SOURIS VALLEY PIPELINE LIMITED
EMERGENCY MANAGEMENT PLAN

61 KM, 12" CO_2 PIPELINE

Souris Valley Pipeline Limited

March 2023

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PREFACE

A. Overview

This Emergency Management Plan (EMP) has been prepared by and for Souris Valley Pipeline Limited (SVPL). SVPL is a Canadian corporation registered in the province of Saskatchewan. SVPL owns the carbon dioxide (CO_2) pipeline that delivers CO_2 from the Canadian border to the Weyburn oil field (Weyburn Unit) in southeastern Saskatchewan. Operation of the pipeline is the responsibility of SVPL's parent company Dakota Gasification Company (DGC) of Bismarck, North Dakota. DGC is owner and operator of the Great Plains Synfuels Plant (GPSP) near Beulah, North Dakota, and the source of the CO_2 supply.

DGC is a wholly owned subsidiary of Basin Electric Power Cooperative (Basin Electric) of Bismarck, North Dakota. Basin Electric is a consumer-owned utility company which supplies electricity to about 1.5 million people in eight states. DGC produces more than 1.5 billion cubic meters (54 billion cubic feet per year) of natural gas from lignite coal.

B. Project Objectives

The SVPL pipeline project is designed to meet demands for CO_2 within existing oil fields in southeastern Saskatchewan. The CO_2 is used by oil field operators for enhanced oil recovery (EOR) in oil reservoirs where production is slowly declining. The product is injected into deep in-situ oil reservoirs to change the physical properties of trapped oil for easier removal by existing pumping facilities.

SVPL has an agreement with two companies to provide 2.6 million cubic meters (95 million cubic feet) of CO_2 per day to the Weyburn and Midale Units near Goodwater, Saskatchewan. The CO_2 is used for implementation of CO_2 miscible Flood Project, a separate downstream project expected to extend the life of the existing oil field by 25 years and help stimulate long-term economic growth in Saskatchewan.

The SVPL pipeline project consists of a 61 km (38 mile) 324 mm (12.75 inch) nominal pipeline. The pipeline originates at the Canada/U.S. border at a tie-in to the DGC CO_2 pipeline which extends approximately 270 km (167 miles) from the GPSP near Beulah, North Dakota.

C. Pipeline Route

The SVPL pipeline originates at the United States border at 1-1-10 W2M. The route travels in a northwest direction approximately 21 kms (13 miles) to SW 8-2-10 W2M where it crosses Highway #18 and the Canadian Pacific railway line approximately 3 km (2 miles) west of Outram. The pipeline then continues northwest for 34 km (21 miles), crossing primary grid road #606 and the Jewel Creek. The pipeline then extends to a location 5 km (3 miles) southeast of Goodwater at SW 3-5-13 W2M. From this point, the pipeline turns north to cross approximately 4 km (2.5 miles) of the Lomond Prairie Farm Rehabilitation Administration's (PFRA) pasture. The route leaves PFRA pasture at SW 22-5-13 W2M and extends north another 2 kms (approximately 1 mile) to the Goodwater CRT at SW 34-5-13 W2M.

The total distance of the route is 61 km (38 miles). It is contained within a permanent access easement of 15 m (50 feet).

The route passes through three Rural Municipalities (Cambria, Cymri, and Lomond). The only major water crossing is the Jewel Creek in Lomond. Existing land use is primarily crop agriculture with interspersed areas of rangeland. Many of these agricultural areas contain existing oil well pumping operations, particularly at the north end of the route.

D. Hydraulic Capability

The pipeline transports pressurized CO_2 at an expected year round rate of 2.6 million cubic meters (95 million cubic feet per day). Normal composition of the gas mixture is 97 mole% CO_2 and 0.8% hydrogen sulfide (H_2S) with trace amounts of hydrocarbons. Small variations in composition are due to changes in the CO_2 stream from the Rectisol process (i.e., sulfur and CO_2 removal) at the GPSP facility. Maximum CO_2 concentration is 98 mole%. Maximum concentration of H_2S is 2.0 mole%.

Delivery pressure at the Weyburn Field is a minimum of 15170 kPa (2,200 psig) at a temperature of 15.5ºC (60ºF).

E. Line Pipe Specifications

The line pipe consists of the following:

Actual Outside Diameter (OD):	324 mm (12.750 inches)
Nominal Wall Thickness:	9.53 mm (0.375 inch)
Specification:	AP15L, Grade x70, CSA Z245.1, Cat. 111 ERW (Sour Service)
Maximum Operating Pressure:	20445 kPa (2,965 psi)
Test Pressure (min):	25551 kPa (3,706 psi)

A special pipe was used for road and railway crossings. Wall thickness is 12.7 mm (0.500 inch) and pipe grade is x65.

F. Standards and Codes

The pipeline is operated and maintained in accordance with both United States and Canadian pipeline engineering design codes. To provide for maximum protection of pipeline integrity, the most stringent codes in each country were applied over the entire route. Primary pipeline design codes include:

Canadian CSA Z662-(latest edition) – Oil and Gas Pipeline Systems;

U.S. Title 49, CFR Part 195 – Transportation of Hazardous Liquids by Pipeline;
ANSI/ASME B31.4a-1994 – Liquid Transportation Systems for Hydrocarbons, Liquid Petroleum gas, Anhydrous Ammonia, and Alcohols.

The minimum burial depth of the pipeline was 1.2 m (4 feet).

G. Corrosion Control

External corrosion protection consists of a coating of fusion bonded epoxy (FBE) to an average thickness of 0.41 mm (0.016 inch).

In addition to FBE coating for external corrosion protection, the pipeline is equipped with an impressed current cathodic protection system to mitigate differences in soil potentials along the pipeline route.

H. Pipeline Equipment

Protection from pipeline break discharge is provided by emergency shut-off valves. As part of the Project, a full opening, mainline block valve is installed approximately 30 km (18.7 miles) from the border tie-in at SE 18-3-11 W2M. This valve is equipped for remote, electric actuation. Block valves are included both upstream and downstream of the point of connection to the SVPL pipeline. The downstream receiving terminus also includes a check valve for additional backflow control.

Continuous monitoring of pipeline pressure and control of remote, emergency shut-off capabilities is provided by a Supervisory Control and Data Acquisition (SCADA) system, which reports to the control room operator in the Synfuels facility. Two SCADA antennae are installed along the SVPL pipeline, one at the 30-km block valve and one at the Goodwater terminus.

I. Inspection and Testing

The pipeline was installed and tested in accordance with specified design and construction codes as well as applicable environmental regulations. All field welds were analyzed radio graphically for 100 percent of the circumference of the pipe.

The pipeline was hydrostatically tested with water for a minimum of 24 hours to a minimum of 1.25 times the maximum operating pressure.

1. INTRODUCTION

1.1. Purpose

The purpose of the Emergency Management Plan (EMP) is to provide the public information in the event of a carbon dioxide pipeline emergency.

Dakota Gasification Company (DGC) based in Beulah, North Dakota, USA, is the parent company of Souris Valley Pipeline Limited (SVPL).

This EMP in its entirety is intended to provide the necessary information for pre-emergency planning. Our Emergency Response Procedure (ERP) # 4322 will provide a step by step guideline to be used during an emergency.

This EMP is a comprehensive plan that includes specific information that will be valuable to the public and provide contact information for emergency responders.

1.2. Scope

SVPL operations in Canada consist of a single 61 km long, 323.9 mm diameter pipeline. This line originates in Beulah, North Dakota, USA, and terminates at the Goodwater facility in southern Saskatchewan, about 30 km south of Weyburn. SVPL has two customers for the CO2 transported by the pipeline.

Contractors performing services for SVPL will ensure that their emergency procedures align with this EMP.

