Appendix A
Approvals and Authorizations

National Energy Board | Office national de l'énergie

MAIL ROOM
SALLE DE COURIER
14 DEC 17 P 3:07
NEB/ONE

OPERATIONS AUTHORIZATION

APPLICATION

IMPERIAL OIL RESOURCES N.W.T. LIMITED

(Name of Operator)

Hereby applies for authorization of a proposed:

☐ Drilling Program ☒ Production Program ☐ Installation/Removal Program ☐ Other
Please Specify:

under paragraph 5(1)(b) of the *Canada Oil and Gas Operations Act (R.S.C., 1985, c. O-7) and* Part 2 of the *Canada Oil and Gas Drilling and Production Regulations* (SOR/2009-0315) using equipment and procedures described in the application .

Changes in equipment or procedures, outside the scope of this application, require the approval of the Board in order that this authorization remains valid. An approved copy of this notice is to be posted at each work site and is subject to the terms and conditions attached to this authorization.

Licence No. Other - Norman Wells Proven Area NEB Operating Licence No. 1210

Region NWT Mainland

Field Norman Wells

Anticipated date of commencement January 2015 Proposed Duration 120 months

Scope of Work as per Operations Authorization application dated July 31, 2014

"I certify that the information provided on this form is true and correct"

Name Zaidah Ibrahim Telephone (403) 237-4029 Ext

Job Designation Production Manager E-Mail zaidah.ibrahim@exxonmobil.com

Signature Zaidah Ibrahim Date December 17, 2014

Responsible Officer of Company

NATIONAL ENERGY BOARD AUTHORIZATION

(Board Use Only)

The operator named above is hereby authorized under paragraph 5(1)(b) of the *Canada Oil and Gas Operations Act (R.S.C., 1985, c. O-7)* and is subject to the terms and conditions attached to this authorization.

Job Designation Chief Conservation Officer

Signature *NEB Authority* Date 19 December, 2014

Operation Authorization (OA) No. OA-1210-001 Expiry Date 31 December 2019 S.K.

Canada

National Energy Board

Office national de l'énergie

File OF-EP-OA-I047-1210 0101
19 December 2014

Jennifer L. Watson
Norman Wells Operations Superintendent
Imperial Oil Resources N.W.T. Limited
1001 Canol Drive
Bag 5000
Norman Wells, NT X0E 0V0

Dear Ms. Watson:

Imperial Oil Resources N.W.T. Limited (Imperial) Operations Authorization Application dated 31 July 2014 for the Norman Wells Field

The National Energy Board (NEB) has considered the Imperial Norman Wells Field Operations Authorization application dated 31 July 2014. Imperial is hereby granted Operations Authorization OA-1210-001 for a ten year term ending on 31 December 2024 subject to the attached terms and conditions.

In addition, the flow system, the flow calculation procedure and the flow allocation procedure for the Imperial Norman Wells operations, as outlined in Section 11 of the Operations Authorization application, are hereby approved in accordance with subsection 7(2) of the *Canada Oil and Gas Drilling and Production Regulations*.

Note that all future well approvals, applications, notifications and reports relating to the Operations Authorization for Norman Wells are to be submitted by Imperial Oil Resources N.W.T. Limited.

If you have questions please contact Gary Woo, Technical Coordinator, by telephone at 403-299-3143.

Yours truly,

Jamie Kereliuk
Chief Conservation Officer

Attachments

cc: Geoff Pearse, SSHE Manager, Imperial
Helga Shield, Senior Environmental and Regulatory Advisor, Imperial

517 Tenth Avenue SW
Calgary, Alberta T2R 0A8

517, Dixième Avenue S.-O.
Calgary (Alberta) T2R 0A8

Canada

Telephone/Téléphone : 403-292-4800
Facsimile/Télécopieur : 403-292-5503
www.neb-one.gc.ca
Telephone/Téléphone : 1-800-899-1265
Facsimile/Télécopieur : 1-877-288-8803

Operations Authorization OA-1210-001
File OF-EP-OA-I047-1210 0101
Terms and Conditions

General

1. Imperial shall implement or cause to be implemented all of the commitments, policies, practices, mitigative measures, recommendations and procedures for safety and/or the protection of the environment referred to in its application and subsequent filings.

Plans

2. Imperial shall submit any changes made to the safety plan, the environmental protection plan (EPP) or contingency plans to the Chief Conservation Officer, and, for the EPP, identify any modifications or deviations to the EPP that relate to commitments made to, or conditions imposed by the Sahtu Land and Water Board Water Licence.

Operations

3. Imperial shall submit an application for any deviation from the authorized work or activities for approval by the Chief Conservation Officer no less than fifteen (15) working days prior to the commencement of the work or activity. The application shall include a description and the objectives of the proposed work and the anticipated impacts.

4. Imperial shall submit an application to abandon any facility or flowline for approval by the Chief Conservation Officer no less than fifteen (15) working days prior to the commencement of the work or activity. The application shall include a description of the facility or flowline to be abandoned and a plot plan.

5. Imperial shall notify the Chief Conservation Officer no less than fifteen (15) working days prior to commencement of any major, non-routine operations and maintenance project work or modifications to flowlines, production storage tanks, the central processing facility or its systems, or work related to remediation (but not work requiring a Well Approval). Imperial shall send the notification by email to the COGOA.notifications@neb-one.gc.ca email address. The notification shall include a description of the proposed work and confirmation that it is within the scope of OA-1210-001 and confirmation that all appropriate safety and environmental protection measures will be applied.

6. Imperial shall notify the Chief Conservation Officer no less than thirty (30) working days prior to commencement of any table-top, functional or full-scale emergency response exercises. Imperial shall send the notification by email to the COGOA.notifications@neb-one.gc.ca email address. The notification shall include a

description of the scope and objectives of the proposed exercise, anticipated dates and exercise locations, and participants to be invited.

7. Imperial shall submit for approval by the Chief Conservation Officer no less than fifteen (15) working days prior to any modifications to the flow system, the flow calculation procedure and the flow allocation procedure (production metering, grouping or proration procedures). The submission shall include the scope and objectives of the proposed changes and anticipated impacts.

Reporting

8. The annual safety, environmental and production reports to be submitted pursuant to *Canada Oil and Gas Drilling and Production Regulations* (COGDPR) sections 85- 87 shall include a confirmation by an officer of the company that the authorized work and activities were completed in compliance with all applicable conditions in OA-1210-00. If compliance with any of these conditions cannot be confirmed, the officer of the company shall provide details as to why compliance cannot be confirmed.

9. Imperial shall submit an Annual "Flowline Integrity and Mackenzie River Breakup" Report no later than 31 October of the reporting year.

10. Each month Imperial shall submit to the Chief Conservation Officer a report about pollution incidents relating to the previous month's operations. The report shall:

    (a) describe each unauthorized discharge (COGDPR paragraph 9(i)), spill and/or release, or each exceedance of the maximum gas flow rate to the flare stack whether reported or not to the NT-NU 24-hour Spill Report Line;

    (b) provide a copy of the investigative report, as per subsection 75(2) of the COGDPR, that identifies the root cause, causal factors and corrective actions taken for each spill and/or release or each exceedance of the authorized maximum gas flow rate to the flare stack that may exceed applicable water, soil or air quality standards, objectives or guidelines; and,

    (c) identify each unauthorized discharge (COGDPR paragraph 9(i)), spill and/or release from previous reports for which further corrective action or clean-up is required or is ongoing.

11. The annual environmental report, required under section 86 of the COGDPR shall include the following additional details for the reported year:

    (a) For monitoring of the central processing facility flare gas discharge stream (authorized limits of discharge (CODPR paragraph 9(i));

        (i) the maximum daily discharge rate, and duration of the maximum rate, per month;

(ii) the average daily flaring duration and flow rate, per month;

(iii) a description of any changes to the system for monitoring compliance with the routine and non-routine daily flare gas discharge limits;

(iv) a summary table of all of routine operation where flaring occurred in exceedance of 200 km^3/d as well as all events of non-routine operation where flaring occurred in exceedance of 700 km^3/d. This table shall include:

(1) date the event was reported to the NEB;

(2) the rate and duration of the exceedance;

(3) the operating conditions (routine or non-routine) experienced at that time;

(4) the probable sources of each identified exceedance; and,

(5) the corrective actions proposed or undertaken for each identified exceedance.

(v) a table of the maximum flow rate and duration per month of all non-routine flaring events which occurred below the authorized discharge limit of 700 km^3/d.

(b) For the purposes of tracking contaminated sites, Imperial shall provide and maintain a listing of all known, suspected and remediated contaminated sites, including but not limited to a description of

(i) the current status,

(ii) the clean-up end points, and

(iii) the actions taken or proposed to be taken to assess, monitor or remediate each site.

(c) Identify any information to be reported that may be delayed and provide the reason for the delay.

