

## A TECHNICAL WORKSHOP

# “Appalachian Storage Hub for Natural Gas Liquids”

August 29, 2017, Hilton Garden Inn Southpointe, Canonsburg, PA

Registration: \$295

Check-in opens: 8:00 a.m.

Workshop: 9:00 a.m. to 5:00 p.m.

## The first public release of results from a one-year, regional geologic study

### PROJECT BACKGROUND

State officials in Ohio, Pennsylvania, and West Virginia are promoting a high-technology program to enhance economic development by expanding the market for ethane and other natural gas liquids (NGLs) production from the liquids-rich Marcellus and Utica shale plays. The vision is to create a robust infrastructure supporting the creation of value from the prolific NGLs production in the Appalachian Basin, including NGLs storage and trading plus pipeline infrastructure.

The **Tri-State Shale Coalition** (see box) realized that a critical first step in the development of infrastructure and expanded industrial growth would be to conduct a geologic investigation of the potential to develop adequate subsurface storage along the pipeline route. Such a study would provide data essential to decision-makers intent on supporting the development of an Appalachian Storage Hub and the petrochemical industry.

The Appalachian Oil and Natural Gas Research Consortium (AONGRC), a program of the WVU Energy Institute's National Research Center for Coal and Energy, was tasked with evaluating the storage potential of subsurface stratigraphic units along the pipeline route. Individual formations and intervals of interest include the Greenbrier Limestone for subsurface mining; the Salina salt for the creation of cavities through brine extraction; and depleted gas fields and gas storage fields in sandstone reservoirs in the Lower Mississippian (Keener to Berea Interval); Upper Devonian (Venango, Bradford and Elk Intervals), Lower Devonian (Oriskany Sandstone);

### TRI-STATE SHALE COALITION Promoting a World Scale Economic Opportunity

In 2015 the Governors of Pennsylvania and West Virginia and the Lt. Governor of Ohio signed a Tri-State Regional Cooperation Agreement – an unprecedented commitment to cross-border promotion of the economic opportunities presented by the Marcellus and Utica Shales to build a global petrochemical hub.

The Coalition's founding organizations – Team NEO, the Allegheny Conference, VisionShared, and the Claude Worthington Benedum Foundation – have since been working with partners including JobsOhio, the Pennsylvania Department of Community and Economic Development, the West Virginia Department of Commerce, and the Appalachian Partnership for Economic Growth to advance initiatives in policy, workforce, transportation and infrastructure, innovation, and marketing.

This workshop is the first work product of the Tri-State Shale Coalition's Transportation and Infrastructure working group. Coalition member WVU defined and organized the research through the Appalachian Oil and Natural Gas Research Consortium of the WVU Energy Institute's National Research Center for Coal and Energy. Researchers from WVU and the West Virginia, Pennsylvania, and Ohio Geological Surveys conducted the work. Initial funding for the project was provided by Tri-State Coalition Member, the Benedum Foundation, with WVU's Energy Institute securing matching funding from 13 industrial partners.



Upper Silurian (Newburg sandstone); Lower Silurian (Clinton/Medina Group); and Lower Ordovician (Rose Run Formation) - Upper Cambrian (Gatesburg Formation).

- The goal of the study was to complete a geologic study of all potential options for subsurface storage of liquid ethane and other NGLs along and adjacent to the Ohio River from southwest Pennsylvania to eastern Kentucky, with a similar study along the Kanawha River in West Virginia. This involved the mapping and identification of areas where the Salina F Salt is at least 100 feet thick and suitable for solution mining; mapping and identification of areas of the Greenbrier Limestone that are at least 40 feet thick and suitable for hard-rock mining; and mapping the thickness and extent of sandstone reservoirs in depleted gas fields that could be converted to NGLs storage.
- The study was completed July 31, 2017, and produced three main products: (1) a regional subsurface geologic investigation of all geologic units of interest; (2) a detailed reservoir characterization effort, including field-level studies, rating criteria used to screen candidate fields, the final ranking of storage candidates and presentation of three prospect areas; and (3) the publicly accessible website in which all of the above reside. These deliverables are intended to guide the future site investigations conducted by any operators interested in developing the Appalachian Storage Hub.

