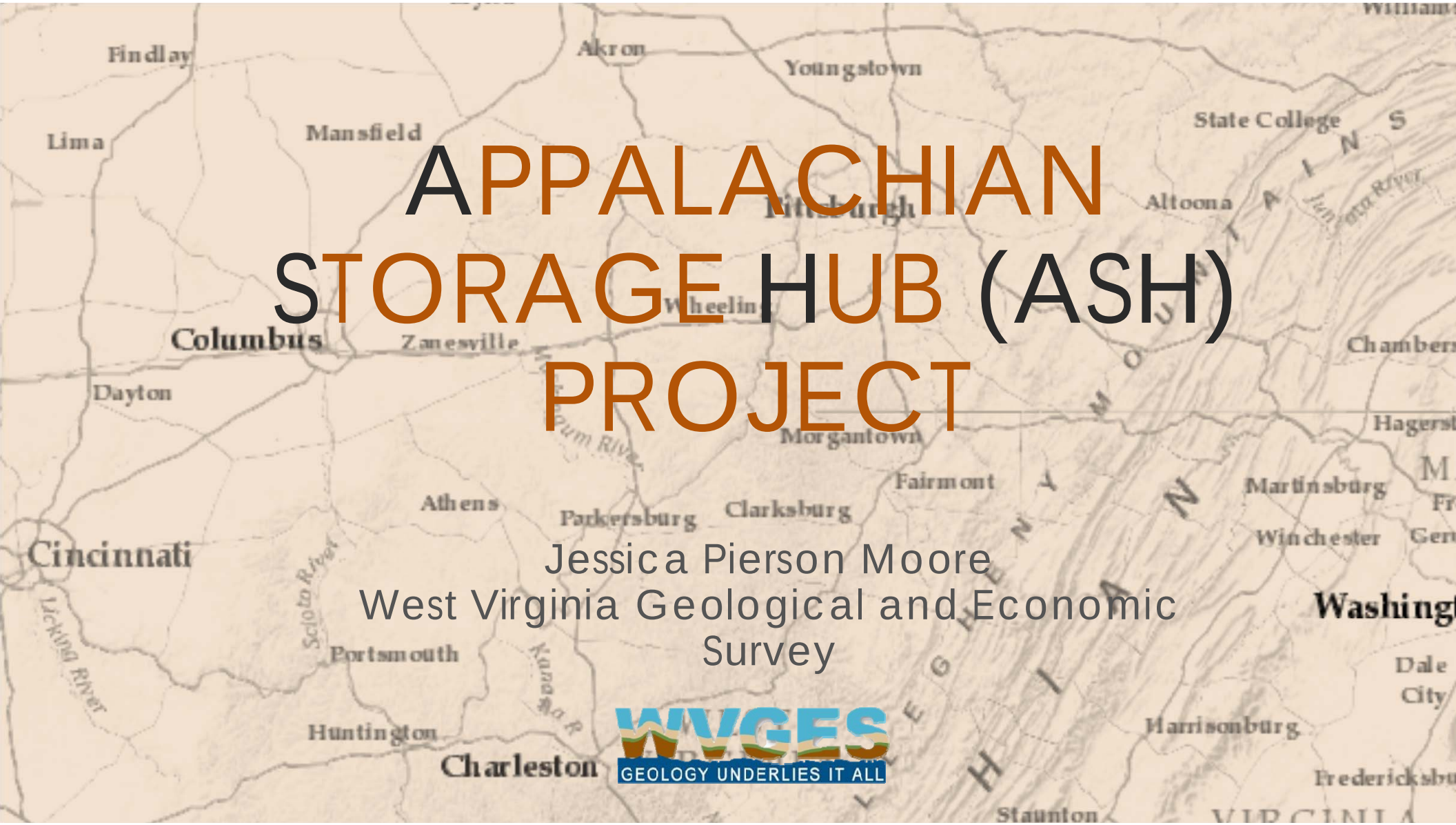


APPALACHIAN STORAGE HUB (ASH) PROJECT

Jessica Pierson Moore
West Virginia Geological and Economic Survey

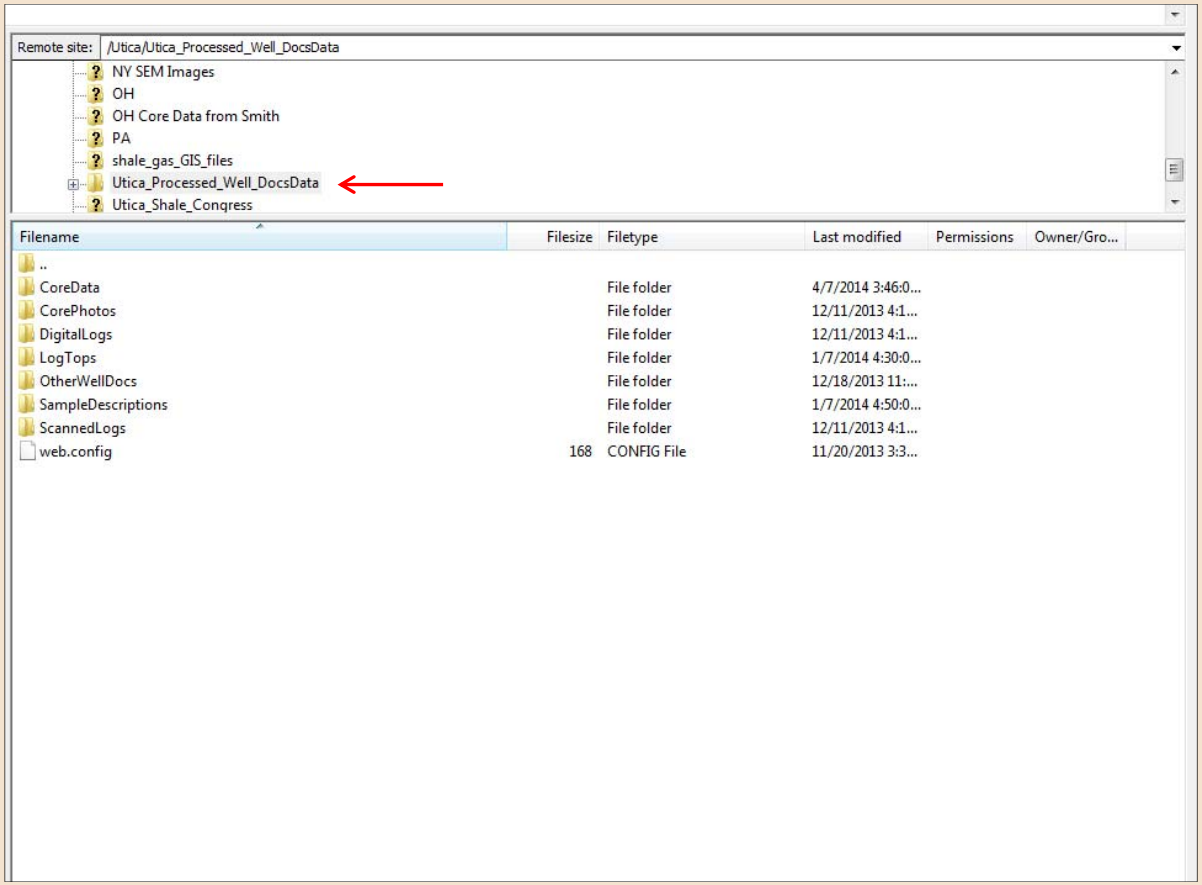
WVGES
GEOLOGY UNDERLIES IT ALL

DATABASE CONSTRUCTION

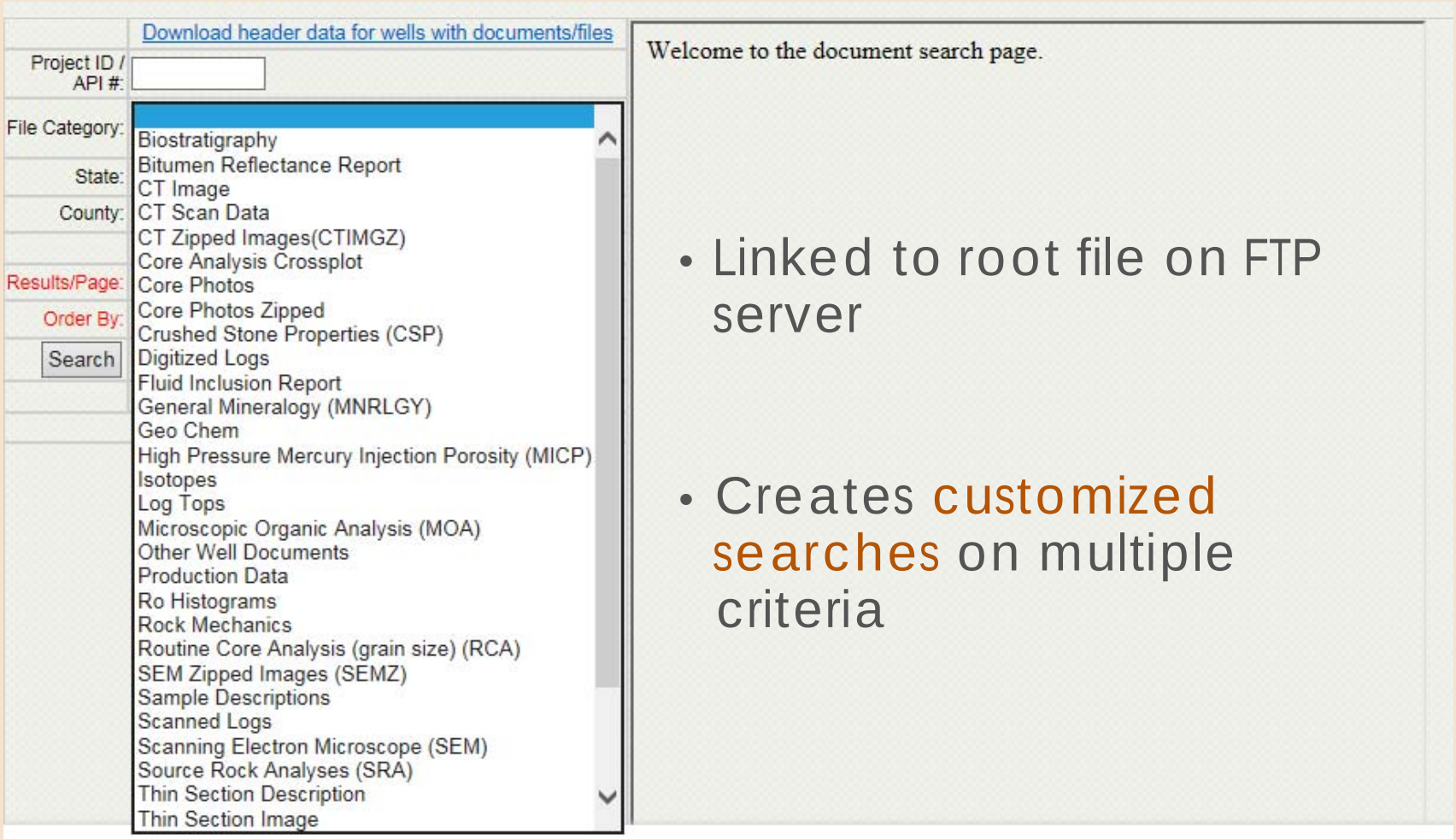
- Flexible, iterative process that can be modified depending on project needs
- Uses format and template derived from previous work
- Database will be built to ensure maximum efficiency of technology transfer

FTP/DROPBOX SITE

- Researchers will submit information as it is gathered/interpreted
- Each folder organized by state
- Linked to online searchable database



WELL FILE DOCUMENT SEARCH



- Linked to root file on FTP server
- Creates customized searches on multiple criteria

LEGACY PROJECTS

Appalachian Basin Tight Gas Reservoirs Project Disclaimer Contact/Comments

Appalachian Oil and Natural Gas Research Consortium (About)

Project Info | System Overview | Interactive Mapping | Well Header Data | Well-Based E-Files (Logs) | Play-Based E-Files

Play-Based E-File search

Play Category: Clinton-Medina

Data Type:

Author (like):

Results/Page: 25

Order By: Data Type

Search Reset Export To Excel

8 Records Found, showing page 1 of 1 at 25 records per page

Details	Play Category	Data Type	Year	Author	File Name
Details	Clinton-Medina	Cross Section	1982	Diecchio, R.J.	MDIN_xsec_Diecchio_1983.pdf
