



**Jody Crawford**  
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October 28, 2021

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

**Re: Monthly Water Use Report for September 2021  
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. Water licence requirements were met for the month of September.

If you require further information please contact Benjamin Fraser at 587-476-2878 or [benjamin.fraser@esso.ca](mailto:benjamin.fraser@esso.ca).

Sincerely,

A handwritten signature in black ink, appearing to read "Benjamin Fraser".

Benjamin Fraser  
Environment and Regulatory Advisor  
Imperial

cc: D.Penney, CIRNAC, Yellowknife  
T.Morton CIRNAC, Yellowknife

IMPERIAL - NORMAN WELLS OPERATIONS  
WATER LICENCE S13L1-007  
CPF DAILY VOLUMES  
September 2021

| Date         | VOLUMES (m <sup>3</sup> )          |                                      |                          |                             |                          | TEMP (C)                           |                                      | CHLORINE (mg/L)                      |
|--------------|------------------------------------|--------------------------------------|--------------------------|-----------------------------|--------------------------|------------------------------------|--------------------------------------|--------------------------------------|
|              | S13L1-007-1<br>CPF Intake<br>Water | S13L1-007-2<br>CPF Effluent<br>Water | Fresh Water<br>Injection | Produced Water<br>Injection | Total Water<br>Injection | S13L1-007-1<br>CPF Intake<br>Water | S13L1-007-2<br>CPF Effluent<br>Water | S13L1-007-2<br>CPF Effluent<br>Water |
| 1            | 6,900                              | 6,900                                | 0.47                     | 6,848                       | 6,849                    | 16.2                               | 22.0                                 | 0.00                                 |
| 2            | 6,901                              | 6,900                                | 0.48                     | 6,902                       | 6,903                    | 16.6                               | 22.7                                 | 0.00                                 |
| 3            | 6,900                              | 6,900                                | 0.52                     | 6,597                       | 6,598                    | 16.4                               | 23.0                                 | 0.00                                 |
| 4            | 6,900                              | 6,900                                | 0.46                     | 6,436                       | 6,436                    | 17.0                               | 23.2                                 | 0.00                                 |
| 5            | 6,901                              | 6,900                                | 0.46                     | 6,412                       | 6,413                    | 16.8                               | 23.3                                 | 0.00                                 |
| 6            | 6,765                              | 6,765                                | 0.50                     | 6,248                       | 6,249                    | 15.9                               | 22.5                                 | 0.00                                 |
| 7            | 6,946                              | 6,945                                | 0.47                     | 6,256                       | 6,256                    | 15.8                               | 21.0                                 | 0.00                                 |
| 8            | 7,273                              | 7,273                                | 0.49                     | 6,219                       | 6,219                    | 15.7                               | 18.1                                 | 0.00                                 |
| 9            | 7,469                              | 7,469                                | 0.50                     | 6,182                       | 6,183                    | 15.2                               | 16.9                                 | 0.00                                 |
| 10           | 7,444                              | 7,443                                | 0.49                     | 6,109                       | 6,110                    | 14.9                               | 16.2                                 | 0.00                                 |
| 11           | 7,559                              | 7,558                                | 0.49                     | 6,130                       | 6,130                    | 15.2                               | 15.8                                 | 0.00                                 |
| 12           | 7,733                              | 7,733                                | 0.48                     | 6,143                       | 6,143                    | 14.8                               | 15.7                                 | 0.00                                 |
| 13           | 7,870                              | 7,869                                | 0.49                     | 6,047                       | 6,048                    | 14.6                               | 15.6                                 | 0.00                                 |
| 14           | 7,900                              | 7,900                                | 0.48                     | 5,888                       | 5,888                    | 14.6                               | 15.3                                 | 0.00                                 |
| 15           | 7,900                              | 7,900                                | 0.47                     | 5,811                       | 5,812                    | 14.0                               | 15.1                                 | 0.00                                 |
| 16           | 7,900                              | 7,900                                | 0.48                     | 5,718                       | 5,718                    | 13.9                               | 20.8                                 | 0.00                                 |
| 17           | 7,900                              | 7,900                                | 0.46                     | 5,748                       | 5,748                    | 13.2                               | 20.4                                 | 0.00                                 |
| 18           | 7,205                              | 7,205                                | 0.46                     | 5,647                       | 5,647                    | 13.0                               | 20.0                                 | 0.00                                 |
| 19           | 6,617                              | 6,617                                | 0.46                     | 5,736                       | 5,737                    | 12.7                               | 20.1                                 | 0.00                                 |
| 20           | 6,054                              | 4,544                                | 1,510                    | 5,584                       | 7,094                    | 11.8                               | 19.1                                 | 0.00                                 |
| 21           | 6,054                              | 4,544                                | 1,510                    | 5,584                       | 7,094                    | 11.8                               | 19.1                                 | 0.00                                 |
| 22           | 5,461                              | 4,066                                | 1,396                    | 5,480                       | 6,876                    | 10.6                               | 16.2                                 | 0.00                                 |
| 23           | 5,754                              | 4,234                                | 1,521                    | 5,020                       | 6,541                    | 10.8                               | 15.7                                 | 0.00                                 |
| 24           | 5,407                              | 3,899                                | 1,508                    | 4,714                       | 6,222                    | 10.2                               | 15.4                                 | 0.02                                 |
| 25           | 5,345                              | 3,844                                | 1,501                    | 5,222                       | 6,723                    | 9.1                                | 14.0                                 | 0.00                                 |
| 26           | 5,500                              | 4,005                                | 1,496                    | 5,480                       | 6,976                    | 9.5                                | 14.5                                 | 0.01                                 |
| 27           | 5,510                              | 4,000                                | 1,510                    | 5,609                       | 7,120                    | 10.0                               | 15.4                                 | 0.01                                 |
| 28           | 5,325                              | 3,730                                | 1,595                    | 5,412                       | 7,007                    | 9.0                                | 14.3                                 | 0.02                                 |
| 29           | 5,300                              | 3,491                                | 1,809                    | 5,147                       | 6,956                    | 8.9                                | 14.7                                 | 0.04                                 |
| 30           | 5,300                              | 3,582                                | 1,718                    | 5,173                       | 6,891                    | 8.9                                | 15.1                                 | 0.00                                 |
| <b>TOTAL</b> | 199,997                            | 182,915                              | 17,082                   | 175,503                     | 192,585                  | -                                  | -                                    | -                                    |
| <b>AVG</b>   | 6,667                              | 6,097                                | 569                      | 5,850                       | 6,419                    | 13.2                               | 18.0                                 | 0.00                                 |
| <b>HIGH</b>  | 7,900                              | 7,900                                | 1,809                    | 6,902                       | 7,120                    | 17.0                               | 23.3                                 | 0.04                                 |

