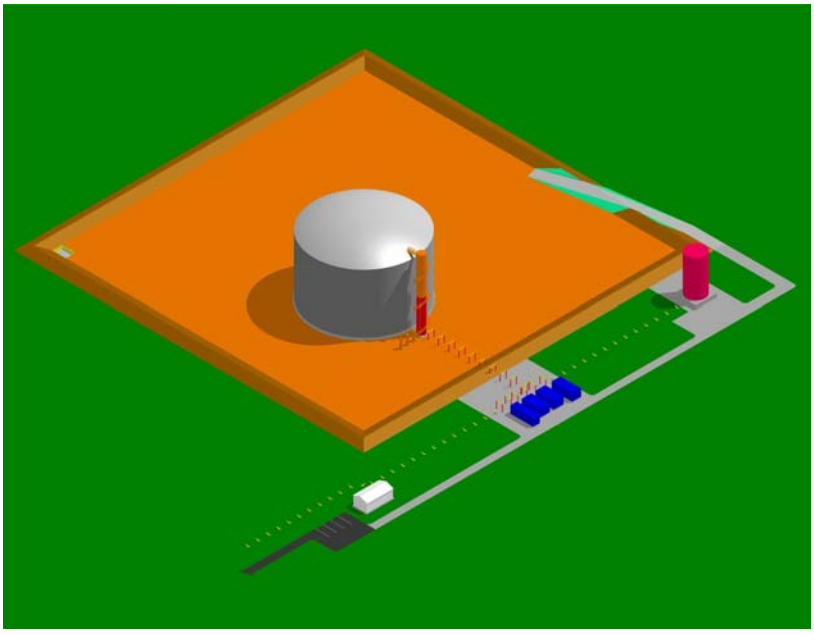
NORTH ATLANTIC REFINING LIMITED

PROPOSED BUTANE STORAGE FACILITY

ENVIRONMENTAL ASSESSMENT REGISTRATION



North Atlantic

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ENVIRONMENTAL ASSESSMENT REGISTRATION

SUBMITTED TO:

ENVIRONMENTAL ASSESSMENT DIVISION
DEPARTMENT OF ENVIRONMENT
GOVERNMENT OF NEWFOUNDLAND AND LABRADOR
4th FLOOR, WEST BLOCK CONFEDERATION BUILDING
P.O. BOX 8700
ST. JOHN'S, NEWFOUNDLAND
A1B 4J6

SUBMITTED BY:

NORTH ATLANTIC REFINING LIMITED
REFINERY ROAD, P.O. BOX 40
COME BY CHANCE, NEWFOUNDLAND
A0B 1N0
Tel: (709) 463-8811
Fax: (709) 463-5535

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1.0 INTRODUCTION

North Atlantic Refining Limited (North Atlantic) is proposing to develop a 200,000 barrel butane storage facility at its refinery at Come By Chance, Newfoundland. This environmental assessment registration has been prepared in relation to this proposed undertaking by North Atlantic, with assistance from Jacques Whitford Environment Limited.

1.1 Proponent

i)	Name of Corporate Body:	North Atlantic Refining Limited
ii)	Address:	Refinery Road, P.O. Box 40 Come By Chance, Newfoundland A0B 1N0
iii)	Chief Executive Officer:	
	Name:	Gunther Baumgartner
	Official Title:	President and Refinery Manager
	Telephone Number:	(709) 463-8811 (Ext. 479)
	Facsimile:	(709) 463-5535
	Email:	*guntherbaumgartner@na-refining.nf.ca*
iv)	Principal contact person for the purposes of environmental assessment:	
	Name:	Fred Hallett
	Official Title:	Director, Economics and Technical Support
	Telephone Number:	(709) 463-8811 (Ext. 444)
	Facsimile:	(709) 463-5535
	Email:	*fredhallett@na-refining.nf.ca*

1.2 North Atlantic Refining Limited

North Atlantic operates a 105,000 barrel per day (bpd) refinery at Come By Chance, located on the southeast coast of the Island of Newfoundland approximately 130 km northwest of St. John's.

The refinery was originally established by Shaheen Resources Inc., in cooperation with the Government of Newfoundland and Labrador. Construction of the facility began in 1971, and the first shipment of crude arrived in May 1973. Shaheen Resources operated the refinery until February 1976, at which time it went bankrupt and the refinery was closed. Petro-Canada purchased the refinery in July 1980 but did not operate it, and in 1986 it was sold to Newfoundland Processing Limited which operated the facility until 1994. In August of that year, Vitol S.A. Limited purchased the refinery and it was renamed North Atlantic Refining. After a major maintenance program, the refinery was restarted in November 1994 and has remained in operation since that time.

Refinery processing consists of Atmospheric and Vacuum Crude Distillation, Platforming, Hydrotreating, Hydrocracking and associated downstream auxiliary units. Petroleum products produced at the refinery include: Propane, Reformulated Gasoline, Road and Marine Diesel Fuels, Jet Fuels, Furnace and Stove Heating Oil, and Bunker Fuels. The refinery's crude oil storage capacity is 3.4 million barrels, with an additional 3.6 million barrels of storage for intermediate and finished products. The refinery also has a deep-water jetty for off-loading crude oil and for loading finished products for export. The refinery's petroleum products are sold locally, as well as in over 25 countries around the world. The primary markets for these products at present are the northeastern United States and Europe.

As the only oil refinery in Newfoundland and Labrador, North Atlantic is one of the province's largest employers. Nearly 550 persons are employed at the refinery, and over 150 more work with the company's marketing division, North Atlantic Petroleum.

1.3 Safety, Health and Environment Management

North Atlantic is committed to operating its refinery with due regard for the health and safety of its employees and the general public, and the protection of the environment in and around the refinery area and the surrounding communities. Since North Atlantic took ownership of the refinery in 1994, it has invested more than $300 million to make the facility safer, more efficient, and more environmentally friendly, including the implementation of several refinery modernization projects, sulfur dioxide emission reduction projects and safety enhancement projects.

In keeping with its commitment to human health and safety and environmental protection, North Atlantic has implemented an Integrated Safety, Health and Environment (SHE) Management System.

North Atlantic's SHE Policy is as follows:

To support our corporate goals North Atlantic will:

- *Prevent all incidents, injuries, emissions, loss of containment and occupational illnesses by involving the total workforce to improve our ability to manage the risks associated with our business and protect the environment, the employees and the public.*
- *Apply the principles of quality management to SHE activities including continuous improvement.*
- *Develop and implement SHE standards, procedures, guidelines and practices based upon hazard identification and risk assessment.*
- *Identify the right behavioural and skill competencies and develop our employees to be superior SHE performers.*
- *Integrate SHE into all aspects of operating and maintenance practices and procedures.*
- *Ensure that SHE risks related to our business and products are identified, assessed, documented, managed and communicated.*

- *Ensure that recognized SHE standards, company standards, appropriate industry standards, operating certificates and legal requirements are met through the provision of adequate facilities, equipment, procedures, training and management systems.*
- *Respond effectively to incidents, cooperating with industry organizations and regulatory authorities, to find root causes and prevent recurrence. This includes being prepared to respond to emergencies.*
- *Emphasize individual and supervisory responsibilities and accountability, requiring everyone throughout the organization to adhere to management approved SHE standards, procedures and legal requirements.*
- *Require all contract employees, under our direct control, to be responsible for their SHE performance.*

North Atlantic has a comprehensive SHE Manual and a supplementary pocket manual which contains its Vision, Mission, Principles and SHE Policy, as well as information regarding emergency equipment, potential hazards, key regulations and guidelines, security, incident reporting and investigation procedures, and required permits.

North Atlantic is committed to a program of integrating and continuously improving its SHE Management System. To accomplish this, North Atlantic has been working with the Industrial Accident Prevention Association (IAPA) of Ontario, utlizing their Integrated Management System (IMS). To date several of the refinery's existing standards and procedures have been reviewed and updated to meet the requirements of IMS, including those related to Management of Change, Risk Assessment and Management, Incident Reporting and Investigation, and Planned General Inspections. In addition, various training programs have been developed and provided to support the implementation of these standards and procedures.

2.0 THE UNDERTAKING

2.1 Nature of the Undertaking

The proposed project will involve the construction and operation of a butane storage facility at North Atlantic's refinery at Come By Chance, Newfoundland. The facility will comprise one 200,000 barrel storage tank, as well as auxiliary facilities such as: a butane dryer system; a refrigeration system; associated piping, pumps, valves, and fittings; an instrumentation and control system; a relief system and ground flare; a hydrocarbon gas detection system; a fire water system; and other associated infrastructure such as an access road, fence and dike.

2.2 Purpose/Rationale/Need for Undertaking

Butane is produced and stored in small quantities in the refinery as part of the refining process. Butane produced during the winter gasoline season (approximately mid-September to mid-March) is used as a blending component for the final reformulated gasoline product. Butane boosts the octane property of gasoline, as well as helping to generate sufficient vapours for proper ignition. However, due to vapour pressure limitations in United States markets, butane cannot be included in reformulated gasoline during the summer months.

The butane produced at the refinery in the summer period is therefore consumed as fuel in the various process heaters. However, for most of the summer period the total butane produced cannot be burned, and with the limited storage capacity for butane at present (four cylindrical tanks, with a combined capacity of approximately 4,065 barrels), the only alternative is to restrict crude processing, sometimes even affecting the operation of other units. In winter, however, the refinery experiences a shortage of butane to meet the requirements of its winter gasoline product.

The purpose of the proposed project is to store part of the butane produced during the summer gasoline season, which would then be available for winter gasoline blending. Based on existing and foreseeable refinery production, it is estimated that approximately 200,000 barrels of butane can be stored during the summer period and later used in the winter months.

