



NEB REGULATED EMERGENCY RESPONSE PLAN

HAY RIVER AREA

CONTENTS

Two Harvest Hay River Area pipelines cross the border between British Columbia and Alberta and are regulated by the National Energy Board (NEB).

There are no substances in excess of threshold limits listed in Schedule 1 of the Canadian Environmental Protection Act stored in the Harvest Hay River Area. Therefore, a Canadian Environmental Protection Act Emergency Response Plan is not required for the Harvest Hay River NEB Area.

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Attachment

- Harvest Hay River Area Hazard Assessment

Hay River Area ERP
Distribution List

Document No.	Recipient	Address	Type
F1	Foreman's Office.	Hay River	Binder
F2	Leads Office.	Hay River	Binder
F3	Control Room	Hay River	Binder
F4	Pad 20	Hay River	Binder
C13	David E. Jones	Calgary	Binder
C22	EOC	Calgary	Binder
C23	EOC	Calgary	Binder
G1	Oil & Gas Commission	British Columbia	Binder
G2	National Energy Board	Calgary	Binder

Hay River Area
Revision Record

Rev. Number	Date	Details
1	July 22, 2011	Addition of the following documents: 'Type and Location of Emergency Equipment', 'Emergency Procedures Training', 'Incident Debrief', 'Isolation Points and Shut-Down procedures', 'Spill Response'. Update to the 'Telephone Directory'.
2	September 13, 2011	Additional statements in Section 5 to include access to emergency equipment and exercise scenarios.
3	May 2015	Update to EOC Team list in Section 7.
4	February 2016	Update to EOC Team list in Section 7.
5	August 2016	Major amendments and updates to most of ERP. Document was redistributed to all shown in distribution list.
6	March 2017	Added Incident Classification Matrix. Updated sect. 1.14. Added sect 1.15. Amended the Initial Response Steps. Added sect. 1.17. Amended sect. 1.16. Amended sect. 1.5.2. Amended sect. 3.5 & 3.6
7	July 2017	Updated EOC Team contacts
8	July 2018	Annual update and submission. Minor updates to telephone directory. Addition of WCSS Area A contact information.
9	July 2019	Annual Update

Seven Initial Emergency Response Actions:

Initial Response Actions:

EVACUATE - Get away from the hazard and direct others to a safe area.

NOTE: Evacuation may not be the best method of public protection and Shelter-In-Place should be considered.

ALARM - Alert others to the danger and situation.

CALL FOR HELP- If you cannot contact your supervisor, contact the On-Duty EOC Director at

Note: Names, Phone numbers, communication channels and addresses (mailing and e-mail) not publicly posted by the owner, have been removed from the publicly posted Emergency Response Plan for the protection of private and/or confidential information.

ASSESS - Assess hazards: do not rush in and endanger yourself. Account for all personnel. Monitor air quality with personal monitors. Consider potential ignition sources and how to eliminate them.

RESCUE - Protect yourself at all times, use appropriate personal protective equipment (PPE). Remove casualty to a safe area, ensure medical aid has been called for and administer first aid.

SECURE THE AREA - Prevent unauthorized access. If possible, take steps to protect people, the environment and property.

ACT AS INCIDENT COMMANDER - Until relieved by the appropriate person.

NOTE: Remember the Primary Objectives:

- Responder/Public Safety
- Environmental Protection
- Control and Containment.

GOVERNANCE

It is the responsibility of the Director of Field Operations to ensure that this emergency response plan (ERP) is reviewed and updated on at least an annual basis and to ensure that all relevant information is kept current. Any changes or updates to the ERP must be identified in the Revision Record.

It is the responsibility of Harvest's Emergency Management Advisor to carry out the review and required updates/amendments.

1. DESCRIPTION OF AREA

Harvest Operations Corp. owns and operates a sweet oil pipeline and a sweet water source pipeline in its Hay River Area. The sweet oil pipeline transports production from the Harvest Multiwell Oil Battery in NTS b-76-H/94-I-9 to the Harvest Meter Station in LS 11-17-110-9 W6M.

A sweet water source pipeline transports source water from the Harvest well sites in LS 12-11-111-12 W6M and 6-9-111-12 W6 to the Harvest oil battery in b-76-H.

Harvest used to operate sweet gas wells in NTS b-24-A/94-I-16 and a sweet gas pipeline which crossed the BC/AB border and transported production from the wellsite in

NTS b-24-A/94-I-16 to the TransCanada Pipelines Limited Meter Station tie-in in

LS 2-3-113-12 W6M; these wells, the pipeline and the facility have been shut-in and suspended.

For approximately 9 months of the year (March to November) travel around the oil fields by operations personnel is by ATV.

There is an all season road that runs from Highway 58 in Rainbow Lake, AB to the Harvest Oil and Gas Battery in NTS b-76-H/94-I-9.

Locations of surface installments, valves, environmental crossings and muster locations have been removed from the publicly posted version of the Emergency Response Plan for the protection of private and confidential information.

1.1 PIPELINES

Refer to the Harvest Hay River Area Hazard Assessment in this Site-Specific Supplemental Section for details about the pipelines.

Pipeline Operations - the Harvest Hay River Area is defined by a sweet oil pipeline and a sweet water pipeline which contain numerous site-specific Emergency Planning Zones (EPZs). The site-specific EPZ depends on the source and location of the emergency.

The Harvest Hay River Area pipelines transfer sweet oil and sweet water that contain traces of H₂S, from British Columbia to Alberta and from Alberta to British Columbia and requires NEB approval. According to the Alberta Energy Regulator (AER) and the British Columbia Oil and Gas Commission (OGC) regulations, the site-specific EPZ for a sweet pipeline is 0.00 km. However, calculation for a jet/pool fire (as indicated in the Hazard Assessment section, page 3) shows an EPZ of 0.09 km.

During any level of emergency, as a precaution, Harvest will manage a non-regulated EPZ of 0.10 km from the point of the pipeline emergency.

Facility Modifications and Additions - whenever a modification or addition is made to the Harvest Hay River Area, a potential H₂S release rate/volume and corresponding EPZ will be determined if required by regulation; Harvest will then revise this emergency response plan accordingly.

1.2 EMERGENCY PLANNING DATA

ALBERTA

Area Description	4 industrial operators ❖ 4 energy operators 2 traplines Gravel road Fire Creek Several unnamed creeks
Closest Urban Centre	Rainbow Lake, AB - approximately 20 km southeast of the Harvest meter station in LS 11-17-110-9 W6M

BRITISH COLUMBIA

Area Description	2 industrial operator ❖ 2 energy operators (Harvest Operations Corp. and TCPL) 2 traplines Little Hay River
Closest Urban Centre	Fort Nelson, BC - approximately 151.78 km west of the

Harvest Battery in NTS b-76-H/94-I-9 is the closest BC urban centre.

Rainbow Lake, AB still remains the closest urban centre.

BRIDGING STATEMENT

The following tie-in table illustrates the interaction of the various tie-ins in the Harvest Hay River Area. If an emergency occurs and one of the following tie-ins is impacted by the emergency, then Harvest will contact the appropriate company:

Tie-in Location (W6M)	Tie-in Product	Harvest Sends/Receives Product at tie-in	Tie-in Company
	None	This Line is Shut-In and Suspended	

Locations of surface installments, valves, environmental crossings and muster locations have been removed from the publicly posted version of the Emergency Response Plan for the protection of private and confidential information.

1.3 EMERGENCY ALARMS

The Harvest b-76-H battery is manned 11 hours/day, 7 days/ week; however, operations personnel are on location 24 hours/day 7 days/week. Day shift hours are between 07:00 and 18:00. Outside of these times the system can be monitored from a satellite control at the Harvest Hay River Camp near the b-76-H battery. After hours response to the battery is immediate because the camp is located in close proximity to the battery. The fluid volumes in the Harvest Hay River Area are monitored by a Supervisory Control and Data Acquisition (SCADA) system.

Surveillance by field operations personnel and control room personnel in conjunction with fire detection, gas detection and process control limits provide 24-hour manual and automatic notification of changes in facility status and emergency conditions. Detection equipment and alarms are tested regularly and are included in the preventative maintenance program.

The pipeline from the Harvest b-76-H battery to the Harvest 11-17-110-9 meter station is fitted with automatic emergency shut down (ESD) valves located at the xxxxxxxxxxxxxx that operate on a pressure differential system or a flow differential system. ESD's are located at the at the xxxxxxxxxxxxxxxxxxxxxx but these operate on high or low pressure only

Locations of surface installments, valves, environmental crossings and muster locations have been removed from the publicly posted version of the Emergency Response Plan for the protection of private and confidential information.

If the high or low level alarm sounds and a leak from the pipeline is confirmed or detected by field personnel, the on-call operator will be mobilized to close these isolation valves.

If the pressure differential in the pipeline between the Harvest Battery in b-76-H and the 11-17-110-9 meter station is greater than 4000 kPa or the flow differential in the pipeline reaches 50 m³/day, then an audible alarm will sound until acknowledged. The on-call operator will be notified of the alarm via voice communication over the two-way radio and will continue until it has been acknowledged.

If the pressure in the pipeline falls below 2000 kPa, the ESD at the xxxxxxxxxxxxxxxxxxxx will activate. If the pressure in the pipeline increases to above 3000 kPa the ESD at the xxxxxxxxxxxxxxxxxxxx will close. In either case the on-call operator will be notified via the alarm system.

If an emergency is indicated via any of the methods listed above, the Incident Commander will mobilize an investigation team to determine the situation and confirm an incident. The investigation team will consist of operations personnel based at the Hay River facility.

