

SAFETY

**APPLICATION FOR APPROVAL OF
THE DEVELOPMENT PLAN FOR
TAGLU FIELD
PROJECT DESCRIPTION**

SAFETY PLAN

10.1.1 HEALTH, SAFETY AND ENVIRONMENTAL MANAGEMENT PLAN

The health, safety and environmental management plans presented in this development plan application and in EIS Volume 7 are broad and conceptual. Before construction and drilling begins, Imperial Oil Resources Limited will have detailed, functional plans in place during the transportation, drilling, construction and pre-commissioning activities of the project. These plans will incorporate feedback obtained through the regulatory review process, and will continue to evolve as project activities progress. An Operations Safety Plan will be put in place for the Operations Phase. Further risk assessments and other required studies will be conducted before any decommissioning and abandonment activity starts.

The Environmental Protection Plan in EIS Volume 7 describes conceptual environmental protection measures that will limit the environmental disturbances associated with the project's design and construction. These conceptual environmental protection measures can also be used for project activities during pre-construction, operations and reclamation.

The environmental contingency plans in EIS Volume 7 describe procedures to be implemented if unforeseen events that could have environmental or socio-economic impacts occur during construction, drilling or operations. The environmental protection measures and the environmental contingency plans described in the EIS will evolve as Taglu engineering design advances and site conditions are better understood. More site-specific environmental protection measures and contingency plans will then be formulated.

As the Taglu field development advances through conceptual, preliminary and detailed engineering and pre-construction planning, and as input is received through community consultations and regulatory reviews, Imperial Oil Resources Limited's health, safety and environmental management plans will be revised and updated to meet the:

- needs of Imperial Oil Resources Limited and its contractors
- requirements of the regulators
- expectations of the public and northern residents

10.1.2 SAFETY GOALS

The Taglu safety goals are to:

- create an incident and injury-free workplace
- provide a drug and alcohol-free workplace

10.1.3 SAFETY BELIEFS

The safety goals are based on the belief that:

- all injuries and occupational illnesses are preventable
- every worker is capable of working safely
- a job is considered well done only if it is done safely
- all workers have the authority to stop work if they believe it cannot be done safely

10.1.4 MANAGEMENT COMMITMENT

The proponent is committed to:

- ensuring that safety is never compromised during decision making
- creating a culture where safety is a fundamental part of doing business
- emphasizing personal responsibility for safety at all levels of management
- using employee involvement at all levels to reinforce systematic incident prevention
- focusing resources on incident prevention processes
- providing a focal point for reporting safety-related initiatives directly to management

10.1.5 REGULATIONS AND STANDARDS

All applicable safety regulations will be adhered to. These will serve as a minimum standard. Corporate standards will be applied where regulations do not exist, or as a supplement to existing regulations, for the benefit of employees, contractors and the public.

10.1.6 SAFETY PLAN IMPLEMENTATION

The proponent will:

- promote safety through management commitment, leadership and participation, and encourage employee involvement at all levels
- assign a safety specialist to the project management team
- develop a safety management system that is specific to project organization, contracting strategy and construction activities, using Imperial Oil Limited's existing safety management system as a guide
- develop a project-specific emergency response plan based on Imperial Oil Limited's existing emergency response plan
- establish a drug and alcohol program (based on Imperial Oil Limited's policies) that includes:
 - awareness
 - training
 - testing
 - employee assistance
- use supplier safety programs and ensure that those safety programs meet the project's standards. Safety requirements will be established in suppliers' contracts.
- evaluate supplier performance, before contracting, to ensure that they have acceptable safety records
- assist companies that have substandard safety records and systems, but whose northern content or specialty skills would provide benefit to the project's goals
- use a proactive approach to safety, such as a behaviour-based observation program
- educate and train project managers, supervisors, employees and supplier personnel to ensure awareness of, competence in, and consistent compliance with policies, standards and procedures
- review industry's best standards, processes and procedures and implement high value-added items
- employ a job hazard and task analysis process, involving all levels of project management and the workforce, to address potential hazards and eliminate or control them before incidents occur

10.1.6 SAFETY PLAN IMPLEMENTATION (cont'd)

- accurately report and thoroughly investigate incidents. This will help to implement a continuous lessons-learned process, maximizing learnings that can be applied to the project.
- establish clear safety expectations and world-class performance targets that can be used for comparison to other similar projects worldwide
- continue to update the emergency response plan

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PROJECT DESCRIPTION****OCCUPATIONAL HEALTH PLAN**

10.2.1 SCOPE

The proponent's occupational health plan addresses issues related to medical care, public health and occupational health risks at the workplace during the project's design, transportation, construction and pre-commissioning stages.

