

SCHEDULE "A" WHARF LAND

Parcel "A"

ALL that parcel of land situated near Come-By-Chance in the Electoral District of Placentia East and being more particularly described as follows:

BEGINNING at a Point, said Point being on the Easterly limit of a thirty-three-foot-wide reservation extending along the Easterly shoreline of Placentia Bay, said Point being the Northwest angle of land granted by the Crown to Provincial Building Company Limited and registered in Special Volume 3, Folio 171 in the Registry of Crown Grants and being S 69°-30' W, 10,165.63 feet from Crown Lands Monument No. 73050;

THENCE following the Easterly limit of the said reservation in a generally Northeasterly direction, 920 feet more or less to a point;

THENCE following the southerly limit of a 100-foot-wide access road leading to the Trans Canada Highway in a generally Easterly direction along the arc of a 433.6-foot-radius curve to the left and S 88°-09' E, 475.1 feet to a point;

THENCE by Crown Land, S 01°-24' W, 202.8 feet more or less to a point;

THENCE by the aforesaid land granted by the Crown to Provincial Building Company Limited, N 89°-18' W, 932.8 feet more or less to the Point of Beginning.

Containing an area of 4.84 acres more or less.

All bearings refer to Newfoundland Grid North.

PARCEL "B"

ALL that parcel of land situated near Come-By-Chance in the Electoral District of Placentia East and being more particularly described as follows:

BEGINNING at a Point, said Point being on the Easterly limit of a thirty-three-foot-wide reservation extending along the Easterly shoreline of Placentia Bay and being the southwest angle of Parcel "A";

THENCE following the boundary of Parcel "A", S 89°-18' E, 932.8 feet more or less to a point;

THENCE by land granted by the Crown to Provincial Building Company Limited and registered in Special Volume 3, Folio 171 in the Registry of Crown Grants, S 01°-24' W, 420 feet, N 88°-38' W, 140 feet, and S. 01°-24' W, 1,541.3 feet more or less;

THENCE following the aforesaid Easterly limit of the reservation in a generally Northwesterly direction, 2,325 feet more or less to the Point of Beginning.

Containing an area of 21.65 acres more or less.

All bearings refer to Newfoundland Grid North.

PARCEL "C"

Waterlot

ALL that parcel of land and land covered by water, situated near Come-By-Chance in the Electoral District of Placentia East and being more particularly described as follows:

BEGINNING at a Point, said Point being on the Easterly limit of a thirty-three foot-wide reservation extending along the Easterly shoreline of Placentia Bay and being S 14⁰-31' E, 1,600.90 feet from the Southwest angle of Parcel "A";

THENCE following the limit of the said reservation and by the waters of Placentia Bay,

S 79⁰-01' W, 2,940 feet,

S 15⁰-51' W, 1,674 feet,

N 74⁰-53' W, 600 feet,

N 15⁰-51' E, 2,046 feet,

N 79⁰-01' E, 2,422 feet, and

N 00⁰-46' W, 926 feet;

THENCE by the waters of Placentia Bay and the aforesaid reservation, N 89⁰-13' E, 600 feet more or less;

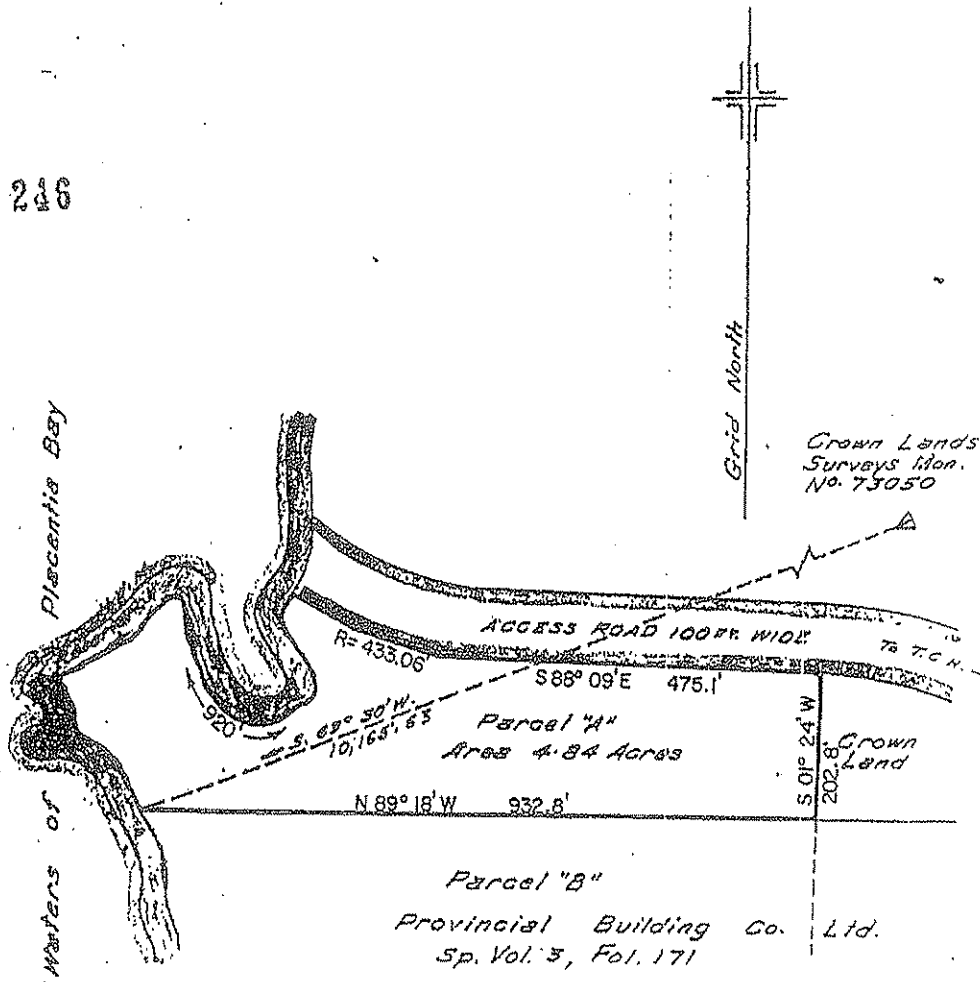
THENCE by the Easterly limit of the reservation in a generally Southerly direction, 1,700 feet more or less to the Point of Beginning.

Containing an area of 86.1 acres more or less.

All bearings refer to Newfoundland Grid North.

Schedule

246



Parcel "B"
Provincial Building Co. Ltd.
Sp. Vol. 3, Fol. 171

Scale: 1 inch to 200 feet

562

Grid North

Parcel "A"

Crown Land

S 89° 18' E 932.8'

S 01° 24' W 420'

Parcel "B"

Area 21.65 Acres

N 88° 36' W 140'

N 88° 36' W 140'

1541.3'

S 01° 24' W

Waters of
Placentia Bay

Parcel "C"

Provincial Building Co. Ltd.
Sp. Vol. 3, Fol. 171

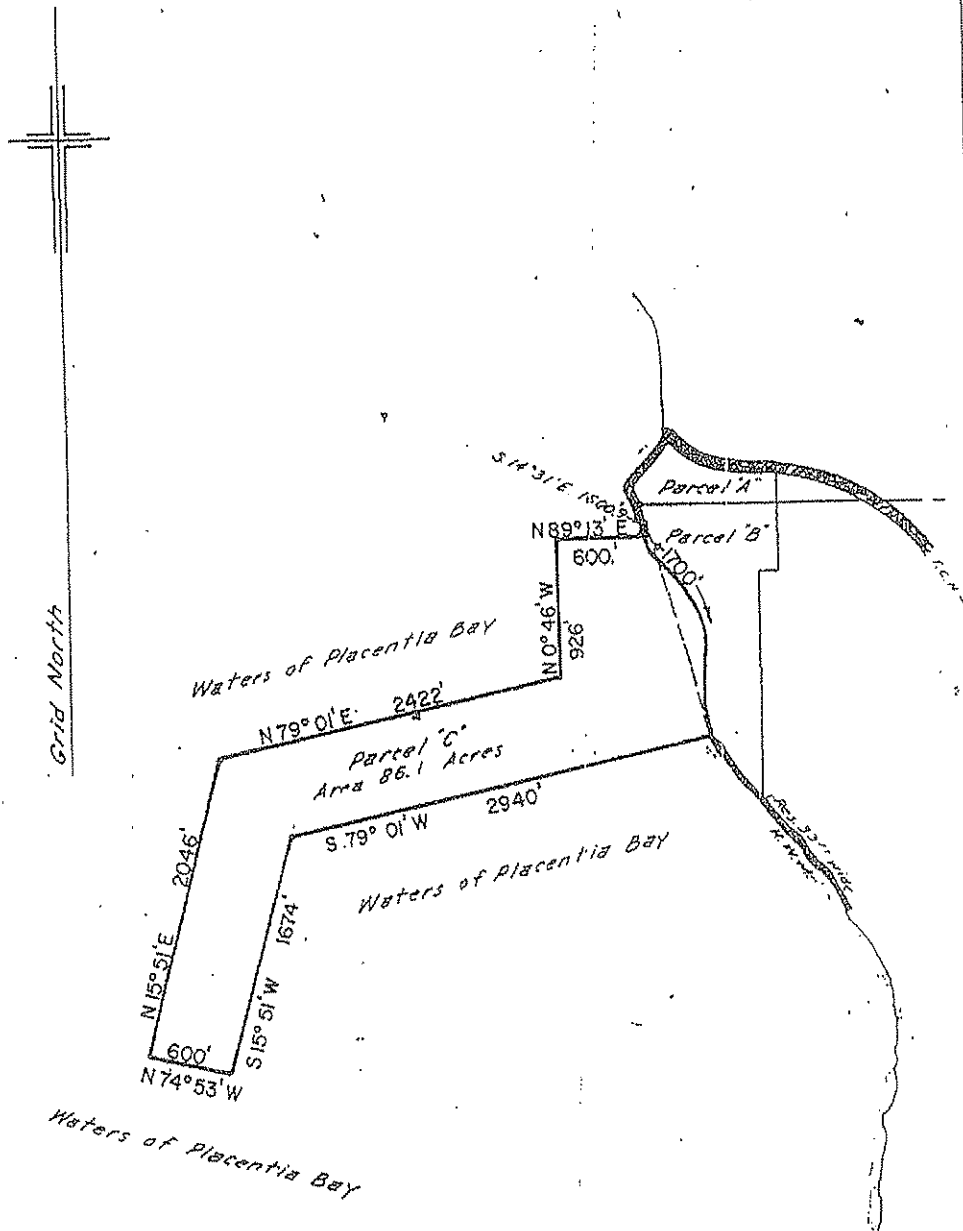
Scale: 1 inch to 300 feet

C.L. & S.D. Dep't. M.A. & R. June 1971

June

Schedule

217



Scale: 1 inch to 1000 feet

grm
JLH

SCHEDULE "B"
REFINERY AND TANK FARM LAND

DESCRIPTION

All that piece or parcel of land situate and being at Come-By-Chance, in the Electoral District of Bellevue, in the Province of Newfoundland, Canada, and being bounded and abutted as follows: that is to say; Beginning at a point on the south side of an Access Road (30.48 metres wide) said point having co-ordinates N 5 296 026.747 metres and E 230 116.319 metres of the Modified Three Degree Transverse Mercator Projection for the Province of Newfoundland Canada, thence along the said south side of the aforesaid Access Road in a general southeasterly direction six hundred and fifteen decimal three eight eight (615.388) metres more or less to a point having co-ordinates N 5 295 864.095 metres and E 230 709.582 metres thence turning and running by land now or formerly Canadian International Refining Company Limited south zero degree forty-five minutes zero seconds west one thousand and five decimal zero seven eight (1005.078) metres, north eighty-nine degrees fifteen minutes zero seconds west five hundred and forty-two decimal four seven one (542.471) metres more or less, thence turning and running by other land of Petro Canada north zero degree thirty-three minutes thirty-nine seconds east nine hundred and sixty-two decimal seven four six (962.746) metres more or less, north eighty-nine degrees eleven minutes thirty-seven seconds west forty-nine decimal nine zero zero (49.900) metres, north zero degree forty-eight minutes thirty-seven seconds east one hundred and ninety-seven decimal one five eight (197.158) metres more or less to the point of beginning and containing an area of fifty-nine decimal four zero zero (59.400) hectares. Which land is more particularly shown and outlined in red on Plan No.4077-234-86 hereto attached. All bearings being referred to the above Projection.

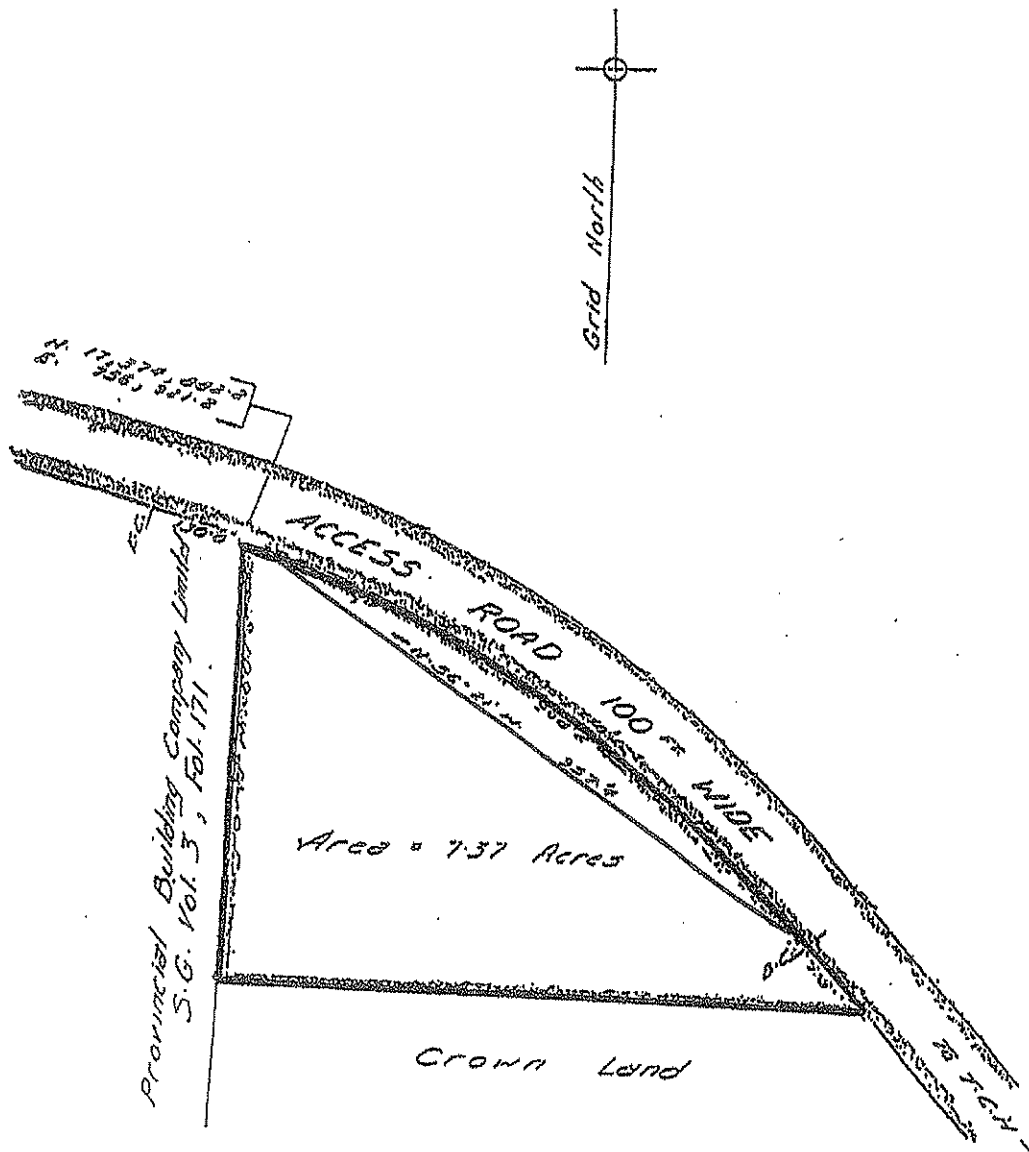
Sh.

TANK FARM LANDS

All that piece or parcel of land situate and being at Come-By-Chance, in the Electoral District of Bellevue, in the Province of Newfoundland, Canada, and being bounded and abutted as follows: that is to say; Beginning at a point on the south side of an Access Road (30.48 metres wide) said point having co-ordinates N 5 296 026.747 metres and E 230 116.319 metres of the Modified Three Degree Transverse Mercator Projection for the Province of Newfoundland, Canada, thence by other land of Petro Canada south zero degree forty-eight minutes thirty-seven seconds west one hundred and ninety-seven decimal one five eight (197.158) metres, south eighty-nine degrees eleven minutes twenty-three seconds east forty-nine decimal nine zero zero (49.900) metres, south zero degree thirty-three minutes thirty-nine seconds west nine hundred and sixty-two decimal seven four six (962.746) metres more or less, thence turning and running by land now or formerly Canadian International Refining Company Limited north eighty-nine degrees fifteen minutes zero seconds west four hundred and twenty-three decimal eight nine seven (423.897) metres more or less to a point in the eastern limit of a reservation (10.06 metres wide) extending along the shore of Placentia Bay, said point having co-ordinates N 5 294 871.752 metres and E 229 730.140 metres, thence along the said reservation in a general northerly and northwesterly direction one thousand two hundred and sixty-five (1265) metres more or less to a point having co-ordinates N 5 296 048.482 metres and E 229 530.880 metres, thence turning and running by land of Public Works Canada north one degree twenty-four minutes zero seconds east four hundred and sixty-nine decimal seven eight eight (469.788) metres south eighty-eight degrees thirty-six minutes zero seconds east forty-two decimal six seven two (42.672) metres, north one degree twenty-four minutes zero seconds east one hundred and twenty-eight decimal zero one six (128.016) metres, thence turning and running by Crown Land south eighty-nine degrees seventeen minutes fifty-one seconds east one hundred and eighty-seven decimal four five two (187.452) metres to a point on the south side of the aforesaid Access Road having co-ordinates N 5 296 642.767 metres and E 229 775.583 metres, thence along the said south side of the said Access Road in a general southwesterly direction seven hundred and forty-nine decimal nine seven nine (749.979) metres more or less to the point of beginning and containing an area of sixty-seven decimal nine three eight (67.938) hectares. Which land is more particularly shown and outlined in red on Plan No. 4077-234-86 hereto attached. All bearings being referred to the above Projection.

Schedule "C"
Refinery Site, 7.37 Acres

ALL THAT piece or parcel of land situate and being near Come-
by-Chance in the Electoral District of Placentia East in the
Province of Newfoundland, Canada, being bounded and abutted as
follows, that is to say: Beginning at a point marked by an iron
pin set in the limit of the Access Road one hundred feet (100')
wide, said point having co-ordinates of North 17,374,882.2 feet
and East 756,921.2 feet of the Transverse Mercator Projection;
thence by land of the Provincial Building Co. Ltd. (Special
Grant Vol. 3, Fol. 171) South zero degrees forty-five minutes
West (S 00° 45' W) six hundred and seven decimal six (607.6)
feet; thence by Crown Land South eighty-nine degrees fifteen
minutes East (S 89° 15' E) eight hundred and eighty-three decimal
two (883.2) feet; thence by the Southwestern limit of the Access
Road North forty-one degrees twenty-six minutes West (N 41° 26' W)
one hundred and eighteen decimal one (118.1) feet; thence by the
arc of a curve to the left of radius one thousand eight hundred
and sixty decimal zero seven (1,860.7) feet, a distance of nine
hundred and sixty-eight decimal two (968.2) feet, more or less,
to the point of beginning and containing an area of seven decimal
three seven (7.37) acres. All bearings being referred to Grid North.
The said land is outlined in red on the plan annexed to this Schedule "A".

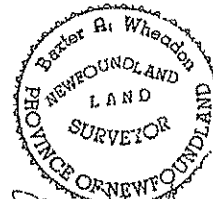


Scale: 1 inch to 200 feet

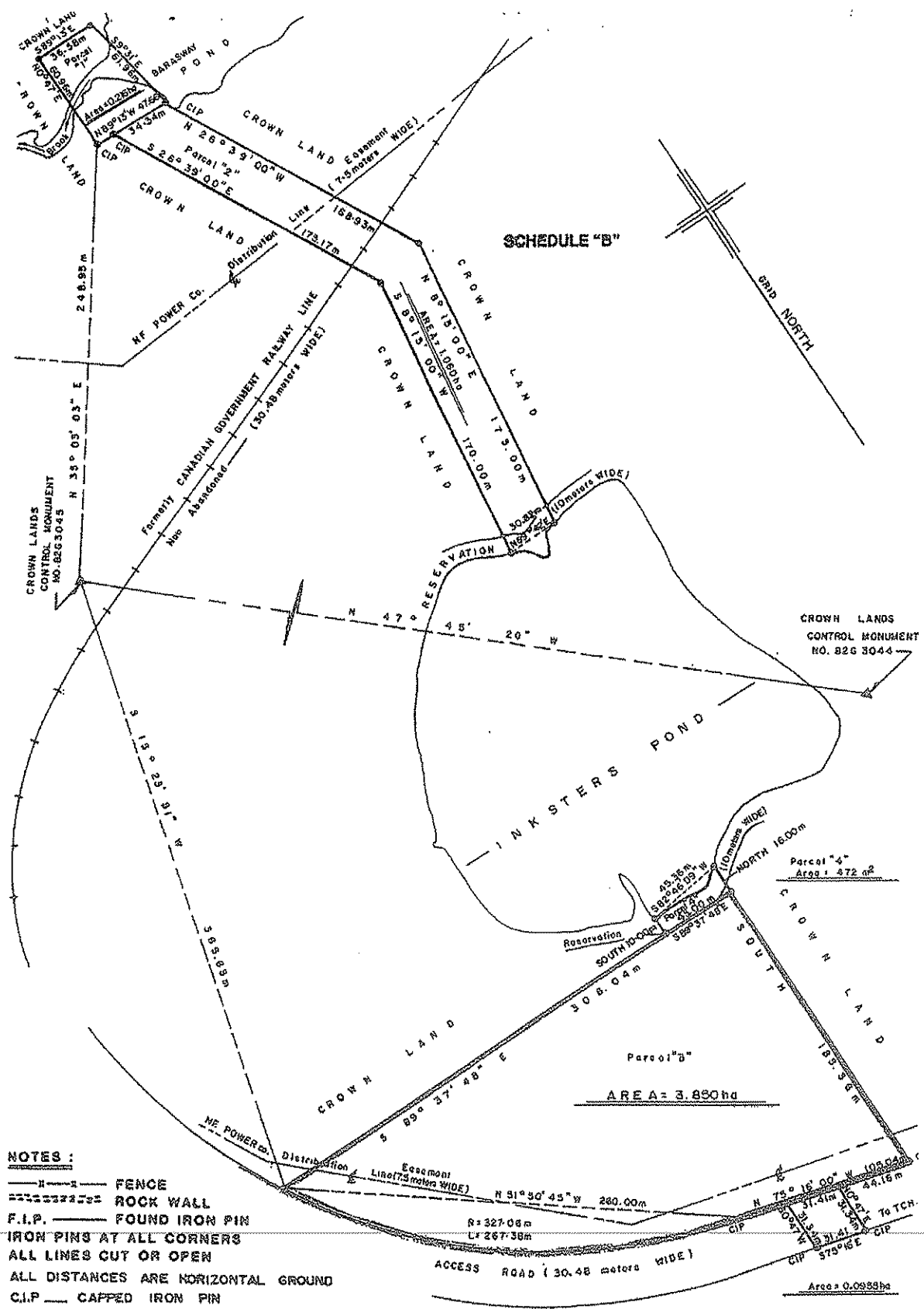
SURVEY DIV, D.F.L.A. Feb. 6, 1970

Schedule "D"
Refinery Site, Crown Grant

All that piece or parcel of land situate and being at Come by Chance in the Electoral District of Bellevue abutted and bounded as follows, That is to say: Commencing at a point in the northerly limit of an Access Road (30.48 meters wide) the said point being distant 365.65 meters as measured on a bearing of S 15° 23' 51" W from Crown Lands Control Monument No. 82G3045; Thence by Crown lands and running along the southerly limit of a Reservation (10 meters wide) extending along the shoreline of Inksters Pond S 89° 37' 48" E, 306.04 meters; Thence by Crown lands, due south, 185.36 meters, more or less; Thence running along the aforesaid northerly limit of an Access Road (30.48 meters wide) N 75° 16' 00" W, 105.04 meters; Thence running along the aforesaid northerly limit of an Access Road and being the arc of a curve, having a length of 267.38 meters and a radius of 327.06 meters, to a point bearing N 51° 50' 45" W, for a distance of 260.00 meters; more or less, to the point of commencement and being more particularly shown and delineated on the attached plan. The above described parcel of land being subject to a Nfld. Power Co. distribution line easement (7.5 meters wide). The above described parcel of land containing an area of 3.850 hectares, more or less. All bearings are referenced from the 3° Transverse Mercator Projection (modified) having central meridian of 53° west longitude. All bearings are derived from NAD-83 values.



Baxter R. Wheeldon
1993 03 23



SCHEDULE "B"

NOTES :

- +—+—+— FENCE
- x—x—x—x— ROCK WALL
- F.I.P. — FOUND IRON PIN
- IRON PINS AT ALL CORNERS
- ALL LINES CUT OR OPEN
- ALL DISTANCES ARE HORIZONTAL GROUND
- C.I.P. — CAPPED IRON PIN

APP NO 87028

PROVINCIAL BUILDING CO. LTD
SP. GRANT Vol. 3 Fol. 171

ALL BEARINGS ARE DERIVED FROM NAD-83 VALUES

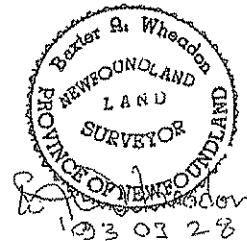
Scale 1:2500

Date 1993 03 23



PARCEL "5"

All that piece or parcel of land situate and being at Come by Chance in the Electoral District of Bellevue, abutted and bounded as follows, that is to say: Commencing at a point in the southerly limit of an Access Road (30.48 meters wide) the said point being distant 238.45 meters as measured on a bearing of S 38° 23' 25" E from Crown Lands Control Monument No. 82G3044; Thence running along the aforesaid southerly limit of an Access Road (30.48 meters wide) S 41° 26' 00" E, 108.44 meters; Thence by Crown lands N 89° 15' 00" W, 342.02 meters; Thence by land described in Sp. Grant issued by the Crown to Provincial Building Co. Ltd. and registered in Vol. 3, Fol. 171, N 0° 45' 00" E, 80.35 meters; Thence by land owned by Newfoundland Processing Limited S 89° 15' 00" E, 269.20 meters; more or less, to the point of commencement and being more particularly shown and delineated on the attached plan. . The above described parcel of land containing an area of 2.456 hectares, more or less. All bearings are referenced from the 3° Transverse Mercator Projection (modified) having central meridian of 53° west longitude. All bearings are derived from NAD-83 values.



