



Expertise Applied | Answers Delivered

A large, complex offshore oil and gas platform structure, primarily yellow, with multiple levels of decks, walkways, and piping. The platform is situated over a vast expanse of blue ocean under a clear sky. A prominent yellow crane is visible on one of the upper levels. The structure is supported by several vertical legs extending into the water.

**POWERING AND PROTECTING  
THE OIL & GAS INDUSTRY**



# Littelfuse—Protecting the Oil & Gas Industry

Littelfuse products are vital components in virtually every market that uses electrical energy. Our electrical safety product portfolio includes industry leading power fuses, a comprehensive line of protection relays and controls, surge protective devices as well as industrial GFCIs for personnel protection. Our portfolio of products help to minimize electrical safety hazards, limit damage to equipment and improve productivity.

Our team of professional engineers has extensive experience with petrochemical applications and are here to help our customers improve safety and productivity in their petrochemical facilities.

## Our Product Offering Includes:

- Alternating Relays
- Arc-Flash Relays
- Enhanced Overload Relays
- Fuses and Fuse Holders
- Ground-Fault Relays
- Industrial GFCIs
- Load Sensors
- Neutral-Grounding Resistors
- NGR Monitors
- Pump Controllers
- Surge Protective Devices
- Time-Delay Relays
- Voltage/Phase Monitors
- Voltage Protection

## Our Products Improve Safety While Reducing Costs & Hazards in the Workplace



### IMPROVE SAFETY

Shock Hazard  
Injury to Personnel  
Arc-Flash Hazards  
Open-CT Hazards  
Failed Resistors  
High SCCR Devices  
Touch Safe



### REDUCE COSTS

Fault Damage  
Equipment Replacement  
Calibration Costs  
Compliance Citations  
Motor Rewinds  
Inventory Consolidation  
Footprint Reduction



### MINIMIZE DOWNTIME

Replacement Time  
Nuisance Tripping  
Intermittent Faults  
Unreliable Protection  
Calibration Time  
Fuse Indication  
Fuse Cycling

# Oil & Gas Applications



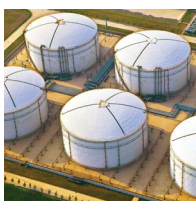
## Oil Sands

One of the world's largest producers of synthetic crude oil from oil sands requested assistance in developing a ground-check monitor for long cables. We were able to provide them with a highly reliable solution, the SE-135 Ground-Fault Ground-Check Monitor, to protect oil-sands mining shovels powered by 10 km long cables. This allowed them to optimize their mine plan and save millions of dollars by minimizing substation moves, which require expensive down time.



## Refinery

A 140,000 barrel-per-day refinery uses Variable Frequency Drives (VFDs) to operate cooling tower fans. The VFDs are high-resistance grounded in order to limit the ground-fault current to a safe level. They realized that the built-in ground-fault protection on the VFDs, which are often designed to trip at high levels of ground-fault current, was not sensitive enough to protect the VFD on a High Resistance Grounding (HRG) system. EL731 ground-fault relays specifically designed for this application were installed to provide supplemental protection.



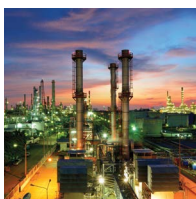
## Oil Battery

An energy company that was building an oil battery was concerned about arc-flash hazards, not only in terms of personnel safety but also to reduce the potential costs associated with damaged equipment and downtime. They installed PGR-8800 Arc-Flash Relays in the low-voltage motor control centers (MCCs) and medium-voltage switchgear. Incorporating the arc-flash relay reduced the incident energy levels of many of the compartments by the equivalent of two PPE category levels, reducing the risk to employees and lowering the PPE rating.



## Transportation

One of the longest oil pipelines in North America was experiencing grounding power-resistor failures. These resistors are used on the power source to limit destructive ground-fault currents. Compounding the issue, the pipeline crew wasn't even aware of the resistor failures since they were not being monitored. Once the pipeline company became aware that they could continuously monitor the resistors using field-proven technology that Littelfuse pioneered over 20 years ago, they standardized on the SE-330 on resistor monitoring for all of their 5 kV pumping stations. A high-pressure natural gas pipeline company selected our MPU-32 Motor Protection Units to protect the motors in their compressor stations.