12. Imperial shall submit a biannual report summarizing the packer isolation data and findings to the Chief Conservation Officer.

13. Imperial shall submit an annual report summarizing the surface casing vent flow data and findings to the Chief Conservation Officer.

14. With respect to the biannual pressure survey Imperial shall submit the following to the Chief Conservation Officer:

(a) For approval, a proposed biannual pressure survey no less than fifteen (15) working days prior to the commencement of the survey; and,

(b) A biannual pressure survey report summarizing the data and findings.

15. Imperial shall include a summary of the injection volumes for the F-31X well in the annual production report (section 85 of the COGDPR).

16. Imperial shall submit renewed insurance certificates within thirty (30) days following the beginning of each calendar year to the Chief Conservation Officer.

Navigable Waters

17. Imperial shall maintain "No Anchorage" signs on both sides of the Mackenzie River near the cross-river flowline bundles.

Closure

18. Imperial shall submit within one year of water licence S13L1-007 being issued a closure and reclamation plan to the Chief Conservation Officer.

19. Imperial shall submit any revisions to the closure and reclamation plan to the Chief Conservation Officer.

20. Imperial shall submit an annual "closure and Reclamation" report to the Chief Conservation Officer no later 31 May following the calendar year being reported.

21. Imperial shall submit a minimum of 24 months prior to the end of commercial operations, a final closure and reclamation plan to the Chief Conservation Officer.

Biannual Meeting

22. Imperial shall notify the Chief Conservation Officer at least 60 days in advance of undertaking and presenting a bi-annual review of its operations to the National Energy Board, beginning in 2016.

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OPERATIONS AUTHORIZATION

APPLICATION

IMPERIAL OIL RESOURCES N.W.T. LIMITED

(Name of Operator)

Hereby applies for authorization of a proposed:

☐ Drilling Program ☒ Production Program ☐ Installation/Removal Program ☐ Other
Please Specify:

under paragraph 5(1)(b) of the *Canada Oil and Gas Operations Act (R.S.C., 1985, c. O-7) and* Part 2 of the *Canada Oil and Gas Drilling and Production Regulations* (SOR/2009-0315) using equipment and procedures described in the application .

Changes in equipment or procedures, outside the scope of this application, require the approval of the Board in order that this authorization remains valid. An approved copy of this notice is to be posted at each work site and is subject to the terms and conditions attached to this authorization.

Licence No. Other - Norman Wells Proven Area NEB Operating Licence No. 1210

Region NWT Mainland

Field Norman Wells

Anticipated date of commencement January 2015 Proposed Duration 120 months

Scope of Work as per Operations Authorization application dated July 31, 2014

"I certify that the information provided on this form is true and correct"

Name Zaidah Ibrahim Telephone (403) 237-4029 Ext

Job Designation Production Manager E-Mail zaidah.ibrahim@exxonmobil.com

Signature Zaidah Ibrahim Date December 17, 2014

Responsible Officer of Company

NATIONAL ENERGY BOARD AUTHORIZATION

(Board Use Only)

The operator named above is hereby authorized under paragraph 5(1)(b) of the *Canada Oil and Gas Operations Act (R.S.C., 1985, c. O-7)* and is subject to the terms and conditions attached to this authorization.

Job Designation Chief Conservation Officer

Signature Date 19 December, 2014

NEB Authority

Operation Authorization (OA) No. OA-1210-001 Expiry Date 31 December 2014

Canada

National Energy Board

Office national de l'énergie

OA-1210-001
OF-EP-Well-I047 0101
21 June 2017

Mr. Chris Yanke
Imperial Oil Resources NWT Limited
N4C – 223 Quarry Park
PO Box 2480 Station M
Calgary, AB T2P 3M9

Dear Mr. Yanke:

Imperial Oil Resources N.W.T. Limited (Imperial) Application dated 24 January 2017 for a Blanket Approval to Alter the Condition of a Well in the Norman Wells Proven Area.

The National Energy Board (NEB) is in receipt of the application for a blanket approval to Alter the Condition of a Well (Blanket ACW Approval) for routine well workover activities in the Norman Wells Proven Area. Imperial is hereby granted a Blanket ACW Approval for the following eligible well operations:

a) pulling, running and fishing sucker rods and bottom hole pumps;
b) pulling, running and fishing tubing strings including injection, gas lift strings and electric submersible pumps; and,
c) wellbore isolation and wireline logging operations for surface casing vent flow (SCVF) investigations.

The Blanket ACW Approval is subject to the following conditions:

(1) Imperial shall submit an Alter the Condition of a Well application for any well operations not outlined in a), b) or c); or if there is any change or deviation from the scope of the well work program.

(2) Imperial shall submit notification to COGOA.notifications@neb-one.gc.ca 48 hours prior to the commencement of each eligible well operation.

(3) Imperial shall ensure that work performed by Imperial and contractors is consistent with all obligations and responsibilities under the Imperial's management system.

Suite 210, 517 Tenth Avenue SW
Calgary, Alberta T2R 0A8

517, Dixième Avenue S.-O., bureau 210
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www.neb-one.gc.ca
Telephone/Téléphone : 1-800-899-1265
Facsimile/Télécopieur : 1-877-288-8803

(4) Imperial shall submit notification to COGOA.notifications@neb-one.gc.ca within 48 hours after the completion of each eligible well operation.

(5) Imperial shall submit a well operations report for each eligible well operation in accordance with section 89 of the *Canada Oil and Gas Drilling and Production Regulations* (CODPR).

(6) For SCVF investigation well work, Imperial shall include a copy of each log run in both log ascii standard (LAS) format and in raster log (TIFF or PDF) format on a CD or DVD with the well operations report submission to the NEB.

This approval is subject to the terms and conditions of Operations Authorization OA-1210-001. In addition, the elements related to the Operations Authorization 1210-001 (management systems, safety plan, environmental protection plan, contingency and emergency response plan) apply to all well operations.

Please note that all oil and gas activities are to meet the requirements of CODPR, the *Canada Labour Code, Part II* and the *Oil and Gas Occupational Safety and Health Regulations*. Any incidents and near-misses under the CODPR are to be reported using the NEB web-based Online Event Reporting System (OERS).

If you have any questions, please feel free to contact Orlando Huang at 403-299-3137 or at orlando.huang@neb-one.gc.ca.

Yours truly,

Iain Colquhoun
Chief Conservation Officer

Ministre des Affaires autochtones
et du développement du Nord

Minister of Aboriginal Affairs and
Northern Development

Ottawa, Canada K1A 0H4

FEV
FEB 18 2015

SAHTU LAND &
WATER BOARD
MAR 02 2015
RECEIVED

Mr. Larry Wallace
Chair
Sahtu Land and Water Board
PO BOX 1
FORT GOOD HOPE NT X0E 0H0

Dear Mr. Wallace:

Thank you for your letter of January 2, 2015, conveying and recommending for my approval the Sahtu Land and Water Board's renewed Type A Water Licence S13L1-007, for Imperial Oil Resources N.W.T. Limited's Norman Wells operations.

I am pleased to note the Board's recognition of the issue of the use of Schedules in licences. I also appreciate and understand that the Board, to effectively and efficiently co-manage water resources, needs to have flexibility in making insignificant administrative changes to licences. However, I would like to further clarify my concerns with the Board's practice of making potentially significant changes to a licence without adhering to the process prescribed by legislation. For example, the renewal of licence S13L1-007 states that the Board may amend the Schedules, at its discretion, through a process that includes public notice and an accompanying explanation of the proposed changes, as well as a reasonable opportunity for interested parties to comment and have their comments considered before the Board makes a decision. While this approach may provide the Board with the desired flexibility to make subsequent changes, both administratively insignificant and potentially significant, to an approved water licence, it restricts the application of the statutory process for water licensing and circumvents my roles and responsibilities with regard to a Board's mandatory referral to me for approval of a Board's decision to issue, renew or amend a Type A licence.

I understand and appreciate the need for a process that affords the Sahtu Land and Water Board flexibility in making administrative changes to licences. To that end, I would strongly encourage the Board and departmental officials to work together to explore avenues that will allow for this administrative flexibility sought by the Board, while fully respecting the statutory requirements and prescribed processes.

.../2

In light of the foregoing, I have approved the water licence as recommended by the Sahtu Land and Water Board. The signed original is enclosed.

Sincerely,

Bernard Valcourt, PC, QC, MP

Encl.

Pursuant to the *Mackenzie Valley Resource Management Act* and Regulations, the Sahtu Land and Water Board, hereinafter referred to as the Board, hereby grants to:

Imperial Oil Resources N.W.T. Limited
Norman Wells Operations
(Licensee)

of **Bag Service 5000, Norman Wells, NT, X0E 0V0**
(Mailing Address)

Hereinafter called the Licensee, the right to alter, divert or otherwise use water subject to the restrictions and conditions contained in the *Mackenzie Valley Resource Management Act* and Regulations made there under and subject to and in accordance with the conditions specified in this Licence.