IMPERIAL - NORMAN WELLS OPERATIONS  
WATER LICENCE S13L1-007  
CPF MONTHLY VOLUMES SUMMARY  
September 2021

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

|                               |                |                       |
|-------------------------------|----------------|-----------------------|
| Total fresh water injected    | 17,082         |                       |
| Total produced water injected | 175,503        |                       |
| <b>Total Monthly</b>          | <b>192,585</b> | <b>Total Injected</b> |

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

|   |                  |   |
|---|------------------|---|
| Total CPF intake water S13L1-007-01     | 199,997          |   |
| Total CPF effluent water S13L1-007-02   | 182,915          |   |
| Highest daily water intake S13L1-007-01 | 7,900            | Max. Allow. 16,000 m <sup>3</sup> /day.   |
| <b>YTD water intake S13L1-007</b>       | <b>1,293,189</b> | Max. Allow. 3,500,000 m <sup>3</sup> /yr. |

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

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

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

|                                   |               |
|-----------------------------------|---------------|
| Refinery Impound Basin            | 25,271        |
| LT 11 Impound Basin               | 812           |
| Refinery Water flood Basin        | 0             |
| CPF Impound Basin                 | 10,078        |
| Misc. Mainland Impound Areas      | 2,182         |
| Misc. Bear Island Impound Areas   | 27            |
| Misc. Goose Island Impound Areas  | 99            |
| <b>Total - YTD Surface Runoff</b> | <b>38,469</b> |



