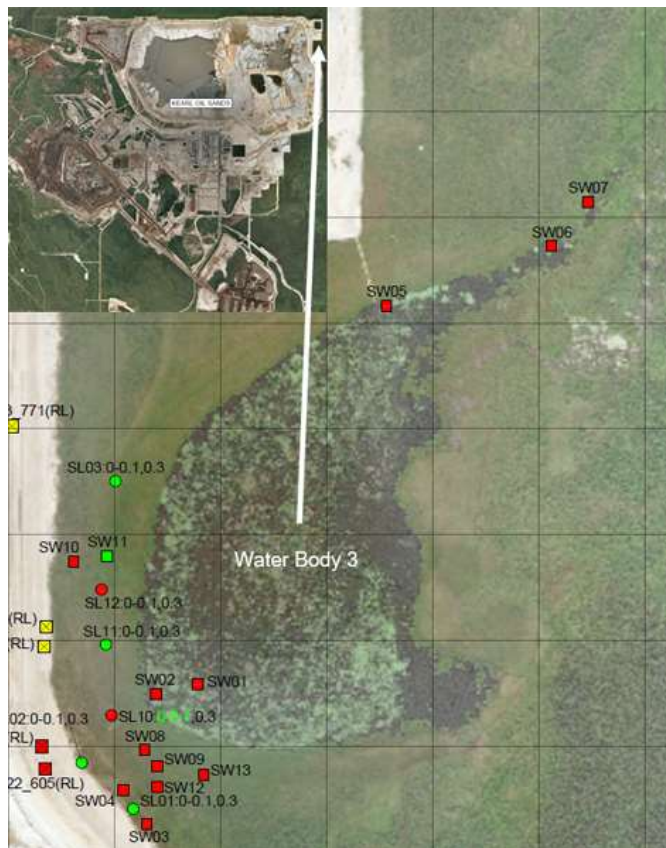


AER Third-Party Sampling 2023

Kearl Oil Sands

Surface Water Quality



Location	Date	PAL Guideline Exceedance*
Receptor (Water Body 3)		
SW05 (receptor-near outlet)	21-Apr-2023	PAL: total cobalt
SW06 (receptor-outlet)	21-Apr-2023	PAL: toluene, total selenium
SW07 (receptor-outlet)	21-Apr-2023	PAL: total selenium, dissolved aluminum
SW01 and SW02 not sampled due to ice safety. To be included in future sampling.		
Source		
SW03 (source- seep)	21-Apr-2023	PAL: F2, total arsenic, total cobalt, total copper, total selenium, total zinc, dissolved iron No guideline: naphthenic acids (3.1 mg/L)
SW04 (source- seep)	21-Apr-2023	PAL: F2, dissolved aluminum, dissolved iron No guideline: naphthenic acids (6.0 mg/L)
SW08 (source- onshore)	21-Apr-2023	PAL: F2, total selenium, dissolved aluminum
SW09 (source- onshore)	21-Apr-2023	PAL: F2, total selenium, total zinc, dissolved iron No guideline: naphthenic acids (4.7 mg/L)
SW10 (source- onshore)	21-Apr-2023	PAL: F2, total selenium No guideline: naphthenic acids (2.0 mg/L)
SW11 (source- onshore)	21-Apr-2023	No guideline: naphthenic acids (0.3 mg/L)
SW12 (source- onshore)	21-Apr-2023	PAL: F2, dissolved aluminum, dissolved iron No guideline: naphthenic acids (3.6 mg/L)
SW13 (source- onshore)	21-Apr-2023	PAL: dissolved iron No guideline: naphthenic acids (0.4 mg/L)

* Environmental Quality Guidelines for Alberta Surface Waters, Surface Water Quality Guidelines for the Protection of Aquatic Life.

Interpretation

- Additional source locations near Water Body 3 (SW08 to SW13) were added to surface water quality sampling.
- F2 hydrocarbons, a potential indicator of industrial wastewater, continues to exceed PAL guidelines near source locations since April 2023. Naphthenic acids were not present at locations sampled on April 21, 2023. However, locations closest to the source, SW01 and SW02, were not sampled due to ice safety.
- Several metals and major ions exceed guidelines in the area prior to Kearl mine development, based on 2003-2004 baseline sampling. This includes iron, sulphide, zinc.
- Exceedances of fluoride, sulphide, iron, aluminum, selenium, silver, zinc, toluene occur in Water Body 3 historically based on 2012-2021 monitoring.
- Toluene may be biogenic (natural) in origin. This may be confirmed with further analysis and sampling.

AER Third-Party Sampling 2023

Kearl Oil Sands



Surface Water Quality

Location	Date	PAL Guideline Exceedance*
Seep (DP4)		
DP4- SW01 (source)	22-Apr-2023	PAL: F2, dissolved iron No guideline: naphthenic acids (0.3mg/L)
Water Body 4		
WB4-SW01	22-Apr-2023	PAL: toluene, total cadmium, total cobalt, total zinc, nitrate-N, alkalinity

*Environmental Quality Guidelines for Alberta Surface Waters, Surface Water Quality Guidelines for the Protection of Aquatic Life

Interpretation

- Source location DP4-SW01 was added April 22, 2023. It indicated presence of F2 hydrocarbons and naphthenic acids, which are potential indicators of industrial wastewater.
- Water Body 4, a potential receptor, was added to surface water quality sampling on April 22, 2023. There is no definitive presence of industrial wastewater in Water Body 4.
- Toluene may be biogenic (natural) in origin. This may be confirmed with further analysis and sampling.

AER Third-Party Sampling 2023

Kearl Oil Sands



Soils

Location	Date	AB Tier 1 Guideline Exceedance* (Surface soil, coarse)
SL13 (north of DP4)	22-Apr-2023	AB Tier 1: F3
SL11 (north of DP4)	22-Apr-2023	AB Tier 1: F3
SL12 (north of DP4)	22-Apr-2023	AB Tier 1: F3

*Alberta Tier 1 Soil and Groundwater Remediation Guidelines.

Groundwater

Groundwater was last sampled on April 6, 2023. Refer to previous update.

Interpretation

- Locations SL13, SL14, SL15 were added April 22, 2023 downgradient of source DP4.
- F3 hydrocarbons downgradient of DP4 are possibly biogenic (natural) in origin. To be confirmed with further analysis and sampling.
- Soil sampling locations adjacent to Water Body 3 were last sampled on April 7, 2023. Refer to previous update.
- Soil sampling locations north of NODA were last sampled on March 15, 2023. Refer to previous update.