Licence Number:	S13L1-007
Licence Type:	A
Location:	NORMAN WELLS PROVEN AREA, NT
Purpose:	WATER USE AND WASTE DISPOSAL
Description:	FOR INDUSTRIAL UNDERTAKINGS IN OIL AND GAS PRODUCTION, AND ASSOCIATED USES
Effective Date of Licence:	
Term of Licence:	10 YEARS
Expiry Date of Licence:	

This Licence issued and recorded at Fort Good Hope, NT, includes and is subject to the annexed conditions.

Sahtu Land and Water Board:

Witness **Chair – Mr. Larry Wallace**

APPROVED BY:

Minister of Indian Affairs and Northern Development

Sahtu Land and Water Board
P.O Box 1
Fort Good Hope, NT
X0E 0H0
Phone: 867-598-2413
Fax: 867-598-2325
www.slwb.com

March 5, 2015 **S13L1-007**

Ms. Helga Shield
Senior Environmental Advisor
Safety, Health and Environment
Imperial Oil Resources Ltd.
237 Fourth Avenue S.W.
P.O. Box 2480, Station M
Calgary, AB T2P 3M9

E-mail: helga.m.shield@esso.ca

Dear Ms. Shield,

ISSUANCE OF TYPE 'A' WATER LICENCE S13L1-007

Attached is Water Licence S13L1-007 granted by the Sahtu Land and Water Board (SLWB) in accordance with the *Mackenzie Valley Resource Management Act*. This Licence has been approved for a period of 10 years, commencing on March 1, 2015 and expiring on March 1, 2025.

In accordance with Part B, Item 3, the Licensee must operate in accordance with all approved plans. The Board has approved the Environmental Protection Plan, the Waste Management Plan, the Flowline Integrity Management Plan, the Spill Contingency Plan and the Emergency Response Plan.

The following plans require approval by the Board and are to be submitted within 60 days following the effective date of this Licence: revised Engagement Plan as per Part B, Item 11. A revised Groundwater Management Plan is to be submitted within six months following the effective date of this Licence as per Part E, Item 2. An Aquatic Effects Monitoring Program (AEMP) Design Plan is to be submitted within one year of the effective date of this Licence as per Part I, Item 1. A Closure and Reclamation Plan is to be submitted within one year of the effective date of the Licence as per Part J, Item 1.

The Special Effects Study identified in Schedule 6 is to be developed within 90 days after the effective date of the Licence. Upon approval, it will form part of the AEMP Design Plan.

The Licensee shall post and maintain a security deposit of CDN $ 178,883,606.00. for the Imperial Oil Norman Wells Operation, in accordance with Section 72.11 of the Act and Part C, Item 1 of this Licence.

A copy of this Licence has been filed in the Public Registry at the office of the SLWB. Please be advised that this letter, all attachments, all Inspection Reports, and correspondence related thereto, are part of the Public Registry, and are intended to keep all interested parties informed of the manner in which the Water Licence requirements are being met. All Public Registry material will be considered if an amendment to the Water Licence is requested.

The full cooperation of Imperial Oil Resources Ltd. is anticipated and appreciated. If you have any questions or concerns, please contact Bonnie Bergsma at (867) 598-2413 ext. 227 or e-mail at bonnie.bergsma@slwb.com.

Yours Sincerely,

Larry Wallace
Chair

Copy to: Distribution List

Attachments:

- Water Licence S13L1-007
- Reasons for Decision
- Minister's Letter of Approval

Pursuant to the *Mackenzie Valley Resource Management Act* and Regulations, the Sahtu Land and Water Board, hereinafter referred to as the Board, hereby grants to:

Imperial Oil Resources N.W.T. Limited
Norman Wells Operations
(Licensee)

of **Bag Service 5000, Norman Wells, NT, X0E 0V0**
(Mailing Address)

Hereinafter called the Licensee, the right to alter, divert or otherwise use water subject to the restrictions and conditions contained in the *Mackenzie Valley Resource Management Act* and Regulations made there under and subject to and in accordance with the conditions specified in this Licence.

Licence Number:	S13L1-007
Licence Type:	A
Location:	NORMAN WELLS PROVEN AREA, NT
Purpose:	WATER USE AND WASTE DISPOSAL
Description:	FOR INDUSTRIAL UNDERTAKINGS IN OIL AND GAS PRODUCTION, AND ASSOCIATED USES
Effective Date of Licence:	March 5 2015
Term of Licence:	10 YEARS
Expiry Date of Licence:	March 4 2025

This Licence issued and recorded at Fort Good Hope, NT, includes and is subject to the annexed conditions.

Sahtu Land and Water Board:

Witness **Chair – Mr. Larry Wallace**

APPROVED BY:

Minister of Indian Affairs and Northern Development

List of Abbreviations

AANDC	Aboriginal Affairs and Northern Development Canada
AEMP	Aquatic Effects Monitoring Program
BTEX	benzene, toluene, ethylbenzene, and xylenes
CPF	Central Processing Facility
EQC	Effluent Quality Criteria
GW	Groundwater
ICP-MS	Inductively coupled plasma mass spectrometry
IORL	Imperial Oil Resources N.W.T. Limited, the Licensee
MVRMA	Mackenzie Valley Resource Management Act
NT	Northwest Territories
NWPA	Norman Wells Proven Area
QA/QC	Quality Assurance and Quality Control
SNP	Surveillance Network Program

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Part A: Location of Surface Water Surveillance Stations
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Part A: Scope and Definitions

1. Scope

a) This Licence entitles Imperial Oil Resources N.W.T. Limited to use waters and dispose of Waste for industrial undertakings in oil and gas production, closure and reclamation, and associated uses at the Norman Wells Norman Wells Proven Area located at Latitude 65º 17' N., Longitude 126º51' W., in the Northwest Territories;

b) This Licence is issued, subject to the conditions contained herein, with respect to the use of Waters and the deposit of Waste of any type in any Waters or in any place under any conditions where such Waste or any other Waste that results from the deposits of such Waste may enter any Waters. Whenever new Regulations are made or existing Regulations are amended by the Governor-in- Council under the *Mackenzie Valley Resource Management Act*, or other statutes imposing more stringent conditions relating to the quantity or type of Waste that may be so deposited or under which any such Waste may be so deposited, this Licence shall be deemed, upon promulgation of such Regulations, to be automatically amended to conform with such Regulations; and,

c) Compliance with the terms and conditions of this Licence does not affect the Licensee's obligation to comply with the requirements of all applicable Federal, Territorial and Municipal legislation.

2. Definitions

"Act" means the *Mackenzie Valley Resource Management Act*.

"Acute Lethality" means an effluent which is deemed acutely lethal if the undiluted (100%) effluent kills 50% or more of the fish or daphnia in the test. (Biological test method: Acute Lethality Test Using Rainbow Trout Report EPS 1/RM/9 July 1990), and (Biological test method: Acute Lethality of Effluents to Daphnia magna EPS 1/RM/14 Second Edition December 2000), as may be amended from time to time.

"Analyst" means an Analyst designated by the Minister under Sub-section 84(2) of the *Act*.

"Aquatic Effects Monitoring Program" means a monitoring program designed to determine the short and long-term effects in the Receiving Environment resulting from Project activities and to evaluate if the Receiving Environment is being adequately protected or Waters used are being adequately managed or additional mitigation measures are necessary.

"Artificial Islands" means the physical structure of the constructed islands, including the sand core, slope and scour protection, drilling equipment and supplies, storage facilities, well head equipment, and temporary or permanent buildings.

"Biocell" comprises the area or engineered cell designed for the treatment of contaminated soil through biological processes by degradation of contaminants. The

bioremediation process may involve the addition of water and nutrients, as well as aeration through mechanical processing.

"Board" means the Sahtu Land and Water Board established under Section 56 of the *Act*.

"Central Processing Facility" means the plant where oil, gas, and Produced Water are collected from the oilfield and separated, with plant cooling being accomplished using Mackenzie River water.

"Commercial Operations" means the period of oil production.

"Discharge" means the direct or indirect release of any Waters or Waste to the Receiving Environment.

"Flowline" means a line that is used to transport fluids from a well to a production facility or vice versa, and includes intrafield export and all gathering lines.

"Grab Sample" means an instantaneous sample of Waters.

"Groundwater" means all Waters below the ground surface.

"**Groundwater Treatment Facilities"** system designed to collect and treat contaminated Groundwater.

"Impermeable Lined Diked Areas" means an area enclosed by a dike incorporating a synthetic liner that is considered to be impermeable to leakage for the purposes of completely containing all drilling fluids and drilling Wastes within the diked and lined area.

"Inspector" means an Inspector designated by the Minister under Sub-section 84(1) of the *Act*.

"Licensee" means the holder of this Licence.

"Minister" means the Minister of Indian Affairs and Northern Development;

"Modification" in respect of a structure, means a change, other than an expansion, that does not alter the purpose or function of a structure.

