{In Archive} UEC's Power point presentation

Ray Leissner to: Stacey Dwyer, Philip Dellinger, Jose Torres, Scott Ellinger, David Gillespie 01/24/2012 02:41 PM

From: Ray Leissner/R6/USEPA/US
To: Stacey Dwyer/R6/USEPA/US@EPA, Philip Dellinger/R6/USEPA/US@EPA, Jose Torres/R6/USEPA/US@EPA, Scott Ellinger/R6/USEPA/US@EPA, David Gillespie/R6/USEPA/US@EPA
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See below.

Ray Leissner, Env. Eng.
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(214) 665 - 7183
USEPA, Region 6

The FIRST STEP in protecting your ground water is to have your well tested.

----- Forwarded by Ray Leissner/R6/USEPA/US on 01/24/2012 02:39 PM -----

From: Van Kelley <vkelley@intera.com>
To: Ray Leissner/R6/USEPA/US@EPA
Cc: "craig w. holmes" <pommelhouse@sbcglobal.net>
Date: 01/24/2012 12:34 PM
Subject: RE: Power point presentation

Ray

Sorry for the delayed response, I was out yesterday. I have attached the pdf of the presentation.

We put a significant amount of thought into developing a conservative analytical approach that we believe goes beyond the requirements of the rules set out for EPA's review of an aquifer exemption. You will see that the approach would develop site-specific properties and the time frame for analysis we have proposed is consistent with the EPA's letter to the TCEQ and 40 CFR 144.6.

It was a pleasure to meet you and look forward to developing a constructive working relationship.

Van Kelley

From: Ray Leissner [mailto:Leissner.Ray@epamail.epa.gov]
Sent: Thursday, January 19, 2012 9:36 AM
To: vkelley@intera.com
Cc: Scott Ellinger
Subject: Power point presentation

Van,

00774.pdf

It was good to meet you yesterday. Unfortunately I forgot to get a copy of your power point presentation. Could you email that to us? Thanks.

Ray Leissner, Env. Eng.
Ground Water / UIC Section (6WQ-SG)
(214) 665 - 7183
USEPA, Region 6

The FIRST STEP in protecting your ground water is to have your well tested. EPA approach 1 18 2012 Final.pdf

UEC Aquifer Exemption Boundary

EPA Region 6
Dallas
1/18/12

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Aquifer Exemption Boundary

- Objective:
  - Demonstrate that no existing domestic well that is currently used for human consumption is using water from the AE Area
  - Demonstrate that no existing domestic well could produce water from the AE Area for the entire mine life
- Approach: Use accepted EPA capture zone methods and site data to delineate capture zones