NEWFOUNDLAND
PROCESSING
LIMITED
R.O.D. Roll 321 Frame 857

PROVINCIAL
SP. GRANT
BUILDING CO. LTD.
Vol. 3 Fol. 171

CROWN LANDS
CONTROL MONUMENT
NO. 82G 3045

CROWN LANDS
CONTROL MONUMENT
NO. 82G 3044

PROVINCIAL
SP. GRANT
BUILDING CO. LTD.
VOL. 3 FOL. 171

NEWFOUNDLAND
PROCESSING LIMITED
R.O.D. Roll 619 Frame 2163

Parcel '5'
GRANT APP NO. 87028
AREA = 2.466ha

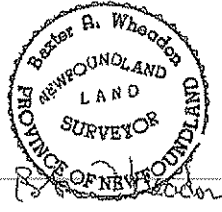
CROWN LANDS

NOTES :

- x— FENCE
- x—x—x— ROCK WALL
- F.I.P. — FOUND IRON PIN
- IRON PINS AT ALL CORNERS
- ALL LINES CUT OR OPEN

ALL DISTANCES ARE HORIZONTAL GROUND DISTANCES
C.I.P. — CAPPED IRON PIN
APP. NO. 87028

ALL BEARINGS ARE DERIVED FROM NAD-83 VALUES



SCALE 1:2500
DATE 1993 03 28

PARCEL "6"

All that piece or parcel of land situate and being at Come by Chance in the Electoral District of Bellevue, abutted and bounded as follows, that is to say: Commencing at a point in the southerly limit of an Access Road (30.48 meters wide) the said point being distant 1541.95 meters as measured on a bearing of N 51° 08' 37" W, from the northeasterly most corner of parcel "5"; Thence running along the aforesaid southerly limit of an Access Road (30.48 meters wide), being the Arc of a Curve having radius of 275.95 meters, for a distance of 201.08 meters to a point bearing N 70° 58' 47" W for a distance of 196.66 meters; Thence by land owned by Newfoundland Processing Limited S 1° 24' 00" W, 61.81 meters; Thence by land described in Sp. Grant issued by the Crown to Provincial Building Co. Ltd. and registered in Vol. 3, Fol. 171 S 89° 17' 51" E, 187.45 meters, more or less, to the point of commencement and being more particularly shown and delineated on the attached plan. The above described parcel of land containing an area of 0.818 hectares, more or less. All bearings are referenced from the 3° Transverse Mercator Projection (modified) having central meridian of 53° west longitude. All bearings are derived from NAD-83 values.



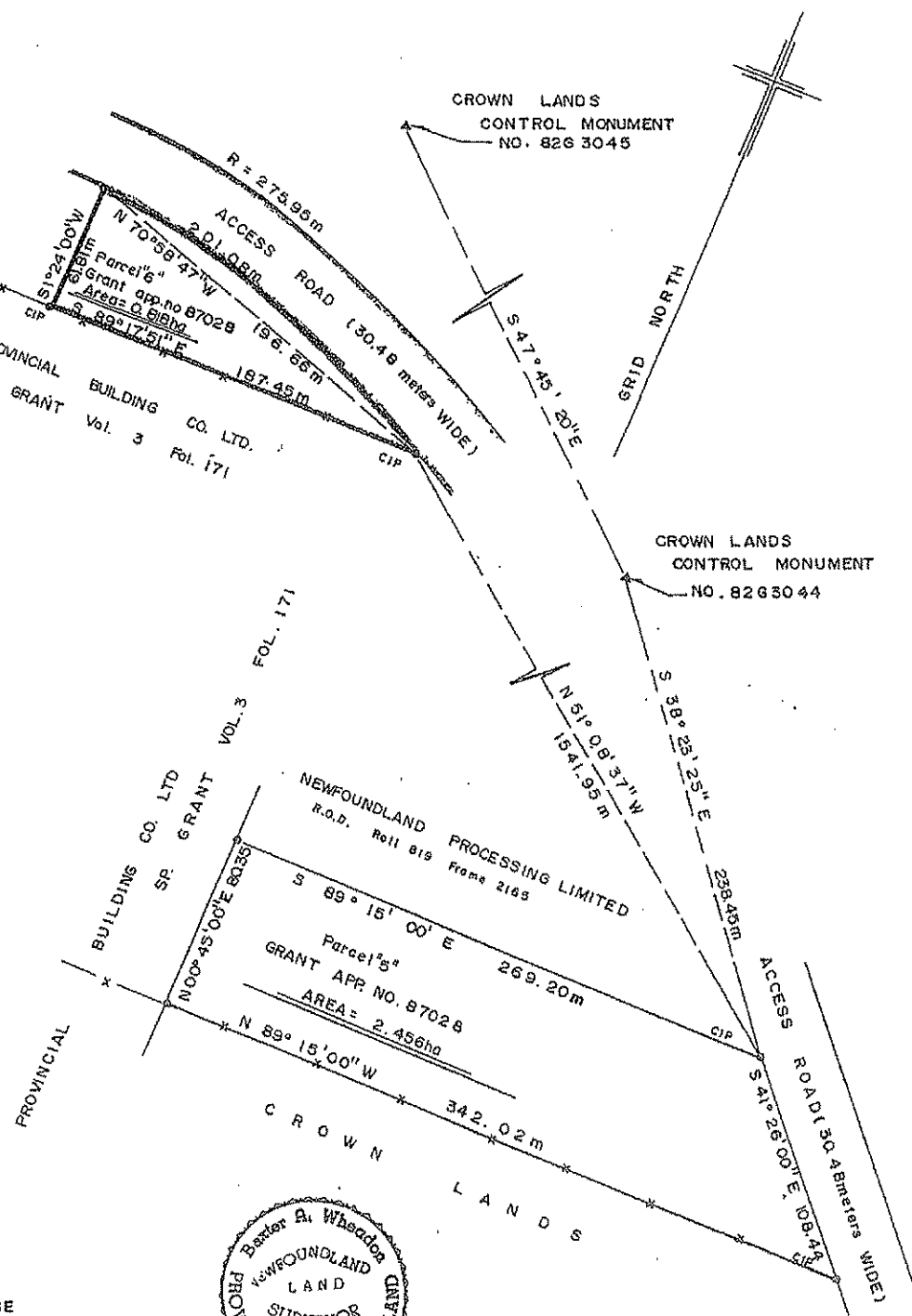
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NEWFOUNDLAND
PROCESSING
LIMITED
R.O.D. Roll 321 Frame 037

PROVINCIAL
SR. GRANT
BUILDING CO. LTD.
Vol. 3 Fol. 171

CROWN LANDS
CONTROL MONUMENT
NO. 826 3045

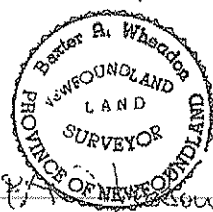
CROWN LANDS
CONTROL MONUMENT
NO. 826 3044



NOTES :

- x—x— FENCE
- ===== ROCK WALL
- F.I.P. ——— FOUND IRON PIN
- IRON PINS AT ALL CORNERS
- ALL LINES CUT OR OPEN
- ALL DISTANCES ARE HORIZONTAL GROUND DISTANCES
- C.I.P. ——— CAPPED IRON PIN
- APR. NO. 87028

ALL BEARINGS ARE DERIVED FROM NAD-83 VALUES



SCALE 1:2500

DATE 1993 03 28

Schedule "E"
Refinery Site, Crown Easement

All that piece or parcel of land situate and being at Come by Chance, in the Electoral District of Bellevue, abutted and bounded as follows, that is to say:

Commencing at a point being distant two hundred forty-eight decimal nine five metres as measured on a bearing of north thirty-five degrees zero three minutes zero three seconds east from Crown Land Control Monument number 82G3045;

Thence running by Crown land and through the reservation, ten metres wide, extending along the southerly bank of the brook flowing from Barasway Pond, through the said brook, through the reservation, ten metres wide, extending along the northerly bank of the said brook and by Crown land north zero degrees forty-seven minutes east sixty decimal nine six metres;

Thence by Crown land south eighty-nine degrees thirteen minutes east thirty-six decimal five eight metres;

Thence running through the reservation, ten metres wide, extending along the northwestern shoreline of Barasway Pond and through the waters of Barasway Pond south nine degrees thirty-one minutes east sixty-one decimal nine six metres;

Thence by the hereinafter described Parcel "2" and by Crown land north eighty-nine degrees thirteen minutes west forty-seven decimal six six metres, more or less, to the point of commencement and being more particularly shown and delineated on the attached plan. The above described parcel of land containing an area of 0.216 hectares, more or less.

All bearings are referenced to the three degree Transverse Mercator Projection (modified) having central meridian of fifty-three degrees west longitude. All bearings are derived from NAD-83 values.

Parcel "2"

All that piece or parcel of land situate and being at Come by Chance, in the Electoral District of Bellevue, abutted and bounded as follows, that is to say:

Commencing at a point being the southeasterly most corner of land described in Parcel "1";

Thence by the aforesaid Parcel "1" north eighty-nine degrees thirteen minutes west thirty-four decimal three four metres;

Thence by Crown land south twenty-six degrees thirty-nine minutes zero zero seconds east one hundred seventy-five decimal one seven metres;

Thence by Crown land and running through the reservation, ten metres wide, extending along the northerly shoreline of Inkster's Pond south eight degrees fifteen minutes zero zero seconds west one hundred seventy decimal zero zero metres;

Thence running along the aforesaid shoreline of Inkster's Pond to a point bearing north eighty-nine degrees forty-two minutes east thirty decimal eight two metres;

Thence running through the aforesaid reservation, ten metres wide, and by Crown land north eight degrees fifteen minutes zero zero seconds east one hundred seventy-five decimal zero zero metres;

Thence by Crown land and through the reservation, ten metres, extending along the southerly shoreline of Barasway Pond north twenty-six degrees thirty-nine minutes zero zero seconds west one hundred sixty-eight decimal nine three metres, more or less, to the point of commencement and being more particularly shown and delineated on the attached plan.

The above described parcel of land being subject to a pole line easement, seven decimal five metres wide, as shown delineated on the attached plan.

The above described parcel of land containing an area of 1.060 hectares, more or less. All bearings are referenced to the three degree Transverse Mercator Projection (modified) having central meridian of fifty-three degrees west longitude. All bearings are derived from NAD-83 values.

Parcel "4"

All that piece or parcel of land situate and being at Come by Chance, in the Electoral District of Bellevue, abutted and bounded as follows, that is to say:

Commencing at a point the said point being the northeasterly most corner of Parcel "3" of land granted by the Crown to Newfoundland Processing Limited and registered in Volume 204, Folio 102 in the Registry of Crown Grants;

Thence by Crown land and running through the reservation, ten metres wide, extending along the southerly shoreline of Inkster's Pond, due north, sixteen decimal zero zero metres;

Thence running along the aforesaid southerly shoreline of Inkster's Pond to a point bearing south eighty-two degrees forty-six minutes zero nine seconds west for a distance of forty-five decimal three six metres;

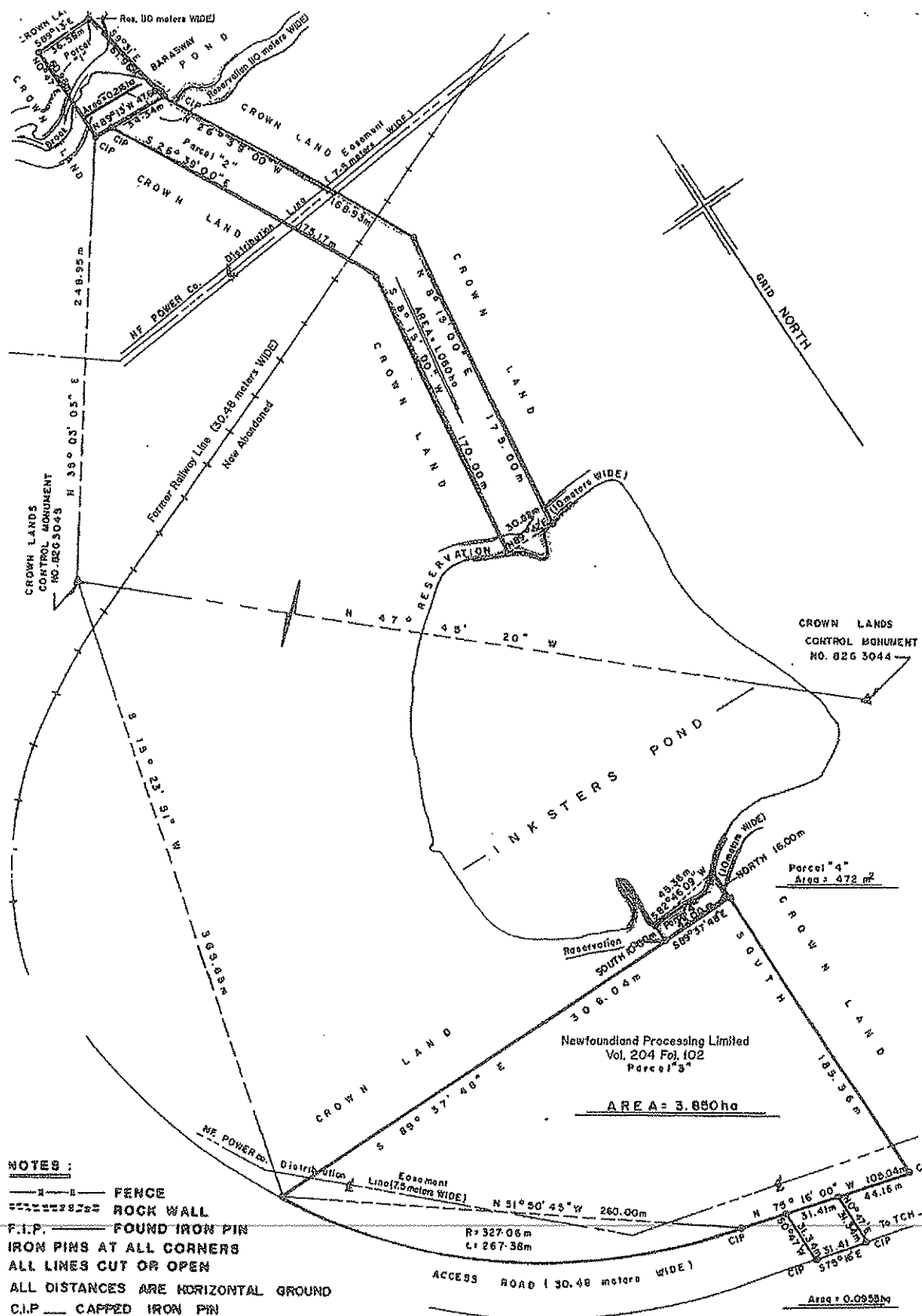
Thence running across the aforesaid Reservation, ten metres wide, extending along the southerly shoreline of Inkster's Pond, due south, ten decimal zero zero metres;

Thence by the aforesaid land described in Parcel "3" south eighty-nine degrees thirty-seven minutes forty-eight seconds east forty-five decimal zero zero metres, more or less, to the point of commencement and being more particularly shown and delineated on the attached plan.

The above described parcel of land containing an area of 472 square metres, more or less.

All bearings are referenced to the three degrees Transverse Mercator Projection (modified) having central meridian of fifty-three degrees west longitude.

All bearings are derived from NAD-83 values.



Schedule "F"
Refinery Site, Crown Grant 2

NO. 123913

ALL THAT piece or parcel of land situate at Come By Chance, the Electoral District of Bellevue, in the Province of Newfoundland, abutted and bounded as follows, that is to say:

BEGINNING at a point, the said point being distant (365.683) metres, as measured on a bearing of south (15) degrees (25) minutes (52) seconds west from Coordinate Monument No. 82G3045, which Monument is on a bearing of north (22) degrees (54) minutes (24) seconds west to Coordinate Monument No. 82G3046;

THENCE running along the easterly limit of Refinery Road, (30.48) metres wide, following a curve, with a radius of (327.196) metres, for an arc distance of (119.769) metres to a point being distant (119.101) metres, as measured on a bearing of north (17) degrees (55) minutes (11) seconds west from the point of beginning;

THENCE north (07) degrees (26) minutes (00) seconds west, a distance of (59.523) metres;

THENCE running along the southerly limit of an Access Road, (20.0) metres wide, following a curve, with a radius of (203.360) metres, for an arc distance of (187.548) metres to a point being distant (180.971) metres, as measured on a bearing of north (41) degrees (29) minutes (49) seconds east from the previously described point;

THENCE north (67) degrees (55) minutes (03) seconds east, a distance of (271.317) metres;

THENCE running by land described in Parcel "2", Lease No. 87029 issued by the Crown to North Atlantic Refining Limited, south (26) degrees (39) minutes (00) seconds east, a distance of (11.562) metres;

THENCE south (08) degrees (15) minutes (00) seconds west, a distance of (155.660) metres;

THENCE running along the limit of a Crown Reserve, (15.0) metres wide, extending along the shore of Inksters Pond for a distance of (388.0) metres, more or less, to a point being distant (254.309) metres, as measured on a bearing of south (13) degrees (34) minutes (21) seconds west from the previously described point;

THENCE running by land granted to Newfoundland Processing Limited, Parcel "3", as registered in Volume 204, Folio 102 in the Registry of Crown Grants, north (89) degrees (36) minutes (41) seconds west, a distance of (250.151) metres, more or less, to the point of beginning and being more particularly shown and delineated on the attached plan;

CONTAINING an area of (8.395) Hectares, more or less;

ALL BEARINGS being referred to the meridian of (53) degrees west longitude of the Three Degree Transverse Mercator Projection. (NAD83)

The above described piece or parcel of land being subject to a Power Line Easement, (7.5) metres wide, extending through the said land, as shown on the attached plan.

Barrow & Hodder Surveys Ltd.



Scale — 1 : 5000



GOVERNMENT OF
NEWFOUNDLAND AND LABRADOR

Department of Environment & Conservation

Policy Directive

Division: Pollution Prevention

P.D. PPD05-01

Prepared by: T. Matthews

Issue Date: February 22, 2005

Authorized by: [Signature] Director

Supersedes: PPD97-01

Authorized by: [Signature] ADM

Approved by: [Signature] DM

Approved by: [Signature] Minister

Subject Management of Impacted Sites.

Objective Update and Replace Contaminated Sites Cleanup Criteria PPD97-01

Background

Prior to May 2002, provisions of the Environment Act, Waste Material Disposal Act and associated Regulations, supplemented with policy and guidelines documents, provided authority to manage contaminated or impacted sites. Through national and regional initiatives, protocols have been updated. An example is the risk based (as an alternative to criteria based) approach to management of impacted sites. Other developments have also occurred in Canada-wide Standards, CCME Environmental Quality Guidelines and Atlantic PIRI software.

Legislative Authority

- *The Environmental Protection Act, 2002, Part VII, Section 26(2)*
- *The Storage and Handling of Gasoline and Associated Products Regulations, CNLR 58/03*
- *Heating Oil Storage Tank System Regulations, CNLR 60/03(amended 103/03)*
- *Used Oil Control Regulations, CNLR 82/02*
- *Environmental Control Water and Sewer Regulations, CNLR 65/03*

Definitions

CCME	means Canadian Council of Ministers of Environment
CEQG	means Canadian Environmental Quality Guidelines
Department	means Department of Environment and Conservation
GSC	means Government Service Centre
PIRI	means Partnership in Risk Based Corrective Action Initiative involving Government Regulators, Oil Industry and Environmental Consultants in Atlantic Canada.
Risk Based Approach	means characterizing potential risks, hazards and exposures of receptors to contaminants at a site that is or may be impacted or contaminated.

General Provisions:

- Harmonize with other jurisdictions in accordance with the Canada-wide Accord on Environmental Harmonization and the Canada-wide Environmental Standards Sub Agreement.
- Harmonize protocols with Canada-wide Standards for Petroleum Hydrocarbons in Soil.
- CCME CEQG as cleanup objectives for impacted sites.
- Criteria and risk based options to manage an impacted/contaminated site.
- Limited Remedial Action as an option for cleanup of a contaminated site.
- Scope of management to include metals, chlorinated and non-chlorinated organic compounds, pesticides and microbiologicals.
- Protect human health and the environment.
- Polluter pays principle.
- Scientifically defensible in each step of the management process.
- A voluntary procedure and process (unless prescribed in writing by the Minister as with designation of an area that is/is suspect to be contaminated).
- A phased approach to environmental site assessment consistent with national protocols.
- Removal of free product required prior to use of protocols.
- A flexible and cost effective approach.
- A management process to be completed in a timely manner.
- Defined duties and responsibilities of the province, responsible person and site professional.
- A formal structure for impacted site/contaminated site management.
- Clear language.
- Documentation for each step.
- 3 tiered approach for petroleum impacted sites. (Tier to be chosen by person responsible).
- A letter or other document to be issued by the department or its agents at the completion of management steps.
- Consistency via standard internal forms and formats.
- Updated software developed by Atlantic PIRI.
- Laboratory analyses to be conducted by laboratories having a form of accreditation as provided for in the Department's policy on Laboratory Accreditation
- Provision for 3rd party review when environmental professional and regulator positions conflict.

Policy

1. The "Guidance Document for Management of Impacted Sites" as amended replaces Department Policy Document PPD97-01, Contaminated Sites Cleanup Criteria.
2. The CCME CEQG, 1999 (as amended) are adopted as the environmental quality standard in the absence of a specific regulation when assessing or in remediation of an impacted site.
3. In cases where the identified groundwater contamination has the potential to impact on-site or nearby wells that are used for drinking purposes, the relevant human health criteria for portable groundwater shall be used. Where this is not a concern the relevant non-potable groundwater criteria shall be used. For those sites with petroleum hydrocarbon impacts only, the use of the Atlantic RBCA Ecological Screening Checklist is required to evaluate the potential for impacts to off-site ecological receptors within 150m, although that distance is subject to professional judgement and must be justified in each case. Regardless for contaminant of concern, the nearest ecological habitat must be identified and the potential for impacts must be ruled out to the satisfaction of the Department, otherwise further qualitative or quantitative assessments may be required.
4. Specific risk based methodologies shall be approved by the Department
5. All remedial action plans shall include a confirmatory sampling program to demonstrate that applicable remediation objectives have been met.
6. In instances where naturally occurring background levels at a contaminated site exceed the criteria levels established by this policy, the remediation requirements may be modified, with Department approval, such that the objectives are not at levels below background concentrations.



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GUIDANCE DOCUMENT

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GUIDANCE DOCUMENT FOR THE
MANAGEMENT OF IMPACTED SITES
VERSION 2.0

TABLE OF CONTENTS

	Page No.
1 INTRODUCTION	1
1.1 Guiding Principles	1
1.2 Regulatory Rationale	2
1.3 Tiered Approach	2
1.3.1 Tier I	3
1.3.2 Tier II	4
1.3.3 Tier III	5
1.4 Responsibilities	5
1.4.1 The Person Responsible	6
1.4.2 The Site Professional	6
1.4.3 The Department	7
2 PROCESS STEPS	8
2.1 Step 1 – Initial Actions	8
2.1.1 Active Impacts	8
2.1.2 Historical Impacts	8
2.2 Step 2 – Environmental Site Assessment and Risk Assessment	9
2.3 Step 3 – Remedial Action Planning and Implementation	9
2.3.1 Monitoring	10
2.4 Step 4 – Regulatory Closure	10
2.4.1 Closure Options for Site Professionals	11
2.4.2 Closure Options for the Department	11
2.5 Step 5 – Decommissioning of Monitoring Wells	12
2.5.1 Decommissioning Protocol	13
3 TECHNICAL CONSIDERATIONS	15
3.1 Land Use and Receptors	15
3.2 Ecological Risk Assessment	15
3.3 Laboratory Analytical Methods	16
3.4 Groundwater Assessment	17
3.5 Disposal of Impacted Materials	18
3.6 Scientific Advancements	18
4 RBCA REQUIREMENTS	19
4.1 Minimum Site Assessment Requirements	19
4.2 Mandatory Conditions	20
4.3 Default Site Characteristics and Exposure Scenarios	20
5 CONTAMINANT GROUPS	21
6 SITE PROFESSIONAL	22
6.1 Qualifications	22
6.2 Conflict of Interest	24
7 RECORD OF SITE CONDITION	25
8 REFERENCES	31

Definitions

Adverse effect

Impairment of or damage to the environment, human health or ecological health.

Affected third party

A property owner, or occupier that is directly affected by contaminant(s) at concentrations exceeding the applicable guidelines, originating from a source property.

Aquifer

A water bearing formation that transmits water in sufficient quantities to supply a well for a beneficial use.

Atlantic PIRI

Atlantic Partnership in RBCA (Risk-Based Corrective Action) Implementation. Atlantic PIRI is a committee comprised of provincial environment regulators from Atlantic Canada, Environment Canada, regional oil industry representatives, and regional consultants.

Atlantic RBCA toolkit

A software model used to assess risk to human health and develop site-specific screening levels. The toolkit is currently endorsed by the four Atlantic Provinces for petroleum hydrocarbon contamination only.

Borehole

An open or cased subsurface hole created by drilling, often used to investigate soil conditions.

BTEX/TPH

Benzene, toluene, ethylbenzene and xylenes (BTEX) and Total Petroleum Hydrocarbons (TPH).

CCME

Canadian Council of Ministers of the Environment (www.ccme.ca).

CEQG

Canadian Environmental Quality Guidelines. Published in 1999 by CCME and updated as required. These, as well as others, are often referred to as “guidelines” throughout this document.

Closure Report

A final report prepared by a Site Professional following the successful completion of the Impacted Site Management Process. The closure report typically contains a completed Record of Site Condition.

