SNYDER E 1A

SAFETY AND EMERGENCY RESPONSE PLANS
On-Site Emergency Response Requirements – Safety Services
On-Site Emergency Response -Overview

This presentation is intended to highlight key areas of IRP-8: Pumping of Flammable Fluids and recommended third party safety requirements as required for GASFRAC’s 100% LPG Vantage Fracturing Process. A detailed review of IRP-8: Pumping of Flammable Fluids should be conducted by operators prior to any operations involving flammable fluids. A current copy of IRP-8 is available at the address below.

“The intent of the Industry Recommended Practice, (IRP) for Pumping of Flammable Fluids is to enhance operating consistency within industry through the establishment of minimum standards and procedures. This IRP is intended to clarify and document good practices and procedures. The purpose of this document is to recommend specific standards and operating procedures that should be considered the minimum acceptable for a given application. The IRP stresses the importance of standards and safe operating procedures to protect workers and the public and to minimize environmental risk. They are intended to complement existing documentation and regulation. ”*

IRP-8: Pumping of Flammable Fluids document as well as future revisions and additions are available from:

Enform
1538 – 25 Avenue NE
Calgary, Alberta
T2E 8Y3
Phone: (403) 250-9606
Fax: (403) 291-9408
Website: www.enform.ca

*IRP-8: Pumping of Flammable Fluids •3
## On-site Emergency Response Requirements

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<td>Chemical Exposure and Burns</td>
<td>Spearhead Acid Pumping Chemical Van</td>
<td>Shower Unit, ANSI Standard Z358.1 Sections 4, 5 &amp; 6</td>
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<td>Rescue</td>
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<td>Reduce employees exposure to Hot Area, IRP-8: 8.9.8 Assigned Rescue Personnel, GASFrac’s Standard</td>
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<td>Fire Protection and Suppression</td>
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</tr>
<tr>
<td>Site Control (Operator Assistance)</td>
<td>Based on the Above Situations</td>
<td>Operator’s ERP, GASFrac’s ERP</td>
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<tr>
<td>-Road Blocks</td>
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<td>-Notification</td>
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<tr>
<td>-Traffic Control</td>
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</tbody>
</table>
Chemical Exposures and Burns

Shower units are intended to provide standby safety services for workers whenever hazardous fluids (see WHMIS guidelines) are being pumped or handled.

8.10.2 Capabilities and Capacities of Mobile Shower Units

In order to meet the requirements set out in the OH & S GSR 448/83 Section 16 (1) and the First Aid Regulation 48/2000 Section 13, suitable on-site facilities shall be provided as defined in Provincial/Territorial Regulations and ANSI – Z358.1 – 1998). On-board water supplies are typically 1.9m³ – 2.3m³ (500 – 600 US gallons). Each person that could be exposed to hazardous fluids requires 1.15m³ (300 US gallons) of potable water available for safety shower use.
Chemical Exposures and Burns

ANSI Standard Z358.1 – 1998, Sections 4, 5 and 8, set out the following **minimum standards for shower units, eyewash units, and drench hoses:**

- Each shower head shall be capable of delivering a minimum of 76 liters per minute (20 US gpm) of “flushing solution” for a minimum of 15 minutes. This requires a minimum of 1.14m³ (300 US gallons) for each person exposed to hazardous fluids.

- Each eyewash unit shall be capable of delivering flushing fluid to the eyes at a rate of not less than 1.5 liters per minute (0.4 US gpm) for 15 minutes.

- Each drench hose shall be capable of delivering a minimum of 11.4 liters per minute (3 US gpm) of flushing fluid for a minimum of 15 minutes.

- The delivered flushing fluid temperature shall be “tepid”. Tepid is defined in the ANSI Standard as “moderately warm; lukewarm”.

- If the number of persons required to be in the **HOT ZONE exceeds the on-board water supply of a mobile shower unit, supplemental (tepid) potable water shall be required.**

Ordinary showers installed in travel trailers etc. do not meet the ANSI standard and shall not be factored in when determining the number of shower heads required to provide adequate protection for personnel working in the **HOT ZONE.**
8.9.8 Assigned Rescue Personnel

A competent, properly equipped rescue team shall be available on-site whenever High Hazard Flammable Fluids are to be pumped, (refer to Attachment 13 “Fire and Rescue Training Requirements for Industrial/Oilfield Fire Fighters; Level II”). The firefighting personnel shall assist in a fire exposed rescue attempt by controlling the fire. **However, the two person fire fighting team cannot provide fire fighting and rescue duties simultaneously.** When fire rescue is required, the minimum requirement shall be two firemen and one dedicated rescue person. The rescue person shall be prepared to initiate a fire rescue whenever personnel are working in the Hot Zone. This requires suitable bunker gear and donned SCBA. The response team shall have a written Emergency Plan that is reviewed, communicated and practiced before the job in order to affect an emergency rescue. The emergency plan shall contain the steps needed to respond to and recover a casualty as a result of an incident. The fire fighting service company can be contracted to supply additional rescue personnel or a third party company can supply the rescue person.
## Fire Protection and Suppression