2.3 Project Planning

Project planning and design work in relation to the proposed butane storage facility have been ongoing since mid-2001. This has included the identification and evaluation of a number of potential storage options and alternative project sites. In addition, a government and public consultation process was undertaken to identify any potential environmental issues which may be associated with the proposed butane storage facility.

2.3.1 Evaluation of Storage Options and Locations

A number of storage options and potential locations were identified and evaluated as part of project planning. Two major consultants in the petroleum and chemical industries responded to North Atlantic's request to bid for the project proposal. Both consultants proposed identical storage options for evaluation:

- ***Pressurized Spheres***: Four 50,000 barrel pressurized spheres. The spheres would be non-insulated pressure vessels constructed on fireproof columns, designed to store butane at 43 pounds per square inch (psig) and at 100^{o}F (37.8^{o}C).
- ***Refrigerated Storage****:* Consisting either of one 200,000 barrel tank or two 100,000 barrel tanks, with associated refrigeration facilities. This option would store butane at 0.5 psig (only slightly higher than atmospheric pressure) and at 23^{o}F (-5^{o}C).

A number of possible locations for the proposed facility were also identified, with the following two sites subjected to detailed evaluation:

- at the southeastern edge of the refinery's property, adjacent to the existing butane bullets (TK-850/851) and across from crude tanks TK-103/104.
- northeast of the refinery's existing gasoline storage and truck loading facilities, outside of the refinery fence on land which is currently held by the Crown.

Each of these storage options and locations were subsequently evaluated on the basis of technical, economic, safety and environmental factors.

Of the two potential project locations identified, the site located to the northeast of the refinery's existing gasoline storage and truck loading facilities, outside of the refinery fence, was eventually selected. Some of the key factors which resulted in its selection were:

- it is located on relatively high, dry ground, and is readily accessible;
- there would be no disruption to existing refinery operations during project construction;
- it is farther away from the refinery's process units and heaters and the existing petroleum storage tanks;
- this location would minimize the length of piping required to transfer butane to and from the facility, which would minimize costs as well as the potential for leakage;
- it is adjacent to the refinery's existing fire water supply; and
- it is adjacent to existing roadways, to facilitate the transport of materials and personnel to the site during construction.

North Atlantic also considered such factors as construction, operating and maintenance costs, technical feasibility and safety and environmental factors in selecting its preferred storage option. A single 200,000 barrel refrigerated storage tank was found to be considerably less expensive to construct than either two 100,000 barrel refrigerated storage tanks or four 50,000 barrel pressurised spheres, as well as being easier to maintain. Refrigerated storage is a relatively simple process, and experience elsewhere suggests that such a system can be operated and maintained easily and quite safely. Refrigerated storage is quite common in refineries and terminals which handle large amounts of liquefied petroleum gases (such as propane and butane) and liquefied natural gas, particularly those involved in transporting these products by sea. As part of project planning, North Atlantic personnel visited the Koch Refinery in Minneapolis, Minnesota, which has been operating a 500,000 barrel refrigerated butane storage facility for the past several years.

Of the two storage options evaluated, the refrigerated storage option was eventually selected for development. Front end design work for the project commenced in early 2002. A detailed description of the proposed 200,000 barrel atmospheric refrigerated storage tank and associated infrastructure is provided in this registration document.

2.3.2 Regulatory and Public Consultation

North Atlantic consulted directly with relevant government departments and agencies, community and interest groups and the general public, in order to identify any questions or environmental issues which may be associated with the proposed butane storage facility. The nature and results of this consultation process are described in the following sections.

2.3.2.1 Project Overview

In late January 2002, a brief description of the proposed facility was distributed to a number of government agencies which were identified as potentially having an interest in the proposed project, as well as local area communities and other stakeholder groups. This included the following:

- Environmental Assessment Division, Department of Environment
- Pollution Prevention Division, Department of Environment
- Water Resources Division, Department of Environment
- Historic Resources Division, Department of Tourism, Culture and Recreation
- Inland Fish and Wildlife Division, Department of Tourism, Culture and Recreation
- Office of the Fire Commissioner, Department of Municipal and Provincial Affairs
- Women's Policy Office, Executive Council
- Urban and Rural Planning Division, Department of Municipal and Provincial Affairs
- Crown Lands Division, Department of Government Services and Lands
- Policy and Planning Division, Department of Works, Services and Transportation

- Department of Health and Community Services – Eastern
- Marine Environment and Habitat Management Division, Department of Fisheries and Oceans
- Canadian Coast Guard, Department of Fisheries and Oceans
- Canadian Wildlife Service, Environment Canada
- Environmental Protection Branch, Environment Canada
- Town of Come By Chance
- Town of Arnold's Cove
- Town of Southern Harbour
- Town of Sunnyside
- Discovery Regional Development Board
- Arnold's Cove Area Chamber of Commerce
- Trinity-Placentia Development Association
- Concerned Citizen's Committee
- Trinity-Placentia Fisherpersons' Committee

These agencies and organizations were asked to review the project description information provided, and were invited to respond with any questions or concerns which they might have regarding the proposed facility. Appendix A provides a sample of the letter and the *Project Overview* which was distributed to these agencies, communities and groups.

2.3.2.2 Public Information Meeting

North Atlantic also conducted a public information meeting to provide an opportunity for the general public to obtain information on the proposed project, and to ask questions and raise any issues or concerns that they might have.

This information session took place on March 14, 2002 from 7 p.m. to 8:30 p.m. at the Come By Chance Lion's Club. A public notice describing the purpose, location and time of the information meeting (see Appendix B) was placed on the local community cable television channel, and was forwarded to the local town councils, members of the Community Liaison Committee, and to all North Atlantic employees.

A total of nine persons attended the public information meeting. Attendees were provided with a handout consisting of a general summary of the proposed project (Appendix B). The information session began with a presentation by North Atlantic, which described the purpose of the meeting, and provided an overview of the proposed project and the environmental assessment registration process. This was followed by a question and answer session. Following this, attendees were given the opportunity to ask questions and provide comments on the proposed project directly to any of the North Atlantic representatives in attendance.

2.3.2.3 Community Liaison Committee

A Community Liaison Committee was established in 1994 to provide a forum for information sharing between North Atlantic, government regulators, local communities and other stakeholder groups. The Community Liaison Committee's membership includes representatives from the following:

- Town of Arnold's Cove
- Town of Come By Chance
- Town of Sunnyside
- Town of Southern Harbour
- Trinity-Placentia Fisherpersons' Committee
- Clean Air Coalition
- Trinity-Placentia Development Association
- Arnold's Cove Area Chamber of Commerce
- Discovery Regional Development Board
- Department of Environment
- Department of Health and Community Services
- Department of Mines and Energy
- Environment Canada
- United Steel Workers of America, Local 9316
- North Atlantic

The Community Liaison Committee meets monthly, and provides an opportunity to exchange information and to identify and discuss any issues of concern relating to refinery operations.

The April 4, 2002 meeting of the Community Liaison Committee included a discussion of the proposed butane storage facility. Committee members were provided with copies of the handout summarizing the proposed project (see Appendix B). The meeting included a presentation by North Atlantic which provided an overview of the proposed project and the environmental assessment registration process, which was followed by a question and answer session.

2.3.2.4 Summary of Questions and Issues Raised

Table 2.1 summarizes the issues and questions raised through the consultation process described above. The table also indicates where each of these are addressed in this registration document.

Table 2.1 Summary of Questions and Issues

Questions and Issues	Where Addressed in the EA Registration	Comments
Project Description		
Project purpose and need	Section 2.2	
Existing butane disposal / storage at the refinery	Section 2.2	
Capacity of proposed facility and ability to meet current and future butane production	Sections 2.1, 2.2, 3.3	
Refrigeration and foundation heating systems and media	Sections 3.3.2, 3.3.3	
Combustion processes and any associated air quality effects	Sections 3.3.7, 3.5	There are no planned combustion processes. A flare is provided for safety purposes only, and flaring will occur very infrequently, if at all.
Redundancy in project components	Sections 3.3.5, 3.5.4.1	
Uninterrupted power supply	Sections 3.3.6, 3.5.4.1	
Pipeline road crossings	Sections 3.3.1, 3.3.4	
Dike design information	Sections 3.3.3, 3.5.4.1	
Expected water usage and associated effluent	Sections 3.3.9, 3.4.3.1, 3.5.4.1	There will be no requirement for water during normal project operation activities. If required, the project would draw fire water from the refinery's existing source of fire water and process water.
Flare purpose, design and use	Sections 3.3.7, 3.5.4.1	
Leak detection	Sections 3.3.8, 3.5.4.1	Although a leak is unlikely, any leaked butane would evaporate quickly. The facility will include a sophisticated hydrocarbon gas detection system.
Expected relief system loss and associated air quality effects	Sections 3.3.7, 3.5.2	There will be no loss during normal operations. A relief system (including flare) is provided in case of a tank pressure increase in the unlikely event of refrigeration failure. Vapours would be sent to the flare for complete combustion. No adverse effects to air quality would occur.
Gauging and reconciliation procedures	Sections 3.3.5, 3.5.4.1	
Determination of cumulative loss	N/A	No loss is anticipated.
Fill/withdrawal cycle	Sections 3.3.1, 3.3.2, 3.3.3, 3.3.4, 3.5	

Questions and Issues	Where Addressed in the EA Registration	Comments
Potential accidental events	Section 3.5.4	
Effect of the project on overall air emissions at the refinery	N/A	The project will not influence air emissions at the refinery.
Radius/buffer around the facility for safety purposes	Section 3.5.4.1	
Safety features and contingency planning / emergency preparedness	Section 3.5.4	
Timing and duration of construction	Sections 3.4.1, 5.1	
Personnel required to complete construction	Section 3.7	
Potential employment and business opportunities	Section 3.7	
Equity in project-related employment	Section 3.7	
Natural / Socioeconomic Environment		
Compliance with applicable legislation/regulations and safety codes	Sections 3.3, 3.4.3, 4.0	
Potential for human-wildlife interactions and protocols for preventing / addressing these	Sections 3.4.3, 3.5.3	
Potential effects of flaring	Sections 3.3.7, 3.5.3	
Vegetation clearing and potential disturbance of avifauna and their habitat	Section 3.4.3.2	
Raptor nest survey and buffer zones around nest sites	Section 3.4.3.2	
Measures to reduce effects on avifauna and their habitat (should a nest site be found)	Section 3.4.3.2	
The potential for accidental events and possible implications for human health and safety and the natural environment	Section 3.5.4	

3.0 DESCRIPTION OF THE UNDERTAKING

3.1 Location

The proposed project site is located northeast of the refinery's existing gasoline storage and truck loading facilities, outside of the refinery fence. The proposed location of the facility is illustrated in Figure 3.1.

