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May 31, 2016

SLWB File: S13L1-007

Bonnie Bergsma  
Sahtu Land and Water Board  
Regulatory Specialist  
P.O. Box 1  
Fort Good Hope, NT  
X0E 0H0

**Re: Water Licence S13L1-007 Monthly Water Use Report for April 2016**

Dear Ms. Bergsma,

Imperial Oil Resources N.W.T. Limited (Imperial) is submitting the April 2016 monthly results for the Surveillance Network Program under Water Licence S13L1-007.

On December 4, 2015 the chlorine injection system was shut off and remained inoperable until repaired. Daily chlorine analysis began on April 21, 2016.

On April 16, 2016 the inlet composite sampler malfunctioned and overfilled the sample bottles. The sampler was isolated until repaired the next business day; a suite of grab samples was taken in replace of the composite samples. Results are included in the attached data sheet.

Any questions or concerns please contact me at (867) 587-3215.

Sincerely,

A handwritten signature in black ink, appearing to read "Lindsay Hollands".

Lindsay Hollands, B.ASc  
Regulatory and Environmental Advisor

cc: T. Morton, INAC, Yellowknife

**IMPERIAL - NORMAN WELLS OPERATIONS**  
**WATER LICENCE S13L1-007**  
**CPF DAILY VOLUMES**  
**April 2016**

Date	VOLUMES (m <sup>3</sup> )					TEMP (C)		CHLORINE (mg/L)
	S13L1-007-1 CPF Intake Water	S13L1-007-2 CPF Effluent Water	Fresh Water Injection	Produced Water Injection	Total Water Injection	S13L1-007-1 CPF Intake Water	S13L1-007-2 CPF Effluent Water	S13L1-007-2 CPF Effluent Water
1	5,990	3,939	2,051	7,156	9,208	2	12	*
2	6,051	4,004	2,047	7,135	9,182	2	12	*
3	6,051	4,013	2,037	7,097	9,134	2	13	*
4	6,051	4,003	2,047	7,044	9,091	2	12	*
5	6,050	3,997	2,054	7,011	9,065	2	13	*
6	6,051	3,966	2,085	7,088	9,173	2	13	*
7	6,051	3,926	2,124	6,830	8,954	2	13	*
8	6,051	4,007	2,044	6,877	8,921	2	14	*
9	6,051	4,010	2,041	6,798	8,839	2	13	*
10	6,051	4,012	2,039	6,742	8,781	2	14	*
11	6,051	4,011	2,040	6,713	8,752	2	14	*
12	6,051	4,013	2,038	6,702	8,740	2	14	*
13	6,051	4,020	2,030	6,672	8,702	2	14	*
14	6,051	3,982	2,068	6,889	8,957	2	14	*
15	6,017	3,894	2,123	7,028	9,151	2	14	*
16	5,901	3,760	2,141	6,997	9,138	2	15	*
17	5,977	3,838	2,139	6,949	9,088	2	15	*
18	6,072	3,931	2,140	7,041	9,182	2	13	*
19	5,844	3,709	2,135	7,091	9,226	2	13	*
20	5,801	3,690	2,110	7,046	9,156	2	13	*
21	5,801	3,701	2,099	7,064	9,163	2	13	0.04
22	5,839	3,730	2,109	7,047	9,156	2	13	0.04
23	5,901	3,792	2,109	7,041	9,149	2	15	0.03
24	5,963	3,854	2,109	7,057	9,166	2	16	0.02
25	6,134	4,019	2,115	7,081	9,197	2	17	0.08
26	6,223	4,111	2,112	7,100	9,212	2	15	0.02
27	6,107	3,993	2,114	7,081	9,194	2	15	0.02
28	6,101	3,989	2,111	7,050	9,161	2	16	0.06
29	6,101	3,992	2,109	7,003	9,112	2	17	0.09
30	6,101	3,986	2,115	7,005	9,120	2	17	0.09
<b>TOTAL</b>	180,527	117,893	62,634	209,434	272,068			
<b>AVG</b>	6,018	3,930	2,088	6,981	9,069	2	14	-
<b>HIGH</b>	6,223	4,111	2,141	7,156	9,226			

\*Chlorine system inoperable therefore no samples were taken during this time

**IMPERIAL - NORMAN WELLS OPERATIONS**  
**WATER LICENCE S13L1-007**  
**CPF MONTHLY VOLUMES SUMMARY**  
**April 2016**

**Water Injection Volumes (m<sup>3</sup>)**

Total fresh water injected	62,634	
Total produced water injected	209,434	
<b>Total Monthly</b>	<b>272,068</b>	Total Injected

**CPF Water Volumes (m<sup>3</sup>)**

Total CPF intake water S13L1-007-01	180,527	
Total CPF effluent water S13L1-007-02	117,893	
Highest daily water intake S13L1-007-01	6,223	Max. Allow. 16,000 m3/day.
<b>YTD water intake S13L1-007</b>	<b>687,645</b>	Max. Allow. 3,500,000 m3/yr.