## Natural Gas Processing

A large gas processing plant in the U.S. continues to upgrade their older 480 V motor protection relays with reliable, small form factor motor protection relays. After considering options including installation time, they continue to rely on our 777-P2 Motor Protection Relay to protect numerous motors throughout their facility.



## Oil Field Pump Jacks

Littelfuse protection relays are found throughout the expansive oil fields in North America. The MP8000 Bluetooth\* Overload Relay is used in the pump panel to provide enhanced protection in place of a standard overload relay and voltage monitor. Customers prefer all the advanced protection in one unit, and the MP8000 delivers. The unique Bluetooth capability also increases personnel safety by keeping people out of the panel. Technicians can easily make trip settings without opening the panel door—or even getting out of the truck.




## Oil & Gas Drilling Rigs

Typically, oil and gas drilling rigs use an ungrounded electrical system to allow for continuous operation during the first ground fault. However, this type of system has many disadvantages such as potential overvoltages and difficulty in locating ground faults. A large rig manufacturer experienced these issues and was looking for a way to eliminate these problems. After consultation, they chose a high-resistance grounding package that included a zig-zag transformer, neutral-grounding resistor and the SE-330, which continuously monitors the integrity of the grounding circuit. To help determine ground-fault location, SE-701 Ground-Fault Relays were installed on each feeder. After installation and during operation, they experienced a ground-fault, but located it in 1/10th of the time compared to the previous ungrounded system.

# Upstream


Offshore Drilling | Steam-Assisted Gravity Drainage | Oil & Gas | Oil Sands | Fracking




**SE-330 Neutral-Grounding-Resistor Monitor**  
1 Used on HRG systems to monitor the resistor




**SB6100 Industrial Shock Block® GFCI**  
5 Used on welding receptacles to provide personnel protection




**777-P2 MotorSaver & 777-KW/HP-P2 PumpSaver**  
9 Provides 3-phase voltage/phase protection, plus motor/pump protection from current overloads and underloads, current unbalance and ground-fault protection




**MP8000 Bluetooth\* Overload Relay**  
13 Works on all motors 90–690 V ac single or 3-phase. Monitor and control multiple MP8000 relays through the Littelfuse app on your smartphone. No need to open the control panel.




**SE-134C Ground-Fault Ground-Check Monitor**  
2 Monitors long cables powering oil-sands mining



**EL3100 Ground-Fault & Phase-Voltage Indicator**  
6 Used in main power panel to identify ground faults, protecting equipment and personnel




**UL Class & Semiconductor Fuses, Fuse Blocks**  
10 Provides on-site circuit protection for service main, control cabinet, freshwater injection panels, transformers, pumps, and pump panels located at each pump jack




**Voltage/Phase Monitors**  
14 Prevent motors from running at temperatures above approved ratings, and provide protection due to blown fuses, broken wires or worn contacts. These monitors help to prevent damaged machinery and injury of personnel.




**SE-701/SE-704 Earth-Leakage Monitor**  
3 Used on VFDs to provide additional protection for submersible pumps



**Arc-Flash Relays**  
7 Installed in new electrical gear, or easily retrofitted into existing switchgear with little or no configuration. Rapidly detect an impending arc flash and send a signal to interrupt power




**Fuse Replacement and Custom Kit**  
11 The FRCK series helps reduce downtime by providing mobile storage in harsh fracking environments and can be filled with multiple fuse series specific to your application




**460 / 201 A-AU Voltage/Phase Monitors**  
15 Protects 3-phase motors from over/undervoltage, phase loss, reverse phase, unbalanced voltage and rapid cycling




**SE-105 Ground-Fault Ground-Check Monitor**  
4 Monitors for ground faults and proper bonding of trailing-cable fed equipment




**MPU-32 Motor Protection Unit**  
8 Used in gas pipeline compressor stations to protect motors



**Medium Voltage Fuses for Power Generation**  
12 Used between pole and site for incoming power from utility; typically E-rated and R-rated fuses up to 4160 V, but can be larger




**777-MV-P2 Voltage/Phase Monitors**  
16 Protect any 3-phase medium voltage motor drawing 10–800 full load amps




**Surge Protective Devices**  
17 Provides service entrance and branch circuit surge protection

# Midstream


Fuel Trading Terminal | Pipeline Transportation




**SE-330 Neutral-Grounding-Resistor Monitor**  
1 Used on HRG systems to monitor the resistor




**Pulsing High-Resistance-Grounding System**  
5 Used to lower risk of arc-flash and transient overvoltages




**MPU-32 Motor Protection Unit**  
9 Used in gas pipeline compressor stations to protect motors




**MP8000 Bluetooth\* Overload Relay**  
2 Works on all motors 90–690 V ac single or 3-phase. Monitor and control multiple MP8000 relays through the Littelfuse app on your smartphone. No need to open the control panel.




