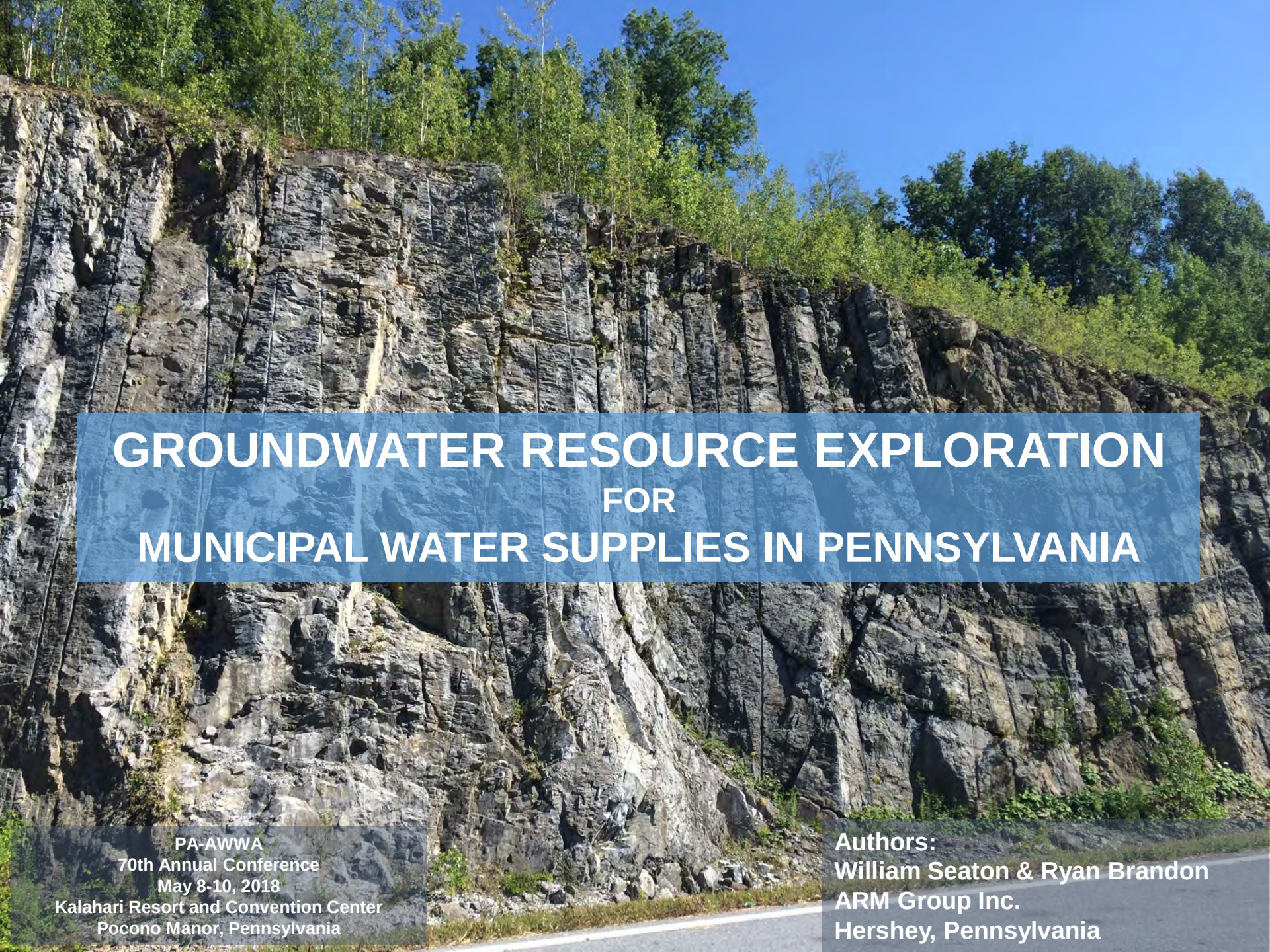
