

# Utility Group Facilities Inc.

(a subsidiary of TriSummit Utilities Inc.)



## Inuvik Gas Project Safety Plan

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September 2021



## Distribution List

<b>Inuvik Gas Ltd. (IGL)</b>			
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Conrad Bourque	Supervisor, Production & Gas Distribution	Shop	3
Library		Inuvik - IGL Office	4
Shop		Shop	5
PAS MCC		PAS	6
Inuvik Ops	Inuvik Operators	Truck 42	7
Ikhil Ops	Ikhil Contractors	Truck 49	8
Operators		Trucks	9-15
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Canada Energy Regulator (CER)	Regulator	Calgary	21

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# Revision Request Form

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Date of request	
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Document section reference	Revision requested and reason for request
-	
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# 1 Introduction

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Utility Group Facilities Inc. (UGFI – a subsidiary of TriSummit utilities Inc.) is the operator of the Ikhil gas field. TriSummit Utilities Ltd. (TriSummit), Inuvialuit Petroleum Corporation (IPC), and ATCO Midstream form a joint venture and together jointly own the Ikhil Gas Field which supplies natural gas to the town of Inuvik for power generation, commercial, and residential heating.

- UGFI is the licensed operator of the Ikhil Gas Field and pipeline.
- Inuvik Gas Ltd. (IGL) has been contracted to operate the Ikhil Gas Field facilities and is the owner and operator of the gas distribution system within the town Inuvik.
- ATCO is the managing partner of IGL and its gas distribution system.
- IGL is equally owned by Inuvialuit Petroleum Corporation, TriSummit Utilities, and ATCO Midstream.

## 1.1 Purpose

Inuvik Gas mandates the use of responsible safety and environmental practices. Employees and Contractors alike, working for Inuvik Gas, are expected to utilize and develop economically reasonable operational practices, which will be performed in a responsible and safe manner.

This Safety Plan is directed to all employees and contractors of Inuvik Gas Ltd., including operations and field personnel, office personnel, contract personnel and third-party contractors. This Manual is intended to:

- Provide a consolidated field guide for use by personnel
- Describe standards of workplace safety and environmental care expected by the management of Inuvik Gas
- Demonstrate a corporate commitment to achieving the principles stated in the Safety Policy

## 1.2 Scope

This Safety Plan is a part the Ikhil Gas Project Production Operations Plan, which is comprised of this Safety Plan, the Environmental Protection Plan, and Emergency Response Plan

This Safety Plan applies to all areas of the Ikhil Operations. Where local regulatory requirements are more stringent than those in Northwest Territories, the requirements of the local regulations must be followed. In the absence of local regulations, the program will be used to guide operating practices.

## 1.3 Application

This Plan applies to all Inuvik Gas Ltd. employees and contractors. Where the term "*employee(s)*" is used, it is intended to include contract employees and third-party contractors working at Inuvik Gas Ltd. worksites that involve the Ikhil natural gas wells and facilities. This is intended to provide employees and contractors, principally those working in field operations, guidance in safe work practices and environmental protection.

**All workers are expected to work safely and to refuse to undertake any work where there exists an imminent danger.**

Each individual worker is responsible for his/her own safety and for the safety of his/her fellow workers.

The Inuvik Gas Ltd. Safety Plan is for the protection of employees, contractors, the public, the environment and Inuvik Gas Ltd. property. Disciplinary action may be taken with those who disregard or violate these practices.

## 1.4 Compliance and Continual Improvement

There are several processes in place to monitor safety of the Inuvik Gas Project operations and overall compliance with this Safety Plan:

- Monthly safety meetings
- Tailgate meetings
- Hazard IDs
- Incident Reporting
- Monthly Safety Inspections

The following safety indicators are tracked and recorded, with records maintained, to monitor safety performance:

- Total man hours worked
- Lost time injuries recorded
- Medical aids recorded
- Near misses recorded
- Monthly safety inspections
- Monthly safety meetings

The safety indicators listed above are compiled annually into a Safety Summary that is submitted to CER.

Monthly safety meetings are conducted as a measure to improve and promote safety on an ongoing basis. Meetings include all employees of Inuvik Gas Ltd. (IGL), the contract operator for the Ikhil Joint Venture, and Utility Group Facilities Inc. The monthly safety meetings provide a regular opportunity for staff input to the ongoing safety of operations, review any updates in regulations as well as a time to review Hazard IDs, near misses and safety incidents. All employees participate in reviewing procedures at each safety meeting.

## 1.5 Revisions and Updates

This Plan will be updated as required. It is intended to serve the needs of all employees and contractors, especially those in field operations. Suggestions for changes or improvements are encouraged. Proposed changes should be discussed at safety and environmental meetings and recommended to the appropriate supervisor. If necessary, the Management of Change procedure will be initiated.

When there are enough changes to justify a revised edition, the entire Manual will be reprinted. In the interim, revisions and updates will be forwarded to all manual holders for inserting. Revisions to this manual will be recorded in the revision record at the beginning of the document. The document will be assigned a new version number when revised, and new versions of the Manual will be distributed to manual holders, including CER. Manual holders are indicated in the Distribution List at the beginning of this document.

## 1.6 Management of Change

TriSummit Management of Change procedure identifies a process for managing planned or unplanned changes, and modifications to ensure that safety, integrity, and operability of equipment and operations are maintained. This procedure does not apply to routine procedural updates, maintenance, repairs, and / or replacement of similar parts or equipment. When a change is expected (planned) or encountered (unplanned) the Ikhil Asset Manager or designate initiates the Management of Change process.

### 1.6.1 Types of Change

Two types of change have been identified for the Ikhil Operations.

- TriSummit organizational changes, including policy and administrative changes. These types of changes are normally addressed through TriSummit Team meetings and project reviews. If health and safety and environmental issues are part of these changes then the MOC Procedure must be initiated.
- TriSummit facility, process, or site equipment changes. These types of changes must be addressed by following the MOC Procedure.

### 1.6.2 MOC Procedure

It is the responsibility of the individual proposing the change (requestor) to request support from the Ikhil Asset Manager and follow this procedure prior to making any changes. Once the review has been completed, it must be approved by the Ikhil Asset Manager. Sound judgment and experience must be used when applying this management of change process.

The MOC procedure is as follows: (Each step below shoe be documented)

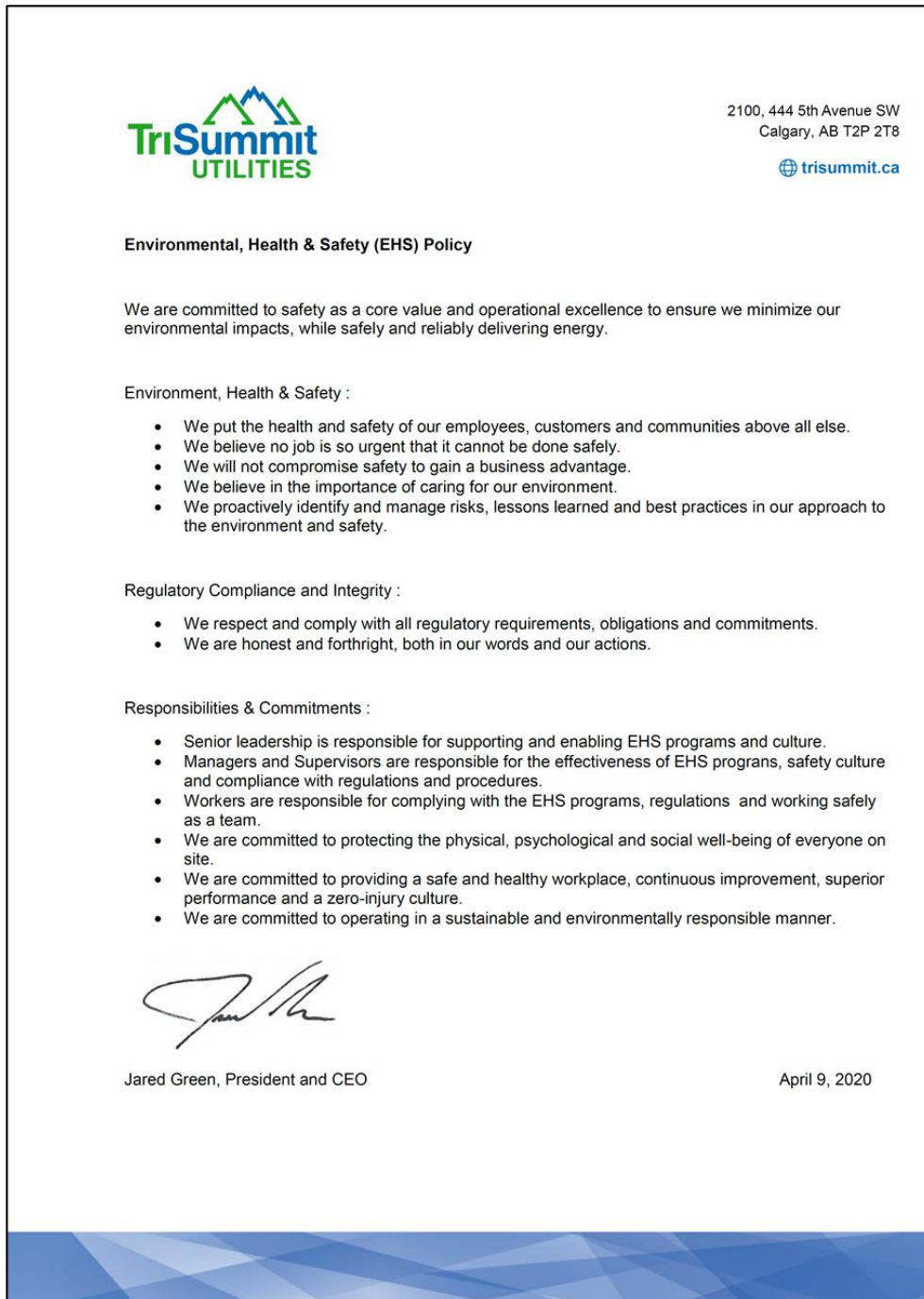
- The requestor reports to the Ikhil Asset Manager or designate that an MOC review is required.
- The requestor describes, in detail identifying all the potential hazards of the request.



- Examples of aspects to consider include machinery and equipment, personal protective equipment, personnel training, fire protection utility and energy requirements, hazardous materials, waste disposal, material handling, , walking surfaces, ergonomics, ventilation, radiation sources.
- The Ikhil Asset Manager, or designate, review the request and if needed will engage impacted or potentially impacted TriSummit personnel and others as appropriate to:
  - evaluate and mitigate the health and safety risks and environmental impacts.
  - assessed to determine if risks are acceptable.
  - Consider whether control measures are adequate or needed. A hierarchy of controls should be followed: eliminate hazards, safe work practices, procedures, training, personal protective equipment, or other portable equipment. Control measures that are developed during this process should be implemented and communicated.
- If changes are made, communicate the changes to all impacted TriSummit personnel and others as appropriate.
- Conduct a pre-start-up review to ensure that all requirements outlined in the change review have been addressed, and to ensure that any other possible hazardous conditions are considered.

## 2 Management & Leadership

### 2.1 Safety and Environmental Policy Statement

The management of Inuvik Gas Ltd. are expected to demonstrate active and visible leadership of the safety and environmental program.



 2100, 444 5th Avenue SW  
Calgary, AB T2P 2T8  


**Environmental, Health & Safety (EHS) Policy**

We are committed to safety as a core value and operational excellence to ensure we minimize our environmental impacts, while safely and reliably delivering energy.

Environment, Health & Safety :


- We put the health and safety of our employees, customers and communities above all else.
- We believe no job is so urgent that it cannot be done safely.
- We will not compromise safety to gain a business advantage.
- We believe in the importance of caring for our environment.
- We proactively identify and manage risks, lessons learned and best practices in our approach to the environment and safety.

Regulatory Compliance and Integrity :

- We respect and comply with all regulatory requirements, obligations and commitments.
- We are honest and forthright, both in our words and our actions.

Responsibilities & Commitments :

- Senior leadership is responsible for supporting and enabling EHS programs and culture.
- Managers and Supervisors are responsible for the effectiveness of EHS programs, safety culture and compliance with regulations and procedures.
- Workers are responsible for complying with the EHS programs, regulations and working safely as a team.
- We are committed to protecting the physical, psychological and social well-being of everyone on site.
- We are committed to providing a safe and healthy workplace, continuous improvement, superior performance and a zero-injury culture.
- We are committed to operating in a sustainable and environmentally responsible manner.

  
Jared Green, President and CEO

April 9, 2020

## 2.2 Safety Commitments – Code of Conduct

TriSummit Utilities has a Health and Safety Management Code of Conduct in place. The TriSummit code of conduct describes the underlying safety philosophies and key safety principles that the company has committed to. The Health and Safety Management Code of Conduct is shown below:

  
**HEALTH AND SAFETY MANAGEMENT CODE OF CONDUCT**

The Safety of our customers, our communities, our employees and our contractors is a CORE VALUE of TSU (TriSummit Utilities); and as such, employees, and those engaged in conducting business with or on behalf of TSU are required to comply with this Code of Conduct. The two underlying philosophies at TSU are:

- Safety is Everyone’s Responsibility; and
- If We Cannot Do It Safely, We Will Not Do It.

