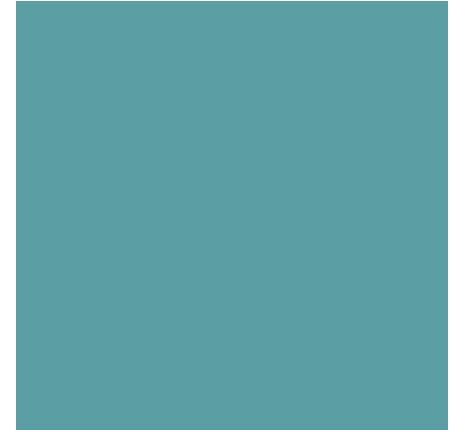




# Review of Preliminary Phase II Groundwater Report

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## Discussion Outline

- Preliminary Phase II Groundwater Report
- Bedrock Aquifer Contaminants of Concern
- Connection between Shallow Groundwater and Fractured Bedrock
- The Stockton Formation-Your Local Aquifer
- Ambler Borough Supply Wells



# Preliminary Phase II Groundwater Report

# Bedrock Well Locations





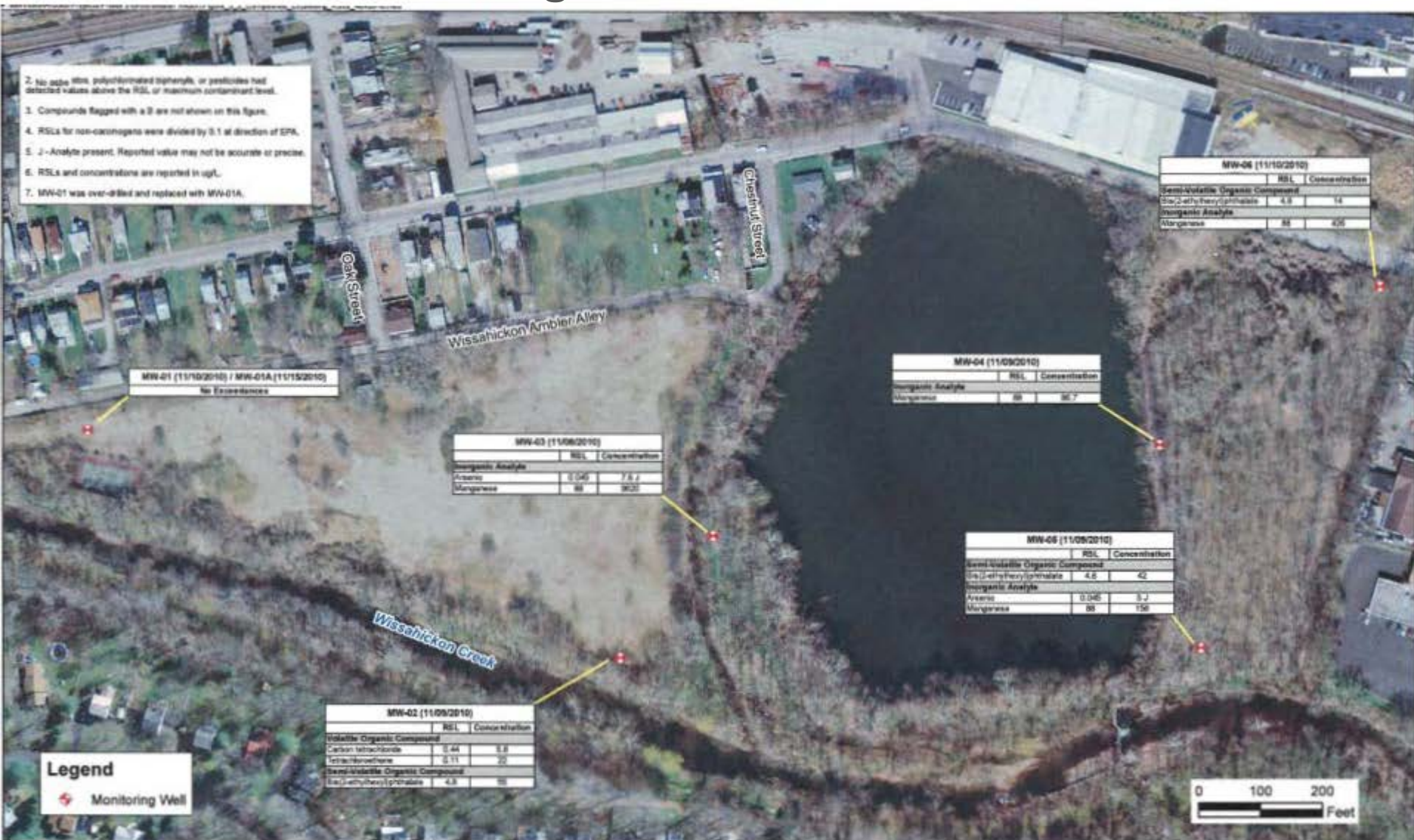
# BoRit Asbestos Superfund Site

## Preliminary Phase II Groundwater Report

### Bedrock Well Construction Details

Well ID	Depth to Top of Bedrock	Depth of Surface casing	Depth to Water Bearing Fracture	Total Depth of Well	Screen Section	Distance from Top of Bedrock to Water Bearing Fracture
MW-01A	14.5	25	64	73	63-73	43.5
MW-2	26.4	36	58	63	53-63	31.6
MW-3	14.4	24	48	53	43-53	33.6
MW-4	32.1	44	95	100	80-100	62.9
MW-5	29	39	58	64	54-64	29
MW-6	18	28	48	53	43-53	30

# Compounds Exceeding Groundwater Screening Levels in Bedrock Wells



# Contaminant Concentrations (µg/L) Reported above RSLs in BoRit Monitoring Wells, November 2012

	Monitoring Well ID					
Organic Contaminant (RSL)	1A	02	03	04	05	06
Carbon Tetrachloride (0.44)	ND	5.8	ND	ND	ND	ND
Tetrachloroethylene (PCE) (0.11)	ND	22	ND	ND	ND	ND
Bis(2-ethylhexyl)phthalate (4.8)	ND	56	ND	ND	42	14
Inorganic Contaminant (RSL)						
Arsenic (0.045)	ND	ND	7.6J	ND	5J	ND
Manganese (88)	ND	ND	9,620	ND	156	426

**Notes:**

**Inorganic results from filtered samples**

**µg/L – micrograms per liter, analogous to parts per billion**

**RSL – Regional Screening Level**

**ND – Not detected above the RSL**

**J – Analyte present. Result may not be precise or accurate**



# Bedrock Aquifer Contaminants of Concern



# Organic Compounds:

➤ Carbon Tetrachloride

➤ PCE

- Chlorinated solvents
- Wide industrial usage
- Known/Suspected human carcinogens
- Concentrations in MW-02 exceed both RSLs and MCLs
- Carbon tetrachloride not reported in soil or shallow groundwater