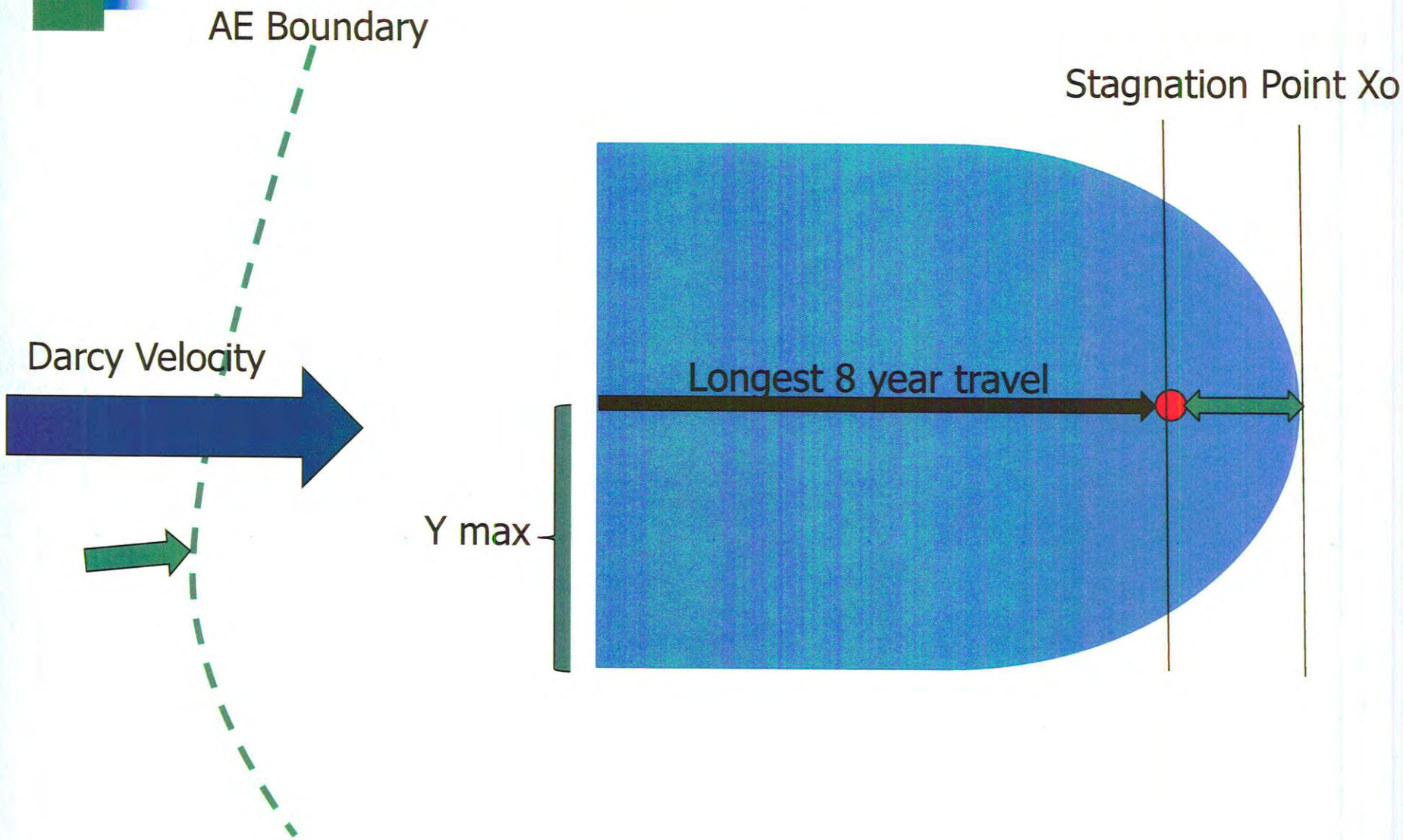
Capture Zone Time Frame

- We will perform calculations of capture for the 8 year mine life provided in the issued permit.
- This is consistent with:
  - 40 CFR 146.6
  - Region 6 EPA's response to UEC's Application received on May 27, 2011

Capture Zone Approach

1. Tabulate the rural domestic wells to be considered in the AOR and detail what strata each is completed in, where known.
2. Calculate average hydraulic gradients in each stratum
3. Calculate the 8 year capture zones for each rural domestic well and plot relative to the AE Boundary

8 year Capture Zone



Variables / Nomenclature

Q = Extraction rate at rural/domestic well (L3/T)
K = Average hydraulic conductivity of stratum (L/T)
b = Average thickness of stratum (L)
T = Average transmissivity (K * b) of stratum (L2/T)
i = Average hydraulic gradient (L/L)
Φ= Porosity of stratum (L3/L3)
v = Average seepage velocity (L/T)
x = Coordinate parallel to seepage velocity direction
y = Coordinate normal to seepage velocity direction

Capture Model Properties

Stratum	Average Thickness (ft)	Average Hydraulic Gradient	
		Magnitude (ft/ft)	Direction (degrees)
A	65	TBD	TBD
B	36	TBD	TBD
C	36	TBD	TBD
D	80	TBD	TBD

- We have good sand hydraulic properties from two large-scale pump tests and a calibrated flow model of the B-sand