The Health and Safety of people is fundamental to the way TSU conducts business operations. We believe each individual should go home safe and healthy. In support of this, TSU has established the following key principles:

TSU will:

- Comply with or exceed applicable Health and Safety laws, acts, regulations, codes and industry standards;
- Understand the hazards and risks associated with our business and effectively manage them;
- Maintain a management system providing a framework for the protection of the Health and Safety of those involved with or impacted by our business;
- Promote a culture of Health and Safety awareness throughout the organization;
- Ensure our employees, contractors and visitors receive appropriate training and have the right equipment to safely do their work;
- Prepare for, report, respond to and investigate all incidents to learn and improve systems and processes to prevent recurrence;
- Monitor our performance, utilizing key performance indicators, and address areas of concern in a timely manner; and
- Engage with our employees, regulators, industry partners and the communities in which we work to continuously improve our processes and systems.

To achieve excellence in Health and Safety, we recognize that it is a process involving continuous improvement and commitment for everyone bound by this Code of Conduct.

  
JARED GREEN  
President and CEO

*Issued November 2020*



## 2.3 Safety and Environmental Reporting

The General Manager receives regular reports about safety and environmental incidents and other aspects of the safety and environmental program.

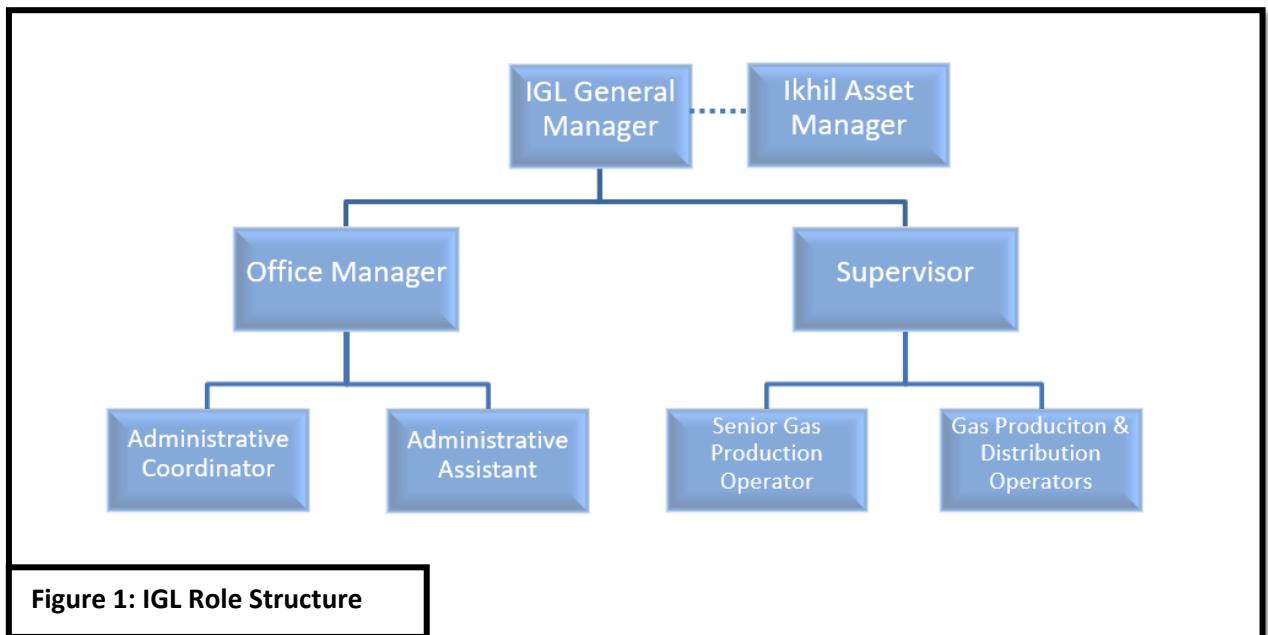
The General Manager will present quarterly reports to the Board of Directors. These reports should cover:

- Incidents (e.g., lost time accidents, property damage, spills, permit infractions, legal actions against the Company, etc.) that occurred and what corrective actions have been taken
- Safety and environmental audits or inspections and action plans
- New projects planned by the Company including the safety and environmental implications and how they will be managed
- Foreseeable safety and environmental or regulatory trends or issues that may affect the Company
- Other safety and environmental program initiatives such as development of manuals, personnel training, wellsite abandonments, etc.

## 2.4 Safety and Environmental Responsibilities

### 2.4.1 Organizational Structure

Figure 1 below illustrates the IGL roles and reporting structure that will support that are responsible for the implementation of this Safety Plan, and how those roles relate to each other within the company.





The IGL General Manager and Ikhil Asset Manager are jointly responsible for implementing and following the EPP Plan. Monitoring, maintenance, and continuous improvement is overseen by the Ikhil Asset Manager.

- IGL General Manager:
  - Name: Paul Unangst
  - Phone: 867-777-3422
  - Email: iglmanager@inuvikgas.com
- TriSummit Ikhil Asset Manager:
  - Name: John Hogg
  - Phone: 403-819-6096
  - Email: jhogg@trisummit.ca

## 2.4.2 Management

To support the Company's policy on safety and the environment, management has established these objectives:

- Provide and maintain safe and healthy working conditions
- Follow established operating procedures that will safeguard all employees
- Ensure that employees are properly trained for the job
- Continue to promote safe and efficient work practices among all employees
- Ensure that property and equipment is maintained within acceptable standards.

## 2.4.3 Supervisors

The supervisor has key responsibilities for safety and environmental protection in his/her area of operations.

The supervisor must:

- Know and practice the company policy on safety and the environment
- Ensure that guidance in proper and safe work practices is given to workers in his/her area
- Ensure that company and government safety regulations are being followed
- Monitor the activities of contractors and their employees in his/her area
- Make sure regular safety meetings are being held and recorded so that unsafe situations are being properly addressed.

## 2.4.4 Employees, Contractors and Visitors

Employees, contractors, and visitors are responsible to follow safety rules and regulations which pertain to their operation. Employees and contractors shall work safely and follow all operating procedures and instructions. If an employee or contractor has any doubt regarding job procedures, the supervisor must be notified.

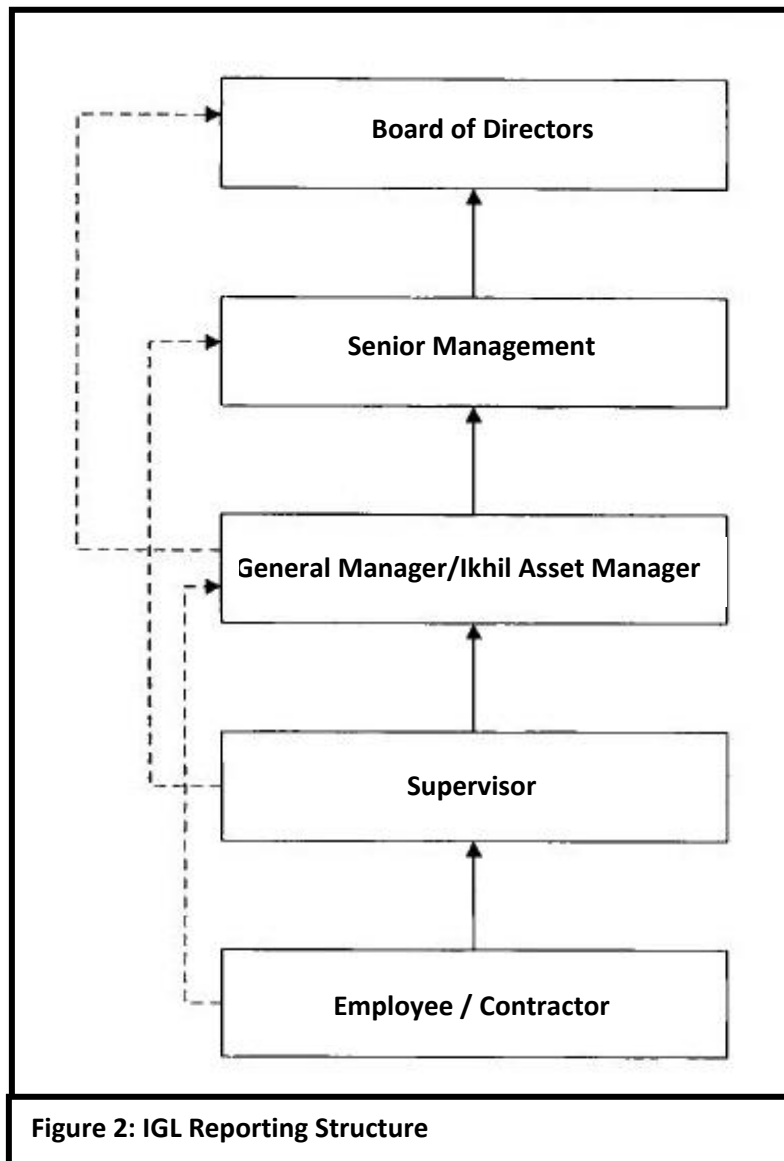
Employees, contractors, or visitors shall correct any unsafe condition as soon as it is observed. If unable to correct the unsafe condition, the employee shall immediately report the problem to the supervisor. All employees are required to take an active part and participate in the Inuvik Gas Ltd. safety programs.

### 2.4.5 Reporting of Safety and Environmental Issues

Reported safety and environmental issues are handled promptly and consistent with Company standards. The following chart is intended to avoid the possibility of a level of management not reacting within reasonable time to Safety and Environmental related issues.

The solid line represents the normal reporting procedures that would be followed to report safety hazards and issues, and environmental concerns.

The dotted line represents the alternate reporting procedure to be followed when there is a failure to respond, or take responsible action on reported issues or concerns



## 3 Communications

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Communications is a critical component of Inuvik Gas Ltd.'s operating practises. An effective communication system will distribute information and receive valuable feedback from employees, contractors, and subcontractors. From this feedback Inuvik Gas Ltd. can determine how well policies, safety rules, safe work practises and procedures are understood and working. This also serves as a means of determining what areas need to be improved and how to improve them.

### 3.1 Employee Training and Awareness

#### 3.1.1 Training Requirements

Oilfield workers come to the job with a wide variety of educational backgrounds and safety training. All new employees will receive a safety orientation on the first day of the job. Some of the items that will be included in the orientation checklist are as follows:

- Verify what safety and environmental training they have received in the past
- Describe Inuvik Gas Ltd.'s Safety and Environmental Policy Statement
- Provide an overview of the Safety and Environmental Program Manual
- Identify the risks associated with the facility where he/she will be working
- Describe emergency and spill response procedures
- Agree on a schedule and priority for him/her to review each of the elements in the Safety and Environmental Program Manual
- Complete and sign the orientation form (see attached)

It is important to keep a record of the mandatory training completed by each employee. The training should include courses such as First Aid, H<sub>2</sub>S, WHMIS, TDG, etc.

#### 3.1.2 Safety and Environmental Orientations

Employees and contractors will be oriented in a timely fashion and to the level of detail they require before undertaking work for which the orientation is required.

Use the attached checklist to ensure consistency of presentation. The checklist must be signed by the person receiving the orientation and the person giving the orientation.

New employees must work under the direct supervision of a competent and experienced employee until the supervisor is satisfied with the employee's competence.

**Required Safety Training Courses**

Type	Certificate Issued	Training Time (Hours)	Renewal Frequency (Years)	Required by
First Aid / CPR	St. John Ambulance	16	3	All Field Employees
H <sub>2</sub> S Alive	Energy Safety Canada	8	3	All Employees Who May be Exposed to Any H <sub>2</sub> S
Respiratory Protection	To Be Determined by Particular Job Requirements, But Not Less Than Annually			All Employees Who May Be Exposed to Oxygen-Deficient or Toxic Atmosphere
Fire Fighting	Operation of Extinguishers, Fire Control		As Required	All Field Employees
WHMIS 2015	Workplace Hazardous Materials Information System	As Required	Refresher Each Year	All Field Employees
Transportation of Dangerous Goods	TDG	As Required	3	All Field Employees Who May Ship Transport or Receive Dangerous Goods
Orientation Training of New Employees	As Required			All New or Transferred Employees

Highlighted box indicates training courses which are mandatory by legislation.



**Employee Orientation Checklist**

<b>Name of Employee:</b>		
<b>Hiring Date:</b>		
<b>Manager or Supervisor:</b>		
	EMP/SUP Initial	Date
Staff Organization		
Hours of Work, Statutory Holidays		
Pay Days, Overtime		
Facility Tour		
Introduction to Fellow Employees		
Safety Policy and Procedures Manual		
Emergency Response		
Alarms - Evacuations - Safe Havens		
Occupational Health and Safety Act and Regulations		
Incident Reporting Requirements		
General Safety Communications (meeting, near miss, etc.)		
Personal Protective Equipment		
Chemical Awareness Program		
Previous Safety Training (if any)		
Driving and Vehicle Policies		
Site Specific Safe Operating Procedures		
Permits		
Assignment of Job Duties		

<b>Courses</b>	<b>Date Taken</b>	<b>Renewal Date</b>
First Aid/CPR		
H <sub>2</sub> S Alive		
WHMIS 2015		
TDG		
Other:		

### 3.2 Task Instruction

Task instruction is a means by which people are told what to do, explained as to how and sometimes why.

