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Infrastructure, environment, buildings

GM-38 Remedial System Capture Zone Evaluation

This presentation was prepared on August 31, 2005 in response to a request from the NYSDEC to the US Navy.

Why are we here today ?

- To address concerns raised by the Bethpage Water District regarding the implementation of the GM38 Remedy.
  - Location of the system with respect to the TVOC hot-spot.
  - Evaluate the potential for TVOC impacts at BWD Plant 4 resulting from the implementation of the GM38 Remedial System.
    - Evaluate the relative locations of the BWD Plant 4 and GM38 Remedial System Capture Zones.
    - Evaluate the model-predicted TVOC impacts to BWD Plant 4.

Definition of Capture Zone

- Capture Zone: The volumetric portion of an aquifer from which groundwater is diverted to a pumping well.
- The capture zone of one well can exist alongside, but not within, the area of another well's capture zone.

Basis for Selection of Remedial Well Locations

- Direction of regional groundwater flow.
- Effects of nearby supply well pumpage.
- Desired capture zone area to accomplish ROD goals.
- Selected location for discharge of treated water.
- Accessible drilling locations.

Sources of Pumping Rate Data

- NYSDEC annual reports from 2001 to 2004 were used to develop seasonal average pumping rates to reflect the variability in pumping at the Bethpage Water District Plant 4 Well Field.
- Pumping Rates for the GM38 Remedial System Wells were kept constant throughout the simulation (except during the simulated system failure).

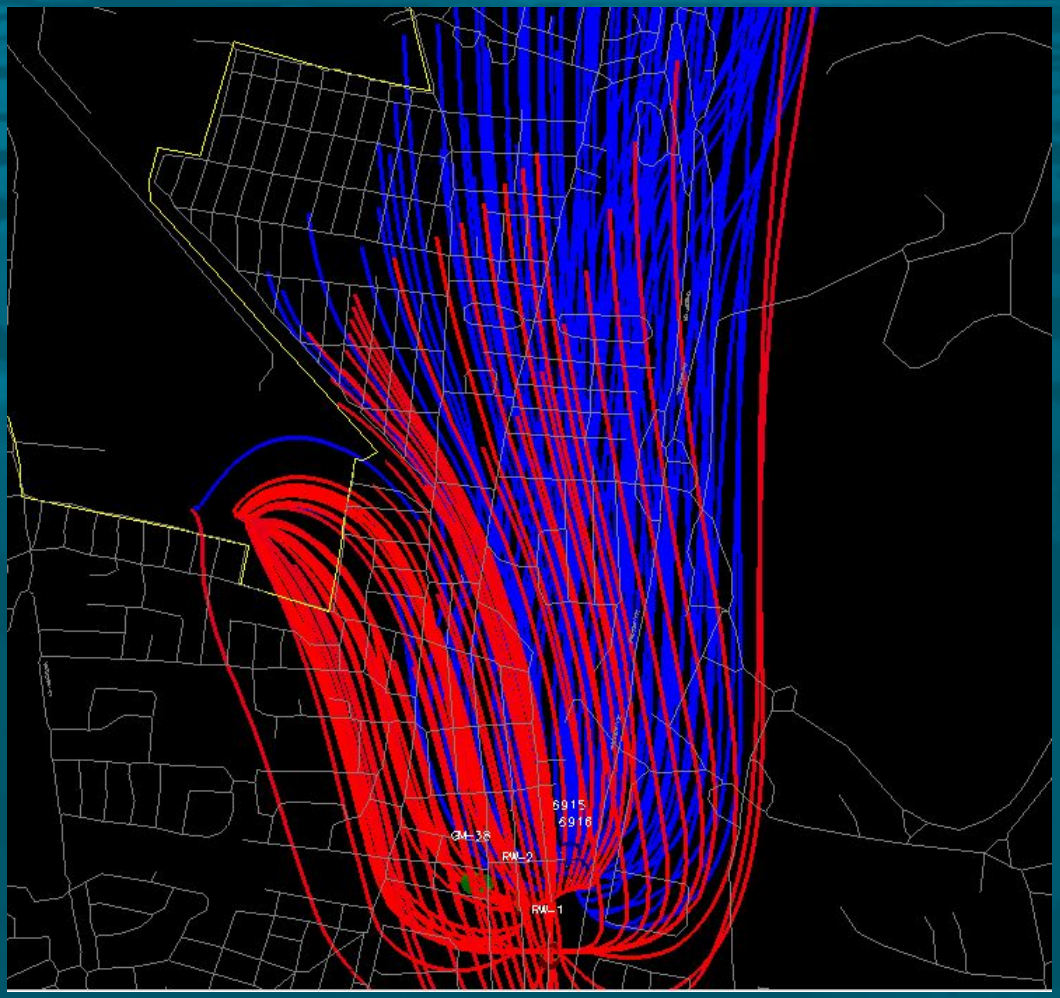
Well ID and Screen Depths
(in feet below land surface)

- **RW-1: 313-388 ft bls**
- **RW-2: 400-485 ft bls**
- **BWD Plant 4-1 (6915): 540-603 ft bls**
- **BWD Plant 4-2 (6916): 556-606 ft bls**
- **GM-38D: 320-340 ft bls**
- **GM-38D2: 475-495 ft bls**