Contaminant

A substance that causes or may cause an adverse effect

Contaminant of Concern (CoC)

A contaminant that is or may be present at a given site above an applicable guideline.

Department

The Department of Environment and Conservation or its successors.

Designated Contaminated Site

A site formally designated as a contaminated site by the Minister of Environment under Section 26 of the *Environmental Protection Act* SNL 2002 cE-14.2. In this Guidance, impacted site is used throughout.

Ecological Habitat

The environment within which populations of flora and fauna exist; the ecological habitat contains both living and non-living constituents.

Emergency Response

Remedial action required directly following the identification of contamination on a site in order to eliminate or prevent immediate unacceptable human or ecological risk. Action could include free phase product removal, provision of drinking water, building ventilation and diversion or treatment of water as deemed necessary by the Province or the Person Responsible, Site Professional or the Department/Province.

Engineered Controls

Designed and installed measures to limit the extent of risk posed by an impacted site to human or ecological receptors. These controls may require on-going monitoring or maintenance to be effective. Some examples of engineered controls are ground covers, ventilation systems and water treatment systems.

ENVC

Acronym for the Newfoundland and Labrador Department of Environment and Conservation or the Department.

Environmental Protection Officer (EPO)

An inspector with Service Newfoundland and Labrador (Service NL), who can act as an agent of the Department of Environment and Conservation.

Environmental Site Assessment (ESA)

An assessment of the environmental conditions at a site, conducted in accordance with applicable guidance from Atlantic PIRI, CCME and Canadian Standards Association. A Phase I ESA includes a review of current and historical activities associated with the subject site and adjacent properties, in order to determine the potential for contamination. A Phase II ESA involves the preliminary collection and laboratory analysis of samples of potentially impacted media (soil, sediment, groundwater and/or surface water). A Phase III ESA involves further sampling and laboratory analysis to delineate the extent of impacts identified during the Phase II ESA. Subsequent Phases involve remedial action planning and remediation/risk management.

Environmental Sites Registry

An internal listing of sites that have been reported as containing, potentially containing or previously containing CoCs. Information is added to the registry as it is received by the Pollution Prevention Division of ENVC.

Exposure Pathway

A unique mechanism by which an individual or population is exposed to contaminants of concern originating from a site. This requires an exposure route such as inhalation, ingestion and dermal contact.

Grout

Approved cement, concrete or bentonite sealing material used to fill in the annular spacing of a monitoring or recovery well or to abandon a monitoring or recovery well.

Guidelines

Tier I Risk-Based Screening Levels (defined below), CEQGs or guidelines from any other jurisdiction deemed appropriate, that may be used for screening at impacted sites.

Hazard

The inherent adverse effect that a contaminant poses. It is that which has the potential for creating adverse effects.

Inspector

A person appointed under Section 89 of the Newfoundland and Labrador *Environmental Protection Act* or otherwise appointed by the provincial Minister responsible for environmental protection in Newfoundland and Labrador. The appointed inspector is often an EPO with Service NL.

Impacted Site

A site that contains an identified contaminant.

Impacted Sites Letter

A letter issued to the Person Responsible from the Province, informing them of their requirement to hire a Site Professional and follow the Impacted Site Management Process. This letter is issued following notification of impacts and an initial site inspection.

Impacted Site Management Process

A series of steps laid out in this document relating to the process of managing impacted sites in Newfoundland and Labrador.

Minimum Site Assessment Requirements

Minimum requirements that must be satisfied in order to use the Atlantic RBCA process. These are outlined in Section 4, and detailed in the Atlantic PIRI document entitled "*Atlantic RBCA User Guidance for Petroleum impacted sites in Atlantic Canada*" (www.atlanticrbca.com).

Monitoring

The routine collection of environmental quality data and/or operational data related to impacted site conditions. This can include, but is not limited to, regular groundwater or air sampling, or annual monitoring of a ground cap or other engineered controls.

Monitoring Well

A borehole or other artificial excavation, completed with casing/piping, constructed to measure or monitor the quality and/or quantity or movement of substances, elements, chemicals, or fluids, beneath the surface of the ground.

Person Responsible

The person(s), association of persons, corporate entity, or municipality determined, by the Province, to be responsible for the remediation of an impacted site, as defined in Section 2(x) or Section 2(y) of the Newfoundland and Labrador *Environmental Protection Act*.

Petroleum Hydrocarbon

A hydrocarbon is a molecule consisting primarily of carbon and hydrogen. Hydrocarbon groups present in petroleum products include: alkanes, alkenes, alkynes, aromatics, polynuclear aromatics, and complex hydrocarbon compounds containing oxygen, nitrogen, and sulfur. These compounds are found in or derived from geological sources such as oil, coal and bitumen. In this document, petroleum hydrocarbons refer to BTEX and Modified Total Petroleum Hydrocarbons (TPH), which is TPH minus BTEX.

Pollution Prevention Division (PPD)

The Division of ENVC that is responsible for the Management of Impacted Sites.

Receptor

A human or ecological being that may be exposed to CoCs originating at a given site.

Record of Site Condition

A document completed by the Site Professional which summarizes the environmental findings and remedial work at an impacted site. In order to achieve regulatory closure, this document must be reviewed and signed by Service NL or PPD.

Recovery Well

Sub-surface infrastructure, which can be installed for the purpose of bulk recovery of free phase contaminants

Remedial Action Plan (RAP)

A report describing the remedial approach and methodology to be used on a site to mitigate potential unacceptable risks to human and/or ecological receptors and to achieve regulatory closure.

Remediation

Mitigation of potential unacceptable risks to identified receptors through the removal or treatment of impacted media (i.e., soil, sediment, groundwater, surface water).

Risk Assessment

The scientific determination of potential adverse effects to a receptor, from exposure to CoCs at a site. It involves qualifying or quantifying risks to identified receptors. Tier I Risk Assessment involves comparing site analytical data to published risk-based guidelines/screening levels. Tier II Risk Assessment involves use of published pathway specific guidelines/screening levels or the calculation of site specific target levels through use of approved risk assessment models. Tier III Risk Assessment involves use of other risk assessment tools or techniques, beyond the basic approved methods.

Risk-Based Screening Level (RBSL)

RBSLs are acceptable levels of concentrations of petroleum hydrocarbon impacts. These are often referred to as Tier I RBSLs and are found in Appendix 3 of the *Atlantic RBCA User Guidance for Petroleum Impacted Sites in Atlantic Canada* (www.atlanticrbca.com). These, as well as others, are often referred to as “guidelines” throughout this document.

Risk Management

The implementation of measures to mitigate potential unacceptable risks to receptors. Risk Management is often used instead of or in addition to remediation. Some examples of risk management approaches include, but are not limited to, capping, limiting site access, ventilation systems and building exclusion zones.

Site

A defined area of the environment that has been impacted by contaminants. For convenience, the site is often identified by the civic address(es) of the property on which the site is located.

Site Professional

An individual meeting the provincial requirements listed in Section 6 that manages the completion of remedial tasks and that is authorized to sign a Record of Site Condition.

Site-Specific Target Levels (SSTL)

Risk-based remedial criteria for a specific site that are derived using site-specific conditions and accepted risk assessment / risk management methods at Tier II or III.

Source Property

The property where CoCs have been released into the environment.

Substance

Matter, energy, odour, organism or combination thereof that may become dispersed in the environment.

Unacceptable Risk

A level of risk at which potentially adverse effects may occur to human or ecological receptors. When concentrations of CoCs in site media are above acceptable risk levels defined by regulatory agencies, there is a potential for unacceptable risks.

Valued Environmental Component (VEC)

VECs are the key indicator species that may have important social or economic value or ecological significance. Assessment of VEC species may serve as a baseline from which the significance of impacts can be evaluated.

Acronyms

BTEX	Benzene, toluene, ethylbenzene and xylenes
CALA	Canadian Association for Laboratory Accreditation
CCME	Canadian Council of Ministers of the Environment
CEQG	Canadian Environmental Quality Guidelines.
CoC	Contaminant of Concern
CWS	Canada Wide Standards
ENVC	Newfoundland and Labrador Department of Environment and Conservation
EPO	Environmental Protection Officer
ESA	Environmental Site Assessment
ERA	Ecological Risk Assessment
HHRA	Human Health Risk Assessment
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PIRI	Partnership in RBCA (Risk-Based Corrective Action) Implementation
PPD	Pollution Prevention Division
PSSL	Pathway-Specific Screening Level
RAP	Remedial Action Plan
RBCA	Risk-Based Corrective Action
RBSL	Risk-Based Screening Level
Service NL	Service Newfoundland and Labrador
SSTL	Site- Specific Target Level
TPH	Total Petroleum Hydrocarbons
VEC	Valued Environmental Component
VOCs	Volatile Organic Compounds

1 INTRODUCTION

This guidance document specifies the Impacted Site Management Process to be followed during the assessment and remediation of impacted sites in Newfoundland and Labrador (herein referred to as the Province). This document outlines a specific process which includes Environmental Site Assessment (ESA), as well as risk management and remediation. This process can also be applied to federally owned or controlled properties, particularly those that are subject to divestiture to provincial agencies directly, or to those governed by provincial departments and agencies. This guidance is applicable to both designated and non-designated contaminated/impacted sites (referred to as impacted sites throughout). The Guidance is controlled by the Newfoundland and Labrador Department of Environment and Conservation (herein referred to as the Department).

This document replaces the Guidance Document for the Management of Impacted Sites, Version 1.01, September 2005, the Guidelines for Decommissioning of Monitor Wells and Boreholes (Guidance Document GD-PPD-024rev.1) and Conflict of Interest and Site Clean-up (Guidance Document GD-PPD-038). The associated Policy Directive for the management of Impacted Sites, PPD05-01 remains in place.

The process applies to impacted areas regardless of property boundaries. The resulting closure documents may be for entire sites, if fully assessed, or may just address identified impacts, provided that a proper description of the area being managed is provided in the text and site plans of closure reports and other related documentation.

This guidance document is applicable to all contaminants of concern (CoCs) that have been released into the environment that may require assessment, remediation and/or risk management to ensure protection of human health and the environment. The guidance document is applicable to historical contamination or active contamination.

1.1 GUIDING PRINCIPLES

This guidance document is based on the following guiding principles:

- Human health and the environment must be protected through the timely and proper management of impacted sites;
- The Person Responsible for an impacted site must ensure that the Impacted Site Management Process is taken to completion to provide adequate protection of human health and the environment;
- The Site Professional providing the technical expertise and final documentation is responsible for the results of their work;

- The Department requires final documentation of the Site Professional's opinion stating the condition and safe uses of the site. This is achieved through completion of a Record of Site Condition by the Site Professional and subsequent acknowledgement by the Pollution Prevention Division of the Department (PPD) or Service NL; and
- The management process shall be applicable to all impacted sites and provide a flexible, cost-effective approach to achieving regulatory closure for identified impacts.

1.2 REGULATORY RATIONALE

This guidance document details the steps to be followed for impacted sites. Once impacts are reported, the Person Responsible is fully entered into the process and this guidance shall be followed and brought to completion. If followed correctly, this process should result in regulatory closure.

It is required under Section 8.1 of the *Environmental Protection Act* that **all releases of a contaminant into the environment are to be reported**. It is required under Section 9 of the *Environmental Protection Act* that a person responsible for the release of a substance shall take all reasonable measures to prevent, reduce, and remedy the adverse effects of the substance, and to remove or otherwise dispose of the substance in a manner that minimizes adverse effects. They also shall take other measures required by an inspector or the Department and rehabilitate the environment to a standard that the department may adopt or require.

The Minister's responsibility and authority for the management of impacted sites is contained in Part VII of the *Environmental Protection Act*, the *Heating Oil Storage Tank System Regulations*, and the *Storage and the Handling of Gasoline and Associated Products Regulations*. Where action by the Person Responsible is inappropriate or untimely, the Minister has the authority to order specific actions or to prosecute.

This process is mandatory for all impacted sites. The Person Responsible is required to hire a Site Professional to conduct an ESA and if required, submit a Remedial Action Plan (RAP) to the Department or its designate, for review and acceptance. Following the Impacted Site Management Process facilitates regulatory closure of impacted sites.

1.3 TIERED APPROACH

The risk-based approach to management of impacted sites is based on a three-tier system of assessment of risk that is commonly accepted in North America. Each tier provides an equivalent level of health protection. The tiered approach can be applied to a wide variety of contaminants. The three tiers of risk assessment and risk management accepted by regulators are summarized in the following sections.

1.3.1 Tier I

The Tier I method minimizes the technical complexity of selecting remedial criteria published by the Canadian Council of Ministers of the Environment (CCME) and the Atlantic Partners in RBCA (Risk-Based Corrective Action) Implementation (Atlantic PIRI).

The presence of contaminants at concentrations above the Tier I values does not necessarily indicate that an unacceptable risk exists at the site. It does generally indicate that additional investigation and evaluation of potential environmental concerns is warranted, likely at a Tier II or Tier III level, or that remedial action is required.

1.3.1.1 *Petroleum Hydrocarbons*

The Tier I Risk-Based Screening Levels (RBSLs) are used to screen sites for petroleum hydrocarbon impacts. The Tier I RBSLs were calculated with the Atlantic RBCA Toolkit which uses conservative default parameters typical of many sites in Atlantic Canada. These parameters are also consistent with most CCME Canada Wide Standards (CWS) assumptions. Using the Atlantic RBCA toolkit, screening levels are derived for a variety of exposure pathways, and the most conservative (i.e., lowest) calculated levels are published as Tier I RBSLs.

The Tier I RBSLs are specific to the type of land use at the source and surrounding properties (i.e., agricultural, residential, commercial or industrial), groundwater use (potable or non-potable) and soil type (course or fine-grained) and are developed based on the protection of human health. The Tier I RBSLs can be found in Appendix 3 of the *Atlantic RBCA Guidance Document for Petroleum Impacted Sites in Atlantic Canada* (herein referred to as the Atlantic RBCA Guidance Document).

In order for the Tier I RBSLs to be used, the following must be satisfied:

- All minimum site assessment requirements as listed in Section 4 must be fulfilled. If some of these requirements are not met, full professional justification acceptable to PPD or Service NL must be provided; and
- All mandatory conditions as listed in Section 4 must be met; and
- All default site characteristics as listed in Section 4 must be applicable to the site and surrounding properties.

Ecological concerns are addressed separately using Tier I Ecological Screening Values. These guidelines were developed by Atlantic PIRI in 2012 to provide a more reliable method for evaluating the effects of contaminants on ecological receptors and habitat. Further details are provided in Section 3.2 of this Guidance Document. The Tier I Ecological Screening Values can be found in Appendix 2 of the Atlantic RBCA Guidance Document.

1.3.1.2 Other Contaminants

Besides petroleum hydrocarbons, there are a variety of other contaminants that may be present at a given site including, but not limited to, metals, Polychlorinated Biphenyls (PCBs), Polycyclic Aromatic Hydrocarbons (PAHs) and Volatile Organic Compounds (VOCs). For a listing of contaminant types, refer to Section 5. In most instances the CCME Canadian Environmental Quality Guidelines (CEQG) provide the basis for Tier I assessment. Where there are no CCME guidelines available, guidelines from other jurisdictions can be used for comparison, as deemed appropriate by Site Professionals and PPD.

1.3.2 Tier II

Tier II site-specific or pathway-specific guidelines are developed by a Site Professional using site-specific information to determine the need for and extent of remedial work required for a site. The Tier II approach can be applied to all types of contaminants governed by Atlantic PIRI or CCME (i.e., where guidelines exist). Generally, the Tier II approach is only used to assess potential unacceptable risks to human health.

1.3.2.1 Petroleum Hydrocarbons

Atlantic PIRI has produced Tier II Pathway-Specific Screening Levels (PSSLs) which were derived using the same defaults as the Tier I RBSLs. The Tier II PSSLs can be applied when certain exposure pathways are not present on a site (i.e., no buildings on a site). The use of the PSSL table requires detailed evaluation of existing/potential future land and/or groundwater use. In order for the Tier II PSSLs to be applicable, the same minimum site assessment requirements, mandatory conditions and default characteristics, as discussed in Section 1.3.1.1, must be met. The Tier II PSSLs are in Appendix 4 of the Atlantic RBCA Guidance Document.

The Tier II method can also involve the calculation of Site-Specific Screening Levels (SSTLs) using the Atlantic RBCA toolkit. This involves incorporation of site-specific information to derive screening levels to be applicable at that site only. In order for the Atlantic RBCA Toolkit to be used, the same minimum site assessment requirements and mandatory conditions outlined in Sections 4.1 and 4.2 must be satisfied. The use of the toolkit to develop SSTLs requires a higher level of Site Professional expertise and additional site-specific information.

1.3.2.2 Other Contaminants

As noted previously, for contaminants other than petroleum hydrocarbons, CCME often provides the basis for assessment. For many parameters, CCME has developed fact sheets that provide pathway-specific guidelines (similar to the Tier II PSSSLs for petroleum hydrocarbons) that can be applied when certain exposure pathways are not present on a site. The use of the pathway-specific guidelines requires detailed evaluation of existing and potential future land use.

SSTLs can be calculated for contaminants other than petroleum hydrocarbons using the CCME *"Protocol for the Derivation of Environmental and Human Health Soil Quality Guidelines"* and the most recent version of Health Canada's *"Guidance on Human Health Preliminary Quantitative Risk Assessment (PQRA)"*, and associated documents.

1.3.3 Tier III

The Tier III approach involves the use of additional risk assessment models and scientific approaches to derive SSTLs for sites where Tier II is not applicable or does not fully address the range of issues present at the site. Tier III may be required to address issues or routes of exposure that can not be adequately handled at Tier II such as contamination in air, bedrock, potential ecological impacts or a lack of toxicological or other data. Some examples of Tier III assessment include, but are not limited to: soil vapour testing, ambient air testing, ecological risk assessment and use of risk assessment models other than Atlantic RBCA, CCME and Health Canada.

Due to the complexity of Tier III Risk Assessments, peer review may be required at the expense of the Person Responsible.

1.4 RESPONSIBILITIES

There are three key parties in the Impacted Site Management Process, including the Person Responsible, the Site Professional and the Province. The responsibilities of each of these parties are outlined in subsequent sections.

It is important to note that the Person Responsible is not necessarily the polluter. **The Minister of Environment and Conservation does not determine or apportion liability.** Any civil or legal issues between the polluter and the Person Responsible, if not the same person, are not dealt with through the Impacted Site Management Process. The advantage for all parties is that the process provides unbiased steps to be followed and a documented end to the process.

1.4.1 The Person Responsible

The Person Responsible shall:

- Notify the Province of the presence of impacts on a source property, as follows:
 1. For active spills/releases, immediately notify the Province, through contacting the Newfoundland and Labrador Environmental Emergency telephone line; or
 2. For historical impacts, notify the regional Service NL office. Provide information on how impacts were identified (Phase I or Phase II ESA, etc), the extent of impacts, if known, any remedial actions completed to date and what recommended remedial actions are.
- Take action necessary to ensure human health and the environment are protected during and after the completion of the Impacted Site Management Process, through the hiring of a Site Professional;
- Proceed through the Impacted Site Management Process in a timely manner;
- Immediately notify third party property owners, in writing, that they may be adversely affected by impacts from the source property (i.e., when impacts at the property line are in exceedance of applicable guidelines), and provide proof of notification to PPD or Service NL; and
- Remain informed and involved throughout the Impacted Site Management Process.

The Person Responsible is responsible for due diligence and financing of the assessment and remediation.

1.4.2 The Site Professional

The Site Professional shall:

- Advise the Person Responsible of their responsibilities;
- Advise the Person Responsible of any necessary emergency response required to mitigate immediate threats to human health or the environment;
- Provide the necessary level of professional competence to resolve all technical issues in the Impacted Site Management Process;
- Advise the Province when, in his/her opinion, the Person Responsible fails to act in a manner necessary to mitigate an immediate threat to the safety or health of the public;
- Ensure the appropriate level of characterization and contaminant delineation is achieved (i.e., that the minimum site assessment requirements are met); and

- Provide all applicable technical reports and a completed Record of Site Condition to PPD or Service NL, in a timely manner, demonstrating that the site has been managed in compliance with the Impacted Site Management Process and is safe for the intended use.

1.4.3 The Department

The Department, on behalf of the Province, shall:

- Ensure the protection of human health and the natural environment;
- Identify the Person Responsible for management of each impacted site;
- Give written notice to the Person Responsible through issuing an Impacted Sites letter, to notify them of their requirement to hire a Site Professional (note that this is generally only completed for active spills);
- Ensure the Impacted Site Management Process is properly followed in a timely manner;
- Establish applicable standards, criteria or guidelines for impacted sites;
- Provide technical verification of the work of the Site Professional;
- Provide acknowledgement when satisfied that the Impacted Sites Management Process has been followed (Regulatory Closure is achieved);
- Record and maintain information on sites managed through this process using the provincial Environmental Sites Registry;
- Revise/review and update this guidance document as deemed necessary; and
- Provide direction and guidance to Service NL Environmental Protection Officers (EPOs) and other Government Departments and Agencies on the management of impacted sites.

The Province has the discretionary authority to enforce compliance if the Person Responsible is delinquent or negligent, including ensuring that any necessary emergency action is taken, through issuance of a Ministerial Order or Designation of a Contaminated Site;

2 PROCESS STEPS

The Impacted Site Management Process is divided into five steps discussed in detail in the following sections. The five steps are:

- Initial Actions;
- Environmental Site Assessment and Risk Assessment;
- Remedial Action Planning and Implementation;
- Regulatory Closure; and
- Monitor Well Decommissioning (if applicable).

2.1 STEP 1 – INITIAL ACTIONS

2.1.1 Active Impacts

Upon notification of an active spill/impact on a site, an EPO will complete an initial investigation in order to:

- Assess the type and potential extent of contamination;
- Determine any potential for immediate human health and ecological concerns as well as identify any potentially sensitive receptors on or in the vicinity of the site;
- Determine the Person Responsible for emergency and remedial actions; and
- Determine if the initial emergency response is satisfactory.

Once the EPO has completed their initial investigation, they will issue an impacted sites letter to the Person Responsible informing them of their requirement to hire a Site Professional to complete an Environmental Site Assessment (ESA).

2.1.2 Historical Impacts

Historical impacts are generally identified through the ESA process. The ESA process is often started if there is a property transaction, re-financing, construction on a site, etc. Upon identification of impacts, they must be reported to Service NL or PPD. Once reported, the site professional generally continues with the site assessment and remediation process.

The initial actions of an EPO would depend on the type and extent of impacts identified and other site specific information.

2.2 STEP 2 – ENVIRONMENTAL SITE ASSESSMENT AND RISK ASSESSMENT

The Person Responsible must employ a Site Professional meeting the requirements outlined in Section 6. The Site Professional is required to complete an ESA that meets the Minimum Site Assessment Requirements set out in the most recent version of the Atlantic RBCA Guidance Document. The Site Professional is responsible for determining what CoCs require investigation during the ESA, based on all available information. If there are any issues related to assessment of non-petroleum hydrocarbon compounds, it is the responsibility of the Site Professional to apply good judgement to meet the intent of the Minimum Site Assessment Requirements.

If contaminant concentrations exceed Tier I guidelines, the Site Professional has the option to remediate or further assess the site using a Tier II or Tier III Risk Assessment approach based on site-specific conditions, as discussed in previous sections. If Tier II or Tier III SSTLs are calculated, the Site Professional must provide supporting details that will allow duplication of all steps of the Risk Assessment process. Where default parameters are changed, the Site Professional must provide full justification for these changes.

If actual or potential impacts are identified at the property line in excess of applicable guidelines, the Person Responsible must immediately notify third party property owners, in writing, that they may be adversely affected by impacts from the source property and provide proof of notification to the PPD and/or Service NL.

Part of the Minimum Site Assessment Requirements is to conduct an ecological screening following the Atlantic PIRI Ecological Screening Protocol in Appendix 2 of the Atlantic RBCA Guidance Document. Further discussion of this protocol is provided in Section 3.2. For non-petroleum CoCs, it is the responsibility of the Site Professional to apply good judgement in the assessment of ecological exposures.

2.3 STEP 3 – REMEDIAL ACTION PLANNING AND IMPLEMENTATION

Remediation or risk management is required to mitigate any impacts where there are exceedances of selected guidelines, whether Tier I, II or III. Remediation or risk management may include eliminating the exposure pathway, the receptor and/or the contaminant.

The Person Responsible and the Site Professional must determine if they wish to use a Tier I, Tier II or Tier III approach to direct necessary remedial action. Any remedial activities beyond soil excavation and disposal will require the preparation and submission of a RAP, which must mitigate unacceptable risk to both human health and the environment.

The RAP must be submitted to Service NL or PPD for review and approval prior to completing the remedial activities. If the site is remediated to Tier I guidelines, it is the responsibility of Service NL to oversee the process and ensure that it is brought to completion. Anything beyond remediation to Tier I guidelines falls under the responsibility of the PPD.

2.3.1 Monitoring

The Site Professional must determine, through the work completed in Steps 2 and 3, if a monitoring program is required. In cases where a monitoring program is required to demonstrate the success of the RAP, details on the program shall be included in the RAP.

Typical components of a monitoring program include:

- A clear definition of the monitoring objectives;
- Identification of the parameters to be monitored and measured;
- Description of when, where, and how data is to be collected, analyzed and reported;
- Description of how RAP or site management performance will be confirmed; and
- Detailed interpretation of monitoring results.

The Person Responsible and the Site Professional implement remediation and any proposed monitoring. The period of implementation and extent of monitoring will depend on the method of remediation selected. If deviation in method or schedule from the RAP occurs or is planned, the Person Responsible must inform the PPD or Service NL in writing.

2.4 STEP 4 – REGULATORY CLOSURE

Once the Site Professional is satisfied that impacts have been satisfactorily addressed and unacceptable risks are not expected, the Person Responsible or Site Professional will submit a Closure Report to PPD or Service NL, demonstrating that the site meets remedial objectives. PPD or Service NL will review the Closure Report to ensure the site has been managed in accordance with this guidance document and, if necessary, return it for correction.

The Closure Report must include a completed Record of Site Condition that is valid only for the land use and conditions stated by the Site Professional. The risk to receptors must be reassessed if there are changes in land use or site conditions that could potentially increase risk (e.g., commercial to residential land use or removal of an asphalt cover).

The Record of Site Condition is important as it provides a high level of certainty to the PPD, Service NL, current and future property owners and lenders that any concerns associated with the identified impacts have been satisfactorily addressed.