When giving task instruction to new employees or contractors unfamiliar with the job or the location, it is important to:

- Ensure that there is an understanding of the job requirement
- Test their knowledge by asking questions
- Ensure that safety issues are discussed
- Ensure that they know the expected results

### 3.3 Pre-Job Meetings

Pre-job safety meetings will be held prior to the commencement of any new, unfamiliar or potentially hazardous task. The meeting shall include:

- Method of performing the task
- General safety requirements
- Hazards likely to be encountered
- Procedures to control the hazards
- The required work permits, if applicable
- Rescue procedures, escape route and assembly locations
- Communication requirement
- Safety equipment

### 3.4 Safety Meetings

Regular safety meetings will be held monthly. The agenda will follow the outline of a normal business meeting. The minutes of the meeting and the names of the attendees will be recorded.

A sample agenda is as follows:

- Previous concerns
  - Solutions
  - Safety training
  - Accident /Incident Review
- New Concerns
  - New Hazards
- Education Program
  - Review Legislation
  - Review Procedures
- Operational Problems
  - Area by Area
- Environmental Concerns

Copies of the safety meeting minutes are to be forwarded to the Calgary office as required. The original copy of the minutes should be retained on file at the work location.

## 3.5 Emergency Response Plan

Inuvik Gas Ltd. has developed an Emergency Response Plan that outlines both the corporate and site-specific procedures.

These procedures can be found in the Ikhil Operations - Emergency Response Plan Manual. The contents of the Emergency Response Plan include:

- Quick Reference Material
  - How to use the Plan
  - Corporate Information
- Head Office Response and Corporate Information
  - Head Office Response
  - Corporate Information
- Field Response and Site-Specific Information
  - Field Response- Production Facility
  - Site Specific Information
  - Site Emergency Contact List
  - Evacuation Centre information
  - Maps and Resident information
  - Hazardous Material
- Reference Material
  - Forms
  - Government Roles & Responsibilities
  - Communication Guidelines
  - Hazardous Chemicals
  - Ignition Procedures

## 3.6 Key Safety Regulations

The Occupational Health and Safety Act and Regulations are intended to promote workers' health and safety on the job. It provides a framework within which the employees and employers can keep the work site safe and free of health hazards. It outlines the rights and responsibilities of all personnel, including contractors.

The Act and Regulations are "rules" to keep the workplace safe and healthy and the employer must do everything reasonable to protect and educate the workers to know and understand these rules.

Other safety regulations stem from the Workers' Compensation Board (WCB) whose purpose is to serve workers and employers by reducing injuries, compensating workers who suffer occupational injuries and illnesses and rehabilitating injured workers to re-employment status.

There are also other legislated requirements that have some effect on the safety program of a company. These include, but are not limited to, the following:





- Radiation Protection Regulation (Canada)
- Transportation of Dangerous Goods Act (Canada)
- Public Health regulations ( NWT and Canada)
- Pipeline Safety Act (Canada)
- Oil and Gas Operations Act (NWT and Canada)
- Safety Act (NWT and Canada)

## 4 Contractor Management

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### 4.1 Contractor Selection

TriSummit or Inuvik Gas Ltd. will verify that all contractors have an adequate safety program for the scope of the work being completed. Safety Programs and plans will be discussed in the planning phases and pre-job safety meetings. The safe work history of contractors will be considered as one of the factors during contractor selection. Contractors that do not have their own formal safety program will be provided with this Safety Plan, informed of, and expected to follow portions that apply to the scope of work.

### 4.2 Contractor Safety and Environmental Program

Inuvik Gas Ltd. will strive to hire contractors who conduct their activities in a manner consistent with the appropriate safety and environmental practices. Contractors shall remain independent as to all work performed under the contract. The detail, manner, means and methods of performing said work shall be under the control and direction of the contractor.

- Contractors are expected to comply with the applicable safety, health and environmental regulations of agencies having jurisdiction at the location where services are performed.
- Contractors are expected to provide their personnel with appropriate safety, health and/or other environmental training required.

Contractors are required to immediately notify the appropriate Inuvik Gas Ltd. supervisor or representative of contractor's or subcontractor's personnel accident(s), incident(s) or spills.

### 4.3 Formal Contractor Agreements

Formal agreements may be signed when contractors are selected to perform specific tasks over an extended period of time. These Inuvik Gas Ltd. agreements will outline the specific responsibilities of both parties. The contractor under the terms of the agreement assumes responsibility for the regulatory requirements and for compliance with the Inuvik Gas Ltd. safety program.

## 5 Incident / Accident Reporting

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### 5.1 Incident Notification and Reporting

All employees and contractors are required to report injuries, serious incidents and spills immediately to their supervisors and to notify government agencies. Failing to report an injury, serious incident, spill or other accidental release is a very serious offence.

All serious injuries, or incidents having the potential to cause serious injury, or any accident whether medical treatment was required or not, must be immediately reported to your supervisor.

When an incident occurs the employee or contractor involved, is responsible to:

- Prevent further injury and loss of property
- Report the event immediately to their supervisor
- Log all data for inclusion in the incident report (copy of the Incident Report following).

### 5.2 Incident and Accident Investigation

In the event of a major incident involving serious injury or extensive property damage an investigation team would be organized to investigate the circumstances leading up to and during the event.

#### 5.2.1 Purpose

The purpose of gathering all relevant information and data is to establish the facts, to enable the drawing of conclusions regarding how and why the incident occurred.

#### 5.2.2 Qualifications

The following areas of qualifications should be considered when selecting an investigation team:

- Technical knowledge
- Objectivity
- Familiarity with the job
- Communications skills
- Analytical skills

#### 5.2.3 How to Gather Information and Data

- Visit scene before any physical evidence is disturbed.
- Ensure the area is secure and safe to enter.
- Make comprehensive visual records. Photographs and/or videos are valuable tools along with sketches and diagrams. In some cases it may not be practical or possible to prolong the preservation of the incident scene; for example: vehicles blocking a public thoroughfare, visual records may be the only source of future reference.

- Identify who was involved and anyone else who may have seen or know something about the incident.
- Interview the witnesses as soon as possible. The validity of their statements is highest immediately following the incident. Witnesses should be interviewed individually and in private so the comments of one do not influence the response of others.
- Review any other sources of potentially useful information. These may include original design specifications, piping and instrument diagrams, operating logs, previous incident reports, procedures, maintenance records, or inspection and test results.
- Determine which incident related items should be preserved. These could become critical evidence items should some form of litigation occur. For example, a piece of piping that failed prematurely.

If potentially beneficial, take samples of unknown chemicals, vapor, residues, dusts, noting any conditions that may have affected the samples.

### 5.2.4 Incident Report

Due to the nature of the ownership and operation, the IGL Incident Report will be used for the Inuvik Gas Project.



## Incident Report

Report Number \_\_\_\_

Completed by: \_\_\_\_\_

1. **PRELIMINARY INFORMATION**

(Complete this page as outlined below within one working day)

a. INCIDENT DATE:	TIME:	REPORT DATE:
b. DEPARTMENT/GROUP NAME:		
c. INCIDENT LOCATION		
d. CATEGORY (check one)		
Medical Aid	Lost Time	Fire / Explosion
Environmental	Vehicle	Security
Near Miss	Close Call	Other (specify)
e. EMPLOYEE(S) INVOLVED OR INJURED IN THE INCIDENT		
Name(s):		
f. INCIDENT DESCRIPTION: (describe the <u>facts</u> surrounding the incident)		
g. IMMEDIATE ACTIONS TAKEN: ( <u>factual</u> account of actions taken immediately after the incident)		
h. Notifications: (your supervisor should be included here)		
Agency:	Talked to :	Date/Time:
Agency:	Talked to:	Date/Time:
Agency:	Talked to:	Date/Time:



# Incident Report

Report Number \_\_\_\_

<b>2. INVESTIGATION AND ANALYSIS</b>			
<b>a. EMPLOYEE(S) INDIRECTLY INVOLVED IN THE INCIDENT:</b>			
Investigator's Name(s):			
Witness' Names(s):			
<b>b. ESTIMATED COSTS</b>			
<b>ITEM</b>	<b>COST</b>	<b>ITEM</b>	<b>COST</b>
Lost Product		Property Damage Costs	
Equipment Repair or Replacement		Clean-up Equipment (spill absorbent, vacuum truck, etc.)	
Lost Time (days)		Disposal Costs (wastes or contaminated materials)	
Employee Costs (wages, overtime)		Other	
Consultants / Contractors		<b>TOTAL COST OF INCIDENT</b>	
<b>c. IMMEDIATE CAUSES: (see reference information, if necessary, AND EXPLAIN)</b>			
<b>d. BASIC CAUSES: (see reference information, if necessary, AND EXPLAIN)</b>			
<b>d. ROOT CAUSE: (see reference information, if necessary, AND EXPLAIN)</b>			
<b>e. OTHER FACTORS AND/OR ENVIRONMENTAL FACTORS FOR CONSIDERATION:</b>			

FM1230



## 5.3 Spill Prevention, Response and Reporting

### 5.3.1 Spill Prevention

The following guidelines should be considered to minimize the risk of spills at Inuvik Gas Ltd. facilities:

- Dykes should be constructed around all facilities that have a reasonable possibility of oil or produced water spills. (Refer to CER & ILA rules - Dykes)
- For a well within 100 meters of a waterbody or where a spill could flow directly into a waterbody, automatic wellhead valves or subsurface valves may be required.
- Water disposal facilities should be checked regularly for tank overflows and piping or flowline leaks and high-level shutdowns.
- Low pressure and high pressure shut-down switches should be employed on water injection pumps where practical. Level alarms on tanks should also be considered.
- All berms, dykes or diversion ditches for spill containment must be properly maintained.
- All dead-end pipe or tubing that could leak fluids must be terminated with a bull plug, blind flange or equivalent.
- All flowing or pumping oil wells and gas wells that handle significant volumes of fluids should be inspected regularly.
- Loading or transferring of produced fluids should be properly supervised.
- Leak detection, level alarms and other spill prevention instrumentation should be checked on a regular basis.
- Corrosion monitoring and prevention practices should be reviewed on a regular basis.

### 5.3.2 Spill Response

The first priorities after discovering a spill are to protect the safety of all personnel and the public, minimize damage to the environment and control costs associated with loss of product or equipment.

The key actions to take immediately following a spill are:

- Assess the safety of the situation (including surrounding public).
- Activate the Ikhil Operations Emergency Response Plan manual to initiate public protection and reporting instructions.
- Remove sources of ignition if safe to do so.
- Approach spill site from upwind side if possible. Positive Pressure Breathing Apparatus (PPBA) should be worn in an H<sub>2</sub>S spill area until such time as atmospheric tests prove the area safe.
- Shut in the source of the spill if safe to do so.
- Information regarding the hazards of all chemicals handled on site can be found in the Material Safety Data Sheets (MSDS) located at the site.
- Notify supervisor. The senior employee or Company representative on-site is responsible to initiate the notification and response procedures.
- Begin containment (dykes, booms, etc.)
- Begin recovery (vacuum trucks, etc.)



- Obtain assistance from appropriate oil spill Co-op or consultants for clean-up and reclamation as required.

### 5.3.3 Spill Reporting

Notify CER, or NT Spill report Line as required by the guidance below. An Incident Report (section 5.2.4 of this document) in conjunction with the spill report form must be completed immediately after a spill and retained on file at the site with a copy forwarded to the General Manager.

### 5.3.4 CER Spill Reporting Guidance

Table 1- Spill Notification Requirements		
Type of Release	Amount / Volume	Responsible Agency
An unintended or uncontrolled sweet natural gas or high vapour pressure (HVP) release .	greater than 30,000 m <sup>3</sup>	CER/TSB
Unrefined product (e.g. crude oil, produced water) on lease	less than 1.5m <sup>3</sup>	not required to report
	greater than 1.5m <sup>3</sup>	CER/TSB
Unrefined product (e.g. crude oil, produced water) off lease	any amount	CER/TSB
Refined product (e.g. lube oil, diesel fuel) on lease	less than 2m <sup>3</sup>	not required to report
	greater than 2m <sup>3</sup>	CER/TSB
Refined product (e.g. lube oil, diesel fuel) off lease	greater than 200 L	CER/TSB
Dangerous Oilfield Wastes	see Table 2	CER/TSB
Contravention of AEP Approval or violation of ambient air quality criteria	-	CER/TSB
TDG or Canadian Environmental Protection Act regulated substance	see Table 2	NT ENR 24-Hr Spill Line (1-867-920-8130) for transportation accidents

These reports are to be made immediately by telephone and, unless the requirement is waived by CER at the time of the oral report, must be followed by a written report within seven days.

For a pipeline emergency Call the Transportation Safety Board (TSB) 24-hour hotline at 819-997-7887.

For all other emergencies related to CER-regulated operations, call the CER at 403-299-2773.

Companies are also required to notify CER and the TSB of spills through their online Event Reporting System (<https://apps.cer-rec.gc.ca/ERS/Home/Index/>). Some examples of reportable Dangerous Goods releases are listed in Table 2.