1.3. EMP Manual Locations

Controlled numbered copies of the EMP must be kept in the following locations:

- SVPL Representative's office
- Vehicle/office of key Jerry Mainil LTD emergency responder personnel
- GPSP offices in Beulah, ND, USA
- Local municipal emergency operations center
- Appropriate federal, provincial, and municipal agencies
- Company Website

1.4. Emergency "Out Call" System

The emergency "out call" system is designed to notify those residents living or working within the pipeline corridor that a pipeline emergency has occurred with the potential to affect them. In Canada the pipeline corridor is two kilometers in width on each side of the pipeline or four kilometers total, while in the United States the pipeline corridor is two miles in width, one mile on either side of the pipeline. The population density in this corridor is surveyed and the information updated annually.

When a pipeline emergency is declared, the emergency "out call" system will be initiated from Dakota Gasification Company for those residents on the affected pipeline segment(s). The computer driven system has twenty dedicated phone lines and will simultaneously call the first twenty residents and deliver a recorded message alerting the resident of the pipeline emergency. It will take approximately one minute to complete these first twenty calls. Any unanswered calls will be repeated eight times at three-minute intervals. During the time between the retry intervals any additional residents in the affected area will be called. The emergency "out call" system also has the capability of calling an alternate phone number if unable to reach a resident on the first try.

The priority of calls is established by the resident's proximity to the pipeline, with those living closest receiving their calls first. These priorities will be reevaluated following each population density survey.

Each resident will be notified annually and asked if the current notification numbers are correct and if they wish to provide alternate phone numbers.

1.5. Definitions

- **Dakota Gasification Company (DGC):** Dakota Gasification Company based in Beulah, North Dakota, USA is the parent company of SVPL
- **Emergency Commander**: The individual responsible for directing and coordinating the overall emergency response.
- **Emergency Command Center:** The communication center set up to receive information from the emergency crew, as well an assembly point to coordinate response activities and carry out risk assessment.
- **Emergency Planning Zone (EPZ):** Area along the pipeline length extending 2 kilometers on either side of the pipeline centerline.

- **Emergency Response Crew:** 2-man crew dispatched to the incident site to assess the **emergency**, and begin marking the "Hot Zone". This crew will be trained in the use of the Emergency Response Plan, the expected hazards that will be present in an emergency and the use of all emergency equipment.
- **Emergency Response Reports:** Reports that detail the sequence of events with subjective opinions of what went wrong. The reports will also include the condition of the site when the Emergency Response Crews were relieved.
- **Emergency Services**: Includes the ambulance, local police, RCMP and fire departments in the area.
- **Emergency Shut Down (ESD):** The ability to close all mainline valves remotely in order to separate the pipeline into 13 isolated segments.
- **Great Plains Synfuels Plant (GPSP):** Coal gasification plant owned and operated by DGC. Located northwest of Beulah, ND. DGC produces, compresses, and exports CO2 to the pipeline.
- **Hot Zone:** Area around a pipeline leak with a concentration of H2S greater than 10 ppm
- **Incident Log:** Log completed by Protection Services Control Center and the Emergency Commander. All activities will be logged during the emergency including times, names of contacts and names of responders.
- **Incident Site:** The location where the pipeline emergency exists.
- **Mainline Valve:** (MLV) Valves located along the pipeline route which can be remotely operated from the GPSP. There are thirteen valves between GPSP and the Weyburn CO2 Miscible Flood Project.
- **Mutual Aid Contractor**: A contract exists between SVPL and Jerry Mainil LTD to supply personnel and equipment to respond to an emergency situation.
- **Multi-Disciplinary** Advisors**:** Experienced management and operational staff capable of assisting with risk assessment and emergency response.
- **Off-site Emergencies:** Emergencies that occur away from a plant or office site. Initiation of the ERP is keyed to receiving a phone call at a prearranged 24-hour emergency telephone number.
- **Pipeline Corridor:** Consists of an area 2 kilometers on either side of the pipeline centerline along the length of the pipeline.
- **Pipeline Emergency:** Unplanned gas release or pipeline failure that may pose a risk to the public.

- **Pipeline Section:** Refers to a section of pipeline between MLV sites. (example: section 12 refers to the section from the border to MLV #11, section 13 refers to the section from MLV #11 to the Goodwater Station)
- **Population Density Survey:** A list of all residences, businesses and public facilities within two kilometers on either side of the pipeline centerline. The survey collected data on the number of residents, their ages, primary and secondary phone numbers and any specific evacuation data such as special routes into the business or home and if additional help in evacuation was required. The survey will be updated annually to determine any changes to the data.
- **Protection Services Control Center (PSCC):** The DGC on-site security center that will receive first notification of an emergency, will initiate additional notifications, and will serve as a resource center for emergency planning and response. This office is staffed 24 hours a day.
- **Risk Assessment:** A review of the Hot Zone during an emergency to determine its direction and movement and identify what population and sensitive areas might be at risk from a pipeline CO2 release.
- **Receptors:** Individuals who might possibly "receive" adverse effects in the event of an emergency. Includes all residences, businesses and public facilities within two kilometers on either side of the pipeline centerline.
- **Shift Superintendent:** The GPSP 24 hour on site management representative responsible for the coordination of emergency activities and after hour plant operation.
- **Site Safety/Logistics Coordinator:** Person at the Incident Site who is responsible for site safety and advising the Emergency Commander of the status of the Incident. The Site Safety/Logistics Coordinator may also advise the Emergency Commander of the need for additional resources.

1.6. Health, Safety, and Environmental Statement

SVPL is committed to protecting the health and safety of people and the environment.

SVPL will comply with government regulations, follow accepted industry practices, and maintain its own corporate policies in order to protect the health and safety of individuals affected by SVPL operations.

We are committed to pursuing these objectives and accept, individually, the responsibility for doing so.

We will communicate on health, safety and environmental matters in an open and timely manner with all affected parties and will take health, safety and environmental matters into account when making business decisions.

We will maintain SVPL as a healthy and safe place to work and a desirable member of the communities in which we operate.

1.7. Emergency Preparedness Commitment

We are committed to conducting our operations in a manner that protects the health and safety of people and the environment.

In order to meet this commitment, we endorse this EMP as a standard component for comprehensive and ongoing operational emergency preparedness.

All our employees, including management, are responsible and accountable for ensuring that:

- This EMP is developed and maintained for pipeline operations to a level of detail commensurate with the risk.
- Training and resources are provided to ensure the successful implementation of this plan.
- Emergency preparedness is regularly validated through exercises and reviews of actual responses.
- All pipeline operations comply with applicable laws, regulations, and industry standards.
- Pipeline personnel are trained HAZMAT Technicians and versed in the Incident Command system.
- Employees and contractors are prepared to take prompt action in order to protect life, the environment and property.

2. ORGANIZATION AND DEVELOPMENT

2.1. Policy

As indicated in the Policy Statement Section 1.7, Souris Valley Pipeline Limited is committed to emergency response preparedness and planning. All employees, representatives and Mutual Aid Contractors that have a vested interest in the EMP have approved this plan and will take an active role in the maintenance of the plan. The plan will be reviewed and approved on an annual basis. A copy of the approval form is provided in Appendix A. The signed annual certifications for the current year will placed inside the cover of each hardcopy manual.

2.2. Planning Coordinator

The management of SVPL has appointed the SVPL Representative as the planning coordinator responsible for the development and administration of the EMP. The planning coordinator will have the authority to ensure that adequate attention is given to the plan and the needs of all personnel involved in the plan. The Planning Coordinator will incorporate the pipeline operation experience of DGC as well as representatives from the emergency response contractor Jerry Mainil LTD as a Planning Committee.

2.3. Risk Determination

SVPL has performed a risk determination analysis of the pipeline. The results of the analysis indicated that an EMP was required. This Qualitative Risk Assessment will be kept on file and reviewed on an annual basis as part of the ongoing maintenance of the EMP.

2.4. Legislation and Industry Codes of Practice

Local, Provincial, Federal and Industrial authorities were consulted in the development of this EMP.

