

Delayed Coker
Environmental Assessment Registration

REGISTRATION PURSUANT TO
SECTION 40(1) AND 45 (1) OF THE ENVIRONMENTAL ASSESSMENT
REGULATIONS, 2003
UNDER THE
ENVIRONMENTAL PROTECTION ACT (SNL 2002 CE-14.2)
FOR THE PROPOSED
NARL FUELS LP
DEALYED COKER PROJECT
JULY 2019

Submitted to:

Minister of Municipal Affairs and Environment
P. O Box 8700
St. John's NF A1B 4J6
Attention: Director of Environmental Assessment

Submitted by:

NARL Fuels LP
P.O. Box 40
Come By Chance, NL
A0B 1N0

DELAYED COKER PROJECT

Executive Summary

This document provides the Project Registration for the construction and operation of a Delayed Coker complex equipped with a small integrated Crude Oil Fractionation Unit, a Distillate Hydrotreater, and assorted utilities. NARL Fuels LP, a fully owned subsidiary of North Atlantic Refining Ltd. Refinery (“NARL”), proposes to construct and operate this facility in Come by Chance, northwest of the existing NARL refinery.

Effective, January 1, 2020, the International Maritime Organization (IMO) will implement a global cap of 0.5% sulfur on fuel oil used by all ocean-going vessels. As a result, existing markets for residual fuel oil higher than 0.5% sulfur are predicted to experience significant declines. Combined with the predicted increases in heavy sour and medium sour crude production, this will require an estimated three million barrels per day of additional Delayed Coker capacity to be built over the next twenty years worldwide.

Operation of the Delayed Coker will consume vacuum residue from the adjacent NARL Refinery allowing for the shutdown of its Visbreaking Unit. The Integrated Crude Fractionation unit will operate on crude sourced from offshore Newfoundland and elsewhere.

Significant environmental improvements will be realized from this project. The elimination of residual fuel combustion and treatment at the NARL refinery will reduce its Sulfur Dioxide (SO₂) and GHG emissions from NARL.

The project will incorporate state-of-the-art methods with Best Available Control Technology (subject to availability) for the limitation of environmental impact including process and plant design, comprehensive waste management practices and safeguards against the atmospheric, terrestrial and marine pollution to ensure meeting all applicable regulatory requirements. The project will be carried out in an environmentally-responsible manner, with minimal adverse impact on environment, human health and safety.

The project will create much needed employment for the region. NARL will be meeting with community groups in the surrounding area and will work with them to identify their concerns and to develop a path forward.

Highlights of the project include:

- A total of \$450-500 million CAD in physical plant investment plus an additional \$100 million in new working capital
- approximately 40% reduction in area Sulfur Dioxide emissions (NARL Refinery)
- supporting the long term viability of NARL refinery and employment in the regional Newfoundland economy

Fabrication, and modularization of project components will be performed in China by a world-class engineering and fabrication team. Our suppliers include the world's largest and most-valuable oil company – CNPC who will be responsible for the detailed design, the patented technology, and project commissioning. CNPC is the world's second largest oil refiner with more than 30 owned and JV plants. The company has designed, constructed, or operates approximately 1/4th of the globe's delayed cokers and more than 1/2 of those built in the last 10 years. NARL Fuels LP also intends to use pre-fabricated modules for the assembly of the delayed coker and its supporting units. The Chinese have perfected the massive-module technology over the past decade. Building refinery process units inside of a factory environment ensures superior quality and speed, lower cost, and more consistent project delivery. This is a critical aspect of the project as the technology being used is unique and requires a very specific skill set. Following construction, modules will be delivered to NL for their final assembly. Construction of tanks and power generating facilities will occur in Newfoundland. All construction is expected to be completed by the end of 2021, with full commercial production by mid-2022.

NARL Fuels LP is committed to executing this project in a manner consistent with all applicable Safety, Health and Environmental regulations and industry best practices.

NAME OF UNDERTAKING: DELAYED COKER

PROPONENT:

(i) **Name of Corporate Body:** NARL Fuels LP

(ii) **Address:** P.O. Box 40; Come By Chance, NL; A0B 1N0

(iii) **Chief Operating Officer:**

Name: Thomas Jenke

Official Title: Chief Operating Officer

Address: P.O. Box 40; Come By Chance, NL; A0B 1N0

Telephone No.: 709-463-5293

Email: ThomasJenke@NARefining.ca

(iv) **Principal Contact Person for purposes of environmental assessment:**

Name: Rhonda Hiscock

Official Title: Environmental Chemist

Address: P.O. Box 40; Come By Chance, NL; A0B 1N0

Telephone No.: 709-463-5131

Email: RhondaHiscock@NARefining.ca

Table of Contents

1.0	THE UNDERTAKING	2
1.1	Introduction	2
1.2	NARL Fuels LP	2
1.3	Nature of the Undertaking	2
1.4	Rationale for the Undertaking	3
1.5	Regulatory and Public Consultation	4
2.0	DESCRIPTION OF THE UNDERTAKING	4
2.1	Geographical Location	5
2.2	Physical Features	8
2.3	Construction	10
2.3.1	Construction Activities	10
2.3.2	Potential Sources of Pollution from Construction	11
2.4	Operation	12
2.4.1	Crude Fractionation Unit	12
2.4.2	Delayed Coker Unit	12
2.4.3	Distillate Hydrotreating Unit	13
2.4.4	Shipping	13
2.4.5	Flare	13
2.4.6	Tanks	14
2.4.7	Energy	14
2.4.8	Wastewater	14
2.4.9	Hydrogen Sulfide Treatment	15
2.4.10	Water Supply	15
2.4.11	Drainage Systems	15
2.4.11.1	Storm Water Drainage System	15
2.4.11.3	Sanitary Sewer	16
2.4.12	Emissions	16
2.4.12.1	Coke Drums	16
2.4.12.3	GHG	18
2.4.13	Stack Testing	18
2.4.14	Air Dispersion Modelling	18
2.4.15	Decommissioning	18
2.4.16	Resource Conflicts	20
2.4.17	Occupations	20
2.4.17.1	Construction and Operation	20
2.4.17.2	Employment and Gender Equity	21
3.0	APPROVAL OF THE UNDERTAKING	22
4.0	SCHEDULE	26
5.0	FUNDING	26
6.0	References	27

1.0 THE UNDERTAKING

1.1 Introduction

NARL Fuels LP is private company which is beginning the environmental assessment process for the construction and operation of a Delayed Coker equipped with an Integrated Crude Fractionation Unit and Distillate Hydrotreater. The proposed location is Come by Chance, NL, northwest of the NARL Refinery.

This document provides a Project Registration of the proposed facility based on the requirements defined under the Newfoundland and Labrador Environmental Protection Act. The Project Registration is submitted to the Department of Municipal Affairs and Environment in order to initiate the provincial environmental assessment process.

1.2 NARL Fuels LP

NARL Fuels LP is a subsidiary of NARL Refinery LP.

1.3 Nature of the Undertaking

NARL Fuels LP plans to construct and operate a petroleum facility consisting of a 26,000 barrel per day (“BPD”) (based on raw feedstock) Delayed Coker equipped with 40,000 BPD Crude Fractionation Unit and a 17,000 BPD Distillate Hydrotreater in Come by Chance, NL, northwest of the NARL Refinery.

The facility will require a delayed coking unit with a fired charge heater, 2 coke drums, a combination distillation tower, automatic coke drum de-heading devices, a remotely controlled coke derrick and removal system, an enclosed coke dewatering building, coke conveying and handling facilities, power generation system, two vacuum residue storage tanks, two crude storage tanks, piping connections to NARL Refinery and utilities (air, nitrogen, fresh water, office, flare relief). The Delayed Coker will be supplemented with an Integrated Crude Fractionation train which will include an atmospheric column and a vacuum flasher plus diesel and kerosene stripper towers, a debutanizer, a 2 stage electric grid desalter, 2 charge heaters, and an network of heat exchangers that transfer waste heat from the delayed coking process into crude heating. Also, within the Delayed Coker

project will be a stand-alone Distillate Hydrotreater that will be used to stabilize and clean up coker products to meet ultra-low sulfur and nitrogen specifications. The Distillate Hydrotreater will include a high-pressure reactor vessel, a charge heater, high and low pressure separators, and a stabilization tower and a splitter tower.

The unit's feedstock storage tanks will include 2 crude oil/residue tanks each with individual capacity of 550,000 barrels each and will be of internal floating roof design to minimize vapor space emissions. There will also be three vacuum residue oil storage tanks with an individual capacity of 150,000 barrels to be used to supplement feed and to buffer NARL Refinery's vacuum tower bottoms feedstock prior to being charged to the unit.

The project is budgeted at \$300 to \$350 million CAD for construction of the facility. Investment will consist of privately provided funds. Additionally, there will be \$100 million required for site preparation, storage tanks, offsites, port modifications, and some minor changes to the NARL Refinery. The facility will employ up to 330 trades people during the 2+ year construction phase and approximately 80 permanent staff (including the transportation division) during the operational phase. It is anticipated that construction on this project will begin in 2020.

The Project will take place in four stages: (1) pre-construction phase, including feasibility study, engineering and environmental assessment; (2) off-site construction of modules; (3) on-site assembly of modules; (4) commissioning & operation

1.4 Rationale for the Undertaking

January 14, 2020 has been set as the implementation date for a significant reduction in the sulfur content of fuel oil used by ships. The existing global limit of 3.5% will be reduced to 0.5%, as decided by the International Maritime Organization. The subsequent reduction in sulfur dioxide emissions are expected to have a significant benefit to the environment and on human health. The economic impacts of this change are many. Demand and price of heavy fuel oil will experience a direct decline, impacting the NARL refinery's nearly 5 million barrels of annual residual production. Markets will be further impacted as heavy sour and medium sour crude production is predicted to increase from 41 million bpd in

2015 to 47 million bpd by 2040, leading to increased heavy fuel oil production. The excess heavy fuel oil resulting from the combination of reduced demand and increased production will require more than 3 million barrels per day of estimated Delayed Coker capacity over the next 20 years.