"Natural Islands" means Bear, Goose, and Frenchy's Islands, including drilling equipment and supplies, waste and storage facilities, well-head equipment, and temporary or permanent buildings.

"Norman Wells Proven Area" means the proven area identified in the Proven Area Agreement between Canada and Imperial Oil Limited dated July 21, 1944, as amended.

"Produced Water" means Waters naturally present in the reservoir or injected into the reservoir to enhance production and produced as a co-product when gas or oil is produced.

"Project" means the undertaking described in Part A, Item 1.

"Receiving Environment" means, for the purpose of this Licence, the natural environment that receives any deposit or Discharge of Waste, including runoff, from the Project.

"Reclamation" means activities which facilitate the return areas affected by the Project to viable and, wherever practicable, self-sustaining ecosystems that are compatible with a healthy environment, human activities, and the surrounding environment.

"Regulations" means Regulations proclaimed pursuant to Section 90.3 of the *Act*.

"Representative Grab Sample" means a grab sample consisting of equal portions of Water collected from a minimum of two locations within one site.

"River Ice Breakup" means the period from the time the ice first starts to move in the Mackenzie River at Norman Wells in the spring, to the time when the River is free of pack ice at Norman Wells.

"Single Composite Sample" means a sample composed of proportional sub-samples taken over a time period acceptable to an Inspector, as approved by the Analyst, and submitted to the Board in accordance with the sampling and analysis requirements specified in the "Surveillance Network Program";

"Surface Water Run-Off Facilities" means those locations referred to in Annex A, Part F.

"Surveillance Network Program" refers to the program set out in Annex A.

"Unauthorized Discharge" is a Discharge of any waters or Waste not authorized under this Licence or legislation.

"Waste" means waste as defined in Section 51 of the *Act.*

"Watercourse" a natural body of flowing or standing water or an area occupied by water during part of the year, and includes streams, springs, swamps and gulches but does not include groundwater.

"Waterflood" means the injections of Waters into the Norman Wells oilfield reservoir for pressure maintenance and enhanced oil production.

"Waters" means waters as defined in Section 51 of the *Act*;

"Water Intake" means the wetwell pump and associated facilities installed in the Mackenzie River and the water line to the Central Processing Facility.

Part B: General Conditions

1. The Licensee shall ensure that a copy of this Licence is maintained on the Project site at all times.

2. The water use fee shall be paid annually in advance of any use of Waters, in accordance with the Mackenzie Valley Land and Water Board's *Water Use Fee Policy*.

3. The Licensee shall operate in accordance with any Management Plans (Plans) approved pursuant to the conditions of this Licence and with any revision to the Plans as may be made from time to time pursuant to the conditions of this Licence and as approved by the Board. If any Plan or proposed update is not approved by the Board, the Licensee shall revise the Plan according to the Board's direction and re-submit it to the Board for approval.

4. The Licensee shall comply with the Schedules, which are annexed to and form part of the Licence.

5. The Schedules may be amended at the discretion of the Board through a process which shall include public notice of the Board's intention to consider a change, such Notice to be provided to the Licensee, the Minister, regional AANDC officials and other affected or interested stakeholders. Any such Notice shall be accompanied by an explanation of the proposed change to a Schedule and a reasonable opportunity shall be provided for comments to be provided by interested parties, and considered by the Board, before a decision is made.

6. The matters for which flexibility is required by the Board and where amendments to Schedules may be made by the Board from time to time under Part B Item 5 include the following:

    - Schedule 1 General Conditions;
    - Schedule 2 Conditions Applying to Security;
    - Schedule 3 Conditions Applying to Water Use;
    - Schedule 4 Conditions Applying to Waste and Waste Management;
    - Schedule 5 Conditions Applying to Operations and Maintenance;
    - Schedule 6 Conditions Applying to Aquatic Effects Monitoring; and
    - Schedule 7 Conditions Applying to Closure and Reclamation.

7. The Licensee shall comply with the **Surveillance Network Program**, which is annexed to and forms part of this Licence, and any amendments to the **Surveillance Network Program** as may be made from time to time by the Board.

8. The **Surveillance Network Program** and any compliance dates specified in this Licence may be amended at the discretion of the Board.

9. Meters, devices, or other such methods used for measuring the volumes of Waters used and Waste discharged shall be installed, operated and maintained by the Licensee to the satisfaction of an Inspector.

10. The Licensee shall post and maintain signs necessary to identify the stations of the **Surveillance Network Program** in a manner satisfactory to an Inspector.

11. Within 60 days following the effective date of this Licence, the Licensee shall submit to the Board for approval, a revised **Engagement Plan**. The Plan shall be in accordance with the Mackenzie Valley Land and Water Board's *Engagement Guidelines for Applicants and Holders of Land Use Permits and Water Licences,* June 2013, or subsequent editions.

12. The Licensee shall review the **Engagement Plan** annually and shall submit updates to the Board for approval at the following times:

    a) If the Licensee seeks changes to the Plan; and

    b) Upon the request of the Board.

13. In each year of the Licence term, the Licensee shall file an **Annual Report** with the Board. The report shall be filed no later than March 31st of the year following the calendar year reported. The report shall contain the information set out in Schedule 1, Item 1.

14. In conducting its activities under this Licence, the Licensee shall make best efforts to consider and incorporate any scientific information and traditional knowledge that is made available to the Licensee.

Part C: Conditions Applying to Security

1. The Licensee shall post and maintain a security deposit in an amount in accordance with Schedule 2, Item 1.

2. The Licensee shall submit an updated Reclamation liability estimate utilizing the current version of RECLAIM, or another method acceptable to the Board,

   a) If the Licensee seeks changes to the Closure and Reclamation Plan; and

   b) Upon request of the Board.

3. The amount of the security deposit required by Part C, Item 1 and Schedule 2, Item 1 may be revised by the Board in accordance with Part B Item 5 based on estimates of the current Reclamation liability referred to in Part C, Item 2 of this Licence or based on such other information as may be available to the Board.

4. If the amount of the security deposit is revised by the Board as described under Part C, Item 3, the Licensee shall post the revised amount with the Minister within 90 days of the Board giving notice of the revised amount.

5. The Licensee shall submit an updated Reclamation liability estimate after approval of the Closure and Reclamation Plan, using the current version of RECLAIM or another method acceptable to the Board.

Part D: Conditions Applying to Water Use

1. The Licensee shall obtain all Waters from the Mackenzie River, unless otherwise approved by the Board, for Central Processing Facility cooling, Waterflood, drilling, and any other industrial or maintenance uses associated with operations utilizing the approved Water Intake.

2. The Licensee may use Waters from the Surface Water Runoff Facilities for dust suppression only if those Waters meets the effluent quality criteria established in Part E, Item 1 of the **Surveillance Network Program** (Annex A), or as otherwise approved by the Board.

3. The annual quantity of Waters withdrawn for any purpose shall not exceed the limits set out in Schedule 3, Item 1.

4. The Licensee shall minimize the total amount of Waters used by the Project using appropriate water conservation methods, such as, but not limited to, the injection of Produced Water into the Norman Wells Proven Area oilfield reservoir.

Part E: Conditions Applying to Waste and Water Management

1. The Licensee shall manage Waters and Waste with the objective of minimizing the effects of Project activities on the quantity and quality of Waters in the Receiving Environment through the use of appropriate mitigation measures, monitoring, and follow-up actions.

Management Plans

2. Within six months following the effective date of this Licence, the Licensee shall submit to the Board for approval, a revised **Groundwater Management Plan**. The Plan shall be in accordance with the Mackenzie Valley Land and Water Board's *Standard Outline for Management Plans* and the requirements as set out in Schedule 4, Item 1. The Plan shall include the groundwater monitoring wells identified in Annex A, Part G.

3. The Licensee shall operate in accordance with the **Groundwater Management Plan**, once approved.

4. The Licensee shall review the **Groundwater Management Plan** annually and shall submit updates to the Plan to the Board for approval at the following times:

   a) If the Licensee seeks changes to the Plan; and

   b) Upon request of the Board.

5. The Licensee shall operate in accordance with the **Environmental Protection Plan**, once approved.

6. The Licensee shall review the **Environmental Protection Plan** annually and shall submit updates to the Plan to the Board for approval at the following times:

   a) If the Licensee seeks changes to the Plan; and

   b) Upon request of the Board.

7. The Licensee shall operate in accordance with the **Waste Management Plan**, once approved. The Plan shall be in accordance with the Mackenzie Valley Land and Water Board's *Guidelines for Developing a Waste Management Plan*, March 2011, or subsequent editions.

8. The Licensee shall review the **Waste Management Plan** annually and shall submit updates to the Plan to the Board for approval at the following times:

   a) If the Licensee seeks changes to the Plan; and

   b) Upon request of the Board.

