Midwest Generation Groundwater Modeling Powerton

APRIL 2022

Model Scenarios

- From the calibrated, steady-state flow system:
  - Starting concentration of "1" beneath FAB, run forward for 100 years. Move with advection and dispersion

  Model Scenarios:
  - Use the relative distribution from year 100 in base run as the initial concentrations
  - Steady-state flow models
  1. Remove the FAB material, run for 100 years.
  2. Keep concentration of "1" in North and South FAB, remove flux (recharge) in pond area. Run for 100 years.
  3. Keep concentration of "1" in the Southern FAB and remove from the Northern FAB. Set flux (recharge) through northern pond to background recharge. Remove flux (recharge) in the southern pond area. Run for 100 years.
  4. Keep concentration of "1" in the northern and southern FAB but reduce Kv of layers 1&2 (~20 ft) in the FAB area to 1E-07 cm/s (2.83E-04 ft/d) and put in a Horizontal Flow Barrier (HFB) surrounding the FAB with K of 1E-07 cm/s (2.83E-04 ft/d) in layers 1&2. Remove flux (recharge) in the pond area. Run for 100 years.
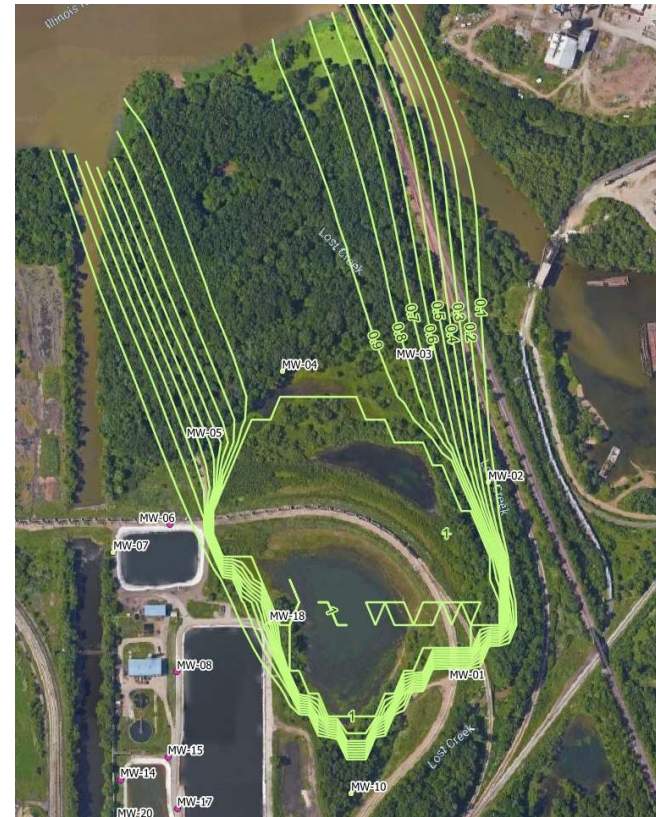
Starting Concentrations

☐ Constant FAB placement area applied here:
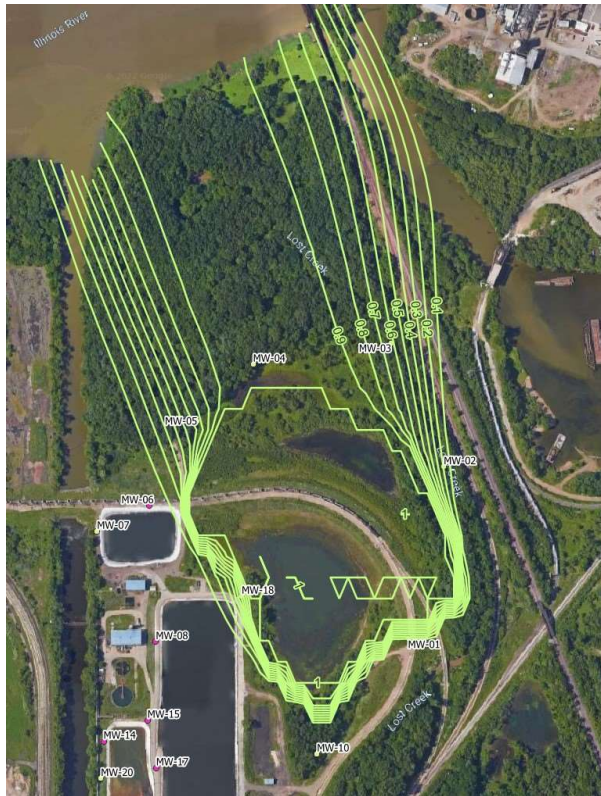
☐ Resulting plume after 100 years

- Model Scenario 1
  - Use the distribution of resulting relative concentration from year 100 in base run as the initial concentrations
  - Steady-state flow model
    1. Remove the FAB material, run for 100 years. *i.e.: if there were a continuous mass at FAB, that created an equilibrated (steady-state) plume from the pond toward the river – then remove that FAB material, how would concentrations change over time.*

5-year plume distribution
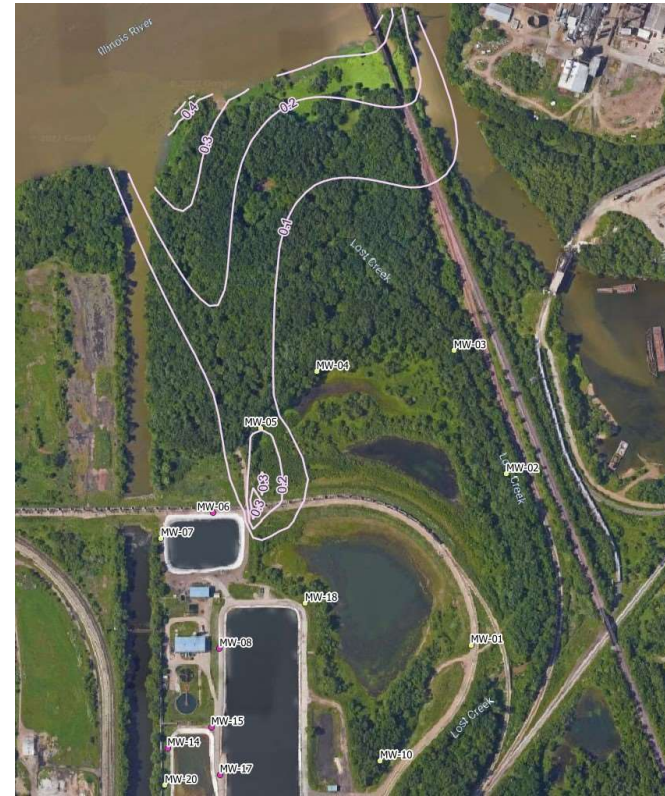
❑ Starting Conditions