The NARL refinery daily vacuum residue production will not be adequate to fully utilize a 26,000 BPD Delayed Coker. To ensure maximum optimization, a Crude Fractionation Unit will be constructed to produce the additional vacuum residue to fill the Delayed Coker. Other products from the Crude Fractionation Unit will be used to fuel the facility and feed the Distillate Hydrotreater. The Distillate Hydrotreater will produce ultra-low sulfur diesel (ULSD). Diesel demand is expected to grow in 2020-2030, based on OPEC forecasts, with gasoline demand being flat in growth. Optimizing the facility for ultra-low sulfur diesel production will address the changing market and increasingly stringent environmental standards.

1.5 Regulatory and Public Consultation

NARL Fuels LP plans to meet with local community groups, trades unions and other interest groups, as well as provincial and federal regulators, to identify and address any potential issues and concerns. Early and sustained communication with people in the area that may be affected by a major development is a priority of NARL Fuels LP.

This project is not expected to be subject to Federal Environmental Assessment as there is no Federal involvement related to implementation, financial assistance or land. Also, capacity will be less than 10,000 m³ per day and therefore does not meet the minimum threshold to trigger a Federal Environmental Assessment.

2.0 DESCRIPTION OF THE UNDERTAKING

This section will describe the project being considered by NARL Fuels LP.

2.1 Geographical Location

The project will be located in Come by Chance, north of the NARL refinery. Figure 1 indicates the proposed location of the facility. Figure 2 indicates the Conceptual Design Plot. The land for the proposed location is currently on hold by NARL Refining who have agreed to transfer hold, upon approval by provincial officials.

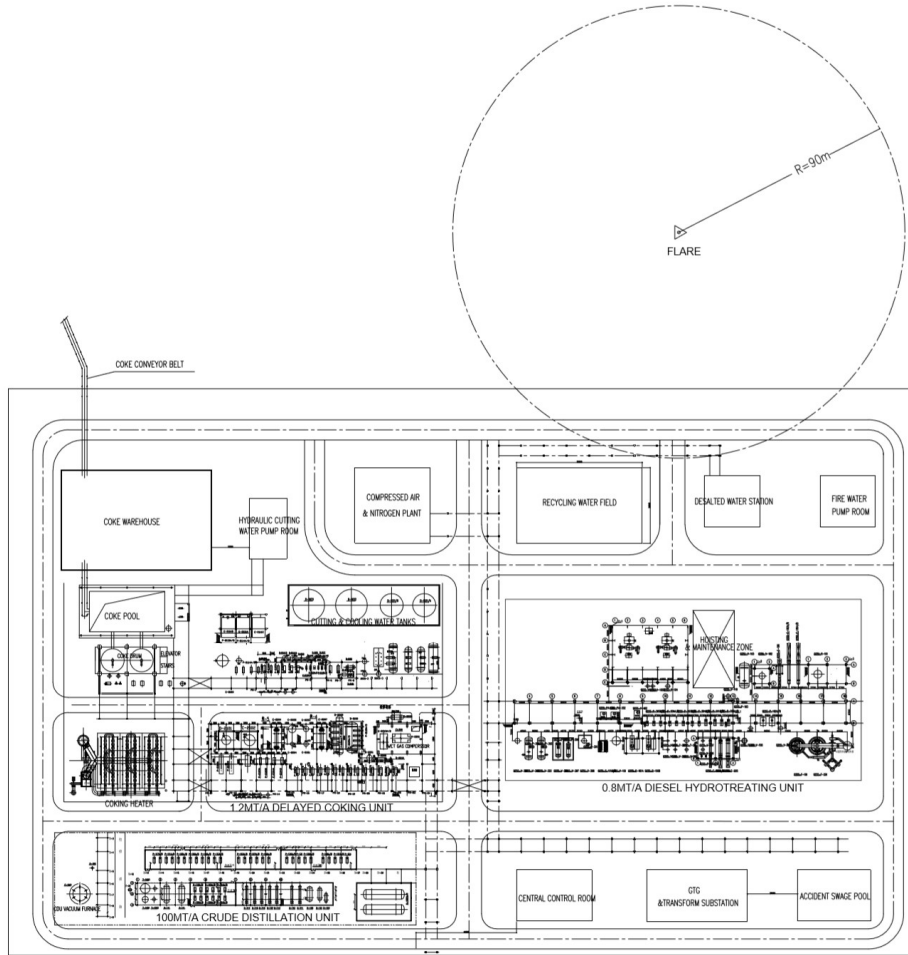
The site selection was based on proximity to the NARL Refinery, which will provide Vacuum Residue feedstock. The existing deepwater NARL jetty will also provide a means to receive crude and ship products with passage through Placentia Bay.

Other nearby industrial facilities include the Municipal Construction asphalt storage facility and the Whiffen Head transshipment facility.