Details	Clinton-Medina	Cross Section	1996	McCormac, M.P., Mychkovsky, G.O., Opritza, S.T., Riley R.A., Wolfe, M.E., Larsen, G.E., and Baranoski, M.T.	MDIN_xsec_McCormac_1996_p158_figScm-5.pdf
Details	Clinton-Medina	Cross Section	1996	McCormac, M.P., Mychkovsky, G.O., Opritza, S.T., Riley R.A., Wolfe, M.E., Larsen, G.E., and Baranoski, M.T.	MDIN_xsec_McCormac_1996_p157_figScm-4.pdf
Details	Clinton-Medina	Cross Section	2000	Ryder, R.T.	MDIN_xsec_Ryder_2000_i-2726_Sheet1.pdf
Details	Clinton-Medina	Report	2004	Burruss, R.C., and Ryder, R.T.	MDIN_rprt_USGS_2003.pdf
Details	Clinton-Medina	Report	1982	Diecchio, R.J.	MDIN_rprt_Diecchio_1982.pdf
Details	Clinton-Medina	Report	1984	Finley, R.J.	MDIN_rprt_Finley_1982.pdf
Details	Clinton-Medina	Stratigraphy	1996	McCormac, M.P., Mychkovsky, G.O., Opritza, S.T., Riley R.A., Wolfe, M.E., Larsen, G.E., and Baranoski, M.T.	MDIN_strd_McCormac_1996_p157_figScm-3.pdf

http://www.wvgs.wvnet.edu/atg/ProjectInfo.aspx

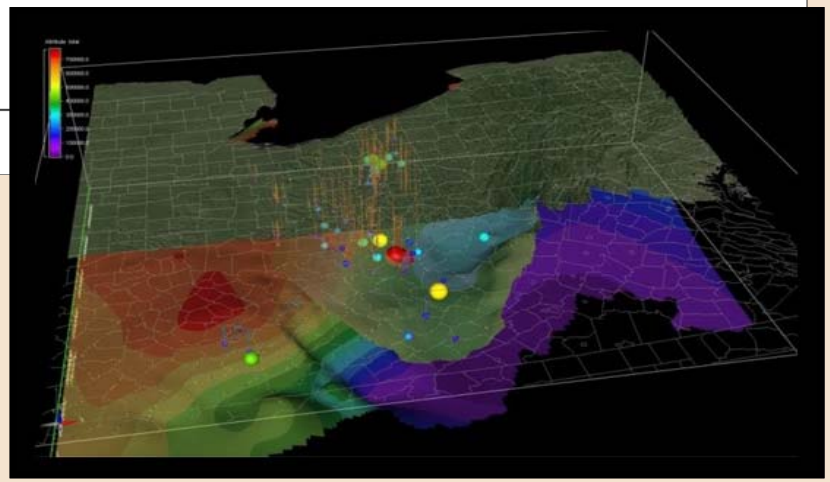
LEGACY PROJECTS

Final Report to

RPSEA

Research Partnership to Secure Energy for America

Development of Subsurface Brine Disposal Framework in the Northern Appalachian Basin



http://www.rpsea.org/projects/11122-73/

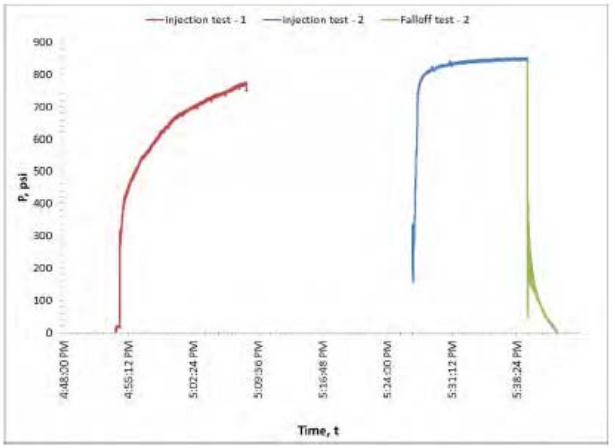


Figure 2-15. Wellhead pressure monitoring results from Clinton-Medina brine disposal well in the east-central Appalachian Basin.