<b>Table 2- TDG Spill Notification Requirements</b>	
<b>Class &amp; Division</b>	<b>Reportable Quantity</b>
TDG Class 2.1 and 2.2 (compressed gas)	Any Quantity
TDG Class 2.3 and 2.4 (poisonous and corrosive gas)	Any Quantity
TDG Class 3 (flammable liquids)	<ul style="list-style-type: none"> <li>• Packing group I or II: Any quantity</li> <li>• Packing group III or without packing group: 30 L or 30 kg</li> </ul>
TDG Class 4 (flammable solids)	<ul style="list-style-type: none"> <li>• Packing group I or II: Any quantity</li> <li>• Packing group III or without packing group: 30 L or 30 kg</li> </ul>
TDG Class 5.1 (oxidizer)	<ul style="list-style-type: none"> <li>• Packing group I or II: Any quantity</li> <li>• Packing group III or without packing group: 30 L or 30 kg</li> </ul>
TDG Class 5.2 (organic peroxide)	<ul style="list-style-type: none"> <li>• Packing group I or II: Any quantity</li> <li>• Packing group III or without packing group: 30 L or 30 kg</li> </ul>
TDG Class 6.1 (poisonous substance)	<ul style="list-style-type: none"> <li>• Packing group I or II: Any quantity</li> <li>• Packing group III or without packing group: 30 L or 30 kg</li> </ul>
TDG Class 6.2 (infectious substance)	Any Quantity
TDG Class 8 (corrosive substance)	<ul style="list-style-type: none"> <li>• Packing group I or II: Any quantity</li> <li>• Packing group III or without packing group: 30 L or 30 kg</li> </ul>

These reports are to be made immediately by telephone to 1-867-920-8130 and must be followed by a written report to Transport Canada within 30 days.

### 5.3.5 NT-NU Spill Reporting Guidance



<b>Appendix A</b>		
<b>Schedule 1 – Reportable Quantities for NT-NU Spills</b>		
<b>Substance</b>	<b>Reportable Quantity</b>	<b>TDG Class</b>
Explosives	Any amount	1.0
Compressed gas (toxic/corrosive)		2.3/2.4
Infectious substances		6.2
Sewage and wastewater (unless otherwise authorized)		6.2
Radioactive materials		7.0
Unknown substance		None
Compressed gas (Flammable)	Any amount of gas from containers with a capacity greater than 100 L	2.1
Compressed gas (Non-corrosive, non-flammable)		2.2
Flammable liquid	≥ 100 L	3.1/3.2/3.3
Flammable solid	≥ 25 kg	4.1
Substances liable to spontaneous combustion		4.2
Water reactant substances		4.3
Oxidizing substances	≥ 50 L or 50 kg	5.1
Organic peroxides	≥ 1 L or 1 kg	5.2
Environmentally hazardous substances intended for disposal		9.0
Toxic substances	≥ 5 L or 5 kg	6.1
Corrosive substances		8.0
Miscellaneous products, substances or organisms		9.0
PCB mixtures of 5 or more parts per million	≥ 0.5 L or 0.5 kg	9.0
Other contaminants, e.g. crude oil, drilling fluid, produced water, waste or spent chemicals, used or waste oil, vehicle fluids, wastewater, etc.	≥ 100 L or 100 kg	None
Sour natural gas (i.e., contains H <sub>2</sub> S)	Uncontrolled release or sustained flow of 10 minutes or more	None
Sweet natural gas		
Flammable liquid	≥ 20 L	3.1/3.2/3.3
Vehicle fluids	When released on a frozen water body that is being used as a working surface	None
Reported releases or potential releases of any size that: 1. Are near or in an open water body; 2. Are near or in a designated sensitive environment or habitat; 3. Pose an imminent threat to human health or safety; or 4. Pose an imminent threat to a listed species at risk or its critical habitat	Any amount	None

**Note:** L = litre; kg = kilogram; PCB = Polychlorinated Biphenyls; ppm = parts per million

### 5.3.6 Spill Report Form

<h1 style="margin: 0;">NT-NU SPILL REPORT</h1> <p style="margin: 0;">OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS</p> <p style="margin: 0;">NT-NU 24-HOUR SPILL REPORT LINE Tel: (867) 920-8130 • Fax: (867) 873-6924 • Email: spills@gov.nt.ca</p>					
REPORT LINE USE ONLY					
<b>A</b>	Report Date: MM   DD   YY	Report Time:	<input type="checkbox"/> Original Spill Report <b>OR</b> <input type="checkbox"/> Update # _____ to the Original Spill Report		<b>Report Number:</b>
<b>B</b>	Occurrence Date: MM   DD   YY	Occurrence Time:			
<b>C</b>	Land Use Permit Number (if applicable):		Water Licence Number (if applicable):		
<b>D</b>	Geographic Place Name or Distance and Direction from the Named Location:			Region: <input type="checkbox"/> NT <input type="checkbox"/> Nunavut <input type="checkbox"/> Adjacent Jurisdiction or Ocean	
<b>E</b>	Latitude: _____ Degrees _____ Minutes _____ Seconds		Longitude: _____ Degrees _____ Minutes _____ Seconds		
<b>F</b>	Responsible Party or Vessel Name:		Responsible Party Address or Office Location:		
<b>G</b>	Any Contractor Involved:		Contractor Address or Office Location:		
<b>H</b>	Product Spilled: <input type="checkbox"/> Potential Spill	Quantity in Litres, Kilograms or Cubic Metres:	U.N. Number:		
<b>I</b>	Spill Source:	Spill Cause:	Area of Contamination in Square Metres:		
<b>J</b>	Factors Affecting Spill or Recovery:	Describe Any Assistance Required:	Hazards to Persons, Property or Environment:		
<b>K</b>	Additional Information, Comments, Actions Proposed or Taken to Contain, Recover or Dispose of Spilled Product and Contaminated Materials:				
<b>L</b>	Reported to Spill Line by:	Position:	Employer:	Location Calling From:	Telephone:
<b>M</b>	Any Alternate Contact:	Position:	Employer:	Alternate Contact Location:	Alternate Telephone:
REPORT LINE USE ONLY					
<b>N</b>	Received at Spill Line by:	Position:	Employer:	Location Called:	Report Line Number:
Lead Agency: <input type="checkbox"/> EC <input type="checkbox"/> CCG/TCMSS <input type="checkbox"/> GNWT <input type="checkbox"/> GN <input type="checkbox"/> ILA <input type="checkbox"/> AANDC <input type="checkbox"/> NEB <input type="checkbox"/> Other: _____			Significance: <input type="checkbox"/> Minor <input type="checkbox"/> Major <input type="checkbox"/> Unknown	File Status: <input type="checkbox"/> Open <input type="checkbox"/> Closed	
<b>Agency:</b>		<b>Contact Name:</b>	<b>Contact Time:</b>	<b>Remarks:</b>	
Lead Agency:					
First Support Agency:					
Second Support Agency:					
Third Support Agency:					

### 5.3.7 Instructions for completing Spill Report Form

Appendix C	
 <b>Instructions for Completing the NT-NU Spill Report Form</b> 	
<p>Spill reports to be phoned in immediately by calling collect at 867-920-8130. The NT/NU Spill Report Form can be filled out electronically and faxed to the Spill Report Line* at 867-873-6924. Forms can also be emailed as an attachment to spills@gov.nt.ca. Please verify receipt of email transmissions with a follow-up telephone call to 867-920-8130.</p>	
A. Report Date and Time	The actual date and time that the spill was reported to the Spill Report Line. If the spill is phoned in, the Spill Report Line will fill this out. <u>Please do not fill in the Report Number.</u> The Spill Report Line will assign a report number after the spill is reported.
B. Occurrence Date and Time	Indicate to the best of your knowledge the exact date and time that the spill occurred. This should not to be confused with the report date and time (Refer to Box A).
C. Land Use Permit Number and/or Water Licence Number	Fill this in only if a Land Use Permit and/or Water Licence has been issued.
D. Geographic Place Name	In most cases, this will be the name of the city or town where the spill occurred. For remote locations outside of communities, identify the most prominent geographic feature such as a named lake or mountain and/or the distance and direction from the nearest population centre. <u>Please include the geographic coordinates for remote locations</u> (Refer to Box E).
E. Geographic Coordinates	Only fill this out if the spill occurred outside of an established community (e.g. at a remote camp, mine site, road, highway or shipping route). <u>State the location in degrees, minutes and seconds of Latitude and Longitude</u> (e.g. 64°29'46"N; 110°16'24"W, where N = North Latitude and W = West Longitude).
F. Responsible Party or Ship/Vessel/Barge Name	The Responsible Party is the person who managed, controlled or owned the product when it spilled. For a spill from a ship/vessel/barge, record the ship/vessel/barge name, normally painted on one or more sides. Provide the full address, telephone number and email of the responsible party or the ship/vessel/barge operator, if known. Use box K if there is insufficient space. <u>Product owners are responsible for product spills, regardless of who or what may have actually caused a spill.</u>
G. Any Contractor Involved	Record the name and address/office location of any other parties or contractors involved with the spill (e.g. a construction company working for the owner of the spilled product and who may have contributed to or caused the spill and/or is responding to the spill on behalf of the owner).
H. Product Spilled	Identify the product spilled. Most commonly, it is gasoline, diesel fuel or sewage. Avoid using trade names for spilled products. Wherever possible, use the chemical name of the product and further identify the product using the four-digit UN number (e.g. UN1203 for Gasoline, UN1202 for Diesel Fuel and UN1863 for Jet A & Jet B fuel). URL <a href="http://www.en.wikipedia.org/wiki/List_of_UN_numbers">www.en.wikipedia.org/wiki/List_of_UN_numbers</a>
I. Spill Source	Identify the source of the spill, if known (e.g. ship/vessel/barge, storage tank, pipeline, truck, sewage lagoon, tailings pond, etc.) and the cause of the spill, if known (e.g. overfill, leak, rupture, grounding, collision, fire, flood, extreme weather, corrosion, equipment failure, human error, vandalism, etc.). Provide an estimate of the extent of the contaminated area (e.g. 10 m <sup>2</sup> or 10 square metres).
J. Factors Affecting Spill	Identify factors that could make it difficult to control or clean up the spill (e.g. terrain, weather, access, visibility, dangerous work conditions, lack of equipment or personnel, ice, currents, tides etc.). Indicate if you require advice and/or assistance with the cleanup operation. Identify any hazards to persons, property or the environment.
K. Additional Information	Provide additional explanatory information and pertinent details about the spill (e.g. unusual hazards, properties or behaviour of the spilled product; a diagram of the spill site and affected areas; actions taken to contain, clean up and dispose of spilled material and notify affected parties; and problems or issues associated with the spill response). If necessary, append additional sheets to the spill report. Number the pages in the same format found in the lower right hand corner of the Spill Report Form (e.g. 'Page 1 of 2', 'Page 2 of 2', etc.). <u>Please number the pages so recipients can determine if they received all pages.</u>
L. Reported to Spill Report Line by	Provide your full name, employer, contact number and the location from which you are reporting the spill. Use box K if there is insufficient space.
M. Alternate Contact	Identify any alternate contacts. This information helps regulatory agencies obtain additional information if they are unable to contact the individual who reported the spill.
N. Spill Report Line Use Only	<u>Leave blank.</u> This box is for the <u>Spill Report Line's use only.</u>

## 6 Hazard Identification and Control

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### 6.1 Hazard Identification

An inventory of hazards associated with the Inuvik Gas Project operations was conducted as a part of the Emergency Response Plan component of the overall Production Operations Plan. Reference the *Ikhil Operations Emergency Response Plan* for a list of hazards and associated hazard guides.

A hazard assessment for the Ikhil Pipeline and the two well sites associated with the Inuvik Gas Project operations was conducted as part of the Environmental Protection Plan component of the overall Production Operations Plan. A hazard evaluation for the pipeline was developed based on a worst-case scenario of a pipeline rupture, gas ignition and resulting jet fire. A hazard evaluation for the well sites was developed based on an assumed worst-case scenario of a wellhead failure, gas ignition and resulting jet fire. Reference *Environmental Protection Plan: The Inuvik Gas Project* for the complete hazard assessments.

### 6.2 Inspections and Audits

The purpose of an inspection and audit program is to ensure facilities are being operated in compliance with regulatory requirements, at acceptable industry practice, and at acceptable levels of risk. Inuvik Gas Ltd.'s safety and environmental inspection program includes:

- Inspections
  - Inspections are conducted on a monthly frequency by operations personnel using an Inspection Checklist. The results of Inspections are to be documented and kept on file at the facility and the Operations Centre. All deficiencies must be tracked to resolution.
- Safety Audits
  - Audits will be undertaken on major facilities when the safety risk is considered significant. Inuvik Gas Ltd. or TriSummit may retain outside specialists to undertake these audits either independently or together with operations staff. Alternatively, personnel from other operating areas of the joint venture partners may audit the Ikhil facilities. The results of any audits are to be documented and kept on file at the facility and the Operations Centre. All deficiencies must be tracked to resolution.