If an incident is confirmed, an emergency message is transmitted over the hand-held radio system for personnel to muster at the control room. If the emergency occurs outside of normal work hours, personnel will be at the camp and are easily notified by verbal communication.

1.4 MUSTER LOCATIONS

Locations of surface installments, valves, environmental crossings and muster locations have been removed from the publicly posted version of the Emergency Response Plan for the protection of private and confidential information.

1.5 COMMUNICATIONS

1.5.1 – Radio Frequencies

If assistance from emergency services and/or support service companies during an incident is required, they will be provided with a rendezvous location and directions to reach that location during the initial contact. Once on site, all relevant information will be passed over, and a radio and radio channel compatibility check will be carried out. If radio communication between Harvest and non-Harvest first responders proves difficult, then they will be provided with a Harvest radio or a Harvest representative will accompany the non-Harvest first responder to ensure radio communication is maintained.

Harvest has the following communication equipment in the Hay River Area:

Medic and Mobile Treatment Centre (MTC)

Note: Names, Phone numbers, communication channels and addresses (mailing and e-mail) not publicly posted by the owner, have been removed from the publicly posted Emergency Response Plan for the protection of private and/or confidential information.

Field Communications

- All field operators are equipped with cellular telephones
- All field operators are equipped with two-way radios

Note: Names, Phone numbers, communication channels and addresses (mailing and e-mail) not publicly posted by the owner, have been removed from the publicly posted Emergency Response Plan for the protection of private and/or confidential information.

Facility Communications

Note: Names, Phone numbers, communication channels and addresses (mailing and e-mail) not publicly posted by the owner, have been removed from the publicly posted Emergency Response Plan for the protection of private and/or confidential information.

1.5.2 - Internal and External Communication Procedures.

During any level of emergency Harvest field response teams will communicate with Harvest's management team and when established, the EOC Team. It is the responsibility of the EOC Team to ensure that senior managers are made aware of and kept updated with all information regarding the emergency situation and the response progress.

Harvest will ensure that all external communications and notifications to members of the public, other stakeholders, required government agencies and emergency response personnel will be carried out in a timely manner.

Specific roles and responsibilities regarding internal and external communications can be found in Section 4 of the CERP under the role of the following response positions:

- Incident Commander – ensures communications are completed
- Public Safety Group Supervisor – public, business and industrial operator notifications
- Liaison Officer – government and regulatory agency notifications
- EOC Director – internal communications
- Information Officer – media communications

Information regarding contact to and from the media and media procedures can be found under the role and responsibility of the Information Officer and in Section 6.22 of the CERP. Forms to be completed in regards to media communications can be found in Section 8 of the CERP.

1.6 PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment used by Harvest personnel in the Harvest Hay River Area is listed below:

- Flame-resistant coveralls
- Personal 4-gas monitors (H₂S, O₂, CO and LEL)
- CSA Approved:
 - Hard hats
 - Safety glasses
 - Safety boots
 - Safety gloves

It is a Harvest requirement that Harvest personnel and all workers entering any Harvest property to carry out work, must wear flame-resistant coveralls with reflective striping in accordance with regulations. All operators are required to wear a personal 4 gas monitor capable of detecting H₂S, O₂, CO and LEL. The monitors must be bump tested daily and calibrated as per manufacturer's instructions.

1.7 SPILL RESPONSE

Harvest's response efforts will be activated to ensure the safety of responders and the public and to ensure minimal environmental impact. First responders, emergency services and government agencies will be advised about any hazards associated with a spill. In the event of a spill or pipeline rupture, Harvest will immediately mobilize its own spill response equipment to mitigate any impact to the environment.

Harvest Operations Corp. is a member in good standing of the Western Canadian Spill Services Ltd. (WCSS) therefore; Harvest will contact WCSS at the earliest opportunity and request mobilization of a spill response trailer and/or other necessary equipment. Harvest will also contact a spill response/clean up company as required.

WCSS facilitate spill response exercises on an annual basis throughout the provinces that Harvest has operations in and Harvest personnel attend and take part in these exercises.

Oil spill contingency plans are designed to assist the oil and gas industry to effectively deal with a petroleum spill that may impact the community and/or the environment. Harvest has acquired and maintains copies of oil contingency plans.

Initial spill response guidelines for use by field personnel are posted in all field offices and initial response procedures and communication procedures are laid out in the initial spill response guidelines.

NOTE: The WCSS equipment trailer is located in Rainbow Lake, AB, approximately 70 km east of the Harvest b-76-H battery

Spill Response Equipment

- Approximately 200, 2 foot x 2 foot soaker pads at the b-76-H battery, pad 20 and pad 78
- Approximately 50, 2' x 2' soaker pads at each pad site
- Approximately 25, 10 foot long booms located at the b-76-H battery

NOTE: The WCSS equipment trailer is located in Rainbow Lake, AB, approximately 70 km south east of the Harvest b-76-H battery

Spill Control Points

WCSS Control Points situated near the Harvest Hay River Area are listed below:

- Control Point A781 (335)

- > LS 3-34-110-7 W6M
- > Latitude: 58°35'21"N - Longitude: 119°05'01"W
- > Approximately 25.60 km northeast of Rainbow Lake, AB
- Control Point A782 (334)
 - > LS 10-26-110-7 W6M
 - > Latitude: 58°35'01"N - Longitude: 119°02'38"W
 - > Approximately 23.00 km northeast of Rainbow Lake, AB
- Control Point A114 (101)
 - > LS 10-30-108-10 W6M
 - > Latitude: 58°24'19"N - Longitude: 119°39'13"W
 - > Approximately 37.00 km southwest of Rainbow Lake, AB
- Control Point A113 (102)
 - > NE 12-108-10 W6M
 - > Latitude: 58°21'48"N- Longitude: 119°30'41"W
 - > Approximately 37.50 km southwest of Rainbow Lake, AB

1.8 EMERGENCY RESPONSE & SAFETY EQUIPMENT

Safety equipment is documented and regularly inspected so that equipment is readily available with minimum chance of failure. The major safety/emergency response equipment that may be required in an emergency situation and the location in which it is kept is listed in the following tables and is available to all Harvest Hay River personnel 24 hours/day.

Safety Equipment

Equipment	Quantity
Each Field Operator's Truck	
Fire extinguisher	1
First aid kit	1
Two-way radio	1
Various hand tools	-
Harvest Multiwell Oil and Gas Battery in NTS b-76-H/94-I-9	
Fire extinguishers (30 lb - dry powder)	60
First aid kits	12
Radios (handheld)	15
Self-contained breathing apparatus (SCBA)	4
Automated External Defibrillator	1

Equipment	Quantity
Small trash pump (2x lengths of delivery hose)	1
20 litre water backpacks	5
Mobile Treatment Centre (MTC)	1
Quad's (ATV's)	10 to 15
Argo and Haagland all terrain vehicles (ATV's)	1 and 1
Bob Cat Mechanical Vehicle (skid steer)	1
2' x 2' Soaker pads	200
Harvest d-20-H/94-I-9 Site	
Fire extinguishers (30 lb - dry powder)	15
Self-contained breathing apparatus (SCBA)	2
Automated External Defibrillator	1
2' x 2' soaker pads	200
20 litre water backpacks	2
Harvest d-78-G/94-I-9	
Fire extinguishers (30 lb - dry powder)	15
Self-contained breathing apparatus (SCBA)	2
Automated External Defibrillator	1
2' x 2' soaker pads	200
20 litre water backpacks	2

Roadblock Equipment

Location	Equipment	Quantity
Harvest Multiwell Oil and Gas Battery in NTS b-76-H/94-I-9	Roadblock kits	2

1.9 EMERGENCY PROCEDURES AND EQUIPMENT TRAINING

Harvest have developed Seven Initial Emergency Response Steps designed to protect first responders and workers and to initiate the full emergency response and communications; these seven steps can be found at the front of this binder.

Because weather conditions vary considerably depending on the time of the year, exercises will be held to cover all weather eventualities, e.g. the response/clean up operations to an oil spill in July when the ground is soft would be different to the response/clean up operations in January when the ground is solid with snow and ice and water bodies are frozen over. Different types of exercise scenarios will be used which cover a whole range of potential incidents from a small

pin-hole leak discovered very early in the emergency, to a complete failure and rupture of the pipeline.

Emergency Response Exercises:

- The Harvest's Hay River Area is situated in WCSS Zone 6, Areas A and C. WCSS carries out training exercises in these areas on an annual basis and Harvest personnel from the Hay River Area attend and take part in these exercises
- Harvest Hay River Area personnel take part in annual exercises conducted according to OGC and AER regulations. These exercise have included 'man-down' drills in which the camp medic, the MTC and the all-terrain vehicles have been utilized.