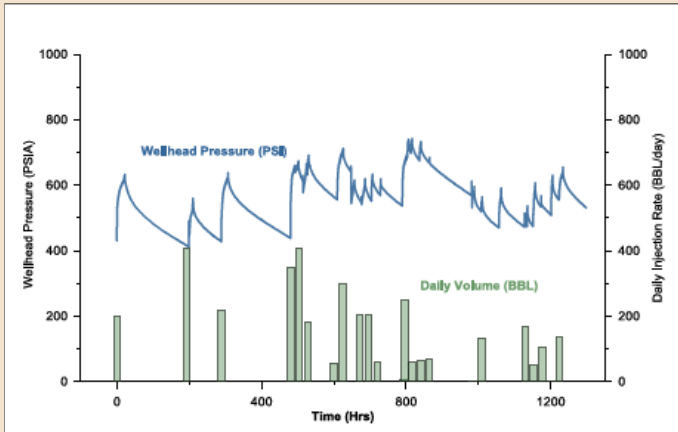


Figure 2-16. Wellhead pressure monitoring results from Newburg brine disposal well in the east-central Appalachian Basin.

LEGACY PROJECTS

- Midwest Regional Carbon Sequestration Partnership (MRCSP)
- Ongoing, collaborative research encompassing a ten-state region
- Project managed by Battelle Memorial Laboratory
- Includes detailed reservoir data and regional cross-sections