**Alternate Water Usage Volumes (m<sup>3</sup>)**

Alternate surface water usage	0
<b>YTD Alternate surface water usage</b>	<b>0</b>

**Surface Runoff Water Release Volumes (m<sup>3</sup>)**

Refinery Impound Basin	0
LT 11 Impound Basin	0
Refinery Water flood Basin	0
CPF Impound Basin	0
Misc. Mainland Impound Areas	9
Misc. Bear Island Impound Areas	0
Misc. Goose Island Impound Areas	0
<b>Total - YTD Surface Runoff</b>	<b>9</b>

IMPERIAL - NORMAN WELLS OPERATIONS  
WATER LICENCE S13L1-007  
CPF MONTHLY WATER DATA  
April 2016

SNP S13L1-007-1 (Intake Water)			
	Suspended Solids (mg/L)	pH	Specific Conductivity uS/cm
<b>Max. Grab Limit</b>			
Mar 31 - April 4	7.3	8.01	310
April 4 - 7	3.3	8.01	300
April 7 - 11	<1.0	*	300
April 18 - In Grab**	2.0	8.05	270
April 18 - 21	5.3	7.95	270
April 21 - 25	<1	8.01	270
April 25 - 28	13.0	7.94	270

\*pH analysis was not run due to lab error

\*\*Composite sampler malfunctioned April 16

SNP S13L1-007-2 (Effluent Water)			
	Suspended Solids (mg/L)	pH	Specific Conductivity uS/cm
<b>Max. Grab Limit</b>		<b>6.0 - 9.0</b>	
Mar 31 - April 4	3.3	8.07	280
April 4 - 7	2.7	8.12	280
April 7 - 11	1.3	*	280
April 11 - 14	<1	7.96	280
April 14 - 18	1.3	8.07	270
April 18 - 21	2	8.08	270
April 21 - 25	2	8.10	260
April 25 - 28	1.3	8.05	270

\*pH analysis was not run due to lab error

SNP S13L1-007-1 (Intake Water)		
	Total Petroleum Hydrocarbons (mg/L)	Phenol (mg/L)
<b>Max. Grab Limit</b>		
March 28 - April 4	<2.0	<0.0020
April 4 - 11	<2.0	<0.0020
April - 18 - In Grab*	<2.0	<0.0020
April 18 - 25	<2.0	<0.0020

\*Composite sampler malfunctioned April 16

SNP S13L1-007-2 (Effluent Water)				
	Total Petroleum Hydrocarbons (mg/L)	Phenol (mg/L)	Daily Chlorine (mg/L)	Temp (C)
<b>Max. Grab Limit</b>	<b>5</b>	<b>0.14</b>		
Mar 28 - Apr 4	<2.0	<0.0020	*	13
Apr 4 - 11	<2.0	<0.0020	*	13
Apr 11 - 18	<2.0	<0.0020	*	14
Apr 18 - 25**	<2.0	<0.0020	0.03	14

\*Chlorine system inoperable therefore no samples were taken during this time

\*\*Chlorine average based on 4 days

IMPERIAL - NORMAN WELLS OPERATIONS  
WATER LICENCE S13L1-007  
CPF MONTHLY WATER DATA  
April 2016

SNP S13L1-007-2 (Effluent Water) - FOUR WEEK AVERAGE CONCENTRATION							
Parameter	Total Petroleum Hydrocarbons (mg/L)	Phenol (mg/L)	Suspend Solids (mg/L)	pH	Specific Conduct. (uS/cm)	Daily Chlorine (mg/L)	Temp (C)
<b>Max. Average Limit</b>	<b>3.00</b>	<b>0.070</b>		<b>6.0 - 9.0</b>			
March 7 - April 4	<2.0	<0.0020	3.7	8.1	208	*	13
March 14 - April 11	<2.0	<0.0020	2.2	8.1	244	*	13
March 21 - April 18	<2.0	<0.0020	2.0	8.0	243	*	13
March 28 - April 25 **	<2.0	<0.0020	1.9	8.1	240	0.03	13

\*Chlorine system inoperable therefore no samples were taken during this time

\*\*Chlorine average based on 4 days

CPF OUT GRAB (MacKenzie River Break-Up Preparation)					
Parameter	Total Petroleum Hydrocarbons (mg/L)	Phenol (mg/L)	Suspend Solids (mg/L)	pH	Specific Conduct. (uS/cm)
28-Apr	<2.0	<0.0020	3.3	8.09	270

