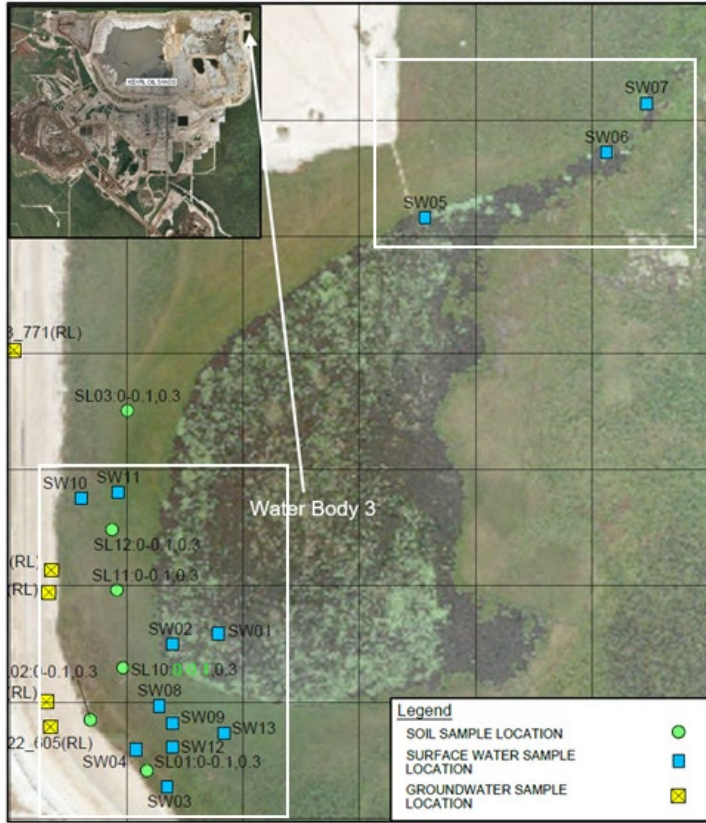


# AER Third-Party Sampling 2023

## Kearl Oil Sands



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

## Surface Water Quality

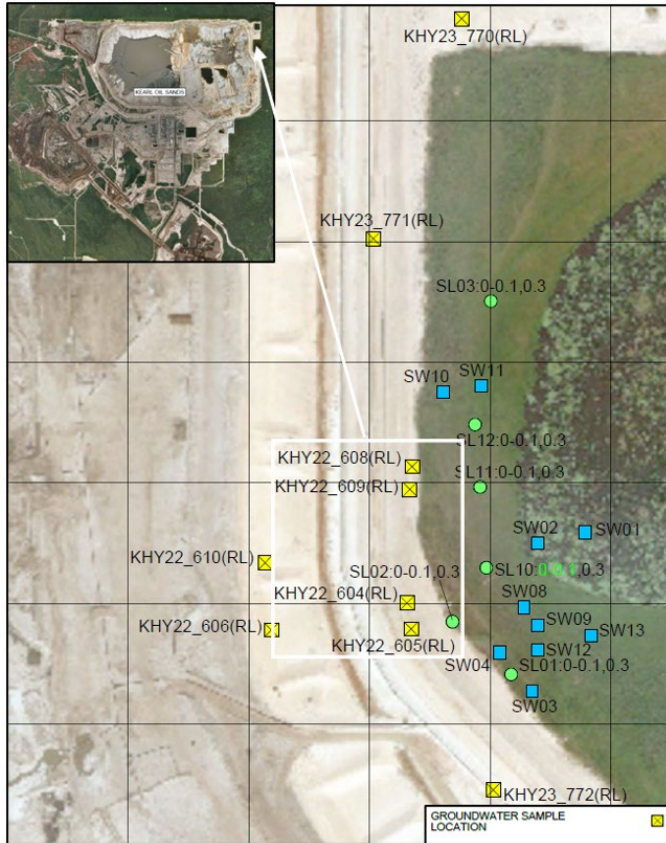
Location	Date	PAL Guideline Exceedance*
Receptor (Water Body 3)		
SW01 (receptor-near seep)	28-September-2023	PAL: total silver, total sulphide
SW02 (receptor-near seep)	28-September-2023	PAL: total silver, total sulphide
SW05 (receptor-near outlet)	28-September-2023	PAL: total silver, total sulphide
SW06 (receptor-outlet)	28-September-2023	PAL: total silver, total sulphide
SW07 (receptor-outlet)	28-September-2023	PAL: total silver, total sulphide
Source		
SW03 (source- seep)	28-September-2023	PAL: F2, total silver, total sulphide No guideline: naphthenic acids (1.8 mg/L)
SW04 (source- seep)	28-September-2023	PAL: F2, total cobalt, total silver, total zinc, dissolved iron, ammonia, total sulphide No guideline: naphthenic acids (4.1 mg/L)
SW08 (source- onshore)	28-September-2023	PAL: F2, total selenium, dissolved aluminum
SW11 (source- onshore)	28-September-2023	PAL: toluene, total silver, total silver
SW13 (source- onshore)	28-September-2023	PAL: toluene, total silver, dissolved iron, total sulphide

## Interpretation

- 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.
- Naphthenic acids were analyzed using the FTIR method. Naphthenic acids sampled on September 27 to 28, 2023 analyzed using the Orbitrap method is not available for this update.