Figure 1: Proposed Location



Figure 2 Proposed Plot Plan



2.2 Physical Features

An overview of the surrounding environment including Climate and Geology, Aquatic Environment, Terrestrial Environment and Socioeconomic Environment is given in *Proposed Butane Storage Facility, Environmental Assessment Registration, North Atlantic Refinery Limited, May 21, 2002*. Some minor changes in the text are made to reflect the current project.

Climate and Geology

The project area is located on the northwestern portion of the Island of Newfoundland's Avalon Peninsula (Figure 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 (1995). Canadian climate normal 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 1995). 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 1995).

Aquatic Environment

There are no major rivers adjacent to the proposed project site. The nearest water bodies consist of two ponds. These ponds are part of a small watershed comprised of several small ponds, wetlands and stream sections that enter Placentia Bay. Past samplings of small ponds and streams in the general area have produced catches of brook trout

(*Salvelinus fontinalis*) and three spine stickleback (*Gasterosteus aculeatus*). Deeper ponds such as Little Mosquito Pond (Bull Arm) contain landlocked Arctic char (*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*).

Drainage from the project is away from identified water bodies, and therefore, they will not be affected by this project.

Terrestrial Environment

The Come By Chance area is located within the Southeastern Barrens Sub region 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*, *Rhododendron canadense* and *Chamaedaphne calyculata*.

In the Southeastern Barrens Subregion, the landscape is dominated by heath lands 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.

Socioeconomic Environment

The Town of Come By Chance is located approximately 5 km north of the proposed site. The project area is 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).

2.3 Construction

2.3.1 Construction Activities

The proposed project is quite large and has a complexity unlike any other completed in the province. The magnitude and complexity of this project means that off-site fabrication will be required internationally.

On-site construction activities will include:

- Clearing and grubbing
- Site grading
- Site leveling
- Construction of earth works for the dyking around the crude and vacuum residue tanks
- Construction of concrete foundations for the tank crude and vacuum residue tanks
- Installation of surface drainage around the project area
- Construction of equipment foundations in the process areas
- Road construction in the plant area
- Construction of pipelines connecting the plant to the NARL Refinery and NARL jetty
- Assembly of the pre-fabricated modules, including the installation of very large, prefabricated heavy wall pressure vessels, coker drums, flare,

heaters, pump and compressors, pipe racks, piping, instrumentation and electrical cabling

- Construction of support buildings including an administrative and engineering office and other support buildings;

Mitigation measures to reduce dust, noise and silt-runoff will be implemented to minimize the impacts through application of proper construction methods and implementation of the proposed environmental management plans. The adjacent secured landfill site will be protected to ensure it is not distributed.

Construction will commence in 2020 in order to meet the proposed project completion date of 2021.

Environmental protection plans and procedures will be in place for all construction activities such as clearing, grubbing, excavation, and grading.

2.3.2 Potential Sources of Pollution from Construction

Potential sources of pollution during the Construction stage may include:

Noise

The nearest communities to the site are Come By Chance and Arnold's Cove, both approximately 5 km away. Noise is not expected to be a concern for residents of these communities or wildlife in the area. Noise within the project area will be that of an industrial site and mitigated with personal protective and safety devices as required.

Air Emissions

All company and contractor vehicles and equipment are required to be in good and safe operating conditions.

Dust and Sediments

During excavation dust and fine material have the potential to escape and get into adjacent ponds and streams. Sediment trapping material such as approved filtration fabrics will be used to contain fines. Road access to the site is not entirely paved and dust will be controlled, as necessary, by the application of water to the road.

Fuel and Lubricants

Construction activity poses a risk for the release of fuel and lubricants from construction equipment. NARL Fuels LP will require that all contractors and company equipment are properly maintained and inspected to avoid leaks of oil, fuel and hydraulic fluids.

Sewage

During the construction phase sewage will be handled with portable facilities.

Waste and Garbage

All non-hazardous waste will be directed to the Robin Hood Bay Waste Management Site for disposal. All non-hazardous waste will be disposed of in conjunction with approved waste facilities in accordance with Provincial Requirements.

2.4 Operation

2.4.1 Crude Fractionation Unit

The Crude Fractionation Unit will include a double desalter, atmospheric column, vacuum furnace and vacuum column. It will operate at a rate of 40,000 BPD of raw crude oil feed. Crude will be received via the adjacent NARL Refinery jetty and will be piped to the proposed facility. Two new 550,000 barrel crude storage tanks will be constructed to support operations and maintain a reliable crude supply.

2.4.2 Delayed Coker Unit

The Delayed Coker Unit will consist of a coker fractionator, two world scale diameter coke drums operating on a 24-hour cycle, and a coker furnace. Vacuum residue piped from the NARL refinery will be combined with the new facility's production for processing at a rate of 26,000 BPD. Two 150,000 barrel vacuum residue storage tanks will be constructed to ensure an uninterrupted supply.

Green petroleum coke will be hydraulically cut from drums onto a pad for dewatering. Water will be recovered and reused. A coke conveying system will operate which

encloses the coke during transport from coker to covered storage and from storage to the loading facility. Coverage will minimize potential emissions during internal handling operations. Covered storage facility will be sized to accommodate approximately one month of production.