9. The Licensee shall maintain a copy of the **Waste Management Plan** on-site in a readily available location to the satisfaction of an Inspector.

General Conditions

10. The Licensee shall not use any biocides where they may enter any Watercourse unless approved by the Board.

11. The Licensee shall ensure that any fuels, chemicals or Waste(s) associated with the Project do not enter any Waters, except in the manner described in the **Surveillance Network Program**.

Effluent Quality Criteria

12. The Licensee shall discharge water in a controlled manner designed to avoid flooding or erosion.

13. All sewage Waste(s) shall be disposed of at a licensed sewage disposal facility.

14. The Licensee shall not release hydrostatic test fluids to land and/or Waters. Hydrostatic test fluids shall be handled through the Licensee's injection processes.

15. No Waste(s) discharged at SNP Station S13L1-007 – 2 to the Mackenzie River shall be acutely lethal to fish nor shall it exceed the following effluent quality criteria:

Parameter	Maximum Average Concentration	Maximum Concentration of Any Grab Sample
Total Petroleum Hydrocarbons	3.0 mg/L	5.0 mg/L
Phenols	0.07 mg/L	0.14 mg/L
Chloride	250 mg/L	500 mg/L
Total Suspended Solids	N/A	N/A
Specific Conductivity	N/A	N/A

16. The Waste referred to in Part E Item 15 shall have a pH between 6.0 and 9.0

Part F: Conditions Applying to Operation and Maintenance

1. The Licensee shall drill all wells from within Impermeable-Lined Diked Areas.

2. The Licensee shall undertake any necessary annual maintenance required to preserve the structural integrity of the Artificial Islands, and where required on the Natural Islands.

3. The Licensee shall inspect the riverbeds, channels and banks of the Mackenzie River in the vicinity of the Flowline(s), and shall immediately notify the Inspector of any significant risk to infrastructure, public safety or the environment from erosion and take appropriate remedial action as required.

4. The Licensee shall operate in accordance with the **Flowline Integrity Management Plan**, once approved.

5. The Licensee shall review the **Flowline Integrity Management Plan** annually and shall submit updates to the Plan to the Board for approval at the following times:

   a) If the Licensee seeks changes to the Plan; and

   b) Upon request of the Board.

6. The Licensee shall submit an **Annual Flowline Integrity and Mackenzie River Breakup Report** no later than October 31st of the year being reported. The report shall contain the information set out in Schedule 5, Item 1.

Part G: Conditions Applying to Modifications

1. The Licensee may, without written consent from the Board, carry out Modification(s) to the water supply and Waste disposal facilities, bunkers, docks, bridges, flowlines, creek banks, and river banks provided that the Modification(s) are consistent with the terms of this Licence and the following requirements are met:

    a) the Licensee has provided the details of the proposed Modification(s) to the Board, in writing, at least 60 days prior to the commencement of the Modification(s);

    b) the Modification(s) does not place the Licensee in contravention of either the Licence, the Act or Federal, Territorial or Municipal Legislation;

    c) the Board has not, during the 60 days following notification of the proposed Modification(s), informed the Licensee that review of the proposal will require more than 60 days; and

    d) the Board has not rejected the proposed Modification(s).

2. Modification(s) for which all of the conditions referred to in Part G: Item 1, have not been met, can be carried out only with written approval from the Board.

3. The Licensee shall provide as-built plans and drawing of the Modification(s) referred to in this Licence within 90 days of completion of the Modification(s).

Part H: Conditions Applying to Contingency Planning

1. The Licensee shall operate in accordance with the **Spill Contingency Plan**, once approved. The Plan shall be in accordance with Indian and Northern Affairs Canada's *Guidelines for Spill Contingency Planning,* 2007, or subsequent editions.

2. The Licensee shall operate in accordance with the **Emergency Response Plan**, once approved.

3. The Licensee shall review the Management Plans referred to in Part H, Items 1 and 2 annually and shall submit updates to the Plans to the Board for approval at the following times:

   a) If the Licensee seeks changes to the Plans;

   b) Upon request of the Board.

4. The Licensee shall carry out field and communication exercises annually to demonstrate the capability to contain, recover and report spills under a variety of environmental conditions, such as early and late winter ice conditions, and moderate and high flow conditions.

5. The Licensee shall undertake further field and communication exercises at the request of the Board.

6. If, during the period of this Licence, a spill or an Unauthorized Discharge of Waste(s) occurs, or is foreseeable, the Licensee shall:

   a) Implement the **Spill Contingency Plan**;

   b) report the incident immediately via the 24 Hour NWT Spill Reporting Line (867) 920-8130 in accordance with the instructions contained in the Spill Report Form NWT 1752/0593 or subsequent editions;

   c) report each spill and Unauthorized Discharge of Waste to the Board and an Inspector within 24 hours; and

   d) within 30 days of an Unauthorized Discharge or an incident reported under Part H, Item 6b), the Licensee shall submit a detailed report to the Board and an Inspector. The report shall include descriptions of causes, response actions, and any changes to procedures to prevent similar occurrences in the future.

7. All spills and Unauthorized Discharges of water or Waste shall be cleaned up and the affected area reclaimed to the satisfaction of an Inspector.

Part I: Conditions Applying to Aquatic Effects Monitoring

1. The Licensee shall submit within one year of the effective date of this Licence an Aquatic Effects Monitoring Program (AEMP) Design Plan for approval by the Board. **The Aquatic Effects Monitoring Program Design Plan** should be developed in accordance with AANDC's "Guidelines for Designing and Implementing Aquatic Effects Monitoring Programs for Development Projects in the NWT" and shall satisfy the requirements of Schedule 6, Item 1.

2. The Licensee shall adhere to the approved **Aquatic Effects Monitoring Program Design Plan** and shall annually review the Plan and make any necessary revisions to reflect changes in operations, technology, chemicals or fuels, or as directed by the Board. Revisions to the Plan shall be submitted to the Board for approval.

3. The Licensee shall submit an **AEMP Annual Report** to the Board for approval on or before April 30, 2017 and each year thereafter.

Part J: Conditions Applying to Closure and Reclamation

1. The Licensee shall submit within one year of the Licence being issued a **Closure and Reclamation Plan** for approval by the Board.

2. The Licensee shall adhere to the approved **Closure and Reclamation Plan** and shall annually review the Plan and make any necessary revisions to reflect changes in operations, technology, chemicals or fuels, or as directed by the Board. Revisions to the Plan shall be submitted to the Board for approval.

3. The Licensee shall carry out Progressive Reclamation of areas affected by licensed operations as soon as is reasonably practicable.

4. The Licensee shall provide an **Annual Closure and Reclamation Plan Progress Report** no later than May 31st following the calendar year being reported. The report shall contain the information set out in Schedule 7, Item 1.

5. A minimum of 24 months prior to the end of Commercial Operations, the Licensee shall submit a **Final Closure and Reclamation Plan** to the Board for approval.

Signed the 4th day of December, 2014 on behalf of the Sahtu Land and Water Board

Witness

Mr. Larry Wallace, Chair
Sahtu Land and Water Board

Annex A: Surveillance Network Program (SNP)

SAHTU LAND AND WATER BOARD

LICENSEE: IMPERIAL OIL RESOURCES N.W.T. LIMITED

LICENCE NUMBER: S13L1-007

EFFECTIVE DATE OF LICENCE ISSUANCE:

A. Location of Surface Water Monitoring Stations

Station	Status	Description	Location
S13L1-007 -1	Active	Central Processing Facility Intake water from the Mackenzie River.	W126°53.053' N65°17.230'
S13L1-007 - 2	Active	Central Processing Facility discharge return line to the Mackenzie River.	W126°53.093' N65°17.196'

B. Quality Assurance and Quality Control

1. All sampling, sample preservation and analyses shall be conducted in accordance with methods prescribed in the current edition of American Public Health Association's (APHA) *Standard Methods for the Examination of Water and Wastewater*, or by such other methods approved by the Analyst.

2. All analyses shall be performed in a laboratory approved by the Analyst.

3. The Licensee shall review the **Quality Assurance and Quality Control Manual** annually and shall revise the manual as necessary to reflect changes in field and laboratory quality control and quality assurance testing, procedures and technology. The proposed revision(s) shall be submitted to the Board for approval. The manual shall be implemented as approved by the Analyst.

4. The Licensee may, upon notifying the Inspector, clean the settling pond at the Central Processing Facility according to the CPF Settling Pond Cleaning Procedure, approved by the Board and amended from time to time.