The following legislation regulations and standards regarding emergency planning and response are cited as reference:

SASKATCHEWAN LEGISLATION & REGULATIONS

Legislation	Associated Regulations
Crown Mineral Act	Petroleum and Natural Gas Regulations (Sask. Reg. 8/69)
Dangerous Goods Transportation (Saskatchewan Act)	Dangerous Goods Transportation Regulations (R.R.S.c.d-1.2. Reg. 1)
Environmental Management and Protection Act	Environmental Spill Control Regulations (R.R.S.c. E-10.22 Reg 2)
	Hazardous Substances and Waste Dangerous Goods Regulations (E-10.22)
Occupational Health Act	Occupational Health and Safety Regulations
	Oil and Gas Conservation Regulations 1985 (R.R.S.c. 0-2 Reg. 6)
Pipe Lines Act	Pipe Lines Regulations (P-12.1 Reg 1)

FEDERAL LEGISLATION & REGULATIONS

Legislation	Associated Regulations
Canada Energy Regulator Act Fisheries Act Canadian Environmental Assessment Act Canada Energy Regulator Act – Reference Only	Onshore Pipeline Regulations (SOR/99-204) – reference only
Transportation of Dangerous Goods Act (TDG)	Transportation of Dangerous Goods Regulations (SOR/2016-95)

STANDARDS

Standards and guidelines of the Canadian Standards Association (CSA) were considered in the preparation of the EMP. These standards and guidelines are found in this publication: Emergency Planning for Industry (CAN/CSA-Z731)

The publication cited above outlines standards for preparation of industrial emergency response plans in Canada.

2.5. Organization, Roles and Responsibility

A reference guideline outlining the roles and responsibilities of personnel involved can be found in ERP #4322. This guideline will be used to define the responsibilities for decision making during an emergency situation.

2.6. Resources

Due to SVPL limited staff, it has identified the need to secure outside resources in order to effectively and efficiently react in the event of an emergency. SVPL has contracted with Jerry Mainil LTD to supply Emergency Response Crews. Jerry Mainil LTD has extensive knowledge and experience with emergency response actions in Southeastern Saskatchewan. Jerry Mainil LTD will be responsible for providing all personnel and equipment for responding in an emergency. A complete inventory of emergency equipment will be maintained at the Jerry Mainil LTD office in Weyburn. This equipment will be routinely checked for operation. A complete list of emergency equipment that will be required for an emergency response is included in Section 7.

Jerry Mainil LTD policy requires that employees are trained for possible hazards that they may encounter in an emergency. SVPL will monitor this training to ensure compliance and provide additional training to potential responders to an SVPL emergency. This training will ensure that all potential responders are familiar with the SVPL EMP and ERP and the area in which the pipeline operates.

As additional training, SVPL will conduct ERP exercises to ensure that the plan is effective. Testing will be performed annually as a minimum requirement. Testing may be done on a more frequent basis if the need to do so is identified.

SVPL also has the advantage of extensive resources with its parent company, DGC. When an emergency situation exists, DGC's Protection Services Command Center (PSCC) will initiate the emergency response plan. PSCC is staffed with experienced people that are trained to handle emergency situations. The role that PSCC will take in an emergency situation is explained further in Section 3. DGC also has staff that will assist in the ongoing risk determination that will be performed continuously during an emergency.

In the event of an emergency, DGC has the capability to remotely close isolation valves that are strategically placed along the pipeline. This is designed to reduce the volume of CO_2 that will be dealt with if a pipeline leak occurs. SVPL also has the ability to locally

close the isolation valves in case problems occur with the communication between a MLV and DGC.

2.7. Mutual Assistance Agreements

At the present time, SVPL does not have any additional mutual assistance agreements with other industries or government agencies. If any agreements are formed in the future, a copy of the agreement will be included in a future Emergency Management Plan.

2.8. Contact Telephone List

A list of internal and external telephone numbers has been compiled for the SVPL EMP. This list will be reviewed on an annual basis. The review will involve contacting the respective parties and ensuring the phone numbers and contact names are current. By doing this on an annual basis, SVPL will ensure that quick contact can be made during an emergency and that all contacts will be aware of the role that they will take in an emergency. The First Responder and Emergency Services Contact list is contained in Attachment B. A list of contact phone numbers for the approved Emergency Commanders is included in Section 6.

2.9. Communication with the Public

During an emergency, it will be critical that the affected public be made aware of the situation. To accomplish this SVPL conducted a Population Density Survey along the pipeline route. All residences, businesses and public facilities (receptors) within two kilometers on either side of the pipeline centerline were included. This area was defined as the Emergency Planning Zone (EPZ). The data collected from the receptors included number of residents and their ages, primary and secondary phone numbers and any specific evacuation data such as special routes into the business or home and if additional help in evacuation was required.

The phone numbers have been programmed into an automatic call-out system that will contact the receptors with a pre-recorded voice message indicating that an emergency situation exists and that evacuation is recommended. After the initial message has been sent to the receptors additional messages can be sent throughout the emergency. The data can be reviewed to determine if additional assistance is required to aid in the evacuation process.

The EPZ will be annually checked in order to maintain the database. The receptors will also be contacted to ensure that the information contained on file is still current.

During and after the emergency situation all media contacts will be handled through the Emergency Commander in consultation with DGC Management. This will ensure that accurate information is released to the public.

3. EMERGENCY RESPONSE PLAN - #4322

3.1. Activation

The SVPL ERP #4322 will be initiated when DGC's PSCC receives notification that an emergency situation exists. All emergencies will be treated as off-site emergencies. PSCC is staffed 24-hours a day and staff are trained in handling emergency calls. The step by step procedure that PSCC will follow is contained in the PLR E1 decision matrix and quick reference guidelines and emergency response procedure contained in procedure 4322

3.2. Notification

PSCC will be responsible for the notification of all parties involved in the SVPL Emergency Response Plan. PSCC will also be responsible for initiating the out call system to the receptors in the section of the pipeline corridor where the emergency exists. Contact with the receptors will be made using an automatic dialer which will contact the receptors via telephone and give them a pre-recorded message.

The step by step procedure that PSCC will follow is contained in the quick reference guidelines and emergency response procedure contained in procedure 4322.

3.3. Resource Mobilization

The activation of the ERP also involves the notification and mobilization of the Emergency Commander and SVPL's Emergency Response Contractor Jerry Mainil LTD.

The step by step procedure that PSCC will follow is contained in the quick reference guidelines and emergency response procedure contained in procedure 4322.

3.4. Appropriate Response

As indicated in the quick reference guidelines and emergency response procedure 4322, the initial task of the first crew dispatched to the incident scene will be to determine the exact location of the incident and nature of SVPL involvement. The first crew will also be responsible for determining wind speed, direction of wind and if there are any injured people requiring immediate rescue. This information will be reported back to the Emergency Commander and additional emergency resources will be deployed as deemed necessary.

3.5. Reporting

Detailed reporting of the events of the emergency is essential. Reports can be used for additional analysis to determine if the situation is worsening or used to provide information for post emergency reports as outlined in procedure 4322.

A list of Regulatory Agencies that must be notified in the event of an emergency are included in EMP attachments along with contact names and phone numbers. Other agencies that do not require notification but may be notified as a courtesy are also listed with any contact names and phone numbers.

3.6. Critical Incident Stress Debriefing

If necessary, the Emergency Commander will request that the DGC Human Resources Manager dispatch counselors to meet with the responders to provide stress counseling, preferably within 24 to 48 hours of the incident.

Professional counselors can be obtained through the DGC Employee Assistance Program to provide support and reassurance to those affected.

4. PUBLIC PROTECTION

4.1. Maps and Lists of Receptors

The population living inside the CO_2 pipeline corridor has been identified and recorded in the ERP #4322. That population consists of residents and employees who work inside the corridor. Collectively, those who comprise the population are referred to as "Receptors", i.e., individuals who might possibly "receive" adverse effects in the event of an emergency.

For the ERP, receptors are considered to be those within 2 kilometers of the pipeline.

For these receptors, special steps were taken to identify them in detail. The detail was collected in a door-to-door survey of the corridor and is intended to help with any evacuation, notification or other precaution resulting from an emergency.