3.2 Existing Environment

The following section provides an overview of the existing environment of the proposed project area, including its physical, biological, and socioeconomic environments.

3.2.1 Climate and Geology

The project area is located on the northwestern portion of the Island of Newfoundland's Avalon Peninsula (Figure 3.1). The area is located within the *South and Southeast Coasts and Immediate Hinterlands* climatic zone, as defined by Banfield (1981). The area's climate exhibits a strong maritime influence with mild winters, cool summers, frequent fog, high precipitation and strong, predominantly southwest, winds (SGE 1996). Canadian climate normals data for the period 1951-1980 (AES 1982) are available for the Come By Chance area. Daily maximum and minimum temperatures at Come By Chance during that period averaged 0.2° C to –7.1°C in February and 18.5° C to 12.9°C in August. Annual rainfall averaged 968 mm, and the average snowfall was 160 cm. Wind data are available only from nearby Arnold's Cove, but are likely indicative of wind conditions in the general area (SGE 1996). The average annual wind speed during this period was 21.2 km/h, with the prevailing wind direction being southwest (AES 1982).

Bedrock geology in the Come By Chance area is comprised of late Precambrian sedimentary and volcanic rocks, and Cambrian-Ordovician quartzite and sedimentary rocks. Surficial deposits consist primarily of continuous and discontinuous ground moraine, with lesser amounts of bog, outwash and modern stream deposits (King 1989 and Henderson 1982, cited in SGE 1996). The project site and immediate area are characterized by relatively flat terrain.

3.2.2 Aquatic Environment

There are no major rivers adjacent to the proposed project site. The nearest waterbodies are Barachois Pond (approximately 400 m to the northeast) and Inkster's Pond (100 m to the east) (Figure 3.1). These ponds are part of a small watershed comprised of several small ponds, wetlands and stream sections that enter Placentia Bay just north of the refinery site.

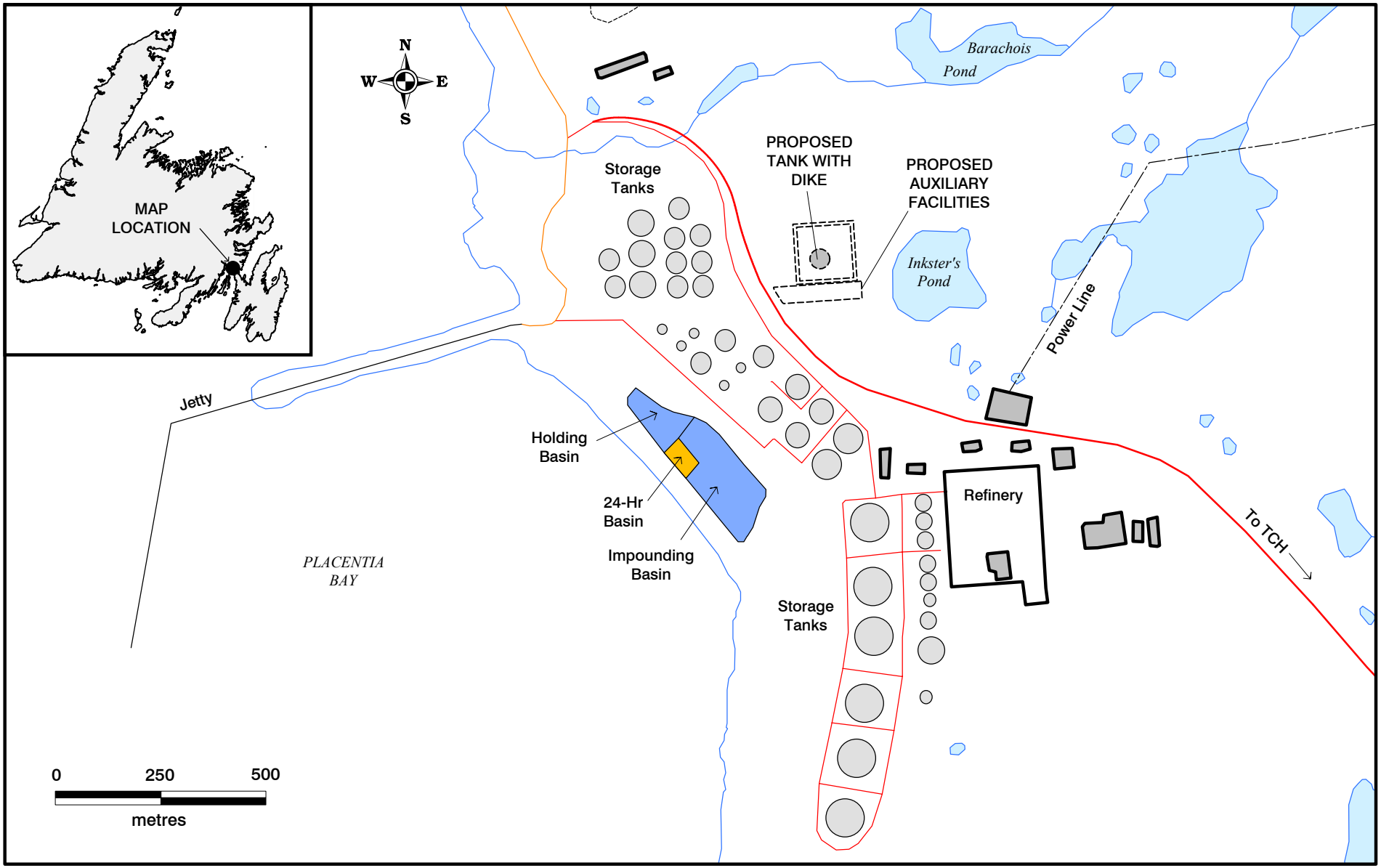

Figure 3.1

LOCATION OF PROPOSED BUTANE STORAGE FACILITY

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Inkster's Pond is currently used to supply fire water and process water required for refinery operations. A pipeline extends from Inkster's Pond to the refinery. This waterbody is maintained by pumping water from nearby Barachois Pond, as required. A small corridor of land between the two ponds is currently designated as refinery property. Both of these waterbodies are exclusively for refinery use.

Past sampling of small ponds and streams in the general area have produced catches of brook trout (*Salvelinus fontinalis*) and threespine stickleback (*Gasterosteus aculeatus*). Deeper ponds such as Little Mosquito Pond (Bull Arm) contain landlocked Arctic charr (*Salvelinus alpinus*) and larger streams in the broader region contain Atlantic salmon (*Salmo salar*) (i.e., Come By Chance Brook and Arnold's Cove Brook) (JWEL 1990). Other fish that may be present in the watershed include American eel (*Anguilla rostrata*).

3.2.3 Terrestrial Environment

The Come By Chance area is located within the *Southeastern Barrens Subregion* of the Island of Newfoundland's *Maritime Barrens Ecoregion* (Damman 1983). This ecoregion is characterized by extensive barren areas of heath, bog and fen with forested valleys. The main forest vegetation is balsam fir (*Abies balsamea)* associated with black spruce (*Picea mariana)* and lesser amounts of white spruce (*Picea glauca)*, white birch (*Betula papyrifera)* and larch (*Larix laricina)*. Scrub forest is common. Rock and soil barrens characterize heath areas. Rock barren vegetation is low and tundra-like. The dominant plant species are *Kalmia angustifolia, Ledum groenlandicum, Rododendron canadense* and *Chamaedaphne calyculata*.

In the *Southeastern Barrens Subregion,* the landscape is dominated by heathlands and the forest occurs only in small acreages which have escaped fire. The dominant heath shrub on uplands is *Empetrum nigrum*, with *Kalmia angustifolia* forming a dense cover only in protected valleys (Meades 1990). No rare or endangered plant species have been identified in this area by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC 2002).

Wildlife species using the general region are likely those which are typically found in predominantly barren ground habitats on the Island of Newfoundland. This may include red fox (*Vulpes vulpes)*, moose (*Alces alces)* and willow ptarmigan (*Lagopus lagopus)*. Raptors such as bald eagle (*Haliaeetus leucocephalus)*, sharp-shinned hawk (*Accipiter striatus)*, northern harrier (*Circus cyaneus)* and short-eared owl (*Asio flammeus)* may also hunt in the general area. The short-eared owl is listed as a species of special concern by COSEWIC.