10.2.2 GOALS

The goals of the plan are to:

- ensure that healthy working conditions are established
- ensure that both general and emergency medical care is available and complies with health-related regulatory requirements
- ensure that the workforce is healthy and productive
- reduce health risks related to work activities, processes or products
- establish expectations that contractors and suppliers implement procedures and programs for ensuring healthy working conditions for their personnel in the field

10.2.3 IMPLEMENTATION

The proponent will develop project-specific health plans to:

- assess northern health care facility and service capabilities and develop plans to deliver needed services
- provide specific health-issue identification and awareness training about the risks associated with working in cold, remote arctic locations
- assess risk exposure at job sites and provide appropriate risk-reduction measures
- identify, during the engineering design process, potential health and human factor risks and, to the extent feasible, reduce the risks through engineering

10.2.3 IMPLEMENTATION (cont'd)

- continue to incorporate human factors and health specialist input, including industrial hygiene and ergonomics, through reviews of the:
 - project's design basis
 - project design reviews
 - pre-start-up reviews
- set expectations for contractors and suppliers to implement procedures and programs for ensuring healthy working conditions for their personnel

These plans will continue to be upgraded as the project progresses through the Construction Phase and continues into production operations.

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PROJECT DESCRIPTION****FACILITIES DESIGN**

10.3.1 SCOPE

A high-level risk assessment of the Taglu development was conducted to identify potential hazards and ways to address and mitigate them. The results of the risk assessment were used to incorporate safety features into the engineering design.

10.3.2 MANAGEMENT OF CHANGE

As the project progresses through detailed design, the results of further safety system analyses will be incorporated into the design of the Taglu facilities.

The proponent will build on its existing Management of Change (MOC) procedures to ensure that changes to the project design or construction will not compromise facility or process integrity. These procedures will initiate risk assessments and safety studies to validate proposed changes to the facility and work processes.

10.3.3 FLARE SYSTEM

The flare system consists of a high-pressure system and a low-pressure system to handle all emergency relief and flaring.

The high-pressure system will handle the major relief cases, such as:

- compressor discharge blocked flow
- plant blowdown
- gas chiller tube rupture
- vapour generated in the hydrocarbon liquid dehydration column, caused by a liquid pool fire beneath the column

The low-pressure system will handle the minor relief cases from low-pressure sources, such as:

- equipment with design pressures at or below 689 kPa(g) (100 psig)
- fuel gas system control valve failure

10.3.4 EMERGENCY SHUTDOWN SYSTEM

If an unsafe operating condition requires the facility to be depressurized, ESD valves will be activated automatically to:

- block inlet flow to the facility by shutting in the gas wells
- depressurize the facility by directing the hydrocarbon gas inventory to the flare system at a controlled rate

ESD push-button stations will also be located throughout the facility to enable operators to activate the ESD system manually.

10.3.5 FIRE AND GAS DETECTION

Fire and gas detectors in the Taglu facilities will identify fire and dangerous levels of hydrocarbon vapours. Fire detection might be in the form of flame, heat or smoke detectors or a combination of more than one type. The type of detector selected will depend on the fire risk for a particular area. Responses to alarms will range from continued monitoring to an entire facility ESD. For example, local fire detection in a processing building might lead to isolating the identified area (depending on the location of automatic isolation valves) and directing the system volume, through blowdown, to the flare. The response to such events will be incorporated into the plant control system logic and operations and maintenance procedures. The logic will be reviewed during hazard and operability (HAZOP) reviews.

10.3.6 SAFE REFUGE AND EVACUATION

If the facility needs to be evacuated in an emergency, personnel will gather at the living quarters or the warehouse at the dock. From there, it will be possible to evacuate personnel safely either by barge, fixed-wing aircraft or helicopter.

10.3.7 DESIGN CONDITIONS

10.3.7.1 Overpressure Protection

Equipment and piping systems will be protected from overpressure and loss of hydrocarbon containment by:

- pressure transmitters
- automatic pressure control valves
- pressure safety valves

Pressure transmitters will monitor the pressure at specific locations and sound an alarm if the control system fails and set pressure limits are exceeded. If this occurs, operators will use established procedures to reduce the operating pressure to within normal limits. If the pressure continues to rise, a pressure safety valve

will open and release flow to the flare. When the pressure drops back to normal, the pressure safety valve will close.

