



January 22, 2025

Mr. James C. Bennett
Source Water & UIC Section
Water Division
U.S. EPA Region 3
Four Penn Center
1600 John F. Kennedy Blvd.
Philadelphia, PA 19103

Mr. Bennett:

EnerVest is submitting this permit application to renew proposed Permit #VAS2D955BBUC Class II-D fluid disposal well in the Prater area of Buchanan County, Virginia. Attachment 1 details information included for updating the UIC permit renewal application.

Please contact me with any questions and/or further requested information (276) 730-5617.

Sincerely,

A handwritten signature in black ink, appearing to read 'J. Lawson'.

Jon Lawson
Sr. HSE Specialist
jlawson@enervest.net



UNDERGROUND INJECTION CONTROL

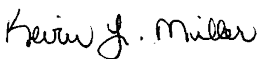
PERMIT RENEWAL APPLICATION

FOR CLASS II-D PRODUCTION FLUID DISPOSAL WELL

EXISTING WELL 900146 SWD
EPA # VAS2D955BBUC

NORA/HAYSI FIELD
BUCHANAN COUNTY, VIRGINIA

JANUARY 2025

 United States Environmental Protection Agency Underground Injection Control Permit Application for a Class II Well <i>(Collected under the authority of the Safe Drinking Water Act. Sections 1421, 1422, and 40 CFR Part 144)</i>		For Official Use Only	
		Date Received 	
		Permit Number VAS2D955BBUC	
Read Attached Instructions Before Starting			
I. Owner Name, Address, Phone Number and/or Email		II. Operator Name, Address, Phone Number and/or Email	
EnerVest Operating, LLC 809 Happy Valley Dr Clintwood, VA 24228 276-926-1300 jlawson@enervest.net		EnerVest Operating, LLC 809 Happy Valley Dr Clintwood, VA 24228 276-926-1300 jlawson@enervest.net	
III. Commercial Facility	IV. Ownership	V. Permit Action Requested	VI. SIC Code(s)
☐ Yes ☒ No	☒ Private ☐ Federal ☐ State/Tribal/Municipal	☐ New Permit ☒ Permit Renewal ☐ Modification ☐ Add Well to Area Permit ☐ Other	1311
VII. Indian Country			
☐ Yes ☒ No			
VIII. Type of Permit (For multiple wells, use additional page(s) to provide the information requested for each additional well)			
☒ A. Individual ☐ B. Area	Number of Wells 1	Well Field and/or Project Names NORA	
IX. Class and Type of Well (see reverse)			
A. Class II	B. Type (enter code(s)) D	C. If type code is "X," explain.	
X. Well Status		XI. Well Information	
☐ A. Operating Date Injection Started		API Number Permit (or EPA ID) Number VAS2D955BBUC Full Well Name 900146 SWD	
☐ B. Conversion Date Well Constructed		☒ C. Proposed	
XII. Location of Well or, for Multiple Wells, Approximate Center of Field or Project			
Locate well in two directions from nearest lines of quarter section and drilling unit Surface Location 1/4 of 1/4 of Section Township Range ft. from (N/S) Line of quarter section ft. from (E/W) Line of quarter section.		Latitude 37-11-38 N Longitude 82-12-15 W	
XIII. Attachments			
<i>In addition to this form, complete Attachments A-U (as appropriate for the specific well class) on separate sheets. Submit complete information, as required in the instructions and list all attachments, maps or other figures, by the applicable letter.</i>			
XIV. Certification			
I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR § 144.32)			
Authorized Signatory and Official Title (Please Type or Print) Kevin Miller, VP		Signature 	Date Signed 12/04/2024

INSTRUCTIONS FOR FORM 7520-6 (CLASS II WELLS)

A permit application must be completed by all owners or operators of current or proposed Class I, II, and III wells, and some Class V injection wells subject to the requirement to obtain an Underground Injection Control (UIC) permit as described at 40 CFR 144.31 and others directed by a UIC official to apply for a UIC permit. Please note that the information needs vary by well class. These instructions are specific to Class III wells; other versions are available for other well classes. If the application covers multiple wells, use additional pages as necessary to provide all the requested information.

I. OWNER NAME, ADDRESS, PHONE AND/OR EMAIL: Enter the name and street address, city/town, state, and ZIP code of the owner of the well, well field, or company. Also provide an email address (if available) and/or a phone number.

II. OPERATOR NAME, ADDRESS, PHONE AND/OR EMAIL: Enter the name and street address, city/town, state, and ZIP code of the operator of well or well field; also provide an email address (if available) and/or a phone number. If the operator is the same as the owner, enter "same as owner."

III. COMMERCIAL FACILITY: Check the appropriate box to indicate the type of facility. A commercial facility is a single or multiple well facility that is specifically engaged in the business of injecting waste fluids generated by third party producers that is originated off-site and transported to the facility by truck for a fee or compensation.

IV. OWNERSHIP: Check the appropriate box to indicate whether the owner of the well/facility is a private, Federal, or State/Tribal/Municipal entity.

V. TYPE OF PERMIT ACTION REQUESTED: Check "new permit" if the well has never been subject to a UIC permit (e.g., for a newly constructed or converted well). Check "permit renewal" for an application associated with extending an expiring UIC permit. Check "modification" for an application to modify an existing permit that is not expiring. Check "add well to area permit" if additional wells are to be covered under an existing UIC area permit. Check "other," if needed and describe the situation.

VI. SIC CODES: List at least one and no more than four Standard Industrial Classification (SIC) Codes that best describe the nature of the business in order of priority. A list of SIC codes is available from the U.S. Department of Labor at <https://www.osha.gov/pls/imis/sicsearch.html>.

VII. INDIAN COUNTRY: Check yes if the well is located in Indian country. Indian country (as defined in 18 U.S.C. 1151) includes: all land within the limits of any Indian reservation under the jurisdiction of the U.S. government; all dependent Indian communities within the borders of the U.S.; and all Indian allotments, the Indian titles to which have not been extinguished.

VIII. TYPE OF PERMIT: Check "Individual" or "Area" to indicate the type of permit requested. Individual permits cover a single injection well, while area permits may cover more than one injection well. Note that area permits are issued at the discretion of the Director and that wells covered by an area permit must: be at one contiguous site, be under the control of one entity, and may not inject hazardous waste. If an area permit is requested, enter the **number of wells** to be included in the permit. In the case of a project or field that crosses State lines, it may be possible to consider an area permit if EPA has jurisdiction in all affected States (each such case will be considered individually). Also provide the **name of the well field or project**.

IX. CLASS AND TYPE OF WELL: Enter the class (as defined in 40 CFR 144.6) and type of injection well for which a permit is requested. Use the most pertinent code selected from the table below. When selecting type "X", please explain in the space provided.

TABLE OF CLASS II WELL TYPES

A	Annular Disposal Well.
D	Produced Fluid Disposal Well.
H	Hydrocarbon Storage Well (excluding natural gas).
R	Enhanced Recovery Well.
X	Other Class II Wells (not included in Type "A," "D," "H," or "R").

X. WELL STATUS: Check **Box A, Operating** if the well currently operates as an injection well (e.g., if a permit renewal is requested or a permit is sought for an existing rule-authorized injection well). Check **Box B, Conversion** for an existing well not currently being utilized for injection that is proposed to be converted to an injection well. Check **Box C, Proposed** for an underground injection well not yet constructed or completed. Provide relevant dates if A or B are checked.

XI. WELL INFORMATION: Enter the **API number** (the number assigned by the local jurisdiction (usually a State Oil and Gas Agency) using the American Petroleum Institute standard numbering system). Enter the **Permit or EPA ID number** assigned to the injection well by the EPA or the permitting authority. If you do not have a number (e.g., for a new well), this will be provided by EPA or the permitting authority, and you can leave the field blank. Also enter the **Full Name of the Well** or project.

XII. LOCATION: For individual permit applications, in the fields provided, enter the location of the well using latitude and longitude and/or the Public Land Survey System. When using latitude and longitude, use decimal degrees to five or six places after the decimal, if possible; be sure to include a negative sign for the longitude of a well in the Western Hemisphere and a

negative sign for the latitude of a well in the Southern Hemisphere. When using the Public Land Survey System, fill in the complete township, range, and section to the nearest quarter-quarter section. A township is north or south of the baseline, and a range is east or west of the principal meridian (e.g., T12N, R34W). Also include the distance, in feet, from the nearest north or south line and nearest east or west line of the quarter-section. For area permit applications, provide the latitude and longitude of the approximate center of the area.

XIII. ATTACHMENTS: Specific instructions for completing the attachments are presented on pages 3 through 6. Place the permit or EPA ID number (or, if none has been assigned, other identifying information such as an API number or the project name) in the upper right hand corner of each page of the attachments.

XIV. CERTIFICATION: All permit applications must be signed by either: a responsible corporate officer for a corporation, by a general partner for a partnership, by the proprietor of a sole proprietorship, or by a principal executive or ranking elected official for a public agency, or a duly authorized representative of that person. Please note that this form must be signed by a responsible entity as described at 40 CFR 144.32, even if the attachments are prepared by contractors or service companies.

PAPERWORK REDUCTION ACT NOTICE: The public reporting and recordkeeping burden for this collection of information is estimated to average 61 hours per response for a Class II well permit application. Burden means the total time, effort, or financial resource expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal Agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to the collection of information; search data sources; complete and review the collection of information; and, transmit or otherwise disclose the information. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including the use of automated collection techniques to Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822), 1200 Pennsylvania Ave., NW, Washington, DC 20460. Include the OMB control number in any correspondence. Do not send the completed forms to this address.

Instructions for Completing Attachments to Form 7520-6 (Class II Wells)

The Underground Injection Control (UIC) program, as promulgated under the Safe Drinking Water Act (SDWA), is designed to prevent injection activity from allowing the movement of fluid containing any contaminant into underground sources of drinking water (USDWs), if the presence of that contaminant may cause a violation of any primary drinking water regulation or may otherwise adversely affect the health of persons as found at Title 40 of the Code of Federal Regulations (40 CFR) section 144.12. Any applicant for a permit under this program shall have the burden of showing that their proposed construction, operation, maintenance, conversion, plugging, abandonment, and injection activity, does not endanger USDWs.

The attachments below have been constructed to provide applicants with clear expectations as to what information EPA needs to make a determination that an applicant's proposed activities will not endanger USDWs.

Pre-Application Coordination

Coordination between the UIC program and the permit applicant prior to submittal of the permit application is an important step for efficient and effective permitting. Early discussions will ensure that the applicant is aware of all the permit application requirements, including state specific requirements found at 40 CFR part 147. These discussions may also help the applicant plan how to invest time and resources needed to develop a comprehensive and complete permit application.

Applicants are encouraged to contact their EPA regional UIC program for a pre-application coordination meeting.

Note: If the owner or operator of *existing rule authorized Class II UIC well(s)* is required by the EPA to apply for a permit (40 CFR § 144.25), consult with EPA staff during the pre-application coordination for additional requirements that may apply.

When completing each attachment, please be sure to specify the units reported, e.g., of depth, pressure, temperature, etc.

Attachment A. Map(s) and Area of Review

Part I. Well Location(s)

For Individual Permits: If the surface location provided in the accompanying 7520-6 form does not adequately describe the well location (i.e., due to deviation, directional, or horizontal drilling), please describe the well's orientation and provide the top- and bottom-hole coordinates, as appropriate. If any monitoring wells are proposed as part of this permit application, provide coordinates for all monitoring wells.

For Area Permits (40 CFR § 144.33): Provide information similar to what is outlined above for individual permits for each well (existing or proposed) to be covered by this permit. In addition, provide a description of the proposed permitted area. At a minimum, this area should include all the proposed or existing wells known at the time of permit application submittal. For circular areas, this description should consist of a defined-radius from a singular point whose coordinates have been given. For polygonal areas, use a series of coordinates describing the vertices or corners of the area. Submit a Geographic Information System (GIS) file, if available.

Part II. Area of Review Size Determination (40 CFR § 146.6)

For All Permits. Give the method (fixed radius or equation) and, if appropriate, all calculations used to determine the size of the area of review (AOR). If you are uncertain as to which method to use, consult with your regional EPA office.

The AOR must be a minimum radius of one-fourth (1/4) mile from the well bore, including a well's lateral, or the proposed area permit boundary for area permits, unless the use of an equation is approved by the Director.

In addition, for Class II enhanced oil recovery well(s). The AOR will be at a minimum the larger of the following: one-fourth (1/4) mile radius or the distance to the nearest active producer in the production formation.

Part III. Map(s) (40 CFR §§ 144.31 & 146.24)

Submit a topographic map (or other map if a topographic map is unavailable) extending one mile beyond the facility property boundary showing:

- project injection well(s), well pad(s) and/or project area,
- applicable area of review,
- all outcrops of injection and confining formations,
- all surface water intake and discharge structures, and
- all hazardous waste treatment, storage, or disposal facilities.

Consult with your EPA regional office for the definition of the facility property boundary.

The information below does not apply to existing rule authorized Class II well(s).

Within the one-fourth (1/4) mile beyond the facility property boundary or the AOR, whichever is larger, the map will also show the:

- name and location of all production wells, injection wells, abandoned wells, dry holes, and all water wells, noting their types (public water system, domestic drinking water, stock, etc.),

- springs and surface bodies of water,
- mines (surface and subsurface) and quarries, and
- other pertinent surface features, including residences, schools, hospitals, and roads.

Only information of public record and pertinent information known to the applicant is required to be included on this map. Multiple maps may be needed to display this information clearly. If a certain feature is not present in the area covered, please state so definitively (e.g., *"There are no known outcrops of the confining formation in the mapped area."*).

Part IV, below does not apply to existing rule authorized Class II well(s).

Part IV. Area of Review Wells and Corrective Action Plans (40 CFR §§ 144.55 & 146.24)

Submit a tabulation of data and wellbore diagrams reasonably available from public records or otherwise known to the applicant on all wells within the AOR included on the map, which penetrate the proposed confining zone(s). Such information will include:

- well name, location and depth,
- well type,
- date well was drilled,
- well construction that includes casing and cement details, including demonstrated or calculated top of cement,
- cement bond logs (if available), and
- record of well completion and plugging (if applicable).

For such wells which are improperly sealed, completed, or abandoned, also submit a plan consisting of such steps or modifications as are necessary to prevent movement of fluid into USDWs.

Part V. Landowners Information (40 CFR § 144.31 and part 147)

Identify and submit a list with the names and addresses of all owners of record of land within one-fourth (1/4) mile of the facility property boundary. This requirement may be waived by the Regional Administrator if the site is in a populous area and the Regional Administrator determines that the requirement would be impracticable.

Consult with your regional EPA office, as additional state landowner notification requirements may apply (40 CFR part 147).

Attachment B. Geological and Geophysical Information

Part I. Geological Data (40 CFR § 146.24)

Provide the following information:

- geological data on all formations from the surface to the base of the injection well, identifying all USDWs and confining and injection zone(s). This data includes the lithologic description, geological name, thickness, depth, and total dissolved solids (TDS) concentrations from these formations (if known),
- source of information for the geologic data and formation TDS,
- porosity and permeability of injection formation (if available),
- geological cross-sections (if available) proximate to the injection well that includes the confining and injection zones. The cross-sections should illustrate the regional geologic setting and show the thickness and lateral continuity of the confining zone(s) through the area of review,
- within the AOR, identify known or suspected faults and fracture systems. If identified, provide proximity to the injection zone and the effect the fault/fracture system may have on the injection activities, and
- a history of seismic activity in the area and proximity to crystalline (i.e., granitic) basement.

Part II. Proposed Formation Testing Program (40 CFR § 146.22)

Provide a formation testing program to obtain data on:

- fluid pressure,
- estimated fracture pressure, and
- physical and chemical characteristics of the injection zone.

Attachment C. Well Construction/Conversion Information

Part I. Well Schematic Diagram (40 CFR § 146.24)

Provide a detailed proposed well schematic diagram that includes:

- identification of USDWs and confining and injection zones,
- casing and cementing details, including demonstrated or calculated top of cement,
- tubing and packer (if applicable),
- open hole or perforated intervals, and

- surface trace (if horizontal or deviated well).

For wells that are drilled and to be converted to an injection well, also provide the current well schematic diagram.

Part II. Well Construction or Conversion Procedures (40 CFR §§ 144.52, 146.22, & 146.24)

Provide detailed description of well construction or conversion procedures, that includes:

- proposed logs and other tests conducted during the drilling and construction of new well(s),
- proposed stimulation plan(s), if planned, and
- description of alarms and shut-down systems at the well (if applicable).

For wells that are drilled and to be converted to an injection well, also provide:

- well completion and cementing records, and
- previously run logs/tests.

Attachment D. Injection Operation and Monitoring Program (40 CFR §§ 146.23 & 146.24)

Submit the following information:

- flow diagram of fluid flow through the facility,
- contingency plan(s) to cope with well failure, so as to prevent migration of contaminating fluids into a USDW,
- drawing of the surface construction,
- locations of all monitoring devices (show on the map(s) referenced in section A.III. above), and
- description of sampling and monitoring devices to monitor the nature of the injected fluids, injection pressure, annulus pressure (if applicable), flowrate, and cumulative volume.

Hydrocarbon storage and enhanced recovery may be monitored on a field or project basis rather than on an individual well basis by manifold monitoring. If a manifold monitoring program is utilized, describe details of the monitoring program and how the program is comparable to individual well monitoring. Also, include on the map in section A.III.B, the distribution manifold applying injection fluid to all wells in the area, including location of all system monitoring locations.

Additionally, submit the following proposed operating data for each well in the individual or area permit:

- average and maximum daily rate and volume of fluids to be injected,
- average and maximum injection pressure,
- source(s) of injection fluids (including field and formation names),
- proposed annular fluid, and
- analysis of the chemical and physical characteristics of the injection fluid. At a minimum, this should include pH, specific gravity, TDS, and conductivity. Consult with the regional EPA office for additional guidance.

Attachment E. Plugging and Abandonment Plan (40 CFR §§ 144.31, 144.51 & 146.24)

Submit a plugging and abandonment (P&A) plan of the well on EPA Form 7520-19 along with a P&A diagram. The plan should include:

- type, and number of plugs to be used,
- placement of each plug including the elevation of top and bottom,
- type, grade, and quantity of cement to be used, and
- method of placement of the plugs.

Provide one or more cost estimates from an independent firm in the business of plugging and abandoning wells to conduct the work proposed in the P&A plan for EPA to contract plugging of the well. This is to ensure that EPA has adequate funding to plug the well(s) if the operator is unable to plug the well(s).

Consult with the regional EPA office for additional guidance on developing the P&A plan and cost estimate calculations.

Attachment F. Financial Assurance (40 CFR § 144.52)

Submit evidence of financial resources, such as a surety bond or financial statement, necessary for a third party to close, plug, or abandon the well in the event an owner or operator is unable to do so. The monetary amount is based on the P&A plan cost estimate provided in Attachment E.

Attachment G. Site Security and Manifest Requirements (Commercial Wells Only)

Provide a proposed site security plan. This could include fencing around the perimeter of the facility. Consult with the regional EPA office for additional guidance on manifest requirements.

Attachment H. Aquifer Exemptions (40 CFR §§ 144.7 & 146.4)

If an aquifer exemption (AE) is requested, submit the information required at 40 CFR § 144.7 and to demonstrate that the criteria found at 40 CFR § 146.4 are met. Consult with your regional EPA office for additional guidance.

Attachment I. Existing EPA Permits (40 CFR § 144.31)

Submit a listing of all permits or construction approvals received or applied for under any of the following programs:

- Hazardous Waste Management program under RCRA,
- UIC program under SDWA,
- NPDES program under CWA,
- Prevention of Significant Deterioration (PSD) program under the Clean Air Act,
- Nonattainment program under the Clean Air Act,
- National Emission Standards for Hazardous Pollutants (NESHAPS) preconstruction approval under the Clean Air Act.
- Ocean dumping permits under the Marine Protection Research and Sanctuaries Act,
- Dredge and fill permits under section 404 of CWA, and
- Other relevant environmental permits, including State permits.

Attachment J. Description of Business (40 CFR § 144.31)

Provide a brief description of the nature of the business.

Attachment K. Optional Additional Project Information (40 CFR § 144.4)

The following is a list of Federal laws that may apply prior to the issuance of permits. When any of these laws are applicable, EPA must ensure that they are followed. The optional additional information requested below will assist EPA in its analyses to satisfy these laws.

- The Wild and Scenic Rivers Act, 16 U.S.C. 1273 et seq.
Identify any national wild and scenic river that may be impacted by the activities associated with the proposed project.
- The National Historic Preservation Act of 1966, 16 U.S.C. 470 et seq.
Identify properties listed or eligible for listing in the National Register of Historic Places that may be affected by the activities associated with the proposed project. If previous historic and cultural resource survey(s) have been conducted, provide the results of the survey(s).
- The Endangered Species Act, 16 U.S.C. 1531 et seq.
Identify any endangered or threatened species that may be affected by the activities associated with the proposed project. If a previous endangered or threatened species survey has been conducted, provide the results of the survey.
- The Coastal Zone Management Act, 16 U.S.C. 1451 et seq.
Identify any coastal zones that may be affected by the activities associated with the proposed project.

1.0 Introduction

The fixed radius of ¼-mile from proposed UIC Well 900146 was used for the area of review. All information presented and mapping provided are based upon the ¼-mile radius using Well 900146 as the center.

On some selective mapping, a radius of one mile, using proposed UIC well 900146 as the center, will be the area of review as required by this permit application.

1.0 AREA OF REVIEW MAP

ENERVEST used ¼-mile as the Area of Review for proposed UIC well 900146. Drawing 1 is a topographic map that identifies the area within a one mile and ¼-mile radius of proposed UIC well 900146. This drawing provides the following information:

- **Location of proposed UIC well 900146** – This well is located on an existing CBM well site. The proposed injection zone is the Weir formation at a projected depth of 4,400'. The existing CBM well, Haysi 26, was drilled to a total depth ("TD") of 2,330' into the Pocahontas Formation, which is approximately 2,000' above the proposed injection zone.
- **Existing Well Information** – All wells within one mile are identified by operator's well number, state file number and well type for all known producing, abandoned, dry holes, and injection. This information was gathered from well and map records on file with the Virginia Division of Gas and Oil and from Range – Pine Mountains' company files.
- **Surface and Subsurface Features** – The map identifies all surface bodies of water, springs, underground sources of drinking water ("USDW"), mines (surface and deep), quarries, roads, and other pertinent surface and subsurface features. Structures were identified using aerial photography.
- **Geologic Features** – The map also identifies the inactive Little Pawpaw fault, the only fault within one mile of proposed UIC well 900146.

Environmental Data Resources, Inc. conducted a state and federal records review within a one mile radius. There were no intake and discharge structures or hazardous waste facilities identified (attached as Appendix B).

2.0 PROPOSED UIC WELL 900146

Proposed UIC Class IID Well 900146 will be located in the Prater District of Buchanan County, Virginia and is approximately 4,350' to the south of existing UIC Permit

REVIEW AREA AND WELL INFORMATION

ATTACHMENT

Number VAS2D950BBUC (Class IID Injection Well), which is also permitted to inject into the Weir Formation and is owned and operated by ENERVEST OPERATING.

The 900146 is projected to be drilled to an approximate depth of 4,650', with the target injection zone (Weir Formation) being approximately 4,400' deep. The geologic prognosis is included in Attachment G.

3.0 SURFACE OWNERS

The surface owners within the ¼-mile radius of proposed UIC well 900146 are listed below. Addresses and tax map identification information are listed for each owner. A certified plat is also attached.

One Quarter Mile Radius Surface Ownership

Proposed UIC well 900146 Location

<u>Owner Name and Address</u>	<u>Tax Map ID</u>
1. CF Highlands, LLC The Nature Conservancy 19045 Stone Mountain Road Abingdon, VA 24210	2HH-272-003

¼-Mile Surface Owners

	Kingsport, TN 37660
<u>Owner Name and Address</u>	
2. CF Highlands, LLC – The Nature Conservancy 19045 Stone Mountain Road Abingdon, VA 24210	4. Edgar Mae O'Quinn 1052 Sawbriar Road Vansant, VA 24656
3. Samuel J. Breeding Jr. 4322 Louita Avenue	5. Kimberly Nicole O'Quinn 1442 O'Quinn Hollow Road Vansant, VA 24656

Tax Map ID

	2HH-271-027
2HH-271-032	2HH-271-034
2HH-271-033	
2HH-271-034A	
	2HH-271-027A
2HH-272-012	

**¼-Mile Surface Owners
(continued)****Owner Name and Address**

6. Berenice O'Quinn and
Alice Jane O'Quinn
1423 O'Quinn Hollow Road
Vansant, VA 24656
7. Jimmy Jerry O'Quinn
1404 O'Quinn Hollow Road
PO Box 461
Vansant, VA 24656
8. Jimmy Adam O'Quinn
1404 O'Quinn Hollow Road
Vansant, VA 24656
9. Natasha Lyn O'Quinn
1404 O'Quinn Hollow Road
Vansant, VA 24656
10. Jeffery Lyn Yates and
Diana Kay Yates
2169 Cranesnest Road
Vansant, VA 24656

11. Michael Yates and
Heather Yates
2169 Cranesnest Road
Vansant, VA 24656
12. Lenda Owens and
Sammie Ray Owens
Rt. 1 Box 465
Vansant, VA 24656
13. Dempsey Stanley and
Cathy Sue Stanley
1280 Cranesnest Road
Vansant, VA 24656

**¼ -Mile Surface Owners
(continued)**

Owner Name and Address

14. Roy Dee Stanley and
Brenda Joyce Stanley
Rt. 1 Box 442
Vansant, VA 24656
15. Roger Lee Stanley and
Sarah Mabeline Stanley
3118 Belchers Fork Road
Grundy, VA 24614
16. Winford Stanley and
Judy Ilene Stanley
5306 Helen Henderson Highway
Honaker, VA 24260
17. Jerry L. Coleman and
Barbara Ann Coleman
2613 Cranesnest Road
Vansant, VA 24656
18. Tollie Fleming
2056 Rose Ridge
Clintwood, VA 24228
19. Kyle Fleming
2056 Rose Ridge
Clintwood, VA 24288
20. Melissa Fleming Deel
2056 Rose Ridge
Clintwood, VA 24228

4.0 SURROUNDING NATURAL GAS WELLS

Within a one mile radius of proposed UIC well 900146, a total of 65 natural gas wells exist and 1 UIC wells existing based on Virginia Division of Gas and Oil and EnerVest's records as of November 2024. The existing wells consist of:

- **Vertical Natural Gas Wells** – There are 15 vertical wells within one mile that penetrate the Weir formation, with only one falling within the ¼-mile area of review. Drilling and completion reports are attached as Appendix C.
- **Coalbed Methane Wells** – There are 50 drilled CBM wells within one mile. Of those, two fall within ¼-mile. Information on these wells, such as TD and formation at TD, is presented as Appendix C. The intended injection zone in the proposed well is the Weir formation. The deepest CBM well within the ¼-mile radius is 2,610', which provides for a minimum separation of approximately 1,700 feet from the top of the Weir to the bottom of the deepest CBM well within the area of review. Many low permeability formations such as tight sands, shales and limestones form the layers separating the coals and the injection zone. These include the Mauch Chunk Formation (Ravencliff sand and Maxton sands) and the Greenbrier Limestone (Big Lime). More detailed information on these formations is included in Attachment G.
- **Horizontal Wells** – There are no existing horizontal wells within one mile of the proposed UIC well. Five permitted horizontal wells have been identified within one mile; none fall within ¼-mile. The target formation for these wells is the Huron, a Devonian aged shale part of the Ohio Shale Formation, which is approximately 1,500' below the Weir. One horizontal lateral leg is planned to pass within 750' of the proposed well location, but will be over 1,500' below the injection zone. The numerous tight gas sands and shales lying between the formations will act as a barrier for any fluid migration. These formations include the lower section of the Price Formation, the Sunbury shale, the Berea sand, and the upper shales and siltstones of the Ohio Shale.
- **Existing UIC Disposal Wells** – There is one UIC Class II-D injection well within one mile (Permit #VAS2D950BBUC) and is located 4,350' to the north of

proposed UIC well 900146. The injection formation for this well is also the Weir and it is owned and operated by ENERVEST.

Appendix C is a listing of all the wells, their total depths and the geologic formation at total depth. Additionally, all wells penetrating the Weir formation have been noted and the drilling and completion reports have been attached. These reports were obtained from the Virginia Division of Gas and Oil.

5.0 WATER SOURCES

A survey of the area within a one mile radius of proposed UIC well 900146 was conducted to identify water wells, springs, and other drinking water sources. This survey was performed by Environmental Monitoring, Inc. and included a compilation of groundwater monitoring results conducted as part of Virginia Division of Gas and Oil permitting requirements for existing natural gas and coal bed methane wells. The results of the survey indicated there are no water wells within ¼-mile of the proposed well. The survey identified 19 water wells and six springs between ¼-mile and one mile of proposed UIC well 900146. All water wells and springs are shown on the attached Drawing-1. The results are outlined in Attachment E.

6.0 MINING ACTIVITIES

Data obtained from the Virginia Department of Mines, Minerals and Energy indicate there are no active deep or surface mining operations within one mile of the proposed injection well. There is an inactive surface mine within ¼-mile, and one additional inactive surface mine within the one mile radius of the proposed well. There are three inactive deep mines within one mile of the proposed site. These deep mines targeted the Hagy and Clintwood seams located several thousand feet above the intended injection zone.

Associated with these inactive mines, are several surface and ground water monitoring points and National Pollutant Discharge Elimination System (“NPDES”) points that have been identified. Figure B-1 identifies these points, but no data was obtained given the current inactive status of the mines.

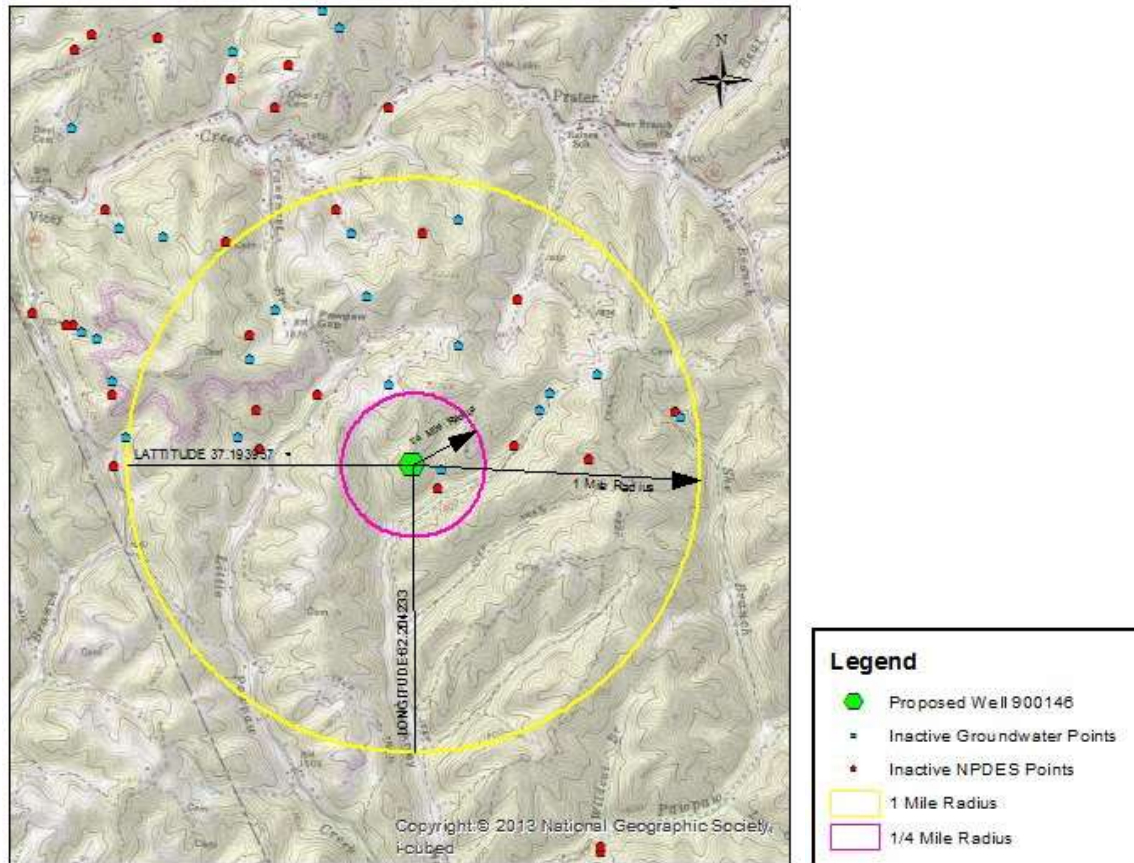


Figure B-1. Mining Activity

7.0 REGIONAL STRUCTURE AND FAULTS

The proposed UIC well will be properly separated from all USDW's by thousands of feet of confining strata and there are no active faults in the region.

The proposed UIC wellsite falls within the Appalachian Plateau geologic province, dominated by relatively flat-lying strata typically dipping one to two degrees. (Nolde, et.al., 1984). This region consists of an extensive, thick sedimentary sequence with numerous confining strata between all USDW's and the proposed injection zone. The proposed injection zone is the Weir formation, which has confining strata above and below of sufficient thickness and low enough permeability to confine the injection

interval and isolate injected fluids to that zone. The Weir is thousands of feet below any known underground source of drinking water, thereby allowing adequate separation from potable water zones.

There are no faults identified within the Area of Review. The region is considered geologically stable with no active faults. The currently inactive faults in this region originated during the Acadian and Alleghanian Orogenies approximately 375 million to 260 million years ago. The Little Pawpaw fault, a tear fault associated with the Russell Fork Fault, is a high-angle, right-lateral strike-slip fault located within one mile of the proposed disposal well. Figures B-2 and B-3 identify these inactive faults. Maps depicting all recorded seismic activity (see Attachment G) show there is no activity associated with these faults. A cross-section is attached as Figure G-9. The cross-section highlights the Weir formation in four wells and transects the Little Pawpaw fault. This cross-section demonstrates there is little variability and no measurable offset resulting from the fault.

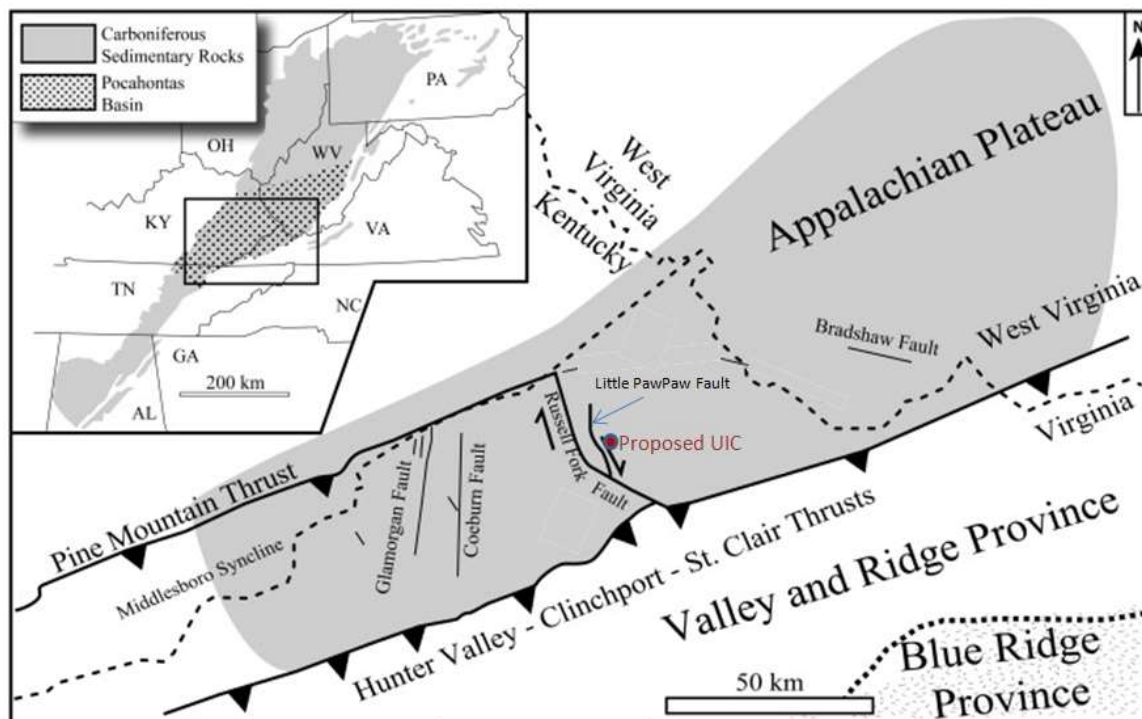


Figure B-2. Regional Faults adapted from Grimm, et.al., 2012

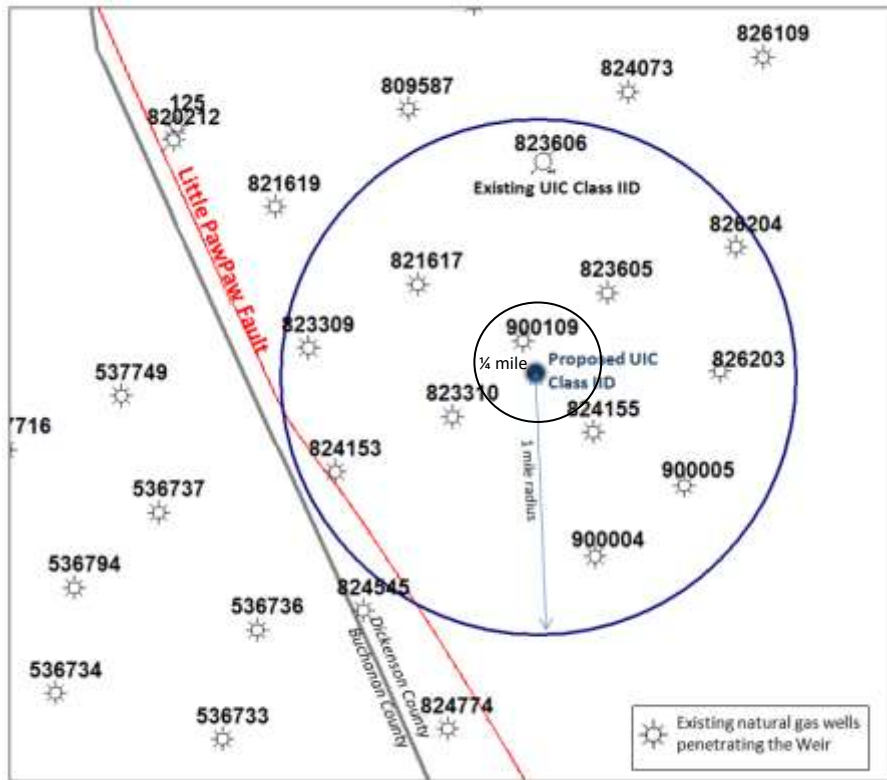
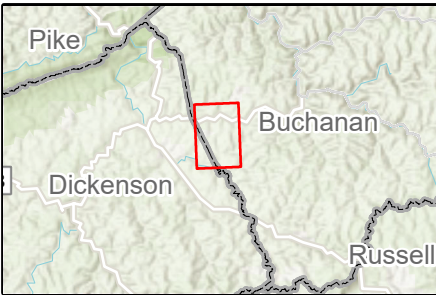
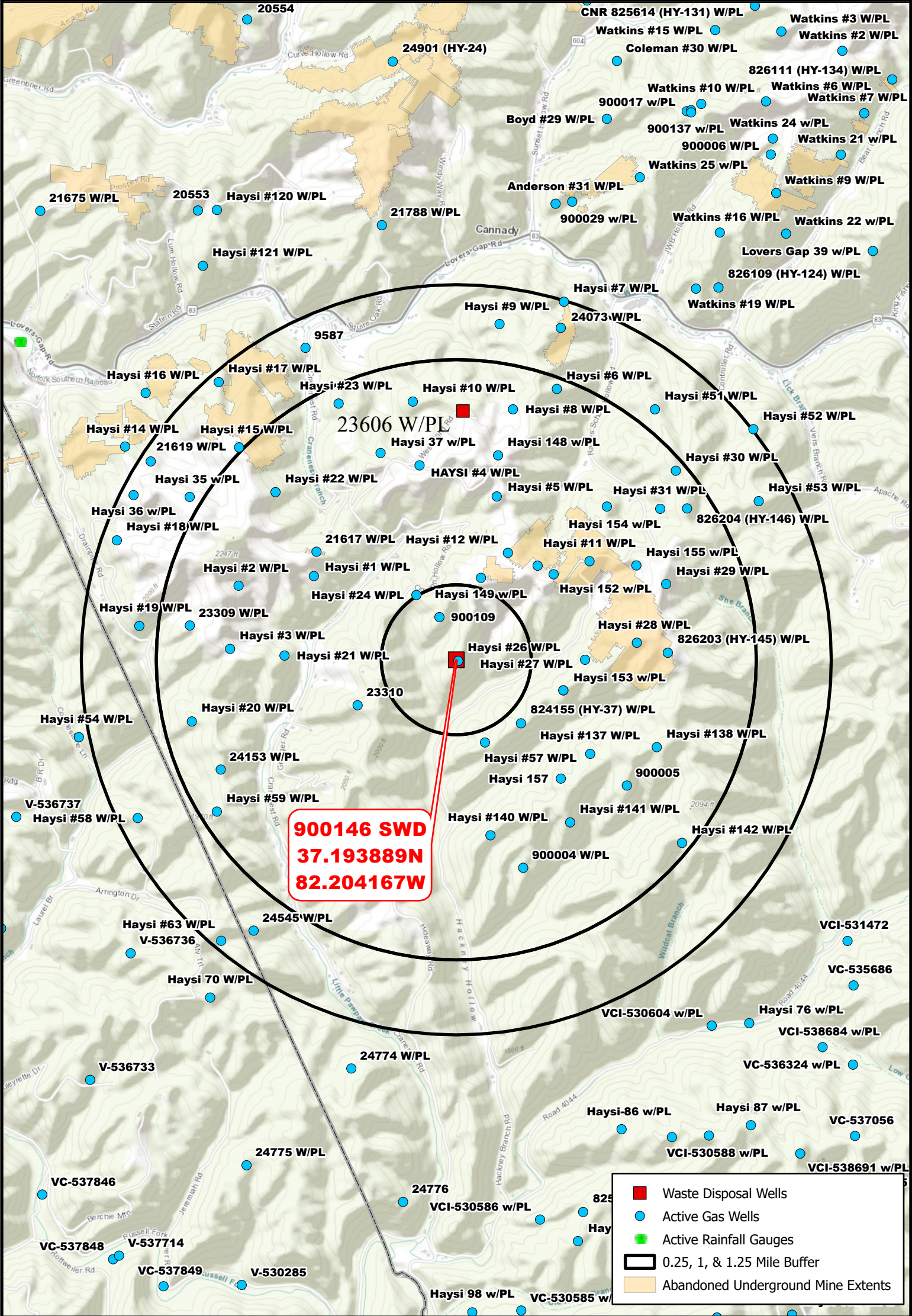


Figure B-3. Faults within one mile of proposed well

REFERENCES

Grimm, Ryan P., et al, 2012, Seal evaluation and confinement screening criteria for beneficial carbon dioxide storage with enhanced coal bed methane recovery in the Pocahontas Basin, Virginia, *International Journal of Coal Geology*, V. 90-91, p. 110-125.

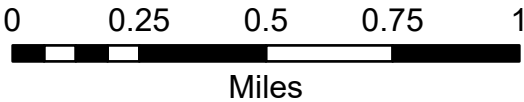
Nolde, Jack, et.al., 1984, Geology of the Prater and Vansant Quadrangles, Virginia, Virginia Division of Mineral Resources Publication 52.



Location Map



1 inch = 2,000 feet



900146 SWD

Buchanan Co., Virginia

Wells within 1/4 mile of Proposed 900146 SWD

STATE FILE	WELL TYPE	STATUS	API	ALT NAME	OPERATOR	LATITUDE	LONGITUDE	SPUD DATE	COMP DATE	TD
BU-3236	CBM	Drilled	450270323600	HAYSI 26	EnerVest Operating LLC	37.193837	-82.204044	11/20/2006	1/4/2007	2400
BU-3244	CBM	Drilled	450270324400	HAYSI 24	EnerVest Operating LLC	37.196935	-82.206725	12/28/2006	2/8/2007	2460
BU-4949	GAS	Drilled	450270494900	V-900109	EnerVest Operating LLC	37.195917	-82.205287	8/31/2012	9/17/2012	5162

Wells within 1-mile of Proposed 900146 SWD

STATE FILE	WELL TYPE	STATUS	API	ALT NAME	OPERATOR	LATITUDE	LONGITUDE	SPUD DATE	COMP DATE	TD
BU-2789	CBM	Drilled	450270278900	HAYSI 2	EnerVest Operating LLC	37.197045	-82.217485	7/15/2005	3/31/2006	2610
BU-2790	CBM	Drilled	450270279000	HAYSI 3	EnerVest Operating LLC	37.19398	-82.217846	7/25/2005	5/12/2006	2460
BU-2870	CBM	Drilled	450270287000	HAYSI 1	EnerVest Operating LLC	37.197655	-82.212962	7/11/2005	3/30/2006	2510
BU-3045	CBM	Drilled	450270304500	HAYSI 8	EnerVest Operating LLC	37.206085	-82.201332	4/24/2006	5/11/2006	2370
BU-3046	CBM	Drilled	450270304600	HAYSI 4	EnerVest Operating LLC	37.203202	-82.206843	4/17/2006	5/5/2006	2460
BU-3065	CBM	Drilled	450270306500	HAYSI 9	EnerVest Operating LLC	37.210199	-82.202338	5/4/2006	5/18/2006	2400
BU-3066	CBM	Drilled	450270306600	HAYSI 7	EnerVest Operating LLC	37.211377	-82.198509	5/12/2006	8/4/2006	2160
BU-3067	CBM	Drilled	450270306700	HAYSI 10	EnerVest Operating LLC	37.206252	-82.207396	4/28/2006	6/2/2006	2300
BU-3086	CBM	Drilled	450270308600	HAYSI 5	EnerVest Operating LLC	37.201847	-82.202107	5/18/2006	7/21/2006	2460
BU-3090	CBM	Drilled	450270309000	HAYSI 6	EnerVest Operating LLC	37.207153	-82.198731	11/1/2006	11/18/2006	2310
BU-3142	CBM	Drilled	450270314200	HAYSI 11	EnerVest Operating LLC	37.198897	-82.196351	11/14/2006	12/1/2006	2460
BU-3158	CBM	Drilled	450270315800	HAYSI 12	EnerVest Operating LLC	37.199143	-82.201301	11/6/2006	4/4/2007	2490
BU-3165	CBM	Drilled	450270316500	HAYSI 17	EnerVest Operating LLC	37.206843	-82.219167	12/29/2006	1/18/2007	2460
BU-3237	CBM	Drilled	450270323700	HAYSI 15	EnerVest Operating LLC	37.203729	-82.217783	12/12/2006	7/13/2007	2610
BU-3291	CBM	Drilled	450270329100	HAYSI 23	EnerVest Operating LLC	37.206034	-82.211876	1/16/2007	2/2/2007	2340
BU-3292	CBM	Drilled	450270329200	HAYSI 18	EnerVest Operating LLC	37.199006	-82.224942	12/1/2006	2/16/2007	2460
BU-3311	CBM	Drilled	450270331100	HAYSI 31	EnerVest Operating LLC	37.201567	-82.19543	1/9/2007	1/27/2007	2370
BU-3350	CBM	Drilled	450270335000	HAYSI 22	EnerVest Operating LLC	37.201635	-82.215477	3/7/2007	3/23/2007	2430
BU-3375	CBM	Drilled	450270337500	HAYSI 19	EnerVest Operating LLC	37.194912	-82.223383	3/16/2007	3/30/2007	2280
BU-3455	CBM	Drilled	450270345500	HAYSI 59	EnerVest Operating LLC	37.186096	-82.218258	5/24/2007	6/16/2007	2280
BU-3456	CBM	Drilled	450270345600	HAYSI 20	EnerVest Operating LLC	37.190402	-82.219985	5/18/2007	6/14/2007	2310
BU-3458	CBM	Drilled	450270345800	HAYSI 21	EnerVest Operating LLC	37.193759	-82.214547	5/9/2007	6/12/2007	2310
BU-3553	CBM	Drilled	450270355300	HAYSI 57	EnerVest Operating LLC	37.189944	-82.202234	9/20/2007	10/10/2007	2400
BU-3556	CBM	Drilled	450270355600	HAYSI 27	EnerVest Operating LLC	37.194126	-82.196389	9/26/2007	10/16/2007	2460
BU-3597	CBM	Drilled	450270359700	HAYSI 30	EnerVest Operating LLC	37.203425	-82.191359	10/24/2007	11/13/2007	2480
BU-3598	CBM	Drilled	450270359800	HAYSI 29	EnerVest Operating LLC	37.197938	-82.191672	10/11/2007	12/4/2007	2556
BU-3608	CBM	Drilled	450270360800	HAYSI 51	EnerVest Operating LLC	37.206354	-82.192757	10/18/2007	11/6/2007	2400
BU-3615	CBM	Drilled	450270361500	HAYSI 28	EnerVest Operating LLC	37.195048	-82.1933	10/3/2007	10/23/2007	2550
BU-3725	CBM	Drilled	450270372500	HAYSI 138	EnerVest Operating LLC	37.190043	-82.191849	12/13/2007	4/23/2008	2550
BU-3728	CBM	Drilled	450270372800	HAYSI 137	EnerVest Operating LLC	37.189591	-82.195857	12/20/2007	2/13/2008	2460
BU-3865	CBM	Drilled	450270386500	HAYSI 52	EnerVest Operating LLC	37.205582	-82.18677	7/30/2008	8/12/2008	2350
BU-3894	CBM	Drilled	450270389400	HAYSI 53	EnerVest Operating LLC	37.202121	-82.186278	7/18/2008	8/6/2008	2328
BU-4055	CBM	Drilled	450270405500	HAYSI 141	EnerVest Operating LLC	37.186247	-82.196906	12/4/2008	12/17/2008	2345
BU-4056	CBM	Drilled	450270405600	HAYSI 140	EnerVest Operating LLC	37.185476	-82.201689	12/11/2008	2/10/2009	2350
BU-4074	CBM	Drilled	450270407400	HAYSI 142	EnerVest Operating LLC	37.18547	-82.190106	12/17/2008	1/9/2009	2465
DI-1791	CBM	Drilled	450510179100	HAYSI 54	EnerVest Operating LLC	37.189429	-82.226768	9/10/2007	9/25/2007	2115
DI-1797	CBM	Drilled	450510179700	HAYSI 58	EnerVest Operating LLC	37.185633	-82.223021	9/13/2007	10/2/2007	2340
DI-2064	CBM	Drilled	450510206400	HAYSI 63	EnerVest Operating LLC	37.179869	-82.217692	11/13/2008	12/3/2008	2494
BU-4800	CBMIF	Drilled	450270480000	HAYSI 148	EnerVest Operating LLC	37.203839	-82.202129	10/31/2011	2/27/2012	2602.4
BU-4821	CBMIF	Drilled	450270482100	HAYSI 154	EnerVest Operating LLC	37.201564	-82.192212	11/5/2011	2/22/2012	2305
BU-4830	CBMIF	Drilled	450270483000	HAYSI 155	EnerVest Operating LLC	37.198784	-82.193516	11/3/2011	2/21/2012	2442
BU-4837	CBMIF	Drilled	450270483700	HAYSI 152	EnerVest Operating LLC	37.198199	-82.198492	11/8/2011	2/28/2012	2453.47
BU-4846	CBMIF	Drilled	450270484600	HAYSI 149	EnerVest Operating LLC	37.197891	-82.202869	11/11/2011	2/24/2012	2571.36
BU-4860	CBMIF	Drilled	450270486000	HAYSI 153	EnerVest Operating LLC	37.192615	-82.197631	12/2/2011	1/26/2012	2430.8
BU-4861	CBMIF	Drilled	450270486100	HAYSI 157	EnerVest Operating LLC	37.188347	-82.197571	12/5/2011	1/25/2012	2414.01
BU-5078	CBMIF	Drilled	450270507800	HAYSI 35	EnerVest Operating LLC	37.201247	-82.220649	12/7/2014	4/10/2015	2513.87
BU-5126	CBMIF	Drilled	450270512600	HAYSI 36	EnerVest Operating LLC	37.201227	-82.224044	10/3/2016	10/12/2016	2501
BU-5144	CBMIF	Drilled	450270514400	HAYSI 37	EnerVest Operating LLC	37.203729	-82.209228	6/3/2017	6/27/2017	2377
BU-0092	GAS	Drilled	450270009200	V-809587	EnerVest Operating LLC	37.208666	-82.214012	9/10/1970	10/27/1970	5860
BU-1379	GAS	Drilled	450270137900	V-823309	EnerVest Operating LLC	37.195033	-82.220339	8/7/1998	10/10/1998	6054
BU-1380	GAS	Drilled	450270138000	V-821619	EnerVest Operating LLC	37.20288	-82.223087	7/27/1998	10/10/1998	6118
BU-1437	GAS	Drilled	450270143700	V-821617	EnerVest Operating LLC	37.198837	-82.212861	9/2/1998	10/12/1998	6102
BU-1613	GAS	Drilled	450270161300	V-823605	EnerVest Operating LLC	37.198797	-82.199533	7/16/1999	8/23/1999	6176
BU-1626	GAS	Drilled	450270162600	V-823310	EnerVest Operating LLC	37.191502	-82.210016	6/15/1999	8/16/1999	6099
BU-1806	GAS	Drilled	450270180600	V-824073	EnerVest Operating LLC	37.210112	-82.19864	5/2/2000	6/21/2000	6060

BU-1864	GAS	Drilled	450270186400	V-824153	EnerVest Operating LLC	37.188137	-82.218126	6/17/2000	7/18/2000	5895
BU-2549	GAS	Drilled	450270254900	V-824545	EnerVest Operating LLC	37.180422	-82.215757	10/21/2003	11/19/2003	5974
BU-3349	GAS	Drilled	450270334900	V-824155	EnerVest Operating LLC	37.190939	-82.200111	5/30/2007	7/3/2007	6625
BU-3391	GAS	Drilled	450270339100	V-826204	EnerVest Operating LLC	37.20163	-82.190586	7/19/2007	8/14/2007	6707
BU-3396	GAS	Drilled	450270339600	V-826203	EnerVest Operating LLC	37.194625	-82.191409	8/3/2007	8/27/2007	6728
BU-4554	GAS	Drilled	450270455400	V-900005	EnerVest Operating LLC	37.188138	-82.193572	11/30/2010	12/22/2010	5202
BU-4608	GAS	Drilled	450270460800	V-900004	EnerVest Operating LLC	37.183969	-82.199634	12/21/2010	1/20/2011	4936

UIC within 1-mile of Proposed 900146 SWD

STATE FILE	WELL TYPE	STATUS	API	ALT NAME	OPERATOR	LATITUDE	LONGITUDE	SPUD DATE	COMP DATE	TD
BU-1614	SWD	Drilled	450270161400	VS-823606	EnerVest Operating LLC	37.205985	-82.204358	7/6/1999	8/23/1999	6165

1.0 INTRODUCTION

The proposed injection well is in the Appalachian Basin in an area with an extensive, thick sedimentary sequence with an adequate injection interval and numerous confining strata. The injection zone, the Weir Formation, is a siltstone that is relatively homogeneous with no highly permeable streaks or major lithologic differences across its vast lateral extent. The lateral extent, which covers most of southwest Virginia, into Kentucky, West Virginia and beyond, is large enough to minimize injection pressure variations. The Weir has confining strata above and below of sufficient thickness and low enough permeability to confine the injection interval and isolate injected fluids to that zone. The Weir is thousands of feet below any known underground source of drinking water, thereby allowing adequate separation from potable water zones.

The overall geology in the area is structurally simple with flat-lying strata and no active fault systems. There are no identified faults within the Area of Review. Faults in the region were active hundreds of millions of years ago with no current tectonic forces on fault planes resulting in movement. Since the forces that caused faulting in the area occurred hundreds of millions of years ago, the fault zones are considered inactive and the triggering of seismic activity by fluid injection is unlikely.

The Weir is the primary injection zone targeted by Class II-D wells in Virginia. Rock characteristics allow for it to be an effective injection zone with lithology above and below for adequate confinement.

2.0 INJECTION ZONE

The target formation for the injection of produced fluid is a zone within the Mississippian Price Formation, known as the Weir. The Weir is a hydrocarbon reservoir rock across the Basin. As such, it has sufficient porosity and permeability to permit the storage and accumulation of hydrocarbons under adequate confining conditions. This formation is the target zone in many existing injection wells throughout southwest Virginia including ENERVEST's existing UIC Class II-D injection well located approximately 4,350' to the north of the proposed well (UIC Permit VAS2D950BBUC).

In the area of the proposed well, the Weir formation consists of a very fine-grained siltstone. The lower portion of the Weir, locally referred to as the Weir Shale, is finer grained with slightly higher organic content. The target interval within the Weir is in the upper siltstone section with an average offset porosity of approximately six percent. Water saturation in the Weir is around 35% and is mainly associated with bound water found in its clay constituents.

A local geologic stratigraphic column is included in this section as Figure G-1. The Weir lies below the Greenbrier Group (Big Lime) and above the Pocono Formation (Berea). The Weir is expected to be at a depth of about 4,250' and the Weir Shale at a depth of about 4,500'. The target zone is projected to be at a depth of 4,400' with an approximate thickness of 60-80'. Exact depths will be determined once the well is drilled and geophysical logs are run. Figure G-6 is an isopach map of the Weir.

3.0 CONFINING ZONES

The sedimentary sequence in the southern Appalachian Basin contains several confining zones above and below the Weir siltstone. Since the Weir is a hydrocarbon reservoir rock across the Basin, there are adequate confining zones above the formation that act as barriers to the upward movement of hydrocarbons. These confining rock layers are stratigraphic traps for the accumulating hydrocarbons as a result of lithologic changes in reduced porosity and permeability.

Figure G-1 is a geologic column indicating the formations above and below the proposed injection zone. The following is a brief description of these formations.

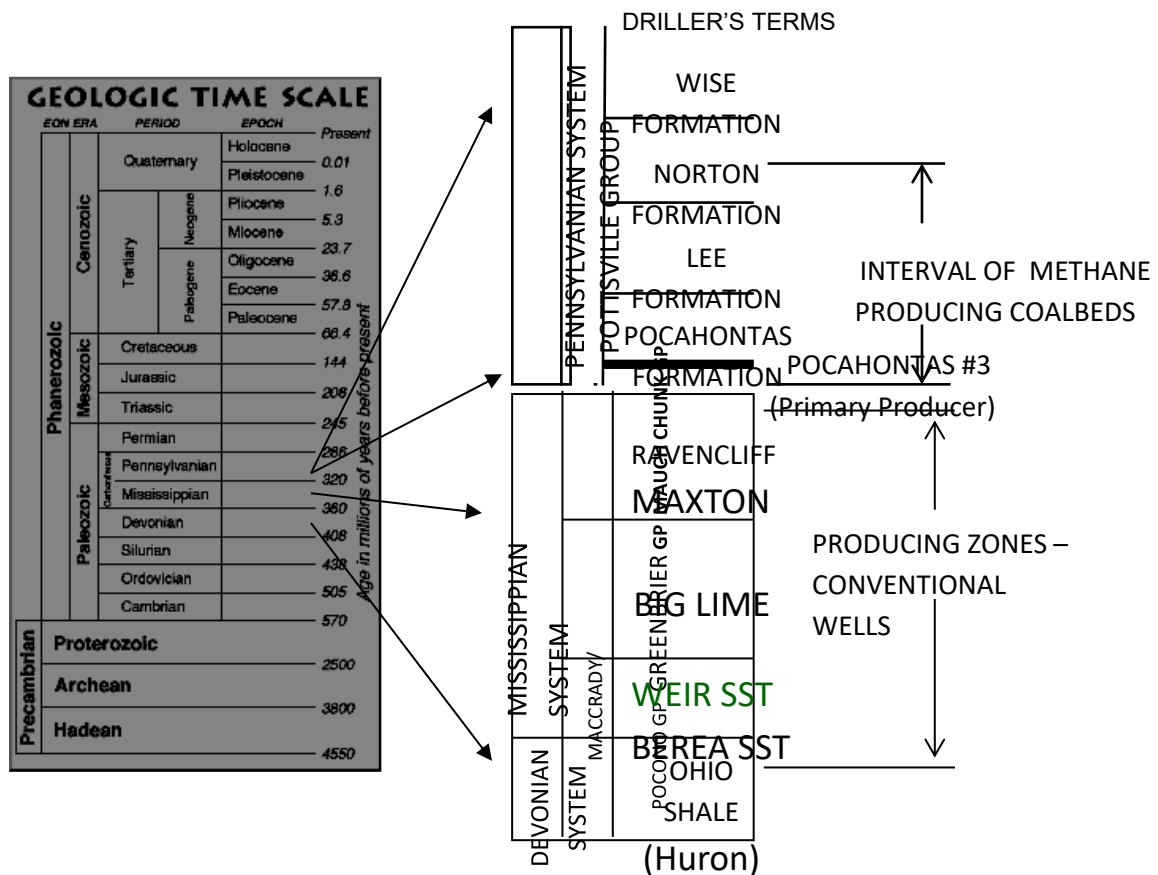


Figure G-1. Virginia Geologic Column

The confining zone directly above the Weir formation is the Mississippian Greenbrier Group, locally referred to as the Big Lime. This is a dense carbonate approximately 350' thick. The porosity zones in the Big Lime consist of thin oolitic channel deposits. Overall porosity within this formation, based on offset data, is around two percent. Water saturation for the Big Lime is typically near zero.

The Big Lime is projected to be at a depth of approximately 3,900' to 4,250'. A structure map for the base of the Big Lime is attached as Figure G-7.

Above the Big Lime is the Mauch Chunk Formation consisting of over 1,000' of tight sands, siltstones and limestones that act as further barriers to the upward migration of fluids.

Above the Mauch Chunk are several thousand feet of siltstone, tight sands and coal beds that also inhibit the migration of injected fluid.

There are also several confining zones below the Weir, such as the Weir shale and below that the Sunbury shale. The very low permeability of shale will inhibit the downward migration of produced fluids.

Additionally the Pocono Formation, locally known as the Berea Sandstone, consists of a fine-grained, dirty siltstone. Offset data indicate the Berea has an average porosity of about four percent. In this area, the Berea is approximately 50-60' thick. As mentioned, directly above the Berea is the Sunbury Shale. This shale is also about 60-70' thick and acts as a further barrier for downward migration of fluid. The top of the Sunbury is projected at approximately 4,850' and the top of the Berea at 4,920'. A structure map of the top of the Berea is attached at the end of this section as Figure G-8.

Based on offset well data, an approximate geologic prognosis for the proposed UIC well 900146 is:

Formation:	Depth KB	Interval Ft
Base Lee Sand	2139	
Bluestone	2543	
Ravenclyff	2847	551
Maxton	3398	273
Little Lime	3671	206
Big Lime	3877	370
Weir (proposed injection zone)	4247	244
Weir Shale	4491	366
Sunbury	4857	61
Berea	4918	60

Figure G-2. Geologic Prognosis for proposed UIC well 900146

4.0 STRUCTURAL GEOLOGY

As stated, the site falls within the Appalachian Plateau geologic province. This region is dominated by relatively flat-lying strata typically dipping one to two degrees. There are no active tectonic forces in the region with Virginia being on a passive continental margin. There are no faults identified within the Area of Review. The few faults closest to the proposed well have minimal surficial movement. The attached cross-

section (Figure G-9) indicates no measureable offset through the proposed injection zone.

One of the main structural features in the region is the Pine Mountain Thrust Block (Figure G-3). Movement along this block occurred several hundred million years ago and was due to regional compression oriented northwest-southeast causing the block to move in a northwest direction. Crustal rupturing occurred along the eastern most extent of this block resulting in the Russell Fork Fault. This fault is a high angle, right-lateral strike-slip fault with the fault plane dipping 75° to 90° to the southwest. Overall vertical movement is slight, with numerous slickensides existing along the fault trace (Giles, 1921). There are several tear faults to the northeast of the Russell Fork Fault that occurred as the block rotated counterclockwise (Molinda and Ingram, 1989). The Little Pawpaw Fault, located about one mile west of the proposed well, is an example of a surficial tear fault. The strike of the Little Pawpaw Fault is generally N35°W (Byington, 2007). There is minimal offset associated with the fault (20' max). The Little Pawpaw Fault is located to the west of the proposed UIC well 900146 as indicated on the attached map.

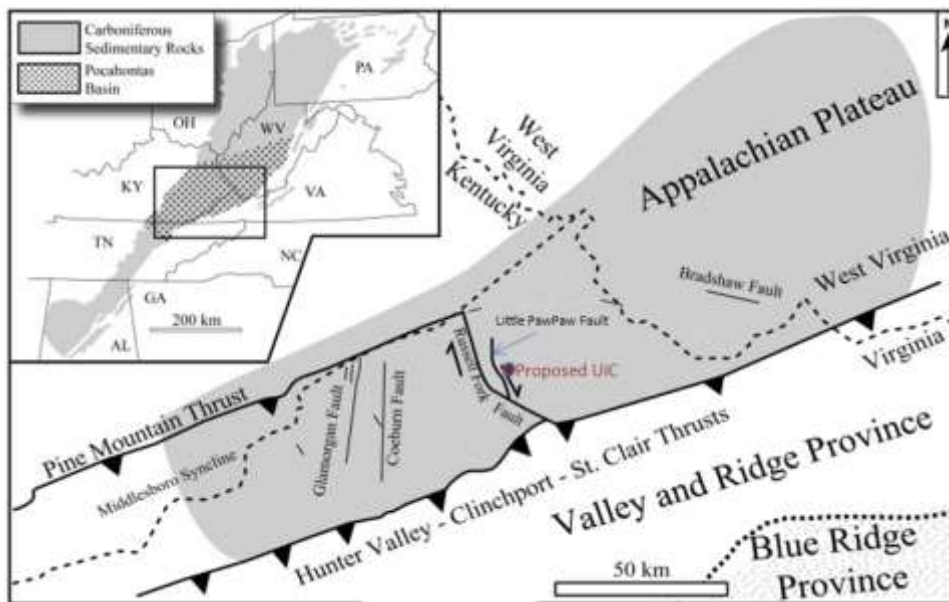


Figure G-3. Regional Geology. (Adapted from Grimm, et al, 2012)

The Little Pawpaw Fault lies almost 1 mile to the west of proposed 900146.

A cross-section is attached as Figure G-9 at the end of this section. The cross-section highlights the Weir formation in four wells and transects the Little Pawpaw fault. This cross-section demonstrates there is little variability and no measurable offset

resulting from the fault. Figure G-10 is a cross-section of the same wells showing all formations.

Local Seismic Activity

Historically, seismic activity in Virginia has been minor. The proposed well is in a region that is not susceptible to earthquakes since there are no active forces causing crustal movement. There are no recorded earthquakes within the area of review (Figure G-5). The faults that exist were active during the Acadian and Alleghanian Orogenies approximately 375 million to 260 million years ago.

Two main concentrations of earthquakes in the state are the central Virginia seismic zone and the Giles County/New River seismic zone.

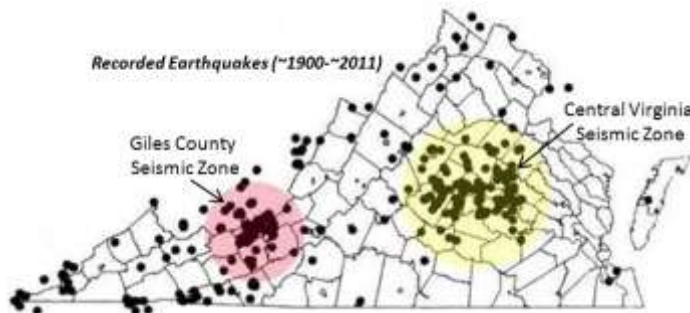


Figure G-4. Seismic Zones in Virginia (<http://www.dmme.virginia.gov/dgmr/earthquakes.shtml>)

The mechanism for Virginia's earthquakes has been attributed to residual stresses from the formation of the Appalachian Mountain range and the Piedmont province hundreds of millions of years ago. Most of the earthquake hypocenters are located miles below the target injection zone at depths between 3-15 miles and are not associated with faults mapped at the surface (VADMME, 2007). Figure G-5 shows the location of earthquakes in southwest Virginia. There have been no earthquakes recorded in the vicinity of proposed UIC well 900146 or along the Little Pawpaw Fault system. Also of note is that the Weir formation is the injection zone for EnerVest's existing UIC well, which is approximately one mile to the north of the proposed well and has been in operation since 2007 with no associated seismic activity.

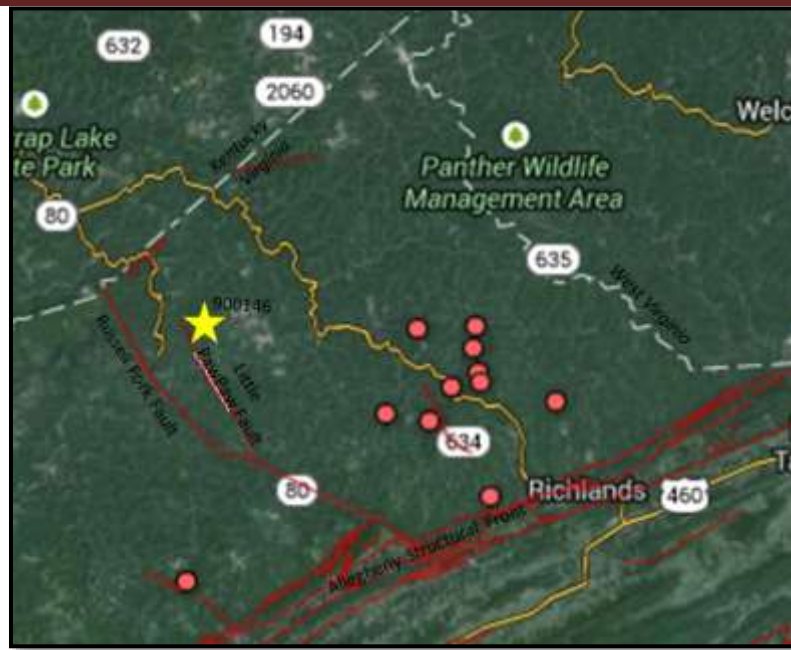


Figure G-5. Location of seismic activity
<http://www.dmme.virginia.gov/DGMR/earthquake2011.shtml>

5.0 FRACTURE PRESSURES

Target Zone: Table G-1 summarizes the fracture pressures for the Weir formation in several offset wells within one mile of the proposed well. The average fracture gradient for these wells was 0.53 psi/ft. This results in an estimated fracture pressure of 2,332 psi at 4,400', the approximate depth of the Weir zone in the proposed well.

WEIR:	State File Number	Company Well #	Frac Pressure-Bottomhole (psi)	Frac Gradient (psi/ft)	ISIP-Surface (psi)	ISIP fluid	Mid Perf Depth (ft)
Existing UIC Class IID	BU-1614	823606	2431	0.55	1890	90% foam	4410
Well within 1 mi	BU-1437	821617	2087	0.48	1304	65% foam	4332
Well within 1 mi	BU-3391	826204	2803	0.62	2425	nitrogen	4541
Well within 1 mi	BU-4608	900004	2245	0.52	1245	65% foam	4303
Well within 1 mi	BU-4554	900005	2263	0.50	296	freshwater	4540
		Average	2366	0.53			

Table G-1. Offset Fracture Pressures – Weir Formation

Upper Confining Zone: There are seven wells within one mile of the proposed UIC well 900146 that were completed in the overlying Big Lime zone and have fracture

GEOLOGICAL INFORMATION

ATTACHMENT

pressures available. The average fracture gradient for these wells was 0.79 psi/ft. This results in an estimated fracture pressure of 3,358 psi at approximately 4,250', the base of the Big Lime, in the proposed well. The offset well data is shown in Table G-2.

BIG LIME:	State File Number	Company Well #	Frac Pressure- Bottomhole (psi)	Frac Gradient (psi/ft)	ISIP- Surface (psi)	ISIP fluid	Mid Perf Depth (ft)	
Well within 1/4 mi	BU-4959	900109	2318	0.54	470	freshwater	4266	(2-stage Big Lime completion)
	"	"	2963	0.74	1217	freshwater	4030	
Well within 1 mi	BU-1613	823605	3634	0.89	2717	60% foam	4100	
Well within 1 mi	BU-3349	824155	3090	0.73	2688	nitrogen	4234	
Well within 1 mi	BU-3396	826203	3267	0.78	2872	nitrogen	4222	
Well within 1 mi	BU-3391	826204	3846	0.92	3411	nitrogen	4186	
Well within 1 mi	BU-4608	900004	2895	0.75	1230	freshwater	3844	
Well within 1 mi	BU-4554	900005	4061	0.95	2219	freshwater	4253	
Average:			3259	0.79				

Table G-2. Offset Fracture Pressures – Big Lime

Lower Confining Zone: There are eight wells within one mile of the proposed UIC well 900146 well that have fracture pressures available and were completed in the underlying Berea zone. The average fracture gradient for these wells was 0.48 psi/ft. This results in an estimated fracture pressure of 2,361 psi at 4,920', the approximate top of the Berea formation, in the proposed well. The offset well data is shown in Table G-3.