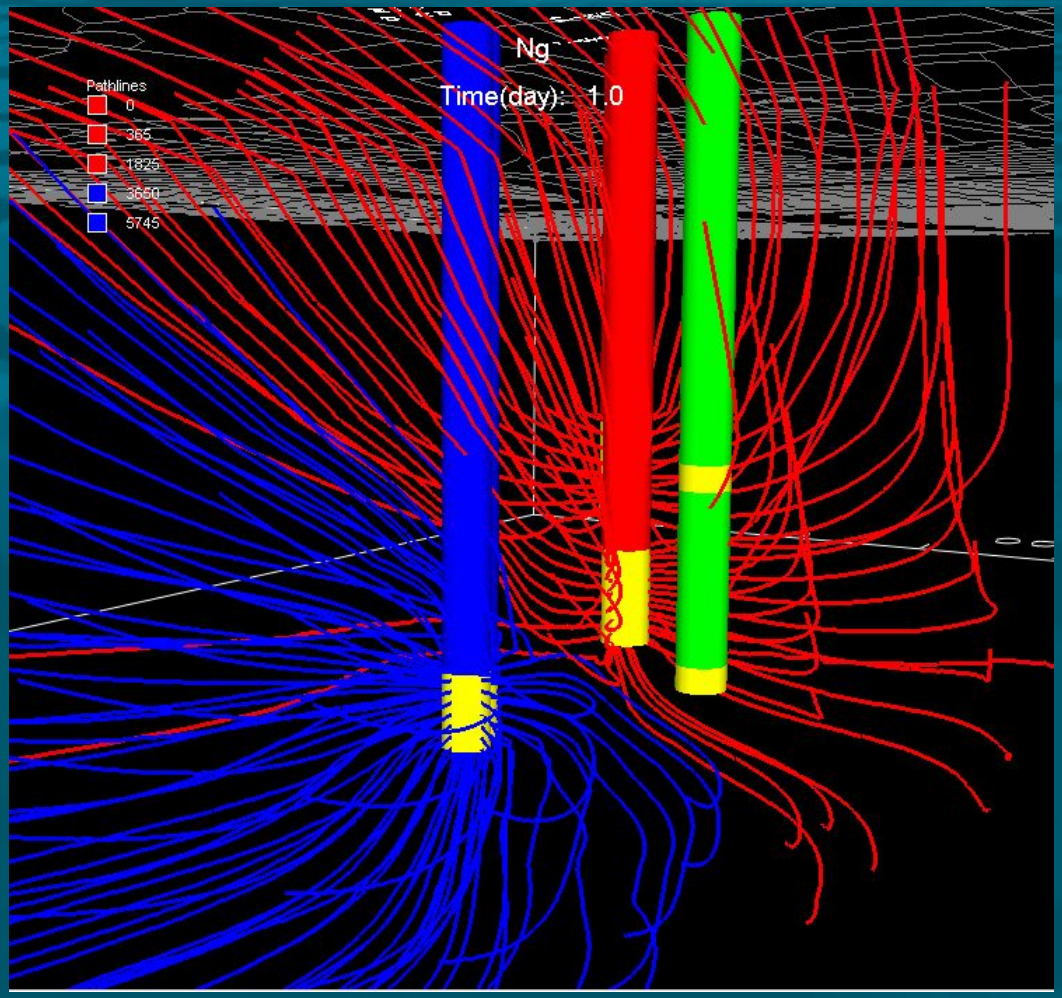
BWD Average Pumping Rate
GM-38 Remedial System Off

BWD Average Pumping Rate
GM-38 Remedial System On

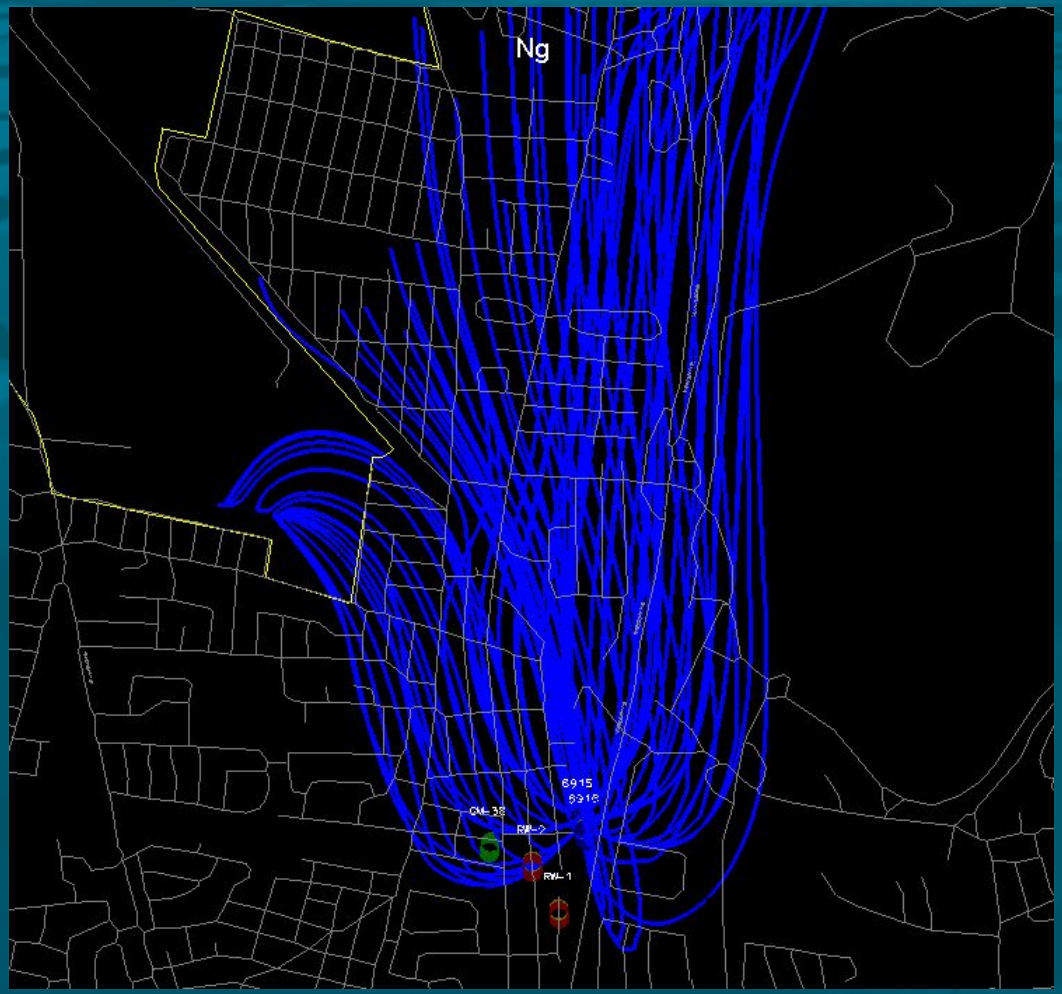
BWD Average Pumping Rate
GM-38 Remedial System On