2.4.1 Closure Options for Site Professionals

On the Record of Site Condition, there are two options for Closure that the Site Professional may recommend, on behalf of the Person Responsible. These are Final Closure and Conditional Closure.

Final Closure is recommended once it has been demonstrated that remedial objectives have been achieved and no further work is required.

Conditional Closure is recommended when all remediation is complete and a monitoring program is required to verify that all of the remedial objectives have been achieved. Once monitoring demonstrates to the satisfaction of the Province that site conditions are stable, the Site Professional can submit a new Record of Site Condition recommending Final Closure, on behalf of the Person Responsible.

2.4.2 Closure Options for the Department

Following review of the Closure Report and Record of Site Condition, the site is acknowledged by Service NL or PPD for either Unconditional or Conditional Regulatory Closure. Unconditional Regulatory Closure is achieved by demonstrating that Tier I, II, or III guidelines have been met. Unconditional closure usually permits unrestricted future development or use within the particular land use designation (agricultural, residential, commercial or industrial).

Conditional Regulatory Closure requires on-going site management using engineered controls, institutional controls, or periodic monitoring to ensure adequate protection of human and environmental health for the land uses specified in Part 5 of the Record of Site Condition.

Conditional Regulatory Closure will require someone, such as the Person Responsible, current and future property owners and bonding or other financial guarantors, to accept long-term responsibility for the ongoing site management, in writing. On sites where institutional or building restrictions are required, the Site Professional or Person Responsible is required to consult with/notify any affected stakeholders (e.g., Regulator, Municipality). As an example, a municipality would have to be informed of any building exclusion zones on a property. Prior to Regulatory Closure, PPD or Service NL must be satisfied that the necessary site management controls will be maintained in future.

Examples of site management controls include:

- Engineered controls such as slurry walls, asphalt covers, imported soil covers, forced or passive air ventilation systems, retention ponds, groundwater pumping systems and long-term treatment equipment; and
- Institutional controls such as building location limitations, building construction limitations (i.e. slab on grade), fish advisories and potable groundwater well location and/or construction.

When institutional or engineered controls are part of the risk management selected for the site, the Closure Report and Record of Site Condition must disclose the relevant limitations and requirements associated with the controls.

Regulatory Closure is achieved once the PPD or Service NL signs Part 7 of 7 of the Record of Site Condition and returns the original signed document to the Person Responsible. Copies are also forwarded to the Site Professional and any other interested parties (i.e., any affected third party properties, insurance companies, etc.).

PPD will ensure that the internal environmental sites registry is updated to include information regarding the work completed and the type of Regulatory Closure achieved.

PPD reserves the right to re-evaluate sites should new information become available or should site activities or circumstances change that may pose a risk to human health or environment.

2.5 STEP 5 – DECOMMISSIONING OF MONITORING WELLS

The last step after Final/Unconditional Regulatory Closure is achieved is the decommissioning of monitoring wells and remedial infrastructure, where applicable.

Monitoring wells are specifically designed and used for aquifer assessment purposes including groundwater flow and water quality observations. Monitoring wells and other types of boreholes that penetrate into the water table depth, such as remediation wells, can provide potential pathways for contaminants to impact groundwater. Following completion of assessment and remediation, these shall be properly decommissioned to prevent both vertical movement of water within the well bore and infiltration of surface water into the well.

The objectives of the decommissioning procedure are to:

- 1) Eliminate the vertical migration of fluids down the borehole;
- 2) Eliminate physical hazards;
- 3) Eliminate improper use; and,
- 4) Conserve groundwater resources.

This guidance does not apply to:

- 1) Seismic shot holes and mineral exploration holes (addressed by Department of Natural Resources);
- 2) Piezometers, and monitor wells where active long term monitoring is required (eg. dams, service stations, landfills);
- 3) Boreholes advanced above an aquifer for the purpose of characterizing local geology;
- 4) Water wells, oil and gas wells; and,
- 5) Special cases with prior approval of the Department.

2.5.1 Decommissioning Protocol

Monitoring wells and boreholes shall be decommissioned in accordance with the following protocols.

2.5.1.1 *Monitoring/Recovery Wells*

- 1) Wells that have not been monitored for 1 year shall be considered abandoned unless written permission is obtained from PPD to continue usage of the well. This permission is contingent upon inspection and verification that the well is in good condition.
- 2) Monitoring wells shall be checked to ensure they are free from obstructions prior to sealing. In all cases, the casing must be cut below the natural ground level so as not to interfere with future land use. In no case should the casing be cut less than 1 m below ground level.
- 3) Decommissioned monitoring wells must be filled with material of equal or lower permeability than the original geologic formation.

- 4) Monitoring wells up to and including 50 millimetres (mm) in diameter shall be completely filled with a sealant such as bentonite pellets or chips sized no more than 1/4 of the minimum well diameter. The rate of pouring the pellets/chips into the well shall be at a rate to prevent bridging. Where pellets/chips are poured above the water level, the addition of water is required to properly hydrate the bentonite.
- 5) Monitoring wells and other vertical structures greater than 50 mm and less than or equal to 300 mm diameter are to be filled with alternating layers of 3.0 m sand and 0.3 m bentonite to the bottom of the well, starting with a minimum of 0.3 m of bentonite.
- 6) Vertical infrastructures with a diameter greater than 300 mm are to be removed and the void filled with material having permeability lower than the native, on site material.
- 7) Where the abandonment will be completed below grade, the area of the well boring shall be covered with a layer of bentonite, grout, or other sealant before back filling.
- 8) Acceptable sealants are bentonite grout, pellets, and chips.
- 9) A monitoring well abandonment record is required for each well that is decommissioned and forwarded to PPD. As a minimum, the log must contain the client name, site name, monitor well/borehole identification, list of materials used, abandonment method, name of site professional, total well depth and borehole log (schematic) showing zone(s) of grout placement.

2.5.1.2 Boreholes

- 1) Boreholes that are advanced into an aquifer for the purpose of characterizing local geology and are not developed into a monitor well are to be backfilled with material of equal or lower permeability.
- 2) The back filling material must be compacted and a mound placed over the hole to allow for future settling.
- 3) Boreholes in which a monitor well is not installed shall be decommissioned immediately upon completion of the relevant site investigation activities.

3 TECHNICAL CONSIDERATIONS

3.1 LAND USE AND RECEPTORS

Identification of the human and ecological receptors that will be exposed to residual contaminants is critical to the selection of Tier I or Tier II guidelines. There are four land use categories specified by Atlantic PIRI and CCME that are adopted by the Department as follows:

- Agricultural;
- Residential/Parkland;
- Commercial; and
- Industrial.

The Site Professional is responsible for identifying the reasonable future land use prior to the selection of applicable guidelines.

For more information on exposure assumptions for these land uses, refer to the Atlantic RBCA User Guidance Document and CCME documentation.

3.2 ECOLOGICAL RISK ASSESSMENT

The accepted approach to Ecological Risk Assessment (ERA) is based on the CCME document, *A Framework for Ecological Risk Assessment at Contaminated Sites: General Guidance* (1996). ERA is the formal process that has been developed for assessing and quantifying risk to ecological receptors from exposure to one or more stressors.

A three-tier framework is typically followed and is composed of sequentially more sophisticated and complex evaluations. Tiers in the framework include:

- Screening or Qualitative Assessment,
- Preliminary Quantitative ERA, and
- Detailed Quantitative ERA.

There is a potential for unacceptable risk when a hazard (e.g., a high concentration of contaminant) co-exists with a receptor, and there are active pathways that may cause the receptor to be exposed to the hazard.

Hazard identification involves the identification of CoCs that may pose a risk to organisms and relates toxicity information obtained from literature for the contaminants. Receptor identification involves the identification of organisms that may be exposed to the potential hazards. Exposure assessment involves the evaluation of the likelihood or degree to which receptors will be exposed to the hazard, and the pathway(s) by which exposure may occur. Finally, risk characterization involves the assessment of risk of each hazard to each receptor, based on degree of exposure.

When assessing potential impacts to ecological receptors from petroleum hydrocarbons, the site professional must complete an initial screening in accordance with the *Atlantic RBCA Ecological Screening Protocol for Petroleum Impacted Sites in Atlantic Canada*, herein referred to as the ecological screening protocol, located in Appendix 2 of the Atlantic RBCA Guidance Document. The protocol contains Tier I Ecological Screening Levels for soil, sediment, groundwater and surface water for the protection of ecological receptors and provides guidance for receptor and exposure identification. Completion of this protocol is therefore considered a Tier I approach.

If the ecological screening levels are exceeded, if potential or actual ecological habitat is identified within 200 m, and if there is a potential for ecological receptors to be exposed to the impacts, more detailed ecological assessment (i.e., higher tiers of risk assessment) is required. Further details on what is classified as ecological habitat are provided in the Ecological Screening Protocol in Appendix 2 of the Atlantic RBCA Guidance Document.

At any point during the process, the site professional may recommend remediation/risk management.

3.3 LABORATORY ANALYTICAL METHODS

Samples are to be collected using standard defensible methods, kept cool until delivery to the laboratory and must respect storage and handling requirements of the laboratory.

For all CoCs, all laboratories analyzing samples must be accredited by the Canadian Association for Laboratory Accreditation (CALA) for the specific parameters being analyzed.

In Canada, there are various methods for the analysis of petroleum hydrocarbons. For Atlantic Canada, the accepted laboratory method is the Atlantic RBCA Method, discussed in the Atlantic PIRI document entitled *Atlantic RBCA Guidelines for Laboratories, Tier I and Tier II Petroleum Hydrocarbon Methods*. In this method, the samples are analyzed for TPH, comprised of both purgeable and extractable hydrocarbons (gas/diesel/lube oil ranges - C₆ to C₃₂), as well as the BTEX compounds.

3.4 GROUNDWATER ASSESSMENT

As discussed in Section 2.2, assessment work carried out at a site must meet the Minimum Site Assessment Requirements detailed in the most recent version of the Atlantic RBCA Guidance Document. This will typically include the installation of monitoring wells to assess the quality and characteristics of groundwater. However, there may be instances where the Province may permit groundwater at some impacted sites to remain unevaluated if full justification is provided by the Site Professional. In order for this to be approved, one of the following requirements must be met:

1. All of the following conditions must be satisfied:
 - Approximate volume of spill is known;
 - Emergency spill response and remedial actions must have been initiated within a timely manner (i.e., before leaching to groundwater or off-site migration of contaminants could take place);
 - Groundwater at the site and on surrounding sites is not used for potable purposes;
 - There are no aquatic receptors within 200 m of the site; and
 - Groundwater is not encountered during excavation.

Or,

2. If the conditions outlined the above have not been met, and the site professional believes that groundwater assessment is not required and can support this through other lines of evidence, this can be discussed with the PPD prior to submission of the report for closure. If PPD agrees with the site professional's justification, groundwater may be permitted to be unevaluated.

Site Professionals must consult with the Province if groundwater is not going to be assessed, prior to submission of the report for closure. If approved, full justification as to why groundwater is believed not to be impacted must be provided in the closure reporting.

In cases where monitoring wells cannot be installed due to space constraints or geological limitations, Site Professionals must provide supporting evidence to the Province to demonstrate this. In these cases, it is recommended that the Site Professional meet with the PPD or Service NL on the site to discuss potential groundwater assessment options.

3.5 DISPOSAL OF IMPACTED MATERIALS

Once soil is excavated at a site, it must be managed based on recommendations and guidance provided by the Waste Management Section of PPD. The closure report shall include documentation providing proof of proper disposal.

If removal of impacted groundwater is required, a licenced waste disposal contractor can be utilized for removal or it can be treated on site. If a waste disposal contractor is used, the closure report must include the name of the contractor used and the volume of impacted groundwater removed. If on-site treatment is conducted, approval must be requested in advance and any discharge must meet the Provincial *Environmental Control Water and Sewage Regulations*, or a guideline acceptable to the Department (for CoCs not included under the *Environmental Control Water and Sewage Regulations*).

3.6 SCIENTIFIC ADVANCEMENTS

Site Professionals are responsible for maintaining current technical and guidance/policy knowledge in impacted sites management. There will be times when changes in criteria or protocols, laboratory methods, risk assessment software and other directly related issues occur prior to changes to the Department's guidance document. Site Professionals must incorporate these types of changes into their work once they become generally accepted and consult with the Department if they are in doubt about application.

4 RBCA REQUIREMENTS

4.1 MINIMUM SITE ASSESSMENT REQUIREMENTS

As discussed previously, in order for the Tier I RBSLs or Tier II PSSSLs to be applied or use the Atlantic RBCA Toolkit to calculate Tier II SSTLs, the following requirements must be met:

- PID (if applicable), owner, location identified;
- Current and anticipated future land use identified;
- Review of underground services as conduits;
- Historical review completed;
- Local groundwater use identified;
- Adjacent land uses and receptors identified;
- Ecological screening completed;
- Soil and groundwater samples from all source areas obtained;
- Soil and groundwater impacts delineated to Tier I RBSLs for potential receptor (adjacent property receptor may be lower Tier I RBSLs);
- Groundwater flow direction and gradient established;
- Combination of surface and sub-surface soil samples analysed;
- Free product observations made in soil and groundwater;
- Low lab detection level for benzene in soil if potable water area;
- Grain size and organic carbon analysis completed on soil;
- TPH fractionation done on soil and water if calculating Tier II SSTL;
- Scaled site plan showing all relevant site features; and,
- Receptor building characteristics obtained (storeys, floor condition, ceiling height, etc).

4.2 MANDATORY CONDITIONS

As discussed previously, in order for the Tier I RBSLs or Tier II PSSSLs to be applied or use the Atlantic RBCA Toolkit to calculate Tier II SSTLs, the following conditions must be met:

- Non-aqueous phase liquids not present in groundwater;
- Potable water free of objectionable taste and odour;
- Soils do not contain liquid and/or free petroleum product;
- Residual hydrocarbons do not create objectionable odours or explosive conditions in indoor or outdoor air;
- Surface soils are not stained;
- No dirt basement floors, sumps with dirt bottoms, etc;
- Confirmed that correct TPH type selected in RBSL or PSSSL Table; and,
- Confirmed that correct soil type selected in RBSL or PSSSL Table.

4.3 DEFAULT SITE CHARACTERISTICS AND EXPOSURE SCENARIOS

As discussed previously, in order for the Tier I RBSLs or Tier II PSSSLs to be applied, the following site characteristics must conform to the following defaults and exposure scenarios:

- Depth to groundwater approximately 3.0 metres;
- Impacted soil thickness is less than 3.0 metres;
- Default foundation crack fraction is appropriate;
- Default foundation thickness is appropriate;
- Two floors exist if using a residential scenario;
- Hydrocarbon impacts above RBSL or PSSSL Table soil values are not within 0.3 m of foundation walls or floor slab;
- Confirmed that RBSL or PSSSL Table values is correct for adjacent property receptors (i.e. use residential at property line if adjacent property is residential);
- Where exposure pathways have been eliminated at Tier II, detailed explanation provided in report explain why pathways are not relevant;
- Where PSSSLs tables are used based on elimination or control of a pathway that could be reopened by changes in site use, this condition is specified as a limitation in the report; and,
- Where Tier II SSTLs have been calculated by changing default values, the report includes the parameter changed, the default value, the site-specific value used, and the rationale and/or detailed written justification.

5 CONTAMINANT GROUPS

GROUP 1 – PETROLEUM HYDROCARBONS	
Benzene	Gasoline
Toluene	#2 Fuel oil (furnace & diesel)
Ethylbenzene	Heavy oil (Bunker & waste oil)
Xylenes	TPH fractions (C6-10, C11-16, C17-34)
GROUP 2 – PAHs	
Benzo(a)pyrene	Fluoranthene
Naphthalene	Pyrene
2-methylnaphthalene	Benz(a)anthracene
1-methylnaphthalene	Chrysene
Acenaphthylene	Benzo(a)fluoranthene
Acenaphthene	Benzo(k)fluoranthene
Fluoranthene	Perlene
Phenanthrene	Indeno(1,2,3-cd)pyrene
Anthracene	Dibenz(a,h)anthracene
	Benzo(ghi)perylene
GROUP 3 – HEAVY METALS (inorganic forms only)	
Antimony	Lead
Arsenic	Mercury
Barium	Nickel
Beryllium	Selenium
Cadmium	Thallium
Chromium (total)	Uranium
Chromium (hexavalent)	Vanadium
Copper	Zinc
GROUP 4 – NON-CHLORINATED ORGANIC COMPOUNDS	
MTBE	Ethylene glycol
Phenol	Cyanide (free)
GROUP 5 – CHLORINATED ORGANIC COMPOUNDS	
Polychlorinated Biphenyls (PCB)	Trichloroethane
Tetrachloroethylene (PCE)	Methylene chloride
Trichloroethylene (TCE)	1,1,1-trichloroethane
Chlorophenols (Penta and daughters)	
GROUP 6 – PESTICIDES	
DDT insecticide and daughters	Phenoxy Acid Herbicides
Organochlorine insecticides (excl DDT)	Carbamate insecticides
Organophosphate insecticides	Fungicides
GROUP 7 – MICROBIOLOGICAL	
e-coli	Cryptosporidium
total coliform	Giardia

Note: Microbiological contaminants are listed above but no screening level guidelines are provided in the Tier I Look Up Tables. The technical tools discussed are not suitable for assessing risk from this Group. The Province should be contacted for site-specific guidance on methods of assessing microbiological contamination as regulated criteria may be used to supplement the Look Up Tables for bacterial impacts (e.g., sewer regulations, health regulations, ecological regulations). Testing for the presence of microbiological contaminants should be conducted when microbiological contaminants are identified as likely or known as contaminants of concern.

6 SITE PROFESSIONAL

6.1 QUALIFICATIONS

The work on which the Record of Site Condition is based shall be reviewed, overseen or conducted by the person signing it (Site Professional). There are minimum requirements that must be met in order to become a Site Professional due to the high level of confidence placed upon them. The Department has developed a registration process for Site Professionals to ensure that impacted sites in Newfoundland and Labrador are managed by qualified individuals. In order to become registered, the application form on the next page must be completed and submitted for approval to the Director of Pollution Prevention.

The following are the minimum standards for application review:

- 1) The individual shall:
 - a. be full member in good standing with the Professional Engineers and geoscientist of Newfoundland and Labrador (PEGNL); or
 - b. hold a minimum of a related Masters Degree in science, applied science, engineering, applied technology, or one otherwise acceptable to the Department. If Masters Degree is from a post-secondary institution is outside of Canada, further information may have to be provided prior to acceptance.

And;

- 2) The individual shall also have, and shall successfully demonstrate, a minimum of five (5) years direct experience in the conduct, supervision, and review of environmental site assessment, risk assessment, and/or remediation projects.

And;

- 3) The individual or the company the individual represents shall hold professional errors and omissions liability insurance coverage of at least \$1,000,000 for environmental work.

Once approved by the Director of Pollution Prevention, the Site Professional will receive a registration number. This number shall be clearly identified on the Record of Site Condition.

If professional competency and/or conduct issues occur, the Department has the discretion to review the standing of an individual's site professional privileges.

If any changes to site professional status occur, such as no longer in good standing with PEGNL, the Site Professional or the company that the Site Professional represents shall inform PPD of these changes.

Management of Impacted Sites, Site Professional Application Form			
Name of Applicant:			
Company:			
Qualifications			
The applicant (check applicable statement(s)):			
1. Is a full member in good standing with the Professional Engineers and Geoscientists of Newfoundland and Labrador (PEGNL)		<input type="checkbox"/>	
2. Holds a minimum of a related Master's Degree in science, applied science, engineering, applied technology or one otherwise acceptable to ENVC.		<input type="checkbox"/>	
If 2. Please provide details:	Degree:	Post-secondary institution :	
Note: If the post-secondary institution is outside of Canada, further information on the program may be requested.			
Insurance			
Does the Applicant or Company that the applicant represents hold professional errors and omissions liability insurance coverage of at least \$1,000,000 for environmental work? Please attach insurance certificates.		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Work Experience			
Does the Individual have a minimum of five (5) years direct experience in the conduct, supervision, and review of environmental site assessment, risk assessment and/or remediation projects? Please attach CV for review.		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Notification of Changes			
Does the individual agree to notify ENVC of any changes in Site professional status?		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Does the individual agree to notify ENVC of any changes in PEGNL membership status and/or standing?		<input type="checkbox"/> Yes <input type="checkbox"/> No	
DECLARATION— I solemnly declare that the statements made in this application are true.			
Signature of Applicant:		Date:	

ENVC USE ONLY:			
Approved:	<input type="checkbox"/> Yes <input type="checkbox"/> No	Site Professional Registration # :	
Approved By:		Date:	

6.2 CONFLICT OF INTEREST

To ensure independence and to maintain public faith in the Department's mandate and any environmental clearance documentation, no individual shall act as the Site Professional on a project or property where the individual or company the individual represents has direct or indirect interests. Specifically, the Department's policy is as follows:

- Remediation may be performed by a contracted party; or it may be performed by the property owner, responsible party, or another party themselves.
- Sampling and reporting confirming compliance with Department's legislation, policies, and guidelines must be done by a qualified consultant (site professional) independent of the property owner, responsible party, or any other with an interest in the property.
- Laboratory analysis must be conducted by a laboratory independent of the property owner, responsible party, or any other with an interest in the property.

7 RECORD OF SITE CONDITION

Part 1 of 7: Source Property Information

Civic Address:

Person Responsible (name and address):

Part 2 of 7: List of Reports

Prepared by Others - The following reports pertaining to the source property cited in Part 1 and/or any other related impacted properties have been prepared by others and reviewed under the supervision of the Site Professional (expand the table as required):

Report Title	Prepared by	Date

Prepared by and/or overseen by the Site Professional - The following reports pertaining to the source property cited in Part 1 and/or any other related impacted properties have been prepared by and/or overseen by the Site Professional (expand the table as required):

Report Title	Date

Part 3 of 7: Remedial Action

List the potential Contaminants of Concern (CoCs) on the property (i.e., what was analysed?):

List the CoCs on or originating from the source property (i.e., CoCs above applicable guidelines):

Summarize the assessment and remedial actions completed at the site complete with timelines:

Was a risk assessment completed at the site (includes human health, ecological, vapour sampling, etc)? ☐ Yes ☐ No

If yes, identify the risk assessment methodology and the resulting site-specific remedial criteria in the below table (expand the table as required). If no site-specific remedial criteria were derived, please provide additional details of the assessment:

Risk Assessment Methodology Used:			(Tier II PSSSLs/SSTLs, Tier III, Soil Vapour, etc.)			
Media	Units	(insert CoC #1)	(insert CoC #2)	(insert CoC #3)	(insert CoC #4)	
Soil						
Groundwater						
Vapour/Subslab/Indoor Air						
Sediment						
Surface Water						
Other						

If no, list the selected Tier I guidelines used for all analysed parameters, noting the guideline reference (i.e., CCME, RBCA, CWS, etc): (expand the table as required)

Media	Units	(insert CoC #1)		(insert CoC #2)		(insert CoC #3)		(insert CoC #4)	
		Guideline	Ref.	Guideline	Ref.	Guideline	Ref.	Guideline	Ref.
Soil									
Groundwater									
Vapour/Subslab/Indoor Air									
Sediment									
Surface Water									
Other									

If a peer review of the Remedial Action Plan and/or the Risk Assessment/Closure Report was requested by Service NL or DOEC, provide the following information:

Consultant Name:

Consultant Address:

Date & Title of Report:

Part 4 of 7: Off-Site Impacts

Precautionary duty of the Person Responsible: Based on the work completed, the following third party properties (identified by civic address or property description) were identified by the Person Responsible/Site Professional, in accordance with section 5.8(1)d of the *Environmental Protection Act*, as being affected or threatened by the contamination originating from the source property.

Where appropriate, indicate the type of impact and summarize what assessment was completed and if any mitigative/remedial actions were taken: (expand the table as required)

Civic Address or Property Description	Type of Impact Identified	Summary of Actions and Outcome

Part 5 of 7: Site Activities

Based on the work completed, the source property cited in Part 1 is suitable for the following site activity(s), subject to any conditions and assumptions stated in the report(s) listed in Part 2. Check appropriate box and provide comments if necessary.

IF LAND USE CHANGES – LEVEL OF RISK MUST BE RE-EVALUATED

☐ Agricultural ☐ Residential/Parkland ☐ Commercial ☐ Industrial

Are there any monitoring requirements for this site? ☐ Yes ☐ No

If yes, please provide details:

Are any engineered controls in place to mitigate potential unacceptable risks? ☐ Yes ☐ No

If yes, please provide details:

Are any institutional controls in place to mitigate potential unacceptable risks? ☐ Yes ☐ No

If yes, please provide details:

Additional comments or special considerations:

Part 6 of 7: Summary Statement of Site Professional

The Minister considers Statements 1 to 7, below to be **mandatory** for submission of the Record of Site Condition. The signature of the Site Professional on this form indicates the fulfillment of these mandatory requirements as well as the requirements of all other checked statements. Please check appropriate statements:

1. This Record of Site Condition form is identical to the one provided in the Province of Newfoundland & Labrador Guidance Document for the Management of Impacted Sites and the content of the form has not been altered. ☐
2. All work on which this Record of Site Condition is based was prepared, overseen and/or reviewed by the Site Professional. ☐
3. The site was managed in accordance with the current version of the Province of Newfoundland & Labrador Guidance Document for the Management of Impacted Sites. ☐
4. The applicable quality criteria (Tier I, II or III) for the site as defined by the Site Professional and as cited in Part 3 have been achieved for the current or reasonably foreseeable future site activities as cited in Part 5. ☐
5. A site plan with scale indicated, identifying the referenced properties is attached to this Record of Site Condition. ☐
6. All reports cited in Part 2 and other related documents that have been prepared by the Site Professional have been delivered to the Person Responsible. ☐
7. With respect to notification, the requirements of section 8(d) of the Environmental Protection Act have been fulfilled ☐
8. The Remedial Action Plan, Risk Assessment or Closure Report was peer reviewed by a qualified, independent Site Professional. ☐
9. If peer reviewed, the results of the Peer Review were appropriately incorporated into the final Remedial Action Plan and/or Closure Report. ☐
10. Based on the results of the site evaluation, the applicable quality criteria (Tier I, II or III) were not exceeded on the source property and therefore, remedial action and/or on-going site management is not required for the current or reasonably foreseeable future site activities. ☐
11. Based on results of the site evaluation, the applicable quality criteria (Tier I, II or III) were not exceeded on the third party properties and therefore, remedial action and/or on-going site management is not required for the current or reasonably foreseeable future site activities. ☐
12. The source property has been remediated to an acceptable level for the current or reasonably foreseeable future site activities as cited in Part 5. ☐
13. The source property requires on-going site management to satisfy the current or reasonably foreseeable future site activities as cited in Part 5. ☐
14. Third party properties affected by the contamination of the source property have been addressed and remediated to an acceptable level for the current or reasonably foreseeable future site activities as cited in Part 5. ☐
15. Third party properties affected by the contamination of the source property have been addressed and require on-going site management to satisfy the current or reasonably foreseeable future site activities as cited in Part 5. ☐

-
- ☐ The source property is recommended for **Conditional Closure**, subject to monitoring requirements specified in Part 5.
☐ The source property is recommended for **Final Closure**

Signature _____

Date: _____

Name (Please Print): _____

Site Professional Registration No: _____

Company: _____

Address: _____

Part 7 of 7: Acknowledgement by Newfoundland and Labrador Department of Environment and Conservation

The Department acknowledges receipt of this Record of Site Condition. The Department has processed the report(s) cited in Part 2 of this Record of Site Condition for the purpose of ensuring the site has been managed in accordance with the Newfoundland and Labrador Department of Environment and Conservation *Guidance Document for the Management of Impacted Sites*.

