they object to the facility, the company is expected to discuss and seek to resolve the issues, using *Alternative Dispute Resolution (ADR)* mechanisms when needed (Section 2.4). If the concerns cannot be resolved, the company must make a *non-routine application* and provide a written summary of the outstanding concerns/objections so the AER can decide whether to issue an approval or conduct a hearing.⁷ As the *landowner/occupant*, it is useful for you to also advise the AER in writing of your concerns. As explained in Section 2.3, even if a company has asked for a hearing, *negotiations* should continue, using appropriate dispute resolution. Since the hearing process can be slow, can delay a project, and is expensive for a company, the company will likely try to resolve your

⁶ AER, Directive 056, sections 2 and 5.

⁷ AER, Directive 056, section 3.8.2 and Appendix 11 explain the non-routine application process.

concerns/objections before the hearing date. Section 11 explains the AER hearing process.

There were over 24,800 oil and crude bitumen and satellite installations in Alberta in 2012 and over 15,700 gas batteries.⁸

6.2 Compressor stations

In compressor stations, compressors driven by gas or electric engines apply pressure to gas so that it will flow through process units and pipelines. Compressors come in many different sizes and may be located at a wellhead, battery, or gas plant. Long pipelines may also require a series of compressor stations along the line to boost pressure. A compressor may be heated to prevent freezing and condensation.

More compressors may be required for *coalbed methane* (CBM) or hydraulically fractured wells than for conventional oil and gas wells. In a CBM development, gas comes to the surface at lower pressure and may require compression close to the wellhead as well as prior to tying into a trunk pipeline. In *hydraulic fracturing* operations, additional compression is needed to pressurize the fracture fluid to break subsurface rock layers.

You should inquire whether a compressor will be needed on your property, since they can be noisy and are a source of some air pollutants.

The consultation and notification process for compressor stations is similar to that for batteries and the AER requires the company to consult with you as the landowner/occupant as well as nearby residents.⁹

The AER sets standards for acceptable noise levels (Section 8.5). A number of different compressors are available and some are considerably quieter than others. If a compressor is located close to a dwelling or workplace it is important to discuss noise mitigation measures with the company during your negotiation of a lease to ensure that the best technology is used and your considerations are addressed. If the noise is still disturbing, it may be necessary to use a baffle to further reduce the sound.

⁸ Energy Resources Conservation Board, *Field Operations Provincial Summary 2012*, ST57-2013, 7, 8. <http://www.aer.ca/documents/sts/ST57-2013.pdf>

⁹ AER, Directive 056, table 5.1.

There will be combustion emissions (carbon dioxide, nitrogen oxide, etc.) from compressors that are operated by natural gas, while there may be some fugitive emissions from leakages through valves, seals, and other pipe fittings from compressors driven by either gas or electricity. These fugitive emissions can cause or contribute to air quality and/or odour problems, and are further discussed in Section 8.2.

6.3 Gas processing plants

Gas processing plants remove unwanted substances from the gas before it is transported and sold as marketable natural gas. Some substances are separated out for sale, such as methane, ethane, propane, butane and pentanes. There are also contaminants in the raw gas that must be removed to meet quality specifications, such as water, *hydrogen sulphide* (H₂S), carbon dioxide, nitrogen and other trace gases. There are almost 800 gas processing plants in Alberta.¹⁰

The AER licensing procedure for gas processing plants is similar to that for other facilities such as batteries. If the company leases a site, they must provide you as the landowner or occupant with the AER information package on public consultation and try to reach agreement with you before applying for a licence. The company must consult with residents within a certain radius of the proposed plant.¹¹ In the case of *sour gas* plants, the company will also consult on the *emergency planning zone* (Section 4.6).

Members of the public can submit a statement of concern when a company's application is posted by the Alberta Energy Regulator for a sour gas processing plant (Section 2.5 and Section 11.1.3).

Sour gas plants

New sour gas processing plants are required to make a non-routine application to the AER. If members of the public affected by the application have concerns they can file a statement of concern with the AER, as well as contact the company directly.

The AER sets standards to limit the amount of sulphur that can be released from sour gas processing plants. This is expressed in terms of the sulphur recovery required for new plants; the recovery criteria depend on the size of the plant. At sulphur inlet levels

¹⁰ *Field Operations Provincial Summary 2012*, 8.

¹¹ AER, Directive 056, table 5.1.

below one tonne per day, sulphur recovery is not required. At sulphur inlet rates equal to or greater than one tonne per day, the percentage of sulphur that has to be recovered varies depending on the plant's inlet rate: those sized at 1 to 5 tonnes per day must recover 70%, while those with inlet rates greater than 2,000 tonnes per day must recover 99.8%.¹² Thus small plants release proportionately more than larger plants.