BWD Average Pumping Rate GM-38 Remedial System On



BWD Peak Pumping Rate
GM-38 Remedial System Off



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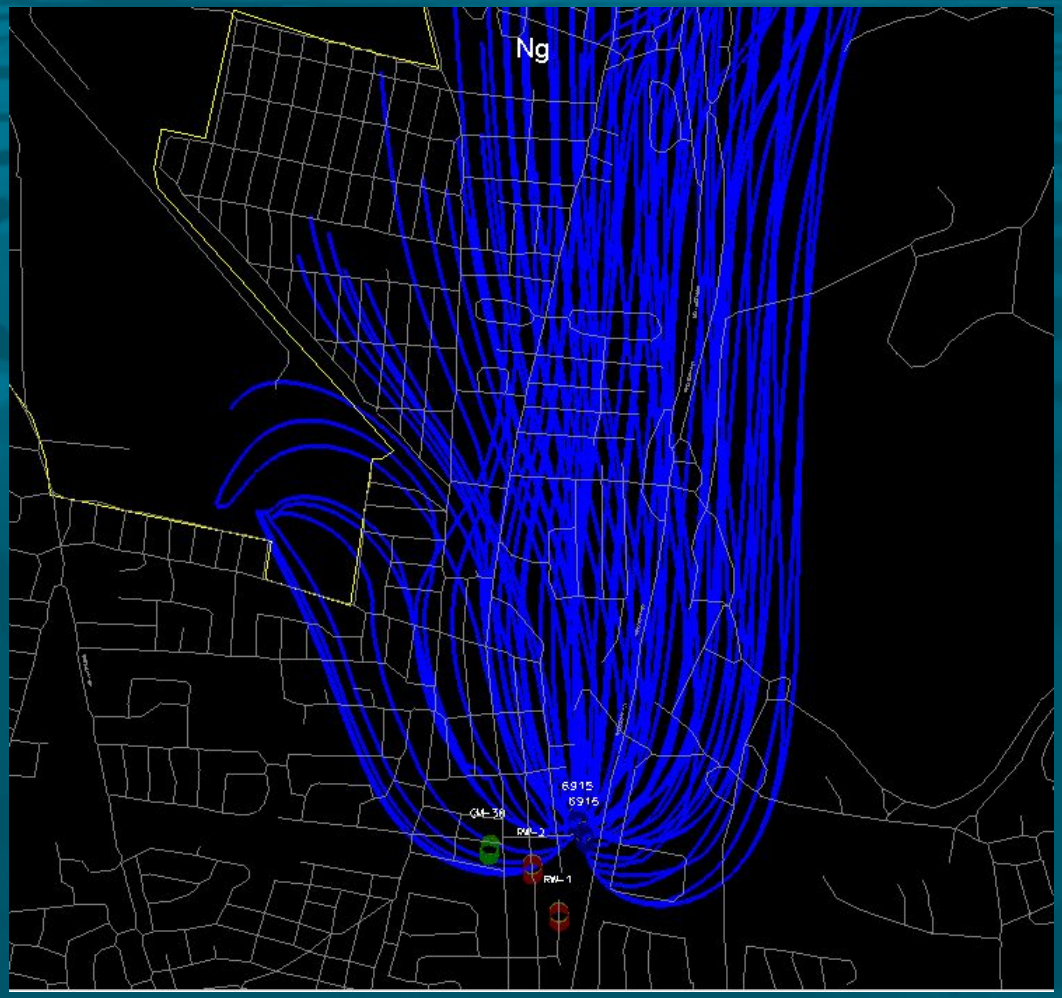