❑ 5 Years

25+ year plume distribution

❑ Starting Conditions

❑ 25/50/100 Years
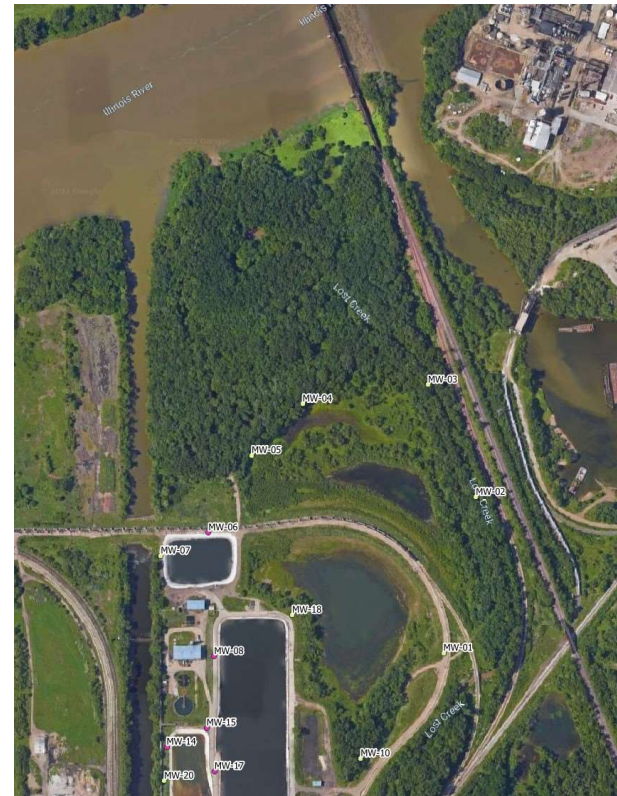
Decay over Time

❏ Starting Conditions
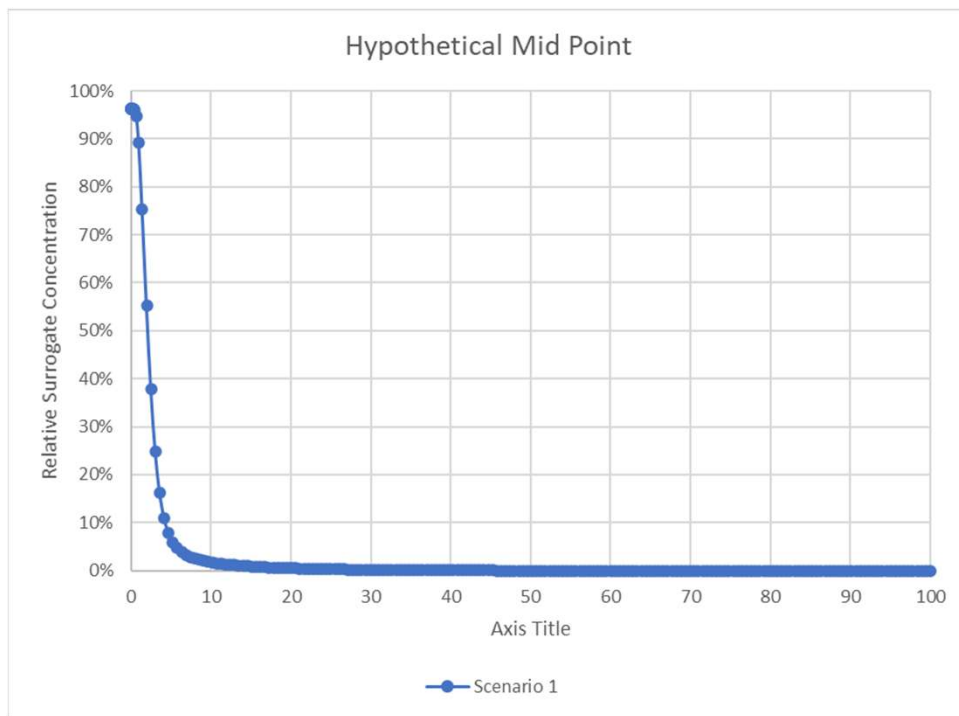
Model Scenario #2
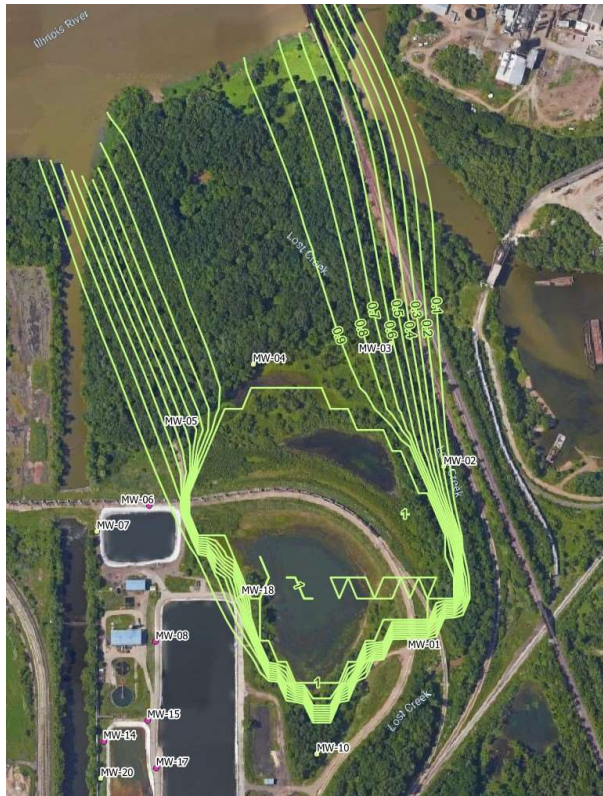
- Model Scenario 2
    - Use the distribution of projected concentration from year 100 in base run as the initial concentrations
    - Steady-state flow model
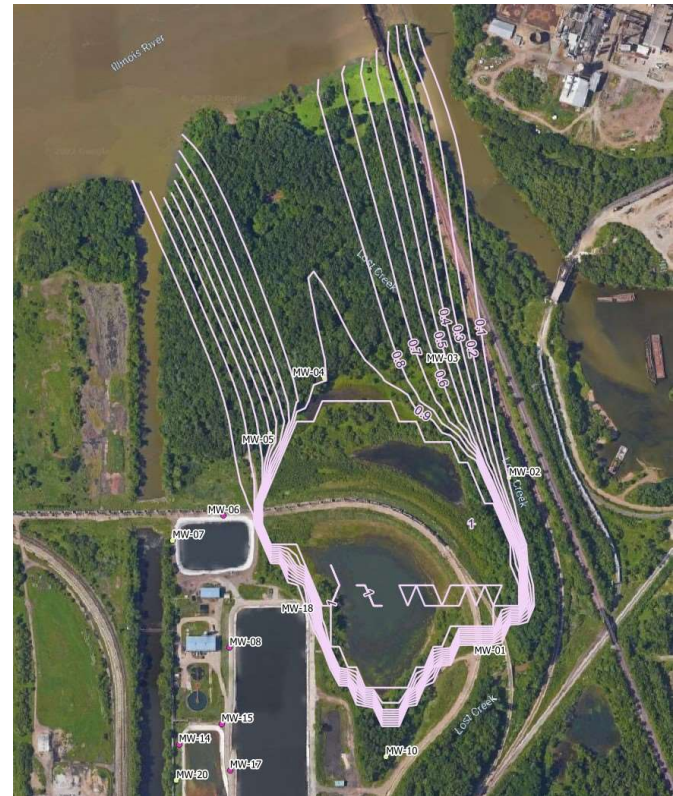   2. Keep material in North and South FAB, remove flux in from both ponds. Run for 100 years.
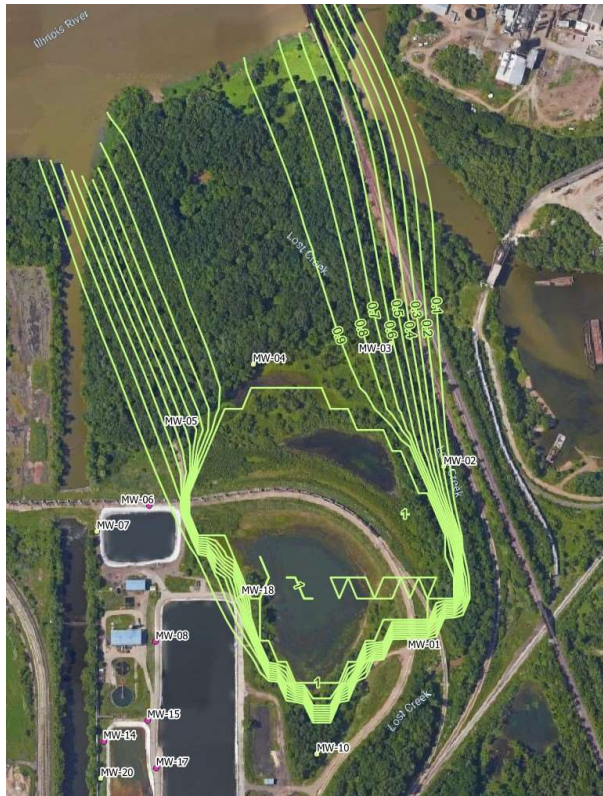
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KPRG and Associates, Inc.