Emergency Response Exercises Include:

- How to determine the level of emergency for incidents occurring in BC and AB
- Determining emergency planning and response zones
- Public protection measures and methods
- Internal communications and the Incident Command System
- External communications, e.g. contacting regulatory agencies, emergency services etc.
- Roles and responsibilities of the Harvest emergency response team
- Isolation of wells and pipelines via the Incident Action Plan
- Mobilizing spill response equipment and other required emergency equipment
- Identifying WCSS control points

Emergency Equipment:

- A fully trained medic is on duty 24 hours/day, 7 days/week. The medic is located at the Harvest Hay River Camp and has access to medical supplies including an Automatic Electronic Defibrillator.
- Argo and Haagland all-terrain vehicles - these vehicles are driven by designated drivers who have been provided with initial and on-going training on its use and limitations
- Mobile Treatment Centre (MTC) - operated by the camp medic and a designated driver in the event of a medical emergency
- Self-contained breathing apparatus (SCBA) - familiarization training with all personnel is carried out every six months and donning and doffing procedures are carried out annually
- Fire extinguishers - Harvest personnel receive fire extinguisher training, i.e. type and use of,

every three years

- Water backpacks - are available at all times and operators use these occasionally throughout the summer months when temperatures are high to dampen down areas of foliage
- All Harvest Hay River Area personnel are trained on the set up and use of the trash pump. Familiarization training occurs annually which includes setting it up and pumping water
- All Harvest Hay River Area personnel are required to be first aid trained and re-certified every three years
- Spill clean-up equipment familiarization training is provided annually
- Two-way radio equipment and personal 4 gas monitors are used daily and personnel are fully aware of their operation, testing and maintenance

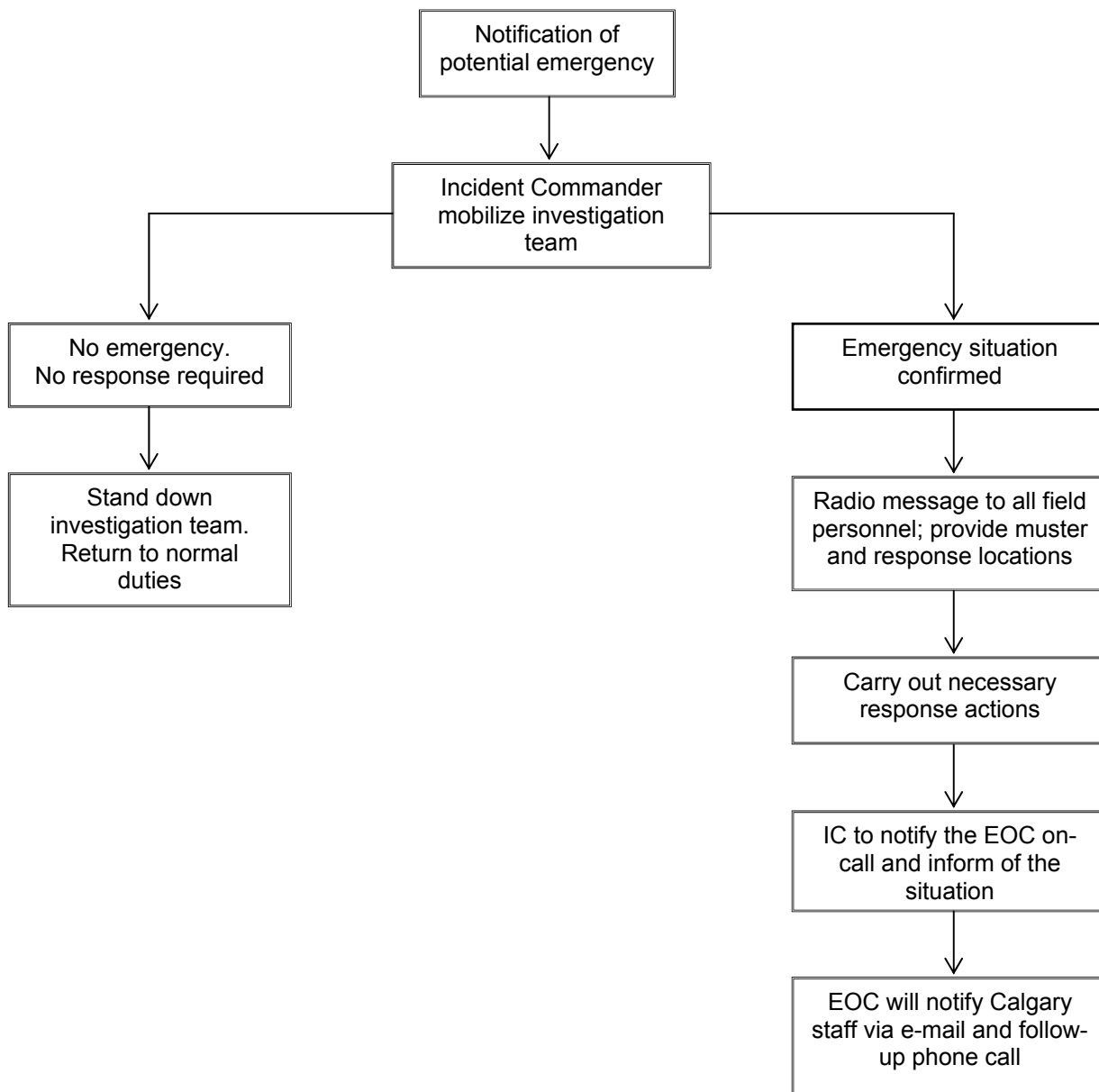
1.10 EMERGENCY NOTIFICATION AND CALL-DOWN FLOW DIAGRAM

Harvest may be notified of a potential emergency situation by many different methods:

- System alarm
- Pressure/flow alarm
- Automatic detection equipment
- Discovery by operations personnel
- Call from member of the public or regulatory agency

A telephone call from a member of the public or from a regulatory agency may be received at Harvest's Hay River control room or via Harvest's 24 hour emergency number; however a notification is received the call-down flow diagram should be followed.

Refer to the flow diagram below.



1.11 DOCUMENTATION

In any emergency situation, documentation of a responder's actions, decisions and calls made/received are of the utmost importance as it may help in the investigation following the incident and to demonstrate that sufficient and appropriate action was taken during the incident; this documentation may also be requested by a regulatory agency. Harvest uses various forms to capture this information e.g. Incident Action Plan, Time and Event Log, regulatory agency incident reporting forms (First Call Communication), Environmental Monitoring Record etc. and these forms can be found in section 8 of the corporate ERP. Time and Event Log booklets can also be found in the visor packs in Harvest vehicles. Once completed, all documentation from all responders should be collected for inclusion into the incident investigation report.

1.12 INCIDENT DEBRIEF

Effective post incident debriefing can play a fundamental role in ensuring that the company monitors, audits and updates their safety and emergency response systems and their processes, and thus can be helpful in preventing future incidents. A debrief session can:

- Enable the facts of the incident to be confirmed.
- Ensure that procedures that went well and areas for improvement are discussed.
- Ensure the company monitors, audits and updates their safety, security and emergency response systems.

Following any major incident, and as soon as all pertinent information has been collated, Harvest will conduct a debrief session for all personnel who attended the incident or who may have been affected by the incident. The debrief session may be conducted by the area foreman, the area superintendent, Harvest management or a combination of these.

It is also an opportunity for the personnel concerned to talk through their reactions to the incident. If they request counselling or if the manager considers that it may be required, the manager should seek professional advice.

Managers should note any signs of stress among staff, bearing in mind the possibility of Post Traumatic Stress Disorder (PTSD) or other stress-related illness. If stress-related illness is suspected, professional advice should be sought. A stress debriefing conducted by someone who is not properly trained may do more harm than good.

1.13 EMERGENCY RESPONSE PLAN MAPPING

To assist Harvest responders during an alert or level of emergency, this Site-Specific Supplemental Section contains the following maps:

- General Area Map
- Emergency Planning Base Area Map

UNIQUE FEATURES OF THE AREA IN RELATION TO EMERGENCY RESPONSE PLANNING

ALBERTA

Fire Creek and Unnamed Creeks

Fire Creek and several unnamed creeks flow through the area. During any level of emergency, Harvest must determine if Fire Creek or any unnamed creek will be impacted by the emergency. Harvest will contact spill response services to reduce the impact of any release into Fire Creek or any unnamed creek.

BRITISH COLUMBIA

Little Hay River

The Little Hay River flows through the area. During any level of emergency, Harvest must determine if the Little Hay River will be impacted by the emergency. Harvest will contact spill response services to reduce the impact of any release into the Little Hay River.

1.14 EMERGENCY EVACUATION PROCEDURES

NOTE: Refer to the flowchart on page 20 of this ERP for evacuation procedures.

A fully trained medic is on duty 24 hours/day, 7 days/week. The medic is located at the Harvest Hay River Camp and has access to medical supplies including an Automatic Electronic Defibrillator and a Mobile Treatment Centre.

For all medical emergencies 911 must be the first number contacted. The 911 dispatch centre has the ability to mobilize an air ambulance (helicopter and fixed wing) along with paramedic personnel as well as a ground ambulance.

The senior Harvest representative on-site is responsible for ensuring emergency transportation is requested and that, if required, a landing location is provided by NTS or LSD or by GPS coordinates. The casualty will be transported to the hospital at High level via the air ambulance with the paramedics.

If, for any reason, the 911 dispatch cannot mobilize the air ambulance, contact one of the helicopter company's listed on **page 36** of this ERP and request a helicopter for medical emergency. Inform the helicopter services of the height and weight of the casualty and if a stretcher is being utilized.

In this situation, the medic will fly with the casualty to either rendezvous with Rainbow Lake EMS or fly directly to the hospital at High Level.

It is vital that the medic communicates with the EMS personnel in Rainbow Lake to determine the best course of action.