### 6.2.1.1 Safety Inspection Checklist

Safety Inspection			
Location:			
Description:			
Inspector:		Inspection Date:	
Inspected By:			
Facility Description			
Type of facility:			
Age of facility:			
History of facility:			
Operational status:			
Future plans:			
Approximate production rates:	m <sup>3</sup> /d oil	m <sup>3</sup> /d water	10 <sup>3</sup> Gas
	m <sup>3</sup> /d	sour	sweet
Past Use of Property (if known):			
Comments:			
Safety			
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Free of obstructions?	
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Excavation barriers in place?	
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Adequate illumination?	
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Trees, brush safely cleared?	
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Scaffolds, ladders?	
<input type="checkbox"/> Yes	<input type="checkbox"/> No	General housekeeping	
Comments:			

<b>Chemical Storage</b>		
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Chemicals stored on site?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Containers labeled? MSDS on site?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	WHMIS labels?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	TDG signs /labels?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Hazard signs?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Tank contents labelled?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Colour coding in place?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Containment system in place around significant storage facilities?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Barrels used for storage? Located on barrel dock or ground?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Bulk storage of chemicals?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Evidence of spills?
Comments:		
<b>Fire Protection</b>		
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Appropriate fire extinguishers available?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Fixed fire protection systems?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Fuel tanks protected?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Extinguishers in /on vehicles?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Flammable property stored?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Extinguishers in buildings?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Exits unobstructed?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	No Smoking signs?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Fire blankets available?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Fire detection I alarm systems adequate?
Comments:		



First Aid		
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Approved first aid supplies?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Signs indicating location?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Trained first aiders?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Treatment logbook available?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Suitable emergency transport?
Comments:		
Mobile Equipment		
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Seatbelts in use?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Refuelling in safe area?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Appropriate bonding and grounding?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Daily vehicle inspections conducted I available?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Hydraulic hoses, fittings inspected?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Proper guards in place?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Back-up alarms installed?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Spark arrestors on exhaust?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Fire extinguishers in place?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Last I next service date shown?
Comments:		

<b>Cranes / Lifting Equipment</b>		
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Logbook available?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Capacity charts available?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Correct latches on hooks?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Loads safely moved?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Booms clear of power lines?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Signalmen, taglines in use?
Comments:		
<b>Welding / Fabrication</b>		
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Equipment inspected daily?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Areas clear of combustibles?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Appropriate ventilation I screens?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Free of tripping hazards?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Materials properly stored?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Free of overhead hazards?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Adequate work platforms?
Comments:		
<b>Hand and Portable Tools</b>		
<input type="checkbox"/> Yes	<input type="checkbox"/> No	General safe condition?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Air hoses, power cables safely positioned?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Guards in place?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Hoses, cables in good condition?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Air hoses, couplings restrained?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Tools safely stored?
Comments:		

<b>Machine Tools and Guarding</b>		
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Adequate guards in place?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Proper general condition?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Emergency stop button?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Operator & Service manual available?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Adequate guards in place?
Comments:		
<b>Personal Protective Equipment</b>		
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Head protection worn?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Eye protection worn?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Foot protection worn?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Hearing protection worn?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Proper clothing worn?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Chainsaw protective clothing?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Fall protection where needed?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	PPE in good general condition?
Comments:		
<b>Eye Baths and Showers</b>		
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Adequate water supply?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Accessibility to known hazards
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Signs and instructions?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Maintenance and testing program?
Comments:		

Floors Aisles and Walkways		
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Free of obstructions?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Free of slipping & tripping hazards?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Openings covered I barricaded?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Adequate lighting?
Comments:		
Entry / Exit		
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Exit doors marked operating?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Adequately illuminated?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Unobstructed?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Proper signage?
Comments:		
Electrical Panels / Switches		
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Unobstructed I secured?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Identified?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Sealed from moisture?
Comments:		

Office Equipment		
<input type="checkbox"/> Yes	<input type="checkbox"/> No	General condition?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Free of material on top?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Operating inst. clearly identified (if applicable)?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Proper handling procedures?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Tripping hazards identified?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Electrical connections free of defects?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Fire I safety equip. available (where applicable)?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Service instr. available (where applicable)?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Sufficient space available?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Supplies safely stored?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Using equipment properly?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Housekeeping in order?
Comments:		
Access / Egress / Roadways		
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Adequate evacuation access I egress?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Adequate building access I egress?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Roadway unobstructed?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Adequate roadway clearances?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Adequate signage?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Complacency by personnel?
Comments:		

<b>Materials / Storage</b>		
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Adequate storage?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Hazardous materials?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Compressed gas cylinders?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Proper fuel storage?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Appropriate waste containers?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Materials properly stacked?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Housekeeping?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Grounding and bonding of flammable liquids?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	MSDS available?
Comments:		
<b>Lockout Systems</b>		
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Lockout available?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Permit systems in place?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Tags to indicate users?
Comments:		
<b>Shop Equipment</b>		
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Guard in place?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	PPE available?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	General conditions /leaks?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Housekeeping?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Proper signage?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Adequate illumination?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Controls identified?
Comments:		
<b>Camp Facilities</b>		

<input type="checkbox"/> Yes	<input type="checkbox"/> No	Housekeeping?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	General fire protection?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Kitchen area fire protection?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Garbage Removed from site?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Proper signage?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Adequate illumination?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Safety signs, posters?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	ERP & Safety Manuals available?
Comments:		
<b>Emergency Response</b>		
ERP On Site:		
Alarm Call-out system:		
Spill Containment Equipment		
Comments:		

## 6.3 Government Inspections

The Canadian Energy Regulator, CER, Office of the Regulator of Oil and Gas Regulations, OROGO, the GNWT Occupational Health and Safety Act and other safety and environmental legislation provide broad powers of search and seizure. Investigators may enter facilities, copy documents, and solicit evidence.

Generally, an "inspection" is a review by Regulators for the purpose of ensuring technical compliance with approvals or legislative standards. The purpose of an "investigation" is to ascertain whether an offence has been committed and to gather sufficient information to support a prosecution. Inuvik Gas Ltd. staff are expected to know the extent of an appropriate response and the nature of reasonable objections, but they should not risk obstructing the investigators in performing their investigation.

A government inspector may call in advance to advise of their planned visit or their arrival may be unexpected. It is important that employees be aware of their responsibilities to co-operate with the inspectors and avoid statements or actions that may incriminate themselves or the Company.

Inspectors and investigators have quite broad powers for warrantless search and removal of documents or samples. The inspector can enter, examine and inspect places, things and vehicles. The inspector can use any equipment, examine, and take documents, take samples, conduct tests and make reasonable inquiries of any person. They may also ask the person to operate mechanical or process equipment. Investigations may be undertaken with or without search warrants.

When an investigator or inspector arrives at the facility, the senior on-site employee will be expected to respond to the inspector's questions and should be aware that any information collected may be used against him/her or the Company if a charge is laid. The following guidelines are suggested for dealing with an inspection:

- It is important that Inuvik Gas Ltd. employees give the inspector or investigator all reasonable assistance for him to carry out his duties and to furnish information relative to the investigation. Employees must not knowingly provide false or misleading information or destroy evidence.
- Be courteous to the investigator and do not attempt to obstruct the investigation.
- Where emergency or spill situations exist, deal with the emergency first.
- As with any other visitor, it is imperative that all safety precautions be followed.
- If possible, obtain the name, title, address, and official identification of the investigator.
- Ask the investigator:
  - are we under investigation?
  - what possible offence is being investigated?
  - what suspected incident, what part of the facility or what materials are being searched?
  - what is the authority for your investigation?
  - to see and make a copy of the order, authority or search warrant.
- The senior employee must accompany the investigator at all times.
- Retrieve information specifically requested by the investigator.
- Take the investigator to the relevant area for his investigation. Do not tour other parts of the facility.
- Take careful notes of information, samples, etc. provided to investigator.



- Report all investigations to the General Manager, within 24 hours.

## 6.4 Hazard Reporting

Workplace hazards come in many forms, they can be created, or occur naturally as a result of a process or environmental condition.

Hazards are most often the result of one or more of the following:

- Poor maintenance
- Poor workmanship
- Inadequate design or engineering
- Wear and tear
- Actions of people
- Abuse or misuse

The assessment questions most commonly addressed are:

- What equipment or materials if improperly used, could possibly be hazardous and may result in an injury or property damage occurrence?
- What activities, if done incorrectly, could be hazardous?
- What environmental conditions (weather, ice, etc.) or activities by other personnel in the area could create a hazard?

Employees, Contractors and Subcontractors are required to report hazards verbally as soon as possible to their immediate supervisor. The supervisor is responsible for ensuring that the necessary action is taken to correct the situation.

A record of hazards reported will be maintained at the work site.

## 6.5 Engineering Controls

Any new construction or modification to existing facilities requires an assessment to ensure that the facilities are properly designed and will operate in a safe manner.

The design review will be conducted by Inuvik Gas Ltd. engineering, and the following approvals must be received prior to commencement of construction;

- **Modifications to High Pressure Systems:**  
No changes can be made to high pressure piping at field locations without receiving prior approval from the Calgary Office Engineering Department.
- **Modifications to Low Pressure Systems:**  
Changes to low pressure piping can be made with the approval of the Field Supervisor. A review of the modifications made must be reviewed with Calgary Office Engineering Department at a later date.

## 7 Safety Rules

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### 7.1 Personal Protective Equipment

The intent of this section is to specify personal protective equipment requirements and to ensure that all staff, contractors, and visitors use the approved personal protective equipment when the work they are doing involves hazards that could cause injury.

#### 7.1.1 Headgear

C.S.A. approved Class B rated, non-conducting high impact plastic, industrial headgear must be worn by all personnel at the field work sites.

#### 7.1.2 Hearing Protection

Where there is a danger of injury to a worker's eyes, the worker will wear properly fitting eye protective equipment that is appropriate to the work being done, the hazard involved and which meets C.S.A. standards.

#### 7.1.3 Eye Protection

Where there is a danger of injury to a worker's eyes, the worker will wear properly fitting eye protective equipment that is appropriate to the work being done, the hazard involved and which meets C.S.A. standards.

#### 7.1.4 Clothing

All persons in the workplace must be fully clothed with fire retardant clothing. Pants must cover the legs and long sleeve shirts must be worn. Clothing that is loose, ragged or torn cannot be worn near rotating equipment. Nylon or other spark producing materials are prohibited.

#### 7.1.5 Gloves and Mitts

Gloves and mitts are recommended for many tasks such as closing or opening valves, handling heavy tools, or where the potential exists for exposure to chemicals.

#### 7.1.6 Footwear

C.S.A. Class I (green label) approved footwear must be worn by all workers entering field sites. Boot style is recommended.

### 7.2 First-Aid

These requirements establish procedures for training employees and providing equipment and emergency conveyance to ensure that adequate medical first aid treatment is available at work sites.

If an accident does occur that results in injuries to one or more people, there are a number of steps to follow:

Call for immediate assistance from other personnel and/or from trained medical personnel. Be prepared to apply first aid (if formally trained). First aid must be limited to only that treatment which is necessary to prevent death or further injury, relieve pain or counteract shock.

Standard first aid equipment requirements as required by legislation must be maintained for each work site. A worker shall, on being injured, report it to their supervisor as soon as practicable following the injury.

An injury must be recorded in a record book provided for that purpose and kept for at least three years from the date of its entry.

## 7.3 Vehicle Safety

All Company-owned, operated, and leased vehicles and the vehicles of contractors conducting Company business shall have properly-operating seat belts for each occupant's seat. All occupants are required to wear seat belts while the vehicle is in operation.

All personnel who operate a motor vehicle in the conduct of Company business must possess a valid driver's license for the class of equipment being operated.

Hazardous Material Transport: All hazardous material will be transported in accordance with applicable regulatory requirements.

Firearms shall not be carried in Company vehicles.

Fire extinguishers are required in all Company/Contractor vehicles and will meet all applicable regulatory requirements. A 20 lb. fire extinguisher is recommended.

An appropriate First-Aid kit must be carried in Company vehicles.

## 7.4 Safety Signs

Safety signs are used to ensure that workplace hazards are identified.

Signs must be posted at the entrances of all Inuvik Gas Ltd.'s battery, gas compression, gas processing facilities and drilling locations. The signs will be visible and legible at all times. The following information may be included on signs posted at Inuvik Gas Ltd. facilities to identify general information and/or specific hazards:

- Legal description (company name and legal description)
- Authorized personnel only
- No smoking
- Other personal protective equipment requirements
- Hard hat area and a H<sub>2</sub>S warning sign (at all facilities where H<sub>2</sub>S may exceed 10 ppm at any location within the facility).
- Emergency phone number (local and Calgary numbers)
- High pressure gas (if applicable)
- Auto restart (if applicable)
- Hearing protection required (if applicable).

Labels and placards must be used in accordance with Workplace Hazardous Materials Information System (WHMIS) and the Transportation of Dangerous Goods (TDG) Regulations. Documentation requirements of both the Workplace Hazardous Materials Information System (WHMIS) and the Transportation of Dangerous Goods Act must be kept on record at locations.

## 7.5 Fire Protection and Equipment

These requirements are to ensure that there is adequate fire fighting equipment available for the safety of personnel, equipment, and facilities.

Appropriate fire extinguishers must be placed in the immediate area of any work involving welding, burning, use of flammable liquids, or any other similar work.

Only competent personnel should attempt to fight a fire, and only when they have adequate training and equipment to control and extinguish the fire. No one should attempt to control or extinguish a fire until a call for assistance has been made. A clear escape route must be maintained at all times.

Locations with potential fire hazards (e.g. flammable liquid storage areas, gasoline filling areas, etc.) must be designated as 'No Smoking' areas. It is your responsibility to know these locations and comply with the 'No Smoking' rule. In these areas, a Safe Work Permit may be required when using electrical, arcing, or sparking devices or other devices that may become a source of ignition.

All maintenance of fire equipment must be performed by a competent person(s) in accordance with the manufacturer's specification.

All fire extinguishers must be visually checked once per month and recorded on the inspection tags fastened to each extinguisher. Once a year, all extinguishers must have a thorough maintenance check by a qualified fire maintenance company.

All fires must be reported immediately to Inuvik Gas Ltd. management.

## 7.6 Housekeeping

The requirements for good housekeeping are to provide a safe and attractive workplace by preserving high standards of maintenance and housekeeping.