C. Sampling and Analysis Requirements for Surface Water SNP Stations

1. A Single Composite Sample of water at SNP Station S13L1-007 – 1 shall be sampled and analyzed for the following parameters and frequencies:

Parameter	Sampling Frequency
Phenols	Once per week
Total Petroleum Hydrocarbons	Once per week
Total Suspended Solids	Twice per week
pH	Twice per week
Specific Conductivity	Twice per week

2. A Representative Grab Sample of Water(s) shall be collected at SNP station S13L1-007 - 1 quarterly (four samples throughout the year) and analyzed for the following parameters:

Parameters		
pH	Chloride	Total Alkalinity
Sodium	Calcium	Specific Conductivity
Potassium	Magnesium	Total Suspended Solids
Sulphate	Phenols	Total Dissolved Solids
Total Petroleum Hydrocarbons	Total Phosphorus	Total Hardness

3. A Single Composite Sample of water at SNP Station S13L1-007 – 2 shall be sampled and analyzed for the following parameters and frequencies:

Parameter	Sampling Frequency
Phenols	Once per week
Total Petroleum Hydrocarbons	Once per week
Total Suspended Solids	Twice per week
pH	Twice per week
Specific Conductivity	Twice per week

4. A daily Grab Sample of water at SNP Station S13L1-007 – 2 shall be field analyzed for Total Residual Chlorine.

5. No Wastes discharged at SNP Station S13L1-007 – 2 to the Mackenzie River shall exceed the effluent criteria set out in Part E, Item 15 of the Licence.

6. A Representative Grab Sample of Water(s) shall be collected at SNP Station S13L1-007 – 2 quarterly (four samples throughout the year at the same time as Acute Lethality testing) and analyzed for the following parameters:

Parameters		
pH	Chloride	Total Alkalinity
Sodium	Calcium	Specific Conductivity

Potassium	Magnesium	Total Suspended Solids
Sulphate	Phenols	Total Dissolved Solids
Total Petroleum Hydrocarbons	Total Phosphorus	Total Hardness

7. The Licensee shall determine the Acute Lethality of the Waste Waters at SNP station S13L1-007 - 2 and performed in a quarterly (four samples throughout the year) time frequency.

8. The Licensee shall provide a 28-day average concentration of the parameters outlined in SNP Part C, Items 3 and 4. The average concentration shall be reported in accordance with SNP Part D, Item 1.

D. Reports

1. The Licensee shall within 30 days following the month being reported, submit to the Board, all data and information required by the SNP including the results of the approved **Quality Assurance Plan**.

E. Sampling and Analysis Requirements for Surface Water Run-Off Facilities

1. A Representative Grab Sample and analysis of all Waters collected in the Surface Water Run-Off Facilities (listed in section F of the Surveillance Network Program) discharged to lands and/or Waters, and/or to be used for dust suppressant on roads, shall be obtained prior to Discharge.

   a) Water to be Discharged from Surface Water Run-Off Facilities (listed as Category A in section F of the Surveillance Network Program) shall be analyzed for the following prior to Discharge and weekly during Discharge:

Parameter	Guideline
Visible oil sheen on the water	Presence of
Chlorides (Field Test)	< 500 mg/L
pH (Field Test)	6.0 – 9.0

   b) Water to be Discharged from Surface Water Run-Off Facilities (listed as Category B in section F of the Surveillance Network Program) shall be analyzed for the following prior to Discharge and weekly during Discharge:

Parameter	Guideline
Total Petroleum Hydrocarbons	5.0 mg/L
Phenols	0.14 mg/L
pH	6.0 -9.0
Chlorides	< 500 mg/L
Total Suspended Solids	N/A
Total Dissolved Solids	N/A
Specific Conductivity	N/A

c) Water shall not be released from Surface Water Run-off Facilities if there is exceedance(s) of criteria in 1(a) and 1(b) above without consulting the Board and Inspector. The licensee shall make every effort to investigate exceedance(s) and treat the water before Discharge.

d) When discharging water volumes greater than 10 m^3, the Discharge shall be monitored by obtaining a Representative Grab Sample(s) and conducting subsequent analyses as outlined in SNP Part E, Items 1 (a) or (b). Samples shall be taken before, in the middle, and the end of the Discharge period. For water volumes less than 10 m^3, a single Representative Grab Sample shall be collected and analyzed before the Discharge begins.

e) An estimate of the total volume of water discharged shall be recorded for each Discharge.

f) Water(s) collected in any area associated with Imperial Oil's Norman Wells operations and facilities not listed in Part F shall be sampled and analyzed as per SNP Part E, Items 1 (b-d), as required.

F. Surface Water Run-off Facility Categories

This Section is intended to outline any area associated with Imperial Oil's Norman Wells operations and facilities that may be used to collect surface water, which will ultimately require Discharge to land(s) and/or Water(s).

Surface Water Run-Off Facilities include impound basins and areas, excavations, bunkers, bermed areas, and associated ditches provided for the collection, storage, and Discharge of Surface Water Run-off from Imperial Oil's Norman Wells operations and facilities. Figure 1 provides a colour coded map of the different Surface Water Run-Off Facilities.

Category A – includes excavations (in areas where there are no known historical impacts), bunkers, bermed areas, and associated ditches.

Category B – includes;

Location	**Coordinates**
CPF Impound Area	W126°53.121’ N65°17.132’
LT 11 Impound Basin	W126°51.722’ N65°17.027’
Refinery Impound Basin	W126°50.817’ N65°16.888’
Refinery Water Flood Basin	W126°50.539’ N65°16.938’
Refinery Tank Farm	
Field Services Storage Yard	
Biocell	
Capped Sumps	
Excavations (in areas where there is known historical impacts)	
Or any area where the Surface Water Run-Off from Category A does not meet the requirements outlined in SNP Part E: 1(a).	

Map of Surface Water Monitoring Stations and Surface Water Run-Off Facilities on Figure 1

G. Groundwater Monitoring Wells

Station	Status	Description	Location
CPF 97-7-5	1997	Located between Central Processing Facility and Bosworth Creek.	W126°877.462’ N65°286.553’
CPF-98-8-3	1998	Located between Central Processing Facility and the Mackenzie River.	W126°885.929’ N65°286.553’
WSY-97-1-5	1997	Closest well located between the Well Service/Warehouse Yard and Bosworth Creek	W126°873.608’ N65°288.127’
ARB-12-3-3	2012	Closest groundwater monitoring well to the biocell	W126°86.037’ N65°28.759’

C38-08-1-4	2008	Located between known previous well issues (C36x) and the Mackenzie River	W126°856.857’ N65°283.478’
TF-03-12-3	2003	Located between the Tank Farm and the Mackenzie River and downgradient from a known hydrocarbons source	W126°846.446’ N65°282.365’
MTF-97-1-5	1997	Located between the Tank Farm and the town of Norman Wells	W126°838.576’ N65°283.627’
BIS-97-1-3	1997	Located between Bear Island sump #5 (near P37X) and the Mackenzie River	W126°895.531’ N65°257.705’
BI-13-3-4-5	2013	Located near Bear Island sump #6 (near M50X) and the Mackenzie River	W126°86.266’ N65°25.581’
BIBG-12-1-7	2012	Located at the western edge of the development on Bear Island and the Mackenzie River	W126°91.713’ N65°25.336’
GIBG-10-2-3	2010	Located between well pads on Goose Island and the Mackenzie River	W126°94.244’ N65°26.778’
GIQ8-10-2-4	2010	Located between the fuel storage and handling area on Goose Island and the Mackenzie River	W126°959.796’ N65°274.052’
Contingency Wells			
MEBG-10-1-3	2010	Central Location on the mainland. Located between the Mainland Sumps and the Mackenzie River	W126°857.963’ N65°286.081’
BI-13-1-4	2013	Located near Bear Island sump #6 (near M50X) and the Mackenzie River	W126°85.955’ N65°25.432’
GIP11-09-1-4	2009	Located between a sump and the Mackenzie River on Goose Island	W126°94.889’ N65°27.444’

Map of Groundwater-SNP Stations on Figure 2[1]

1. Sampling of Groundwater monitoring wells shall be conducted twice a year during the months of May to September.

2. The Groundwater monitoring wells selected shall be sampled for the following parameters:

Parameter	Frequency
Chloride	Twice per year
Benzene Toluene Ethylbenzene and Xylenes (BTEX)	Twice per year
ICP-MS Metal Scan (Total)[1]	Twice per year
Major Ions[2]	Twice per year

[1] IORL, Norman Wells Operation – Groundwater Management Plan, September 2014, Appendix C, Groundwater Well Locations, pg. 43.

H. Flow, Volume and Temperature Measurement Requirements

1. The following qualities shall be measured and recorded daily in cubic metres;

   a) the quantity of fresh Water pumped from the Mackenzie River;

   b) the quantity of Waste water returned to the Mackenzie River; and

   c) the quantity of Produced Water and fresh water injected into the oilfield reservoir;

2. The water temperatures shall be measured daily at SNP station S03L1-01 and S03L1-02 in degrees Celsius.

[1]ICP-MS Metal Scan shall include at a minimum, the following regulated parameters:
Aluminum, Cadmium, Chromium, Copper, Lead, Nickel, Zinc.
Once Annually the ICP shall also include the following monitored parameters:
Manganese, Molybdenum, Selenium, Strontium, Uranium.
Total metals shall be analyzed unfiltered and dissolved using a 0.45 micron filter.

