NRC/DOE/WDEQ Meeting

Shirley Basin South Site

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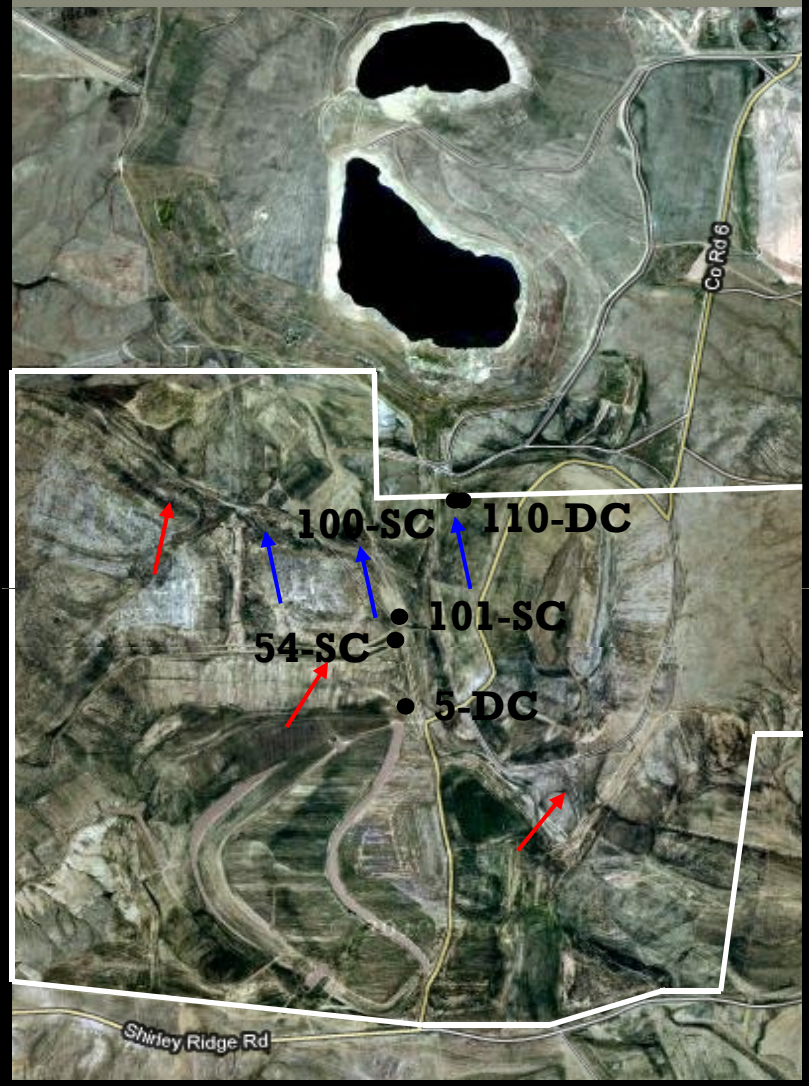
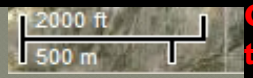
Project Manager, Shirley Basin South

Purpose/Outline

- Share information related to the Shirley Basin South Area
  - Current Conditions
  - WH-3
  - Unknowns
  - Potential Paths Forward For Discussion