Details of Receptors include names, mailing addresses and location descriptions including map locations and telephone numbers. The details also identify, where appropriate, individuals needing special evacuation assistance/notification, such as handicapped or school-aged children, secondary phone numbers or any other unique information that would assist in the event of an emergency.

Receptor information is stored in an electronic database, to allow instantaneous retrieval for SVPL operations. The electronic database used by SVPL operations will be continually updated, as the population changes. ERP #4322 Section 13 attachments C-F is where the "Maps and Lists of Receptors inside the SVPL CO_2 Pipeline Corridor" can be found.

4.2. Public Conveyances near Pipelines

The CO_2 pipeline crosses several public transportation routes between the United States border and the Goodwater terminal. Those routes (including highways and a railway), are shown on the same maps used to show Receptor locations.

The main routes are also listed below. In addition to the main routes listed below, there are gravel roads, unimproved roads and trails, most of which are located on sections lines (see maps for details).

Main Public Routes near the Pipeline
See maps for details.

Pipeline Segment	Description of Public Route
MLV #10 to MLV #11	Immediately north of the U.S./Canada border, an unidentified rural section-line road crosses the pipeline right-of-way.
	Canadian Pacific Railroad crosses 7.5 km east of Torquay.
	RM #6 Provincial Highway 18 crosses 7.5 km east of Torquay.
MLV #11 to terminal	RM #6 Municipal Highway 606 crosses 2.4 km west and 11.1 km north of Torquay.

4.3. Trappers Lists

Trappers who may be operating in the Pipeline Corridor are considered “Receptors” and must be evacuated/notified accordingly.

4.4. Evacuation Centers

In the event that Receptors need to be evacuated from the Pipeline Corridor, the evacuation centers (to which they may be moved) are the same ones normally used by the communities they serve. They include the city or town halls, schools and civic centers. The evacuation centers will be determined by the Emergency Commander, in cooperation with local authorities.

The following public facilities are generally available for emergency evacuations:

- Goodwater Town Hall, for segment 13 of the pipeline.
- Torquay School Gymnasium, for segment 12 of the pipeline.
- Torquay Town Hall, as alternative to Torquay School Gymnasium.

4.5. Environmentally Sensitive Areas

Description	Location
Jewel Creek crossing	Southeast of Goodwater, SK
Lomond #1 Community Pasture crossing	Southeast and east of Goodwater, SK

The Jewel Creek crossing lies within the Lomond #1 Community Pasture crossing. Activity in this area is regulated by the Prairie Farm Rehabilitation Administration (PFRA). See the phone listings for the PFRA in the CONTACT DIRECTORIES in this Emergency Response Plan. As with all pipeline emergencies, this area will be responded to as quickly as possible to minimize environmental contamination.

4.6. Emergency Response Receptor Locations & Maps

(See procedure #4322 section XIII attachments C-F)

5. MUTUAL AID AND OTHER CONTRACT AGREEMENTS

The following agreements are recognized.

- SVPL with Jerry Mainil LTD in Estevan for operations, maintenance and emergency response services.
- PTW Energy Services for electrical and instrumentation

6. EMERGENCY COMMANDER PHONE LIST

Emergency phone lists for Souris Valley Pipeline Representative and approved replacements for the position of Emergency Commander. The SVPL Representative will be the first contact. If person to person contact cannot be made with the SVPL Representative then proceed down through the list in the order it is written.

Wade Borschowa – SVPL Representative	Office Cellular	306-848-0206 306-861-3845
Eric Kesslering - Surepoint	Cellular	306-458-7789

7. EMERGENCY EQUIPMENT LIST

7.1. Equipment List for Emergency Crews Responding to a Pipeline Incident

Equipment that will be in first responding trucks;

• Two Self Contained Breathing Apparatus air packs
• Two fully charged spare bottles
• ATX260 or HS267 H_2S meter (or equivalent)
• Personal Protective Equipment
⇒ full rain suit
⇒ face shield
⇒ rubber gloves
⇒ chemical boots
• Cellular phone
• Flashlight
• Flags for marking “hot zone”
• Hands tools
⇒ Small sledge hammer
⇒ 2 3/16” slugging wrench
⇒ 2 3/16” combination wrench
• A copy of the Emergency Response Plan

7.2. Souris Valley Pipeline Safety Trailer Inventory

- Trailer used for emergency response and mitigation

QUANTITY	ITEM DESCRIPTION
4	Scott - Self-Contained Breathing Apparatus
4	Scott - Spare SCBA Bottles
2	BW Gas Alert Micro multihead monitors (H2S, LEL, O2)
2	"AA" battery chargers for BW Monitors
40	"AA" batteries for BW Monitors and 2-way radios
2	Calibration Kits for BW Monitors
2	Gastec CO2 monitors with 2 boxes of tubes (20 tubes)
1	Venturi Air Mover
1	Windsock and Bracket for rear of safety trailer
1	Stretcher
4	Reflective Vests
4	Body Harnesses
4	100' Lanyards
1	First-Aid Kit
1	Fire Blanket
1	30# Fire Extinguisher
4	Road Barricades
4	Sundowner Amber battery powered lights
2	Amber Beacons (12-volt lighter outlet plugs)
20	Flares in plastic tool box
4	Flashlights
6	Motorola 2-Way Radios with 6 rechargable battery packs
6	Battery Chargers for Motorola Radios
1	Pintle Slide-In Receiver for Towing
1	Bundle Pin Flags/Stakes
1	Set of keys for CRT, MLV 11 and safety trailer doors

Attachment A
SVPL Emergency Management Plan
Annual Certification

DAKOTA GASIFICATION COMPANY

SVPL EMERGENCY MANAGEMENT PLAN ANNUAL CERTIFICATION

SOURIS VALLEY PIPELINE

In accordance with CAN/CSA-Z731-03 (6.5) (6.6), the information in this manual and on company website has been reviewed by the appropriate personnel in the following departments and is up to date and accurate. This can also be viewed on company website at: https://dakotagas.com/about-us/pipelines/souris-valley-pipeline

APPROVALS	DATE
Pipeline Section Superintendent	
SVPL Representative	
Plant Manager	

Date	Revision Description

	Manual No.	Manual Locations:	Custodian
☐	EMP1	SVPL Representative Office	Wade Borschowa
☐	EMP2	Jerry Malnil LTD Emergency Responder Personnel	Wade Borschowa
☐	EMP3	DGC Pipeline Superintendent Office	Claude O'Berry
☐	EMP4	CO2 Pipeline Control Room	Ryan Rask
☐	EMP5	DGC Protection Services	Shift Supervisor
☐	EMP6	Canada Energy Regulator	Wade Borschowa

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Attachment B
First Responder and Emergency Services Contact List

EMERGENCY 911 DO NOT TEST THIS NUMBER		**306-953-4284**
Law Enforcement – RCMP		
Ambulance		
Fire and Rescue		
ELECTRIC / TELEPHONE UTILITIES		
Saskatchewan Power Corporation		
24 hour emergency (from North Dakota)		888-355-5589
Saskatchewan Telephone		
Repairs and locates		306-931-7084-#5
Cable Damage		#6
From Saskatchewan only		611
HOSPITAL		
St. Joseph Hospital of Estevan	Switchboard	306-637-2400
	Emergency Room	306-637-2405
Weyburn General Hospital		306-842-8400
Pasqua Community Hospital of Regina	Switchboard	306-766-2222
Regina General Hospital	Switchboard	306-766-4444
GOVERNMENT AGENCIES		
Canada Energy Regulator		403-807-9473
Transportation Safety Board of Canada/Canada Energy Regulator		
	24 hour	819-997-7887
	Fax	819-953-7876
Saskatchewan Labor/Occupational Health and Safety Division		
Regina Office		306-787-4496
Saskatchewan calls only		800-567-7233
Saskatchewan Emergency Management		
Regina Office		306-787-9563
	Fax	306-787-1694
Dangerous Goods Reporting (TDG)		
Spill Reporting		306-953-4284
OTHER		
North Dakota Public Service Commission		
	Pat Fawn, Director	
	Normal hours	701-328-4077
	After hours:	701-220-5779
	Caleb Simburger, Inspector	
	Office	701-328-4056
	Cell	701-934-3830
DOT National Response Center Office of Pipeline Safety		1-800-424-8802