If a helicopter isn't possible e.g. night time, bad weather etc. the medic should communicate with EMS to determine whether:

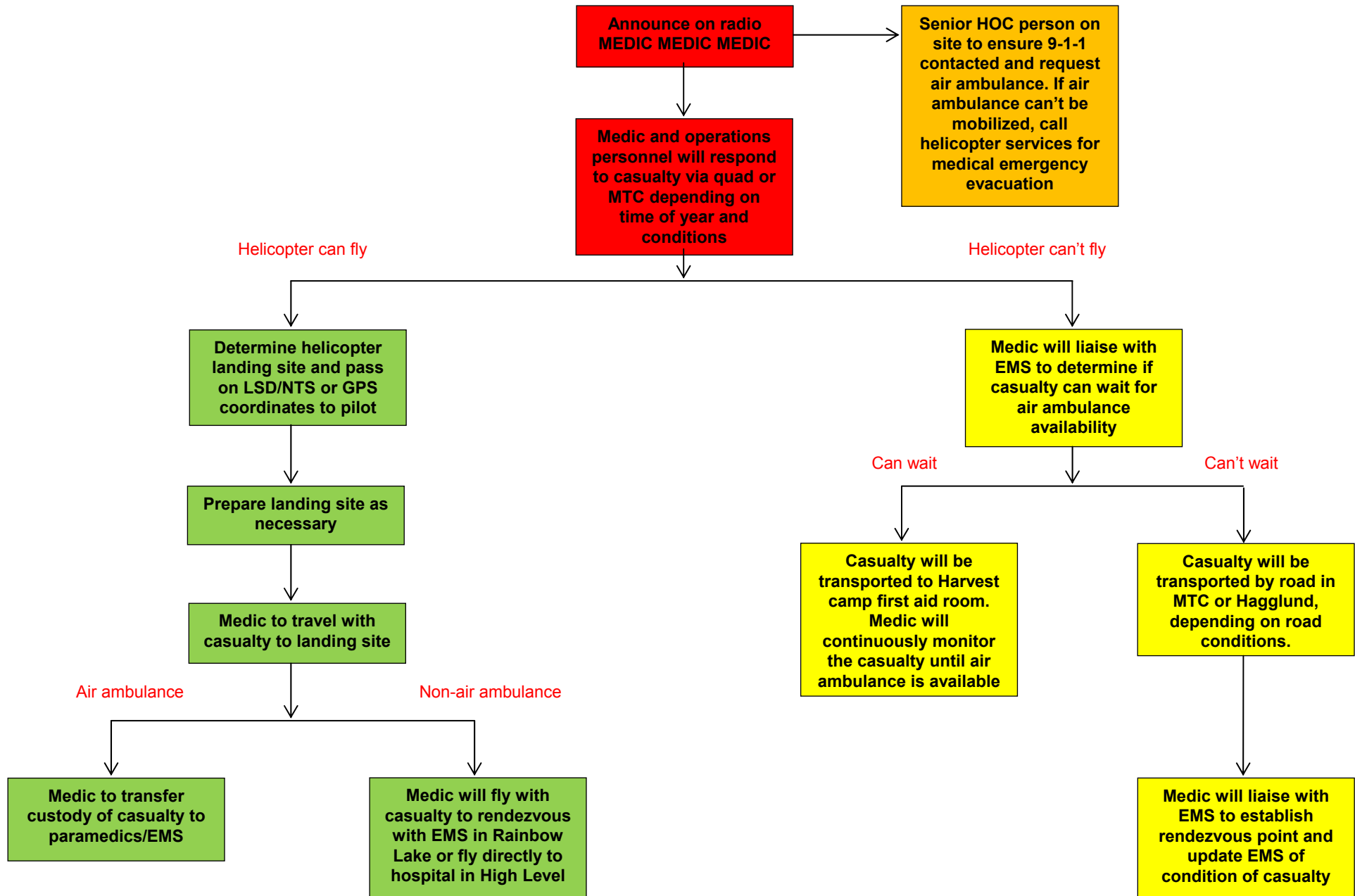
- the casualty can wait until such time as the air ambulance is available or can be mobilized
- the casualty must be transported via the Mobile Treatment Centre to rendezvous with the ground ambulance

Note: if the Harvest road is in too poor a condition for the Mobile Treatment Centre, then the casualty will be transported in the Hagglund vehicle to rendezvous with the ground ambulance.

While the medic remains the care giver to the casualty, whenever possible the medic should remain in communication with EMS personnel to inform them of the casualty's condition and ETA at the rendezvous point.

The most senior Harvest representative on-site will ensure that the Hay River area Superintendent is notified and kept informed of the situation.

Medical Emergency Evacuation Procedure



1.15 EMERGENCY/CRISIS MANAGEMENT

In the event that any emergency/crisis situation is confirmed, Harvest has adopted the Incident Command System (ICS) to manage the response.

Sections 1.4 and 1.5 and appendix 3 of Harvest's corporate emergency response plan (CERP) provides an overview of the ICS.

Section 3 of Harvest's CERP plan details the ICS organization and structure of Harvest's Incident Command Response Team; the Operations Section Response Team and the Emergency Operations Centre Response Team.

Section 4 of the CERP details the role and responsibilities of each emergency response position within Harvest's ICS including. Section 4 also includes additional roles in a crisis management situation.

Harvest Superintendents, Area Foremen, Lead Operators and operations personnel are provided with Incident Commander Competency Training which consists of ICS 100 and an overview of the role and responsibilities of the following ICS response positions:

- Incident Commander
- On-Site Supervisor
- Public Safety Supervisor
- Liaison Officer

Public protection measures and methods including evacuation and shelter-in-place can be found in Sections 2.2; 2.3 and 2.4 of the CERP.

The procedure for ignition of an H₂S gas release and the assessment and criteria for H₂S ignition can be found in section 5 of the CERP.

1.16 SECURITY MANAGEMENT

In accordance with regulations Harvest has a current Security Management Plan (SMP) which discusses security procedures including a Risk Matrix, a Threat Response Matrix and the Harvest's Minimum Operations Security Standards. Copies of the SMP can be found in the control room and in the Foreman's office at the Hay River battery. Copies are also kept at the HOC office in Calgary and personnel can review the SMP on Harvest's computer network.

1.17 HAZARD IDENTIFICATION AND PREVENTION

Harvest has a comprehensive Environmental, Health and Safety Management System (EHSMS); section 2 of the EHSMS discusses hazard identification, risk assessment and establishing controls to eliminate the hazard altogether or to reduce the hazard to such a low risk that work can continue safely.

Section 3 of the EHSMS details policies, codes of practice, safe operating procedures and guidelines to assist with ensuring the safety of Harvest workers.

A list of high risk tasks carried out by operations personnel has been identified and a Safe Operations Procedure (SOP) has been developed for each task; to ensure worker competency when carrying out these tasks each operator is validated to ensure that the task is carried out in accordance with the correct procedure.

Every operator has access to the EHSMS via the Harvest web site and the internal computer network system.

Section 3.6 identifies the list of tasks.

2.0 DIRECTIONS TO AREA

ALBERTA

HUSKY MULTIWELL OIL BATTERY TIE-IN IN LS

Note: Names, Phone numbers, communication channels and addresses (mailing and e-mail) not publicly posted by the owner, have been removed from the publicly posted Emergency Response Plan for the protection of private and/or confidential information.

BRITISH COLUMBIA

HARVEST MULTIWELL OIL AND GAS BATTERY

Note: Names, Phone numbers, communication channels and addresses (mailing and e-mail) not publicly posted by the owner, have been removed from the publicly posted Emergency Response Plan for the protection of private and/or confidential information.

3. TELEPHONE DIRECTORY

Harvest Emergency Numbers

EOC On-Call Director

Daytime number

403-265-1178

Fax

Mailing Address

Harvest Operations Corp.
1500, 700 – 2 Street S.W.
Calgary, AB T2P 2W1

Note: Names, Phone numbers, communication channels and addresses (mailing and e-mail) not publicly posted by the owner, have been removed from the publicly posted Emergency Response Plan for the protection of private and/or confidential information.

Harvest Hay River Area Contacts

Harvest Multiwell Oil and Gas Battery Control Room

Note: Names, Phone numbers, communication channels and addresses (mailing and e-mail) not publicly posted by the owner, have been removed from the publicly posted Emergency Response Plan for the protection of private and/or confidential information.

The position of Incident Commander and the positions on the Harvest Incident Command Response Team will be filled by the following people or outsourced to service companies or other industrial operators where mutual aid is available.

Contact	Work	Residence	Cellular

Note: Names, Phone numbers, communication channels and addresses (mailing and e-mail) not publicly posted by the owner, have been removed from the publicly posted Emergency Response Plan for the protection of private and/or confidential information.

3.1 Harvest Emergency Operations Centre Team

Refer to Section 7.0 of the Harvest Corporate ERP for the positions of the EOC Director and other members of the Harvest Emergency Operations Centre Team.

Emergency Operations Centre

Harvest Calgary office.

Note: Names, Phone numbers, communication channels and addresses (mailing and e-mail) not publicly posted by the owner, have been removed from the publicly posted Emergency Response Plan for the protection of private and/or confidential information.

Incident Command Post/Remote Command Post

Note: Names, Phone numbers, communication channels and addresses (mailing and e-mail) not publicly posted by the owner, have been removed from the publicly posted Emergency Response Plan for the protection of private and/or confidential information.

Alternate Incident Command Post/Remote Command Post

As assigned by the Incident Commander.