The Occupational Health and Safety Act and Regulations and the Oil and Gas Act and Regulations address housekeeping in a general way. In addition to any regulatory requirements Inuvik Gas Ltd. management expect the following from our personnel and Contractors:

- Awareness and correction of the potential hazards which may result from poor housekeeping practices and standards such as slips, trips and falls, fire hazards, damage to equipment and material from falling objects, etc.
- Good housekeeping practices include keeping tools, materials, equipment, buildings, and properties clean and in good order.
- Aisle ways and walking surfaces shall be kept clear of materials and equipment as much as possible.
- Good housekeeping is the day-to-day responsibility of all personnel and is a continual process.
- No job is complete until tools have been cleaned and properly stored, scrap and waste materials properly disposed of, and the equipment and work location is in good orderly condition.

Slick areas on the walking surfaces caused by water, oil or other substances shall be cleaned up immediately.

## 7.7 Smoking Policy

Smoking is not permitted within a plant fence, a facility office, or a company vehicle when there is more than one person present. Also smoking is not permitted in any areas where flammable or combustible liquids or explosives are manufactured, handled or stored. The following are other locations where smoking is prohibited:

- Battery storage or charging location
- Where 'No Smoking' signs are posted
- Around any pipeline or equipment repair work
- Where oxygen and acetylene are stored
- On the derrick floor, substructure, or mud tanks of any drilling rig or during any work over job within 150 feet (45.7 meters) of any tank, well, separator vent line, or other possible source of combustible vapors.

Lighters, matches and any other smoking materials are not to be carried outside of the designated smoking areas.

## 7.8 Drugs and Alcohol

The drug and alcohol restrictions are intended to provide a workplace for our employees and others which is free from the effects of illegal drugs and alcohol, thereby promoting a safe work environment and to protect the Company's assets and reputation with its clients, shareholders, and the general public.

Under no circumstances will Inuvik Gas Ltd. management tolerate any person driving a Company vehicle while under the influence of drugs or alcohol.

Any workers, Company and/or contractor, who are found under the influence of drugs or alcohol while on Company business will be discharged immediately.

## 7.9 Hydrogen Sulphide

The intent of this section is to ensure that safe work practices are followed when there is a risk of H<sub>2</sub>S exposure.

Our requirements regarding H<sub>2</sub>S (or sour gas) are as follows:

- All personnel entering a sour gas location must be aware of the properties and toxicity of hydrogen sulphide gas. They must be able to recognize its presence and know how to protect themselves from its lethal effects. The two tables on the following pages show the properties and toxicity of hydrogen sulphide.
- Standard warning signs must be posted in all facilities and areas that have been identified as 'sour' (i.e., H<sub>2</sub>S gas is present).
- Concentrations of H<sub>2</sub>S will vary from one operation to another and the effects of a particular concentration may vary from one individual to another. Nevertheless,

Table 2, showing H<sub>2</sub>S toxicity, may serve as an indication of the probable dangers of exposure.

- It is imperative that all personnel who may be exposed to H<sub>2</sub>S receive ongoing training in the sources and hazards of hydrogen sulphide. This training must cover procedures for testing and measuring H<sub>2</sub>S concentrations, and the use of self-contained or air-supplied breathing apparatus. Rescue and first aid techniques must also be included as part of an H<sub>2</sub>S training program.

No testing for H<sub>2</sub>S must ever take place unless personnel are wearing full respiratory protection. Rescue of H<sub>2</sub>S-affected personnel must never be attempted without respiratory protection.

### Properties of Hydrogen Sulphide

Chemical Name:	Hydrogen Sulphide
Formula:	H <sub>2</sub> S
Colour:	Colourless
Odour:	Distinctive "Rotten Egg" Odour at Low Levels
Boiling Point:	-60°C (-76°F)
Vapour Density:	1.189
Auto-Ignition Temperature:	260°C (500°F)
Flammable Limits:	4.3% to 46% by volume
Solubility:	In Water and Other Liquids

### Toxicity of Hydrogen Sulphide (Exposure Limits)

Parts Per Million	Percentage	Remarks
1	0.0001	Can usually be smelled by personnel.
10	0.001	Normally the maximum continuous exposure for 8 hours. Respiratory protection must be worn at higher levels,
100	0.01	Dulls the sense of smell and causes burning sensation in eyes and/or throat.
500	0.05	Affects central nervous system, can cause confusion and loss of balance.
700	0.07	Loss of consciousness, death may result if not rescued immediately.
1000	0.1	Immediate loss of consciousness, rescue and resuscitation required to avoid death or permanent brain damage.

In atmospheres which contain more than 10 ppm of H<sub>2</sub>S by volume in air, such as inside tanks, well cellars, bell holes, vessels, other confined areas or open spaces, only the following may be used:

Self-contained breathing apparatus is most suitable where more freedom of movement is required, but the time of use is limited to 15 to 30 minutes.

Supplied - air breathing apparatus, with auxiliary self-contained air-supply for emergency purposes.

All contract personnel must be required to comply with the same H<sub>2</sub>S safety requirements as do Inuvik Gas Ltd. personnel.

Facial hair (beards) is prohibited for any person, contractor or visitor who enters an area where respiratory protective equipment may be necessary. There must be no exceptions to this standard.

Any incidents involving H<sub>2</sub>S exposures must be reported immediately to General Manager and to Alberta Labour, Occupational Health and Safety Division.

## 7.10 Machine Guarding

The intent of this section is to provide procedures for protection of personnel from rotating equipment and heat sources.

Machinery with exposed moving parts must be guarded. Any part of a machine that moves presents a hazard. Injuries resulting from being caught in machinery are usually serious and sometimes fatal. Proper guarding of these moving parts eliminates or controls this danger.

Know how the guards work. Check them regularly and report defects to the appropriate person.

Machine cleaning, oiling, repairing or adjusting of guards must never be done while the machinery is in motion. Turn it off and lock it out before you begin.

Any machinery found missing a guard must be reported immediately to your supervisor.

## 7.11 Enforcement

Inuvik Gas Ltd. reinforces the importance of its safety programs by:

- Informing workers about company rules
- Reinforcing safe work habits
- Correcting violations of safety rules and work procedures.

When violations are noticed, work must be interrupted, and the problem discussed with the worker.

If workers intentionally continue to work unsafely or repeatedly make safety mistakes a more formal process is undertaken. This would include:

- Initially having a discussion with the violating worker and a letter placed on file
- A repeated violation could result in a temporary suspension with or without pay, or job termination.

Contract employees violating safety rules or work procedures may be discharged and the contract may be cancelled.

## 8 Safe Work Practices and Procedures

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### 8.1 Critical Structures, Facilities, Equipment and Systems

Structures, facilities, equipment and systems that are critical to the safety of Inuvik Gas Project operations are described in the Development Plan component of the overall Production Operations Plan. Refer to the Development Plan: *Development of the Ikhil Gas Reservoir to Supply Natural Gas to the Town of Inuvik*.

### 8.2 Safe Work Permits

Work permits serve as safety checklists to explain job requirements, conditions, responsibilities and precautionary measures necessary to complete the job safely. Permits are also a means by which operations staff can monitor work activities.

A hot work permit is necessary for work involving an ignition source such as welding or using electric power tools in any potentially hazardous area.

A cold work permit is necessary for any other work having no potential for explosion or fire.

Work permits may also be used to identify and control hazards associated with electrical work and confined space entry.

### 8.3 Electrical Safety

Management must establish safe operating and maintenance procedures to control work involving electrical and electronic systems.

All electrical systems shall be designed, installed, inspected and maintained by competent qualified persons and must meet all applicable codes and standards.

Electrical work on systems shall be performed by qualified, competent personnel, in accordance with written work procedures.

Any work in and around stations, high voltage utility lines and main switchgear shall only be performed by competent authorized personnel and shall be controlled by written procedures.

Electrical hazards in addition to those required by the work permit for confined space entry.

### 8.4 Lockout Procedures

Lockout procedures are developed to provide protection to all personnel working on electrical and/or mechanically driven equipment.

To prepare equipment for maintenance or repair, employees and contractors are to follow these steps:

- Equipment must be shutdown, blocked in, depressured and purged. While equipment is out of service, it must be chained and locked or have operating handles removed. When required, blinds must be installed. Valves must be locked and tagged to indicate that they are not to be put into service until the work is completed.



- Tags must identify the equipment being isolated, the date and the name(s) of the people responsible for installing and removing locks.
- The equipment's main energy source must be locked out and tagged and tested to ensure that isolation has been achieved.
- All hazards, pressure or harmful substances must be rendered safe and equipment must be tested to make sure it won't start prior to beginning work.

## 8.5 Respiratory Protection

Respiratory protection requirements are developed to provide safe work practices for workers in areas where there is a respiratory hazard. This would include all areas that may be subject to airborne contaminants in amounts that exceed legislated occupational exposure limits, or where an oxygen deficient atmosphere exists.

Standard work site health and safety practices specify that where danger exists from reduced oxygen content of the air (less than 19.5% oxygen), or toxic contaminants exceed the allowable exposure limits, self-contained or supplied-air breathing apparatus must be worn.

Respiratory equipment must meet the following requirements:

- Maintain a positive pressure within the face piece at all times while the apparatus is being worn.
- Provide air capacity for 30 minutes.
- Provide full face protection.
- Have a warning alarm for low supply of air if the apparatus is self-contained.
- Be fitted with an egress bottle to be used for emergency egress only (if the apparatus is supplied-air). All air hoses connecting the apparatus to the main air supply must be a minimum of 6 mm (1/4 inch) I.D. and a maximum of 90 meters in length.
- All apparatus, hose, fittings, and regulators must be of an approved type. Have nose cups for all face pieces to reduce the possibility of fogging of the mask.

All employees, contractors, and visitors to a field work location, must be clean-shaven where the face piece of the respirator seals with the skin of the face.

Conditions such as unusual face contours, scars, skin eruptions, eyeglasses, or missing dentures might interfere with the seal. For this reason, the seal must be tested and a satisfactory fit obtained prior to each use. Most manufacturers provide instructions for fit testing.

Immediately after use, the equipment must be cleaned, the face piece sanitized, and the equipment stored in the proper location. The maintenance,

cleaning, and storage of respiratory protection must be consistent with best industry practice. This task should be performed by the user of the equipment.

Respiratory protective equipment that is not used routinely, but is kept ready for emergency use, must be inspected at least monthly by a trained worker. The inspection must ensure that the equipment is in satisfactory working condition, clean, and in its proper location. Written

documentation of this inspection must be retained at the work site and must include the name of the inspector and the date the inspection was performed.

The Supervisor in charge of the work location, must ensure that the requirements for personnel training, use, maintenance and inspection of respiratory protection equipment are conveyed and followed.

All workers entering an Inuvik Gas Ltd. work site where a respiratory hazard may exist must be trained in the following:

- Identification of the toxicity and properties of the chemical hazard
- The proper use of self-contained and supplied air breathing apparatus.

The frequency of training will be determined by the particular job requirement, but will not be less than annually. For each confined-space entry, training in the use of self-contained, supplied-air respiratory protective equipment will be a requirement of each site-specific pre-entry safety meeting.

Documentation of training frequency, type, and session attendance must be retained.

## 8.6 Chemical Safety

The chemical safety practices are developed to ensure that all employees are familiar with all aspects of the chemicals that they are or may be in contact with during their work activities.

All field employees are in actual or potential contact with a number of different chemicals during their day-to-day activities. In order to effectively handle routine or emergency situations associated with these chemicals, employees must know what the chemicals are, what health hazards they may present, what protective equipment is necessary, what first aid procedures are required and what controls are necessary in case of a spill or a leak.

All employees handling chemicals at a work site shall be trained in accordance with the (WHMIS) Workplace Hazardous Materials Information Systems requirements.

Avoid hazards by following the guidance given below:

- Always read the label on the container or Material Safety Data Sheet (MSDS) and make sure you understand the information. If there is no label, do not use the contents.
- Always check that you are wearing the correct protection before handling chemicals. Gloves, eye protection, protective clothing, rubber boots, respirators may be required. All these must be kept in good order.
- Explosive chemicals must be treated with great care. Some chemicals become unstable when old, and explosions can result if these are mishandled. Check the condition of all chemical containers for indications of leakage or age.
- Some chemicals are poisonous if inhaled. Avoid breathing in any fumes from chemicals. Provide good ventilation, or work in the open air. Leave the area immediately if you feel dizzy or unwell.

Any incidents involving injury of personnel or spillage of chemicals must be reported immediately to the on-site supervisor.

The on-site supervisor will then inform Inuvik Gas Ltd. management and local authorities if necessary and put the emergency response plan (ERP) into effect.

An incident report form or spill report form will then be completed and sent to appropriate authorities.

## 8.7 Safety Belts, Lanyards, and Lifelines

The purpose of this section is to describe the proper use of safety belts, harnesses, lanyards, and lifelines for personnel protection.

Our requirements for the use of safety belts, lifelines and lanyards are as follows:

- Lifelines and lanyards must be a minimum of 1/2" nylon or equivalent, with a breaking strength of at least 5,400 pounds. C.S.A. approved Safety belt/harness must be used.
- Whenever work is to be performed at a vertical distance greater than 3.5 metres from the ground on a temporary work site, or greater than 1.2 metres on a permanent work site that is not protected, safety belts/harness must be worn.
- The safety belts, lifelines and lanyards are to be arranged so that workers are supported independently, and prevented from striking a surface below the work with undue force. The worker must be protected from serious injury due to the action of the belt, lanyard or lifeline.
- Belts, ropes, and lifelines must be routinely inspected and replaced as necessary, i.e., aging, weathering, etc. Suspect equipment must not be used and all defective belts, ropes and lifelines must be immediately destroyed.

