

Flaring is a routine, safe part of operating an LNG facility. This fact sheet explains what causes black smoke (visible emissions) during flaring, how likely it is and what Woodfibre LNG will do to minimize it.

The BCER refers to black smoke as "**visible emissions**" in its guidelines, so people may see these terms used interchangeably.

Smoke during flaring

Woodfibre LNG's facility is designed to minimize smoke, but in some circumstances, people may see smoke depending on the composition of the gas. **Most of the time, flares will have little to no smoke.**

When could black smoke occur?

On occasion, Woodfibre LNG's flare could emit black smoke. During commissioning (when equipment and systems are tested), there will be black smoke associated with specific commissioning events. Black smoke could also occur during stabilizing operations or steady-state operations.

What causes black smoke?

Black smoke could occur when the gas being flared has a different composition than during day-to-day operations. It could be caused by:

- Incomplete flaring of heavier hydrocarbons
- A process upset that causes flaring of the imported refrigerants (propane and ethane)

Heavier hydrocarbons are harder to burn completely as they don't burn as cleanly or efficiently as lighter gases like methane. When they're present in the flare, incomplete burning is more likely, which causes black smoke.

Black smoke is a visible sign of incomplete combustion and is often associated with a higher amount of particulate matter (soot).

What are "heavier hydrocarbons"?

Heavier hydrocarbons are heavier than methane and include pentane and hexane, which are naturally occurring components of natural gas, as well as imported refrigerants like propane and ethane. They are called "heavier" because their molecules are larger and have higher boiling points than methane. They are larger, more complex molecules that can be present in the feed gas coming from the pipeline.

At Woodfibre LNG, these heavier components are removed during processing and collected as condensate (liquid that forms when gas or vapour is cooled and turns back into liquid) before the gas is liquefied. In the event of a process upset, before the heavier hydrocarbons are removed, the heavier hydrocarbons will be sent to the flare to be burned and released.

Higher Carbon, Higher Chance for Smoke



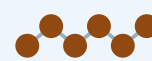
Methane



Ethane



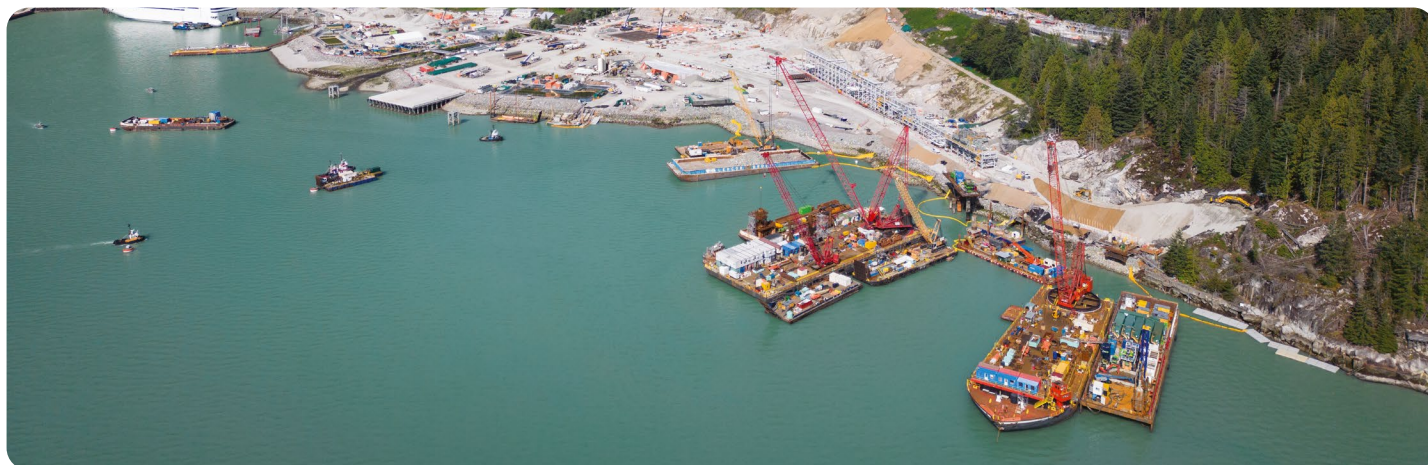
Propane

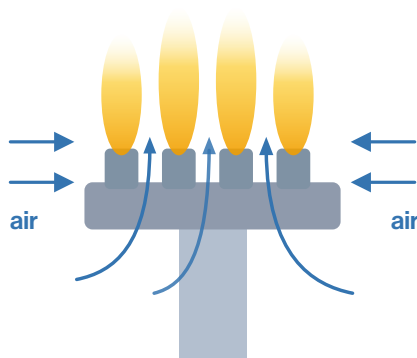


Pentane · Hexane

Burns cleanly

Smoke more likely





Multi-nozzle flare tip
Strong gas-air mixing across
different flow rates

Reducing Likelihood of Black Smoke

Black smoke cannot be avoided completely, but its frequency can be reduced through design features.

- ✓ Woodfibre LNG's high-pressure flare uses a multi-nozzle style flare tip that helps maintain strong gas-air mixing across different flow rates, supporting more complete burning of gas and reducing the likelihood of black smoke
- ✓ Woodfibre LNG's flare tip technology adjusts automatically to keep burning efficiently across a wide range of conditions

During commissioning, there will be black smoke associated with testing certain pieces of equipment.

Regulatory Oversight

Woodfibre LNG operates under a multi-level regulatory framework that involves federal, provincial and local agencies and the Skwxwú7mesh Úxwumixw. The BC Energy Regulator (BCER) provides regulatory oversight for technical operations of the facility, including flaring and thresholds for black smoke during operations.

When Is Black Smoke Allowed to Be Released?

Planned flaring during operations

Not permitted

Black smoke is not permitted during planned flaring events

Unplanned flaring (such as a process upset) during operations

15 min max

Not permitted beyond 15 minutes in any two-hour period

Commissioning & emergencies

No threshold

There is no threshold in commissioning or during an emergency. These are temporary events to test systems or where safety systems respond to unexpected conditions.

Regulatory Thresholds

If black smoke exceeds these limits, Woodfibre LNG will work to bring the facility back into compliance. If Woodfibre LNG surpasses regulatory thresholds or if there is incomplete burning of heavier hydrocarbons during operations that are not related to a process upset, the

facility would be required to report the non-compliance to the BCER and put steps in place to mitigate the black smoke and bring the facility back into compliance as quickly as possible.

Questions or Feedback?

For up-to-date information on flaring at Woodfibre LNG, visit woodfibrelng.ca/flaring. Share your feedback on flaring notifications and communications at info@wlng.ca.