3.2

First Responders

ALBERTA

Organization	Location	Telephone Number
Emergency Services (Fire, Police, Ambulance) 911		
North West Health Centre, High level Hospital	High Level, AB	780.841.3288 24 hr. 780.841.3200 Day Time
Aeromedical Emergency Services Ltd./Aeromedical Industrial Services Ltd. Emergency (24 hours) Daytime only	High Level, AB	911 or 1-866-611-9911 780-926-2166
STARS Emergency Link Centre	Emergency (24 hours)	1-888-888-4567
	Cellular	#4567
RCMP Northern Alberta OCC (24 hours)	Edmonton, AB	780-412-5300

BRITISH COLUMBIA

Organization	Location	Telephone Number
Emergency Services (Fire, Police, Ambulance)		
Emergency 24 hours	BC	250-774-2344
BC Air Ambulance (Calls from Alberta and BC only)	BC-wide	1-800-561-8011
Fire Department		
NOTE: This area is NOT covered by a fire department. Any wellsite fire or secondary fire must be handled by contract oilfield fire fighting services. The Fort Nelson Fire Department will ONLY respond to motor vehicle accidents and medical emergencies.		
Police Department		
NOTE: The RCMP Northern BC OCC is the Public Safety Answering Point (PSAP) that receives all 911 calls in their jurisdiction.		
Fort Nelson RCMP Detachment (24 hours)	Fort St. John, BC	250-774-2777
RCMP Northern BC OCC (24 hours)	Prince George, BC	250-561-3191

3.3

Lead Agency and Priority Contacts

FEDERAL

Organization	Location	Telephone Number
Transportation Safety Board of Canada		
TSB Hot Line (24 hours)	Gatineau, QC	819-997-7887 or 1-800-387-3557
National Energy Board		
For a pipeline emergency, call the Transportation Safety Board's 24-hour hot line (above)		
Office (Daytime only)	Calgary, AB	403-292-4800
Government of Canada - Environment and Climate Change		
In the event of a pollution incident such as an oil or chemical spill, federal and provincial/territorial authorities need to be notified in order to coordinate an adequate oversight of the response	AB Ministry of Environment	1.800.222.6514 or 780.442.4505
	Emergency Management BC	1.800.663.3456
<p>Weather One-on-One, puts you in touch with a meteorologist.</p> <p>Weekdays from 5:00 a.m. to 9:00 p.m. and weekends and statutory holidays from 6:00 a.m. to 6:00 p.m. Charges of \$2.99 per minute, plus taxes, will be added directly to your telephone bill.</p> <p>If you need weather consultation services outside of these hours, you can consult a private meteorological firm from the list on the Canadian Meteorological and Oceanographic Society web site.</p> <p>https://www.ec.gc.ca/meteo-weather/</p>		1-900-565-5555
NAV CANADA – Airspace and Flight information Services		
Emergency Information Services (24 Hours)	Edmonton, AB	1-866-541-4102

NOTE: It is the responsibility of the Incident Commander to ensure that government and regulatory organizations are contacted and notified during an emergency. This role may be delegated to the Liaison Officer and the role and responsibilities can be found in section 4 of the CERP.

ALBERTA

Organization	Location	Telephone Number
Alberta Energy Regulator		
Emergency 24 hours	AB-Wide	1.800.222.6514
Field Centre	High Level, AB	780.926.5399
Alberta Emergency Management Agency		
Emergency (24 hours)	Alberta-wide	1-866-618-2362
Office (Daytime only)	Grande Prairie, AB	780-538-5295
Alberta Environment Emergency Response Support Team		
Emergency (24 hours)	Alberta-wide	1-800-222-6514
Mackenzie County		
Emergency (24 hours)	Fort Vermillion, AB	911 or 1-888-511-6323
Office (Daytime Only)	Fort Vermillion, AB	780-927-3718

BRITISH COLUMBIA

Organization	Location	Telephone Number
All emergencies and spills are reported to the OGC through the Provincial Emergency Program (PEP) at 1-800-663-3456.		
Provincial Emergency Program		
Provincial 24-hour Emergency Coordination Centre	BC-wide	1-800-663-3456
Regional Office (Daytime only)	Prince George, BC	250-612-4172

Organization	Location	Telephone Number
Northern Rockies Regional Municipality		
NOTES: The Northern Rockies Regional Municipality has been granted the powers of a municipality under the Emergency Program Act.		
All emergencies and spills are reported through the Provincial Emergency Program (PEP) at 1-800-663-3456.		
Office (Daytime only)	Fort Nelson, BC	250-774-2541

3.4 Supporting Agency and Services Contacts

ALBERTA

Organization	Location	Telephone Number
Alberta Human Services, Occupational Health and Safety		
Emergency (24 hours)	Alberta-wide	1-866-415-8690
Alberta Boiler Safety Association		
Emergency (24 hours)	Edmonton, AB	780-437-9100
Alberta Health Services - North Zone		
Emergency (24 hours)	High Level, AB	780-841-3200
Office (Daytime only)	High Level, AB	780-841-3252
Hospital		
Alberta Health Services - Northwest Health Centre (24 hours) (H₂S protocol in place)	High Level, AB	780-841-3200 or 780-926-3791
Workers' Compensation Board		
Headquarters (24 hours)	Alberta-wide	1-866-922-9221
Injury reporting (Fax)	Edmonton, AB	1-800-661-1993
Environment Canada Spill Reporting Line		
Alberta Spill Report Line	Alberta-wide	1-800-222-6514
Poison Control Centre		
Emergency (24 hours)	Alberta-wide	1-800-332-1414
Alberta One-call		
Buried Utility Locations	Alberta-wide	1-800-242-3447
Government of Alberta		
Provincial government information (toll free)	Alberta-wide	310-0000
Transport Canada		
NOTE: Transport Canada's Prairie and Northern Region (Winnipeg Office) is responsible for transportation safety throughout Alberta, Saskatchewan, Manitoba, Yukon, Northwest Territories and Nunavut.		
Emergency (24 Hours)	Winnipeg, MB	204-984-1625

Organization	Location	Telephone Number
Office (Daytime only)		204-983-3152 or 1-888-463-0521

BRITISH COLUMBIA

Organization	Location	Telephone Number
BC Safety Authority - Non-government - Boiler and Pressure Vessel Branch		
Office (Daytime only)	BC-wide	1-866-566-7233
BC Safety Authority - Non-government - Electrical Branch		
Office (Daytime only)	BC-wide	1-866-566-7233

Organization	Location	Telephone Number
BC Ministry of Environment - All Divisions		
NOTE: All emergencies and spills are reported through the Provincial Emergency Program (PEP) at 1-800-663-3456.		
Office (Daytime only)	Fort St. John, BC	250-787-3411
BC Ministry of Forests and Range		
NOTE: All emergencies and spills are reported through the Provincial Emergency Program (PEP) at 1-800-663-3456.		
Office (Daytime only)	Fort Nelson, BC	250-774-5511
Local Health Unit		
Northern Health		
Northern Health - Fort Nelson Health Unit (24 hours)	Fort Nelson, BC	250-774-8100
Fort Nelson Health Unit (Daytime only)	Fort Nelson, BC	250-774-7092
Hospital		
Fort Nelson General Hospital (H ₂ S protocol in place)	Fort Nelson, BC	250-774-8100
WorkSafeBC		
NOTE: NOT notified through the Provincial Emergency Program Incident Reporting Line.		
Emergency (Daytime - Monday to Friday from 08:30 to 16:30)	BC-wide	1-888-621-SAFE (1-888-621-7233)
Emergency After-hours Answering Service	BC-wide	1-866-922-4357
Office (Daytime only)	Fort St. John, BC	250-785-1283
Poison Control Centre		
Emergency (24 hours)	BC-wide	1-800-567-8911
BC One Call		
Buried Utility Locations	BC-wide	1-800-474-6886
From a Cellular	BC-wide	*6886
Government of British Columbia		
Provincial government information	BC-wide	1-800-663-7867
Transport Canada		
NOTE: Transport Canada's Pacific Region (Vancouver Office) is responsible for transportation safety (aviation, marine and rail) throughout British Columbia.		
Office (Daytime only)	Vancouver, BC	604-666-3518

3.5

Mutual Aid Partners

Harvest has no formal mutual aid agreements in the Hay River Area; however, Harvest maintains a liaison with other petroleum and industrial operators regarding emergency response issues.

Industrial Operators

ALBERTA

Company Name	Contacts	Telephone Number

Note: Names, Phone numbers, communication channels and addresses (mailing and e-mail) not publicly posted by the owner, have been removed from the publicly posted Emergency Response Plan for the protection of private and/or confidential information.

BRITISH COLUMBIA

Company Name	Contacts	Telephone Number

Note: Names, Phone numbers, communication channels and addresses (mailing and e-mail) not publicly posted by the owner, have been removed from the publicly posted Emergency Response Plan for the protection of private and/or confidential information.

3.6

Trappers

ALBERTA

Trapline Registration No.	Name and Address	Telephone Numbers		
		Office	Residence	Cellular

Note: Names, Phone numbers, communication channels and addresses (mailing and e-mail) not publicly posted by the owner, have been removed from the publicly posted Emergency Response Plan for the protection of private and/or confidential information.

BRITISH COLUMBIA

Trapline Registration No.	Name and Address	Telephone Numbers		
		Office	Residence	Cellular

Note: Names, Phone numbers, communication channels and addresses (mailing and e-mail) not publicly posted by the owner, have been removed from the publicly posted Emergency Response Plan for the protection of private and/or confidential information.

Harvest’s Public Safety Supervisor will ensure that notification and communication with industrial operators and Trappers is carried out.

The role and responsibilities of the Public Safety Supervisor can be found in Section 4 of the CERP.