5-year plume distribution
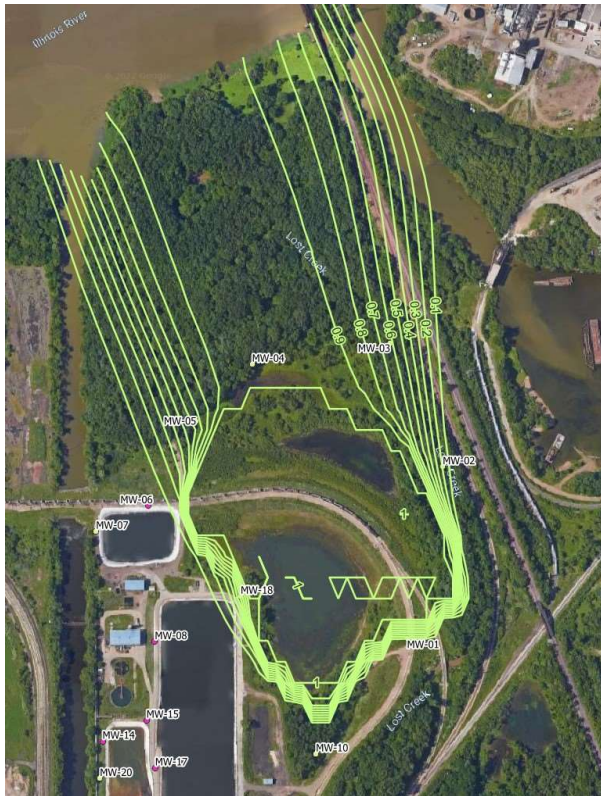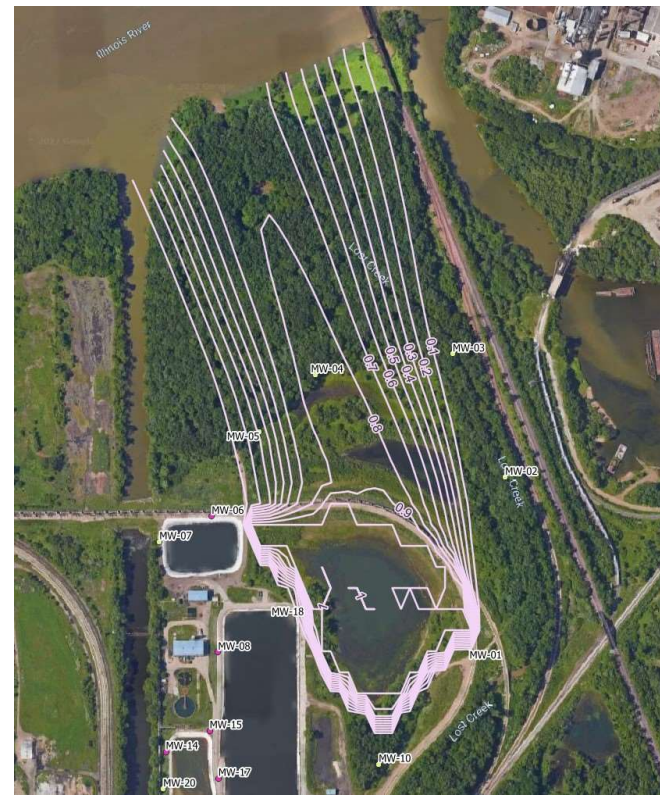
❑ Starting Conditions

❑ 5 Years

# 25+ year plume distribution

❑ Starting Conditions

❑ 25/50/100 Years
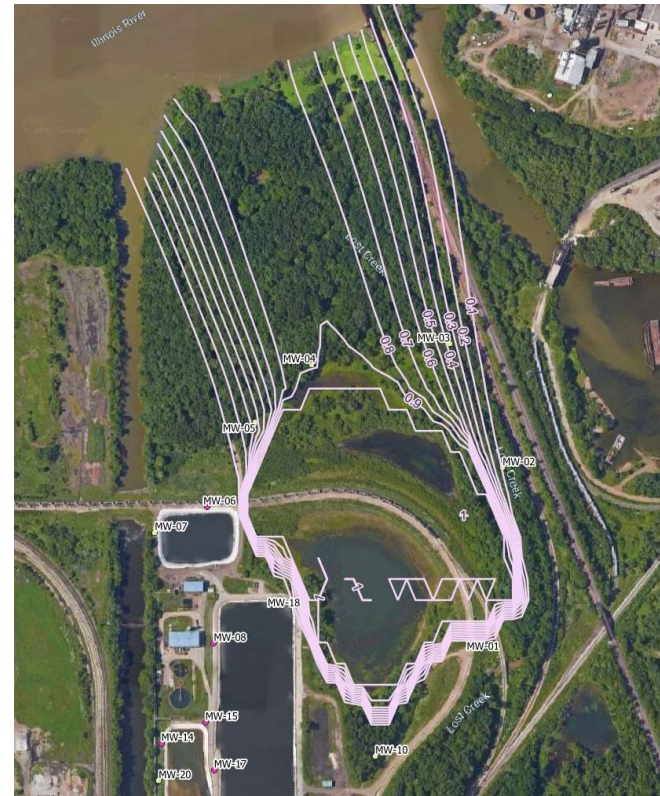
Concentrations reach steady state after 25 years