2.4.3 Distillate Hydrotreating Unit

The Distillate Hydrotreating Unit will operate at a rate of 17,000 BPD and will desulpherize and denitrogenate the distillate production. Required hydrogen will be piped from the NARL refinery.

In addition to coke and distillate, the plant will produce LPG, Naphtha, and Gas Oil. Where synergies and economics exist, products will be piped to the NARL Refinery for blending, consumption or export.

2.4.4 Shipping

Crude will be delivered to the NARL Jetty via tankers carrying 500,000 to 1,000,000 barrels at a frequency of approximately once per month. Similarly coke will be exported monthly. Other products will be used for fuel or piped to the NARL refinery for upgrading. Net impact in Placentia Bay vessel traffic is expected to be minimal. It should be noted as well that NARL's current export activity of roughly fifteen heavy fuel oil cargos per year will cease once the delayed coker has become operational. Hence the net impact of tanker traffic will be minimal.

2.4.5 Flare

The plant will be equipped with an emergency flare.

2.4.6 Tanks

The five new tanks will be constructed and maintained according to the API 650 standard and will comply with the NL Storage and Handling of Gasoline and Associated Products regulations.

2.4.7 Energy

The plant will combust predominately self-generated fuel gas/still gas for its fuel requirements with butane purchases to supplement, if necessary.

An uninterrupted power supply of 12 MW is required for the plant. NARL Fuels LP is considering two options for power;

- Gas turbine with heat recovery steam generator, or
- High-efficiency internal combustion engines with heat recovery and a steam boiler

System will be equipped with two 1.5 MW generators for construction and start-up as well as a 45 TPH MP steam boiler for standby (which may be integrated into the latter of the two options listed above).

2.4.8 Wastewater

Generated wastewater amounts will be small and can be consumed/recycled within the facility. Any wastewater that cannot be reused will be directed to a storage tank and sent to an approved facility for treatment.

Sour water will be piped to the NARL refinery sour water stripper.

2.4.9 Hydrogen Sulfide Treatment

Gaseous steams containing high amounts of Hydrogen sulfide will be piped to the adjacent NARL refinery for treatment in their amine unit. Lean amine will be piped from the NARL refinery.

2.4.10 Water Supply

Raw water will be used to meet the need for cooling water make-up, process water, steam generation, etc. With approval, NARL Fuels LP intends to use the two closest ponds for this purpose. Some or all of the following stages of treatment will be used: clarification, sedimentation, filtration, ion exchange, and aeration/de-aeration. Raw water will supply the fire water system.

Potable water, meeting Canadian Drinking Water Guidelines, will be provided from a commercial source.

2.4.11 Drainage Systems

2.4.11.1 Storm Water Drainage System

The storm water drainage system will consist of a network of drains and catch basins, interconnected with an underground piping system. This system will surface drainage channels and handle all clean water runoff from non-process areas. This water will be discharged to the storm water outfall into Placentia Bay.

Volumes of storm water generated from the site will be estimated using a computer model. The model will be used to size the underground piping network and above-ground channels required to collect and convey the storm water from the site.

2.4.11.2 Oil Water/Process Drainage System

The oily water/process water drainage system consist of a network of surface drainage channels and catch basins interconnected with an underground piping system. This

system will drain and handle all dirty water runoff and expended process water. This water will be stored for transport to an approved facility, unless water quality meets the requirements for discharge to Placentia Bay.

2.4.11.3 Sanitary Sewer

The Sanitary Sewage system will consist of underground pipe sand manholes. Sanitary waste and grey water will be collected from washroom and utility rooms and directed to an underground septic tank.

2.4.12 Emissions

The major sources of potential atmospheric pollution include combustion gasses exhausted from process furnaces and hydrocarbon vapours vented from process equipment. The plant will be built to modern standards using Best Available Control technology (BACT), including low NOx burners in the three furnaces. Both coke drums will comply with US EPA regulations to minimize vapor loss during the venting stage. Drums will be depressurized to 2 psi before coke transfer to reduce emissions and ensure compliance with EPA standards and industry best practice.

The main sources of emissions are the coke drums and heater. Calculations indicate full compliance with *NL Air Pollution Control Regulations, 2004*.

2.4.12.1 Coke Drums

Delayed Cokers are unique among refinery units in that the coke drums do not operate continuously, but rather go through cycles of coking and decoking. During the decoking phase, coke drums must be opened to the atmosphere from coke removal. This provides an opportunity for hydrocarbon and particulate matter to escape.

The proposed Delayed Coker will operate in accordance with the most stringent standard – US EPA standard 40 CFR part 60 subpart J which includes the work practice standards for reducing emission of VOC from delayed coking units. To minimize emissions during a decoking cycle, pressure will be gradually lowered by allowing

vapors to vent to a closed system leading to a gas recovery system. The Coke Drum will not be not vented to atmosphere until drum pressure reaches 2 psi.

The proposed design has been evaluated by an industry Coker Expert and emissions have been modelled based on industry typicals and assuming a 93% unit on stream factor. Results are detailed in Table 1. Assumptions include a vent duration of 90 minutes from start of venting to opening of Coke drum, a vent rate of 3000 scm/h and 408 vent cycles per year. Note these emissions are for the vent portion of the cycle only and will be significantly lower over a 24 hour period.