3.7

Safety Contractors

ALBERTA AND BRITISH COLUMBIA

Company	Location	Telephone Number
Fire Power Oilfield Firefighting Ltd.	Central Dispatch	1-800-463-3187
	Grande Prairie, AB	780-538-0040
Firemaster Oilfield Services Inc.	Central Dispatch	403-342-7500
HSE Integrated Ltd.	Central Dispatch	1-866-347-3911
Safety Boss Inc.	Central Dispatch	1-800-882-4967
United Safety Ltd.	Central Dispatch	1-800-432-1809
	Zama City, AB	780-683-2606

3.8

Mobile Air Monitoring Services

ALBERTA AND BRITISH COLUMBIA

Company	Location	Telephone Number
Firemaster Oilfield Services Inc. (4 units, Red Deer; 1 unit, Grande Prairie; 1 unit, Drayton Valley)	Central Dispatch	403-342-7500
HSE Integrated Ltd. (7 units, Sylvan Lake; 1 unit, Grande Prairie)	Central Dispatch	1-866-347-3911
Promet Environmental Group Ltd. (1 Unit in Calgary)	Central Dispatch	1-877-577-6638
Trojan Safety Services Ltd. (1 unit, Fort St. John; 1 unit, Grande Prairie; 4 units, Red Deer)	Red Deer, AB	403-309-3025
	Grande Prairie, AB	780-567-3440
	Fort St. John, BC	1-877-785-9558 250-785-9557

3.9

Western Canadian Spill Services Ltd. (WCSS)

ALBERTA

ZONE 6 - COOP AREA A			
Chairman	James Barnhill	Husky Energy Inc.	780-956-8052
Alternate Chairman	Jessi Roselle	Sanling Energy Ltd.	780-831-7528 (cell)

ZONE 6 - COOP AREA A RESPONSE UNIT	
Husky Energy Inc. (James Barnhill)	780-956-8052 780-956-1814 (cell)
Equipment location:	Husky Energy Inc. Yard (SE 10-109-9 W6M) Rainbow Lake, AB

BRITISH COLUMBIA

ZONE 6 - COOP AREA C			
Chairman	Arlen Hogg	CNRL	780.832.4190 587.298.7353 (cell)
Alternate Chairman	Meagan Bridger	Paramount Resources	780.882.6635 ext.106 780.926.6339 (cell)

ZONE 6 - COOP AREA C RESPONSE UNIT	
Jamie Wilson, Clean Harbours. Coop Custodian	250-785-4577
Equipment location:	Clean Harbors Surface Rentals 6715 - 85th Avenue Fort St. John, BC V1J 4J3

For the most up-to-date information for Western Canadian Spill Services Ltd., check the website at:
<http://www.wcss.ab.ca/maps/boundaries.asp>

3.10

Support Services

Company	Location	Telephone Number
Electricians & Instrumentation		
Pyramid Corporation	Rainbow Lake, AB	780-956-2249
Fire Fighting Services		
Fire Power Oilfield Firefighting Ltd.	Central Dispatch	1-800-463-3187
	Grande Prairie, AB	780-538-0040
Firemaster Oilfield Services Inc.	Central Dispatch	403-342-7500
HSE Integrated Ltd.	Central Dispatch	1-866-347-3911
Helicopter Services		
Opsmobil Inc.	High Level, AB	1-877-926-5558
	Rainbow Lake, AB	1-877-926-5558
Canadian Helicopters Ltd.	Dispatch	780-429-6900
	High Level, AB	780-926-2686
Delta Helicopters Ltd.	Main Dispatch Office, Edmonton, AB	1.800.665.3564
	Rainbow Lake, AB	780-956-3988
	High Level, AB	780-926-3848
Gemini Helicopters Inc.	High Level, AB	780-926-5752 or 1-877-926-5558
Maintenance Crews		
AECom	Rainbow Lake, AB	780.956.3941
Petroleum Bulk Products & Propane Fuels		
Neufeld Petroleum & Propane Ltd.	Rainbow Lake, AB	780-956-3511
Petroleum Bulk Products & Propane Fuels		
Gregg Distributors Company Co. Ltd.	Rainbow Lake, AB	780-956-2588
Trucks - Bed, Trailer and Picker Units		
Flint Energy Services Ltd.	Alberta-wide	1-866-663-5468
	24-hour Emergency	1-866-416-3427
Flint Energy Services Ltd.	Alberta-wide	1-866-663-5468
RKM Contracting Ltd.	High Level, AB	780-926-4274
Flint Oilfield Hauling	Rainbow Lake, AB	780-956-3388
Trucks - Cranes		
Formula Powell LP	High Level, AB	780-926-4040

Company	Location	Telephone Number
Trucks - Hauling		
Lacrete Transport	La Crete, AB	1-800-422-9203
	Toll-free	780-928-3989
Manitoulin Transport	High Level, AB	780-956-3925
Trucks - Tank/Vacuum		
Formula Powell LP	High Level, AB	780-926-4040
Well Control Specialists		
Fire Power Oilfield Firefighting Ltd.	Central Dispatch	1-800-463-3187
	Grande Prairie, AB	780-538-0040
Firemaster Oilfield Services Inc.	Central Dispatch	403-342-7500
HSE Integrated Ltd.	Central Dispatch	1-866-347-3911
Safety Boss Inc.	Central Dispatch	1-800-882-4967
United Safety Ltd.	Central Dispatch	1-800-432-1809
	Zama City, AB	780-683-2606
Global Industries Ltd.	Carlyss, LA	337-583-5000

3.11

Hotels/Motels

Name	Location	Telephone Number
Noralta Motor Inn	Rainbow Lake, AB	780-956-5665
Rainbow Centre Hotel	5 Rainbow Drive Rainbow Lake, AB	780-956-3481

4. INCIDENT INTERPRETATION

The Onshore Pipeline Regulations, 1999 (SOR/99-294) interprets an 'Incident' as:

An occurrence that results in:

- (a) The death of or serious injury to a person;
- (b) A significant adverse effect on the environment;
- (c) An unintended fire or explosion;
- (d) An unintended or uncontained release of LVP hydrocarbons in excess of 1.5 m³;
- (e) An unintended or uncontrolled release of gas or HVP hydrocarbons;
- (f) The operation of a pipeline beyond its design limits as determined under CSA Z662 or CSA Z276 or any operating limits imposed by the Board.

5.0 NEB and TSB Roles and Responsibilities

5.1 NEB Roles and Responsibilities

The NEB's top priority in an emergency is to make sure that people are safe and secure and that their property and the environment are protected. Any time there is a serious incident; NEB inspectors may attend the site to oversee a company's immediate response. The NEB will require that all reasonable actions are taken to protect employees, the public and the environment. Further, the NEB will verify that the regulated company conducts adequate and appropriate clean-up and remediation of any environmental effects caused by the incident.

As lead regulatory agency, the NEB:

- Monitors, observes and assesses the overall effectiveness of the company's emergency response in terms of:
 - Emergency management
 - Safety
 - Security
 - Environment
 - Integrity of operations and facilities
 - Energy supply
- Investigates the event, either in cooperation with the Transportation Safety Board of Canada, under the Canada Labour Code or as per the National Energy Board Act or Canada Oil & Gas Operations (whichever is applicable)
- Inspects the pipe line or facility
- Examines the integrity of the pipeline or facility
- Requires that appropriate repair methods are being used
- Requires that appropriate environmental remediation of contaminated areas is conducted
- Coordinates stakeholder and aboriginal community feedback regarding environmental clean up and remediation
- Confirms that the company is following its Emergency Procedures Manual, commitments, plans, procedures and NEB regulations and identifies non-compliances
- Initiates enforcement actions as required
- Approves the restart of the pipe line

5.2 TSB Roles and Responsibilities

The mandate of the TSB is to advance transportation safety in the marine, pipe line, rail and air modes of transportation by:

- Conducting independent investigations, including public enquiries when necessary, into selected transportation occurrences in order to make findings as to their causes and contributing factors.
- Identifying safety deficiencies, as evidenced by transportation occurrences.
- Making recommendations designed to eliminate or reduce any such safety deficiencies.
- Reporting publicly on investigations and on the findings in relation thereto.

As part of its ongoing investigations, the TSB also reviews developments in transportation safety and identifies safety risks that it believes government and the transportation industry should address to reduce injury and loss.

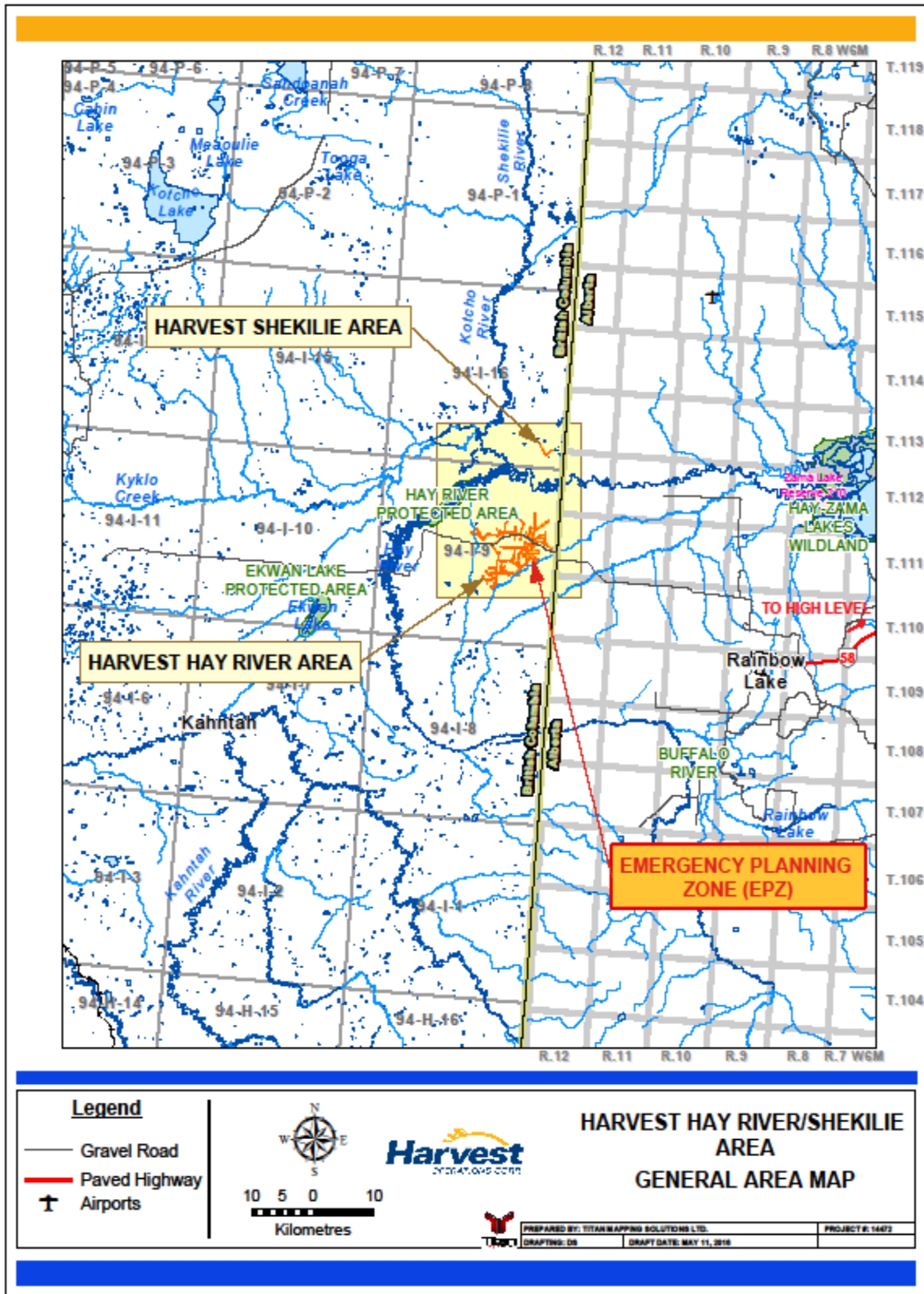
To instill confidence in the public regarding the transportation accident investigation process, it is essential that an investigating agency be independent and free from any conflicts of interest when investigating accidents, identifying safety deficiencies, and making safety recommendations. As such, the TSB is an independent agency, separate from other government agencies and departments that reports to Parliament through the President of the Queen's Privy Council for Canada. Our independence enables us to be fully objective in making findings as to causes and contributing factors, and in making transportation safety recommendations.

