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November 30, 2018

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

**Re: Monthly Water Use Report for October 2018
Water Licence S13L1-007, Annex A, Part D, Condition 1
Imperial Oil Resources N.W.T. Limited (Imperial)**

Dear Ms. Bergsma,

Imperial is submitting this report as per Water Licence S13L1-007, Annex A, Part D, Condition 1. All water licence requirements were met for the month of October.

As per the March 2017 report, the Norman Wells facility remained temporarily shutdown until October 13, 2018. The chlorine injection system still remains shutin.

If you require further information, please contact Sloan Leavitt at 587-476-4449 or sloan.n.leavitt@esso.ca.

Sincerely,

A handwritten signature in black ink that reads "Sloan Leavitt". The signature is written in a cursive style and is placed on a light grey rectangular background.

Sloan Leavitt
Environment and Regulatory Advisor

cc: T. Morton, INAC, Yellowknife

IMPERIAL - NORMAN WELLS OPERATIONS
 WATER LICENCE S13L1-007
 CPF DAILY VOLUMES
 October 2018

Date	VOLUMES (m ³)					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*	5,217	5,217	0	0	0	0	0	0**
2*	5,201	5,201	0	0	0	0	0	0**
3*	5,201	5,201	0	0	0	0	0	0**
4*	5,192	5,192	0	0	0	0	0	0**
5*	5,201	5,201	0	0	0	0	0	0**
6*	5,273	5,273	0	0	0	0	0	0**
7*	5,301	5,301	0	0	0	0	0	0**
8*	4,677	4,677	0	0	0	0	0	0**
9*	4,001	4,001	0	0	0	0	0	0**
10*	4,001	4,001	0	0	0	0	0	0**
11*	4,001	4,001	0	0	0	0	0	0**
12*	4,001	4,001	0	0	0	0	0	0**
13*	4,001	4,001	0	458	458	3.5	10.7	0**
14	4,001	4,001	0	1,728	1,728	3.9	11.1	0**
15	4,001	4,001	0	2,091	2,091	4.0	10.8	0**
16	4,001	4,001	0	3,341	3,341	3.6	11.0	0**
17	4,001	4,001	0	3,275	3,275	3.9	11.3	0**
18	4,001	4,001	0	4,410	4,410	4.1	10.8	0**
19	4,001	4,001	0	4,019	4,019	3.6	10.1	0**
20	4,001	4,001	0	4,891	4,891	3.1	10.4	0**
21	4,001	4,001	0	5,080	5,080	3.9	13.1	0**
22	4,087	4,087	0	5,498	5,498	3.1	14.6	0**
23	5,030	5,030	0	6,670	6,670	3.4	14.5	0**
24	5,376	5,376	0	7,275	7,275	3.5	14.8	0**
25	5,201	5,201	0	7,277	7,277	2.9	15.0	0**
26	5,201	5,201	0	7,086	7,086	2.8	15.2	0**
27	5,184	5,184	0	7,074	7,074	2.6	14.9	0**
28	5,001	5,001	0	7,053	7,053	3.1	14.5	0**
29	5,001	5,001	0	6,900	6,900	3.5	14.8	0**
30	4,451	4,451	0	6,705	6,705	8.8	17.6	0**
31	5,176	5,176	0	6,707	6,707	8.4	17.3	0**
TOTAL	142,977	142,977	0	97,538	97,538			
AVG	4,612	4,612	0	3,146	3,146	2.4	8.1	-
HIGH	5,376	5,376	0	7,277	7,277			

* Norman Wells beginning to startup the operation; water volumes based on pump rates while meters are being tested / re-commissioned

** Chlorine injection offline

IMPERIAL - NORMAN WELLS OPERATIONS
 WATER LICENCE S13L1-007
 CPF MONTHLY VOLUMES SUMMARY
 October 2018

Water Injection Volumes (m³)

Total fresh water injected	0
Total produced water injected	97,538
Total Monthly	97,538

Total Injected

CPF Water Volumes (m³)

Total CPF intake water S13L1-007-01	142,977
Total CPF effluent water S13L1-007-02	142,977
Highest daily water intake S13L1-007-01	5,376
YTD water intake S13L1-007	248,529

Max. Allow. 16,000 m3/day.
Max. Allow. 3,500,000 m3/yr.

Alternate Water Usage Volumes (m³)

Alternate surface water usage	0
YTD Alternate surface water usage	0

Surface Runoff Water Release Volumes (m³)

Refinery Impound Basin	0
LT 11 Impound Basin	0
Refinery Water flood Basin	0
CPF Impound Basin	0
Misc. Mainland Impound Areas	0
Misc. Bear Island Impound Areas	0
Misc. Goose Island Impound Areas	0
Total - YTD Surface Runoff	19,385

IMPERIAL - NORMAN WELLS OPERATIONS
 WATER LICENCE S13L1-007
 CPF MONTHLY WATER DATA
 October 2018

SNP S13L1-007-1 (Intake Water)			
Dates	Total Suspended Solids (mg/L)	pH	Specific Conductivity (uS/cm)
Max. Grab Limit			
1-Oct	120.0	7.9	280.0
4-Oct	3.3	7.9	290.0
9-Oct	2.0	8.0	290.0
12-Oct	21.0	7.9	280.0
15-Oct	21.0	7.9	290.0
18-Oct	2.0	8.0	280.0
22-Oct	4.0	8.0	280.0
25-Oct	17.0	8.1	280.0
29-Oct	32.0	8.0	280.0