**UL Class & Semiconductor Fuses, Fuse Blocks**  
6 Provides on-site circuit protection for service main, MCCs, transformers, pump panels and VFDs located throughout the pipelines and terminal systems



**455 Voltage/Phase Monitor**  
10 Provides voltage/phase protection and monitors voltage on the load-side of the motor contactor to detect contact failure




**Class T and Semiconductor Protection Fuses**  
3 Used to protect motors, pumps and transformers involved in the refinery and along the pipeline systems




**460 / 201 A-AU Voltage/Phase Monitors**  
7 Protects 3-phase motors from over/undervoltage, phase loss, reverse phase, unbalanced voltage and rapid cycling



**Surge Protective Devices**  
11 Provides service entrance and branch circuit surge protection




**SE-134C Ground-Fault Ground-Check Monitor**  
4 Monitors long cables powering oil-sands mining




**777-P2 MotorSaver & 777-KW/HP-P2 PumpSaver**  
8 Provides 3-phase voltage/phase protection, plus motor/pump protection from current overloads & underloads, current unbalance and ground-fault protection

# Downstream

Refinery | Gas Processing




**EL731 AC/DC Sensitive Earth-Leakage Relay**  
1 Used to provide adequate ground-fault protection on HRG systems




**SE-701 Ground-Fault Monitor**  
5 Used to provide adequate ground-fault protection on VFDs and HRG systems




**SB6100 Industrial Shock Block® GFCI**  
9 Used on welding receptacles to provide personnel protection




**Pulsing High-Resistance-Grounding System**  
2 Used to lower risk of arc-flash and transient overvoltages




**777-P2 MotorSaver & 777-KW/HP-P2 PumpSaver**  
6 Provides 3-phase voltage/phase protection, plus motor/pump protection from current overloads & underloads, current unbalance and ground-fault protection




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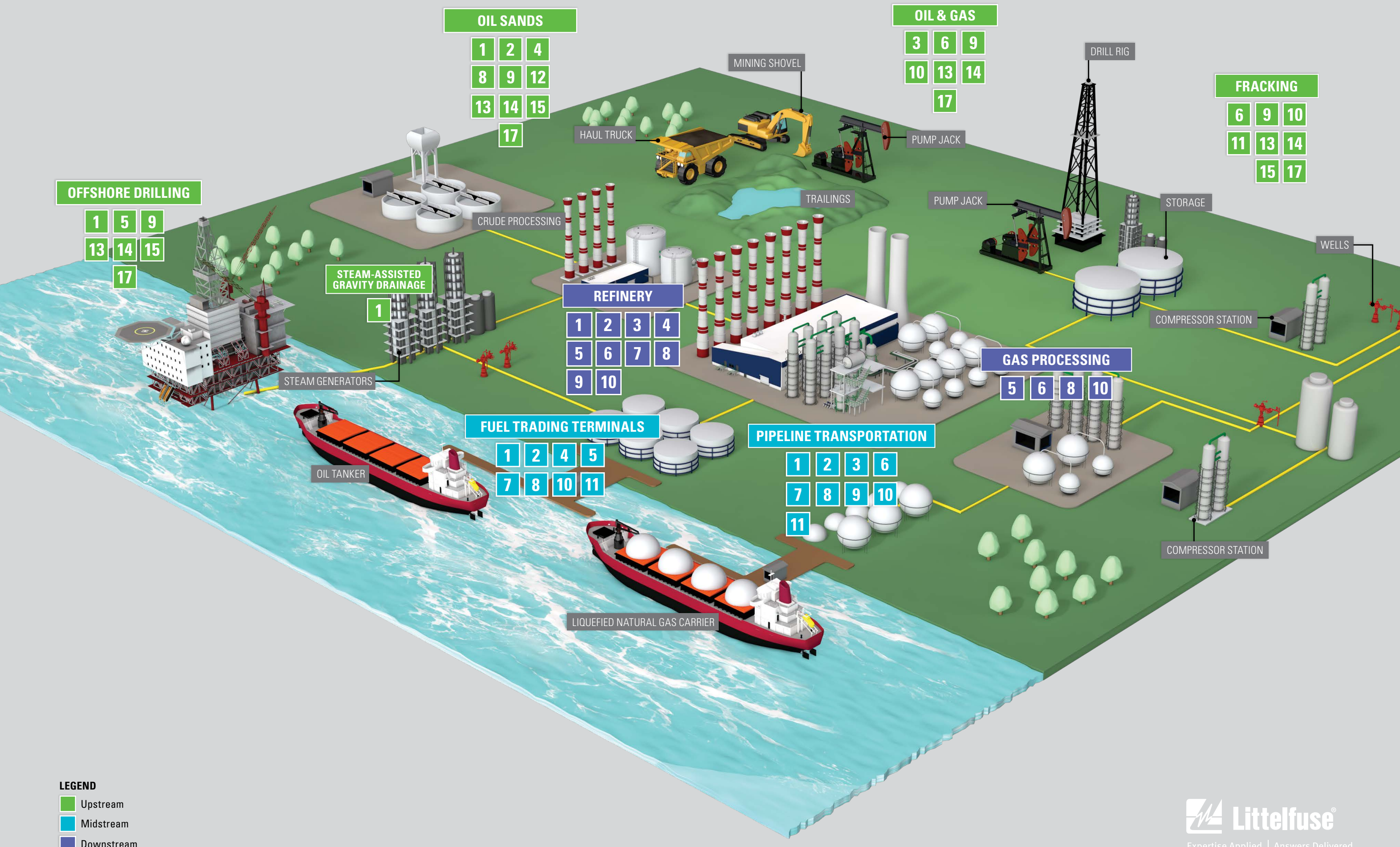
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**MP8000 Bluetooth Overload Relay**  
8 Works on all motors 90–690 V ac single or 3-phase. Monitor and control multiple MP8000 relays through the Littelfuse app on your smartphone. No need to open the control panel.