Attachment C
SVPL Pipeline Operations and Plant Management Contact List

Pipeline Emergency Notification List					
Name/Agency call list:	**Position/Purpose**	**Location**	**Number**	**To be notified by:**	**Notified**
Emergency notification received by Protection Services: Notify Shift Superintendent and Pipeline Controller.					☐
Emergency discovered by Pipeline Controller: Notify Shift Superintendent and Protection Services.					
DGC Plant Control Room	Pipeline Controller	Great Plains Synfuels Plant	701-873-6736	Shift Superintendent	☐
Local first responder	Establish communications	Incident location.	See attachment B for local agency having jurisdiction.	Shift Superintendent	☐
Wade Borschowa	Souris Valley Pipeline Representative	Souris Valley Pipeline Ltd 617 Government Road S. Weyburn, SK S4H 2B3	306-848-0206 (office) 306-861-3845 (cell) 306-842-3846 (cell) 306-848-0293 (fax)	Initial call- Pipeline Controller	☐
				ERP notification - Protection Services	☐
Eric Kesslering	SVPL Alternate Surepoint Group	Surepoint Group 104 Frontier Street Estevan, SK S4A 1C8	306-458-7789 (cell)	Initial call- Pipeline Controller	☐
				ERP notification - Protection Services	☐
Whitecap Resources Inc.	Pipeline Customer	Weyburn Office 3800, 525 - 8th Ave SW Calgary, AB T2P 1G1	306-848-6177 (control) 866-590-5289 (24 hour)	Pipeline Controller	☐
Cardinal Energy LTD	Pipeline Customer	Cardinal-Midale Box 2005 Weyburn, SK S4H 3M8	306-458-2884 (Midale) 866-261-2632 (24 hour)	Pipeline Controller	☐
Darcy McCormick	President	Jerry Mainil LTD Box 848 Weyburn, SK S4H 2L1	306-861-9424 (cell) 306-842-5412 (24hours) darcy@jmlc.ca	Protection Services	☐

Calvin Tracey	Vice President	Jerry Mainil LTD Box 848 Weyburn, SK S4H 2L1	306-861-1993 (cell) 306-842-5412 (24 hours) calvin@jmlc.ca	Protection Services	☐
Jim Laboccetta	Operations Manager	Jerry Mainil LTD Box 848 Weyburn, SK S4H 2L1	306-861-1282 (cell) 306-842-5412 (24 hours)	Protection Services	☐
Rosalyn Meyer	Safety/HR Supervisor	Jerry Mainil LTD Box 848 Weyburn, SK S4H 2L1	306-861-0445 (cell) 306-842-6560 (24 hours) safety@jmlc.ca	Protection Services	☐
Kurt Dutchuk	Pipeline Supervisor	Great Plains Synfuels Plant	701-873-6367 (office) 701-880-1129 (cell) 701-873-5972 (home)	Protection Services R911 automated call	☐
Claude O'Berry	Pipeline Section Superintendent	Great Plains Synfuels Plant	701-873-6703 (office) 701-870-6703 (cell) 701-751-0135 (home)	Protection Services R911 automated call	☐

Secondary Pipeline Emergency Notification List					
Name/Agency	**Position/Purpose**	**Location**	**Number**	**To be notified by:**	**Notified**
Dale Johnson	VP & Plant Manager	Great Plains Synfuels Plant	701-873-6635 (office) 701-748-5385 (home) 701-891-8695 (cell)	Protection Services R911 automated call	☐
Brian Dillman	Maintenance Manager	Great Plains Synfuels Plant	701-873-6609 (office) 701-748-2331 (home) 701-891-9867(cell)	Protection Services R911 automated call	☐
Trinity Turnbow	Ops Manager & Asst. Plant Manager	Great Plains Synfuels Plant	701-873-6233 (office) 701-255-7304 (home) 612-666-4610 (cell)	Protection Services R911 automated call	☐
Jeff Graney	Health and Safety Superintendent	Great Plains Synfuels Plant	701-873-6605 (office) 701-870-0531 (cell)	Protection Services R911 automated call	☐
Jesse Kaelberer	Utilities Section Manager	Great Plains Synfuels Plant	701-873-6106 (office) 701-426-4031 (cell)	Protection Services R911 automated call	☐
Hunter Eslinger	Pipeline Engineer	Great Plains Synfuels Plant	701-873-6511 (office) 701-880-0948 (cell)	Protection Services R911 automated call	☐
Lindsey Chumley	Media Contact	BEPC Headquarters	701-557-5038 (office) 701-400-8784(cell)	Protection Services R911 automated call	☐

Additional Contact Information			
Name/Agency	**Location**	**Number**	**Notes:**
Protection Services	Control center	701-873-6677	24 hour phone line
	Supervisor office	701-873-6786	
	Protection Services GP404 response vehicle / PSCC cell phone	701-870-1125	
Pipeline Operations	Tioga station	701-664-3877	
	MLV #11 Goodwater CRT	306-861-3242 306-456-2553	
MEDIA CONTACT: Joel Armstrong Whitecap Resources	Whitecap Resources Inc. Calgary, AB	(403) 817-2205 (Office) (403) 804-4426 (Cell)	
MEDIA CONTACT: Scott Ratushny Cardinal Energy LTD	Cardinal Energy LTD Calgary, AB	(403) 234-8681 (Office)	

Attachment D
Government Agencies

Transportation Safety Board of Canada/Canada Energy Regulator

24 hour Phone Number	819-997-7887
Fax	819-953-7876

Saskatchewan Labor, Occupational Health and Safety Division

Regina Office	306-787-4496 800-567-7233

Saskatchewan Emergency Planning

Regina Office	306-787-9563
Fax	306-787-7107

Local Emergency Measures Agency

Weyburn Emergency Planning and Response	
Fire Chief, Trent Lee	306-848-3240
Midale EMO Coordinator	306-458-2323

Saskatchewan Environment Resource Management

Regina Office	306-787-2790
Emergency 24 Hour Spill Report Center	800-667-7525

Environment Canada

Regina Office	306-780-5744
Estevan Office	306-634-2833

Saskatchewan Workers Compensation Board

Regina Office	306-787-4370 800-667-7590

Saskatchewan Energy and Mines

Regina Office	306-787-2526
Estevan Office	306-637-4541

Saskatchewan Highways and Transportation

Regina Office	306-787-4800
Weyburn Office	306-848-2435
Estevan Office	306-637-4520

Prairie Farm Rehabilitation Administration

PFRA Lamond #1, Pasture Manager Mark Weisback	306-861-1994
PFRA Weyburn District,	306-848-4488
Land Manager	306-456-4488
Fax	306-456-4499

Canadian Environmental Protection Act (CEPA)

CEPA	800-668-6767

Dangerous Goods Reporting (TDG)

Spill Reporting		800-667-7525

Saskatchewan Power Corporation

Inquiries (Business Hours)		888-757-6937
24-Hour Emergency		888-310-2220

Saskatchewan Telephone

Provincial Network Operational Center		306-777-1500
Repair and locates		800-236-6408

Boiler/Pressure Vessel Safety

Inquiry Line		306-787-4522

Rural Municipalities

Lamond

Goodwater Office		306-456-2566
Greg Collins– RM Foreman	Work	306-456-2566
	Cellular	306-861-1873
John Mackenzie – Reeve		306-456-2568
Kevin Melle, Administrator		306-842-7804

Cymri

Midale Office		306-458-2244
Foreman	Cellular	306-458-7550
Gwen Johnston, Administrator	Work	306-458-2244