Decay over Time
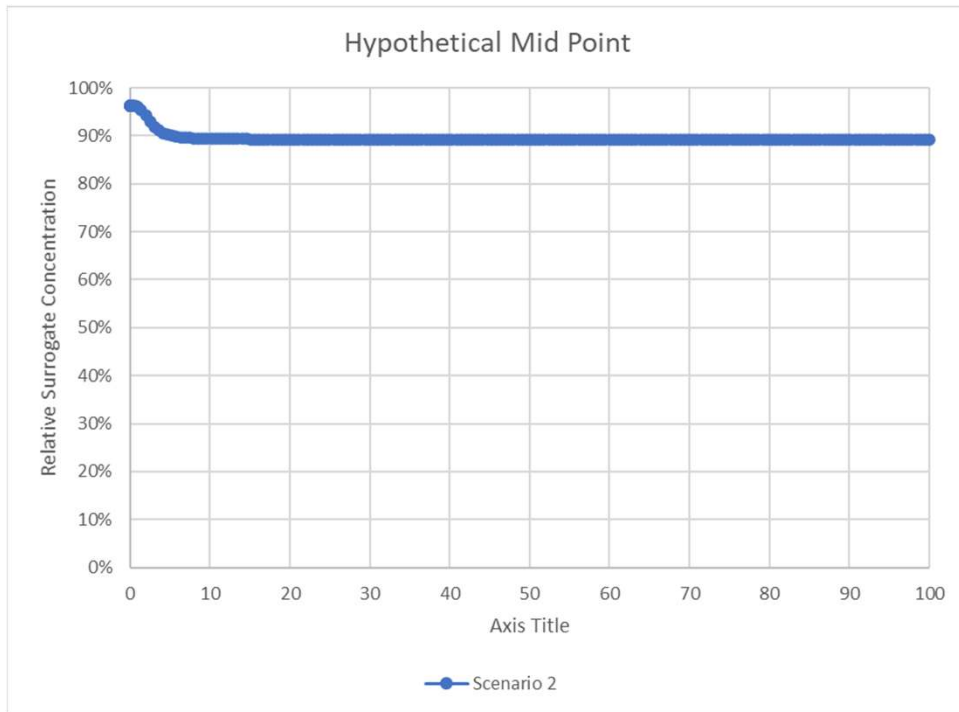
❑ Starting Conditions

Model Scenario #3

- Model Scenario 3
  - Use the distribution of projected concentrations from year 100 in base run as the initial concentrations
  - Steady-state flow model
    3. Keep concentration of "1" in the Southern FAB and remove from the Northern FAB (*see image*). Set flux in north pond area to background recharge. Remove flux (recharge) into south pond area. Run for 100 years.
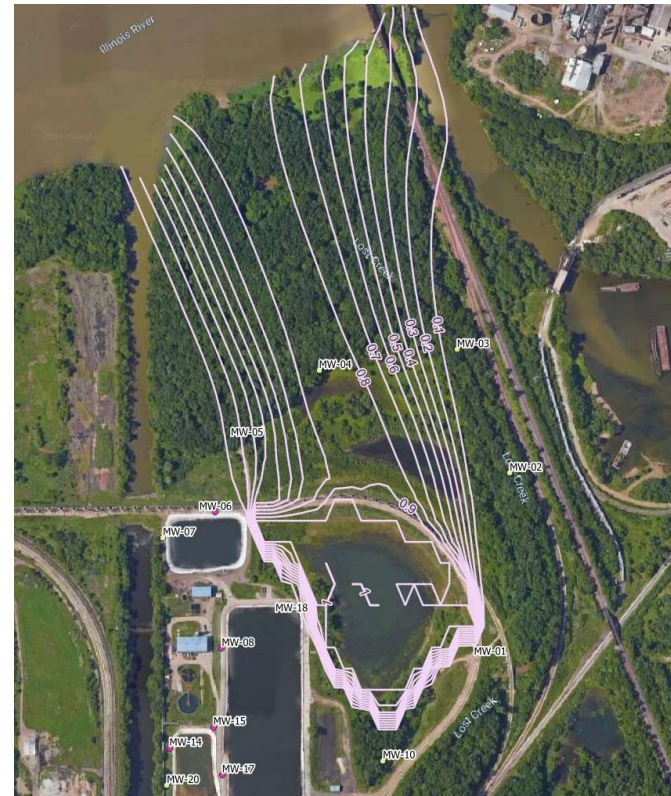
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5-year plume distribution

❑ Starting Conditions

❑ 5 Years

25+ year plume distribution
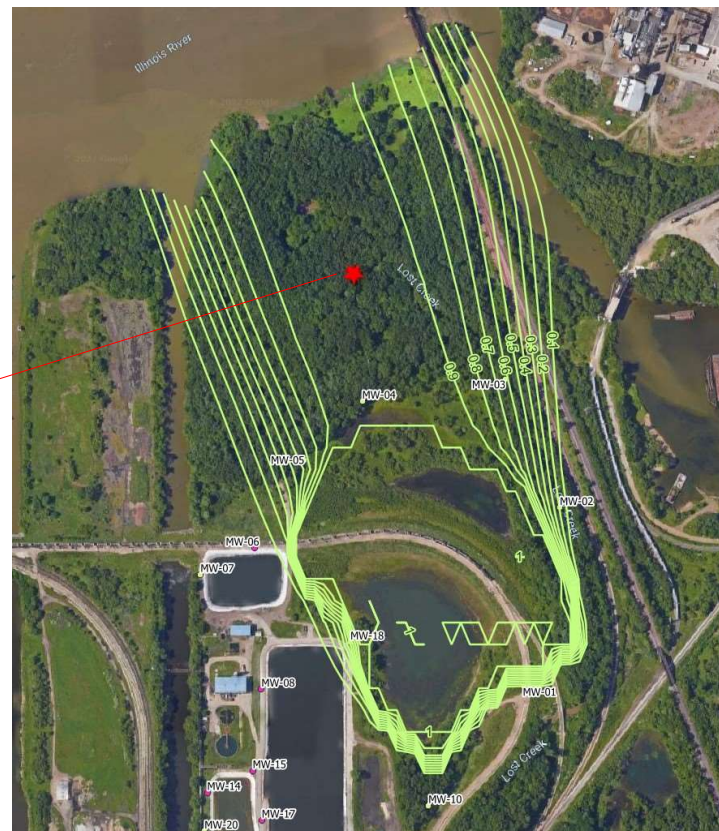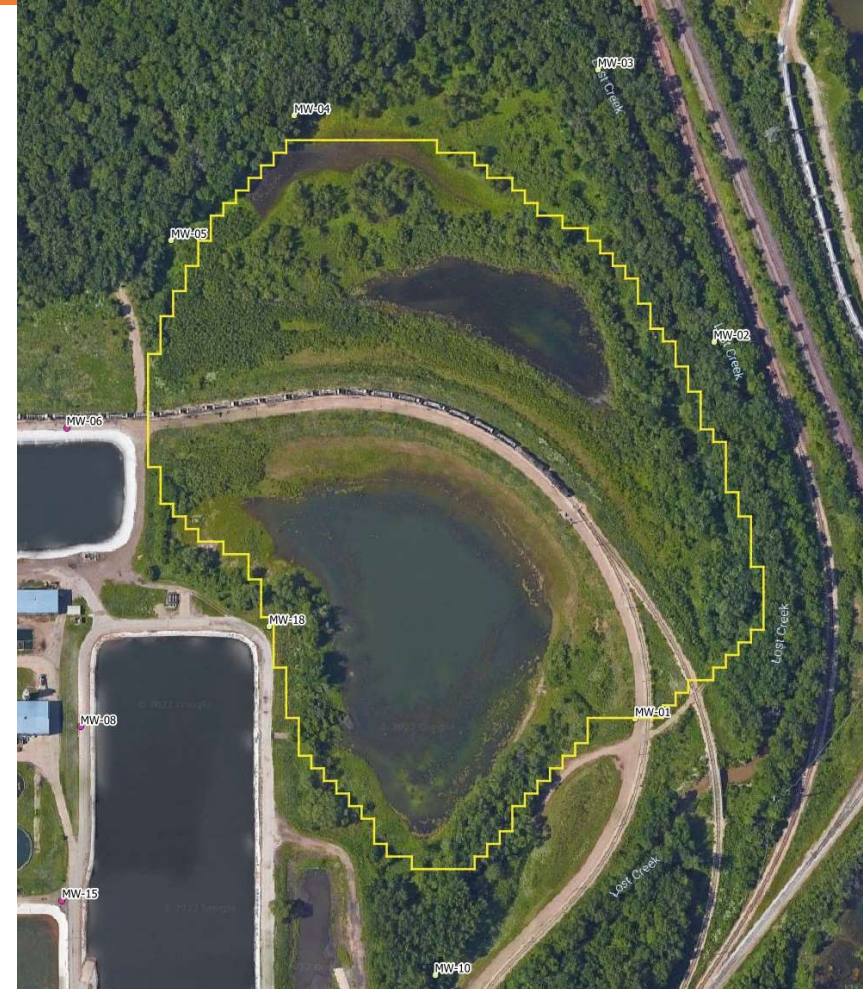
❑ Starting Conditions