**IMPERIAL - NORMAN WELLS OPERATIONS**  
**WATER LICENCE S13L1-007-1**  
**QUARTERLY CPF WATER INLET DATA**  
**September 2021**

| <b>SNP S13L1-007-1 (Intake Water)</b> |                           |                           |                           |                           |                        |
|---------------------------------------|---------------------------|---------------------------|---------------------------|---------------------------|------------------------|
| <b>Parameter</b>                      | <b>Q1 2021<br/>(mg/L)</b> | <b>Q2 2021<br/>(mg/L)</b> | <b>Q3 2021<br/>(mg/L)</b> | <b>Q4 2021<br/>(mg/L)</b> | <b>YTD Avg. (mg/L)</b> |
| pH                                    | 7.65                      | 8.13                      | 8.14                      |                           | 8.0                    |
| Phenols                               | <0.0015                   | <0.0015                   | <0.0015                   |                           | <0.0015                |
| Dissolved Sodium                      | 7.0                       | 5.8                       | 7.5                       |                           | 6.8                    |
| Total Sodium                          | 7.5                       | 5.7                       | 7.6                       |                           | 6.9                    |
| Dissolved Potassium                   | 0.78                      | 0.86                      | 0.88                      |                           | 0.8                    |
| Total Potassium                       | 0.95                      | 1.4                       | 1.7                       |                           | 1.4                    |
| Dissolved Sulphate                    | 29                        | 34                        | 36                        |                           | 33.0                   |
| Dissolved Chloride                    | 10                        | 5.6                       | 7.8                       |                           | 7.8                    |
| Dissolved Calcium                     | 23                        | 30                        | 32                        |                           | 28.3                   |
| Total Calcium                         | 26                        | 32                        | 53                        |                           | 37.0                   |
| Dissolved Magnesium                   | 7.6                       | 8.2                       | 8.9                       |                           | 8.2                    |
| Total Magnesium                       | 9.1                       | 9.1                       | 16                        |                           | 11.4                   |
| Total Alkalinity                      | 75                        | 76                        | 92                        |                           | 81.0                   |
| Specific Conductivity                 | 240                       | 250                       | 280                       |                           | 256.7                  |
| Total Suspended Solids                | 3.3                       | 33                        | 7.5                       |                           | 14.6                   |
| Total Dissolved Solids                | 150                       | 120                       | 160                       |                           | 143.3                  |
| Total Petroleum                       | <2.0                      | <2.0                      | <2.0                      |                           | <2.0                   |
| Total Phosphorus                      | <0.1                      | <0.1                      | 0.17                      |                           | 0.2                    |
| Total Hardness                        | 88                        | 110                       | 120                       |                           | 106.0                  |

**IMPERIAL - NORMAN WELLS OPERATIONS**  
**WATER LICENCE S13L1-007-2**  
**QUARTERLY CPF WATER EFFLUENT DATA**  
**September 2021**

| <b>SNP S13L1-007-2 (Effluent Water)</b> |                           |                           |                           |                           |                        |
|---|---------------------------|---------------------------|---------------------------|---------------------------|------------------------|
| <b>Parameter</b>                        | <b>Q1 2021<br/>(mg/L)</b> | <b>Q2 2021<br/>(mg/L)</b> | <b>Q3 2021<br/>(mg/L)</b> | <b>Q4 2021<br/>(mg/L)</b> | <b>YTD Avg. (mg/L)</b> |
| pH                                      | 7.39                      | 7.93                      | 8.07                      |                           | 7.8                    |
| Phenols                                 | <0.0015                   | <0.0015                   | <0.0015                   |                           | <0.0015                |
| Dissolved Sodium                        | 6.7                       | 5.8                       | 7.2                       |                           | 6.6                    |
| Total Sodium                            | 7.6                       | 6.1                       | 7.6                       |                           | 7.1                    |
| Dissolved Potassium                     | 0.78                      | 0.86                      | 0.75                      |                           | 0.8                    |
| Total Potassium                         | 1.0                       | 1.0                       | 1.2                       |                           | 1.1                    |
| Dissolved Sulphate                      | 29                        | 34                        | 35                        |                           | 32.7                   |
| Dissolved Chloride                      | 10                        | 6.9                       | 8.4                       |                           | 8.4                    |
| Dissolved Calcium                       | 22                        | 30                        | 27                        |                           | 26.3                   |
| Total Calcium                           | 27                        | 31                        | 32                        |                           | 30.0                   |
| Dissolved Magnesium                     | 7.3                       | 7.8                       | 7.9                       |                           | 7.7                    |
| Total Magnesium                         | 9.6                       | 8.7                       | 9.9                       |                           | 9.4                    |
| Total Alkalinity                        | 76                        | 83                        | 83                        |                           | 80.7                   |
| Specific Conductivity                   | 240                       | 250                       | 260                       |                           | 250.0                  |
| Total Suspended Solids                  | 9.1                       | 11                        | 5.8                       |                           | 8.6                    |
| Total Dissolved Solids                  | 130                       | 88                        | 140                       |                           | 119.3                  |
| Total Petroleum                         | <2.0                      | <2.0                      | <2.0                      |                           | <2.0                   |
| Total Phosphorus                        | <0.10                     | <0.10                     | <0.10                     |                           | <0.10                  |
| Total Hardness                          | 84                        | 110                       | 99                        |                           | 97.7                   |