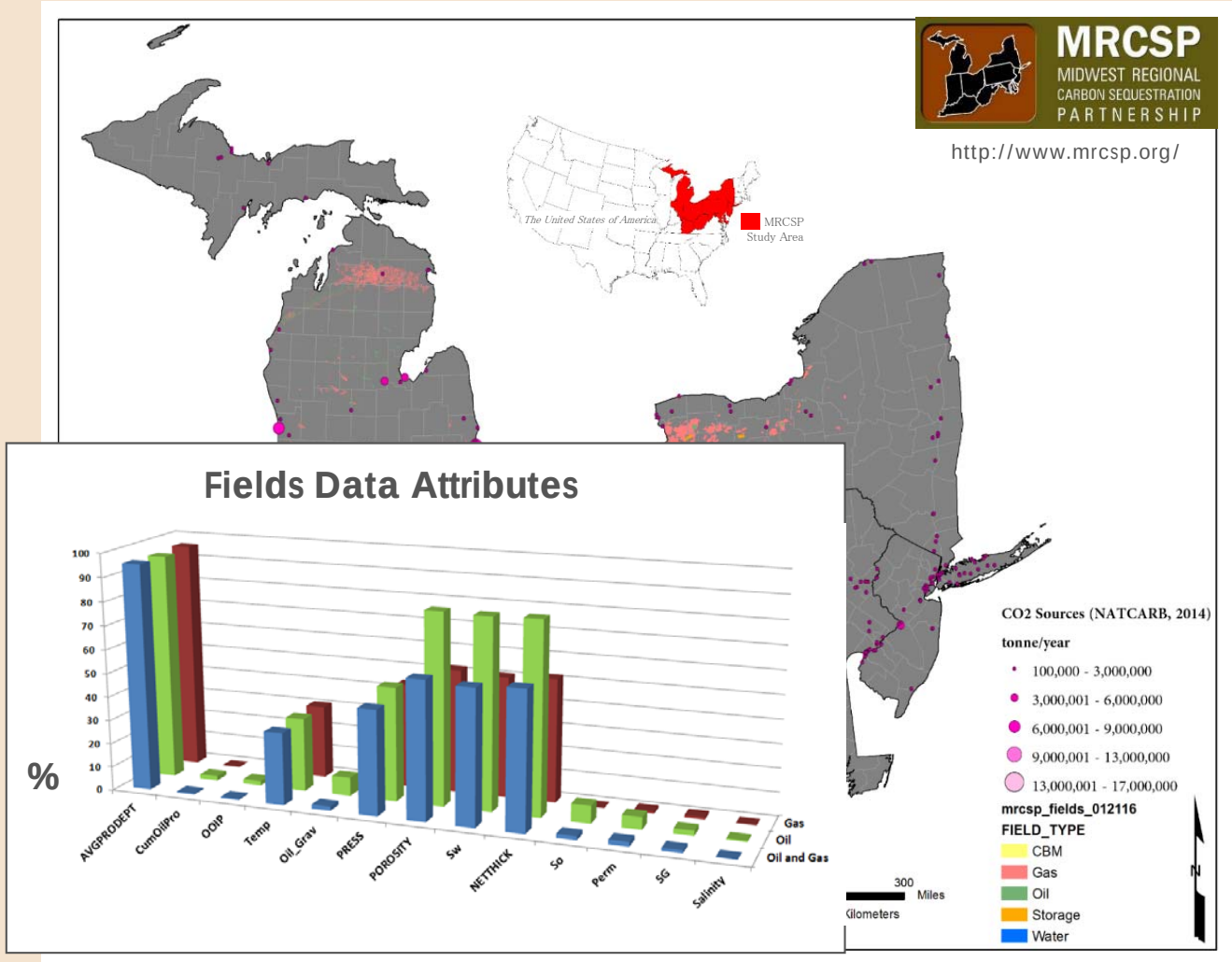
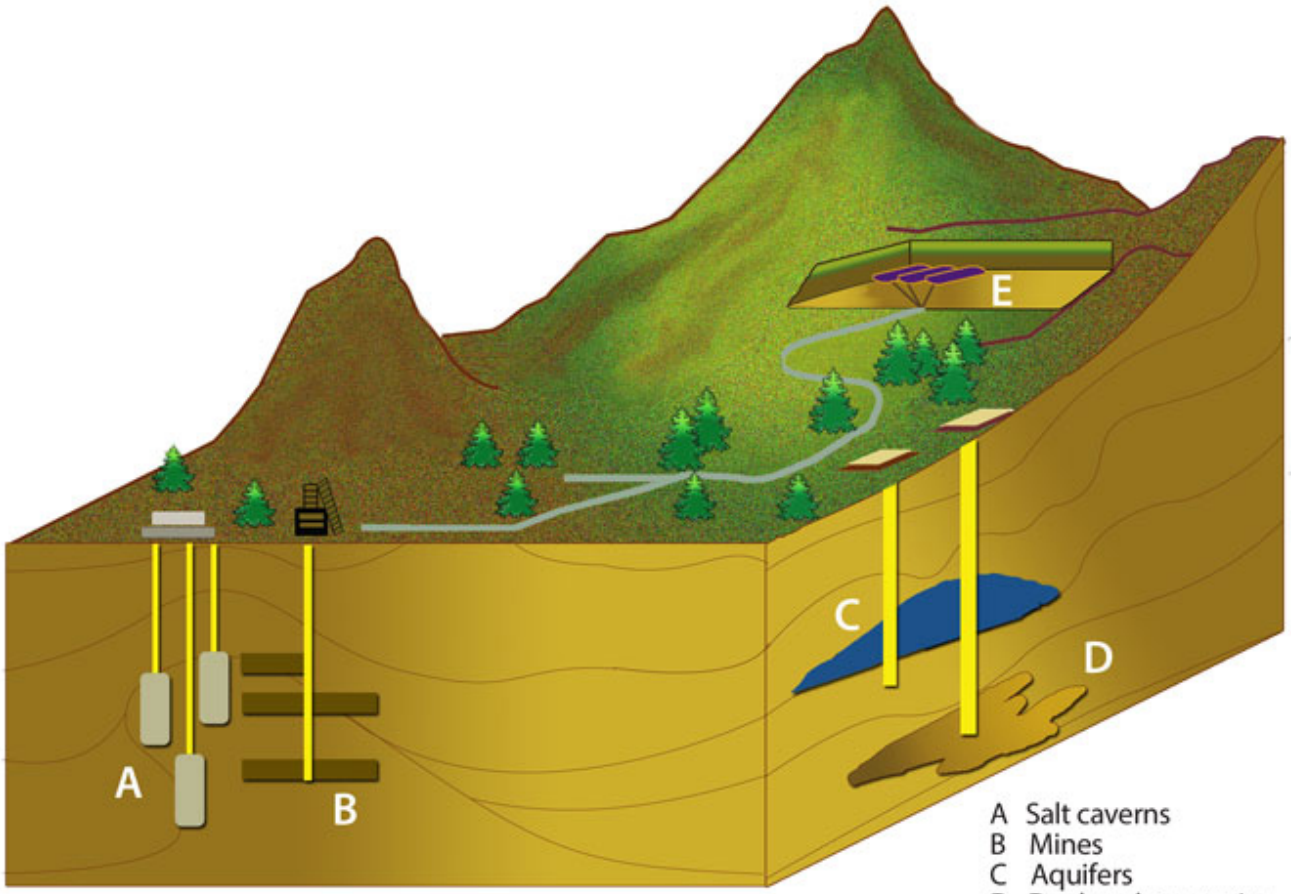
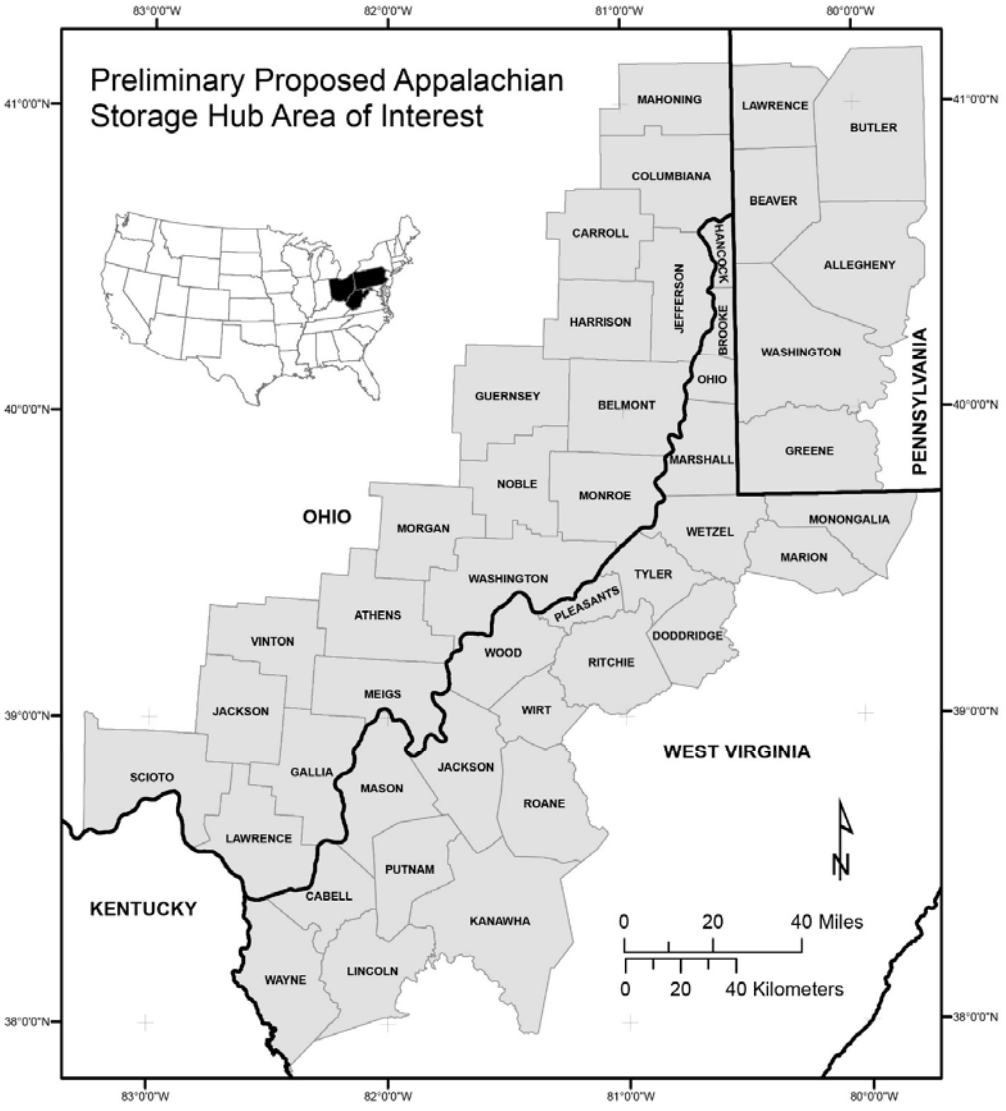
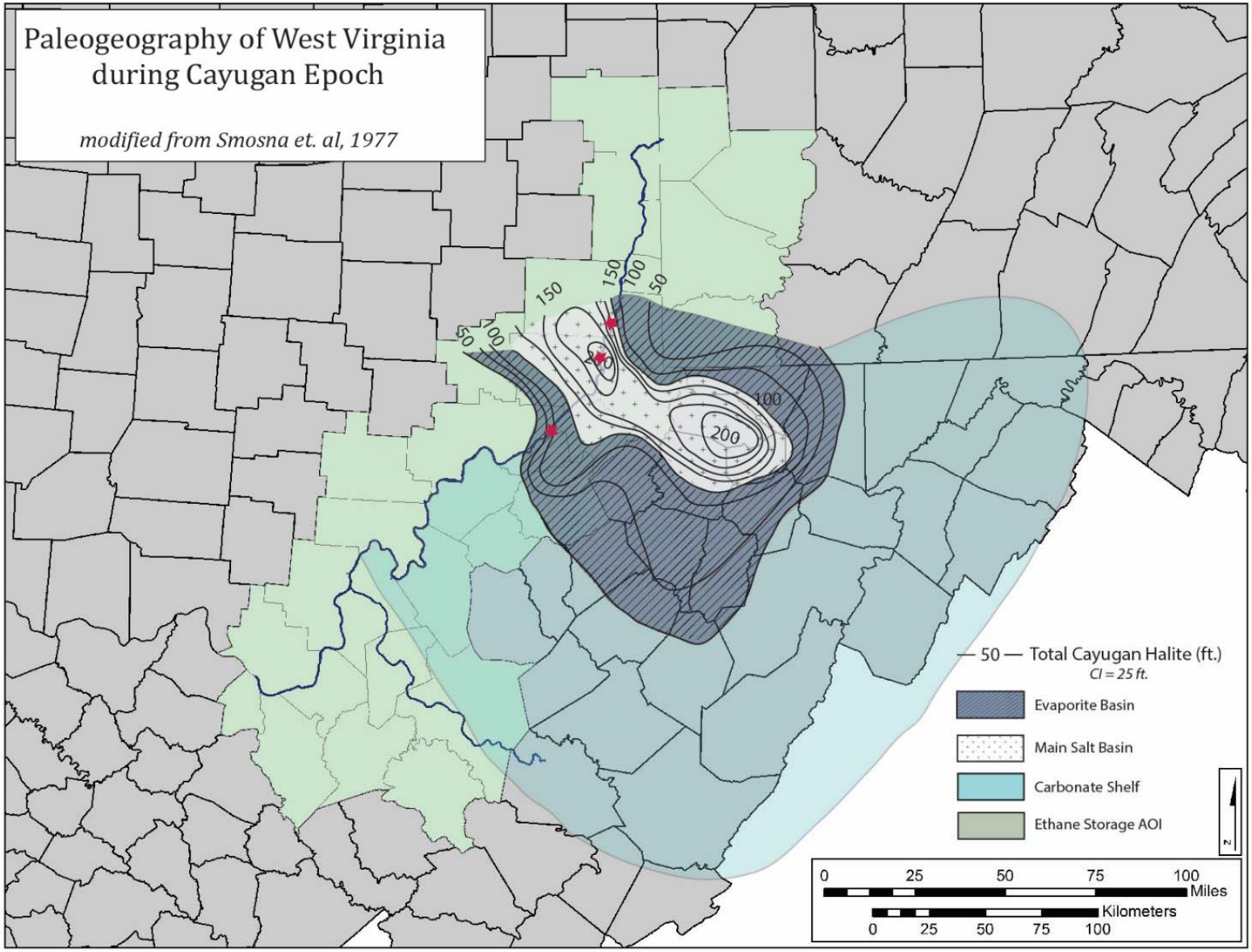