Based solely on the report(s) cited in Part 2 and on the conclusions of the Site Professional stated in Part 6 of this Record of Site Condition, the Department is satisfied, at this point in time, that the stated level of contamination remaining on the subject property, in the portions of the subject property addressed by the report(s), does not pose an unacceptable risk to human health or to the environment. Notwithstanding this opinion, the Department reserves the right to re-evaluate this decision should new information come to light, or should site activities, site uses or circumstances change which may result in an increase in contamination or in contaminant migration or which may cause changes in site conditions or site classification that may pose a risk to human health or to the environment.

The Department has not directly supervised the work undertaken at the site and does not assume any responsibility or liability for this work, or for notifying future owners, or for notifying present or future occupants of the property, of the work completed. In no way does this acknowledgement make any representation with respect to any environmental damage or liability that may have occurred at the above mentioned property due to contamination that was not discovered, reported or investigated. Any persons intending to purchase or occupy the property should make their own independent determination of the environmental condition of the property and the extent of responsibility and liability, if any, that may arise from taking ownership or occupancy. In addition, workers that are engaged in future sub-surface excavations on site must be made aware of the potential risks of exposure to the remaining contamination.

Unconditional Closure

- ☐ It is understood from the information provided that the site has been managed in accordance with the Newfoundland and Labrador Department of Environment and Conservation *Guidance Document for the Management of Impacted Sites* and that **further remedial action and/or site-specific engineered or institutional controls are not required** to ensure compatibility with the current or reasonably foreseeable future site activities (as cited in Part 5).

Conditional Closure

- ☐ It is understood from the information provided that the site has been managed in accordance with the Newfoundland and Labrador Department of Environment and Conservation *Guidance Document for the Management of Impacted Sites* and that **site-specific engineered or institutional controls are required** to ensure compatibility with the current or reasonably foreseeable future site activities (as cited in Part 5).

Department of Environment and Conservation

Date

8 REFERENCES

American Society for Testing and Materials (ASTM), 1995. Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites. Standard E-1739-95.

Atlantic PIRI Committee, 2012. Atlantic RBCA (Risk-Based Corrective Action) Reference Documentation for Petroleum Impacted Sites, Version 3.0, 2012. www.atlanticrbca.com.

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Canadian Council of Ministers of the Environment. 2006. A Protocol for the Derivation of Environmental and Human Health Soil Quality Guidelines. ISBN-10 1-896997-45-7, ISBN-13 978-1-896997-45-2

Environment Canada. 1994. A Framework for Ecological Risk Assessment at Contaminated Sites in Canada: Review and Recommendations. Ecosystem Conservation Directorate. Scientific Series No. 199.

Health Canada. 2010. Federal Contaminated Site Risk Assessment in Canada, Part II: Health Canada Toxicological Reference Values (TRVs) and Chemical-Specific Factors, Version 2.0. ISBN: 978-1-100-17925-4.

Health Canada 2012. Federal Contaminated Site Risk Assessment in Canada, Part I: Guidance on Human Health Preliminary Quantitative Risk Assessment (PQRA), Version 2.0. ISBN: 978-1-100-17671-0.

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U.S. Environmental Protection Agency (U.S. EPA). 1998. Guidance documents for ecological risk assessment. Risk Assessment Forum. EA/630/R-95/002F.

ENVIRONMENTAL COMPLIANCE AGREEMENT
ON ENVIRONMENTAL MATTERS RELATED TO THE OPERATION
OF THE NORTH ATLANTIC REFINING LIMITED - OIL REFINERY
(SHORT TITLE - COMPLIANCE AGREEMENT)

THIS COMPLIANCE AGREEMENT made at St. John's, in the Province of Newfoundland and Labrador, this
15th day of November, 2013.

BETWEEN: **NORTH ATLANTIC REFINING LIMITED**, a company organized and existing under
the laws of the Province of Newfoundland and Labrador (hereinafter called "NA"),

AND: **HER MAJESTY IN RIGHT OF THE PROVINCE OF NEWFOUNDLAND AND**
LABRADOR, as represented by the Minister of Environment and Conservation
(hereinafter called "Minister").

WHEREAS section 105 of the *Environmental Protection Act* ("the Act") grants the Minister the authority to
enter into compliance agreements where he/she has reason to believe that a person will be in contravention of
the Act;

AND WHEREAS NA owns and operates the oil refinery at Come By Chance (hereinafter known as the
refinery), for which a Certificate of Approval No. AA13-115583, has been issued by the Minister under the Act;

AND WHEREAS NA cannot immediately comply with certain regulations of the Province of Newfoundland and
Labrador but wishes to progress towards compliance;

AND WHEREAS the Minister is of the opinion that a compliance agreement is in the public interest and within
the purpose of the Act;

AND WHEREAS NA and the Minister wish to enter into a compliance agreement for the period beginning at
the date of signing and ending on **December 31, 2016**, which agreement is to be in addition to NA's
obligations under the said Certificate of Approval;

NOW THEREFORE and in consideration of the mutual covenants and agreements contained therein, the
parties hereto agree as follows:

1.0 EFFECT OF THIS AGREEMENT

- 1.1** The parties hereto confirm that upon this agreement becoming effective, they will be bound to
undertake the initiatives set out herein, pursuant to the terms and conditions of this
agreement.

2.0 SULPHUR DIOXIDE EMISSIONS

- 2.1 Upon this agreement coming into effect, the parties hereto agree that sulphur dioxide releases to the atmosphere from the refinery will be limited pursuant to the terms of the following schedule:

Operating Period	Annual Maximum (tonnes)	Daily Maximum (Summer) (Apr. 16 to Aug. 31) (tonnes)	Daily Maximum (Winter) (Sep. 1 to Apr. 15) (tonnes)
Jan.1, 2014 to Dec. 31, 2014	17,000	50	60
Jan. 1, 2015 to Dec. 31, 2015	17,000	50	60
Jan. 1, 2016 to Dec. 31, 2016	17,000	50	60

- 2.2 The annual sulphur dioxide emission cap has been established to accommodate a scenario where the refinery operates at a maximum capacity of 120,000 barrels per stream day, continually throughout the year, with a sulphur dioxide emission intensity (amount sulphur dioxide emitted per quantity of total fuel consumed) comparable to that of the past several years. It is understood that NA will maintain sulphur dioxide emission intensity comparable to that of recent years over the term of this agreement, regardless of annual production levels. Nothing in this schedule shall be construed as permission to substantially increase the sulphur dioxide emission intensity of the refinery.
- 2.3 Prior to the end of each calendar year, NA shall submit a report to the Department to demonstrate that there have been no substantial increases in the refinery's sulphur dioxide emission intensity as compared to recent previous years

3.0 STORAGE TANKS

- 3.1 NA shall continue to implement as per the attached Tank-Schedule, the API-653 "*Tank Inspection, Repair, Alteration and Reconstruction*" in accordance with common industry practice.
- 3.2 NA shall continue to progress towards full compliance with the ***Storage and Handling of Gasoline and Associated Products Regulations, 2003*** (GAP). During the term of this agreement, NA shall perform the necessary dyking area work on the crude tanks, as per the attached Tank Schedule, such that the crude storage area shall be in full compliance with GAP by ***December 31, 2016***.

4.0 CONTINUOUS OPACITY MONITORING

- 4.1 NA shall measure visual opacity readings from ***June 30, 2014 to September 1, 2014*** and ***October 01, 2014 to December 31, 2014*** during regular operations (Monday through Friday). NA will report the upset conditions at the refinery during this period. All visual opacity measurements are to be performed by personal certified under the US EPA methodologies.
- 4.2 During this period the Department will suspend the requirement for continuous opacity monitoring equipment.

5.0 OILY WATER SYSTEM & SURFACE/ACCIDENTALLY – CONTAMINATED SYSTEM

- 5.1 NA shall continue to evaluate the condition of these systems and prepare a detailed schedule

for repairs, which shall be submitted to the Department by **December 31, 2015**. Any immediate concerns noted in the evaluation shall be reported to the Department with a separate action plan for resolution.

5.2 NA shall submit a progress report to the Department on a quarterly basis.

6.0 CERTIFICATE OF APPROVAL

6.1 The parties hereto agree to execute the requirements of this document in addition to the terms and conditions outlined in the NA's current Certificate of Approval issued under the Act.

7.0 DURATION OF AGREEMENT

7.1 This compliance agreement will continue in full force for the period beginning at the date of signing and ending on **December 31, 2016**.

8.0 MODIFICATION TO THE AGREEMENT

8.1 This agreement may be subject to modifications or amendments. Such modifications and amendments shall be made in writing and agreed to in their entirety by all parties hereto.

9.0 SERVICE

9.1 Service of notice in respect to this agreement may be made on any of the parties hereto personally or by facsimile or by forwarding the notice by registered mail to:

(A) North Atlantic Refining Limited
P.O. Box 40,
Come By Chance, NL
A0B 1N0

Attention: President

(B) Department of Environment and Conservation
Government of Newfoundland and Labrador
Confederation Building
P.O. Box 8700
St. John's, NL
A1B 4J6

Attention: Minister
Telephone: (709) 729-2574
Facsimile: (709) 729-0112

10.0 GENERAL

10.1 This Agreement shall be binding upon and enure to the benefit of the parties hereto, their respective successors and permitted assigns.

10.2 If NA adheres to this compliance agreement, the Minister agrees not to charge it with an offence under the Act on a matter which is the subject of this environmental compliance agreement.


10.3 This Agreement shall be governed and interpreted in accordance with the laws of the Province of Newfoundland and Labrador and in particular section 105 of the Act.

10.4 Either party may on 60 days prior notice in writing to the other party terminate this Agreement.

IN WITNESS WHEREOF, on the dates indicated, this Agreement has been executed on behalf of the Government of Newfoundland and Labrador by the Minister of Environment and Conservation, and on behalf of North Atlantic Refining Limited by a signing officer duly appointed pursuant to the by-laws of and authorized to bind the corporation.


In the presence of:

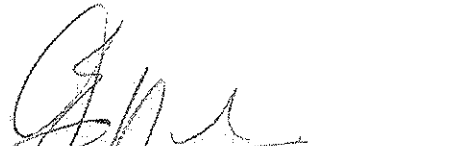
**For the Government of Newfoundland and
Labrador**


Witness


Minister of Environment and Conservation

For North Atlantic Refining Limited


Witness



TANK-SCHEDULE

TANK SCHEDULE 2013 - 2017								
TANK	YEAR							
	2013	2014	2015	2016	2017			
103								
107								
518								
101								
526								
105								
106								
219 / 632								
344								
528								
747								
102								
342								

Tank and CapEx Program

June, 2014

Capital planning for CA
Clarification and Discussion
June 13, 2014



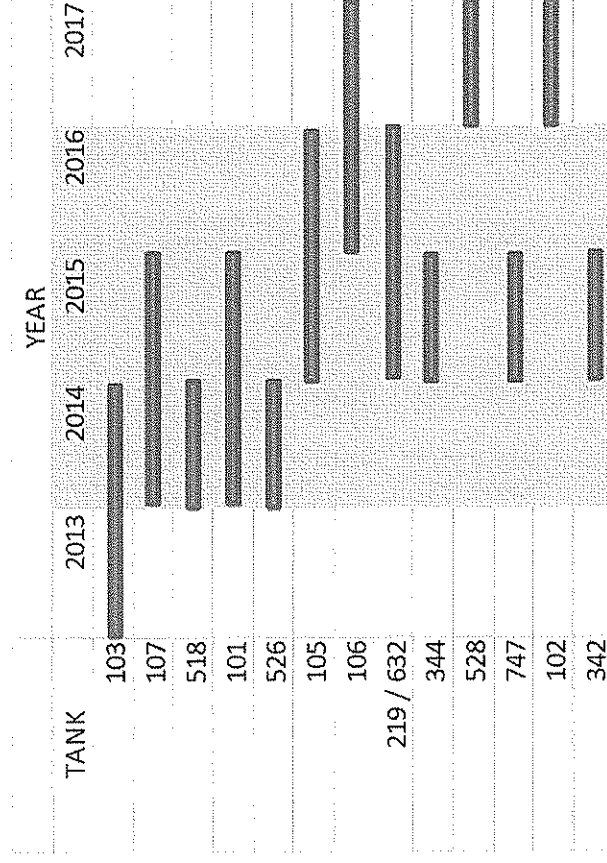
Summary

- The Come-by-Chance Refinery ("CBC") which is owned by North Atlantic Refining Limited ("NARL") is not fully up to date in its API 653 Inspection program, more formally known as : **API Standard 653 : Standard for Tank Inspection, Repair, Alteration and Reconstruction**. This program primarily concerns itself with above-ground hydrocarbon storage tank integrity. It addresses inspection and maintenance intervals and integrity issues such as measuring corrosion factors, repairing and limiting corrosion.
- The Government of Newfoundland and Labrador ("Government") has required CBC to meet a performance schedule for API 653 inspection and repair for its non-compliant above-ground hydrocarbon tanks based on the **Environmental Compliance Agreement on Environmental Matters Related to the Operation of the North Atlantic Refining Limited - Oil Refinery** dated November 15, 2013.
- If SilverRange acquires NARL, the **Environmental Compliance Agreement** will become SilverRange's responsibility.
- SilverRange intends to operate a safe and efficient tank farm with the following principles: 1) No leaks, 2) compliance with inspection intervals, and 3) operational risk assessment.
- The Government has asked several follow-up questions to SilverRange on May 29, 2014 regarding its intended API 653 Compliance Schedule and also its budgeted capital expense to accomplish this task.
- In the following pages, we explain our different needs for storing hydrocarbon inventories in the CBC storage tank farm versus NARL's current plan. As we will change Refinery operations to use a majority of light sweet crudes, we expect to see better environmental performance. Based on our business plan, and incorporating a realistic transition plan, we propose a new compliance schedule on pages 14 & 15 of this document.
 - This plan incorporates the recent failure of the floating roof for Crude Tank 106.
- For the Government's benefit, we have included appendix materials including tankage metrics relative to industry benchmarks and a recent listing of all tanks onsite as furnished by NARL. These materials show that NARL has significantly larger tank capacity than typical North American refineries.
- The information in this presentation has been prepared based on information that SilverRange believes to be accurate based on information provided by NARL. However, we cannot guarantee its accuracy and our plan may change after actual experience with running the Refinery.

Existing CA/CoA Tank Inspection Requirements

Existing CA compliance schedule

- The NL Government has delineated the tank compliance program dates NARL agreed to in its latest communication with SilverRange Financial Partners ("SR"). The schedule agreed to by NARL in 2013 is below:



- We are requesting modification in the CA/CoA to develop a new tank schedule based on the following:
 - SR's crude processing strategy involves mostly light sweet and WTI crudes. NARL current processes mostly heavy sour crudes such as Basra and Kirkuk. Therefore, we will have different requirements for the tank-farm relevant to crude segregation and blending, crude cargo reception volume, intermediates storage and finished product blending and storage.
 - NARL's tank farm plan is quite different than SR's. However, until the plant is owned and operated by SR using its new operating plan, it is difficult to predict the precise needs from the tank farm. Therefore, this request addresses some key changes contemplated today; however, we may request additional changes in the future after completing the acquisition.
 - It should be noted that SR currently has no control over the capital deployments of NARL.

Existing CA capital program

- NARL has provided SR with the following Capex schedule related to tank certification, repair, and upgrade through its data room.

Annual Capex
CAD \$mn

Tank	2014	2015	2016	2017	2018
107	1.0	14.0			
105		1.0	14.0		
106			1.0	14.0	
219 & 632		4.0	4.0		
344		1.5			
524					1.0
101	7.0	7.0			
103	1.0				
526	7.5				
527					1.0
528				5.0	
747		1.0			
102				2.0	
104					2.0
217					1.0
342		1.5			
518	5.0				

Total 21.5 30.0 19.0 21.0 5.0

Period 2014-2016 70.5

- SR is not privy to the exact values presented to the Government of Newfoundland in the CA/CoA extension process of December 2013, and the value of \$73.5 million for the period 2014-2016 is not documented in the CA or CoA. However, we believe that the Capex presented above is substantially similar to the value discussed by the Government in its email to SR.

Responses to the Newfoundland Government's Questions

Tank 107

Government question(s): Tank 107 (crude tank) is a new tank under construction. NARL originally committed to completing this in 2015. Construction has now halted and there is no indication in SR's proposed schedule that this will be completed during the next 6 years. NARL previously indicated that Tank 107 must be brought into service before they can take Tank 106 offline. SR is proposing to do Tank 106 in 2018-19. Can SR provide further details regarding the plan for Tanks 107 and 106 including why Tank 107 appears to be no longer required within the revised plan?

- NARL's current crude slate includes 3-4 grades of dissimilar oils consisting of
 - Basrah: a medium to heavy crude oil with high sulfur content;
 - Kirkuk: a medium crude oil with high sulfur content;
 - WTI: a light crude oil with low sulfur content;
 - LLS: a light crude oil with low sulfur content.
- To minimize feedstock variability, NARL commenced building Tank 107 to serve as an intermediary blending waypoint for several crudes to be blended before processing.
- NARL's current crude deliveries are made in shipments of up to 2 million barrels for Basrah and Kirkuk. Shipments are typically less than 700,000 barrels for WTI and LLS due to shallow US ports. A single inbound VLCC tanker of Basrah may occupy 4 of the total 6 tanks at the time of discharge. SR's operating plan incorporates primarily WTI and other light sweet crudes with minimal blending, thus obviating the requirement of an intermediate blending step in Tank 107 and also for large one-time crude deliveries. Maintaining an adequate safety stock level plus cyclic stock will require significantly less tank space versus the current NARL operation.
- Without a need to blend crude nor to store VLCC shipments, the refinery can be operational with only 4 of 6 tanks (from 101-106) in operation at any given time. However, a 5th tank adds flexibility for cargo timing, thus minimizing demurrage, and also adds another layer of operational security.
- We are still interested in completing Tank 107, but do not envision needing 7 crude tanks at CBC. We believe that Tank 107's completion decision should be made based on economics and independent of the Tank 105 and 106 API 653 inspection program under the SilverRange operating plan. We will make this decision after completing the acquisition of NARL.



Tanks 105 & 106

Government question(s): SR is proposing to delay work on crude Tanks 105 and 106 by 2 years (Tank 105 to be completed in 2018 and Tank 106 completed in 2019). ENVC does not have any records showing that these tanks were ever inspected since being put into service in 1973. Can SR provide further detail as relates to the plan and schedule delay for Tanks 105 and 106, why the delay and how it will not be a concern for overall safety of the tank farm?

- Tank 106 has been damaged as of 6/10/2014 and will be removed from service immediately. Tank 101 has been placed back into service due to the damage sustained on Tank 106. NARL has informed SR that they intend to begin API 653 work immediately on Tank 106 in lieu of the scheduled work on Tank 101.
- SR will need to use Tanks 101 and 105 in the interim and plans to have their API 653 inspection and repairs completed as soon as is economically feasible. Due to the change in crude slate mentioned earlier, we do not believe that it will be critical to complete Tank 107 before having an opportunity to inspect 101 and 105. In light of the mechanical failure of Tank 106, SR has proposed adding operating limits to tanks 101 and 105 on page 16 of this document.
- Under SR's operating plan, Tanks 102, 103, and 104 will be the primary crude oil tanks with 101 and 105 being used as secondary tanks. Tank 106, upon its return to service, will be a primary crude oil tank, giving the refinery 4 primary tanks. Non-primary oil tanks will be used sparingly for purposes such as static storage and as emergency stand-by.
- Our understanding of Tanks # 105 and # 106 histories are that the two were not inspected in the late 2000s but were de-sludged at that time through a year-long removal process which costs ~\$2 million in labor and energy per tank to accomplish.



Tank 518 and other distillate storage

Government question(s): Tank 518 (diesel) is currently out of service. NARL originally committed to completing this work in which SR are proposing for 2015 along with work related to Tank 342 (another diesel tank). NARL had previously indicated that Tank 518 must be returned to service before other diesel tanks can be taken out. Why is SR proposing a 1 year delay for Tank 518 (diesel) to 2015? Can SR provide further detail related to the plan and schedule for these two tanks? How can SR account for the apparent schedule conflict for these tanks particularly given NARL's previous guidance?

- Tank 518 was taken out of service in 2012 due to a leak. Returning it to service will be necessary for flexibility in delivering truck rack service. However, our focus for the period immediately after taking possession of CBC will be to optimize the existing tankage for our anticipated product slate. Since the transaction is likely to close only in September 2014, we need adequate time.
- SR intends to make US ULSD specification diesel and European EN 590 diesel. The EN 590 product will generally contain a blended stream of ultra-low sulfur kerosene. We intend to have 4 tanks of 675,000 bbls of working storage for ULSD and ULSK.
- The refinery has several clean distillate tanks although connectivity with the product distribution rack is likely not available for each tank and is important for supporting the local market.
- We will work diligently to return Tank 518 to service, but need to work within the time frame created by NARL for the scheduled work.
- Tank 342 is presently a low-sulfur kerosene tank that supports diesel blending. We intend to use Tank 523 as a ULSK tank because the production of kerosene will increase by ~6,000 bpd under SR's operation plan. Tank 342's future use is likely to be in supporting ULSD Truck Rack service, but that will be determined by tankage needs after the change in operations. The cost to recertify 342 is not large.

Tank 526

Government question(s): *Tank 526 (#6 fuel oil) is currently out of service which is the tank that failed in 2012. NARL originally committed to completing this work in 2014. SR has listed the Tank as decommissioned and there is no indication in their proposed schedule that this will be completed during the next 6 years. NARL previously indicated that Tank 526 must be brought back into service before other #6 fuel oil tanks can be taken out of service. Can SR provide further detail on the plan for Tank 526 and implications for inspection, schedule and possible work related to other fuel oil tanks as well as any potential schedule issues related to BLIERS?*

- Tank 526 ruptured while in service in 2012 and has remained out of service since then.
- SilverRange's operating plan does not contemplate a return to service for Tank 526 because the volume of fuel oil to be produced at CBC will drop significantly from the change in crude slate from Basrah/Kirkuk crude oil to WTI. In absolute terms, we expect vacuum and visbreaker unit bottoms to fall from a high of 33% of the yield of the plant to less than 10%.
- We believe that the existing tanks in service can provide adequate storage capacity for the project volume of residual and fuel oil production without rebuilding Tank 526 while still providing adequate flexibility to inspect the 600-series tanks and Tanks 525, 527, and 528.
- Further, we intend to change service in a number of the aforementioned tanks because current service allocations are disproportionate in their over allocation of residual oil versus clean products. However, the service design of the new tank farm has to contain flexibility to incorporate our experience after acquisition. A change-in-service for a residual oil tank may necessitate the cleaning of several tank bottoms, which may lead SR to complete API 653 inspection and repair protocols before their currently scheduled dates.
- We are not familiar with the BLIERS reporting requirements for Tank 526. Generally heavy residual oil tanks do not have significant emissions profiles. Can the government please provide more specifics regarding this need?

Capital outlays

Government question(s): NARL's capex for 2014-2017 to meet the tank certification commitments in the existing CA is stated by SR to be approximately \$51 Million. During CA negotiations, ENVC indicates that NARL previously estimated the tank capex for 2014-2016 (excluding 2017) would be approximately \$73.5 million. Can SR clarify the significant reduction in capex for the existing CA previously indicated by NARL as relates to the tank farm and schedule? Why has SR's capex in its revised proposal been further reduced to \$45 million? Can SR provide further discussion how the reduced capex combined with various proposed schedule delays as compared to the existing CA will not be a concern for overall tank farm safety?

- NARL's API 653 recertification program for crude tanks has included several optional modifications of the tanks that increased the cost to \$13-16 million each for #102, 103, and 104. These optional features are not mandated by the API 653 protocol and do not impact tank farm safety.
- SR must be a better steward of capital to transition CBC to a profitable business. We will eliminate optional capital expenses for the tank farm that do not provide an economic return and do not affect safety.
- The disuse of heavy sour crude oils eliminates the need for complex blending systems and additional crude oil movements. However, since NARL has already installed new blending systems on 3 tanks, the refinery has the capability to handle a medium-complexity crude slate blending program.
- The optional capital items account for 39% to 66% of the total tank project (depending on floor and roof replacement versus repair requirements).

NARL crude tank rebuild estimates in conjunction with API 653 \$CAD

Total Mandatory Capital	\$	4,485,000
Roof & Floor Replacement	\$	3,550,000
Discretionary Blending Equip.	\$	2,245,000
Optional Items	\$	1,650,000
EPMC & Contingency	\$	1,193,000
	\$	13,123,000

SR plans to install some of the optional equipment for tanks # 101, 105, and 106 but not all of the items, hence its Capex projections are lower than NARL's 2013 projections

For tanks 101, 105 and 106, we are currently projecting \$9 million per tank in Capex

SilverRange Go-forward Plan

Forward schedule for tank outages (1 of 2)

Government question(s): *Can SR provide a revised schedule that identifies out-of-service and in-service dates for each tank (perhaps specify month & year) as well as provide any notes necessary to demonstrate how these dates will impact refinery operations. Where the initiation of work on one tank is dependent on completion of another, this should be clearly identified and a discussion provided how SR's plan will address these issues.*

- SR has two caveats regarding the production of a definitive schedule of tank out-of-service dates:
 - First, SR does not control NARL's existing capital spending program until the acquisition is complete. The interdependency of a storage tank farm outage plan can be impacted by changes in timing, scope, or sequence by NARL for its current maintenance program.
 - Second, SR will change the operating plan of the refinery during its first few weeks of ownership. Even though we have conducted extensive due diligence, we do not know all outcomes with certainty. Buffering intermediate product flows will be a critical element to managing a successful change process. Therefore, our schedule must permit flexibility to accommodate unexpected outcomes.