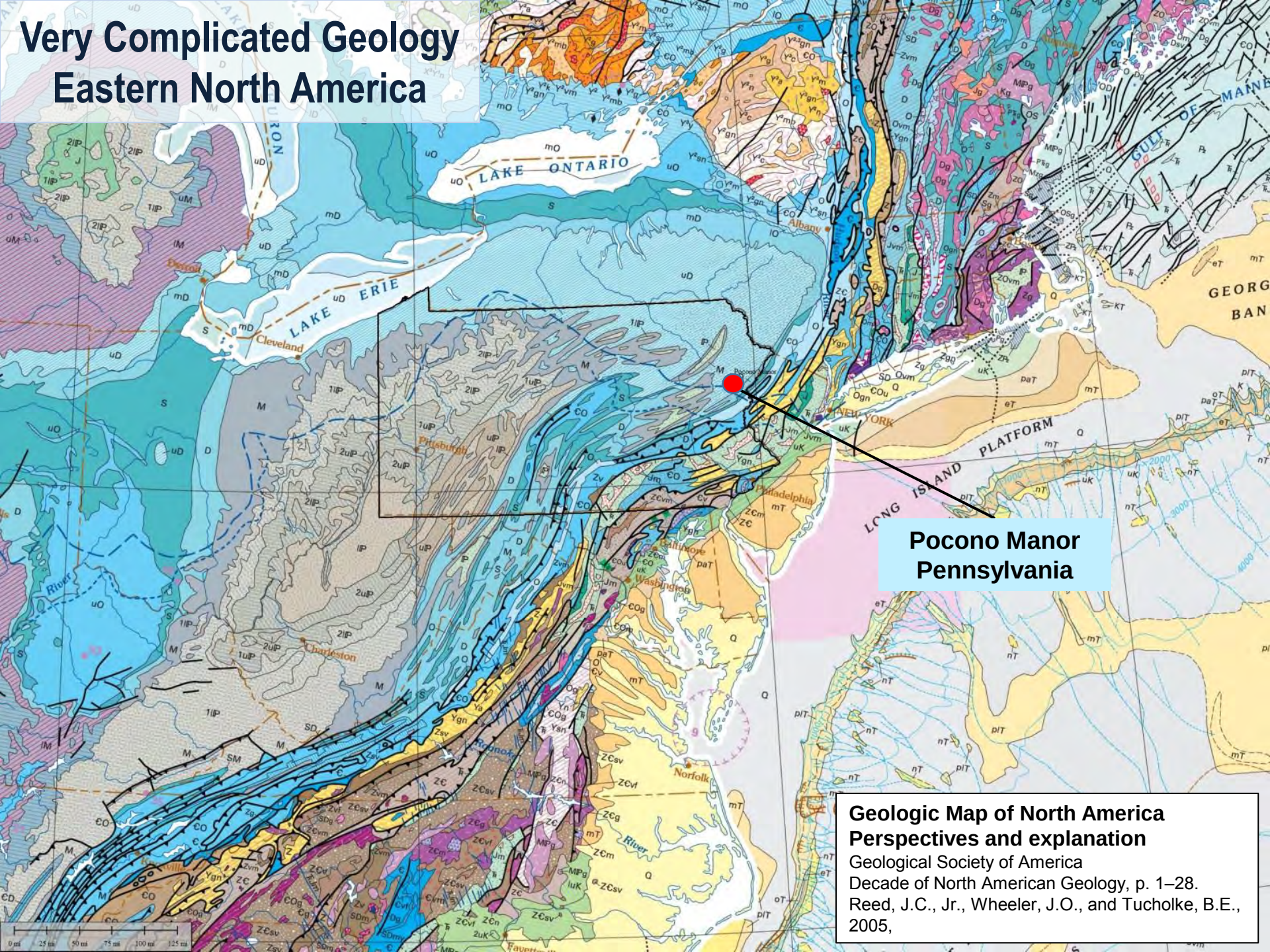