Figure 1. Types of underground natural gas storage facilities



Source: PB-KBB, inc., enhanced by EIA.


Preliminary Proposed Appalachian Storage Hub Area of Interest
83°0'0"W
82°0'0"W
81°0'0"W
80°0'0"W
41°0'0"N
40°0'0"N
39°0'0"N
38°0'0"N
MAHONING
LAWRENCE
BUTLER
COLUMBIANA
BEAVER
CARROLL
HANCOCK
ALLEGHENY
JEFFERSON
HARRISON
BROOKE
WASHINGTON
OHIO
GUERNSEY
BELMONT
GREENE
PENNSYLVANIA
MARSHALL
NOBLE
MONROE
OHIO
MORGAN
WETZEL
MONONGALIA
MARION
WASHINGTON
TYLER
PLEASANTS
ATHENS
VINTON
WOOD
DODDRIDGE
RITCHIE
MEIGS
JACKSON
WIRT
WEST VIRGINIA
SCIOTO
GALLIA
MASON
JACKSON
ROANE
LAWRENCE
PUTNAM
CABELL
KENTUCKY
KANAWHA
WAYNE
LINCOLN
N
0 20 40 Miles
0 20 40 Kilometers


Paleogeography of West Virginia during Cayugan Epoch
modified from Smosna et. al, 1977
150
150
100
50
100
50
100
200
50 — Total Cayugan Halite (ft.)
CI = 25 ft.
Evaporite Basin
Main Salt Basin
Carbonate Shelf
Ethane Storage AOI
N
0 25 50 75 100 Miles
0 25 50 75 100 Kilometers

PPG INDUSTRIES--NATRIUM, WV

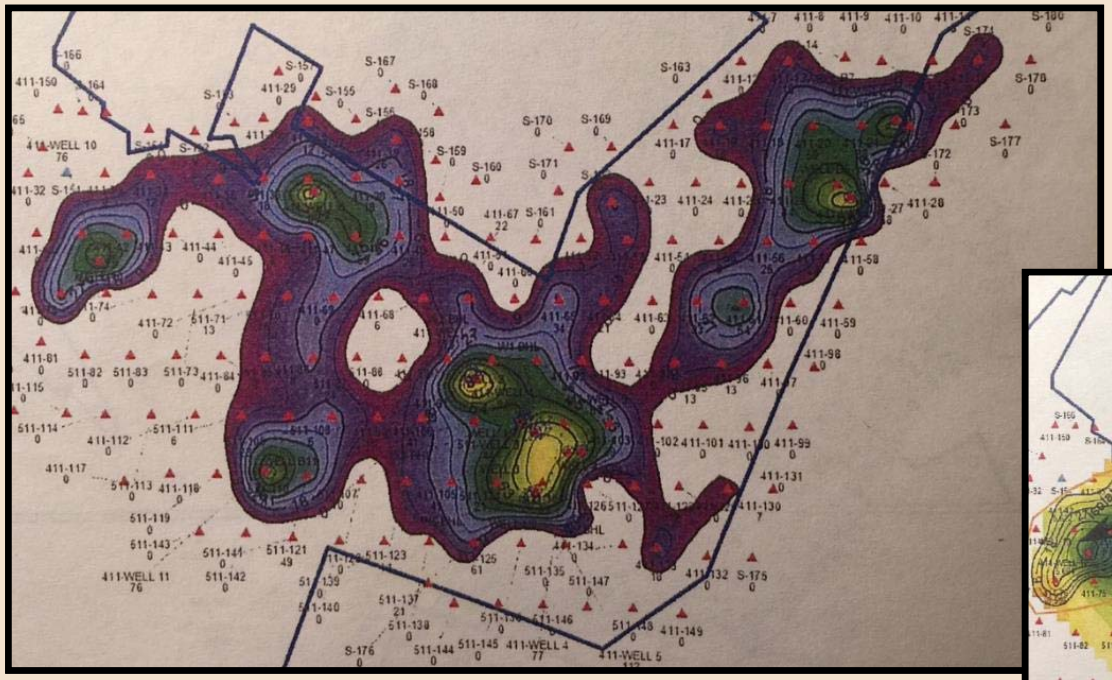
- Cavern Maps and Analyses
- 4” diameter core
- Chemical analyses and maps from UIC permit applications

