

Radio Frequency Interference in Blasting/Perforating Operations



POTENTIAL RISKS



As the use of Starlink satellites becomes more common in the energy industry, it is important to understand the potential risks associated with radio frequency (RF) interference during blasting and perforating operations.

Potential Hazards of RF Interference

Unlike TV satellite dishes, which only receive signals, Starlink dishes also transmit. They function similarly to two-way radios with a transmit power of about 4 watts.

The use of Starlink satellite dishes for communication during perforating operations is becoming more prevalent, and there are concerns about managing explosives and RF power emanating from these satellites. If not carefully managed, explosives can be set off with RF signals. RF hazard assessments are mandatory on worksites where explosives are used, but finding information on transmit power can be challenging.

Guidelines for Safe Operations

All users of Starlink satellite dishes and other RF transmitting devices (e.g., gas monitors with cellular or satellite connectivity and non-intrinsically safe cellular devices) must be aware of their transmit powers and decide whether to leave the dish on or off. Consult Starlink manufacturer's specifications and follow the detonator manufacturer's operating instructions based on the detonator's group classification (see API RP-67e3).



OILWELL DETONATOR GROUPS

Group 1 Electric Detonators

50 Ohm oilwell detonators. Susceptible to RF energy and require an RF free control zone. These detonators are the common choice for conventional Perforating operations. RF devices must be disabled or removed from the designated blast area, as determined by provincial regulations and the Blaster in Charge. Typical in conventional Oilwell operations including completions, workovers and well decommissioning.

Group 2 Electronic Detonators

Electronic Detonators are resistant, but not immune, to RF energy as determined by manufacturer design and testing. RF devices may be used in the same workplace as these detonators but only to a specified level of total Wattage, requiring that the number of devices and their proximity to the Perforating operations designated Blast Area, as determined by provincial regulations and designated by the Blaster in Charge. These systems require specialized surface equipment and smart communication with the detonators. Typical in Pump Down Perforating Operations.

Allowable number of devices and the distance from the Perforating operations is to be calculated as per IME SLP 20 and the manufacturers specifications. transmitter.

Group 3 High Energy Electric Detonators (HEED)

RF immune detonators that are designed to work in high energy environments and are not affected by RF energy. It must be noted that not all provincial jurisdictions acknowledge this group as fully immune and may still require an area of control for RF energy sources. Used in rare occasions where perforating operations are required in high energy environments or offshore operations.

Mechanical Detonators

Mechanical detonators are immune to RF energy and are used in non-electric Tubing Conveyed Perforating or in mechanical slickline operations.

See: American Petroleum Institute (API) – Oilfield Explosives Safety, RP-67e3, October 2019

Owner/Contractor and Worker Responsibilities

Responsibilities of Site Owner or Prime Contractor:

- Understand RF power hazards and implement measures to mitigate risks.
- Ensure proper documentation and agreements for hazard assessments.
- Provide detonator manufacturer's operating instructions.
- Train personnel involved in safe handling, storage and transport of explosives.
- Monitor RF power levels and implement shielding and grounding measures.
- Maintain compliance with regulations and keep records of safety training inspections, applicable permits, certificates and training.
- Ensure that all explosives' operations are done under the authority of a Blaster in Charge with the appropriate provincial Blaster's Permit or authority.
- Adhere to the designated Blast Area and all requirements within this area as defined by the Blaster in Charge

Responsibilities of Workers:

- Attend training on safe handling of explosives and RF hazards.
- Follow all safety procedures and RF device restrictions and controls.
- Participate in emergency drills and exercises.
- Review detonator manufacturer's operating instructions.
- Review Industry Recommended Practices



CONDUCTING HAZARD ASSESSMENTS

- **Identify hazards:** List potential hazards arising from RF interference with perforating operations, including the resistance or immunity of the Detonator Type selected for the operations. Perform a physical count of all RF transmitting devices within the designated Perforating Operations blasting area and maximum outputs of each device if using Group 2 Detonators.
- **Evaluate impact:** Assess the impact on personnel safety, equipment integrity, and operational success. Follow the detonator manufacturer's operating instructions. If RF Energy output of devices exceeds allowable levels, the number of devices must be reduced or a different detonator with higher tolerance should be sourced, this may include Group 3 or mechanical detonator operations.
- **Regulatory compliance:** Ensure compliance with relevant regulations and guidelines. This should include industry recommended practices, federal and provincial regulations within jurisdiction of the operations.
- **Consult stakeholders:** Engage with stakeholders to understand their concerns and recommendations.

Resources

- [Starlink specifications](#)
- [AB Hazard Assessment and Control handbook](#)
- [API Oilfield Explosives Safety RP-67e3, Oct 2019](#)
- [Institute of Makers of Explosives \(IME\) SLP 20 Safety guide for the prevention of radio frequency radiation hazards in the use of commercial electric detonators – 2011](#)
- [Enserva – Perforating Industry Code of Practice – Sept 2022 \(payment required on Enserva site\)](#)
- [WorkSafe BC – OHS Regulation Part 21: Blasting Operations](#)
- [Alberta OHS Code – Part 33: Explosives](#)