**IMPERIAL - NORMAN WELLS OPERATIONS**  
**WATER LICENCE S13L1-007-2**  
**QUARTERLY ACUTE LETHALITY**  
**September 2021**

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

**IMPERIAL - NORMAN WELLS OPERATIONS**  
**WATER LICENCE S13L1-007**  
**SURFACE WATER RUNOFF RELEASE REPORT**  
**September 2021**

| Discharge Where Contamination Suspected |        |                          |  |   |                   |                     |                |  |  |                                 |
|---|--------|--------------------------|--|---|-------------------|---------------------|----------------|--|--|---------------------------------|
|   | Date   | Start/<br>Middle/<br>End | Total<br>Discharge<br>Volume (m <sup>3</sup> ) | Total Petroleum<br>Hydrocarbons<br>(mg/L) | Phenols<br>(mg/L) | Chlorides<br>(mg/L) | pH             | Total<br>Suspended<br>Solids<br>(mg/L) | Total<br>Dissolved<br>Solids<br>(mg/L) | Specific<br>Conduct.<br>(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>                   |        |                          |  |   |                   |                     |                |  |  |                                 |
| CPF Impound Basin                       | 7-Sep  | Start                    | 6578   | <2.0                                      | <0.0015           | 11                  | 7.87           | <1.0                                   | 1300                                   | 1600                            |
|   | 13-Sep | Mid 1                    |  | <2.0                                      | <0.0015           | 7.9                 | 8.05           | <1.0                                   | 140                                    | 320                             |
|   | 21-Sep | Mid 2                    |  | <2.0                                      | <0.0015           | 9.8                 | 7.67           | 4.4                                    | 570                                    | 800                             |
| Refinery Impound Basin                  | 3-Sep  | Start                    | 1834   | <2.0                                      | 0.0026            | 38                  | 8.52           | 9.5                                    | 480                                    | 840                             |
|   | 7-Sep  | Mid 1                    |  | <2.0                                      | 0.0017            | 37                  | 8.53           | <1.0                                   | 520                                    | 870                             |
|   | 14-Sep | Mid 2                    |  | <2.0                                      | <0.0015           | 38                  | 8.55           | <1.0                                   | 560                                    | 870                             |
| Refinery Waterflood Basin               | 7-Sep  | Start                    | 0  | <2.0                                      | <0.0015           | 34                  | 8.51           | 2.0                                    | 570                                    | 1000                            |
|   | 14-Sep | Mid 1                    |  | <2.0                                      | 0.0020            | 36                  | 8.40           | 15                                     | 640                                    | 1100                            |
| <b>Misc. Mainland Impound Areas</b>     |        |                          |  |   |                   |                     |                |  |  |                                 |
|   |        |                          |  |   |                   |                     |                |  |  |                                 |

**IMPERIAL - NORMAN WELLS OPERATIONS**  
**WATER LICENCE S13L1-007**  
**SURFACE WATER RUNOFF RELEASE REPORT**  
**September 2021**

| Discharge Where No Contamination Suspected |      |  |                     |                |              |
|--|------|--|---------------------|----------------|--------------|
|  | Date | Total<br>Discharge<br>Volume (m <sup>3</sup> ) | Chlorides<br>(mg/L) | pH             | Sheen<br>Y/N |
| <b>Sample Limits</b>                       |      |  | <b>&lt; 500</b>     | <b>6.0-9.0</b> | <b>N</b>     |
| <b>Mainland</b>                            |      |  |                     |                |              |
| <b>Bear Island</b>                         |      |  |                     |                |              |
| <b>Goose Island</b>                        |      |  |                     |                |              |