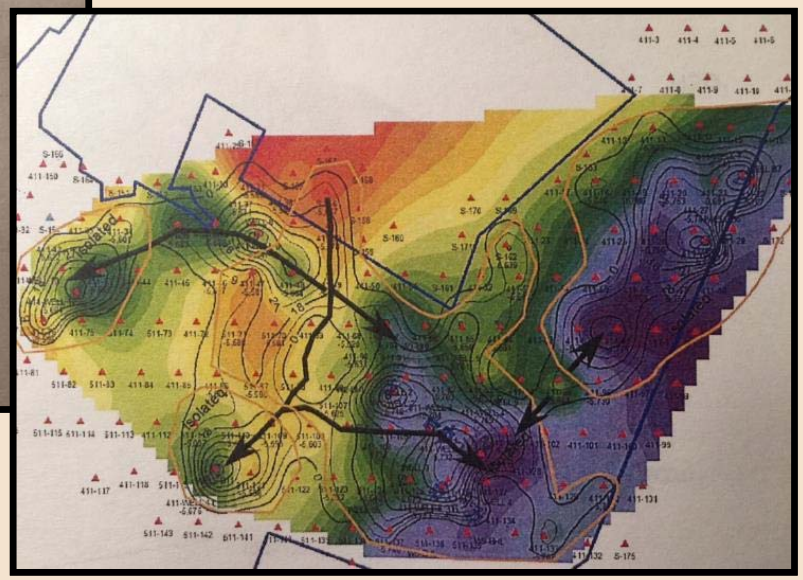
SALT SECTION CHEMICAL ANALYSIS

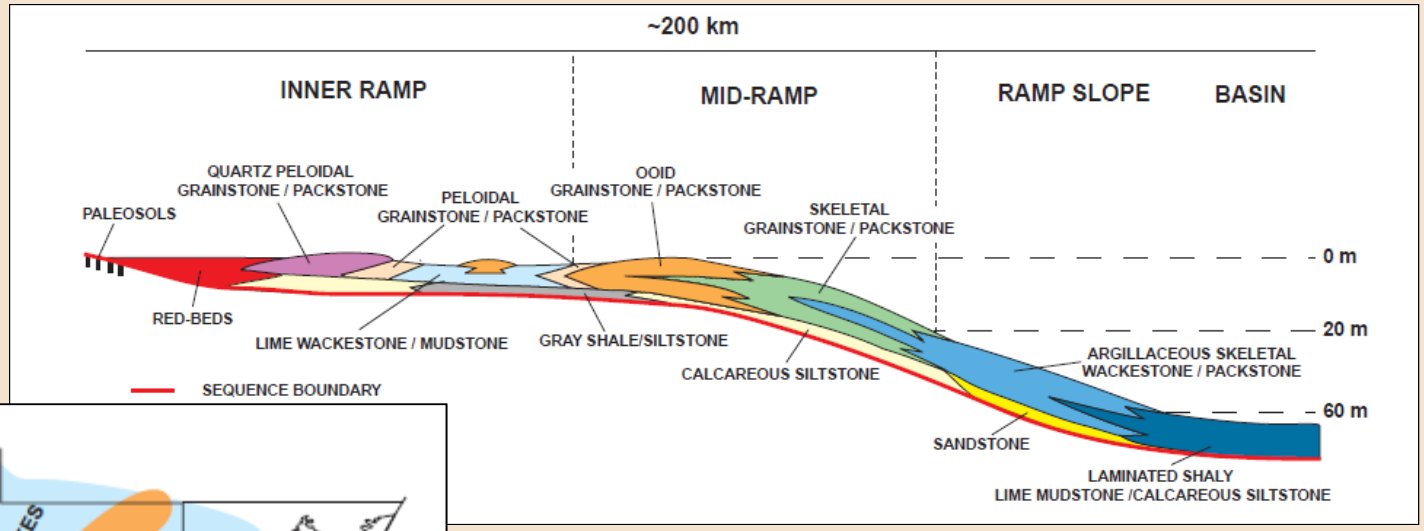
	Log Depths	% H_2O Insoluble	Cl As % NaCl	SO_4 As % Na_2SO_4	% Br_2	% H_2S	% Fe
#1 Salt	6720	1.25	96.05	1.98	0.02	0.0003	<0001
	6739	4.20	93.91	1.92	0.01	0.0002	<0001
	6743	4.97	90.42	1.70	0.01	0.0003	<0001
	6753	1.07	96.25	1.07	0.03	0.0004	<0001
	6772	1.09	96.08	1.27	0.02	0.0003	.0001
	6797	12.17	86.95	1.93	0.02	0.0001	<0001
	6799	5.81	94.45	1.78	0.02	0.0007	<0001
	6828	2.72	90.77	0.77	0.02	0.0002	<0001
	6837.5	1.40	96.00	1.20	0.04	0.0002	<0001
			Average --	1.51			
#2 Salt	6859	4.17	94.47	0.99	0.02	0.0008	<0001
	6863	.94	96.33	0.83	0.02	0.0004	<0001
	6870 Not Salt	98.39	0.82	0.83	0.01	0.0027	<0001
	6873.5	2.12	95.34	1.10	0.01	0.0003	<0001
	6878	.75	95.66	0.83	0.02	0.0002	<0001
			Average --	0.92			

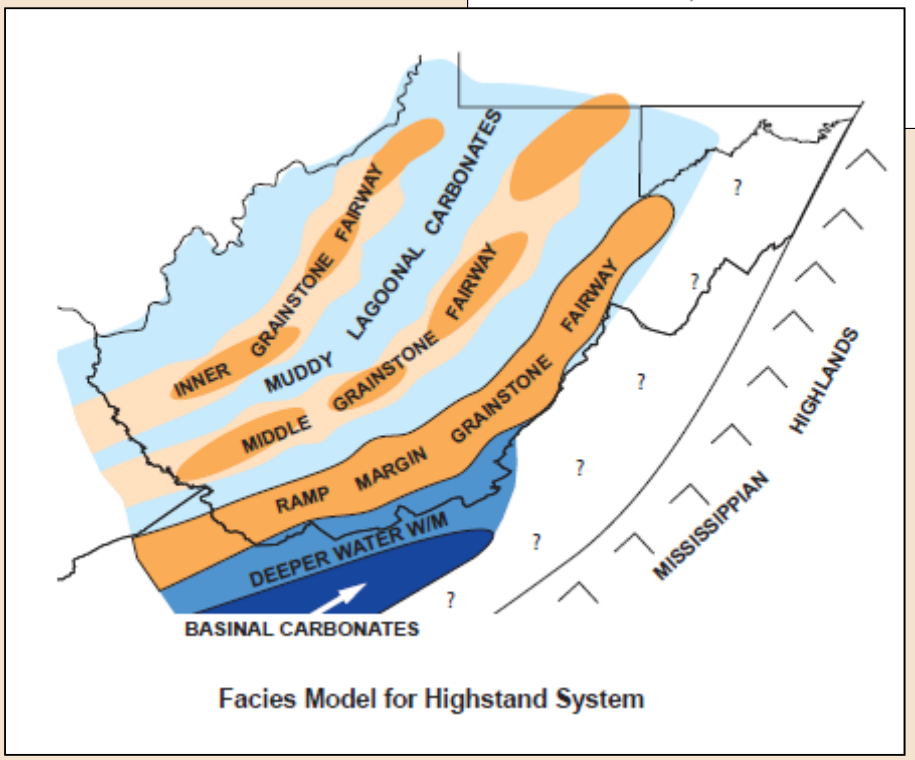
Note: Soluble portion of 6870' sample can be computed to: NaCl .79%
KCl .04%