Whitecap Resources, Inc. Contacts

Weyburn Office		
Phone 24 Hr. Emergency		877-590-5289
Main Office		306-848-6100

Long Creek Railroad

Immediate Emergencies		306-923-0022
Bud Rosiak (Weyburn)		
Cellular		306-861-2879
Glen Pohl		
Phone		306-861-4304

Attachment E
Support Services

Construction Equipment and Crews

Canadian Plains - Carlyle	306-453-3400
Jerry Mainil Construction, Weyburn	306-842-5412

Helicopter Services

Heli-Lift International Inc. Yorkton	306-783-5438

Mobile Air Monitoring Services

Alta Air Monitoring Services, Calgary	403-274-2559
Monitrex Engineering Ltd, Calgary	403-291-3590

Safety Services

Safety Vic, Weyburn	306-842-3333
Carson Safety, Lampman	306-487-4120
HSE	306-842-5490

Instrumentation and Electrical

PTW Energy Services	306-634-5617
Eric Kesslering	306-458-7789

Supply Stores

TS&M Supply Ltd, Weyburn/National Oilwell Canada	306-842-4604
Fax	306-842-0535

Telecommunications

Industrial Electric, Weyburn	306-842-7290
Fax	306-842-7277
Comtech, Weyburn	306-842-3066

Trucks – Bed

Jerry Mainil LTD, Weyburn	306-842-5412
Dayman Trucking Ltd, Estevan	306-634-3412
Bert Baxter Trucking, Estevan	306-634-3616
L & C Trucking, Estevan	306-634-7341

Trucks – Crane

Jerry Mainil LTD, Weyburn	306-842-5412
Dayman Trucking Ltd, Estevan	306-634-3412
Sterling Crane, Regina	306-721-5666
Skylift Services Inc., Estevan	306-634-6116

Trucks – Winch

Jerry Mainil LTD, Weyburn	306-842-5412
Dayman Trucking Ltd, Estevan	306-634-3412
L & C Trucking, Estevan	306-634-7341

Attachment F
Area Oil and Gas Companies

Aldon Oil		306-842-4765
Arc Resources	24 hour answering service	306-634-3522
Caprice	Office 24 hour Cellular	306-456-0550 306-861-6470
Midale Petroleum		306-458-2303
Postell Energy	 Local	403-232-6252 306-483-7698
TORC Oil and gas		877-414-7780
NAL Resources		306-443-2415
Cresecent Point Energy		888-799-0043
LakeView Resources		306-861-9968
Valleyview Petroleums		306-842-5838
Canadian Natural Resources Limited		888-878-3700
Gear Energy LTD		877-494-3430

Local Trucking Companies

Local trucking companies may be under contract to visit oil well facilities on a scheduled basis. The individual trucking companies might be out of the loop of emergency communications unless contacted directly at the numbers listed below:

Spearing Service L.P.	306-458-2344
Dempsey Laird Trucking Ltd.	306-458-2331
Gibson Petroleum Co. Ltd. Emergency Response	866-553-0111
Sonic Oil Field Services	306-634-0070

Attachment G
Carbon Dioxide Typical Gas Analysis

Carbon Dioxide Gas

A product of Dakota Gasification Company

Typical Results (updated June 2019. Most results are an average of >300 samples)

Parameter	Units	Typical Result
Carbon Dioxide	Mole %	96
C2+ and Hydrocarbons	Mole %	2
Hydrogen Sulfide	Mole %	1
Nitrogen	Mole %	0.5
Methane	Mole %	0.6
Oxygen/Argon	Mole %	<0.01
Mercaptans and other Sulfides	Mole %	0.03
Moisture	ppmV	<20

Dakota Gasification Company
A BASIN ELECTRIC SUBSIDIARY
P.O. BOX 5540
BISMARCK, ND 58506-5540
Phone 701-221-4400
Fax 701-221-4450

Attachment H
Carbon Dioxide Safety Data Sheet
(See Attached)

Section 1: Identification

Product identifier

Product Name • **Carbon Dioxide**

Synonyms • Carbonic Acid Gas; Carbonic Anhydride

Relevant identified uses of the substance or mixture and uses advised against

Recommended use • Tertiary oil recovery efforts

Details of the supplier of the safety data sheet

Manufacturer • Dakota Gasification
420 County Road 26
Beulah, ND 58523-9400
United States
www.dakotagas.com

Telephone (General) • 701-873-2100

Emergency telephone number

Manufacturer • (701) 873-6600

Manufacturer • 800-424-9300 - CHEMTREC

Section 2: Hazard Identification

United States (US)

According to OSHA 29 CFR 1910.1200 HCS

Classification of the substance or mixture

OSHA HCS 2012 • Compressed Gas - H280
Simple Asphyxiant

Label elements

OSHA HCS 2012

WARNING

Hazard statements • Contains gas under pressure; may explode if heated - H280
May displace oxygen and cause rapid suffocation.

Precautionary statements

Storage/Disposal • Protect from sunlight. Store in a well-ventilated place. - P410+P403

Other hazards

OSHA HCS 2012 • Under United States Regulations (29 CFR 1910.1200 - Hazard Communication Standard), this product is considered hazardous.

Canada
According to WHMIS

Classification of the substance or mixture

WHMIS • Compressed Gas - A
Very Toxic - D1A
Other Toxic Effects - D2B

Label elements

WHMIS

• Compressed Gas - A
Very Toxic - D1A
Other Toxic Effects - D2B

Other hazards

WHMIS • This material is a simple asphyxiant. May displace or reduce oxygen available for breathing especially in confined spaces.
In Canada, the product mentioned above is considered hazardous under the Workplace Hazardous Materials Information System (WHMIS).

Section 3 - Composition/Information on Ingredients

Substances

• Material does not meet the criteria of a substance.

Mixtures

Composition					
Chemical Name	**Identifiers**	**%**	**LD50/LC50**	**Classifications According to Regulation/Directive**	**Comments**
Carbon dioxide	**CAS:**124-38-9	94% TO 97%	Inhalation-Rat LC50 • 470000 ppm 30 Minute(s)	**OSHA HCS 2012:** Press. Gas - Comp.; Simp. Asphyx.	NDA
Hydrogen sulfide	**CAS:**7783-06-4	0.8% TO 2%	Inhalation-Rat LC50 • 700 mg/m³ 4 Hour(s)	**OSHA HCS 2012:** Flam. Gas 1; Press. Gas - Comp.; Eye Irrit. 2; STOT SE 3: Resp. Irrit.; Acute Tox. 2 (inhl)	NDA

Section 4: First-Aid Measures

Description of first aid measures

Inhalation • IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Administer oxygen if breathing is difficult. Give artificial respiration if victim is not breathing. If signs/symptoms continue, get medical attention.

Skin • If frostbite has occurred, seek medical attention immediately; do NOT rub the affected area(s) or flush them with water. In order to prevent further tissue damage, do NOT attempt to remove frozen clothing

from frostbitten areas. If frostbite has not occurred, immediately and thoroughly wash contaminated skin with soap and water.

Eye
- If eye tissue is frozen, seek medical attention immediately; if tissue is not frozen, immediately and thoroughly flush the eyes with large amounts of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. If irritation, pain, swelling, lacrimation or photophobia persist, get medical attention as soon as possible.

Ingestion
- If frostbite has occurred, seek medical attention immediately; do NOT rub the affected area(s) or flush them with water. Never give anything by mouth to an unconscious person. Do NOT induce vomiting.

Most important symptoms and effects, both acute and delayed

- Refer to Section 11 - Toxicological Information.

Indication of any immediate medical attention and special treatment needed

Notes to Physician
- All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

Other information

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves. RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO GASES WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. At a minimum, Self-Contained Breathing Apparatus must be worn. Victim(s) who experience any adverse effect after over-exposure to this gas mixture must be taken for medical attention. Rescuers should be taken for medical attention if necessary. Take a copy of the label and the SDS to physician or other health professional with victim(s).

Section 5: Fire-Fighting Measures

Extinguishing media

Suitable Extinguishing Media
- Use extinguishing agent suitable for type of surrounding fire.