Groundwater flow in the Upper Sand as of May 1996

Groundwater flow in the Main Sand as of May 1996

Groundwater flow currently in the Upper Sand is similar to May 1996

The Main Sand gradient currently appears essentially flat

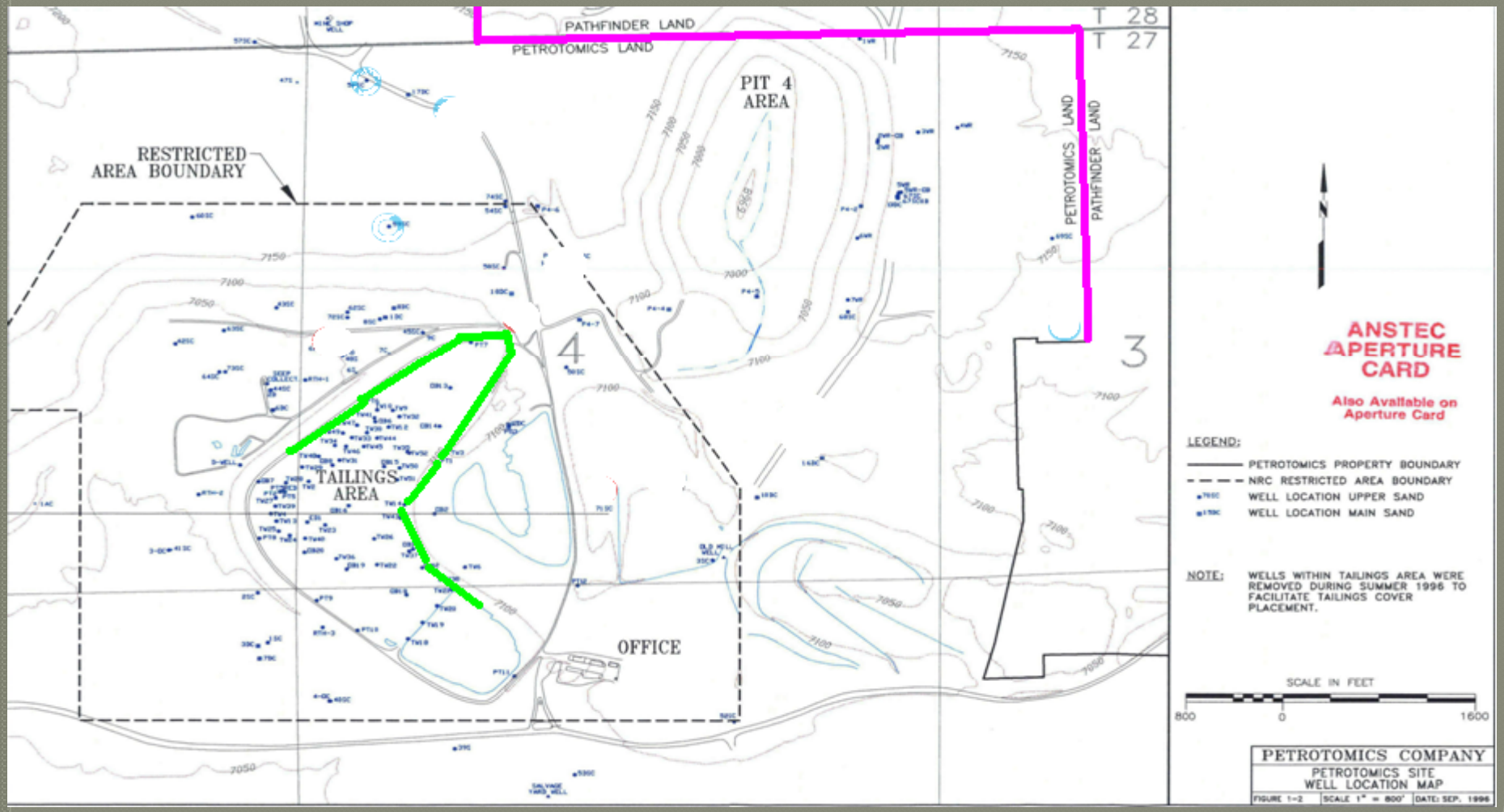
Current Conditions

- Ra-228 has been detected at the POC well 5-DC and well 54-SC since the site was transferred to DOE for long-term care at levels above the ACL
- DOE installed new groundwater monitoring wells
- Ra-226 was detected in the main sand aquifer at recently installed well 110-DC at a level higher than the approved risk assessment for occasional drinking water use at the POE, but below the livestock watering value; the source is unknown

Current Conditions (cont.)