BENS RUN SALT BRINE CAVERNS

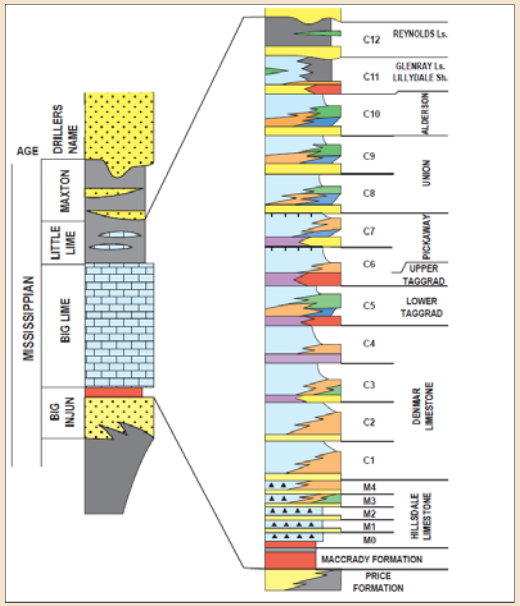




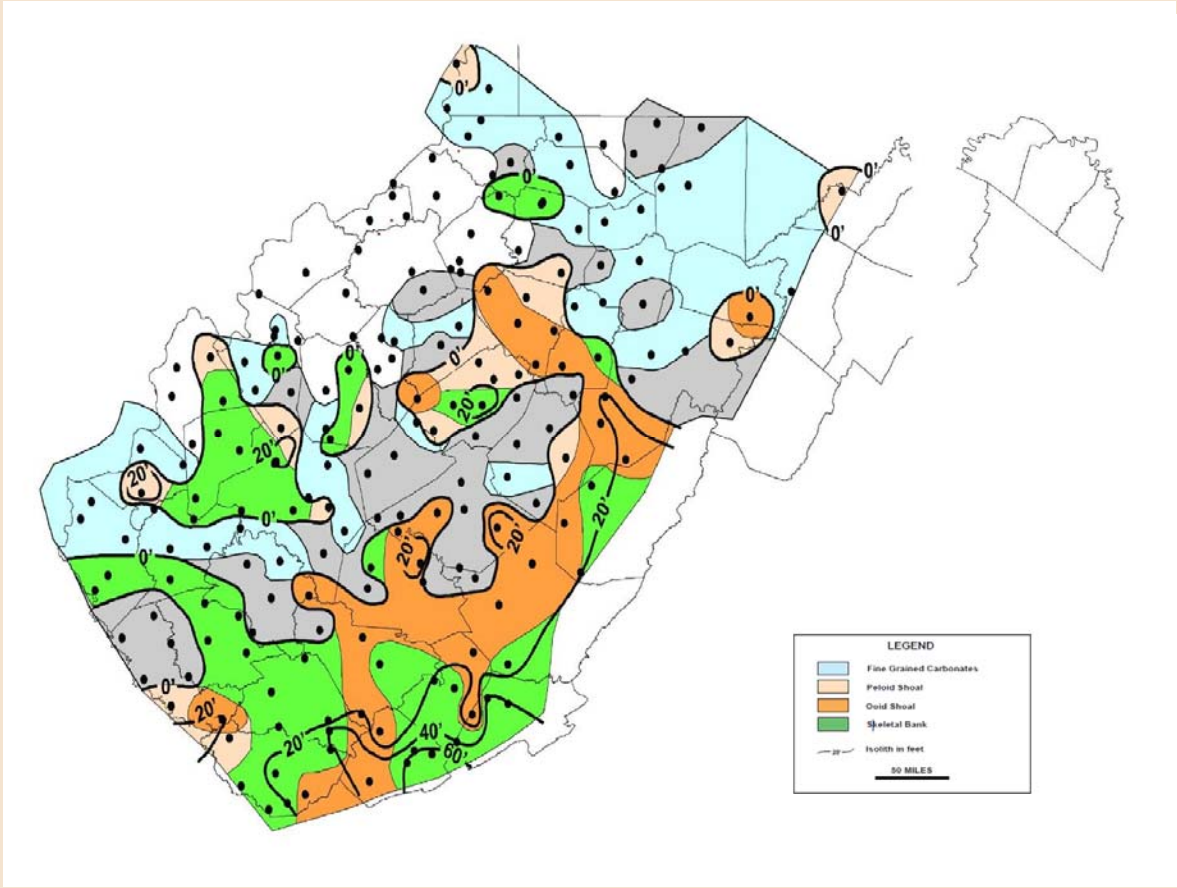




Facies Model for Highstand System



CARBONATE RESERVOIR HETEROGENEITY

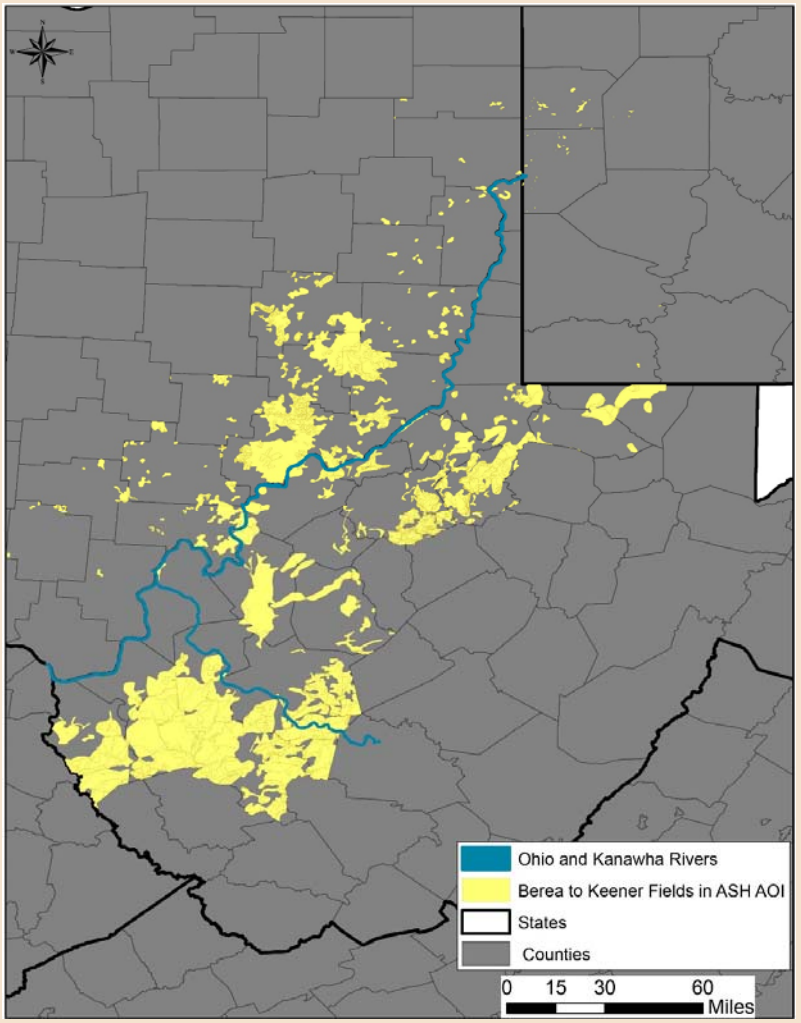


Wynn, 2003


Findlay
Akron
Youngstown
Lima
Mansfield
State College
Pittsburgh
Altoona
Wheeling
Columbus
Zanesville
Dayton
Morgantown
Fairmont
Martinsburg
Athens
Parkersburg
Clarksburg
Winchester
Cincinnati
Portsmouth
Huntington
Charleston
WEST
VIRGINIA
Harrisonburg
Staunton
APPALACHIAN STORAGE HUB
PROJECT
DEPLETED GAS RESERVOIRS