BEREA:	State File Number	Company Well #	Frac Pressure- Bottomhole (psi)	Frac Gradient (psi/ft)	ISIP- Surface (psi)	ISIP fluid	Mid Perf Depth (ft)
Existing UIC Class IID	BU-1614	823606	2453	0.48	2083	nitrogen	5085
Well within 1/4 mi	BU-4959	900109	2215	0.44	1880	nitrogen	4969
Well within 1 mi	BU-1437	821617	2578	0.52	1911	80% foam	4935
Well within 1 mi	BU-1379	823309	2012	0.41	1347	80% foam	4915
Well within 1 mi	BU-1626	823310	2557	0.52	2198	nitrogen	4936
Well within 1 mi	BU-1613	823605	2520	0.50	2150	nitrogen	5080
Well within 1 mi	BU-1864	824153	2211	0.45	1884	nitrogen	4844
Well within 1 mi	BU-4554	900005	2559	0.51	365	freshwater	5066
Average:			2388	0.48			

Table G-3. Offset Fracture Pressures – Berea

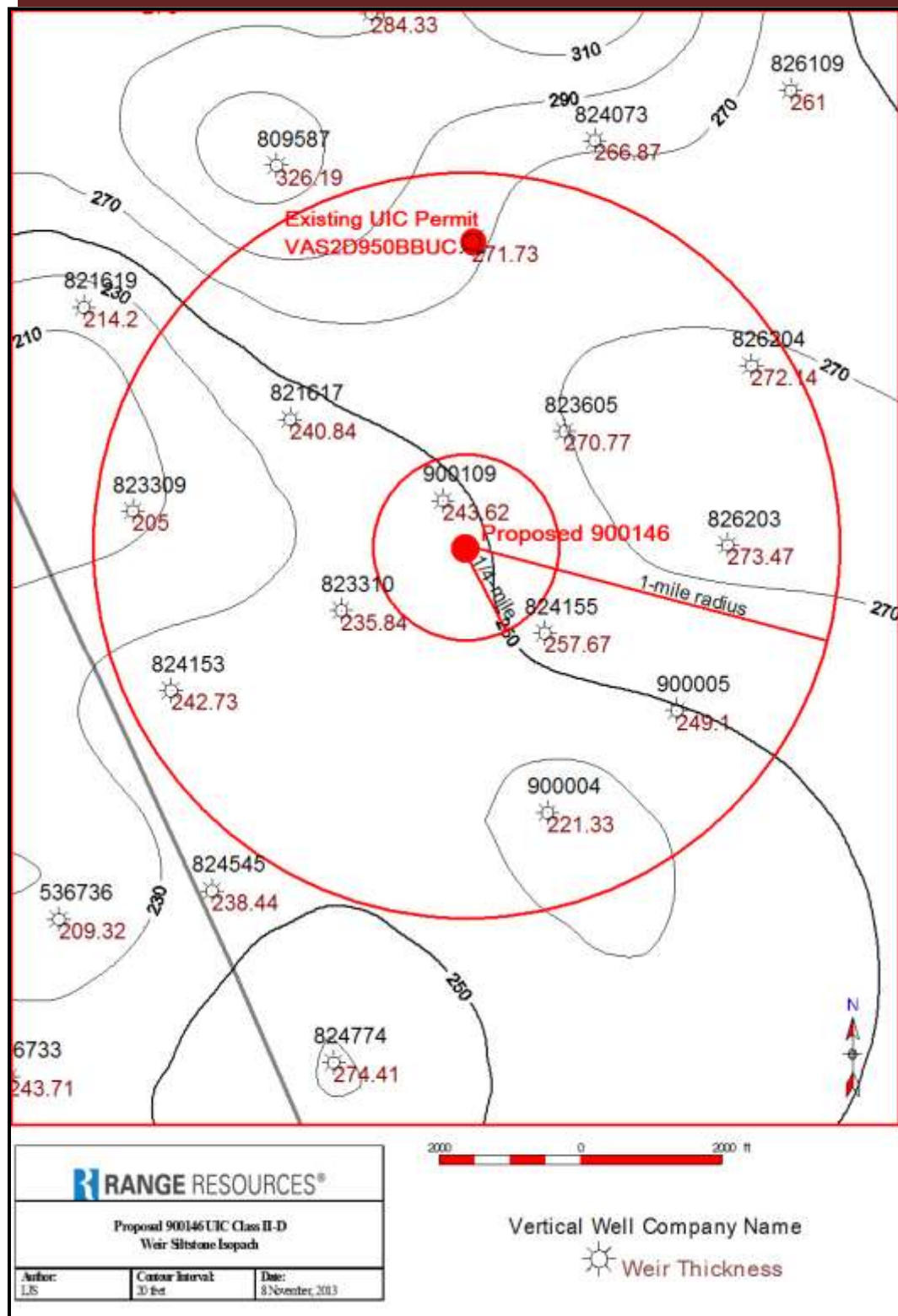


Figure G-6. Isopach – Weir Formation

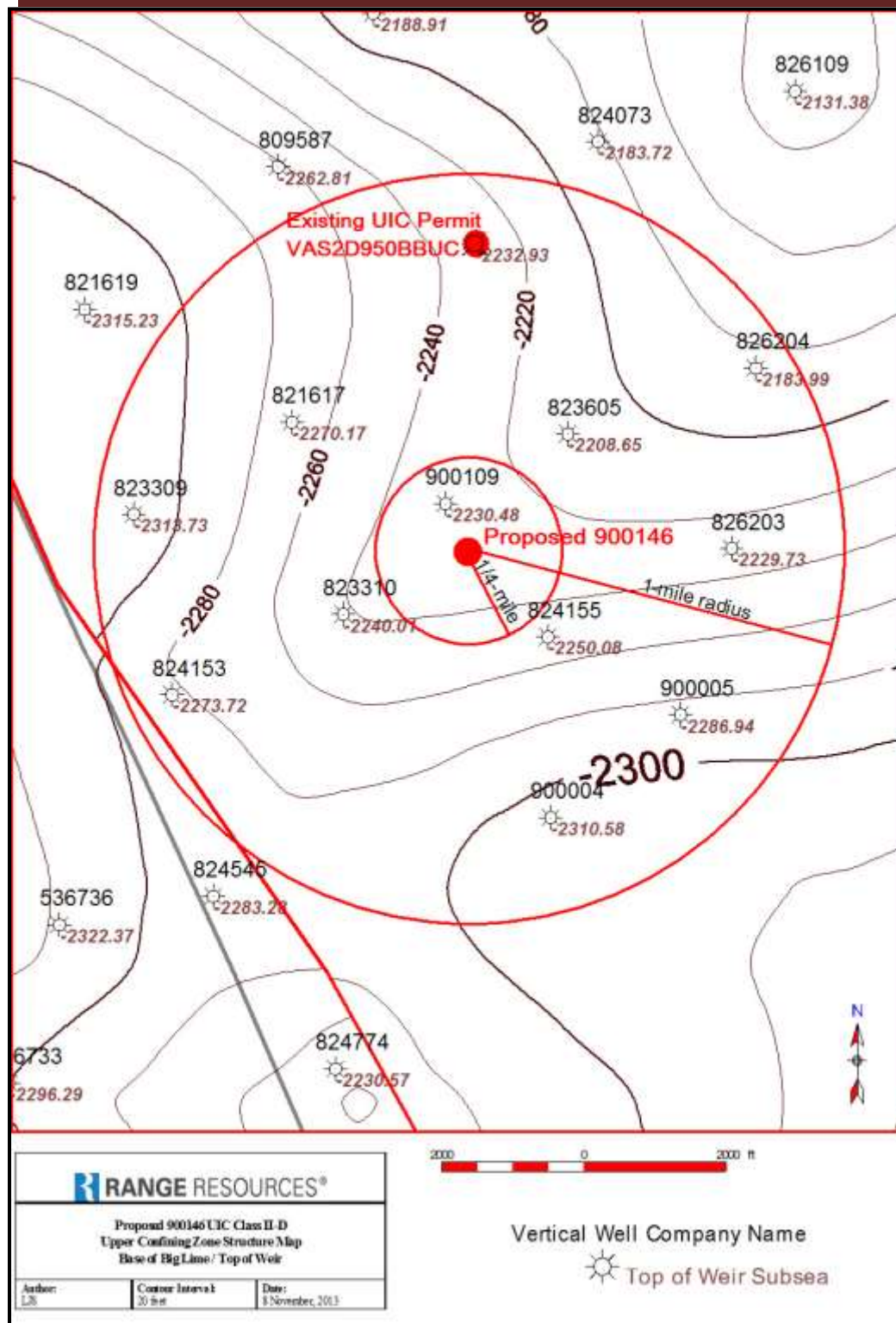


Figure G-7. Structure Map – Base of Big Lime / Top of Weir

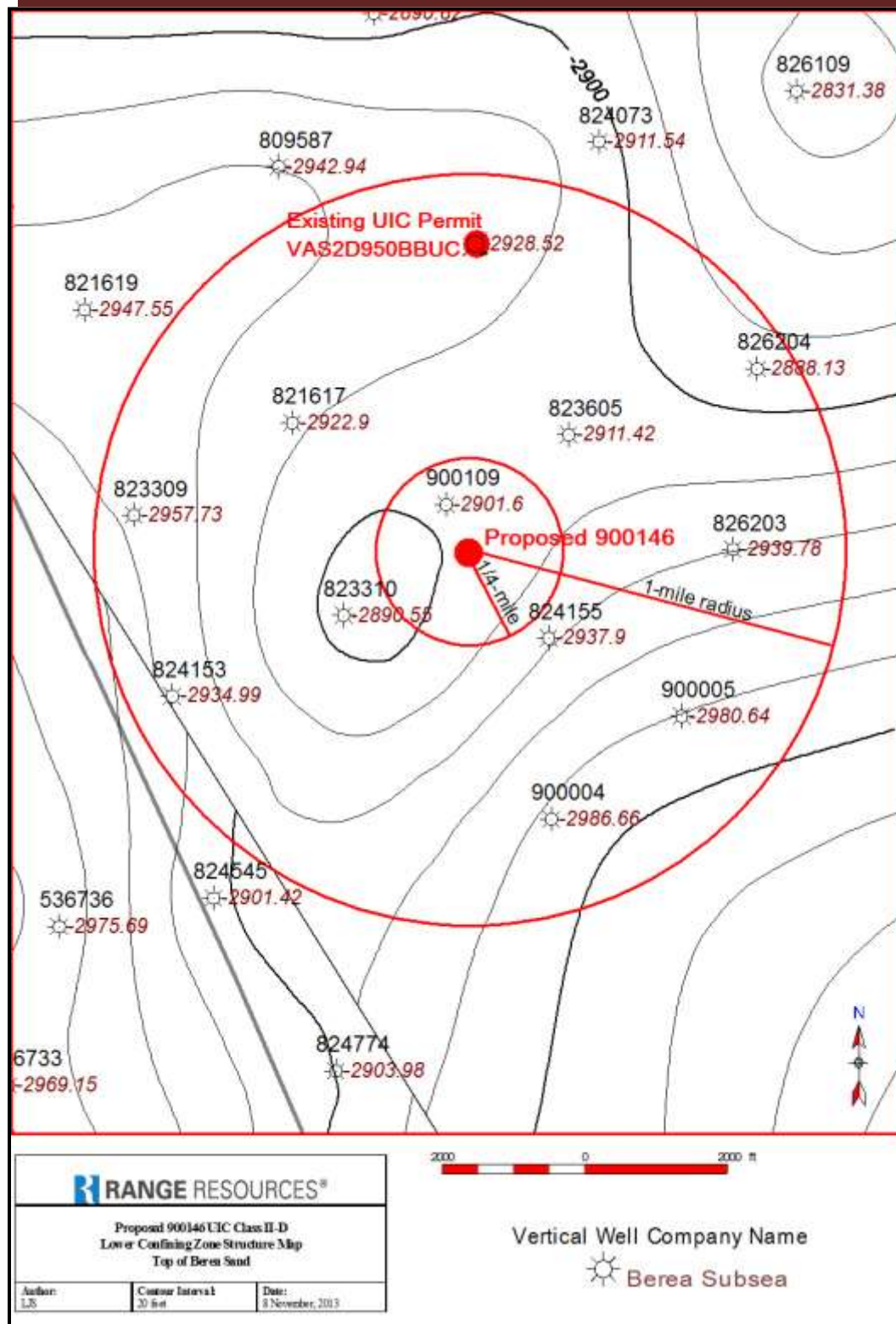


Figure G-8. Structure Map – Top of Berea sand

REFERENCES

Byington, Craig B., 2007, The Tectonic History and Characteristics of Fracture Systems Affecting Coal Mine Roof Stability in Southwest Virginia, Virginia Division of Mineral Resources Open-File Report 07-01.

Giles, Albert W., 1921, *The Geology and Coal Resources of Dickenson County, Virginia*, Virginia Geological Survey, Bulletin No. XXI.

Grimm, Ryan P., et al, 2012, Seal evaluation and confinement screening criteria for beneficial carbon dioxide storage with enhanced coal bed methane recovery in the Pocahontas Basin, Virginia, *International Journal of Coal Geology*, V. 90-91, p. 110-125.

Molinda, M. and D.K. Ingram, 1989, Effects of structural faults on ground control in selected coal mines in southwest Virginia, *International Journal of Mining and Geological Engineering*, V. 1990, 8, p. 332-347.

Virginia Department of Mines, Minerals and Energy, Division of Geology and Mineral Resources, 2007, Earthquake Factsheet (<http://www.dmme.virginia.gov/dgmr/earthquakes.shtml>), and Major Earthquake 2011 (<http://www.dmme.virginia.gov/DGMR/earthquake2011.shtml>).

1.0 FORMATION TESTING PROGRAM

The intended injection zone in proposed UIC well 900146 is the Weir Formation. A typical suite of geophysical logs will be run after the well is drilled to establish porosity and reservoir parameters. The formation will then be stimulated and tested.

2.0 MECHANICAL INTEGRITY TESTING

Proposed UIC well 900146 will be mechanically tested following the procedures as outlined below:

- ☐ A 2 3/8-inch injection tubing will be installed on a packer set just above the perforated interval which will be determined after the geophysical logging operations are completed.
- ☐ The annulus between the 4 1/2-inch casing and the 2 3/8-inch injection tubing will be filled from the top of the packer to the surface with a mixture of fresh water and Nabors Completion and Production Services Packer Fluid Inhibitor at a concentration of 0.2% for fresh water. A copy of the Material Safety Data Sheet is included at the end of this attachment.
- ☐ The annulus between the 4 1/2 -inch casing and the 2 3/8-inch injection tubing will be pressured to a minimum pressure of 110% of the maximum injection pressure (yet to be determined) for the minimum mechanical integrity test pressure.
- ☐ The pressure placed on the annulus area between the 4 1/2 -inch casing and the 2 3/8-inch injection tubing will be monitored for thirty (30) minutes, minimum, and with no loss of pressure greater than 5% of the set test pressure during this time period, the test will be terminated.
- ☐ The pressure within the 2 3/8-inch injection tubing will be monitored for the same thirty (30) minutes as the annulus pressure noted above and with no change in the initial pressure in the 2 3/8-inch injection tubing during this time period, the test will be terminated.

- ☐ Should a loss of pressure or the inability to establish the desired minimum test pressure of the annulus area between the 4 ½-inch casing and the 2 ⅜-inch injection tubing occur, all testing will cease. At the same time, should the pressure within the 2 ⅜-inch injection tubing have a rapid pressure change coinciding with the annulus pressure changes between the 4 ½ -inch casing and the 2 ⅜-inch tubing, all testing will cease. The problem will be corrected and the testing resumed based upon the concurrence of Virginia’s Division of Gas and Oil representative and the U.S. EPA Region III’s representative present during the testing.
- ☐ The pressuring up and the monitoring of the annulus between 4 ½ -inch casing and the 2 ⅜-inch injection tubing, the 2 ⅜-inch injection tubing pressure, and the duration of the test will be recorded by a pressure chart, with these pressures verified by a calibrated digital test pressure gauge.
- ☐ The mechanical integrity testing will be witnessed by representatives of the Virginia Division of Gas and Oil, the U.S. EPA Region III, and EnerVest. With the successful completion of the mechanical integrity test, the pressure chart will be signed and dated by those witnessing the test.
- ☐ At the conclusion of the testing, pressure will be vented from the annulus of the 4 ½ -inch casing and the 2 ⅜-inch injection tubing.

3.0 NOTIFICATIONS

ENERVEST will request the presence of representatives from the Virginia Division of Gas and Oil and U.S. EPA Region III to observe and witness the mechanical integrity testing program. EnerVest will notify the respective state and federal agencies ten working days prior to commencing the testing programs.

4.0 STIMULATION PROGRAM

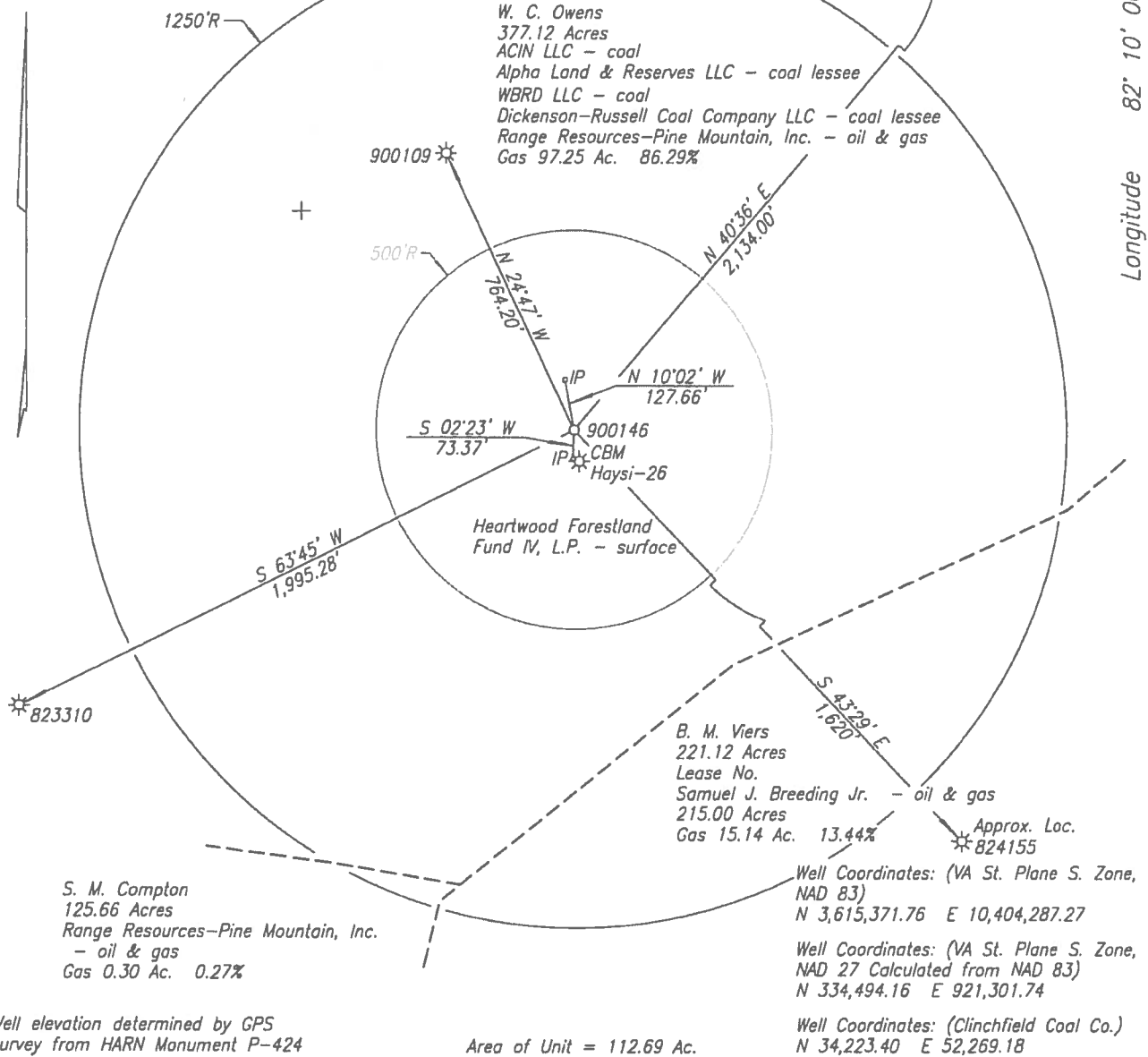
The proposed hydraulic fracture stimulation on the Weir formation for proposed UIC Well 900146 is placing approximately 80,000 lbs of proppant in a carrier fluid. Only one hydraulic fracture stimulation treatment in the Weir interval is planned for proposed UIC well 900146 with no other formations being stimulated. Actual perforation depths and hydraulic fracture stimulation design with results will be provided once proposed UIC Well 900146 has been drilled and logged.

Additionally, completion information will also be submitted to “**FracFocus.org**” which is managed by the Ground Water Protection Council and Interstate Oil and Gas Compact Commission.

Well Coordinates: (Geographic N27)
37.193937° -82.204233°

Note 1: The boundary lines shown hereon are based on deeds, plats and maps of record and do not depict a current boundary survey.

Note 2: The well will be drilled within 10' of the permitted coordinates.



WELL LOCATION PLAT NORA GRID AF-70

COMPANY Range Resources-Pine Mountain, Inc. WELL NAME AND NUMBER 900146
TRACT NO. W. C. Owens ELEVATION 1,999.97' QUADRANGLE Prater
COUNTY Buchanan DISTRICT Prater SCALE 1" = 400' DATE 7-30-2013
This Plat is a new plat x; an updated plat ; or a final location plat

+ Denotes the location of a well on United States topographic Maps, scale 1 to 24,000, latitude and longitude lines being represented by border lines as shown.

PRELIMINARY PLAT

~~Licensed Professional Engineer or~~ Licensed Land Surveyor

1.0 CONSTRUCTION DETAILS

Figure M-1 at the end of this attachment provides an illustration of proposed UIC well 900146's construction details. Figure M-2 shows a more detailed illustration from the bottom of the tubing to the casing TD. A review of these schematics will provide the following information:

- The estimated total depth of the 4 ½-inch casing will be about 4,600 feet. A latch-in float insert will be run 10 feet above the casing shoe on which to land the cement wiper plug. This will leave in place a 10 foot cement plug between the wiper plug and the casing shoe in this air drilled hole and effectively seal off the wellbore.
- The injection string will be 2 ¾-inch, 4.7 lb/ft tubing with a 4 ½-inch x 2 ¾-inch Baker Mechanical Set Retrievable Packer (or equivalent). The packer will be set approximately 50 feet above the perforations in the Weir (depths yet to be determined). The packer will be set on the 2 ¾-inch injection tubing with a joint of tail pipe extending below the bottom of the packer.
- The annulus area between the 2 ¾-inch injection tubing and the 4 ½-inch casing from the top of the packer to the surface will be filled with a mixture of fresh water and Nabors Completion and Production Services Packer Fluid Corrosion Inhibitor at a concentration of 0.2%. A copy of the Material Safety Data Sheet is included at the end of Attachment I.
- The annulus area between the 4 ½-inch casing and the 7 inch casing from the top of the cement will be filled to surface with a mixture of fresh water and Champion Technologies corrosion inhibitor Cortron RN-211 at a concentration of 0.2%.
- A casing head will be installed to seal the 2 ¾ inch injection tubing, 4 ½-inch casing, and the 7 inch casing. The casing head will have pressure monitoring connections for the pressure recorders and the pressure switches.

Drawing-2 provides a schematic layout of the proposed surface facilities, which outlines fluid handling, storage, treatment, and fail-safe controls.

1.0 WELL CONSTRUCTION PROCEDURE

Proposed UIC well 900146 will be a new well drilled through the Weir Formation. The well construction procedures used when this well is drilled and completed are illustrated in Figure L-1 at the end of this attachment. A review of this schematic diagram will provide the following information:

- ☐ The total estimated depth of proposed UIC well 900146 will be about 4,650 feet, as measured from the ground surface of the well.
- ☐ Approximately 44 feet of 13 5/8-inch conductor casing will be installed through unconsolidated sediment until solid bedrock is reached.
- ☐ Approximately 400 feet of 9 5/8-inch of groundwater protection casing will be installed, with this casing cemented along its entire length to the ground surface, thus sealing and protecting groundwater aquifers.
- ☐ Approximately 2,350 feet of 7-inch coal protection casing will be installed, with this casing cemented along its entire length to the ground surface protecting the coal and groundwater aquifers.
- ☐ Approximately 4,600 feet of 4 1/2-inch production casing will be installed, with the production casing cemented from casing TD to a minimum of 100 feet up inside the 7" coal protection string, thus isolating any formation.
- ☐ The Weir Formation is estimated to be confined within the interval from approximately 4,250 feet to approximately 4,500 feet. The depleted gas zone anticipated to be perforated and stimulated for fluid injection within this interval will be determined from continuous geophysical measurements ("Logging").
- ☐ The Weir formation will be the only zone perforated and open to the well bore.

The well's Drilling and Completion reports will be filed with the Virginia Division of Gas and Oil.

2.0 DRILLING AND LOGGING

The following logging, deviation and testing procedures will be conducted upon proposed UIC well 900146:

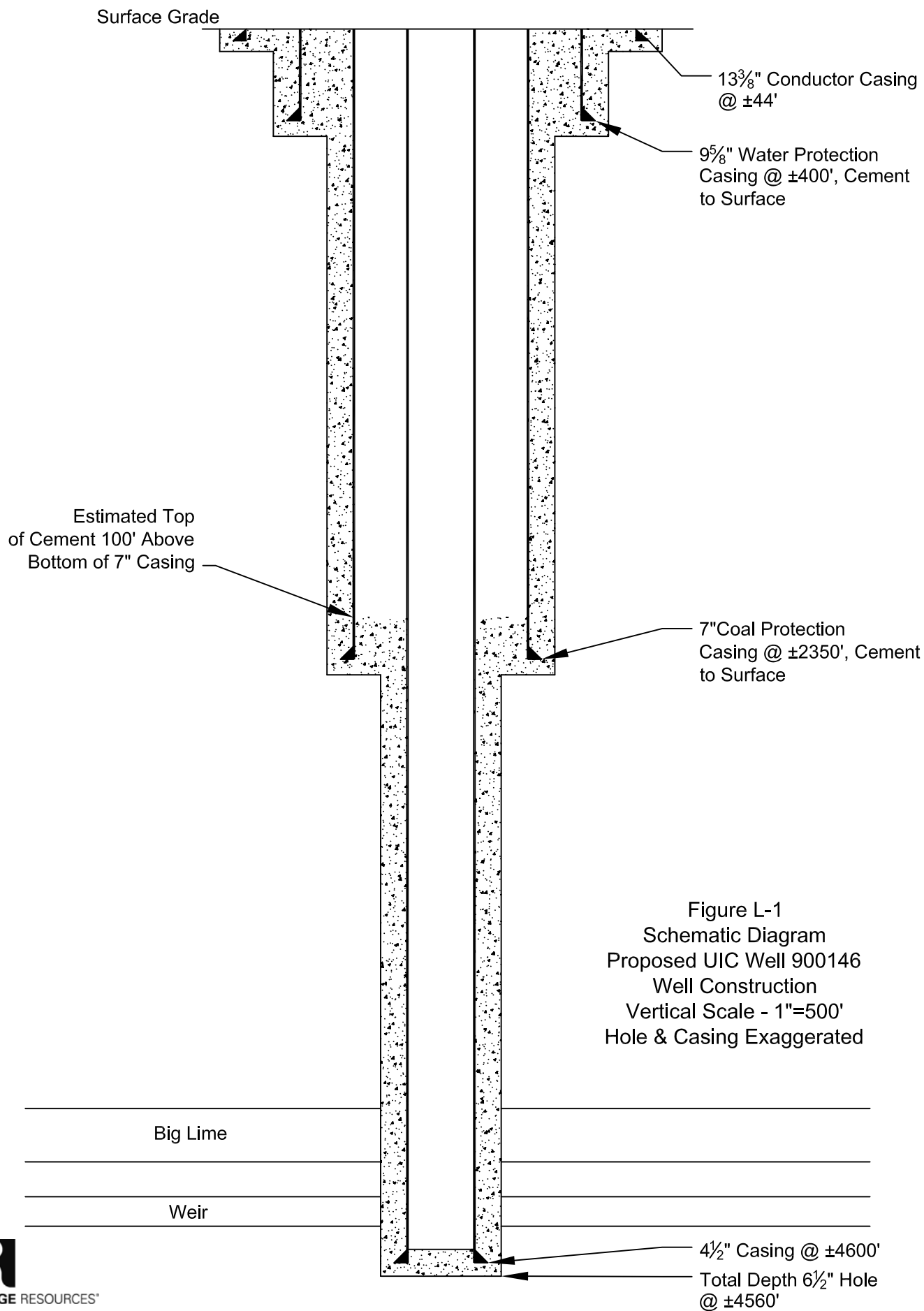
- ☐ **Logging** – The well will be logged with the following log types:

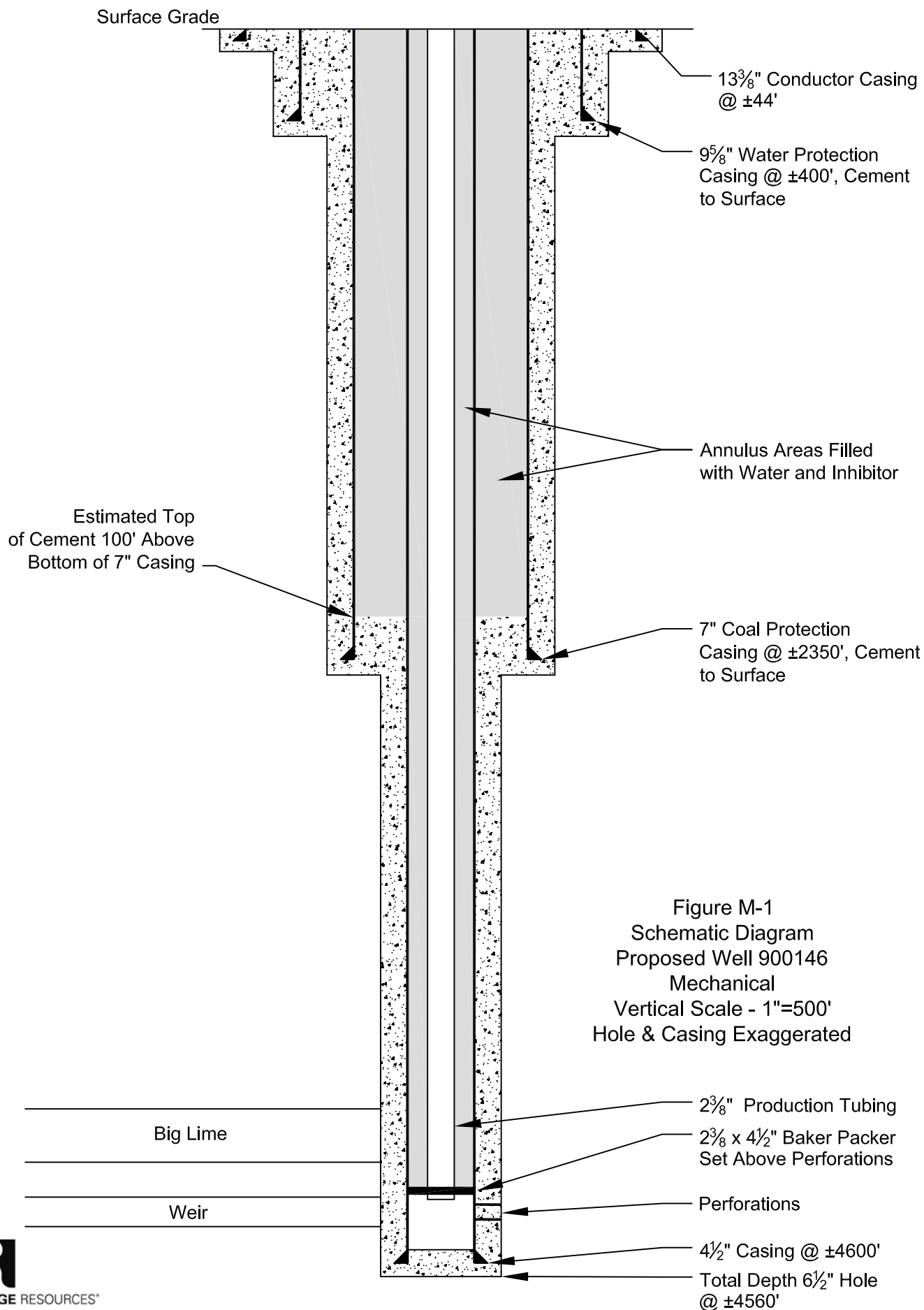
Compensated Formation Density -Temperature - Gamma Ray – Neutron – PE Log and Dual Induction. A Cement Bond Log will be run after the production casing is set and cemented. Copies of these logs will be provided in Appendix C once the well is drilled.
- ☐ **Deviation Checks** –A deviation survey will be performed from 200 feet to the lowest minable coal seam penetrated at intervals no greater than 200 feet. Results of the deviation survey will be provided in the well Drilling Report for proposed UIC well 900146 and will be submitted once the well is drilled.
- ☐ **Drilling** - Drilling reports will be provided once the proposed UIC well 900146 is drilled.
- ☐ **Pressure Testing** - A casing pressure test will be performed on the 4 ½-inch production casing to a surface pressure of 2,200 psi prior to the stimulation of the Weir.
- ☐ **Coring Program** – No formation coring is anticipated.
- ☐ **Annulus Fluid** – The well will be drilled using air drilling methods. No formation fluids are anticipated to be encountered once the intermediate 7 inch coal protection casing is set.

3.0 CEMENT BOND

Cement fill up will be calculated from the well TD to a minimum of 100 feet up inside the 7" intermediate coal protection casing with 20% excess cement.

After 72 hours, a Cement Bond Log will be run from the 4½-inch production casing total depth to a minimum of 300 feet above the observed top of cement to verify the isolation of the formation.





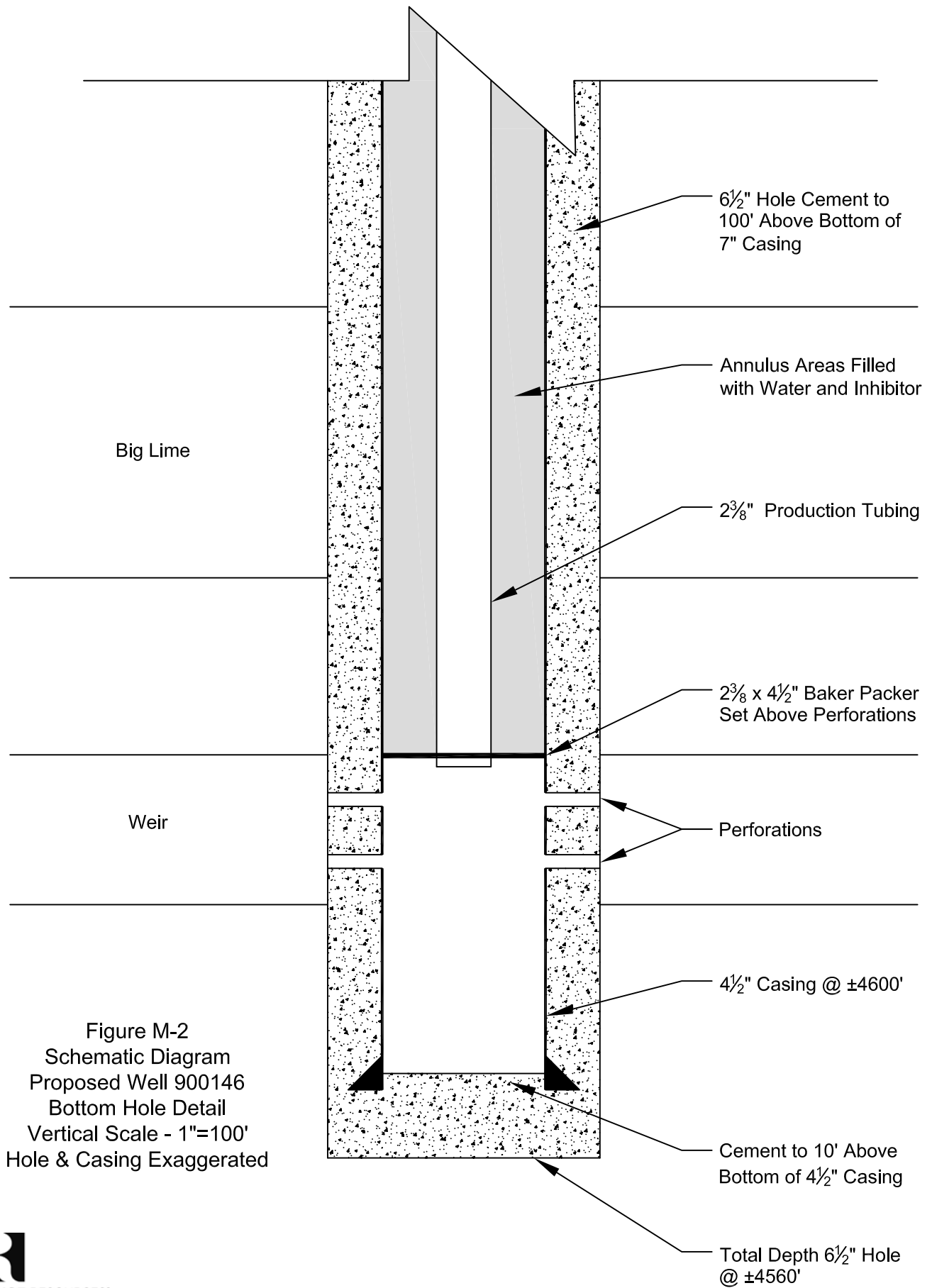


Figure M-2
Schematic Diagram
Proposed Well 900146
Bottom Hole Detail
Vertical Scale - 1"=100'
Hole & Casing Exaggerated

1.0 OPERATIONAL INFORMATION

Proposed UIC well 900146 will only accept treated produced fluids from EnerVest operations in Virginia. The proposed well will utilize existing treatment facilities associated with EnerVest existing permitted UIC VAS2D950BBUC as outlined in approved original permit.

2.0 FLOW RATES

The maximum injection fluid volume is 56,000 barrels per month for EnerVest existing UIC Permit VAS2D950BBUC. The maximum monthly injection fluid volume in the proposed UIC well 900146 will be determined after the well has been completed and tested.

3.0 INJECTION PRESSURES

The maximum injection pressure is 1,512 psig (80% of 1890 psig) for EnerVest's existing UIC Permit VAS2D950BBUC, which is located less than one mile from the proposed well. The maximum injection pressure for proposed UIC well 900146 will be determined once the well is completed. However, until such time that the well is completed and a maximum surface pressure can be calculated, any post completion injection work will not exceed 1,512 psig. The actual Pmax for fluid injection will be based on site specific completion data after the well is completed.

4.0 INJECTION FLUID

Produced fluids will be properly stored at EnerVest operated facilities in Virginia. At frequent intervals, an enclosed tank truck will remove and transport the collected fluids to the existing UIC well's treatment and injection system located at EnerVest UIC Permit VAS2D950BBUC. The treatment and well injection system is outlined in original approved permit. After the fluid is treated, it will then be pumped from the UIC Permit VAS2D950BBUC treatment facilities for injection into the planned UIC well 900146.

The proposed UIC well 900146 will only accept fluids produced from EnerVest operations located in Virginia. Since the fluids to be injected in the proposed well will utilize the same treatment facility as EnerVest's existing UIC well, the physical and chemical characteristics will be similar to what is currently being injected.

Sampling results for the existing UIC Permit VAS2D950BBUC over the past three years is summarized in Table 1.

All samples were collected and tested following set EPA standards:

- ☐ Sample was collected in first-use, certified clean sample containers with the required preservatives.
- ☐ The collected sample containers were labeled, chain-of-custody completed, placed in a cooler, maintained at 5°C, and hand-carried to the lab.



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Certificate of Analysis

Page: 1 of 2

Client Name: ENERVEST OPERATING, LLC
Address: 408 W MAIN STREET
ABINGDON, VA 24210
EMI No. 51776
Sample Identification: 3096.160 HAYSI 23606
Site Description: INJECTION WELL MONITORING

Report Date: 02/16/2023
Lab Sample No.: **1933461**
Client No.: 3096
EMI Project No.: 160
Date Received: 01/30/2023
Date Collected: 01/30/2023
Time Collected: 1142
Sample Matrix: AQ
Collected By: BAKER, BRANDON

Flow if Available (GPM): Depth if Available (Ft): Temp. if Available (C): 7.0 Analysis Package Code: BF4 Type of Sample: Grab

Case Narrative: The analysis of EMI sample number 1933461 was obtained under standard operating conditions unless otherwise indicated. For QA Flag descriptions see attachment.

Summary of Analytical Results

Method Parameter	Sample Result	Units	MDL	RL	Date Analyzed	Time Analyzed	Analyst
EPA 200.7 Rev 4.4 1994							
Barium, Total	1479	mg/l	0.100	3.00	2/2/2023	1358	AWM
Iron, Total	29.0	mg/l	0.800	5.00	2/2/2023	1358	AWM
Magnesium, Total	1480	mg/l	5.00	50.0	2/2/2023	1358	AWM
Manganese, Total	1.66 J	mg/l	0.500	5.00	2/2/2023	1358	AWM
Sodium, Total	28780	mg/l	7.40	50.0	2/2/2023	1358	AWM
SM 2320B-4c-2011							
Alkalinity	78.1	mg/l CaCO ₃	4.00	4.00	1/31/2023	855	THR
SM 2340 B-2011							
Hardness, Total (by Calculation)	26250	mg/l CaCO ₃	0.363	1.00	2/2/2023	1726	PGM
SM 2510B-2011							
Conductivity	212100	umhos/cm	1000	1000	1/31/2023	1007	KLM
SM 2540 C-2015							
Total Dissolved Solids	109765 DC SV	mg/l	25.0	25.0	1/31/2023	706	KLM
SM 2710 F-2011							
Specific Gravity (Not NELAP) (Not WV)	1.07				1/31/2023	1400	KBL
SM 4500 Cl B-2011							
Chloride	69978	mg/l	796	1000	2/2/2023	1156	KBL
SM 4500 S2-F-2011							
Sulfide	BDL	mg/l	1.37	2.00	2/2/2023	1435	THR
SM 4500-H+B-2011							
pH (Not NELAP) (Not WV)	6.30	STD			1/30/2023	1145	FLD



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Certificate of Analysis

02/16/2023

Page: 2 of 2

EMI No. 51776
Sample Identification: 3096.160 HAYSI 23606

Lab Sample No.: **1933461**

Summary of Analytical Results
Summary of Analytical Results - Continued

Method Parameter	Sample Result	Units	MDL	RL	Date Analyzed	Time Analyzed	Analyst
SM 4500-O G-2011							
Dissolved Oxygen (Not NELAP) (Not WV)	2.46	mg/l			1/30/2023	1142	FLD

END OF EMI SAMPLE NUMBER 1933461 CERTIFICATE

To the best of our knowledge and belief, the collection, preservation, and analysis of all parameters represented by this report have been determined to comply the requirements as specified in 40 CFR, Part 136 unless indicated otherwise. This report may not be reproduced except in full, without the written approval of the laboratory.



VA Laboratory ID#: 460038
WV Laboratory ID#: 105
KY Laboratory ID#: 98012
EPA Laboratory ID#: VA00010

The release of this report is authorized by: _____

R. J. Porter
Technical Director



2790 Whitten Road, Memphis, TN 38133
Main 901.213.2400 ° Fax 901.213.2440
www.waypointanalytical.com

25447

Environmental Monitoring Inc.
Ms. Missy Collins
5730 Industrial Park Road
Norton , VA 24273

Project Project #:3096.160

Information :

Report Date : 02/13/2023
Received : 02/03/2023

Connie Cook

Report Number : **23-034-0157**

REPORT OF ANALYSIS

Connie Cook
Project Manager

Lab No : **82666**
Sample ID : **1933461- Haysi**

Matrix: **Aqueous**
Sampled: **1/30/2023 11:42**

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Method
TOC	11.2	mg/L	10.0	10	02/11/23 09:18	CJD	5310C-2014

**Qualifiers/
Definitions**

DF

Dilution Factor

ML

Method Quantitation Limit



QA_FLAGS and Definitions

<u>CODE</u>	<u>DESCRIPTION</u>
AB	Analyte found in Method Blank
BDL	Below detection limit
BQ	Batch QC is outside acceptable range
DC	Duplicate did not meet method criteria; method process in control
EV	Estimated value; outside of calibration range
FC	Failure to comply with current SOP
FLD	Field Technician
HE	Parameter holding time has been exceeded
IV	Insufficient sample volume
J	Estimated value below Report Limit
MI	Matrix Interference - Final result may not be representative
MR	Multiple runs were used to determine the result (an Average)
MSF	Matrix Spike Failure - analyte concentration is disproportionate to spike level; method in control
NA	Result for this analyte is not available
P	Sample container not properly preserved
QR	Additional quality evaluation performed
R	Sample results rejected due to deficiencies in QC or method performance
SV	Volume indicated by method not used
T	Possible toxicity which is expected to influence reported value
XI	Matrix required alternate internal reference standard

This attachment is intended to complement the EMI Certificate of Analysis Package.

Current as of: 04/16/2021

SAMPLE LOG SHEET AND CHAIN OF CUSTODY
ENVIRONMENTAL MONITORING, INC
 5730 INDUSTRIAL PARK RD • NORTON VA 24273 • 216-679-6544

C089484



PROJECT: Enervest Injection Well Protect

ROUTE #: 3096.160 DATE SAMPLED: 1-30-23

SAMPLED BY: Brandon Baker EMP. ID # 3397

LAB NO.	EMINO.	SEQ #	SAMPLE LD.	NO. CONT	HNO	TIME	TEMP °C	3 PT pH CAL	pH TIME	Dop pH / Temp	7.6 RB	FIELD pH	D.O.	APF CODE	COLOR CODE	ANAL CODE	COMMENTS
1933460	51777	120.	CANE CREEK 535517	6	✓	10:44	8	-	10:48	-	-	6.0	4.04	1	B	BE3/ND	
461	51776	121.	HAYSI 23606	6	✓	11:42	7	-	11:45	6.3	7.1	6.3	2.46	1	B	BE3/ND	
462	51779	122.	P-143-T	6	✓	09:30	9	-	09:39	-	-	6.2	1.46	2	B	BE3/ND	
463	51778	123.	P-171	6	✓	08:44	8	✓	08:49	5.8	7.1	5.8	2.12	1	B	BE3/ND	D.O. DWP: 2.10

All samples requiring pH preservation were verified to be as indicated on COC by: MLJ
 Date: 1/30/23 Time: 1833

Bottle list:
 (1) 1/2 gallon plain
 (1) 16 oz. HNO3
 (1) 32 oz. NaOH / ZN ACE
 (3) 40 ML VOA'S H3PO4

* D.O. meter #1336 calibrated 1/30/23 by DWP

THIS ALSO HAS DISSOLVED OXYGEN, SO WILL NEED TO CALIBRATE METER MORING OF SAMPLING.

BIN # 23 EMI pH Meter # 1277

COOLER TEMP 4 CHECKED BY: BE3 Number of Containers this COC#: 24

Relinquished by: [Signature] Date: 1/30/23 Time: 13:31 Received by: Lab cooler

Relinquished by: JAG COOPER Date: 1/30/23 Time: 1831 Received by: [Signature]

APPEARANCE CODES
 1. Clear
 2. Slightly Turbid
 3. Moderately Turbid
 4. Very Turbid
 5. Visible Suspended Matter

COLOR CODES
 A. Natural
 B. Brown to Red
 C. Gray
 D. Black
 E. Other



ENVIRONMENTAL MONITORING, INCORPORATED
ENVIRONMENTAL CONSULTANTS ▲ ANALYTICAL LABORATORIES
5730 INDUSTRIAL PARK RD. ▲ NORTON, VIRGINIA 24273 ▲ 276/679-6544

Certificate of Analysis

Page: 1 of 1

Client Name: ENERVEST OPERATING, LLC
Address: 408 W MAIN STREET
ABINGDON, VA 24210

Report Date: 02/23/21
Lab Sample No.: **1855572**
Client No.: 3096
EMI Project No.: 160
Date Collected: 01/25/21
Time Collected: 910
Sample Matrix: AQ
Collected By: BAKER, BRANDON

Sample Identification: HAYSI 23606

Site Description: INJECTION WELL MONITORING

Parameter	Sample Result	Units	MDL	RL	Method	Date Analyzed	Time Analyzed	Analyst
Alkalinity	87.4	mg/l CaCO ₃	4.00	4.00	SM 2320B-4c-2011	1/28/2021	819	THR
Chloride	62980	mg/l	1000	1000	SM 4500 Cl B-2011	1/29/2021	1522	AWM
Conductivity	199700	umhos/cm	1000	1000	SM 2510B-2011	2/7/2021	1209	RSV
Dissolved Oxygen (Not NELAP)	1.21	mg/l			SM 4500-O G-2011	1/25/2021	910	FLD
Hardness, Total	23000	mg/l CaCO ₃	200	200	SM 2340 C-2011	1/27/2021	1308	AWM
pH (Not NELAP)	6.00	STD			SM 4500-H+B-2011	1/25/2021	910	FLD
Specific Gravity (Not NELAP)	1.06				SM 2710 F-2011	2/1/2021	1151	JLW
Sulfide	BDL	mg/l	1.00	1.00	SM 4500 S2-F-2011	1/28/2021	1457	THR
Total Dissolved Solids	89025 SV	mg/l	1.00	1.00	SM 2540 C-2011	1/27/2021	1515	THR
Barium, Total	1218	mg/l	0.100	3.00	EPA 200.7	2/3/2021	1255	AWM
Iron, Total	42.0	mg/l	0.080	0.500	EPA 200.7	1/26/2021	1813	AWM
Magnesium, Total	1260	mg/l	5.00	50.0	EPA 200.7	1/27/2021	1419	AWM
Manganese, Total	1.77	mg/l	0.050	0.500	EPA 200.7	1/26/2021	1813	AWM
Sodium, Total	26230	mg/l	7.40	50.0	EPA 200.7	1/27/2021	1419	AWM

To the best of our knowledge and belief, the collection, preservation, and analysis of all parameters represented by this report have been determined to comply the requirements as specified in 40 CFR, Part 136.
This report may not be reproduced except in full, without the written approval of the laboratory.



VA Laboratory ID#: 460038
WV Laboratory ID#: 105
KY Laboratory ID#: 98012
EPA Laboratory ID#: VA00010

The release of this report is authorized by: _____

R. J. Porter
Technical Director

Flow if Available (GPM):

Temp. if Available (C): 11.0

Depth if Available (Ft):

Analysis Package Code: BF3

PSCN

Rev-06-02-17p

Type of Sample: Grab

BDL = Below Detection Limit

FLD = Field Technician

MR = Multiple analytical runs were used for this result

IV = Flag indicates Insufficient Sample Volume

SV = Sample volume indicated by method not used

AB = Analyte found in Method Blank

MSF = Matrix Spike Failure - Method in Control

EV = Estimated Value: Outside of calibration range

J = Flag indicates estimated value below Report Limit

T = Results indicate possible toxicity which is expected to influence reported value.

NA = A result for this analyte is not available.

MI = Matrix Interference - Final result may not be representative.

BQ = Batch QC Outside Acceptable Range

HE = Parameter Hold Time Exceeded

FC = Failure to Comply Current SOP

R = Sample results rejected because of gross deficiencies in QC or method performance .

DC = Duplicate did not meet method criteria, method process in control

P = Sample was not properly preserved for this parameter.



1.0 INJECTION PROCEDURES

The production fluid treatment facility located at the UIC Class II-D well, Permit VAS2D950BBUC is designed to serve as a central produced fluid treatment facility, having the capacity to furnish treated produced fluids for injection in UIC Permit VAS2D950BBUC and proposed UIC Well 900146. The produced fluids to be injected into the wells will be transported to the treatment facility by both tank truck and fluid pipeline.

The injection procedures are graphically illustrated by Drawing-2. A review of the drawing will identify the following (minimum) injection procedures:

- ☐ Starting with the arrival of the tank truck and/or pipeline pumped fluids at the planned treatment facilities at UIC Permit VAS2D950BBUC, the collected produced fluids will be pumped from the tank truck or from the fluid pipeline to the primary holding/settling tanks. From the primary holding/settling tanks, the fluids will flow into two secondary settling/holding tanks. These four tanks will have a minimum capacity of 250 barrels (“bbl”) per tank. Should water volumes increase, two future secondary holding/settling tanks are proposed.
- ☐ By gravity, the fluid will flow from the primary settling/holding tanks to the secondary holding/settling tanks. From the secondary holding/settling tanks, the fluid is pumped through the treatment system and stored in the treated fluid storage tank.
- ☐ The treatment system will consist of in-line filters to remove suspended materials. After filtering, the fluids will be injected with an oxygen scavenger chemical, a biocide and a scale inhibitor before flowing to the treated fluid storage tank(s). MSDS sheets are located at the end of this section.
- ☐ A second treated fluid storage tank will be installed if necessary.
- ☐ From the treated fluid storage tank, the fluids will be pumped (proposed Pump B) into a suction fluid manifold and from the proposed suction manifold the fluid will be pumped in UIC Permit VAS2D950BBUC and/or proposed UIC well

900146 through the 2 ⅜-inch injection tubing by positive displacement pumps. The discharge of the injection pumps will be metered

to record the injection volumes. In addition, the fluid volume injected into proposed UIC well 900146 will be metered at the well site. Simultaneously, at the injection wellheads, the injection pressures on the 2 ⅜-inch injection tubing will be measured and recorded, the annulus pressures between the 2 ⅜-inch injection tubing and 4 ½-inch casing will be measured and recorded, and the annulus pressures between the 4 ½-inch and 7-inch casing will also be measured and recorded.

2.0 INJECTION FACILITIES

Drawing-2 provides a schematic which indicates equipment, pumps, storage tank capacities, pressure and volume monitoring, safety shut-down, and data recorders. Further, this drawing defines the interaction and connections between these various components of the treatment facility at UIC Permit VAS2D950BBUC.

The UIC Permit VAS2D950BBUC well site & injection facility is fenced in with a locked chain link security fence for site security. In addition a facility camera system is also installed and monitors the site continuously. The truck transfer valve is locked at all times except during authorized fluid transfer to the site. Warning lights are also located at the main gate and transfer site so that the transfer truck driver(s) and site operator know when the system is in an alarm condition and not available for operation without supervisory authorization.

The proposed pipeline to 900146 will have an automatic shut off valve also entirely within the UIC Permit VAS2D950BBUC well site and injection facility secure area. The 900146 well site and associated equipment will also be enclosed within a locked chain link security fence. An additional automatic pipeline shut off valve will also be located in the 900146 security site as an additional safety feature.

1.0 MONITORING PROGRAM

Drawing-2 provides a schematic layout of the proposed monitoring program for the receipt, treatment and injection of the produced fluid. A review of this monitoring program will, at a minimum, provide the following:

- ☐ Pump controls (low and high pressures) at treatment facility and proposed UIC well 900146 well head
- ☐ Flow metering
- ☐ Well casing and injection tubing pressure controls (low and high pressures) at proposed UIC well 900146
- ☐ Continuous recording at all pressure and flow monitoring points at proposed UIC well 900146 and UIC permit VAS2D950BBUC
- ☐ At a minimum, the pipeline will be visually inspected annually

2.0 MONITORING WELLS

No monitoring wells are proposed or planned in conjunction with this application for proposed UIC well 900146. However, the pressures between the 7-inch and 4 1/2-inch casings and 4 1/2-inch casing and 2 3/8-inch injection tubing at proposed UIC well 900146 will be continuously monitored, with pressure and injection flow recorded. Should a problem exist, these two areas should show an immediate pressure fluctuation, thus alerting ENERVEST OPERATING, LLC that a problem exists and corrective action is needed.

1.0 WELL FAILURES

The operation of the proposed UIC well 900146 will be continuously monitored by recording charts. This monitoring will consist of:

- ☐ Continuous pressure recordings of the area between the 7-inch and 4 ½-inch casings (fresh water and inhibitor area).
- ☐ Continuous pressure recordings of the area between the 4 ½-inch casing and 2 ¾-inch tubing (fresh water and inhibitor area).
- ☐ Continuous recordings of the injection pressure and flow.

This monitoring data will provide historical operation records for the well and should allow for detection of variances or failures within the well. Further, the well and the injection facilities will be equipped with fail-safe devices that will shutdown the operations for the lack of fluid, high pressure, and high flow.

Should failures or shut-ins happen, all injection operations will be stopped immediately. No additional fluid will be trucked and/or pumped to UIC well permit VAS2D950BBUC and the proposed UIC well 900146 sites. If the problem cannot be readily corrected or immediate danger exists that migration will occur, the following will be undertaken:

- ☐ Reduce and stabilize the fluid pressure in the well. Fluid may be returned to surface tanks for proper disposal at other permitted locations.
- ☐ With the fluid pressure stabilized, the well will be plugged as outlined by Attachment E.

2.0 MONITORING

The proposed UIC well 900146 pressures will be continuously monitored at three points and the injection fluid flows will be continuously monitored at two points. The pressures and flow rates will also be recorded.

The pressure points are:

- ☐ Injection pressure measured at the 2 3/8-inch injection tubing at the wellhead.
- ☐ The area (annulus) between the outside of the 2 3/8-inch injection tubing and the inside of the 4 1/2-inch casing. The pressure measurement point will be at the wellhead.
- ☐ The area (annulus) between the outside of the 4 1/2-inch casing and inside of the 7-inch casing. The pressure measurement point will be at the wellhead.

The injection fluid flow points are:

- ☐ The injection flow will be measured as the fluid is pumped from the treated fluid suction manifold through the pump and into the proposed pipeline. The measurement point is on the discharge side of the pump.
- ☐ The injection flow will also be measured as the fluid flows from the pipeline to the well's 2 3/8-inch injection tubing. The measurement point is at the wellhead.

As shown by Drawing-2, no relief valves will be used to control the well's operations. Pressure switches and flow meters will be used to control the injection at the well head and to monitor the well's injection activities and operations.

The following will occur at proposed UIC well 900146:

- ☐ If any abnormal pressure is recorded by pressure switch PC-6 (7-inch and 4 1/2-inch annulus), the control valve on the injection fluid pipeline will close and alarm. The injections will not re-start automatically but must be manually re-started after the problem is corrected.
- ☐ If any abnormal pressure is recorded by pressure switch PC-(7-inch and 4 1/2-inch annulus), the pipeline control valves will close and alarm. The system will not re-start automatically, but must be manually re-started after the problem is corrected.

- ☐ Pressure switch PC-6 monitors the pressures between the annulus of the 4 ½-inch casing and the 7-inch casing. This pressure switch will be set at 2 psig high pressure shutdown and -2 psig (vacuum) low pressure shutdown.
- ☐ Pressure switch PC-5 monitors the pressure between the annulus of the 2 ¾-inch injection tubing and the 4 ½-inch casing. This pressure switch will be set at 2 psig high pressure shutdown and for -2 psig (vacuum) low pressure shutdown.
- ☐ Pressure switch PC-4 and flow control switches FC-2 and FC-3 control the treated injection fluid pump (C-2) and the suction manifold pump (B-1). Pressure switch PC-4 will be set at the maximum allowable operating pressure (high pressure setting) to be determined.
- ☐ Pressure switch PC-4 and flow control switches (flow meter contacts) FC-2 & FC-3 will control the injection into proposed UIC Well 900146. Pressure switch PC-4 will be set at the maximum allowable operating pressure to be determined and flow control switch FC-2 & FC-3 will be set at the maximum daily injection flow.
- ☐ If the maximum allowable injection pressure is reached and recorded by pressure switch PC-4, the control valves on the injection pumps will close and alarm. A one-hour period will be programmed into pressure switch PC-4. If the maximum pressure has subsided to below the maximum allowable injection pressure, then the control valves will open and injection resumed. If the pressure has not subsided then the control valves will remain closed and no injection will occur. At this point, the problem will be corrected before injection resumes.
- ☐ If the maximum allowable daily injection volume or flow has occurred, flow switch FC-2 and FC-3 will close the control valves and alarm, with no further injection. Upon closing of the control valve, the system will be manually checked before pumping/injection is resumed.

If the injection fluid pressure reaches the maximum allowable injection pressure at the wellhead of proposed UIC well 900146, the high pressure shutdown will close the control valves and alarm. After one hour, if the wellhead pressure is less than maximum allowable injection pressure, the control valves will re-open and injection will resume. If after one hour, the wellhead pressure is still at the maximum allowable injection pressure, the system will not re-start automatically, but must be manually re-started after the problem is corrected. If at any time the injection flow reaches the maximum allowable injection rate, the proposed UIC well 900146 meters and the flow control switches (FC-2, or FC-3, or PC-4) will shut down the injection pump and alarm. The system will not re-start automatically, but must be manually re-started after the problem is corrected.

United States Environmental Protection Agency

**WELL REWORK RECORD, PLUGGING AND ABANDONMENT PLAN,
OR PLUGGING AND ABANDONMENT AFFIDAVIT**

Permittee Name and Address, Phone Number and/or Email

EnerVest Operating, LLC
809 Happy Valley Drive
Clintwood, VA 24228
276-926-1300/jlawson@enervest.net

Permit or EPA ID Number

VAS2D955BBUC

API Number

Full Well Name

900146 SWD

State

Virginia

County

Buchanan

Locate well in two directions from nearest lines of quarter section and drilling unit

Latitude 37 11 38 N

Surface Location

Longitude 82 12 15 W

1/4 of 1/4 of Section Township Range

ft. from (N/S) Line of quarter section

ft. from (E/W) Line of quarter section.

Well Class

Timing of Action (pick one)

Type of Action (pick one)

- ☐ Class I
☒ Class II
☐ Class III
☐ Class V

☒ Notice Prior to Work

Date Expected to Commence

☐ Report After Work

Date Work Ended

☐ Well Rework☒ Plugging and Abandonment☐ Conversion to a Non-Injection Well

Provide a narrative description of the work planned to be performed, or that was performed. Alternatively, attach a report that meets the requirements. Use additional pages as necessary. Please see the instructions for the specific information that must be provided.

See Original (attached)

Certification

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR § 144.32)

Authorized Signatory and Official Title (Please type or print)

Kevin Miller, VP-Land

Signature

Kevin J. Miller

Date Signed

12/04/2024

INSTRUCTIONS FOR FORM 7520-19

This form replaces forms 7520-12 and 7520-14. Use this form only when work is planned or has occurred that affects the well's construction or operation as an injection well, including work on the casing, tubing or packer (or for shallow Class V wells, the subsurface fluid emplacement network). Use one form per injection well. Note: operators closing Class V wells should use Form 7520-17.

PERMITTEE NAME, ADDRESS, PHONE AND/OR EMAIL: Enter the name and street address, city/town, state, and ZIP code of the permittee. Also provide an email address (if available) and/or a phone number.

PERMIT OR EPA ID NUMBER: Enter the well identification number or permit number assigned to the well by the EPA or the permitting authority.

API NUMBER: Enter the number assigned by the local jurisdiction (usually a State Oil and Gas Agency) using the American Petroleum Institute standard numbering system.

FULL WELL NAME: Enter the full name of the well or project.

Enter the **STATE** and **COUNTY** where the well is located. For States that do not have counties, use the name of that State's equivalent jurisdiction at a more local level.

WELL LOCATION: Fill in the complete township, range, and section to the nearest quarter-quarter section. A township is north or south of the baseline, and a range is east or west of the principal meridian (e.g., T12N, R34W). Also include the distance, in feet, from the nearest north or south line and nearest east or west line of the quarter-section. Also, enter the **latitude** and **longitude** of the well in decimal degrees, to five or six places if possible; be sure to include a negative sign for the longitude of a well in the Western Hemisphere and a negative sign for the latitude of a well in the Southern Hemisphere.

Enter the **WELL CLASS**, i.e., the class of injection well as defined in 40 CFR 144.6.

TIMING OF THE ACTION: Check **Notice prior to work** if the activity has not yet occurred (i.e., is planned). Check **Report after work** if the activity described has already occurred. As appropriate, include the date the activity is expected to start or the date the activity was completed. (Note this may not be available, e.g., for a plugging plan submitted with a permit application.)

TYPE OF ACTION: Check the appropriate box to describe the kind of activity being reported. Check **Well Rework** for work that was/will be performed on the well after it has already been in operation as an injection well. Check **Plugging and Abandonment** to report on plans for or descriptions of final closure/plugging after use as an injection well. Check **Conversion to a Non-Injection Well** if the well is to be converted to something other than an injection well.

Provide a **NARRATIVE DESCRIPTION** of the work planned to be performed, or that was performed. The narrative should include a description of the main procedures planned or that occurred during the work activity. A service company report, daily report, or similar document may be attached if it includes all the requested information and is clear and legible.

For well reworks, include the following information: The reason for the well rework; depths of activity; type of activity; changes to injection well configuration, well casing, or cement behind casing; any plug added to the well and its depth; any newly drilled interval and its depth; method(s) to demonstrate that the well has mechanical integrity (as applicable); and any deviations from the approved rework plan (as applicable).

For a well plugging plan, include the following information: Reason for the well plugging; number of plugs placed, and their depths; materials used as plugs (e.g., cast iron bridge plug, cement, cement retainer); method to set plugs; and wait-on-cement times, if any. Also provide one or more cost estimates from an independent firm in the business of plugging and abandoning wells to plug the well as described in the plan.

For well plugging affidavit, include the following information: Reason for the well plugging; the method of plug emplacement; a tabular description of casing and tubing after plugging (i.e., size, weight, depth to be put in the well/left in the well, and hole size); a tabular description of plugs placed (i.e., depth of each plug, hole size, amount of cement, slurry weight and volume, calculated and measured top of the plug, materials used as plugs (e.g., cast iron bridge plug, cement, cement retainer)); a tabular description of all open hole and/or perforated intervals and intervals where casing will be varied (if any); wait-on-cement times, if any; and any deviations from the approved plugging plan (if applicable).

For conversion to a non-injection well, include the following information: Depths of activity; type of activity; changes to injection well configuration, well casing, or cement behind casing; any plug added to the well and its depth; any newly drilled interval and its depth; depths of new perforations; and method(s) to demonstrate that the well has mechanical integrity (as applicable).

For all of the above activities, also include the following: a well sketch depicting the work, results of well tests/logging performed, service company tickets, and any other available information demonstrating how the work was/is to be performed. Also, specify whether depths are below ground surface, relative to Kelly bushing, etc.

CERTIFICATION: This form must be signed and dated by either: a responsible corporate officer for a corporation, by a general partner for a partnership, by the proprietor of a sole proprietorship, or by a principal executive or ranking elected official for a public agency. While reports or other information developed by contractors or service companies may be attached, this form must be signed by a responsible entity as described at 40 CFR 144.32.

PAPERWORK REDUCTION ACT NOTICE: The public reporting and recordkeeping burden for this collection of information is estimated to average between 6.0 and 7.9 hours per response, depending on the injection well class. Burden means the total time, effort, or financial resource expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal Agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to the collection of information; search data sources; complete and review the collection of information; and, transmit or otherwise disclose the information. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including the use of automated collection techniques to Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822), 1200 Pennsylvania Ave., NW., Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed forms to this address.

1.0 PLUGGING AND ABANDONMENT PLAN

The plugging and abandonment plan to be used to abandon proposed UIC well 900146 is illustrated by Figure Q-1 at the end of this attachment. A review of this schematic along with the following procedure outlines the plugging plan:

- ☐ Move in service rig and cement service company.
- ☐ Rig up cement service company and pump Class A cement down the injection tubing for Plug #1. Mix and pump enough cement to cover from injection perforations back to the bottom of tubing plus 100% excess to squeeze and shut off the formation perforations.
- ☐ Displace cement out the bottom of the injection tubing.
- ☐ Let cement set until adequate compressive strength has been obtained to allow completion of Plug #1.
- ☐ Release the packer and pull tubing and packer out of the hole. If injection tubing cannot be pulled, cut the tubing off just above the packer and pull the tubing. Run back in hole with tubing only.
- ☐ Using the tubing, finish Plug #1 by spotting 100 foot of Class A cement on top of the existing cement that was used to shut off the perforations.
- ☐ Using the tubing, fill the 4 ½-inch production casing with bentonite gel from top of Plug #1 to 100 foot below the top of the cement in the 4 ½ inch x 7 inch annulus as verified by the cement bond log. Pull the tubing out of the hole.
- ☐ Run in the hole with wireline tools and cut off the 4 ½-inch casing just above the top of the cement in the 4 ½-inch x 7 inch annulus. Pull the 4½-inch casing out of the hole.
- ☐ Run back in the hole with the 2 ¾-inch tubing to the top of the bentonite gel. Pump Class A cement for Plug #2 to fill the 4 ½-inch

casing from the top of the bentonite gel to the top of the cutoff 4 ½ inch casing and then from the top of the cutoff 4 ½ inch casing to 100 feet above the cutoff 4½-inch casing for a total minimum plug length of 200 feet.

- ☐ Pull the 2 ¾-inch tubing above the top of Plug #2 and fill the 7 inch casing with bentonite gel from the top of the cement plug to 120 feet below surface.
- ☐ Pull the tubing above the bentonite gel at 120 feet and fill the 7 inch casing from 120 feet to the surface with Class A cement for Plug #3.
- ☐ Install monument as per Virginia Division of Gas and Oil requirements on the top of the 7-inch casing.
- ☐ The cement to be used will be Class A or Type 1 cement. The fluid between the cement plugs will be 6% bentonite gel slurry.

2.0 PLUGGING AND ABANDONMENT FORM

The completed and signed Plugging and Abandonment Plan Form is presented at the end of this section. Following the Plugging and Abandonment Plan Form is Figure Q-1, a schematic of the proposed UIC well 900146 Plugging and Abandonment Plan.


 United States Environmental Protection Agency
 Washington, DC 20460

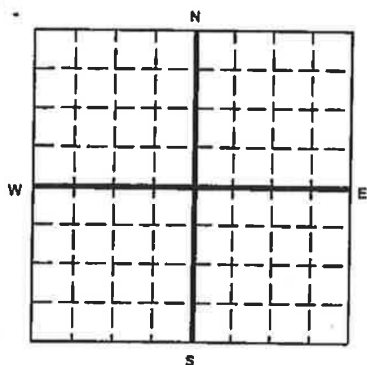
PLUGGING AND ABANDONMENT PLAN

Name and Address of Facility

 Class II-D Injection Well 900146
 Prater District, Buchanan County, VA

Name and Address of Owner/Operator

 EnerVest Operating, LLC
 300 Capitol Street, Suite 200, Charleston, WV 25301

**Locate Well and Outline Unit on
Section Plat - 640 Acres**

 State
 VA

 County
 Buchanan

Permit Number

Surface Location Description

1/4 of ____ 1/4 of ____ 1/4 of ____ 1/4 of ____ Section ____ Township ____ Range ____

Locate well in two directions from nearest lines of quarter section and drilling unit

Surface

 Location ____ ft. from (N/S) ____ Line of quarter section
 and ____ ft. from (E/W) ____ Line of quarter section.

TYPE OF AUTHORIZATION

- ☒ Individual Permit
☐ Area Permit
☐ Rule

 Number of Wells 1
WELL ACTIVITY

- ☐ CLASS I
☒ CLASS II
☒ Brine Disposal
☐ Enhanced Recovery
☐ Hydrocarbon Storage
☐ CLASS III

Lease Name W.C. Owens (Tr. 377.12ac)

Well Number 900146

CASING AND TUBING RECORD AFTER PLUGGING

SIZE	WT (LB/FT)	TO BE PUT IN WELL (FT)	TO BE LEFT IN WELL (FT)	HOLE SIZE
13.38	37	44	44	17 1/2
9.625	26	400	400	12 3/8
7.00	19	2350	2350	8 3/4
4.50	9.5	4600	2400	6 1/4

METHOD OF EMPLACEMENT OF CEMENT PLUGS

- ☒ The Balance Method
☐ The Dump Bailer Method
☐ The Two-Plug Method
☐ Other

CEMENTING TO PLUG AND ABANDON DATA:

	PLUG #1	PLUG #2	PLUG #3	PLUG #4	PLUG #5	PLUG #6	PLUG #7
Size of Hole or Pipe in which Plug Will Be Placed (Inches)	4.5	4.5 / 7	7.0				
Depth to Bottom of Tubing or Drill Pipe (ft)	4300	2300	120				
Sacks of Cement To Be Used (each plug)	23	27	23				
Slurry Volume To Be Pumped (cu. ft.)	27	32	27				
Calculated Top of Plug (ft.)	4200	2100	Surface				
Measured Top of Plug (if tagged ft.)	-----	-----	-----				
Slurry Wt. (Lb./Gal.)	15.6	15.6	15.6				
Type Cement or Other Material (Class III)	Class A	Class A	Class A				

LIST ALL OPEN HOLE AND/OR PERFORATED INTERVALS AND INTERVALS WHERE CASING WILL BE VARIED (if any)

From	To	From	To
4300	4400	Projected Weir	Perforated Interval

Estimated Cost to Plug Wells

\$35,000

Certification

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR 144.32)

Name and Official Title (Please type or print)

James McKinney, Senior VP & General Manager

Signature

Date Signed

1.0 PLUGGING AND ABANDONMENT PLAN

The plugging and abandonment plan to be used to abandon proposed UIC well 900146 is illustrated by Figure Q-1 at the end of this attachment. A review of this schematic along with the following procedure outlines the plugging plan:

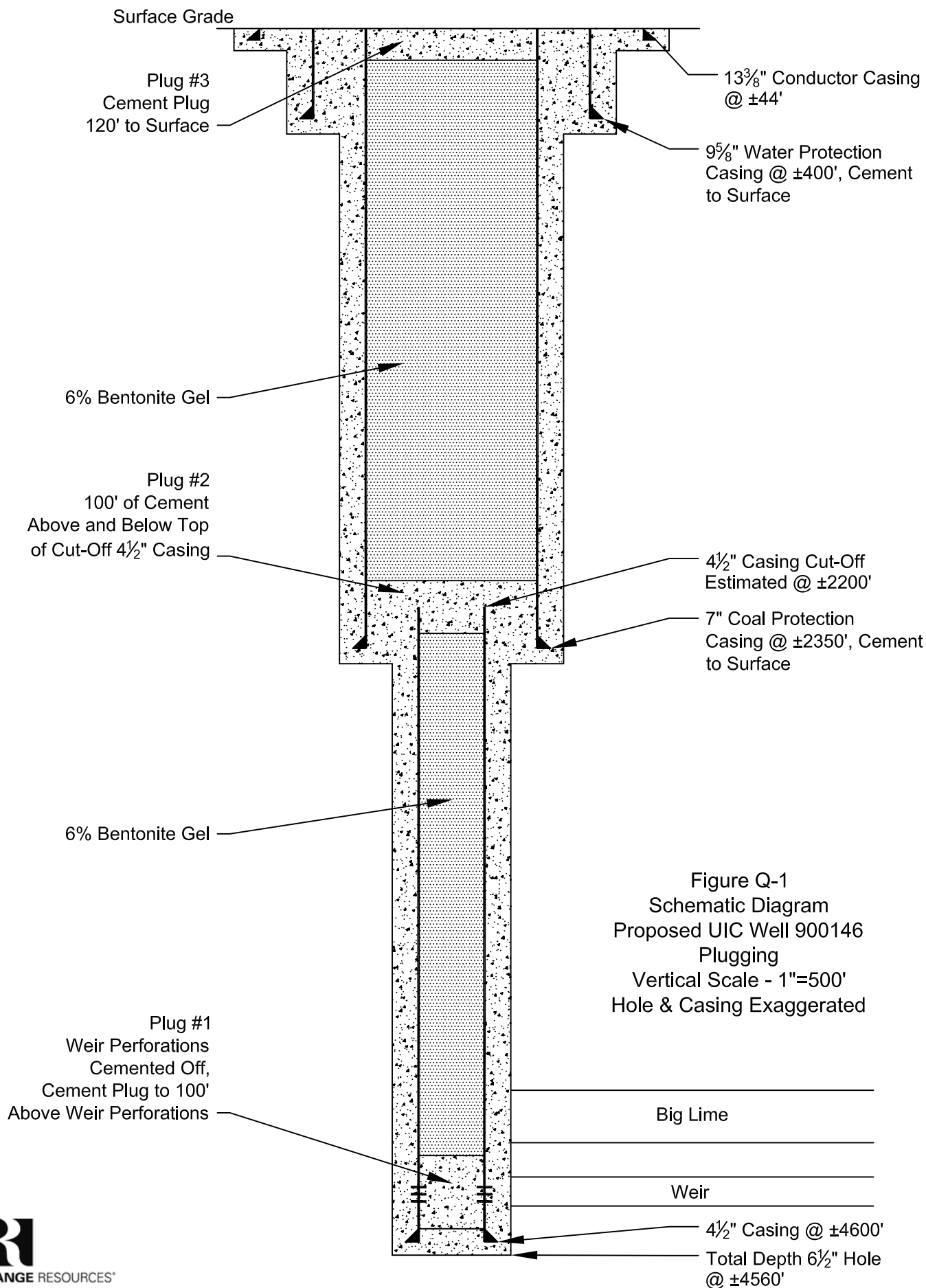
- ☐ Move in service rig and cement service company.
- ☐ Rig up cement service company and pump Class A cement down the injection tubing for Plug #1. Mix and pump enough cement to cover from injection perforations back to the bottom of tubing plus 100% excess to squeeze and shut off the formation perforations.
- ☐ Displace cement out the bottom of the injection tubing.
- ☐ Let cement set until adequate compressive strength has been obtained to allow completion of Plug #1.
- ☐ Release the packer and pull tubing and packer out of the hole. If injection tubing cannot be pulled, cut the tubing off just above the packer and pull the tubing. Run back in hole with tubing only.
- ☐ Using the tubing, finish Plug #1 by spotting 100 foot of Class A cement on top of the existing cement that was used to shut off the perforations.
- ☐ Using the tubing, fill the 4 ½-inch production casing with bentonite gel from top of Plug #1 to 100 foot below the top of the cement in the 4 ½ inch x 7 inch annulus as verified by the cement bond log. Pull the tubing out of the hole.
- ☐ Run in the hole with wireline tools and cut off the 4 ½-inch casing just above the top of the cement in the 4 ½-inch x 7 inch annulus. Pull the 4½-inch casing out of the hole.
- ☐ Run back in the hole with the 2 ⅜-inch tubing to the top of the bentonite gel. Pump Class A cement for Plug #2 to fill the 4 ½-inch

casing from the top of the bentonite gel to the top of the cutoff 4 ½ inch casing and then from the top of the cutoff 4 ½ inch casing to 100 feet above the cutoff 4½-inch casing for a total minimum plug length of 200 feet.

- ☐ Pull the 2 ¾-inch tubing above the top of Plug #2 and fill the 7 inch casing with bentonite gel from the top of the cement plug to 120 feet below surface.
- ☐ Pull the tubing above the bentonite gel at 120 feet and fill the 7 inch casing from 120 feet to the surface with Class A cement for Plug #3.
- ☐ Install monument as per Virginia Division of Gas and Oil requirements on the top of the 7-inch casing.
- ☐ The cement to be used will be Class A or Type 1 cement. The fluid between the cement plugs will be 6% bentonite gel slurry.

2.0 PLUGGING AND ABANDONMENT FORM

The completed and signed Plugging and Abandonment Plan Form is presented at the end of this section. Following the Plugging and Abandonment Plan Form is Figure Q-1, a schematic of the proposed UIC well 900146 Plugging and Abandonment Plan.





EAGLE WELL SERVICE INC

SALYERSVILLE, KY

CONTACT

Eagle Well Service Inc
PO Box 1666
Salysersville, KY 41465
(606) 349-4141

August 24, 2023

Mr. Landon,

Eagle Well Service Inc, would like to submit the following bid to plug Enervest Operating's salt water disposal well in VA for a turnkey price of **\$96,500.00**

This turnkey bid will include:

Rig time and labor

- Up to 8 days total to include rig time and labor along with power swivel, mills, and mud pump

Cementing services – cement mixing and pumping equipment

Cement – Class A (Class L) with 2% gel and 2% CaCl

Wireline services – including Cast Iron Bridge plug, perforating and casing cutting as listed in plugging procedure.

All hauling to and from location and well fluid disposal

All labor per deim and lodging

If changes to the plugging procedure are made, this bid will be adjusted accordingly. If you should have any questions, please do not hesitate to call. Thank you for this opportunity to quote this job for you!

Sincerely,
Brent Wright
Eagle Well Service Inc.
Cell: (740) 502-6171

1.0 SURETY BOND

EnerVest has provided information to EPA Region 3 on the current surety bond for previous injection wells.

The surety is active and renewed annually with the third party insurer

1.0 EXISTING U.S. EPA PERMITS

EnerVest operates six existing UIC wells, recently plugging VAS2D927BDIC, and has permits for two undrilled UIC wells (Table I-1) in Dickenson County and Buchanan County, Virginia.

Table I-1. Existing EPA Permits

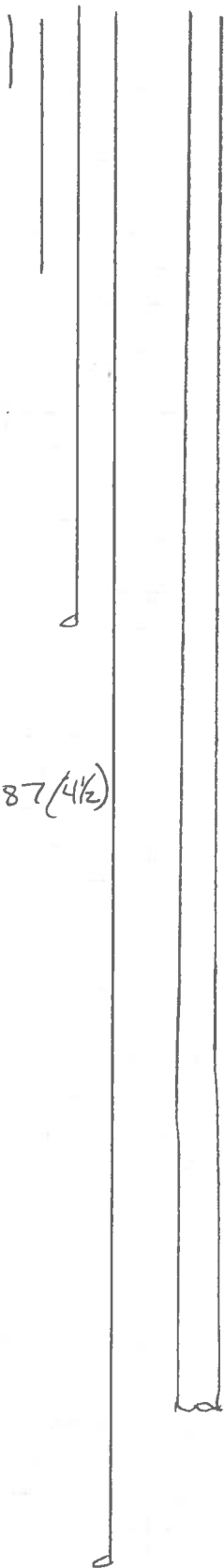
UIC Wells		
NORA		
State File #	Operation Name	EPA #
DI-0192	P-750132 WD	VAS2D947BDIC
DI-0203	P-143 (750143)	VAS2D907BDIC
DI-0220	P-148 (PLUGGED)	VAS2D927BDIC
DI-0230	P-750171 WD	VAS2D937BDIC
DI-0249	P-750205 WD	VAS2D957BDIC
DI-1144	VWD-535517	VAS2D932BDIC
not drilled	VWD-539572	VAS2D697BDIC
HAYSI		
BU-1614	23606 w/PL	VAS2D950BBUC
not drilled	900146	VAS2D955BBUC

1.0 DESCRIPTION OF BUSINESS

EnerVest (www.EnerVest.net) is a private oil and gas company with 10,000 wells across 4 states, 1.5 million acres under lease and \$3 billion in assets under management. Operational Fund XIV owns proved reserves of 6.5 TCF and operations in Appalachia and the Southwestern United States. The December 2015 purchase of Range Resources – Pine Mountain included the operations in the southern Appalachian Basin. EnerVest now owns or has leased the oil, gas and coal bed methane on approximately 350,000 acres in Virginia and produces gas from Pennsylvania age coal seams, as well as deeper formations, including the Devonian Shale, Berea, Weir and Mississippian Big Lime. EnerVest currently operates approximately 3,500 wells in Virginia and plans to drill several hundred additional wells in the next 5 years. Along with coal bed methane and the deeper formation gas production, produced fluid is also extracted. It is these produced fluids that EnerVest will dispose of in the renewed Class II-D disposal well.

WELL # 809587

DATE: 9/25/12



13 3/8" 48# @ 70' cmt to surf

11 3/4" 42# @ 180' cmt to surf

8 5/8" 24# @ 1919' cmt to surf

R/L Nipple @ 3687 (4 1/2')

"CHURCH WELL" - Church built so close to wellhead that no a rig will be a real problem.