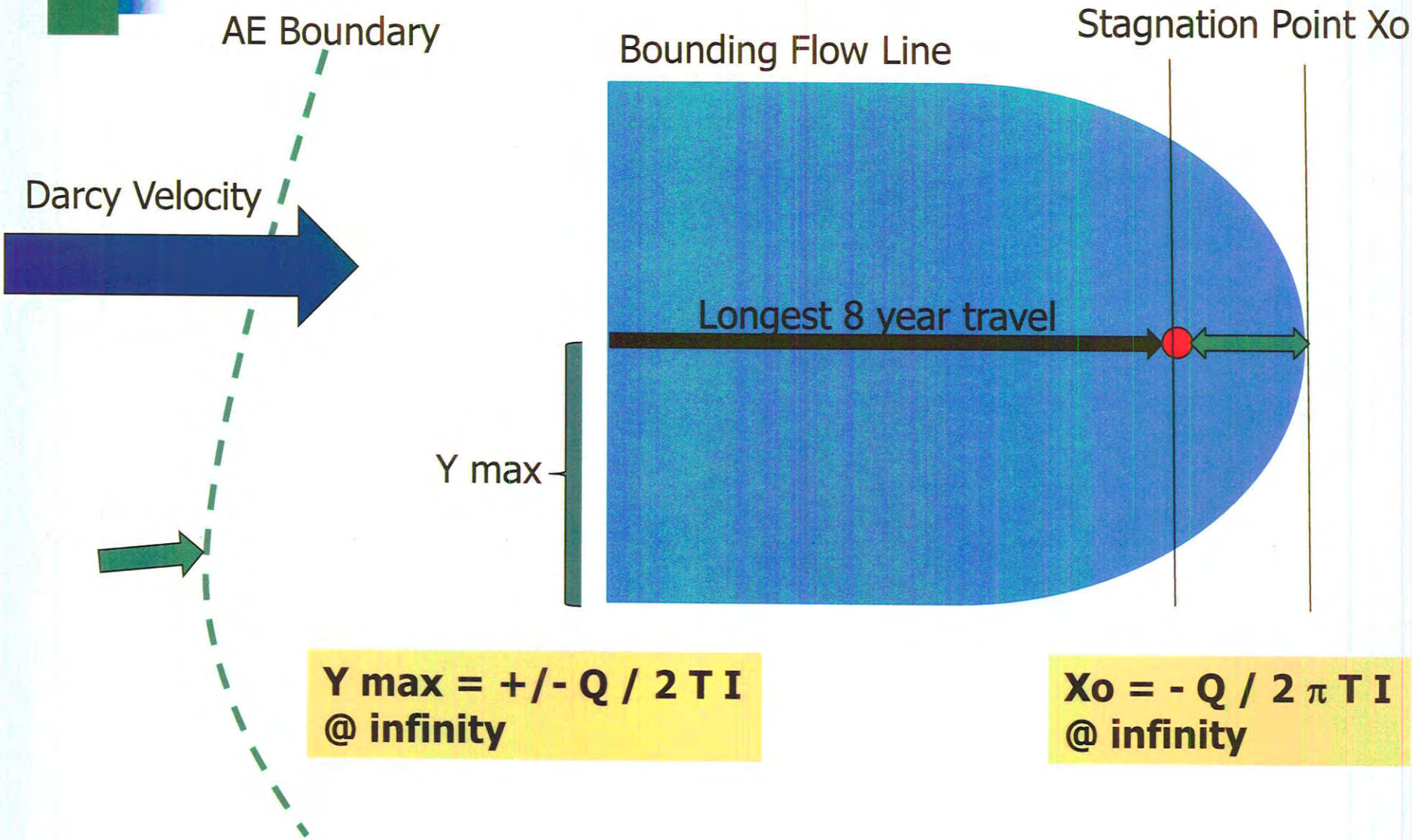
Rural/Domestic Use

- 2009 Water use survey data (Kevin Kluge, TWDB)
- Based upon municipal use and population – TWDB does not calculate a county gpd/capita for rural/domestic
- Goliad County = 119 gpd/person
  - State average = 150 gpd/person
- Average household in Goliad County is comprised of 2.6 people
  - http://www.goliadcc.org/index.php/re-location-info.html

