

Protecting Farm Worker Health and Safety: Risks and Hazards Associated with Hog Production

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As with most industries, there are risks and hazards associated with working in the hog production industry. Some hazards are unique to animal production while others are typical of most industries. It is the employer's responsibility to be aware of the regulations that apply to the safe operation of the facility and to appropriately train staff, while it is the responsibility of the employee to follow the health and safety policies as outlined by the employer. The employee must use personal protective equipment, tools, equipment and machinery as they were designed and intended and as instructed by the employer. Provincial occupational health and safety acts and regulations can assist in identification of hazards and risks associated with the operation.

Hazards more specific to hog production include:

- Dust exposures
- Gas exposures
- Confined space
- Chemical hazards
- Infectious diseases
- Noise hazards
- Animal handling hazards
- Other hazards

■ Dust Exposures

Dust generated within indoor hog facilities may contain many types of particles and substances including: animal dander; dried saliva, fecal material and urine of pigs and rodents; feed components; bedding materials; absorbed gases and

chemicals; and organisms such as viruses, bacteria and mould and the substances they produce. Some dust particles generated in a hog barn facility are very small and can be inhaled deeply into the lungs. These particles are called respirable dusts. Dust will always be present in a hog production facility. The risk of health effects depends on how much time is spent in dusty areas, the size and shape of the dust particles, what is contained in the dust, and if a respirator is worn or if engineering controls are implemented during work activities. Exposure limits for total and respirable dust typically have provincial standards, although these standards do not take into consideration the organic nature of dusts typically found in livestock facilities, and therefore a reduced exposure level for livestock facilities has been suggested (Donham et al. 1989). Research indicates that wearing a disposable respirator significantly reduces health responses from hog barn exposures (Dosman et al. 2000). Engineering controls such as sprinkling canola oil on the floors and pens of hog production areas has also been shown to reduce health effects (Senthilselvan et al. 1997).

■ Gas Exposures

Gases typically produced in hog production facilities include hydrogen sulphide, ammonia and carbon dioxide. Characteristics of these gases and the related health effects resulting from exposure to the gases are seen in Table 1. The occupational exposure limits for typical hog barn gases are presented in Table 2.

Table 1. Health Effects of Gases

Gas	Characteristics	Health Effects
Hydrogen Sulphide (H ₂ S)	<p>Heavier than air</p> <p>Rotten egg smell at low concentrations</p> <p><i>High levels deadens sense of smell so there is no warning of concentrations that can cause unconsciousness and even death</i></p>	<p>Can be irritating to the eyes, nose, and throat. Exposure to moderate levels can irritate the lungs and affect breathing.</p> <p>When manure is agitated hydrogen sulphide can rapidly reach levels that cause immediate unconsciousness (called knockdown) and even death. Workers who enter enclosed or poorly ventilated areas where H₂S has accumulated can experience knockdown as can unprotected workers who attempt to rescue a collapsed worker.</p>

	Colourless, flammable	<i>Note: Workers wearing filtering respirators or masks are not protected against hydrogen sulphide as these devices do not remove hydrogen sulphide. A Self Contained Breathing Apparatus must be worn.</i>
Ammonia (NH ₃)	Pungent; Recognizable by acrid smell, colourless, non- flammable	Eye, nose and throat irritation. Intense irritation typically drives a person from the area preventing more serious and permanent health effects.
Carbon Dioxide (CO ₂)	Colourless, odourless, Non-flammable	If the ventilation or power fails carbon dioxide may accumulate. Exposures to very high levels can result in headaches and dizziness.

Table 2. Occupational contaminant limits

	Carbon Dioxide (CO ₂)	Carbon Monoxide (CO)	Hydrogen Sulphide (H ₂ S)	Ammonia (NH ₃)
Saskatchewan				
8-hour average Contamination Limit (mg/m) ²	9000	29	14	17
15-minute Contamination Limit (mg/m) ²	54,000	220	21	24
Alberta & Manitoba				
8-hour average Contamination Limit (ppm) ³	5000	25	10	25

¹ Saskatchewan Labour, 1997² Milligrams of substance per cubic meter of air.³ parts of substance per million parts of air.