Table 1

	Coker Drum Emissions During Vent Cycle	
	ug/m ³	Tonnes per Year
Methane	6,505	10
Particulate Matter	443	3
CO/CO ₂	3,253	5
VOC's	9,758	15

2.4.12.2 Heaters

High efficiency heaters will run on fuel gas/still gas and LPG with supplemental butane, where required, and will be equipped with low NOx burners. Fuel will contain <15 ppm of Hydrogen Sulfide. Emissions from individual heaters have been evaluated based on industry typicals. Results are in Table 2.

Table 2

	Heater Emissions	
	ug/m ³	Tonnes per Year
SOx	2	0.5
NOx	169	50
CO ₂	138,405	39,500

2.4.12.3 GHG

The plant will meet the minimum 25,000 tonnes of GHG required for regulation under the management of Greenhouse Gas Act. NARL Fuels LP will calculate and report GHG in accordance with these regulations. GHG emissions from the neighboring NARL refinery will decrease with the elimination of fuel oil combustion due to the proposed project.

2.4.13 Stack Testing

The plant is anticipated to fall under the Type V emission source, of the Air Pollution Control Regulations, given there will be no combustion of residual fuel oil or distillate fuel oil, particulate matter emission will be less than 20 tonnes, and less than 25 MW of electrical power is required. With Type V being the least stringent of all categories, stack testing frequency will be outlined in the associated Certificate of Approval.

Heaters will be equipped with sampling ports meeting the requirements of the NL Guidance Document for Source Emission Testing, GD-PPD-016.1.

2.4.14 Air Dispersion Modelling

While in operation, air dispersion modelling will take place to ensure compliance to the NL Air Pollution Control Regulations. Modeling will be in accordance with Plume Dispersion Modelling Guidance Document PPD-019.2 using a pre-approved dispersion model.

2.4.15 Decommissioning

It is intended that the plant will operate for at least 50 years. The modular construction of the project will make for ease of decommissioning. As part of

the design phase, a comprehensive decommissioning plan will be developed.

The following will occur prior to decommissioning of the site:

- The plant will be designed and operated to mitigate environmental impacts
- Inspection of the property pre-closure
- Preliminary site contamination inventory will be developed
- Development of a preliminary plan

A Rehabilitation and Closure Plan will also be developed during the design phase. It will emphasize protecting public health and safety, improving or eliminating environmental damage and restoring the land to meet the requirements of NL Policy Directive PPD05-01, Management of Impacted Sites.

The following activities will be addressed in the Rehabilitation and Closure Plan:

- Hazardous chemicals, reagents and material will be removed for proper disposal
- Pipelines and equipment will be drained and cleaned
- Any building and infrastructure that cannot be utilized will be demolished and removed
- Soil will be tested to determine if contamination exists. Remediation measures will be implemented to address any identified contaminated soil
- Fencing will be removed and natural drainage patterns restored wherever practical
- Re-vegetation will occur where practical, including seeding and reforestation

Decommissioning, Rehabilitation and Closure Plans will be submitted to regulatory authorities for review and comment prior to finalization.

2.4.16 Resource Conflicts

There are no anticipated resource conflicts resulting from the operation of this project. From a socio-economic perspective, there will be increased economic activity in the region in the short term, and this project will contribute to the NARL refinery well into the future.

2.4.17 Occupations

2.4.17.1 Construction and Operation

The peak workforce during construction will be approximately 330 people. Estimates of occupation breakdowns for the project, along with the number of personnel required for each category and the appropriate National Occupational Classification (NOC) codes are listed in Table 3 below. The number of workers is an estimate of the maximum of each type that can be expected at any time.

Table 3: Occupations Breakdown

Occupation	NOC Code	Number of Workers
Direct Field		
Laborer	7611	30
Millwright	7311	10
Rigger	7611	5
Light vehicle driver	7414	0
Heavy vehicle driver	7411	0
Oiler	7612	0
Mechanic	7321	10
Light equipment operator	7421	5
Medium equipment operator	7421	5
Heavy equipment operator	7421	5
Pipefitter	7252	20
Pipe welder	7265	20
Cement finisher	7282	20
Carpenter	7271	10

Occupation	NOC Code	Number of Workers
Ironworker – rebar	7264	10
Ironworker – structural	7264	10
Welder – structural	7265	10
Boilermaker	7262	30
Instrument fitter	7612	15
Electrician – line	7244	10
Electrician – wiring	7242	10
Sheet metal worker	7261	0
Insulator	7293	40
Painter	7294	0
Foreman	7302	25
Project construction superintendent	0711	1
Area superintendents	7302	4
Indirect Field		
Field Superintendents		
Piping	7213	1
Instrumentation	7212	1
Electrical	7212	1
Civil	7217	1
Mechanical	7214	1
QC&A, Inspection	2141	5
Administration		
Cost engineering	2141	1
Field engineering	2131/2132	5
Planning & scheduling	2141	2
Safety & medical	2263	3
Timekeeping & accounting	1432	1
Material controls supervisor	1474	1
Drafting	2253	2
Total		330

Employment levels will be reduced as the project completes major construction and commissioning milestones. Once in full-commercial operation in 2022, we anticipate having a full-time employment level of approximately 80 people split between direct field, indirect field, and administrative occupations.