10.3.7.2 Loss of Electrical Power

The gas conditioning facility will be equipped with a standby electrical power generator, which will operate automatically if primary power is lost. The standby generator is not designed to provide power for full facility operation, but will provide power to the:

- glycol heat circulation systems and other similar life support systems
- control room and key utilities, which will allow for an orderly shutdown of the gas conditioning facility

10.3.7.3 Vapour Cloud Explosion

If the loss of hydrocarbon containment occurs, a gas cloud could develop in sufficient quantity that subsequent ignition of the gas cloud would result in a vapour cloud explosion. The Taglu site has the following design features to protect personnel and equipment from the effects of such an event:

- the control room, located at the south end of the gas conditioning facility, will be blast hardened to protect Taglu personnel, and to protect instrumentation and controls, to allow an orderly shutdown of the facility
- the control room air intakes will be equipped with gas detection systems linked to automatic shutdown of the heating, ventilation and air conditioning system, to ensure that combustible gases do not enter the room
- the permanent living quarters will be located a safe distance from the well pad and the gas conditioning facility. The living quarters will be the safe muster point if a vapour cloud explosion occurs.

10.3.7.4 Flooding

Flooding occurs annually during spring breakup and occasionally during storm surges. The flooding typically lasts about one week before receding. Foundations and associated buildings will be elevated above the maximum flood level, to protect them from flooding.

10.3.7.5 Ice

Foundations will be designed to withstand the ice flows and forces expected for the region.

10.3.7.6 Spills

Permanent storage tanks will be double-walled or have secondary containment to capture fluid if a spill occurs. Spill response will be detailed in the emergency response plan.

10.3.7.6 Spills (cont'd)

Pressure sensing equipment and level transmitters will be used to verify the system integrity, as loss of pressure or loss of level would indicate a spill or leak in the system.

10.3.8 SUBSURFACE EQUIPMENT

An SCSSSV will be installed in all production wells to mitigate the risk of an uncontrolled flow if surface equipment fails. The valves will be designed to close automatically if significant pressure is lost at surface. The valves will be regularly tested according to the Canada Oil and Gas Production and Conservation Regulations to ensure that they work properly. If an SSSV fails a test, it will be repaired, if possible, or replaced.

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**APPLICATION FOR APPROVAL OF
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PROJECT DESCRIPTION****CONTINGENCY PLANS**

10.4.1 PURPOSE

Contingency plans establish structured processes for responding to incidents or situations that pose or could pose a threat to the safety and welfare of people and the environment.

10.4.2 TYPES OF INCIDENTS

Incidents or situations that might arise at Taglu during drilling, construction or production operations include:

- fluid spills
- fires or explosions
- gas leaks
- well control incidents, including blowouts
- personnel injury and medical emergencies
- aircraft or helicopter incidents
- flooding
- equipment or facility failure

Contingency plans for incidents or situations related to all components of the Mackenzie Gas Project, in general, are presented in EIS Volume 7, Environmental Management.

10.4.3 TAGLU EMERGENCY RESPONSE PLANS**10.4.3.1 Types of Plans**

Specific emergency response plans that will be in place at Taglu before any drilling or construction activity starts include:

- Taglu Emergency Response Plan
- Taglu Well Control Emergency Response Plan

10.4.3.2 Objective of Plans

These plans will be patterned on the proponent's existing emergency response plans and are intended to:

10.4.3.2 Objective of Plans (cont'd)

- ensure prompt, capable handling of an emergency
- reduce danger to people, both on and off the site
- reduce environmental impacts
- make communication more efficient among all individuals and agencies responding to an emergency
- clarify emergency response roles and responsibilities
- aid in an efficient return to normal operations and business function

The audience will range from first responders and members of the area emergency response team (AERT) to external stakeholders interested in understanding the plans in place for dealing with emergencies.

10.4.3.3 Scope of Plan

The Emergency Response Plan will provide:

- a general introduction to the plan and information on how to use it
- a description of the operating area, including information on field areas, facilities, maps and site diagrams and information on other parties in the area
- a description of the company organizations and resources available for dealing with emergencies
- checklists for use by the AERT to identify roles and responsibilities
- specific steps and key contacts for medical aid and notification for potential emergencies
- a communication plan for dealing with both internal and external audiences
- a list of contacts for response teams, command centres and emergency support services
- recovery, clean-up and remedial activities
- procedures for managing and updating the plan

10.4.3.4 Types of Emergencies

The plan will provide specific information on the types of emergencies to which it applies, which might include:

- evacuation (advice and information on evacuating the plant control rooms and anyone near the operation)
- injury or fatality (specific steps on actions to be taken in case of injury or fatality)
- spills (specific responsibilities for supervisors and management for responding to spilled materials)
- well out of control (advice and direction on dealing with a well out of control)
- pipeline rupture (advice for dealing with pipeline ruptures)
- fire or explosion of products (area-specific information related to lease-wide evacuation, emergency lighting and methods for controlling fire)
- threats (detailed information regarding procedures during a bomb threat)
- complaints, such as for odour, flare or noise (information about the steps to take in dealing with complaints)
- NGL release (specific advice on the ignition of NGL releases)
- transportation of dangerous goods (TDG) (advice relating to the transportation of dangerous goods)
- waste management (steps dealing with leaks and spills, and with fires related to waste)

10.4.3.5 Incident Response Process

Figure 10-1 illustrates the general response process by Taglu personnel and, where applicable, supplier organizations, for a Taglu-related incident. This response process, which takes into account the severity level of an incident, will be reflected in Taglu's Emergency Response Plan.