[2]Major ions include the following parameters:
Calcium, Chloride, Sulphate, Magnesium, Fluoride, Potassium, Alkalinity, Hardness, Total Dissolved Solids.

Signed the 4th day of December, 2014 on behalf of the Sahtu Land and Water Board

Witness

Mr. Larry Wallace, Chair
Sahtu Land and Water Board

Schedules for Type A Water Licence S13L1-007

Imperial Oil Resources Limited - Norman Wells Operation

Schedule 1 – Annual Report
Schedule 2 – Security Requirements
Schedule 3 – Water Use
Schedule 4 – Groundwater Management Plan
Schedule 5 – Flowline Integrity and Mackenzie River Breakup Report
Schedule 6 – AEMP Design Plan
Schedule 7 – Closure and Reclamation Report
Figure 1 – Map of Surface Water SNP Locations and Surface Water Run-off Facilities
Figure 2 – Map of Active Groundwater SNP Stations

Schedule 1

Part B: General Conditions

1. The Licensee's Annual Report required by Part B: Item 11 of the Licence shall contain the following information:

   a) the monthly and annual quantities, in cubic metres, of fresh Water(s) obtained from all sources;

   b) the monthly and annual quantities, in cubic metres, of each and all Waste discharged;

   c) the monthly and annual quantities, in cubic metres, of Waste discharged to the Mackenzie River at SNP Station S13L1-007 – 2;

   d) the monthly and annual quantities, in cubic metres, of fresh Water(s) and Produced Water injected to the Waterflood;

   e) the monthly and annual quantities, in cubic metres, of Water(s) contained and discharged from the Surface Water Run-Off Facilities;

   f) the monthly and annual quantities, in cubic metres, of Produced Water recovered from the oilfield reservoir;

   g) tabular summaries of all data generated under the **Surveillance Network Program** (SNP);

   h) a list of unauthorized discharges, identification of waterbodies affected and the current status of mitigation measures;

   i) an annual drilling schedule for the upcoming year to the Board with locations of each well;

   j) the annual amounts in cubic metres of Waste(s) generated from all drilling activities;

   k) a summary of the measures taken to minimize net Water(s) withdrawals from all sources as required by Part D: Item 4 of the Licence;

   l) details on the handling, storage, treatment and disposal of all Waste(s) generated by project activities;

m) a review of spill training and communication exercises of the previous year, including the successes and failures, as well as recommendations for improvement;

n) a general schedule for any planned oil spill exercises for the following year;

o) a summary of any Modification(s) and/or major maintenance work carried out as per Part G of the Licence;

p) any other details on Water(s) use or Waste(s) disposal requested by the Board no later than March 31st of the year following the calendar year reported; and

q) a summary of all spills and Unauthorized Discharges and follow-up actions taken that occurred during the previous calendar year.

Schedule 2

Part C: Conditions Applying to Security

1. The Licensee shall post and maintain a security deposit of CDN $178,883,606.00 ($180,883,606.00 less $2,000,000.00 existing security) for the Imperial Oil Resources Norman Wells Operation, in accordance with Section 72.11 of the Act and Part C of this Licence.

Schedule 3

Part D: Conditions Applying to Water Use

1. The Licensee shall not exceed the total allowable Water(s) withdrawal limit of 3,500,000 cubic metres per year, and shall not exceed the withdrawal rate of 16,000 cubic metres per day.

Schedule 4

Part E: Conditions Applying to Waste and Water Management

1. The Licensee's **Groundwater Management Plan** shall contain the following information:

   a) an assessment of available baseline information;

   b) a plan to collect additional information necessary to establish baseline conditions for Groundwater monitoring wells;

   c) proposed criteria for all sampled parameters that indicate contamination;

   d) identification of Groundwater monitoring wells that show contamination;

   e) identification of Groundwater monitoring wells that are indicating a trend towards contamination before end of operations; and

   f) a detailed response plan to address contaminated and potentially contaminated Groundwater.

Schedule 5

Part F: Conditions Applying to Operation and Maintenance

1. The Licensee's Annual **Flowline Integrity and Mackenzie River Breakup Report** required by Part F, Item 6 of the Licence shall contain the following information:

    a) The results of inspections of the physical condition of each Artificial and Natural Island, including channel erosion, island scour holes and erosion, Flowline landfalls, the condition of rip rap and the following information:

        i. locations, depth, and volume of channel scour in the vicinity of any Flowline(s);

        ii. locations and magnitude of Artificial Island slope erosion;

        iii. locations and severity of Artificial Island rip rap disturbance;

        iv. structural integrity of the Artificial Islands, and other related structures; and

        v. structural integrity of the Natural Islands where it is applicable to project activities.

    b) The dates and results of Flowline(s) and fuel storage tank integrity tests; and

    c) Details on necessary repair and maintenance work along with a schedule for completing such work prior to the following spring Mackenzie River Breakup period.

Schedule 6

Part I: Conditions Applying to Aquatic Effects Monitoring

1. Within 90 days after the effective date of the Licence, the Licensee shall develop a **Special Effects Study** which addresses the following:

    a) validation that visible sheen is an effective indicator of the lack of hydrocarbons; and

    b) to establish any threat posed by metals and ions in surface or groundwater by monitoring in the Mackenzie River, upstream of the facility and at the groundwater SNP sites listed in Annex A, Part G, for a period of two years (minimum 12 samples), and submit to the Board for approval.

2. Upon Board approval of the **Special Effects Study** the Licensee shall submit a report to the Board with recommendations on the need for EQC based on the results of the monitoring and trend analysis three months following end of sampling.

Schedule 7

Part J: Conditions Applying to Closure and Reclamation

1. The Licensee's **Annual Closure and Reclamation Report** required by Part J, Item 4 of the Licence shall contain the following information, if applicable to closure and Reclamation work:

   a) a summary of any closure and Reclamation work completed during the year and an outline of any work anticipated for the next year;

   b) activities related to the Water Intake facilities and Water(s) distribution infrastructure;

   c) activities related to Waste disposal sites and facilities;

   d) activities related to the petroleum, chemical, and/or hazardous Waste storage areas;

   e) details related to the restoration of natural drainage and stream banks related to Project activities;

   f) details related to the extent of soil and Groundwater impacts and proposed Remediation;

   g) activities related to the oil collection system, especially any Flowline(s);

   h) activities related to Surface Water Run-Off Facilities;

   i) details on any site affected by unauthorized discharges and/or releases;

   j) activities related to Waterflood facilities and/or infrastructure;

   k) activities related to the Central Processing Facility;

   l) activities related to the Artificial and Natural Islands;

   m) activities related to the former refinery area and associated infrastructure;

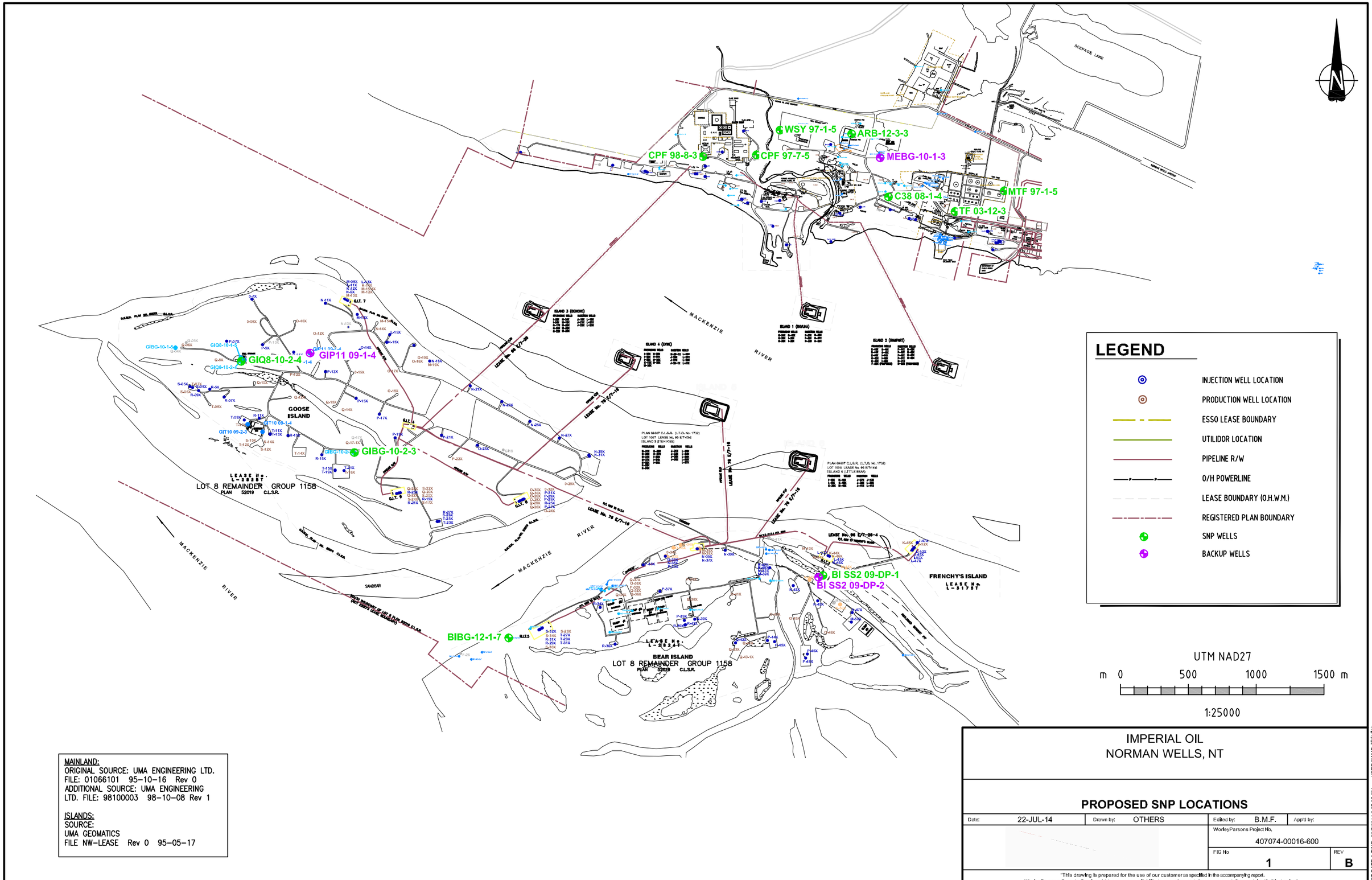
   n) activities related to the Groundwater Treatment Facilities;