SNP S13L1-007-2 (Effluent Water)			
Dates	Total Suspended Solids (mg/L)	pH	Specific Conductivity (uS/cm)
Max. Grab Limit		6.0 - 9.0	
1-Oct	3.3	8.0	270.0
4-Oct	8.0	8.0	330.0
9-Oct	2.7	8.0	280.0
12-Oct	4.7	8.0	280.0
15-Oct	6.7	8.0	280.0
18-Oct	2.7	8.0	280.0
22-Oct	1.3	8.0	270.0
25-Oct	7.3	8.0	280.0
29-Oct	2.0	8.0	280.0

SNP S13L1-007-1 (Intake Water)		
Dates	Total Petroleum Hydrocarbons (mg/L)	Phenols (mg/L)
Max. Grab Limit		
4-Oct	<2.0	<0.0020
12-Oct	<2.0	<0.0020
18-Oct	<2.0	<0.0020
25-Oct	<2.0	<0.0020

SNP S13L1-007-2 (Effluent Water)				
Dates	Total Petroleum Hydrocarbons (mg/L)	Phenols (mg/L)	Daily Chlorine (mg/L)	Temp (C)
Max. Grab Limit	5	0.14		
4-Oct	<2.0	<0.0020	*	-
12-Oct	<2.0	<0.0020	*	-
18-Oct	<2.0	<0.0020	*	10.5
25-Oct	<2.0	<0.0020	*	14.9

* Chlorine injection still offline

IMPERIAL - NORMAN WELLS OPERATIONS
 WATER LICENCE S13L1-007
 CPF MONTHLY WATER DATA
 October 2018

SNP S13L1-007-2 (Effluent Water) - FOUR WEEK AVERAGE CONCENTRATION							
Parameter	Total Petroleum Hydrocarbons (mg/L)	Phenol (mg/L)	Total Suspended Solids (mg/L)	pH	Specific Conductivity (uS/cm)	Daily Chlorine (mg/L)	Temp (C)
Max. Average Limit	5.00	0.14		6.0 - 9.0			
Oct 4 - 25	<2.0	<0.0020	4.3	8.0	4.4	*	8.1

* Chlorine injection system not operational

IMPERIAL - NORMAN WELLS OPERATIONS
WATER LICENCE S13L1-007-1
QUARTERLY CPF WATER INLET DATA
October 2018

SNP S13L1-007-1 (Intake Water)					
Parameter	January 2018* (mg/L)	April 2018* (mg/L)	July 2018* (mg/L)	October 2018 (mg/L)	YTD Avg. (mg/L)
pH				7.87	7.87
Phenols				0.0025	0.0025
Dissolved Sodium				9.80	9.8
Total Sodium				8.7	8.7
Dissolved Potassium				1.0	1.0
Total Potassium				0.92	0.92
Dissolved Sulphate				37	37
Dissolved Chloride				11.0	11
Dissolved Calcium				33.0	33
Total Calcium	N/A	N/A	N/A	31	31
Dissolved Magnesium				9.6	9.6
Total Magnesium				10.0	10
Total Alkalinity				88	88
Specific Conductivity				270	270
Total Suspended Solids				55.0	55
Total Dissolved Solids				150	150
Total Petroleum				<2.0	<2.0
Total Phosphorus				<0.10	<0.10
Total Hardness				130	130

IMPERIAL - NORMAN WELLS OPERATIONS
WATER LICENCE S13L1-007-2
QUARTERLY CPF WATER EFFLUENT DATA
October 2018

SNP S13L1-007-2 (Effluent Water)					
Parameter	January 2018* (mg/L)	April 2018* (mg/L)	July 2018* (mg/L)	October 2018 (mg/L)	YTD Avg. (mg/L)
pH				7.92	7.92
Phenols				0.0022	0.0022
Dissolved Sodium				9.40	9.4
Total Sodium				8.7	8.7
Dissolved Potassium				1.0	0.96
Total Potassium				0.94	0.94
Dissolved Sulphate				37.0	37
Dissolved Chloride				11	11
Dissolved Calcium				33	33
Total Calcium	N/A	N/A	N/A	31.0	31
Dissolved Magnesium				10	10
Total Magnesium				9.50	9.5
Total Alkalinity				87.00	87
Specific Conductivity				280	280
Total Suspended Solids				3	3.3
Total Dissolved Solids				150	150
Total Petroleum				<2.0	<2.0
Total Phosphorus				<0.10	<0.10
Total Hardness				120	120

IMPERIAL - NORMAN WELLS OPERATIONS
WATER LICENCE S13L1-007-2
QUARTERLY ACUTE LETHALITY
October 2018

SNP S13L1-007-2 (Effluent Water)		
Date	Rainbow Trout (% Survival)	Daphnia Magna (% Survival)
Licence Criteria	> 50% Survival	> 50% Survival
Q1 - January	100%	100%
Q2 - April*	N/A	N/A
Q3 - July*	100%	100%
Q4		