\* Bluetooth is a trademark of its respective owner.





**OIL SANDS**

- 1 2 4
- 8 9 12
- 13 14 15
- 17

**OIL & GAS**

- 3 6 9
- 10 13 14
- 17

**FRACKING**

- 6 9 10
- 11 13 14
- 15 17

**OFFSHORE DRILLING**

- 1 5 9
- 13 14 15
- 17

**STEAM-ASSISTED GRAVITY DRAINAGE**

- 1

**REFINERY**

- 1 2 3 4
- 5 6 7 8
- 9 10

**FUEL TRADING TERMINALS**

- 1 2 4 5
- 7 8 10 11

**PIPELINE TRANSPORTATION**

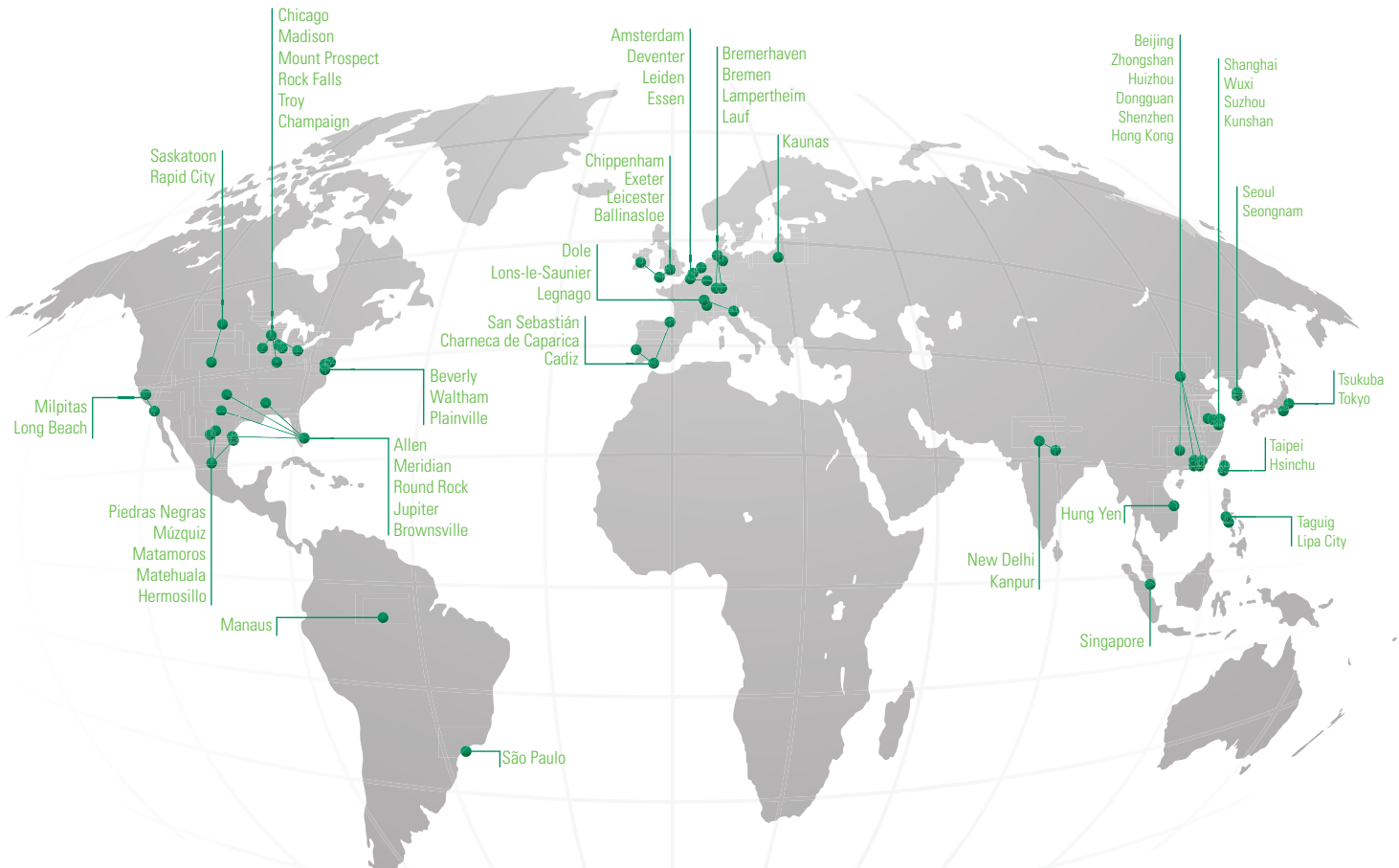
- 1 2 3 6
- 7 8 9 10
- 11

**GAS PROCESSING**

- 5 6 8 10

**LEGEND**  
■ Upstream  
■ Midstream  
■ Downstream

# LOCAL RESOURCES FOR A **GLOBAL** MARKET



## Littelfuse.com/OilAndGas

For a comprehensive library of resources including datasheets, product manuals, white papers, application guides, demos, online design tools, catalogs, and more, visit [www.Littelfuse.com/TechnicalResources](http://www.Littelfuse.com/TechnicalResources).

### North America

**Littelfuse World Headquarters**  
8755 West Higgins Road, Suite 500  
Chicago, IL 60631, USA

**Littelfuse SymCom**  
222 Disk Drive  
Rapid City, SD 57701, USA