There is some shrub/barren vegetation in the general area. The project site itself has, however, been previously cleared of vegetation. As it is also located adjacent to an existing road and a large parking lot, and is in close proximity to on-going industrial activity (i.e., the refinery), the project site likely provides limited or no wildlife habitat at present.

3.2.4 Socioeconomic Environment

The proposed project site is located immediately adjacent to the existing refinery, outside of the refinery fence on land which is currently held by the Crown. The project area is designated for industrial use.

The Town of Come By Chance is located approximately 5 km north of the proposed facility, with the project area located within that community's municipal boundary. Other communities in the general area include Arnold's Cove (approximately 5 km to the south), Sunnyside (approximately 8 km to the northeast) and Southern Harbour (located approximately 10 km to the south).

There are no known archaeological sites within the project area (PAO 2002).

3.3 Physical Features

The proposed butane storage facility will be designed to receive, refrigerate, store and send-out liquid butane. It will include a 200,000 barrel single wall insulated storage tank with 110% capacity dike, a butane dryer, a propane refrigeration system, butane rundown and send-out systems, an instrumentation and control system, a relief system and ground flare, a hydrocarbon gas detection system, a fire water system, and other required infrastructure and components. The facility has been designed in accordance with the requirements of American Petroleum Institute (API) Standard 2510, "*Design and Construction of Liquefied Petroleum Gas Installations*" and API Standard 2510A, "*Fire Protection Considerations for the Design and Operation of Liquefied Petroleum Gas Storage Facilities*".

Figure 3.2 illustrates the general layout of the proposed butane storage facility, and a three-dimensional drawing of the facility is provided in Figure 3.3. A general process diagram is provided in Figure 3.4. The following sections provide a description of the primary components of the facility.

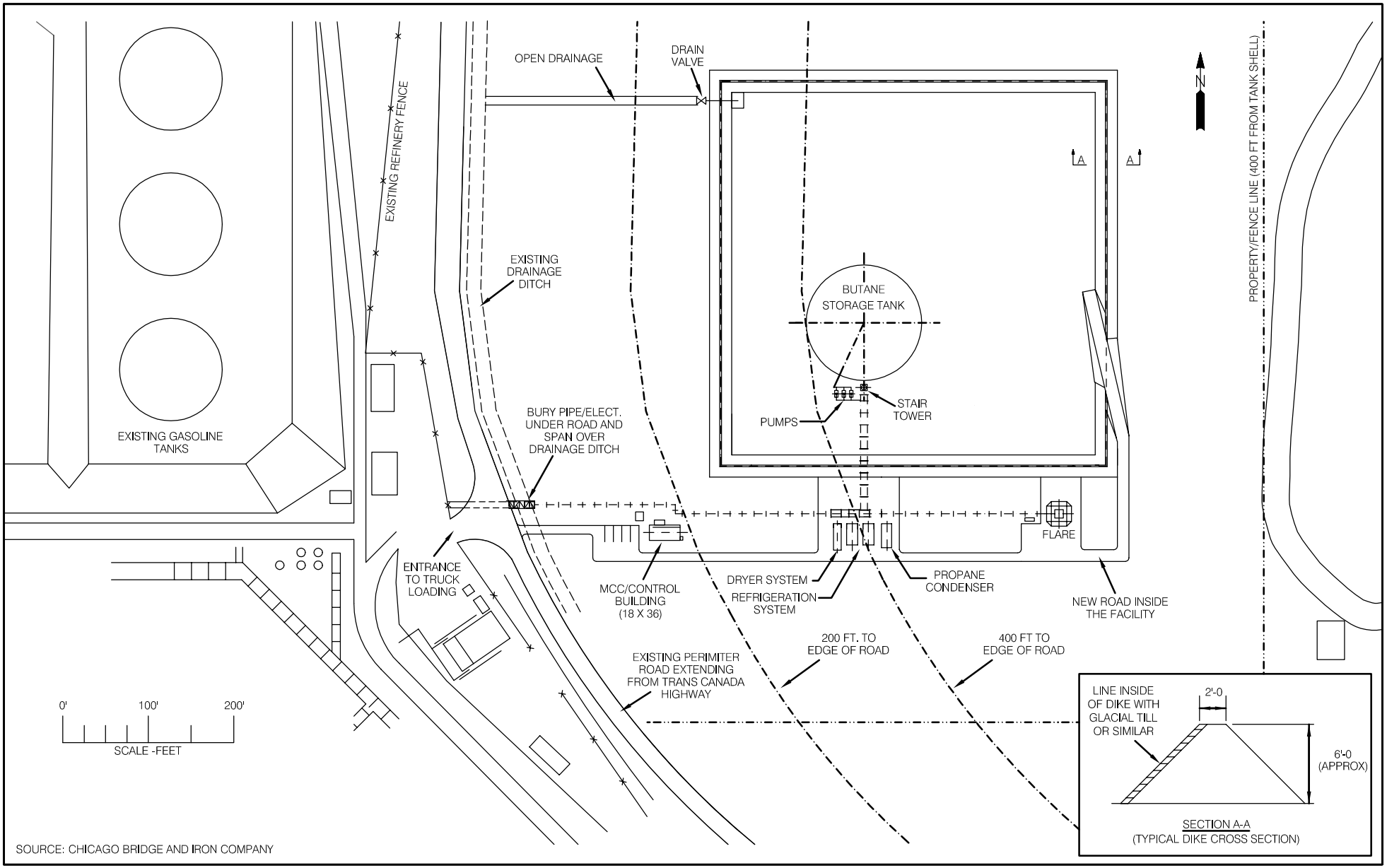

Figure 3.2

PLOT PLAN - PROPOSED BUTANE STORAGE FACILITY

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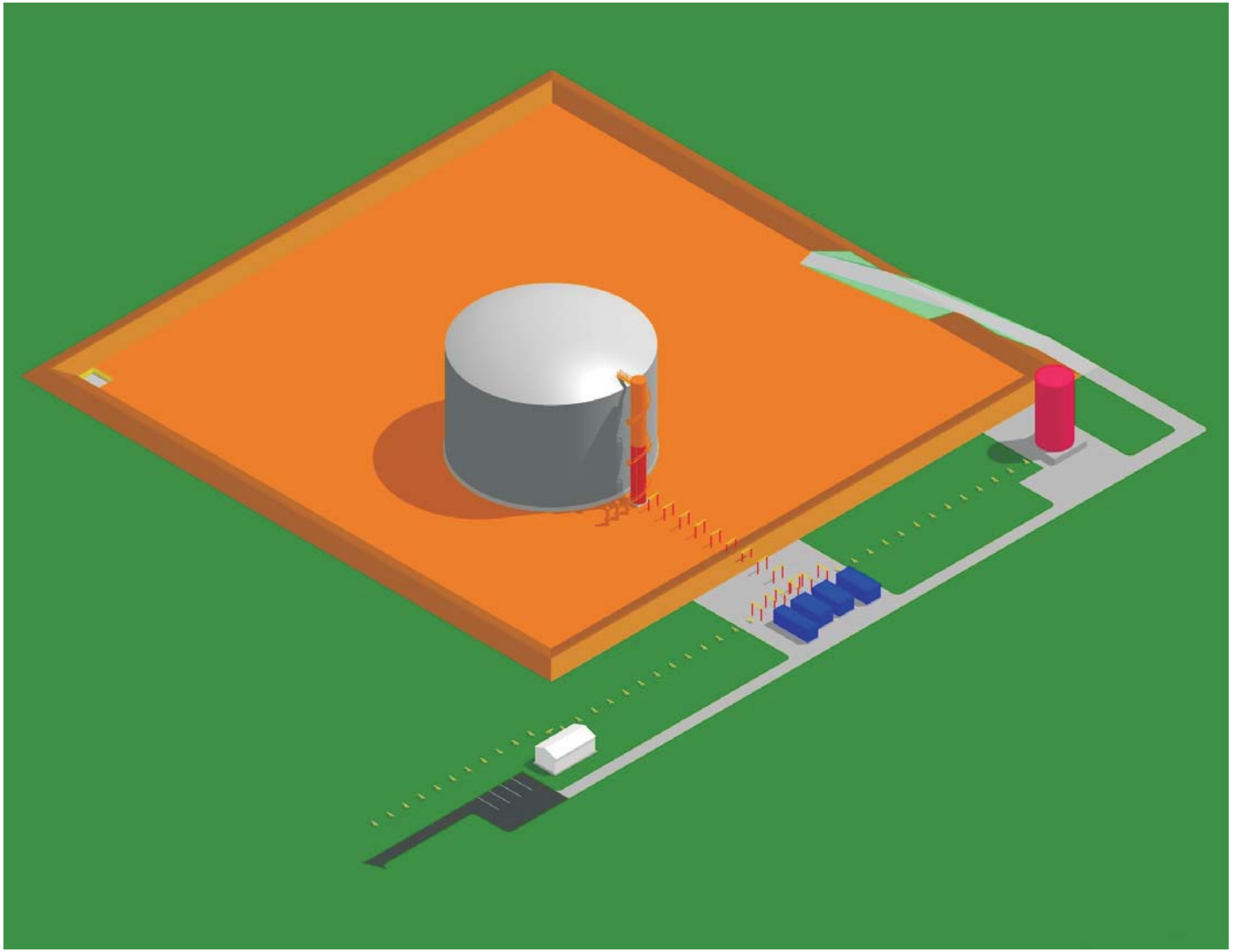
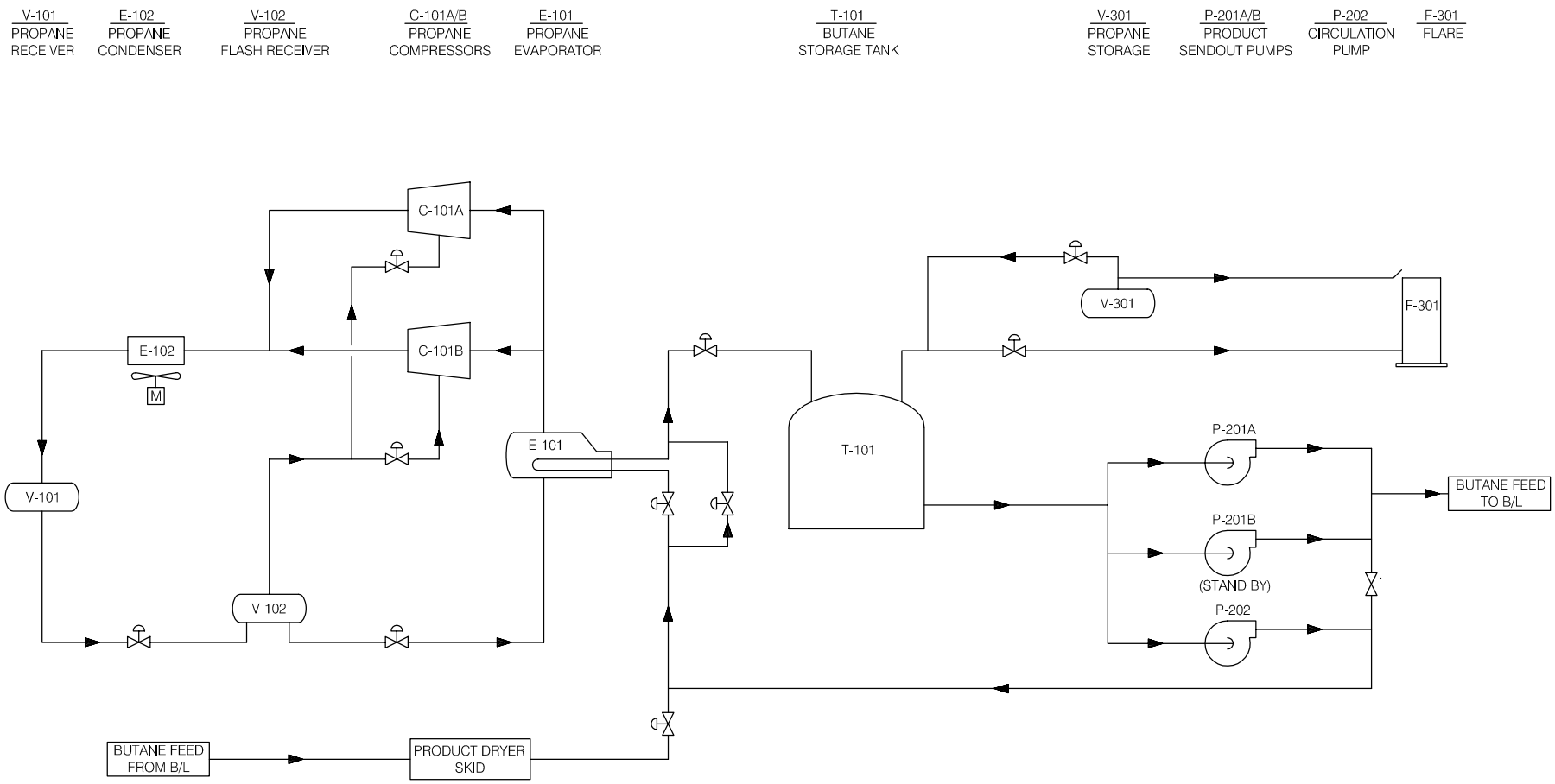