■ Confined Space

It is important to identify and label all confined spaces in an operation and evaluate whether these spaces have the potential to become hazardous confined spaces. Examples of hazardous confined spaces in hog production

facilities include enclosed tanks, pits, gutter wells, manure pits, grain bins, and manure tankers. It's critical that workers recognize the danger associated with entering a confined space. There are four main dangers in confined spaces:

- Oxygen deficiency and oxygen enrichment
- Fire and/or explosion
- Build-up of harmful levels of gases, vapours or particles resulting in potential health hazards and immediately dangerous to life and health
- Drowning in liquids and/or entrapment in free-flowing solids

■ Chemical Hazards

Typical chemical hazards include fuels, solvents, veterinary drugs, cleaners and sanitizers. Hazards of chemicals are located on the material safety data sheet (MSDS) for each product. The MSDS indicates how a worker can be exposed. For example under "Routes of Entry" the MSDS will indicate if the product could be inhaled or if the product could be absorbed through the skin. In assessing the risk one must consider how often, for how long, and under what conditions (i.e. confined space or elevated temperature) worker exposure occurs.

■ Infectious Diseases

Infectious diseases that can be transmitted from animals to humans are called zoonoses. Infectious materials (virus or bacteria for example) may be in the saliva, urine, feces, blood and other body fluids of a diseased animal. Workers can contract the infectious organism by accidental injection with an animal's blood; an animal's blood or other fluids enter a break in a worker's skin (i.e. an open wound); a worker accidentally transfers contaminated materials from their hands to their mouth (i.e. failure to wash hands after handling animals or before eating); and inhaling dusts containing infectious material. Risk is reduced through herd health and proper sanitation facilities and procedures.

■ Noise Hazards

Noise causes hearing loss in many workers despite the fact that noise induced hearing loss is 100% preventable. Continuous exposure to harmful levels of noise over extended time periods without proper hearing protection can result in permanent, irreversible hearing loss. The risk of hearing loss increases if workers are exposed to an average daily (8 hours) noise level of greater than

85 decibels (dbA). Noise levels usually are in excess of 85 dbA if you have to raise your voice to be heard when carrying on a conversation at a distance of approximately 1 meter. Typical noise levels in a hog production facility are shown in Table 3.

Table 3. Typical noise sources and levels in a hog production facility¹.

Source of Noise	Decibel Level (dbA)
Swine in confinement during feeding	121 – 133
Swine barn nursery	66 – 69
Swine barn gestation	95 – 104
12 gauge shot gun	135 – 139
Chainsaw	115

¹ Centre for Agricultural Medicine (1997)

■ **Animal Handling Hazards**

Injuries from animals and animal handling occur during direct pig contact such as moving pigs, restraining pigs, lifting pigs, and injecting pigs. Injuries to the back and neck as well as slips and falls, are common. Working alone with pigs is a high risk factor for injury. Proper animal handling is one of the most important factors in the well being of humans and animals. Understanding pig behavior and using proper equipment and techniques will reduce the risk of injury during animal handling.

■ **Other Common Hazards**

Power washing can result in high noise levels, flying objects and debris, increased gas release from disturbed manure, and increased risk of injection injuries from high pressure water exposure. Proper training in power washing equipment and use of personal protective equipment during power washing will reduce risks.

Tractors, power take off shafts, front end loaders, hydraulic machinery, augers, electrical and fire are hazards common to hog production facilities. Training and familiarity with tools and equipment in facilities will reduce the risk of injury on the job.

■ Conclusion

Risks can be minimized or eliminated when safety is the responsibility of all individuals involved in primary pork production. For example, having hearing protection available and ensuring a worker wears this protection during high noise exposure activities reduces the workers' risk of noise induced hearing loss. Monitoring employee health through health surveillance programs (i.e. respiratory and hearing) provides a forum for health education and prevention. Ensuring all workers receive adequate training and ensuring employees follow the safety and health policies, as outlined, reduces the risks of illness, injury and mortality.

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