Appalachian Storage Hub (ASH) Project

Team Meeting Minutes

January 5, 2017 – 09:30 – 10:00 am

1 (877) 306-9784, Code 211 437 2313

Present: Mohammad Fakhari, Michael Solis, Mike Angle, Jessica Moore, Phil Dinterman, Gary Daft, Mary Behling, John Bocan, John Saucer, Doug Patchen, Kris Carter

1) Strategy Progress and Project Milestones

a. Strategy 1 – Data Collection (WV) – Michele Cooney has been parsing out data from Utica Shale Consortium project that's not relevant for this project, and has been coding Pennsylvania's geophysical logs, removing duplicates, etc. WV asked the group for any suggestions about what else might be included on the ftp site, and how it might be organized differently (if we see any issues with the current format). The group agreed that perhaps there are identifying relevant studies and previous work that could be scanned and added to the site. Team members will follow up on this.

b. Strategy 2 – Stratigraphic Correlation of Key Units (OH) – OH has completed net salt mapping work for the OH portion of the study area. Michael Solis reported that more Salina Group salt data might be needed from PA. Kris Carter indicated that PA has already shared all available Salina data for the study area, but if OH would like data for points east and north, PA can provide.

OH has also been working on the correlation of Upper Devonian sands into three distinct units with subunits for mapping (cross section?) purposes. They have followed the Gas Atlas to subdivide the Venango into five units; the Bradford into five units; and the Elk into four units.

OH will be finished with regional correlations for the Oriskany and Medina/Tuscarora sandstones soon. OH would like more Greenbrier data from the team. Gary Daft said WV was still working on their Mississippian Greenbrier/Big Injun, but should be done in a couple weeks.

Jessica Moore had a question about the Big Injun interval. WV has broken out both the

Greenbrier Big Injun and underlying Price Big Injun, so should we be mapping these for the project, and if so, should the Greenbrier Big Injun (a sandy carbonate) be included with the Greenbrier interval? After some discussion, it was decided that the Greenbrier and Greenbrier Big Injun should, in fact, be mapped separately due to varying lithologies. Ultimately, the engineers could determine if including the basal portion in a mine would be acceptable, giving them more volume of storage without risk of losing fluid laterally in the porous zone at the base. In that case, they could look at thickness of the Greenbrier limestone section and add the underlying Greenbrier Sandy carbonate section. We are letting them know that the two different lithologies exist, rather than mapping both together as carbonate.

Kris Carter reported that she shared updated/final formation top picks for all units (including the Greenbrier/Loyalhanna) on the ftp site for OH's use.

c. Strategy 3 – Mapping (OH) – Kyle Metz will work on this strategy as soon as the correlation work (mentioned above) has been completed.

d. Strategy 4 – Studies of Reservoir Character (PA) – Kris Carter asked OH and WV for lists of existing thin sections that pertain to our intervals of interest, as well as any core that might be sampled for new thin section work. PA has funding to have up to 40 new thin sections made for our work. Doug Patchen mentioned that reviewing certain WVU theses might help of identifying existing thin section sets from WV. PA has developed a standardized thin section analysis form for the project. Other work to be performed for this strategy involves compilation of existing reservoir parameter data derived from MRCSP and other projects with which the research team has been involved.

e. Strategy 5 – Ranking Criteria (open)

f. Strategy 6 – Recommendations (open)

g. Strategy 7 – Suggestions for Follow-Up Study (open)

h. Strategy 8 – Project Management/Tech Transfer (Patchen) – Quarterly reports are due to Doug on February 10, just after our next monthly meeting. The semi-annual meeting will be held on March 14 at WVU Alumni Center. The research team will meet/practice starting at 10 am, have a boxed lunch, and then present to attendees starting at 1 pm.

2) Action Items and Next Steps

a. OH to advise PA as to whether they need more regional Salina Group picks for correlation work
b. Prepare for semi-annual meeting
c. Send invoices (quarter ends January 31)
d. PA and OH to review ftp site to offer suggestions regarding additional content and/or site format
e. WV and OH to provide input on thin section/core availability

Next meeting date – February 7, 2017, at 10 am.

Strategies/Activities	Start Date	End Date
Strategy 1: Data Collection		
• Identify and assemble well log and core data	Month 1	Month 2
• Identify previous studies of interest	Month 1	Month 2
• Create a project database (format, prototype)	Month 1	Month 2
Strategy 2: Stratigraphic correlation of key units		
• Develop cross sections of the Salina Formation	Month 3	Month 8

• Develop cross sections of the Greenbrier Formation	Month 3	Month 8
• Develop cross sections of the Keener to Berea Interval	Month 3	Month 8
• Develop cross sections of the Upper Devonian Sandstones	Month 3	Month 8
• Develop cross sections of the Oriskany Sandstone	Month 3	Month 8
• Develop cross sections of the Clinton-Medina through Tuscarora Interval	Month 3	Month 8
• Develop cross sections of the Rose Run and Upper Sandy Member of the Gatesburg Formation	Month 3	Month 8
Strategy 3: Map the thickness, extent, and structure of potential storage units in the study area		
• Map the Salina Formation	Month 5	Month 7
• Map the Greenbrier Limestone	Month 5	Month 7
• Map the Keener-Berea, Upper Devonian, Oriskany, Clinton-Medina, and Gatesburg Formations	Month 5	Month 7
Strategy 4: Conduct studies of reservoir character		
• Characterize potential storage intervals in the Salina Formation	Month 5	Month 8
• Characterize potential storage intervals in the Greenbrier Formation	Month 5	Month 8
• Characterize potential storage pools in gas-depleted sandstone reservoirs	Month 5	Month 8
Strategy 5: Develop ranking criteria for potential storage zones		
• Determine criteria and weighted priority of potential storage zones	Month 8	Month 9
Strategy 6: Recommendations		
• Rank all candidates within each category	Month 10	Month 11
• Rank the top candidates in each category	Month 10	Month 11
Strategy 7: Suggestions for engineering follow-up study		
• Make suggestions for additional field and lab studies	Month 10	Month 11
Strategy 8: Project management and technology transfer		
• Project management	Month 1	Month 12
• Final Report	Month 11	Month 12
• Technology transfer		Month 12+ ongoing