2 3/8" 4.6# tbg @ 4440' 8" J-55

4428' - 4435' (8h) 22,000# 10/20 sand, 37,758 gal water

4 1/2" esg 11.6# J-55 @ 4490' cmt top @ 4130'



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Drawer 159, Lebanon, VA 24266
Telephone: (276) 415-9650

Tracking Number: 2997
Company: Range Resources-Pine Mountain
File Number: BU-1380
Completion Report Type: Drill Deeper Recompletion

COMPLETION REPORT (DGO-GO-15)

Well Type: Gas/Pipeline	Date Well Completed: 3/15/2011
Driller's Total Depth:	Log's Total Depth:

1. Changes In Casing/Tubing from Approved Drilling Report

Description	FileName
821619 casing	Casing.xls

2. Stimulation Record

Stimulation Status: ☒ Stimulated ☐ GOB ☐ Not Stimulated ☐ Service Well

Description	FileName
821619 stimulation	Frac Report 821619.pdf

3. Final Production

Description	FileName
821619 final production	Final_Prod.xls

4. Comments

Notes:

5. Signature

Permittee: Range Resources-Pine Mountain Date: 7/26/2011 (Company)

By: Jonathan Horne Title: Engineering Tech (Signature)

INTERNAL USE ONLY

Submit Date: 7/26/2011

Status: Approved

Date: 3/5/2012

Final PDF Date: 3/6/2012

Casing Program

	Casing	Casing	Hole	Cement Used	Cemented To Surface	Date
Casing Type	Size	Interval	Size	In Cubic Ft.	Yes/No	Cemented
Conductor	13 ³ / ₈ "	0-45'	15"			
Water Protection	9 ⁵ / ₈ "	0-406'	12 ¹ / ₄ "			
Coal Protection	7"	0-2443'	8 ⁷ / ₈ "			
Production Casing	4 ¹ / ₂ "	0-6126'	6 ¹ / ₄ "	250 ft ³	No	08/17/10
Other Casing And Tubing Left In Well	2 ³ / ₈ "	0-6118'				
Liners						

Completion Report

3/15/2011 4:32:56 PM

105000089 2 821619

Stage 1

Stage Date	3/15/2011	Service Co	Baker Hughes	Avg DH Rate	10.5	
Perf Date	3/15/2011	Fluid Type	60Q Foam	Max DH Rate	11.5	
Logging Co.	Gray Wireline	BD	2774	Total Slurry Volume	298	BBLs
Formation	Maxton	ISIP	0	Total Fluid Volume	240	BBLs
Top Perf	3323	Avg Press	3441	Avg N2 Rate	6,700	
Bottom Perf	3365	Max Treat Pressure	3499	Max N2 Rate	6,900	scfm
#Shots	23	Final ISIP	1639	Total N2 Volume	340,214	scf
Perf Size	0.52	2 Min SIP	1496	Max DH PPA	3.0	
Perf Comments		5 Min SIP	1466	Total Proppant Sks	248	sks
		10 Min SIP	0	Total Acid	750	Gal
		Comments	WHP before stim - 57 psi. Stage was very hard to break. Very tight formation, could only get max of 11.5 bbl/min @ 60Q foam. Ran extra acid @ break/rate sensitive. On pad @ 65Q pressure would climb close to MAX psi. Overall good frac. RBP/BP Depth - 3480'.			

Summary Total for All Stages

Number of Stages	Total Slurry	Total Fluid Volume	Total N2 Volume	Total Proppant	Total Acid
1	298	240	340,214	248	750

Final Production After Stimulation				
	BOD	MCFD	Hours Tested	Rock Pressure
Zone 1				
Zone 2				
Zone 3				
Final/Commingled Zones		133	3	



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Drawer 159, Lebanon, VA 24266
Telephone: (276) 415-9650

Tracking Number: 4282
Company: Range Resources-Pine Mountain
File Number: BU-1380
Completion Report Type: Original

COMPLETION REPORT (DGO-GO-15)

Well Type:	<u>Gas/Pipeline</u>	Date Well Completed:	<u>1/11/2002</u>
Driller's Total Depth:	<u>6118.00</u>	Log's Total Depth:	<u>0.00</u>

1. Changes In Casing/Tubing from Approved Drilling Report

Description	FileName
-------------	----------

2. Stimulation Record

Stimulation Status: ☒ Stimulated ☐ GOB ☐ Not Stimulated ☐ Service Well

Description	FileName
STIM	BU-1380 stim.pdf
STIM	BU-1380 stim_0830201308103700.pdf

3. Final Production

Description	FileName
FINAL	BU-1380 stim.pdf
FINAL	BU-1380 stim_0830201308103700.pdf

4. Comments

Notes:

Inserted by DGO [8/29/2013, jhh]

5. Signature

Permittee: Range Resources-Pine Mountain _____ Date: 8/30/2013 _____ (Company)

By: CNR _____ Title: ***** _____ (Signature)

INTERNAL USE ONLY

Submit Date: 8/30/2013 _____

Status: Approved _____

Date: 11/18/2013 _____

Final PDF Date: 11/18/2013 _____



Commonwealth of Virginia
Department of Mines, Minerals and Energy
Division of Gas and Oil
P.O. Box 1416; Abingdon, VA 24212
Telephone: (540) 676-5423

Handwritten: 5/6/02
BU-1380

Operations Name: Columbia Natural Resources Well #21619
Permit Number: #3808

COMPLETION REPORT

Well type: ☐ Oil ☒ Gas ☐ Coalbed Methane ☐ Injection Well

Date Well Completed: 1/11/02 Total Depth: LTD - 6118' KB

STIMULATION RECORD (Use additional sheets with this format, if more than three zones are stimulated.)

ZONE 1: Weir Sand Formation Stimulated With: Foam and Sand
Perforated 4290' to 4374' No. of Perforations 27 Perforation Size 0.38"
Formation Broke down at: 1328 PSIG Average Injection Rate: 30 BPM
ISIP 1140 (PSIG) 5 MIN SIP. 1057 (PSIG) Average Injection Pressure 1350 (PSIG)
Stimulated: ☒ Yes ☐ No Date Stimulated: 11/3/2001

ZONE 2: Big Lime Formation Stimulated With: Foam and Acid
Perforated 3988' to 3993' No. of Perforations 11 Perforation Size 0.38"
Formation Broke down at: 2367 PSIG Average Injection Rate: 7.5 BPM
ISIP 1451 (PSIG) 5 MIN SIP. 1382 (PSIG) Average Injection Pressure 1470 (PSIG)
Stimulated: ☒ Yes ☐ No Date Stimulated: 11/3/2001

Well was worked over and all plugs drilled out following completion of workover operations. Shale and berea production were maintained.

FINAL PRODUCTION: _____ Natural X After Stimulation

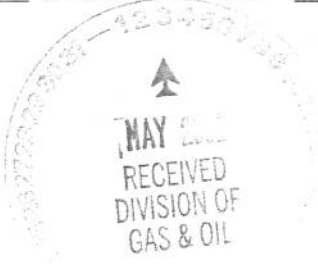
	BOD	MCFD	HOURS TESTED	ROCK PRESSURE	HOURS TESTED
ZONE 1, 2	0	353	6	550	72

Permittee: Columbia Natural Resources, Inc.

(Company)

By: *[Signature]*

(Signature) Date: 4/25/02



ENTERED

Department of Mines, Minerals and Energy
Division of Gas and Oil
P. O. Box 1416
Abingdon, Virginia 24210
703/676-5423

COMPLETION REPORT



WELL TYPE: Oil ☐ Gas ☒ Coalbed Methane ☐ or Injection ☐ well.

Date Well Completed: 10/10/98 Total Depth of Well: 6118 (LTD)

Attach the Drilling Report, if not previously submitted. In addition, submit any changes in casing or tubing that were appr. After the Drilling Report was submitted.

STIMULATION RECORD

Zone 1: Devonian Shale Formation Stimulated With: 250 gal 7 1/2% Fe HCl 1,511,000 SCF of Nitrogen

Perforated: 5560 to 5838 No. of Perforations: 17 Perforation Size: 0.44"
Formation Broke down at: 2585 PSIG Average Injection Rate: 70,525 SCF/M BPM
ISIP 2156 PSIG 5 MIN SIP 2128 PSIG Average Injection Pressure: 3610 PSIG
Date Stimulated: 08/31/98

Zone 2: Berea Formation Stimulated With: 500 gal 7 1/2% Fe HCl, 90/85/75 Quality Foam 110 Bbl
Clean Fluid; 43,400 lbs 20/40 sand; 342,400 scf nitrogen

Perforated: 4840' to 5126' No. of Perforations: 19 Perforation Size: 0.44"
Formation Broke Down at: 2100 PSIG Average Injection Rate: 35 BPM Foam Rate BPM
ISIP 1695 PSIG 5 MIN SIP 1433 PSIG Average Injection Pressure: 2365 PSIG
Date stimulated: 10/05/98

Zone 3: N/A Formation Stimulated With: _____

Perforated: _____ to _____ No. of Perforations: _____ Perforation Size: _____
Formation Broke Down at: _____ PSIG Average Injection Rate: _____ BPM
ISIP _____ PSIG _____ MIN SIP _____ PSIG Average Injection Pressure: _____ PSIG
Date stimulated: _____

FINAL PRODUCTION:	Natural	☒ After Stimulation			
	BOD	MCFD	HOURS TESTED	ROCK PRESSURE	HOURS TESTED
Zone (1) <u>Devonian Shale</u>		<u>176</u>	<u>72</u>	<u>820</u>	<u>120</u>
Zone (2) <u>Berea</u>		<u>110</u>	<u>48</u>	<u>605</u>	<u>72</u>
Zone (3) _____					

Final Production if Gas Zones are Comingled 286 MCFD 48 Hours Tested 605 PSIG 72 Hours Tested

*Use additional sheets with this format, if more than three (3) zones were stimulated.

Permittee: Columbia Natural Resources, Inc. (Company)

By: Jason E. Studham (Signature)



Commonwealth of Virginia
Department of Mines, Minerals and Energy
Division of Gas and Oil
P.O. Box 1416; Abingdon, VA 24212
Telephone: (540) 676-5423

Handwritten: 5/6/02
BU-1380

Operations Name: Columbia Natural Resources Well #21619
Permit Number: #3808

COMPLETION REPORT

Well type: ☐ Oil ☒ Gas ☐ Coalbed Methane ☐ Injection Well

Date Well Completed: 1/11/02 Total Depth: LTD - 6118' KB

STIMULATION RECORD (Use additional sheets with this format, if more than three zones are stimulated.)

ZONE 1: Weir Sand Formation Stimulated With: Foam and Sand
Perforated 4290' to 4374' No. of Perforations 27 Perforation Size 0.38"
Formation Broke down at: 1328 PSIG Average Injection Rate: 30 BPM
ISIP 1140 (PSIG) 5 MIN SIP. 1057 (PSIG) Average Injection Pressure 1350 (PSIG)
Stimulated: ☒ Yes ☐ No Date Stimulated: 11/3/2001

ZONE 2: Big Lime Formation Stimulated With: Foam and Acid
Perforated 3988' to 3993' No. of Perforations 11 Perforation Size 0.38"
Formation Broke down at: 2367 PSIG Average Injection Rate: 7.5 BPM
ISIP 1451 (PSIG) 5 MIN SIP. 1382 (PSIG) Average Injection Pressure 1470 (PSIG)
Stimulated: ☒ Yes ☐ No Date Stimulated: 11/3/2001

Well was worked over and all plugs drilled out following completion of workover operations. Shale and berea production were maintained.

FINAL PRODUCTION: _____ Natural X After Stimulation

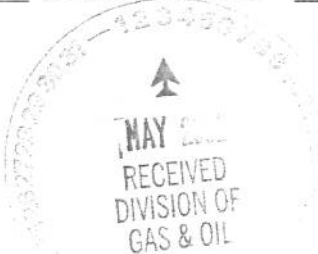
	BOD	MCFD	HOURS TESTED	ROCK PRESSURE	HOURS TESTED
ZONE 1, 2	0	353	6	550	72

Permittee: Columbia Natural Resources, Inc.

(Company)

By: *[Signature]*

(Signature) Date: 4/25/02



ENTERED

Department of Mines, Minerals and Energy
Division of Gas and Oil
P. O. Box 1416
Abingdon, Virginia 24210
703/676-5423

COMPLETION REPORT



WELL TYPE: Oil ☐ Gas ☒ Coalbed Methane ☐ or Injection ☐ well.

Date Well Completed: 10/10/98 Total Depth of Well: 6118 (LTD)

Attach the Drilling Report, if not previously submitted. In addition, submit any changes in casing or tubing that were appr. After the Drilling Report was submitted.

STIMULATION RECORD

Zone 1: Devonian Shale Formation Stimulated With: 250 gal 7 1/2% Fe HCl 1,511,000 SCF of Nitrogen

Perforated: 5560 to 5838 No. of Perforations: 17 Perforation Size: 0.44"
Formation Broke down at: 2585 PSIG Average Injection Rate: 70,525 SCF/M BPM
ISIP 2156 PSIG 5 MIN SIP 2128 PSIG Average Injection Pressure: 3610 PSIG
Date Stimulated: 08/31/98

Zone 2: Berea Formation Stimulated With: 500 gal 7 1/2% Fe HCl, 90/85/75 Quality Foam 110 Bbl
Clean Fluid; 43,400 lbs 20/40 sand; 342,400 scf nitrogen

Perforated: 4840' to 5126' No. of Perforations: 19 Perforation Size: 0.44"
Formation Broke Down at: 2100 PSIG Average Injection Rate: 35 BPM Foam Rate BPM
ISIP 1695 PSIG 5 MIN SIP 1433 PSIG Average Injection Pressure: 2365 PSIG
Date stimulated: 10/05/98

Zone 3: N/A Formation Stimulated With: _____

Perforated: _____ to _____ No. of Perforations: _____ Perforation Size: _____
Formation Broke Down at: _____ PSIG Average Injection Rate: _____ BPM
ISIP _____ PSIG _____ MIN SIP _____ PSIG Average Injection Pressure: _____ PSIG
Date stimulated: _____

FINAL PRODUCTION: ☐ Natural ☒ After Stimulation

	BOD	MCFD	HOURS TESTED	ROCK PRESSURE	HOURS TESTED
Zone (1) <u>Devonian Shale</u>		<u>176</u>	<u>72</u>	<u>820</u>	<u>120</u>
Zone (2) <u>Berea</u>		<u>110</u>	<u>48</u>	<u>605</u>	<u>72</u>
Zone (3) _____					

Final Production if Gas Zones are Comingled 286 MCFD 48 Hours Tested 605 PSIG 72 Hours Tested

*Use additional sheets with this format, if more than three (3) zones were stimulated.

Permittee: Columbia Natural Resources, Inc. (Company)

By: Jason E. Studham (Signature)



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Drawer 159, Lebanon, VA 24266
Telephone: (276) 415-9700

Tracking Number:	4276
Company:	Range Resources-Pine Mountain
File Number:	BU-1380
Operations Name:	21619 W/PL
Operation Type:	Gas/Pipeline
Drilling Report Type:	Original

DRILLING REPORT (DGO-GO-14)

1. Drilling Data

Date drilling commenced:	<u>7/27/1998</u>	Drilling Contractor:	<u>S W Jack Drilling Co.</u>
Date drilling completed:	<u>8/7/1998</u>	Rig Type:	<u>R</u> Rotary <u>E</u> Cable
Driller's Total Depth (feet):	<u>6118.00</u>		
Log Total Depth (feet):	<u>0.00</u>	Formation At Total Depth	<u>Weir</u>

2. Final Location Plat (as required by 4 VAC25-150-360.C.)

Permitted State Plane X:	<u>10398886.0000</u>	Final Plat State Plane X:	<u>10398885.8650</u>
Permitted State Plane Y:	<u>3618804.7100</u>	Final Plat State Plane Y:	<u>3618804.7190</u>

Plat Previously Submitted Or... E

List of Attached Items:

Description	FileName
PLAT	BU-1380 plat.pdf

3. Geological Data

Fresh Water At:

Depth (in feet)	Rate	Unit of Measure
68	1	GPM

Salt Water At:

Depth (in feet)	Rate	Unit of Measure
1530	1	GPM

Coal Seams:

List of Attached Items:

Description	FileName
COAL	BU-1380 coal-gs.pdf

Gas and Oil Shows:

List of Attached Items:

Description	FileName
GAS	BU-1380 coal-gs.pdf
GAS	BU-1380 gs.pdf

4. Electric Logs (As required by 4VAC25-150-280.A)

List all logs run: GR/IND/DEN/NEU/PHOTO/TEMP/AUDIO

Did logs disclose vertical locations of a coal seam? R

5. Survey Results (As required by 4VAC25-150-280.B.2)

List of Attached Items:

Description	FileName
SURVEY	BU-1380 casing-survey.pdf

6. Casing and Tubing Program

List of Attached Items:

Description	FileName
CASING	BU-1380 casing-survey.pdf
CASING	BU-1380 casing.pdf

7. Remarks

Use this space to note any conditions or occurrences, such as lost circulation, fishing jobs, junk left in hole, sidetracks, squeeze jobs, etc., not shown above. Include data and depth of condition/occurrence.

8. Drillers Log

Compiled By: _____

List of Attached Items:

Description	FileName
LOG	BU-1380 log.pdf

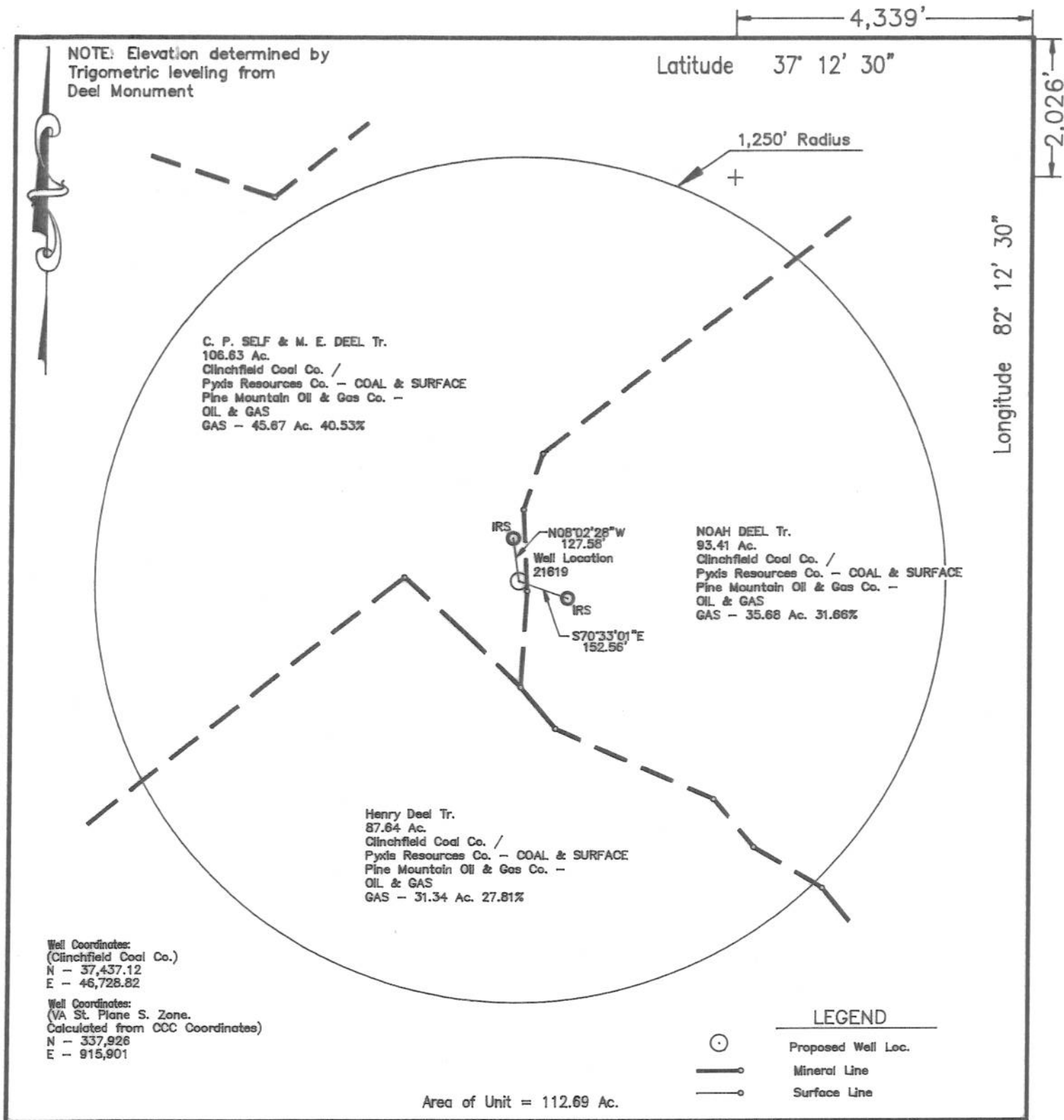
9. Comments

Inserted by DGO [8/29/2013, jhh]

10. Signature

Permitee: Range Resources-Pine Mountain Date: 8/30/2013
Signed By: CNR Title: *****

INTERNAL USE ONLYSubmit Date: 8/30/2013Status: ADate: 11/18/2013Final PDF Date: 11/18/2013



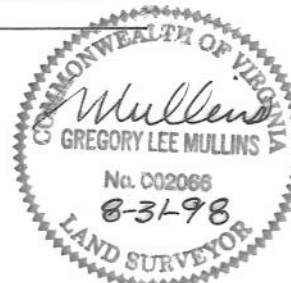
WELL LOCATION PLAT

COMPANY Columbia Natural Resources, Inc. WELL NAME AND NUMBER 21619
TRACT NO. C. P. Self & M. E. Deel ELEVATION 1881.33 QUADRANGLE Prater
COUNTY Buchanan DISTRICT Prater SCALE 1" = 400' DATE 08-31-98

This Plat is a new plat ; an updated plat ; or a final location plat X

+ Denotes the location of a well on United States topographic Maps, scale 1 to 24,000, latitude and longitude lines being represented by border lines as shown.

Greg Mullens
Licensed Land Surveyor



Bu-1380

Department of Mines, Minerals and Energy
Division of Gas and Oil
P. O. Box 1416
Abingdon, Virginia 24210
703/676-5423

ENTERED

DRILLING REPORT

Pursuant to VR-480-05-22.1, Section 1.36, the undersigned Permittee submits this report on Well 21619 in the Prater District of the Buchanan City/County, Virginia on the 22nd day of December, 1998.

LOCATION

City/County: Buchanan District: Prater
Surface Elevation: 1880.57 Elevation of Kelly Bushing: 1890.57 Quadrangle: Prater
2026 Ft. S. of Latitude 37 deg 12' 30" and 4339 Ft. W. of Longitude 82 deg 12' 30"
or, State Plans Coordinates: N-337,926 and E-915,901.

Attach a final location plat as required by VR 480-05-22.1, Section 1.36.

DRILLING DATA

Date Drilling Commenced: 07/27/98 Drilling Contractor: S W Jack Drilling Company Rig
Date Drilling Completed: 08/07/98 Rig Type: X Rotary Cable Tool
Total Depth of Well: 6118'

GEOLOGICAL DATA

Fresh Water at: 68 Feet 1 GPM Feet GPM
 Feet GPM Feet GPM
 Feet GPM Feet GPM

Salt Water at: 1530 Feet 1 GPM Feet GPM
 Feet GPM Feet GPM
 Feet GPM Feet GPM

COAL SEAMS:

NAME:	TOP	BOTTOM	THICKNESS	MINING IN AREA		
				YES	NO	MINED OUT
Unknown	802'	804'	2'		X	X

GAS AND OIL SHOWS:

FORMATION	TOP	BOTTOM	THICKNESS	IPF (MCFD/BOPD)	PRESSURE	HOURS TESTED
Big Lime	3716'	4190'	474	210	Atmosphere	N/A

Bu-1380

Department of Mines, Minerals and Energy
Division of Gas and Oil
P. O. Box 1416
Abingdon, Virginia 24210
703/676-5423

ENTERED

DRILLING REPORT

Pursuant to VR-480-05-22.1, Section 1.36, the undersigned Permittee submits this report on Well 21619 in the Prater District of the Buchanan City/County, Virginia on the 22nd day of December, 1998.

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Surface Elevation: 1880.57 Elevation of Kelly Bushing: 1890.57 Quadrangle: Prater
2026 Ft. S. of Latitude 37 deg 12' 30" and 4339 Ft. W. of Longitude 82 deg 12' 30"
or, State Plans Coordinates: N-337,926 and E-915,901.

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 Feet GPM Feet GPM
 Feet GPM Feet GPM

Salt Water at: 1530 Feet 1 GPM Feet GPM
 Feet GPM Feet GPM
 Feet GPM Feet GPM

COAL SEAMS:

NAME:	TOP	BOTTOM	THICKNESS	MINING IN AREA		
				YES	NO	MINED OUT
Unknown	802'	804'	2'		X	X

GAS AND OIL SHOWS:

FORMATION	TOP	BOTTOM	THICKNESS	IPF (MCFD/BOPD)	PRESSURE	HOURS TESTED
Big Lime	3716'	4190'	474	210	Atmosphere	N/A

VOLUME FACTOR DATA

WELL NO. 821619

COMPLETED/WORKED OVER Completed

TWP/DIST County Common 1 Frater CO. Buchanan ST. Virginia

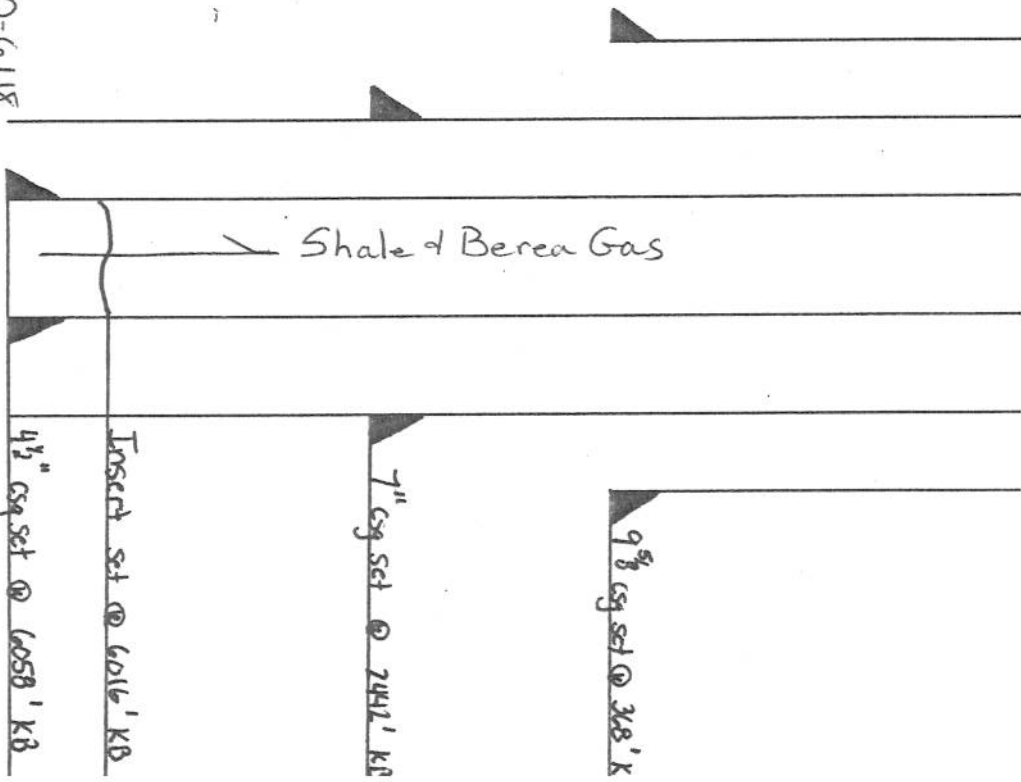
OBTAINED FROM: WELL LOG SUMMARY ☒ OTHER ☐

PIPE SIZE	FEET	WEIGHT
9 5/8"	<u>358</u> '	<u>32.3</u> #
<u>7</u> "	<u>2432</u> '	<u>20</u> #
4 1/2"	<u>6048</u> '	<u>10.5</u> #
"	'	#
2 3/8"	'	#
"	'	#
PACKER	'	
BIT SIZE	<u>6 1/4</u> "	
TOTAL DEPTH	<u>6118</u> '	
OPEN HOLE	'	

Don Brown
11/5/69

Shale Tests: 5560'-5838' (17 Holes); 5124'-5126' (2 Holes) TD-6118

Berea Tests: 4846'-4856' (17 Holes)



Cuttings or samples are X are not _____ available for examination by a member of the Virginia Division of Mineral Resources
Cuttings or samples have _____ have not X been furnished to the Virginia Division of Mineral Resources

ELECTRIC LOGS AND SURVEYS:

List logs ran on wellbore: Gamma Ray, Dual Induction, Litho Density, Compensated Neutron, Photoelectric, Temperature & Audio

Did log disclose vertical location of a coal seam? Yes X No _____ N/A _____

SURVEY RESULTS:

DEPTH OF SURVEY	DIRECTION/DISTANCE/DEGREES FROM TRUE VERTICAL	DEPTH OF SURVEY	DIRECTION/DISTANCE/DEGREES FROM TRUE VERTICAL
<u>400</u>	<u>1/4 DEGREE</u>	<u>2200</u>	<u>1 DEGREE</u>
<u>600</u>	<u>1/4 DEGREE</u>	<u>2400</u>	<u>1/4 DEGREE</u>
<u>1000</u>	<u>3/4 DEGREE</u>	_____	_____
<u>1200</u>	<u>3/4 DEGREE</u>	_____	_____
<u>1400</u>	<u>1/2 DEGREE</u>	_____	_____
<u>2000</u>	<u>3/4 DEGREE</u>	_____	_____

*Use additional sheets if necessary.

CASING AND TUBING

	SIZE	TOP	BOTTOM	LENGTH	CEMENT USED IN CU/FT	DATE CEMENTED	PACKERS OR BRIDGE PI KIND SIZE SET
<u>Conductor</u>	13 3/8"	Surface	45'KB	35'	Driven	--	
<u>Surface</u>	9 5/8"	Surface	368'KB	358'	142 cu.ft.	07/28/98	
<u>Water Protection</u>	7"	Surface	2442'KB	2432'	461 cu.ft.	07/31/98	
<u>Coal Protection</u>							
<u>Other Casing and Tubing Left in Well</u>	4 1/2"	Surface	6058'KB	6048'	184 cu.ft.	08/07/98	

Liners

REMARKS: Shut down, fishing jobs, depths and dates, caving, lost circulation, etc.

N/A

Cuttings or samples are X are not _____ available for examination by a member of the Virginia Division of Mineral Resources
Cuttings or samples have _____ have not X been furnished to the Virginia Division of Mineral Resources

ELECTRIC LOGS AND SURVEYS:

List logs ran on wellbore: Gamma Ray, Dual Induction, Litho Density, Compensated Neutron, Photoelectric, Temperature & Audio

Did log disclose vertical location of a coal seam? Yes X No _____ N/A _____

SURVEY RESULTS:

DEPTH OF SURVEY	DIRECTION/DISTANCE/DEGREES FROM TRUE VERTICAL	DEPTH OF SURVEY	DIRECTION/DISTANCE/DEGREES FROM TRUE VERTICAL
<u>400</u>	<u>1/4 DEGREE</u>	<u>2200</u>	<u>1 DEGREE</u>
<u>600</u>	<u>1/4 DEGREE</u>	<u>2400</u>	<u>1/4 DEGREE</u>
<u>1000</u>	<u>3/4 DEGREE</u>	_____	_____
<u>1200</u>	<u>3/4 DEGREE</u>	_____	_____
<u>1400</u>	<u>1/2 DEGREE</u>	_____	_____
<u>2000</u>	<u>3/4 DEGREE</u>	_____	_____

*Use additional sheets if necessary.

CASING AND TUBING

	SIZE	TOP	BOTTOM	LENGTH	CEMENT USED IN CU/FT	DATE CEMENTED	PACKERS OR BRIDGE PI KIND SIZE SET
<u>Conductor</u>	13 3/8"	Surface	45'KB	35'	Driven	--	
<u>Surface</u>	9 5/8"	Surface	368'KB	358'	142 cu.ft.	07/28/98	
<u>Water Protection</u>	7"	Surface	2442'KB	2432'	461 cu.ft.	07/31/98	
<u>Coal Protection</u>							
<u>Other Casing and Tubing Left in Well</u>	4 1/2"	Surface	6058'KB	6048'	184 cu.ft.	08/07/98	

Liners

REMARKS: Shut down, fishing jobs, depths and dates, caving, lost circulation, etc.

N/A



Commonwealth of Virginia
Department of Mines, Minerals and Energy
Division of Gas and Oil
P.O. Box 1416; Abingdon, VA 24212
Telephone: (540) 676-5423

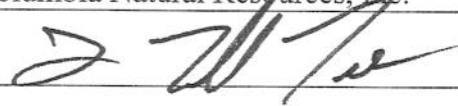
Operations Name: Columbia Natural Resources Well #21619

Permit Number: 3808

DRILLING REPORT

Well was squeeze cemented with 80 Sax Class A w/ 2% gel, 2% CaCl₂ (108 cuft). TOC - 3440'. No other alterations were made to the wellbore, and all production from the Huron Shale, Berea Sand, Weir Sand and Big Lime is through the 4 1/2" production casing.

Permittee: Columbia Natural Resources, Inc. (Company)

By:  (Signature)

DRILLER'S LOG

Compiled by Geologist

GEOLOGICAL AGE	FORMATION	GENERAL LITHOLOGY	COLOR	DEPTH		THICKNESS	REMARKS
				TOP	BOTTOM		
PENNSYLVANIAN	Lee	Sandstone & Shale		0	1310	1310	
	Salt Sand	Sandstone		1310	2100	790	
MISSISSIPPIAN	Bluestone	Sandstone & Shale		2100	2577	477	
	Bluestone	Shale		2577	2782	205	
	Bluefield	Sandstone		2782	2953	171	
	Bluefield	Sandstone & Shale		2953	3100	147	
	Maxon	Sandstone		3100	3132	32	
	Bluefield	Siltstone & Shale		3132	3310	178	
	Maxon	Sandstone		3310	3372	62	
	Bluefield	Sandstone & Shale		3372	3590	218	
	Little Lime	Argillaceous Ls		3590	3716	126	
	Big Lime	Limestone		3716	4190	474	
	Pocono	Shale		4190	4288	98	
	Weir	Siltstone		4288	4410	122	
	Pocono	Shale		4410	4808	398	
	Sunbury	Shale		4808	4832	24	
	Berea	Sandstone		4832	4888	56	
DEVONIAN	Devonian Shale	Shale		4888	5650	762	
	Lower Huron	Shale		5650	5854	204	
	Java	Shale		5854	TD (6118)	264	

Permittee: Columbia Natural Resources (Company)

By: Jason E. Stidham (Signature)



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Drawer 159, Lebanon, VA 24266
Telephone: (276) 415-9650

Tracking Number: 2988
Company: Range Resources-Pine Mountain
File Number: BU-1806
Completion Report Type: Drill Deeper Recompletion

COMPLETION REPORT (DGO-GO-15)

Well Type: Gas/Pipeline	Date Well Completed: 11/16/2010
Driller's Total Depth:	Log's Total Depth:

1. Changes In Casing/Tubing from Approved Drilling Report

Description	FileName
824073 casing	Casing.xls

2. Stimulation Record

Stimulation Status: ☒ Stimulated ☐ GOB ☐ Not Stimulated ☐ Service Well

Description	FileName
824073 stimulation	824073 stimulation.rtf

3. Final Production

Description	FileName
824073 final production	Final_Prod.xls

4. Comments

Notes:

Approved [4/18/2012, cbl]

Need to include cementing information on casing changes. If there were no changes to the casing, please indicate. [3/5/2012, cbl]

Need to describe how was stimulated including water, nitrogen, sand, acid, etc., volumes. [3/5/2012, cbl]

5. Signature

Permittee: Range Resources-Pine Mountain Date: 4/10/2012 (Company)

By: Jonathan Horne Title: Engineering Tech (Signature)

INTERNAL USE ONLY

Submit Date: 4/10/2012

Status: Approved

Date: 4/18/2012

Final PDF Date: 5/14/2012

Casing Program

Casing Type	Casing Size	Casing Interval	Hole Size	Cement Used In Cubic Ft.	Cemented To Surface Yes/No	Date Cemented	Packers Or Bridge Plugs Kind/Size/Set	Cement Baskets (ft)
Conductor	13 $\frac{3}{8}$ "	0-45'	15"					
Water Protection	9 $\frac{5}{8}$ "	0-407'	12 $\frac{3}{4}$ "					
Coal Protection	7"	0-2130'	8 $\frac{7}{8}$ "					
Production Casing	4 $\frac{1}{2}$ "	0-6006'	6 $\frac{3}{4}$ "					
Other Casing And Tubing Left In Well Liners	2 $\frac{3}{8}$ "	0-5920'						

*Tubing was ran on 4/11/11, no other changes were made to the casing program.

Range Resources - Pine Mountain
Completion Report

Page 1 of 1
4/10/2012 3:14:39 PM

105000111 2 824073

Stage 1

Stage Date 11/16/2010
Perf Date 11/15/2010
Logging Co. Universal
Formation Big Lime
Top Perf 3903
Bottom Perf 4084
#Shots 26
Perf Size 0.52
Perf Comments

Service Co Baker Hughes
Fluid Type Bullhead Acid
BD 613
ISIP 0
Avg Press 451
Max Treat Pressure 509
Final ISIP 134
2 Min SIP 129
5 Min SIP 118
10 Min SIP 0
Sand Mesh: n/a
Frac Gradient: 0.4

Avg DH Rate 2.5
Max DH Rate 3
Total Slurry Volume 105 BBLs
Total Fluid Volume 105 BBLs
Avg N2 Rate 0
Max N2 Rate 0 scfm
Total N2 Volume 0 scf
Max DH PPA 0
Total Proppant Sks 0
Total Acid 2700 Gal
Acid Type

Packer Depth - 3710'

Summary Total for All

Number of Stages	Total Slurry	Total Fluid Volume	Total N2 Volume	Total Proppant	Total Acid
1	105	105	0	0	2700

Final Production After Stimulation				
	BOD	MCFD	Hours Tested	Rock Pressure
Final/Commingled Zones		14	in-line	



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Drawer 159, Lebanon, VA 24266
Telephone: (276) 415-9650

Tracking Number: 4889
Company: Range Resources-Pine Mountain
File Number: BU-1806
Completion Report Type: Original

COMPLETION REPORT (DGO-GO-15)

Well Type:	<u>Gas/Pipeline</u>	Date Well Completed:	<u>6/21/2000</u>
Driller's Total Depth:	<u>6060.00</u>	Log's Total Depth:	<u>6060.00</u>

1. Changes In Casing/Tubing from Approved Drilling Report

Description	FileName
-------------	----------

2. Stimulation Record

Stimulation Status: ☒ Stimulated ☐ GOB ☐ Not Stimulated ☐ Service Well

Description	FileName
STIM	BU-1806 stim-final.pdf

3. Final Production

Description	FileName
FINAL	BU-1806 stim-final.pdf

4. Comments

Notes:

Material inserted by DGO [3/10/2014, jhh]

5. Signature

Permittee: Range Resources-Pine Mountain _____ Date: 3/28/2014 _____ (Company)

By: Jason E. Stidham _____ Title: ***** _____ (Signature)

INTERNAL USE ONLY

Submit Date: 3/28/2014 _____

Status: Approved _____

Date: 3/31/2014 _____

Final PDF Date: 3/31/2014 _____



Commonwealth of Virginia
Department of Mines, Minerals and Energy
Division of Gas and Oil
P.O. Box 1416
Abingdon, VA 24212
Telephone: (540) 676-5423

Operations Name CNR Well # 24073
Permit Number 4510

COMPLETION REPORT

WELL TYPE: OIL ☐ Gas ☒ Coalbed Methane ☐ Injection ☐

Date Well Completed June 21, 2000 Total Depth DTD: 6060 LTD: 6060

Attach the Drilling Report, if not previously submitted. In addition, submit any changes in casing or tubing that were approved after the Drilling Report was submitted.

STIMULATION RECORD*

* Use additional sheets with this format, if more than three zones are stimulated

ZONE 1: Devonian Shale Formation Stimulated with 250 gal 7 1/2% HCl, 1,013,700 SCF N2
Perforated 5680 To 5926 No. of Perforations 15 Perforation Size 0.38"
ISIP 3039 (PSIG) 5 MIN. SIP 2417 (PSIG) Average Downhole Injection Pressure 3959 (PSIG)
Stimulated X Yes ☐ No Date Stimulated May 30, 2000

ZONE 2: Berea Formation Stimulated with 250 gal 7 1/2% HCl, 1,017,500 SCF N2
Perforated 4832 To 4864 No. of Perforations 17 Perforation Size 0.38"
ISIP 2471 (PSIG) 5 MIN. SIP 2046 (PSIG) Average Downhole Injection Pressure 4045 (PSIG)
Stimulated X Yes ☐ No Date Stimulated May 30, 2000

ZONE 3: Maxon Formation Stimulated with 250 gal 15 % HCl, 153 Bbls of Water
525,000 SCF N2, 21,000 Lbs 20/40 Mesh Sand
Perforated 3468 To 3482 No. of Perforations 15 Perforation Size 0.38"
ISIP 2939 (PSIG) 5 MIN. SIP 2193 (PSIG) Average Downhole Injection Pressure 3138 (PSIG)
Stimulated X Yes ☐ No Date Stimulated June 15, 2000

FINAL PRODUCTION ☐ Natural ☐ After Stimulation

	BOD	MCFD	HOURS TESTED	ROCK PRESSURE	HOURS TESTED
ZONE (1)					
ZONE (2)					
ZONE (3)		103	48	750	96

Final production if gas zones are comingled 169 MCFD 72 Hours Tested 950 PSIG 72 Hours Tested *These values here represent commingled values for the Berea and Devonian Shale.*

Permittee Columbia Natural Resources, Inc. (Company)

By [Signature] (Signature)

Date 6/22/2000

ENTERED



Commonwealth of Virginia
Department of Mines, Minerals and Energy
Division of Gas and Oil
P.O. Box 1416
Abingdon, VA 24212
Telephone: (540) 676-5423

Operations Name CNR Well # 24073
Permit Number 4510

COMPLETION REPORT

WELL TYPE: OIL ☐ Gas ☒ Coalbed Methane ☐ Injection ☐

Date Well Completed June 21, 2000 Total Depth DTD: 6060 LTD: 6060

Attach the Drilling Report, if not previously submitted. In addition, submit any changes in casing or tubing that were approved after the Drilling Report was submitted.

STIMULATION RECORD*

* Use additional sheets with this format, if more than three zones are stimulated

ZONE 1: Devonian Shale Formation Stimulated with 250 gal 7 1/2% HCl, 1,013,700 SCF N2
Perforated 5680 To 5926 No. of Perforations 15 Perforation Size 0.38"
ISIP 3039 (PSIG) 5 MIN. SIP 2417 (PSIG) Average Downhole Injection Pressure 3959 (PSIG)
Stimulated X Yes ☐ No Date Stimulated May 30, 2000

ZONE 2: Berea Formation Stimulated with 250 gal 7 1/2% HCl, 1,017,500 SCF N2
Perforated 4832 To 4864 No. of Perforations 17 Perforation Size 0.38"
ISIP 2471 (PSIG) 5 MIN. SIP 2046 (PSIG) Average Downhole Injection Pressure 4045 (PSIG)
Stimulated X Yes ☐ No Date Stimulated May 30, 2000

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525,000 SCF N2, 21,000 Lbs 20/40 Mesh Sand
Perforated 3468 To 3482 No. of Perforations 15 Perforation Size 0.38"
ISIP 2939 (PSIG) 5 MIN. SIP 2193 (PSIG) Average Downhole Injection Pressure 3138 (PSIG)
Stimulated X Yes ☐ No Date Stimulated June 15, 2000

FINAL PRODUCTION ☐ Natural ☐ After Stimulation

	BOD	MCFD	HOURS TESTED	ROCK PRESSURE	HOURS TESTED
ZONE (1)					
ZONE (2)					
ZONE (3)		103	48	750	96

Final production if gas zones are comingled 169 MCFD 72 Hours Tested 950 PSIG 72 Hours Tested *These values here represent commingled values for the Berea and Devonian Shale.*

Permittee Columbia Natural Resources, Inc. (Company)

By [Signature] (Signature)

Date 6/22/2000

ENTERED



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Drawer 159, Lebanon, VA 24266
Telephone: (276) 415-9700

Tracking Number:	4887
Company:	Range Resources-Pine Mountain
File Number:	BU-1806
Operations Name:	24073 W/PL
Operation Type:	Gas/Pipeline
Drilling Report Type:	Original

DRILLING REPORT (DGO-GO-14)

1. Drilling Data

Date drilling commenced:	<u>5/2/2000</u>	Drilling Contractor:	<u>S.W. Jack Drilling Co. Rig # 18</u>
Date drilling completed:	<u>5/13/2000</u>	Rig Type:	<u>R Rotary £ Cable</u>
Driller's Total Depth (feet):	<u>6060.00</u>		
Log Total Depth (feet):	<u>6060.00</u>	Formation At Total Depth	<u>Java Shale</u>

2. Final Location Plat (as required by 4 VAC25-150-360.C.)

Permitted State Plane X:	<u>10406103.4350</u>	Final Plat State Plane X:	<u>10406103.4350</u>
Permitted State Plane Y:	<u>3621155.0490</u>	Final Plat State Plane Y:	<u>3621155.0490</u>

Plat Previously Submitted Or... £

List of Attached Items:

Description	FileName
PLAT	BU-1806 plat.pdf

3. Geological Data

Fresh Water At:

Depth (in feet)	Rate	Unit of Measure
120	damp	

Salt Water At:

Depth (in feet)	Rate	Unit of Measure

Coal Seams:

List of Attached Items:

Description	FileName

Gas and Oil Shows:

List of Attached Items:

Description	FileName
GAS	BU-1806 gs.pdf

4. Electric Logs (As required by 4VAC25-150-280.A)

List all logs run: GR/DEN/COMP NUETRON/INDUCT/AUDIO/TEMP

Did logs disclose vertical locations of a coal seam? £

5. Survery Results (As required by 4VAC25-150-280.B.2)

List of Attached Items:

Description	FileName
SURVEY	BU-1806 casing-survey.pdf

6. Casing and Tubing Program

List of Attached Items:

Description	FileName
CASING	BU-1806 casing-survey.pdf

7. Remarks

Use this space to note any conditions or occurrences, such as lost circulation, fishing jobs, junk left in hole, sidetracks, squeeze jobs, etc., not shown above. Include data and depth of condition/occurrence.

8. Drillers Log

Compiled By: _____

List of Attached Items:

Description	FileName
LOG	BU-1806 log.pdf

9. Comments

Material inserted by DGO [3/10/2014, jhh]

10. Signature

Permittee: Range Resources-Pine Mountain Date: 3/28/2014

Signed By: Jason E. Stidham Title: *****

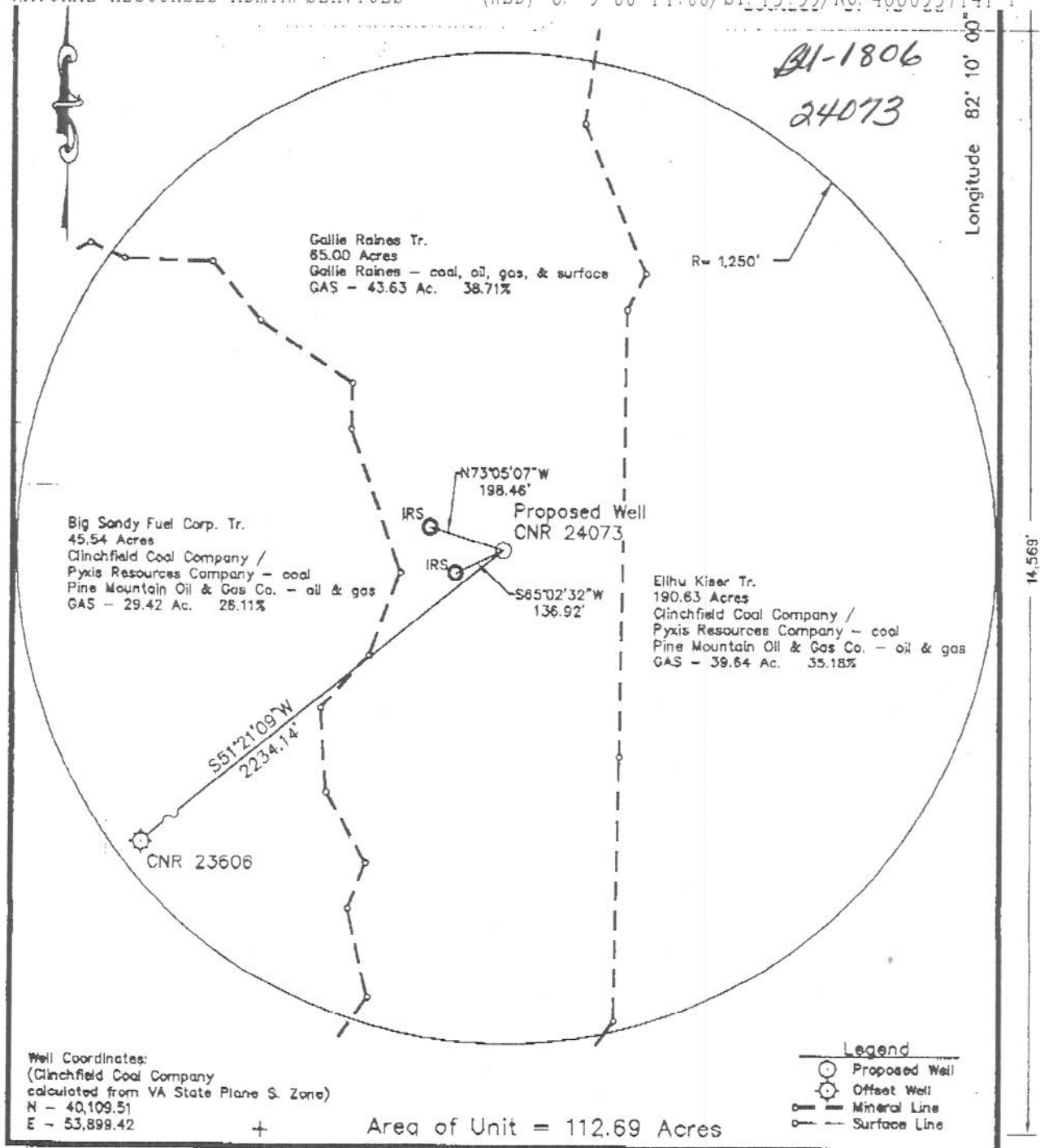
INTERNAL USE ONLY

Submit Date: 3/28/2014

Status: A

Date: 3/31/2014

Final PDF Date: 3/31/2014



WELL LOCATION PLAT

COMPANY: Columbia Natural Resources, Inc. WELL NAME OR NUMBER: 24073

TRACT NUMBER: Gallie Raines QUADRANGLE: Prater

DISTRICT: Prater

WELL COORDINATES (VIRGINIA STATE PLANE): N - 340,276.16 E - 923,118.39

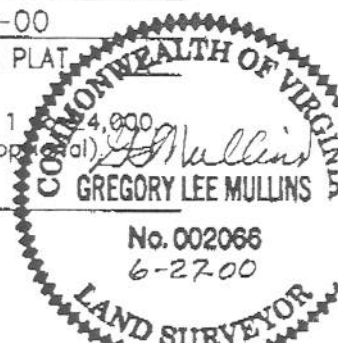
ELEVATION: 1,918.41' METHOD USED TO DETERMINE ELEVATION:

G.P.S. Observation from Cindy Monument

COUNTY: Buchanan SCALE: 1" = 400' DATE: 06-27-00

THIS PLAT IS A NEW PLAT ; AN UPDATED PLAT ; OR A FINAL LOCATION PLAT

+ Denotes the location of a well on United States Topographic Maps, scale 1:250,000, latitude and longitude lines being represented by border lines as shown (optional).



B1-1806



Commonwealth of Virginia
Department of Mines, Minerals and Energy
Division of Gas and Oil
P.O. Box 1416
Abingdon, VA 24212
Telephone: (540) 676-5423

Operations Name CNR Well # 24073
Permit Number 4510

DRILLING REPORT

ATTACH A FINAL LOCATION PLAT AS REQUIRED BY 4 VAC 25-150-360.C.

DRILLING DATA

Date drilling commenced May 2, 2000
Drilling Contractor S. W. Jack Drilling Co. Rig #18
Date drilling completed May 13, 2000 Rig Type X Rotary Cable Tool
Total Depth of Well DTD: 6060 LTD: 6060

GEOLOGICAL DATA

Fresh water at 120 Feet Damp GPM/Inch Stream 700 Feet Damp
GPM/Inch Stream

 Feet GPM/Inch Stream Feet
GPM/Inch Stream

Salt water at Feet GPM/Inch Stream Feet
GPM/Inch Stream

 Feet GPM/Inch Stream Feet
GPM/Inch Stream

Coal Seams	NAME	TOP	BOTTOM	THICKNESS	MINING IN AREA YES	MINED OUT NO
------------	------	-----	--------	-----------	-----------------------	-----------------

Gas and Oil Shows FORMATION	TOP	BOTTOM	THICKNESS	IPF (MCFD/BOPD)	PRESSURE	HOURS TESTED
Ravencliff	2217	2221	4	103	Atmosphere	48

Cuttings or samples are X are not available for examination by a member of the Virginia Division of Mineral Resources

Cuttings or samples have have not X been furnished to the Virginia Division of Mineral Resources

ELECTRIC LOGS AND SURVEYS

List logs ran on wellbore

Gamma Ray, Litho-Density, Compensated Neutron, Dual Induction, Audio, and Temperature

Did logs disclose vertical location of a coal seam? Yes No X

Operations Name CNR Well # 24073
 Permit Number 4510

SURVEY RESULTS

DEPTH OF SURVEY	DIRECTION/DISTANCE/ DEGREES FROM TRUE	DEPTH OF SURVEY	DIRECTION/DISTANCE/ DEGREES FROM TRUE
	VERTICAL		VERTICAL
200	½ Degree	1200	¾ Degree
400	¾ Degree	1400	¾ Degree
600	¾ Degree	1600	¾ Degree
800	¾ Degree	1800	¾ Degree
1000	¾ Degree	2000	¾ Degree

Use additional sheets as necessary

CASING AND TUBING PROGRAM

	CASING	CASING INTERVAL	HOLE SIZE	CEMENT USED IN CU/FT	CEMENTED TO SURFACE YES NO	DATE CEMENTED	PACKERS OR BRIDGE PLUG KIND/SIZE/SE
CONDUCTOR	13 3/8"	45' KB	17 ½"	N/A	No		
SURFACE							
WATER PROTECTION	9 5/8"	407' KB	12 3/8"	177	Yes	May 3, 2000	
COAL PROTECTION	7"	2130' KB	8 ¾"	409	Yes	May 6, 2000	
OTHER CASING AND TUBING LEFT IN WELL	4 ½"	6006' KB	6 ¼"	189	No	May 12, 2000	

LINERS

REMARKS: Shut down, fishing jobs, depths and dates, caving, lost circulation, etc.

Operations Name CNR Well # 24073
 Permit Number 4510

SURVEY RESULTS

DEPTH OF SURVEY	DIRECTION/DISTANCE/ DEGREES FROM TRUE	DEPTH OF SURVEY	DIRECTION/DISTANCE/ DEGREES FROM TRUE
	VERTICAL		VERTICAL
200	½ Degree	1200	¾ Degree
400	¾ Degree	1400	¾ Degree
600	¾ Degree	1600	¾ Degree
800	¾ Degree	1800	¾ Degree
1000	¾ Degree	2000	¾ Degree

Use additional sheets as necessary

CASING AND TUBING PROGRAM

	CASING	CASING INTERVAL	HOLE SIZE	CEMENT USED IN CU/FT	CEMENTED TO SURFACE YES NO	DATE CEMENTED	PACKERS OR BRIDGE PLUG KIND/SIZE/SE
CONDUCTOR	13 3/8"	45' KB	17 ½"	N/A	No		
SURFACE							
WATER PROTECTION	9 5/8"	407' KB	12 3/8"	177	Yes	May 3, 2000	
COAL PROTECTION	7"	2130' KB	8 ¾"	409	Yes	May 6, 2000	
OTHER CASING AND TUBING LEFT IN WELL	4 ½"	6006' KB	6 ¼"	189	No	May 12, 2000	

LINERS

REMARKS: Shut down, fishing jobs, depths and dates, caving, lost circulation, etc.

Bu 1806

Operations Name CNR Well # 24073
 Permit Number 4510

DRILLER'S LOG

Compiled by Jason E. Stidham

GEOLOGIC AGE	FORMATION	GENERAL LITHOLOGY	COLOR	DEPTH		THICKNESS	REMARK
				TOP	BOTTOM		
Penn	Lee	Siltstone & Shale		0	1254	1254	
Penn	Salt Sand (Lee)	Sandstone		1254	1396	142	
Penn	Lee	Siltstone & Shale		1396	1504	108	
Penn	Salt Sand (Lee)	Sandstone		1504	1556	52	
Penn	Lee	Siltstone & Shale		1556	1670	114	
Penn	Salt Sand (Lee)	Sandstone		1670	1744	74	
Penn	Lee	Siltstone & Shale		1744	1922	178	
Penn	Salt Sand (Lee)	Sandstone		1922	2058	136	
Miss	Pennington	Siltstone & Shale		2058	2140	82	
Miss	Ravecliff	Sandstone		2140	2220	80	
Miss	Pennington	Siltstone & Shale		2220	2708	488	
Miss	Maxon	Sandstone		2708	2766	58	
Miss	Pennington	Siltstone & Shale		2766	3060	294	
Miss	Maxon	Sandstone		3060	3164	104	
Miss	Pennington	Siltstone & Shale		3164	3266	102	
Miss	Maxon	Sandstone		3266	3300	34	
Miss	Pennington	Siltstone & Shale		3300	3458	158	
Miss	Maxon	Sandstone		3458	3496	38	
Miss	Pennington	Siltstone & Shale		3496	3546	50	
Miss	Little Lime	Limestone		3546	3664	118	
Miss	Big Lime	Limestone		3664	4102	438	
Miss	Pocono	Shale		4102	4282	180	
Miss	Weir	Siltstone		4282	4374	92	
Miss	Pocono	Shale		4374	4808	434	
Miss	Sunbury	Shale		4808	4830	22	
Miss	Berea	Sandstone		4830	4876	68	
Dev	Devonian Shale	Shale		4876	5716	840	
Dev	Lower Huron	Shale		5716	5936	220	
Dev	Java	Shale		5936	6060	124	

Permittee: Columbia Natural Resources, Inc. (Company)

By: Jason E. Stidham (Signature)

Form DGO-GO-14
 Rev. 10/96



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Drawer 159, Lebanon, VA 24266
Telephone: (276) 415-9700

Tracking Number:	7758
Company:	Range Resources-Pine Mountain,
File Number:	BU-2549
Completion Report Type:	Original

COMPLETION REPORT (DGO-GO-15)

Well Type:	Gas	Date Well Completed:	11/19/2003
Driller's Total Depth:	5983.00	Log's Total Depth:	5974.00

1. Changes In Casing/Tubing from Approved Drilling Report

Description	FileName
-------------	----------

2. Stimulation Record

Stimulation Status: ☒ Stimulated ☐ GOB ☐ Not Stimulated ☐ Service Well

Description	FileName
STIM	5BU2549_24545 WPL_RR_BUCHANAN.pdf

3. Final Production

Description	FileName
FINAL	5BU2549_24545 WPL_RR_BUCHANAN.pdf

4. Comments

Notes:

MATERIAL INSERTED BY DGO [10/26/2015, jhh]

5. Signature

Permittee: Range Resources-Pine Mountain, _____ Date: 10/26/2015 _____ (Company)

By: JASON E. STIDHAM _____ Title: ***** _____ (Signature)

INTERNAL USE ONLY

Submit Date: 10/26/2015 _____

Status: Approved _____

Date: 10/27/2015 _____

Final PDF Date: 3/11/2016 _____



Commonwealth of Virginia
Department of Mines, Minerals and Energy
Division of Gas and Oil
P.O. Box 1416; Abingdon, VA 24212
Telephone: (540) 676-5423

302549

Permit Number: 5912 (Columbia Natural Resources 24545)

COMPLETION REPORT

Well type: ☐ Oil ☒ Gas ☐ Coalbed Methane ☐ Injection Well

Date Well Completed: 11/19/2003 Total Depth: DTD - 5983, LTD - 5974

Attach the Drilling Report if not previously submitted. In addition, submit any changes in casing or tubing that were approved after the Drilling Report was submitted.

STIMULATION RECORD (Use additional sheets with this format, if more than three zones are stimulated.)

ZONE 1: Lower Huron Formation Stimulated With: Nitrogen
Perforated 5520 to 5854 No. of Perforations 48 Perforation Size 0.36
Formation Broke down at: 3658 PSIG Average Injection Rate: 77706 scfm (PSIG)
ISIP 2599 (PSIG) MIN SIP. 2344 (PSIG) Average Downhole Injection Pressure 3923 (PSIG)
Stimulated: ☒ Yes ☐ No Date Stimulated: 11/4/2003

ZONE 2: Berea Formation Stimulated With: Foam and sand
Perforated 4746 to 4786 No. of Perforations 50 Perforation Size 0.36
Formation Broke down at: 2486 PSIG Average Injection Rate: 40 BPM (PSIG)
ISIP 2394 (PSIG) MIN SIP. 1813 (PSIG) Average Downhole Injection Pressure 3346 (PSIG)
Stimulated: ☒ Yes ☐ No Date Stimulated: 11/11/2003

ZONE 3: Weir Formation Stimulated With: Foam and sand
Perforated 4230 to 4330 No. of Perforations 24 Perforation Size 0.36
Formation Broke down at: 2330 PSIG Average Injection Rate: 30 BPM (PSIG)
ISIP 1968 (PSIG) MIN SIP. 1863 (PSIG) Average Downhole Injection Pressure 2215 (PSIG)
Stimulated: ☒ Yes ☐ No Date Stimulated: 11/11/2003

FINAL RODUCTION: Natural x After Stimulation

	BOD	MCFD	HOURS TESTED	ROCK PRESSURE	HOURS TESTED
ZONE (1)					
ZONE (2)					
ZONE (3)					

Final production if gas zones are commingled 765 MCFD 48 Hours Tested

Permittee: Columbia Natural Resources, LLC 550 PS16 144 Hours Tested

By: [Signature] (Signature) Date: 1/9/2004

ENTERED



Commonwealth of Virginia
Department of Mines, Minerals and Energy
Division of Gas and Oil
P.O. Box 1416; Abingdon, VA 24212
Telephone: (540) 676-5423

BV-2549

GWT

2/15/04

Permit Number: 5912 Columbia Natural Resources 24545

COMPLETION REPORT

Well type: ☐ Oil ☒ Gas ☐ Coalbed Methane ☐ Injection Well

Date Well Completed: 11/19/2003 Total Depth: DTD - 5983, LTD - 5974

Attach the Drilling Report if not previously submitted. In addition, submit any changes in casing or tubing that were approved after the Drilling Report was submitted.

STIMULATION RECORD (Use additional sheets with this format, if more than three zones are stimulated.)

ZONE 1: Zone 4 Maxon sand Formation Stimulated With: Natural
Perforated _____ to _____ No. of Perforations _____ Perforation Size _____
Formation Broke down at: _____ PSIG Average Injection Rate: _____ (PSIG)
ISIP _____ (PSIG) MIN SIP. _____ (PSIG) Average Downhole Injection Pressure _____ (PSIG)
Stimulated: ☐ Yes ☒ No Date Stimulated: _____

ZONE 2: _____ Formation Stimulated With: _____
Perforated _____ to _____ No. of Perforations _____ Perforation Size _____
Formation Broke down at: _____ PSIG Average Injection Rate: _____ (PSIG)
ISIP _____ (PSIG) MIN SIP. _____ (PSIG) Average Downhole Injection Pressure _____ (PSIG)
Stimulated: ☐ Yes ☐ No Date Stimulated: _____

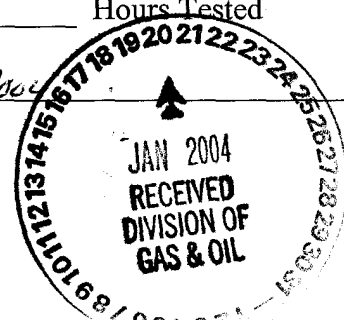
ZONE 3: _____ Formation Stimulated With: _____
Perforated _____ to _____ No. of Perforations _____ Perforation Size _____
Formation Broke down at: _____ PSIG Average Injection Rate: _____ (PSIG)
ISIP _____ (PSIG) MIN SIP. _____ (PSIG) Average Downhole Injection Pressure _____ (PSIG)
Stimulated: ☒ Yes ☐ No Date Stimulated: _____

FINAL RODUCTION: x Natural _____ After Stimulation

	BOD	MCFD	HOURS TESTED	ROCK PRESSURE	HOURS TESTED
ZONE (1)	Zone 4	637	72	650	288
ZONE (2)					
ZONE (3)					

Final production if gas zones are commingled _____ MCFD _____ Hours Tested

Permittee: Columbia Natural Resources, LLC PS16 _____ Hours Tested
By: [Signature] (Signature) Date: 1/19/2004





Commonwealth of Virginia
Department of Mines, Minerals and Energy
Division of Gas and Oil
P.O. Box 1416; Abingdon, VA 24212
Telephone: (540) 676-5423

302549

Permit Number: 5912 (Columbia Natural Resources 24545)

COMPLETION REPORT

Well type: ☐ Oil ☒ Gas ☐ Coalbed Methane ☐ Injection Well

Date Well Completed: 11/19/2003 Total Depth: DTD - 5983, LTD - 5974

Attach the Drilling Report if not previously submitted. In addition, submit any changes in casing or tubing that were approved after the Drilling Report was submitted.

STIMULATION RECORD (Use additional sheets with this format, if more than three zones are stimulated.)

ZONE 1: Lower Huron Formation Stimulated With: Nitrogen
Perforated 5520 to 5854 No. of Perforations 48 Perforation Size 0.36
Formation Broke down at: 3658 PSIG Average Injection Rate: 77706 scfm (PSIG)
ISIP 2599 (PSIG) MIN SIP. 2344 (PSIG) Average Downhole Injection Pressure 3923 (PSIG)
Stimulated: ☒ Yes ☐ No Date Stimulated: 11/4/2003

ZONE 2: Berea Formation Stimulated With: Foam and sand
Perforated 4746 to 4786 No. of Perforations 50 Perforation Size 0.36
Formation Broke down at: 2486 PSIG Average Injection Rate: 40 BPM (PSIG)
ISIP 2394 (PSIG) MIN SIP. 1813 (PSIG) Average Downhole Injection Pressure 3346 (PSIG)
Stimulated: ☒ Yes ☐ No Date Stimulated: 11/11/2003

ZONE 3: Weir Formation Stimulated With: Foam and sand
Perforated 4230 to 4330 No. of Perforations 24 Perforation Size 0.36
Formation Broke down at: 2330 PSIG Average Injection Rate: 30 BPM (PSIG)
ISIP 1968 (PSIG) MIN SIP. 1863 (PSIG) Average Downhole Injection Pressure 2215 (PSIG)
Stimulated: ☒ Yes ☐ No Date Stimulated: 11/11/2003

FINAL RODUCTION: Natural x After Stimulation

	BOD	MCFD	HOURS TESTED	ROCK PRESSURE	HOURS TESTED
ZONE (1)					
ZONE (2)					
ZONE (3)					

Final production if gas zones are commingled 765 MCFD 48 Hours Tested

Permittee: Columbia Natural Resources, LLC 550 PS16 144 Hours Tested

By: [Signature] (Signature) Date: 1/9/2004

ENTERED



Commonwealth of Virginia
Department of Mines, Minerals and Energy
Division of Gas and Oil
P.O. Box 1416; Abingdon, VA 24212
Telephone: (540) 676-5423

BV-2549

GWT

2/15/04

Permit Number: 5912 Columbia Natural Resources 24545

COMPLETION REPORT

Well type: ☐ Oil ☒ Gas ☐ Coalbed Methane ☐ Injection Well

Date Well Completed: 11/19/2003 Total Depth: DTD - 5983, LTD - 5974

Attach the Drilling Report if not previously submitted. In addition, submit any changes in casing or tubing that were approved after the Drilling Report was submitted.

STIMULATION RECORD (Use additional sheets with this format, if more than three zones are stimulated.)

ZONE 1: Zone 4 Maxon sand Formation Stimulated With: Natural
Perforated _____ to _____ No. of Perforations _____ Perforation Size _____
Formation Broke down at: _____ PSIG Average Injection Rate: _____ (PSIG)
ISIP _____ (PSIG) MIN SIP. _____ (PSIG) Average Downhole Injection Pressure _____ (PSIG)
Stimulated: ☐ Yes ☒ No Date Stimulated: _____

ZONE 2: _____ Formation Stimulated With: _____
Perforated _____ to _____ No. of Perforations _____ Perforation Size _____
Formation Broke down at: _____ PSIG Average Injection Rate: _____ (PSIG)
ISIP _____ (PSIG) MIN SIP. _____ (PSIG) Average Downhole Injection Pressure _____ (PSIG)
Stimulated: ☐ Yes ☐ No Date Stimulated: _____

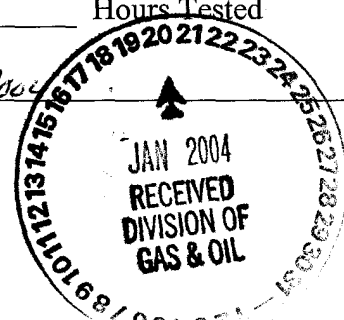
ZONE 3: _____ Formation Stimulated With: _____
Perforated _____ to _____ No. of Perforations _____ Perforation Size _____
Formation Broke down at: _____ PSIG Average Injection Rate: _____ (PSIG)
ISIP _____ (PSIG) MIN SIP. _____ (PSIG) Average Downhole Injection Pressure _____ (PSIG)
Stimulated: ☒ Yes ☐ No Date Stimulated: _____

FINAL RODUCTION: x Natural _____ After Stimulation

	BOD	MCFD	HOURS TESTED	ROCK PRESSURE	HOURS TESTED
ZONE (1)	Zone 4	637	72	650	288
ZONE (2)					
ZONE (3)					

Final production if gas zones are commingled _____ MCFD _____ Hours Tested

Permittee: Columbia Natural Resources, LLC PS16 _____ Hours Tested
By: [Signature] (Signature) Date: 1/19/2004





Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Drawer 159, Lebanon, VA 24266
Telephone: (276) 415-9700

Tracking Number:	7807
Company:	Range Resources-Pine Mountain,
File Number:	BU-2549
Operations Name:	24545 W/PL
Operation Type:	Gas
Drilling Report Type:	Original

DRILLING REPORT (DGO-GO-14)

1. Drilling Data

Date drilling commenced:	10/21/2003	Drilling Contractor:	GASCO
Date drilling completed:	10/30/2003	Rig Type:	☒ Rotary ☐ Cable
Driller's Total Depth (feet):	5983.00		
Log Total Depth (feet):	5974.00	Formation At Total Depth	Java Shale

2. Final Location Plat (as required by 4 VAC25-150-360.C.)

Permitted State Plane X:	10400698.0000	Final Plat State Plane X:	10400697.0000
Permitted State Plane Y:	3610548.9700	Final Plat State Plane Y:	3610549.0000

Plat Previously Submitted Or... ☐

List of Attached Items:

Description	FileName
PLAT	1BU2549_24545 WPL_RR_BUCHANAN.pdf

3. Geological Data

Fresh Water At:

Depth (in feet)	Rate	Unit of Measure
-----------------	------	-----------------

Salt Water At:

Depth (in feet)	Rate	Unit of Measure
-----------------	------	-----------------

Coal Seams:

List of Attached Items:

Description	FileName
COAL	2BU2549_24545 WPL_RR_BUCHANAN.pdf

Gas and Oil Shows:

List of Attached Items:

Description	FileName
GAS	3BU2549_24545 WPL_RR_BUCHANAN.pdf

4. Geophysical Logs (As required by 4VAC25-150-280.A)

List all logs run: GR/DEN/NEU/IND/NOISE/TEMP/CALIPER/CEMENT BOND/CCL

Did logs disclose vertical locations of a coal seam?



5. Survey Results (As required by 4VAC25-150-280.B.2)

List of Attached Items:

Description	FileName
SURVEY	3BU2549_24545 WPL_RR_BUCHANAN.pdf

6. Casing and Tubing Program

List of Attached Items:

Description	FileName
CASING	4BU2549_24545 WPL_RR_BUCHANAN.pdf

7. Remarks

Use this space to note any conditions or occurrences, such as lost circulation, fishing jobs, junk left in hole, sidetracks, squeeze jobs, etc., not shown above. Include data and depth of condition/occurrence.

8. Drillers Log

Compiled By: _____

List of Attached Items:

Description	FileName
LOG	4BU2549_24545 WPL_RR_BUCHANAN.pdf

9. Comments

MATERIAL INSERTED BY DGO [10/26/2015, jhh]

10. Signature

Permitee: Range Resources-Pine Mountain, Date: 10/26/2015
Signed By: JASON STDHAM Title: *****

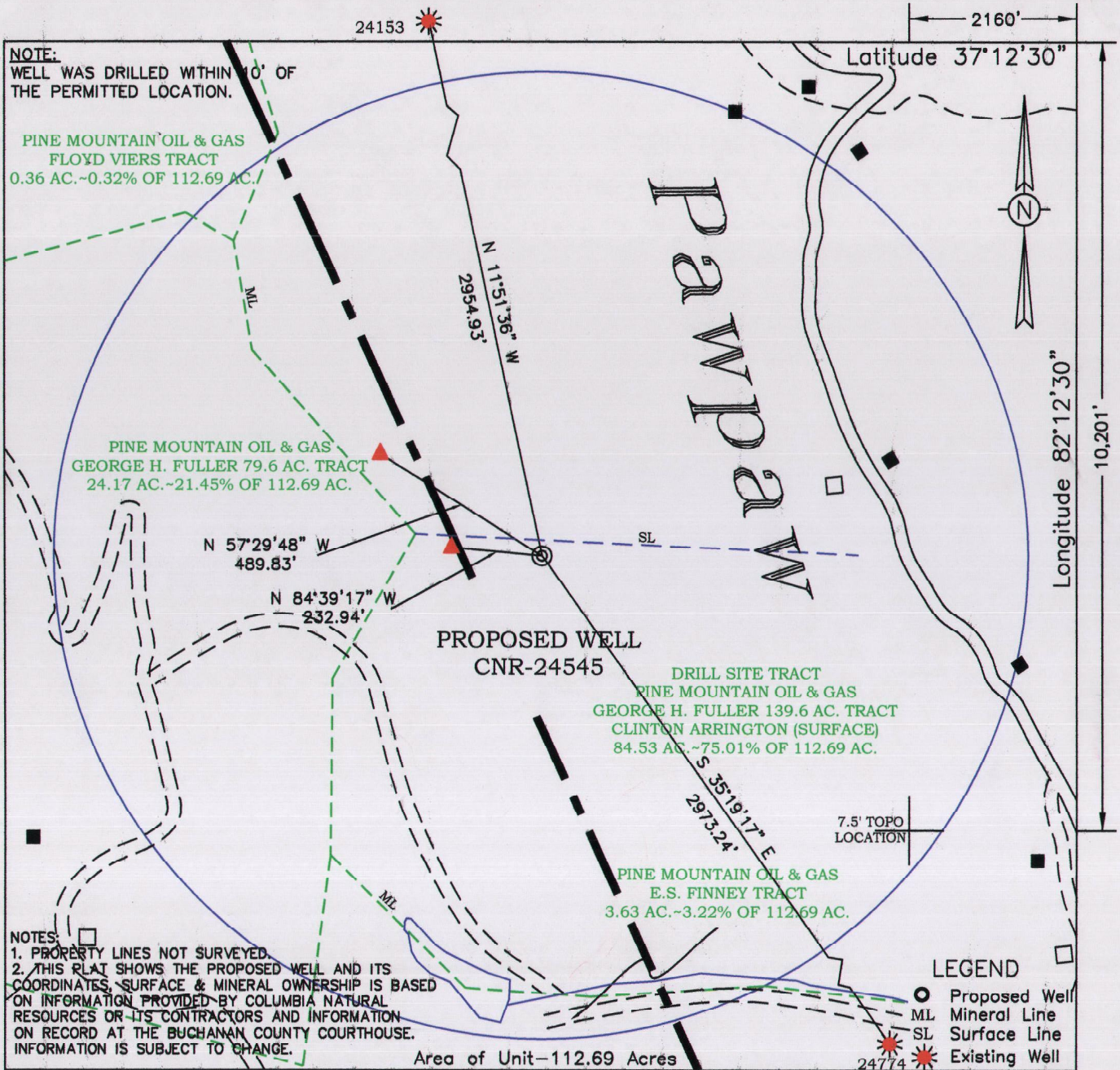
INTERNAL USE ONLY

Submit Date: 10/26/2015

Status: A

Date: 10/27/2015

Final PDF Date: 3/7/2016



WELL LOCATION PLAT

Company Columbia Natural Resources, LLC Well Name or Number CNR-24545 (HY-59)

Tract No. GEORGE H. FULLER 139.6 AC. TRACT Quadrangle PRATER

District PRATER

Well Coordinates (Virginia State Plane) N: 329,670.79 E: 917,712.09

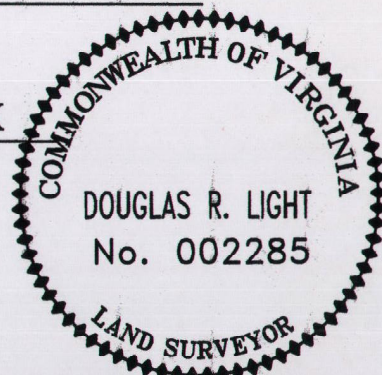
Elevation: 1843.28 Method Used to Determine Elevation: Trig. Levels from GPS derived elevation.

County BUCHANAN Scale: 1" = 400' Date 10-29-03

This Plat is a new plat _____; an updated plat _____; or a final location plat X

⊕ Denotes the location of a well on United States topographic maps, scale 1 to 24,000, latitude and longitude lines being represented by border lines as shown.

Douglas R. Light 10-29-03
Licensed Professional Engineer or Licensed Land Surveyor



(Affix Seal)



Commonwealth of Virginia
Department of Mines, Minerals and Energy
Division of Gas and Oil
P.O. Box 1416; Abingdon, VA 24212
Telephone: (540) 676-5423

Operations Name: Columbia Natural Resources Well # 24545
Permit Number: 5912

DRILLING REPORT

ATTACH A FINAL LOCATION PLAT AS REQUIRED BY 4 VAC 25-150-360.C.