10.4.4 SECURITY PLAN

A comprehensive security plan for the Taglu field will also be developed. The objective of the security plan will be to provide appropriate security safeguards to protect employees and contractors, company information and physical assets from harm or loss resulting from negligence or from hostile or criminal actions. Where appropriate, automation, such as video monitoring and intrusion alarms, will be used to support the security plan.

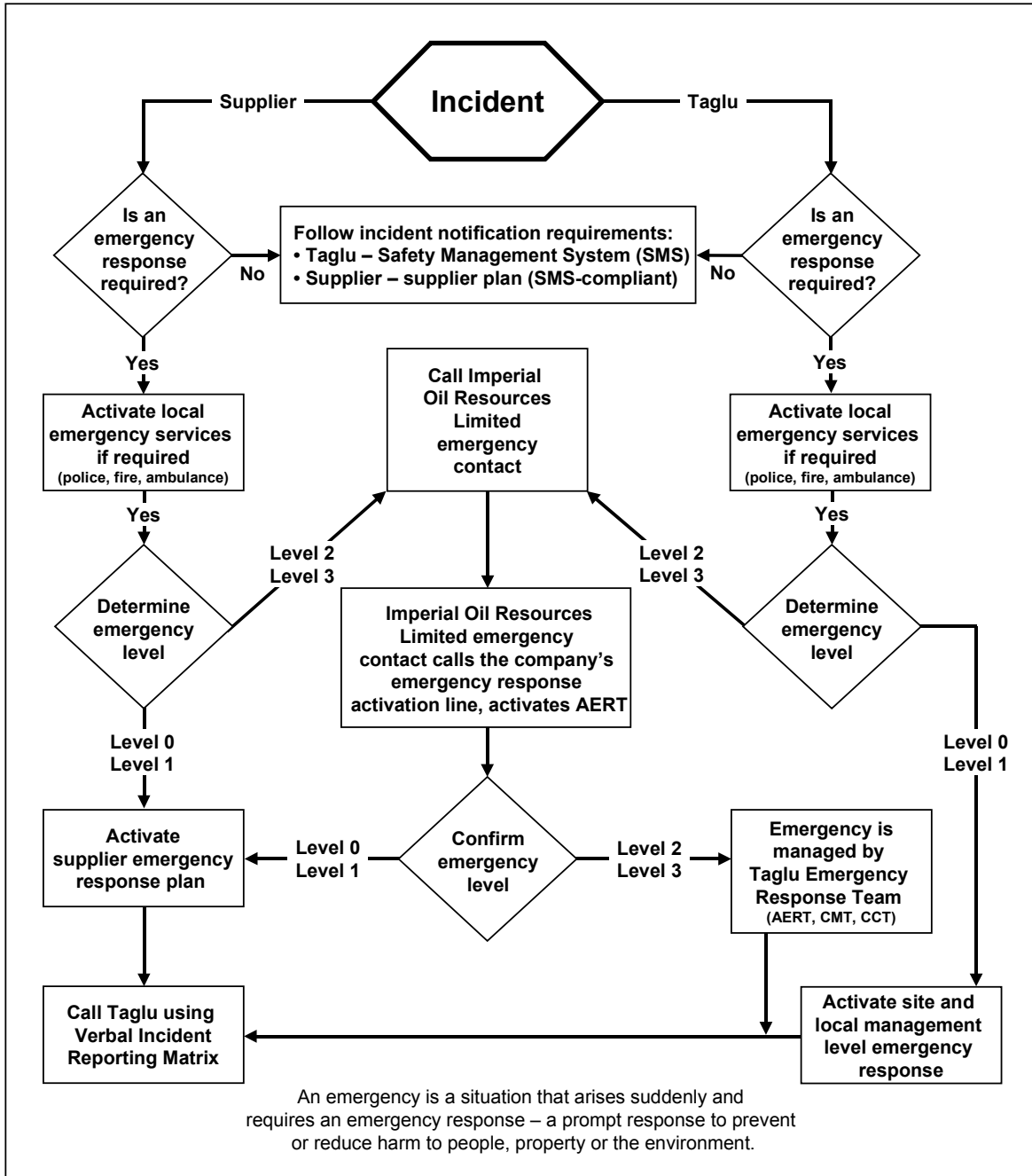


Figure 10-1: Incident Reporting and Emergency Response Process