IMPERIAL - NORMAN WELLS OPERATIONS  
WATER LICENCE S13L1-007  
QUARTERLY CPF WATER INLET DATA  
April 2016

SNP S13L1-007-1 (Intake Water)					
Date	January 2016 (mg/L)	April 2016 (mg/L)	July 2016 (mg/L)	October 2016 (mg/L)	YTD Avg. (mg/L)
pH	7.92	8.05			7.99
Phenols	<0.0020	<0.0020			<0.0020
Dissolved Sodium	9.0	9.0			9.0
Total Sodium	9.8	9.4			9.6
Dissolved Potassium	0.84	0.86			0.85
Total Potassium	0.94	0.92			0.93
Dissolved Sulphate	36.0	37.0			36.5
Dissolved Chloride	11.0	11.0			11.0
Dissolved Calcium	26.0	28.0			27.0
Total Calcium	28.0	29.0			28.5
Dissolved Magnesium	10.0	10.0			10.0
Total Magnesium	11.0	11.0			11.0
Total Alkalinity	80.0	83.0			81.5
Specific Conductivity	270.0	260.0			265.0
Total Suspended Solids	<1.0	<1.0			<1.0
Total Dissolved Solids	120.0	140.0			130.0
Total Petroleum	<2.0	<2.0			<2.0
Total Phosphorus	0.13	<0.10			0.13
Total Hardness	110.0	110.0			110.0

SNP S13L1-007-2 (Effluent Water)					
Date	January 2016 (mg/L)	April 2016 (mg/L)	July 2016 (mg/L)	October 2016 (mg/L)	YTD Avg. (mg/L)
pH	7.99	8.03			8.01
Phenols	<0.0020	<0.0020			<0.0020
Dissolved Sodium	9.4	9.0			9.2
Total Sodium	9.6	9.4			9.5
Dissolved Potassium	0.91	0.87			0.89
Total Potassium	0.93	0.92			0.93
Dissolved Sulphate	36.0	38.0			37.0
Dissolved Chloride	11.0	12.0			11.5
Dissolved Calcium	28.0	28.0			28.0
Total Calcium	28.0	30.0			29.0
Dissolved Magnesium	11.0	11.0			11.0
Total Magnesium	11.0	11.0			11.0
Total Alkalinity	83.0	83.0			83.0
Specific Conductivity	270.0	260.0			265.0
Total Suspended Solids	<1.0	<1.0			<1.0
Total Dissolved Solids	150.0	140.0			145.0
Total Petroleum	<2.0	<2.0			<2.0
Total Phosphorus	0.11	<0.10			0.11
Total Hardness	110.0	110.0			110.0

QUARTERLY CPF EFFLUENT DATA  
QUARTERLY ACUTE LETHALITY  
April 2016

SNP S13L1-007-2 (Effluent Water)		
Date	Rainbow Trout (% Survival)	Daphnia Magna (% Survival)
<b>Licence Criteria</b>	<b>&gt; 50% Survival</b>	<b>&gt; 50% Survival</b>
Q1 - January	100%	100%
Q2 - April	100%	100%
Q3		
Q4		

**IMPERIAL - NORMAN WELLS OPERATIONS**  
**WATER LICENCE S13L1-007**  
**SURFACE WATER RUNOFF RELEASE REPORT**  
**April 2016**

<b>Discharge Where Contamination Suspected</b>										
	Date	Start/ Middle/ End	Total Discharge Volume (m <sup>3</sup> )	Total Petroleum Hydrocarbons (mg/L)	Phenols (mg/L)	Chlorides (mg/L)	pH	Suspended Solids (mg/L)	Total Dissolved Solids (mg/L)	Specific Conduct. (uS/cm)
<b>Max Grab Sample Limit</b>				<b>5</b>	<b>0.14</b>	<b>&lt;500</b>	<b>6.0-9.0</b>			
<b>Mainland Areas</b>										
<b>Refinery Impound</b>	29-Apr	Start	*	<2.0	0.011	2.7	7.71	13	160	260
<b>Misc. Mainland Impound Areas</b>										
<b>Retention Area</b>	28-Apr	Start	*	<2.3	0.0062	2.9	7.73	17	110	180

*\*Samples were taken but release did not commence in April.*

**IMPERIAL - NORMAN WELLS OPERATIONS**  
**WATER LICENCE S13L1-007**  
**SURFACE WATER RUNOFF RELEASE REPORT**  
**April 2016**

<b>Discharge Where No Contamination Suspected</b>					
	Date	Total Discharge Volume (m <sup>3</sup> )	Chlorides (mg/L)	pH	Sheen Y/N
<b>Sample Limits</b>			<b>&lt; 500</b>	<b>6.0-9.0</b>	<b>N</b>
<b>Mainland</b>					
<b>Ditch near LT-11</b>	30-Apr	9	0	6	N
<b>Bear Island</b>					
		0			
<b>Goose Island</b>					
		0			