GROUNDWATER RESOURCE EXPLORATION
FOR
MUNICIPAL WATER SUPPLIES IN PENNSYLVANIA

PA-AWWA
70th Annual Conference
May 8-10, 2018
Kalahari Resort and Convention Center
Pocono Manor, Pennsylvania

Authors:
William Seaton & Ryan Brandon
ARM Group Inc.
Hershey, Pennsylvania

Very Complicated Geology Eastern North America



Geologic Map of North America
Perspectives and explanation
Geological Society of America
Decade of North American Geology, p. 1–28.
Reed, J.C., Jr., Wheeler, J.O., and Tucholke, B.E., 2005,

Developing Municipal Water Supplies

Some Important Considerations

- Long Term Sustainable Well Yield
- Water Quality – PADEP New Source List
- Not Under the Influence of Surface Water (Non-GUDI)
- Permitting/Testing Requirements
- Ease of Operation
- Cost to Construct/Develop/Operate
- Proximity to Existing Distribution System
- Land Ownership/Control of Zone 1 Wellhead Protection Area
- Source Water Protection – Surrounding Land Use
- Potential Impact on Sensitive Water Resource Features (HQ or EV streams, Wetlands, Aquatic Habitat, etc.)

How can Hydrogeology & Geophysics help?

- Long Term Sustainable Well Yield
- Water Quality – PADEP New Source List
- Not Under the Influence of Surface Water (Non-GUDI)
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- Cost to Construct/Develop/Operate
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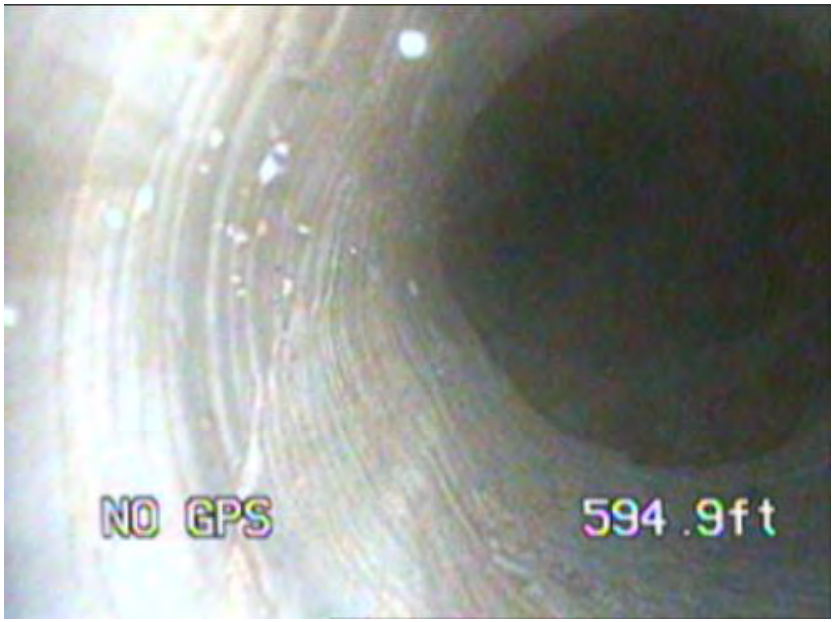
Proximity to Existing Distribution System
Land Ownership/Control of Zone 1 Wellhead Protection Area

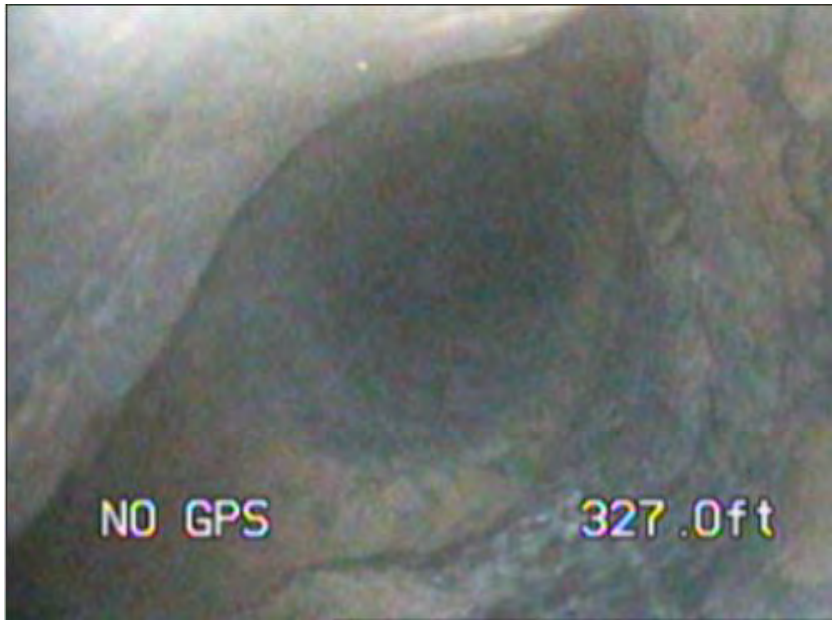
Drilling Discharge Rate ~ 2,440 gpm
Well Total Depth – 702 feet