- Per the existing LTSP, DOE is expected to submit an evaluative monitoring program for Ra-226
- Water levels are rising
- The northern groundwater gradient has been decreasing and may change in the future

POC/POE


PATHFINDER LAND
PETROTOMICS LAND
T 28
T 27
PIT 4
AREA
RESTRICTED
AREA BOUNDARY
PETROTOMICS LAND
PATHFINDER LAND
4
3
TAILINGS
AREA
OFFICE
ANSTEC
APERTURE
CARD
Also Available on
Aperture Card
LEGEND:
PETROTOMICS PROPERTY BOUNDARY
NRC RESTRICTED AREA BOUNDARY
WELL LOCATION UPPER SAND
WELL LOCATION MAIN SAND
NOTE: WELLS WITHIN TAILINGS AREA WERE REMOVED DURING SUMMER 1996 TO FACILITATE TAILINGS COVER PLACEMENT.
SCALE IN FEET
800
0
1600
PETROTOMICS COMPANY
PETROTOMICS SITE
WELL LOCATION MAP
FIGURE 1-2
SCALE 1" = 800'
DATE: SEP. 1996

Expected POE and ACL Values

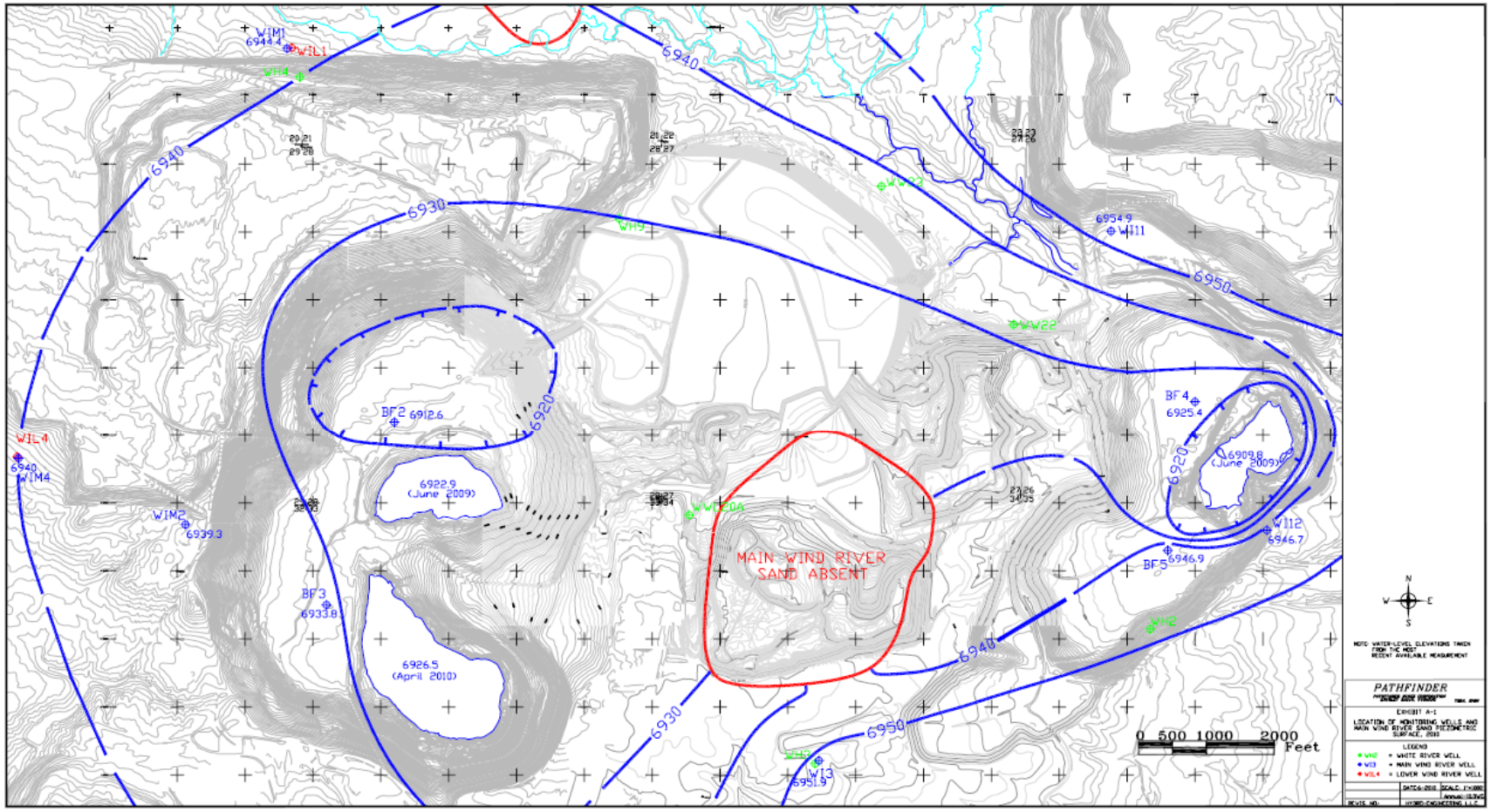
Constituent	Expected POE Value (mg/L unless noted)	ACL at POC (mg/L unless noted)	October 2009 Value at 110-DC
Cadmium	0.038	0.079	0.0013
Chromium	0.077	1.83	0.0011
Lead	**0.18**	**0.05**	**0.0044**
Nickel	**1.32**	**6.15**	**0.0022**
Radium-226 (pCi/L)	**272 (livestock)/106 (drinking water)**	**91.3**	**172**
Radium-228 (pCi/L)	**36 (livestock)/19.8 (drinking water)**	**25.7**	**5.05**
Selenium	**0.0054**	**0.12**	**0.0001**
Thorium-230 (PCi/L)	20.7	2409	0.75
Uranium	0.09	9.2	0.013