To prevent the proliferation of plants, a company must “vigorously explore” the possibility of using existing facilities.¹³ They must also consult and involve local residents in their evaluation of alternatives. If a company wants to construct a sour gas plant within a 15-km radius of an existing plant, they must show that it is justified in terms of social and environmental effects. The AER has established minimum *setback* distances for sour gas plants and facilities, are based on the potential release volume of hydrogen sulphide. The minimum setback distances are shown in Table 5. As a landowner, you may want to negotiate a larger setback in certain circumstances.

Table 5. Setback requirements for sour gas facilities

Level of facility	H ₂ S volume (m ³)	Minimum distance
1	<300	At least 100 m to a lease boundary
2	300–2,000	At least 100 m to individual permanent dwellings and <i>unrestricted country development</i> At least 500 m to <i>urban centres</i> or public facilities
3	2,000–6,000	At least 100 m to individual permanent dwellings up to 8 dwellings per quarter section At least 500 m to unrestricted country developments At least 1.5 km to urban centres or public facilities
4	>6,000	As specified by the AER, but not less than Level 3

Source: This table is based on information in AER Directive 056: Energy Development Applications and Schedules, Tables 5.5, 6.3 and 7.5.¹⁴ The reader should refer to these tables for full details.

¹² AER, Interim Directive ID 2001-03 Sulphur Recovery Guidelines for the Province of Alberta, 2001, 3.

¹³ *Ibid.*, 15.

¹⁴ The AER refers to Category D pipelines (where the pipeline associated with the facility contains gas with more than 10 mol/kmol H₂S) and Category C, D or E facilities, which are

6.3.1 Risks of gas plants

Air emissions

Occasionally there may be a problem at a gas plant, so that the company has to flare some or all of the gas being processed. This is called a “plant upset.” Gas plant upsets can result in flaring the full volume of gas entering the plant (referred to as the “inlet gas” or “raw gas”), the full volume of gas leaving the plant (referred to as the “sales gas”), or the highly concentrated *acid gas* stream created by the sweetening process in sour gas plants. Upset flaring can produce large volumes of air pollution. Therefore, gas plant operating approvals usually limit the length of time gas can be flared before companies must shut down both the plant and the pipeline that brings gas to the plant. Section 8.2.1 provides more information on flares.

The many valves and pipe connections in oil and gas processing facilities can develop tiny leaks. These leaks can release air pollutants, such as methane and volatile organic compounds (VOCs),¹⁵ into the air. These types of emissions are referred to as “fugitive emissions.” Another source of fugitive emissions at these facilities is vapours from liquid hydrocarbon storage tanks.

Tank *venting* and fugitive emissions were recently found to be a likely cause of extreme odour problems in the Peace River area in northeast Alberta that forced residents to leave their homes due to the resulting health impacts.¹⁶

Acid gas injection

Instead of separating the sulphur and flaring other waste gases, the waste acid gas, which contains predominantly H₂S and CO₂, can be injected deep underground. Acid gas injection facilities normally have very low emissions of sulphur dioxide (SO₂). However,

classified according to the volume of sulphur inlet to the facility. This includes gas processing plants, some gas and oil batteries and straddle plants, etc. Facilities with less than 0.01 mol/kmol H₂S in the inlet stream are in Category B and thus exempt. See AER, Directive 056, table 5.1 for full description of categories. The AER provides a H₂S Conversion Calculator on their website: <http://www.aer.ca/rules-and-regulations/directives/directive-056>

¹⁵ Volatile organic compounds are comprised of hydrocarbon compounds larger than three carbon molecules in size and that turn to vapour under ambient conditions.

¹⁶ AER, *Report of Recommendations on Odours and Emissions in the Peace River Area* (2014). <http://www.aer.ca/documents/decisions/2014/2014-ABAER-005.pdf>

if there is a problem with the acid gas disposal well, pipeline or compressor, the highly concentrated acid gas is flared, resulting in very high levels of SO₂ and some fugitive H₂S emissions that can adversely affect local air quality for a period of time before the gas plant can be safely shut down. AER approvals typically contain requirements to minimize the duration of these flaring events. If an acid gas injection facility is planned near you, you should inquire about the flaring minimization requirements at the gas plant and whether it would be completely shut down in the event of a problem.