DRILLING DATA

Date drilling commenced: 10/21/2003 Drilling Contractor: GASCO Drilling
Date drilling completed: 10/30/2003 Rig Type: ☒ Rotary ☐ Cable Tool
Total Depth of Well: LTD - 5974, DTD - 5983

GEOLOGICAL DATA

Fresh Water at	<u>none</u>	Feet	<u>damp</u>	GPM/Inch Stream	<u> </u>	Feet	<u> </u>	GPM/Inch Stream
Salt Water at	<u>none</u>	Feet	<u> </u>	GPM/Inch Stream	<u> </u>	Feet	<u> </u>	GPM/Inch Stream

Coal Seams

NAME	TOP	BOTTOM	THICKNESS	MINING IN AREA		MINED OUT
				YES	NO	
Unknown	1000	1003	3			

Gas and Oil Shows

FORMATION	TOP	BOTTOM	THICKNESS	IPF (MCFD/BOPD)	PRESSURE	HOURS TESTED
Maxon Sand	2675	2770	95	637 mcf/d	650	288

Cuttings or samples: ☐ are ☒ are not available for examination by a member of the Virginia Division of Mineral Resources

Cuttings or samples: ☐ have ☒ have not been furnished to the Virginia Division of Mineral Resources

ELECTRIC LOGS AND SURVEYS

List logs ran on wellbore: GR, Density, Neutron, Induction, Noise, Temp., Caliper, Cement Bond, CCL

Did logs disclose vertical location of a coal seam? ☐ Yes ☒ No

SURVEY RESULTS

Depth Of Survey	Direction/Distance/ Degrees From True Vertical	Depth Of Survey	Direction/Distance Degrees From True Vertical
200	1/4		
400	1/4		
600	1/4		
800	1/4		
1007	1/4		
1225	1/4		
1411	1/2		
1600	1/2		
1819	1/2		
2006	1/2		

Use additional sheets as necessary

CASING AND TUBING PROGRAM

FORMATION	TOP	BOTTOM	THICKNESS	IPF (MCFD/BOPD)	PRESSURE	HOURS TESTED
Maxon Sand	2675	2770	95	637 mcf/d	650	288

Cuttings or samples: ☐ are ☒ are not available for examination by a member of the Virginia Division of Mineral Resources

Cuttings or samples: ☐ have ☒ have not been furnished to the Virginia Division of Mineral Resources

ELECTRIC LOGS AND SURVEYS

List logs ran on wellbore: GR, Density, Neutron, Induction, Noise, Temp., Caliper, Cement Bond, CCL

Did logs disclose vertical location of a coal seam? ☐ Yes ☒ No

SURVEY RESULTS

Depth Of Survey	Direction/Distance/ Degrees From True Vertical	Depth Of Survey	Direction/Distance Degrees From True Vertical
200	1/4		
400	1/4		
600	1/4		
800	1/4		
1007	1/4		
1225	1/4		
1411	1/2		
1600	1/2		
1819	1/2		
2006	1/2		

Use additional sheets as necessary

CASING AND TUBING PROGRAM

	Casing	Casing Interval	Hole Size	Cement Used In Cu/Ft	Cemented To Surface		Date Cemented	Packers Or Bridge Plugs Kind/Size/Set
					Yes	No		
Conductor	12 3/4	14	15	driven	☐	☒		
Surface	9 5/8	326	12 1/4	177	☒	☐	10/22/2003	
Water Protection					☐	☐		
Coal Protection	7	2123	8 7/8	393	☒	☐	10/24/2003	
Other Casing And Tubing Left In Well	4 1/2	5934	6 3/8	270	☐	☒	10/30/2003	
Liners					☐	☐		

REMARKS: Shut down fishing jobs, depths and dates, caving, lost circulation, etc.: _____

Operations Name: Columbia Natural Resources

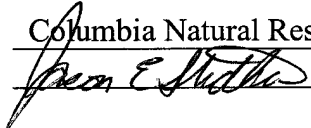
Permit Number 5912

DRILLER'S LOG

Compiled by: Jason Stidham

Geologic Age	Formation	General Lithology	Color	Depth		Thickness	Remarks
				Top	Bottom		
Pennsylvanian	Various	sand and shale		0	1090	1090	
Pennsylvanian	salt sand	sand and shale		1090	1990	900	
Mississippian	unknown	sand and shale		1990	2675	685	
Mississippian	Maxon	sand		2675	2770	95	
Mississippian	unknown	sand and shale		2770	3530	760	
Mississippian	little lime	limestone		3530	3570	40	
Mississippian	big lime	limestone		3570	4120	550	
Mississippian	Borden	sand and shale		4120	4250	130	
Mississippian	Weir	sand		4250	4370	120	
Mississippian	Pocono,coffee	dark shale		4370	4745	375	
Mississippian	berea	sand		4745	4800	55	
Devonian	shale	various shale		4800	5575	775	
Devonian	lower huron	brown shale		5575	5860	285	
Devonian	java	shale		5860	5983	123	

Permittee: Columbia Natural Resources, LLC (Company)

By:  (Signature)

	Casing	Casing Interval	Hole Size	Cement Used In Cu/Ft	Cemented To Surface		Date Cemented	Packers Or Bridge Plugs Kind/Size/Set
					Yes	No		
Conductor	12 3/4	14	15	driven	☐	☒		
Surface	9 5/8	326	12 1/4	177	☒	☐	10/22/2003	
Water Protection					☐	☐		
Coal Protection	7	2123	8 7/8	393	☒	☐	10/24/2003	
Other Casing And Tubing Left In Well	4 1/2	5934	6 3/8	270	☐	☒	10/30/2003	
Liners					☐	☐		

REMARKS: Shut down fishing jobs, depths and dates, caving, lost circulation, etc.: _____

Operations Name: Columbia Natural Resources

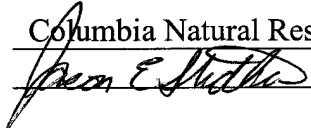
Permit Number 5912

DRILLER'S LOG

Compiled by: Jason Stidham

Geologic Age	Formation	General Lithology	Color	Depth		Thickness	Remarks
				Top	Bottom		
Pennsylvanian	Various	sand and shale		0	1090	1090	
Pennsylvanian	salt sand	sand and shale		1090	1990	900	
Mississippian	unknown	sand and shale		1990	2675	685	
Mississippian	Maxon	sand		2675	2770	95	
Mississippian	unknown	sand and shale		2770	3530	760	
Mississippian	little lime	limestone		3530	3570	40	
Mississippian	big lime	limestone		3570	4120	550	
Mississippian	Borden	sand and shale		4120	4250	130	
Mississippian	Weir	sand		4250	4370	120	
Mississippian	Pocono,coffee	dark shale		4370	4745	375	
Mississippian	berea	sand		4745	4800	55	
Devonian	shale	various shale		4800	5575	775	
Devonian	lower huron	brown shale		5575	5860	285	
Devonian	java	shale		5860	5983	123	

Permittee: Columbia Natural Resources, LLC (Company)

By:  (Signature)



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Box 1416; Abingdon, VA 24212
Telephone: (276) 676-5423

Tracking Number: 78
Company: Pine Mountain Oil & Gas
File Number: BU-3066
Operations Name: Haysi #7 W/PL
Operation Type: Coalbed/Pipeline
Completion Report Type: Original

COMPLETION REPORT (DGO-GO-15)

Well Type:	<u>Coalbed/Pipeline</u>	Date Well Completed:	<u>8/4/2006</u>
Driller's Total Depth:	<u>2,160</u>	Log's Total Depth:	<u>0</u>

1. Changes In Casing/Tubing from Approved Drilling Report

Description	FileName
-------------	----------

2. Stimulation Record

☒ Stimulated ☐ Not Stimulated ☐ Gob

Description	FileName
HAYSI 7	HAYSI 7 COMPLETION.pdf

3. Final Production

Description	FileName
HAYSI 7	HAYSI 7 FINAL PROD.jpg

4. Comments

Notes:

5. Signature

Permittee: Pine Mountain Oil & Gas Date: 2/1/2007 2:53:05 PM (Company)

By: CHRISTIAN MOORE Title: MANAGER (Signature)

INTERNAL USE ONLY

Submit Date: 2/1/2007

Status: Inspr Approved

Date: 2/2/2007

Final PDF Date: 2/2/2007



Commonwealth of Virginia
Department of Mines, Minerals and Energy
Division of Gas and Oil
P.O. Box 1416; Abingdon, VA 24212
Telephone: (276) 676-5423

B4-3066

Permit Number: 7233- Haysi 7

COMPLETION REPORT

Well type: ☐ Oil ☐ Gas ☒ Coalbed Methane ☐ Injection Well

Date Well Completed: 8/4/06 Total Depth: 2160

Attach the Drilling Report if not previously submitted. In addition, submit any changes in casing or tubing that were approved after the Drilling Report was submitted.

STIMULATION RECORD (Use additional sheets with this format, if more than three zones are stimulated.)

ZONE 1: Poca 1 Formation Stimulated With: 70Q N2 Foam
Perforated 2004 to 2008 feet No. of Perforations 16 Perforation Size 0.49
Formation Broke down at: 3092 PSIG Average Injection Rate: 6.3 BPM
ISIP 1775 PSIG 5 Min SIP N/A PSIG Average Downhole Injection Pressure 3066 PSIG
Stimulated: ☒ Yes ☐ No Date Stimulated: 8/4/06

ZONE 2: Poca 3 Formation Stimulated With: 70Q N2 Foam
Perforated 1877.5 to 1882 feet No. of Perforations 18 Perforation Size 0.33
Formation Broke down at: 3191 PSIG Average Injection Rate: 9.1 BPM
ISIP 1650 PSIG 5 Min SIP N/A PSIG Average Downhole Injection Pressure 3327 PSIG
Stimulated: ☒ Yes ☐ No Date Stimulated: 8/4/06

ZONE 3: War Creek, Beckley & Lower Horsepen Formation Stimulated With: 70Q N2 Foam
Perforated 1406.5 to 1560.5 feet No. of Perforations 23 Perforation Size 0.33
Formation Broke down at: 3563 PSIG Average Injection Rate: 13 BPM
ISIP 1892 PSIG 5 Min SIP 1890 PSIG Average Downhole Injection Pressure 3548 PSIG
Stimulated: ☒ Yes ☐ No Date Stimulated: 8/4/06

FINAL PRODUCTION: Natural After Stimulation

	BOD	MCFD	HOURS TESTED	ROCK PRESSURE	HOURS TESTED
ZONE (1)					
ZONE (2)					
ZONE (3)					

Final production if gas zones are commingled 37 MCFD In-line Hours Tested
150 PSIG 24 Hours Tested

Permittee: Pine Mountain Oil & Gas, Inc.

By: (Company)
(Signature) Date: 16 Nov 06



ZONE 4: Upper Seaboard, Greasy Creek & Upper Horsepen Formation Stimulated With: 70Q N2 Foam
Perforated 983.5 to 1276 feet No. of Perforations 19 Perforation Size 0.33
Formation Broke down at: 2421 PSIG Average Injection Rate: BPM
ISIP PSIG 5 Min SIP 1127 PSIG Average Downhole Injection Pressure 3881 PSIG
Stimulated: ☒ Yes ☐ No Date Stimulated: 8/4/06

Final production if gas zones are commingled	<u>37</u>	MCFD	<u>In-line</u>	Hours Tested
	<u>150</u>	PSIG	<u>24</u>	Hours Tested



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Box 1416; Abingdon, VA 24212
Telephone: (276) 676-5423

Tracking Number: 100
Company: Pine Mountain Oil & Gas
File Number: BU-3066
Operations Name: Haysi #7 W/PL
Operation Type: Coalbed/Pipeline
Drilling Report Type: Original

DRILLING REPORT (DGO-GO-14)

1. Drilling Data

Date drilling commenced: 5/14/2006 Drilling Contractor: NOAH HORN
Date drilling completed: 5/18/2006 Rig Type: ☒ Rotary ☐ Cable Tool
Driller's Total Depth (feet): 2,160
Log Total Depth (feet): 0 Coal Seam At Total Depth POCAHONTAS #1

2. Final Location Plat (as required by 4 VAC25-150-360.C.)

Permitted State Plane X 923,168 Final Plat State Plane X: 923,174
Permitted State Plane Y: 340,730 Final Plat State Plane Y: 340,736

☐ Plat Previously Submitted Or...

List of Attached Items:

Description	FileName
HAYSI 7	HAYSI 7 WELL LOCATION PLAT (FINAL).pdf

3. Geological Data

Fresh Water At:

Depth (in feet)	Rate	Unit of Measure
10	1/4	INCH

Salt Water At:

Depth (in feet)	Rate	Unit of Measure
1,320	DAMP	

Coal Seams

List of Attached Items:

Description	FileName
HAYSI 7	HAYSI 7 COAL SEAMS.jpg

Gas and Oil Shows

List of Attached Items:

Description	FileName
HAYSI 7	HAYSI 7 GAS AND OIL SHOW.JPG

4. Electric Logs (As required by 4VAC25-150-280.A.)

List all logs run: HI RES GR/DENS/TEMP/AUDIO/PE/CALIPER (DATA PACK)

Did logs disclose vertical locations of a coal seam? ☒ Yes ☐ No

5. Survey Results (As required by 4VAC25-150-280.B.2)

List of Attached Items:

Description	FileName
-------------	----------

6. Casing and Tubing Program

List of Attached Items:

Description	FileName
HAYSI 7	HAYSI 7 CASING AND TUBING.jpg

7. Remarks

Use this space to note any conditions or occurrences, such as lost circulation, fishing jobs, junk left in hole, sidetracks, squeeze jobs, etc., not shown above. Include data and depth of condition/occurrence.

10 1/2" HOLE,BASKET@44',CIRC 9BBL SLURRY. 6 1/2" HOLE,BASKET @JOINTS 9,18,&27,CIRC 6 BBLs SLURRY TO SURF.

8. Drillers Log

Compiled By: DENNY JOHNSON

List of Attached Items:

Description	FileName
HAYSI 7	HAYSI 7 DRILLERS LOG.jpg

9. Comments

DEVIATION LOG DELAYED INDEFINITELY.

10. Signature

Permitee: Pine Mountain Oil & Gas Date: 2/1/2007 (Company)

Signed By: CHRISTIAN MOORE Title: MANAGER (Signature)

INTERNAL USE ONLY

Submit Date: 2/1/2007

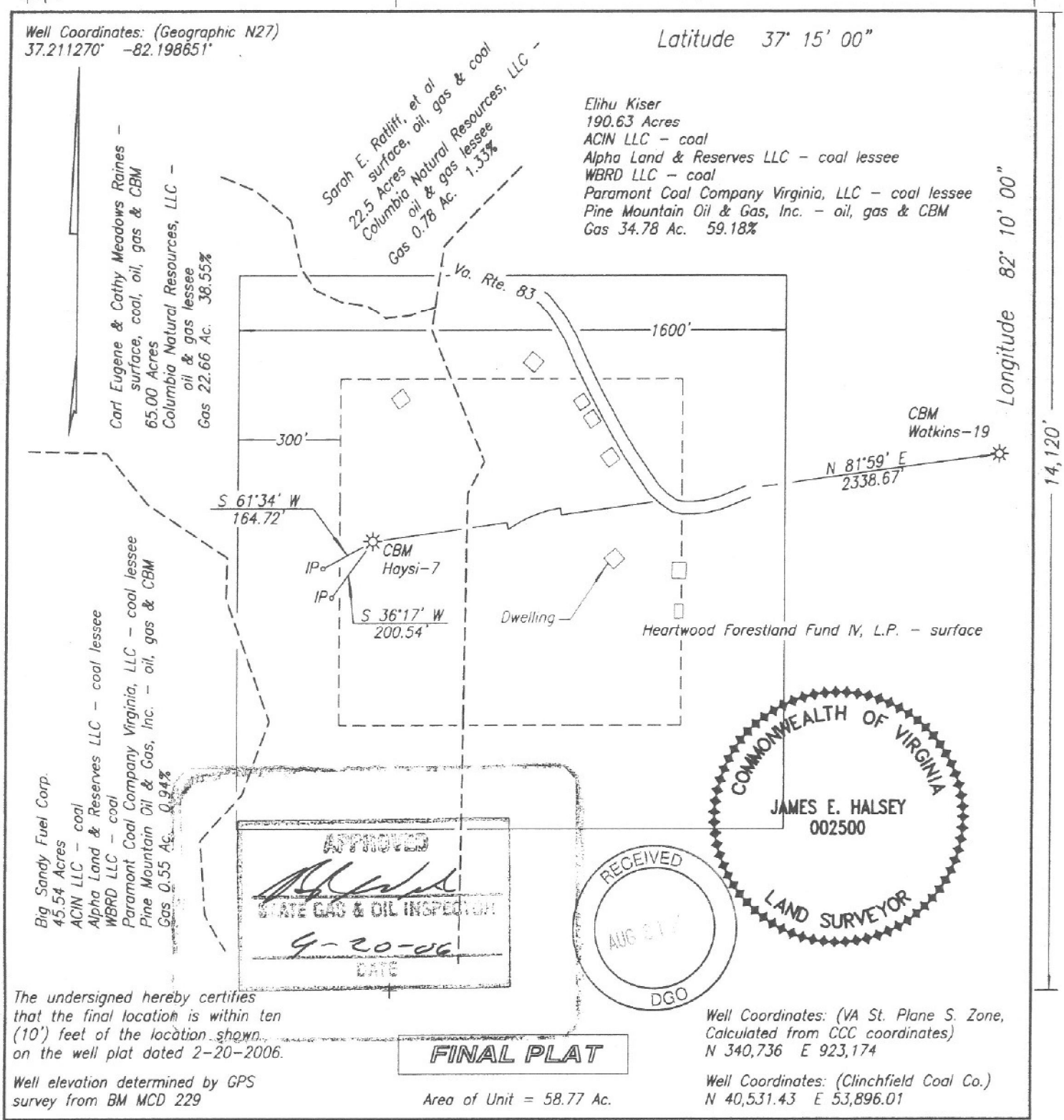
Status: Inspr Approved

Date: 2/2/2007

Final PDF Date: 2/13/2007

9/19/06

BU-3066



WELL LOCATION PLAT

COMPANY Pine Mountain Oil & Gas, Inc. WELL NAME AND NUMBER Haysi-7
 TRACT NO. Carl Raines ELEVATION 1,702.22' QUADRANGLE Prater
 COUNTY Buchanan DISTRICT Prater SCALE 1" = 400' DATE 5-26-2006
 This Plat is a new plat ; an updated plat ; or a final location plat x
 + Denotes the location of a well on United States topographic Maps, scale 1 to 24,000, latitude and longitude lines being represented by border lines as shown.

Coal Seams

NAME	TOP	BOTTOM	THICKNESS	MINING IN AREA		MINED OUT
				YES	NO	
Jawbone Rider	763	766			X	
Jawbone	804	805			X	
Tiller	870	871			X	
Upper Seaboard	982	984			X	
Greasy Creek	1132	1135			X	
Upper Horsepen	1272	1273			X	
Warcreek	1405	1405			X	
Beckley	1503	1504			X	
Lower Horsepen	1567	1568			X	
Poco 3	1878	1881			X	
Poco 1	2004	2007			X	

Gas and Oil Shows

FORMATION	TOP	BOTTOM	THICKNESS	IPF (MCFD/BOPD)	PRESSURE	HOURS TESTED
TD				70M w/ CSG		

CASING AND TUBING PROGRAM

	Casing	Casing Interval	Hole Size	Cement Used In Cu/Ft	Cemented To Surface		Date Cemented	Packers Or Bridge Plugs Kind/Size/Set
					Yes	No		
Conductor	11 3/4"	0-18'	15"					
Surface	8 5/8"	0-393'	10 1/2"	173	Yes		5/15/06	
Water Protection								
Coal Protection	4 1/2"	0-2106'	6 1/2"	421	Yes		5/18/06	
Other Casing And Tubing Left In Well								
Liners								

DRILLER’S LOG

Compiled by: Denny Johnson

Geologic Age	Formation	General Lithology	Color	Depth		Thickness	Remarks
				Top	Bottom		
	Jawbone Rider			763	766		
	Jawbone			804	805		
	Tiller			870	871		
	Upper Seaboard			982	984		
	Greasy Creek			1132	1135		
	Upper Horsepen			1272	1273		
	Warcreek			1405	1405		
	Beckley			1503	1504		
	Lower Horsepen			1567	1568		
	Poco 3			1878	1881		
	Poco 1			2004	2007		



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Drawer 159, Lebanon, VA 24266
Telephone: (276) 415-9650

Tracking Number:	7846
Company:	Range Resources-Pine Mountain,
File Number:	BU-3065
Completion Report Type:	Original

COMPLETION REPORT (DGO-GO-15)

Well Type:	Coalbed/Pipeline	Date Well Completed:	5/18/2006
Driller's Total Depth:	2400.00	Log's Total Depth:	2400.00

1. Changes In Casing/Tubing from Approved Drilling Report

Description	FileName
-------------	----------

2. Stimulation Record

Stimulation Status: ☒ Stimulated ☐ GOB ☐ Not Stimulated ☐ Service Well

Description	FileName
STIM	5BU3065_Haysi9_WPL_RR_BUCHANAN.pdf

3. Final Production

Description	FileName
FINAL	5BU3065_Haysi9_WPL_RR_BUCHANAN.pdf

4. Comments

Notes:

MATERIAL INSERTED BY DGO [11/19/2015, jhh]

5. Signature

Permittee: Range Resources-Pine Mountain, _____ Date: 11/19/2015 _____ (Company)

By: DENNY JOHNSON _____ Title: ***** _____ (Signature)

INTERNAL USE ONLY

Submit Date: 11/19/2015 _____

Status: Approved _____

Date: 11/19/2015 _____

Final PDF Date: 11/19/2015 _____



Commonwealth of Virginia
Department of Mines, Minerals and Energy
Division of Gas and Oil
P.O. Box 1416; Abingdon, VA 24212
Telephone: (276) 676-5423

BM-3069

Permit Number: 7232

COMPLETION REPORT

Well type: ☐ Oil ☐ Gas ☒ Coalbed Methane ☐ Injection Well

Date Well Completed: 5/18/06 Total Depth: 2400

Attach the Drilling Report if not previously submitted. In addition, submit any changes in casing or tubing that were approved after the Drilling Report was submitted.

STIMULATION RECORD (Use additional sheets with this format, if more than three zones are stimulated.)

ZONE 1 Poco 1 Formation Stimulated With 700Q N2 Foam
Perforated 2215 to 2219.5 No. of Perforations 18 Perforation Size 0.49
Formation Broke down at: 2043 PSIG Average Injection Rate: 10.2 (BPM)
ISIP 2307 (PSIG) MIN SIP. 1953 (PSIG) Average Downhole Injection Pressure 2596 (PSIG)
Stimulated: ☒ Yes ☐ No Date Stimulated: 5/18/06

ZONE 2 Poco 4, Poco 4 & Poco 3 Formation Stimulated With 700Q N2 Foam
Perforated 1997.5 to 2095.5 No. of Perforations 22 Perforation Size 0.33
Formation Broke down at: 3494 PSIG Average Injection Rate: 13.7 (BPM)
ISIP 2687 (PSIG) MIN SIP. 1712 (PSIG) Average Downhole Injection Pressure 3877 (PSIG)
Stimulated: ☒ Yes ☐ No Date Stimulated: 5/18/06

ZONE 3 Warcreek, Beckley, L. Horsepen, Poco 9 Formation Stimulated With 700Q N2 Foam
Perforated 1616.5 to 1844.5 No. of Perforations 22 Perforation Size 0.33
Formation Broke down at: 2685 PSIG Average Injection Rate: 24.7 (BPM)
ISIP 2390 (PSIG) MIN SIP. 1877 (PSIG) Average Downhole Injection Pressure 3216 (PSIG)
Stimulated: ☒ Yes ☐ No Date Stimulated: 5/18/06

FINAL PRODUCTION: Natural After Stimulation

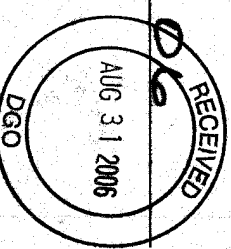
	BOD	MCFD	HOURS TESTED	ROCK PRESSURE	HOURS TESTED
ZONE (1)					
ZONE (2)					
ZONE (3)					

Final production if gas zones are commingled 64 MCFD Vent Hours Tested

92 PSIG 120 Hours Tested

Permittee: Pine Mountain Oil & Gas, Inc. (Company)
By: Charles D. Williams Date: 28 Aug 06 (Signature)

ENTERED



ZONE 4 Upper Seaboard, Greasy Crk., U. Hpen Formation Stimulated With 70Q N2 Foam
Perforated 1195.5 to 1485.5 No. of Perforations 18 Perforation Size 0.33
Formation Broke down at: 1650 PSIG Average Injection Rate: 21.4 (BPM)
ISIP 2780 (PSIG) MIN SIP. 2527 (PSIG) Average Downhole Injection Pressure 3749 (PSIG)
Stimulated: ☒ Yes ☐ No Date Stimulated: 5/18/06

ZONE 5 Aily, Raven, JB Rider, Jawbone, Tiller Formation Stimulated With 70Q N2 Foam
Perforated 786.5 to 1087 No. of Perforations 32 Perforation Size 0.33
Formation Broke down at: 1461 PSIG Average Injection Rate: 27.8 (BPM)
ISIP 1200 (PSIG) MIN SIP. 1112 (PSIG) Average Downhole Injection Pressure 2616 (PSIG)
Stimulated: ☒ Yes ☐ No Date Stimulated: 5/18/06



Commonwealth of Virginia
Department of Mines, Minerals and Energy
Division of Gas and Oil
P.O. Box 1416; Abingdon, VA 24212
Telephone: (276) 676-5423

BM-3069

Permit Number: 7232

COMPLETION REPORT

Well type: ☐ Oil ☐ Gas ☒ Coalbed Methane ☐ Injection Well

Date Well Completed: 5/18/06 Total Depth: 2400

Attach the Drilling Report if not previously submitted. In addition, submit any changes in casing or tubing that were approved after the Drilling Report was submitted.

STIMULATION RECORD (Use additional sheets with this format, if more than three zones are stimulated.)

ZONE 1 Poco 1 Formation Stimulated With 700Q N2 Foam
Perforated 2215 to 2219.5 No. of Perforations 18 Perforation Size 0.49
Formation Broke down at: 2043 PSIG Average Injection Rate: 10.2 (BPM)
ISIP 2307 (PSIG) MIN SIP. 1953 (PSIG) Average Downhole Injection Pressure 2596 (PSIG)
Stimulated: ☒ Yes ☐ No Date Stimulated: 5/18/06

ZONE 2 Poco 4, Poco 4 & Poco 3 Formation Stimulated With 700Q N2 Foam
Perforated 1997.5 to 2095.5 No. of Perforations 22 Perforation Size 0.33
Formation Broke down at: 3494 PSIG Average Injection Rate: 13.7 (BPM)
ISIP 2687 (PSIG) MIN SIP. 1712 (PSIG) Average Downhole Injection Pressure 3877 (PSIG)
Stimulated: ☒ Yes ☐ No Date Stimulated: 5/18/06

ZONE 3 Warcreek, Beckley, L. Horsepen, Poco 9 Formation Stimulated With 700Q N2 Foam
Perforated 1616.5 to 1844.5 No. of Perforations 22 Perforation Size 0.33
Formation Broke down at: 2685 PSIG Average Injection Rate: 24.7 (BPM)
ISIP 2390 (PSIG) MIN SIP. 1877 (PSIG) Average Downhole Injection Pressure 3216 (PSIG)
Stimulated: ☒ Yes ☐ No Date Stimulated: 5/18/06

FINAL PRODUCTION: Natural After Stimulation

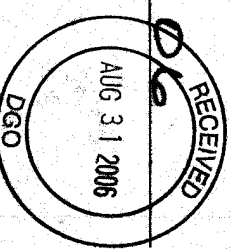
	BOD	MCFD	HOURS TESTED	ROCK PRESSURE	HOURS TESTED
ZONE (1)					
ZONE (2)					
ZONE (3)					

Final production if gas zones are commingled 64 MCFD Vent Hours Tested

92 PSIG 120 Hours Tested

Permittee: Pine Mountain Oil & Gas, Inc. (Company)
By: Charles D. Williams Date: 28 Aug 06 (Signature)

ENTERED



ZONE 4 Upper Seaboard, Greasy Crk., U. Hpen Formation Stimulated With 70Q N2 Foam
Perforated 1195.5 to 1485.5 No. of Perforations 18 Perforation Size 0.33
Formation Broke down at: 1650 PSIG Average Injection Rate: 21.4 (BPM)
ISIP 2780 (PSIG) MIN SIP. 2527 (PSIG) Average Downhole Injection Pressure 3749 (PSIG)
Stimulated: ☒ Yes ☐ No Date Stimulated: 5/18/06

ZONE 5 Aily, Raven, JB Rider, Jawbone, Tiller Formation Stimulated With 70Q N2 Foam
Perforated 786.5 to 1087 No. of Perforations 32 Perforation Size 0.33
Formation Broke down at: 1461 PSIG Average Injection Rate: 27.8 (BPM)
ISIP 1200 (PSIG) MIN SIP. 1112 (PSIG) Average Downhole Injection Pressure 2616 (PSIG)
Stimulated: ☒ Yes ☐ No Date Stimulated: 5/18/06



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Drawer 159, Lebanon, VA 24266
Telephone: (276) 415-9700

Tracking Number:	7900
Company:	Range Resources-Pine Mountain,
File Number:	BU-3065
Operations Name:	Haysi #9 W/PL
Operation Type:	Coalbed/Pipeline
Drilling Report Type:	Original

DRILLING REPORT (DGO-GO-14)

1. Drilling Data

Date drilling commenced:	5/4/2006	Drilling Contractor:	NOAH HORN
Date drilling completed:	5/13/2006	Rig Type:	☒ Rotary ☐ Cable
Driller's Total Depth (feet):	2400.00		
Log Total Depth (feet):	2400.00	Coal Seam at Total Depth:	POCAHONTAS #1

2. Final Location Plat (as required by 4 VAC25-150-360.C.)

Permitted State Plane X:	10405025.0100	Final Plat State Plane X:	10405025.0000
Permitted State Plane Y:	3621223.8800	Final Plat State Plane Y:	3621223.0000

Plat Previously Submitted Or... ☐

List of Attached Items:

Description	FileName
PLAT	1BU3065_Haysi9_WPL_RR_BUCHANAN.pdf

3. Geological Data

Fresh Water At:

Depth (in feet)	Rate	Unit of Measure
-----------------	------	-----------------

Salt Water At:

Depth (in feet)	Rate	Unit of Measure
1290	DAMP	

Coal Seams:

List of Attached Items:

Description	FileName
COAL	2BU3065_Haysi9_WPL_RR_BUCHANAN.pdf

Gas and Oil Shows:

List of Attached Items:

Description	FileName
GAS	3BU3065_Haysi9_WPL_RR_BUCHANAN.pdf

4. Electric Logs (As required by 4VAC25-150-280.A)

List all logs run: GR/DEN/TEMP/AUDIO/PE/CAL

Did logs disclose vertical locations of a coal seam? ✓

5. Survey Results (As required by 4VAC25-150-280.B.2)

List of Attached Items:

Description	FileName
SURVEY	3BU3065_Haysi9_WPL_RR_BUCHANAN.pdf

6. Casing and Tubing Program

List of Attached Items:

Description	FileName
CASING	4BU3065_Haysi9_WPL_RR_BUCHANAN.pdf

7. Remarks

Use this space to note any conditions or occurrences, such as lost circulation, fishing jobs, junk left in hole, sidetracks, squeeze jobs, etc., not shown above. Include data and depth of condition/occurrence.

8. Drillers Log

Compiled By: _____

List of Attached Items:

Description	FileName
LOG	4BU3065_Haysi9_WPL_RR_BUCHANAN.pdf

9. Comments

MATERIAL INSERTED BY DGO [11/19/2015, jhh]

10. Signature

Permitee: Range Resources-Pine Mountain, Date: 11/19/2015

Signed By: DENNY JOHNSON Title: *****

INTERNAL USE ONLY

Submit Date: 11/19/2015

Status: A

Date: 11/19/2015

9/18/06

BU-3065

Well Coordinates: (Geographic N27)
37.210090° -82.202479°

Latitude 37° 15' 00"

Longitude 82° 10' 00"

14,555'

James M. Owens
409.73 Acres
ACIN LLC - coal
Alpha Land & Reserves LLC - coal lessee
Paramont Coal Company, Virginia LLC - coal lessee
WBDR LLC - coal
Pine Mountain Oil & Gas, Inc. - oil, gas & CBM
Gas 7.95 Ac. 13.53%

Carl Eugene & Cathy Meadows Raines -
surface, coal, oil, gas & CBM
65.00 Acres
Columbia Natural Resources, LLC -
oil & gas lessee
Gas 14.10 Ac. 23.99%



Big Sandy Fuel Corp.
45.54 Acres
Heartwood Forestland Fund IV, L.P. - surface
ACIN LLC - coal
Alpha Land & Reserves LLC - coal lessee
WBDR LLC - coal
Paramont Coal Company, Virginia LLC - coal lessee
Pine Mountain Oil & Gas, Inc. - oil, gas & CBM
Gas 30.71 Ac. 52.25%

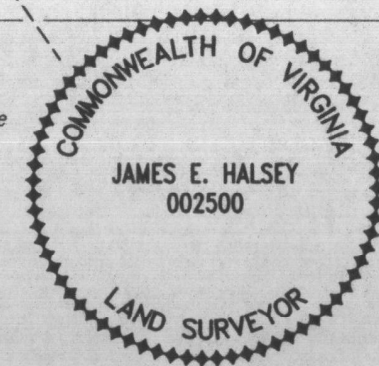
CBM
Haysi-9

CBM
Watkins-19

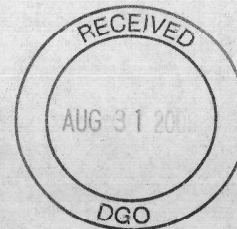
James M. Owens
95.13 Acres
ACIN LLC - coal
Alpha Land & Reserves LLC - coal lessee
WBDR LLC - coal
Paramont Coal Company, Virginia LLC - coal lessee
Pine Mountain Oil & Gas, Inc. - oil, gas & CBM
Gas 6.01 Ac. 10.23%

The undersigned hereby certifies
that the final location is within ten
(10') feet of the location shown
on the well plat dated 2-20-2006.

Well elevation determined by
GPS Survey from BM MCD 229



Area of Unit = 58.77 Ac.



FINAL PLAT

Well Coordinates: (VA St. Plane S. Zone,
Calculated from CCC coordinates)
N 340,351 E 922,043

Well Coordinates: (Clinchfield Coal Co.)
N 40,101.70 E 52,779.69

WELL LOCATION PLAT

COMPANY Pine Mountain Oil & Gas, Inc. WELL NAME AND NUMBER Haysi-9
TRACT NO. Big Sandy Fuel Corp. ELEVATION 1,895.52' QUADRANGLE Prater
COUNTY Buchanan DISTRICT Prater SCALE 1" = 400' DATE 5-17-2006
This Plat is a new plat ; an updated plat ; or a final location plat x

+ Denotes the location of a well on United States topographic Maps, scale 1 to
24,000, latitude and longitude lines being represented by border lines as shown.

James E. Halsey
Licensed Professional Engineer or Licensed Land Surveyor

Gas and Oil Shows

FORMATION	TOP	BOTTOM	THICKNESS	IPF (MCFD/BOPD)	PRESSURE	HOURS TESTED
TD				70 M w/ Csg		

Cuttings or samples: ☐ are ☒ are not available for examination by a member of the Virginia Division of Mineral Resources

Cuttings or samples: ☐ have ☒ have not been furnished to the Virginia Division of Mineral Resources

ELECTRIC LOGS AND SURVEYS

List logs ran on wellbore: Hi Res GR/Dens/Temp/Audio/Pe/Caliper (Data Pack)

Did logs disclose vertical location of a coal seam? ☒ Yes ☐ No

SURVEY RESULTS

[illegible]

Use additional sheets as necessary

Gas and Oil Shows

FORMATION	TOP	BOTTOM	THICKNESS	IPF (MCFD/BOPD)	PRESSURE	HOURS TESTED
TD				70 M w/ Csg		

Cuttings or samples: ☐ are ☒ are not available for examination by a member of the Virginia Division of Mineral Resources

Cuttings or samples: ☐ have ☒ have not been furnished to the Virginia Division of Mineral Resources

ELECTRIC LOGS AND SURVEYS

List logs ran on wellbore: Hi Res GR/Dens/Temp/Audio/Pe/Caliper (Data Pack)

Did logs disclose vertical location of a coal seam? ☒ Yes ☐ No

SURVEY RESULTS

[illegible]

Use additional sheets as necessary

CASING AND TUBING PROGRAM

	Casing	Casing Interval	Hole Size	Cement Used In Cu/Ft	Cemented To Surface Yes No		Date Cemented	Packers Or Bridge Plugs Kind/Size/Set
Conductor	11 3/4"	0-17'	15"					
Surface	8 5/8"	0-309'	10 1/2"	107	Yes		5/04/06	
Water Protection								
Coal Protection	4 1/2"	0-2325'	6 1/2"	472	Yes		4/23/06	
Other Casing And Tubing Left In Well								
Liners								

REMARKS: 10 1/2" Hole, basket@30', circ 1 bbls to surf. 6 1/2 hole, baskets@ Jts 9,17&27, circ 6 bbls slurry to surf.

Operations Name: Haysi 9

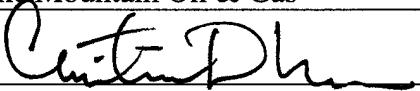
Permit Number 7232

DRILLER'S LOG

Compiled by: Denny Johnson

Geologic Age	Formation	General Lithology	Color	Depth		Thickness	Remarks
				Top	Bottom		
	Aily			787	788		
	Raven			860	861		
	Jawbone Rider			981	983		
	Jawbone			1021	1022		
	Tiller			1085	1086		
	Upper Seaboard			1196	1197		
	Greasy Creek			1345	1346		
	Upper Horsepen			1485	1485		
	Warcreek			1617	1617		
	Beckley			1713	1713		
	Lower Horsepen			1753	1754		
	Poco 9			1843	1843		
	Poco 4			1998	1998		
	Poco 4			2025	2027		
	Poco 3			2091	2095		
	Poco 1			2216	2218		

Permittee: Pine Mountain Oil & Gas (Company)

By:  (Signature)

CASING AND TUBING PROGRAM

	Casing	Casing Interval	Hole Size	Cement Used In Cu/Ft	Cemented To Surface Yes No		Date Cemented	Packers Or Bridge Plugs Kind/Size/Set
Conductor	11 3/4"	0-17'	15"					
Surface	8 5/8"	0-309'	10 1/2"	107	Yes		5/04/06	
Water Protection								
Coal Protection	4 1/2"	0-2325'	6 1/2"	472	Yes		4/23/06	
Other Casing And Tubing Left In Well								
Liners								

REMARKS: 10 1/2" Hole, basket@30', circ 1 bbls to surf. 6 1/2 hole, baskets@ Jts 9,17&27, circ 6 bbls slurry to surf.

Operations Name: Haysi 9

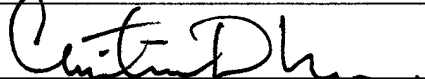
Permit Number 7232

DRILLER'S LOG

Compiled by: Denny Johnson

Geologic Age	Formation	General Lithology	Color	Depth		Thickness	Remarks
				Top	Bottom		
	Aily			787	788		
	Raven			860	861		
	Jawbone Rider			981	983		
	Jawbone			1021	1022		
	Tiller			1085	1086		
	Upper Seaboard			1196	1197		
	Greasy Creek			1345	1346		
	Upper Horsepen			1485	1485		
	Warcreek			1617	1617		
	Beckley			1713	1713		
	Lower Horsepen			1753	1754		
	Poco 9			1843	1843		
	Poco 4			1998	1998		
	Poco 4			2025	2027		
	Poco 3			2091	2095		
	Poco 1			2216	2218		

Permittee: Pine Mountain Oil & Gas (Company)

By:  (Signature)



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Box 1416; Abingdon, VA 24212
Telephone: (276) 676-5423

Tracking Number: 594
Company: Pine Mountain Oil & Gas
File Number: BU-3165
Operations Name: Haysi #17 W/PL
Operation Type: Coalbed/Pipeline
Completion Report Type: Original

COMPLETION REPORT (DGO-GO-15)

Well Type:	Coalbed/Pipeline	Date Well Completed:	1/18/2007
Driller's Total Depth:	2,454	Log's Total Depth:	2,438

1. Changes In Casing/Tubing from Approved Drilling Report

Description	FileName
Haysi 17 Comp. Casing	Haysi 17 Comp Casing.doc

2. Stimulation Record

☐ Stimulated ☐ Not Stimulated ☐ Gob

Description	FileName
Haysi 17 Stimulation	Haysi 17 Stimulation.doc

3. Final Production

Description	FileName
Haysi 17 Final Prod.	Haysi 17 Final Prod.xls

4. Comments

Notes:

5. Signature

Permittee: Pine Mountain Oil & Gas Date: 8/16/2007 2:21:06 PM (Company)

By: Christian D. Moore Title: Permit/GIS Specialist (Signature)

INTERNAL USE ONLY

Submit Date: 8/16/2007

Status: Inspr Approved

Date: 8/30/2007

Final PDF Date: 8/30/2007

CASING AND TUBING PROGRAM

	Casing	Casing Interval	Hole Size	Cement Used In Cu/Ft	Cemented To Surface		Date Cemented	Packers Or Bridge Plugs Kind/Size/Set
					Yes	No		
Conductor	11 ³ / ₄ "	15'	15"					
Surface	8 ⁵ / ₈ "	395'	11"	155	Yes		1/2/07	
Water Protection	4 ¹ / ₂ "	2405'	6 ¹ / ₂ /6 ¹ / ₄ "	488	Yes		1/8/07	
Coal Protection								
Other Casing And Tubing Left In Well	2 ³ / ₈ "	2349'						
Liners								

STIMULATION RECORD

ZONE 1: Poco 2 & 1 Formation Stimulated With: Gel
 Perforated 2263 to 2302 feet No. of Perforations 5 Perforation Size 0.34
 Formation Broke down at: 2533 PSIG Average Injection Rate: 14 BPM
 ISIP 1643 PSIG 5 Min SIP 1555 PSIG Average Downhole Injection Pressure 3300 PSIG
 Stimulated: ☒ Yes ☐ No Date Stimulated: 1/18/07

ZONE 2: Poco 4 & 3 Formation Stimulated With: Gel
 Perforated 2112.8 to 2199.5 feet No. of Perforations 13 Perforation Size 0.34
 Formation Broke down at: 3480 PSIG Average Injection Rate: 15 BPM
 ISIP 1959 PSIG 5 Min SIP 1777 PSIG Average Downhole Injection Pressure 3600 PSIG
 Stimulated: ☒ Yes ☐ No Date Stimulated: 1/18/07

ZONE 3: Lower Horsepen x2, War Creek & Beckley Formation Stimulated With: Gel
 Perforated 1742 to 1855.5 feet No. of Perforations 26 Perforation Size 0.33
 Formation Broke down at: 2282 PSIG Average Injection Rate: 20 BPM
 ISIP 1465 PSIG 5 Min SIP 1348 PSIG Average Downhole Injection Pressure 2400 PSIG
 Stimulated: ☒ Yes ☐ No Date Stimulated: 1/18/07

ZONE 4: Greasy Creek, Upper & Middle Horsepen Formation Stimulated With: Gel
 Perforated 1442 to 1661.5 feet No. of Perforations 27 Perforation Size 0.33
 Formation Broke down at: 2249 PSIG Average Injection Rate: 20 BPM
 ISIP 1482 PSIG 5 Min SIP 1383 PSIG Average Downhole Injection Pressure 2843 PSIG
 Stimulated: ☒ Yes ☐ No Date Stimulated: 1/18/07

ZONE 5: JB Rider, Jawbone, Tiller & Upper Seaboard Formation Stimulated With: Gel
 Perforated 1082.5 to 1310 feet No. of Perforations 29 Perforation Size 0.33
 Formation Broke down at: 1338 PSIG Average Injection Rate: 17 BPM
 ISIP 1417 PSIG 5 Min SIP 1236 PSIG Average Downhole Injection Pressure 2492 PSIG
 Stimulated: ☒ Yes ☐ No Date Stimulated: 1/18/07

ZONE 6: Kennedy, Aily Rider, Aily & Raven Formation Stimulated With: Gel/H2O
 Perforated 783.8 to 971 feet No. of Perforations 24 Perforation Size 0.33
 Formation Broke down at: 1925 PSIG Average Injection Rate: 16 BPM
 ISIP 1800 PSIG 5 Min SIP 1527 PSIG Average Downhole Injection Pressure 2998 PSIG
 Stimulated: ☒ Yes ☐ No Date Stimulated: 1/18/07

Final Production After Stimulation				
	BOD	MCFD	Hours Tested	Rock Pressure
Zone 1				
Zone 2				
Zone 3				
Final/Commingled Zones		32	In-Line	120



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Box 1416; Abingdon, VA 24212
Telephone: (276) 676-5423

Tracking Number: 576
Company: Pine Mountain Oil & Gas
File Number: BU-3165
Operations Name: Haysi #17 W/PL
Operation Type: Coalbed/Pipeline
Drilling Report Type: Original

DRILLING REPORT (DGO-GO-14)

1. Drilling Data

Date drilling commenced: 12/29/2006 Drilling Contractor: Noah Horn
Date drilling completed: 1/8/2007 Rig Type: ☒ Rotary ☐ Cable Tool
Driller's Total Depth (feet): 2,454
Log Total Depth (feet): 2,438 Coal Seam At Total Depth POCAHONTAS #1

2. Final Location Plat (as required by 4 VAC25-150-360.C.)

Permitted State Plane X 917,103 Final Plat State Plane X: 917,098
Permitted State Plane Y: 339,319 Final Plat State Plane Y: 339,323

☐ Plat Previously Submitted Or...

List of Attached Items:

Description	FileName
Haysi 17 Plat	Haysi 17 Plat.pdf

3. Geological Data

Fresh Water At:

Depth (in feet)	Rate	Unit of Measure
-----------------	------	-----------------

Salt Water At:

Depth (in feet)	Rate	Unit of Measure
1,414	Damp	GPM

Coal Seams

List of Attached Items:

Description	FileName
Haysi 17 Coals	Haysi 17 Coal.xls

Gas and Oil Shows

List of Attached Items:

Description	FileName
Haysi 17 Shows	Haysi 17 Shows.xls

4. Electric Logs (As required by 4VAC25-150-280.A.)

List all logs run: Hi Res GR/Dens/Temp/Audio/Pe/Caliper (Data Pack)

Did logs disclose vertical locations of a coal seam? ☒ Yes ☐ No

5. Survey Results (As required by 4VAC25-150-280.B.2)

List of Attached Items:

Description	FileName
Haysi 17 Surveys	Haysi 17 Survey.xls

6. Casing and Tubing Program

List of Attached Items:

Description	FileName
Haysi 17 Casing	Haysi 17 Casing.xls

7. Remarks

Use this space to note any conditions or occurrences, such as lost circulation, fishing jobs, junk left in hole, sidetracks, squeeze jobs, etc., not shown above. Include data and depth of condition/occurrence.

Circ 3 bbls to surf on 8" csng. Circ 1 bbl to surf on 4½" csng.

8. Drillers Log

Compiled By: Noah Horn

List of Attached Items:

Description	FileName
Haysi 17 Log	Haysi 17 Log.xls

9. Comments

10. Signature

Permitee: Pine Mountain Oil & Gas Date: 7/31/2007 (Company)

Signed By: Christian D. Moore Title: Permit/GIS Specialist (Signature)

INTERNAL USE ONLY

Submit Date: 7/31/2007

Status: Inspr Approved

Date: 8/21/2007

Final PDF Date: 8/21/2007

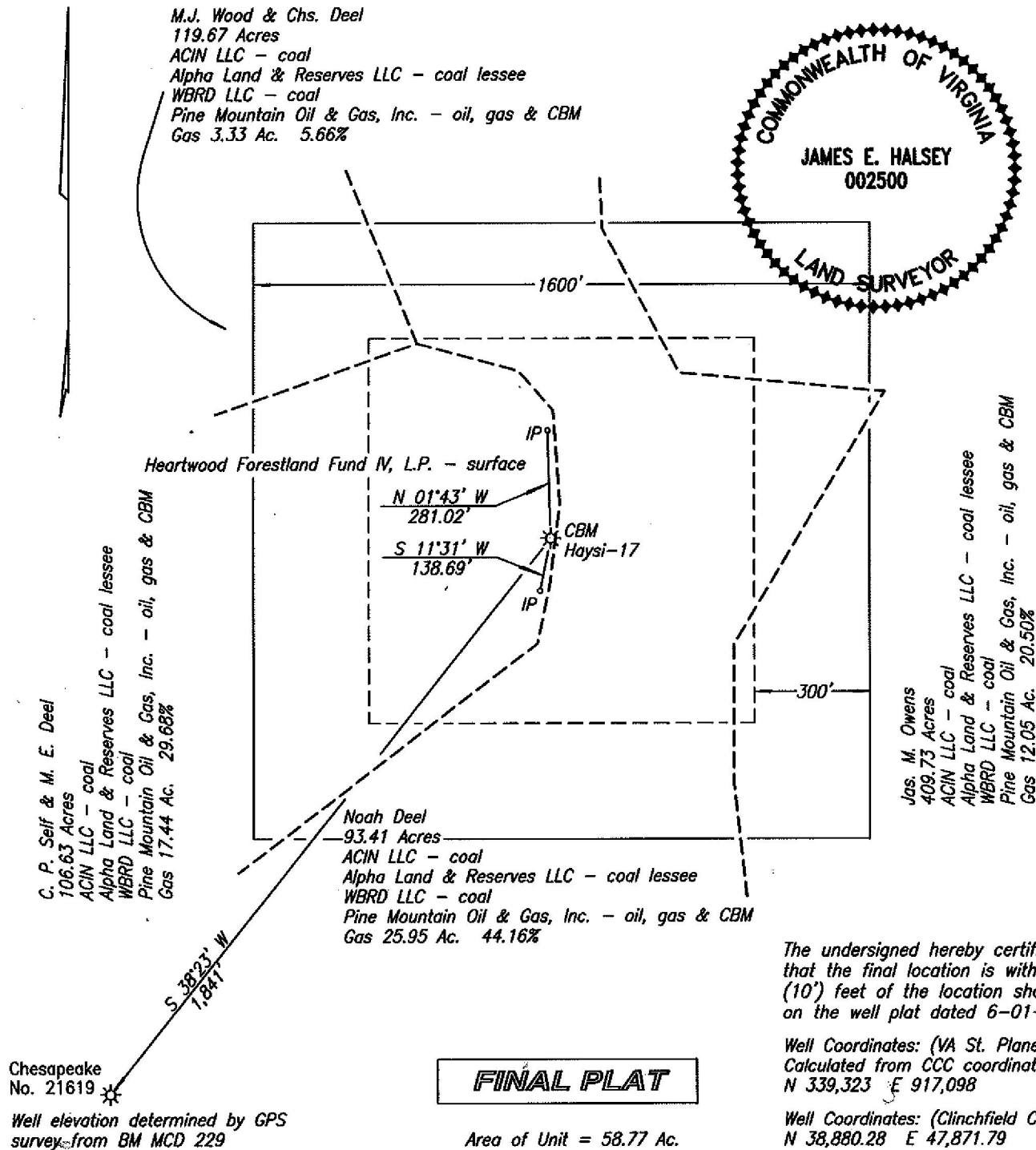
Well Coordinates: (Geographic N27)
37.206736° -82.219306°

Latitude 37° 12' 30" +

3,190'

605'

Longitude 82° 12' 30"



WELL LOCATION PLAT

COMPANY Pine Mountain Oil & Gas, Inc. WELL NAME AND NUMBER Haysi-17
TRACT NO. C.P. Self & M.E. Deel ELEVATION 1,911.00' QUADRANGLE Prater
COUNTY Buchanan DISTRICT Prater SCALE 1" = 400' DATE 1-16-2007

This Plat is a new plat ; an updated plat ; or a final location plat x

+ Denotes the location of a well on United States topographic Maps, scale 1 to 24,000, latitude and longitude lines being represented by border lines as shown.

James E. Halsey
Licensed Professional Engineer or Licensed Land Surveyor

Coal Seams

				MINING IN AREA		
NAME	TOP	BOTTOM	THICKNESS	YES	NO	MINED OUT
Kennedy	784	785	1		NO	
Aily Rider	867	868	1		NO	
Aily	896	897	1		NO	
Raven	970	971	1		NO	
Jawbone Rider	1083	1085	2		NO	
Jawbone	1130	1131	1		NO	
Tiller	1189	1190	1		NO	
Upper Seaboard	1307	1309	2		NO	
Greasy Creek	1443	1445	2		NO	
Upper Horsepen	1602	1603	1		NO	
Middle Horsepen	1659	1661	2		NO	
War Creek	1743	1744	1		NO	
Beckley	1812	1813	1		NO	
Lower Horsepen	1846	1847	1		NO	
Lower Horsepen	1854	1855	1		NO	
Poco 4	2113	2114	1		NO	
Poco 3	2196	2199	3		NO	
Poco 2	2264	2265	1		NO	
Poco 1	2301	2302	1		NO	

Gas and Oil Shows

FORMATION	TOP	BOTTOM	THICKNESS	IPF (MCFD/BOPD)	PRESSURE	HOURS TESTED
-----------	-----	--------	-----------	-----------------	----------	--------------

Open Hole TD

14M

Survey Results

Depth of Survey	Direction/Distance/Degree From True Vertical
210'	0.5°
420'	0.5
600'	0.25°
810'	0.25°
1020'	0.25°
1230'	0.25°
1440'	0.25°
1650'	0.75°
1860'	0.75°
2070'	0.5°
2310'	0.25°

Casing Program

	Casing	Casing	Hole	Cement Used	Cemented To Surface	Date
Casing Type	Size	Interval	Size	In Cubic Ft.	Yes/No	Cemented
Conductor	11.75	0-15	15			
Surface	8.625	0-395	11	155	Yes	1/2/2007
Water Protection	4.5	0-2405	6.5/6.25	488	Yes	1/8/2007

Packers Or Bridge Plugs
Kind/Size/Set

Driller's Log

		General		Depth	Depth	
Geologic Age	Formation	Lithology	Color	Top	Bottom	Thickness
PENN	Lee	SS, SH, Thin Coals		0	784	784
PENN	Lee	Coal		784	785	1
PENN	Lee	SS, SH, Thin Coals		785	867	82
PENN	Lee	Coal		867	868	1
PENN	Lee	SS, SH, Thin Coals		868	896	28
PENN	Lee	Coal		896	897	1
PENN	Lee	SS, SH, Thin Coals		897	970	73
PENN	Lee	Coal		970	971	1
PENN	Lee	SS, SH, Thin Coals		971	1083	112
PENN	Lee	Coal		1083	1085	2
PENN	Lee	SS, SH, Thin Coals		1085	1130	45
PENN	Lee	Coal		1130	1131	1
PENN	Lee	SS, SH, Thin Coals		1131	1189	58
PENN	Lee	Coal		1189	1190	1
PENN	Lee	SS, SH, Thin Coals		1190	1307	117
PENN	Lee	Coal		1307	1309	2
PENN	Lee	SS, SH, Thin Coals		1309	1443	134
PENN	Lee	Coal		1443	1445	2
PENN	Lee	SS, SH, Thin Coals		1445	1602	157
PENN	Lee	Coal		1602	1603	1
PENN	Lee	SS, SH, Thin Coals		1603	1659	56
PENN	Lee	Coal		1659	1661	2
PENN	Lee	SS, SH, Thin Coals		1661	1743	82
PENN	Lee	Coal		1743	1744	1
PENN	Lee	SS, SH, Thin Coals		1744	1812	68
PENN	Lee	Coal		1812	1813	1
PENN	Lee	SS, SH, Thin Coals		1813	1846	33
PENN	Lee	Coal		1846	1847	1
PENN	Lee	SS, SH, Thin Coals		1847	1854	7
PENN	Lee	Coal		1854	1855	1
PENN	Pocahontas	SS, SH, Thin Coals		1855	2113	258
PENN	Pocahontas	Coal		2113	2114	1
PENN	Pocahontas	SS, SH, Thin Coals		2114	2196	82
PENN	Pocahontas	Coal		2196	2199	3
PENN	Pocahontas	SS, SH, Thin Coals		2199	2264	65
PENN	Pocahontas	Coal		2264	2265	1
PENN	Pocahontas	SS, SH, Thin Coals		2265	2301	36
PENN	Pocahontas	Coal		2301	2302	1

[illegible]



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Box 1416; Abingdon, VA 24212
Telephone: (276) 676-5423

Tracking Number: 596
Company: Pine Mountain Oil & Gas
File Number: BU-3292
Operations Name: Haysi #18 W/PL
Operation Type: Coalbed/Pipeline
Completion Report Type: Original

COMPLETION REPORT (DGO-GO-15)

Well Type:	Coalbed/Pipeline	Date Well Completed:	2/16/2007
Driller's Total Depth:	2,460	Log's Total Depth:	2,460

1. Changes In Casing/Tubing from Approved Drilling Report

Description	FileName
Haysi 18 Comp Casing	Haysi 18 Comp Casing.doc

2. Stimulation Record

☐ Stimulated ☐ Not Stimulated ☐ Gob

Description	FileName
Haysi 18 Stimulation	Haysi 18 Stimulation.doc

3. Final Production

Description	FileName
Haysi 18 Final Prod.	Haysi 18 Final Prod.xls

4. Comments

Notes:

5. Signature

Permittee: Pine Mountain Oil & Gas Date: 8/16/2007 2:25:28 PM (Company)

By: Christian D. Moore Title: Permit/GIS Specialist (Signature)

INTERNAL USE ONLY

Submit Date: 8/16/2007

Status: Inspr Approved

Date: 8/30/2007

Final PDF Date: 8/30/2007

HAYSI 18 CASING AND TUBING PROGRAM

	Casing	Casing Interval	Hole Size	Cement Used In Cu/Ft	Cemented To Surface		Date Cemented	Packers Or Bridge Plugs Kind/Size/Set
					Yes	No		
Conductor	11 $\frac{3}{4}$ "	0-28'	15"					
Surface	8 $\frac{5}{8}$ "	0-309'	11"	149	Yes		12/2/06	
Water Protection	4 $\frac{1}{2}$ "	0-2408'	6 $\frac{1}{2}$ "	488	Yes		12/5/06	
Coal Protection								
Other Casing And Tubing Left In Well	2 $\frac{3}{8}$ "	0-2308						
Liners								

STIMULATION RECORD

ZONE 1: Poco 4, 3 Rider, 3 & 2 Formation Stimulated With: N₂ Foam
 Perforated 2122.5 to 2260.5 feet No. of Perforations 15 Perforation Size 0.34
 Formation Broke down at: 2400 PSIG Average Injection Rate: 9.5 BPM
 ISIP 2395 PSIG 5 Min SIP 2148 PSIG Average Downhole Injection Pressure 2888 PSIG
 Stimulated: ☒ Yes ☐ No Date Stimulated: 2/16/07

ZONE 2: Upper, Middle & Lower Horsepen Formation Stimulated With: N₂ Foam
 Perforated 1598.5 to 1775 feet No. of Perforations 21 Perforation Size 0.33
 Formation Broke down at: 2078 PSIG Average Injection Rate: 7.2 BPM
 ISIP 2034 PSIG 5 Min SIP 1884 PSIG Average Downhole Injection Pressure 2951 PSIG
 Stimulated: ☒ Yes ☐ No Date Stimulated: 2/16/07

ZONE 3: Upper Seaboard & Greasy Creek Formation Stimulated With: N₂ Foam
 Perforated 1306.5 to 1460 feet No. of Perforations 21 Perforation Size 0.33
 Formation Broke down at: 2917 PSIG Average Injection Rate: 6.4 BPM
 ISIP 3375 PSIG 5 Min SIP 2882 PSIG Average Downhole Injection Pressure 3404 PSIG
 Stimulated: ☒ Yes ☐ No Date Stimulated: 2/16/07

ZONE 4: JB Rider, Jawbone & Tiller Formation Stimulated With: N₂ Foam
 Perforated 1104 to 1200 feet No. of Perforations 25 Perforation Size 0.33
 Formation Broke down at: 1976 PSIG Average Injection Rate: 7.9 BPM
 ISIP 1824 PSIG 5 Min SIP N/A PSIG Average Downhole Injection Pressure 2991 PSIG
 Stimulated: ☒ Yes ☐ No Date Stimulated: 2/16/07

ZONE 5: Aily & Raven x3 Formation Stimulated With: N₂ Foam
 Perforated 907.5 to 1019.5 feet No. of Perforations 26 Perforation Size 0.33
 Formation Broke down at: 1963 PSIG Average Injection Rate: 8.0 BPM
 ISIP 1688 PSIG 5 Min SIP 1209 PSIG Average Downhole Injection Pressure 2783 PSIG
 Stimulated: ☒ Yes ☐ No Date Stimulated: 2/16/07

Final Production After Stimulation				
	BOD	MCFD	Hours Tested	Rock Pressure
Zone 1				
Zone 2				
Zone 3				
Final/Commingled Zones		36	In-Line	75



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Box 1416; Abingdon, VA 24212
Telephone: (276) 676-5423

Tracking Number: 577
Company: Pine Mountain Oil & Gas
File Number: BU-3292
Operations Name: Haysi #18 W/PL
Operation Type: Coalbed/Pipeline
Drilling Report Type: Original

DRILLING REPORT (DGO-GO-14)

1. Drilling Data

Date drilling commenced: 12/1/2006 Drilling Contractor: Noah Horn
Date drilling completed: 12/5/2006 Rig Type: ☒ Rotary ☐ Cable Tool
Driller's Total Depth (feet): 2,460
Log Total Depth (feet): 2,460 Coal Seam At Total Depth POCAHONTAS #2

2. Final Location Plat (as required by 4 VAC25-150-360.C.)

Permitted State Plane X 915,303 Final Plat State Plane X: 915,305
Permitted State Plane Y: 336,542 Final Plat State Plane Y: 336,538

☐ Plat Previously Submitted Or...

List of Attached Items:

Description	FileName
Haysi 18 Plat	Haysi 18 Plat.pdf

3. Geological Data

Fresh Water At:

Depth (in feet)	Rate	Unit of Measure
-----------------	------	-----------------

Salt Water At:

Depth (in feet)	Rate	Unit of Measure
1,210	Damp	GPM

Coal Seams

List of Attached Items:

Description	FileName
Haysi 18 Coals	Haysi 18 Coal.xls

Gas and Oil Shows

List of Attached Items:

Description	FileName
Haysi 18 Shows	Haysi 18 Shows.xls

4. Electric Logs (As required by 4VAC25-150-280.A.)

List all logs run: Hi Res GR/Dens/Temp/Audio/Pe/Caliper (Data Pack)

Did logs disclose vertical locations of a coal seam? ☒ Yes ☐ No

5. Survey Results (As required by 4VAC25-150-280.B.2)

List of Attached Items:

Description	FileName
Haysi 18 Shows	Haysi 18 Shows.xls

6. Casing and Tubing Program

List of Attached Items:

Description	FileName
Haysi 18 Casing	Haysi 18 Casing.xls

7. Remarks

Use this space to note any conditions or occurrences, such as lost circulation, fishing jobs, junk left in hole, sidetracks, squeeze jobs, etc., not shown above. Include data and depth of condition/occurrence.

Circ 1 bbl to surf on 8 5/8" csng. Circ 12 bbl to surf on 4 1/2" csng.

8. Drillers Log

Compiled By: Noah Horn

List of Attached Items:

Description	FileName
Haysi 18 Log	Haysi 18 Log.xls

9. Comments

10. Signature

Permitee: Pine Mountain Oil & Gas Date: 7/31/2007 (Company)

Signed By: Christian D. Moore Title: Permit/GIS Specialist (Signature)

INTERNAL USE ONLY

Submit Date: 7/31/2007

Status: Inspr Approved

Date: 8/21/2007

Final PDF Date: 8/21/2007

Well Coordinates: (Geographic N27)
37.198899° -82.225080°

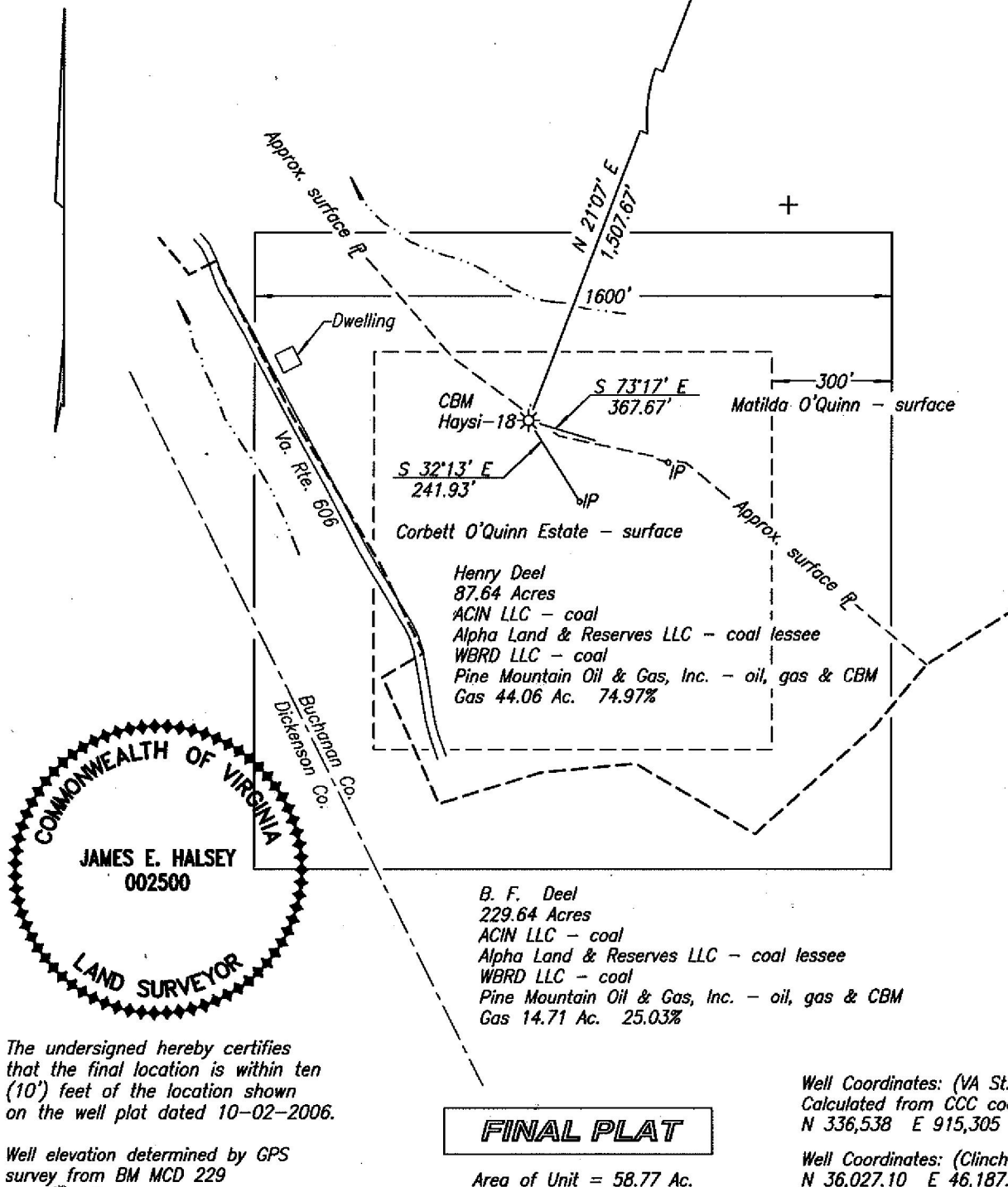
Chesapeake
No. 21619

Latitude 37° 12' 30"

4,880'

3,450'

Longitude 82° 12' 30"



The undersigned hereby certifies
that the final location is within ten
(10') feet of the location shown
on the well plat dated 10-02-2006.

Well elevation determined by GPS
survey from BM MCD 229

FINAL PLAT

Area of Unit = 58.77 Ac.

Well Coordinates: (VA St. Plane S. Zone,
Calculated from CCC coordinates)
N 336,538 E 915,305

Well Coordinates: (Clinchfield Coal Co.)
N 36,027.10 E 46,187.77

WELL LOCATION PLAT

COMPANY Pine Mountain Oil & Gas, Inc. WELL NAME AND NUMBER Haysi-18
TRACT NO. Henry Deel ELEVATION 1,913.36' QUADRANGLE Prater
COUNTY Buchanan DISTRICT Prater SCALE 1" = 400' DATE 12-04-2006

This Plat is a new plat ; an updated plat ; or a final location plat x

+ Denotes the location of a well on United States topographic Maps, scale 1 to
24,000, latitude and longitude lines being represented by border lines as shown.

James E. Halsey
Licensed Professional Engineer or Licensed Land Surveyor

Coal Seams

				MINING IN AREA		
NAME	TOP	BOTTOM	THICKNESS	YES	NO	MINED OUT
Aily	908	909	1		NO	
Raven	989	990	1		NO	
Raven	1007	1008	1		NO	
Raven	1018	1019	1		NO	
Jawbone Rider	1105	1107	2		NO	
Jawbone	1143	1144	1		NO	
Tiller	1199	1200	1		NO	
Upper Seaboard	1307	1309	2		NO	
Greasy Creek	1457	1459	2		NO	
Upper Horsepen	1599	1600	1		NO	
Middle Horsepen	1658	1660	2		NO	
Lower Horsepen	1774	1775	1		NO	
Poco 4	2123	2124	1		NO	
Poco 3 rider	2182	2183	1		NO	
Poco 3	2198	2200	2		NO	
Poco 2	2260	2261	1		NO	

Gas and Oil Shows

FORMATION	TOP	BOTTOM	THICKNESS	IPF (MCFD/BOPD)	PRESSURE	HOURS TESTED
Open Hole TD				21.8M		
Cased Hole TD				22.2M		

Gas and Oil Shows

FORMATION	TOP	BOTTOM	THICKNESS	IPF (MCFD/BOPD)	PRESSURE	HOURS TESTED
Open Hole TD				21.8M		
Cased Hole TD				22.2M		

Casing Program

	Casing	Casing	Hole	Cement Used	Cemented To Surface	Date
Casing Type	Size	Interval	Size	In Cubic Ft.	Yes/No	Cemented
Conductor	11.75	0-28	15			
Surface	8.625	0-309	11	149	Yes	12/2/2006
Water Protection	4.5	0-2408	6.5	488	Yes	12/5/2006

Packers Or Bridge Plugs
Kind/Size/Set

Driller's Log

		General		Depth	Depth	
Geologic Age	Formation	Lithology	Color	Top	Bottom	Thickness
PENN	Lee	SS, SH, Thin Coals		0	908	908
PENN	Lee	Coal		908	909	1
PENN	Lee	SS, SH, Thin Coals		909	989	80
PENN	Lee	Coal		989	990	1
PENN	Lee	SS, SH, Thin Coals		990	1007	17
PENN	Lee	Coal		1007	1008	1
PENN	Lee	SS, SH, Thin Coals		1008	1018	10
PENN	Lee	Coal		1018	1019	1
PENN	Lee	SS, SH, Thin Coals		1019	1105	86
PENN	Lee	Coal		1105	1107	2
PENN	Lee	SS, SH, Thin Coals		1107	1143	36
PENN	Lee	Coal		1143	1144	1
PENN	Lee	SS, SH, Thin Coals		1144	1199	55
PENN	Lee	Coal		1199	1200	1
PENN	Lee	SS, SH, Thin Coals		1200	1307	107
PENN	Lee	Coal		1307	1309	2
PENN	Lee	SS, SH, Thin Coals		1309	1457	148
PENN	Lee	Coal		1457	1459	2
PENN	Lee	SS, SH, Thin Coals		1459	1599	140
PENN	Lee	Coal		1599	1600	1
PENN	Lee	SS, SH, Thin Coals		1600	1774	174
PENN	Lee	Coal		1774	1775	1
PENN	Pocahontas	SS, SH, Thin Coals		1775	2123	348
PENN	Pocahontas	Coal		2123	2124	1
PENN	Pocahontas	SS, SH, Thin Coals		2124	2182	58
PENN	Pocahontas	Coal		2182	2183	1
PENN	Pocahontas	SS, SH, Thin Coals		2183	2198	15
PENN	Pocahontas	Coal		2198	2200	2
PENN	Pocahontas	SS, SH, Thin Coals		2200	2260	60
PENN	Pocahontas	Coal		2260	2261	1
PENN	Pocahontas	SS, SH, Thin Coals		2261	2460	199

[illegible]



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Box 1416; Abingdon, VA 24212
Telephone: (276) 676-5423

Tracking Number: 597
Company: Pine Mountain Oil & Gas
File Number: BU-3375
Operations Name: Haysi #19 W/PL
Operation Type: Coalbed/Pipeline
Completion Report Type: Original

COMPLETION REPORT (DGO-GO-15)

Well Type:	Coalbed/Pipeline	Date Well Completed:	3/30/2007
Driller's Total Depth:	2,280	Log's Total Depth:	2,271

1. Changes In Casing/Tubing from Approved Drilling Report

Description	FileName
Haysi 19 Comp Casing	Haysi 19 Comp Casing.xls

2. Stimulation Record

☒ Stimulated ☐ Not Stimulated ☐ Gob

Description	FileName
Haysi 19 Stimulation	Haysi 19 Stimulation.doc

3. Final Production

Description	FileName
Haysi 19 Final Prod.	Haysi 19 Final Prod.xls

4. Comments

Notes:

5. Signature

Permittee: Pine Mountain Oil & Gas Date: 8/16/2007 2:29:10 PM (Company)

By: Christian D. Moore Title: Permit/GIS Specialist (Signature)

INTERNAL USE ONLY

Submit Date: 8/16/2007

Status: Inspr Approved

Date: 9/4/2007

Final PDF Date: 11/5/2007

Casing Program

	Casing	Casing	Hole	Cement Used	Cemented To Surface	Date
Casing Type	Size	Interval	Size	In Cubic Ft.	Yes/No	Cemented

Packers Or Bridge Plugs
Kind/Size/Set

STIMULATION RECORD (Use additional sheets with this format, if more than three zones are stimulated.)

ZONE 1: Poco 4, 3 & 2 Formation Stimulated With: N2 Foam
 Perforated 2016.5 to 2124.8 feet No. of Perforations 17 Perforation Size 0.33
 Formation Broke down at: 3228 PSIG Average Injection Rate: 16.9 BPM
 ISIP 1856 PSIG 5 Min SIP 1770 PSIG Average Downhole Injection Pressure 2713 PSIG
 Stimulated: ☒ Yes ☐ No Date Stimulated: 3/30/07

ZONE 2: U. Hpen, M. Hpen, L. Hpen & Poco 9 Formation Stimulated With: N2 Foam
 Perforated 1459.5 to 1696.6 feet No. of Perforations 25 Perforation Size 0.33
 Formation Broke down at: 2790 PSIG Average Injection Rate: 20.7 BPM
 ISIP 1480 PSIG 5 Min SIP 1433 PSIG Average Downhole Injection Pressure 2435 PSIG
 Stimulated: ☒ Yes ☐ No Date Stimulated: 3/30/07

ZONE 3: Upper Seaboard & Greasy Creek Formation Stimulated With: N2 Foam
 Perforated 1176.5 to 1318 feet No. of Perforations 23 Perforation Size 0.33
 Formation Broke down at: 2047 PSIG Average Injection Rate: 11.4 BPM
 ISIP 1768 PSIG 5 Min SIP 1698 PSIG Average Downhole Injection Pressure 2848 PSIG
 Stimulated: ☒ Yes ☐ No Date Stimulated: 3/30/07

ZONE 4: Jb Rider, Jawbone x2, Tiller Formation Stimulated With: N2 Foam
 Perforated 971.5 to 1061.5 feet No. of Perforations 28 Perforation Size 0.33
 Formation Broke down at: 2330 PSIG Average Injection Rate: 16.0 BPM
 ISIP N/A PSIG 5 Min SIP N/A PSIG Average Downhole Injection Pressure 3186 PSIG
 Stimulated: ☒ Yes ☐ No Date Stimulated: 3/30/07

ZONE 5: _____ Formation Stimulated With: _____
 Perforated _____ to _____ feet No. of Perforations _____ Perforation Size _____
 Formation Broke down at: _____ PSIG Average Injection Rate: _____ BPM
 ISIP _____ PSIG 5 Min SIP _____ PSIG Average Downhole Injection Pressure _____ PSIG
 Stimulated: ☒ Yes ☐ No Date Stimulated: _____

Final Production After Stimulation				
	BOD	MCFD	Hours Tested	Rock Pressure
Zone 1				
Zone 2				
Zone 3				
Final/Commingled Zones		34	In-Line	60



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Box 1416; Abingdon, VA 24212
Telephone: (276) 676-5423

Tracking Number: 592
Company: Pine Mountain Oil & Gas
File Number: BU-3375
Operations Name: Haysi #19 W/PL
Operation Type: Coalbed/Pipeline
Drilling Report Type: Original

DRILLING REPORT (DGO-GO-14)

1. Drilling Data

Date drilling commenced: 3/16/2007 Drilling Contractor: Noah Horn
Date drilling completed: 3/22/2007 Rig Type: ☒ Rotary ☐ Cable Tool
Driller's Total Depth (feet): 2,280
Log Total Depth (feet): 2,271 Coal Seam At Total Depth POCAHONTAS #2

2. Final Location Plat (as required by 4 VAC25-150-360.C.)

Permitted State Plane X 915,700 Final Plat State Plane X: 915,700
Permitted State Plane Y: 335,025 Final Plat State Plane Y: 335,031

☐ Plat Previously Submitted Or...

List of Attached Items:

Description	FileName
Haysi 19 Plat	Haysi 19 Plat.pdf

3. Geological Data

Fresh Water At:

Depth (in feet)	Rate	Unit of Measure
264	Damp	

Salt Water At:

Depth (in feet)	Rate	Unit of Measure
1,240	Damp	
2,247	Log	
2,260	Video	

Coal Seams

List of Attached Items:

Description	FileName
Haysi 19 Coal	Haysi 19 Coal.xls

Gas and Oil Shows

List of Attached Items:

Description	FileName
Haysi 19 Shows	Haysi 19 Shows.xls

4. Electric Logs (As required by 4VAC25-150-280.A.)

List all logs run: Hi Res GR/Dens/Temp/Audio/Pe/Caliper (Data Pack)

Did logs disclose vertical locations of a coal seam? ☒ Yes ☐ No

5. Survey Results (As required by 4VAC25-150-280.B.2)

List of Attached Items:

Description	FileName
Haysi 19 Survey	Haysi 19 Survey.xls

6. Casing and Tubing Program

List of Attached Items:

Description	FileName
Haysi 19 Casing	Haysi 19 Casing.xls

7. Remarks

Use this space to note any conditions or occurrences, such as lost circulation, fishing jobs, junk left in hole, sidetracks, squeeze jobs, etc., not shown above. Include data and depth of condition/occurrence.

Circ 15 bbls to surf on 8" csng. Circ 10 bbls to surf on 4½" csng.