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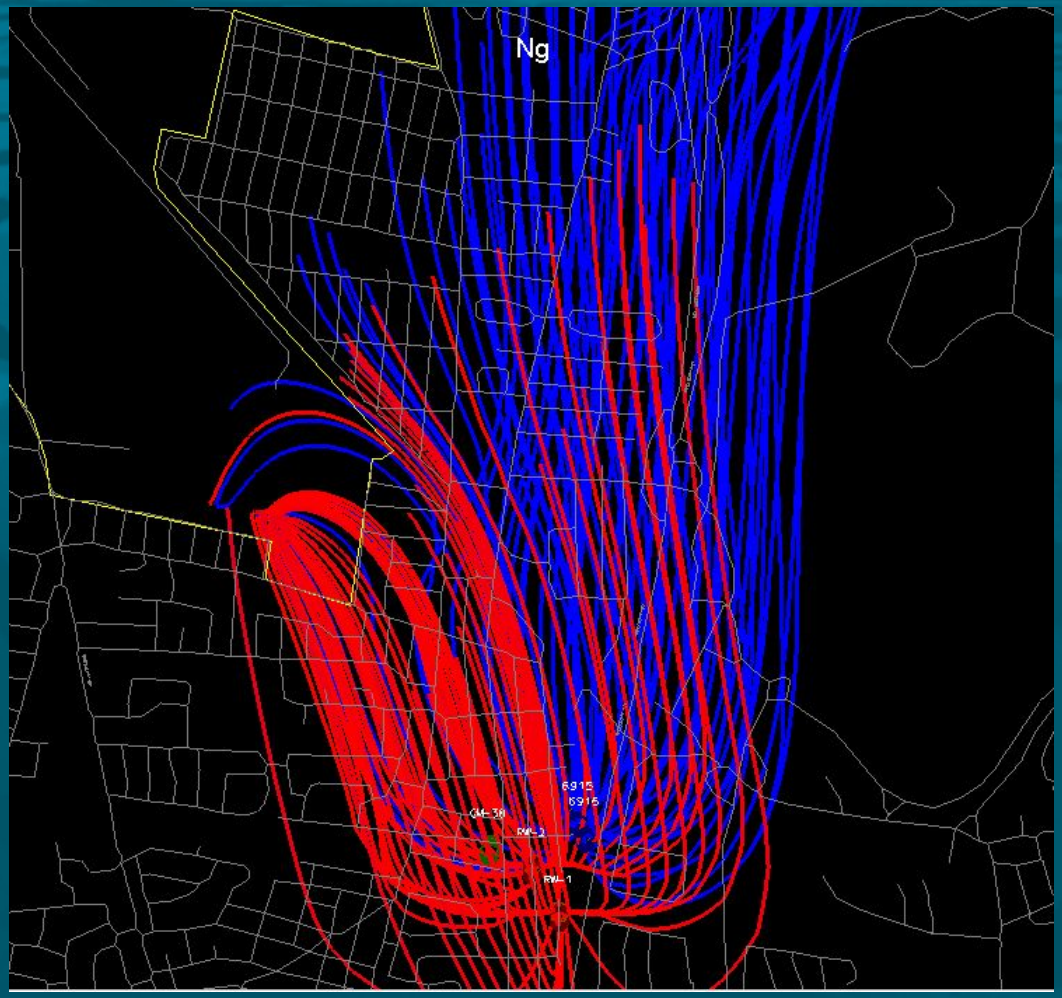
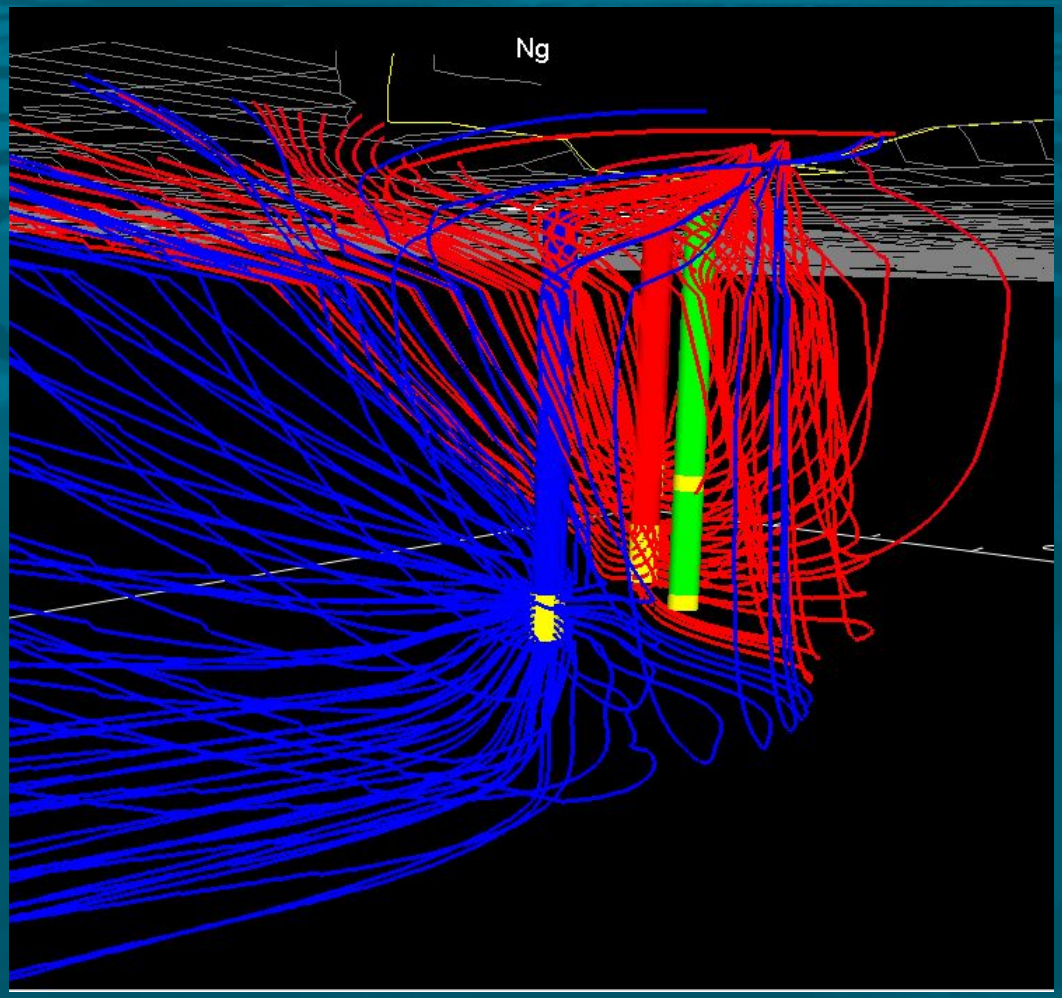
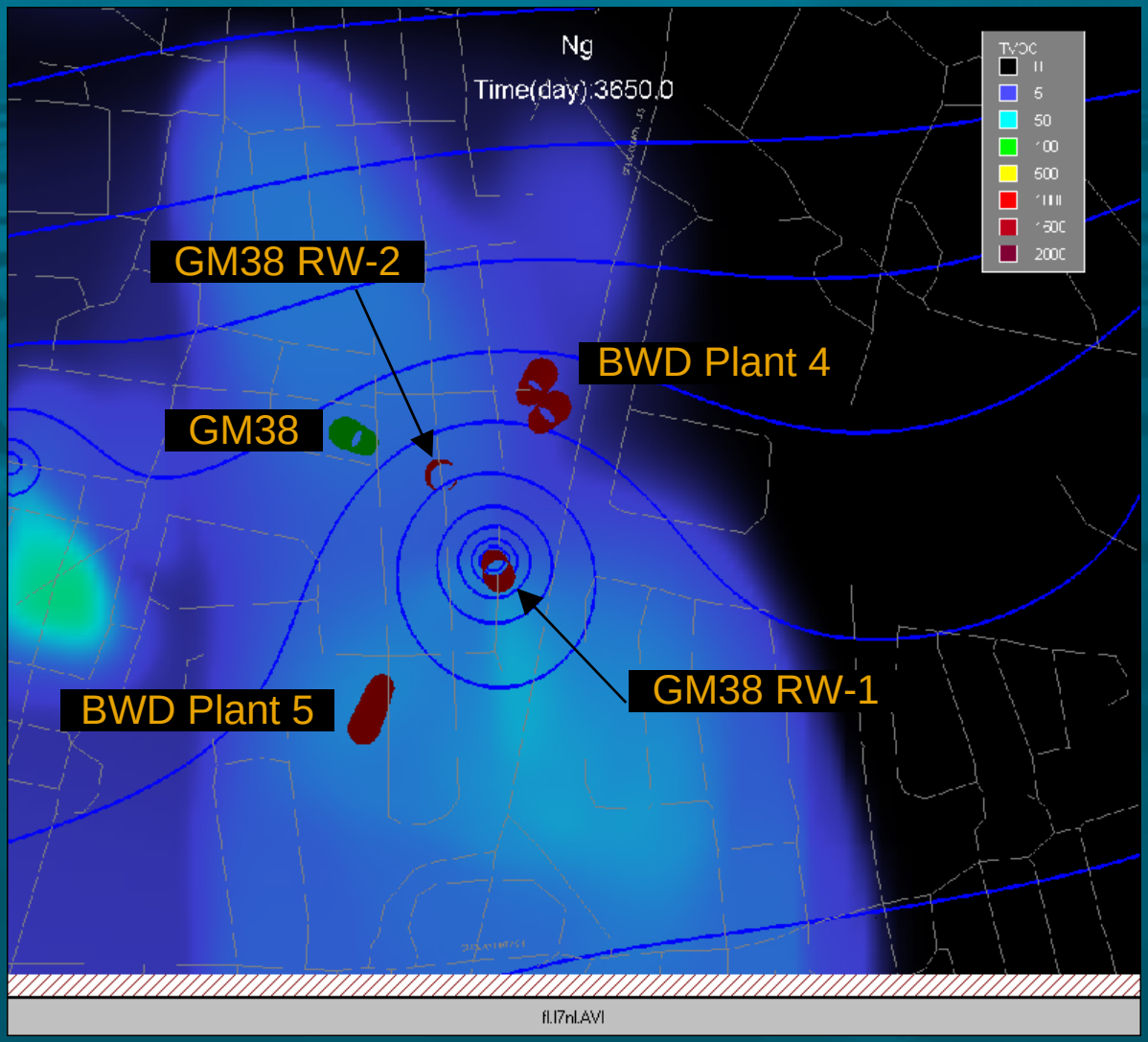
BWD Peak Pumping Rate
GM-38 Remedial System On