❑ 25/50/100 Years

Concentrations reach steady state after 25 years

Decay over Time
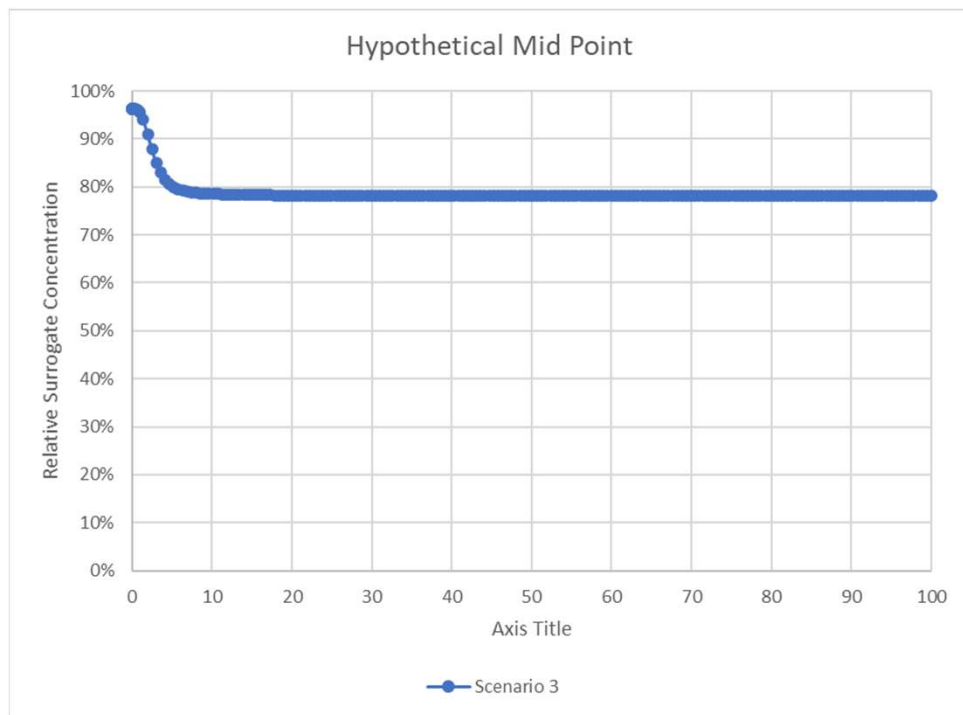
❑ Starting Conditions

Model Scenario #4

- Model Scenario 4
  - Use the distribution of projected concentrations from year 100 in base run as the initial concentrations
  - Steady-state flow model
    4. Keep concentration of "1" in the northern and southern FAB but reduce Kv of layers 1&2 (~20 ft) in the FAB area to 1E-07 cm/s (2.83E-04 ft/d), and put in a HFB surrounding the FAB with K of 1E-07 cm/s (2.83E-04 ft/d) in layers 1&2. Remove flux (recharge) through both northern and southern FAB. Run for 100 years.

- Model Scenario 4
  - The HFB barrier wall was drawn around the entire footprint of the FAB, in model layers 1 & 2 (~20 feet deep).
  - The HFB was assigned a K of 1E-07 cm/s
  - Layers 1&2 were assigned a Kv of 1E-07 cm/s in this polygon area
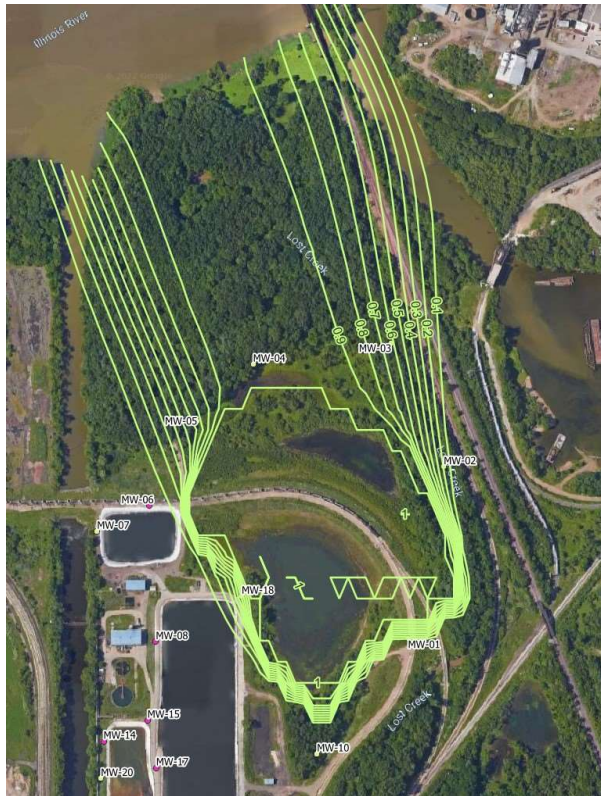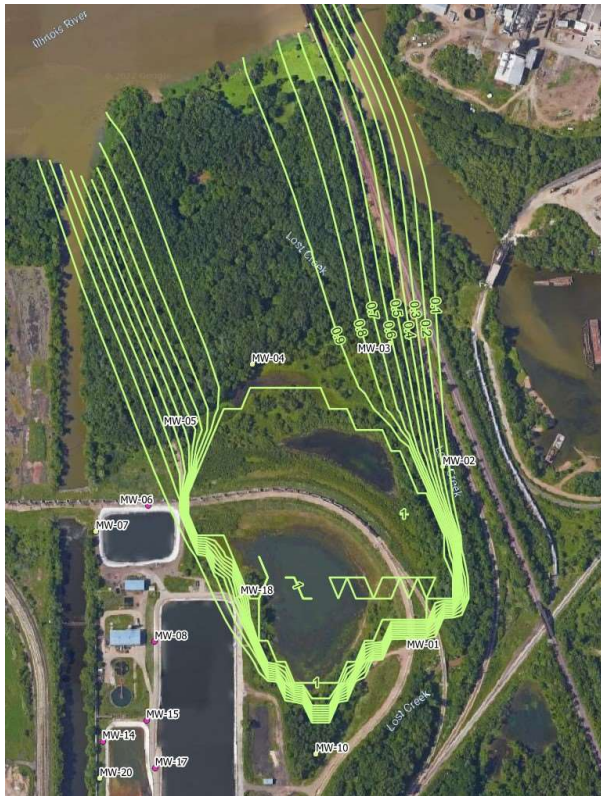

