UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

Supplemental Statement of Basis
for
The Reissuance of two Underground Injection Control Permits
to
EnerVest Operating, LLC

On March 1, 2017, the U.S. Environmental Protection Agency Region III (EPA) issued a public notice in Clintwood, Virginia's Dickenson Star paper and via the internet on EPA's website requesting comment and announcing the opportunity for a public hearing on the proposed renewal of two Underground Injection Control (UIC) permits: VAS2D937BDIC ("P-171") and VAS2D947BDIC ("P-132"). EnerVest Operating, LLC (EnerVest) is the permittee in each of these permits. The two existing permits were administratively extended beyond their expiration date of October 31, 2015 (P-171) and January 17, 2016 (P-132). The permits are to be reissued for a term of ten years.

EPA did not receive sufficient public interest to hold a hearing, and received one public comment via email during the comment period. The public comment period closed on March 31, 2017.

All of the information submitted by EnerVest as part of the applications for UIC permit renewals for P-171 and P-132, as well as the Draft Permits, Statements of Basis, and Administrative Indexes for the permit renewals, as prepared by EPA, were available for review at the Jonnie B. Deel Memorial Library located in Clintwood, Va, and at the EPA regional office in Philadelphia, PA.

EPA received one comment during the public comment period concerning two permit conditions: specific gravity values and specific gravity testing per truckload. This supplemental statement of basis provides responses to issues raised by the commenter during the public comment period and serves as additional information on how EPA made its decision to make two changes to the original draft permits. EPA thanks the Jonnie B. Deel Memorial Library for allowing EPA to house documentation at its location, and the Dickinson County Judicial Center and its staff for allowing us to reserve space for a hearing at its location.

1) Specific Gravity limits should be the same value as the current permit condition

After discussion with EnerVest regarding this issue, EPA decided that both wells will be allowed to operate with the same specific gravity limitations as under the company's current permit conditions. This increase in Specific Gravity (SG) specified in the draft permits results in a decrease in maximum injection pressure allowed in both wells. In its application for permit renewal, EnerVest submitted a representative sample of produced fluid containing a lower SG which EPA used as the determinant for calculating maximum injection pressure and bottom hole pressure for the first draft renewal permits for

both wells. EnerVest would like to maintain the original permit SG to allow the wells to continue to operate under existing conditions. After further technical review, EPA determined that EnerVest can safely operate both wells under the same parameters as in the previous issued permits.

In 2005, the permit for well P-171 specified a SG maximum of 1.08. Well P-171 injects into both the Big Lime and Weir formations, and using a depth of 4013 feet to top of tubing perforations, SG of 1.08, and fracture gradient of 0.79, the maximum allowable injection pressure if the well injects into both the Big Lime and Weir formation will be 976 psi with a maximum bottom hole pressure of 2853 psi. This value represents 90% of the maximum bottom hole pressure (2853psi) minus calculated hydrostatic pressure (1877psi). Using a value of 90% of maximum bottom hole pressure minus calculated hydrostatic pressure allows for additional protection of the formation from creating any additional fractures in the injection formations.

The draft permit for well P-171 gives EnerVest the option to seal off the Big Lime formation and inject solely into the Weir. If EnerVest decides to seal off the Big Lime formation, the maximum injection pressure for well P-171 will increase from 976 psi to 1119 psi. The maximum bottom hole pressure will increase from 2853 psi to 3270 psi. This value was calculated using a depth of 4599 feet to top of perforations, SG of 1.08, and fracture gradient of 0.79.

In 2006, the permit for well P-132 specified a SG maximum of 1.105. The well injects into the Weir formation. Using a depth of 4474 feet to the top of tubing perforations, SG of 1.105, and fracture gradient of 0.79, the maximum injection pressure will be 1066 psi, and a maximum bottom hole pressure of 3207 psi. This value represents 90% of the maximum bottom hole pressure of 3207 psi minus calculated hydrostatic pressure of 2141 psi.

2) Specific Gravity testing per truckload should be eliminated from the permit

In the March 1, 2017, draft permit EPA included a requirement for testing each truckload of produced fluid or “brine”. This is a requirement typically included in a commercial Class IID UIC well permit. This requirement does not apply to either EnerVest well since it will only be disposing of EnerVest production fluids via these UIC wells. This requirement (II.C.4) has been deleted from both draft permits.