Figure 3.3

THREE-DIMENSIONAL DRAWING OF
PROPOSED BUTANE STORAGE FACILITY



SOURCE: CHICAGO BRIDGE AND IRON COMPANY

Figure 3.4

PROCESS FLOW DIAGRAM - PROPOSED BUTANE STORAGE FACILITY

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3.3.1 Butane Rundown System

During the summer, a measured quantity of approximately 1,000 bpd of butane from the refinery will be diverted through a control valve to a refrigeration plant, and from there to the new storage tank. The butane rundown to the refrigeration plant and storage tank will be tied into the existing refinery system. Two 3 inch pipes will be installed between the refinery and the storage facility, one to transfer hot butane to the refrigeration plant during summer (butane rundown) and the other to carry the refrigerated butane from the storage tank to the refinery operations for gasoline blending in winter (sendout system). The pipelines will be installed above ground in a pipe rack, but will cross under the existing perimeter road through a concrete sleeve.

3.3.2 Butane Dryer System and Refrigeration System

A butane dryer system will be located in front of the facility's refrigeration plant (Figures 3.2, 3.4), to remove any trace quantities of water from the butane. The butane dryer will be a two bed, skid-mounted desiccant system. The system will include an inlet coalescing separator, which will remove any free water in the product, as well as dryer beds, a butane regeneration pump, butane vapourizer, butane superheater, condenser and dust filter. It is designed to dehydrate up to 2,000 bpd of butane saturated at 80^{o}F (26.7^{o}C) to an outlet quantity of less than 5 parts per million by weight (ppmw) of water.

A skid-mounted refrigeration plant will be installed on the south side of the facility, located at a minimum of 50 feet (15.2 m) from the dike surrounding the storage tank (Figure 3.2). The refrigeration system will consist of a two-stage closed loop propane cycle, which will include two compressors (one as a stand-by), an air cooled condenser, a receiver, a flash economizer, and a propane evaporator. The compressors circulate commercial grade refrigerant propane through the closed loop refrigeration system. The system is designed for the following loads: load required for subcooling of hot butane feed from the refinery; heat leak to cold product in the storage tank through tank insulation due to higher ambient temperature; and vapour displacement load from the storage tank due to the incoming butane feed.

The butane feed will pass through the coil of the propane evaporator, where it will be subcooled to a temperature of approximately 18^{o}F (-7.8^{o}C) by the cold propane refrigerant circulating from the compressor. The cold butane will then be directed to the storage tank. The equilibrium temperature of the butane increases to approximately 23^{o}F (-5^{o}C) in the storage tank due to tank heat leak and vapour displacement loads. The refrigeration system control will be fully automated.

3.3.3 Storage Tank

The facility will include one 200,000 barrel atmospheric refrigerated storage tank, approximately 144 feet (43.9 m) in diameter and 72 feet (21.9 m) in height. The tank will be a cylindrical, single-walled, flat-bottom tank with a stiffened umbrella roof. It will be insulated with a thick polyurethane foam with

external seal coat. The tank will have an internal design pressure of 1 to 1.5 psig. The butane feed from the refrigeration plant will enter the storage tank through an inlet located at the top of the tank. A stair tower will be installed on the south side of the tank (Figure 3.2).

The storage tank will have a reinforced concrete ringwall foundation. The tank foundation will be insulated with a load bearing foam glass insulation, with hot mopped asphalt applied to develop full compressive strength. The tank foundation will be equipped with a heating system to prevent heaving and structural damage to the foundation due to freezing (as a result of the cooled liquid butane stored in the tank). This electric heating system will comprise heating wires located in conduits in the base of the tank, with temperature sensors installed in the tank foundation.

A storage tank vapour makeup system will be installed to maintain tank pressure during low ambient conditions. Hot butane vapours from the butane dryer system (Section 3.3.2) will be diverted to the storage tank through a control valve to counteract any low pressure resulting from extreme low atmospheric temperatures.

Instrumentation is provided to keep a constant watch on the liquid level in the tank, in order to avoid overfilling. A SAAB radar level gauge will measure the height of the liquid in the tank by a radio beam directed at the liquid surface. This will be backed up by a differential pressure transmitter, which is a simple basic level gauge which measures tank level based on the pressure difference of the liquid column of butane inside the tank.

The tank will be fabricated, constructed, and tested in accordance with the requirements of API Standard 620 (*Design and Construction of Large, Welded, Low-Pressure Storage Tanks*). The tank will be fully hydrotested by filling with water to the design liquid level prior to project commissioning.

An earthen dike (110% of tank volume) will be constructed around the storage tank to contain any possible leaks in the unlikely event of tank rupture. The dike will be approximately 6 feet (1.8 m) high and 2 feet (0.6 m) wide at the top, with a glacial till lining on the inside surface. The dike floor will consist of normal soil, as any butane pool would evaporate quickly and not contaminate the soil. It will be designed to drain towards the northwest end, away from the tank. Rainwater collected inside the dike will drain towards this end, and will be released through a valve in the corner of the dike, as required. A short, 250 feet (76.2 m) ditch will transport this water to the existing drainage ditch which follows the existing roadway (Figure 3.2). During normal operation, the valve will remain closed so that in case of an accidental leak, liquid butane would be contained inside the dike.

3.3.4 Butane Sendout System

During the winter gasoline season (approximately mid-September to mid-March), the butane rundown to the storage tank will be discontinued. The stored butane will be transferred to refinery operations for gasoline blending, along with the refinery's normal butane production.

The butane send-out system will include two vertical turbine can pumps, each designed to deliver 100% of the sendout capacity (thereby providing 100% standby capacity). The send-out system is designed to transfer a maximum of 5,000 bpd of butane from the storage tank to the refinery for gasoline blending. Butane would be transferred from the storage facility to the refinery operations through a single 3 inch pipeline, which would extend alongside the pipeline for the butane rundown (Section 3.3.1). A flow control valve will be located in the transfer line to control the sendout rate.