   o) details on any other facility or infrastructure which could potentially impact land and/or Water(s);

   p) cataloguing of all closed wells and sumps, identifying the status of each, including any planned mitigation measures;

   q) activities related to revegetation; and

   r) post-closure monitoring plans for any facility and/or infrastructure.



MAINLAND:
ORIGINAL SOURCE: UMA ENGINEERING LTD.
FILE: 01066101 95-10-16 Rev 0
ADDITIONAL SOURCE: UMA ENGINEERING LTD. FILE: 98100003 98-10-08 Rev 1

ISLANDS:
SOURCE:
UMA GEOMATICS
FILE NW-LEASE Rev 0 95-05-17

IMPERIAL OIL
NORMAN WELLS, NT

PROPOSED SNP LOCATIONS

Date: 22-JUL-14	Drawn by: OTHERS	Edited by: B.M.F.	App'd by:
		WorleyParsons Project No. 407074-00016-600	
		FIG No 1	REV B

"This drawing is prepared for the use of our customer as specified in the accompanying report. WorleyParsons Canada Services Ltd. assumes no liability to any other party for any representations contained in this drawing."

FILE LOCATION: J:\53760000\53761300\11.0_FIGURES_&_MAPS\11.4_CAD_FILES\2013-SITEPLAN.DWG

PLOT DATE & TIME: 22/7/2014 3:07:35 PM USER NAME: blair.fink
SAVE DATE & TIME: 19/6/2014 3:39:34 PM ISSUING OFFICE: CALGARY

MAINLAND:
ORIGINAL SOURCE: UMA ENGINEERING LTD.
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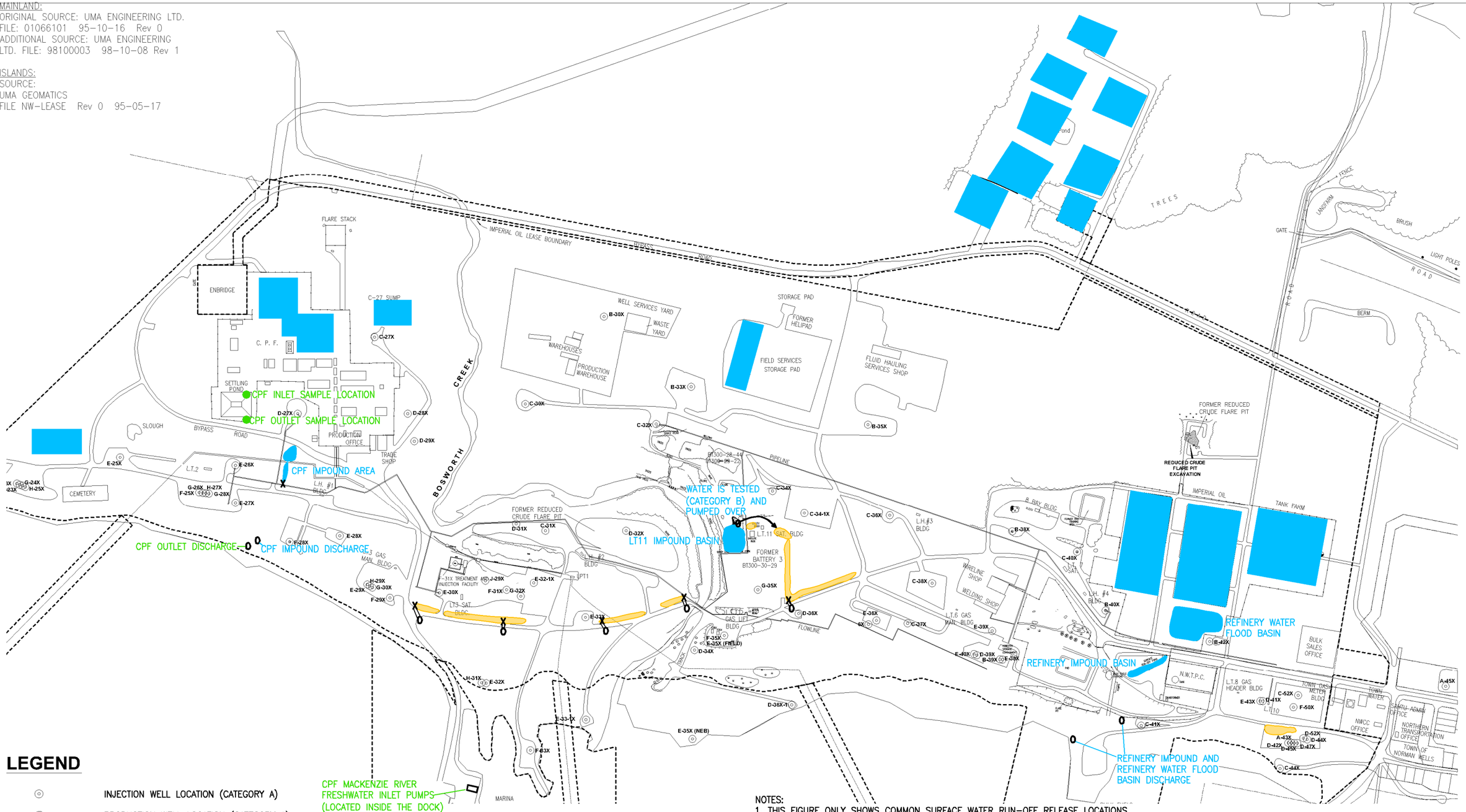
LTD. FILE: 98100003 98-10-08 Rev 1

ISLANDS:
SOURCE:
UMA GEOMATICS
FILE NW-LEASE Rev 0 95-05-17



LEGEND

- INJECTION WELL LOCATION (CATEGORY A)
- PRODUCTION WELL LOCATION (CATEGORY A)
- IMPERIAL OIL LEASE BOUNDARY
- FLOWLINE R/W
- UTILIDOR LOCATION
- CPF INLET AND OUTLET SAMPLE LOCATION
- X CULVERT GATE/PUMP LOCATION
- 0 END OF PIPE/CULVERT/PUMP DISCHARGE LOCATION
- CATEGORY A SURFACE WATER RUN-OFF COLLECTION LOCATIONS
- CATEGORY B SURFACE WATER RUN-OFF COLLECTION LOCATIONS

UTM NAD 27 ZONE 9

0 75 150 225 300m

SCALE 1 : 7,500

NOTES:
1. THIS FIGURE ONLY SHOWS COMMON SURFACE WATER RUN-OFF RELEASE LOCATIONS.
2. ALL INJECTION AND PRODUCTION WELLS FOR THE ENTIRE SITE FALL UNDER CATEGORY A.

Infrastructure & Environment

IMPERIAL OIL RESOURCES
NORMAN WELLS RENEWAL APPLICATION FOR WATER LICENCE

SNP INLET, OUTLET AND SURFACE WATER RUN-OFF COLLECTION LOCATIONS

30-JAN-14	date	B.M.F.	edited by	M.Y.T.	drawn by		app by

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WorleyParsons
resources & energy

PROJECT NUMBER: 307074-01618-1500

FIGURE: 4.3

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