8. Drillers Log

Compiled By: Noah Horn

List of Attached Items:

Description	FileName
Haysi 19 Log	Haysi 19 Log.xls

9. Comments

10. Signature

Permitee: Pine Mountain Oil & Gas Date: 8/7/2007 (Company)

Signed By: Christian D. Moore Title: Permit/GIS Specialist (Signature)

INTERNAL USE ONLY

Submit Date: 8/7/2007

Status: Inspr Approved

Date: 8/8/2007

Final PDF Date: 8/8/2007

Well Coordinates: (Geographic N27)
37.194806° -82.223520°

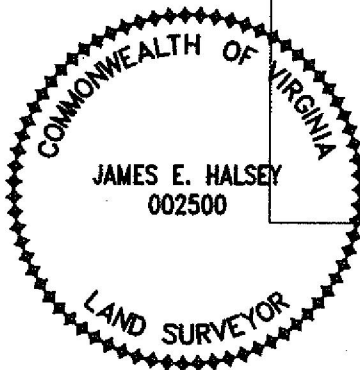
Latitude 37° 12' 30"

4,425'

Longitude 82° 12' 30"

4,950'

H. H. Viers
185.73 Acres
ACIN LLC - coal
Alpha Land & Reserves LLC - coal lessee
WBRD LLC - coal
Pine Mountain Oil & Gas, Inc. - oil, gas & CBM
Gas 11.86 Ac. 20.18%



The undersigned hereby certifies
that the final location is within ten
(10') feet of the location shown
on the well plat dated 1-08-2007.

Well elevation determined by GPS
survey from BM MCD 229

FINAL PLAT

Area of Unit = 58.77 Ac.

B. F. Deel
229.64 Acres
ACIN LLC - coal
Alpha Land & Reserves LLC - coal lessee
WBRD LLC - coal
Pine Mountain Oil & Gas, Inc. - oil, gas & CBM
Gas 46.91 Ac. 79.82%

Well Coordinates: (VA St. Plane S. Zone,
Calculated from CCC coordinates)
N 335,031 E 915,700

Well Coordinates: (Clinchfield Coal Co.)
N 34,536.74 E 46,642.66

WELL LOCATION PLAT

COMPANY Pine Mountain Oil & Gas, Inc. WELL NAME AND NUMBER Haysi-19
TRACT NO. B.F. Deel ELEVATION 1,799.75' QUADRANGLE Prater
COUNTY Buchanan DISTRICT Prater SCALE 1" = 400' DATE 3-22-2007
This Plat is a new plat ; an updated plat ; or a final location plat x

+ Denotes the location of a well on United States topographic Maps, scale 1 to
24,000, latitude and longitude lines being represented by border lines as shown.

James E. Halsey
Licensed Professional Engineer or Licensed Land Surveyor

Coal Seams

				MINING IN AREA		
NAME	TOP	BOTTOM	THICKNESS	YES	NO	MINED OUT
Jawbone Rider	973	975	2		NO	
Jawbone	1010	1012	2		NO	
Jawbone	1025	1026	1		NO	
Tiller	1065	1067	2		NO	
Upper Seaboard	1181	1183	2		NO	
Greasy Creek	1319	1321	2		NO	
Upper Horsepen	1463	1465	2		NO	
Middle Horsepen	1511	1512	1		NO	
Lower Horsepen	1631	1632	1		NO	
Poco 9	1697	1698	1		NO	
Poco 4	2017	2019	2		NO	
Poco 3	2057	2060	3		NO	
Poco 2	2124	2125	1		NO	

Gas and Oil Shows

FORMATION	TOP	BOTTOM	THICKNESS	IPF (MCFD/BOPD)	PRESSURE	HOURS TESTED
-----------	-----	--------	-----------	-----------------	----------	--------------

Open Hole TD

No Show

Survey Results

Depth of Survey	Direction/Distance/Degree From True Vertical
210	0°
420	0°
600	¼°
810	¼°
1020	¼°
1230	½°
1440	¼°
1650	¼°
1800	¼°
2010	¼°
2220	¼°

Casing Program

	Casing	Casing	Hole	Cement Used	Cemented To Surface	Date
Casing Type	Size	Interval	Size	In Cubic Ft.	Yes/No	Cemented
Conductor	11 ³ / ₄ "	26'	15"			
Surface	8 ⁵ / ₈ "	401'	11"	190	Yes	3/19/2007
Water Protection	4 ¹ / ₂ "	2229'	6 ¹ / ₂ "	671	Yes	3/22/2007

Packers Or Bridge Plugs
Kind/Size/Set

Driller's Log

[illegible]

Depth	Depth		
Top	Bottom	Thickness	Remarks
0	973	973	
973	975	2	Jawbone Rider
975	1010	35	
1010	1012	2	Jawbone
1012	1025	13	
1025	1026	1	Jawbone
1026	1065	39	
1065	1067	2	Tiller
1067	1181	114	
1181	1183	2	Upper Seaboard
1183	1319	136	
1319	1321	2	Greasy Creek
1321	1463	142	
1463	1465	2	Upper Horsepen
1465	1511	46	
1511	1512	1	Middle Horsepen
1512	1631	119	
1631	1632	1	Lower Horsepen
1632	1697	65	
1697	1698	1	Poco 9
1698	2017	319	
2017	2019	2	Poco 4
2019	2057	38	
2057	2060	3	Poco 3
2060	2124	64	
2124	2125	1	Poco 2
2125	2271	146	



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Box 1416; Abingdon, VA 24212
Telephone: (276) 676-5423

Tracking Number: 598
Company: Pine Mountain Oil & Gas
File Number: BU-3458
Operations Name: Haysi #21 W/PL
Operation Type: Coalbed/Pipeline
Completion Report Type: Original

COMPLETION REPORT (DGO-GO-15)

Well Type:	Coalbed/Pipeline	Date Well Completed:	6/13/2007
Driller's Total Depth:	2,304	Log's Total Depth:	2,295

1. Changes In Casing/Tubing from Approved Drilling Report

Description	FileName
Haysi 21 Comp Casing	Haysi 19 Comp Casing.xls

2. Stimulation Record

☐ Stimulated ☐ Not Stimulated ☐ Gob

Description	FileName
Haysi 21 Stimulation	Haysi 19 Stimulation.doc

3. Final Production

Description	FileName
Haysi 21 Final Prod	Haysi 19 Final Prod.xls

4. Comments

Notes:

5. Signature

Permittee: Pine Mountain Oil & Gas Date: 8/16/2007 2:34:50 PM (Company)

By: Christian D. Moore Title: Permit/GIS Specialist (Signature)

INTERNAL USE ONLY

Submit Date: 8/16/2007

Status: Inspr Approved

Date: 9/4/2007

Final PDF Date: 9/4/2007

Casing Program

	Casing	Casing	Hole	Cement Used	Cemented To Surface	Date
Casing Type	Size	Interval	Size	In Cubic Ft.	Yes/No	Cemented

Packers Or Bridge Plugs
Kind/Size/Set

STIMULATION RECORD (Use additional sheets with this format, if more than three zones are stimulated.)

ZONE 1: Poco 4, 3 & 2 Formation Stimulated With: N2 Foam
 Perforated 2016.5 to 2124.8 feet No. of Perforations 17 Perforation Size 0.33
 Formation Broke down at: 3228 PSIG Average Injection Rate: 16.9 BPM
 ISIP 1856 PSIG 5 Min SIP 1770 PSIG Average Downhole Injection Pressure 2713 PSIG
 Stimulated: ☒ Yes ☐ No Date Stimulated: 3/30/07

ZONE 2: U. Hpen, M. Hpen, L. Hpen & Poco 9 Formation Stimulated With: N2 Foam
 Perforated 1459.5 to 1696.6 feet No. of Perforations 25 Perforation Size 0.33
 Formation Broke down at: 2790 PSIG Average Injection Rate: 20.7 BPM
 ISIP 1480 PSIG 5 Min SIP 1433 PSIG Average Downhole Injection Pressure 2435 PSIG
 Stimulated: ☒ Yes ☐ No Date Stimulated: 3/30/07

ZONE 3: Upper Seaboard & Greasy Creek Formation Stimulated With: N2 Foam
 Perforated 1176.5 to 1318 feet No. of Perforations 23 Perforation Size 0.33
 Formation Broke down at: 2047 PSIG Average Injection Rate: 11.4 BPM
 ISIP 1768 PSIG 5 Min SIP 1698 PSIG Average Downhole Injection Pressure 2848 PSIG
 Stimulated: ☒ Yes ☐ No Date Stimulated: 3/30/07

ZONE 4: Jb Rider, Jawbone x2, Tiller Formation Stimulated With: N2 Foam
 Perforated 971.5 to 1061.5 feet No. of Perforations 28 Perforation Size 0.33
 Formation Broke down at: 2330 PSIG Average Injection Rate: 16.0 BPM
 ISIP N/A PSIG 5 Min SIP N/A PSIG Average Downhole Injection Pressure 3186 PSIG
 Stimulated: ☒ Yes ☐ No Date Stimulated: 3/30/07

ZONE 5: _____ Formation Stimulated With: _____
 Perforated _____ to _____ feet No. of Perforations _____ Perforation Size _____
 Formation Broke down at: _____ PSIG Average Injection Rate: _____ BPM
 ISIP _____ PSIG 5 Min SIP _____ PSIG Average Downhole Injection Pressure _____ PSIG
 Stimulated: ☒ Yes ☐ No Date Stimulated: _____

Final Production After Stimulation				
	BOD	MCFD	Hours Tested	Rock Pressure
Zone 1				
Zone 2				
Zone 3				
Final/Commingled Zones		34	In-Line	60



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Box 1416; Abingdon, VA 24212
Telephone: (276) 676-5423

Tracking Number: 601
Company: Pine Mountain Oil & Gas
File Number: BU-3458
Operations Name: Haysi #21 W/PL
Operation Type: Coalbed/Pipeline
Drilling Report Type: Original

DRILLING REPORT (DGO-GO-14)

1. Drilling Data

Date drilling commenced: 5/9/2007 Drilling Contractor: Noah Horn
Date drilling completed: 5/18/2007 Rig Type: ☒ Rotary ☐ Cable Tool
Driller's Total Depth (feet): 2,304
Log Total Depth (feet): 2,295 Coal Seam At Total Depth POCAHONTAS #2

2. Final Location Plat (as required by 4 VAC25-150-360.C.)

Permitted State Plane X 918,255 Final Plat State Plane X: 918,255
Permitted State Plane Y: 334,506 Final Plat State Plane Y: 334,510

☐ Plat Previously Submitted Or...

List of Attached Items:

Description	FileName
Haysi 21 Plat	Haysi 21 Plat.pdf

3. Geological Data

Fresh Water At:

Depth (in feet)	Rate	Unit of Measure
960	Damp	

Salt Water At:

Depth (in feet)	Rate	Unit of Measure
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Coal Seams

List of Attached Items:

Description	FileName
Haysi 21 Coal	Haysi 21 Coal.xls

Gas and Oil Shows

List of Attached Items:

Description	FileName
Haysi 21 Shows	Haysi 21 Shows.xls

4. Electric Logs (As required by 4VAC25-150-280.A.)

List all logs run: Hi Res GR/Dens/Temp/Audio/Pe/Caliper (Data Pack)

Did logs disclose vertical locations of a coal seam? ☐ Yes ☒ No

5. Survey Results (As required by 4VAC25-150-280.B.2)

List of Attached Items:

Description	FileName
Haysi 21 Survey	Haysi 21 Survey.xls

6. Casing and Tubing Program

List of Attached Items:

Description	FileName
Haysi 21 Casing	Haysi 21 Casing.xls

7. Remarks

Use this space to note any conditions or occurrences, such as lost circulation, fishing jobs, junk left in hole, sidetracks, squeeze jobs, etc., not shown above. Include data and depth of condition/occurrence.

Basket @ 88' in 11" hole; Circ 10 bbl to surf. Circ 10 bbl to surf on 6½ hole.

8. Drillers Log

Compiled By: Noah Horn

List of Attached Items:

Description	FileName
Haysi 21 Log	Haysi 21 Log.xls

9. Comments

10. Signature

Permitee: Pine Mountain Oil & Gas Date: 8/10/2007 (Company)

Signed By: Christian D. Moore Title: Permit/GIS Specialist (Signature)

INTERNAL USE ONLY

Submit Date: 8/10/2007

Status: Inspr Approved

Date: 8/21/2007

Final PDF Date: 8/22/2007

Well Coordinates: (Geographic N27)
37.193653° -82.214686°

Latitude 37° 12' 30"

1,845'

Longitude 82° 12' 30"

5,370'

W. C. Owens
115.81 Acres
ACIN LLC - coal
Alpha Land & Reserves LLC - coal lessee
WBRD LLC - coal
Paramount Coal Company LLC - coal lessee
Pine Mountain Oil & Gas, Inc. - oil, gas & CBM
Gas 6.88 Ac. 11.71%

B. E. Arrington
68.39 Acres
ACIN LLC - coal
Alpha Land & Reserves LLC - coal lessee
WBRD LLC - coal
Paramount Coal Company LLC - coal lessee
Pine Mountain Oil & Gas, Inc. - oil, gas & CBM
Gas 24.90 Ac. 42.37%

Heartwood Forestland Fund, IV - surface

Dwelling

S 84°40' W
261.48'

Haysi-3

N 85°15' W
966'

IP

CBM
Haysi-21

IP

S 69°53' W
185.17'

Barry Owens - surface

Jerry Coleman, et al - coal, oil, gas & CBM
32.4 Acres
Gas 8.30 Ac. 14.12%

Dwelling

Tommy Francis Boyd - coal, oil, gas & CBM
6 Acres
Gas 4.50 Ac. 7.66%

Jno. Raines
105.89 Acres
ACIN LLC - coal
Alpha Land & Reserves LLC - coal lessee
WBRD LLC - coal
Paramount Coal Company LLC - coal lessee
Pine Mountain Oil & Gas, Inc. - oil, gas & CBM
Gas 13.50 Ac. 22.97%

S. M. Compton
111.88 Acres
ACIN LLC - coal
Alpha Land & Reserves LLC - coal lessee
WBRD LLC - coal
Paramount Coal Company LLC - coal lessee
Pine Mountain Oil & Gas, Inc. - oil, gas & CBM
Gas 0.69 Ac. 1.17%

Well Coordinates: (VA St. Plane S. Zone,
Calculated from CCC coordinates)
N 334,510 E 918,255

Well Coordinates: (Clinchfield Coal Co.)
N 34,116.91 E 49,219.18

FINAL PLAT

Area of Unit = 58.77 Ac.

The undersigned hereby certifies
that the final location is within ten
(10') feet of the location shown
on the well plat dated 3-12-2007.

Well elevation determined by GPS
survey from HARN Mon. P-424

WELL LOCATION PLAT

COMPANY Pine Mountain Oil & Gas, Inc. WELL NAME AND NUMBER Haysi-21
TRACT NO. B. E. Arrington ELEVATION 1,844.53' QUADRANGLE Prater
COUNTY Buchanan DISTRICT Prater SCALE 1" = 400' DATE 5-11-2007

This Plat is a new plat ; an updated plat ; or a final location plat x

+ Denotes the location of a well on United States topographic Maps, scale 1 to
24,000, latitude and longitude lines being represented by border lines as shown.

James C. Halsey
Licensed Professional Engineer or Licensed Land Surveyor

Coal Seams

				MINING IN AREA		
NAME	TOP	BOTTOM	THICKNESS	YES	NO	MINED OUT
Kennedy	623	624		1	NO	
Aily Rider	713	714		1	NO	
Aily	748	750		2	NO	
Raven	830	831		1	NO	
Jawbone Rider	951	953		2	NO	
Jawbone	982	984		2	NO	
Tiller	1043	1044		1	NO	
Upper Seaboard	1160	1163		3	NO	
Greasy Creek	1287	1289		2	NO	
Upper Horsepen	1442	1443		1	NO	
Middle Horsepen	1498	1499		1	NO	
War Creek	1575	1576		1	NO	
Lower Horsepen	1618	1620		2	NO	
Poco 9	1696	1697		1	NO	
Poco 4	1986	1987		1	NO	
Poco 3	2066	2069		3	NO	
Poco 2	2129	2130		1	NO	

Gas and Oil Shows

FORMATION	TOP	BOTTOM	THICKNESS	IPF (MCFD/BOPD)	PRESSURE	HOURS TESTED
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Open Hole TD

6.2M

Survey Results

Depth of Survey	Direction/Distance/Degree From True Vertical
210	0°
420	¼°
600	¼°
810	¼°
1020	¼°
1200	¼°
1410	¼°
1620	¼°
1800	¼°
2101	¼°
2220	¼°

Casing Program

	Casing	Casing	Hole	Cement Used	Cemented To Surface	Date
Casing Type	Size	Interval	Size	In Cubic Ft.	Yes/No	Cemented
Conductor	11 ³ / ₄ "	0-20'	15"			
Surface	8 ⁵ / ₈ "	0-345'	11"	169	Yes	5/10/2007
Water Protection	4 ¹ / ₂ "	0-2266'	6 ¹ / ₂ "	417	Yes	5/18/2007
Tubing	2 ³ / ₈ "	0-2167				

Packers Or Bridge Plugs
Kind/Size/Set

Driller's Log

[illegible]

Depth	Depth		
Top	Bottom	Thickness	Remarks
0	623	623	
623	624		Kennedy
624	713		
713	714		Aily Rider
714	748		
748	750		Aily
750	830		
830	831	1	Raven
831	951	120	
951	953	2	Jawbone Rider
953	982	29	
982	984	2	Jawbone
984	1043	59	
1043	1044	1	Tiller
1044	1160	116	
1160	1163	3	Upper Seaboard
1163	1287	124	
1287	1289	2	Greasy Creek
1289	1442	153	
1442	1443	1	Upper Horsepen
1443	1498	55	
1498	1499	1	Middle Horsepen
1499	1575	76	
1575	1576	1	War Creek
1576	1618	42	
1618	1620	2	Lower Horsepen
1620	1696	76	
1696	1697	1	Poco 9
1697	1986	289	
1986	1987	1	Poco 4
1987	2066	79	
2066	2069	3	Poco 3
2069	2129	60	
2129	2130	1	Poco 3
2130	2301	171	



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Drawer 159, Lebanon, VA 24266
Telephone: (276) 415-9650

Tracking Number: 6548
Company: Range Resources-Pine Mountain,
File Number: BU-5078
Completion Report Type: Original

COMPLETION REPORT (DGO-GO-15)

Well Type:	<u>Coalbed/Pipeline</u>	Date Well Completed:	<u>4/10/2015</u>
Driller's Total Depth:	<u>2520.00</u>	Log's Total Depth:	<u>2522.00</u>

1. Changes In Casing/Tubing from Approved Drilling Report

Description	FileName
Haysi 35 Casing/Tubing	Casing Haysi 35.xlsx

2. Stimulation Record

Stimulation Status: ☒ Stimulated ☐ GOB ☐ Not Stimulated ☐ Service Well

Description	FileName
Haysi 35 Completion Report	Haysi 35 Completion Report.pdf

3. Final Production

Description	FileName
Haysi 35 Final Production	Final_Prod.xls

4. Comments

Notes:

5. Signature

Permittee: Range Resources-Pine Mountain, _____ Date: 4/24/2015 _____ (Company)

By: Laura Murray _____ Title: Regulatory Compliance Specialist _____ (Signature)

INTERNAL USE ONLY

Submit Date: 4/24/2015 _____

Status: Approved _____

Date: 5/1/2015 _____

Final PDF Date: 5/21/2015 _____

Casing Program

	Casing	Casing	Hole	Cement Used	Cemented To Surface	Date	Packers Or Bridge Plugs	Cement Baskets
Casing Type	Size	Interval	Size	In Cubic Ft.	Yes/No	Cemented	Kind/Size/Set	(ft)
Conductor	13 3/8	0-92'	15		No			
Water Protection	9 5/8	0-344'	12 3/8	182	Yes	12/08/14		48' 92'
Coal Protection								
Production Casing	4½"	0-2475'	6 1/2	473	Yes	12/10/14		910'
Other Casing And Tubing Left In Well	2¾"	0-2403						
Liners								

Completion Report**105010446 --Haysi 35**

Stage:	<u>01</u>	Service Co.	C&J Energy	Avg DH Rate:	57.5
Stage Date:	04/10/2015	Fluid Type:	70Q Foam	Max DH Rate:	63.0
Perf Date:	04/10/2015	BD:	1801	Total Slurry Volume:	682
Logging Co.	KLX (Blue Dot)	ISIP:	0	Total Fluid Volume:	658
Formation	Poco #4, #3, #2, #2	Avg Press:	3342	Avg N2 Rate:	43,000
Perf Top:	2200	Max Treat Pressure:	3447	Max N2 Rate:	45,200
Perf Bottom:	2375.7	Final ISIP:	1812	Total N2 Volume:	1,270,200
# Shots:	34	2 Min SIP:	0	Max DH PPA:	1.40
Perf Size:	0.52	5 Min SIP:	0	Total Proppant Sks:	288
Perf Comments:		10 Min SIP:	0	Total Acid:	250
		Sand Mesh:	20/40 Sand	Acid Type:	15% HCL
Comments:		Frac Gradient:	1.2		

Stage:	<u>02</u>	Service Co.	C&J Energy	Avg DH Rate:	58.0
Stage Date:	04/10/2015	Fluid Type:	70Q Foam	Max DH Rate:	60.0
Perf Date:	04/10/2015	BD:	2031	Total Slurry Volume:	229
Logging Co.	KLX (Blue Dot)	ISIP:	0	Total Fluid Volume:	215
Formation	Up Horsepen, Mid Horsepen, Greasy Creek	Avg Press:	3409	Avg N2 Rate:	41,100
Perf Top:	1694.4	Max Treat Pressure:	3633	Max N2 Rate:	42,000
Perf Bottom:	1862.7	Final ISIP:	1406	Total N2 Volume:	432,400
# Shots:	28	2 Min SIP:	0	Max DH PPA:	1.80
Perf Size:	0.52	5 Min SIP:	0	Total Proppant Sks:	169
Perf Comments:		10 Min SIP:	0	Total Acid:	250
		Sand Mesh:	20/40 Sand	Acid Type:	15% HCL
Comments:		Frac Gradient:	1.3		

Stage:	<u>03</u>	Service Co.	C&J Energy	Avg DH Rate:	38.0
Stage Date:	04/10/2015	Fluid Type:	70Q Foam	Max DH Rate:	43.0
Perf Date:	04/10/2015	BD:	2803	Total Slurry Volume:	174
Logging Co.	KLX (Blue Dot)	ISIP:	0	Total Fluid Volume:	171
Formation	Upper Seaboard, Greasy Creek	Avg Press:	4401	Avg N2 Rate:	37,900
Perf Top:	1395.6	Max Treat Pressure:	4634	Max N2 Rate:	38,200
Perf Bottom:	1551.7	Final ISIP:	1904	Total N2 Volume:	338,600
# Shots:	20	2 Min SIP:	0	Max DH PPA:	1.40
Perf Size:	0.52	5 Min SIP:	0	Total Proppant Sks:	49
Perf Comments:		10 Min SIP:	0	Total Acid:	250
		Sand Mesh:	20/40 Sand	Acid Type:	15% HCL
Comments:		Frac Gradient:	1.8		

Stage:	<u>04</u>	Service Co.	C&J Energy	Avg DH Rate:	61.5
Stage Date:	04/10/2015	Fluid Type:	70Q Foam	Max DH Rate:	63.5
Perf Date:	04/10/2015	BD:	1850	Total Slurry Volume:	463

Completion Report

105010446 --Haysi 35

Logging Co.	KLX (Blue Dot)	ISIP:	0	Total Fluid Volume:	442
Formation	Jawbone Rider, Jawbone, Tiller	Avg Press:	3196	Avg N2 Rate:	40,200
Perf Top:	1192.7	Max Treat Pressure:	3535	Max N2 Rate:	42,300
Perf Bottom:	1291	Final ISIP:	1069	Total N2 Volume:	840,400
# Shots:	30	2 Min SIP:	0	Max DH PPA:	1.80
Perf Size:	0.52	5 Min SIP:	0	Total Proppant Sks:	266
Perf Comments:		10 Min SIP:	0	Total Acid:	750
		Sand Mesh:	20/40 Sand	Acid Type:	15% HCL
Comments:		Frac Gradient:	1.3		

Stage:	05	Service Co.	C&J Energy	Avg DH Rate:	59.0
Stage Date:	04/10/2015	Fluid Type:	70Q Foam	Max DH Rate:	61.0
Perf Date:	04/10/2015	BD:	3301	Total Slurry Volume:	273
Logging Co.	KLX (Blue Dot)	ISIP:	0	Total Fluid Volume:	260
Formation	Aily Rider, Aily, Raven, Raven	Avg Press:	3579	Avg N2 Rate:	43,400
Perf Top:	966.5	Max Treat Pressure:	3804	Max N2 Rate:	43,900
Perf Bottom:	1107.2	Final ISIP:	1948	Total N2 Volume:	647,800
# Shots:	23	2 Min SIP:	1234	Max DH PPA:	1.70
Perf Size:	0.52	5 Min SIP:	1172	Total Proppant Sks:	157
Perf Comments:		10 Min SIP:	1098	Total Acid:	1,000
		Sand Mesh:	20/40 Sand	Acid Type:	15% HCL
Comments:		Frac Gradient:	1.4		

Final Production After Stimulation				
	BOD	MCFD	Hours Tested	Rock Pressure
Final/Commingled Zones				
Commingled		52	in-line	



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Drawer 159, Lebanon, VA 24266
Telephone: (276) 415-9700

Tracking Number:	6120
Company:	Range Resources-Pine Mountain,
File Number:	BU-5078
Operations Name:	Haysi 35 w/PL
Operation Type:	Coalbed/Pipeline
Drilling Report Type:	Original

DRILLING REPORT (DGO-GO-14)

1. Drilling Data

Date drilling commenced:	12/7/2014	Drilling Contractor:	Gascp #2
Date drilling completed:	12/10/2014	Rig Type:	☒ Rotary ☐ Cable
Driller's Total Depth (feet):	2520.00		
Log Total Depth (feet):	2522.00	Coal Seam at Total Depth:	POCAHONTAS #1

2. Final Location Plat (as required by 4 VAC25-150-360.C.)

Permitted State Plane X:	10399571.3100	Final Plat State Plane X:	10399572.2500
Permitted State Plane Y:	3618181.7600	Final Plat State Plane Y:	3618180.9100

Plat Previously Submitted Or... ☐

List of Attached Items:

Description	FileName
Haysi 35 Final Plat	Haysi-35 Final Plat.pdf

3. Geological Data

Fresh Water At:

Depth (in feet)	Rate	Unit of Measure
-----------------	------	-----------------

Salt Water At:

Depth (in feet)	Rate	Unit of Measure
-----------------	------	-----------------

Coal Seams:

List of Attached Items:

Description	FileName
Haysi 35 Coal	Coals Haysi 35.xlsx

Gas and Oil Shows:

List of Attached Items:

Description	FileName
Haysi 35 Gas Shows	Shows Haysi 35.xlsx

4. Electric Logs (As required by 4VAC25-150-280.A)

List all logs run: GR/CDL/PE/DIL/Neu/TEMP/Audio

Did logs disclose vertical locations of a coal seam? £

5. Survery Results (As required by 4VAC25-150-280.B.2)

List of Attached Items:

Description	FileName
Haysi 35 Survey	Survey Haysi 35.xlsx

6. Casing and Tubing Program

List of Attached Items:

Description	FileName
Haysi 35 Casing	Casing Haysi 35.xlsx

7. Remarks

Use this space to note any conditions or occurrences, such as lost circulation, fishing jobs, junk left in hole, sidetracks, squeeze jobs, etc., not shown above. Include data and depth of condition/occurrence.

8. Drillers Log

Compiled By: Range Resources

List of Attached Items:

Description	FileName
Haysi 35 Driller's Log	Drilling Haysi 35.xlsx

9. Comments

10. Signature

Permittee: Range Resources-Pine Mountain, Date: 1/13/2015

Signed By: Laura Murray Title: Regulatory Compliance Specialist

INTERNAL USE ONLY

Submit Date: 1/13/2015

Status: A

Date: 1/13/2015

Final PDF Date: 1/14/2015

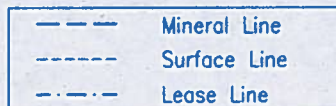
Well Coordinates: (Geographic N83)
37.201247° -82.220649°

Latitude 37° 12' 30"

3,620'

2,640'

Longitude -82° 12' 30"

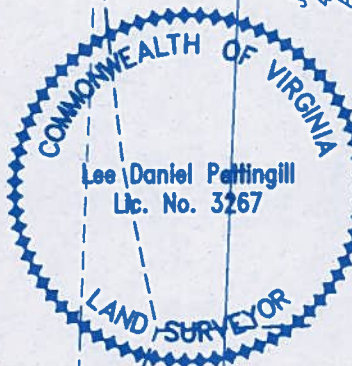


C. P. Self & M. E. Deel
106.63 Acres
ACIN LLC - coal
Alpha Land & Reserves LLC - coal lessee
WBRD LLC - coal
Dickenson-Russell Coal Company LLC - coal lessee
Range Resources-Pine Mountain, Inc. - oil, gas & CBM
Gas 0.06 Ac. 0.10%

Jas M. Owens
409.73 Acres
ACIN LLC - coal
Alpha Land & Reserves LLC - coal lessee
WBRD LLC - coal
Dickenson-Russell Coal Company LLC - coal lessee
Range Resources-Pine Mountain, Inc. - oil, gas & CBM
Gas 7.01 Ac. 11.93%

Elihu Owens
13.15 Acres
ACIN LLC - coal
Alpha Land & Reserves LLC - coal lessee
WBRD LLC - coal
Dickenson-Russell Coal Company LLC - coal lessee
Range Resources-Pine Mountain, Inc. - oil, gas & CBM
Gas 1.65 Ac. 2.81%

Noah Deel
93.41 Acres
ACIN LLC - coal
Alpha Land & Reserves LLC - coal lessee
WBRD LLC - coal
Dickenson-Russell Coal Company LLC - coal lessee
Range Resources-Pine Mountain, Inc. - oil, gas & CBM
Gas 47.57 Ac. 80.94%



Mullins Land and Mineral - surface

Henry Deel
87.64 Acres
ACIN LLC - coal
Alpha Land & Reserves LLC - coal lessee
WBRD LLC - coal
Dickenson-Russell Coal Company LLC - coal lessee
Range Resources-Pine Mountain, Inc. - oil, gas & CBM
Gas 2.48 Ac. 4.22%

Note: The boundary lines shown hereon are based on deeds, plats and maps of record and do not depict a current boundary survey.

The undersigned hereby certifies that the final location is within ten (10') feet of the location shown on the well plat dated 3-28-2013.

Well elevation determined by GPS survey from HARN Monument P-424

FINAL PLAT

Area of Unit = 58.77 Ac.

Well Coordinates: (VA St. Plane S. Zone, NAD 83 (1993))
N 3,618,180.91 E 10,399,572.25

Well Coordinates: (VA St. Plane S. Zone, NAD 27 Calculated from NAD 83 (1993))
N 337,303.23 E 916,586.87

Well Coordinates: (Clinchfield Coal Co.)
N 36,845.04 E 47,441.02

WELL LOCATION PLAT NORA GRID AD-67

COMPANY Range Resources-Pine Mountain, Inc. WELL NAME AND NUMBER Haysi-35
TRACT NO. Noah Deel ELEVATION 2,019.75' QUADRANGLE Prater
COUNTY Buchanan DISTRICT Prater SCALE 1" = 400' DATE 12-8-2014

This Plat is a new plat ; an updated plat ; or a final location plat x

+ Denotes the location of a well on United States topographic Maps, scale 1 to 24,000, latitude and longitude lines being represented by border lines as shown.

LD P Jell

Licensed Professional Engineer or Licensed Land Surveyor

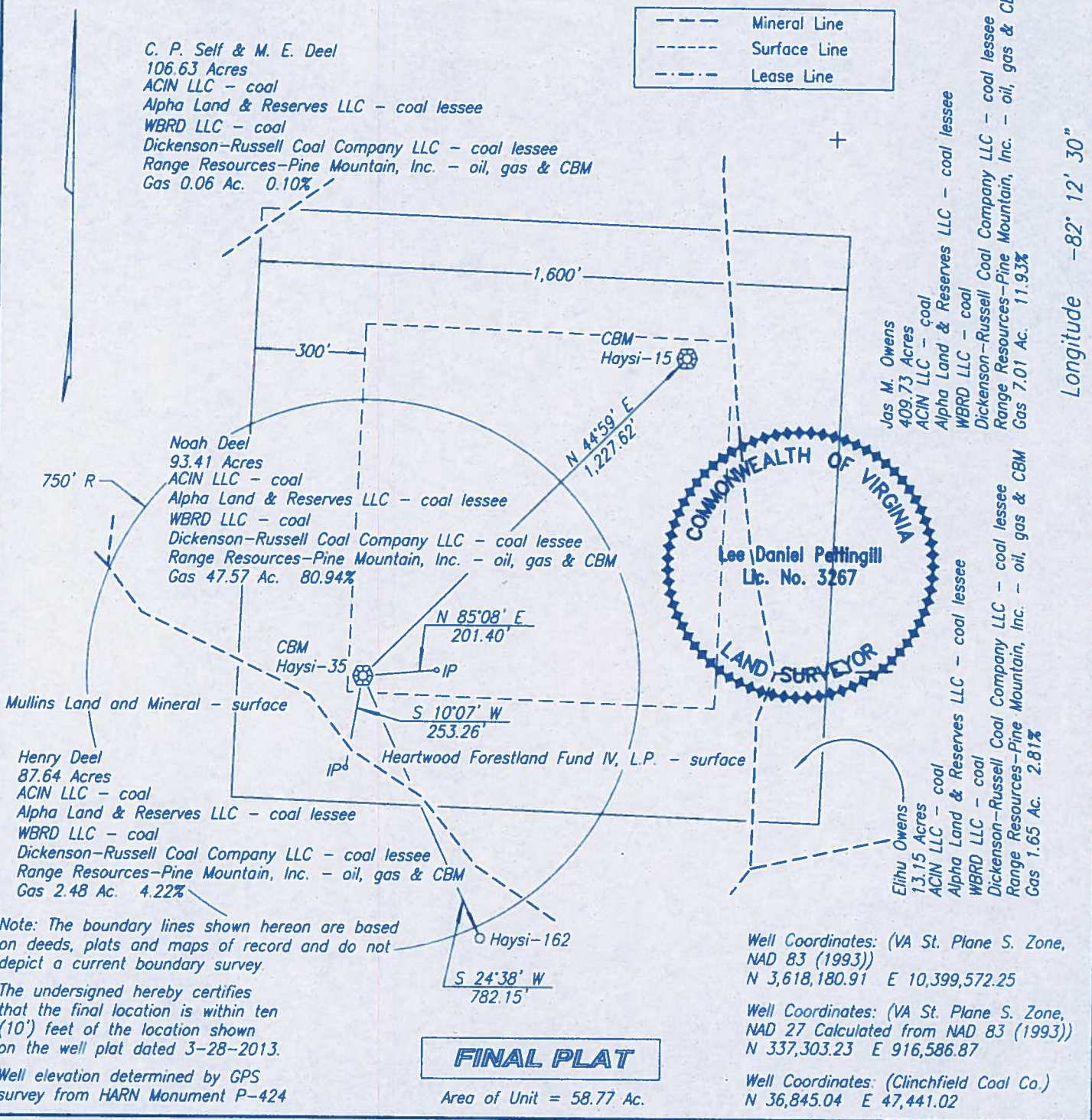
Well Coordinates: (Geographic N83)
37.201247° -82.220649°

Latitude 37° 12' 30"

3,620'

2,640'

Longitude -82° 12' 30"



WELL LOCATION PLAT NORA GRID AD-67

COMPANY Range Resources-Pine Mountain, Inc. WELL NAME AND NUMBER Haysi-35
TRACT NO. Noah Deel ELEVATION 2,019.75' QUADRANGLE Prater
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Lee Daniel Pettingill

Licensed Professional Engineer or Licensed Land Surveyor

Well Coordinates: (Geographic N83)
37.201247° -82.220649°

Latitude 37° 12' 30"

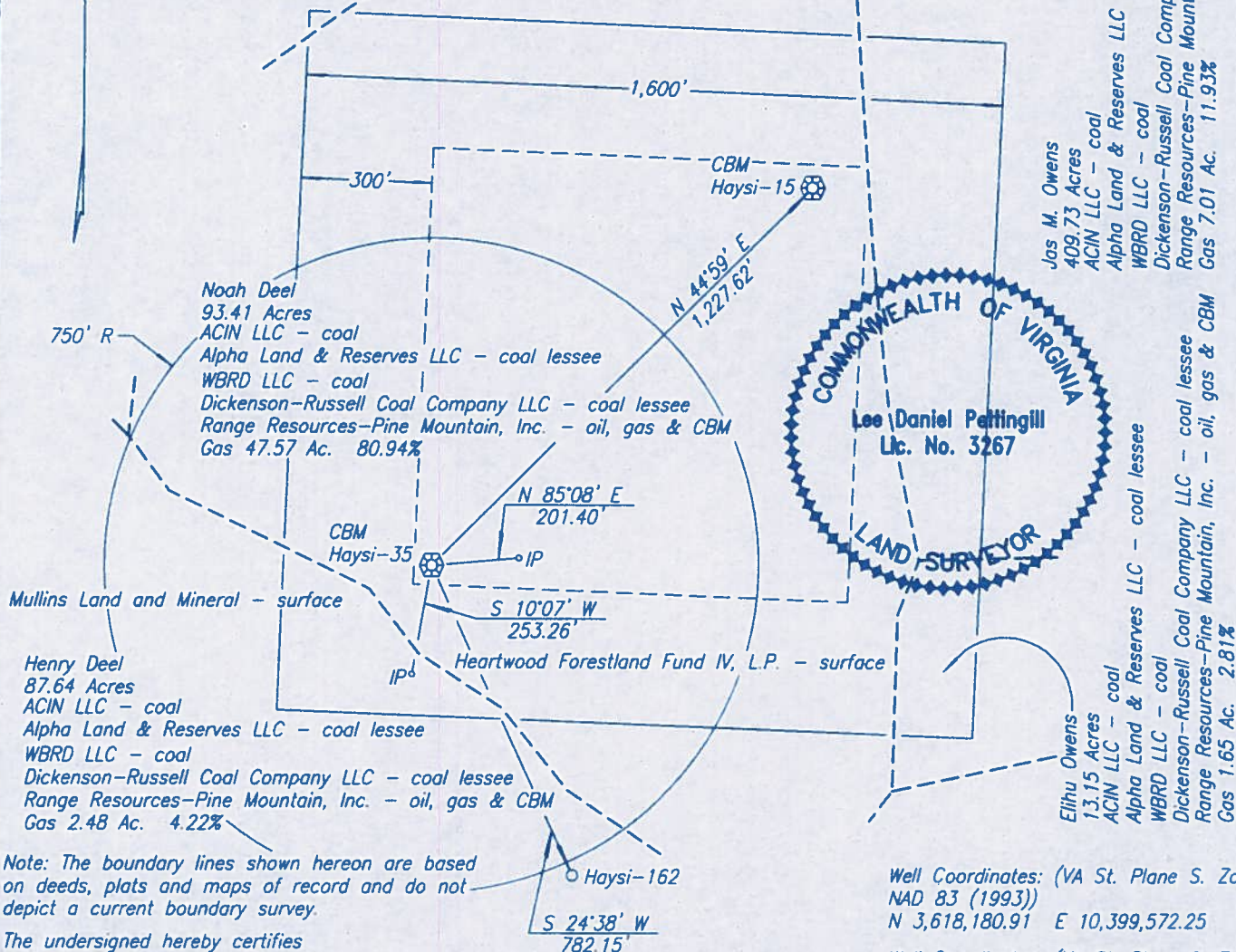
3,620'

2,640'

Longitude -82° 12' 30"

C. P. Self & M. E. Deel
106.63 Acres
ACIN LLC - coal
Alpha Land & Reserves LLC - coal lessee
WBRD LLC - coal
Dickenson-Russell Coal Company LLC - coal lessee
Range Resources-Pine Mountain, Inc. - oil, gas & CBM
Gas 0.06 Ac. 0.10%

--- Mineral Line
- - - Surface Line
- . - Lease Line



FINAL PLAT

Area of Unit = 58.77 Ac.

Well Coordinates: (VA St. Plane S. Zone, NAD 83 (1993))
N 3,618,180.91 E 10,399,572.25

Well Coordinates: (VA St. Plane S. Zone, NAD 27 Calculated from NAD 83 (1993))
N 337,303.23 E 916,586.87

Well Coordinates: (Cinchfield Coal Co.)
N 36,845.04 E 47,441.02

WELL LOCATION PLAT NORA GRID AD-67

COMPANY Range Resources-Pine Mountain, Inc. WELL NAME AND NUMBER Haysi-35
TRACT NO. Noah Deel ELEVATION 2,019.75' QUADRANGLE Prater
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This Plat is a new plat ; an updated plat ; or a final location plat x

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LD P Jill

Licensed Professional Engineer or Licensed Land Surveyor

[illegible]

Gas and Oil Shows

FORMATION	DEPTH	THICKNESS	IPF (MCFD/BOPD)	PRESSURE	HOURS TESTED
	1263		Odor		
	1327		Odor		
	1579		Odor		
	1862		Odor		
	2306		Odor		
	2520		Odor		

Survey Results

Depth of Survey	Direction/Distance/Degree From True Vertical
196	1/4
385	1/4
570	1/2
760	1/2
949	3/4
1137	3/4
1327	1/2
1516	1/2
1705	1/4
1894	1/4
2084	1/2
2275	3/4
2464	1/2
2510	1/2

Casing Program

	Casing	Casing	Hole	Cement Used	Cemented To Surface	Date	Packers Or Bridge Plugs	Cement Baskets
Casing Type	Size	Interval	Size	In Cubic Ft.	Yes/No	Cemented	Kind/Size/Set	(ft)
Conductor	13 3/8	0-92'	15		No			
Water Protection	9 5/8	0-344'	12 3/8	182	Yes	12/08/14		48' 92'
Coal Protection								
Production Casing	4½"	0-2475'	6 1/2	473	Yes	12/10/14		910'
Other Casing And Tubing Left In Well	2¾"							
Liners								

Drillers Log		Well # Haysi 35 1/9/2015			
Geologic Age	Formation	General Lithology	Depth Top	Depth Bottom	Thickness
Pennsylvanian	Lee	KB	0.00	8.00	8.00
Pennsylvanian	Lee	Overburden	8.00	120.00	112.00
Pennsylvanian	Lee	Sandyshale	120.00	150.00	30.00
Pennsylvanian	Lee	Sandstone	150.00	198.00	48.00
Pennsylvanian	Lee	Coal	198.00	199.00	1.00
Pennsylvanian	Lee	Sandstone	199.00	229.00	30.00
Pennsylvanian	Lee	Coal	229.00	230.00	1.00
Pennsylvanian	Lee	Sandstone	230.00	580.00	350.00
Pennsylvanian	Lee	Coal	580.00	581.00	1.00
Pennsylvanian	Lee	Sandyshale	581.00	640.00	59.00
Pennsylvanian	Lee	Coal	640.00	641.00	1.00
Pennsylvanian	Lee	Sandyshale	641.00	720.00	79.00
Pennsylvanian	Lee	Sandstone	720.00	860.00	140.00
Pennsylvanian	Lee	Coal	860.00	861.00	1.00
Pennsylvanian	Lee	Sandyshale	861.00	874.40	13.40
Pennsylvanian	Kennedy	Coal	874.40	875.50	1.10
Pennsylvanian	Lee	Sandyshale	875.50	966.77	91.27
Pennsylvanian	Aily Rider	Coal	966.77	967.44	0.67
Pennsylvanian	Lee	Sandyshale	967.44	998.80	31.36
Pennsylvanian	Aily	Coal	998.80	1000.22	1.42
Pennsylvanian	Lee	Sandyshale	1000.22	1076.80	76.58
Pennsylvanian	Raven	Coal	1076.80	1078.40	1.60
Pennsylvanian	Lee	Sandyshale	1078.40	1098.60	20.20
Pennsylvanian	Raven	Coal	1098.60	1098.80	0.20
Pennsylvanian	Lee	Sandyshale	1098.80	1101.50	2.70
Pennsylvanian	Raven	Coal	1101.50	1101.60	0.10
Pennsylvanian	Lee	Sandyshale	1101.60	1106.50	4.90
Pennsylvanian	Raven	Coal	1106.50	1106.70	0.20
Pennsylvanian	Lee	Sandyshale	1106.70	1192.70	86.00
Pennsylvanian	Jawbone Rider	Coal	1192.70	1196.44	3.74
Pennsylvanian	Lee	Sandyshale	1196.44	1227.10	30.66
Pennsylvanian	Jawbone	Coal	1227.10	1230.80	3.70
Pennsylvanian	Lee	Sandyshale	1230.80	1289.70	58.90
Pennsylvanian	Tiller	Coal	1289.70	1290.70	1.00
Pennsylvanian	Lee	Sandyshale	1290.70	1395.90	105.20
Pennsylvanian	Upper Seaboard	Coal	1395.90	1398.05	2.15
Pennsylvanian	Lee	Sandyshale	1398.05	1548.90	150.85
Pennsylvanian	Greasy Creek	Coal	1548.90	1551.40	2.50
Pennsylvanian	Lee	Sandyshale	1551.40	1694.90	143.50
Pennsylvanian	Upper Horsepen	Coal	1694.90	1695.57	0.67
Pennsylvanian	Lee	Sandyshale	1695.57	1702.90	7.33
Pennsylvanian	Upper Horsepen	Coal	1702.90	1703.10	0.20
Pennsylvanian	Lee	Sandyshale	1703.10	1755.00	51.90
Pennsylvanian	Middle Horsepen	Coal	1755.00	1756.00	1.00

Pennsylvanian	Lee	Sandyshale	1756.00	1836.10	80.10
Pennsylvanian	Beckley	Coal	1836.10	1837.20	1.10
Pennsylvanian	Lee	Sandyshale	1837.20	1861.00	23.80
Pennsylvanian	Beckley	Coal	1861.00	1862.20	1.20
Pennsylvanian	Lee	Sandyshale	1862.20	2200.70	338.50
Pennsylvanian	Pocahontas #4	Coal	2200.70	2201.40	0.70
Pennsylvanian	Lee	Sandyshale	2201.40	2288.50	87.10
Pennsylvanian	Pocahontas #3	Coal	2288.50	2291.90	3.40
Pennsylvanian	Lee	Sandyshale	2291.90	2352.50	60.60
Pennsylvanian	Pocahontas #2	Coal	2352.50	2355.00	2.50
Pennsylvanian	Lee	Sandyshale	2355.00	2375.00	20.00
Pennsylvanian	Pocahontas #2	Coal	2375.00	2375.2	0.20
Pennsylvanian	Lee	Sandyshale	2375.20	2513.87	138.67



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Drawer 159, Lebanon, VA 24266
Telephone: (276) 415-9700

Tracking Number: 9782
Company: EnerVest Operating, LLC
File Number: BU-5126
Completion Report Type: Original

COMPLETION REPORT (DGO-GO-15)

Well Type:	<u>Coalbed/Pipeline</u>	Date Well Completed:	<u>10/12/2016</u>
Driller's Total Depth:	<u>2501.00</u>	Log's Total Depth:	<u>2477.00</u>

1. Changes In Casing/Tubing from Approved Drilling Report

Description	FileName
-------------	----------

2. Stimulation Record

Stimulation Status: ☐ Stimulated ☐ GOB ☐ Not Stimulated ☐ Service Well

Description	FileName
Perf Report	HAYSI-36 Perf Report.pdf
Stimulation Report	HAYSI-36 Stimulation Report.pdf

3. Final Production

Description	FileName
Final Production	Haysi 36 Final_Prod.xls

4. Comments

Notes:

5. Signature

Permittee: EnerVest Operating, LLC Date: 12/15/2016 (Company)

By: Laura Murray Title: Associate Landman (Signature)

INTERNAL USE ONLY

Submit Date: 12/15/2016

Status: _____

Date: 12/15/2016

Final PDF Date: 12/27/2016



HAYSI 036

Report date: 10/13/2016

Perforation Report

Asset Name	APPALACHIAN
Project	APPALACHIA SOUTH
Site	HAYSI
Well Common Name	HAYSI 036
Operator	ENERVEST OPERATING, LLC
MD Top - MD Base	1,141.8 ft - 2,306.4 ft
Perf Length Gross	1,164.60 ft

Intervals

Report Date	Stage	Formation	MD top (ft)	MD base (ft)	Shot density (shot/ft)	# of Shots	Charge Phasing (°)	Carr size (in)	Charge weight (gram)	Charge Manufacturer	Hole Diameter
10/12/2016	01	POCAHONTAS #02	2,304.7	2,306.4	3.00	6.000	60.00	2.500		Owens	0.32
10/12/2016	01	POCAHONTAS #03	2,245.8	2,250.0	3.00	14.000	60.00	2.250		Owens	0.32
10/12/2016	01	POCAHONTAS #04	2,218.0	2,219.0	3.00	4.000	60.00	2.500		Owens	0.32
10/12/2016	02	C SEAM	1,815.9	1,817.4	3.00	6.000	60.00	2.500		Owens	0.32
10/12/2016	02	C SEAM	1,790.4	1,791.6	3.00	5.000	60.00	2.500		Owens	0.32
10/12/2016	03	HORSEPEN MIDDLE	1,700.3	1,702.1	3.00	6.000	60.00	2.500		Owens	0.32
10/12/2016	03	HORSEPEN UPPER	1,646.8	1,648.4	3.00	6.000	60.00	2.500		Owens	0.32
10/12/2016	04	GREASY CREEK	1,490.7	1,493.7	3.00	10.000	60.00	2.750		Owens	0.42
10/12/2016	04	SEABOARD UPPER	1,340.8	1,343.8	3.00	10.000	60.00	2.500		Owens	0.42
10/12/2016	05	TILLER	1,232.1	1,233.6	3.00	6.000	60.00	2.750		Owens	0.42
10/12/2016	05	JAWBONE	1,182.6	1,184.0	3.00	5.000	60.00	2.750		Owens	0.42
10/12/2016	05	JAWBONE	1,178.8	1,180.8	3.00	7.000	60.00	2.750		Owens	0.42
10/12/2016	06	JAWBONE RIDER	1,141.8	1,144.5	3.00	9.000	60.00	2.750		Owens	0.42



APPALACHIAN STIMULATION REPORT

Company / Asset	APPALACHIAN
Project / Basin	APPALACHIA SOUTH
Site / Field	HAYSI

Well common name:	HAYSI 036	API no.:	4502705126
Well legal name:	HAYSI 036	Bolo no.:	8200000093
Wellbore name:	HAYSI 36	Wellbore No.:	00
Report No.:	1	Report date:	10/13/2016
Job Date:	10/12/2016	Event type:	COMPLETION
Spud date:	9/30/2016	Event end date:	
Contractor:	C&J ENERGY SERVICES	Active datum:	RKB @1,974.8ft (above Mean Sea Level)
Supervisor:	KEVIN DARBY		

Initial Wellhead Pressure (psi)	88.00
Water Source	FRESH

Summary for Stage No.: 1 - 10/12/2016

Fluid System: ENERGIZED - SW/N2 TREATMENT	
Interval Top: 2,218.0 ft	Frac Gradient: 1,1100 psi/ft
Interval Base: 2,306.4 ft	Breakdown Press: 2,870.00 psi
Stage Length: 88.4 ft	Breakdown Rate: 5,00 bbl/min
CO2 Energized Quality (%):	Max Rate: 57.20 bbl/min
N2 Energized Quality (%): 70.000	Avg Rate: 50.10 bbl/min
No. of Perfs: 24	Max Treat. Press.: 3,994.00 psi
No. of Clusters: 3	Avg Treat. Press.: 3,472.00 psi
BP Removal Date:	Avg HHP:
Screened out: No	ISIP: 1,523.00 psi
Coil tubing used: No	10 Min ISIP:
Tracer used: No	5 Min ISIP:
	15 Min ISIP:
	Total Proppant: 44,300 lbm
	Total Propp. Format.: 44,300 lbm
	Slurry Vol: 12,280.8 gal
	Clean Vol: 10,277.4 gal
	Treated Water Vol: 252.0 gal

Fluids

Fluid name	Pumped (gal)	Energized Fluid total	Density (ppg)
ACID	252.0		
NITROGEN ENERGIZED		544100	

Proppants

Proppant name	Type	Size	Used (lbm)
WHITE	SAND	20/40	44,300

Summary for Stage No.: 2 - 10/12/2016

Fluid System: ENERGIZED - SW/N2 TREATMENT	
Interval Top: 1,790.0 ft	Frac Gradient: 1,2400 psi/ft
Interval Base: 1,817.4 ft	Breakdown Press: 2,646.00 psi
Stage Length: 27.4 ft	Breakdown Rate: 5,00 bbl/min
CO2 Energized Quality (%):	Max Rate: 40,10 bbl/min
N2 Energized Quality (%): 70.000	Avg Rate: 34.70 bbl/min
No. of Perfs: 11	Max Treat. Press.: 4,263.00 psi
No. of Clusters: 2	Avg Treat. Press.: 4,081.00 psi
BP Removal Date:	Avg HHP:
Screened out: No	ISIP: 1,450.00 psi
Coil tubing used: No	10 Min ISIP:
Tracer used: No	5 Min ISIP:
	15 Min ISIP:
	Total Proppant: 15,800 lbm
	Total Propp. Format.: 15,800 lbm
	Slurry Vol: 11,806.2 gal
	Clean Vol: 11,092.2 gal
	Treated Water Vol: 252.0 gal

Fluids

Fluid name	Pumped (gal)	Energized Fluid total	Density (ppg)
NITROGEN ENERGIZED		558700	
ACID	252.0		

Proppants

Proppant name	Type	Size	Used (lbm)
WHITE	SAND	20/40	15,800

Summary for Stage No.: 3 - 10/12/2016

Fluid System: ENERGIZED - SW/N2 TREATMENT	
Interval Top: 1,646.8 ft	Frac Gradient: 1.3900 psi/ft
Interval Base: 1,702.1 ft	Breakdown Press: 2,114.00 psi
Stage Length: 55.3 ft	Breakdown Rate: 5.20 bbl/min
CO2 Energized Quality (%):	Max Rate: 53.20 bbl/min
N2 Energized Quality (%): 70.000	Avg Rate: 48.20 bbl/min
No. of Perfs: 12	Max Treat. Press.: 4,009.00 psi
No. of Clusters: 2	Avg Treat. Press.: 3,552.00 psi
BP Removal Date:	Avg HHP:
Screened out: No	ISIP: 1,602.00 psi
Coil tubing used: No	10 Min ISIP:
Tracer used: No	5 Min ISIP:
	15 Min ISIP:
	Total Proppant: 22,100 lbm
	Total Propp. Format.: 22,100 lbm
	Slurry Vol: 8,282.4 gal
	Clean Vol: 7,282.8 gal
	Treated Water Vol: 252.0 gal

Fluids

Fluid name	Pumped (gal)	Energized Fluid total	Density (ppg)
ACID	252.0		
NITROGEN ENERGIZED		345300	

Proppants

Proppant name	Type	Size	Used (lbm)
WHITE	SAND	20/40	22,100

Summary for Stage No.: 4 - 10/12/2016

Fluid System: ENERGIZED - SW/N2 TREATMENT	
Interval Top: 1,340.8 ft	Frac Gradient: 2.2300 psi/ft
Interval Base: 1,493.7 ft	Breakdown Press: 2,073.00 psi
Stage Length: 152.9 ft	Breakdown Rate: 5.10 bbl/min
CO2 Energized Quality (%):	Max Rate: 51.30 bbl/min
N2 Energized Quality (%): 70.000	Avg Rate: 37.90 bbl/min
No. of Perfs: 20	Max Treat. Press.: 4,473.00 psi
No. of Clusters: 2	Avg Treat. Press.: 4,054.00 psi
BP Removal Date:	Avg HHP:
Screened out: No	ISIP: 2,550.00 psi
Coil tubing used: No	10 Min ISIP:
Tracer used: No	5 Min ISIP:
	15 Min ISIP:
	Total Proppant: 33,600 lbm
	Total Propp. Format.: 33,600 lbm
	Slurry Vol: 15,615.6 gal
	Clean Vol: 14,095.2 gal
	Treated Water Vol: 252.0 gal

Fluids

Fluid name	Pumped (gal)	Energized Fluid total	Density (ppg)
NITROGEN ENERGIZED		741400	
ACID	252.0		

Proppants

Proppant name	Type	Size	Used (lbm)
WHITE	SAND	20/40	33,600

Summary for Stage No.: 5 - 10/12/2016

Fluid System: ENERGIZED - SW/N2 TREATMENT	
Interval Top: 1,178.8 ft	Frac Gradient: 1.3800 psi/ft
Interval Base: 1,233.6 ft	Breakdown Press: 2,217.00 psi
Stage Length: 54.8 ft	Breakdown Rate: 5.00 bbl/min
CO2 Energized Quality (%):	Max Rate: 65.10 bbl/min
N2 Energized Quality (%): 70.000	Avg Rate: 54.70 bbl/min
No. of Perfs: 18	Max Treat. Press.: 3,188.00 psi
No. of Clusters: 3	Avg Treat. Press.: 2,860.00 psi
BP Removal Date:	Avg HHP:
Screened out: No	ISIP: 1,138.00 psi
Coil tubing used: No	10 Min ISIP:
Tracer used: No	5 Min ISIP:
	15 Min ISIP:
	Total Proppant: 29,700 lbm
	Total Propp. Format.: 29,700 lbm
	Slurry Vol: 8,341.2 gal
	Clean Vol: 6,997.2 gal
	Treated Water Vol: 252.0 gal

Fluids

Fluid name	Pumped (gal)	Energized Fluid total	Density (ppg)
ACID	252.0		
NITROGEN ENERGIZED		326300	

Proppants

Proppant name	Type	Size	Used (lbm)
WHITE	SAND	20/40	29,700

Summary for Stage No.: 6 - 10/12/2016

Fluid System: ENERGIZED - SW/N2 TREATMENT	
Interval Top: 1,141.8 ft	Frac Gradient: 1.8900 psi/ft
Interval Base: 1,144.5 ft	Breakdown Press: 1,411.00 psi
Stage Length: 2.7 ft	Breakdown Rate: 5.00 bbl/min
CO2 Energized Quality (%):	Max Rate: 36,20 bbl/min
N2 Energized Quality (%): 70,000	Avg Rate: 31.50 bbl/min
No. of Perfs: 9	Max Treat. Press.: 4,399.00 psi
No. of Clusters: 1	Avg Treat. Press.: 4,012.00 psi
BP Removal Date:	Avg HHP:
Screened out: No	ISIP: 1,670.00 psi
Coil tubing used: No	10 Min ISIP: 1,304.00 psi
Tracer used: No	5 Min ISIP: 1,348.00
	15 Min ISIP:
	Total Proppant: 19,300 lbm
	Total Propp. Format.: 19,300 lbm
	Slurry Vol: 5,896.8 gal
	Clean Vol: 5,023.2 gal
	Treated Water Vol: 0.0 gal

Fluids

Fluid name	Pumped (gal)	Energized Fluid total	Density (ppg)
NITROGEN ENERGIZED		310000	

Proppants

Proppant name	Type	Size	Used (lbm)
WHITE	SAND	20/40	19,300

Final Production After Stimulation				
	BOD	MCFD	Hours Tested	Rock Pressure
Final/Commingled Zones				
Commingled		30	in-line	



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Drawer 159, Lebanon, VA 24266
Telephone: (276) 415-9700

Tracking Number:	9848
Company:	EnerVest Operating, LLC
File Number:	BU-5126
Operations Name:	Haysi 36 w/PL
Operation Type:	Coalbed/Pipeline
Drilling Report Type:	Original

DRILLING REPORT (DGO-GO-14)

1. Drilling Data

Date drilling commenced:	9/30/2016	Drilling Contractor:	Gasco #5
Date drilling completed:	10/4/2016	Rig Type:	☒ Rotary ☐ Cable
Driller's Total Depth (feet):	2501.00		
Log Total Depth (feet):	2477.00	Coal Seam at Total Depth:	POCAHONTAS #1

2. Final Location Plat (as required by 4 VAC25-150-360.C.)

Permitted State Plane X:	10398586.7300	Final Plat State Plane X:	10398584.0900
Permitted State Plane Y:	3618212.9800	Final Plat State Plane Y:	3618212.4900

Plat Previously Submitted Or... ☐

List of Attached Items:

Description	FileName
Haysi 36 Final Plat	HAYSI-36 Final Plat.pdf

Haysi 36 Plat Attachment	Haysi-36_ plat Owner Info.pdf
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3. Geological Data

Fresh Water At:

Depth (in feet)	Rate	Unit of Measure
-----------------	------	-----------------

Salt Water At:

Depth (in feet)	Rate	Unit of Measure
2150	2	INCH
2233	wet	

Coal Seams:

List of Attached Items:

Description	FileName
Coal	Haysi 36 Coals.xlsx

Gas and Oil Shows:

List of Attached Items:

Description	FileName
Shows	Haysi 36 Shows.xlsx

4. Geophysical Logs (As required by 4VAC25-150-280.A)

List all logs run: GR/CDL/PE/DIL/Neu/TEMP/Audio

Did logs disclose vertical locations of a coal seam?

☐

5. Survey Results (As required by 4VAC25-150-280.B.2)

List of Attached Items:

Description	FileName
Surveys	Haysi 36 Surveys.xlsx

6. Casing and Tubing Program

List of Attached Items:

Description	FileName
Casing	Haysi 36 Casing.xlsx

7. Remarks

Use this space to note any conditions or occurrences, such as lost circulation, fishing jobs, junk left in hole, sidetracks, squeeze jobs, etc., not shown above. Include data and depth of condition/occurrence.

8. Drillers Log

Compiled By: EnerVest Operating, LLC

List of Attached Items:

Description	FileName
Driller's Log	Haysi 36 DrillersLog.xlsx

9. Comments

10. Signature

Permitee: EnerVest Operating, LLC

Date: 12/14/2016

Signed By: Laura Murray

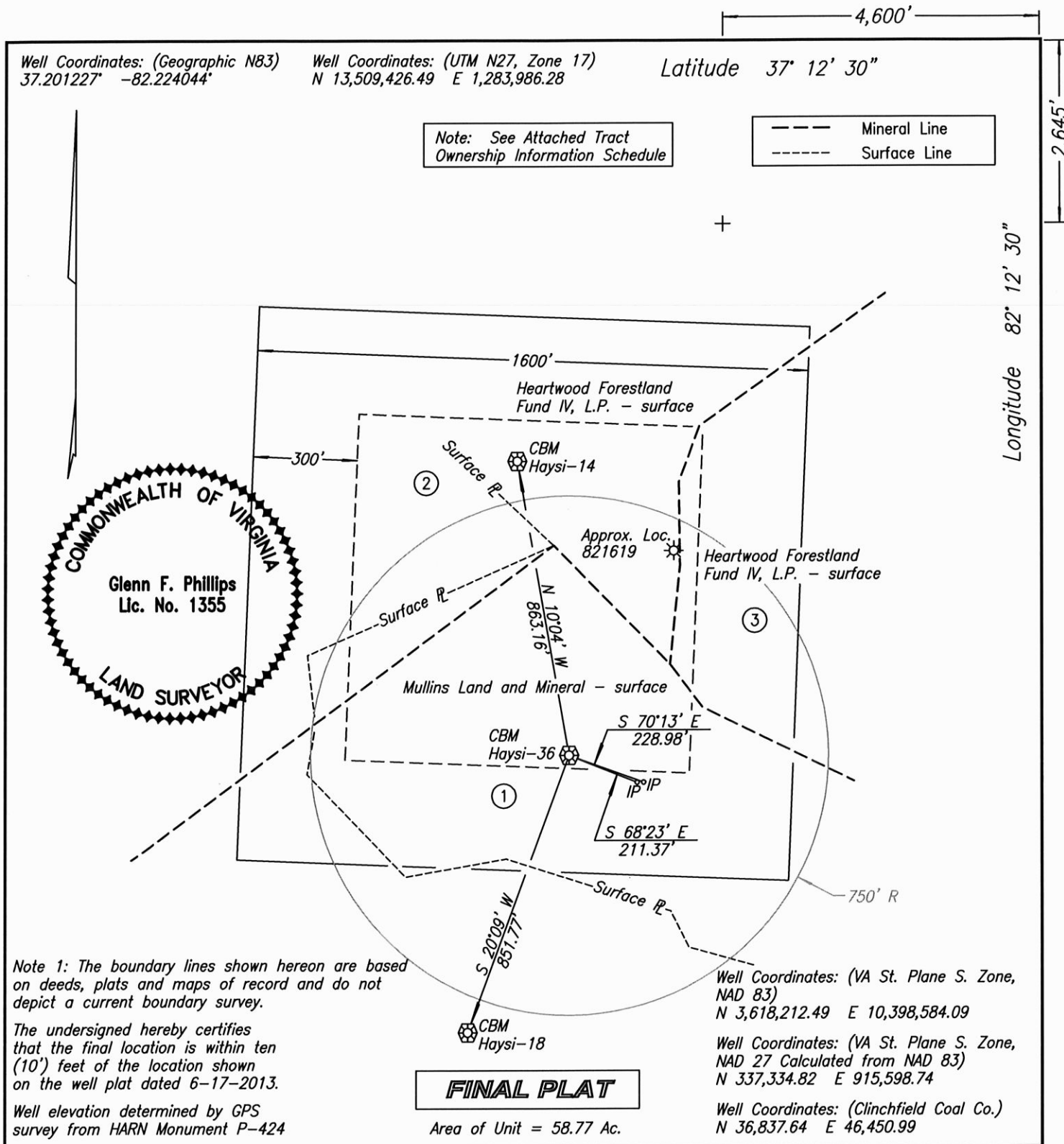
Title: Associate Landman

INTERNAL USE ONLY

Submit Date: 12/14/2016

Status: A

Date: 12/15/2016



WELL LOCATION PLAT NORA GRID AD-66

COMPANY EnerVest Operating, LLC WELL NAME AND NUMBER Haysi-36
TRACT NO. Henry Deel ELEVATION 1,964.46' QUADRANGLE Prater
COUNTY Buchanan DISTRICT Prater SCALE 1" = 400' DATE 10-01-2016
This Plat is a new plat ; an updated plat ; or a final location plat x
+ Denotes the location of a well on United States topographic Maps, scale 1 to 24,000, latitude and longitude lines being represented by border lines as shown.

Glenn F. Phillips

Licensed Professional Engineer or Licensed Land Surveyor

HAYSI-36 PLAT
TRACT OWNERSHIP INFORMATION SCHEDULE
10/1/2016

- 1 . Henry Deel
87.64 Acres
ACIN LLC - coal
Paramont Contura, LLC - coal lessee
WBRD LLC - coal
Dickenson-Russell Contura, LLC - coal lessee
EnerVest Energy Institutional Fund XIV-A, L.P., EnerVest Energy Institutional Fund XIV-A1, L.P., &
EnerVest Energy Institutional Fund XIV-WIC, L.P. - oil, gas & CBM
Gas 22.05 Ac. 37.52%

- 2 . C. P. Self & M. E. Deel
106.63 Acres
ACIN LLC - coal
Paramont Contura, LLC - coal lessee
WBRD LLC - coal
Dickenson-Russell Contura, LLC - coal lessee
EnerVest Energy Institutional Fund XIV-A, L.P., EnerVest Energy Institutional Fund XIV-A1, L.P., &
EnerVest Energy Institutional Fund XIV-WIC, L.P. - oil, gas & CBM
Gas 29.02 Ac. 49.38%

- 3 . Noah Deel
93.41 Acres
ACIN LLC - coal
Paramont Contura, LLC - coal lessee
WBRD LLC - coal
Dickenson-Russell Contura, LLC - coal lessee
EnerVest Energy Institutional Fund XIV-A, L.P., EnerVest Energy Institutional Fund XIV-A1, L.P., &
EnerVest Energy Institutional Fund XIV-WIC, L.P. - oil, gas & CBM
Gas 7.70 Ac. 13.10%

Coal seams			Well #	Haysi 36		
Names	Depth Top	Depth Bottom	Thickness	Mining in Area Yes No		Mined Out
Aily	958.40	959.70	959.70		No	No
Raven	1016.50	1017.90	1017.90		No	No
Raven	1025.20	1026.90	1026.90		No	No
Jawbone Rider	1142.00	1144.30	1144.30		No	No
Jawbone	1179.00	1180.60	1180.60		No	No
Jawbone	1182.80	1183.80	1183.80		No	No
Tiller	1232.30	1233.40	1233.40		No	No
Upper Seaboard A	1306.00	1306.10	1306.10		No	No
Upper Seaboard	1341.00	1343.60	1343.60		No	No
Greasy Creek	1490.90	1493.50	1493.50		No	No
Middle Seaboard	1533.40	1533.50	1533.50		No	No
Lower Seaboard	1593.00	1593.10	1593.10		No	No
Unnamed A	1614.50	1614.60	1614.60		No	No
Unnamed B	1629.50	1629.60	1629.60		No	No
Upper Horsepen	1647.00	1648.20	1648.20		No	No
Middle Horsepen	1700.50	1701.90	1701.90		No	No
C Seam Rider	1790.60	1791.40	1791.40		No	No
C Seam	1816.10	1817.20	1817.20		No	No
War Creek	1851.00	1851.10	1851.10		No	No
Unnamed C	1877.00	1877.10	1877.10		No	No
Beckley	1903.50	1903.60	1903.60		No	No
Lower Horsepen	1911.50	1911.60	1911.60		No	No
Pocahontas #9	1944.60	1944.70	1944.70		No	No
Pocahontas #8	2014.00	2014.10	2014.10		No	No
Pocahontas #7	2090.00	2090.10	2090.10		No	No
Pocahontas #6	2145.70	2147.10	2147.10		No	No
Pocahontas #5	2187.40	2187.50	2187.50		No	No
Pocahontas #4	2218.20	2218.80	2218.80		No	No
Pocahontas #3	2246.00	2249.80	2249.80		No	No
Pocahontas #2	2304.90	2306.20	2306.20		No	No
Pocahontas #1	2397.50	2397.60	2397.60		No	No

Gas and Oil Shows Haysi 36

Haysi 36

[illegible]

Survey Results

Haysi 36

Depth of Survey	Direction/Distance/Degree From True Vertical
193	1/2
380	1/2
521	3/4
721	1/2
915.00	1/4
1,103.00	1/2
1,292.00	1/4
1,479.00	3/4
1,667.00	3/4
1,855.00	1
2,044.00	3/4
2,248.00	1/2
2,421.00	1/4

Casing Program

Haysi 36	Casing	Casing	Hole	Cement Used	Cemented To Surface	Date	Packers Or Bridge Plugs	Cement Baskets (ft)
Casing Type	Size	Interval	Size	In Cubic Ft.	Yes/No	Cemented	Kind/Size/Set	
Conductor	18	0-42'	22	Sanded in	No			
Conductor	13 3/8	0-84'	13 3/8	Sanded in	No			
Water Protection	9 5/8	0-848'	12 3/8	151	Yes	10/04/16		382'
Coal Protection								
Production Casing	4½"	0-2378'	6 3/8	378	Yes	10/06/16		2378'
Other Casing And Tubing Left In Well	2¾"	0-2269'						
Liners								

Drillers Log		Well # Haysi 36 10/11/2016			
Geologic Age	Formation	General Lithology	Depth Top	Depth Bottom	Thickness
Pennsylvanian	Lee	Sand/Shale/Coal	0.00	958.40	958.40
Pennsylvanian	Lee	Aily	958.40	959.70	1.30
Pennsylvanian	Lee	Sand/Shale	959.70	1016.50	56.80
Pennsylvanian	Lee	Raven	1016.50	1017.90	1.40
Pennsylvanian	Lee	Sand/Shale	1017.90	1025.20	7.30
Pennsylvanian	Lee	Raven	1025.20	1026.90	1.70
Pennsylvanian	Lee	Sand/Shale	1026.90	1142.00	115.10
Pennsylvanian	Lee	Jawbone Rider	1142.00	1144.30	2.30
Pennsylvanian	Lee	Sand/Shale	1144.30	1179.00	34.70
Pennsylvanian	Lee	Jawbone	1179.00	1180.60	1.60
Pennsylvanian	Lee	Sand/Shale	1180.60	1182.80	2.20
Pennsylvanian	Lee	Jawbone	1182.80	1183.80	1.00
Pennsylvanian	Lee	Sand/Shale	1183.80	1232.30	48.50
Pennsylvanian	Lee	Tiller	1232.30	1233.40	1.10
Pennsylvanian	Lee	Sand/Shale	1233.40	1306.00	72.60
Pennsylvanian	Lee	Upper Seaboard A	1306.00	1306.10	0.10
Pennsylvanian	Lee	Sand/Shale	1306.10	1341.00	34.90
Pennsylvanian	Lee	Upper Seaboard	1341.00	1343.60	2.60
Pennsylvanian	Lee	Sand/Shale	1343.60	1490.90	147.30
Pennsylvanian	Lee	Greasy Creek	1490.90	1493.50	2.60
Pennsylvanian	Lee	Sand/Shale	1493.50	1533.40	39.90
Pennsylvanian	Lee	Middle Seaboard	1533.40	1533.50	0.10
Pennsylvanian	Lee	Sand/Shale	1533.50	1593.00	59.50
Pennsylvanian	Lee	Lower Seaboard	1593.00	1593.10	0.10
Pennsylvanian	Lee	Sand/Shale	1593.10	1614.50	21.40
Pennsylvanian	Lee	Unnamed A	1614.50	1614.60	0.10
Pennsylvanian	Lee	Sand/Shale	1614.60	1629.50	14.90
Pennsylvanian	Lee	Unnamed B	1629.50	1629.60	0.10
Pennsylvanian	Lee	Sand/Shale	1629.60	1647.00	17.40
Pennsylvanian	Lee	Upper Horsepen	1647.00	1648.20	1.20
Pennsylvanian	Lee	Sand/Shale	1648.20	1700.50	52.30
Pennsylvanian	Lee	Middle Horsepen	1700.50	1701.90	1.40
Pennsylvanian	Lee	Sand/Shale	1701.90	1790.60	88.70
Pennsylvanian	Lee	C Seam Rider	1790.60	1791.40	0.80
Pennsylvanian	Lee	Sand/Shale	1791.40	1816.10	24.70
Pennsylvanian	Lee	C Seam	1816.10	1817.20	1.10
Pennsylvanian	Lee	Sand/Shale	1817.20	1851.00	33.80
Pennsylvanian	Lee	War Creek	1851.00	1851.10	0.10
Pennsylvanian	Lee	Sand/Shale	1851.10	1877.00	25.90
Pennsylvanian	Lee	Unnamed C	1877.00	1877.10	0.10
Pennsylvanian	Lee	Sand/Shale	1877.10	1903.50	26.40
Pennsylvanian	Lee	Beckley	1903.50	1903.60	0.10
Pennsylvanian	Lee	Sand/Shale	1903.60	1911.50	7.90

Pennsylvanian	Lee	Lower Horsepen	1911.50	1911.60	0.10
Pennsylvanian	Lee	Sand/Shale	1911.60	1944.60	33.00
Pennsylvanian	Lee	Pocahontas #9	1944.60	1944.70	0.10
Pennsylvanian	Lee	Sand/Shale	1944.70	2014.00	69.30
Pennsylvanian	Lee	Pocahontas #8	2014.00	2014.10	0.10
Pennsylvanian	Lee	Sand/Shale	2014.10	2090.00	75.90
Pennsylvanian	Lee	Pocahontas #7	2090.00	2090.10	0.10
Pennsylvanian	Lee	Sand/Shale	2090.10	2145.70	55.60
Pennsylvanian	Lee	Pocahontas #6	2145.70	2147.10	1.40
Pennsylvanian	Lee	Sand/Shale	2147.10	2187.40	40.30
Pennsylvanian	Lee	Pocahontas #5	2187.40	2187.50	0.10
Pennsylvanian	Lee	Sand/Shale	2187.50	2218.20	30.70
Pennsylvanian	Lee	Pocahontas #4	2218.20	2218.80	0.60
Pennsylvanian	Lee	Sand/Shale	2218.80	2246.00	27.20
Pennsylvanian	Lee	Pocahontas #3	2246.00	2249.80	3.80
Pennsylvanian	Lee	Sand/Shale	2249.80	2304.90	55.10
Pennsylvanian	Lee	Pocahontas #2	2304.90	2306.20	1.30
Pennsylvanian	Lee	Sand/Shale	2306.20	2397.50	91.30
Pennsylvanian	Lee	Pocahontas #1	2397.50	2397.60	0.10
Pennsylvanian	Lee	Sand/Shale	2397.60	2501.00	103.40



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Drawer 159, Lebanon, VA 24266
Telephone: (276) 415-9700

Tracking Number:	9923
Company:	EnerVest Operating, LLC
File Number:	BU-5144
Completion Report Type:	Original

COMPLETION REPORT (DGO-GO-15)

Well Type:	Coalbed/Pipeline	Date Well Completed:	6/27/2017
Driller's Total Depth:	2373.00	Log's Total Depth:	2377.00

Changes In Casing/Tubing from Approved Drilling Report

Description	FileName
-------------	----------

Water Protection Casing Cement Bond Log

Description	FileName
Cement Report	Haysi-37 Cement Chart.pdf

Stimulation Record

Stimulation Status: ☒ Stimulated ☐ GOB ☐ Not Stimulated ☐ Service Well

Chemical Disclosure submitted? On File

Final Fracturing Ingredient Status: Approved 42

Description	FileName
Perf Report	Haysi-37 Perforation Report.pdf
Stimulation Report	Haysi-37 Stimulation Report.pdf

Final Production

Description	FileName
Final Production	Haysi 37 Final_Prod.xls

Comments

Notes:

OK. [11/8/2017, cwh]

Signature

Permittee: EnerVest Operating, LLC Date: 11/2/2017 (Company)
By: Laura Murray Title: Associate Landman (Signature)

INTERNAL USE ONLY

Submit Date: 11/2/2017
Status: _____ Date: 11/8/2017
Final PDF Date: 11/8/2017



Perforation Report

Asset Name	APPALACHIAN
Project	APPALACHIA SOUTH
Site	HAYSI
Well Common Name	HAYSI 037
Operator	ENERVEST OPERATING, LLC
MD Top - MD Base	981.4 ft - 2,254.6 ft
Perf Length Gross	1,273.20 ft