Unsuitable Extinguishing Media
- No data available

Special hazards arising from the substance or mixture

Unusual Fire and Explosion Hazards
- Material is non-combustible and is not expected to pose a fire or explosion hazard.

Hazardous Combustion Products
- No data available

Advice for firefighters

- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible. Always wear thermal protective clothing when handling refrigerated/cryogenic liquids. Wear positive pressure self-contained breathing apparatus (SCBA).

Section 6 - Accidental Release Measures

Personal precautions, protective equipment and emergency procedures

Personal Precautions
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Do not walk through spilled material. Ventilate the area before entry.

Emergency Procedures
- Stop leak if you can do it without risk. Keep unauthorized personnel away. Keep out of low areas. Stay upwind. Do not direct water at spill or source of leak. LARGE SPILL: Consider initial downwind evacuation for at least 500 meters (1/3 mile)

Environmental precautions

- Prevent entry into waterways, sewers, basements or confined areas.

Methods and material for containment and cleaning up

Containment/Clean-up Measures

- Stop leak if you can do it without risk.
  Do not direct water at spill or source of leak.
  Isolate area until gas has dispersed.
  Ventilate the area.
  Use water spray to reduce vapors; do not put water directly on leak, spill area or inside container.
  Allow substance to evaporate.

Section 7 - Handling and Storage

Precautions for safe handling

Handling

- Be aware of any signs of dizziness or fatigue, especially if work is done in a poorly ventilated area; exposures to fatal concentrations of this gas mixture could occur without any significant warning symptoms, due to olfactory fatigue or oxygen deficiency.

Conditions for safe storage, including any incompatibilities

Storage

- This product is not handled by personnel nor is it stored.

Section 8 - Exposure Controls/Personal Protection

Control parameters

Exposure Limits/Guidelines				
	Result	**ACGIH**	**NIOSH**	**OSHA**
Hydrogen sulfide (7783-06-4)	Ceilings	Not established	10 ppm Ceiling (10 min); 15 mg/m3 Ceiling (10 min)	20 ppm Ceiling
	STELs	5 ppm STEL	Not established	Not established
	TWAs	1 ppm TWA	Not established	Not established
Carbon dioxide (124-38-9)	TWAs	5000 ppm TWA	5000 ppm TWA; 9000 mg/m3 TWA	5000 ppm TWA; 9000 mg/m3 TWA
	STELs	30000 ppm STEL	30000 ppm STEL; 54000 mg/m3 STEL	Not established

Exposure controls

Engineering Measures/Controls

- Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Personal Protective Equipment

Respiratory

- In case of insufficient ventilation, wear suitable respiratory equipment.

Eye/Face

- Wear safety glasses.

Skin/Body

- Wear appropriate gloves.

Environmental Exposure Controls

- Follow best practice for site management and disposal of waste. Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways.

Key to abbreviations

ACGIH = American Conference of Governmental Industrial Hygiene
NIOSH = National Institute of Occupational Safety and Health
OSHA = Occupational Safety and Health Administration
STEL = Short Term Exposure Limits are based on 15-minute exposures
TWA = Time-Weighted Averages are based on 8h/day, 40h/week exposures

Section 9 - Physical and Chemical Properties

Information on Physical and Chemical Properties

Material Description			
Physical Form	Gas	Appearance/Description	Colorless gas with an acidic, irritating, sharp odor; the presence of hydrogen sulfide may give gas a rotten egg type odor.
Color	Colorless	Odor	Pure carbon dioxide may have an acidic, irritating, sharp odor. The presence of hydrogen sulfide may give gas a rotten egg type odor.
Odor Threshold	0.1 ppm (Hydrogen sulfide)		
General Properties			
Boiling Point	-109 F(-78.3333 C) (sublimes)	Melting Point	-70.6 F(-57 C) @4000 mmHg
Decomposition Temperature	No data available	pH	2 to 3.7
Specific Gravity/Relative Density	1.522 Water=1 @ 21 C(69.8 F)	Water Solubility	No data available
Viscosity	No data available		
Volatility			
Vapor Pressure	No data available	Vapor Density	1.5 Air=1
Evaporation Rate	No data available		
Flammability			
Flash Point	Not relevant	UEL	Not relevant
LEL	Not relevant	Autoignition	No data available
Flammability (solid, gas)	Nonflammable Gas.		
Environmental			
Octanol/Water Partition coefficient	No data available		

Section 10: Stability and Reactivity

Reactivity

- No dangerous reaction known under conditions of normal use.

Chemical stability

- Stable under normal temperatures and pressures.

Possibility of hazardous reactions

- Hazardous polymerization will not occur.

Conditions to avoid

- No data available

Incompatible materials

- Violent reaction with ammonia and amines. Contact with chemically active metals such as sodium or potassium may cause fire. Dry carbon dioxide can be handled with most common structural materials. Moist carbon dioxide is corrosive by its formation of carbonic acid. For these applications, 316, 309 and 310 stainless steels may be used as well as Hastelloy A, B, and C and Monel. Ferrous nickel alloys are slightly corroded.

Hazardous decomposition products

- Temperatures above 1700C may cause decomposition and the release of oxygen and highly toxic carbon monoxide.

Section 11 - Toxicological Information

Information on toxicological effects

Components

Carbon dioxide (94% TO 97%)	124-38-9	**Acute Toxicity:** Inhalation-Rat LC50 • 470000 ppm 30 Minute(s); Inhalation-Human TCLo • 7 pph; *Behavioral*:**Irritability**; *Brain and Coverings*:**Other degenerative changes**; *Nutritional and Gross Metabolic:Changes in Chemistry or Temperature*:**Body temperature decrease**; **Reproductive:** Inhalation-Rat TCLo • 6 pph 24 Hour(s)(10D preg); *Reproductive Effects:Specific Developmental Abnormalities*:**Musculoskeletal system**; *Reproductive Effects:Specific Developmental Abnormalities*:**Cardiovascular (circulatory) system**; *Reproductive Effects:Specific Developmental Abnormalities*:**Respiratory system**
Hydrogen sulfide (0.8% TO 2%)	7783-06-4	**Acute Toxicity:** Inhalation-Rat LC50 • 444 ppm; *Lungs, Thorax, or Respiration*:**Other changes**; *Gastrointestinal*:**Hypermotility, diarrhea**; *Kidney, Ureter, and Bladder*:**Urine volume increased**; Inhalation-Human LCLo • 1500 mg/m³; *Sense Organs and Special Senses:Olfaction*:**Change in olfactory nerve**; *Behavioral*:**General anesthetic**; *Lungs, Thorax, or Respiration*:**Acute pulmonary edema**; **Irritation:** Eye-Human • 0.000125 ppm 5 Hour(s); **Reproductive:** Inhalation-Rat TCLo • 10 mg/m³ (48D pre/1-22D preg); *Reproductive Effects:Effects on Fertility*:**Pre-implantation mortality**; *Reproductive Effects:Effects on Fertility*:**Post-implantation mortality**; *Reproductive Effects:Specific Developmental Abnormalities*:**Urogenital system**

GHS Properties	Classification
Acute toxicity	**OSHA HCS 2012**•Data lacking
Aspiration Hazard	**OSHA HCS 2012**•Data lacking
Carcinogenicity	**OSHA HCS 2012**•Data lacking
Germ Cell Mutagenicity	**OSHA HCS 2012**•Data lacking
Skin corrosion/Irritation	**OSHA HCS 2012**•Data lacking
Skin sensitization	**OSHA HCS 2012**•Data lacking
STOT-RE	**OSHA HCS 2012**•Data lacking
STOT-SE	**OSHA HCS 2012**•Data lacking
Toxicity for Reproduction	**OSHA HCS 2012**•Data lacking
Respiratory sensitization	**OSHA HCS 2012**•Data lacking
Serious eye damage/Irritation	**OSHA HCS 2012**•Data lacking

Route(s) of entry/exposure
- Inhalation, Skin, Eye

Potential Health Effects

Inhalation

Acute (Immediate)
- If this material is released in a small, poorly ventilated area (i.e. an enclosed or confined space), an oxygen-deficient environment may occur. Individuals breathing such an atmosphere may experience symptoms which include headaches, ringing in ears, dizziness, drowsiness, unconsciousness, nausea, vomiting, and depression of all the senses. Under some circumstances of over-exposure, death may occur. The following effects associated with decreased levels of oxygen: increase in breathing and pulse rate, emotional upset, abnormal fatigue, nausea, vomiting, collapse, loss of consciousness, convulsive movements, respiratory collapse and death.