Forward schedule for tank outages (2 of 2)

Tank #	Capacity	Service	Status	Type	Tank Completion Schedule				Notes
					2014	2015	2016	2017	
518	112.8	Diesel	Out of service	Fixed					Tank 518's completion by year-end 2014 is contingent on NARL progress during 2014
101	575	Crude	In Service	Floating					Tank 101 will be taken out of service and certified once tank 106 is back online
107			Out of service						Tank 107 is currently not under construction and will remain dormant until further notice
526	200.5	Fuel Oil	Out of service	Fixed					Tank 526 is surplus to needs in the new operating plan and will not be repaired
105	575	Crude	In Service	Floating					Tank 105 will be a secondary tank that will be completed by year-end 2016/early 2017
106	575	Crude	Out of service	Floating					Tank 106 will be repaired immediately
219	200.5	VGO	In Service	Fixed					Tank 219 will be completed no later than year-end 2016, or sooner pending a change of service
532	150	Fuel Oil	In Service	Fixed					Tank 532 will be completed no later than year-end 2016, or sooner pending a change of service
344	32.9	Platformate	In Service	Fixed					Tank 344 will be completed as soon as possible but is contingent on NARL's progress during 2014
528	253.8	VGO	In Service	Fixed					Tank 528 may be completed early with a change of service
747	32.9	Slop Oil	Out of service	Floating					Tank 747 will likely remain out-of-service unless slop oil production increases
102	575	Crude	In Service	Floating					Tank 102 is a recertification
342	32.9	Diesel	In Service	Fixed					Tank 342 is a recertification

Grey = possible outage

Black = likely outage and completion year

Forward schedule for tank Capex

NARL Proposed

Annual Capex CAD \$mn

Tank	2014	2015	2016	2017	2018
107	1.0	14.0			
105		1.0	14.0		
106			1.0	14.0	
219 & 632		4.0	4.0		
344		1.5			
524					1.0
101	7.0	7.0			
103	1.0				
526	7.5				
527					1.0
528				5.0	
747		1.0			
102				2.0	
104					2.0
217					1.0
342		1.5			
518	5.0				

Total 21.5 30.0 19.0 21.0 5.0

Period 2014-2016

70.5



Period 2014-2016

45.0

SR Proposed

Annual Capex CAD \$mn

Tank	2014	2015	2016	2017	2018
107					
105			5.0	4.0	
106	3.0	6.0			
219 & 632		4.0	4.0		
344		1.5			
524					1.0
101		3.0	6.0		
103	1.0				
526					
527					1.0
528		5.0			
747					
102				2.0	
104					2.0
217					1.0
342		1.5			
518	5.0				

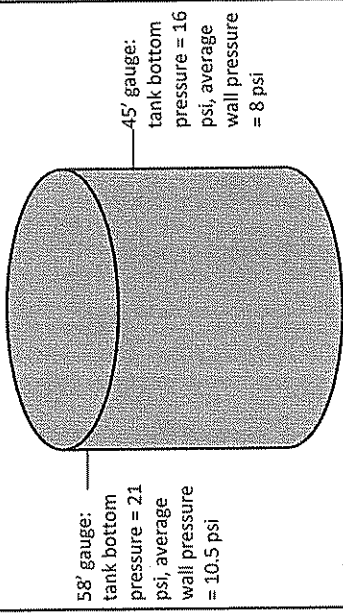
Total 9.0 21.0 15.0 6.0 5.0

- Nearly all of the economization of mandatory Capex is explained by eliminating Tank 107 for \$15mn and Tank 526 for \$7.5mn (see earlier pages for explanation) and reducing capital spend on Tanks 101, 105, and 106 from \$15 million to \$9 million each by reducing optional features. Tank 106 has been substituted for 101 in the updated schedule.
- We will maintain all mandatory safety requirements for the tanks.



SILVERRANGE
FINANCIAL PARTNERS

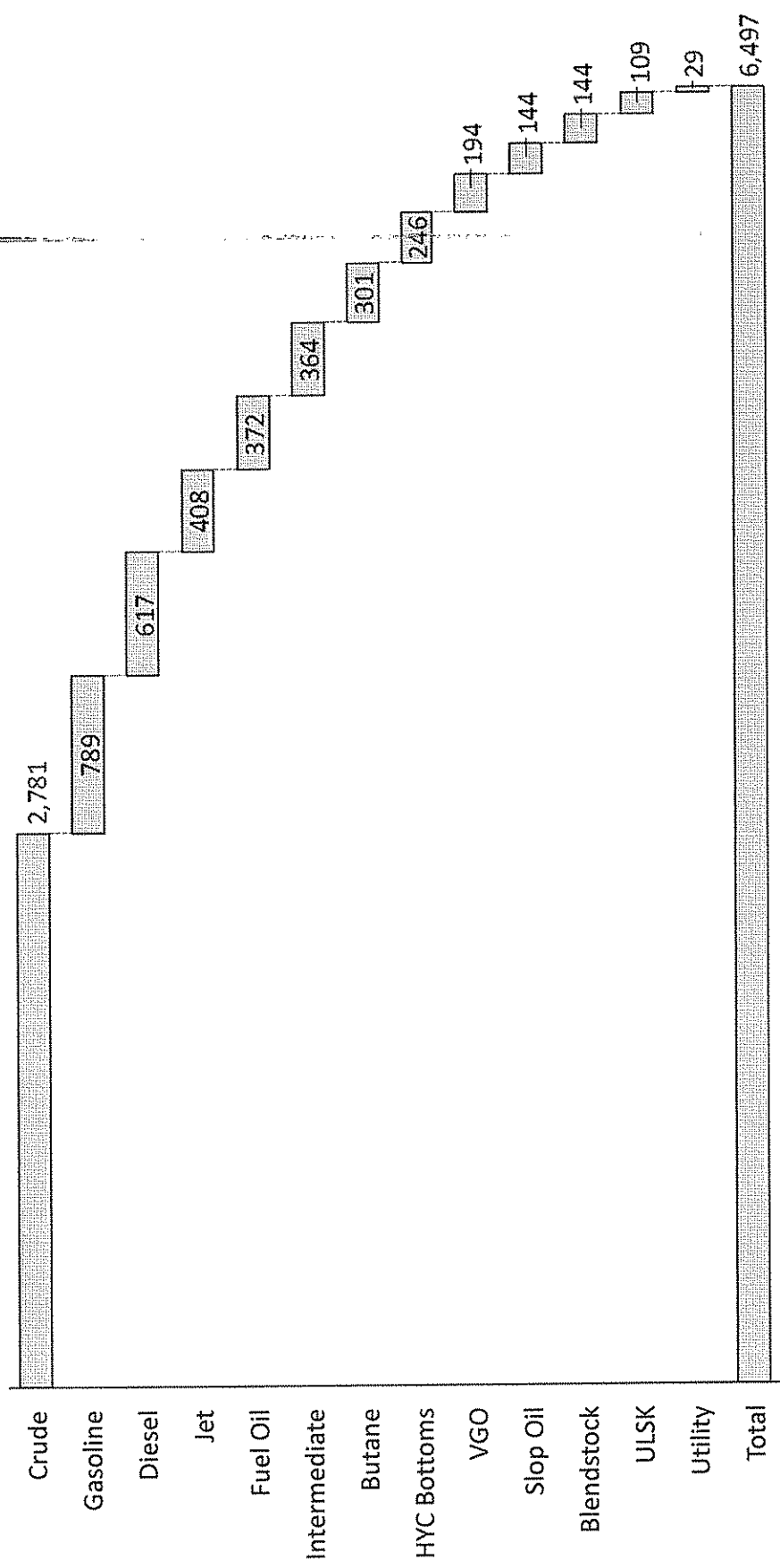
SilverRange will voluntarily reduce operating stresses for inspection-delayed crude oil tanks

Maximum Head Pressure will be Reduced	Pumping Rates will be Slowed	Tanks designated as primary and secondary
<ul style="list-style-type: none"> Maximum safe gauge levels in tanks 101 and 105 will be reduced from 58' to 45' until API 653 certification has been completed  <p>58' gauge: tank bottom pressure = 21 psi, average wall pressure = 10.5 psi</p> <p>45' gauge: tank bottom pressure = 16 psi, average wall pressure = 8 psi</p> <ul style="list-style-type: none"> Benefits include: <ol style="list-style-type: none"> Reducing pressure stresses by ~30% Cutting emergency pump-out time in the event of a leak or rupture by 24% Reducing the head pressure of a potential leak (and hence its flow rate) 	<ul style="list-style-type: none"> In light of recurring floating roof buoyancy issues likely caused by mechanical failure (tank 104 in 2004 and tank 106 in 2014); SR will limit the maximum filling rates on tanks 101 and 105 to 50,000 barrels per hour instead of the current 100,000 barrels per hour Benefits include: <ol style="list-style-type: none"> Mitigating roof balance issues during tank fills Reducing turbulence which can damage internal structures within the storage tank 	<ul style="list-style-type: none"> CBC will cycle all of its crude oil working storage 13-15 times per year assuming that the refinery operates at full rates Instead of using all tanks equally, SR will concentrate nearly all oil movements through storage tanks which have already been API 653 certified; including Tanks 102, 103, and 104 (and 106 after its repair) Tanks 101 and 105 will be used as static storage tanks until they have been certified We have modeled that 96% of the time, SR's operating plan will utilize only the primary crude oil tanks – safety stocks will be held in 101 and 105 Benefits include: <ol style="list-style-type: none"> Reducing utilization of tanks 101 and 105 will limit the chances of a mechanical failure Tanks will be used as static storage to hold refinery's safety stock, minimizing tanks flows while keep hydrostatic pressure steady

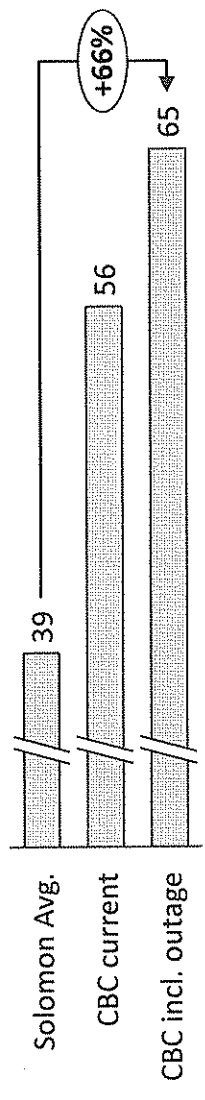
Appendix -- CBC Tank Storage Metrics & Tank Listing

CBC has ~50% more storage than the benchmark North American refinery

CBC Shell Capacity (does not include out-of-service tanks) in kb



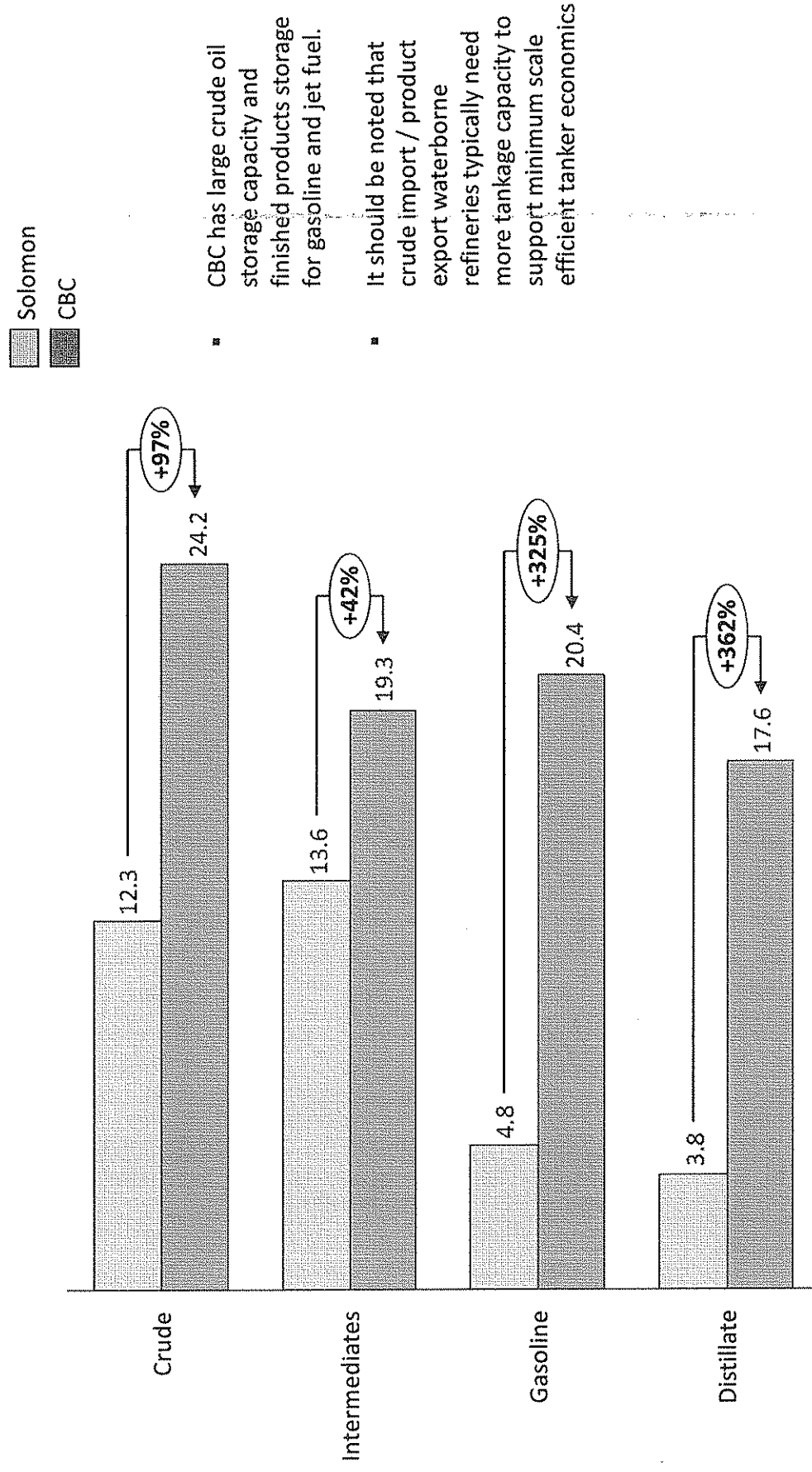
CBC Shell Capacity in days of storage



▪ CBC has considerably more hydrocarbon tankage than most refineries of its size.

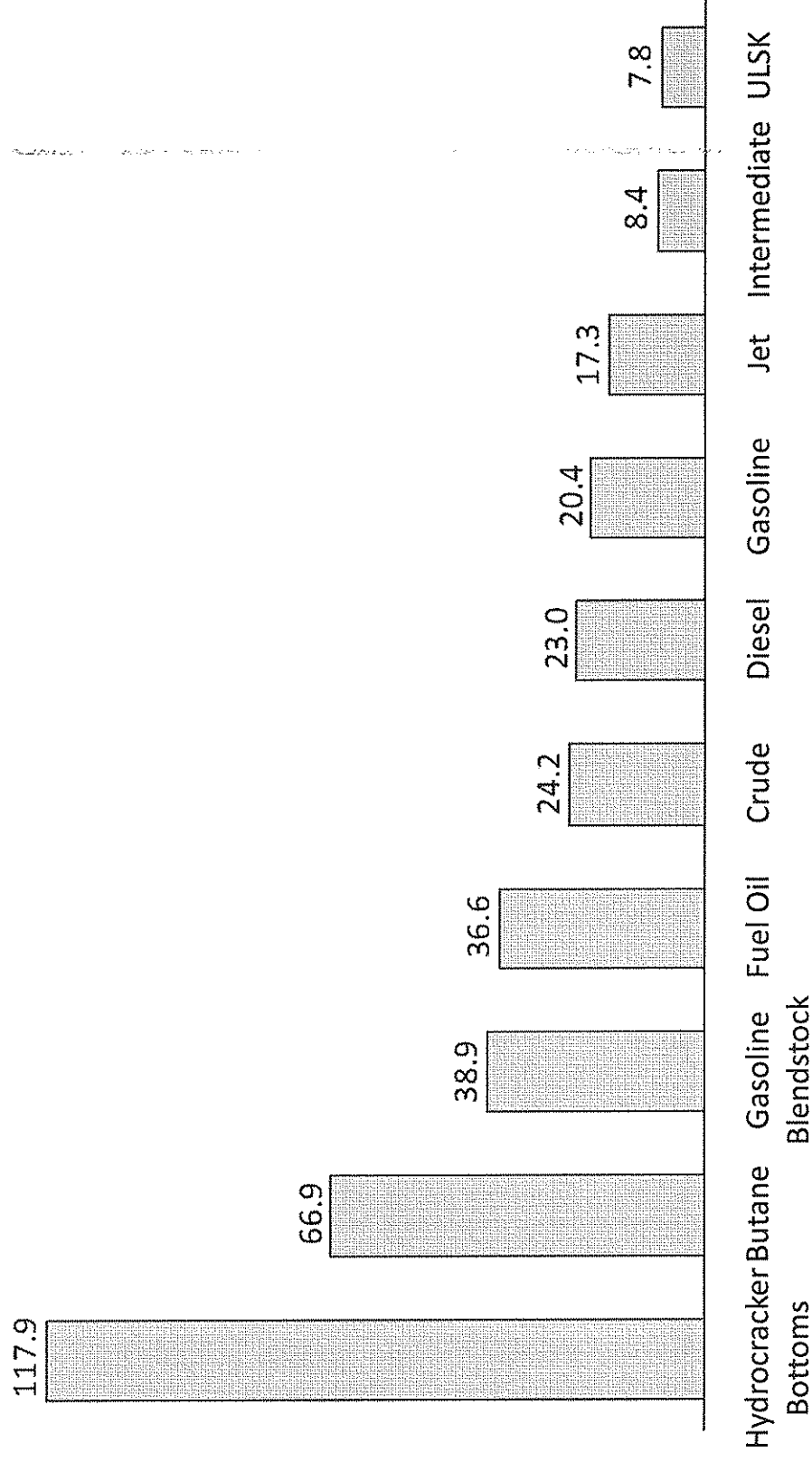
Appendix – CBC days capacity by tank contents

Shell Capacity Days of Storage @ 115,000 bpd WTI crude run rate



Appendix – CBC days capacity by tank contents

Shell Capacity Days of Storage @ 115,000 bpd WTI crude run rate



Appendix – CBC Tank List (1 of 2)

Tank #	Roof	Service	Reference Gauge	Diameter	Shell height	Overflow/ Max height	Safe gauge ^{1,2}		Max fill rate, BPH ^{1,2}		Max ^(C) Lowering Rate BPH	Low Gauge ^{1,2}		Temp.	Aprox. Bbls Per	
							Gauge ¹	BBLS	(A) see above	(B) see above		Gauge	BBLS		°F max.	Foot
101	Float	Crude	65'-2"3/4	260'	64'	61'-0"	58'-10"	556543	100,000	40,000	7,500	12'-6"	118246	100	9530	794
102	Float	Crude	65'-6"3/4	260'	63' 5"	61'-7"	58'-5"	552601	100,000	40,000	7,500	7'-6"	70947	100	9531	794
103	Float	Crude	65'-3"1/4	260'	64'	61'-0"	58'-0"	548860	75,000	40,000	7,500	12'-0"	113516	100	9469	789
104	Float	Crude	65'-1"1/2	260'	64'	61'-0"	58'-0"	548660	75,000	40,000	7,500	12'-0"	113516	100	9466	789
105	Float	Crude	65'-3"1/2	260'	64'	61'-0"	58'-10"	556543	100,000	40,000	7,500	12'-0"	113516	100	9534	795
106	Float	Crude	65'-0"3/8	260'	64'	61'-0"	58'-10"	556543	100,000	40,000	7,500	14'-0"	132435	100	9529	794
217	Float	HSR(U-14 feed)	60'-6"	120'	56'	53'-6"	52'-0"	104784	1,600	1,600	1,600	6'-0"	12090	100	2016	168
219	Fixed	Iso. Feed(VGO)	56'-8"1/2	160'	56'	56'-0"	54'-10"	196432	4,000	4,000	6,000	4'-0" *	14329	175	3588	299
245	Float	Sour water	51'-7" 3/4	70'	48'	43'-7"	42'-8"	29256	1,600	1,600	1,600	8'-0"	5485	120	685	57
246	Fixed	Sweet Naph.	48'-9"5/8	70'	48'	46'-7"1/2	45'-9"	31370	1,600	1,600	1,600	4'-0"	2743	100	685	57
342	Fixed	LS Road Dsl	51'-8"1/8	70'	47' 11"	46'-6"1/2	37'-0"	25370	360	250	2500	10'-0"	6857	110	684	57
343	Fixed	LSRN	48'-8"7/8	70'	48'	46'-7"1/2	45'-9"	31370	2,600	1,000	2,000	1'-0"	686	100	685	57
344	Fixed	Plat.	48'-2"3/8	70'	47' 5"	46'-0"1/2	45'-2"	30970	2,600	1,100	2,000	1'-0"	686	110	685	57
410	Fixed	Gasoline	56'-9 3/4"	120'	55' 11"	54'-6"1/2	53'-08"	108142	10,000	3,500	15,000	1'-0"	2015	100	2014	168
411	Fixed	Gasoline	56'-8"3/4	120'	56'	54'-7"1/2	53'-09"	108310	10,000	3,500	15,000	1'-0"	2015	100	2016	168
412	Fixed	Gasoline	56'-9"3/4	120'	55' 11"	54'-6"1/2	53'-08"	108142	10,000	3,500	15,000	1'-0"	2015	100	2012	168
413	Float	Gasoline	58'-8 3/8"	120'	56'	53'-6"	52'-6"	105791	10,000	3,500	15,000	5'-6"	11083	100	2016	168
414	Float	Gasoline	65'-8 3/4	120'	63' 3"	60'-7"	59'-7"	120065	10,000	3,500	15,000	5'-6"	11083	100	2014	168
415	Float	Gasoline	58'-4"1/2	120'	56'	53'-6"	52'-6"	105791	10,000	3,500	15,000	5'-6"	11083	100	2016	168
416	Float	Gasoline	66'-06"1/4	120'	64' 01"	61'-7"	60'-03"	121408	10,000	3,500	15,000	5'-10"	11755	100	2015	168
518	Fixed	Diesel/truck	56'-9"7/8	120'	55' 11"	54'-6"1/2	53'-08"	108142	12,000	3,500	13,000	2'-0"	4030	110	2016	168
520	Fixed	#2 Fuel Oil	56'-8"3/16	160'	56'	56'-0"	54'-10"	196432	12,000	8,000	15,000	1'-0"	3582	110	3584	299
521	Fixed	#2 Fuel Oil	56'-8"3/8	160'	56'	56'-0"	54'-10"	196432	12,000	8,000	15,000	1'-0"	3582	110	3585	299
522	Fixed	#2 Fuel Oil	56'-8"3/4	160'	56'	56'-0"	54'-10"	196432	12,000	8,000	15,000	1'-0"	3582	110	3584	299

Appendix – CBC Tank List (2 of 2)

Tank #	Roof	Service	Reference Gauge	Diameter	Shell height	Overflow/Max height	Safe gauge ^{1,2}		Max fill rate, BPH ^{1,2}		Max ^(C) Lowering Rate BPH	Low Gauge ^{1,2}		Temp. °F max.	Aprox. Bbls Per	
							Gauge ¹	BBLs	(A) see above	(B) see above		Gauge	BBLs		Foot	Inch
523	Fixed	Jet A1/truck	56'-10"1/4	120'	56'	54'-7"1/2	53'-09"	108310	12,000	3,500	15,000	4'-6" 3	9068	100	2016	168
524	Fixed	Jet A1/truck	56'-8"1/4	120'	56'	54'-7"1/2	53'-09"	108310	12,000	3,500	15,000	4'-6" 3	9068	100	2014	168
525	Fixed	LSFO/VGO	56'-7 3/8"	160'	55' 7"	55' 7"	54'-0"	193447	15,000	8,000	15,000	1'-0" *	3582	140 *	3583	299
526	Fixed	#6 Fuel Oil	56'-8"1/2	160'	56'	56'-0"	54'-0"	193447	15,000	8,000	15,000	1'-0" *	3582	140 *	3585	299
527	Fixed	Frac. Bottom	56'-9"	180'	56'	56'-0"	54'-0"	244832	12,500	8,000	10,000	1'-0" *	4534	150	4537	378
528	Fixed	VGO	56'-10"	180'	56'	56'-0"	54'-10"	248610	15,000	8,000	10,000	1'-0" *	4534	150	4538	378
629	Fixed	Truck bunker	48'-7"5/8	70'	48'	46'-7"1/2	45'-9"	31370	3,000	1,000	4,500	2'-0" *	1371	140 *	685	57
630	Fixed		48'-8"1/2	70'	48'	46'-7"1/2	Out of service							140 *	685	57
631	Fixed	Bunker	56'-1" 9/16	140'	55' 4"	53'-11" 1/2	53'-1"	145594	15,000	4,500	14,000	1'-0" *	2743	140 *	2756	230
632	Fixed	LSFO	56'-1"7/8	140'	55' 6"	54'-1"1/2	53'-3"	146051	15,000	4,500	14,000	1'-0" *	2743	150	2749	229
640	Fixed	RFO (diesel)	48'-10"1/2	86' 5"	48'	48'-0"	46'-0"	48164	4,000	4,000	2,500	4'-0"	4188	110	1044	87
641	Fixed	RFO	48'-9"	86' 5"	48'	48'-0"	46'-0"	48164	4,000	4,000	2,500	10'-0"	10470	140 *	1044	87
747	Float	Slop Oil	51'-6"	70'	48'	43'-7"	42'-8"	29256	2,500	800	2,500	8'-0"	5485	100	686	57
748	Float	Slop Oil	50'-9"	70'	46' 11 1/4"	42'-7"	41'-5"	28399	2,500	800	2,500	5'-6"	3771	120	685	57
850	Bullet	Butane		75' long	12'	12'-0"	9'-6"	1338	200	200		1'-0"	54	70		
851	Bullet	Butane		75' long	12'	12'-0"	9'-6"	1338	200	200		1'-0"	54	70		
852	Sphere	Propane		42' 3"	42'-3"	42'-3"	32'-0"	5990	175	175		3'-0"	101	70		
853	Bullet	Prop.+Butane		37' 4" long	10' 9"	10' 9"	80%	614	350	350		20%	100	70		
854	Bullet	Prop.+Butane		37' 4" long	10' 9"	10' 9"	80%	614	350	350		20%	100	70		
901	Fixed	Slop Oil	48'-7"3/4	116'	48'-0"	48'-0"	46'-0"	86617	2,500	800	2,500	6'-0"	11298	100	1883	157
949	Float	MTBE	57'-9"9/16	140'	55'-6"7/16	53'-6"	52'-6"	143994	10,000	4,000	15,000	5'-6"	15085	100	2749	229
11	Fixed	Tolad-3005	17'-01/2"	10'	16'	16'-0"	14'-0"	196				1'-0"	14	100	14	1.16

Schedule "J"
Certificate of Approval



GOVERNMENT OF
NEWFOUNDLAND AND LABRADOR
Department of Environment and Conservation

CERTIFICATE OF APPROVAL

Pursuant to the Environmental Protection Act, SNL 2002 c E-14.2 Section 83

Issue Date: **November 15, 2013**

Approval No. AA13-115583

Expiration: **December 31, 2016**

File No. 745.142.4

Proponent: **North Atlantic Refining Limited**
P.O. Box 40
1 Refinery Road,
Come By Chance, Newfoundland
A0B 1N0

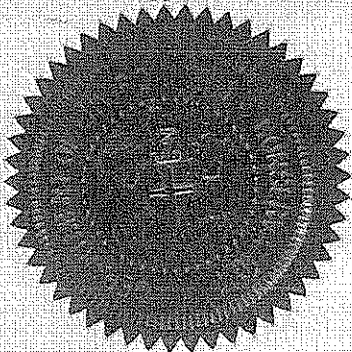
Attention: **Mr. KiYoung Kim, President and CEO**

Re: **Petroleum Refinery**

Approval is hereby given for the operation of North Atlantic Refining Limited's petroleum refinery near Come By Chance, Newfoundland and Labrador.