Intervals

Report Date	Stage	Formation	MD top (ft)	MD base (ft)	Shot density (shot/ft)	# of Shots	Charge Phasing (°)	Carr size (in)	Charge weight (gram)	Charge Manufacturer	Hole Diameter
06/27/2017	01	POCAHONTAS #02	2252	2255	3.00	8.000	60.00	2.500		Owens	0.32
06/27/2017	01	POCAHONTAS #03	2193	2197	3.00	15.000	60.00	2.500		Owens	0.32
06/27/2017	01	POCAHONTAS #04	2113	2116	3.00	9.000	60.00	2.500		Owens	0.32
06/27/2017	02	HORSEPEN LOWER	1853	1855	3.00	8.000	60.00	2.500		Owens	0.32
06/27/2017	02	HORSEPEN LOWER	1844	1846	3.00	6.000	60.00	2.500		Owens	0.32
06/27/2017	02	BECKLEY	1812	1815	3.00	9.000	60.00	2.500		Owens	0.32
06/27/2017	03	WAR CREEK	1723	1725	3.00	8.000	60.00	2.750		Owens	0.42
06/27/2017	03	HORSEPEN MIDDLE	1646	1648	3.00	9.000	60.00	2.750		Owens	0.42
06/27/2017	03	HORSEPEN UPPER	1583	1585	3.00	6.000	60.00	2.750		Owens	0.42
06/27/2017	04	GREASY CREEK	1448	1452	3.00	12.000	60.00	2.750		Owens	0.42
06/27/2017	04	SEABOARD UPPER	1303	1306	3.00	12.000	60.00	2.750		Owens	0.42
06/27/2017	05	TILLER	1194	1196	3.00	6.000	60.00	2.750		Owens	0.42
06/27/2017	05	JAWBONE	1144	1146	3.00	6.000	60.00	2.750		Owens	0.42
06/27/2017	05	JAWBONE	1134	1138	3.00	12.000	60.00	2.750		Owens	0.42
06/27/2017	06	JAWBONE RIDER	1090	1094	3.00	11.000	60.00	2.750		Owens	0.42
06/27/2017	06	RAVEN	981	985	3.00	11.000	60.00	2.750		Owens	0.42



APPALACHIAN STIMULATION REPORT

Company / Asset	APPALACHIAN
Project / Basin	APPALACHIA SOUTH
Site / Field	HAYSI

Well common name:	HAYSI 037	API no.:	4502705144
Well legal name:	HAYSI 37	Bolo no.:	411116369
Wellbore name:	HAYSI 37	Wellbore No.:	00
Report No.:	1	Report date:	6/28/2017
Job Date:	6/27/2017	Event type:	COMPLETION
Spud date:	6/3/2017	Event end date:	
Contractor:	C&J ENERGY SERVICES	Active datum:	RKB @1,974.1ft (above Mean Sea Level)
Supervisor:	KEVIN DARBY		

Initial Wellhead Pressure (psi)	48.00
Water Source	LITTLE GREENBRIER

Summary for Stage No.: 1 - 6/27/2017

Fluid System: ENERGIZED - SW/N2 TREATMENT	
Interval Top MD: 2,113.4 ft	Frac Gradient: 1.1900 psi/ft
Interval Base MD: 2,254.6 ft	Breakdown Press: 2,354.00 psi
Stage Length: 141.2 ft	Breakdown Rate: 2.80 bbl/min
CO2 Energized Quality (%):	Max Rate: 50.40 bbl/min
N2 Energized Quality (%): 65.000	Avg Rate: 47.20 bbl/min
No. of Perfs: 32	Max Treat. Press.: 4,220.00 psi
No. of Clusters: 3	Avg Treat. Press.: 3,524.00 psi
BP Removal Date:	Avg HHP:
Screened Out: No	ISIP: 1,646.00 psi
Coil Tubing Used: No	10 Min ISIP:
Tracer Used: No	5 Min ISIP:
	15 Min ISIP:
	Total Proppant: 45,200 lbm
	Total Propp. Format.: 45,200 lbm
	Slurry Vol: 13,343.4 gal
	Clean Vol: 11,440.8 gal
	Treated Water Vol: 252.0 gal

Fluids

Fluid name	Pumped (gal)	Energized Fluid total	Density (ppg)
ACID	252.0		
NITROGEN ENERGIZED		608200	

Proppants

Proppant name	Type	Size	Used (lbm)
WHITE	SAND	20/40	45,200

Summary for Stage No.: 2 - 6/27/2017

Fluid System: ENERGIZED - SW/N2 TREATMENT	
Interval Top MD: 1,811.9 ft	Frac Gradient: 1.2200 psi/ft
Interval Base MD: 1,855.4 ft	Breakdown Press: 3,013.00 psi
Stage Length: 43.5 ft	Breakdown Rate: 6.00 bbl/min
CO2 Energized Quality (%):	Max Rate: 55.70 bbl/min
N2 Energized Quality (%): 70.000	Avg Rate: 52.50 bbl/min
No. of Perfs: 23	Max Treat. Press.: 3,496.00 psi
No. of Clusters: 3	Avg Treat. Press.: 3,302.00 psi
BP Removal Date:	Avg HHP:
Screened Out: No	ISIP: 1,450.00 psi
Coil Tubing Used: No	10 Min ISIP:
Tracer Used: No	5 Min ISIP:
	15 Min ISIP:
	Total Proppant: 29,700 lbm
	Total Propp. Format.: 29,700 lbm
	Slurry Vol: 8,857.8 gal
	Clean Vol: 7,883.4 gal
	Treated Water Vol: 252.0 gal

Fluids

Fluid name	Pumped (gal)	Energized Fluid total	Density (ppg)
ACID	252.0		
NITROGEN ENERGIZED		392300	

Proppants

Proppant name	Type	Size	Used (lbm)
WHITE	SAND	20/40	29,700

Summary for Stage No.: 3 - 6/27/2017

Fluid System: ENERGIZED - SW/N2 TREATMENT	
Interval Top MD: 1,582.8 ft	Frac Gradient: 1.2600 psi/ft
Interval Base MD: 1,725.4 ft	Breakdown Press: 3,506.00 psi
Stage Length: 142.6 ft	Breakdown Rate: 6.00 bbl/min
CO2 Energized Quality (%):	Max Rate: 56.20 bbl/min
N2 Energized Quality (%): 70.000	Avg Rate: 52.80 bbl/min
No. of Perfs: 23	Max Treat. Press.: 3,706.00 psi
No. of Clusters: 3	Avg Treat. Press.: 3,281.00 psi
BP Removal Date:	Avg HHP:
Screened Out: No	ISIP: 1,367.00 psi
Coil Tubing Used: No	10 Min ISIP:
Tracer Used: No	5 Min ISIP:
	15 Min ISIP:
	Total Proppant: 28,400 lbm
	Total Propp. Format.: 28,400 lbm
	Slurry Vol: 8,635.2 gal
	Clean Vol: 7,341.6 gal
	Treated Water Vol: 252.0 gal

Fluids

Fluid name	Pumped (gal)	Energized Fluid total	Density (ppg)
ACID	252.0		
NITROGEN ENERGIZED		396300	

Proppants

Proppant name	Type	Size	Used (lbm)
WHITE	SAND	20/40	28,400

Summary for Stage No.: 4 - 6/27/2017

Fluid System: ENERGIZED - SW/N2 TREATMENT	
Interval Top MD: 1,302.5 ft	Frac Gradient: 1.3900 psi/ft
Interval Base MD: 1,451.5 ft	Breakdown Press: 2,779.00 psi
Stage Length: 149.0 ft	Breakdown Rate: 6.10 bbl/min
CO2 Energized Quality (%):	Max Rate: 44.80 bbl/min
N2 Energized Quality (%): 70.000	Avg Rate: 41.30 bbl/min
No. of Perfs: 24	Max Treat. Press.: 3,706.00 psi
No. of Clusters: 2	Avg Treat. Press.: 2,654.00 psi
BP Removal Date:	Avg HHP:
Screened Out: No	ISIP: 1,313.00 psi
Coil Tubing Used: No	10 Min ISIP:
Tracer Used: No	5 Min ISIP:
	15 Min ISIP:
	Total Proppant: 38,600 lbm
	Total Propp. Format.: 38,600 lbm
	Slurry Vol: 9,219.0 gal
	Clean Vol: 7,547.4 gal
	Treated Water Vol: 252.0 gal

Fluids

Fluid name	Pumped (gal)	Energized Fluid total	Density (ppg)
NITROGEN ENERGIZED		375600	
ACID	252.0		

Proppants

Proppant name	Type	Size	Used (lbm)
WHITE	SAND	20/40	38,600

Summary for Stage No.: 5 - 6/27/2017

Fluid System: ENERGIZED - SW/N2 TREATMENT	
Interval Top MD: 1,134.1 ft	Frac Gradient: 1.4000 psi/ft
Interval Base MD: 1,195.7 ft	Breakdown Press: 2,646.00 psi
Stage Length: 61.6 ft	Breakdown Rate: 6.10 bbl/min
CO2 Energized Quality (%):	Max Rate: 44.60 bbl/min
N2 Energized Quality (%): 70.000	Avg Rate: 41.10 bbl/min
No. of Perfs: 24	Max Treat. Press.: 3,918.00 psi
No. of Clusters: 3	Avg Treat. Press.: 3,312.00 psi
BP Removal Date:	Avg HHP:
Screened Out: No	ISIP: 1,123.00 psi
Coil Tubing Used: No	10 Min ISIP:
Tracer Used: No	5 Min ISIP:
	15 Min ISIP:
	Total Proppant: 27,700 lbm
	Total Propp. Format.: 27,700 lbm
	Slurry Vol: 7,274.4 gal
	Clean Vol: 6,010.2 gal
	Treated Water Vol: 252.0 gal

Fluids

Fluid name	Pumped (gal)	Energized Fluid total	Density (ppg)
NITROGEN ENERGIZED		315700	
ACID	252.0		

Proppants

Proppant name	Type	Size	Used (lbm)
WHITE	SAND	20/40	27,700

Summary for Stage No.: 6 - 6/27/2017

Fluid System: ENERGIZED - SW/N2 TREATMENT	
Interval Top MD: 981.4 ft	Frac Gradient: 2.3600 psi/ft
Interval Base MD: 1,093.8 ft	Breakdown Press: 2,524.00 psi
Stage Length: 112.4 ft	Breakdown Rate: 5.90 bbl/min
CO2 Energized Quality (%):	Max Rate: 40.20 bbl/min
N2 Energized Quality (%): 70.000	Avg Rate: 39.10 bbl/min
No. of Perfs: 22	Max Treat. Press.: 3,823.00 psi
No. of Clusters: 2	Avg Treat. Press.: 2,854.00 psi
BP Removal Date:	Avg HHP:
Screened Out: No	ISIP: 2,002.00 psi
Coil Tubing Used: No	10 Min ISIP: 1,250.00 psi
Tracer Used: No	5 Min ISIP: 1,309.00
	15 Min ISIP:
	Total Proppant: 37,300 lbm
	Total Propp. Format.: 37,300 lbm
	Slurry Vol: 7,429.8 gal
	Clean Vol: 6,081.6 gal
	Treated Water Vol: 0.0 gal

Fluids

Fluid name	Pumped (gal)	Energized Fluid total	Density (ppg)
NITROGEN ENERGIZED		313200	

Proppants

Proppant name	Type	Size	Used (lbm)
WHITE	SAND	20/40	37,300

Final Production After Stimulation			Haysi 37	
	BOD	MCFD	Hours Tested	Rock Pressure
Final/Commingled Zones				
Commingled		50	in-line	



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Drawer 159, Lebanon, VA 24266
Telephone: (276) 415-9700

Tracking Number:	9981
Company:	EnerVest Operating, LLC
File Number:	BU-5144
Operations Name:	Haysi 37 w/PL
Operation Type:	Coalbed/Pipeline
Drilling Report Type:	Original

DRILLING REPORT (DGO-GO-14)

1. Drilling Data

Date drilling commenced:	6/3/2017	Drilling Contractor:	Gasco #5
Date drilling completed:	6/4/2017	Rig Type:	☒ Rotary ☐ Cable
Driller's Total Depth (feet):	2373.00		
Log Total Depth (feet):	2377.00	Coal Seam at Total Depth:	POCAHONTAS #1

2. Final Location Plat (as required by 4 VAC25-150-360.C.)

Permitted State Plane X:	10402932.2600	Final Plat State Plane X:	10402931.6600
Permitted State Plane Y:	3618953.1800	Final Plat State Plane Y:	3618952.9100

Plat Previously Submitted Or... ☐

List of Attached Items:

Description	FileName
Haysi 37 Final Plat	Haysi-37 Final plat.pdf

Haysi 37 Plat attachment	Haysi-37_Plat Owner Info.pdf
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3. Geological Data

Fresh Water At:

Depth (in feet)	Rate	Unit of Measure
-----------------	------	-----------------

Salt Water At:

Depth (in feet)	Rate	Unit of Measure
-----------------	------	-----------------

Coal Seams:

List of Attached Items:

Description	FileName
Haysi 37 Coal	Haysi 37 Coals.xlsx

Gas and Oil Shows:

List of Attached Items:

Description	FileName
Haysi 37 Shows	Haysi 37 Shows.xlsx

4. Geophysical Logs (As required by 4VAC25-150-280.A)

List all logs run: GR/CDL/PE/DIL/Neu/TEMP/Audio

Did logs disclose vertical locations of a coal seam?

☐

5. Survey Results (As required by 4VAC25-150-280.B.2)

List of Attached Items:

Description	FileName
Haysi 37 Surveys	Haysi 37 Survey.xlsx

6. Casing, Centralizers and Tubing Program

List of Attached Items:

Description	FileName
Haysi 37 Casing, Centralizers and Tubing	Haysi 37 Casing.xlsx

7. Remarks

Use this space to note any conditions or occurrences, such as lost circulation, fishing jobs, junk left in hole, sidetracks, squeeze jobs, etc., not shown above. Include data and depth of condition/occurrence.

8. Drillers Log

Compiled By: EnerVest Operating, LLC

List of Attached Items:

Description	FileName
Haysi 37 Driller's Log	Haysi 37 DrillersLog.xlsx

9. Comments

Drilling Report OK. [8/30/2017, cwh]

10. Signature

Permitee: EnerVest Operating, LLC

Date: 8/18/2017

Signed By: Laura Murray

Title: Associate Landman

INTERNAL USE ONLY

Submit Date: 8/18/2017

Status: A

Date: 8/30/2017

Final PDF Date: 8/31/2017

290'

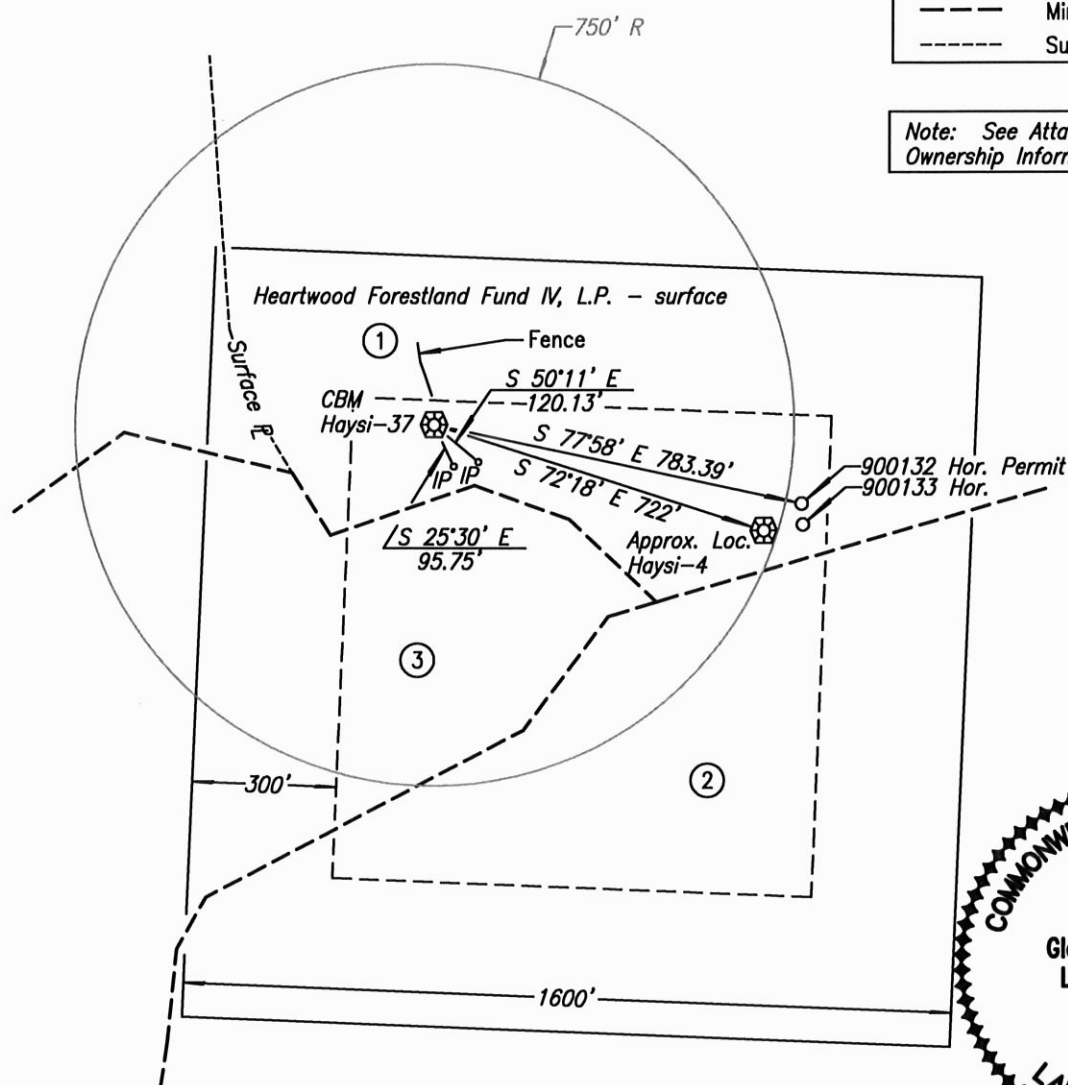
Well Coordinates: (Geographic N83)
37.203729° -82.209228°

Well Coordinates: (UTM N27, Zone 17)
N 13,510,281.71 E 1,288,311.67

Latitude 37° 12' 30"

1,740'

Longitude -82° 12' 30"



Note: The boundary lines shown hereon are based on deeds, plats and maps of record and do not depict a current boundary survey.

The undersigned hereby certifies that the final location is within ten (10') feet of the location shown on the well plat dated 8-12-2013.

Well elevation determined by GPS survey from HARN Monument P-424

FINAL PLAT

Area of Unit = 58.77 Ac.

Well Coordinates: (VA St. Plane S. Zone, NAD 83 (1993))
N 3,618,952.91 E 10,402,931.66

Well Coordinates: (VA St. Plane S. Zone, NAD 27 Calculated from NAD 83 (1993))
N 338,075.15 E 919,946.19

Well Coordinates: (Cinchfield Coal Co.)
N 37,749.01 E 50,772.02

WELL LOCATION PLAT NORA GRID AD-69

COMPANY EnerVest Operating, LLC WELL NAME AND NUMBER Haysi-37
TRACT NO. Jas. M. Owens ELEVATION 1,963.79' QUADRANGLE Prater
COUNTY Buchanan DISTRICT Prater SCALE 1" = 400' DATE 6-5-2017
This Plat is a new plat ____; an updated plat ____; or a final location plat x

+ Denotes the location of a well on United States topographic Maps, scale 1 to 24,000, latitude and longitude lines being represented by border lines as shown.

Glenn F. Phillips

~~Licensed Professional Engineer or~~ Licensed Land Surveyor

HAYSI-37 FINAL PLAT
TRACT OWNERSHIP INFORMATION SCHEDULE
6/5/2017

- 1 . Jas. M. Owens
409.73 Acres
ACIN LLC - coal
Paramont Contura, LLC - coal lessee
WBRD LLC - coal
Dickenson-Russell Contura, LLC - coal lessee
EnerVest Energy Institutional Fund XIV-A, L.P., EnerVest Energy Institutional Fund XIV-A1, L.P., &
EnerVest Energy Institutional Fund XIV-WIC, L.P. - oil, gas & CBM
Gas 20.31 Ac. 34.55%
- 2 . W. C. Owens
377.12 Acres
ACIN LLC - coal
Paramont Contura, LLC - coal lessee
WBRD LLC - coal
Dickenson-Russell Contura, LLC - coal lessee
EnerVest Energy Institutional Fund XIV-A, L.P., EnerVest Energy Institutional Fund XIV-A1, L.P., &
EnerVest Energy Institutional Fund XIV-WIC, L.P. - oil, gas & CBM
Gas 26.55 Ac. 45.18%
- 3 . W. C. Owens
115.81 Acres
ACIN LLC - coal
Paramont Contura, LLC - coal lessee
WBRD LLC - coal
Dickenson-Russell Contura, LLC - coal lessee
EnerVest Energy Institutional Fund XIV-A, L.P., EnerVest Energy Institutional Fund XIV-A1, L.P., &
EnerVest Energy Institutional Fund XIV-WIC, L.P. - oil, gas & CBM
Gas 11.91 Ac. 20.27%

Coal seams			Well #	Haysi 37		
Names	Depth Top	Depth Bottom	Thickness	Mining in Area Yes No		Mined Out
Aily	901.60	903.20	1.60		No	No
Raven	981.90	984.10	2.20		No	No
Jawbone Rider	1090.90	1093.30	2.40		No	No
Jawbone	1134.60	1137.10	2.50		No	No
Jawbone	1144.80	1145.30	0.50		No	No
Tiller	1194.70	1195.20	0.50		No	No
Upper Seaboard A	1272.00	1272.10	0.10		No	No
Upper Seaboard	1303.00	1305.50	2.50		No	No
Greasy Creek	1448.30	1451.00	2.70		No	No
Middle Seaboard	1497.00	1497.10	0.10		No	No
Lower Seaboard	1510.50	1510.60	0.10		No	No
Unnamed A	1551.50	1551.60	0.10		No	No
Unnamed B	1569.50	1569.60	0.10		No	No
Upper Horsepen	1583.30	1584.10	0.80		No	No
Middle Horsepen	1646.30	1647.80	1.50		No	No
C Seam Rider	1667.50	1667.60	0.10		No	No
C Seam	1684.00	1684.10	0.10		No	No
War Creek	1723.70	1724.90	1.20		No	No
Unnamed C	1768.00	1768.10	0.10		No	No
Beckley	1812.40	1814.20	1.80		No	No
Lower Horsepen	1844.70	1845.20	0.50		No	No
Lower Horsepen	1853.60	1854.90	1.30		No	No
X Seam Rider	1881.50	1881.60	0.10		No	No
X Seam	1902.00	1902.10	0.10		No	No
Pocahontas #9	1914.50	1914.60	0.10		No	No
Pocahontas #8	1944.50	1944.60	0.10		No	No
Pocahontas #7	1969.50	1969.60	0.10		No	No
Pocahontas #6	2034.50	2034.60	0.10		No	No
Pocahontas #5	2045.80	2045.90	0.10		No	No
Pocahontas #4	2113.90	2115.70	1.80		No	No
Pocahontas #3	2193.00	2196.50	3.50		No	No
Pocahontas #3	2212.00	2212.50	0.50		No	No
Pocahontas #2	2252.90	2254.10	1.20		No	No
Pocahontas #1	2335.00	2335.10	0.10		No	No

Gas and Oil Shows

Haysi 37

FORMATION	DEPTH	THICKNESS	IPF (MCFD/BOPD)	PRESSURE	HOURS TESTED
	572		N/S		
	759		N/S		
	949		N/S		
	1138		N/S		
	1327		N/S		
	1517		N/S		
	1894		N/S		

Survey Results

Haysi 37

Depth of Survey	Direction/Distance/Degree From True Vertical
194	1/4
383	1/4
572	1/2
759.00	1/4
949.00	1/2
1,138.00	1/2
1,327.00	1/2
1,517.00	1/2
1,707.00	1/2
1,894.00	3/4
2,082.00	1/2
2,270.00	1/4

Casing Program

[illegible]

Drillers Log		Haysi 37			
Geologic Age	Formation	General Lithology	Depth Top	Depth Bottom	Thickness
Pennsylvanian	Lee	Sand/Shale/Coal	0.00	901.60	901.60
Pennsylvanian	Lee	Aily	901.60	903.20	1.60
Pennsylvanian	Lee	Sand/Shale	903.20	981.90	78.70
Pennsylvanian	Lee	Raven	981.90	984.10	2.20
Pennsylvanian	Lee	Sand/Shale	984.10	1090.90	106.80
Pennsylvanian	Lee	Jawbone Rider	1090.90	1093.30	2.40
Pennsylvanian	Lee	Sand/Shale	1093.30	1134.60	41.30
Pennsylvanian	Lee	Jawbone	1134.60	1137.10	2.50
Pennsylvanian	Lee	Sand/Shale	1137.10	1144.80	7.70
Pennsylvanian	Lee	Jawbone	1144.80	1145.30	0.50
Pennsylvanian	Lee	Sand/Shale	1145.30	1194.70	49.40
Pennsylvanian	Lee	Tiller	1194.70	1195.20	0.50
Pennsylvanian	Lee	Sand/Shale	1195.20	1272.00	76.80
Pennsylvanian	Lee	Upper Seaboard A	1272.00	1272.10	0.10
Pennsylvanian	Lee	Sand/Shale	1272.10	1303.00	30.90
Pennsylvanian	Lee	Upper Seaboard	1303.00	1305.50	2.50
Pennsylvanian	Lee	Sand/Shale	1305.50	1448.30	142.80
Pennsylvanian	Lee	Greasy Creek	1448.30	1451.00	2.70
Pennsylvanian	Lee	Sand/Shale	1451.00	1497.00	46.00
Pennsylvanian	Lee	Middle Seaboard	1497.00	1497.10	0.10
Pennsylvanian	Lee	Sand/Shale	1497.10	1510.50	13.40
Pennsylvanian	Lee	Lower Seaboard	1510.50	1510.60	0.10
Pennsylvanian	Lee	Sand/Shale	1510.60	1551.50	40.90
Pennsylvanian	Lee	Unnamed A	1551.50	1551.60	0.10
Pennsylvanian	Lee	Sand/Shale	1551.60	1569.50	17.90
Pennsylvanian	Lee	Unnamed B	1569.50	1569.60	0.10
Pennsylvanian	Lee	Sand/Shale	1569.60	1583.30	13.70
Pennsylvanian	Lee	Upper Horsepen	1583.30	1584.10	0.80
Pennsylvanian	Lee	Sand/Shale	1584.10	1646.30	62.20
Pennsylvanian	Lee	Middle Horsepen	1646.30	1647.80	1.50
Pennsylvanian	Lee	Sand/Shale	1647.80	1667.50	19.70
Pennsylvanian	Lee	C Seam Rider	1667.50	1667.60	0.10
Pennsylvanian	Lee	Sand/Shale	1667.60	1684.00	16.40
Pennsylvanian	Lee	C Seam	1684.00	1684.10	0.10
Pennsylvanian	Lee	Sand/Shale	1684.10	1723.70	39.60
Pennsylvanian	Lee	War Creek	1723.70	1724.90	1.20
Pennsylvanian	Lee	Sand/Shale	1724.90	1768.00	43.10
Pennsylvanian	Lee	Unnnamed C	1768.00	1768.10	0.10
Pennsylvanian	Lee	Sand/Shale	1768.10	1812.40	44.30
Pennsylvanian	Lee	Beckley	1812.40	1814.20	1.80
Pennsylvanian	Lee	Sand/Shale	1814.20	1844.70	30.50
Pennsylvanian	Lee	Lower Horsepen	1844.70	1845.20	0.50
Pennsylvanian	Lee	Sand/Shale	1845.20	1853.60	8.40

Pennsylvanian	Lee	Lower Horsepen	1853.60	1854.90	1.30
Pennsylvanian	Lee	Sand/Shale	1854.90	1881.50	26.60
Pennsylvanian	Lee	X Seam Rider	1881.50	1881.60	0.10
Pennsylvanian	Lee	Sand/Shale	1881.60	1902.00	20.40
Pennsylvanian	Lee	X Seam	1902.00	1902.10	0.10
Pennsylvanian	Lee	Sand/Shale	1902.10	1914.50	12.40
Pennsylvanian	Lee	Pocahontas #9	1914.50	1914.60	0.10
Pennsylvanian	Lee	Sand/Shale	1914.60	1944.50	29.90
Pennsylvanian	Lee	Pocahontas #8	1944.50	1944.60	0.10
Pennsylvanian	Lee	Sand/Shale	1944.60	1969.50	24.90
Pennsylvanian	Lee	Pocahontas #7	1969.50	1969.60	0.10
Pennsylvanian	Lee	Sand/Shale	1969.60	2034.50	64.90
Pennsylvanian	Lee	Pocahontas #6	2034.50	2034.60	0.10
Pennsylvanian	Lee	Sand/Shale	2034.60	2045.80	11.20
Pennsylvanian	Lee	Pocahontas #5	2045.80	2045.90	0.10
Pennsylvanian	Lee	Sand/Shale	2045.90	2113.90	68.00
Pennsylvanian	Lee	Pocahontas #4	2113.90	2115.70	1.80
Pennsylvanian	Lee	Sand/Shale	2115.70	2193.00	77.30
Pennsylvanian	Lee	Pocahontas #3	2193.00	2196.50	3.50
Pennsylvanian	Lee	Sand/Shale	2196.50	2212.00	15.50
Pennsylvanian	Lee	Pocahontas #3	2212.00	2212.50	0.50
Pennsylvanian	Lee	Sand/Shale	2212.50	2252.90	40.40
Pennsylvanian	Lee	Pocahontas #2	2252.90	2254.10	1.20
Pennsylvanian	Lee	Sand/Shale	2254.10	2335.00	80.90
Pennsylvanian	Lee	Pocahontas #1	2335.00	2335.10	0.10
Pennsylvanian	Lee	Sand/Shale	2335.10	2377.00	41.90



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Drawer 159, Lebanon, VA 24266
Telephone: (276) 415-9650

Tracking Number: 2311
Company: Range Resources-Pine Mountain
File Number: BU-3865
Completion Report Type: Original

COMPLETION REPORT (DGO-GO-15)

Well Type:	<u>Coalbed/Pipeline</u>	Date Well Completed:	<u>8/12/2008</u>
Driller's Total Depth:	<u>2350.00</u>	Log's Total Depth:	<u>2221.00</u>

1. Changes In Casing/Tubing from Approved Drilling Report

Description	FileName
-------------	----------

2. Stimulation Record

Stimulation Status: ☒ Stimulated ☐ GOB ☐ Not Stimulated ☐ Service Well

Description	FileName
Haysi #52 stimulation	Haysi 52 stimulation.rtf

3. Final Production

Description	FileName
Haysi 52 Final Production	Final_Prod.xls

4. Comments

Notes:

5. Signature

Permittee: Range Resources-Pine Mountain Date: 3/15/2012 (Company)

By: Jonathan Horne Title: Engineering Tech (Signature)

INTERNAL USE ONLY

Submit Date: 3/15/2012

Status: Approved

Date: 3/28/2012

Final PDF Date: 3/29/2012

Range Resources - Pine Mountain
Completion Report

Page 1 of 2
3/15/2012 10:25:18 AM

105010061 1 Haysi 52

Stage 1

Stage Date 8/12/2008
Perf Date 8/12/2008
Logging Co. Key
Formation Poco 2, Poco 1
Top Perf 2118
Bottom Perf 2169
#Shots 20
Perf Size 0.49
Perf Comments

Service Co Superior
Fluid Type Gel + N2 foam (70Q)
BD 2173
ISIP
Avg Press 2917
Max Treat Pressure 2931
Final ISIP 1621
2 Min SIP 1517
5 Min SIP
10 Min SIP
Sand Mesh:
Frac Gradient:

Avg DH Rate 30
Max DH Rate 32
Total Slurry Volume 123.7 BBLs
Total Fluid Volume 112 BBLs
Avg N2 Rate 19,500
Max N2 Rate scfm
Total N2 Volume 167,600 scf
Max DH PPA
Total Proppant Sks 159 sks
Total Acid 250 Gal
Acid Type 15% HCL

Stage 2

Stage Date 8/12/2008
Perf Date 8/12/2008
Logging Co. Key
Formation Poco 3
Top Perf 2047.6
Bottom Perf 2048.8
#Shots 12
Perf Size 0.49
Perf Comments

Service Co Superior
Fluid Type Gel + N2 Foam
BD 2056
ISIP
Avg Press 1918
Max Treat Pressure 2517
Final ISIP 1917
2 Min SIP 1721
5 Min SIP
10 Min SIP
Sand Mesh:
Frac Gradient:

Avg DH Rate 31
Max DH Rate 35
Total Slurry Volume 121 BBLs
Total Fluid Volume 105 BBLs
Avg N2 Rate 19,100
Max N2 Rate scfm
Total N2 Volume 123,600 scf
Max DH PPA
Total Proppant Sks 116 sks
Total Acid 250 Gal
Acid Type 15% hcl

Stage 3

Stage Date 8/12/2008
Perf Date 8/12/2008
Logging Co. Key
Formation Up.Horsepen,War
Top Perf 1398.5
Bottom Perf 1685.5
#Shots 32
Perf Size 0.34
Perf Comments

Service Co Superior
Fluid Type Gel + N2 Foam
BD 1513
ISIP
Avg Press 2131
Max Treat Pressure 2217
Final ISIP 1309
2 Min SIP 1207
5 Min SIP 1108
10 Min SIP
Sand Mesh:
Frac Gradient:

Avg DH Rate 25
Max DH Rate 36
Total Slurry Volume 173.0 BBLs
Total Fluid Volume 151 BBLs
Avg N2 Rate 21,000
Max N2 Rate scfm
Total N2 Volume 254,200 scf
Max DH PPA
Total Proppant Sks 191 sks
Total Acid Gal
Acid Type

Range Resources - Pine Mountain
Completion Report

3/15/2012 10:26:58 AM

Stage 4

Stage Date 8/12/2008
Perf Date 8/12/2008
Logging Co. Key
Formation Up. Seaboard, Greasy
Top Perf 1105.6
Bottom Perf 1254.5
#Shots 26
Perf Size 0.34
Perf Comments

Service Co Superior
Fluid Type Gel + N2 Foam
BD 2825
ISIP
Avg Press 2491
Max Treat Pressure 3217
Final ISIP 1712
2 Min SIP 1610
5 Min SIP
10 Min SIP
Sand Mesh:
Frac Gradient:

Avg DH Rate 30
Max DH Rate 33
Total Slurry Volume 151.4 BBLs
Total Fluid Volume 138.2 BBLs
Avg N2 Rate 18,170
Max N2 Rate scfm
Total N2 Volume 208,600 scf
Max DH PPA
Total Proppant Sks 242 sks
Total Acid 250 Gal
Acid Type 15% HCL

Stage 5

Stage Date 8/12/2008
Perf Date 8/12/2008
Logging Co. Key
Formation Jawbone Rider,
Top Perf 888
Bottom Perf 992
#Shots 25
Perf Size 0.34
Perf Comments

Service Co Superior
Fluid Type Gel + N2 Foam
BD 2378
ISIP
Avg Press 2725
Max Treat Pressure 3170
Final ISIP 1620
2 Min SIP 1147
5 Min SIP 1012
10 Min SIP
Sand Mesh:
Frac Gradient:

Avg DH Rate 22
Max DH Rate 27
Total Slurry Volume 160.5 BBLs
Total Fluid Volume 147.2 BBLs
Avg N2 Rate 19,500
Max N2 Rate scfm
Total N2 Volume 236,500 scf
Max DH PPA
Total Proppant Sks sks
Total Acid Gal
Acid Type

Summary Total for All

Number of Stages	Total Slurry	Total Fluid Volume	Total N2 Volume	Total Proppant	Total Acid
5	729.6	653.4	990,500	708	750

Final Production After Stimulation				
	BOD	MCFD	Hours Tested	Rock Pressure
Zone 1				
Zone 2				
Zone 3				
Final/Commingled Zones		9	in-line	25



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Drawer 159, Lebanon, VA 24266
Telephone: (276) 415-9700

Tracking Number:	2359
Company:	Range Resources-Pine Mountain
File Number:	BU-3865
Operations Name:	Haysi #52 W/PL
Operation Type:	Coalbed/Pipeline
Drilling Report Type:	Original

DRILLING REPORT (DGO-GO-14)

1. Drilling Data

Date drilling commenced:	7/29/2008	Drilling Contractor:	Noah Horn #17
Date drilling completed:	8/6/2008	Rig Type:	R Rotary £ Cable
Driller's Total Depth (feet):	2350.00		
Log Total Depth (feet):	2221.00	Coal Seam at Total Depth:	POCAHONTAS #10

2. Final Location Plat (as required by 4 VAC25-150-360.C.)

Permitted State Plane X:	10409494.1500	Final Plat State Plane X:	10409493.0000
Permitted State Plane Y:	3619371.8500	Final Plat State Plane Y:	3619372.0000

Plat Previously Submitted Or... £

List of Attached Items:

Description	FileName
Hasi 52 Final Plat	Haysi 52 Plat.pdf

3. Geological Data

Fresh Water At:

Depth (in feet)	Rate	Unit of Measure
-----------------	------	-----------------

Salt Water At:

Depth (in feet)	Rate	Unit of Measure
-----------------	------	-----------------

Coal Seams:

List of Attached Items:

Description	FileName
Haysi 52 Coal	Haysi 52 Coal.xls

Gas and Oil Shows:

List of Attached Items:

Description	FileName
Haysi #52 gas shows	Shows.xls

4. Electric Logs (As required by 4VAC25-150-280.A)

List all logs run: Res GR/Dens/Temp/Audio/PE/Caliper Data Pack, camera

Did logs disclose vertical locations of a coal seam? **R**

5. Survey Results (As required by 4VAC25-150-280.B.2)

List of Attached Items:

Description	FileName
Haysi #52 survey	Haysi 52 Survey.xls

6. Casing and Tubing Program

List of Attached Items:

Description	FileName
Haysi 52 casing	Casing.xls

7. Remarks

Use this space to note any conditions or occurrences, such as lost circulation, fishing jobs, junk left in hole, sidetracks, squeeze jobs, etc., not shown above. Include data and depth of condition/occurrence.

8. Drillers Log

Compiled By: Range Resources

List of Attached Items:

Description	FileName
Haysi 52 log	Haysi 52 Log.xls

9. Comments

10. Signature

Permittee: Range Resources-Pine Mountain Date: 3/15/2012

Signed By: Jonathan Horne Title: Engineering Tech

INTERNAL USE ONLY

Submit Date: 3/15/2012

Status: A

Date: 3/28/2012

Final PDF Date: 3/29/2012

Form DGO-GO-7

HAYSI 52 PLAT
TRACT OWNERSHIP INFORMATION SCHEDULE
3/12/2008

- 1 . Lease No.
Michael Phillips, et al - surface, coal, oil, gas & CBM
50.00 Acres
Gas 5.81 Ac. 9.89%
- 2 . Lease No.
Ruby & Jim Perkins - gas
7.09 Acres
ACIN, LLC - coal
Alpha Land and Reserves, LLC - coal lessee
WBRD, LLC - coal
Dickenson-Russell Coal Company, LLC - coal lessee
Range Resources-Pine Mountain, Inc. - oil & CBM
Gas 3.88 Ac. 6.60%
- 3 . Lease No.
Harmon Boyd, et ux - gas
21.34 Acres
ACIN, LLC - coal
Alpha Land and Reserves, LLC - coal lessee
WBRD, LLC - coal
Dickenson-Russell Coal Company, LLC - coal lessee
Range Resources-Pine Mountain, Inc. - oil & CBM
Gas 5.28 Ac. 8.98%
- 4 . Lease No.
Norman Boyd, et al. - gas
7.61 Acres
ACIN, LLC - coal
Alpha Land and Reserves, LLC - coal lessee
WBRD, LLC - coal
Dickenson-Russell Coal Company, LLC - coal lessee
Range Resources-Pine Mountain, Inc. - oil & CBM
Gas 2.79 Ac. 4.75%
- 5 . Lease No.
Norman Boyd, et al. - gas
0.54 Acres
ACIN, LLC - coal
Alpha Land and Reserves, LLC - coal lessee
WBRD, LLC - coal
Dickenson-Russell Coal Company, LLC - coal lessee
Range Resources-Pine Mountain, Inc. - oil & CBM
Gas 0.52 Ac. 0.88%

- 6 . Lease No.
Norman Boyd - gas
12.5 Acres
ACIN, LLC - coal
Alpha Land and Reserves, LLC - coal lessee
WBRD, LLC - coal
Dickenson-Russell Coal Company, LLC - coal lessee
Range Resources-Pine Mountain, Inc. - oil & CBM
Gas 11.92 Ac. 20.29%
- 7 . Lease No.
Norman Boyd - gas
12.5 Acres
ACIN, LLC - coal
Alpha Land and Reserves, LLC - coal lessee
WBRD, LLC - coal
Dickenson-Russell Coal Company, LLC - coal lessee
Range Resources-Pine Mountain, Inc. - oil & CBM
Gas 0.71 Ac. 1.21%
- 8 . Lease No.
Bobby & Sheridan Compton - gas
12 Acres
ACIN, LLC - coal
Alpha Land and Reserves, LLC - coal lessee
WBRD, LLC - coal
Dickenson-Russell Coal Company, LLC - coal lessee
Range Resources-Pine Mountain, Inc. - oil & CBM
Gas 1.06 Ac. 1.80%
- 9 . Lease No.
Terry O'Quinn - gas
0.11 Acre
ACIN, LLC - coal
Alpha Land and Reserves, LLC - coal lessee
WBRD, LLC - coal
Dickenson-Russell Coal Company, LLC - coal lessee
Range Resources-Pine Mountain, Inc. - oil & CBM
Gas 0.34 Ac. 0.58%

- 10 . Lease No.
Woody Dales - gas
3 Acres
ACIN, LLC - coal
Alpha Land and Reserves, LLC - coal lessee
WBRD, LLC - coal
Dickenson-Russell Coal Company, LLC - coal lessee
Range Resources-Pine Mountain, Inc. - oil & CBM
Gas 0.86 Ac. 1.46%
- 11 . Lease No.
Coleman United Methodist Church - gas
1 Acres
ACIN, LLC - coal
Alpha Land and Reserves, LLC - coal lessee
WBRD, LLC - coal
Dickenson-Russell Coal Company, LLC - coal lessee
Range Resources-Pine Mountain, Inc. - oil & CBM
Gas 0.59 Ac. 1.00%
- 12 . Lease No.
Jeffrey Dean Fuller - gas
0.75 Acres
ACIN, LLC - coal
Alpha Land and Reserves, LLC - coal lessee
WBRD, LLC - coal
Dickenson-Russell Coal Company, LLC - coal lessee
Range Resources-Pine Mountain, Inc. - oil & CBM
Gas 0.64 Ac. 1.09%
- 13 . Lease No.
Mark Deel - gas
3 & 5.5 Acres
ACIN, LLC - coal
Alpha Land and Reserves, LLC - coal lessee
WBRD, LLC - coal
Dickenson-Russell Coal Company, LLC - coal lessee
Range Resources-Pine Mountain, Inc. - oil & CBM
Gas 2.86 Ac. 4.87%

- 14 . Lease No.
James Vance Deel - gas
1.0 & 0.47 Acres
ACIN, LLC - coal
Alpha Land and Reserves, LLC - coal lessee
WBRD, LLC - coal
Dickenson-Russell Coal Company, LLC - coal lessee
Range Resources-Pine Mountain, Inc. - oil & CBM
Gas 1.95 Ac. 3.32%
- 15 . Lease No.
Johnny Michael Chambers - gas
6 Acres
ACIN, LLC - coal
Alpha Land and Reserves, LLC - coal lessee
WBRD, LLC - coal
Dickenson-Russell Coal Company, LLC - coal lessee
Range Resources-Pine Mountain, Inc. - oil & CBM
Gas 0.30 Ac. 0.51%
- 16 . Lease No.
Mark Deel - gas
6 Acres
ACIN, LLC - coal
Alpha Land and Reserves, LLC - coal lessee
WBRD, LLC - coal
Dickenson-Russell Coal Company, LLC - coal lessee
Range Resources-Pine Mountain, Inc. - oil & CBM
Gas 1.64 Ac. 2.79%
- 17 . Lease No.
Flornia Charles - gas
8 Acres
ACIN, LLC - coal
Alpha Land and Reserves, LLC - coal lessee
WBRD, LLC - coal
Dickenson-Russell Coal Company, LLC - coal lessee
Range Resources-Pine Mountain, Inc. - oil & CBM
Gas 7.01 Ac. 11.93%
- 18 . Lease No.
Jason Fuller - gas
7 Acres
ACIN, LLC - coal
Alpha Land and Reserves, LLC - coal lessee
WBRD, LLC - coal
Dickenson-Russell Coal Company, LLC - coal lessee
Range Resources-Pine Mountain, Inc. - oil & CBM
Gas 4.98 Ac. 8.47%

- 19 . Lease No.
Johnny Michael Chambers - gas
6 Acres
ACIN, LLC - coal
Alpha Land and Reserves, LLC - coal lessee
WBRD, LLC - coal
Dickenson-Russell Coal Company, LLC - coal lessee
Range Resources-Pine Mountain, Inc. - oil & CBM
Gas 5.40 Ac. 9.19%
- 20 . Lease No.
Sandra & Wayne Charles - gas
4.8 Acres
ACIN, LLC - coal
Alpha Land and Reserves, LLC - coal lessee
WBRD, LLC - coal
Dickenson-Russell Coal Company, LLC - coal lessee
Range Resources-Pine Mountain, Inc. - oil & CBM
Gas 0.21 Ac. 0.36%
- 21 . Lease No.
Charlie Powell Chambers - gas
32 Acres
ACIN, LLC - coal
Alpha Land and Reserves, LLC - coal lessee
WBRD, LLC - coal
Dickenson-Russell Coal Company, LLC - coal lessee
Range Resources-Pine Mountain, Inc. - oil & CBM
Gas 0.02 Ac. 0.03%

Coal Seams

				MINING IN AREA		
NAME	TOP	BOTTOM	THICKNESS	YES	NO	MINED OUT
Aily Rider	674	675	1		NO	NO
Aily	708	710	2		NO	NO
Raven	789	790	1		NO	NO
Raven	803	804	1		NO	NO
Jawbone Rider	889	892	3		NO	NO
Jawbone	924	925	1		NO	NO
Tiller	990	991	1		NO	NO
Upper Seaboard	1107	1109	2		NO	NO
Greasy Creek	1253	1257	4		NO	NO
Upper Horsepen	1399	1400	1		NO	NO
War Creek	1535	1536	1		NO	NO
Beckley	1631	1633	2		NO	NO
Lower Horsepen	1692	1694	2		NO	NO
Poco 4	1997	1998	1		NO	NO
Poco 3	2048	2049	1		NO	NO
Poco 2	2118	2119	1		NO	NO
Poco 1	2165	2168	3		NO	NO

Gas and Oil Shows

FORMATION	TOP	BOTTOM	THICKNESS	IPF (MCFD/BOPD)	PRESSURE	HOURS TESTED
TD w/csg		2350		103 MCFD		

Survey Results

Depth of Survey	Direction/Distance/Degree From True Vertical
200	$\frac{1}{4}^{\circ}$
400	$\frac{1}{4}^{\circ}$
600	$\frac{1}{2}^{\circ}$
800	$\frac{1}{4}^{\circ}$
1000	$\frac{1}{4}^{\circ}$
1200	$\frac{1}{2}^{\circ}$
1400	$\frac{1}{2}^{\circ}$
1600	$\frac{1}{2}^{\circ}$
1800	$\frac{3}{4}^{\circ}$
2000	$\frac{3}{4}^{\circ}$
2200	1°

Casing Program

	Casing	Casing	Hole	Cement Used	Cemented To Surface	Date	Packers Or Bridge Plugs	Cement Baskets
Casing Type	Size	Interval	Size	In Cubic Ft.	Yes/No	Cemented	Kind/Size/Set	(ft)
Conductor	11¾"	0-39'	15"					
Water Protection	8⅝"	0-540'	11"	302.5	Yes	08/01/08		
Production Casing	4½"	0-2301'	6½"	536.8	No	08/07/08		294' 1344'
Squeeze Job				196.02	Yes	08/28/08	Bridge plug @ 470'	
Other Casing And Tubing Left In Well	2⅜"	0-2199'						
Liners								

Driller's Log

Geologic Age	Formation	General Lithology	Color	Depth Top	Depth Bottom	Thickness	Remarks
Penn	Lee	Sand and shale		0	674	674	
Penn	Lee	Coal		674	675	1	Aily Rider
Penn	Lee	Sand and shale		675	708	33	
Penn	Lee	Coal		708	710	2	Aily
Penn	Lee	Sand and shale		710	789	79	
Penn	Lee	Coal		789	790	1	Raven
Penn	Lee	Sand and shale		790	803	13	
Penn	Lee	Coal		803	804	1	Raven
Penn	Lee	Sand and shale		804	889	85	
Penn	Lee	Coal		889	892	3	Jawbone Rider
Penn	Lee	Sand and shale		892	924	32	
Penn	Lee	Coal		924	925	1	Jawbone
Penn	Lee	Sand and shale		925	990	65	
Penn	Lee	Coal		990	991	1	Tiller
Penn	Lee	Sand and shale		991	1107	116	
Penn	Lee	Coal		1107	1109	2	Upper Seaboard
Penn	Lee	Sand and shale		1109	1253	144	
Penn	Lee	Coal		1253	1257	4	Greasy Creek
Penn	Lee	Sand and shale		1257	1399	142	
Penn	Lee	Coal		1399	1400	1	Upper Horsepen
Penn	Lee	Sand and shale		1400	1535	135	
Penn	Lee	Coal		1535	1536	1	War Creek
Penn	Lee	Sand and shale		1536	1631	95	
Penn	Lee	Coal		1631	1633	2	Beckley
Penn	Lee	Sand and shale		1633	1692	59	
Penn	Lee	Coal		1692	1694	2	Lower Horsepen
Penn	Lee	Sand and shale		1694	1997	303	
Penn	Lee	Coal		1997	1998	1	Poco 4
Penn	Lee	Sand and shale		1998	2048	50	
Penn	Lee	Coal		2048	2049	1	Poco 3
Penn	Lee	Sand and shale		2049	2118	69	
Penn	Lee	Coal		2118	2119	1	Poco 2
Penn	Lee	Sand and shale		2119	2165	46	
	Lee	Coal		2165	2168	3	Poco 1
	Lee	Sand and shale		2168	2350	182	



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Drawer 159, Lebanon, VA 24266
Telephone: (276) 415-9700

Tracking Number: 1873
Company: Range Resources-Pine Mountain
File Number: BU-3894
Completion Report Type: Original

COMPLETION REPORT (DGO-GO-15)

Well Type:	<u>Coalbed/Pipeline</u>	Date Well Completed:	<u>8/6/2008</u>
Driller's Total Depth:	<u>2465.00</u>	Log's Total Depth:	<u>2465.00</u>

1. Changes In Casing/Tubing from Approved Drilling Report

Description	FileName
-------------	----------

2. Stimulation Record

Stimulation Status: ☒ Stimulated ☐ GOB ☐ Not Stimulated ☐ Service Well

Description	FileName
Haysi #53 Stimulation	Haysi #53 Stimulation.doc

3. Final Production

Description	FileName
Haysi #53 Production	Final_Prod.xls

4. Comments

Notes:

5. Signature

Permittee: Range Resources-Pine Mountain Date: 8/6/2009 (Company)

By: Laura Murray Title: Permit Specialist (Signature)

INTERNAL USE ONLY

Submit Date: 8/6/2009

Status:

Date: 8/13/2009

Final PDF Date: 8/28/2009

STIMULATION RECORD

ZONE 1: Poco 2/ Poco 1 Formation Stimulated With: 70QGel+N₂Fm
Perforated 2143 to 2298 feet No. of Perforations 18 Perforation Size .54
Formation Broke down at: 1454 PSIG Average Injection Rate: 23.1 BPM
ISIP 1791 PSIG 2 Min SIP 1757 PSIG Average Downhole Injection Pressure 2610 PSIG
Stimulated: ☒ Yes ☐ No Date Stimulated: 8/6/2008

ZONE 2: P4 / P3 Formation Stimulated With: 70QGel+N₂Fm
Perforated 2122 to 2168 feet No. of Perforations 17 Perforation Size .33
Formation Broke down at: 1910 PSIG Average Injection Rate: 18 BPM
ISIP 2818 PSIG 2 Min SIP 2112 PSIG Average Downhole Injection Pressure 2819 PSIG
Stimulated: ☒ Yes ☐ No Date Stimulated: 8/6/2008

ZONE 3: U. Horsepen, War Creek, Beckley, L. Horsepen Formation Stimulated With: 70QGel+N₂Fm
Perforated 1514 to 1800 feet No. of Perforations 25 Perforation Size .33
Formation Broke down at: 3510 PSIG Average Injection Rate: 22 BPM
ISIP 2871 PSIG 5 Min SIP 2571 PSIG Average Downhole Injection Pressure 3610 PSIG
Stimulated: ☒ Yes ☐ No Date Stimulated: 8/6/2008

ZONE 4: U. Seaboard, Greasy Creek Formation Stimulated With: 70QGel+N₂Fm
Perforated 1217.5 to 1366.5 feet No. of Perforations 20 Perforation Size .33
Formation Broke down at: 2219 PSIG Average Injection Rate: 21.5 BPM
ISIP 2234 PSIG 5 Min SIP 2055 PSIG Average Downhole Injection Pressure 3180 PSIG
Stimulated: ☒ Yes ☐ No Date Stimulated: 8/6/2008

ZONE 5: Jawbone Rider, Jawbone, Tiller Formation Stimulated With: 70QGel+N₂Fm
Perforated 1007.5 to 1105.5 feet No. of Perforations 25 Perforation Size .33
Formation Broke down at: 2451 PSIG Average Injection Rate: 22 BPM
ISIP 1921 PSIG 5 Min SIP 1718 PSIG Average Downhole Injection Pressure 2605 PSIG
Stimulated: ☒ Yes ☐ No Date Stimulated: 8/6/2008

Final Production After Stimulation				
	BOD	MCFD	Hours Tested	Rock Pressure
Zone 1				
Zone 2				
Zone 3				
Final/Commingled Zones		113	in-line	49



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Drawer 159, Lebanon, VA 24266
Telephone: (276) 415-9700

Tracking Number:	1446
Company:	Range Resources-Pine Mountain
File Number:	BU-3894
Operations Name:	Haysi #53 W/PL
Operation Type:	Coalbed/Pipeline
Drilling Report Type:	Original

DRILLING REPORT (DGO-GO-14)

1. Drilling Data

Date drilling commenced:	<u>7/18/2008</u>	Drilling Contractor:	<u>Noah Horn #17</u>
Date drilling completed:	<u>7/28/2008</u>	Rig Type:	<u>R Rotary</u> <u>E Cable</u>
Driller's Total Depth (feet):	<u>2465.00</u>		
Log Total Depth (feet):	<u>2465.00</u>	Coal Seam at Total Depth:	<u>POCAHONTAS #1</u>

2. Final Location Plat (as required by 4 VAC25-150-360.C.)

Permitted State Plane X:	<u>10409586.1600</u>	Final Plat State Plane X:	<u>10409587.0000</u>
Permitted State Plane Y:	<u>3618105.8000</u>	Final Plat State Plane Y:	<u>3618107.0000</u>

Plat Previously Submitted Or... E

List of Attached Items:

Description	FileName
Haysi #53 Final Plat	Haysi 53 Plat CBM.pdf

3. Geological Data

Fresh Water At:

Depth (in feet)	Rate	Unit of Measure
900	Damp	

Salt Water At:

Depth (in feet)	Rate	Unit of Measure

Coal Seams:

List of Attached Items:

Description	FileName
Haysi #53 Coal	Haysi 53 Coal.xls

Gas and Oil Shows:

List of Attached Items:

Description	FileName
Haysi #53 shows	Haysi 53 Shows.xls

4. Electric Logs (As required by 4VAC25-150-280.A)

List all logs run: Hi Res GR/Dens/Temp/Audio/PE/Caliper Data Pack

Did logs disclose vertical locations of a coal seam? R

5. Survey Results (As required by 4VAC25-150-280.B.2)

List of Attached Items:

Description	FileName
Haysi #53 Survey	Haysi 53 deviation survey.tif

6. Casing and Tubing Program

List of Attached Items:

Description	FileName
Haysi #53 Casing	Casing.xls

7. Remarks

Use this space to note any conditions or occurrences, such as lost circulation, fishing jobs, junk left in hole, sidetracks, squeeze jobs, etc., not shown above. Include data and depth of condition/occurrence.

Cement Baskets(MD-ft): 406, 454, 1756

8. Drillers Log

Compiled By: Range Resources

List of Attached Items:

Description	FileName
Haysi #53 Log	Haysi 53 Log.xls

9. Comments

10. Signature

Permitee: Range Resources-Pine Mountain

Date: 8/6/2009

Signed By: Laura Murray

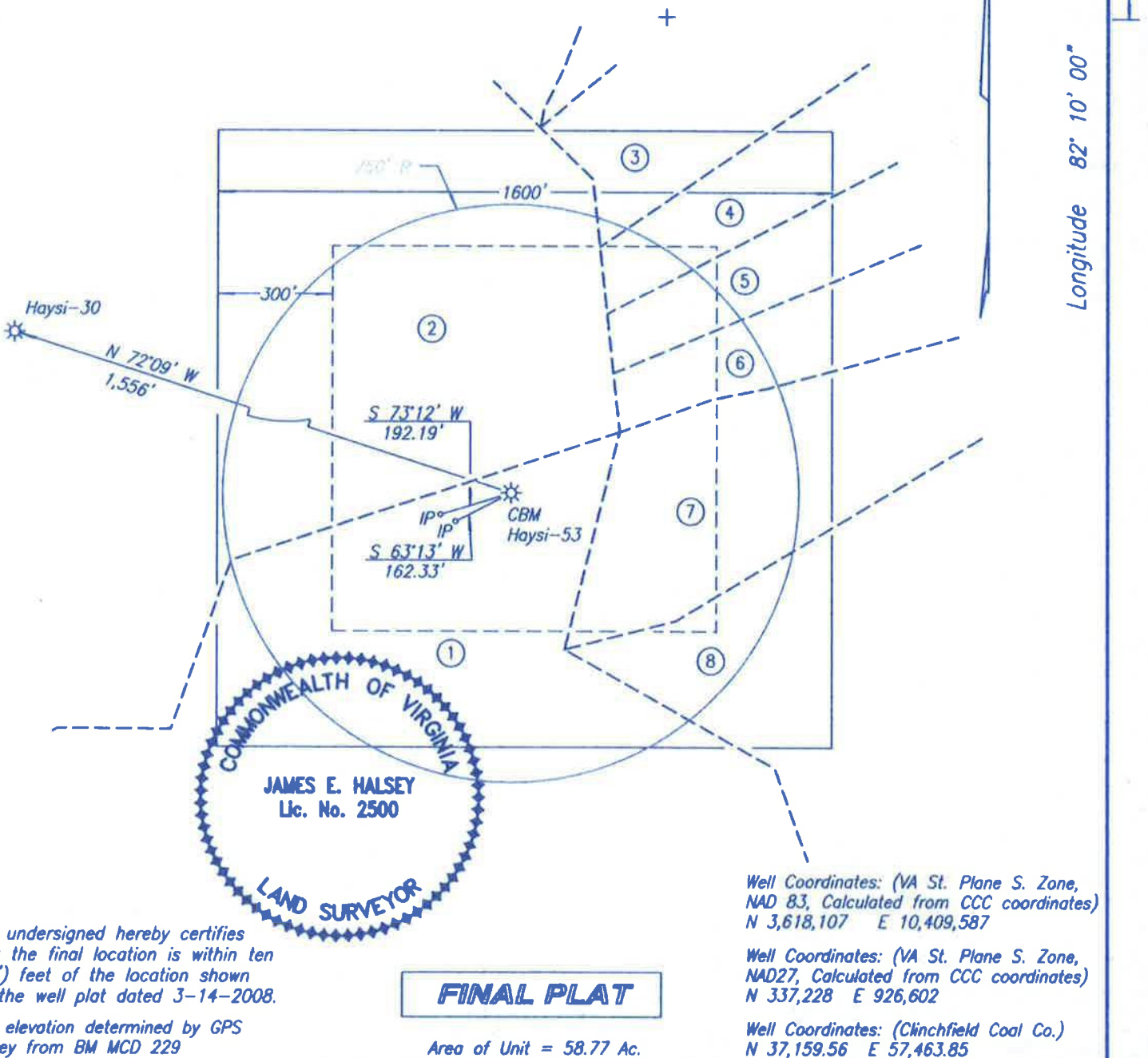
Title: Permit Specialist

INTERNAL USE ONLYSubmit Date: 8/6/2009Status: ADate: 8/13/2009Final PDF Date: 9/2/2009

Well Coordinates: (Geographic N27)
37.202010° -82.186419°

Latitude 37° 12' 30"

See attached Tract Ownership
Information Schedule



WELL LOCATION PLAT (Nora Grid 73-AD)

COMPANY Range Resources - Pine Mountain, Inc. WELL NAME AND NUMBER Haysi-53
TRACT NO. Michael Phillips, et al ELEVATION 2,068.12' QUADRANGLE Prater
COUNTY Buchanan DISTRICT Prater SCALE 1" = 400' DATE 7-21-2008
This Plat is a new plat ; an updated plat ; or a final location plat x

+ Denotes the location of a well on United States topographic Maps, scale 1 to 24,000, latitude and longitude lines being represented by border lines as shown.

James E. Halsey
Licensed Professional Engineer or Licensed Land Surveyor

HAYSI 53 PLAT
TRACT OWNERSHIP INFORMATION SCHEDULE
3/12/2008

- 1 . Lease No.
Michael Phillips, et al - surface, coal, oil, gas & CBM
92.00 Acres
Gas 15.01 Ac. 25.54%
- 2 . Lease No.
Michael Phillips, et al - surface, coal, oil, gas & CBM
50.00 Acres
Gas 22.04 Ac. 37.50%
- 3 . Lease No.
Johnny Michael Chambers - gas
6 Acres
ACIN, LLC - coal
Alpha Land and Reserves, LLC - coal lessee
WBRD, LLC - coal
Dickenson-Russell Coal Company, LLC - coal lessee
Range Resources-Pine Mountain, Inc. - oil & CBM
Gas 1.81 Ac. 3.08%
- 4 . Lease No.
Sandra & Wayne Charles - gas
4.8 Acres
ACIN, LLC - coal
Alpha Land and Reserves, LLC - coal lessee
WBRD, LLC - coal
Dickenson-Russell Coal Company, LLC - coal lessee
Range Resources-Pine Mountain, Inc. - oil & CBM
Gas 2.99 Ac. 5.09%
- 5 . Lease No.
Roger Gene & Rita Kathy Deel - gas
2 Acres
ACIN, LLC - coal
Alpha Land and Reserves, LLC - coal lessee
WBRD, LLC - coal
Dickenson-Russell Coal Company, LLC - coal lessee
Range Resources-Pine Mountain, Inc. - oil & CBM
Gas 2.55 Ac. 4.34%

- 6 . Lease No.
Toby Deel - gas
2 Acres
ACIN, LLC - coal
Alpha Land and Reserves, LLC - coal lessee
WBRD, LLC - coal
Dickenson-Russell Coal Company, LLC - coal lessee
Range Resources-Pine Mountain, Inc. - oil & CBM
Gas 2.44 Ac. 4.15%
- 7 . Lease No.
Kelsie Stiltner - gas
5 Acres
ACIN, LLC - coal
Alpha Land and Reserves, LLC - coal lessee
WBRD, LLC - coal
Dickenson-Russell Coal Company, LLC - coal lessee
Range Resources-Pine Mountain, Inc. - oil & CBM
Gas 7.12 Ac. 12.12%
- 8 . Lease No.
Kelsie Stiltner, et al - gas
19 Acres
ACIN, LLC - coal
Alpha Land and Reserves, LLC - coal lessee
WBRD, LLC - coal
Dickenson-Russell Coal Company, LLC - coal lessee
Range Resources-Pine Mountain, Inc. - oil & CBM
Gas 4.81 Ac. 8.18%

Coal Seams

				MINING IN AREA		
NAME	TOP	BOTTOM	THICKNESS	YES	NO	MINED OUT
Aily Rider	788	789	1		NO	
Aily	820	822	2		NO	
Raven	905	907	2		NO	
Jawbone Rider	1008	1011	3		NO	
Jawbone	1038	1039	1		NO	
Tiller	1105	1106	1		NO	
Upper Seaboard	1219	1221	2		NO	
Greasy Creek	1364	1366	2		NO	
Upper Horsepen	1515	1516	1		NO	
War Creek	1652	1653	1		NO	
Beckley	1747	1748	1		NO	
Lower Horsepen	1805	1807	2		NO	
Poco 4	2123	2126	3		NO	
Poco 3	2165	2168	3		NO	
Poco 2	2243	2244	1		NO	
Poco 1	2295	2298	3		NO	

Gas and Oil Shows

FORMATION	TOP	BOTTOM	THICKNESS	IPF (MCFD/BOPD)	PRESSURE	HOURS TESTED
Case hole TD				No show		

SCALE: 25 FT/IN
TRUE DEPTH: 2326.40 FT
AZIMUTH: 134.9
DISTANCE: 43.7 FT
+ = 300 FT INCR

Casing Program

	Casing	Casing	Hole	Cement Used	Cemented To Surface	Date	Packers Or Bridge Plugs
Casing Type	Size	Interval	Size	In Cubic Ft.	Yes/No	Cemented	Kind/Size/Set
Conductor	13 ³ / ₈ "	0-19'	15"				
Water Protection	8 ³ / ₈ "	0-574'	12 ³ / ₈ "	363	Yes, circ 13bbls	7/21/2008	
Production Casing	4 ¹ / ₂ "	0-2428'	6 ¹ / ₂ "	563.5	Yes, circ 5bbls	7/28/2008	
Other Casing And Tubing Left In Well	2 ³ / ₈ "	0-2348'					
Liners							

Driller's Log

Geologic Age	Formation	General Lithology	Color	Depth Top	Depth Bottom	Thickness	Remarks
Penn	Lee	Sandy Shale		0	788	788	
Penn	Lee	Coal		788	789	1	Aily Rider
Penn	Lee	Sandy Shale		789	820	31	
Penn	Lee	Coal		820	822	2	Aily
Penn	Lee	Sandy Shale		822	905	83	
Penn	Lee	Coal		905	907	2	Raven
Penn	Lee	Sandy Shale		907	1008	101	
Penn	Lee	Coal		1008	1011	3	Jawbone Rider
Penn	Lee	Sandy Shale		1011	1038	27	
Penn	Lee	Coal		1038	1039	1	Jawbone
Penn	Lee	Sandy Shale		1039	1105	66	
Penn	Lee	Coal		1105	1106	1	Tiller
Penn	Lee	Sandy Shale		1106	1219	113	
Penn	Lee	Coal		1219	1221	2	Upper Seaboard
Penn	Lee	Sandy Shale		1221	1364	143	
Penn	Lee	Coal		1364	1366	2	Greasy Creek
Penn	Lee	Sandy Shale		1366	1515	149	
Penn	Lee	Coal		1515	1516	1	Upper Horsepen
Penn	Lee	Sandy Shale		1516	1652	136	
Penn	Lee	Coal		1652	1653	1	War Creek
Penn	Lee	Sandy Shale		1653	1747	94	
Penn	Lee	Coal		1747	1748	1	Beckley
Penn	Lee	Sandy Shale		1748	1805	57	
Penn	Lee	Coal		1805	1807	2	Lower Horsepen
Penn	Lee	Sandy Shale		1807	2123	316	
Penn	Lee	Coal		2123	2126	3	Poco 4
Penn	Lee	Sandy Shale		2126	2165	39	
Penn	Lee	Coal		2165	2168	3	Poco 3
Penn	Lee	Sandy Shale		2168	2243	75	
Penn	Lee	Coal		2243	2244	1	Poco 2
Penn	Lee	Sandy Shale		2244	2295	51	
Penn	Lee	Coal		2295	2298	3	Poco 1
Penn	Lee	Sandy Shale		2298	2328	30	



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Drawer 159, Lebanon, VA 24266
Telephone: (276) 415-9650

Tracking Number: 3240
Company: Range Resources-Pine Mountain
File Number: DI-1791
Completion Report Type: Original

COMPLETION REPORT (DGO-GO-15)

Well Type:	<u>Coalbed/Pipeline</u>	Date Well Completed:	<u>9/25/2007</u>
Driller's Total Depth:	<u>2109.00</u>	Log's Total Depth:	<u>2094.00</u>

1. Changes In Casing/Tubing from Approved Drilling Report

Description	FileName
-------------	----------

2. Stimulation Record

Stimulation Status: ☒ Stimulated ☐ GOB ☐ Not Stimulated ☐ Service Well

Description	FileName
Haysi #54 stimulation	Haysi 54 stimulation.rtf

3. Final Production

Description	FileName
Haysi #54 final production	Haysi 54 Final Prod.xls

4. Comments

Notes:

5. Signature

Permittee: Range Resources-Pine Mountain Date: 3/15/2012 (Company)

By: Jonathan Horne Title: Engineering Tech (Signature)

INTERNAL USE ONLY

Submit Date: 3/15/2012

Status: Approved

Date: 3/28/2012

Final PDF Date: 3/29/2012

Range Resources - Pine Mountain
Completion Report

Page 1 of 2
3/15/2012 10:43:26 AM

105010076 1 Haysi 54

Stage 1

Stage Date 9/25/2007
Perf Date 9/25/2007
Logging Co.
Formation Poco 4 Rider, Poco 4,
Top Perf 1787.9
Bottom Perf 1901.1
#Shots 12
Perf Size 0.33
Perf Comments

Service Co
Fluid Type Foam
BD 0
ISIP
Avg Press 0
Max Treat Pressure 0
Final ISIP
2 Min SIP
5 Min SIP
10 Min SIP
Sand Mesh:
Frac Gradient:

Avg DH Rate 0
Max DH Rate 0
Total Slurry Volume 0 BBLs
Total Fluid Volume 0 BBLs
Avg N2 Rate 0
Max N2 Rate scfm
Total N2 Volume scf
Max DH PPA 0
Total Proppant Sks 0 sks
Total Acid 0 Gal
Acid Type

Stage 2

Stage Date 9/25/2007
Perf Date 9/25/2007
Logging Co.
Formation Up Horsepen, M
Top Perf 1241
Bottom Perf 1751
#Shots 29
Perf Size 0.33
Perf Comments

Service Co
Fluid Type
BD 0
ISIP
Avg Press 0
Max Treat Pressure 0
Final ISIP
2 Min SIP
5 Min SIP
10 Min SIP
Sand Mesh:
Frac Gradient:

Avg DH Rate 0
Max DH Rate 0
Total Slurry Volume 0 BBLs
Total Fluid Volume 0 BBLs
Avg N2 Rate 0
Max N2 Rate scfm
Total N2 Volume scf
Max DH PPA 0
Total Proppant Sks 0 sks
Total Acid 0 Gal
Acid Type

Stage 3

Stage Date 9/25/2007
Perf Date 9/25/2007
Logging Co.
Formation Tiller, Up Seaboard
Top Perf 817.5
Bottom Perf 1081
#Shots 32
Perf Size 0.33
Perf Comments

Service Co
Fluid Type
BD 0
ISIP
Avg Press 0
Max Treat Pressure 0
Final ISIP
2 Min SIP
5 Min SIP
10 Min SIP
Sand Mesh:
Frac Gradient:

Avg DH Rate 0
Max DH Rate 0
Total Slurry Volume 0 BBLs
Total Fluid Volume 0 BBLs
Avg N2 Rate 0
Max N2 Rate scfm
Total N2 Volume scf
Max DH PPA 0
Total Proppant Sks 0 sks
Total Acid 0 Gal
Acid Type

Range Resources - Pine Mountain
Completion Report

Stage 4		Service Co	Avg DH Rate	0	
Stage Date	9/25/2007	Fluid Type	Max DH Rate	0	
Perf Date	9/25/2007	BD	Total Slurry Volume	0	BBLs
Logging Co.		ISIP	Total Fluid Volume	0	BBLs
Formation		Avg Press	Avg N2 Rate	0	
Top Perf	609.5	Max Treat Pressure	Max N2 Rate		scfm
Bottom Perf	741	Final ISIP	Total N2 Volume		scf
#Shots	28	2 Min SIP	Max DH PPA	0	
Perf Size	0.33	5 Min SIP	Total Proppant Sks	0	sks
Perf Comments		10 Min SIP	Total Acid	0	Gal
		Sand Mesh:	Acid Type		
		Frac Gradient:			

Summary Total for All						
Number of Stages	Total Slurry	Total Fluid Volume	Total N2 Volume	Total Proppant	Total Acid	
4	0	0		0	0	

Final Production After Stimulation				
	BOD	MCFD	Hours Tested	Rock Pressure
Zone 1				
Zone 2				
Zone 3				
Final/Commingled Zones		28	In Line	22



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Box 1416, Abingdon, VA 24212
Telephone: (276) 676-5423

Tracking Number:	1188
Company:	Range Resources-Pine Mountain
File Number:	DI-1791
Operations Name:	Haysi #54 W/PL
Operation Type:	Coalbed/Pipeline
Drilling Report Type:	Original

DRILLING REPORT (DGO-GO-14)

1. Drilling Data

Date drilling commenced:	9/10/2007	Drilling Contractor:	Noah Horn
Date drilling completed:	9/13/2007	Rig Type:	☒ Rotary ☐ Cable
Driller's Total Depth (feet):	2109.00		
Log Total Depth (feet):	2094.00	Coal Seam at Total Depth:	POCAHONTAS #2

2. Final Location Plat (as required by 4 VAC25-150-360.C.)

Permitted State Plane X:	914644.00	Final Plat State Plane X:	914636.00
Permitted State Plane Y:	333072.00	Final Plat State Plane Y:	333075.00

Plat Previously Submitted Or... ☐

List of Attached Items:

Description	FileName
Haysi 54 Final Plat	Haysi 54 Plat.pdf

3. Geological Data

Fresh Water At:

Depth (in feet)	Rate	Unit of Measure
60	Wet	

Salt Water At:

Depth (in feet)	Rate	Unit of Measure
1080	Wet	

Coal Seams:

List of Attached Items:

Description	FileName
Haysi 54 Coals	Haysi 54 Coal.xls

Gas and Oil Shows:

List of Attached Items:

Description	FileName
Haysi 54 Shows	Haysi 54 Shows.xls

4. Electric Logs (As required by 4VAC25-150-280.A)

List all logs run: Hi Res GR/Dens/Temp/Audio/Pe/Caliper (Data Pack)

Did logs disclose vertical locations of a coal seam? ☐

5. Survey Results (As required by 4VAC25-150-280.B.2)

List of Attached Items:

Description	FileName
Haysi 54 Surveys	Haysi 54 Survey.xls

6. Casing and Tubing Program

List of Attached Items:

Description	FileName
Haysi 54 Casing	Haysi 54 Casing.xls

7. Remarks

Use this space to note any conditions or occurrences, such as lost circulation, fishing jobs, junk left in hole, sidetracks, squeeze jobs, etc., not shown above. Include data and depth of condition/occurrence.

Circ 3 bbl to surf on 11" hole; Circ 9 bbls to surf on 6.5" hole.

8. Drillers Log

Compiled By: Joshua Phillips, GEO Tech

List of Attached Items:

Description	FileName
Haysi 54 Log	Haysi 54 Log.xls

9. Comments

10. Signature

Permittee: Range Resources-Pine Mountain Date: 3/3/2008

Signed By: Christian D. Moore Title: Permit/GIS Specialist

INTERNAL USE ONLYSubmit Date: 3/3/2008Status: ADate: 3/6/2008Final PDF Date: 3/10/2008

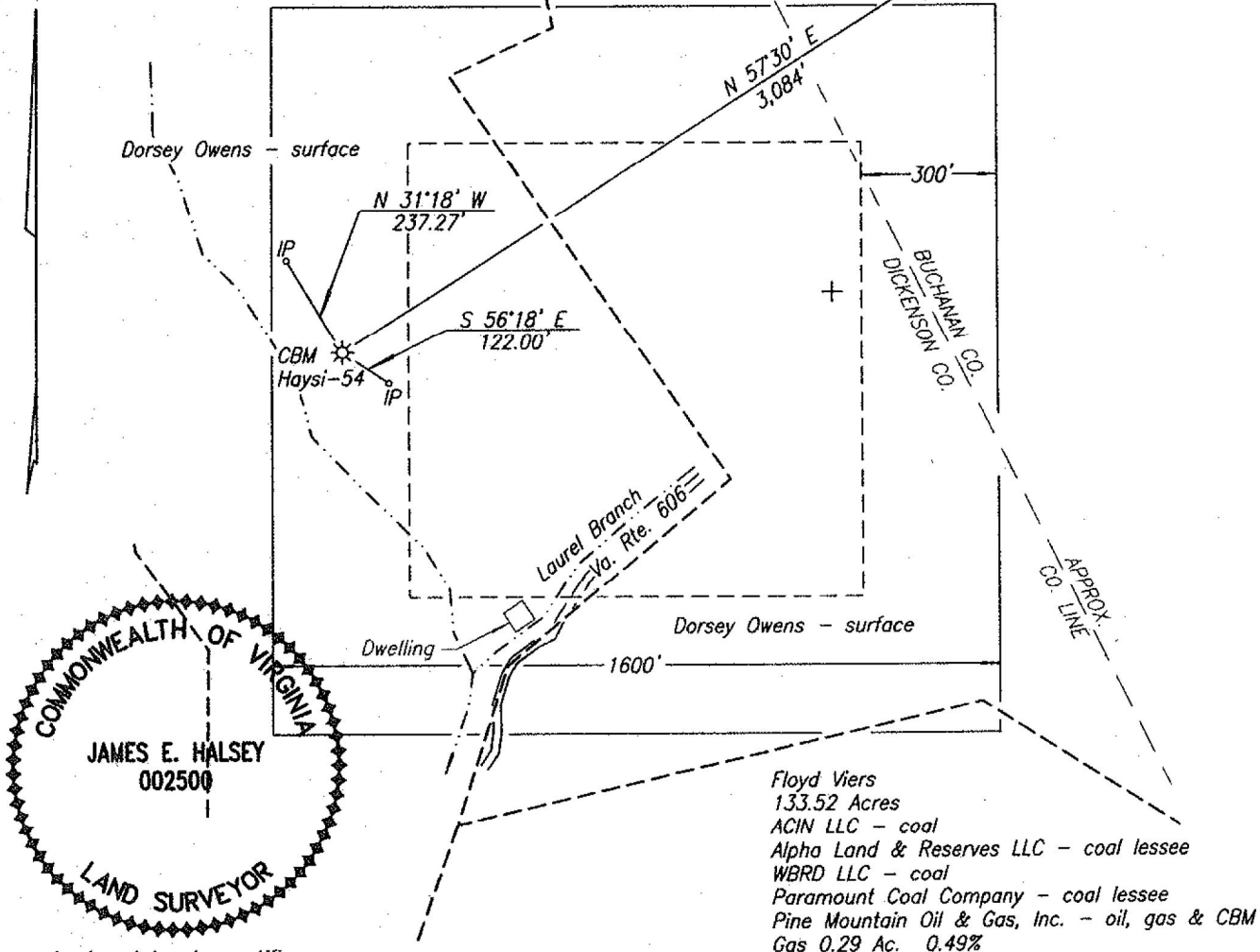
Well Coordinates: (Geographic N27)
37.189322° -82.226906°

Larkin Viers
185.73 Acres
ACIN LLC - coal
Alpha Land & Reserves LLC - coal lessee
WBRD LLC - coal
Paramount Coal Company - coal lessee
Pine Mountain Oil & Gas, Inc. - oil, gas & CBM
Gas 25.03 Ac. 42.59%

B. F. Deel
229.64 Acres
ACIN LLC - coal
Alpha Land & Reserves LLC - coal lessee
WBRD LLC - coal
Paramount Coal Company - coal lessee
Pine Mountain Oil & Gas, Inc. - oil, gas & CBM
Gas 33.45 Ac. 56.92%

Latitude 37° 12' 30"

Longitude 82° 12' 30"



The undersigned hereby certifies that the final location is within ten (10') feet of the location shown on the well plat dated 6-20-2007.