Glycol dehydration

Glycol *dehydrators* are used at gas processing plants, well sites and compressor stations to remove water from gas before introducing the gas into pipelines. Removing the water prevents freezing and corrosion in the pipeline. To remove the water, the gas is exposed to glycol, which also absorbs benzene, toluene, ethylbenzene, and xylene (collectively referred to as *BTEX* molecules) and H₂S (if present). The water is subsequently separated from the glycol by a process called heat regeneration, allowing the glycol to be reused. Emissions from glycol dehydrators include BTEX if the vapours from the regeneration process are vented to the atmosphere.

Benzene is classified as “toxic” as defined under the Canadian Environmental Protection Act, and Canada-wide standards for the chemical were adopted in 2001.¹⁷ The oil and gas industry subsequently committed to voluntarily limit the emissions of benzene from dehydrators.¹⁸ In 2006, these voluntary initiatives were adopted by the Energy Resources Conservation Board (the predecessor to the Alberta Energy Regulator). Since that time, the regulatory requirements have been revised to try to minimize the public’s exposure to benzene by placing stricter emissions limits based on the proximity to a permanent residence or public facility such as a rural hospital or school. The AER’s current requirements aim to transition all current and new glycol dehydrators to meet a maximum emissions limit of 1 tonne annually for uncontrolled sources and 3 tonnes annually for those with a flare or *incinerator* control by 2018.¹⁹

¹⁷ Canadian Council of Ministers of the Environment, *Canada-wide Standard for Benzene Phase 2* (2001). <http://www.ccme.ca/en/resources/air/benzene.html>

¹⁸ Canadian Association of Petroleum Producers. *Benzene: Emission Reductions by the Upstream Petroleum Industry* (2003). <http://www.capp.ca/publications-and-statistics/publications/60315>

¹⁹ AER, Directive 039: Revised Program to Reduce Benzene Emissions from Glycol Dehydrators (2013), 3.

If a glycol dehydrator is planned near you, you should inquire about the expected benzene emissions and how they are to be managed. If it is planned to be in close proximity to your residence or pasture, you may wish to ask for monitoring of benzene or other BTEX emissions around the site and request that results are reported back to you.

6.4 Large petroleum production facilities

A company is required to obtain approval if it is developing a large-scale oil production site for the recovery of heavy oil or *oilsands*. Environmental Impact Assessments are also mandatory for oilsands mines, and for oilsands in situ and processing plants that produce more than 2000 cubic metres of bitumen per day.²⁰

If a company wants to expand or significantly alter its operations, they may need to change their AER approvals to allow for the alterations. If so, there will be an opportunity for public input (and in some cases, such as what is outlined under the Environmental Protection and Enhancement Act, the opportunity to appeal a decision respecting the approval).

6.5 Questions to ask regarding batteries, compressors and facilities

The series of questions presented below may be helpful for identifying issues to discuss with respect to batteries, compressors and facilities. First it is important to find out what kind of facility a company is proposing, and what kind of air, water and land impacts are expected. Then you can select the questions that will be relevant to that particular development.

Air quality

Will there be any flares and, if so, how will the amount of flaring be minimized?

This question applies especially to oil battery sites.

²⁰ Alberta, Environmental Assessment (Mandatory and Exempted Activities) Regulation, 111/1993.

What type of fugitive emission detection/control system will the company have in place?

Tank vapours and small leaks at pipe connections and valves can be sources of fugitive emissions. These types of releases can start and worsen gradually – requiring companies to do regular preventative maintenance or periodic checks.

Water quality

How will groundwater and surface water be protected?

There may be dykes around storage tanks or berms around the entire site, to control surface water runoff.

How will surface water be managed on the site?

If there is a possibility that surface water could be contaminated by leaks, etc. from on-site equipment, it must be drained to a collection area.

Will water quality testing of surface runoff be required before it is discharged?

If government regulations require surface runoff to be collected, it usually must be tested and meet certain criteria before it can be released off-site. If it does not meet the criteria it must be treated or trucked off to an approved disposal facility.

Will monitoring of groundwater be required?

Groundwater monitoring is sometimes required. This may depend on whether there are storage tanks on the site, and how they are constructed and contained.

Noise

What noise mitigation measures will be used?

This applies in particular to compressor stations, but is relevant for other facilities. It is advisable to obtain a copy of the noise plan, as required by the AER.

Emergencies

Does the company have a site specific emergency response plan (ERP), and if so how large is the evacuation zone?

An ERP is required for sour gas facilities (Section 4.6.1).

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600, 920 Yonge St., Toronto, ON M4W 2J2

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610, 55 Water St., Vancouver, BC V6B 1A1