This Certificate of Approval does not release the proponent from the obligation to obtain appropriate approvals from other concerned provincial, federal and municipal agencies. Nothing in this Certificate of Approval negates any regulatory requirement placed on the proponent. Where there is a conflict between conditions in this Certificate of Approval and a regulation, the condition in the regulation shall take precedence. Approval from the Department of Environment and Conservation shall be obtained prior to any significant change in the design, construction, installation, or operation of the petroleum refinery, including any future expansion of the petroleum refinery. This Certificate of Approval shall not be sold, assigned, transferred, leased, mortgaged, sublet or otherwise alienated by the proponent without obtaining prior approval from the Minister.

This Certificate of Approval is subject to the terms and conditions as contained therein, as may be revised from time to time by the Department. Failure to comply with any of the terms and conditions may render this Certificate of Approval null and void, may require the proponent to cease all activities associated with this Certificate of Approval, may place the proponent and its agent(s) in violation of the *Environmental Protection Act*, and will make the proponent responsible for taking such remedial measures as may be prescribed by the Department. The Department reserves the right to add, delete or modify conditions to correct errors in the Certificate of Approval or to address significant environmental or health concerns.



Dexter Pittman
For MINISTER

TERMS AND CONDITIONS FOR APPROVAL No. AA13-115583

November 15, 2013

General

1. This Certificate of Approval is for the operation of a petroleum refinery located at Come By Chance, Newfoundland and Labrador, as per plans and specifications supplied by North Atlantic Refining Limited. Extensive future expansion or change of activities will require a separate Certificate of Approval.
2. Any inquires concerning this approval shall be directed to the St. John's office of the Pollution Prevention Division (telephone: (709) 729-2556; or facsimile: (709) 729-6969).
3. In this Certificate of Approval:
 - **accredited** means the formal recognition of the competence of a laboratory to carry out specific functions;
 - **acutely lethal** means that the effluent at 100% concentration kills more than 50% of the rainbow trout subjected to it during a 96-hour period, when tested in accordance with the ALT;
 - **air contaminant** means any discharge, release, or other propagation into the air and includes, but is not limited to, dust, fumes, mist, smoke, particulate matter, vapours, gases, odours, odorous substances, acids, soot, grime or any combination of them;
 - **ALT (acute lethality test)** means a test conducted as per Environment Canada's Environmental Protection Service reference method EPS/1/RM-13 Section 5 or 6;
 - **compliance agreement** means an agreement made between the Minister and the facility/industry as permitted by the *Environmental Protection Act* in accordance with section 105;
 - **CO** means carbon monoxide;
 - **CO₂** means carbon dioxide;
 - **composite sample** means a quantity of undiluted effluent collected continually at an equal rate or at a rate proportionate to flow over a designated sampling period;
 - **CSQG** means the Canadian Soil Quality Guidelines;
 - **Department** means the Department of Environment and Conservation and its successors;
 - **Director** means the Director of the Pollution Prevention Division of the

Department;

- **grab sample** means a quantity of undiluted sample collected at any given time. In this approval it refers to waste oil and effluent;
- **hazardous waste** means a product, substance or organism that is intended for disposal or recycling, including storage prior to disposal or recycling, and that:
 - (a) is listed in Schedule III of the *Export and Import of Hazardous Waste Regulations under the Canadian Environmental Protection Act, 1999*;
 - (b) is included in any of Classes 2 to 6, and 8 and 9 of the *Transportation of Dangerous Goods Regulations under the Transportation of Dangerous Goods Act, 1992*; or
 - (c) exhibits a hazard classification of a gas, a flammable liquid, an oxidizer, or a substance that is dangerously reactive, toxic, infectious, corrosive or environmentally hazardous.
- **licensed** means has a Certificate of Approval issued by the Minister to conduct an activity;
- **liquid waste** is defined by the *Slump Test* (Canadian Standards Association test method A23.2-5C for determining the slump of concrete). The liquid waste slump test involves placing the waste in a 30 cm open inverted cone. The cone is removed and the immediate decrease (slump) in height of the waste material is measured. If the material slumps such that the original height is reduced by 15 cm or more, the waste is considered liquid;
- **malfunction** means any sudden, infrequent and not reasonably preventable failure of air pollution control equipment, wastewater treatment equipment, process equipment, or a process to operate in a normal or usual manner. Failures caused in part by poor maintenance or careless operation are not malfunctions;
- **Minister** means the Minister of the Department;
- **NA** means North Atlantic Refining Limited;
- **NO_x** means oxides of nitrogen;
- **NO₂** means nitrogen dioxide;
- **O₂** means oxygen;
- **Plan** means the specific plan as identified in the section of this Approval within which it is used. For example, in the *Waste Management Plan* section it refers to the Waste Management Plan;
- **PM₁₀** means particulate matter with a diameter of 10 µm or less;
- **PM_{2.5}** means particulate matter with a diameter of 2.5 µm or less;
- **proficiency testing** means the use of inter-laboratory comparisons to determine the performance of individual laboratories for specific tests or

measurements;

- **QA/QC** means Quality Assurance/Quality Control;
- **rainbow trout test** means a test conducted as per Environment Canada's Environmental Protection Service reference method EPS/1/RM-13 Section 5 or 6;
- **register(ed)** in the context of storage tanks, means that information regarding the storage tank system has been submitted to a Service NL office and a registration number has been assigned to the storage tank system. In the context of dispersion modelling, registered means submitted to and approved by the Department in accordance with departmental policy and guidelines;
- **regulated substance** means a substance subject to discharge limit(s) under the *Environmental Control Water and Sewage Regulations, 2003*;
- **SO₂** means sulphur dioxide;
- **sour water** means water that has been used in the refining process for the removal of sulphur and ammonia compounds and reports to the Sour Water Stripper;
- **spill or spillage** means a loss of gasoline or associated product in excess of 70 litres from a storage tank system, pipeline, tank vessel or vehicle, or an uncontrolled release of any volume of a regulated substance onto or into soil or a body of water;
- **stack** means a chimney, flue, conduit or duct arranged to conduct an air contaminant into the environment;
- **storage tank system** means a tank and all vent, fill and withdrawal piping associated with it installed in a fixed location and includes a temporary arrangement;
- **SRU** means Sulphur Recovery Unit;
- **summer** refers to the period from *April 16* to *August 31*, of each year;
- **tail gas** means waste gases remaining after final stage of the Claus sulphur recovery process. Tail gas contains compounds of sulphur and may contains compounds of nitrogen;
- **TDS** means total dissolved solids;
- **TPH** means total petroleum hydrocarbons;
- **TSS** means total suspended solids;
- **used lubricating oil** means lubricating oil that as a result of its use, storage or handling, is altered so that it is no longer suitable for its intended purpose but is suitable for refining or other permitted uses;
- **used oil** means a used lubricating oil or waste oil;

- **VOCs** means volatile organic compounds;
 - **waste oil** means an oil that as a result of contamination by any means or by its use, is altered so that it is no longer suitable for its intended purpose; and
 - **winter** refers to the period from *September 1* to *April 15*, of each year.
4. All necessary measures shall be taken to ensure compliance with all applicable acts, regulations, policies and guidelines, including the following, or their successors:
- *Environmental Protection Act;*
 - *Water Resources Act;*
 - *Air Pollution Control Regulations, 2004;*
 - *Environmental Control Water and Sewage Regulations, 2003;*
 - *Halocarbon Regulations;*
 - *Storage and Handling of Gasoline and Associated Products Regulations, 2003;*
 - *Used Oil Control Regulations;*
 - *Heating Oil Storage Tank System Regulations, 2003;*
 - *Storage of PCB Waste Regulations, 2003;*
 - *Ambient Air Monitoring Guidance Document;*
 - *Sampling of Water and Wastewater - Industrial Effluent Applications Guidance Document;*
 - *Accredited Laboratory Policy;*
 - *Compliance Determination Guidance Document;*
 - *Stack Emission Testing Guidance Document;*
 - *Plume Dispersion Modelling Guidance Document;*
 - *Precipitation Drainage of Dyke Areas Guidance Document;* and
 - *Environmental Guidelines for Controlling Emissions of Volatile Organic Compounds from Above Ground Storage Tanks.*

This Approval provides terms and conditions to satisfy various requirements of the above listed acts, regulations, Departmental policies and guidelines. If it appears that all of the pertinent requirements of these acts, regulations, policies and guidelines are not being met, then a further review of the works shall be conducted, and suitable pollution control measures may be required by the Minister.

5. All reasonable efforts shall be taken to minimize the impact of the operation on the environment. Such efforts include minimizing the area disturbed by the operation, minimizing air or water pollution, finding alternative uses, acceptable to the Director, for waste or rejected materials, removing equipment or structures when they no longer have further use, and considering the requirement for the eventual rehabilitation of disturbed areas when planning the development of any area on the facility property.
6. NA shall provide to the Department, within a reasonable time, any information, records, reports or access to data requested or specified by the Department.
7. NA shall keep all records or other documents required by this Approval at the refinery for a period of not less than three (3) years, beginning the day they were made. These records shall be made available for review by officials of the Department or Service NL when requested.

8. Should NA wish to deviate in any way from the terms and conditions of this Certificate of Approval, a written request detailing the proposed deviation shall be made to the Minister. NA shall comply with the most current terms and conditions until the Minister has authorized otherwise. In the case of meeting a deadline requirement, the request shall be made at least 60 days ahead of the applicable date as specified in this Approval or elsewhere by the Department.
9. The refinery shall operate at a capacity that does not result in fuel consumption rates in excess of present maximum design fuel consumption. Any operation or increase in capacity beyond **120,000** barrels per stream day shall require prior notification to the Department.

Point Source Inventory

10. By **June 30, 2014**, NA shall submit, to the Director for review, a list of stationary point source emitters (i.e. BOILERS, PROCESS HEATERS, INCINERATORS, PROCESS VENTS, FLARES, etc.) in operation. Information to be included in the list shall be manufacturer, manufactured date, installation date, specifications of outlet stack, associated pollution control equipment, fuel burned, and any other information which NA considers appropriate.

SRU Emergency Downtime Plan

11. In the event of a malfunction or emergency shutdown of the SRU, NA shall immediately implement the appropriate procedure to reduce emissions, increase monitoring and provide frequent consultation.
12. In the first 36 hours following the outage of the SRU, the SO₂ emissions shall be reduced as quickly as possible and the total amount of SO₂ emitted shall not exceed 300 tonnes.
13. NA shall make all efforts to ensure prompt activation of the SRU. NA shall notify the local Community Councils, members of the Community Liaison Committee, and the Pollution Prevention Division by telephone, e-mail or facsimile, without delay, in the event of an emergency shutdown of the SRU.
14. NA shall assess the situation and provide a briefing to the parties listed above within twenty-four (24) hours. This briefing shall include hourly readings at all air monitoring stations.
15. NA shall assess the situation daily and provide a briefing to the parties listed above if there is any significant change.
16. During the next eight and one half twenty-four (24) hour period (hours 37 through 240 following the outage of the SRU), the total amount of SO₂ emitted shall not exceed 130 tonnes per twenty-four (24) hours during summer conditions or 160 tonnes during the remainder of the year. NA shall monitor ambient SO₂ concentrations in the nearby communities and in cases where the concentrations are within 20% of the standards, NA shall implement further actions to reduce concentrations and prevent the exceedances of these standards. NA shall provide a briefing to the parties listed above regarding these actions within twenty-four (24) hours of their implementation.

17. If the outage continues past the ninth (9th) twenty-four (24) hour period (greater than 216 hours following the outage of the SRU), NA shall provide a detailed assessment and schedule for completion, startup of the unit or any further action that is planned.
18. If the outage is likely to continue into the eleventh (11th) 24-hour period (greater than 264 hours following the outage of the SRU), NA shall request an extension to the emergency shutdown schedule, outlining the justification for requiring the extension and an estimate of extra time required to bring the SRU online.
19. NA shall notify and submit a plan to the Department in an event when the SRU unit fails to start or fails to operate at its optimum/maximum efficiency due to unforeseen failure or breakdown after the repairs. This plan shall include at a minimum; the time required to fix the problem, further actions to be taken to minimize the environmental impact and summary of all exceedances of the maximum allowable daily SO₂ emissions.
20. NA shall submit the annual summary of SRU downtime report to the Director as per the **Reporting** section.

SRU Operation

21. All tail gas from the SRU shall be incinerated in the sulphur incinerator (H-2104) or diverted to the flare when the sulphur incinerator is not in operation or down for maintenance, except in start-up and emergencies.
22. During normal operation all off-gas discharges from the sour water stripper shall report to the SRU, except for a minimum volume to flare required to maintain stable operations.
23. Vent gas from the sulphur storage pits shall report to the sulphur incinerator at all times.
24. Sulphur incinerator flue gas temperature shall be maintained at a minimum of 538°C as a 15-minute average when the incinerator is on-line and fully operational.
25. NA shall continuously monitor and record the temperature of the flue gas from the SRU tail gas incinerator.
26. All reasonable efforts shall be made to operate the SRU at its maximum efficiency. The SRU efficiency shall be assessed on an annual basis with notification given to the Department prior to commencement of the assessment. The report shall be submitted to the Department within 30 days of being issued to NA.

Sulphur Storage and Handling

27. All elemental sulphur recovered from the SRU shall be converted to prill, unless otherwise approved in writing by the Department.
28. Elemental sulphur shall not be disposed of in any landfill, unless otherwise approved in writing by the Department.

Sour Water Storage and Handling

29. All sour water (process wastewater) streams shall be routed or reported to the sour water stripper for treatment prior to transfer to the wastewater treatment facility. The stream shall then be treated at the wastewater treatment facility to meet the existing water quality criteria before being discharged from the facility.
30. All sour water (process wastewater) shall be handled, stored, and transferred in a closed system.
31. Air stripping of sour water resulting in the discharge of hydrogen sulphide to the atmosphere is not permitted.

Spent Caustic

32. NA shall store all their spent caustic in a close storage tank(s) and are permitted to treat through the wastewater treatment plant provided that the spent caustic discharge rate and composition does not generate odour concerns or issues.
33. All of the generated spent caustic which cannot be treated in the refinery shall be shipped off-site in a closed system for treatment or disposal.

Storage Tanks

34. All new and existing storage tanks shall comply with the conditions specified in the CCME guidelines "*Environmental Guidelines for Controlling Emissions of Volatile Organic Compounds from Aboveground Storage Tanks, PN 1180*" or its successor.
35. NA shall implement the API-653, "Tank Inspection, Repair, Alteration and Reconstruction" in accordance with common industry practice.
36. An inventory of all petroleum storage tanks shall be submitted to the Director for review by **June 30, 2014**. This inventory shall include a plan showing location, registration number (where applicable), identification number, material stored, capacity, annual throughput, tank material, tank type, tank diameter, tank height, tank colour, roof type, year of manufacture, date of installation, date of last inspection, failure history, maintenance history, dyke capacity and date of next planned inspection. Every two (2) years, an update of any significant changes to the inventory shall be submitted to the Director.

Product Loading

37. The tank truck loading facility shall use submerged or bottom loading for gasoline and middle distillates.
38. The tank truck loading facility shall comply with CCME guidelines "*Environmental Code of Practice for Vapour Recovery in Gasoline Distribution Networks, PN 1057*" or its successor.
39. As described in the *Code of Practice (PN 1057)* the tank truck loading facility shall have a vapour recovery system or vapour destruction system, and at a minimum once

in every 12 months:

- (a) conduct tests as specified in the “*Vapour Control Systems in Gasoline Distribution Network*” (CAN/CGSB-3.1000 Standard) to ensure that the vapour recovery unit or vapour destruction unit emissions do not exceed the level as specified in the CAN/CGSB-3.1000 Standard, and
 - (b) test the vapour control system as per test(s) specified in the CAN/CGSB-3.1000 Standard for leaks.
40. All records and compliance determination as per sections 3.4 & 3.5 of the CCME guidelines “*Environmental Code of Practice for Vapour Recovery in Gasoline Distribution Networks, PN 1057*” or its successor for the tank truck loading terminal shall be submitted annually to the Director by **Feb 28** of each subsequent year, as per **Reporting** section.

Waste Management

41. All waste generated at the facility is subject to compliance with the ***Environmental Protection Act***. All non-industrial waste shall be placed in closed containers and, on at least a weekly basis, removed from the site. If required, industrial waste shall be disposed of by a licenced operator. These wastes shall be disposed of at an authorized waste disposal site with the permission of the owner/operator of the site.
42. NA shall ensure that all volatile chemical and solvent wastes, if they can not be reused, are placed in suitable covered containers for disposal in a manner acceptable to the Department. Disposal of liquid wastes at waste disposal sites in the province is not permitted.
43. The NA fire fighting training pad is designated as a temporary holding site for oil spill related debris. The fire fighting training pad shall not be used for such training until the oil spill related debris is removed by an approved waste management contractor.
44. Disposal of hazardous waste in a municipal or regional waste disposal site in this Province is prohibited. Transporters of hazardous waste shall have an approval issued by the Minister. Those generating hazardous waste shall have a waste generators number issued by the Director and shall also complete the required information outlined in the Waste Manifest Form.

Waste Management Plan

45. NA shall submit an updated Waste Management Plan for the petroleum refinery. With the goal of minimizing adverse effects on the environment, the Plan shall: be comprehensive, including all operations within the refinery; identify the types of waste materials (i.e. boiler ash, sewage, empty chemical packaging, etc.); provide general direction in dealing with the handling, storage, transport, treatment and disposal of waste materials; and incorporate the basic waste management principles of reduce, reuse, recycle, recover and residual disposal. An outline of the Plan shall be submitted to the Director for review by **September 30, 2014**. The outline shall include a schedule of dates for preparation and implementation for each section of the Plan. The completed Plan shall then be submitted to the Director for review by **December 31, 2014**. Every year the Plan shall be reviewed and revised as necessary,

accounting for expanding or alteration of activities. All proposed revisions shall be submitted to the Director for review. The Department will acknowledge receipt of the Plan and/or revisions, and shall provide any review comments within a reasonable time frame.

Wastewater Treatment System

46. NA shall ensure that all components of the wastewater treatment system are operated and maintained in such a way that the emission of VOCs and odours is at a minimum.
47. NA shall maintain the impounding basin in such a way that emergency containment capacity of 900,000 barrels is available at all times to handle a tank failure.
48. NA shall make best efforts to prevent the discharge of petroleum products or other liquids to the impounding basin. Intentional discharges to the impounding basin must be approved by the Department.
49. The Department approves the practice of discharging wasted bacteriological culture from wastewater treatment plant to the impounding basin.
50. NA shall ensure that any free petroleum product or other liquid discharged or spilled to the impounding basin is recovered within a reasonable period of time. The reasonable period of time shall be determined by the Department based on the circumstances at the time of the discharge or spill.
51. Discharge of sludge to the impounding basin, twenty-four (24) hour basin, primary basin or final holding basin shall not be permitted, unless otherwise approved by the Department.
52. Malfunctions, unplanned shutdowns, emergency diversion or failure of any effluent treatment system equipment shall be reported to the Department as soon as possible, but not later than the end of the next working day. A summary of these shall be noted in the monthly report detailing the reason(s), duration of malfunction or diversion, volume and composition of material diverted and any corrective actions taken to remedy the problem.
53. NA shall ensure that all the wastewater after oil/water separation is sent to the equalization system prior to its introduction into the effluent treatment plant, or take such other actions as are necessary or effective to achieve equalization of wastewater.
54. No discharges bypassing the control works is authorized, unless prior approval has been obtained from the Department. In the event of an emergency, bypassing shall be only permitted to affect a safe and orderly shutdown of the related process.
55. The Department approves the use of the impounding basin for the purpose of equalization of wastewater, provided that this use does not contribute to odours and the 900,000 barrels of emergency storage capacity is maintained in the basin.
56. NA shall ensure that the sludge in the impounding basin is not a source of odour.
57. NA shall skim the oil from the impounding basin on a regular basis.

Pressure Safety Valve (PSV) & Flare System

- 58. All new pressure relief or pressure safety valve installations in gas services shall not discharge directly to the atmosphere. This requirement excludes repairs and replacements of existing pressure relief or pressure safety valves.
- 59. The John Zink smokeless emergency flare stack (M-6301) shall be operated in accordance with common industry practice at all times when the refinery is operating. Operation shall consider the elements of API 537 *"Flare Details for General Refinery and Petrochemical Service"*.
- 60. The Crude Unit Vacuum Tower ejector vent off-gas shall be combusted in the Vacuum Heater H-1102 or the flare. The Crude Unit Vacuum Tower ejector vent off-gas may discharge to atmosphere during start-up conditions only.
- 61. The off-gas from the Visbreaker Unit Vacuum Tower ejector vents shall be combusted in the Visbreaker Vacuum Heater H-1102 or the flare. The Visbreaker Unit Vacuum Tower ejector off-gas may discharge to atmosphere during start-up conditions only.

Fire Fighting Training Facility

- 62. To avoid any potential contamination of the area around the fire fighting training facility, a fully sealed liquid tight curb of minimum effective height of fifteen (15) centimetres shall be maintained around the perimeter of the concrete pad. The curb may be ramped to facilitate the safe entry and exit of personnel and equipment.
- 63. The curbing and pad shall be inspected and maintained on a regular basis to avoid problems associated with spalling, frost heave, cracking or any other damage that may result in leakage from the pad.
- 64. Liquid effluent from the fire fighting facility shall be drained to an oil/water separator and subsequently transferred to the effluent treatment plant. Pad drainage shall be facilitated by a fifteen (15) centimetre drain line to the oil/water separator. The drain line shall be valved with the valve maintained in the closed position when the facility is not in use.
- 65. A suitable absorbent shall be kept at the site during training exercises in sufficient quantities to mitigate any fuel spillage or over splash in the vicinity of the pad.
- 66. NA shall obtain prior approval from the Department for the use of fuels other than propane gas, diesel oil, kerosene, or gasoline.

Open Burning

- 67. Materials listed in Table 1 shall not be burnt in open fires.

Table 1 - Material Not Approved for Open Burning	
tires & plastics	manure & rubber
treated lumber	tar paper
asphalt and asphalt products	railway ties
drywall	paint and paint products
demolition waste	fuel and lubricant containers
hazardous waste	used oil
biomedical waste	animal cadavers
domestic waste	hazardous substances
trash, garbage, or other waste from commercial, industrial or municipal operations	materials disposed of as part of the removal or decontamination of equipment, buildings or other structures

Noise

68. Efforts shall be made to minimize and control noise resulting from the NA's operations and maintenance activities. All vehicles hauling materials within the facility shall have exhaust and muffling devices in good working order.

Dust Suppression

69. NA shall control dusting resulting from construction and operational activities at the site. Use of dust suppressants other than water or calcium chloride shall require approval of the Director. NA is encouraged to use best management practices when applying calcium chloride or any other approved dust suppressant.

Spill Prevention and Containment

70. Areas in which chemicals are used or stored shall have impermeable floors and dykes or curbs and shall not have a floor drain system, nor shall it discharge to the environment. Areas inside the dykes or curbs shall have an effective secondary containment capacity of at least **110%** of the chemical storage tank capacity, in the case of a single storage container. If there is more than one storage container, the dyked area shall be able to retain no less than **110% of the capacity of the largest container or 100 % of the capacity of the largest container plus 10% of the aggregate capacity of all additional containers, whichever is greater**. These dyked areas shall be kept clear of material that may compromise the capacity of the dyke system. Once a year, the dykes shall be visually inspected for their liquid containing integrity, and repairs shall be made when required. Once every ten years, the dykes shall be inspected, by a means other than visual inspection, for their liquid containing integrity, and repairs shall be made when required.
71. All on site petroleum storage tank systems shall be registered with Service NL. All aboveground storage tanks shall be clearly and visibly labelled with their GAP registration numbers.
72. Where applicable, all tanks and fuel delivery systems shall be inspected to appropriate American Petroleum Institute or Underwriters' Laboratories of Canada

standards, or any other standards acceptable to this Department. The required frequency of inspections may be changed at the discretion of the Director.