2.4.17.2 Employment and Gender Equity

NARL Fuels LP believes that all employees should be treated fairly. NARL Fuels LP promotes employment equity in the workplace to ensure that women, aboriginal peoples, persons with disabilities and visible minorities are fully represented at all levels of the

organization. NARL Fuels LP is developing an employment equity program ensures that ensures hiring and promotion practices are based on qualifications and ability.

3.0 APPROVAL OF THE UNDERTAKING

This proposed undertaking will require provincial, federal and municipal authorizations. To ensure permitting compliance, a permitting registry has been developed to record and track permitting activities.

Permits and authorizations which may be required in relation to this proposed undertaking are listed below in Table 4.

Table 4 Approvals and Authorizations

Activity	Approval/Certificate/ License/Permit/Inspection	Legislation	Regulating Agency
Government of Newfoundland and Labrador			
Project Construction/ Commencement	Release from the Newfoundland and Labrador <i>Environmental Protection Act</i> , Part X, Environmental Assessment	Newfoundland and Labrador <i>Environmental Protection Act</i> , SNL 2002 c.E-14.2, Part X, Environmental Assessment	Environmental Assessment Division, NLDEC
	Certificate of Approval to Operate	Newfoundland and Labrador <i>Environmental Protection Act</i> , SNL 2002	Pollution Prevention Division, NLDEC
Site Construction	Statutory Declaration for Registration of Boiler and Pressure Vessels Fittings Fabricated in Newfoundland and Labrador	<i>Boiler Pressure Vessels and Compressed Gas Regulation</i> under the NL <i>Public Safety Act</i>	NLDGS
	Certificate of Plant Registration for Power, Heat, Refrigeration Compressed Gas or Combined Plant	<i>Boiler Pressure Vessels and Compressed Gas Regulation</i> under the NL <i>Public Safety Act</i>	NLDGS
	Contractor's Licence – Pressure Piping System	<i>Boiler Pressure Vessels and</i>	NLDGS

Activity	Approval/Certificate/ License/Permit/Inspection	Legislation	Regulating Agency
		<i>Compressed Gas Regulations</i> under the NL <i>Public Safety Act</i>	
	Examination and Certification of Welders and Blazers	<i>Boiler Pressure Vessels and Compressed Gas Regulations</i> under the NL <i>Public Safety Act</i>	NLDGS
	Compliance Standard -	Fisheries Act, Sec. 36 (3) Deleterious Substances	Environment Canada
Waste Management Related to Construction Activities	Waste Oil – Handling and Disposal	Newfoundland and Labrador <i>Environmental Protection Act</i> , SNL 2002 c.E-14.2, <i>Used Oil Control Regulations</i>	NLDEC
Garbage Disposal/Waste Management	Waste Management System, Certificate of Approval	Newfoundland and Labrador <i>Environmental Protection Act</i> , SNL 2002 c.E-14.2, <i>Waste Disposal and Litter</i>	NLDEC
Access Roads	Culvert Installation, Certificate of Approval, Application for Environmental Permit to Alter a Body of Water	Newfoundland and Labrador <i>Water Resources Act</i> , SNL 2002, c.W-4.01, Section 48	NLDEC
	Certificate of Approval for Stream Fording, Application for Environmental Permit to Alter a Body of Water	Newfoundland and Labrador <i>Water Resources Act</i> , SNL 2002, c.W-4.01, Section 48	NLDEC
	Permit for Access off any Highway	Newfoundland and Labrador <i>Urban and Rural Planning Act</i> , SNL 2000, c.0-8, <i>Highway Sign Regulations</i>	NLDMA

Activity	Approval/Certificate/ License/Permit/Inspection	Legislation	Regulating Agency
	Construction (Site Drainage) Certificate of Approval	Newfoundland and Labrador <i>Water Resources Act</i> , SNL 2002, c.W-4.01, Section 48	NLDEC
Stream Crossings/ Fording	Water Resources – Water Course Crossings, Certificate of Environmental Approval	Newfoundland and Labrador <i>Water Resources Act</i> , SNL 2002, c.W-4.01, Section 48	NLDEC
Fuel Storage	Fuel Storage & Handling – Temporary Storage Remote Locations	Newfoundland and Labrador <i>Environmental Protection Act</i> , SNL 2002, c.E-14.2, Storage and Handling of Gasoline and Associated Products Regulations, 2003	NLDEC
	Fuel Storage & Handling – A Permit Flammable & Liquid Storage & Dispensing (above or below ground) & for Bulk Storage (above ground only)	Newfoundland and Labrador <i>Environmental Protection Act</i> , SNL 2002, c.E-14.2, Storage and Handling of Gasoline and Associated Products Regulations, 2003, and <i>Fire Prevention Act</i> , SNL 1991, c.34	NLDEC and NLDMA (Office of the Fire Commissioner)
Borrow Pits and Rock Quarries	Quarry Development Permit – A permit is required to dig for, excavate, remove and dispose of any crown quarry material	Newfoundland and Labrador <i>Quarry Minerals Act</i> , SNL 1999, c.Q-1.1	NLDNR, Mines Division
Handling and Transportation of Dangerous Goods	Permit to Transport	<i>Transport of Dangerous Good Act</i>	Transport Canada
Accidental Hazardous Material Spill	Report Mechanism/Response	Guidelines for Reporting Incidents Involving Dangerous Goods, Harmful	DFO – Canadian Coast Guard