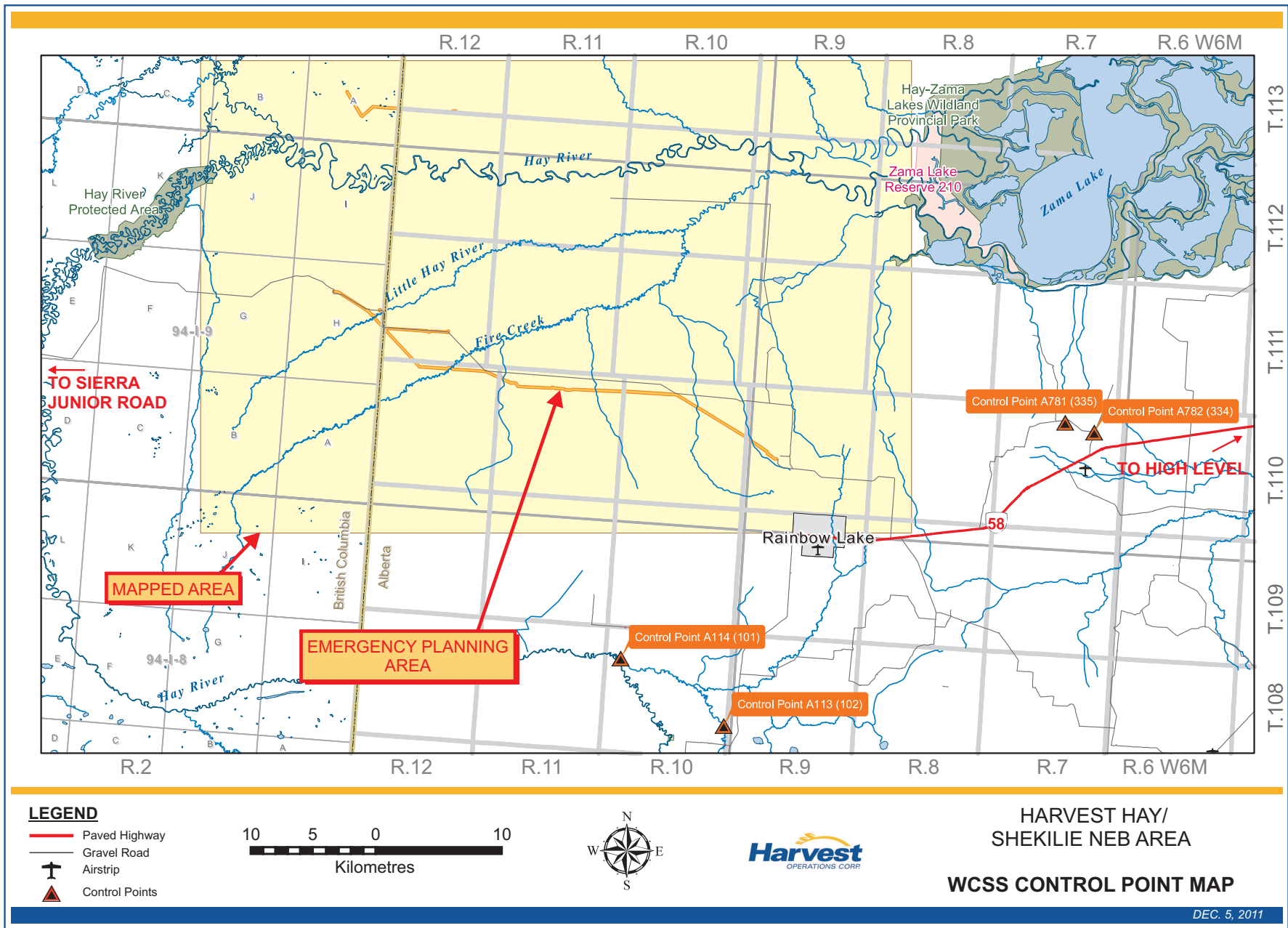
In making its findings as to the causes and contributing factors of a transportation occurrence, it is not the function of the Board to assign fault or determine civil or criminal liability. However, the Board does not refrain from fully reporting on the causes and contributing factors merely because fault or liability might be inferred from the Board's findings. No finding of the Board should be construed as assigning fault or determining civil or criminal liability. Findings of the Board are not binding on the parties to any legal, disciplinary, or other proceedings.

6. MAPS

GENERAL

- General Area Map
- Emergency Planning Base Area Map (plastic pocket)
- WCSS Control Point Map





HARVEST HAY/SHEKILIE NEB PIPELINES HAZARD ASSESSMENT

INTRODUCTION

Harvest Operations Corp. owns and operates three separate pipelines which cross the border between British Columbia and Alberta and are regulated by the National Energy Board (NEB).

Hay Area

Harvest owns and operates a **sweet** crude oil sales pipeline which transports sales oil across the border from British Columbia to Alberta from the Harvest Multiwell Oil Battery in NTS d-41-H/94-I-9 to the Husky Multiwell Oil Battery in LS 11-17-110-9 W6M, where a second section of pipeline, regulated by the Alberta Energy Regulator (AER), transports the sales oil to the Harvest tank farm/oil loading terminal in LS 16-29-109-8 W6M.

Harvest also owns and operates a **sweet** water source pipeline which transport source water from a Harvest Alberta well in LS 12-11-111-12 W6M to the Harvest British Columbia multiwell pad in NTS a-61-H/94-I-9.

Shekilie Area

Harvest also owns a **sweet** gas pipeline which crosses the border into Alberta from British Columbia. This NEB regulated pipeline has been cleaned, pigged, purged, blind ended and filled with nitrogen. The Harvest Shekilie wells and pipelines are scheduled for abandonment in the near future.

DISCUSSION

The focus of this hazard assessment report is to provide information for emergency response planning in the event of a release of **sweet** crude oil, **sweet** gas or water as a result of a pipeline leak, catastrophic failure and/or fire hazard. Although unlikely, these incidents may occur at any point in time during active operations along their respective pipeline route. Harvest has identified Emergency Response Zones (EPZs) for oil and gas activity relating to the Harvest Hay/Shekilie NEB pipelines, as prescribed by the Alberta Energy Regulator (AER)¹, BC Oil and Gas Commission (OGC)², and the National Energy Board (NEB)³ regulations. This report is divided into sections to address the following:

- Hydrogen sulphide assessment
- Fire and explosion hazards
- Toxicological properties
- Reactivity properties
- Infrastructure modifications and additions
- Environmental considerations

¹ Alberta Energy Regulator, 2008 with errata in November 2009, Directive 071: Emergency Preparedness and Response Requirements for the Petroleum Industry

² BC Oil and Gas Commission, 2014, BC Oil and Gas Commission Emergency Management Manual (Revised July 2015, Version 1.1).

³ National Energy Board, 2015, Guidance Notes for the National Energy Board Onshore Pipeline Regulations. The Office of the Regulator of Oil and Gas Operations uses the NEB framework as their regulatory guidelines.

HYDROGEN SULPHIDE ASSESSMENT

Hydrogen sulphide (H₂S) is a colorless, toxic and flammable gas. The Harvest Hay/Shekilie NEB pipelines will transfer **sweet** crude oil, **sweet** gas, and **sweet** water that are devoid of any presence of H₂S. See Table 1 and Attachment 1 for further details.

Table 1. Pipeline H₂S Emergency Planning Zone Assessment Summary

H ₂ S Concentration (%)	H ₂ S Release Volume (m ³)	Emergency Planning Zone (km)
0.00	0.00	0.00

FIRE AND EXPLOSION HAZARDS

Sweet natural gas is an extremely flammable gas in the presence of an open flame and sparks. Hazardous by-products of combustion include carbon dioxide, carbon monoxide, oxides of sulphur and oxides of nitrogen.