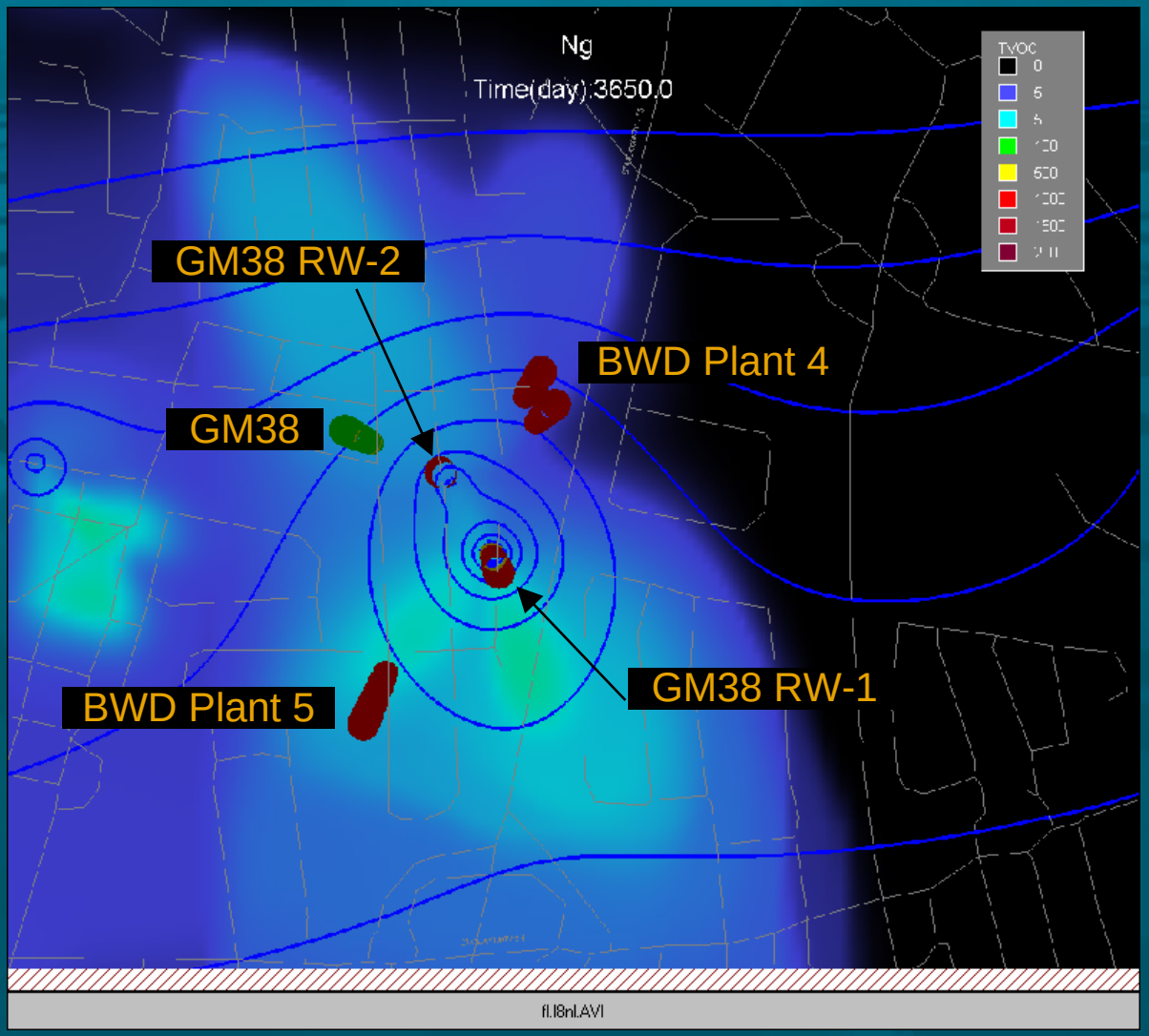
BWD Peak Pumping Rate
GM-38 Remedial System On