# AER Third-Party Sampling 2023

## Kearl Oil Sands



## Groundwater

Location	Date	AB Tier 1 Guideline Exceedance*
KHY22-604 (shallow well)	23-August-2023	No guideline: naphthenic acids (9.6 mg/L)
	27-September-2023	AB Tier 1: TDS, manganese, iron, arsenic, F2
KHY22-605 (deep well)	27-September-2023	AB tier 1: iron, manganese
KHY22-608 (shallow well)	27-September-2023	AB Tier 1: TDS, sulphate, iron, manganese, F2
KHY22-609 (deep well)	27-September-2023	AB Tier 1: no exceedance
KHY23-771 (shallow well)	27-September-2023	AB Tier 1: TDS, iron, manganese
KHY23-772 (shallow well)	27-September-2023	AB Tier 1: TDS, sulphate, iron, manganese, arsenic, F2

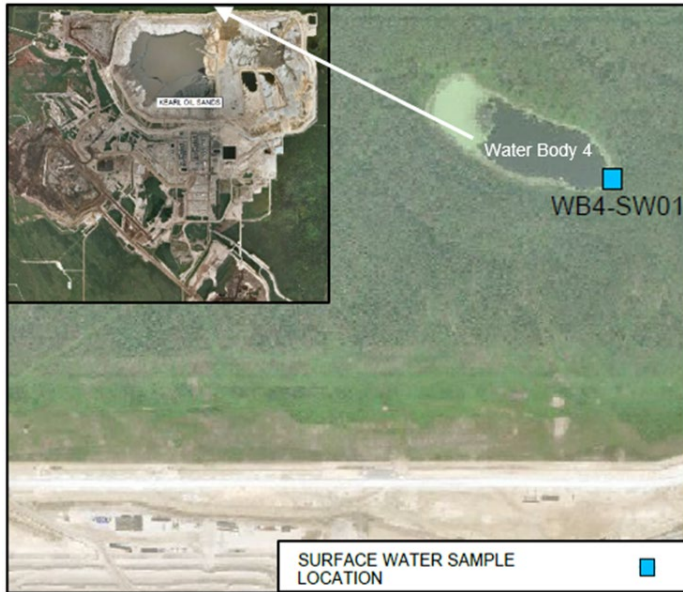
\*Alberta Tier 1 Soil and Groundwater Remediation Guidelines.

## Interpretation

- Exceedances suggest the presence of tailings seepage in shallow groundwater.
- KHY22-605 and KHY22-609 do not show impacts from tailings seepage in deeper groundwater.
- Lab analysis for naphthenic acids sampled in September is underway. Results to be provided in a future update.

# AER Third-Party Sampling 2023

## Kearl Oil Sands



## Surface Water Quality

Location	Date	AB Tier 1 Guideline Exceedance*
Water Body 4		
WB4-SW01	27-September-2023	PAL: F2, total cadmium, total cobalt, total lead, total silver, total sulphide

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

## Interpretation

- Naphthenic acids are analyzed using the FTIR method. Naphthenic acids sampled on September 27 to 28, 2023 analyzed using the Orbitrap method is not available for this update.



# AER Third-Party Sampling 2023

## Kearl Oil Sands



## Soils

Location	Date	AB Tier 1 Guideline Exceedance*
SL01 (southwest of WB3)	27-September-2023	AB Tier 1: electrical conductivity (EC)
SL16 (southwest of WB3)	27-September-2023	AB Tier 1: F3
SL17 (southwest of WB3)	27-September-2023	AB Tier 1: F3, pH (low)
SL18 (WB4)	27-September-2023	AB Tier 1: pH

\*Alberta Tier 1 Soil and Groundwater Remediation Guidelines.



## Interpretation

- Location SL01 at WB3 was resampled. Location SL16, SL17 were added September 27, 2023, adjacent to WB3. SL18 was added September 27, 2023, to the south of the west end of WB4.
- F3 hydrocarbons are possibly biogenic (natural) in origin. To be confirmed with further analysis and sampling.
- Low pH is not uncommon for soils in the area.
- Soil sampling locations north of DP4 were last sampled on April 21, 2023. Refer to previous update.
- Soil sampling locations north of NODA were last sampled on March 15, 2023. Refer to previous update.