Chronic (Delayed)
- No data available

Skin

Acute (Immediate)
- Contact with rapidly expanding gas may cause burns or frostbite.

Chronic (Delayed)
- No data available

Eye

Acute (Immediate)	• Contact with rapidly expanding gas may cause burns or frostbite.
Chronic (Delayed)	• No data available

Ingestion

Acute (Immediate)	• Ingestion is not anticipated to be a likely route of exposure to this product.
Chronic (Delayed)	• No data available

Key to abbreviations

LC = Lethal Concentration
TC = Toxic Concentration

Section 12 - Ecological Information

Toxicity

• Non-mandatory section - information about this substance not complied for this reason.

Persistence and degradability

• Non-mandatory section - information about this substance not complied for this reason.

Bioaccumulative potential

• Non-mandatory section - information about this substance not complied for this reason.

Mobility in Soil

• Non-mandatory section - information about this substance not complied for this reason.

Other adverse effects

• Non-mandatory section - information about this substance not complied for this reason.

Section 13 - Disposal Considerations

Waste treatment methods

Product waste	• Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.
Packaging waste	• Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Section 14 - Transport Information

	UN number	UN proper shipping name	Transport hazard class(es)	Packing group	Environmental hazards
DOT	UN1956	Compressed gas, n.o.s. (contains Carbon Dioxide, Hydrogen Sulfide)	2.2	NDA	NDA
TDG	UN1956	COMPRESSED GAS, N.O.S. (contains Carbon Dioxide, Hydrogen Sulfide)	2.2	NDA	NDA
IATA/ICAO	UN1956	Compressed gas, n.o.s. (contains Carbon Dioxide, Hydrogen Sulfide)	2.2	NDA	NDA

Special precautions for user	• Cylinders should be transported in a secure position, in a well-ventilated vehicle. The transportation of compressed gas cylinders in automobiles or in closed-body vehicles can present serious safety hazards. If transporting these cylinders in vehicles, ensure these cylinders are not exposed to extremely high temperatures (as may occur in an

enclosed vehicle on a hot day). Additionally, the vehicle should be well-ventilated during transportation.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

- No data available

Other information

- This product is shipped via pipeline. Typical transportation information does not generally apply since material is usually not carried by rail or truck transport. When this material is shipped the transportation information listed above applies.

Section 15 - Regulatory Information

Safety, health and environmental regulations/legislation specific for the substance or mixture

SARA Hazard Classifications

- Acute, Pressure(Sudden Release of)

Inventory						
Component	**CAS**	**Canada DSL**	**Canada NDSL**	**EU EINECS**	**EU ELNICS**	**Korea KECL**
Carbon dioxide	124-38-9	Yes	No	Yes	No	Yes
Hydrogen sulfide	7783-06-4	Yes	No	Yes	No	Yes

Canada

Labor

Canada - WHMIS - Classifications of Substances

•Hydrogen sulfide	7783-06-4	A, B1, D1A, D2B
•Carbon dioxide	124-38-9	A; Uncontrolled product according to WHMIS classification criteria (solid)

Canada - WHMIS - Ingredient Disclosure List

•Hydrogen sulfide	7783-06-4	1 %
•Carbon dioxide	124-38-9	1 %

Environment

Canada - CEPA - Priority Substances List

•Hydrogen sulfide	7783-06-4	Not Listed
•Carbon dioxide	124-38-9	Not Listed

United States

Labor

U.S. - OSHA - Process Safety Management - Highly Hazardous Chemicals

•Hydrogen sulfide	7783-06-4	1500 lb TQ
•Carbon dioxide	124-38-9	Not Listed

U.S. - OSHA - Specifically Regulated Chemicals

•Hydrogen sulfide	7783-06-4	Not Listed
•Carbon dioxide	124-38-9	Not Listed

Environment

U.S. - CAA (Clean Air Act) - 1990 Hazardous Air Pollutants

•Hydrogen sulfide	7783-06-4	Not Listed
•Carbon dioxide	124-38-9	Not Listed

U.S. - CERCLA/SARA - Hazardous Substances and their Reportable Quantities

•Hydrogen sulfide	7783-06-4	100 lb final RQ; 45.4 kg final RQ
•Carbon dioxide	124-38-9	Not Listed

U.S. - CERCLA/SARA - Radionuclides and Their Reportable Quantities

•Hydrogen sulfide	7783-06-4	Not Listed
•Carbon dioxide	124-38-9	Not Listed

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances EPCRA RQs		
•Hydrogen sulfide	7783-06-4	100 lb EPCRA RQ
•Carbon dioxide	124-38-9	Not Listed
U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances TPQs		
•Hydrogen sulfide	7783-06-4	500 lb TPQ
•Carbon dioxide	124-38-9	Not Listed
U.S. - CERCLA/SARA - Section 313 - Emission Reporting		
•Hydrogen sulfide	7783-06-4	1.0 % de minimis concentration
•Carbon dioxide	124-38-9	Not Listed
U.S. - CERCLA/SARA - Section 313 - PBT Chemical Listing		
•Hydrogen sulfide	7783-06-4	Not Listed
•Carbon dioxide	124-38-9	Not Listed
Inventory - United States - Section 8(b) Inventory (TSCA) - PMN Number to EPA Accession Number Link		
•Hydrogen sulfide	7783-06-4	Not Listed
•Carbon dioxide	124-38-9	Not Listed

United States - California

Environment

U.S. - California - Proposition 65 - Carcinogens List		
•Hydrogen sulfide	7783-06-4	Not Listed
•Carbon dioxide	124-38-9	Not Listed
U.S. - California - Proposition 65 - Developmental Toxicity		
•Hydrogen sulfide	7783-06-4	Not Listed
•Carbon dioxide	124-38-9	Not Listed
U.S. - California - Proposition 65 - Maximum Allowable Dose Levels (MADL)		
•Hydrogen sulfide	7783-06-4	Not Listed
•Carbon dioxide	124-38-9	Not Listed
U.S. - California - Proposition 65 - No Significant Risk Levels (NSRL)		
•Hydrogen sulfide	7783-06-4	Not Listed
•Carbon dioxide	124-38-9	Not Listed
U.S. - California - Proposition 65 - Reproductive Toxicity - Female		
•Hydrogen sulfide	7783-06-4	Not Listed
•Carbon dioxide	124-38-9	Not Listed
U.S. - California - Proposition 65 - Reproductive Toxicity - Male		
•Hydrogen sulfide	7783-06-4	Not Listed
•Carbon dioxide	124-38-9	Not Listed

Section 16 - Other Information

Last Revision Date
- 01/October/2014

Preparation Date
- 01/October/2014

Disclaimer/Statement of Liability
- The information contained in this Safety Data Sheet (SDS) is believed to be correct since it was obtained from sources we believe are reliable. However no representation, guarantees or warranties of any kind are made as to its accuracy, suitability for particular applications, hazards connected with the use of the material, or the results to be obtained from the use thereof. User assumes all risks and liability of any use, processing or handling of any material, variations in methods, conditions and equipment used to store, handle, or process the material and hazards connected with the use of the material are solely the responsibility of the user and remain at his sole discretion. Compliance with all applicable federal, state, and local laws and regulations remains the responsibility of the user, and the user has the responsibility to provide a safe work place to examine all aspects of its operation and to determine if or where precautions, in addition to those described herein, are required.

Key to abbreviations

NDA = No Data Available