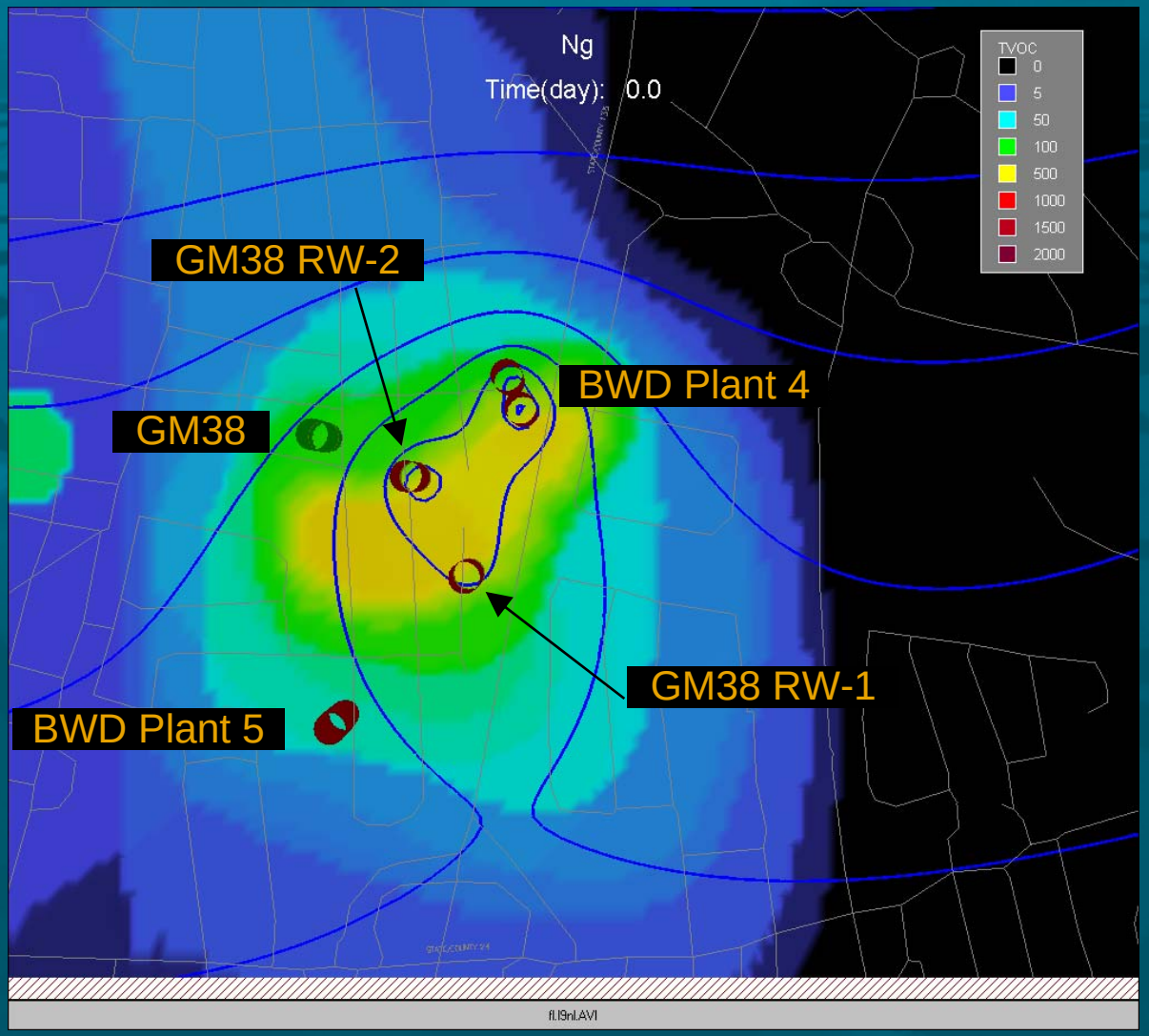
Contaminant mass transport in Model Layer 7