- Trace concentrations of PCE (0.075, 0.075, 0.084  $\mu\text{g/L}$  ) were detected in shallow park ground water during Phase I – less than MW-02 concentrations

## Organic Compounds:

➤ Bis(2-ethylhexyl)  
phthalate

- Used in production of PVC resins and plastics
- Detected above the RSL in three well samples and field blank
- Detection in field blank suggests it may be sampling artifact

## Inorganic Compounds:

### ➤Asbestos

- Detected above the MCL in all of the shallow wells because the wells were completed in or near asbestos waste
- Detected in one bedrock well – MW-04 at 0.51 MFL – well below the MCL of 7 MFL
- Not detected in the other five wells above the method detection limit of 0.2 MFL

MFL = Million Fibers per Liter

# Inorganic Compounds:

## ➤ Arsenic

- Naturally occurring element
- Used for strengthening metal alloys, in pesticides/herbicides and in semiconductors
- Detected across site in waste layers, native soil, sediment and shallow groundwater
- Detected in bedrock wells MW-03 and MW-05 above the RSL of 0.045 µg/L but below the MCL of 10 µg/L
- No clear pattern of elevated concentrations associated with a particular waste layer or media



# Inorganic Compounds:

## ➤Manganese

- Common, naturally occurring element
- Used in metal alloys, especially stainless steel
- Detected across site in waste layers, native soil, sediment and shallow groundwater
- Detected in bedrock wells MW-03, MW-05 and MW-06 above the RSL of 88 µg/L and non-enforceable SMCL of 50 µg/L



# Connection Between Shallow Groundwater and Fractured Bedrock

## Are Contaminants Migrating Into the Bedrock Aquifer?

- The current data suggest not
- No clear correlation between shallow and deep contaminants
- The connection between the shallow groundwater and bedrock fractures has not been evaluated
- Pump testing one or more of the deep wells while monitoring the water level in the other wells would help establish the interconnectivity between the wells and the shallow groundwater