Contingency Plan

73. A Contingency Plan [Oil Pollution Emergency Plan (OPEP) and Hazardous Material Spill Response Plan (HAZMAT)] for the operation of the petroleum refinery shall be submitted to the Director for review by ***December 31, 2014***. The Plan shall clearly describe the actions to be taken in the event of a spill of a toxic or hazardous material. It shall include, as a minimum: notification and alerting procedures; duties and responsibilities of the “on-scene commander” and other involved staff; spill control and clean-up procedures; restoration of the spill site; information on disposal of contaminants; and resource inventory. Copies of the Plan shall be placed in convenient areas throughout the facility so that employees can easily refer to it when needed. NA shall ensure that all employees are aware of the Plan and understand the procedures and the reporting protocol to be followed in the event of an emergency. An annual response exercise is recommended for response personnel. Every year, as a minimum, the Plan shall be reviewed and revised as necessary. Any proposed significant revisions shall be submitted to the Director for review. Changes which are not considered significant include minor variations in equipment or personnel characteristics which do not effect implementation of the Plan.
74. Every time NA implements the Contingency Plan, information shall be recorded for future reference. This will assist in reviewing and updating the Plan. The record is to consist of all incidents with environmental implications, and include such details as: date; time of day; type of incident (i.e. liquid spill, gas leak, granular chemical spill, equipment malfunction, etc.); actions taken; problems encountered; and other relevant information that would aid in later review of the Plan performance. Each incident report shall be submitted to the Director as per the ***Reporting*** section.

Site Decommissioning and Restoration Plan

75. A revised Plan to restore areas disturbed by the operation shall be submitted to the Director for review by ***December 31, 2015***. For guidance on the preparation of the Plan, refer to Appendix A. Wherever possible, the Plan shall promote progressive reclamation of disturbed areas. NA shall proceed through a phased environmental site assessment process to closure.

Used Oil

76. Any used oil that cannot be recycled or processed at the refinery shall be retained in an approved tank or closed container, and disposed of by a company licensed for handling and disposal of used oil products.

Effluent Monitoring and Discharge

77. NA is only permitted to discharge refinery effluent into Placentia Bay via the wastewater treatment system discharge channel under the terms and conditions as outlined in this Approval. All piping transporting effluent shall be maintained in such a way that there is no leakage, spillage, seepage or other releases to the environment,

except at the point where effluent is normally discharged.

78. NA shall perform an Effluent Monitoring Program as per Table 2. All results shall be submitted to the Director as per the **Reporting** section.

Table 2: Effluent Monitoring Program	
Parameters	Frequency †
pH	Daily (24-hour composite)
Flow	Continuously
TSS	3 times per week (24-hour Composite)
Phenol	
Sulphide	
Ammonia	
TPH	Monthly Grab
Rainbow Trout (96-hour LT ₅₀ or LC ₅₀)	

79. With the exception of pH, determination of authorized deposits of constituents listed in Table 2 will be based on the NA reference crude rate and determined as per calculations stipulated in Schedule E of the **Environmental Control Water and Sewage Regulations, 2003**. pH shall be maintained between 5.5 and 9 pH units.
80. If a sample is determined to be acutely lethal, NA shall collect a grab sample once per week and perform a Rainbow Trout test. Samples shall be collected weekly, until it is determined that this effluent is not acutely lethal for 3 consecutive tests.
81. If effluent is determined to be acutely lethal for three consecutive ALTs, NA shall implement a toxicity identification evaluation (TIE) to identify the toxin, and from this develop measures to prevent or reduce the toxin. The report, written as a result of these identification activities, shall be submitted to the Director for review, **within 60 days** of the third consecutive failed acutely lethal test result. After review of the report, the Director may place additional requirements upon the proponent for treatment of effluent prior to discharge.
82. The oil/water separator at the tank truck loading terminal shall be checked routinely to ensure that it is working properly. A log of these checks shall be maintained. Samples shall be taken from the valve pit and analysed for TPH on a monthly basis.
83. All effluent from oil/water separator's valve pit at the tank truck loading terminal shall discharge to the wastewater treatment plant.

Water Chemistry Analysis

84. NA shall perform a Water Chemistry Analysis Program 4 times per year at least 30 days apart, as per Table 3. All results shall be submitted to the Director as per the **Reporting** section.

Table 3 - Water Chemistry Analysis Program					
Location	Parameters				
Outfall	General Parameters - must include the following:				
	nitrate + nitrite	colour	magnesium	reactive silica	TDS (calculated)
	nitrate	sodium	alkalinity	orthophosphate	phenolics
	nitrite	potassium	sulfate	phosphorous	carbonate (CaCO ₃)
	ammonia	calcium	chloride	DOC	hardness (CaCO ₃)
	pH	sulphide	turbidity	conductance	bicarbonate (CaCO ₃)
	TSS				
	Metals Scan - must include the following:				
	aluminum	boron	iron	nickel	tin
	antimony	cadmium	lead	selenium	titanium
	arsenic	chromium	manganese	silver	uranium
	barium	cobalt	molybdenum	strontium	vanadium
	beryllium	copper	mercury	thallium	zinc
	bismuth				

Marine Environmental Effects Monitoring

85. Each year NA shall conduct the Marine Environmental Effects Monitoring program to monitor the impacts of the discharge of effluent stream on Placentia Bay. The results of the completed study shall be submitted to the Director for review.

Terrestrial Effects Monitoring

86. NA shall continue the Terrestrial Effects Monitoring program (commenced in 1995) to identify any impacts from the refinery on the surrounding terrestrial environment, over and above any impacts which may have already occurred as of August 15, 1994. All work plans shall be approved by the Department.
87. The Terrestrial Effects Monitoring program shall be carried out every five years with the next report due by **December 31, 2018**.

Hazardous Waste Landfill

88. NA shall maintain the hazardous waste landfill in the manner as described in section 3 - *Waste Site Operations Manual* of the report entitled "*North Atlantic Refining Limited Filling and Closure of Waste Site Come By Chance, Newfoundland, June 1997, Project No. 84764*" as prepared by Jacques Whitford. NA shall submit any proposed revisions of the *Waste Site Operations Manual* to the Director for review.
89. NA shall maintain a security fence around the landfill, with a sign identifying the site as a hazardous waste landfill site. The sign shall identify the owner and the contact phone number. The sign and its placement shall be acceptable to the Department.
90. NA shall perform an annual physical inspection of the landfill as per section 3 - *Waste Site Operations Manual* using the assigned bench mark. The results of each inspection shall be submitted to the Director for review.

91. NA shall take corrective measures to repair any damage noted within a reasonable period of time. The reasonable period of time shall be determined by the Department based on the circumstances at the time of inspection report.
92. NA shall control the accumulation of leachate so that it does not overflow or challenge the integrity of the landfill liner.
93. NA shall perform a Groundwater and Leachate Monitoring Program as per Table 4.

Table 4 – Groundwater & Leachate Monitoring Program					
Location	Parameters				Frequency
MW # 3 MW # 6	Sodium	Magnesium Alkalinity	Calcium	Chloride Reactive	4 times per year at least 30 days apart
	Potassium	(CaCO ₃) Othro	Sulphate	silca (as SiO ₂)	
	Nitrate (N)	Phosphate (P) Nitrate +	Nitrite	Ammonia (N)	
	DOC	Nitrite (N) Color (TCU)	Turbidity	TDS (calculated)	
	pH	Specific Conductance	Anion sum	Cation sum	
	Ion balance	Hardness (CaCO ₃)	Aluminium	Antimony	
	Arsenic	Bicarbonate (CaCO ₃)	Barium	Beryllium	
	Bismuth	Carbonate (CaCO ₃)	Boron	Cadmium	
	Chromium	Langlier index @ 4C	Cobalt	Copper	
	Iron	Langlier index @ 20C	Lead	Manganese	
	Molybdenum	Saturation pH @ 4C	Nickel	Selenium	
	Silver	Saturation pH @ 20C	Strontium	Thallium	
	Titanium	C6 - C10 (gas range)	Tin	Uranium	
	Vanadium	>C10 - C21 (fuel range)	Zinc	Phenolics	
	Toluene	>C21-C32 (lube range)	o-Xylene	mp-Xylene	
	TEH	TPH (C6 - C32)	Benzene	VPH surrogate	
	surrogate	Ethylbenzene			
MW # 1 MW # 2 MW # 4 MW # 5	All of the above				Annually
Leachate	All of the above + Leachate Volume				4 times per year at least 30 days apart

94. All results from the Groundwater and Leachate Monitoring Program shall be submitted to the Director as per **Reporting** section.
95. NA shall perform corrective action(s) in consultation with the Department if the leachate flow rate is confirmed to be greater than 1 m³/day (36 ft³/day).

Ambient Air

96. NA shall operate an ambient air monitoring program as per the conditions in this Approval and its amendments. Approval shall be obtained from the Director prior to purchase or installation of any monitoring equipment.
97. Parameters to be monitored are outlined in Table 5.

Table 5 - Ambient Air Monitoring Program	
Monitoring Site & Number of Monitors	Parameter
East of Tricentia Academy in Arnold's Cove One (1) SO ₂ Analyzer One (1) Particulate Matter Monitor	SO ₂ PM _{2.5}
Town Hall in Come By Chance One (1) SO ₂ Analyzer One (1) Particulate Matter Monitor	SO ₂ PM _{2.5}
Sunnyside One (1) SO ₂ Analyzer One (1) Particulate Matter Monitor	SO ₂ PM _{2.5}
Refinery Fence Line One (1) SO ₂ Analyzer One (1) Particulate Matter Monitor	SO ₂ PM _{2.5}

98. Ambient air monitoring shall be done in accordance with the *Ambient Air Monitoring Guidance Document (GD-PPD-065)*, or its successors.
99. NA shall continuously monitor the ambient SO₂ levels at each of the three communities' to assess the ambient air quality at these communities. If the measured readings/levels are in excess of **450µg/m³** on an hourly average basis, NA shall immediately implement remedial actions to bring the levels down below **450µg/m³** on an hourly average basis.
100. All results from the Ambient Air Monitoring Program shall be submitted to the Director as per the *Reporting* section.
101. NA shall operate and maintain a meteorological station at the south of Inkster Pond in accordance with the guidelines specified in the United States EPA document "*Quality Assurance Handbook for Air Pollution Measurement Systems - Volume IV: Meteorological Measurements Version 2.0 (Final)*," EPA- 454/B-08-002, March 2008, or its successors. Parameters to be measured and recorded shall include: wind speed, wind direction, ambient air temperature, relative humidity, barometric pressure and precipitation. All results from this station shall be submitted in an acceptable digital format annually or as otherwise specified by the Department, as per the *Reporting* section.
102. NA shall submit the annual Leak Detection and Repair (LDAR) program report to the Department within 30 days of being issued to NA. The report shall be in compliance with Part 3, Performance Guidelines of the CCME "*Environmental Code of Practice for the Measurement and Control of Fugitive VOC Emissions from Equipment Leaks (CCME PN 1106)*".
103. The ambient air quality standards specified in Schedule A of the *Air Pollution Control Regulations, 2004* shall apply to all points outside of NA administrative boundary. The administrative boundary is defined as the area encompassed by the coordinates contained in Appendix 'B', a total area of approximately **1.252 km²**. All coordinates are referenced to NAD83 UTM Zone 22.

104. The Department reserves the right to add, delete or amend any term or condition of this Certificate of Approval as deemed necessary to meet the provisions of any new standards or emission requirements, including those adopted through the new Canadian Air Quality Management System.

Air Quality Complaints

105. NA shall maintain a record of all air quality complaints received from the municipalities or communities and Government agencies. The collected information shall be used to determine if there are specific meteorological or operating conditions or combinations thereof that result in an impact on the community. If significant relationships can be established, the information shall be used by the refinery to prevent or mitigate air quality problems during adverse conditions.

Pollution Control Equipment

106. All pollution control equipment shall be maintained and operated as per the manufacturer's specifications for best performance.

Stack Emissions Testing and Dispersion Modelling

107. NA shall perform the stack emission sampling program for the refinery heaters H1304 & H-1501, as well as for the sulphur incinerator stack.
108. NA shall conduct a study to determine the feasibility of installing stack emission sampling ports and access to all the remaining stacks. The study report shall be submitted to the Department by **June 30, 2016**.
109. NA shall use the stack testing results to estimate the stack emissions for the heaters and boilers that are not equipped with stack sampling ports. The data to be recorded and reported to the Department shall include: the concentration of SO₂, NO_x, CO, Percentages of O₂, CO₂, unburned hydrocarbons, stack gas temperature, combustion efficiency, estimated fuel firing rates and fuel quality information.
110. Stack emissions testing shall be done in accordance with the ***Stack Emission Testing Guidance Document (GD-PPD-016.1)***. Dispersion modelling shall be done in accordance with the ***Plume Dispersion Modelling Guidance Document (GD-PPD-019.2)***. Determination of frequency of stack emissions testing and dispersion modelling shall be done in accordance with the ***Compliance Determination Guidance Document (GD-PPD-009.4)***.
111. NA shall be required to complete stack emissions testing once every four years if it has been shown, via a registered dispersion model, that the operation is in compliance with section 3(2) and Schedule A of the ***Air Pollution Control Regulations, 2004***. If it has been shown, via a registered dispersion model, that the operation is not in compliance with section 3(2) and Schedule A of the ***Air Pollution Control Regulations, 2004***, then the facility shall complete stack emissions testing every two years.
112. Plume dispersion modelling results shall be submitted to the Department within ***120 days*** of completion of the stack emissions testing.

113. Any modification in the process area resulting in a reduction or increase in the number of stacks shall include the installation of the necessary ports and platforms to conduct the stack gas sampling.
114. NA shall conduct a feasibility study for the installation of flow meters on fuel oil reporting to each heater and boiler. This study shall be presented to the Department by **December 31, 2014**.

Analysis and QA/QC

115. Unless otherwise stated herein, all solids and liquids analysis performed pursuant to this Approval shall be done by either a contracted commercial laboratory or an in-house laboratory. Contracted commercial laboratories shall have a recognized form of accreditation. In-house laboratories have the option of either obtaining accreditation or submitting to an annual inspection by a representative of the Department, for which NA shall be billed for each laboratory inspection in accordance with Schedule 1 of the ***Accredited Laboratory Policy (PD-PP2001-01.02)***. Recommendations of the Director stemming from the annual inspections shall be addressed within 6 months; otherwise further analytical results shall not be accepted by the Director.
116. If NA wishes to perform in-house laboratory testing and submit to an annual inspection by the Department then a recognized form of proficiency testing recognition shall be obtained for compliance parameters for which this recognition exists. The compliance parameters are listed in the ***Effluent and Monitoring*** section. If using a commercial laboratory, NA shall contact that commercial laboratory to determine and to implement the sampling and transportation QA/QC requirements for those activities.
117. The exact location of each sampling point as referenced in Table 3, 4 and 5, shall remain consistent over the life of the monitoring programs, unless otherwise approved by the Director. A sketch or diagram clearly identifying each sampling location shall be submitted by **June 30, 2014** to the Director.
118. NA shall bear all expenses incurred in carrying out the environmental monitoring and analysis required under conditions of this Approval.

Monitoring Alteration

119. The Director has the authority to alter monitoring programs or require additional testing at any time when:
- pollutants might be released to the surrounding environment without being detected;
 - an adverse environmental effect may occur; or
 - it is no longer necessary to maintain the current frequency of sampling and/or the monitoring of parameters.
120. NA may, at any time, request that monitoring program or requirements of this Approval be altered by:
- requesting the change in writing to the Director; and

- providing sufficient justification, as determined by the Director.

The requirements of this Approval shall remain in effect until altered, in writing, by the Director.

Reporting

121. NA shall submit on a monthly basis a report for the previous calendar month. This report shall contain:

- Crude summary:
 - Amount processed (barrels);
 - Average percentage sulphur; and
 - Average API gravity.
- Products summary:
 - Amount produced (barrels);
 - Average percentage sulphur; and
 - Average API gravity.
- Fuel oil summary:
 - Consumption (barrels);
 - Sulphur content (%);
 - API gravity;
 - Viscosity (Cst); and
 - Estimated Daily boiler consumption (barrels).
- Refinery fuel gas summary:
 - Consumption (millions standard cubic feet/day); and
 - Estimated Daily boiler consumption (millions standard cubic feet/day).
- Detailed emissions of sulphur compounds and sulphur balance data obtained by sampling or calculation procedures approved by the Department, including:
 - Monthly total crude sulphur content (tonnes);
 - Monthly total product sulphur content (tonnes);
 - Daily total sulphur dioxide emissions (tonnes) from fuel oil combustion, SRU incinerator, and any other sources;
 - Daily total sulphur recovery from the SRU (tonnes); and
 - SRU downtime report (date, duration, nature or problem, corrective actions taken and estimated sulphur dioxide emission associated with each downtime period);
- Summary of results from the ambient air monitoring program, including:
 - Hourly and daily sulphur dioxide concentrations from each designated site;
 - Daily PM_{2.5} concentrations from each site, and
 - In the event that the emitted contaminant standards as specified in Schedule 'A' of the *Air Pollution Control Regulations, 2004* are exceeded at any time during the reporting period, the monthly report shall specifically note the date, time and location of the violation and provide a brief explanation of the reason for, or contributing causes to the violation. Any periods of missing or questionable air monitoring results during the reporting period shall be specifically noted and brief explanation provided as to why the results are unavailable or questionable.

122. NA shall submit by **June 30** of each year a report for the previous calendar year. This report shall contain:

- Annual summary of SRU downtime:
 - Date(s);
 - Duration;
 - Nature of problem;
 - Corrective actions taken; and
 - Estimated sulphur dioxide emission associated with each downtime period.
- Condition of all storage tanks;
- Estimate (by calculation) of the discharge of CO₂ (tonnes) from operation of the hydrogen plant;
- Electronic record of data collected for the previous calendar year from the meteorological station south of Inkster Pond, including the semi annual calibrations of the meteorological station;
- Sufficient data to enable the estimation of annual emissions of SO_x, PM_{total}, PM₁₀, PM_{2.5}, VOCs, NO_x, CO, benzene; and
- All records under parts 3, 4, 5, & 6 of the CCME guidelines "*Environmental Code of Practice of Vapour Recovery in gasoline Distribution Networks (PN 1057)*".

123. Monthly reports containing the environmental compliance monitoring and sampling information required in this Approval shall be received by the Director, in digital format (e-mail or CD), within 30 calendar days of the reporting month. All related laboratory reports shall be submitted with the monthly report, in spreadsheet format (Microsoft Excel or a format easily transferable to Excel), and either Adobe Portable Document Format (PDF) or hardcopy format. Digital report submissions, if e-mailed, shall be sent to the following address: <<statenv@gov.nl.ca>>

124. All incidents of:

- *Contingency Plan* implementation; or
- non-conformance of any condition within this approval; or
- spillage or leakage of a regulated substance; or
- whenever discharge criteria is, or is suspected to be, exceeded; or
- whenever atmospheric emissions rates are greater than those specified in this Approval, or emissions of other unspecified air pollutants occur as a result of abnormal or upset operating conditions; or
- verbal/written complaints of an environmental nature from the public received by NA related to the refinery, whether or not they are received anonymously;

shall be immediately reported, within one working day, to a person or message manager or facsimile machine as follows:

- contact this Department (St. John's office) by phoning (709) 729-2556, or faxing (709) 729-6969.

A written report including a detailed description of the incident, summary of contributing factors, and an Action Plan to prevent future incidents of a similar nature, shall be submitted to the Director. The Action Plan shall include a description of actions already taken and future actions to be implemented, and shall be submitted within thirty days of the date of the initial incident. The address for written report submission is:

Director, Pollution Prevention Division
Department of Environment and Conservation
P.O. Box 8700
St. John's, NL
A1B 4J6
Telephone: (709) 729-2556
Facsimile: (709) 729-6969

125. Any spillage or leakage of gasoline or associated product shall be reported immediately through the Canadian Coast Guard at 1-(709)-772-2083.
126. The Department shall be advised prior to or as soon as possible with regard to malfunctions, unplanned or emergency shutdowns or start-ups of the process units, sulphur recovery plant, air pollution control equipment or effluent treatment equipment.
127. The Department shall be provided with at least two weeks advance notice of scheduled shutdowns of any process unit, air pollution control equipment or effluent treatment equipment.
128. NA shall notify the members of the Community Liaison Committee, by telephone, facsimile, or e-mail of the conditions at the refinery that may be reasonably expected to lead to air quality complaints. Whenever possible these notifications should be in advance of the incident, but failing that, as soon as possible after the incident. Situations requiring notification may include, but not be limited to, sulphur plant malfunctions, processing unit upsets, emergency venting and emergency flaring episodes, as well as major spills, leaks and discharges.
129. In addition to the reporting specified in this Approval, NA shall, upon the request of the Director, and within such time as may be specified, provide this Department with such reports, drawings, specifications, analytical data, flow rate measurements, shift logs, laboratory logs, maintenance records and other such information as may from time to time be requested.
130. The Department reserves the right, at its discretion, to make available to the general public any final reports in its possession pertaining to environmental matters at the refinery. This includes, but is not limited to, air quality reports, effluent reports, groundwater monitoring reports, leachate quality reports, terrestrial effects monitoring reports, chemical and petroleum spill reports, stack sampling reports and dispersion modelling reports. Information of a proprietary or commercially sensitive nature shall not be disclosed without written approval of NA.

Liaison Committee

131. The Department recognizes the benefits of accurate, unbiased communication between the public and the refinery operations which may have an impact on the properties and residents in the area. The Department encourages that NA continue the regular Community Liaison Committee (CLC) meetings, as per the terms and conditions outlined in the CLC Constitution. Regular meetings of the Liaison Committee will provide a clear conduit of communication between concerned citizens and refinery. The Director reserves the right to require the continuation of the Liaison Committee should it be deemed necessary.

132. NA shall provide information relating to environmental matters and any other matter of general interest or concern through the liaison committee to the CLC members. NA with the assistance of the liaison committee shall identify further opportunities to improve communication with the CLC members. NA shall assume all reasonable costs associated with the operation of the liaison committee.

Compliance and Progress Review

133. Representatives of NA, the Department of Environment and Conservation, and the Department of Health and Community Services shall meet quarterly to review progress on work items and compliance with conditions of this Certificate of Approval.

Expiration

134. This Certificate of Approval expires *December 31, 2016*.
135. Should the proponent wish to continue to operate refinery beyond this expiry date, a written request shall be submitted to the Director for the renewal of this approval. Such request shall be made prior to *June 30, 2016*.

APPENDIX A

Industrial Site Decommissioning and Restoration Plan Guidelines

As part of the Department of Environment and Conservation's ongoing commitment to minimize the residual impact of industrial activities on the environment of the province, the Department requires that NA develop a Decommissioning and Restoration Plan for the NA Refinery at Come By Chance and its associated property. The guidelines listed below are intended to provide some general guidance as to the expectations of the Department with regard to the development of the Plan, and to identify areas that are of particular concern or interest. The points presented are for consideration, and are open to interpretation and discussion.

Decommissioning and Restoration Plans are intended to present the scope of activities that a company shall undertake at the time of final closure and/or decommissioning of the industrial properties. Where it is useful and practical to do so the company is encouraged to begin undertaking some of the activities outlined in the Plan prior to final closure and decommissioning. The objectives of the restoration work to be undertaken can be summarized as follows:

- to ensure that abandoned industrial facilities do not endanger public health or safety;
- to prevent progressive degradation and to enhance the natural recovery of areas affected by industrial activities;
- to ensure that industrial facilities and associated wastes are abandoned in a manner that will minimize the requirement for long term maintenance and monitoring;
- to mitigate, and if possible prevent, the continued loadings of contaminants and wastes to the environment. The primary objective shall be to prevent the release of contaminants into the environment. Where prevention is not practical due to technical or economic limitations then activities intended to mitigate the consequence of such a release of contaminants shall become the objective of restoration work;
- to return affected areas to a state compatible with the original undisturbed condition, giving due consideration to practical factors including economics, aesthetics, future productivity and future use; and
- to plan new facilities so as to facilitate eventual rehabilitation.

The Decommissioning and Restoration Plan should:

- identify areas of known historical or current contamination;
- identify past or existing operational procedures and waste management practices that have, or may have, resulted in site contamination;
- highlight the issues or components to be addressed;
- identify operational procedures and waste management practices that can prevent or reduce site contamination;
- consider future land use, regulatory concerns and public concerns;

- enable estimation of the resources and time frame required to decommission the facility and restore the site to a condition acceptable to the Department;
- enable financial planning to ensure the necessary funds for decommissioning and restoration are set aside during the operational life of the facility, and
- include arrangements for appropriate project management to ensure successful completion of the decommissioning and restoration program.

APPENDIX B

North Atlantic Refinery Administrative Boundary Coordinates

275227.2	5297399.3	276111.6	5297688.2
275253.2	5297440.4	276108.3	5297609.2
275264.0	5297560.9	276092.6	5297514.1
275297.1	5297656.8	276064.0	5297465.7
275281.2	5297754.5	275984.2	5297408.8
275290.5	5297817.9	275573.4	5297447.3
275331.4	5297920.3	275570.5	5297420.8
275351.2	5298053.3	275446.7	5297359.6
275329.8	5298155.7	275256.5	5297369.4
275230.5	5298313.2	275227.2	5297399.3
274890.3	5298732.5		
274967.9	5298928.5		
275086.7	5298988.9		
275083.5	5299034.1		
275082.8	5299102.6		
275094.7	5299145.8		
275328.2	5299139.3		
275409.1	5299029.8		
275425.3	5298978.3		
275436.7	5298911.8		
275442.5	5298845.6		
275446.6	5298797.1		
275445.2	5298781.0		
275463.6	5298779.5		
275465.1	5298768.1		
275472.6	5298712.6		
275499.9	5298661.8		
275531.2	5298615.9		
275570.6	5298573.9		
275615.7	5298539.5		
275665.7	5298514.3		
275696.3	5298502.6		
275725.8	5298500.7		
275802.3	5298478.2		
275814.3	5298474.5		
275833.2	5298463.4		
275898.2	5298442.9		
275952.4	5298425.5		
276009.7	5298407.8		
276077.3	5298387.2		
276253.3	5298336.0		
276381.1	5298265.0		
276468.5	5298186.4		
276576.8	5298059.8		
276066.8	5298080.3		
276053.2	5298002.6		
276030.1	5297966.3		
276025.0	5297815.0		
276075.9	5297779.7		

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