Well elevation determined by GPS survey from BM MCD 229

Dorsey Owens - ± 43.5 Acres surface

FINAL PLAT

Area of Unit = 58.77 Ac.

Floyd Viers
133.52 Acres
ACIN LLC - coal
Alpha Land & Reserves LLC - coal lessee
WBRD LLC - coal
Paramount Coal Company - coal lessee
Pine Mountain Oil & Gas, Inc. - oil, gas & CBM
Gas 0.29 Ac. 0.49%

Well Coordinates: (VA St. Plane S. Zone,
Calculated from CCC coordinates)
N 333,075 E 914,636

Well Coordinates: (Clinchfield Coal Co.)
N 32,539.89 E 45,655.36

WELL LOCATION PLAT

COMPANY Pine Mountain Oil & Gas, Inc. WELL NAME AND NUMBER Haysi-54
TRACT NO. Larkin Viers T-441 ELEVATION 1,606.73' QUADRANGLE Prater
COUNTY Dickenson DISTRICT Sandlick SCALE 1" = 400' DATE 9-10-2007

This Plat is a new plat ; an updated plat ; or a final location plat x

+ Denotes the location of a well on United States topographic Maps, scale 1 to 24,000, latitude and longitude lines being represented by border lines as shown.

James E. Halsey
Licensed Professional Engineer or Licensed Land Surveyor

Coal Seams

				MINING IN AREA		
NAME	TOP	BOTTOM	THICKNESS	YES	NO	MINED OUT
Aily	512	513	1		NO	
Raven	591	592	1		NO	
Raven	610	611	1		NO	
Raven	625	626	1		NO	
Jawbone Rider	706	709	3		NO	
Jawbone	739	740	1		NO	
Tiller	818	819	1		NO	
Upper Seaboard	942	946	4		NO	
Greasy Creek	1078	1081	3		NO	
Upper Horsepen	1241	1244	3		NO	
Middle Horsepen	1281	1282	1		NO	
Beckley	1403	1404	1		NO	
Poco 5	1748	1751	3		NO	
Poco 4 Rider	1788	1789	1		NO	
Poco 4	1804	1805	1		NO	
Poco 3	1827	1828	1		NO	
Poco 2	1900	1901	1		NO	

Gas and Oil Shows

FORMATION	TOP	BOTTOM	THICKNESS	IPF (MCFD/BOPD)	PRESSURE	HOURS TESTED
Open Hole TD				NS		

Survey Results

Depth of Survey	Direction/Distance/Degree From True Vertical
200	$\frac{3}{4}^{\circ}$
400	$\frac{3}{4}^{\circ}$
600	$1\frac{1}{4}^{\circ}$
800	$1\frac{1}{4}^{\circ}$
1000	$1\frac{1}{4}^{\circ}$
1200	$1\frac{1}{4}^{\circ}$
1400	1°
1600	1°
1800	1°
2000	1°

Casing Program

	Casing	Casing	Hole	Cement Used	Cemented To Surface	Date	Packers Or Bridge Plugs
Casing Type	Size	Interval	Size	In Cubic Ft.	Yes/No	Cemented	Kind/Size/Set
Conductor	11 ³ / ₄ "	0-15'	15"				
Surface	8 ⁵ / ₈ "	0-332'	11"	115 sx	Yes	9/10/2007	
Water Protection	4 ¹ / ₂ "	0-2061'	6 ¹ / ₂ "	195 sx	Yes	9/13/2007	
Tubing	2 ³ / ₈ "	0-1953'					

Driller's Log

Geologic Age	Formation	General Lithology	Color	Depth Top	Depth Bottom	Thickness	Remarks
Penn	Lee	Sand, shale, thin coals		0	929	929	
Penn	Lee	Coal		929	931	2	Aily
Penn	Lee	Sand, shale, thin coals		931	1015	84	
Penn	Lee	Coal		1015	1017	2	Raven
Penn	Lee	Sand, shale, thin coals		1017	1118	101	
Penn	Lee	Coal		1118	1121	3	Jawbone Rider
Penn	Lee	Sand, shale, thin coals		1121	1149	28	
Penn	Lee	Coal		1149	1153	4	Jawbone
Penn	Lee	Sand, shale, thin coals		1153	1213	60	
Penn	Lee	Coal		1213	1215	2	Tiller
Penn	Lee	Sand, shale, thin coals		1215	1313	98	
Penn	Lee	Coal		1313	1314	1	Upper Seaboard
Penn	Lee	Sand, shale, thin coals		1314	1333	19	
Penn	Lee	Coal		1333	1334	1	Upper Seaboard A
Penn	Lee	Sand, shale, thin coals		1334	1486	152	
Penn	Lee	Coal		1486	1490	4	Greasy Creek
Penn	Lee	Sand, shale, thin coals		1490	1635	145	
Penn	Lee	Coal		1635	1638	3	Upper Horsepen
Penn	Lee	Sand, shale, thin coals		1638	1691	53	
Penn	Lee	Coal		1691	1693	2	Middle Horsepen
Penn	Lee	Sand, shale, thin coals		1693	1853	160	
Penn	Lee	Coal		1853	1855	2	Beckley
Penn	Lee	Sand, shale, thin coals		1855	1903	48	
Penn	Lee	Coal		1903	1904	1	Lower Horsepen
Penn	Lee	Sand, shale, thin coals		1904	2233	329	
Penn	Lee	Coal		2233	2236	3	Poco 4
Penn	Lee	Sand, shale, thin coals		2236	2266	30	
Penn	Lee	Coal		2266	2268	2	Poco 3
Penn	Lee	Sand, shale, thin coals		2268	2279	11	
Penn	Lee	Coal		2279	2280	1	Poco 3
Penn	Lee	Sand, shale, thin coals		2280	2287	7	
Penn	Lee	Coal		2287	2288	1	Poco 3
Penn	Lee	Sand, shale, thin coals		2288	2350	62	
Penn	Lee	Coal		2350	2351	1	Poco 2
Penn	Lee	Sand, shale, thin coals		2351	2398	47	
Penn	Lee	Coal		2398	2401	3	Poco 1
Penn	Lee	Sand, shale, thin coals		2401	2438	37	



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Box 1416, Abingdon, VA 24212
Telephone: (276) 676-5423

Tracking Number: 1261
Company: Range Resources-Pine Mountain
File Number: DI-1797
Completion Report Type: Original

COMPLETION REPORT (DGO-GO-15)

Well Type:	<u>Coalbed/Pipeline</u>	Date Well Completed:	<u>10/2/2007</u>
Driller's Total Depth:	<u>2334.00</u>	Log's Total Depth:	<u>2273.00</u>

1. Changes In Casing/Tubing from Approved Drilling Report

Description	FileName
Haysi 58 Casing	Haysi 58 Comp Casing.xls

2. Stimulation Record

Stimulation Status: ☒ Stimulated ☐ GOB ☐ Not Stimulated ☐ Service Well

Description	FileName
Haysi 58 Stimulation	Haysi 58 Stimulation.doc

3. Final Production

Description	FileName
Haysi 58 Final Production	Haysi 58 Final Prod.xls

4. Comments

Notes:

5. Signature

Permittee: Range Resources-Pine Mountain _____ Date: 5/1/2008 _____ (Company)

By: Laura Murray _____ Title: Permit Assistant _____ (Signature)

INTERNAL USE ONLY

Submit Date: 5/1/2008 _____

Status: _____

Date: 5/5/2008 _____

Final PDF Date: 6/11/2008 _____

Casing Program

	Casing	Casing	Hole	Cement Used	Cemented To Surface	Date	Packers Or Bridge Plugs
Casing Type	Size	Interval	Size	In Cubic Ft.	Yes/No	Cemented	Kind/Size/Set
Conductor	11¾"	0-63'	15"				
Surface	8⅝"	0-309'	11"	143	Yes	09/14/07	
Water Protection	4½"	0-2281'	6½"	569	Yes	09/19/07	
Other Casing and Tubing Left in Well	2⅝"	0-2223'					

STIMULATION RECORD (Use additional sheets with this format, if more than three zones are stimulated.)

ZONE 1: Poco 4 Formation Stimulated With: Gel+70QN₂Fm
 Perforated 2007 to 2175 feet No. of Perforations 15 Perforation Size .34
 Formation Broke down at: PSIG Average Injection Rate: 24 BPM
 ISIP 1620 PSIG 5 Min SIP PSIG Average Downhole Injection Pressure 2804 PSIG
 Stimulated: ☒ Yes ☐ No Date Stimulated: 10/02/2007

ZONE 2: Middle Horsepen Formation Stimulated With: Gel+70QN₂Fm
 Perforated 1493 to 1605 feet No. of Perforations 26 Perforation Size .33
 Formation Broke down at: 3376 PSIG Average Injection Rate: 19 BPM
 ISIP 1770 PSIG 5 Min SIP PSIG Average Downhole Injection Pressure 3442 PSIG
 Stimulated: ☒ Yes ☐ No Date Stimulated: 10/02/2007

ZONE 3: Greasy Creek Formation Stimulated With: Gel+70QN₂Fm
 Perforated 1290 to 1295 feet No. of Perforations 18 Perforation Size .33
 Formation Broke down at: 3914 PSIG Average Injection Rate: 16 BPM
 ISIP 1498 PSIG 5 Min SIP PSIG Average Downhole Injection Pressure 2690 PSIG
 Stimulated: ☒ Yes ☐ No Date Stimulated: 10/03/2007

ZONE 4: Upper Seaboard A Formation Stimulated With: Gel+70QN₂Fm
 Perforated 1136 to 1164 feet No. of Perforations 24 Perforation Size .33
 Formation Broke down at: 3478 PSIG Average Injection Rate: 21 BPM
 ISIP 1758 PSIG 5 Min SIP PSIG Average Downhole Injection Pressure 2774 PSIG
 Stimulated: ☒ Yes ☐ No Date Stimulated: 10/03/2007

ZONE 5: Jawbone Rider Formation Stimulated With: Gel+70QN₂Fm
 Perforated 919 to 1027 feet No. of Perforations 23 Perforation Size .33
 Formation Broke down at: 1714 PSIG Average Injection Rate: 23 BPM
 ISIP 1032 PSIG 5 Min SIP PSIG Average Downhole Injection Pressure 2609 PSIG
 Stimulated: ☒ Yes ☐ No Date Stimulated: 10/03/2007

Final Production After Stimulation				
	BOD	MCFD	Hours Tested	Rock Pressure
Zone 1				
Zone 2				
Zone 3				
Final/Commingled Zones		54	In Line	62



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Box 1416, Abingdon, VA 24212
Telephone: (276) 676-5423

Tracking Number:	1293
Company:	Range Resources-Pine Mountain
File Number:	DI-1797
Operations Name:	Haysi #58 W/PL
Operation Type:	Coalbed/Pipeline
Drilling Report Type:	Original

DRILLING REPORT (DGO-GO-14)

1. Drilling Data

Date drilling commenced:	<u>9/13/2007</u>	Drilling Contractor:	<u>Noah Horn</u>
Date drilling completed:	<u>9/19/2007</u>	Rig Type:	☒ Rotary ☐ Cable
Driller's Total Depth (feet):	<u>2334.00</u>		
Log Total Depth (feet):	<u>2273.00</u>	Coal Seam at Total Depth:	<u>POCAHONTAS #1</u>

2. Final Location Plat (as required by 4 VAC25-150-360.C.)

Permitted State Plane X:	<u>915679.00</u>	Final Plat State Plane X:	<u>915672.00</u>
Permitted State Plane Y:	<u>331654.00</u>	Final Plat State Plane Y:	<u>331651.00</u>

Plat Previously Submitted Or... ☐

List of Attached Items:

Description	FileName
Haysi 58 Final Plat	Haysi 58 Final Plat.pdf

3. Geological Data

Fresh Water At:

Depth (in feet)	Rate	Unit of Measure
-----------------	------	-----------------

Salt Water At:

Depth (in feet)	Rate	Unit of Measure
1200	Damp	

Coal Seams:

List of Attached Items:

Description	FileName
Haysi 58 Coal	Haysi 58 Coal.xls

Gas and Oil Shows:

List of Attached Items:

Description	FileName
Haysi 58 Shows	Haysi 58 Shows.xls

4. Electric Logs (As required by 4VAC25-150-280.A)

List all logs run: Hi Res GR/Dens/Temp/Audio/Pe/Caliper (Data Pack)

Did logs disclose vertical locations of a coal seam? ☒

5. Survey Results (As required by 4VAC25-150-280.B.2)

List of Attached Items:

Description	FileName
Haysi 58 Survey	deviation log.tif

6. Casing and Tubing Program

List of Attached Items:

Description	FileName
Haysi 58 Casing/Tubing	Haysi 58 Casing.xls

7. Remarks

Use this space to note any conditions or occurrences, such as lost circulation, fishing jobs, junk left in hole, sidetracks, squeeze jobs, etc., not shown above. Include data and depth of condition/occurrence.

Circ 11 bbl to surf on 11" hole; Circ 12 bbl to surf on 6.5" hole.

8. Drillers Log

Compiled By: Joshua Phillips

List of Attached Items:

Description	FileName
Haysi 58 Log	Haysi 58 Log.xls

9. Comments

10. Signature

Permittee: Range Resources-Pine Mountain Date: 4/23/2008

Signed By: Christian D. Moore Title: GIS/Permit Specialist

INTERNAL USE ONLYSubmit Date: 4/23/2008Status: ADate: 4/25/2008Final PDF Date: 6/10/2008

Well Coordinates: (Geographic N27)
37.185527° -82.223161°

Latitude 37° 12' 30"  Haysi-3

H. H. Viers
185.73 Acres
ACIN LLC - coal
Alpha Land & Reserves LLC - coal lessee
WBRD LLC - coal
Paramount Coal Company - coal lessee
Pine Mountain Oil & Gas, Inc. - oil, gas & CBM
Gas 6.94 Ac. 11.81%

B. F. Deel
229.64 Acres
ACIN LLC - coal
Alpha Land & Reserves LLC - coal lessee
WBRD LLC - coal
Paramount Coal Company - coal lessee
Pine Mountain Oil & Gas, Inc. - oil, gas & CBM
Gas 1.81 Ac. 3.08%

Dorsey Owens - surface

Dorsey Owens - surface

1600' N 71°00' W 307.53'

N 26°25' E 339.3'

S 54°17' E 90.40'

IP

CBM

Haysi-58

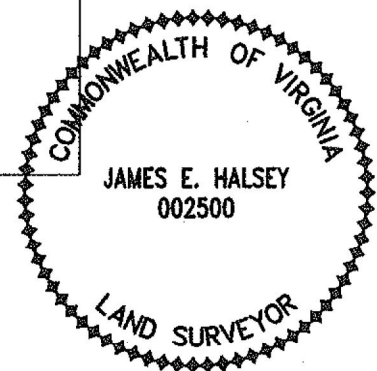
IP

Dorsey Owens - ± 43.5 Acres surface

Floyd Viers
133.52 Acres
ACIN LLC - coal
Alpha Land & Reserves LLC - coal lessee
WBRD LLC - coal
Paramount Coal Company - coal lessee
Pine Mountain Oil & Gas, Inc. - oil, gas & CBM
Gas 48.89 Ac. 83.19%

Approx. Surface R

H. H. Viers
223.40 Acres
ACIN LLC - coal
Alpha Land & Reserves LLC - coal lessee
WBRD LLC - coal
Paramount Coal Company - coal lessee
Pine Mountain Oil & Gas, Inc. - oil, gas & CBM
Gas 1.13 Ac. 1.92%



The undersigned hereby certifies
that the final location is within ten
(10') feet of the location shown
on the well plat dated 7-03-2007.

Well elevation determined by GPS
survey from BM MCD 229

FINAL PLAT

Area of Unit = 58.77 Ac.

Well Coordinates: (VA St. Plane S. Zone,
Calculated from CCC coordinates)
N 331,651 E 915,672

Well Coordinates: (Cinchfield Coal Co.)
N 31,158.18 E 46,747.61

WELL LOCATION PLAT

COMPANY Pine Mountain Oil & Gas, Inc. WELL NAME AND NUMBER Haysi-58
TRACT NO. T-442 ELEVATION 1,846.20' QUADRANGLE Prater
COUNTY Dickenson DISTRICT Sandlick SCALE 1" = 400' DATE 9-18-2007

This Plat is a new plat ; an updated plat ; or a final location plat x

+ Denotes the location of a well on United States topographic Maps, scale 1 to 24,000, latitude and longitude lines being represented by border lines as shown.

James E. Halsey
Licensed Professional Engineer or Licensed Land Surveyor

Coal Seams

				MINING IN AREA		
NAME	TOP	BOTTOM	THICKNESS	YES	NO	MINED OUT
Aily	711	713	2		NO	
Raven	792	793	1		NO	
Raven	815	816	1		NO	
Raven	823	824	1		NO	
Jawbone Rider	920	922	2		NO	
Jawbone	957	961	4		NO	
Tiller	1025	1026	1		NO	
Upper Seaboard A	1137	1139	2		NO	
Upper Seaboard	1161	1163	2		NO	
Greasy Creek	1290	1292	2		NO	
Middle Horsepen	1494	1495	1		NO	
War Creek Rider	1565	1566	1		NO	
War Creek	1603	1604	1		NO	
Poco 4	2007	2008	1		NO	
Poco 4	2019	2020	1		NO	
Poco 3	2064	2065	1		NO	
Poco 2	2132	2133	1		NO	
Poco 1	2173	2175	2		NO	

Gas and Oil Shows

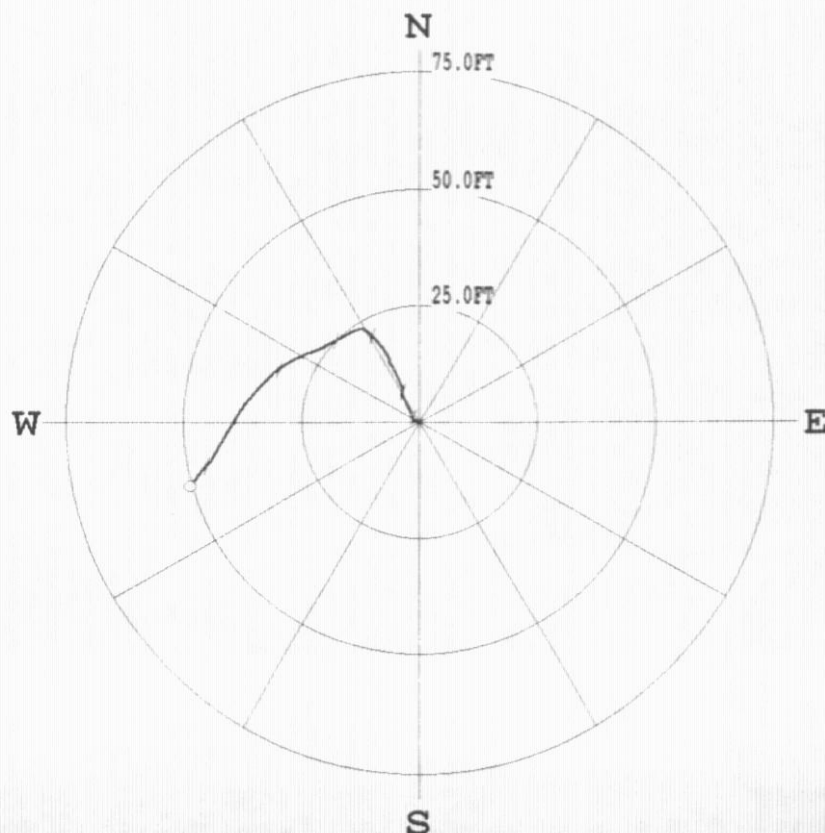
FORMATION	TOP	BOTTOM	THICKNESS	IPF (MCFD/BOPD)	PRESSURE	HOURS TESTED
-----------	-----	--------	-----------	-----------------	----------	--------------

PLAN VIEW COMPU-LOG DEVIATION

CLIENT: Pine Mountain Oil and Gas
LOCATION: Prater
HOLE ID: Haysi 58
DATE OF LOG: 09/19/07
PROBE: 9136AA 962

MAG DECL: -6.9

SCALE: 25 FT/IN
TRUE DEPTH: 2257.81 FT
AZINUTH: 254.0
DISTANCE: 50.5 FT
+ = 300 FT INCR
○ = BOTTOM OF HOLE



***** COMPU-LOG - VERTICAL DEVIATION *****

CLIENT	: Pine Mountain Oil a	HOLE ID.	: Haysi 58
FIELD OFFICE	:	DATE OF LOG	: 09/19/07
DATA FROM	:	PROBE	: 9136AA , 962
MAG. DECL.	: -6.900	DEPTH UNITS	: FEET
LOG: Haysi58_09-19-07_12-34_9136AA_.02_3.02_2259.76_DEVI.log			

CABLE DEPTH	TRUE DEPTH	NORTH DEV.	EAST DEV.	DISTANCE	AZIMUTH	SANG	SANGB
50.0	50.00	-0.09	-0.04	0.1	202.4	0.8	270.2
60.0	60.00	-0.01	0.02	0.0	104.5	1.1	19.9
70.0	70.00	0.14	0.05	0.1	20.5	1.0	47.6
80.0	79.99	0.19	0.23	0.3	50.8	1.2	67.7
90.0	89.99	0.26	0.38	0.5	55.4	1.4	22.8
100.0	99.99	0.23	0.35	0.4	56.2	1.3	275.1
110.0	109.99	0.23	0.21	0.3	42.6	1.2	261.5
120.0	119.98	0.24	0.02	0.2	4.3	1.1	280.1
130.0	129.98	0.22	-0.11	0.2	333.6	1.1	269.0
140.0	139.98	0.18	-0.30	0.3	302.0	1.1	258.8
150.0	149.98	0.19	-0.46	0.5	292.2	1.2	293.8
160.0	159.98	0.24	-0.59	0.6	292.5	1.1	113.3
170.0	169.97	0.30	-0.75	0.8	291.5	1.1	276.7
180.0	179.97	0.34	-0.88	0.9	291.1	1.1	100.1
190.0	189.97	0.35	-0.89	1.0	291.3	1.0	131.7
200.0	199.97	0.25	-0.87	0.9	285.7	0.9	345.5

Casing Program

	Casing	Casing	Hole	Cement Used	Cemented To Surface	Date	Packers Or Bridge Plugs
Casing Type	Size	Interval	Size	In Cubic Ft.	Yes/No	Cemented	Kind/Size/Set
Conductor	11 ³ / ₄ "	0-63'	15"				
Surface	8 ⁵ / ₈ "	0-309'	11"	143	Yes	09/14/07	
Water Protection	4 ¹ / ₂ "	0-2281'	6 ¹ / ₂ "	569	Yes	09/19/07	
Other Casing and Tubing Left in Well	2 ³ / ₈ "	0-2223'					

Driller's Log

Geologic Age	Formation	General Lithology	Color	Depth Top	Depth Bottom	Thickness	Remarks
Penn	Lee	Sand, shale, thin coals		0	711	711	
Penn	Lee	Coal		711	713	2	Aily
Penn	Lee	Sand, shale, thin coals		713	792	79	
Penn	Lee	Coal		792	793	1	Raven
Penn	Lee	Sand, shale, thin coals		793	815	22	
Penn	Lee	Coal		815	816	1	Jawbone Rider
Penn	Lee	Sand, shale, thin coals		816	823	7	
Penn	Lee	Coal		823	824	1	Jawbone
Penn	Lee	Sand, shale, thin coals		824	920	96	
Penn	Lee	Coal		920	922	2	Jawbone Rider
Penn	Lee	Sand, shale, thin coals		922	957	35	
Penn	Lee	Coal		957	961	4	Jawbone
Penn	Lee	Sand, shale, thin coals		961	1025	64	
Penn	Lee	Coal		1025	1026	1	Tiller
Penn	Lee	Sand, shale, thin coals		1026	1137	111	
Penn	Lee	Coal		1137	1139	2	Upper Seaboard A
Penn	Lee	Sand, shale, thin coals		1139	1161	22	
Penn	Lee	Coal		1161	1163	2	Upper Seaboard
Penn	Lee	Sand, shale, thin coals		1163	1290	127	
Penn	Lee	Coal		1290	1292	2	Greasy Creek
Penn	Lee	Sand, shale, thin coals		1292	1494	202	
Penn	Lee	Coal		1494	1495	1	Middle Horsepen
Penn	Lee	Sand, shale, thin coals		1495	1565	70	
Penn	Lee	Coal		1565	1566	1	War Creek Rider
Penn	Lee	Sand, shale, thin coals		1566	1603	37	
Penn	Lee	Coal		1603	1604	1	War Creek
Penn	Lee	Sand, shale, thin coals		1604	2007	403	
Penn	Lee	Coal		2007	2008	1	Poco 4
Penn	Lee	Sand, shale, thin coals		2008	2019	11	
Penn	Lee	Coal		2019	2020	1	Poco 4
Penn	Lee	Sand, shale, thin coals		2020	2064	44	
Penn	Lee	Coal		2064	2065	1	Poco 3
Penn	Lee	Sand, shale, thin coals		2065	2132	67	
Penn	Lee	Coal		2132	2133	1	Poco 2
Penn	Lee	Sand, shale, thin coals		2133	2173	40	
Penn	Lee	Coal		2173	2175	2	Poco 1
Penn	Lee	Sand, shale, thin coals		2175	2271	96	



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Drawer 159, Lebanon, VA 24266
Telephone: (276) 415-9650

Tracking Number: 3246
Company: Range Resources-Pine Mountain
File Number: DI-2064
Completion Report Type: Original

COMPLETION REPORT (DGO-GO-15)

Well Type:	<u>Coalbed/Pipeline</u>	Date Well Completed:	<u>12/3/2008</u>
Driller's Total Depth:	<u>2494.00</u>	Log's Total Depth:	<u>2494.00</u>

1. Changes In Casing/Tubing from Approved Drilling Report

Description	FileName
-------------	----------

2. Stimulation Record

Stimulation Status: ☒ Stimulated ☐ GOB ☐ Not Stimulated ☐ Service Well

Description	FileName
Haysi #63 stimulation	haysi 63 stimulation.rtf

3. Final Production

Description	FileName
Haysi #63 final production	Final_Prod.xls

4. Comments

Notes:

5. Signature

Permittee: Range Resources-Pine Mountain Date: 3/15/2012 (Company)

By: Jonathan Horne Title: Engineering Tech (Signature)

INTERNAL USE ONLY

Submit Date: 3/15/2012

Status: Approved

Date: 3/28/2012

Final PDF Date: 3/29/2012

Range Resources - Pine Mountain
Completion Report

Page 1 of 2
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105010115 1 Haysi 63

Stage 1

Stage Date 12/3/2008
Perf Date 12/3/2008
Logging Co. Key Energy
Formation Poca 4 Rider, Poca 4,
Top Perf 2034
Bottom Perf 2118.5
#Shots 25
Perf Size 0.33
Perf Comments

Service Co Superior
Fluid Type 15 lb Gel Fresh Water
BD 2255
ISIP n/a
Avg Press 2854
Max Treat Pressure 4193
Final ISIP s/o
2 Min SIP s/o
5 Min SIP s/o
10 Min SIP
Sand Mesh:
Frac Gradient:

Avg DH Rate 27.3
Max DH Rate 28.2
Total Slurry Volume 119 BBLs
Total Fluid Volume 105 BBLs
Avg N2 Rate 18,000
Max N2 Rate scfm
Total N2 Volume 189,100 scf
Max DH PPA
Total Proppant Sks 14300 sks
Total Acid 500 Gal
Acid Type 15% HCL

Stage 2

Stage Date 12/3/2008
Perf Date 12/3/2008
Logging Co. Key Energy
Formation Upper Horsepen, Mid
Top Perf 1393.5
Bottom Perf 1570.5
#Shots 23
Perf Size 0.33
Perf Comments

Service Co Superior
Fluid Type 15 lb Gel Fresh Water
BD 2114
ISIP n/a
Avg Press 2808
Max Treat Pressure 4103
Final ISIP 1605
2 Min SIP 1120
5 Min SIP 1079
10 Min SIP
Sand Mesh:
Frac Gradient:

Avg DH Rate 28.5
Max DH Rate 29.3
Total Slurry Volume 230 BBLs
Total Fluid Volume 210 BBLs
Avg N2 Rate 18,500
Max N2 Rate scfm
Total N2 Volume 349,000 scf
Max DH PPA
Total Proppant Sks 21400 sks
Total Acid 550 Gal
Acid Type 15% + 7.5%

Stage 3

Stage Date 12/3/2008
Perf Date 12/3/2008
Logging Co. Key Energy
Formation Upper Seaboard,
Top Perf 1122
Bottom Perf 1258.5
#Shots 20
Perf Size 0.33
Perf Comments

Service Co Superior
Fluid Type 15 lb Gel - Fresh
BD 2417
ISIP n/a
Avg Press 2233
Max Treat Pressure 2610
Final ISIP 1060
2 Min SIP 977
5 Min SIP 864
10 Min SIP
Sand Mesh:
Frac Gradient:

Avg DH Rate 28
Max DH Rate 29
Total Slurry Volume 112 BBLs
Total Fluid Volume 98 BBLs
Avg N2 Rate 14,000
Max N2 Rate scfm
Total N2 Volume 141,000 scf
Max DH PPA
Total Proppant Sks 16700 sks
Total Acid 250 Gal
Acid Type 7.5%

Range Resources - Pine Mountain
Completion Report

Page 2 of 2
3/15/2012 9:56:10 AM

Stage 4		Service Co	Superior	Avg DH Rate		
Stage Date	12/3/2008	Fluid Type	15 lb Gel - Fresh	Max DH Rate	29.1	
Perf Date	12/3/2008	BD	2603	Total Slurry Volume	146	BBLs
Logging Co.	Key Energy	ISIP	n/a	Total Fluid Volume	125	BBLs
Formation	Jawbone Rider,	Avg Press		Avg N2 Rate	13,000	
Top Perf	875	Max Treat Pressure	3302	Max N2 Rate		scfm
Bottom Perf	979	Final ISIP	1021	Total N2 Volume	241,000	scf
#Shots	22	2 Min SIP	933	Max DH PPA		
Perf Size	0.33	5 Min SIP	918	Total Proppant Sks	17000	sks
Perf Comments		10 Min SIP		Total Acid	350	Gal
		Sand Mesh:		Acid Type	7.5%	
		Frac Gradient:				

Summary Total for All

Number of Stages	Total Slurry	Total Fluid Volume	Total N2 Volume	Total Proppant	Total Acid
4	607	538	920,100	69400	1650

Final Production After Stimulation				
	BOD	MCFD	Hours Tested	Rock Pressure
Zone 1				
Zone 2				
Zone 3				
Final/Commingled Zones		7	in-line	9



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Drawer 159, Lebanon, VA 24266
Telephone: (276) 415-9700

Tracking Number:	3313
Company:	Range Resources-Pine Mountain
File Number:	DI-2064
Operations Name:	Haysi #63 W/PL
Operation Type:	Coalbed/Pipeline
Drilling Report Type:	Original

DRILLING REPORT (DGO-GO-14)

1. Drilling Data

Date drilling commenced:	11/13/2008	Drilling Contractor:	Noah Horn #109
Date drilling completed:	11/18/2008	Rig Type:	R Rotary £ Cable
Driller's Total Depth (feet):	2494.00		
Log Total Depth (feet):	2494.00	Coal Seam at Total Depth:	Pocahontas

2. Final Location Plat (as required by 4 VAC25-150-360.C.)

Permitted State Plane X:	10400117.9500	Final Plat State Plane X:	10400125.7800
Permitted State Plane Y:	3610375.3900	Final Plat State Plane Y:	3610370.3600

Plat Previously Submitted Or... £

List of Attached Items:

Description	FileName
Haysi #63 final location	Haysi 63 Plat.pdf

3. Geological Data

Fresh Water At:

Depth (in feet)	Rate	Unit of Measure
-----------------	------	-----------------

Salt Water At:

Depth (in feet)	Rate	Unit of Measure
-----------------	------	-----------------

Coal Seams:

List of Attached Items:

Description	FileName
Haysi #63 coals	Haysi 63 Coal.xls

Gas and Oil Shows:

List of Attached Items:

Description	FileName
Haysi #63 gas shows	Shows.xls

4. Electric Logs (As required by 4VAC25-150-280.A)

List all logs run: Hi Res GR/Dens/Temp/Audio/PE/Caliper Data Pack, camera

Did logs disclose vertical locations of a coal seam? **R**

5. Survey Results (As required by 4VAC25-150-280.B.2)

List of Attached Items:

Description	FileName
Haysi #63 survey	Haysi 63 Deviation Log.pdf

6. Casing and Tubing Program

List of Attached Items:

Description	FileName
Haysi #63 casing	Casing.xls

7. Remarks

Use this space to note any conditions or occurrences, such as lost circulation, fishing jobs, junk left in hole, sidetracks, squeeze jobs, etc., not shown above. Include data and depth of condition/occurrence.

8. Drillers Log

Compiled By: Range Resources

List of Attached Items:

Description	FileName
Haysi #63 log	Haysi 63 Log.xls

9. Comments

10. Signature

Permittee: Range Resources-Pine Mountain Date: 3/15/2012

Signed By: Jonathan Horne Title: Engineering Tech

INTERNAL USE ONLY

Submit Date: 3/15/2012

Status: A

Date: 3/28/2012

Final PDF Date: 3/29/2012

Well Coordinates: (Geographic N27)
37.179763° -82.217832°

Latitude 37° 12' 30"

2,770'

Floyd Viers
133.52 Acres
ACIN LLC - coal
Alpha Land & Reserves LLC - coal lessee
WBRD LLC - coal
Paramount Coal Company - coal lessee
Range Resources - Pine Mountain, Inc. - oil, gas & CBM
Gas 2.57 Ac. 4.38%

Haysi-59

Marty O'Quinn - surface

Approx. Surface R

Ronnie Owens - surface

Approx. Surface R

Venita Stepp - surface

John S. Owens - surface

George H. Fuller

139.69 Acres

ACIN LLC - coal

Alpha Land & Reserves LLC - coal lessee

WBRD LLC - coal

Paramount Coal Company - coal lessee

Range Resources - Pine Mountain, Inc. - oil, gas & CBM

Gas 12.82 Ac. 21.81%

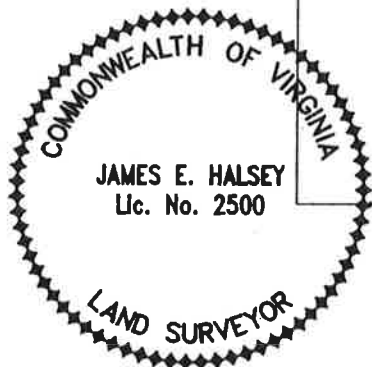
Approx. Loc.

CNR-24545

Clinton Arrington, Jr. - surface

Debra Aultin - surface

George H. Fuller
79.60 Acres
ACIN LLC - coal
Alpha Land & Reserves LLC - coal lessee
WBRD LLC - coal
Paramount Coal Company - coal lessee
Range Resources - Pine Mountain, Inc. - oil, gas & CBM
Gas 43.38 Ac. 73.81%



--- Mineral Line
- - - Surface Line

FINAL PLAT

Area of Unit = 58.77 Ac.

Well Coordinates: (VA St. Plane S. Zone, NAD 83)
N 3,610,370.36 E 10,400,125.78

Well Coordinates: (VA St. Plane NAD27, S. Zone,
Calculated from NAD 83 coordinates)
N 329,493.04 E 917,140.34

Well Coordinates: (Clinchfield Coal Co., Calculated
from NAD 83 coordinates)
N 29,061.68 E 48,302.08

The undersigned hereby certifies
that the final location is within ten
(10') feet of the location shown
on the well plat dated 8-21-2008.

Well elevation determined by GPS
survey from P-424

WELL LOCATION PLAT (Nora Grid AI-67)

COMPANY Range Resources - Pine Mountain, Inc. WELL NAME AND NUMBER Haysi-63
TRACT NO. George H. Fuller/T-293 ELEVATION 1,882.41' QUADRANGLE Prater
COUNTY Dickenson DISTRICT Sandlick SCALE 1" = 400' DATE 11-14-2008

This Plat is a new plat ; an updated plat ; or a final location plat x

+ Denotes the location of a well on United States topographic Maps, scale 1 to
24,000, latitude and longitude lines being represented by border lines as shown.

James E. Halsey
Licensed Professional Engineer or Licensed Land Surveyor

Coal Seams

				MINING IN AREA		
NAME	TOP	BOTTOM	THICKNESS	YES	NO	MINED OUT
Jawbone Rider	876	878	2		NO	NO
Jawbone	924	925	1		NO	NO
Tiller	977	978	1		NO	NO
Upper Seaboard	1123	1125	2		NO	NO
Greasy Creek	1255	1257	2		NO	NO
Upper Horsepen	1394	1396	2		NO	NO
Middle Horsepen	1450	1452	2		NO	NO
Lower Horsepen	1569	1570	1		NO	NO
Poco 4 Rider	2034	2035	1		NO	NO
Poco 4	2044	2047	3		NO	NO
Poco 2	2117	2118	1		NO	NO

Gas and Oil Shows

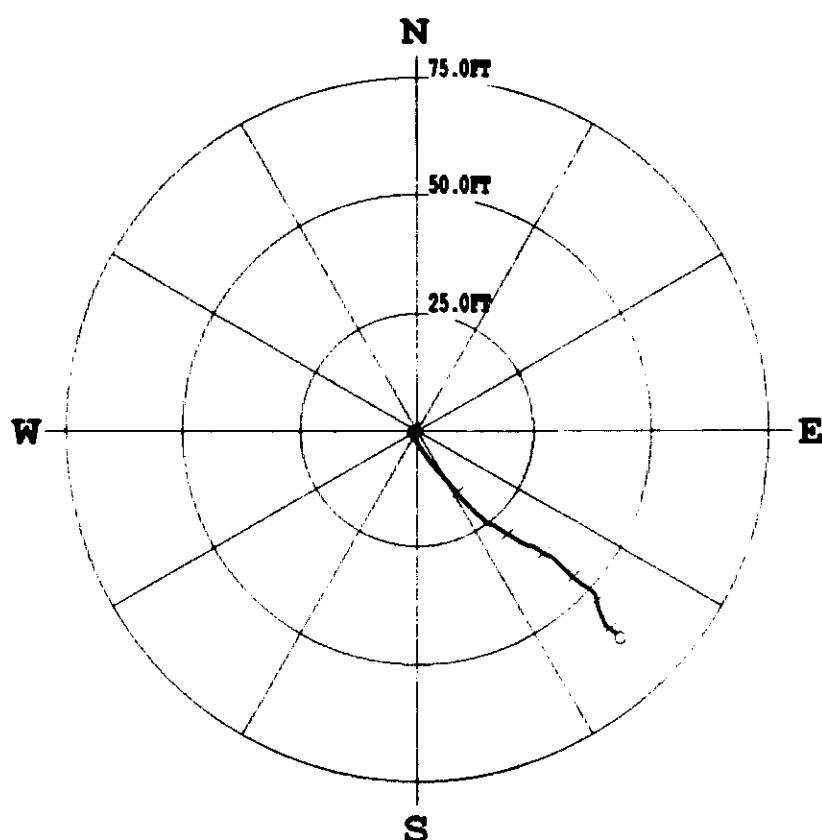
FORMATION	TOP	BOTTOM	THICKNESS	IPF (MCFD/BOPD)	PRESSURE	HOURS TESTED
TD w/csg		2490		49.1		

PLAN VIEW
COMPU-LOG DEVIATION

CLIENT: Range Resources/Pine Mountain
LOCATION: PawPaw
HOLE ID: Haysi #63
DATE OF LOG: 11/19/08
PROBE: 9136AA 4520



SCALE: 25 FT/IN
TRUE DEPTH: 2479.07 FT
AZIMUTH: 135.7
DISTANCE: 61.9 FT
+ = 300 FT INCR
O = BOTTOM OF HOLE



* * * * * COMPU-LOG - VERTICAL DEVIATION * * * * *

CLIENT : Range Resources/Pin HOLE ID. : Haysi #63
FIELD OFFICE : DATE OF LOG : 11/19/08
DATA FROM : PROBE : 9136AA , 4520
MAG. DECL. : -6.900 DEPTH UNITS : FEET
LOG: Haysi#63_11-19-08_10-17_9136AA_.1_12.30_2480.50_DEVI.log

CABLE DEPTH	TRUE DEPTH	NORTH DEV.	EAST DEV.	DISTANCE	AZIMUTH	SANG	SANGB
13.8	13.80	0.00	0.00	0.0	0.0	0.0	0.0
50.0	50.00	-0.04	-0.12	0.1	253.6	0.6	209.3
100.0	100.00	-0.08	-0.36	0.4	258.2	0.8	305.6
150.0	149.99	0.23	-0.72	0.6	287.8	0.6	317.3
200.0	199.99	0.39	-0.83	0.9	295.4	0.6	191.9
250.0	249.99	0.47	-0.86	1.0	298.6	0.4	256.8
300.0	299.98	0.50	-0.97	1.1	297.0	0.3	274.7
350.0	349.98	0.41	-1.16	1.2	289.4	0.4	227.7
400.0	399.98	0.12	-1.35	1.4	275.1	0.3	212.1
450.0	449.98	-0.14	-1.55	1.6	264.8	0.5	245.6
500.0	499.98	-0.43	-1.69	1.7	255.8	0.4	200.9
550.0	549.98	-0.92	-1.55	1.8	239.5	0.9	150.3
600.0	599.95	-1.79	-0.66	1.9	200.2	1.9	144.8
650.0	649.92	-3.26	0.35	3.3	173.9	2.1	149.3
700.0	699.88	-4.92	1.48	5.1	163.3	2.4	141.5
750.0	749.83	-6.74	2.78	7.3	157.6	2.9	144.4
800.0	799.75	-8.94	4.61	10.1	152.7	3.5	140.3
850.0	849.66	-11.16	6.63	13.0	149.3	3.3	138.8
900.0	899.58	-13.28	8.43	15.7	147.6	3.0	141.3
950.0	949.52	-15.21	10.05	18.2	146.6	2.9	140.0
1000.0	999.44	-17.22	12.02	21.0	145.1	3.4	151.5
1050.0	1049.36	-19.10	14.03	23.7	143.7	2.9	134.9
1100.0	1099.30	-20.17	15.69	25.6	142.1	2.6	38.5
1150.0	1149.26	-21.12	17.47	27.4	140.4	2.2	117.9
1200.0	1149.22	-22.12	19.11	29.2	138.2	2.3	136.9
1250.0	1249.19	-23.04	20.67	30.9	138.1	1.7	135.0
1300.0	1299.15	-23.95	22.19	32.6	137.2	2.0	132.2
1350.0	1349.13	-24.61	23.43	34.0	136.4	2.0	97.0
1400.0	1399.11	-24.54	24.21	34.5	135.4	2.0	65.4
1450.0	1449.08	-25.25	25.52	35.9	134.7	1.6	116.4
1500.0	1499.06	-26.12	26.78	37.4	134.3	1.7	123.6
1550.0	1549.04	-26.65	27.65	38.4	134.0	1.6	135.4
1600.0	1599.01	-27.09	28.71	39.5	133.3	1.9	132.2
1650.0	1648.99	-28.14	29.80	41.0	133.4	1.8	137.4
1700.0	1698.96	-29.25	30.90	42.5	133.4	1.7	155.7
1750.0	1748.94	-30.35	32.00	44.1	133.5	1.7	135.7
1800.0	1798.92	-31.39	33.06	45.6	133.5	1.6	136.7
1850.0	1848.89	-32.30	34.19	47.0	133.4	1.7	128.7
1900.0	1898.87	-33.16	35.43	48.5	133.1	1.7	132.5
1950.0	1948.85	-33.84	36.50	49.8	132.8	1.1	151.4
2000.0	1998.84	-34.48	37.30	50.8	132.8	1.0	125.2
2050.0	2048.83	-35.18	37.85	51.7	132.9	1.0	146.4
2100.0	2098.82	-36.14	38.20	52.6	133.4	1.6	166.8
2150.0	2148.80	-37.49	38.51	53.7	134.2	1.9	169.6
2200.0	2198.78	-38.81	38.92	55.0	134.9	1.6	165.2
2250.0	2248.76	-39.84	39.54	56.1	135.2	1.6	113.3
2300.0	2298.75	-40.90	39.74	57.0	135.8	1.1	146.5
2350.0	2348.74	-41.53	40.18	57.8	135.9	1.2	150.1
2400.0	2398.72	-42.22	40.87	58.8	135.9	1.8	115.7
2450.0	2448.69	-43.33	42.24	60.5	135.7	2.4	133.1
2480.5	2479.07	-44.32	43.27	61.9	135.7	-999999.0	-999639.0

Casing Program

	Casing	Casing	Hole	Cement Used	Cemented To Surface	Date
Casing Type	Size	Interval	Size	In Cubic Ft.	Yes/No	Cemented
Conductor	11¾"	0-21'	15"			
Water Protection	8⅝"	0-313'	11"	133.1	Yes, circ 5bbls	11/14/08
Production Casing	4½"	0-2450'	6½"	439.2	Yes, circ 4bbls	11/19/08
Other Casing And Tubing Left In Well	2⅜"					
Liners						

Packers Or Bridge Plugs	Cement Baskets
Kind/Size/Set	(ft)
	84'
	334' 1874'

Driller's Log

[illegible]

Depth	Depth		
Top	Bottom	Thickness	Remarks
0	876	876	
876	878	2	Jawbone Rider
878	924	46	
924	925	1	Jawbone
925	977	52	
977	978	1	Tiller
978	1123	145	
1123	1125	2	Upper Seaboard
1125	1255	130	
1255	1257	2	Greasy Creek
1257	1394	137	
1394	1396	2	Upper Horsepen
1396	1450	54	
1450	1452	2	Middle Horsepen
1452	1569	117	
1569	1570	1	Lower Horsepen
1570	2034	464	
2034	2035	1	Poco 4 Rider
2035	2044	9	
2044	2047	3	Poco 4
2047	2117	70	
2117	2118	1	Poco 2
2118	2494	376	



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Drawer 159, Lebanon, VA 24266
Telephone: (276) 415-9650

Tracking Number: 2320
Company: Range Resources-Pine Mountain
File Number: BU-4074
Completion Report Type: Original

COMPLETION REPORT (DGO-GO-15)

Well Type:	<u>Coalbed/Pipeline</u>	Date Well Completed:	<u>1/9/2009</u>
Driller's Total Depth:	<u>2461.00</u>	Log's Total Depth:	<u>2474.00</u>

1. Changes In Casing/Tubing from Approved Drilling Report

Description	FileName
-------------	----------

2. Stimulation Record

Stimulation Status: ☒ Stimulated ☐ GOB ☐ Not Stimulated ☐ Service Well

Description	FileName
Haysi 142 Stimulation Record	Stimulation Report.doc

3. Final Production

Description	FileName
Haysi 142 Final Production	Final_Prod.xls

4. Comments

Notes:

5. Signature

Permittee: Range Resources-Pine Mountain
Date: 1/27/2010 (Company)

By: Laura Murray
Title: Permit Specialist (Signature)

INTERNAL USE ONLY

Submit Date: 1/27/2010

Status: Approved

Date: 3/5/2012

Final PDF Date: 3/6/2012

STIMULATION RECORD

ZONE 1: Poca 2, Poca 1 Formation Stimulated With: N₂Fm
Perforated 2274 to 2325 feet No. of Perforations 24 Perforation Size .33
Formation Broke down at: 2217 PSIG Average Injection Rate: 20 BPM
ISIP 1719 PSIG 2 Min SIP 1660 PSIG Average Downhole Injection Pressure 3498 PSIG
Stimulated: ☒ Yes ☐ No Date Stimulated: 1/9/2009

ZONE 2: Poca 4, Poca 3, Poca Formation Stimulated With: N₂Fm
Perforated 2151 to 2225 feet No. of Perforations 30 Perforation Size .33
Formation Broke down at: 3716 PSIG Average Injection Rate: 22 BPM
ISIP 2041 PSIG 2 Min SIP 1836 PSIG Average Downhole Injection Pressure 2785 PSIG
Stimulated: ☒ Yes ☐ No Date Stimulated: 1/9/2009

ZONE 3: Upper Horsepen Formation Stimulated With: N₂Fm
Perforated 1528 to 1738 feet No. of Perforations 30 Perforation Size .33
Formation Broke down at: 2925 PSIG Average Injection Rate: 23 BPM
ISIP 2310 PSIG 2 Min SIP 2075 PSIG Average Downhole Injection Pressure 3760 PSIG
Stimulated: ☒ Yes ☐ No Date Stimulated: 1/9/2009

ZONE 4: Upper Seaboard Formation Stimulated With: N₂Fm
Perforated 1219 to 1451 feet No. of Perforations 29 Perforation Size .33
Formation Broke down at: 2012 PSIG Average Injection Rate: 25 BPM
ISIP 1270 PSIG 2 Min SIP 1187 PSIG Average Downhole Injection Pressure 2720 PSIG
Stimulated: ☒ Yes ☐ No Date Stimulated: 1/9/2009

ZONE 5: Raven, Jawbone Rider Formation Stimulated With: N₂Fm
Perforated 905 to 1107 feet No. of Perforations 30 Perforation Size .33
Formation Broke down at: 2119 PSIG Average Injection Rate: 26 BPM
ISIP 1182 PSIG 2 Min SIP 1115 PSIG Average Downhole Injection Pressure 2363 PSIG
Stimulated: ☒ Yes ☐ No Date Stimulated: 1/9/2009

Final Production After Stimulation				
	BOD	MCFD	Hours Tested	Rock Pressure
Zone 1				
Zone 2				
Zone 3				
Final/Commingled Zones		14	in-line	10



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Drawer 159, Lebanon, VA 24266
Telephone: (276) 415-9700

Tracking Number:	2368
Company:	Range Resources-Pine Mountain
File Number:	BU-4074
Operations Name:	Haysi #142 W/PL
Operation Type:	Coalbed/Pipeline
Drilling Report Type:	Original

DRILLING REPORT (DGO-GO-14)

1. Drilling Data

Date drilling commenced:	12/17/2008	Drilling Contractor:	Noah Horn #109
Date drilling completed:	12/20/2008	Rig Type:	R Rotary £ Cable
Driller's Total Depth (feet):	2461.00		
Log Total Depth (feet):	2474.00	Coal Seam at Total Depth:	POCAHONTAS #2

2. Final Location Plat (as required by 4 VAC25-150-360.C.)

Permitted State Plane X:	10408237.0100	Final Plat State Plane X:	10408236.5300
Permitted State Plane Y:	3612091.4000	Final Plat State Plane Y:	3612091.8200

Plat Previously Submitted Or... £

List of Attached Items:

Description	FileName
Haysi 142 Final Plat	Haysi 142 Plat.pdf

3. Geological Data

Fresh Water At:

Depth (in feet)	Rate	Unit of Measure
-----------------	------	-----------------

Salt Water At:

Depth (in feet)	Rate	Unit of Measure
-----------------	------	-----------------

Coal Seams:

List of Attached Items:

Description	FileName
Haysi 142 Coal	Haysi 142 Coal.xls

Gas and Oil Shows:

List of Attached Items:

Description	FileName
Haysi 142 Gas Shows	Shows.xls

4. Electric Logs (As required by 4VAC25-150-280.A)

List all logs run: Hi Res GR/Dens/Temp/Audio/PE/Caliper Data Pack

Did logs disclose vertical locations of a coal seam? £

5. Survery Results (As required by 4VAC25-150-280.B.2)

List of Attached Items:

Description	FileName
Haysi #142 Survey	Haysi #142 Survey.pdf

6. Casing and Tubing Program

List of Attached Items:

Description	FileName
Haysi 142 Casing	Casing.xls

7. Remarks

Use this space to note any conditions or occurrences, such as lost circulation, fishing jobs, junk left in hole, sidetracks, squeeze jobs, etc., not shown above. Include data and depth of condition/occurrence.

8. Drillers Log

Compiled By: _____

List of Attached Items:

Description	FileName
Haysi 142 Driller's Log	Haysi 142 Log.xls

9. Comments

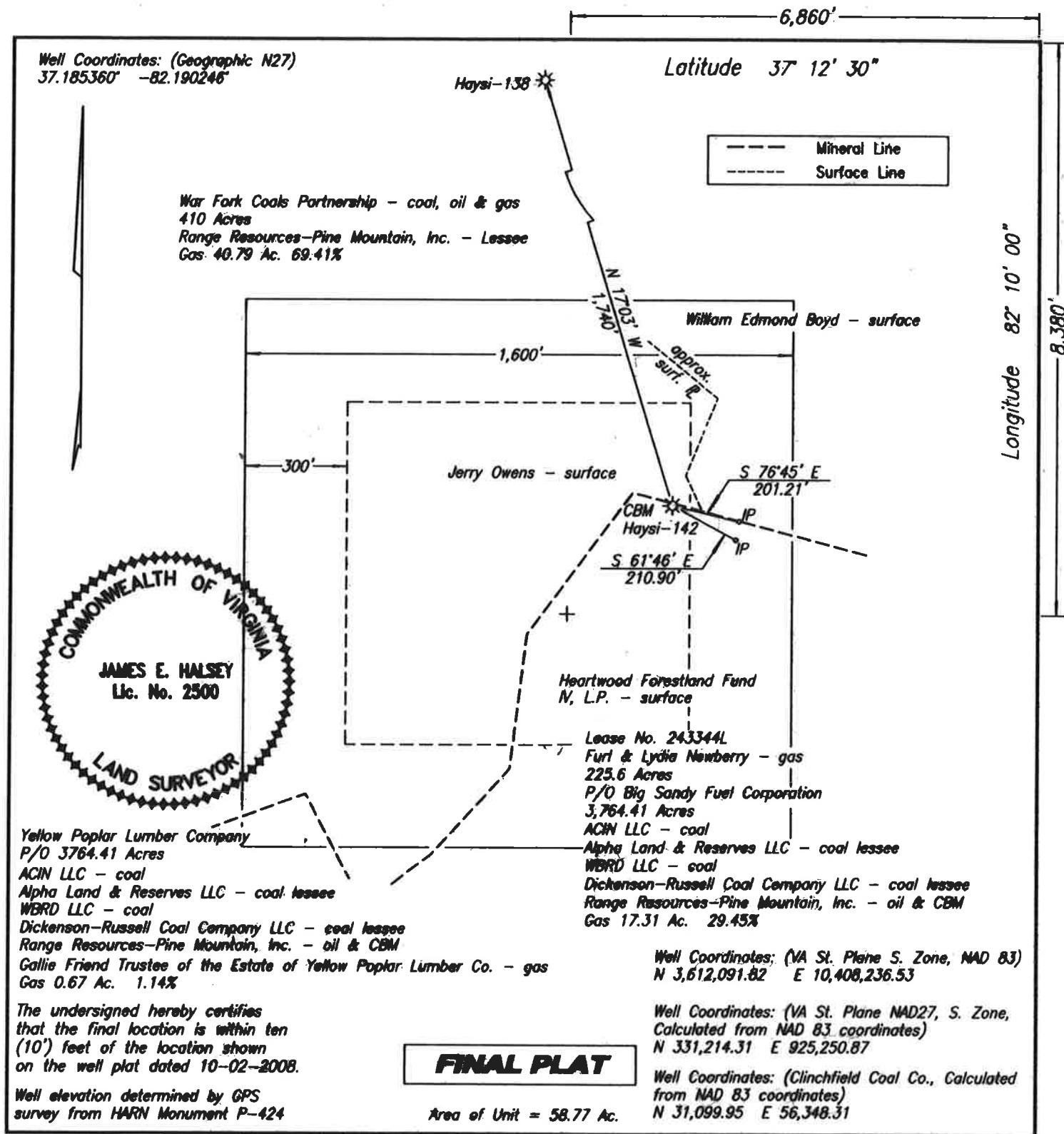
updated casing file to include basket depths [7/12/2011, jhorne]
Cement baskets [3/10/2010, jah]
Need depth of cement baskets [3/4/2010, jah]
Deviation survey not legible [3/4/2010, jah]

10. Signature

Permitee: Range Resources-Pine Mountain Date: 7/12/2011

Signed By: Laura Murray Title: Permit Specialist

INTERNAL USE ONLYSubmit Date: 7/12/2011Status: ADate: 3/1/2012Final PDF Date: 3/2/2012



WELL LOCATION PLAT (Nora. Grid AH-72)

COMPANY Range Resources-Pine Mountain, Inc. WELL NAME AND NUMBER Haysi-142
TRACT NO. Lease No. 243344L ELEVATION 2,061.40' QUADRANGLE Prater
COUNTY Buchanan DISTRICT Prater SCALE 1" = 400' DATE 12-18-2008

This Plat is a new plat ____; an updated plat ____; or a final location plat x

+ Denotes the location of a well on United States topographic Maps, scale 1 to 24,000, latitude and longitude lines being represented by border lines as shown.

James E. Halsey
Licensed Professional Engineer or Licensed Land Surveyor

Coal Seams

				MINING IN AREA		
NAME	TOP	BOTTOM	THICKNESS	YES	NO	MINED OUT
Kennedy	682	684	2		NO	NO
Aily	813	814	1		NO	NO
Raven	906	909	3		NO	NO
Jawbone Rider	1007	1011	4		NO	NO
Jawbone	1037	1040	3		NO	NO
Tiller	1105	1106	1		NO	NO
Upper Seaboard A	1219	1220	1		NO	NO
Upper Seaboard	1245	1246	1		NO	NO
Greasy Creek	1389	1393	4		NO	NO
Lower Seaboard	1448	1449	1		NO	NO
Upper Horsepen	1528	1529	1		NO	NO
Middle Horsepen	1594	1595	1		NO	NO
Unnamed	1657	1658	1		NO	NO
Lower Horsepen	1736	1737	1		NO	NO
Poco 4	2551	2553	2		NO	NO
Poco 3	2186	2189	3		NO	NO
Poco 3	2204	2205	1		NO	NO
Poco 3	2214	2215	1		NO	NO
Poco 2	2274	2276	2		NO	NO
Poco 1	2321	2323	2		NO	NO

Gas and Oil Shows

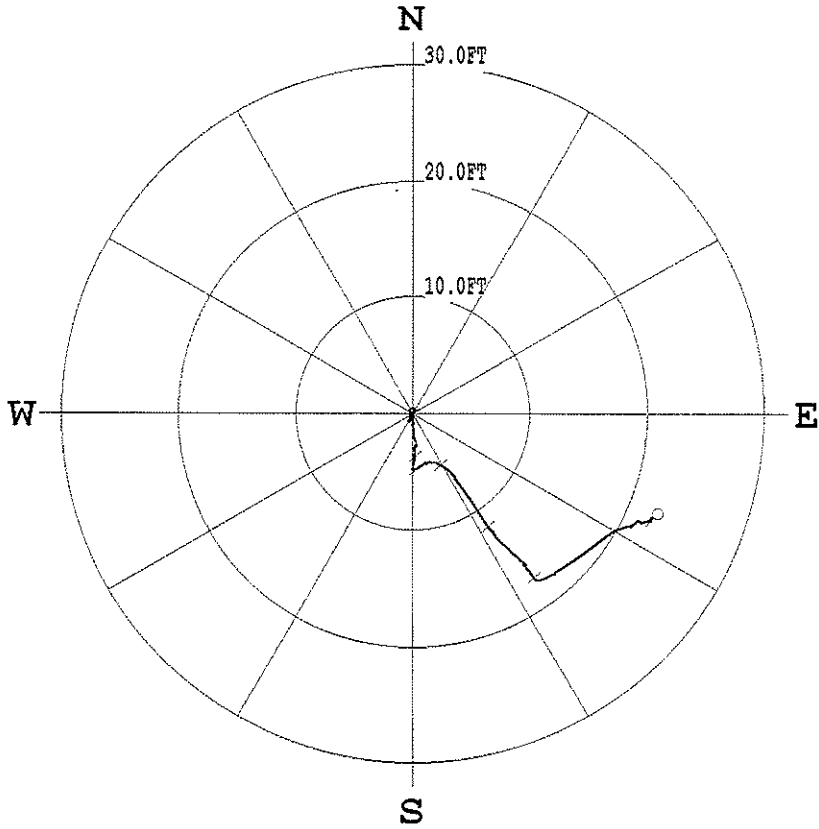
FORMATION	TOP	BOTTOM	THICKNESS	IPF (MCFD/BOPD)	PRESSURE	HOURS TESTED
TD	2461			NA		
TD w/csg	2461			NA		

PLAN VIEW
COMPU-LOG DEVIATION

CLIENT: Range Resources/Pine Mt.
LOCATION: PawPaw
HOLE ID: Haysi 142
DATE OF LOG: 12/20/08
PROBE: 9136AA 4520



SCALE: 10 FT/IN
TRUE DEPTH: 2462.49 FT
AZIMUTH: 112.2
DISTANCE: 22.6 FT
+ = 300 FT INCR
○ = BOTTOM OF HOLE



+ + + + + COMPU LOG VERTICAL DEVIATION + + + + +

CLIENT : Range Resources/Pin HOLE ID. : Haysi 142
FIELD OFFICE : DATE OF LOG : 12/20/08
DATA FROM : PROBE : 9136AA , 4520
MAG. DECL. : -6.900 DEPTH UNITS : FEET
LOG: Haysi142_12-20-08_06-49_9136AA_.1_12.20_2463.10_DEVI.log

CABLE DEPTH	TRUE DEPTH	NORTH DEV.	EAST DEV.	DISTANCE	AZIMUTH	SANG	SANGB
13.8	13.72	0.02	0.10	0.1	81.0	0.0	0.0
50.0	49.91	0.14	0.15	0.2	47.3	0.7	30.4
100.0	99.91	0.34	0.09	0.4	14.6	0.8	227.1
150.0	149.90	0.18	-0.24	0.3	307.7	0.9	201.1
200.0	199.90	-0.32	-0.26	0.4	219.0	1.1	198.0
250.0	249.89	-0.54	-0.05	0.5	184.8	0.9	342.0
300.0	299.88	-0.13	-0.05	0.1	202.0	0.9	288.4
350.0	349.87	-0.67	0.06	0.7	175.1	1.3	152.1
400.0	399.86	-1.38	0.10	1.4	176.0	0.9	152.9
450.0	449.85	-2.12	0.16	2.1	175.6	0.9	190.5
500.0	499.84	-2.81	0.28	2.8	174.4	0.9	303.6
550.0	549.84	-3.25	0.19	3.3	176.7	0.6	181.8
600.0	599.84	-3.67	0.18	3.7	177.2	0.5	166.1
650.0	649.84	-3.95	0.14	4.0	177.9	0.3	146.1
700.0	699.83	-4.30	0.14	4.3	178.1	0.5	145.3
750.0	749.83	-4.68	0.03	4.7	179.6	0.4	245.0
800.0	799.83	-4.76	-0.04	4.8	180.5	0.1	90.8
850.0	849.83	-4.83	0.03	4.8	179.6	0.2	79.4
900.0	899.83	-4.81	0.22	4.8	177.4	0.4	107.7
950.0	949.83	-4.65	0.53	4.7	173.5	0.5	55.8
1000.0	999.83	-4.48	0.78	4.5	170.1	0.5	48.2
1050.0	1049.82	-4.34	1.14	4.5	165.3	0.4	151.9
1100.0	1099.82	-4.23	1.37	4.4	162.0	0.6	55.7
1150.0	1149.82	-4.24	1.78	4.6	157.2	0.7	96.7
1200.0	1199.81	-4.42	2.28	5.0	152.7	0.8	98.3

1250.0	1249.81	-4.77	2.97	5.6	148.1	1.2	115.6
1300.0	1299.79	-5.60	3.66	6.7	146.8	1.1	275.7
1350.0	1349.77	-6.41	4.23	7.7	146.6	1.5	141.1
1400.0	1399.76	-7.45	4.99	9.0	146.2	1.5	158.0
1450.0	1449.74	-8.52	5.69	10.2	146.3	1.5	148.5
1500.0	1499.72	-9.59	6.39	11.5	146.3	1.4	156.5
1550.0	1549.71	-10.23	6.92	12.4	145.9	1.3	136.6
1600.0	1599.70	-11.04	7.64	13.4	145.3	1.2	128.4
1650.0	1649.68	-11.85	8.53	14.6	144.2	1.4	132.6
1700.0	1699.67	-12.67	9.46	15.8	143.3	1.4	132.8
1750.0	1749.65	-13.13	9.72	16.3	143.5	1.4	148.2
1800.0	1799.64	-13.93	10.32	17.3	143.5	1.3	155.3
1850.0	1849.63	-14.19	10.91	17.9	142.5	1.1	84.2
1900.0	1899.61	-13.68	12.14	18.3	138.4	2.2	1.1
1950.0	1949.59	-12.72	13.41	18.5	133.5	2.0	52.9
2000.0	1999.56	-11.89	14.63	18.9	129.1	1.4	48.5
2050.0	2049.54	-11.04	15.73	19.2	125.1	1.5	49.6
2100.0	2099.53	-10.46	16.50	19.5	122.4	1.4	59.3
2150.0	2149.52	-9.92	17.47	20.1	119.6	1.4	59.8
2200.0	2199.50	-9.57	18.46	20.8	117.4	1.5	67.5
2250.0	2249.49	-9.21	19.10	21.2	115.7	1.0	26.4
2300.0	2299.49	-9.25	19.68	21.7	115.2	0.6	78.4
2350.0	2349.48	-9.11	20.20	22.2	114.3	0.6	63.0
2400.0	2399.48	-9.08	20.33	22.3	114.1	0.9	277.6
2450.0	2449.47	-8.62	20.71	22.4	112.6	0.7	49.1
2463.1	2462.49	-8.53	20.92	22.6	112.2	-999999.0	-999639.0

Casing Program

[illegible]

Driller's Log

Geologic Age	Formation	General Lithology	Color	Depth Top	Depth Bottom	Thickness	Remarks
Penn	Lee	Sand and shale		0	682	682	
Penn	Lee	Coal		682	684	2	Kennedy
Penn	Lee	Sand and shale		684	813	129	
Penn	Lee	Coal		813	814	1	Aily
Penn	Lee	Sand and shale		814	906	92	
Penn	Lee	Coal		906	909	3	Raven
Penn	Lee	Sand and shale		909	1007	98	
Penn	Lee	Coal		1007	1011	4	Jawbone Rider
Penn	Lee	Sand and shale		1011	1037	26	
Penn	Lee	Coal		1037	1040	3	Jawbone
Penn	Lee	Sand and shale		1040	1105	65	
Penn	Lee	Coal		1105	1106	1	Tiller
Penn	Lee	Sand and shale		1106	1219	113	
Penn	Lee	Coal		1219	1220	1	Upper Seaboard A
Penn	Lee	Sand and shale		1220	1245	25	
Penn	Lee	Coal		1245	1246	1	Upper Seaboard
Penn	Lee	Sand and shale		1246	1389	143	
Penn	Lee	Coal		1389	1393	4	Greasy Creek
Penn	Lee	Sand and shale		1393	1448	55	
Penn	Lee	Coal		1448	1449	1	Lower Seaboard
Penn	Lee	Sand and shale		1449	1528	79	
Penn	Lee	Coal		1528	1529	1	Upper Horsepen
Penn	Lee	Sand and shale		1529	1594	65	
Penn	Lee	Coal		1594	1595	1	Middle Horsepen
Penn	Lee	Sand and shale		1595	1657	62	
Penn	Lee	Coal		1657	1658	1	Unnamed
Penn	Lee	Sand and shale		1658	1736	78	
Penn	Lee	Coal		1736	1737	1	Lower Horsepen
Penn	Lee	Sand and shale		1737	2151	414	
Penn	Lee	Coal		2151	2153	2	Poco 4
Penn	Lee	Sand and shale		2153	2186	33	
Penn	Lee	Coal		2186	2189	3	Poco 3
Penn	Lee	Sand and shale		2189	2204	15	
Penn	Lee	Coal		2204	2205	1	Poco 3
Penn	Lee	Sand and shale		2205	2214	9	
Penn	Lee	Coal		2214	2215	1	Poco 3
Penn	Lee	Sand and shale		2215	2274	59	
Penn	Lee	Coal		2274	2276	2	Poco 2
Penn	Lee	Sand and shale		2276	2321	45	
Penn	Lee	Coal		2321	2323	2	Poco 1
Penn	Lee	Sand and shale		2323	2474	151	



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Drawer 159, Lebanon, VA 24266
Telephone: (276) 415-9700

Tracking Number:	3540
Company:	Range Resources-Pine Mountain
File Number:	BU-4949
Operations Name:	900109
Operation Type:	Gas
Drilling Report Type:	Original

DRILLING REPORT (DGO-GO-14)

1. Drilling Data

Date drilling commenced:	7/11/2012	Drilling Contractor:	Gasco #5
Date drilling completed:	8/31/2012	Rig Type:	☒ Rotary ☐ Cable
Driller's Total Depth (feet):	5156.00		
Log Total Depth (feet):	5162.00	Formation At Total Depth	Cleveland Shale

2. Final Location Plat (as required by 4 VAC25-150-360.C.)

Permitted State Plane X:	10403973.6600	Final Plat State Plane X:	10403966.8700
Permitted State Plane Y:	3616063.8300	Final Plat State Plane Y:	3616065.5500

Plat Previously Submitted Or... ☐

List of Attached Items:

Description	FileName
900109 final plat	900109 Final Plat.pdf

3. Geological Data

Fresh Water At:

Depth (in feet)	Rate	Unit of Measure
-----------------	------	-----------------

Salt Water At:

Depth (in feet)	Rate	Unit of Measure
-----------------	------	-----------------

Coal Seams:

List of Attached Items:

Description	FileName
900109 coal	V-900109 Coal.xlsx

Gas and Oil Shows:

List of Attached Items:

Description	FileName
900109 gas shows	Shows.xls

4. Electric Logs (As required by 4VAC25-150-280.A)

List all logs run: GR/CDL/PE/DIL/Neu/TEMP/Petrosolve

Did logs disclose vertical locations of a coal seam? ☒

5. Survey Results (As required by 4VAC25-150-280.B.2)

List of Attached Items:

Description	FileName
900109 survey	Survey.xls

6. Casing and Tubing Program

List of Attached Items:

Description	FileName
900109 casing	Casing.xlsx

7. Remarks

Use this space to note any conditions or occurrences, such as lost circulation, fishing jobs, junk left in hole, sidetracks, squeeze jobs, etc., not shown above. Include data and depth of condition/occurrence.

8. Drillers Log

Compiled By: Range Resources

List of Attached Items:

Description	FileName
900109 log	V-900109 Log.xlsx

9. Comments

Approved [11/7/2012, cbl]

10. Signature

Permitee: Range Resources-Pine Mountain Date: 10/23/2012

Signed By: Jonathan Horne Title: Engineering Tech

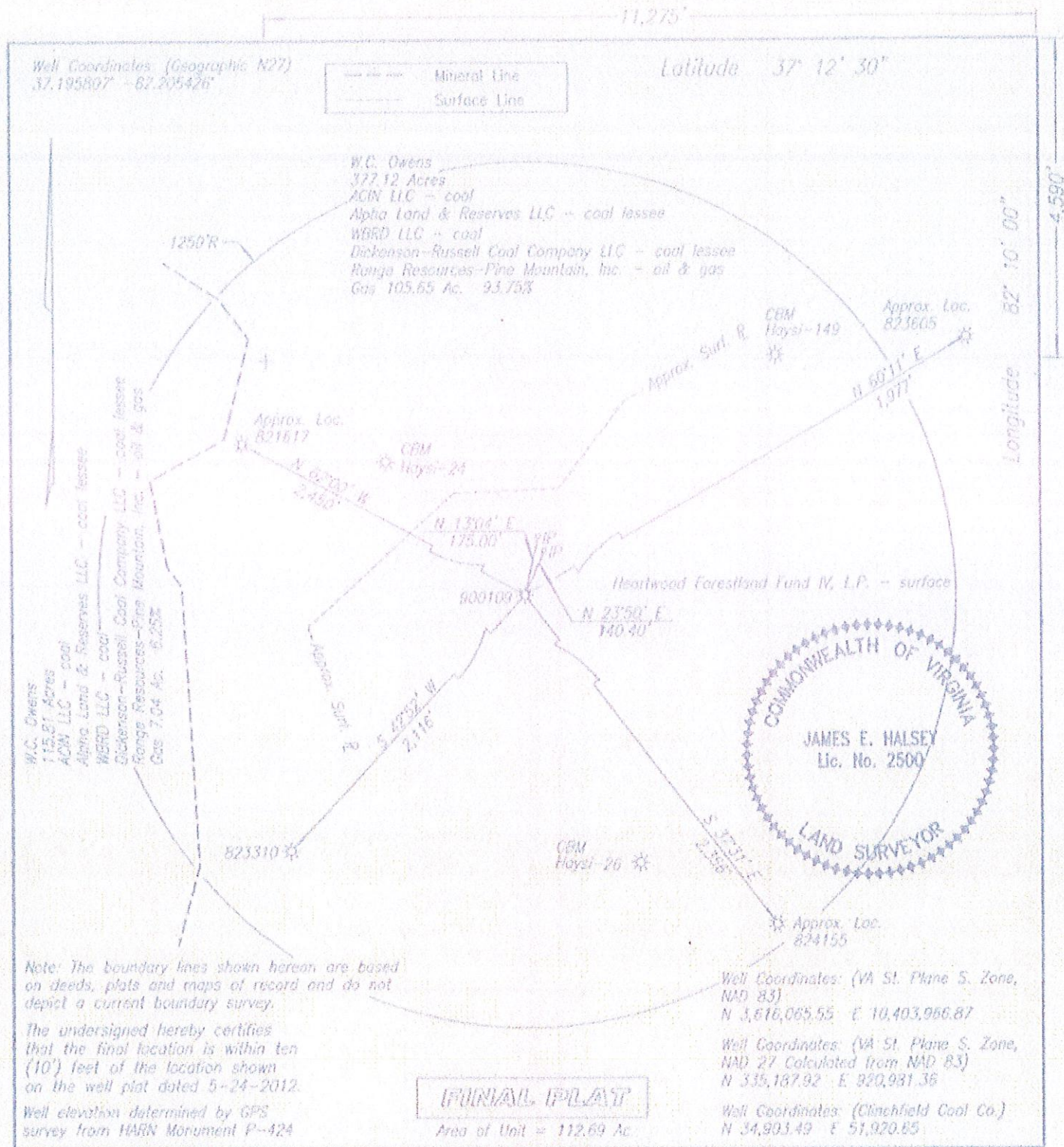
INTERNAL USE ONLY

Submit Date: 10/23/2012

Status: A

Date: 11/7/2012

Final PDF Date: 11/16/2012



WELL LOCATION PLAT NORA GRID AE-70

COMPANY Range Resources-Pine Mountain, Inc. WELL NAME AND NUMBER 900109
TRACT NO. W.C. Owens ELEVATION 2,056.90' QUADRANGLE Proter
COUNTY Buchanan DISTRICT Proter SCALE 1" = 400' DATE 9-04-2012
This Plat is a new plat _____; an updated plat _____; or a final location plat _____.

+ Denotes the location of a well on United States topographic Maps, scale 1 to 24,000, latitude and longitude lines being represented by border lines as shown.