## Are Contaminants Migrating Into the Bedrock Aquifer?

- No source area of carbon tetrachloride or PCE was identified by the soil and shallow groundwater sampling—lots of sampling was done
- It appears that carbon tetrachloride and PCE are migrating in the bedrock from an unidentified source
- Additional wells and aquifer testing would help determine if the source(s) are on or off site





# The Stockton Formation -Your Local Aquifer

# The Stockton Formation

- Sedimentary sequence of sandstone, conglomerate, shale and siltstone
- Majority of water occurs in fractures, bedding planes and joints
- Individual well yield is determined by frequency and interconnectivity of water bearing fractures

# The Stockton Formation Water Quality

**Water quality.**—As seen in the following table, wells completed in the Stockton Formation generally yield water that contains low to moderate amounts of dissolved solids, is moderately hard to hard, and is slightly acidic. Calcium is the dominant cation, and bicarbonate is the dominant anion. Elevated concentrations of iron, lead, manganese, and radon and low pH are common water-quality problems in the Stockton Formation. Rima and others (1962, p. 41) reported no significant difference in the chemical makeup of water from the different members of the Stockton Formation. Additional information on the source and significance of these and other selected dissolved constituents and properties of ground water are presented in the appendix.

## *Summary of selected chemical constituents and properties analyzed for the Stockton Formation*

[Concentrations in milligram per liter unless otherwise noted;  $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 degrees Celsius; —, insufficient data available; <, less than; >, greater than; pCi/L, picoCuries per liter; P25, twenty-fifth percentile; P75, seventy-fifth percentile]

Chemical constituent or property	Number of wells sampled	Maximum contaminant or action level <sup>1</sup>	Secondary maximum contaminant level <sup>2</sup>	Number of wells containing water that exceeds contaminant level	P25	Median	P75	Minimum reported	Maximum reported
Field specific conductance ( $\mu\text{S}/\text{cm}$ )	179	—	—	—	250	320	400	120	1,100
Field hardness	191	—	—	—	86	140	170	7.0	1,300
Field pH (standard units)	182	—	<6.5 >8.5	64	6.2	6.9	7.5	4.1	9.1
Bicarbonate	165	—	—	—	64	98	130	6.0	220
Calcium	126	—	—	—	23	40	52	2.0	230
Chloride	171	—	250	0	7.2	13	23	1.2	120
Iron	155	—	.3	24	.010	.050	.14	<.003	4.0
Lead	72	0.015	—	12	.001	.002	.006	<.001	.055
Magnesium	126	—	—	—	8.0	12	17	.70	49
Manganese	119	—	.05	25	.003	.010	.060	<.001	.87
Nickel	24	.1	—	2	.001	.002	.006	<.001	.12
Nitrate (as N)	165	10	—	3	.96	2.1	3.8	.00	17
Potassium	97	—	—	—	.90	1.1	1.6	.30	4.0
Radon (pCi/L)	30	<sup>3</sup> 300	—	30	1,100	1,400	1,700	610	4,100
Silica	123	—	—	—	20	23	26	1.3	52
Sodium	97	—	—	—	9.6	14	20	.70	87
Sulfate	164	—	250	5	19	29	54	2.4	600
Total dissolved solids	157	—	500	11	180	230	310	51	1,040

<sup>1</sup> U.S. Environmental Protection Agency, 1994.

<sup>2</sup> U.S. Environmental Protection Agency, 1986b.

<sup>3</sup> U.S. Environmental Protection Agency, 1994, proposed maximum contaminant level.



# Ambler Borough Water Supply Wells



Three slides were removed from the original presentation here which contained the location of and information about Ambler public water supply wells.

## Will BoRit Contaminants Affect the Ambler Water Wells?

The current data suggests not, but there is insufficient information to make a definitive statement

- No clear connection between shallow and bedrock contamination on site has been established
- The 2011 analytical data provided by Ambler Borough did not report detecting arsenic, carbon tetrachloride or PCE in Wells 04, 09 or 11
- The Borough does not test for asbestos
- No investigation of the radius of influence created under pumping conditions of the closest Ambler wells has been done

## Determining the Connection Between Ambler Water System and BoRit Site

- Monitoring water levels in on-site wells during operation of Ambler supply wells
- Would require cooperation of Ambler Water Department to provide operation schedule for nearby supply wells



# QUESTIONS?



# THANK YOU

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