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5-year plume distribution
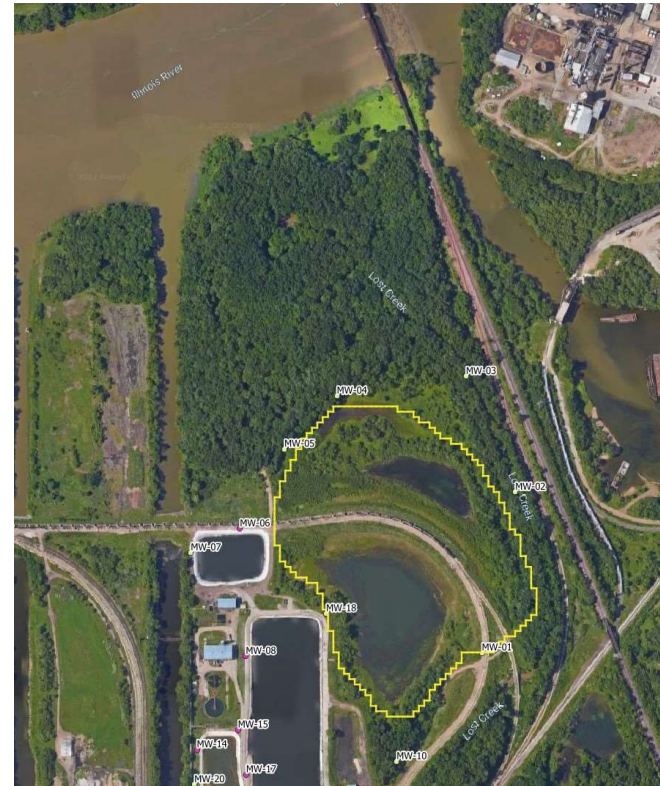
❑ Starting Conditions

❑ 5 Years

25+ year plume distribution
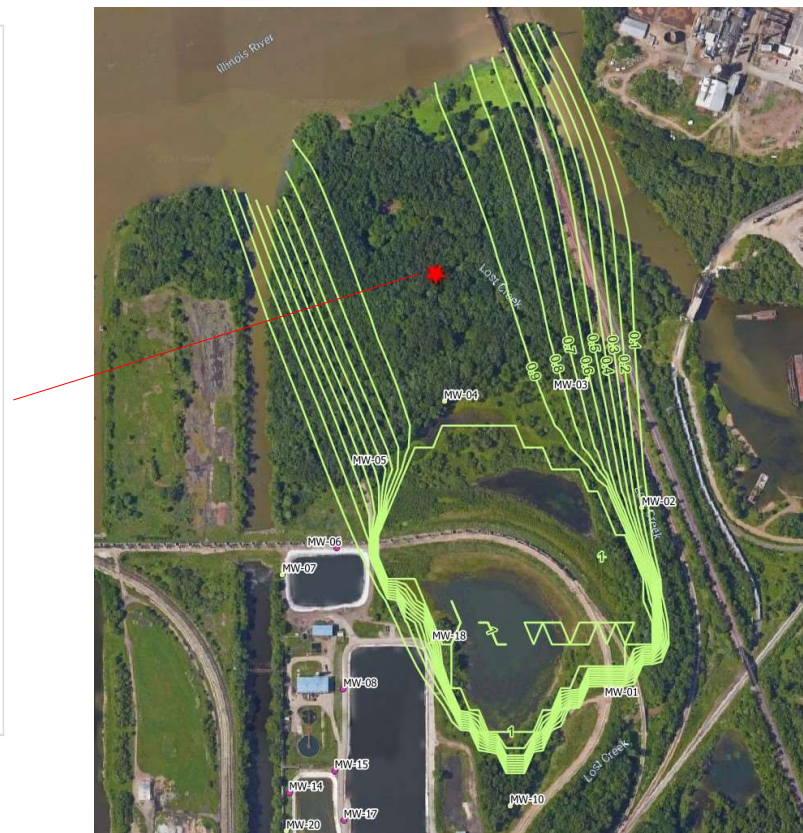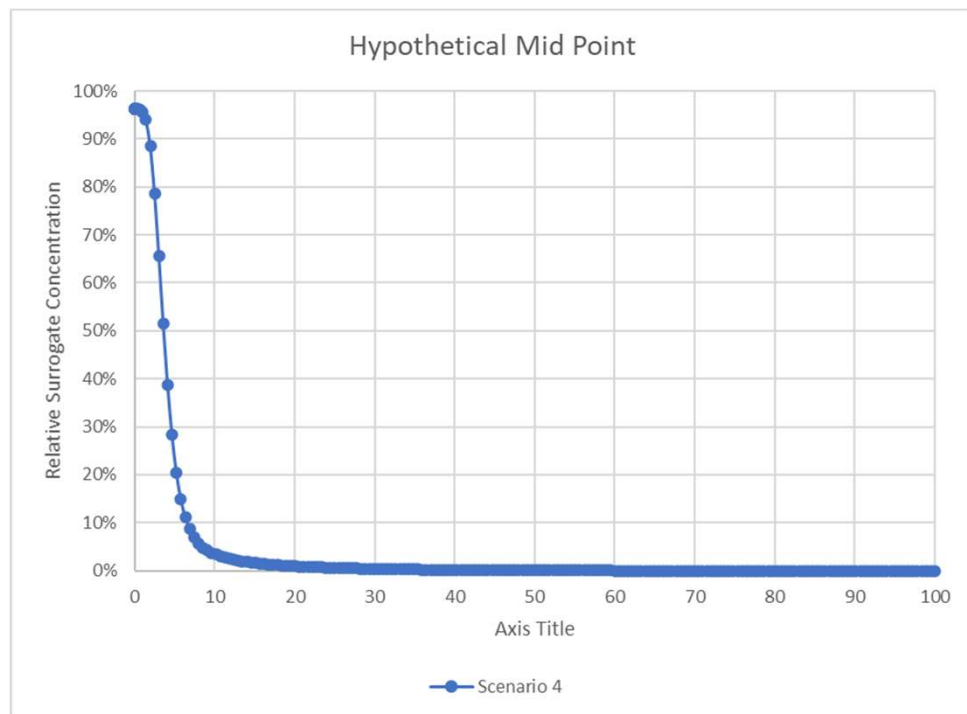
☐ Starting Conditions

☐ 25/50/100 Years

Decay over Time

❑ Starting Conditions

Concentrations over Time

❑ Starting Concentrations (mg/l)

% decrease in surrogate concentration over time was calculated for each monitor well and applied to the starting concentrations (defined from 11/30/21 sampling event) to show the change in concentration over time

Starting concentrations:

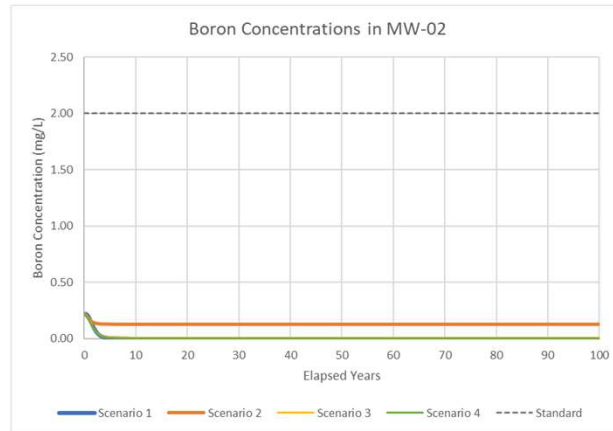|	MW-02	MW-03	MW-04	MW-05	Standard
Boron	0.22	0.30	0.51	0.68	2.00
Chloride	41	47	56	67	200
Sulfate	36.00	23.00	62.00	92.00	400.00
Arsenic	0.0017	0.0014	0.0012	0.0011	0.01
Lithium	0.0045	0.0040	0.0035	0.0052	0.04
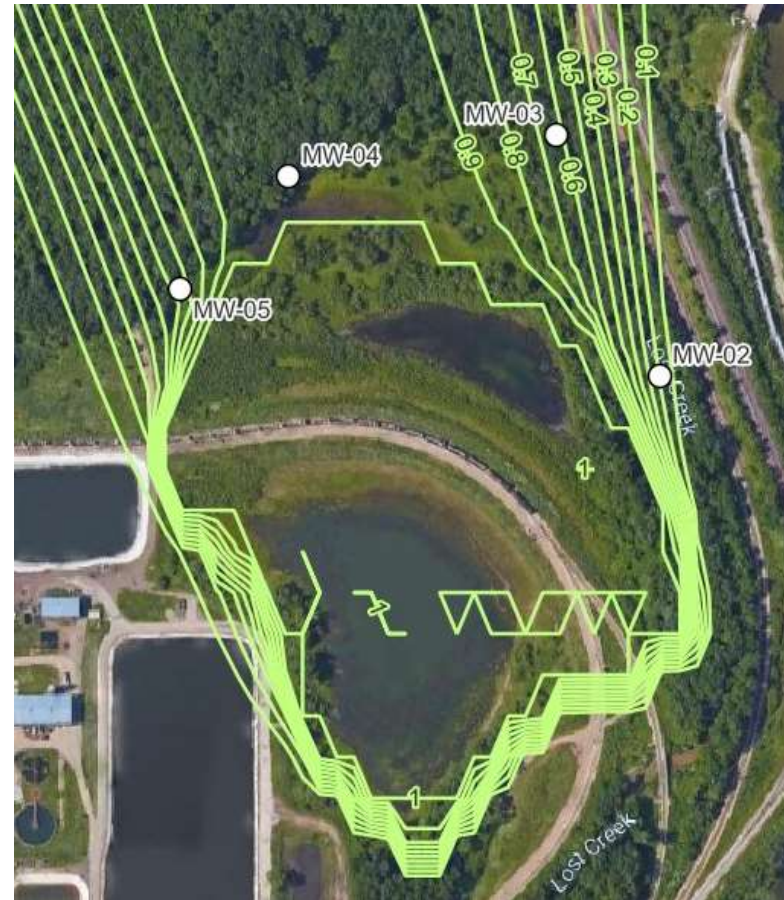
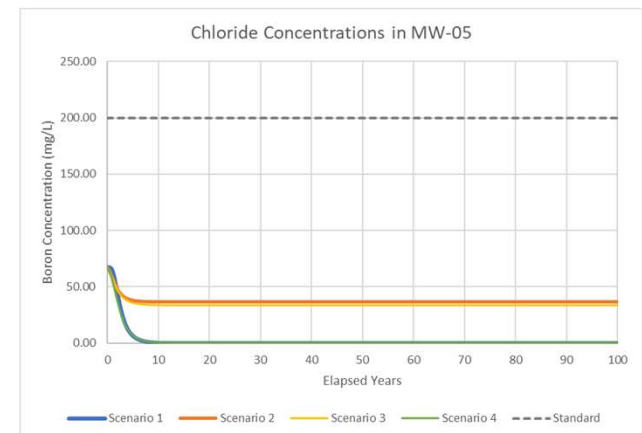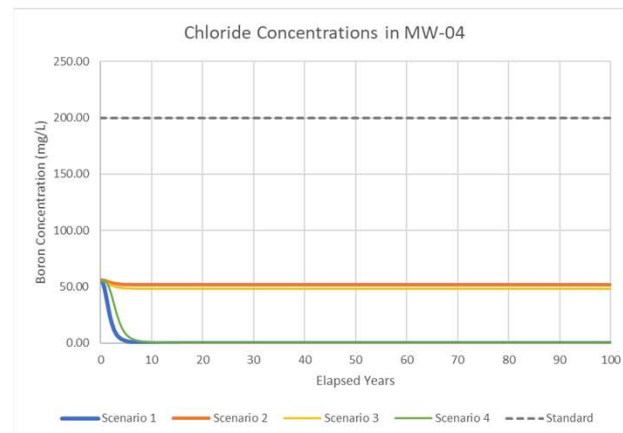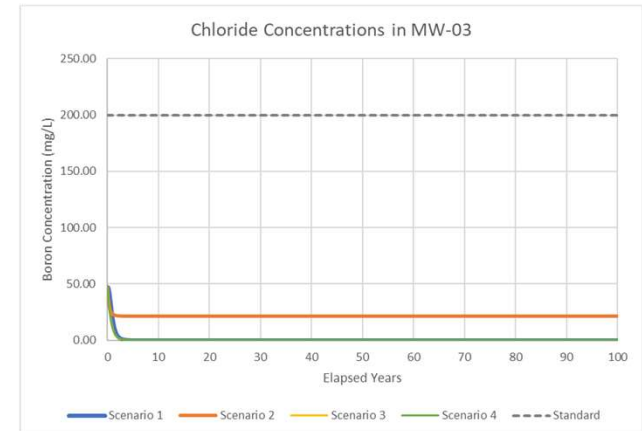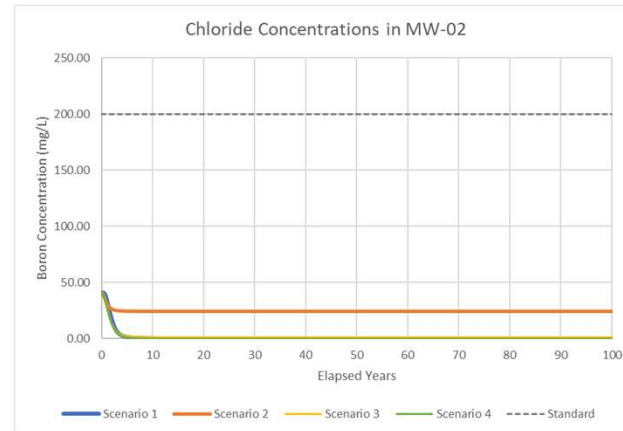100-year relative surrogate concentrations