3.3.5 Instrumentation and Control System

The proposed facility will have a state-of-the-art instrumentation and control system. It will be monitored and controlled from a stand alone control system located inside a building at the site (Figure 3.2), as well as remotely from the Off-Site/Tank Farm Area's main control room. The instrumentation and control system will include built-in redundancy, with key instrumentation and equipment at both locations.

Normal control of the facility is accomplished in the Programmable Logic Controller (PLC) system. Switches from field devices input into the PLC for interlocking, alarms, and shutdowns. The PLC outputs control equipment operation and sequencing. The facility will include a dedicated compressor-dryer system for the supply of instrument air. An operator interface system in both control rooms will graphically display the process by showing equipment status, process variables (pressure, temperature, flows, etc.) and alarm status. An operator can use the interface system to start or stop equipment, open or close valves, or to operate control loops in manual control.

The systems are designed on a "fail-safe" basis. Protective devices are provided for all plant equipment to prevent process conditions which might be unsafe to personnel or damaging to equipment. All important safety trip systems and interlocks will be separately controlled by a Fail-Safe Control (FSC) system for a high degree of reliability. This system employs a state-of-the-art, sophisticated multi-layer redundancy controller, which continuously monitors the function of all of the connected instruments, trips, interlocks, etc.

The project's safety features are discussed further in Section 3.5.4.

3.3.6 Electricity Supply

The refinery currently purchases its electricity from the public grid from Newfoundland and Labrador Hydro as an individual customer. Electricity is distributed to the refinery through a number of substations. Electricity will be supplied to the butane storage facility from the nearest substation inside the refinery property. Appropriate conduits will extend from this substation, and will be laid underground to carry the required electricity to the new butane storage facility (Figure 3.2)

The facility will also include an uninterrupted power supply (UPS). In the event of a power failure, this system would cut in and supply power to the facility for a minimum of half an hour, so that the entire facility can be shut down safely, until its regular power supply can be restored. The primary UPS system will have another redundant back-up UPS.

3.3.7 Relief System and Flare

A relief system will be in place should tank pressure increase in the unlikely event of refrigeration failure. As noted previously, there will be a spare compressor for refrigeration, and even if both compressors were to fail, butane can be diverted from the tank to the refinery's existing storage tanks, thereby avoiding any build up of pressure in the butane storage tank.

However, in the unlikely event of an increase in tank pressure, a relief valve on the tank will open and release any excess butane vapours from the storage tank to a dedicated ground flare system for complete combustion. The flare system will consist of a ground flare with a pilot burner which will maintain a small flame by burning a small quantity of clean, commercial grade propane (approximately 9 litres/hour). The flare will be covered by louver-type shutters on all sides to allow the intake of combustion air while at the same time keeping the flame hidden from view. The centre portion of the flare structure will be covered by a tall rectangular chimney stack. The flare will be connected to the storage tank through a knockout drum, which acts as a separator vessel to collect liquid, allowing only vapours to go to the flare. An electric heater will be located in the knockout drum to vaporize any liquid collected.

With various safeguards in place to avoid pressurization of the storage tank, flaring is expected to occur very infrequently, if at all.

3.3.8 Hydrocarbon Gas Detection System

The facility will also include a sophisticated hydrocarbon gas detection system. The system will include gas detector heads with integral transmitters placed throughout the facility at strategic locations, including inside the control room building. Each detector will be calibrated for butane gas to give an alarm at 25% of LEL (Lower Explosive Limit) and shutdown process equipment at 50% of LEL. The gas detection system will be interconnected with the control system to close valves and shut down process equipment. Alarms would initiate the action of appropriate response teams.

3.3.9 Fire Water System

The butane storage facility will have a dedicated fire water system in case of an accidental event. In a fire situation, the project will draw water from the refinery's current source of fire water. Inkster's Pond currently supplies process water and fire water to the refinery (see Figure 3.1). The piping for the storage facility's fire water system will be installed below the frost line, and tied into the existing fire

water lines. Alternatively, North Atlantic may establish a separate pump and water line from Inkster's Pond, if necessary. In either case, in an emergency the new project will draw water only from the existing reservoir.

The fire water system will comprise a looped hydrant system. Hydrants will be strategically placed on the earthen dike surrounding the storage tank, and around the auxiliary facilities and the perimeter of the project site. The piping will be looped, allowing water to be supplied to any hydrant from two directions. Each hydrant will include two hose connection nozzles with independent valves on each outlet, and two pumper valve connection nozzles. Each hydrant/monitor will be provided with an auxiliary gate valve and gate box to allow for isolation of the hydrant. A monitor will be connected to one of the hose connection nozzles.

3.3.10 Other Required Infrastructure and Equipment

The facility will include a small building, which will house a motor control centre (which controls all of the motors installed in the field to drive the pumps and compressors), an instrument rack and cabinet, and an operator console with associated instrumentation (Figure 3.2). There will not be a requirement for the installation of sewage or potable water systems at the facility.

An approximately 700 feet (213 m) long paved access road will extend from the existing road and along the south side of the proposed facility. It will include a small parking lot, and provide access to the control building, refrigeration system, and flare structure (Figure 3.2). The road will also extend over the dike and provide access to the storage tank. There will be no stream crossings required.

The entire facility will be fenced, with access restricted to authorized construction personnel, and later to the facility's operating personnel.

All piping will be laid in a systematic manner in a pipe rack, with easy access to the various valves and fittings.

3.4 Construction

3.4.1 Project Activities

Subsequent to release from the environmental assessment process, and the receipt of formal corporate approval and all other required environmental approvals and permits, construction activity would commence in the summer of 2002. Site preparation activities would begin at that time, and the area will be fenced. This will be followed by the construction of the tank foundation, the supply and erection of the storage tank, tank insulation, construction of the control building, and the installation of the required piping, electrical system and instrumentation. Equipment (refrigeration unit, etc.) delivery and installation, and the reminder of the piping would follow. Construction activity would continue until

mid-2003, with work stopping during the winter months. Construction activities will not disrupt the existing refinery operations in any way.

3.4.2 Potential Sources of Pollution

All waste materials generated during project construction will be disposed of in an environmentally acceptable manner. Non-hazardous waste produced during construction will be stored in covered metal receptacles, and will be disposed of on an as-needed basis at an approved landfill site. North Atlantic currently has an on-site landfill which is used for non-hazardous, non-combustible solid waste. Non-hazardous material is also disposed of at the landfill of the Town of Sunnyside. Recyclable materials such as scrap steel, wood and plastic are removed from the refinery site by a local contractor. Liquid waste is recycled where possible. Liquid wastes that are not recyclable are transported to an approved off-site facility by the company's waste contractor. North Atlantic also maintains a Waste Water Treatment Plant for treating non-hazardous liquid waste, used process water, storm water, drainage water, etc. prior to discharge.

North Atlantic also has a comprehensive Waste Management Plan for the handling of solid hazardous waste. It has a waste management contract in place with a company which transports all hazardous wastes generated at the refinery to secure, licensed mainland disposal facilities. Additionally, North Atlantic maintains a secure hazardous waste cell on site which is regularly monitored and sampled. There will therefore be no interaction between construction-related waste material and the environment.

3.4.3 Potential Resource Conflicts

3.4.3.1 Aquatic Environment

Construction activities will not result in any adverse effects to water resources or fish and fish habitat. There are no waterbodies or streams in the immediate vicinity of the storage facility, and no watercourse crossing are required. The following measures will be put into place to further decrease the probability of a project-related effect on the aquatic environment during construction:

- all waste materials will be stored, handled and disposed of in accordance with applicable regulations;
- site drainage will be managed in a manner to prevent the introduction of sediment-laden water into adjacent watersheds;
- should there be a requirement for an additional water intake in Inkster's Pond for the project's fire water system, this would be installed so as to minimize the potential for substrate disturbance and sediment introductions;
- vehicles will be maintained in efficient and safe running order. All fuels and lubricants will be stored, handled, delivered, and wastes disposed of according to applicable regulations. No storage or refuelling will be conducted within 100 m of a waterbody; and

- as required, dust will be controlled to minimize potential contamination of watercourses.

The storage tank will be hydrotested by filling with water to the design maximum liquid level prior to project commissioning. To fill the tank, water will be drawn from Inkster's Pond, a reservoir which currently serves as the refinery's source of process water and fire water (Section 3.2.2), using the new fire water pumps or portable pumps and hoses. Upon completion of hydrotesting (a maximum of 2-3 days), the water from the tank will be pumped back into Inkster's Pond. Water withdrawal for hydrotesting will therefore be temporary and short-term, and overall there will not be an increase in water withdrawal from Inkster's Pond and Barachois Pond compared to normal refinery operation.

3.4.3.2 Terrestrial Environment

The proposed project is characterized by a relatively small footprint, and the area has previously been cleared of vegetation. The site is located adjacent to an existing roadway and in close proximity to existing industrial activity, and therefore provides limited or no wildlife habitat at present. The potential for interactions between the project and wildlife resources is therefore also limited.

It is possible, however, that some bird species may be present in the general area during the breeding season (typically May to mid-July). A survey of the project area will be conducted prior to the start of construction to determine if any avifauna are using this area. Should an active nest be discovered, appropriate buffer zones will be maintained.

In addition, the following measures will be implemented to reduce the potential for interactions between construction activity and wildlife in the area:

- the construction site will be kept clear of garbage;
- construction personnel will not harass or hunt wildlife while on site;
- pets will not be permitted on the construction site;
- equipment and vehicles will yield the right-of-way to wildlife; and
- any nuisance animals will be dealt with in consultation with the Inland Fish and Wildlife Division.