Activity	Approval/Certificate/ License/Permit/Inspection	Legislation	Regulating Agency
		Substances, and/or Marine Pollutants. TP9834E. under the <i>Canada Shipping Act</i>	
Communications	Application for License to Install and Operate a Radio Station in Canada	<i>Radiocommunication Act</i>	Industry Canada Communications
In stream Activities	Fish Habitat Authorization for Works or Undertakings Affecting Fish Habitat	<i>Fisheries Act</i>	DFO
	Application for a Water Lease	<i>Fisheries Act</i>	Transport Canada
Municipal Government			
Project Approval	Compliance Standard/ Development Plan		City of St. Johns
Waste Disposal	Approval to dispose waste in municipal landfill		Relevant municipality
Guidelines			
In addition, the Project will also need to comply with or consider the following guidelines:			
<ul style="list-style-type: none"> • DFO's Guidelines for Protections of Freshwater Fish Habitat in Newfoundland and Labrador (Gosse et al 1998) 			
<ul style="list-style-type: none"> • DFO's Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters (Wright and Hopky 1998) 			
<ul style="list-style-type: none"> • Newfoundland and Labrador Department of Natural Resources' Environmental Guidelines for Construction and Mineral Exploration Companies 			
<ul style="list-style-type: none"> • Newfoundland and Labrador Department of Environment and Conservation's Environmental Guidelines for General Construction Practices 			
<ul style="list-style-type: none"> • Newfoundland and Labrador Department of Environment and Conservation's Guidelines for Culverts 			
<ul style="list-style-type: none"> • Newfoundland and Labrador Department of Environment and Conservation's Guidelines for Diversions, New Channels, Major Alterations (1992) 			
<ul style="list-style-type: none"> • Newfoundland and Labrador Department of Environment and Conservation's Environmental Guidelines for Water Course Crossings (1992) 			

4.0 SCHEDULE

Pending final approvals and completed engineering and design, work will commence as early as 2020. The work will be undertaken in conjunction with regularly scheduled refinery turnarounds as appropriate. Current planning suggests that the project will be completed by December 2021.

5.0 FUNDING

The project will be privately funded by company owner-provided equity supplemented with debt in the form of corporate issued debentures or a term bank loan. The debt will be have a minimum tenor of 7-years to ensure adequate time for repayment from the cash flows of the project. NARL Fuels LP has been in advanced discussions with several potential debt providers and believes that it will be able to fund up to 70% of the Delayed Coker project's capital expenditure with debt, leaving the balance to be funded with equity.

July 5, 2019

Date



Signature of Chief Executive Officer

6.0 REFERENCES

AES (Atmospheric Environment Service). 1982. Canadian Climate Normals, Volumes 1-5. Environment Canada, Ottawa, ON.

Banfield, C. C. 1981. The climatic environment of Newfoundland. In: The Natural Environment of Newfoundland – Past and Present. A.G. Macpherson and J.B. Macpherson (eds.). Department of Geography, Memorial University of Newfoundland, St. John's, NF.

COSEWIC (Committee on the Status of Endangered Wildlife in Canada). 2002. Species Database. http://www.cosewic.gc.ca/eng/sct1/searchform_e.cfm

Damman, A.W.H. 1983. An ecological subdivision of the Island of Newfoundland. In: Biogeography and Ecology of the Island of Newfoundland. G.R. South (ed.). Dr. W. Junk Publishers, The Hague.

JWEL (Jacques Whitford Environment Limited (LeDrew, Fudge and Associates Limited)). 1990. Hibernia Development Project Field Survey Freshwater Resources Habitat and Water Quality. Prepared for Mobil Oil Canada Properties, St. John's, NF.

Meades, S.J. 1990. Natural Regions of Newfoundland and Labrador. Report prepared for the Protected Areas Association, St. John's, NF.

PAO (Provincial Archaeology Office). 2002. Archaeological Site Inventory, Culture and Heritage Division, Department of Tourism, Culture and Recreation, St. John's, NF.

SGE (Sheppard Green Engineering and Associates Limited). 1995. North Atlantic Refining Limited Terrestrial Effects Monitoring Program. Report prepared in association with G.R. Ringius and Associates for North Atlantic Refining Limited, Come By Chance, NF.

Source Test Report for the 205 Delayed Coking Unit Drum 205-1201 and Drum 205-1202 Depressurization Vents, 2011, URS Corporation, Austin, TX.