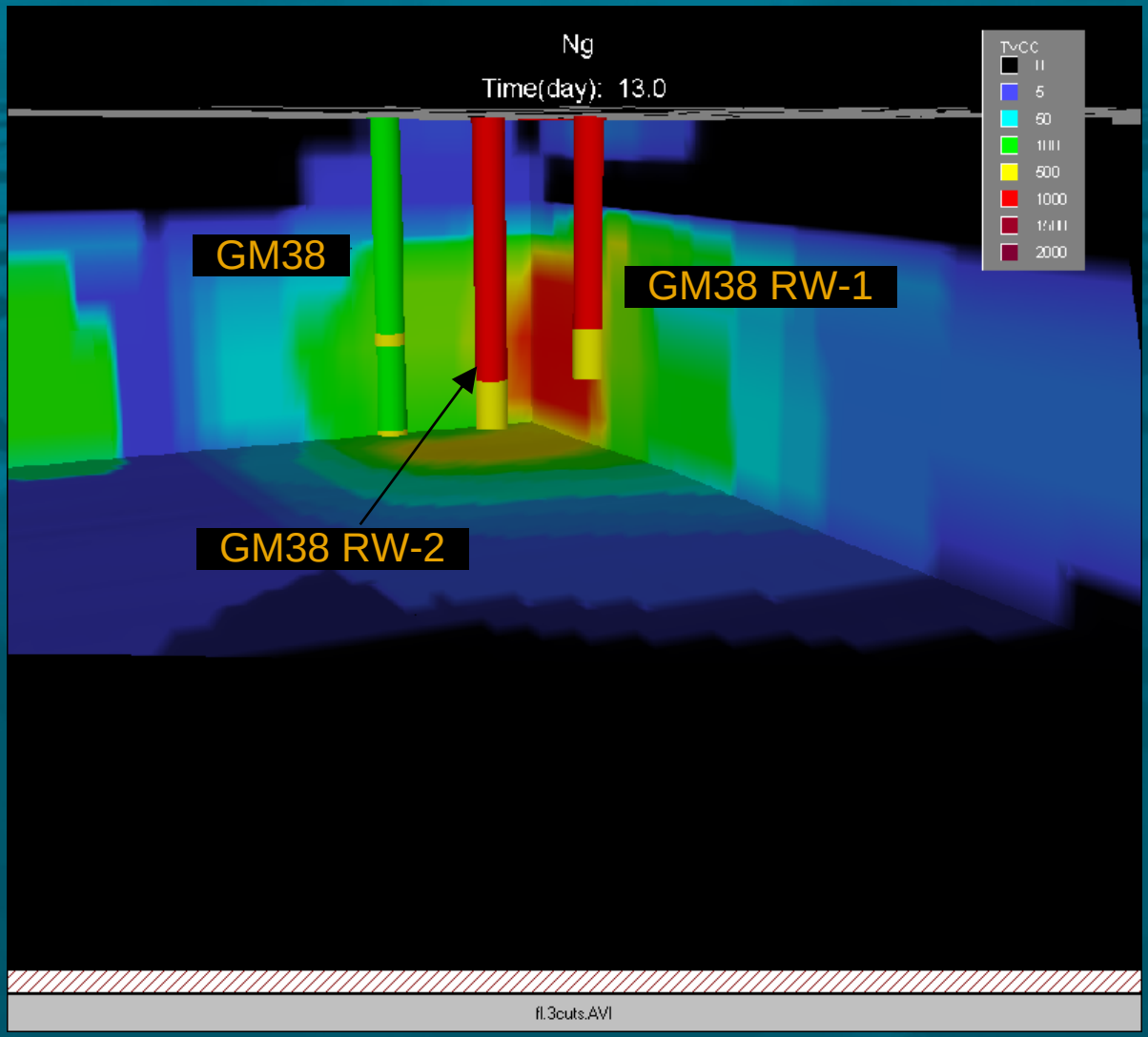
Contaminant mass transport in Model Layer 8