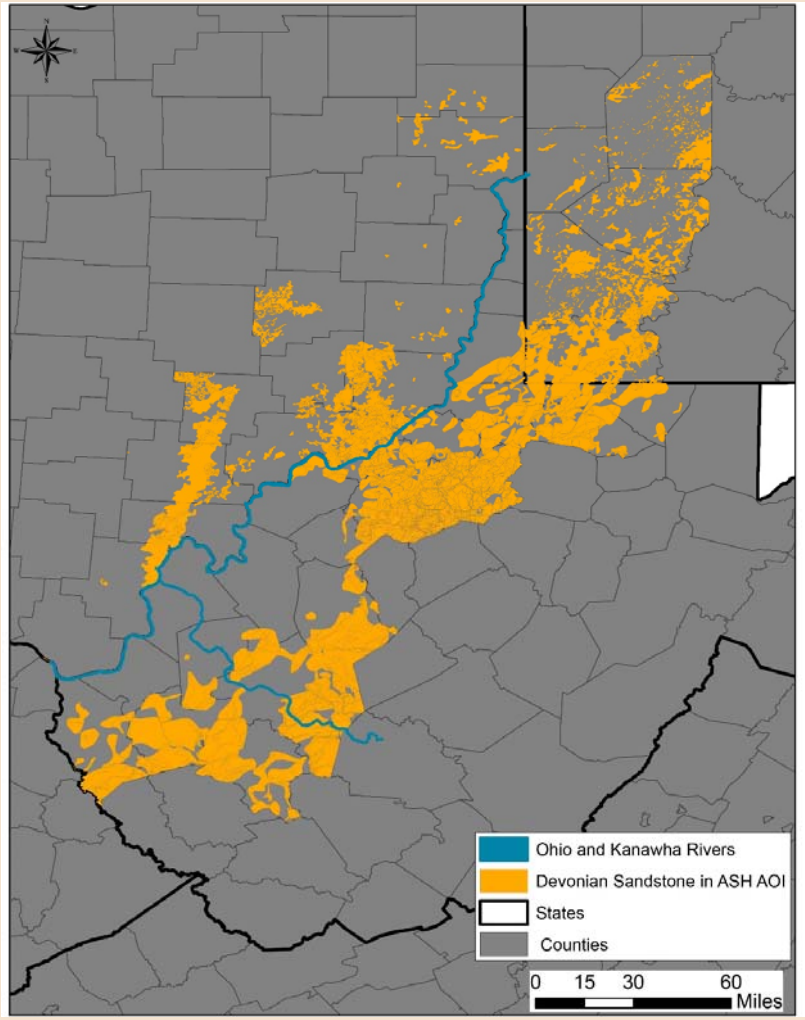
BEREA TO KEENER INTERVAL

- Includes conventional drillers' targets such as the "Big Injun", "Squaw", and "Weir" sands
- Many small fields within the larger, regional trends



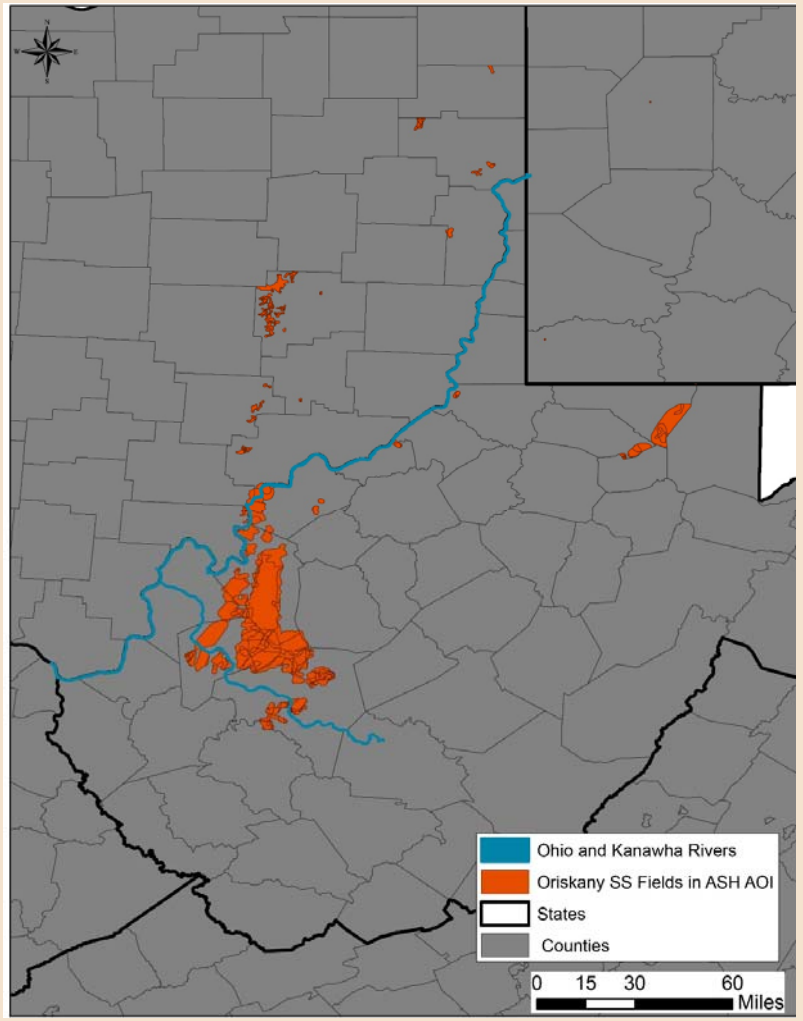
DEVONIAN SANDSTONE INTERVAL

- Historical drilling targets in northern WV and SW PA
- Sand bodies become more discontinuous to west
- Shales replace siliciclastics to west and south



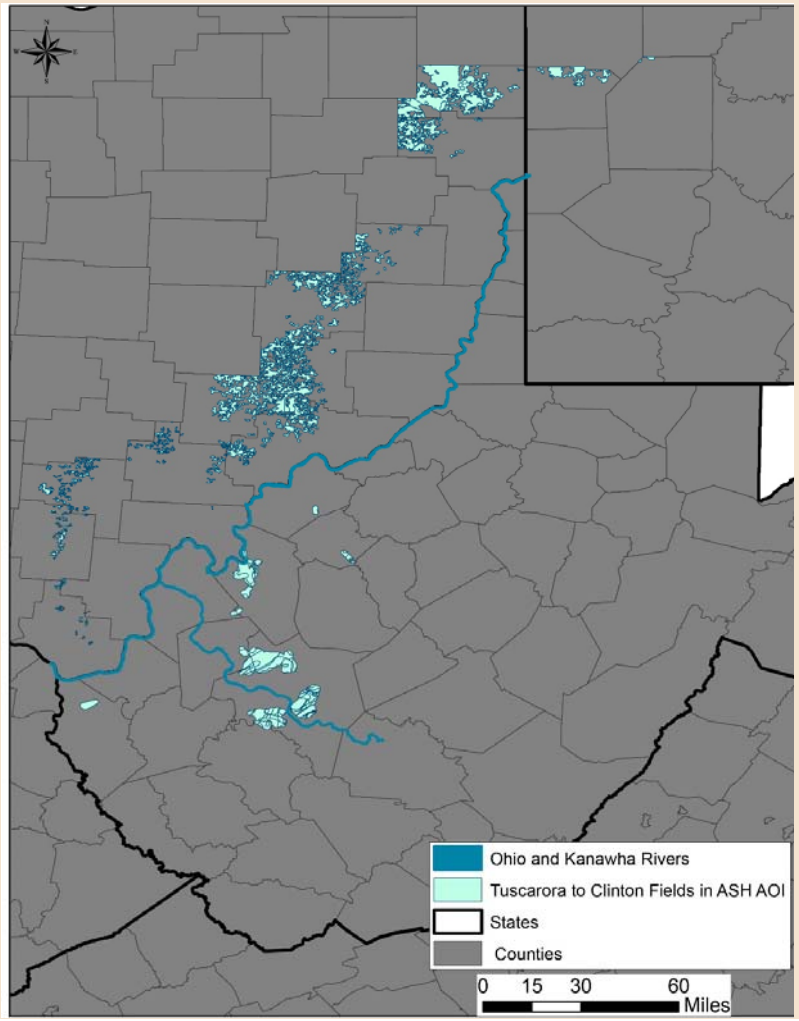
ORISKANY SANDSTONE

- Some pools/fields demonstrate excellent porosity and permeability
- Variable reservoir composition and quality
- Becomes highly fractured to east



TUSCARORA TO CLINTON INTERVAL

- Excellent production history in Ohio
- Deeper, and less frequently targeted, in eastern portions of the basin
- Food-grade CO_2 produced from Indian Creek field (Kanawha County, WV)



SUMMARY

- Database construction has begun, and database will continue to be populated as project moves forward
- Robust legacy dataset available
- Variable geographic footprint
- Variable lithologic character within and between reservoirs


Findlay
Akron
Youngstown
Lima
Mansfield
State College
Pittsburgh
Altoona
Wheeling
Columbus
Zanesville
Dayton
Fairmont
Martinsburg
Athens
Parkersburg
Clarksburg
Cincinnati
Winchester
Portsmouth
Huntington
WEST
VIRGINIA
Charleston
Harrisonburg
Staunton

THANK YOU!