## 8.8 Grounding Procedures

The intent of this section is to ensure the safety of personnel and that proper grounding procedures are adhered to.

The usual precaution to avoid static electricity sparking is proper bonding or grounding. Bonding and grounding systems should be checked regularly for good mechanical conditions. While overall resistance of the system can be determined with an ohm meter, static voltmeters give a quantitative measure of effectiveness of a ground system.

The nature of a cathodic protection system is to put an electrical charge on the pipe or equipment in question to prevent external corrosion. As a result, the protection must be shut off or disconnected, and the equipment grounded before work on any such protected equipment is started.

Serious harm can result from electricity with relatively low voltages if a person is not adequately isolated. Entering a vessel with improper lighting equipment or tools can lead to serious injury. Improperly grounded tools or equipment can cause shock. The correct tools, devices, and properly trained personnel must be available on site.

## 8.9 Hydrates

The purpose of this section is to provide procedures for the proper identification and safe removal of gas hydrates.

Gas hydrates are solid compounds formed by the reaction of a gas with water. Some of the light hydrocarbons that are components of natural gas form hydrates under pressure at temperatures above Zero. These hydrates form as crystals and look like snow. In pipelines, they can pack solidly to form a restriction resulting in partial or no flow. This is referred to as "line freezing."

A pipeline system should not be run when hydrates are forming unless methanol is being injected or the flowing temperature is being increased over a short period of time.

Hydrates can be removed by increasing the temperature, depressuring, or injecting a water tie-up chemical.

Open flames (i.e., torches, fires, etc.), must not be used for hydrate removal.

When steaming is to take place, safe steaming procedures must be followed. Particular attention should be paid to the rapid vaporization of hydrates and the resultant pressure.

The most effective method for the removal of a hydrate plug is shutting in and depressuring. When depressuring, the hydrate should be depressured from both ends. One side only should not be depressured, followed by an attempt to move the hydrate with the pressure drop. This will only cause a more severe hydrate which may exist for days after depressuring.

Caution must be exercised when a line where hydrates are suspected is being depressured and opened; the hydrates may plug the line and trap pressure as well as dissolve and release hydrocarbons and toxic gases after depressuring.

Gas hydrate formation can be prevented or the hydrates dissolved by the injection of methanol or glycol. Glycols are not recommended unless a specific circumstance dictates, particularly if the injection point is upstream of any compressors.

## 8.10 Ladders and Scaffolding

This section is intended to outline precautions for the safe use of portable ladders and scaffolding.

- ladders must be removed and properly stored after each use. leaving ladders leaning against equipment, vessels, etc. is not acceptable.
- ladders and scaffolding shall be inspected prior to each use. Defective ladders or scaffolding in need of repair must be removed from service, tagged and replaced.
- ladders must be equipped with non-slip feet and be secured against movement.
- Wooden and fiberglass ladders may be used only when working near or with electrical circuits. Metal ladders must not be used in this application.
- When in use, the ladder must extend 1 meter past any platform or landing, and be secured from movement. It must be positioned so that it is no more than one quarter of its height away from the well or structure against which it stands, and the worker must not work from either of the top two rungs, or steps.
- Both hands should be free when climbing up or down ladders. If material must be transported, it should be handled with a rope.

## 8.11 Naturally Occurring Radioactive Materials (NORM)

This information is intended to provide personnel with a general knowledge of Naturally Occurring Radioactive Materials and the precautions to be observed when dealing with these.

- Only those personnel with proper training and experience should work in areas or activities where exposure to NORM could occur. Strict control by monitoring, the implementation of safety measures and the use of personal protective equipment are all required.
- Any incidents involving the presence of NORM's must be reported to the on-site supervisor.

## 8.12 Pressure Safety Valves

This section will provide general information concerning pressure safety valves.

- All safety relief valves and shutdown devices must be tested at regular intervals to determine whether they are in good operating condition.
- Inspection and maintenance are performed so that all safety valves and shutdown equipment are in proper operating condition.
- No PSV may be taken out of service at any time without the approval of the Inuvik Gas Ltd. representative or designate and a signed work permit and procedure.
- No PSV may be taken out of service unless adequate protection is maintained by adjacent equipment or unless continuously manned by an Operator to sufficiently control the working pressure of the equipment.
- All PSVs removed from service must be immediately logged and the following information attached to the PSV tag:
  - Equipment number and location
  - Date removed and reason
  - Serial number
  - Set pressure
- Repairs to the PSV must be made as quickly as possible and the PSV must be replaced immediately after the repair is complete.

### **Procedure for the Removal and Replacement of PSVs:**

- Before a permit is obtained for the removal and replacement of each individual PSV, the following must be ensured:
  - Nothing is going to flare;
  - Nothing is expected to flare;
  - Sweet gas purge to the flare header has been increased to maintain positive pressure at the flare header;
  - The permit writer and the person conducting the job have discussed the possible hazards.
- Breathing equipment must be worn while the task is performed if the facility has a sour flare system.
- Removal or replacement of a PSV must be conducted without interruption and as quickly as possible, including the placing or removal of blind flanges to prevent air from entering the flare systems.

- After installation of a PSV, all block valves must be opened, sealed or locked in the open position, and all flanges checked for leaks.
- The sweet gas purge must be returned to normal. The permit must be returned to the issuer.
- The operator must record the operation in the log.

Testing of safety valves should be done on a regular basis with results being documented and filed at each work location. All work done when removing PSV's must be done under the control of a safe work permit and supervised by an Inuvik Gas Ltd. representative or designate.

## 8.13 Pressure Vessels

The purpose of this section is to ensure that pressure vessels are inspected, tested and maintained to applicable legislative requirements.

- All pressure vessels and piping systems used in a workplace shall be constructed, tested, and installed by qualified personnel.
- No new pressure vessels or piping systems will be used until an Inspector (qualified by Boilers Branch) has inspected them.
- An inspection must also be done by a qualified inspector after any welding, alterations, and/or repairs have been done on a pressure vessel.
- It is recommended by Alberta Labour that all pressure vessels and piping systems be tested anywhere from two to ten-year intervals depending on service and history criteria.
- A list of all pressure vessels and piping systems must be maintained to determine inspection interval and the date for the next inspection.
- Records of all inspections, tests, and maintenance on all pressure vessels and piping systems must be maintained for future references.
- All pressure vessels and piping systems must have a certificate of inspection which stays with equipment until decommissioned.

## 8.14 Excavations and Trenching

This information is intended to provide information on excavation and trenching safety.

- Prior to any worker entering a trench or excavation more than 1.4 metres in depth and narrower than two times the depth, the employer must ensure that the worker is protected from cave-ins and sliding material by cutting back the walls of the excavation to reduce the remaining vertical height to less than 1.4 meters and/or by installing temporary protective structures (shoring).
- Where the cut back method is used, the walls must be cut back to not less than 30 degrees from the vertical in hard and compact soils and in other soils to not less than 45 degrees from the vertical.
- In an excavation of 3 meters or less which is not cut back, temporary protective structures (shoring) must be used. Construction materials must be of sufficient strength to prevent walls of the excavation from caving in.

- The spoil pile must be piled so that it is kept at a safe distance from the edge of the excavation equal to the depth of the excavation. The slope of the spoil pile adjacent to the excavation must be at an angle of not less than 45 degrees from the vertical.
- When it is necessary for a worker to enter an excavation regardless of depth and construction, a suitable means of escape must be provided in the event that some caving may occur (i.e., a ladder that can be used as an escape route).
- Before commencement of work on an excavation or trenching, all underground pipelines, cables and conduits in the area shall be clearly marked.

## 8.15 Hand Tools

This section is intended to ensure the safety of personnel while using hand tools.

- Check tools before each use to ensure they have not been damaged. Use only tools that are in good repair.
- Impact tools such as drift pins, wedges and chisels are unsafe if they have mushroomed or burred heads.
- Do not carry tools in your pockets, especially if they are sharp or pointed. Use a tool kit or tool belt.
- When working overhead, make sure that tools cannot fall to lower levels. Do not leave them on overhead ledges, beams, window sills, etc.
- Tools must be inspected before each use and taken out of service if defective.

Routine maintenance, including frequent cleaning and sharpening is a necessity.

## 8.16 Confined Space Entry

Any person required to enter and work in a confined space must be protected from all hazards associated with the activities involved.

- Entry into any confined space shall be allowed only after completion of all requirements of a safe work permit that defines the protective measures and procedures to protect personnel from injury and illness.
- All workers involved in a confined space entry are required to adhere to the procedures established.
- Prior to entry into a confined space, the atmosphere in the space shall be tested for oxygen content, explosive gases, and toxic substances by a competent person, and entry is not permitted unless:
  - oxygen concentration is maintained between 19% and 25%; and
  - explosive level is below 10% of the LEL; and
  - level of toxic substances is below 10% of the established standard.
- Proper ventilation, or personal protective equipment must be used to control the employee's exposure, where the toxic substance level is excessive or cannot be assured.

- Confined spaces must be isolated by a blanking process or double-block-and-bleed, prior to entry.
- A communication and rescue procedure must be in place to ensure that all personnel in the confined space are in communication at all times and can be rescued, this must be reviewed with all involved personnel.
- Constant monitoring of oxygen and LEL levels must be in place where sources of ignition are introduced into the confined space as part of the work.
- Records of all confined space entry permits shall be kept for at least one year from the date of entry.

## 8.17 Hot Tapping

The purpose of this section is to ensure the safety of all personnel during a hot tapping operation.

- The Contractor must have an on-site procedure that has been approved by Inuvik Gas Ltd. representatives.
- A pre-job safety meeting shall be held with all involved personnel and adequate fire fighting equipment shall be located on site and all personnel involved in the operation shall be familiar with its use.
- If sour product has been in the line, self-contained breathing apparatus must be available.
- The Boiler's Branch must be notified of all hot taps on pressure vessels.

## 8.18 Piping and Equipment Isolation

The purpose of this section is to provide instructions for the isolation of piping and equipment for the protection of personnel and equipment.

- Written procedures must include the purging method and medium to be used, the use of a 'blind list' to ensure placement and removal of blinds (where suitable) and step-by-step instructions on performing the job. The unit is to be clearly marked to indicate that a blind flange has been installed. Blind flanges used for this purpose are to be of sufficient rating to withstand the highest possible pressure that may result.
- All handling of equipment required for blowdown, gas excavations or purging must be done by or under the direction of on-site supervisor.

## 8.19 Pigging and Testing

The purpose of this section is to provide safe procedures for pigging operations on pipes, pipelines, and flowlines for the removal of wax, other solid deposits, and trapped fluids.

- Pigging and testing of pipelines and facilities shall be carried out in accordance with the procedures and applicable regulations made under government legislation.
- No workers shall be allowed in the immediate area of the ends of the pipe or the pig catcher while the pipe is under pressure during pigging and testing.



- Prior to inserting or removing the pig, the pig trap must be isolated and depressurized.
- Where the receiver is vented to a proper drain or flare system, a baffle must be fully vented to atmosphere, prior to opening the receiver or launcher.
- A copy of the applicable work procedure must be available at the work site and reviewed by all involved personnel prior to the start of the work.

## 8.20 Stress Relieving

The purpose of this section is to provide guidelines for stress relieving requirements and procedures.

- The Contractor shall have a site-specific procedure in place and approved by on-site supervisor.
- A pre-job safety meeting with all involved personnel shall be held before the operation starts.
- All lines and vessels must be purged of all liquids and toxic or explosive substances.
- At least two persons must be on site at all times during the operation.

## 8.21 Radiographic Inspection and Safety

The purpose of this section is to establish the requirements for safe radiographic inspection of vessels, piping, and pipelines.

- The Contractor must have an on-site procedure that meets established radiation protection standards as made under the Nuclear Safety and Control Act.
- Nominal procedures involve roping off the area, putting up radiation warning signs, and banning unauthorized entry of personnel in the area affected by the work.
- All radioactive materials must be stored in a locked, shielded canister or container, properly identified as to contents and owner, and placed in a locked enclosure or room when not in use.

## 8.22 Construction Activities

There are no planned construction activities for the Inuvik Gas Project. In the event of a future construction project, a construction safety plan would be developed or added to this plan.

## 8.23 Helicopter Travel

The helicopter is normally very safe but it must be approached with caution.

- Areas which present a hazard that should be avoided at all times are:
  - the tail rotor
  - main rotor blades
  - jet exhaust

- radio Antenna and
- pitot head
- The landing areas shall be kept clear of all personnel, cargo, hazardous articles, personal belongings or articles that may be blown around by the rotor downdraft while the helicopter is approaching or leaving the helipad.
- Approach and leave the helicopter in a crouched position and always within the view of the pilot. Never towards the rear of the helicopter. On uneven ground always approach and leave on the downhill side. Never on the uphill side.
- All equipment must be carried horizontally below waist level. Never upright or over the shoulder.
- Any loose articles of clothing (scarves, caps, hard hats, mitts, goggles, etc.) must be properly secured before approaching or leaving the helicopter. It is imperative to keep a tight grip on loose articles.

## 9 Drilling, Completion and Workover Operations

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### 9.1 General Information and Requirements

All contract personnel must be properly trained and certified to meet all provincial legislation (i.e., BOP Certificates, First Aid, H<sub>2</sub>S Alive, WHMIS, Transportation of Dangerous Goods and technical training in the type of operation(s) to be carried out).