**Littelfuse Startco**  
140 – 15 Innovation Boulevard  
(The Galleria Building)  
Saskatoon, SK S7N 2X8  
Tel: +1-306-373-5505

### Hartland Controls now part of Littelfuse

807 Antec Road  
Rock Falls, IL 61071, USA  
Tel: +1-815-626-5170

**Fuse and Relay Technical Support:**  
Tel: +1-800-TEC-FUSE  
Tel: +1-800-832-3873  
Fuses: [techline@littelfuse.com](mailto:techline@littelfuse.com)  
Relays: [relays@littelfuse.com](mailto:relays@littelfuse.com)

**Customer Service:**  
Tel: +1-800-227-0029  
E-mail: [PG\\_CSG@littelfuse.com](mailto:PG_CSG@littelfuse.com)

### Asia

**Littelfuse**  
Unit 1604B Desay Building,  
Gaoxin Nanyi Ave.  
Hi-Tech Industrial Park  
Nashan District  
Shenzhen, 518057, China  
+86 755 8207 0760

### Europe

**Littelfuse**  
Julius-Bamberger-Str. 8a  
Bremen, D-28279, Germany  
+49 421 82 87 3 147



Littelfuse products are certified to many standards around the world. To check certifications on specific components, please refer to the specific product datasheet on Littelfuse.com.

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