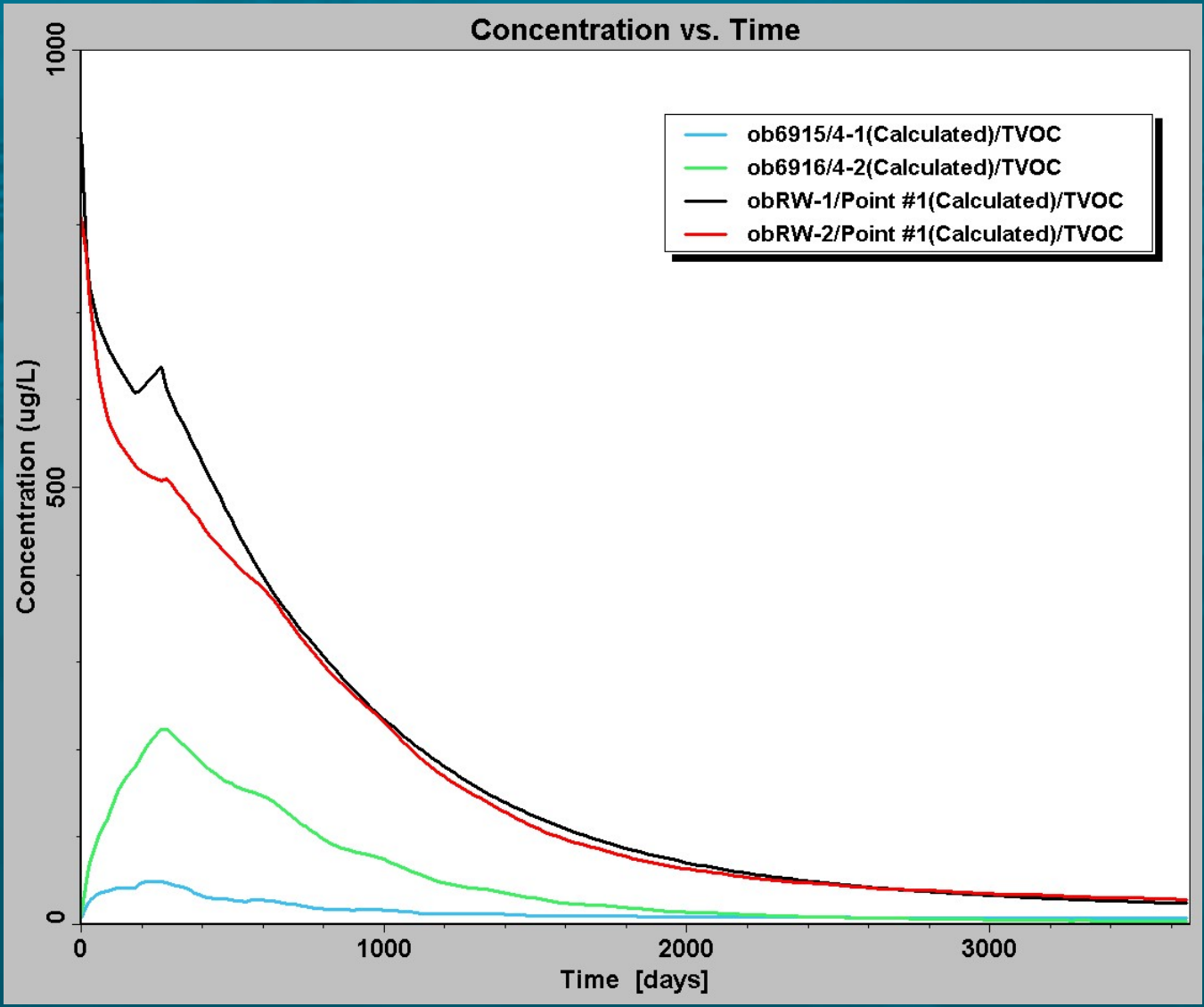


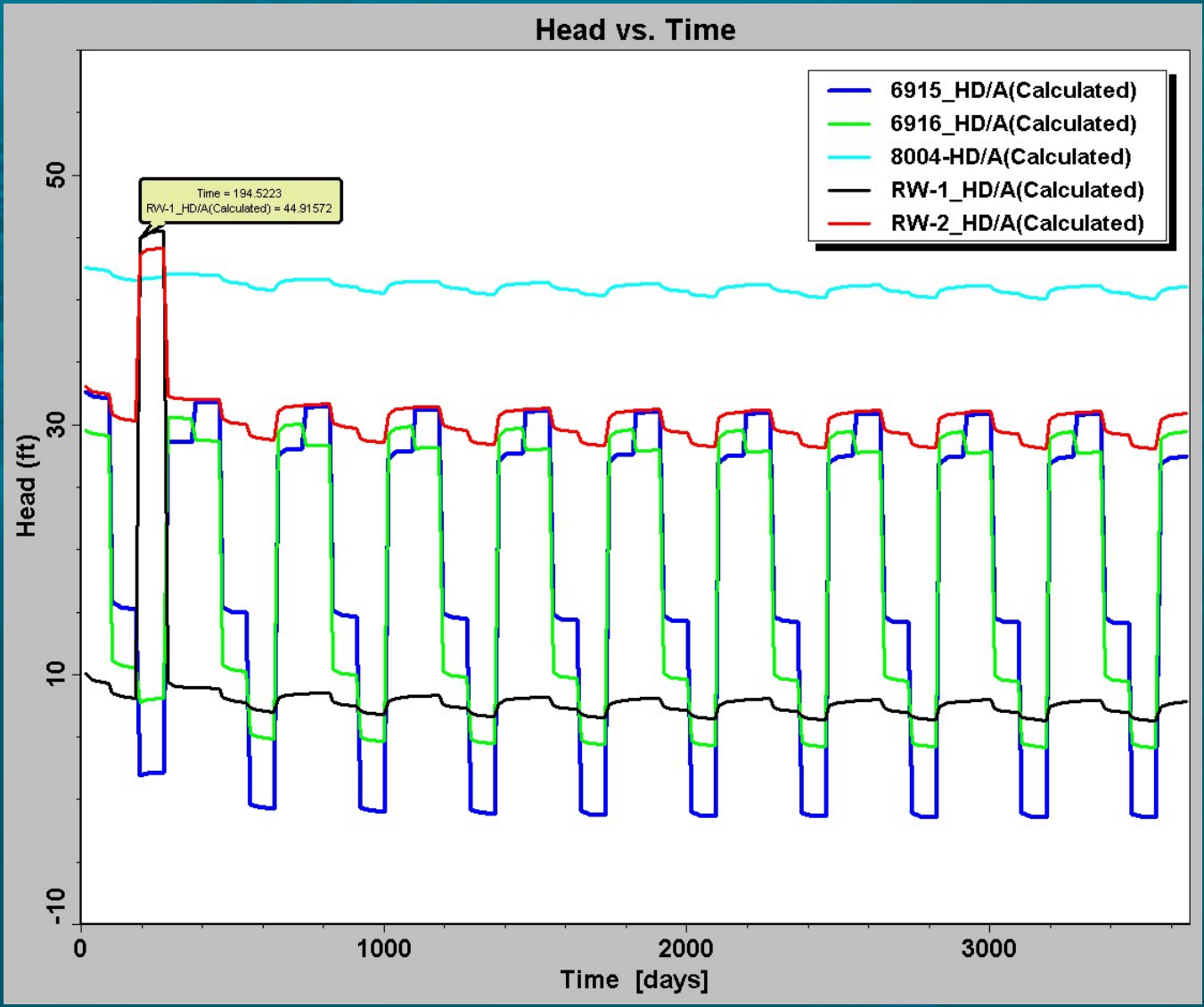
Contaminant mass transport in Model Layer 9



Mass Transport in vicinity of GM-38




Concentration vs. Time
ob6915/4-1(Calculated)/TVOC
ob6916/4-2(Calculated)/TVOC
obRW-1/Point #1(Calculated)/TVOC
obRW-2/Point #1(Calculated)/TVOC
Concentration (ug/L)
1000
500
0
0
1000
2000
3000
Time [days]


Head vs. Time
6915_HD/A(Calculated)
6916_HD/A(Calculated)
8004-HD/A(Calculated)
RW-1_HD/A(Calculated)
RW-2_HD/A(Calculated)
Time = 194.5223
RW-1_HD/A(Calculated) = 44.91572
Head (ft)
50
30
10
-10
0
1000
2000
3000
Time [days]

Summary & Conclusions

- This presentation has demonstrated that operation of the GM38 remedial system affects the BWD Plant 4 capture zone by causing it to shift to the northeast, away from the GM38 hot-spot.
- The GM38 Remedial System location and pumping rates have been optimized to affect an appropriately sized capture zone for the remediation of the hot-spot.
- Operation of the GM38 Remedial System does not adversely affect BWD Plant 4.

BWD Peak Pumping Rate
GM-38 Remedial System On