During this technical workshop, members of the Research Team will present the research that was conducted, areas that “graded” the highest for subsurface storage of NGLs, and recommendations for the next phase of subsurface research prior to creating the Appalachian Storage Hub.

## **WHO SHOULD ATTEND**

This course will present the results, conclusions, and recommendations in the Appalachian Storage Hub Final Report, and should be attended by geologists, engineers, regulatory agency personnel and anyone who has an interest in developing a subsurface storage facility for NGLs in the Appalachian basin to take advantage of the wet natural gas resources in the Marcellus and Utica shale plays.

## **WORKSHOP OBJECTIVES**

By the end of this course, participants will have an understanding of:

- The contents and organization of, and public access to, the Appalachian Storage Hub project database
- Regional subsurface geology of 10 formations or stratigraphic intervals considered to be candidates for subsurface storage
- Reservoir character of candidate reservoirs
- Criteria to evaluate and rank three types of storage containers
- Ranking results for mined-limestone and solution-mined salt cavities and depleted gas reservoirs
- Stacked opportunities and evaluation of field-level prospects
- Recommendations for follow-up site-specific geologic and engineering studies

## **WORKSHOP CONTENT**

- Welcome – Brian Anderson, WVU Energy Institute
- Introduction to the Appalachian Storage Hub Study – Doug Patchen, WVU Research Corporation, National Research Center for Coal and Energy
- Data Deliverables Access, Organization, and Management – Jessica Moore, West Virginia Geological Survey

- Regional Subsurface Geology of Candidates for Storage – Michael Solis, Ohio Geological Survey
- Reservoir Characterization – Kristin Carter, Pennsylvania Geological Survey
- Ranking Results, Stacked Opportunities, and Field-Level Prospects – Kristin Carter
- Recommendations, Suggestions, and Conclusions – Doug Patchen, WVU National Research Center for Coal and Energy

## **PDH CREDITS**

PTTC will issue a certificate for six (6) Professional Development Hours at the end of the workshop. To receive this certificate at the workshop, **you must register in advance.**

## **LOCATION AND HOUSING**

The conference will be held at the Hilton Garden Inn, 1000 Corporate Drive, Canonsburg, PA 15317. For reservations, call 724-743-5000. For directions, click on the link below.

<http://hiltongardeninn3.hilton.com/en/hotels/pennsylvania/hilton-garden-inn-pittsburgh-southpointe-PITSPGI/maps-directions/index.html>

## **REGISTRATION: ONLINE AND MAIL OPTIONS**

The registration cost of \$295 covers lunch, coffee breaks and all workshop expenses.

**Pre-registration online is required by August 22 at:**

<https://www.eventbrite.com/e/appalachian-storage-hub-ash-for-liquid-ethane-tickets-36518565011>

Payment by credit card or check is accepted. **To pay by check, select the small, blue “Show other payment options” link** immediately below the Order Now button on the website. Send checks to WVU NRCCE PTTC, attn.: Doug Patchen, PO Box 6064, Morgantown, WV 26506-6064. Make checks payable to the WVU Research Corp. and include “WVU NGLs Workshop” on the memo line. **Checks must be received by August 22.**

On-site check-in begins at 8:00 a.m. The workshop starts at 9:00 a.m. and will end by 5:00 p.m.

For further information contact: Doug Patchen, at 304-293-6216, or [doug.patchen@mail.wvu.edu](mailto:doug.patchen@mail.wvu.edu)

## **ACKNOWLEDGMENTS**

The PTTC and WVU Energy Institute thank the Claude Worthington Benedum Foundation for providing the initial funding for the Appalachian Storage Hub project and the following companies for providing the matching funding that made this project possible: AEP, Antero, Blue Racer, Charleston Area Alliance, Chevron, Dominion, EQT, First Energy/Team NEO, Mountaineer NGL Storage LLC, Noble Energy, Southwestern Energy, XTO Energy, and the West Virginia Oil and Natural Gas Association (WVONGA).

We also would like to acknowledge the efforts of the WVU Foundation for taking the lead in obtaining these matching funds, and the WVU Research Corporation and the WVU Corporate Relations Office for their administrative support.