Boron Concentrations over Time

- - - - - - Standard concentration

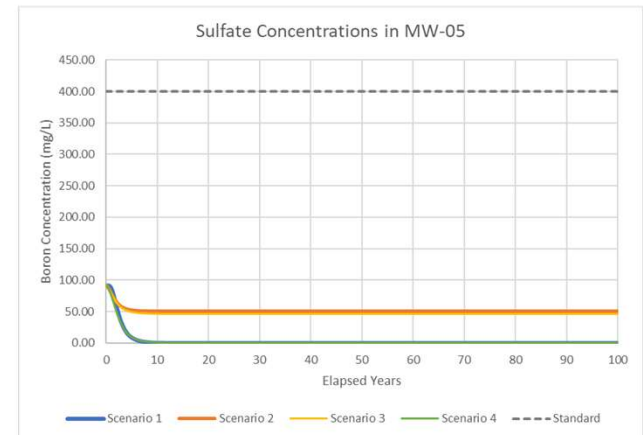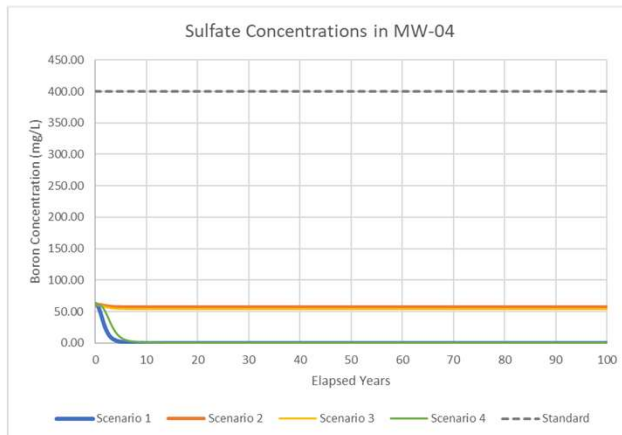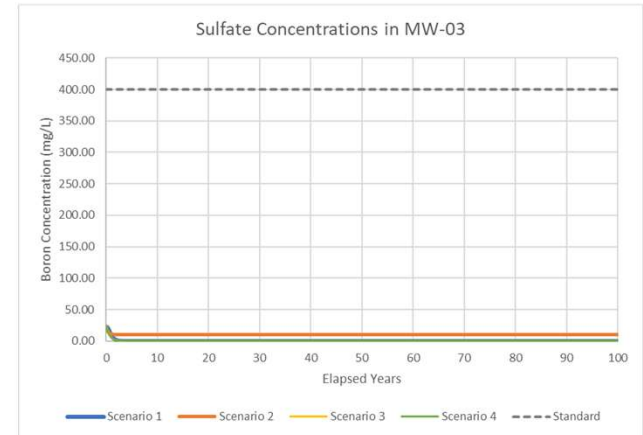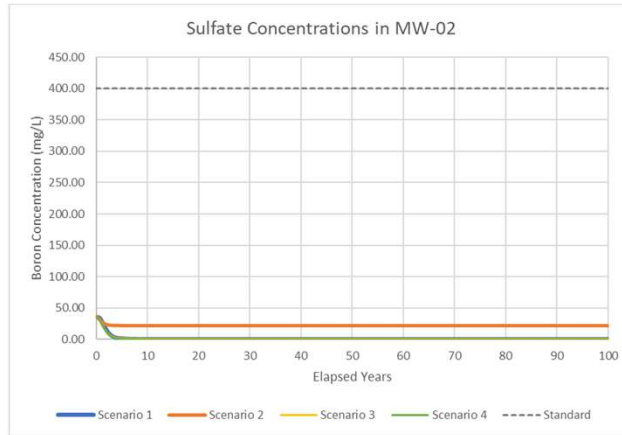# Chloride Concentrations over Time

‐ ‐ ‐ ‐ ‐ ‐ Standard concentration
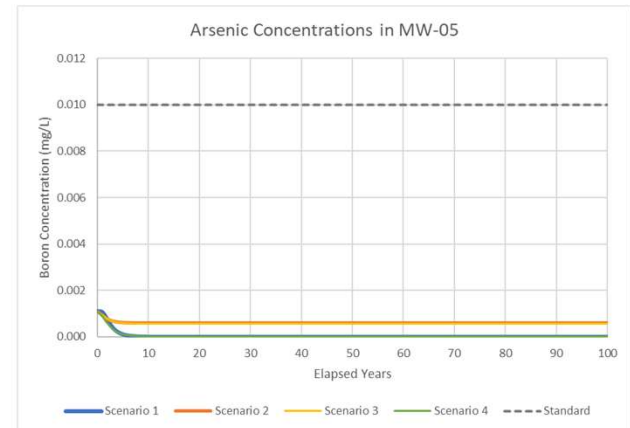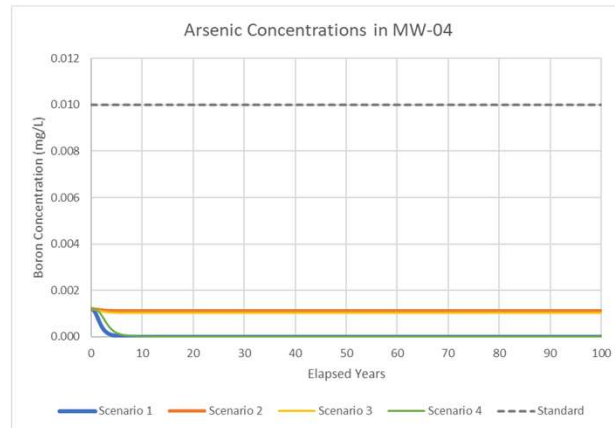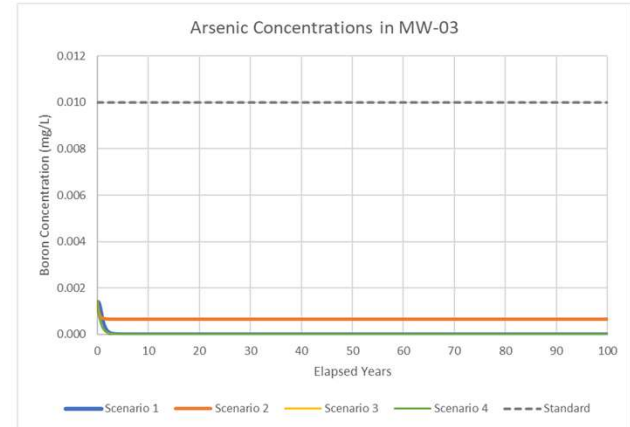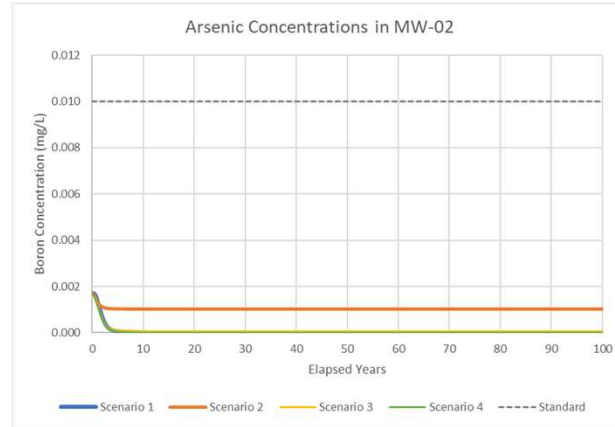

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Sulfate Concentrations over Time

DRAFT

- - - - - - Standard concentration

Arsenic Concentrations over Time

- - - - - - Standard concentration

Arsenic Concentrations in MW-02

Arsenic Concentrations in MW-03

Arsenic Concentrations in MW-04

Arsenic Concentrations in MW-05

Lithium Concentrations over Time

- - - - - - Standard concentration