<table>
<thead>
<tr>
<th>Number of Well Service Fluid Tanks</th>
<th>1 Tank</th>
<th>2-4 Tank</th>
<th>5 or more LPG storage tanks or when pumping energized fluids and using 2 or more storage tanks</th>
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<tbody>
<tr>
<td><strong>IRP-8: Recommendation:</strong></td>
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<tr>
<td>1 – Twin Agent Unit</td>
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<td>1 – Continuous Foam Unit with on</td>
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<td>board water supply</td>
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<td><strong>IRP-8: Recommendation:</strong></td>
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<tr>
<td>1 – Continuous Foam Unit with a 15.8 m³ (100 Bbl) water truck</td>
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<td>2 – Continuous Foam Units with two 15.8 m³ (100 Bbl) water trucks.</td>
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<tr>
<td><strong>GASFRAC Standard:</strong></td>
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<tr>
<td>Continuous Foam Unit with a 15.8 m³ (100 Bbl) water truck . Minimum 3 Firefighting Personnel</td>
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<td><strong>GASFRAC Standard:</strong></td>
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<tr>
<td>Note: Tank = 63 m³ (400 Bbl)</td>
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<td><strong>GASFRAC Standard:</strong></td>
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</tbody>
</table>
| In addition: 1X Continuous Foam unit with a minimum of 16 m³ (100 Bbl) water Storage. ( Pumpers, and frontline) Minimum 2 Firefighting Personnel | | | **IRP-8:** Pumping of Flammable Fluids •59
8.9.6 Minimum Requirements for Twin-Agent / Continuous Foam System

**Twin-Agent Unit**

- 1,136 litres, (300 US gallons) pre-mixed A.T.C foam solution at 6 %
- 680 Kg. (1,500 lb) Purple "K" Dry Chemical System
- 30 m discharge hose with Twin-Agent application system
- Two fire-fighting personnel

**Continuous Foam System**

- 475 litres, (125 US gallons) chemical concentrate (suitable for on-site fluids)
- 1,900 litres per minute, (500 US gpm) centrifugal certified fire pump
- Two fire-fighting personnel
- 680 Kg (1500 lb) Purple-K Dry chemical system
- Continuous Foam System with onboard water supply will have a minimum of 3028 litres (800 us gal)
A training and education program shall be established and maintained for all fire brigade members to ensure that they are able to perform their assigned duties in a safe manner that does not pose a hazard to themselves or other members. All members shall be trained to a level of competency commensurate with the duties and functions that they are expected to perform, including the operation of all of the fire fighting and rescue equipment and systems they are expected to use.
GASFRAC Safety Systems

The GASFRAC safety system features a self-supporting safety trailer that monitors a dedicated ‘hot zone’, which is in place to prohibit access during hydrocarbon fracturing operations. The safety trailer operator monitors the atmosphere for the presence of hydrocarbon vapors and provides continual equipment monitoring with remotely operated cameras.

The monitoring for hydrocarbon vapors is conducted using a RAE MeshGuard LEL (MeshGuard) system. The hub of the MeshGuard network is a FMC 2000 wireless controller, which acts as a wireless base station for up to 24 LEL sensors placed strategically on site. The MeshGuard system is equipped with a RAE Systems Echo View FMC 400 (Echo View) which, in the event of an emergency, is capable of off site monitoring of the MeshGuard readings.

The safety trailer is also equipped with emergency equipment including two self contained breathing apparatus’ (SCBA), one set of Firefighters Bunker gear and one hand held V-REA LEL gas monitor with a built-in sampling pump and data logging capabilities.

In addition to the safety trailer, the data van on site is equipped with an evacuation siren and strobe light. In the event of an emergency, the Frac Supervisor initiates these two safety measures, in accordance with GASFRAC emergency procedures.

GASFRAC Emergency Prevention Measures

- Multiple purpose built emergency shutdown systems on equipment including:
  - Fail close valves on LPG Storage vessels
  - Fail close LPG isolation valve on LPG boost pumps
  - All GASFRAC engines equipped with positive air shut offs, including an automatic over speed shutdown
  - Global shutdown system that activates positive air shut off and evacuates control air to close LPG supply valves
  - Global Neutral direct system that disengages throttles and places transmissions in neutral
- GASFRAC Operating Procedures (GFS) include provisions for operational upsets and emergencies
- ERP Drills on client sites at start of project and each new crew rotation

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Phone: 403.356.3221
Email: safety@gasfrac.com
Mirabito Energy Products follows a wide variety of federal, state and local environmental, safety and transportation laws to make sure that we can deliver propane safely to our customers. Some of these laws include, among others, the Comprehensive Environmental Response, Compensation and Liability Act (“CERCLA”), the Clean Air Act, the Occupational Safety and Health Act, the Homeland Security Act of 2002, the Emergency Planning and Community Right to Know Act, and the Clean Water Act. If you’ve ever wondered why we are such sticklers for certain policies and procedures such as our need to conduct leak tests, it’s because we want to make sure we keep everyone safe.

**Fire Safety**
Every state has its own set of fire safety codes that regulate the storage and distribution of propane. In some states these laws are administered by state agencies, and in others they are administered on a municipal level. Mirabito works hard to conduct training programs to help ensure that our operations are in compliance with applicable governmental regulations. With respect to our general operations, the National Fire Protection Association and specifically the NFPA 54: National Fuel Gas Code and NFPA 58: Liquefied Petroleum Gas Code pamphlets, have established a set of rules and procedures governing the safe handling of propane.

**Transporting Propane**
With respect to the transportation of propane by truck, Mirabito adheres to the Federal Motor Carrier Safety Act and the Homeland Security Act of 2002. Regulations under these statutes cover the security and transportation of hazardous materials and are administered by the United States Department of Transportation (DOT). Mirabito provides training and procedures for employees to minimize the hazards resulting from propane transportation emergencies, and we regularly conduct inspections and testing.