3.4.3.3 Socioeconomic Environment

There are no known archaeological sites within the project area, and the site itself is relatively small and has already been disturbed. It is therefore unlikely that the project will result in the disturbance or destruction of historic resources. During project construction, however, standard precautionary and reporting procedures will be implemented. Should an accidental discovery of historic resources occur, all work will cease in the immediate area of the discovery until authorization is given for the resumption of the work. Any archaeological materials encountered will be reported to the Provincial Archaeology

Office, including information on the nature of the material discovered and the location and date of the find.

As noted above, project construction will not result in adverse effects to air quality, or to water, fish or wildlife resources in the area. There will therefore be no indirect effects to human health and well-being or use of these resources.

There will be some noise associated with construction activity. However, there are no residences located in close proximity to the site, which is immediately adjacent to the existing refinery operations. The site will be fenced and off limits to the general public during project construction and operations for safety reasons. No conflicts with local land and resource use activities are anticipated.

Potential employment and business opportunities which may be associated with the construction of the proposed butane storage facility are discussed in Section 3.7.

The proponent and/or its contractors will obtain all required provincial, federal and/or municipal authorizations prior to the start of construction (Section 4.0).

3.5 Operation

3.5.1 Planned Project Activities

The proposed facility will store part of the butane produced at the refinery during the summer gasoline season. During this period, around 1,000 bpd of liquid butane from the refinery (at approximately 125^{o}F (51.7^{o}C)) will be automatically diverted through a control valve to the refrigeration plant. The refrigeration plant will continuously cool the butane to its saturated liquid temperature of approximately 23^{o}F (-5^{o}C) for a set pressure of 0.5 psig. The cooled butane will then be transferred from the refrigeration unit to the storage tank through its top inlet. A small portion of butane from the tank bottom will be re-circulated to the refrigeration compressor along with the incoming main butane rundown. Throughout the summer period, this process of transferring and storing butane will occur automatically, according to the pressure set by the facility operator.

In winter, the butane rundown to the storage tank will be discontinued. The send-out system will transfer the stored butane to the refinery operations (along with the refinery's normal butane production), as per the blending requirement of the gasoline product, which is controlled by the blending operator. The send-out system is designed to transfer up to a maximum of 5,000 bpd of butane from the storage tank to the refinery for gasoline blending. The refrigeration plant will operate at a low load during this period, to maintain the tank temperature at a steady state.

Once commissioned, the facility will operate on a continuous basis. The facility will be checked regularly (twice per 12 hour shift) by qualified personnel, as well as being continuously monitored from the Off-Site/Tank Farm Area's main control room.

3.5.2 Potential Sources of Pollution

As a safety precaution, a dedicated ground flare is provided to route butane vapours in the unlikely event of an increase in tank pressure. Flaring is, however, not expected to occur during normal project operation. The ground flare will burn a small quantity of clean commercial-grade propane for its pilot burner. This will not result in any harmful emissions.

There are no planned discharges to the aquatic and terrestrial environments associated with the operation of the proposed facility. The system operates as a closed circuit, and uses no process water. The facility will be subject to regular inspection and maintenance, which will help to prevent leakage or spills to the environment (Section 3.5.4).

Waste material generated as part of project operation will be minimal. Any waste will, however, be disposed of in accordance with the procedures described in Section 3.4.2.

3.5.3 Potential Resource Conflicts

No water withdrawal will be required for the normal operating activities of the proposed butane storage facility, and there will be no project-related discharges to the aquatic environment. Therefore, no conflicts with water resources or fish and fish habitat are anticipated.

As noted above, the potential for interactions between the project and wildlife resources is limited. The project footprint will be quite small. The site has previously been cleared of vegetation, is located adjacent to an existing road, and is in close proximity to on-going industrial activity. There will be no additional ground disturbance during project operation, and the level of human activity and associated disturbance (e.g., noise, dust, etc.) will decrease considerably following the completion of project construction. In addition, the project area will be fenced during operation. Vehicle/wildlife avoidance procedures will, however, continue to be implemented when driving through areas which may be used by wildlife.

Birds may be attracted to flares, which can result in mortality. As noted above, however, flaring will occur very infrequently, if at all. Furthermore, the flare structure will be designed with louver-type shutters on all sides, which will ensure that the flare is not visible, and thus, reduce the potential for bird attraction and mortality.

Operational activities will therefore not result in any adverse effects to air quality, or to water, fish or wildlife resources in the area. There will therefore be no indirect effects to human health and well-being

or use of these resources. Noise associated with the operation of the proposed butane storage facility will likewise be minimal. There are no residences located within close proximity to the site. The project will be located immediately adjacent to the existing refinery operations. The project site will continue to be fenced and off limits to the general public during operation for safety reasons. No conflicts with local land and resource use activities are anticipated.

3.5.4 Unplanned Events

There are a number of potential accidental events which could conceivably be associated with the operation of a refrigerated butane storage facility. Most such events are similar to those involved in the storage, transfer and use of other petroleum products. Loss of containment could result from gasket failures, ruptures in pumps and pipelines, and storage tank leak or rupture. An accidental release of liquid butane could result in a pool fire, jet fire, or in a vapour cloud fire should the butane evaporate and form a vapour. Such an accidental event could have varying implications for safety and the natural environment in the vicinity of the proposed facility, depending on the nature and magnitude of such an event. These are described in Section 3.5.4.2.

3.5.4.1 Safety Features

Butane storage at refineries and terminals is a common practice. North Atlantic currently produces, handles and stores butane at its refinery, and is therefore very familiar with the characteristics and handling requirements of butane. As noted earlier, potential accidental events were considered in selecting the preferred storage option, project location, and in plot plan development (i.e., removed from other hazards, close to fire water supply, etc.).

The new storage facility will meet all environmental, safety and industry standards and applicable codes, including the National Fire Protection Association (NFPA) Guideline 59 (*Standard for the Storage and Handling of Liquefied Petroleum Gases at Utility Gas Plants*), which specifies that it be located at least 400 feet (121.9 m) from any adjacent property. It has also been designed in accordance with other applicable industry standards for a facility of this type, and all required authorizations will be obtained by the proponent and/or its contractors prior to construction (Section 4.0).

A range of safety features have also been incorporated into the design of the proposed facility to decrease the likelihood and severity of any accidental events (a number of which have been discussed previously). These include the following:

- a 6 foot (1.8 m) high dike (110% of tank volume) with glacial till lining (Section 3.3.3);
- a back-up refrigeration compressor to protect against refrigeration failure and resulting tank pressurization (Section 3.3.2);
- a relief system and dedicated ground flare system to handle any butane vapours that may be released from the tank due to a pressure build-up (Section 3.3.7);

- a sophisticated hydrocarbon gas detection system with alarm, located at strategic points throughout the facility (including the control room building), interconnected with the control system to close valves and shut down process equipment (Section 3.3.8);
- a state-of-the-art instrumentation system with programmable logic controllers (Section 3.3.5);
- built in redundancy (control from field control room and main control room, spares for instruments and equipment as required) (Section 3.3.5);
- an uninterrupted power supply (UPS) with a redundant back-up system, for safe manual shut-down of the facility in case of an electrical failure (Section 3.3.6);
- a multi-layer automatic shutdown system including inter locks for all possible emergency situations;
- a fail-safe control (FSC) system based on Safety Integrity System (SIS) analysis (Section 3.3.5);
- protection from vacuum formation (during pump-out) and extreme low ambient temperatures (Section 3.3.3);
- an emergency shutdown valve at the tank outlet, which would shut down the system automatically if there is a fire, a hydrocarbon leak is detected by the LEL detectors, or if a pipe were to rupture or a pipe seal fails;
- a dedicated fire water system (Section 3.3.9);
- a dedicated compressor for uninterrupted instrument air supply (Section 3.3.5);
- SAAB radar level gauge for the tank backed up by differential pressure transmitter (Section 3.3.3); and
- hydrogen sulfide, hydrocarbon and smoke detection inside the control room and in the instrument cabinets, as well as a fire protection system inside the building.

Each of these safety features will be in place before the project is commissioned. The tank will be fully hydrotested by filling with water to the design liquid level prior to project commissioning. In addition, once operational the facility will be checked regularly (twice per 12 hour shift) by qualified personnel, as well as being continuously monitored from the Off-Site/Tank Farm area's main control room.

In the event of an emergency shutdown of the facility in the summer period, the 1,000 bpd of butane coming to the butane dryer / refrigeration plant will stop, and will be transferred to the refinery's existing butane tanks, along with the rest of the refinery's butane production. These existing butane storage tanks will maintain sufficient space at all times for 10 to 12 hours worth of butane production. This will be sufficient time to either increase gas firing in the refinery's process heaters, if possible, or to decrease crude processing to reduce butane production by 1,000 bpd.

The probability of an accident occurring at the proposed facility is therefore very low. Although such an incident is very unlikely, North Atlantic has emergency response procedures, personnel and equipment in place at the refinery to respond. These are discussed in the next section.

3.5.4.2 Emergency Response Personnel, Equipment and Procedures

North Atlantic currently has significant emergency response personnel, equipment and procedures in place at the refinery.

Each shift at the refinery has an Emergency Response Crew, who are supported by full-time Fire and Safety Technicians. These technicians provide shift team leadership and also focus on fire crew training, equipment maintenance and supporting response activities. The refinery's Fire and Safety Technicians have received extensive training in foam technology, large diameter tank fire fighting, flammable liquid fires, pressurized fires, advanced level first aid, hazardous material response (HAZMAT), and other prevention and response procedures. Each crew receives training on a monthly basis and participates in emergency response drills on a regular basis. North Atlantic's emergency response personnel and training program are well known throughout Newfoundland and Labrador and elsewhere. Each year North Atlantic, in conjunction with the Newfoundland and Labrador Association of Fire Chiefs and Fire Fighters, conducts training for various fire departments throughout the province free of charge. The refinery's Emergency Response group is also sought after by the Newfoundland and Labrador Association of Fire Chiefs and Fire Fighters, as well as the Maritime Fire Chiefs Association, to conduct educational workshops at their conventions.