Images from a Borehole Camera

Cylindrical Borehole
with Deeper Void



Asymmetric Borehole
with Large Fracture

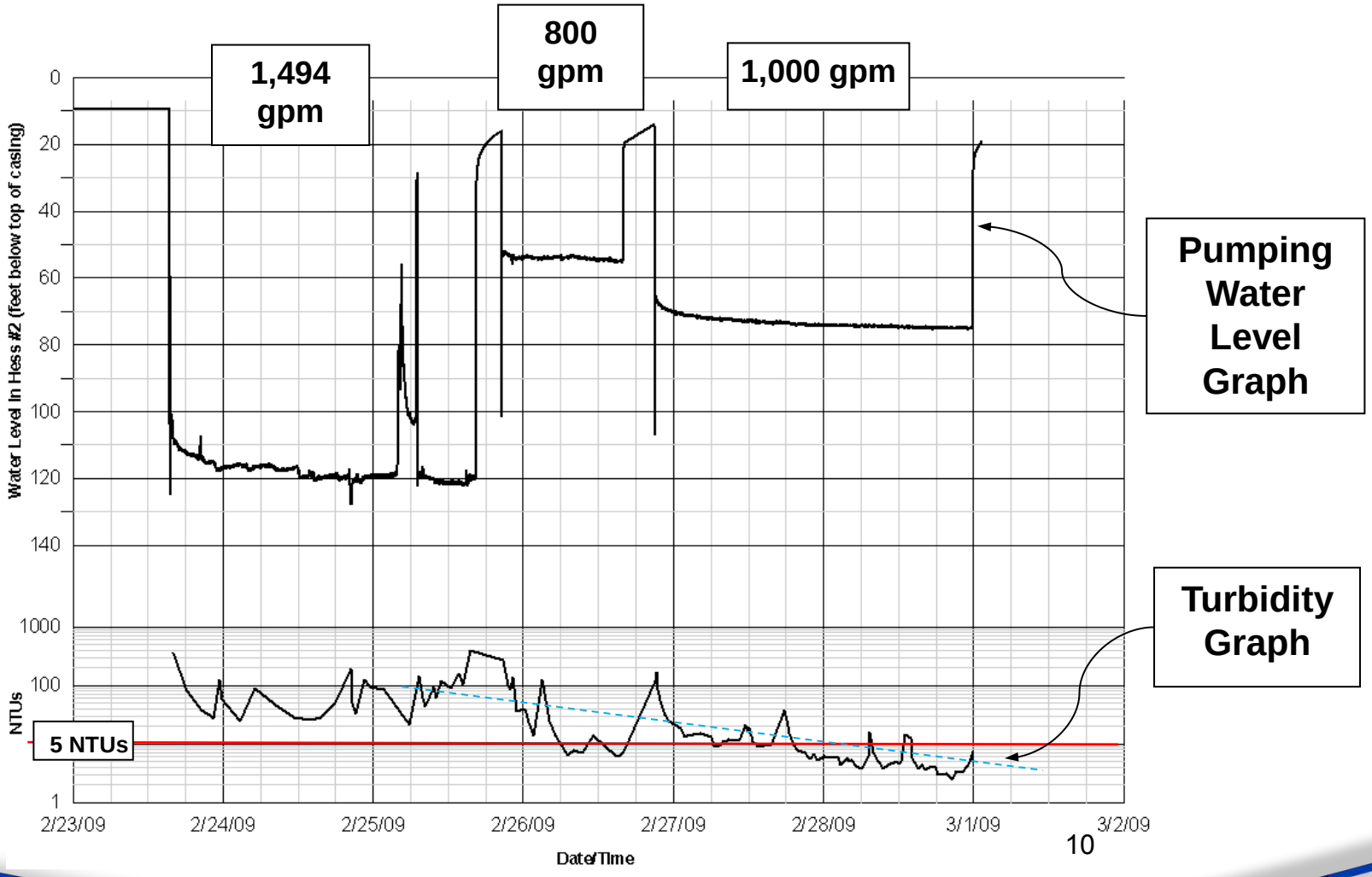


Submersible Pump
~150 HP – 1,500 gpm

Erosion and Sediment Control

Creek Discharge < 100 NTU

Aquifer Test Pumping Water Level and Turbidity Graph



Meet All Permitting Requirements

- Pa Department of Environmental Protection
  Regional office

- Pa Fish & Boat Commission