An approved work plan outlining all facets of the job must be completed and approved by Inuvik Gas Ltd. management prior to commencement of work.

The Contractor must have a site specific job procedure available which includes emergency response information.

An emergency response plan will be required in all critical jobs and will include blowout prevention and well control procedures.

BOPs will be installed and tested on each job as per legislative requirements. The Contractor will be responsible to have a BOP testing procedure in place and will report all results to the Company representative.

The Contractor will ensure that all spacing requirements for equipment is adhered to.

The Contractor will provide all reports and notifications required by Inuvik Gas Ltd. management, (i.e., inspection checklists, BOP reports, regulatory requirements, ERP'S, etc.).

### 9.2 Safety Requirements for Drilling Operations

This section is intended to ensure the safety of personnel and equipment during drilling operations.

Our requirements for safety during drilling operations are:

- The Drilling Contractor must ensure that all drilling operations are done in accordance with legislative and industry standards.

- All personnel who work on wells with potential of H<sub>2</sub>S must be certified. There must be at least one person on each shift with first aid training. The Toolpush must have 2nd Line BOP Certification.
- The Driller must have 1st Line BOP and standard First Aid Certification.
- All rigs must have MSDS available to personnel and all hands must have WHMIS training on a regular basis.
- Personal protective equipment used on location must be inspected at intervals recommended by the manufacturer and maintained in good condition. This includes hardhats, hearing protection, safety glasses and goggles, rubber gloves, safety belts, etc.
- An adequate number of fire extinguishers of the approved type and design are to be strategically placed around the location before any work is started.
- A minimum of two Self-Contained Breathing Apparatus must be available on those wells where hydrogen sulphide may be encountered. In addition, windsocks or stretchers and fixed hydrogen sulphide monitors must also be utilized.
- All derrick locking pins must be in place on the rig and safety retainers utilized. A guard must be installed in front of the drawworks to help prevent anyone from accidentally accessing this area.
- The emergency escape line, "Geronimo" line must be in place after rigging up.
- The safety pressure relief valve must be in place on the mud circulating system. The shear pin must be in place.
- Emphasis should be given as to the location of overhead electrical lines during rigging up and during operations.
- Emergency phone numbers must be current and posted. Open flame heaters must not be used on location.
- The generator skid and any mobile trailers must be grounded.
- Special precautions should be given to the work platform area since this is the location where the majority of accidents occur, particularly due to rotating and swinging equipment, falls, etc.
- Any governmental inspections must be reported to on-site supervisor or Inuvik Gas Ltd. representative, and any significant incidents or deviations from the work plan must be reported to the on-site supervisor.

### 9.3 Safety Requirements for Well Servicing

This section is intended to review major areas of concern in regard to service rig safety.

Our requirements for well servicing safety are:

- When well servicing operations are being performed, service rig safety is based on good operating practice, safety concerns and legislated requirements.
- Blowout preventers (BOPs) must be installed on all wells when tubing is to be moved (i.e., Class 3 BOPs if H<sub>2</sub>S of 1% or greater).

- The accumulator must be sized so that it can close the annular preventer, open the hydraulic valve and maintain 8,400 kPa (1,200 psig) in the system without recharging. The ram preventers must close completely in no more than 30 seconds and the annular preventer in no more than 60 seconds.
- A back-up nitrogen unit will be provided with enough capacity to close all of the BOPs on the well. The minimum pressure for this system will be 12,500 kPa (1800 psi).
- The BOP controls must be located as close to the driller as possible. A second set of controls must be provided remote from the rig and, where possible, they should be at the accumulator.
- An open stabbing valve with the correct thread and pin size for the tubing being pulled or run must be present on the rig floor at all times. The valve should be raised off the rig floor if possible and handles should be added.
- All BOPs must be pressure tested. Conduct a low pressure test (1400 kPa) and a high pressure test (7000 kPa or formation pressure, whichever is greater). If the well will not accept this pressure level, a tubing hanger plug must be used.
- Ram preventers must be function-tested daily until the job is completed. Annular preventers must be function-tested with pipe through the preventer no less than weekly.
- The kill line must be larger than 50 mm (2") and must be connected directly to the pump discharge manifold.
- Lubricators must be used for all wireline operations. The lubricator must be long enough for the entire tool string including sinker bars and rope sockets. Where the well is classified as sour (1.0% H<sub>2</sub>S) or the bottomhole pressure exceeds 14,000 kPa, the lubricator must be equipped with a grease injector that can be operated from 10 meters away. Lubricators must be pressure- tested to their working pressure with other than well pressure.
- All diesel engines must be equipped with a quick-closing shut-off valve manually operated and mounted on the air intakes. This valve will be operated daily.
- Power tongs must be used to make up and break out all tubing joints. Under no circumstances may chains be used. Torque indicators will be used when making up joints and it will be the wellsite supervisor's responsibility to ensure that the final string run in is made up to recommended manufacturer's levels.
- Where pick-up subs are being used they must have the same OD as the working tubing string or drill pipe. Ram closure on the sub will be checked.
- If conditions warrant, a safety trailer should be on location for sour workovers (oil, water, gas) and will provide the type of equipment required.
- The sump, swab tank and flare stack must be located 50 meters downwind of the rig. The flare stack must be equipped with an ignition device as per CER regulations.
- No smoking is allowed within 25 m of a well, separator, oil storage tank, or ignitable vapour, or on a rig or derrick at a wellsite. Signs must be placed on the entrance to the lease defining the limit of the 'No Smoking' area. All personnel must leave matches, lighters and smoking materials outside this area.
- All rigs must be inspected in accordance with CER, OROGO and OH&S Regulations (i.e., complete CAODC Rig Inspection Sheet).

## 9.4 Well Killing

The purpose of this section is to provide a general guide for well killing operations for service rigs.

- The Contractor must ensure that a procedure is in place and communicated to all personnel involved in the operations.
- Generally an open well, i.e., when neither the wellhead nor the BOPs are in place, is only permitted during daylight. Operations where sour gas or fluids are potentially being flowed or returned to surface should also take place during daylight where possible.
- There must be no pressure on the wellhead before the BOP is installed - this should be done by opening the casing valve to atmosphere. No dependence should be placed on pressure gauges as the casing could be frozen off or plugged.
- A manifold is required between the pump and the wellhead, and adjacent to the pump, so that circulation can be reversed, as required, without breaking out any lines. A check valve must be installed on the discharge line between the pump and the manifold and should be at the manifold.
- All equipment to be used during well killing must meet regulatory standards.

## 9.5 Workovers

This section is developed to provide a general guide for performing rod jobs safely.

The service company must ensure that the following is adhered to:

- The derrick and equipment must be properly grounded.
- Service rigs must be properly centered over the wellhead to prevent the damaging of scrapers and/or centralizers.
- The beam pumping unit brake must be properly set and gear reducer chained. Counter balance weights should never be chained.
- Guy lines must not cross under or over any existing power line.
- There must be no pressure on the wellhead prior to installation of the rod BOP.
- Cathodic protection must be turned off and the pipeline properly bonded
- No personnel should be on the derrick when the initial pull is made on the rods or until one stand of rods is removed from the well.
- Only approved strippers may be used for pulling sucker rods or corod.
- One person must be at the cathead controls when the cathead is being operated in accordance with OH&S regulations (448/83 Sections 203 and 204).
- The manufacturer's specifications for the correct number of guy lines and proper spacing are displayed by means of a plate fixed to the derrick or by a specification sheet available at the rig.
- Rod elevators must be used for pulling or laying down bottomhole pumps. An accurate weight indicator must be used at all times when pulling rods.

- Sucker rods or corod should be properly treated with chemical if they are to be out of the hole for an extended period of time.

## 9.6 Swabbing

This section provides a general guide for safe swabbing operations.

- The Contractor shall ensure that a general procedure is in place and the following items are highlighted:
- If H<sub>2</sub>S is present in dangerous concentrations (10 ppm or 0.001 %), all fluid should be swabbed through proper equipment which may include a separator, flare stack, continuous flare pilot, gas boot, and vented tanks. The equipment, configured appropriately for the specific well, should be supervised by qualified personnel. CER approval is required to flare gas.
- Swabbing down a flowline to either a satellite or a battery will be allowed only with Inuvik Gas Ltd. management approval.
- Swabbing must not be performed after dark.
- Prior to swabbing, all engines except the rig engine must be shut down. Provision must be made for operating oil savers, located on the lubricator from the rig floor or ground level.
- Oil saver rubbers must be maintained in good condition with minimum hydraulic pressure applied to the seals.
- The amount of fluid pulled should be reduced as the well begins to flow.

## 9.7 Perforating

The purpose of this section is to provide a general guide for safe perforating operations.

The service company must ensure that:

- The rear wheels of the perforating unit must be properly chocked, and the perforating unit must be a minimum of 25 m from the wellhead.
- Perforating trucks should not be parked in such a manner that the truck or electric cable will be near or under a power line. Perforating trucks and equipment and the rig and derrick must be properly grounded.
- During perforating operations, all persons except those required to lower or pull the perforating gun from the hole should remain off the rig floor and away from the general area of the wellbore.
- Perforating guns must not be handled on the surface during thunder and lightning storms, due to the possibility of accidental firing.
- The service company is responsible to ensure that no explosives remain around company locations after the job is completed.
- All radio and mobile transmitters must be turned off when their antennae are within 150m of the perforating gun operations. All unnecessary electrical motors must also be turned off.

- If the gun is to be retrieved from the wellbore unfired, only personnel necessary to disarm the gun may stay on the rig floor. All service companies must have a set procedure for safely disarming the gun under these circumstances.
- During perforating operations, a sign must be placed at the lease entrance advising that all radio and mobile transmitters must be turned off and 'No Smoking' regulations followed.
- Lubricators must have a hydraulic pressure test to the working pressure of the lubricator prior to perforating.

## 9.8 Acidizing

The intent of this section is to provide a general guide for safe acidizing operations.

- A pre-treatment safety and procedures meeting with all personnel must be held prior to the acid treatment. The following specific items must be covered:
  - Test pressure
  - Maximum treating pressure
  - Safe handling procedures and identification of fluids to be pumped
  - Delegate responsibility to individuals responsible for looking after wellhead and tank valves
  - Material Safety Data Sheets must be available for all fluids and chemicals to be pumped
  - Eyewash equipment must be available.
- All equipment must be spaced according to applicable government regulations.
- A fire truck may be required if pumping flammable or energized fluids. One or more continuous foam units are recommended.
- Two qualified attendants, i.e., paramedic or emergency medical technician, and an ambulance are required to be present for all acid fractures.
- Toxic fumes may be liberated from returned acid. Breathing apparatus and safety standby may be required for tank gauging.

## 9.9 Cementing

This section is intended to provide a general guide to safe cementing.

All pumping operations where cement is pumped down the wellbore, i.e., squeeze cementing, primary cementing, etc. must meet these requirements:

- All personnel in contact with cement and applicable additives must wear protective equipment specified on the MSDS. Handling procedures should minimize the exposure to chemicals or airborne contaminants. MSDS's must be available on location. Eye wash equipment must be available on the lease.
- Steel lines must be used, and pressure tested to at least 1.2 times the maximum anticipated working pressure, or the wellhead rating, whichever is the lesser. Lines and swivel joints must be properly secured to prevent whipping in the event of a failure.

- Equipment should be located as far away from the wellhead as equipment configuration permits, thus minimizing exposure to high pressure lines.
- The Inuvik Gas Ltd. representative in charge is responsible for ensuring that safe pumping operations are carried out.
- The Service Contractor shall ensure that equipment, personnel, and job procedures adhere to all applicable government regulations and practices.

## 9.10 Testing

The purpose of this section is to provide a general guide for testing operations.

- The Contractor must ensure compliance with all regulatory requirements as per testing programs.
- All government departments that govern well testing must be notified (i.e., CER - for Flaring operations permit and noise permit).
- All personnel involved must be aware of all hazards and what protective equipment is required.
- All equipment spacing must meet CER Regulations.
- A remote-controlled master valve must be installed on the testing head.
- A drill stem test shall be pulled only in daylight unless authorized by Inuvik Gas Ltd. management.
- CER area offices must be notified not less than three days prior to the commencement of all flaring operations. CER approved flare permit is required for H<sub>2</sub>S concentrations of 1%.

## 9.11 Wireline

The purpose of this section is to provide a general guideline for safe wireline operations.

- Well pressure must be checked to ensure that wireline equipment is rated for the working pressure.
- A work permit must be issued prior to commencing all non-routine work or operations involving sour wells unless wireline operation is part of ongoing rig operation.
- A safety meeting must be conducted and documented prior to commencing all non-routine work or operations involving sour wells.
- A safe work procedure must be developed for routine wireline operations where a work permit and pre-job safety meeting is not issued or conducted. The procedure must cover all pertinent safety and operation considerations and emergency plans. This procedure must be reviewed with all pertinent contract personnel. Procedures reviewed and individuals trained must be documented.
- All equipment attached to the wellhead must be adequately supported to prevent lateral movement. Climbing on the lubricator is not allowed. Wireline Units and Picker/Mast Units must have wheels chocked.
- Lubricator and BOP's must be pressure tested to the lesser of 1.2 times the maximum working pressure or the wellhead pressure rating, prior to use.





- Equipment approved for use in sour service must be used (i.e., line, lubricator, BOP's, running tools).