Emergency response equipment at the refinery includes both fixed and manual intervention type equipment. Fixed equipment includes water deluge systems for hot oil pumps, fixed elevated water monitors, hydrant monitors, foam application chambers for storage tanks, and a looped fire water system. In terms of manual intervention equipment, there are pumper trucks, a high volume portable fire water pump, a significant quantity of fire fighting foam, and an emergency transportation vehicle. In addition, there are various portable water monitors, portable dry chemical equipment, fire extinguishers, and other related apparatuses at strategic locations throughout the refinery. The refinery's fire water system is kept charged by an electric pump and redundant back up diesel pump.

As discussed in Section 3.3.9, the butane storage facility will have a dedicated fire water system, consisting of looped hydrants placed at strategic locations on the dike surrounding the tank, the auxiliary facilities and around the perimeter of the site. These hydrants will be equipped with various hose connection nozzles, pumper valve connection nozzles, a monitoring system for directing the water spray, and valves and fittings for operating and isolating.

Although unlikely, there are a number of potential emergency scenarios associated with the proposed refrigerated butane storage facility that could require the use of emergency response equipment, personnel and procedures. These could range from simple gasket leaks, pump seal failures, or pipe ruptures, to possible tank leaks or rupture. The type and level of response required would depend on the specific nature and severity of the event. For example, a gasket leak fire that is not impinging on other equipment would be left to burn until isolation eliminates the source, thereby extinguishing the fire. If required, exposure protection would be implemented to protect the surrounding equipment (e.g., the use

of portable dry chemical equipment). In the case of a leak from the main storage tank forming a pool inside the dike, there are two potential scenarios. In the case of a pool without a fire, the source will be isolated and the pool collected away from the tank and allowed to evaporate. All of the potential ignition sources would be shutdown (including the complete shutdown of the butane storage facility). Depending upon the size of the butane pool, other precautions such as stopping all vehicular traffic in the area may be implemented. If the leak were to result in a pool fire, it would either be blanketed with foam or allowed to burn, along with isolating the source of leak. The surrounding equipment would also be protected from exposure (e.g., through a water spray).

The project's final detailed engineering work is on-going. In addition, a process hazard analysis (PHA) will be completed by North Atlantic in relation to the proposed facility. These will provide additional information related to potential accidental events (e.g., potential release points and quantities, possible ignition sources). This information will be used to develop specific emergency response procedures unique to the proposed butane storage facility, as required.

3.6 Decommissioning

The facility will be subject to periodic maintenance and upgrading, as required, and it is assumed that the proposed facility would be operated on a permanent basis. As such, formal plans for decommissioning the facility have not been developed. However, should decommissioning be required for all or a portion of the proposed facility, a detailed decommissioning plan would be developed and implemented in accordance with acceptable standards of the day, and in consultation with relevant regulatory agencies.

3.7 Employment and Business

It is estimated that project construction will require approximately 75,000 person-hours of work, with an estimated 30-40 construction workers at peak. Potential business opportunities include the supply of boiler, civil, mechanical, piping, structural, electrical, painting and insulation products and services. Project construction will be carried out on a contractual basis, with workers hired at the discretion of the contractor and in accordance with its own hiring practices and policies. The facility will be operated using North Atlantic's existing workforce. North Atlantic supports employment and gender equity in its hiring and contracting practices.

3.8 Project-Related Documents

No other environmental reports have been completed in relation to the proposed butane storage facility.

4.0 APPROVAL OF THE UNDERTAKING

The proposed undertaking will also require a number of other provincial, federal and municipal authorizations. North Atlantic is committed to complying with all relevant legislation and regulations, and the conditions of these required approvals. Permits and authorizations which may be required in relation to the proposed butane storage facility include those listed in Table 4.1.

Table 4.1 Potentially Applicable Environmental Permits and Authorizations

Permit or Authorization	Legislation/ Guidelines	Activity Requiring Compliance	Agency	Comments
Provincial				
Release from Environmental Assessment	*Environmental Assessment Act* and *Regulations*	Project construction and operation	Environmental Assessment Division, Department of Environment	The Act applies to any proposed development activity in the province which may have a significant effect on the environment. The proposed butane storage facility requires registration under the Act. After a public and governmental review, the Minister of Environment decides whether the project may proceed, subject to other applicable legislation.
Certificate of Plant Registration Permit for the Installation of Piping System Certificate of Inspection Propane System Installation Certificate	*Boiler, Pressure Vessel and Compressed Gas Act* and *Regulations*	Project construction and operation	Government Service Centre, Department of Government Services and Lands	Detailed engineering drawings will be submitted to the Government Service Centre for approval.
Permit to Occupy Crown Land	*Crown Lands Act*	Erection of structures or easements on crown land	Lands Branch, Department of Government Services and Lands	The proposed project will be located on land which is currently held by the Crown.
Certificate of Approval for Storing and Handling Gasoline and Associated Products	*Environment Act, Storage and Handling of Gasoline and Associated Products Regulations*	Storing and handling gasoline and associated products	Operations Division, Department of Government Services and Lands	A Certificate of Approval is required for storing and handling gasoline and associated products
Permit for Flammable and Combustible Liquid Storing and Dispensing (above or below ground) and for Bulk Storage (above ground only)	*Fire Prevention Act, and Fire Prevention Flammable and Combustible Liquids Regulations*	Storage and handling flammable liquids	Engineering Services, Department of Government Services and Lands	This permit is issued on behalf of the Office of the Fire Commissioner. Approval is based on a review of information provided for the Certificate of Approval for Storing and Handling Gasoline and Associated Products. No additional submission is required.

Permit or Authorization	Legislation/ Guidelines	Activity Requiring Compliance	Agency	Comments
Certificate of Approval for Site Drainage	*Environment Act*	Water run-off from the project site	Water Resources Division, Department of Environment	
Certificate of Approval for Industrial or Processing Works	*Environment Act*	Industrial or processing works	Pollution Prevention Division, Department of Environment	A Certificate of Approval may be required for any industrial or processing works.
Certificate of Approval for any Alteration to a Body of Water	*Environment Act*	Any activities in close proximity to a waterbody	Water Resources Division, Department of Environment	Permits are required for construction activities within 15 m of the high water mark of any waterbody.
Compliance Standard	*Dangerous Goods Transportation Act* and *Regulations*	Storing, handling and transporting dangerous goods	Department of Works, Services and Transportation	If the materials are transported, handled and stored fully in compliance with the Regulations, a permit is not required. A Permit of Equivalent Level of Safety is required if a variance from the regulations is necessary.
Compliance Standard	*Occupational Health and Safety Act* and *Regulations*	Project-related employment	Department of Labour	Outlines minimum requirements for workplace health and safety.
Compliance Standards	*National Fire Code* *National Building Code* *Life Safety Code*	On-site buildings	Department of Government Services and Lands	
Compliance Standard	*Historic Resources Act*	Construction and operation	Culture and Heritage Division, Department of Tourism, Culture and Recreation	All archaeology sites and artifacts are considered to be the property of the Crown and must not be disturbed. Any archaeology materials encountered must be reported to the Provincial Archaeology Office. Any proposed alterations to the Project will be referred to the Provincial Archaeology Office for approval.
Federal				
Permit to Store, Handle and Transport Dangerous Goods	*Transportation of Dangerous Goods Act* and *Regulations*	Storage, handling and transportation of fuel and chemicals	Transport Canada	
Compliance Standard	*Fisheries Act*, Section 36(3), Deleterious Substances	Any project-related water run-off	Environment Canada	Any deposited substance or discharge must not be deleterious (i.e., must be acutely non-lethal).
Radio Station Licence	*Radio-Communication Act*	Use of radios on site	Industry Canada	A license must be obtained for each radio used on site.
Compliance Standard	*Migratory Birds Convention Act* and *Regulations*	Any activities which could result in the mortality of migratory birds and endangered species and any species under federal authority	Canadian Wildlife Service, Environment Canada	The Canadian Wildlife Service should be notified about the mortality of any migratory bird in the project area, including passerines and waterfowl. Notice should also be given about the mortality of any species known to be endangered or under federal authority.

Permit or Authorization	Legislation/ Guidelines	Activity Requiring Compliance	Agency	Comments
Municipal				
Compliance Standard / Development Permit	*Urban and Rural Planning Act,* Municipal Plan and Development Regulations	Project construction and operation	Town of Come By Chance	The municipal plan divides the municipal planning area (MPA) into land use designations and defines the manner in which development may occur in the MPA. It is prepared under the *Urban and Rural Planning Act,* and is binding on council and others using or proposing to use land in the MPA. All development in the MPA must conform with the municipal plan and associated development regulations. These regulations specify permitted and discretionary land uses within each land use zone. The project area is currently designated for "Hazardous Industrial Uses".

Following release from the environmental assessment process, the proponent and/or its contractors will obtain all applicable authorizations required for the project.

5.0 SCHEDULE AND FUNDING

5.1 Schedule

Pending project release by Government and company senior management, construction of the facility is scheduled to begin in the summer of 2002. Construction activity would continue until mid-2003, with work stopping during the winter months. Project commissioning is tentatively scheduled for the fall of 2003.

5.2 Funding

The project will be funded entirely by North Atlantic. Government funding is not required.

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Date Signature of Chief Executive Officer

6.0 REFERENCES

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