Rural/Domestic Use

- 2.6 people x 119 gpd/person = 309.4 gpd
- 309.4 gpd = 0.215 gpm = 41.4 ft3/day

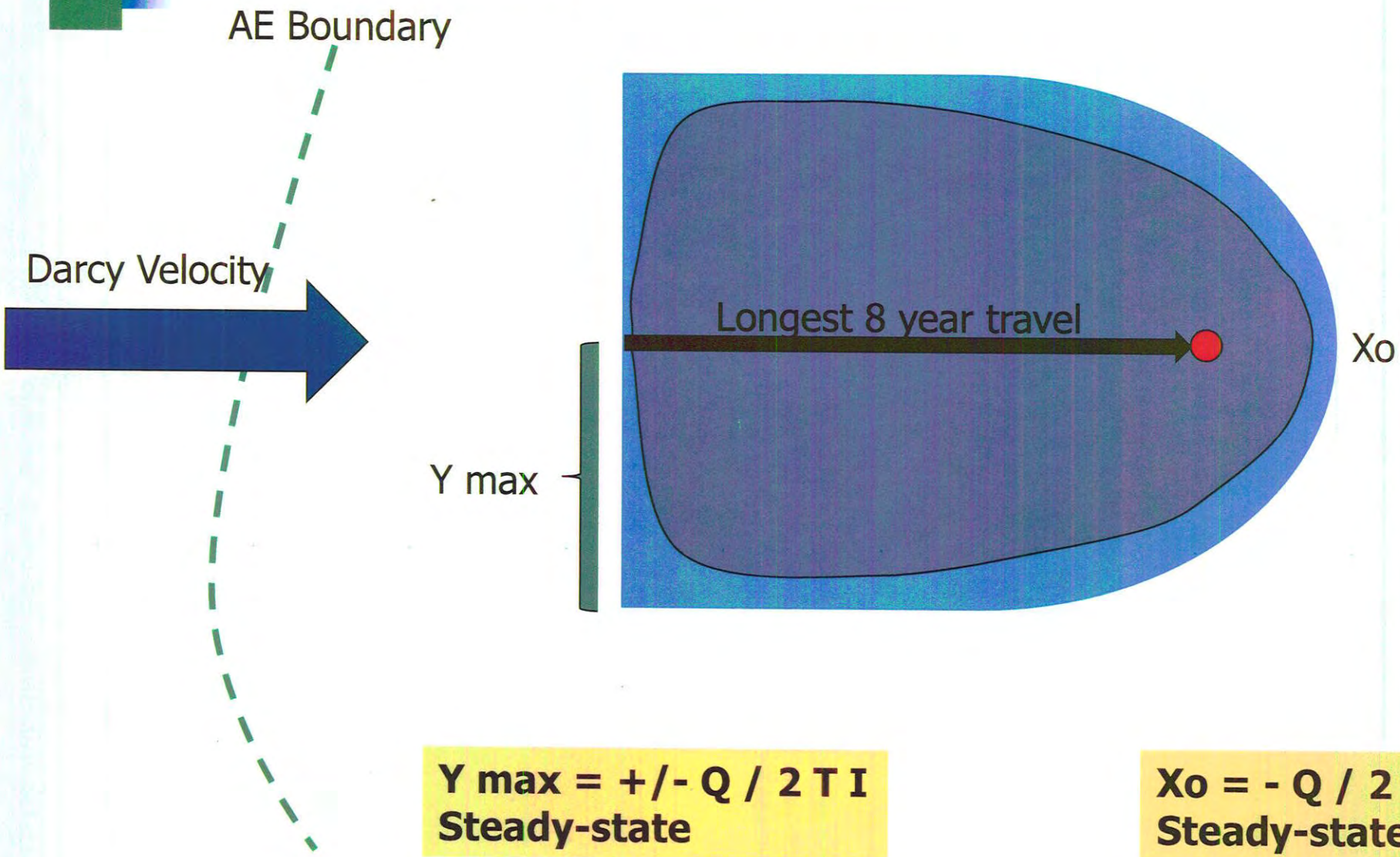
Calculation of the 8 year Capture Zone



Y max = +/- Q / 2 T I
@ infinity

Xo = - Q / 2 π T I
@ infinity

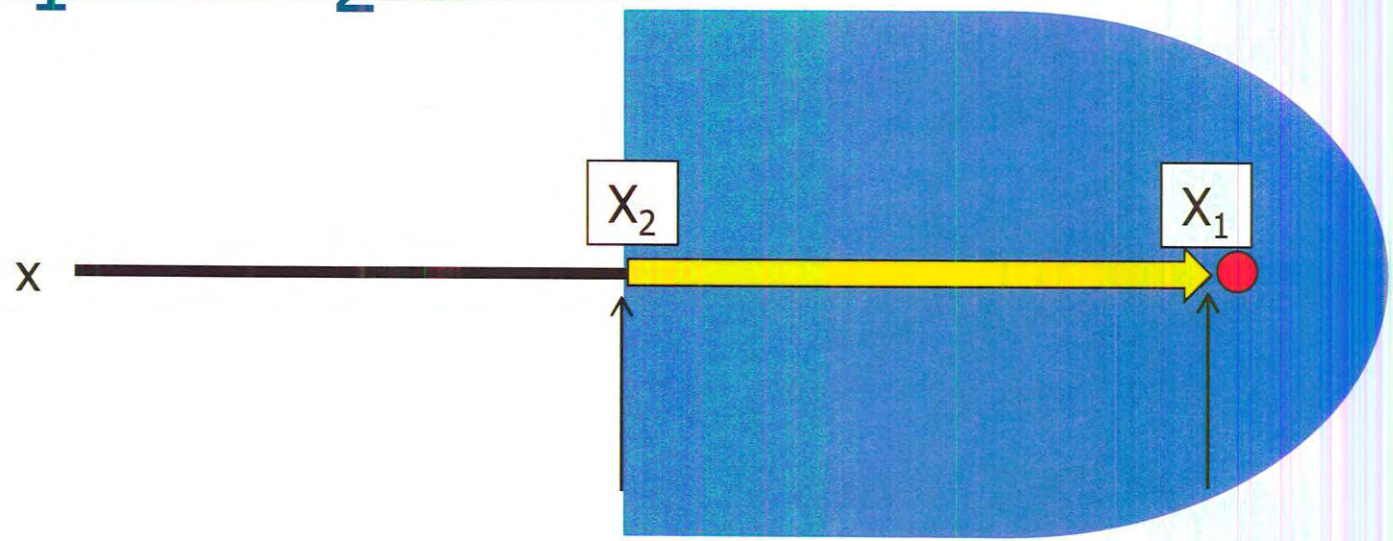
Conservative Aspect of the Calculation



Y max = +/- Q / 2 T I
Steady-state

Xo = - Q / 2 π T I
Steady-state

Travel Time Calculation from X_1 to X_2



Travel Time from x_2 to x_1 =

$$\{vx_2 - Q/2\pi b\phi\ [\ln (vx_2 + Q/2\pi b\phi)\} / v^2 \ -$$

$$\{vx_1 - Q/2\pi b\phi\ [\ln (vx_1 + Q/2\pi b\phi)\} / v^2$$

Product to EPA

- Review all wells in the AOR and provide verification of where the wells are completed where we have data
- Develop reasonable estimates of:
  - Aquifer properties
  - Hydraulic gradients
  - Rural/domestic pumping rate

Product to EPA

- Provide plots of the 8 year capture zones for each rural/domestic well in the AOR
  - If a well is known to be completed in a particular stratum, calculations for that well will be limited to that stratum
  - If completion of a well is unknown, the calculations will be performed assuming all four potential strata
- Technical memorandum documenting results

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