Sweet crude oil is an extremely flammable liquid and vapor in the presence of open flame and sparks. Hazardous by-products of combustion include aldehydes, oxides of carbon, and sulphur.

Common flammability characteristics associated with **sweet** natural gas and **sweet** crude oil are presented in Table 2. In the unlikely event of a pipeline rupture, refer to Tables 3 and 4 for the fire/explosion EPZs for **sweet** natural gas and **sweet** crude oil, respectively.

Table 2. Fire and Explosion Data^{4&5}

Characteristic or Feature	Value
Sweet Natural Gas Characteristics	
Flashpoint temperature	
Auto ignition temperature	
Lower explosive limit (LEL)	
Upper explosive limit (UEL)	
Sweet Crude Oil Characteristics	
Flashpoint temperature	
Firefighting Recommendations	
<ul style="list-style-type: none">• When extinguishing a small fire use dry chemicals or CO₂.• When extinguishing a large fire use water spray or fog.• Eliminate all ignition sources if safe to do so.• Use water spray to reduce vapors or divert vapor cloud drift.• If leak or spill has not ignited, use water spray to disperse the vapours.• Do not extinguish, unless leak can be stopped safely.	

Technical data has been removed from the publicly posted version of the Emergency Response Plan for the security of operations and protection of confidential information.

⁴ Harvest Operations Corp. August 2014, Material Safety Data Sheet, Natural Gas (Sweet).

⁵ Harvest Operations Corp. August 2014, Material Safety Data Sheet, Crude Oil (Sweet).

Table 3. Sweet Natural Gas Pipeline Fire and Explosion Planning Zone Assessment Summary

Hazard	EPZ Endpoint	Emergency Planning Zone (km)
Explosive Overpressure	1 psi	Not exceeded
Flash Fire	50% of Lower Explosive Limit	0.00
Jet/Pool Fire	4.73kW/ m ²	0.00

Table 4. Sweet Crude Oil Pipeline Fire and Explosion Planning Zone Assessment Summary

Hazard	EPZ Endpoint	Emergency Planning Zone (km)
Explosive Overpressure	1 psi	Not exceeded
Flash Fire	50% of Lower Explosive Limit	N/Applic
Jet/Pool Fire	4.73kW/ m ²	0.09

TOXICOLOGICAL PROPERTIES

Sweet natural gas is not listed as a carcinogen by Occupational Safety and Health Administration (OSHA) and International Agency for Research on Cancer (IARC). Although not considered toxic, **sweet** natural gas is an asphyxiant and will displace oxygen.

Sweet crude oil is listed as a carcinogen by OSHA and IARC. Considered toxic, **sweet** crude oil vapors will spread along the ground and collect in low or confined areas.

Further properties and exposure limits are listed in Table 5 for both **sweet** natural gas and **sweet** crude oil. Harvest employees have been properly trained to attend to any emergency with the hazards associated with these products and pipelines.

Table 5. Toxicological Properties of Sweet Natural Gas and Sweet Crude Oil^{6&7}

Routes of Entry	Effects on Human Physiology
Sweet Natural Gas	
Inhalation	<ul style="list-style-type: none"> • May cause respiratory irritation. • May displace oxygen and cause rapid suffocation. • Vapors may cause dizziness or asphyxiation without warning.
Skin Contact	<ul style="list-style-type: none"> • Contact with rapidly expanding or liquefied gas may cause irritation and/ or frostbite.
Eye Contact	<ul style="list-style-type: none"> • Permanent eye damage or blindness could result. May cause eye irritation.
Sweet Crude Oil	
Inhalation	<ul style="list-style-type: none"> • May cause respiratory irritation. • Vapors may cause dizziness or drowsiness without warning.
Skin Contact	<ul style="list-style-type: none"> • May causes skin irritation in forms of localized redness, swelling and itching.
Eye Contact	<ul style="list-style-type: none"> • May cause eye irritation such as redness, swelling, pain, tearing, and blurred or hazy vision
Recommended First Aid Measures	
<ul style="list-style-type: none"> • Supplied air breathing apparatus must be used when oxygen concentrations are low. • Wash with plenty of soap and water. Do not rub affected area. Remove non-adhering, contaminated clothing. Do not remove adherent material or clothing. • Rinse cautiously with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. • Get medical advice/ attention. 	

REACTIVITY PROPERTIES

Sweet natural gas is stable under normal storage conditions. It is a Category 1 extremely flammable gas.

Sweet crude oil is stable under normal storage conditions. It is also a Category 2 flammable liquid.

Both substances cannot have contact with incompatible materials, sources of ignition and/or exposure to heat, as this can cause fire and/ or an explosion.

INFRASTRUCTURE MODIFICATIONS AND ADDITIONS

If the construction, modification or addition could affect the potential H₂S conditions, flammable substance parameters, flammability/explosion hazards or storage tank conditions of an existing or new facility; the Emergency Planning Zone must be calculated/re-calculated. Examples of modifications or additions are new pipelines, changes in H₂S concentrations, and additions of storage tanks, bullets and process equipment.

⁶ Harvest Operations Corp. August 2014, Material Safety Data Sheet, Natural Gas (Sweet).

⁷ Harvest Operations Corp. August 2014, Material Safety Data Sheet, Crude Oil (Sweet).

ENVIRONMENTAL CONSIDERATIONS

In the unlikely event of a pipeline rupture or spill, Harvest will ensure appropriate environmental protection measures are put in place.

SUMMARY

The Harvest Hay River NEB pipelines transfer **sweet** crude oil and **sweet** water. Harvest will maintain an EPZ of 0.09 km for the operational **sweet** crude oil pipeline. Harvest will maintain an EPZ along the specific pipeline right-of-way for the **sweet** water pipeline.

The Harvest Shekilie NEB pipeline is in the process of being abandoned, and Harvest will maintain an EPZ along the right-of-way until abandonment operations have been completed.

**ATTACHMENT 1
PIPELINE EMERGENCY PLANNING ZONE ASSESSMENT**

Standard Pressure..... 101.325 kPa
 Atmospheric Pressure..... 89.8 kPa
 Standard Temperature..... 15.0 °C
 Minimum Pipeline Temperature..... 5.0 °C

Starting		Ending		Product	Project/Segment or Licence/Line	Foot Notes	H ₂ S (%)	MOP (kPag)	GLR (m ³ /m ³)	Length (km)	OD (mm)	WT (mm)	ID (mm)	Line Volume (m ³)	Comp. Factor z	H ₂ S RV (m ³)	H ₂ S RV Drained (m ³)	Emergency Planning Zone				NEB Required (km)
Point	Valve	Point	Valve															H ₂ S	Fire/Explosion		NEB Required (km)	
				OGC Nomograph (km)	Explosive Overpressure (km)	Flash Fire (km)	Jet/Pool Fire (km)															
Hay Area																						
Sweet crude oil sales pipeline																						
NTS d-41-H/94-I-9		NTS b-76-H/94-I-9		Crude Oil	80348/1	1, 3	0.00		N/Applic.	7.00	219.10	4.78	209.54	241.39	N/Applic.	0.00	0.00	0.00	Not exceeded	N/Applic	0.09	0.09
LS 8-7-111-12 W6M		LS 11-17-110-9 W6M		Crude Oil	80072/1	1, 3	0.00		N/Applic.	33.00	219.10	4.78	209.54	1137.99	N/Applic.	0.00	0.00	0.00	Not exceeded	N/Applic	0.09	0.09
Fresh water pipeline from the wellsite in LS 12-11-111-12 W6M to the multiwell pad in NTS a-61-H/94-I-9																						
LS 12-11-111-12 W6M		LS 8-7-111-12 W6M		Fresh Water	80180/1		0.00		1	6.64	168.30	4.80	158.70	131.34	N/Applic.	0.00	0.00	0.00	Not exceeded	N/Applic	N/Applic	Right-of-Way
LS 8-7-111-12 W6M		NTS a-61-H/94-I-9		Fresh Water	80387/1		0.00		1	6.64	168.30	4.80	158.70	131.34	N/Applic.	0.00	0.00	0.00	Not exceeded	N/Applic	N/Applic	Right-of-Way
Shekilie Area (Shut-in)																						
Discontinued																						
LS 1-6-113-12 W6M		LS 13-32-112-12 W6M		Natural Gas	80169/1	2	0.00	0	9999999	0.43	168.30	4.80	158.70	8.51	N/Applic.	0.00	0.00	0.00	Not exceeded	0.00	0.00	Right-of-Way
LS 13-32-112-12 W6M		LS 2-3-113-12 W6M		Natural Gas	47065/1	1, 2	0.00	0	9999999	4.25	168.30	4.80	158.70	84.07	N/Applic.	0.00	0.00	0.00	Not exceeded	0.00	0.00	Right-of-Way

NOTE:
 All pipelines included in this assessment are regulated by the NEB.

FOOTNOTES:

- Harvest has provided the specifications for this pipeline.
- This pipeline has been cleaned, pigged, purged, blind ended and filled with nitrogen (N₂). It is destined for abandonment in the future.
- This pipeline segment crosses the Alberta/British Columbia border and is part of a system used to transport sweet crude oil from the Harvest multiwell battery tie-in in NTS d-41-H/94-I-9, through the Husky facility in LS 11-17-110-9 W6M, to the Harvest tank farm/oil loading terminal in LS 16-29-109-8 W6M.

Locations of surface installments, valves, and maximum operating pressures have been removed from the publicly posted version of the Emergency Response Plan for the security of operations and protection of private and confidential information.