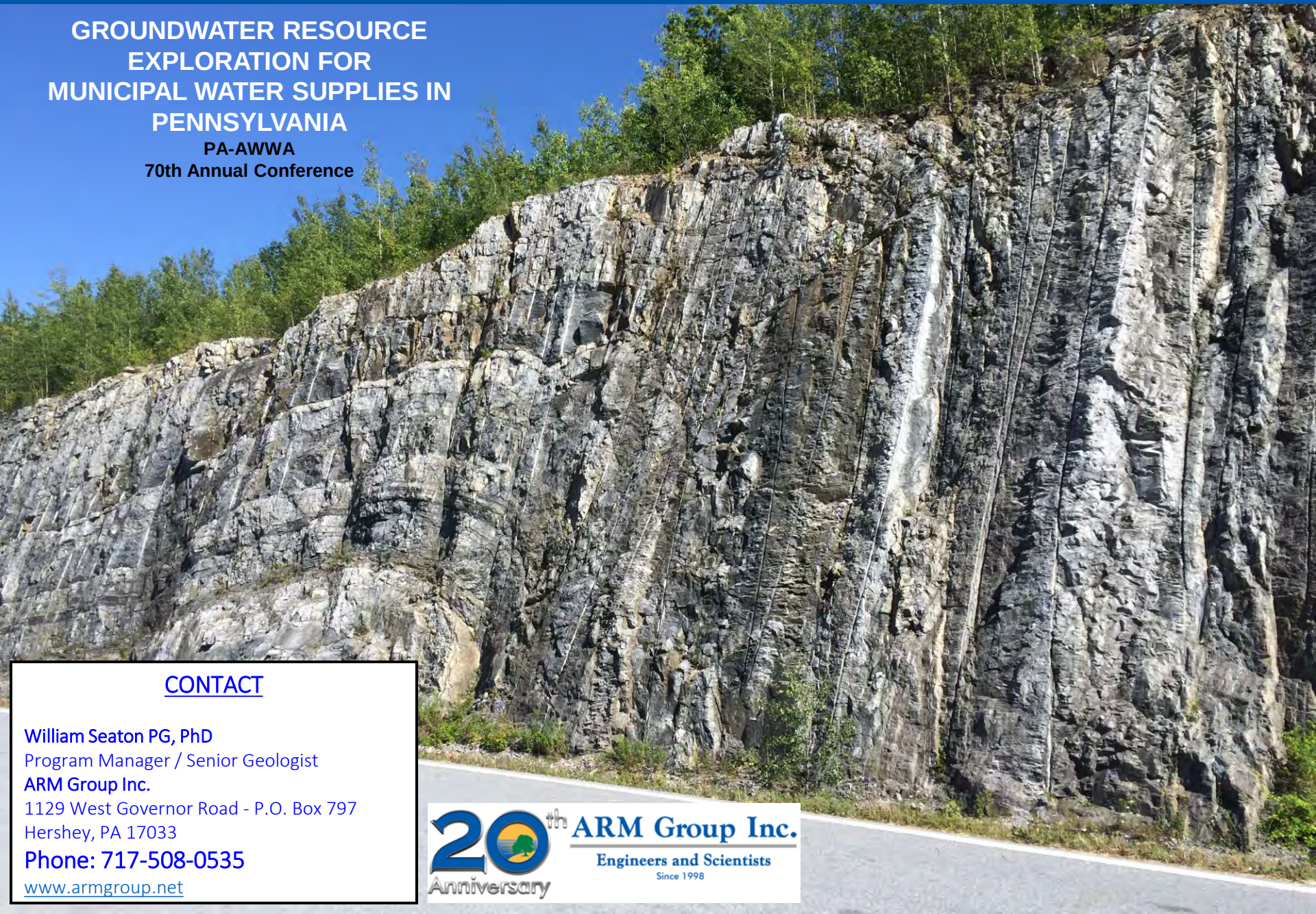
- Pa Department of Conservation and Natural Resources
  Bureau of Forestry

- County Conservation District

Final Permit

- Maximum discharge rate 1,494 gpm (2.1 MGD)
- Filtration plant NOT NECESSARY
- Entire water needs of municipality can be supplied by this well
- Surplus water resources may be sold to nearby customers

Thank You for Attending!



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