Well WH-3 Current Conditons

- On Pathfinder property
- Elevated radium and sulfate, and low pH
- NRC staff believes elevated levels could possibly be attributed to local mineralization

NRC Review of WH-3

- **NRC staff does not believe that the Ra-226 (235 pCi/L) readings from well WH-3 originate from Shirley Basin South because:**
  - **The White River aquifer is located above the Main Wind River Sand aquifer but is not present in the vicinity of the Shirley Basin South tailings pile. The Main Wind River Sand aquifer extends north from the Shirley Basin South site, unlike the Upper Wind River Sand that terminates south of Well WH-3.**
  - **Groundwater flow from Shirley Basin South in the Main Wind River Sand aquifer is not in the direction of well WH-3**
  - **Well WI-3, which is completed in the Main Wind River Sand aquifer immediately adjacent to Well WH-3, is relatively uncontaminated. (note: On Pathfinder's August 26, 2009, report, it appears that groundwater samples from WH-3 and WI-3 were switched, as explained on page A-1 of Appendix A).**


WIM1
6944.4
WIL1
WH4
6940
6930
WH9
WW12
6954.9
WI11
6950
WW22
BF2 6912.6
6920
WIL4
6940
WIM4
6922.9
(June 2009)
WIM2
6939.3
WW20A
MAIN WIND RIVER
SAND ABSENT
BF4
6925.4
6909.8
(June 2009)
WI12
6946.7
BF5 6946.9
BF3
6933.8
6926.5
(April 2010)
WH2
6930
WH3
WI3
6951.9
0 500 1000 2000
Feet
N
W
E
S
NOTE: WATER-LEVEL ELEVATIONS TAKEN FROM THE MOST RECENT AVAILABLE MEASUREMENT
PATHFINDER
EXHIBIT A-1
LOCATION OF MONITORING WELLS AND MAIN WIND RIVER SAND PIEZOMETRIC SURFACE, 2010
LEGEND
WI2 = WHITE RIVER WELL
WI3 = MAIN WIND RIVER WELL
WIL4 = LOWER WIND RIVER WELL

Unknowns

- Rate of fill for Reservoir 2/8, and whether regional flow will reverse
- Source of Ra-226 detected at well 110-DC
  - Prior exceedances were for wells 5-DC and 54-SC for Ra-228
  - Ra-226 detected is further complicated by Pit 4 in proximity of the well

Unknowns (cont.)

- **Future land use between the Reservoir 2/8 area and Shirley Basin South**

Potential Paths Forward For Discussion

- Placement of a well between Reservoir 2/8 and the Shirley Basin South Site- to determine groundwater gradient, and Ra-226 levels

- Temporary institutional controls on land from Shirley Basin South to Reservoir 2/8, if Ra-226 is determined to be tailings derived

Potential Paths Forward For Discussion (cont.)

- Monitoring groundwater and surface water elevations
- Collect surface water quality data
- Continue in assessment mode (e.g., continue monitoring groundwater quality)