James E. Halsey
Licensed Professional Engineer or Licensed Land Surveyor

Coal Seams V-900109

				MINING IN AREA		
NAME	TOP	BOTTOM	THICKNESS	YES	NO	MINED OUT
COAL	98	99	1	NO	NO	
COAL	320	321	1	NO	NO	
COAL	470	471	1	NO	NO	
COAL	513	514	1	NO	NO	
COAL	857	858	1	NO	NO	
COAL	898	899	1	NO	NO	
COAL	980	981	1	NO	NO	
COAL	1120	1121	1	NO	NO	
COAL	1305	1306	1	NO	NO	
COAL	1585	1586	1	NO	NO	
COAL	1800	1801	1	NO	NO	

Gas and Oil Shows

FORMATION	DEPTH	THICKNESS	IPF (MCFD/BOPD)	PRESSURE	HOURS TESTED
Ravencliff	3385		NS		
Maxton	3764		odor		
Big Lime	4302		odor		
Cleveland	5029		84 MCFD		
Cleveland	5093		103 MCFD		

Survey Results

Depth of Survey	Direction/Distance/Degree From True Vertical
195	$\frac{1}{4}^{\circ}$
380	$\frac{1}{4}^{\circ}$
564	$\frac{1}{2}^{\circ}$
752	$\frac{3}{4}^{\circ}$
939	$\frac{1}{2}^{\circ}$
1128	$\frac{1}{2}^{\circ}$
1314	$\frac{1}{4}^{\circ}$
1503	$\frac{1}{2}^{\circ}$
1691	$\frac{3}{4}^{\circ}$
1881	$\frac{1}{2}^{\circ}$
2005	$\frac{1}{2}^{\circ}$
2191	$\frac{1}{2}^{\circ}$
2380	$\frac{3}{4}^{\circ}$

Casing Program

	Casing	Casing	Hole	Cement Used	Cemented To Surface	Date	Packers Or Bridge Plugs	Cement Baskets
Casing Type	Size	Interval	Size	In Cubic Ft.	Yes/No	Cemented	Kind/Size/Set	(ft)
Conductor	13 3/4"	0-41'	15"					
Water Protection	9 5/8"	0-345'	12 1/4"	270	Yes, grouted to surface	09/04/12		126'
Coal Protection	7"	0-2387'	8 5/8"	575	Yes	09/06/12		301'
Production Casing	4 1/2"	0-5093'	6 1/2"	408	No	09/09/12		4066' 4722'
Other Casing And Tubing Left In Well Liners	2 3/4"	0-4966'						

Driller's Log V-900109

		General		Depth	Depth	
Geologic Age	Formation	Lithology	Color	Top	Bottom	Thickness
		OVERBURDEN		0	3	3
PENNSYLVANIAN		SANDSTONE		3	98	95
PENNSYLVANIAN		COAL		98	99	1
PENNSYLVANIAN		SANDSTONE		99	320	221
PENNSYLVANIAN		COAL		320	321	1
PENNSYLVANIAN		SANDY SHALE		321	470	149
PENNSYLVANIAN		COAL		470	471	1
PENNSYLVANIAN		SANDSTONE		471	513	42
PENNSYLVANIAN		COAL		513	514	1
PENNSYLVANIAN		SANDY SHALE		514	857	343
PENNSYLVANIAN		COAL		857	858	1
PENNSYLVANIAN		SANDY SHALE		858	898	40
PENNSYLVANIAN		COAL		898	899	1
PENNSYLVANIAN		SANDY SHALE		899	980	81
PENNSYLVANIAN		COAL		980	981	1
PENNSYLVANIAN		SANDY SHALE		981	1120	139
PENNSYLVANIAN		COAL		1120	1121	1
PENNSYLVANIAN		SANDY SHALE		1121	1305	184
PENNSYLVANIAN		COAL		1305	1306	1
PENNSYLVANIAN		SANDSTONE		1306	1585	279
PENNSYLVANIAN		COAL		1585	1586	1
PENNSYLVANIAN		SANDY SHALE		1586	1800	214
PENNSYLVANIAN		COAL		1800	1801	1
PENNSYLVANIAN		SANDSTONE		1801	2150	349
PENNSYLVANIAN		SANDY SHALE		2150	2300	150
MISSISSIPPIAN		SANDSTONE		2300	2750	450
MISSISSIPPIAN	RAVENCLIFF	SANDSTONE		2750	3380	630
MISSISSIPPIAN	MAXTON	SANDSTONE/SHALE		3380	3740	360
MISSISSIPPIAN	LITTLE LIME/BIG LIP	LIMESTONE		3740	4290	550
MISSISSIPPIAN	WEIR	SILTSTONE		4290	4535	245
MISSISSIPPIAN	WEIR SHALE	SHALE		4535	4920	385
MISSISSIPPIAN	SUNBURY	SHALE		4920	4970	50
MISSISSIPPIAN	BEREA	SANDSTONE		4970	5014	44
DEVONIAN	CLEVELAND	SHALE		5014	5162	148

Remarks

TD



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Drawer 159, Lebanon, VA 24266
Telephone: (276) 415-9650

Tracking Number: 3532
Company: Range Resources-Pine Mountain
File Number: BU-4949
Completion Report Type: Original

COMPLETION REPORT (DGO-GO-15)

Well Type:	Gas	Date Well Completed:	9/17/2012
Driller's Total Depth:	5156.00	Log's Total Depth:	5162.00

1. Changes in Casing/Tubing from Approved Drilling Report

Description	FileName
-------------	----------

2. Stimulation Record

Stimulation Status: ☒ Stimulated ☐ GOB ☐ Not Stimulated ☐ Service Well

Description	FileName
900109 stimulation	900109 stimulation.rtf

3. Final Production

Description	FileName
900109 final production	Final_Prod.xls

4. Comments

Notes:

5. Signature

Permittee: Range Resources-Pine Mountain Date: 11/7/2012 (Company)

By: Jonathan Horne Title: Engineering Tech (Signature)

INTERNAL USE ONLY

Submit Date: 11/7/2012

Status: Approved

Date: 11/7/2012

Final PDF Date: 11/16/2012

Range Resources - Pine Mountain
Completion Report

Page 1 of 2
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105010393 1 900109

Stage 1

Stage Date 9/17/2012
Perf Date 9/17/2012
Logging Co. Gray Wireline
Formation Berea
Top Perf 4963
Bottom Perf 4976
#Shots 27
Perf Size 0.52
Perf Comments

Service Co Superior
Fluid Type 75Q Foam
BD 555
ISIP 0
Avg Press 1810
Max Treat Pressure 1895
Final ISIP 1880
2 Min SIP 0
5 Min SIP 0
10 Min SIP 0
Sand Mesh: 20/40 OttawaWhite
Frac Gradient: 0.5

Avg DH Rate 34
Max DH Rate 35.5
Total Slurry Volume 135 BBLs
Total Fluid Volume 111 BBLs
Avg N2 Rate 16,100
Max N2 Rate 16,300 scfm
Total N2 Volume 269,000 scf
Max DH PPA 3
Total Proppant Sks 241 sks
Total Acid 0 Gal
Acid Type

Stage 2

Stage Date 9/17/2012
Perf Date 9/17/2012
Logging Co. Gray Wireline
Formation Big Lime
Top Perf 4260
Bottom Perf 4273
#Shots 27
Perf Size 0.42
Perf Comments

Service Co Superior
Fluid Type 60Q Foam
BD 3304
ISIP 0
Avg Press 3059
Max Treat Pressure 3172
Final ISIP 470
2 Min SIP 0
5 Min SIP 0
10 Min SIP 0
Sand Mesh: n/a
Frac Gradient: 0.6

Avg DH Rate 22
Max DH Rate 23
Total Slurry Volume 295 BBLs
Total Fluid Volume 295 BBLs
Avg N2 Rate 14,300
Max N2 Rate 15,300 scfm
Total N2 Volume 375,000 scf
Max DH PPA 0
Total Proppant Sks 0 sks
Total Acid 4500 Gal
Acid Type 15% HCL

Baffle Depth - 4295'

Stage 3

Stage Date 9/17/2012
Perf Date 9/17/2012
Logging Co. Gray Wireline
Formation Big Lime
Top Perf 3943
Bottom Perf 4117
#Shots 28
Perf Size 0.42
Perf Comments

Service Co Superior
Fluid Type 60Q Foam
BD Feed @ 600
ISIP 0
Avg Press 3280
Max Treat Pressure 3356
Final ISIP 1217
2 Min SIP 0
5 Min SIP 0
10 Min SIP 0
Sand Mesh: n/a
Frac Gradient: 0.7

Avg DH Rate 14
Max DH Rate 15.5
Total Slurry Volume 153 BBLs
Total Fluid Volume 153 BBLs
Avg N2 Rate 10,000
Max N2 Rate 10,300 scfm
Total N2 Volume 132,000 scf
Max DH PPA 0
Total Proppant Sks 0 sks
Total Acid 2020 Gal
Acid Type 15% HCL

Baffle Depth - 4197'

Range Resources - Pine Mountain
Completion Report

Page 2 of 2
11/7/2012 2:27:51 PM

Stage 4

Stage Date 9/17/2012
Perf Date 9/17/2012
Logging Co. Gray Wireline
Formation Maxton
Top Perf 3510
Bottom Perf 3521
#Shots 45
Perf Size 0.52
Perf Comments

Service Co Superior
Fluid Type 75Q Foam
BD 682
ISIP 0
Avg Press 2108
Max Treat Pressure 2168
Final ISIP 1025
2 Min SIP 0
5 Min SIP 0
10 Min SIP 0
Sand Mesh: 20/40 OttawaWhite
Frac Gradient: 0.7

Avg DH Rate 34
Max DH Rate 35
Total Slurry Volume 216 BBLs
Total Fluid Volume 186 BBLs
Avg N2 Rate 16,800
Max N2 Rate 17,300 scfm
Total N2 Volume 269,000 scf
Max DH PPA 3
Total Proppant Sks 315 sks
Total Acid 750 Gal
Acid Type 15% HCL

Baffle Depth - 3541'

Stage 5

Stage Date 9/17/2012
Perf Date 9/17/2012
Logging Co. Gray Wireline
Formation Ravencliff
Top Perf 2892
Bottom Perf 2929
#Shots 104
Perf Size 0.39
Perf Comments

Service Co Superior
Fluid Type 75Q Foam
BD 831
ISIP 0
Avg Press 2331
Max Treat Pressure 2371
Final ISIP 1977
2 Min SIP 1870
5 Min SIP 1778
10 Min SIP 0
Sand Mesh: 20/40 OttawaWhite
Frac Gradient: 0.6

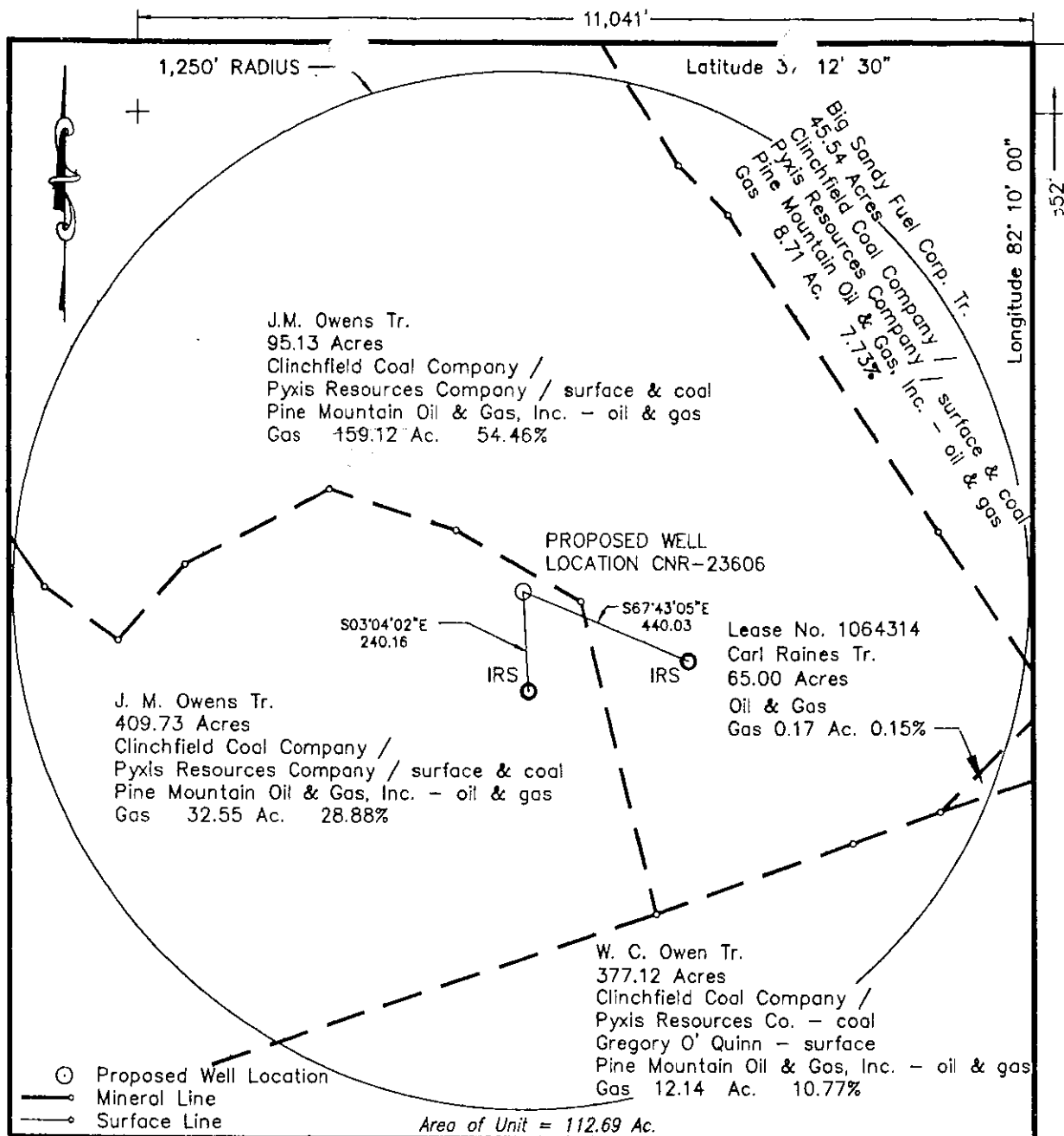
Avg DH Rate 33
Max DH Rate 34.5
Total Slurry Volume 245 BBLs
Total Fluid Volume 197 BBLs
Avg N2 Rate 18,900
Max N2 Rate 19,400 scfm
Total N2 Volume 421,000 scf
Max DH PPA 3.5
Total Proppant Sks 502 sks
Total Acid 750 Gal
Acid Type 15% HCL

Baffle Depth - 2950'

Summary Total for All

Number of Stages	Total Slurry	Total Fluid Volume	Total N2 Volume	Total Proppant	Total Acid
5	1044	942	1,466,000	1058	8020

Final Production After Stimulation				
	BOD	MCFD	Hours Tested	Rock Pressure
Final/Commingle Zones		802	3	280



Well Coordinates: (Clinchfield Coal Co.)
 N 38,606.59 E 52,167.31

WELL LOCATION PLAT

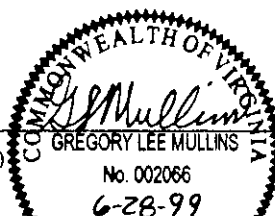
COMPANY: Columbia Natural Resources, Inc. WELL NAME OR NUMBER: 23606
 TRACT NUMBER: J. M. Owens QUADRANGLE: Prater
 DISTRICT: Prater
 WELL COORDINATES (VIRGINIA STATE PLANE): N - 338,880.69 E - 921,373.275
 ELEVATION: 1996.40 METHOD USED TO DETERMINE ELEVATION:
Trigonometric Leveling from Deel Monument

COUNTY: Buchanan SCALE: 1" = 400' DATE: 06-28-1999
 THIS PLAT IS A NEW PLAT ; AN UPDATED PLAT ; OR A FINAL LOCATION PLAT X

+

Denotes the location of a well on United States Topographic Maps, scale 1 to 24,000, latitude and longitude lines being represented by border lines as shown (optional).

Licensed Land Surveyor (Affix Seal)



Department of Mines, Minerals and Energy
Division of Gas and Oil
P. O. Box 1416
Abingdon, Virginia 24210
703/676-5423

DRILLING REPORT

Pursuant to VR-480-05-22.1, Section 1.36, the undersigned Permittee submits this report on Well 21617 in the Prater District of the Buchanan City/County, Virginia on the 4th day of December, 1998.

LOCATION

City/County: Buchanan District: Prater
Surface Elevation: 1983.94 Elevation of Kelly Bushing: 1993.94 Quadrangle: Prater
3496 Ft. S. of Latitude 37 deg 12' 30" and 1359 Ft. W. of Longitude 82 deg 12' 30"
or, State Plans Coordinates: N-336,337 and E-918,819.

Attach a final location plat as required by VR 480-05-22.1, Section 1.36.

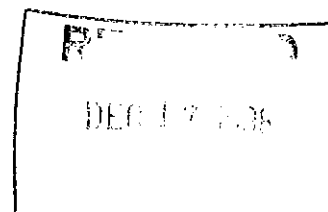
DRILLING DATA

Date Drilling Commenced: 09/02/98 Drilling Contractor: S W Jack Drilling Company Rig
Date Drilling Completed: 09/16/98 Rig Type: X Rotary Cable Tool
Total Depth of Well: 6102'

GEOLOGICAL DATA

Fresh Water at: 78 Feet 2 GPM Feet GPM
1170 Feet 1 GPM Feet GPM
 Feet GPM Feet GPM

Salt Water at: n/a Feet GPM Feet GPM
 Feet GPM Feet GPM
 Feet GPM Feet GPM



COAL SEAMS:

<u>NAME:</u>	<u>TOP</u>	<u>BOTTOM</u>	<u>THICKNESS</u>	<u>MINING IN AREA</u>		
				<u>YES</u>	<u>NO</u>	<u>MINED OUT</u>
<u>Unknown</u>	<u>900'</u>	<u>903'</u>	<u>3'</u>	<u> </u>	<u>X</u>	<u>X</u>
<u>Unknown</u>	<u>1158'</u>	<u>1162'</u>	<u>4'</u>	<u> </u>	<u>X</u>	<u>X</u>

GAS AND OIL SHOWS:

<u>FORMATION</u>	<u>TOP</u>	<u>BOTTOM</u>	<u>THICKNESS</u>	<u>IPF (MCFD/BOPD)</u>	<u>PRESSURE</u>	<u>HOURS TESTED</u>
<u>Maxon</u>	<u>2866'</u>	<u>3269'</u>	<u>403'</u>	<u>133</u>	<u>N/A</u>	<u>N/A</u>
<u>Berea</u>	<u>4906'</u>	<u>4964'</u>	<u>58'</u>	<u>297</u>	<u>N/A</u>	<u>N/A</u>

Department of Mines, Minerals and Energy
Division of Gas and Oil

Operations Name: CNR-21617
Permit # 3917

Cuttings or samples are X are not available for examination by a member of the Virginia Division of Mineral Resources
Cuttings or samples have have not X been furnished to the Virginia Division of Mineral Resources

ELECTRIC LOGS AND SURVEYS:

List logs ran on wellbore: GR, TEMP, AUDIO, THREE DETECTOR DENSITY, CN & AI.

Did log disclose vertical location of a coal seam? Yes X No N/A

SURVEY RESULTS:

<u>DEPTH OF SURVEY</u>	<u>DIRECTION/DISTANCE/DEGREES FROM TRUE VERTICAL</u>	<u>DEPTH OF SURVEY</u>	<u>DIRECTION/DISTANCE/DEGREES FROM TRUE VERTICAL</u>
<u>200</u>	<u>1/2 DEGREE</u>	<u>1300</u>	<u>3/4 DEGREE</u>
<u>400</u>	<u>1/2 DEGREE</u>	<u>1500</u>	<u>1/4 DEGREE</u>
<u>600</u>	<u>1/2 DEGREE</u>	<u>1700</u>	<u>1/2 DEGREE</u>
<u>800</u>	<u>3/4 DEGREE</u>	<u>1900</u>	<u>1/2 DEGREE</u>
<u>902</u>	<u>3/4 DEGREE</u>	<u>2100</u>	<u>3/4 DEGREE</u>
<u>1100</u>	<u>3/4 DEGREE</u>		

*Use additional sheets if necessary.

CASING AND TUBING

	<u>SIZE</u>	<u>TOP</u>	<u>BOTTOM</u>	<u>LENGTH</u>	<u>CEMENT USED IN CU/FT</u>	<u>DATE CEMENTED</u>	<u>PACKERS OR BRIDGE PI KIND SIZE SET</u>
<u>Conductor</u>	13 3/8"	Surface	35'	35'	--	--	
<u>Surface</u>	9 5/8"	Surface	529'	529'	201 cu.ft.	09/03/98	
<u>Water Protection</u>							
<u>Coal Protection</u>	7"	Surface	2425'	2425'	455 cu.ft.	09/10/98	
<u>Other Casing and Tubing Left in Well</u>	4 1/2"	Surface	6072'	6072'	183 cu.ft.	09/16/98	

Liners

REMARKS: Shut down, fishing jobs, depths and dates, caving, lost circulation, etc.

N/A

DRILLER'S LOG

Compiled by Geologist

GEOLOGICAL AGE	FORMATION	GENERAL LITHOLOGY	COLOR	DEPTH		THICKNESS	REMARKS
				TOP	BOTTOM		
PENNSYLVANIAN	Lee	Siltstone & Shale		0	1376	1376	
	Salt Sand	Sandstone		1376	1504	128	
	Lee	Siltstone & Shale		1504	1918	414	
	Salt Sand	Sandstone		1918	2167	249	
MISSISSIPPIAN	Bluefield	Siltstone & Shale		2167	2866	699	
	Maxon	Sandstone		2866	2946	80	
	Bluefield	Siltstone & Shale		2946	3180	234	
	Maxon	Sandstone		3180	3269	89	
	Bluefield	Siltstone & Shale		3269	3888	619	
	Little Lime	Argillaceous Lime		3888	3998	110	
	Big Lime	Limestone		3998	4252	254	
	Weir	Siltstone		4252	4454	202	
	Pocono	Shale		4454	4852	398	
	Sunbury	Shale		4852	4906	54	
	Berea	Sandstone		4906	4964	58	
DEVONIAN	Devonian	Shale		4964	5770	806	
	Lower Huron	Shale		5770	5976	206	
	Java	Shale		5976	6102 (TD)	126	

Permittee: Columbia Natural Resources (Company)

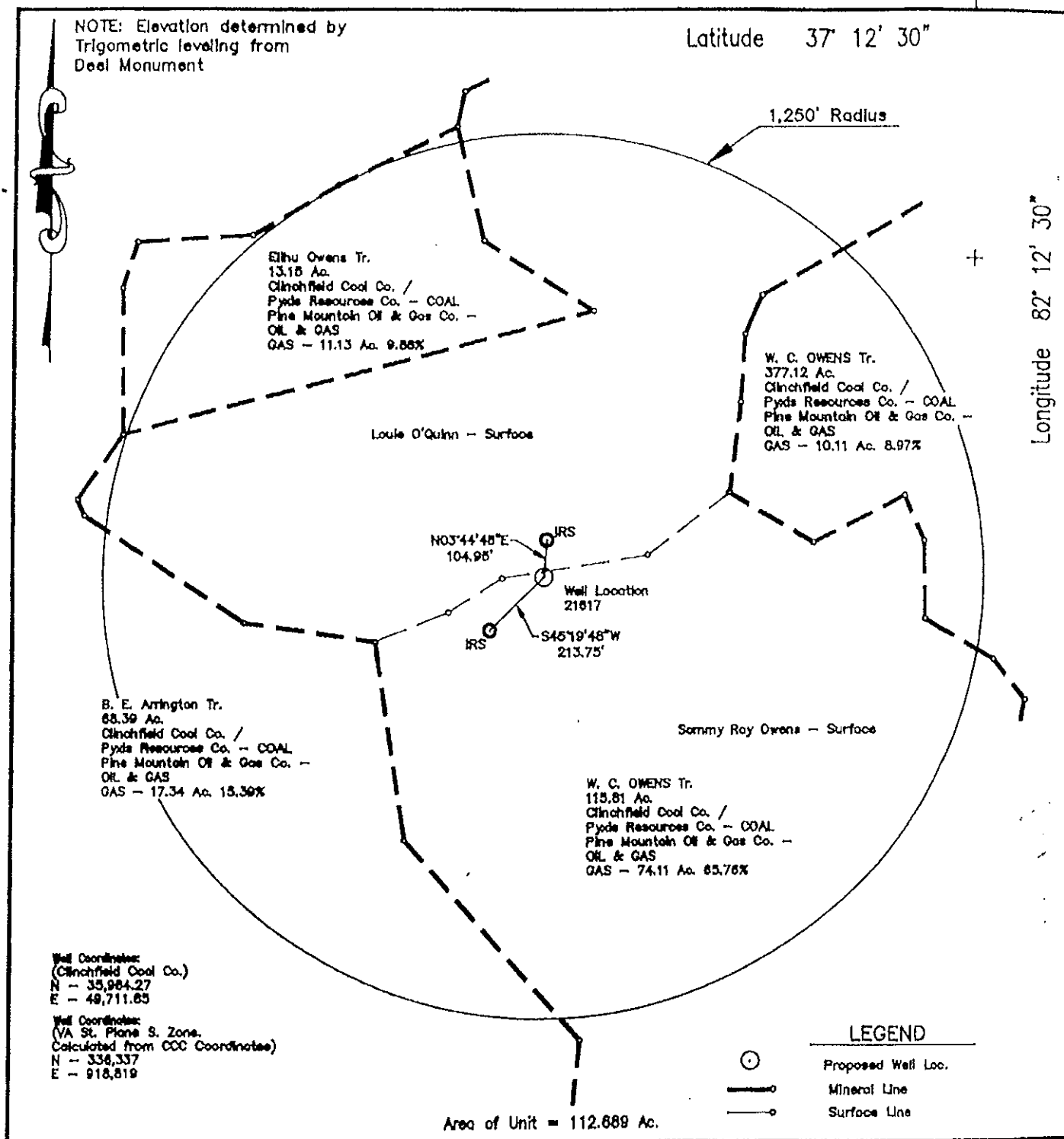
By: Jason E. Stidham (Signature)

1,359'

NOTE: Elevation determined by
Trigometric leveling from
Deal Monument

Latitude 37° 12' 30"

Longitude 82° 12' 30"



WELL LOCATION PLAT

COMPANY Columbia Natural Resources, Inc. WELL NAME AND NUMBER 21617
TRACT NO. W. C. Owens ELEVATION 1983.94 QUADRANGLE Prater
COUNTY Buchanan DISTRICT Prater SCALE 1" = 400' DATE 09-07-98

This Plat is a new plat ; an updated plat ; or a final location plat X

+ Denotes the location of a well on United States topographic Maps, scale 1 to 24,000, latitude and longitude lines being represented by border lines as shown.

Greg Mullins

COMMONWEALTH OF VA
Gregory Lee Mullins
GREGORY LEE MULLINS

Range Resources - Pine Mountain, Inc. certifies that, to the best of its knowledge, information and belief, the original plat by Greg Mullins is correct and accurate "as-drilled" but for the change of operator name. Range Resources - Pine Mountain, Inc. is the new operator of the asset and accepts and assumes any and all



Commonwealth of Virginia
Department of Mines, Minerals and Energy
Division of Gas and Oil
P.O. Box 1416; Abingdon, VA 24212
Telephone: (540) 676-5423

Operations Name: Columbia Natural Resources Well #21617
Permit Number: #3917

COMPLETION REPORT

Well type: ☐ Oil ☒ Gas ☐ Coalbed Methane ☐ Injection Well

Date Well Completed: 1/1/02 Total Depth: LTD - 6028' KB

STIMULATION RECORD (Use additional sheets with this format, if more than three zones are stimulated.)

ZONE 1: Weir Sand Formation Stimulated With: Foam and Sand
Perforated 4356' to 4432' No. of Perforations 33 Perforation Size 0.38"
Formation Broke down at: 2275 PSIG Average Injection Rate: 30 BPM
SIP 1304 (PSIG) 5 MIN SIP. 1154 (PSIG) Average Injection Pressure 1631 (PSIG)
Stimulated: ☒ Yes ☐ No Date Stimulated: 11/28/2001

ZONE 2: Big Lime Formation Stimulated With: Foam and Sand
Perforated 4227' to 4235' No. of Perforations 32 Perforation Size 0.38"
Formation Broke down at: 2200 PSIG Average Injection Rate: 15 BPM
SIP NA (PSIG) 5 MIN SIP. NA (PSIG) Average Injection Pressure 2070 (PSIG)
Stimulated: ☒ Yes ☐ No Date Stimulated: 11/28/2001 - Job screened out

Well was worked over and all plugs drilled out following completion of workover operations. Shale and berea reduction were maintained.

FINAL PRODUCTION: _____ Natural X _____ After Stimulation

	BOD	MCFD	HOURS TESTED	ROCK PRESSURE	HOURS TESTED
ZONE 1, 2	0	377	6	650	48

Permittee: Columbia Natural Resources, Inc. (Company)

By: [Signature] (Signature) Date: 5/2/02

Department of Mines, Minerals and Energy
Division of Gas and Oil
P. O. Box 1416
Abingdon, Virginia 24210
703/676-5423

DRILLING REPORT

Pursuant to VR-480-05-22.1, Section 1.36, the undersigned Permittee submits this report on Well 23309 in the Prater District of the Buchanan City/County, Virginia on the 4th day of December, 1998.

LOCATION

City/County: Buchanan District: Prater

Surface Elevation: 1943.83 Elevation of Kelly Bushing: 1953.83 Quadrangle: Prater

4883 Ft. S. of Latitude 37 deg 12' 30" and 3283 Ft. W. of Longitude 82 deg 12' 30"
or, State Plans Coordinates: N-335,039 and E-916,588.

Attach a final location plat as required by VR 480-05-22.1, Section 1.36.

DRILLING DATA

Date Drilling Commenced: 08/07/98 Drilling Contractor: S W Jack Drilling Company Rig

Date Drilling Completed: 08/21/98 Rig Type: X Rotary Cable Tool

Total Depth of Well: 6054'

GEOLOGICAL DATA

Fresh Water at: 526 Feet 5 GPM Feet GPM
 Feet GPM Feet GPM
 Feet GPM Feet GPM

Salt Water at: 1420 Feet 3 GPM Feet GPM
1832 Feet 2 GPM Feet GPM
 Feet GPM Feet GPM

COAL SEAMS:

<u>NAME:</u>	<u>TOP</u>	<u>BOTTOM</u>	<u>THICKNESS</u>	<u>MINING IN AREA</u>		
				<u>YES</u>	<u>NO</u>	<u>MINED OUT</u>
<u>Unknown</u>	<u>1104'</u>	<u>1108'</u>	<u>4'</u>	<u> </u>	<u>X</u>	<u>X</u>
<u>Unknown</u>	<u>1299'</u>	<u>1303'</u>	<u>4'</u>	<u> </u>	<u>X</u>	<u>X</u>

GAS AND OIL SHOWS:

<u>FORMATION</u>	<u>TOP</u>	<u>BOTTOM</u>	<u>THICKNESS</u>	<u>IPF (MCFD/BOPD)</u>	<u>PRESSURE</u>	<u>HOURS TESTED</u>
<u>Maxon</u>	<u>2866'</u>	<u>3211'</u>	<u>345'</u>	<u>503</u>	<u>672#</u>	<u>96 hr</u>

Cuttings or samples are X are not available for examination by a member of the Virginia Division of Mineral Resources
Cuttings or samples have have not X been furnished to the Virginia Division of Mineral Resources

ELECTRIC LOGS AND SURVEYS:

List logs ran on wellbore: Photo Density, Digital Dual Induction, Epithermal Neutron, TEMP

Did log disclose vertical location of a coal seam? Yes X No N/A

SURVEY RESULTS:

<u>DEPTH</u> <u>OF SURVEY</u>	<u>DIRECTION/DISTANCE/DEGREES</u> <u>FROM TRUE VERTICAL</u>	<u>DEPTH</u> <u>OF SURVEY</u>	<u>DIRECTION/DISTANCE/DEGREES</u> <u>FROM TRUE VERTICAL</u>
<u>200</u>	<u>1/4 DEGREE</u>	<u>1300</u>	<u>3/4 DEGREE</u>
<u>400</u>	<u>1 DEGREE</u>	<u>1400</u>	<u>3/4 DEGREE</u>
<u>600</u>	<u>3/4 DEGREE</u>	<u>1600</u>	<u>3/4 DEGREE</u>
<u>800</u>	<u>3/4 DEGREE</u>	<u>1800</u>	<u>1 DEGREE</u>
<u>1000</u>	<u>3/4 DEGREE</u>	<u>2040</u>	<u>1-1/4 DEGREE</u>
<u>1100</u>	<u>3/4 DEGREE</u>	<u>2300</u>	<u>1-1/2 DEGREE</u>

*Use additional sheets if necessary.

CASING AND TUBING

	<u>SIZE</u>	<u>TOP</u>	<u>BOTTOM</u>	<u>LENGTH</u>	<u>CEMENT USED</u> <u>IN CU/FT</u>	<u>DATE</u> <u>CEMENTED</u>	<u>PACKERS OR BRIDGE PI</u> <u>KIND SIZE SET</u>
<u>Conductor</u>	13 3/8"	Surface	45'KB	35'	--	--	
<u>Surface</u>	9 5/8"	Surface	351'KB	341'	153 cu.ft.	08/09/98	
<u>Water Protection</u>	7"	Surface	2266'KB	2256'	425 cu.ft.	08/12/98	
<u>Coal Protection</u>							
<u>Other Casing</u> <u>and Tubing Left in Well</u>	4 1/2"	Surface	6016'KB	6006'	184 cu.ft.	08/20/98	

Liners

REMARKS: Shut down, fishing jobs, depths and dates, caving, lost circulation, etc.

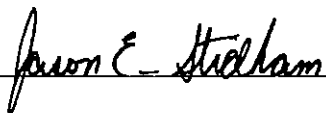
N/A

DRILLER'S LOG

Compiled by Geologist

GEOLOGICAL AGE	FORMATION	GENERAL LITHOLOGY	COLOR	DEPTH		THICKNESS	REMARKS
				TOP	BOTTOM		
PENNSYLVANIAN	Lee	Siltstone & Shale		0	1350	1350	
	Salt Sand	Sandstone		1350	1493	143	
	Lee	Siltstone & Shale		1493	2058	565	
	Salt Sand	Sandstone		2058	2148	90	
MISSISSIPPIAN	Bluestone	Siltstone & Shale		2148	2866	718	
	Maxon	Sandstone		2866	2908	42	
	Bluefield	Siltstone & Shale		2908	3185	277	
	Maxon	Sandstone		3185	3211	26	
	Bluefield	Siltstone & Shale		3211	3716	505	
	Little Lime	Limestone		3716	3820	104	
	Big Lime	Limestone		3820	4260	440	
	Pocono	Shale		4260	4346	86	
	Weir	Siltstone		4346	4458	112	
	Pocono	Shale		4458	4882	424	
	Sunbury	Shale		4882	4904	22	
	Berea	Sandstone		4904	4953	49	
DEVONIAN	Cleveland	Shale		4953	4977	24	
		Shale		4977	5754	777	
	Lower Huron	Shale		5754	5954	200	
	Java	Shale		5954	TD		

Permittee: Columbia Natural Resources (Company)

By:  (Signature)

3,283'

NOTE: Elevation determined by
Trigometric leveling from
Deel Monument

Latitude 37° 12' 30"

Longitude 82° 12' 30"

Henry Deel Tr.
87.64 Ac.
Climchfield Coal Co. /
Pyxis Resources Co. - COAL & SURFACE
Pine Mountain Oil & Gas Co. -
OIL & GAS
GAS - 10.14 Ac. 9.00%

1,250' Radius

N33°12'42"E
154.45'
Well Location
23309
IRS
N69°26'43"E
209.89'

B. E. Arrington Tr.
68.39 Ac.
Climchfield Coal Co. /
Pyxis Resources Co. - COAL & SURFACE
Pine Mountain Oil & Gas Co. -
OIL & GAS
GAS - 21.72 Ac. 19.27%

B. F. Deel Tr.
229.64 Ac.
Climchfield Coal Co. /
Pyxis Resources Co. - COAL
Pine Mountain Oil & Gas Co. -
OIL & GAS
GAS - 77.86 Ac. 89.09%
Edith Childress - SURFACE

Well Coordinates:
(Climchfield Coal Co.)
N - 34,579.58
E - 47,330.16

Well Coordinates:
(VA St. Plane S. Zone,
Calculated from CCC Coordinates)
N - 335,038
E - 918,588

J. N. O. Raines Tr.
105.89 Ac.
Climchfield Coal Co. /
Pyxis Resources Co. - COAL & SURFACE
Pine Mountain Oil & Gas Co. -
OIL & GAS
GAS - 2.97 Ac. 2.64%

LEGEND

-  Proposed Well Loc.
-  Mineral Line
-  Surface Line

Area of Unit = 112.689 Ac.

WELL LOCATION PLAT

COMPANY Columbia Natural Resources, Inc. WELL NAME AND NUMBER 23309
TRACT NO. B. F. Deel ELEVATION 1943.83 QUADRANGLE Prater
COUNTY Buchanan DISTRICT Prater SCALE 1" = 400' DATE 08-31-98
This Plat is a new plat ; an updated plat ; or a final location plat X

+ Denotes the location of a well on United States topographic Maps, scale 1 to 24,000, latitude and longitude lines being represented by border lines as shown.

Greg Mullins
Licensed Land Surveyor



Department of Mines, Minerals and Energy
Division of Gas and Oil
P. O. Box 1416
Abingdon, Virginia 24210
703/676-5423

COMPLETION REPORT

WELL TYPE: Oil ☐ Gas ☒ Coalbed Methane ☐ or Injection ☐ well.

Date Well Completed: 10/10/98 Total Depth of Well: 6054 (LTD) 4 1/2

Attach the Drilling Report, if not previously submitted. In addition, submit any changes in casing or tubing that were appr. After the Drilling Report was submitted.

STIMULATION RECORD

Zone 1: Devonian Shale Formation Stimulated With: 250 gal 7 1/2% HCl 1,207,600 SCF of Nitrogen

Perforated: 5760 to 5945 No. of Perforations: 13 Perforation Size: 0.44"
Formation Broke down at: 3081 PSIG Average Injection Rate: 72,325 SCF/M BPM
ISIP 2477 PSIG 5 MIN SIP 2348 PSIG Average Injection Pressure: 4035 PSIG
Date Stimulated: 09/01/98

Zone 2: Berea Formation Stimulated With: 90/85/80 % Foam, 250 gal 7 1/2% HCl, 97 Bbls Clean Fluid, 44,000 lbs 20/40 sand
Perforated: 4910' to 4920' No. of Perforations: 14 Perforation Size: 0.44"
Formation Broke Down at: 2005 PSIG Average Injection Rate: 35 BPM Foam Rate BPM
ISIP 1347 PSIG 5 MIN SIP 1176 PSIG Average Injection Pressure: 2490 PSIG
Date stimulated: 10/05/98

Zone 3: N/A Formation Stimulated With: _____

Perforated: _____ to _____ No. of Perforations: _____ Perforation Size: _____
Formation Broke Down at: _____ PSIG Average Injection Rate: _____ BPM
ISIP _____ PSIG _____ MIN SIP _____ PSIG Average Injection Pressure: _____ PSIG
Date stimulated: _____

FINAL PRODUCTION: ☐ Natural ☒ After Stimulation

	Natural BOD	MCFD	HOURS TESTED	ROCK PRESSURE	HOURS TESTED
Zone (1) <u>Devonian Shale</u>		<u>146</u>	<u>72</u>	<u>750</u>	<u>96</u>
Zone (2) <u>Berea</u>		<u>222</u>	<u>48</u>	<u>585</u>	<u>72</u>
Zone (3) <u>Maxon **</u>		<u>503</u>	<u>6</u>	<u>672</u>	<u>96</u>

Final Production if Gas Zones are Comingled 368 MCFD 48 Hours Tested 585 PSIG 72 Hours Tested

****Note: Maxon will produce natural from annulus. Not included in final comingled production zones.**

*Use additional sheets with this format, if more than three (3) zones were stimulated.

Permittee: Columbia Natural Resources, Inc. (Company)

By: Jason C. Stidham (Signature)



Commonwealth of Virginia
Department of Mines, Minerals and Energy
Division of Gas and Oil
P.O. Box 1416
Abingdon, VA 24212
Telephone: (540) 676-5423

Operations Name CNR - 23310
Permit Number 4209

DRILLING REPORT

ATTACH A FINAL LOCATION PLAT AS REQUIRED BY 4 VAC 25-150-360.C.

DRILLING DATA

Date drilling commenced 06/15/99
Drilling Contractor S. W. Jack Drilling Co.
Date drilling completed 06/24/99 Rig Type Rotary ☒ Cable Tool
Total Depth of Well 6099 DTD

GEOLOGICAL DATA

Fresh water at 80 Feet Damp GPM/Inch Stream Feet GPM/Inch Stream
595 Feet Damp GPM/Inch Stream Feet GPM/Inch Stream
Salt water at Feet GPM/Inch Stream Feet GPM/Inch Stream
Feet GPM/Inch Stream Feet GPM/Inch Stream

Coal Seams

NAME	TOP	BOTTOM	THICKNESS	MINING IN AREA		MINED OUT
				YES	NO	
Unknown	515	518	3	No		N/A

Gas and Oil Shows

FORMATION	TOP	BOTTOM	THICKNESS	IPF (MCFD/BOPD)	PRESSURE	HOURS TESTED
Maxon	3390	3455	65	241	N/A	N/A
Berea	4920	4965	45	286	N/A	N/A

Cuttings or samples ☒ are not available for examination by a member of the Virginia Division of Mineral Resources
Cuttings or samples have not been furnished to the Virginia Division of Mineral Resources

ELECTRIC LOGS AND SURVEYS

Three detector density, compensated neutron, gamma ray,
List logs ran on wellbore temp., array induction, caliper
Did logs disclose vertical location of a coal seam? Yes no No ☒

Operations Name CNR - 23310
 Permit Number 4209

SURVEY RESULTS

DEPTH OF SURVEY	DIRECTION/DISTANCE/ DEGREES FROM TRUE VERTICAL	DEPTH OF SURVEY	DIRECTION/DISTANCE/ DEGREES FROM TRUE VERTICAL
200'	1/2°	1340'	1°
400'	1/2°	1550'	1°
518'	1/4°	1750'	1 1/2°
718'	1/4°	1950'	1 1/2°
920'	1/2°	2150'	1 1/2°
1140'	3/4°		

Use additional sheets as necessary

CASING AND TUBING PROGRAM

CONDUCTOR	CASING	CASING INTERVAL	HOLE SIZE	CEMENT USED IN CU/FT	CEMENTED TO SURFACE		DATE CEMENTED	PACKERS OR BRIDGE PLUGS KIND/SIZE/SET
					YES	NO		
	13-3/8"	25'	17"	Surface	Yes		6/15/99	N/A
SURFACE	9-5/8"	400'	12-1/4"	153	Yes		6/16/99	N/A
WATER PROTECTION	7"	2337'	8-3/4"	457	Yes		6/20/99	N/A
COAL PROTECTION	4-1/2"	6046'	6-1/4"	247	No		6/25/99	N/A

OTHER CASING AND
TUBING LEFT IN
WELL

LINERS

REMARKS: Shut down, fishing jobs, depths and dates, caving, lost circulation, etc.

DRILLER'S LOG

Compiled by Ed Rothman

GEOLOGIC AGE	FORMATION	GENERAL LITHOLGY	DEPTH		THICKNESS	REMARKS
			TOP	BOTTOM		
	Lee	siltstone & shale	0	316	316	
	Lee	sandstone	316	383	67	
P	Lee	siltstone & shale	383	1346	963	
E	Salt Sand (Lee)	sandstone	1346	1498	152	
N	Lee	siltstone & shale	1498	1876	378	
N	Salt Sand (Lee)	sandstone	1876	1924	48	
	Lee	siltstone & shale	1924	2050	126	
	Salt Sand (Lee)	sandstone	2050	2164	114	
	Pennington	siltstone & shale	2164	2870	706	
	Maxon	sandstone	2870	2904	34	
	Pennington	siltstone & shale	2904	3396	492	
	Maxon	sandstone	3396	3434	38	
	Pennington	siltstone & shale	3434	3674	240	
M	Little Lime	limestone	3674	3742	68	
I	Big Lime	limestone	3742	4264	522	
S	Pocono	shale	4264	4354	90	
S	Weir	siltstone	4354	4463	109	
	Pocono	shale	4463	4894	431	
	Sunbury	shale	4894	4916	22	
	Berea	sandstone	4916	4972	56	
	Cleveland	siltstone	4972	4996	24	
D	Devonian Shale	shale	4996	5760	764	
E	Lower Huron	shale	5760	5982	222	
V	Java	shale	5982	6093	111	
				LTD		

Permittee: Columbia Natural Resources, Inc. (Company)

By: James L. Risner (Signature)
3 of 3

550'

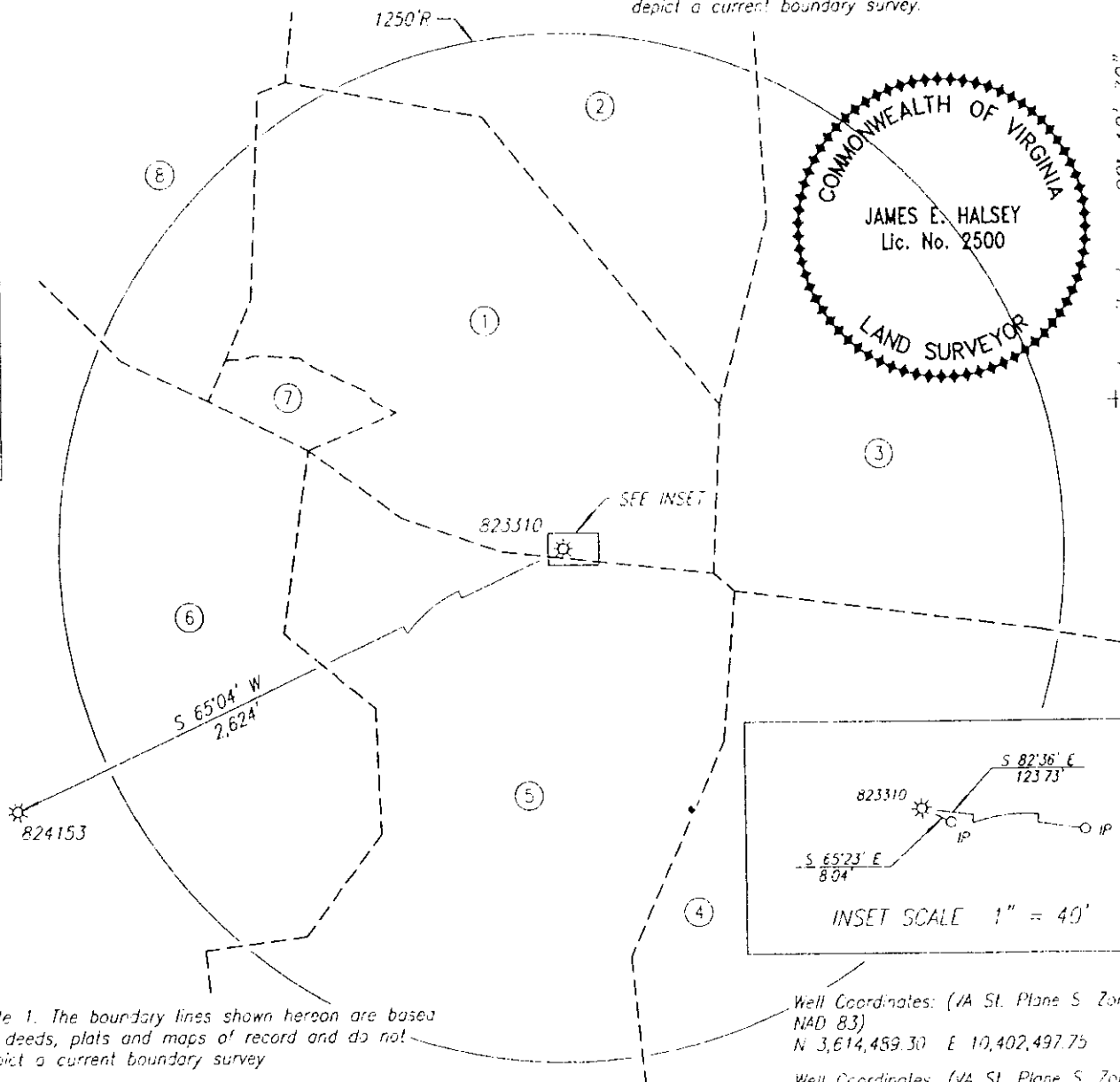
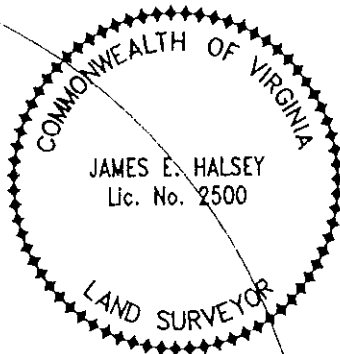
Well Coordinates: (Geographic N27)
37.191323° 82.210253°

Latitude 37° 12' 30"

The boundary lines shown hereon are based
on deeds, plats and maps of record and do not
depict a current boundary survey.

Longitude 82° 12' 30"

6,220'



Note 1: The boundary lines shown hereon are based
on deeds, plats and maps of record and do not
depict a current boundary survey

Note 2: The well will be drilled within 10' of
the permitted coordinates

Well elevation determined by GPS
survey from HARN Monument P-424

FINAL PLAT

Area of Unit - 112.69 Ac

Well Coordinates: (VA St. Plane S. Zone,
NAD 83)

N 3,614,459.30 E 10,402,497.75

Well Coordinates: (VA St. Plane S. Zone,
NAD 27 Calculated from NAD 83)

N 333,611.76 E 919,512.27

Well Coordinates: (Clinchfield Coal Co.)
N 33,270.75 E 50,512.69

WELL LOCATION PLAT

COMPANY Range Resources-Pine Mountain, Inc. WELL NAME AND NUMBER 823310
TRACT NO. Jerry Coleman, et al. ELEVATION 2,023.38 QUADRANGLE PRATER
COUNTY BUCHANAN DISTRICT PRATER SCALE 1" = 400' DATE 1-26-2011

This Plat is a new plat ; an updated plat ; or a final location plat

+ Denotes the location of a well on United States topographic Maps, scale 1 to
24,000, latitude and longitude lines being represented by border lines as shown.

James E. Halsey
Licensed Professional Engineer or Licensed Land Surveyor

823310 PLAT
TRACT OWNERSHIP INFORMATION SCHEDULE
1/26/2011

- | | |
|---|---|
| 1 . Lease No.
Jerry Coleman, et al - coal, oil & gas
32.4 Acres
Gas 20.88 Ac. 18.53% | 6 . Lease No.
Jno. Raines
105.89 Acres
Range Resources-Pine Mountain, Inc. - oil & gas
Gas 17.28 Ac. 15.33% |
| 2 . Lease No. 906889 / T-105
W.C. Owens
115.81 Acres
Range Resources-Pine Mountain, Inc. - oil & gas
Gas 9.66 Ac. 8.57% | 7 . Lease No.
Chesapeake Appalachia LLC - oil & gas
p/o 6 Acres
Gas 1.44 Ac. 1.28% |
| 3 . Lease No.
W.C. Owens
377.12 Acres
ACIN LLC - coal
Alpha Land & Reserves LLC - coal lessee
WBRD LLC - coal
Dickenson-Russell Coal company LLC - coal lessee
Range Resources-Pine Mountain, Inc. - oil & gas
Gas 18.63 Ac. 16.53% | 8 . Lease No.
B.E. Arrington
68.39 Acres
Range Resources-Pine Mountain, Inc. - oil & gas
Gas 3.00 Ac. 2.66% |
| 4 . Lease No.
S.M. Compton
125.66 Acres
ACIN LLC - coal
Alpha Land & Reserves LLC - coal lessee
WBRD LLC - coal
Dickenson-Russell Coal company LLC - coal lessee
Range Resources-Pine Mountain, Inc. - oil & gas
Gas 16.45 Ac. 14.60% | |
| 5 . Lease No.
S.M. Compton
111.88 Acres
ACIN LLC - coal
Alpha Land & Reserves LLC - coal lessee
WBRD LLC - coal
Paramount Coal Company - coal lessee
Range Resources-Pine Mountain, Inc. - oil & gas
Gas 25.35 Ac. 22.50% | |



Commonwealth of Virginia
Department of Mines, Minerals and Energy
Division of Gas and Oil
P.O. Box 1416
Abingdon, VA 24212
Telephone: (540) 676-5423

Operations Name CNR - 23310
Permit Number 4209

COMPLETION REPORT

WELL TYPE: OIL ☐ Gas ☒ Coalbed Methane ☐ Injection ☐

Date Well Completed 8/16/99 Total Depth 6093' LTD

Attach the Drilling Report, if not previously submitted. In addition, submit any changes in casing or tubing that were approved after the Drilling Report was submitted.

STIMULATION RECORD*

* Use additional sheets with this format, if more than three zones are stimulated

ZONE 1: Devonian Shale Formation Stimulated With 250 gal. 15% acid & 850,000 scf of N2
Perforated 5958 To 5834 No. of Perforations 14 Perforation Size .35
Formation Broke Down At: 3874 PSIG Average Injection Rate 46,871 scf/min
ISIP 2717 (PSIG) 5 MIN. SIP 2208 (PSIG) Average Downhole Injection Pressure 3417 (PSIG).
Stimulated ☒ Yes ☐ No Date Stimulated 8/10/99

ZONE 2: Berea Formation Stimulated With 250 gal. 15% acid & 1,400,000 scf of N2
Perforated 4951 To 4921 No. of Perforations 16 Perforation Size .35
Formation Broke Down At: 2647 PSIG Average Injection Rate 55,370 scf/min
ISIP 2198 (PSIG) 5 MIN. SIP 1668 (PSIG) Average Downhole Injection Pressure 3571 (PSIG).
Stimulated ☒ Yes ☐ No Date Stimulated 8/10/99

ZONE 3: _____ Formation Stimulated With _____
Perforated _____ To _____ No. of Perforations _____ Perforation Size _____
Formation Broke Down At: _____ PSIG Average Injection Rate _____
ISIP _____ (PSIG) _____ MIN. SIP _____ (PSIG) Average Downhole Injection Pressure _____ (PSIG).
Stimulated _____ Yes ☐ No ☐ Date Stimulated _____

FINAL PRODUCTION ☐ Natural ☒ After Stimulation

Unable to test zones separately due to stimulation technique.

BOD	MCFD	HOURS TESTED	ROCK PRESSURE	HOURS TESTED
-----	------	--------------	---------------	--------------

ZONE (1)

ZONE (2)

ZONE (3)

Final production if gas zones are comingled 606 MCFD 48 Hours Tested 450 PSIG 96 Hours Tested

Permittee Columbia Natural Resources (Company)

By James J. Rinn (Signature)

Date 10-29-99



Commonwealth of Virginia
Department of Mines, Minerals and Energy
Division of Gas and Oil
P.O. Box 1416
Abingdon, VA 24212
Telephone: (540) 676-5423

Operations Name CNR - 23605
Permit Number 4189

DRILLING REPORT

ATTACH A FINAL LOCATION PLAT AS REQUIRED BY 4 VAC 25-150-360.C.

DRILLING DATA

Date drilling commenced 07/16/99
Drilling Contractor S. W. Jack Drilling Co.
Date drilling completed 7/27/99 Rig Type X Rotary Cable Tool
Total Depth of Well 6190 LTD

GEOLOGICAL DATA

Fresh water at 975 Feet Damp GPM/Inch Stream Feet GPM/Inch Stream
 Feet GPM/Inch Stream Feet GPM/Inch Stream
Salt water at 3400 Feet Damp GPM/Inch Stream Feet GPM/Inch Stream
 Feet GPM/Inch Stream Feet GPM/Inch Stream

Coal Seams

<u>NAME</u>	<u>TOP</u>	<u>BOTTOM</u>	<u>THICKNESS</u>	<u>MINING IN AREA</u>		<u>MINED OUT</u>
				<u>YES</u>	<u>NO</u>	
Hagy	335	337	2	No		Yes

Gas and Oil Shows

<u>FORMATION</u>	<u>TOP</u>	<u>BOTTOM</u>	<u>THICKNESS</u>	<u>IPF</u> <u>(MCFD/BOPD)</u>	<u>PRESSURE</u>	<u>HOURS</u> <u>TESTED</u>
Big Lime	4009	4294	285	60 mcf/d	N/A	Unknown
Berea	5006	5040	36	43 mcf/d	N/A	Unknown

Cuttings or samples X are are not available for examination by a member of the Virginia Division of Mineral Resources
Cuttings or samples have have not X been furnished to the Virginia Division of Mineral Resources

ELECTRIC LOGS AND SURVEYS

List logs ran on wellbore Three detector density; compensated neutron; gamma ray; temp; array deduction; caliper
Did logs disclose vertical location of a coal seam? Yes No X

Operations Name CNR-23605
 Permit Number 4189

SURVEY RESULTS

DEPTH OF SURVEY	DIRECTION/DISTANCE/ DEGREES FROM TRUE VERTICAL	DEPTH OF SURVEY	DIRECTION/DISTANCE/ DEGREES FROM TRUE VERTICAL
200'	¼ degree	1460'	¼ degree
460'	¼ degree	1660'	¼ degree
660'	¾ degree	1860'	1 degree
860'	¾ degree	2060'	1 ¼ degree
1060'	½ degree	2480'	1 ¼ degree
1260'	½ degree		

Use additional sheets as necessary

CASING AND TUBING PROGRAM

CONDUCTOR	CASING 13-3/8"	CASING INTERVAL 45'	HOLE SIZE 17-1/2"	CEMENT USED IN CU/FT 24	CEMENTED TO SURFACE YES NO Yes	DATE CEMENTED 7-16-99	PACKERS OR BRIDGE PLUGS KIND/SIZE/SET N/A
SURFACE	9-5/8"	406'	12-1/4"	155	Yes	7-17-99	N/A
WATER PROTECTION	7"	2443'	8-3/4"	433	Yes	7-20-99	N/A
COAL PROTECTION	4-1/2"	6136'	6-1/4"	178	No	7-27-99	N/A
OTHER CASING AND TUBING LEFT IN WELL	N/A						
LINERS	N/A						

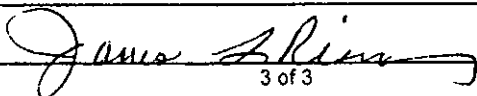
REMARKS: Shut down, fishing jobs, depths and dates, caving, lost circulation, etc.

DRILLER'S LOG

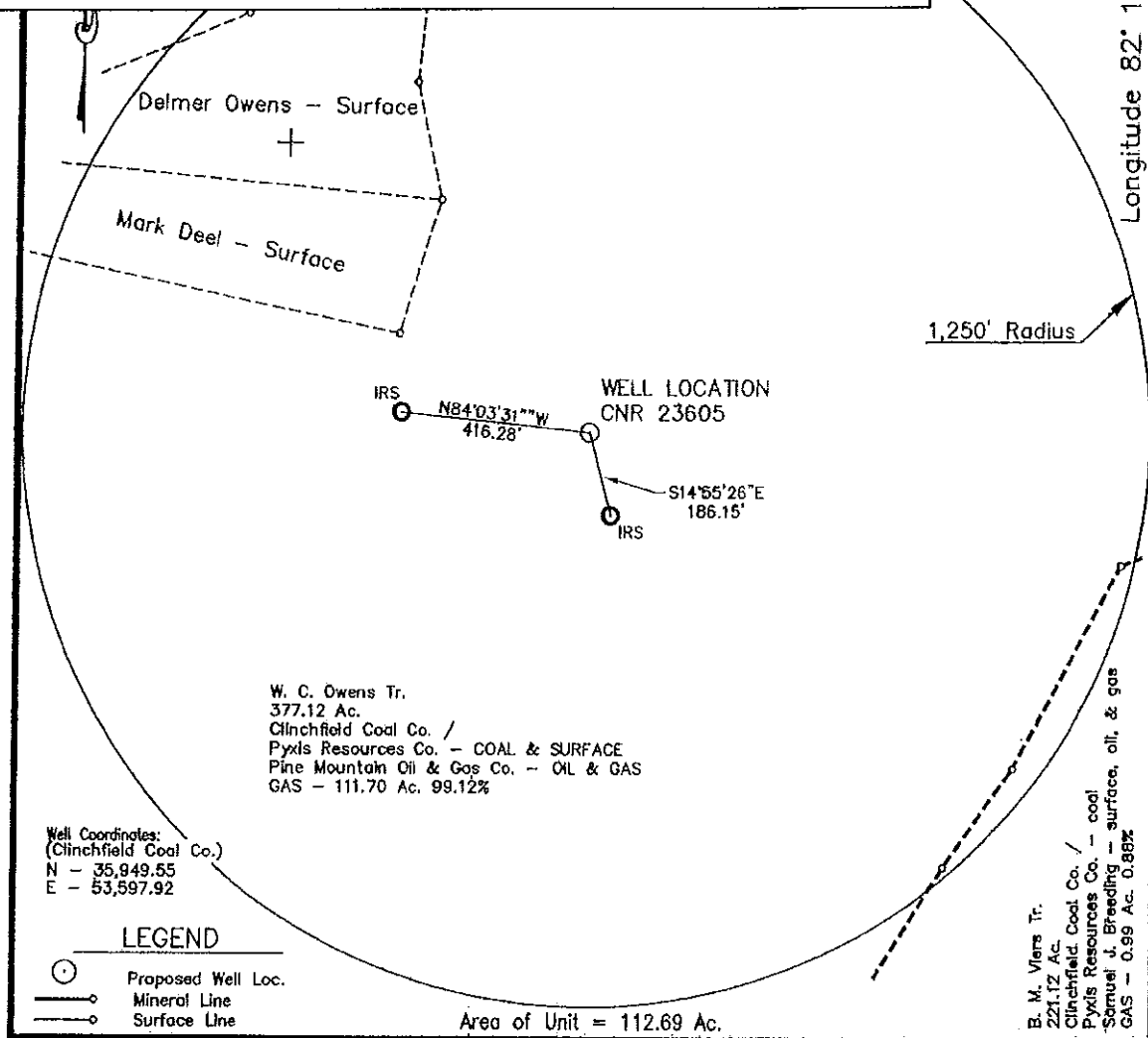
Compiled by Ed Rothman

GEOLOGIC AGE	FORMATION	GENERAL LITHOLGY	DEPTH		THICKNESS	REMARKS
			TOP	BOTTOM		
P	Lee	siltstone & shale	0	1362	1362	
E	Salt Sand (Lee)	sandstone	1362	1500	138	
N	Lee	siltstone & shale	1500	2054	554	
N	Salt Sand (Lee)	sandstone	2054	2204	150	
	Pennington	siltstone & shale	2204	2903	699	
	Maxon	sandstone	2903	2942	39	
	Pennington	siltstone & shale	2942	3234	292	
	Maxon	sandstone	3234	3262	28	
	Pennington	siltstone & shale	3262	3527	265	
M	Maxon	sandstone	3527	3566	39	
I	Pennington	siltstone & shale	3566	3900	334	
S	Little Lime	limestone	3900	4009	109	
S	Big Lime	limestone	4009	4294	285	
	Pocono	shale	4294	4462	168	
	Weir	siltstone	4462	4540	78	
	Pocono	shale	4540	4986	446	
	Sunbury	shale	4986	5006	20	
	Berea	sandstone	5006	5040	34	
	Cleveland	siltstone	5040	5054	14	
D	Devonian Shale	shale	5054	5840	786	
E	Lower Huron	shale	5840	6064	224	
V	Java	shale	6064	6176	112	
				LTD		

Permittee: Columbia Natural Resources, Inc. (Company)

By:  (Signature)

Range Resources - Pine Mountain, Inc. certifies that, to the best of its knowledge, information and belief, the original plat by G. Mullins is correct and accurate "as-drilled" but for the change of operator name. Range Resources - Pine Mountain, is the new operator of the asset and accepts and assumes any and all regulatory and statutory liability attached thereto with the transfer of the this permit.



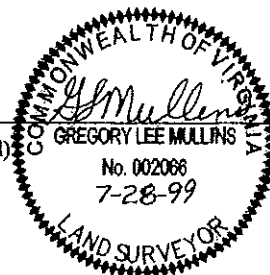
WELL LOCATION PLAT

COMPANY: Columbia Natural Resources, Inc. WELL NAME OR NUMBER: 23605 Bu-1613
TRACT NUMBER: W. C. Owens QUADRANGLE: Prater
DISTRICT: Prater
WELL COORDINATES (VIRGINIA STATE PLANE): N - 336,170 E - 922,697
ELEVATION: 2,094.58 METHOD USED TO DETERMINE ELEVATION:
Trigonometric Leveling from Deel Monument

COUNTY: Buchanan SCALE: 1" = 400' DATE: 07-28-1999
THIS PLAT IS A NEW PLAT ; AN UPDATED PLAT ; OR A FINAL LOCATION PLAT X

+ Denotes the location of a well on United States Topographic Maps, scale 1 to 24,000, latitude and longitude lines being represented by border lines as shown (optional).

Licensed Land Surveyor (Affix Seal)





Commonwealth of Virginia
Department of Mines, Minerals and Energy
Division of Gas and Oil
P.O. Box 1416
Abingdon, VA 24212
Telephone: (540) 676-5423

Operations Name CNR - 23605
Permit Number 4189

COMPLETION REPORT

WELL TYPE: OIL ☐ Gas ☒ Coalbed Methane ☐ Injection ☐

Date Well Completed 8-23-99 Total Depth 6058/PBTD

Attach the Drilling Report, if not previously submitted. In addition, submit any changes in casing or tubing that were approved after the Drilling Report was submitted.

STIMULATION RECORD*

* Use additional sheets with this format, if more than three zones are stimulated

ZONE 1: Devonian Shale Formation Stimulated With 250 gal 15% HCl acid & 850,000 scf of N2

Perforated 5572 To 6060 No. of Perforations 18 Perforation Size .35
Formation Broke Down At: 4009 PSIG Average Injection Rate 30,000 scf/min
ISIP 3296 (PSIG) 5 MIN. SIP 2493 (PSIG) Average Downhole Injection Pressure 3565 (PSIG).
Stimulated ☒ Yes ☐ No Date Stimulated 8-16-99

ZONE 2: Berea Formation Stimulated With 250 gal 15% HCl & 1,400,000 of scf N2

Perforated 5026 To 5134 No. of Perforations 20 Perforation Size .35
Formation Broke Down At: 3051 PSIG Average Injection Rate 63,300 scf/min
ISIP 2150 (PSIG) 5 MIN. SIP 1966 (PSIG) Average Downhole Injection Pressure 3504 (PSIG).
Stimulated ☒ Yes ☐ No Date Stimulated 08/16/99

ZONE 3: _____ Formation Stimulated With _____

Perforated _____ To _____ No. of Perforations _____ Perforation Size _____
Formation Broke Down At: _____ PSIG Average Injection Rate _____
ISIP _____ (PSIG) _____ MIN. SIP _____ (PSIG) Average Downhole Injection Pressure _____ (PSIG).
Stimulated ☐ Yes ☐ No Date Stimulated _____

FINAL PRODUCTION ☐ Natural ☒ After Stimulation

The stimulation method used did not allow for testing of separate zones.

	BOD	MCFD	HOURS TESTED	ROCK PRESSURE	HOURS TESTED
ZONE (1)					
ZONE (2)					
ZONE (3)					

Final production if gas zones are comingled 350 MCFD 72 Hours Tested 815 PSIG 96 Hours Tested

Permittee Columbia Natural Resources, Inc. (Company)

By James S. Rine (Signature)

Date 11-16-99



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Drawer 159, Lebanon, VA 24266
Telephone: (276) 415-9650

Tracking Number: 2731
Company: Range Resources-Pine Mountain
File Number: BU-1613
Completion Report Type: Drill Deeper Recompletion

COMPLETION REPORT (DGO-GO-15)

Well Type:	Gas/Pipeline	Date Well Completed:	8/25/2010
Driller's Total Depth:		Log's Total Depth:	

1. Changes In Casing/Tubing from Approved Drilling Report

Description	FileName
Casing	Casing.xls

2. Stimulation Record

Stimulation Status: ☒ Stimulated ☐ GOB ☐ Not Stimulated ☐ Service Well

Description	FileName
Stimulation Record	823605 Stimulation.doc

3. Final Production

Description	FileName
Final Production	Final_Prod.xls

4. Comments

Notes:

5. Signature

Permittee: Range Resources-Pine Mountain Date: 4/28/2011 (Company)

By: Laura Murray Title: Permit Specialist (Signature)

INTERNAL USE ONLY

Submit Date: 4/28/2011

Status: Approved

Date: 3/5/2012

Final PDF Date: 3/6/2012

Casing Program

Casing Type	Casing Size	Casing Interval	Hole Size	Cement Used in Cubic Ft	Cemented To Surface Yes/No	Date Cemented	Packers Or Bridge Plugs Kind/Size/Set	Cement Baskets (ft)
Conductor	13 3/8"	0-45'	15"					
Water Protection	9 5/8"	0-406'	12 1/4"					
Coal Protection	7"	0-2443'	8 7/8"					
Production Casing	4 1/2"	0-6126'	6 1/4"	250 ft ³	No	08/17/10		
Other Casing And Tubing Left In Well	2 3/8"	0-6118'						
Liners								

STIMULATION RECORD

ZONE 1: Big Lime Formation Stimulated With: 60Q Foam
Perforated 4042 to 4158 feet No. of Perforations 29 Perforation Size .52
Formation Broke down at: 2980 PSIG Average Injection Rate: 24.5 BPM
ISIP 0 PSIG 2 Min SIP 0 PSIG Average Downhole Injection Pressure 3061 PSIG
Stimulated: ☒ Yes ☐ No Date Stimulated: 8/25/2010

ZONE 2: Maxton Formation Stimulated With: 75Q Foam
Perforated 3661 to 3675 feet No. of Perforations 29 Perforation Size .42
Formation Broke down at: 2776 PSIG Average Injection Rate: 36.5 BPM
ISIP 2144 PSIG 2 Min SIP 0 PSIG Average Downhole Injection Pressure 2482 PSIG
Stimulated: ☒ Yes ☐ No Date Stimulated: 8/25/2010

ZONE 3: Ravencliff Formation Stimulated With: 75Q Foam
Perforated 2905 to 2944 feet No. of Perforations 30 Perforation Size .42
Formation Broke down at: 2560 PSIG Average Injection Rate: 38 BPM
ISIP 1761 PSIG 2 Min SIP 1719 PSIG Average Downhole Injection Pressure 2788 PSIG
Stimulated: ☒ Yes ☐ No Date Stimulated: 8/25/2010

Final Production After Stimulation				
	BOD	MCFD	Hours Tested	Rock Pressure
Zone 1				
Zone 2				
Zone 3				
Final/Commingled Zones		N/A		



Commonwealth of Virginia
Department of Mines, Minerals and Energy
Division of Gas and Oil
P.O. Box 1416
Abingdon, VA 24212
Telephone: (540) 676-5423

Operations Name CNR Well # 24153
Permit Number 4602

DRILLING REPORT

ATTACH A FINAL LOCATION PLAT AS REQUIRED BY 4 VAC 25-150-360.C.

DRILLING DATA

Date drilling commenced 6/17/2000
Drilling Contractor S.W. Jack Drilling Co. Rig #18
Date drilling completed 6/27/2000 Rig Type X Rotary Cable Tool
Total Depth of Well DTD: 5995 LTD: 5990

GEOLOGICAL DATA

Fresh water at 80 Feet Damp GPM/Inch Stream 650 Feet Damp
GPM/Inch Stream

 Feet GPM/Inch Stream Feet
GPM/Inch Stream

Salt water at Feet GPM/Inch Stream Feet
GPM/Inch Stream

 Feet GPM/Inch Stream Feet
GPM/Inch Stream

Coal Seams	NAME	TOP	BOTTOM	THICKNESS	MINING IN AREA YES NO	MINED OUT
------------	------	-----	--------	-----------	--------------------------	-----------

Gas and Oil Shows	FORMATION	TOP	BOTTOM	THICKNESS	IPF (MCFD/BOPD)	PRESSURE	HOURS TESTED
	Ravencliff, Maxon , & Big Lime	2350	4050	1700	853	700	192

Cuttings or samples are X are not available for examination by a member of the Virginia Division of Mineral Resources

Cuttings or samples have have not X been furnished to the Virginia Division of Mineral Resources

ELECTRIC LOGS AND SURVEYS

List logs ran on wellbore

Gamma Ray, Lithodensity, Compensated Neutron, Dual Induction, Audio, and Temperature

Did logs disclose vertical location of a coal seam? Yes No X

Form DGO-GO-14
Rev. 10/96

Operations Name CNR Well #24153

Permit Number 4602

SURVEY RESULTS

DEPTH OF SURVEY	DIRECTION/DISTANCE/ DEGREES FROM TRUE	DEPTH OF SURVEY	DIRECTION/DISTANCE/ DEGREES FROM TRUE
200	VERTICAL	1200	VERTICAL
400	¼ Degree	1400	¼ Degree
600	1 Degree	1600	¼ Degree
800	¼ Degree	1800	¼ Degree
1000	½ Degree	2000	1 Degree

Use additional sheets as necessary

CASING AND TUBING PROGRAM

CONDUCTOR	CASING	CASING INTERVAL	HOLE SIZE	CEMENT USED IN CU/FT	CEMENTED TO SURFACE		DATE CEMENTED	PACKE BRIDGE KIND/SI
					YES	NO		
	13 3/8"	45' KB	17 1/2"	N/A				
SURFACE	9 5/8"	317' KB	12 3/8"	142	Yes		6/18/2000	

WATER PROTECTION

COAL PROTECTION	7"	2130' KB	8 1/4"	417	Yes		6/21/2000	
OTHER CASING AND TUBING LEFT IN WELL	4 1/2"	5936' KB	6 1/4"	189	No		6/27/2000	

LINERS

REMARKS: Shut down, fishing jobs, depths and dates, caving, lost circulation, etc.

Operations Name CNR Well #24153
 Permit Number 4602

DRILLER'S LOG

Compiled by Jason Stidham

GEOLOGIC AGE	FORMATION	GENERAL LITHOLOGY	COLOR	DEPTH		THICKNESS	REM
				TOP	BOTTOM		
Penn	Lee	Shale & Siltstone		0	1258	1258	
Penn	Salt Sand (Lee)	Sandstone		1258	1396	138	
Penn	Lee	Shale & Siltstone		1396	1530	134	
Penn	Salt Sand (Lee)	Sandstone		1530	1574	44	
Penn	Lee	Shale & Siltstone		1574	1600	26	
Penn	Salt Sand (Lee)	Sandstone		1600	1640	40	
Penn	Lee	Shale & Siltstone		1640	1660	20	
Penn	Salt Sand (Lee)	Sandstone		1660	1720	60	
Penn	Lee	Shale & Siltstone		1720	1750	30	
Penn	Salt Sand (Lee)	Sandstone		1750	1880	130	
Penn	Lee	Shale & Siltstone		1880	1934	54	
Penn	Salt Sand (Lee)	Sandstone		1934	2054	120	
Miss	Pennington	Shale & Siltstone		2054	2322	268	
Miss	Ravenclyff	Sandstone		2322	2376	54	
Miss	Pennington	Shale & Siltstone		2376	2484	108	
Miss	Maxon	Sandstone		2484	2518	34	
Miss	Pennington	Shale & Siltstone		2518	2754	236	
Miss	Maxon	Sandstone		2754	2800	46	
Miss	Pennington	Shale & Siltstone		2800	3072	272	
Miss	Maxon	Sandstone		3072	3134	62	
Miss	Pennington	Shale & Siltstone		3134	3362	228	
Miss	Maxon	Sandstone		3362	3378	16	
Miss	Pennington	Shale & Siltstone		3378	3484	106	
Miss	Maxon	Sandstone		3484	3506	22	
Miss	Pennington	Shale & Siltstone		3506	3560	54	
Miss	Little Lime	Limestone		3560	3612	52	
Miss	Big Lime	Limestone		3612	4150	538	
Miss	Pocono	Shale		4150	4252	102	
Miss	Weir	Siltstone		4252	4360	108	
Miss	Pocono	Shale		4360	4792	432	
Miss	Sunbury	Shale		4792	4810	18	
Miss	Berea	Sandstone		4810	4880	70	
Dev	Devonian Shale	Shale		4880	5672	862	
Dev	Lower Huron	Shale		5672	5872	200	
Dev	Java	Shale		5872	5990	118	

Permittee: Columbia Natural Resources, Inc. (Company)

By: _____ (Signature)

Form DGO-GO-14
 Rev. 10/96



Commonwealth of Virginia
Department of Mines, Minerals and Energy
Division of Gas and Oil
P.O. Box 1416
Abingdon, VA 24212
Telephone: (540) 676-5423

Operations Name CNR Well # 24153
Permit Number 4602

COMPLETION REPORT

WELL TYPE: OIL ☐ Gas ☒ Coalbed Methane ☐ Injection ☐

Date Well Completed July 18, 2000 Total Depth DTD: 5995 LTD: 5995

Attach the Drilling Report, if not previously submitted. In addition, submit any changes in casing or tubing that were approved after the Drilling Report was submitted.

STIMULATION RECORD*

* Use additional sheets with this format, if more than three zones are stimulated

ZONE 1: Devonian Shale Formation Stimulated with 250 gal 7 1/2% HCl, 1,113,700 SCF N2

Perforated 5606 To 5872 No. of Perforations 20 Perforation Size 0.38"
ISIP 2479 (PSIG) 5 MIN. SIP 2288 (PSIG) Average Downhole Injection Pressure 3870 (PSIG)
Stimulated ☒ Yes ☐ No Date Stimulated 7/10/2000

ZONE 2: Berea Formation Stimulated with 250 gal 7 1/2% HCl, 1,120,000 SCF N2

Perforated 4816 To 4872 No. of Perforations 20 Perforation Size 0.38"
ISIP 1884 (PSIG) 5 MIN. SIP 1825 (PSIG) Average Downhole Injection Pressure 3830 (PSIG)
Stimulated ☒ Yes ☐ No Date Stimulated 7/10/2000

ZONE 3: _____ Formation Stimulated with _____

Perforated _____ To _____ No. of Perforations _____ Perforation Size _____
ISIP _____ (PSIG) _____ MIN. SIP _____ (PSIG) Average Downhole Injection Pressure _____ (PSIG)
Stimulated ☐ Yes ☐ No Date Stimulated _____

FINAL PRODUCTION ☐ Natural ☒ After Stimulation

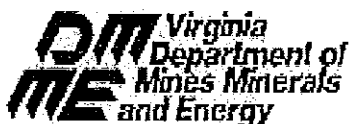
	BOD	MCFD	HOURS TESTED	ROCK PRESSURE	HOURS TESTED
ZONE (1)	Devonian Shale	428	72	340	120
	Berea				
ZONE (2)	Big Lime, Maxon, And Ravencliff	853	24	700	192
ZONE (3)					

Final production if gas zones are comingled _____ MCFD _____ Hours Tested _____ PSIG _____ Hours Tested

Permittee Columbia Natural Resources, Inc (Company)

By _____ (Signature)

Date _____



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Box 1416; Abingdon, VA 24212
Telephone: (276) 676-5423

Tracking Number: 774
Company: Chesapeake Appalachia, LLC
File Number: BU-3349
Operations Name: 824155 (HY-37) W/PL
Operation Type: Gas/Pipeline
Drilling Report Type: Original

DRILLING REPORT (DGO-GO-14)

1. Drilling Data

Date drilling commenced: 5/30/2007 Drilling Contractor: S.W. Jack Drilling
Date drilling completed: 6/9/2007 Rig Type: ☒ Rotary ☐ Cable Tool
Driller's Total Depth (feet): 6,625
Log Total Depth (feet): 6,630 Formation At Total Depth Onandoga

2. Final Location Plat (as required by 4 VAC25-150-360.C.)

Permitted State Plane X: 922,416 Final Plat State Plane X: 922,417
Permitted State Plane Y: 333,319 Final Plat State Plane Y: 333,318

☐ Plat Previously Submitted Or...

List of Attached Items:

Description	FileName
Final Plat Well #824155	Final Plat 824155.tif

3. Geological Data

Fresh Water At:

Depth (In feet)	Rate	Unit of Measure
30	Damp	

Salt Water At:

Depth (in feet)	Rate	Unit of Measure
1,316	Damp	

Coal Seams

List of Attached Items:

Description	FileName
Coal Seams Well #824155	CoalBeds 824155.xls

Gas and Oil Shows

List of Attached Items:

Description	FileName
-------------	----------

4. Electric Logs (As required by 4VAC25-150-280.A.)

List all logs run: GR,CNL,DLT,SIB,TEMP,AUDIO

Did logs disclose vertical locations of a coal seam? ☒ Yes ☐ No

5. Survey Results (As required by 4VAC25-150-280.B.2)

List of Attached Items:

Description	FileName
Survey Results Well #824155	Survey Results 824155.xls

6. Casing and Tubing Program

List of Attached Items:

Description	FileName
Casing Program Well #824155	Casing Program 824155.xls

7. Remarks

Use this space to note any conditions or occurrences, such as lost circulation, fishing jobs, junk left in hole, sidetracks, squeeze jobs, etc., not shown above. Include data and depth of condition/occurrence.

8. Drillers Log

Compiled By: Chad L Satterfield

List of Attached Items:

Description	FileName
Drillers Log Well #824155	DrillersLog 824155.xls

9. Comments

10. Signature

Permitee: Chesapeake Appalachia, LLC Date: 10/19/2007 (Company)

Signed By: Chad L Satterfield Title: Drilling Engineer (Signature)

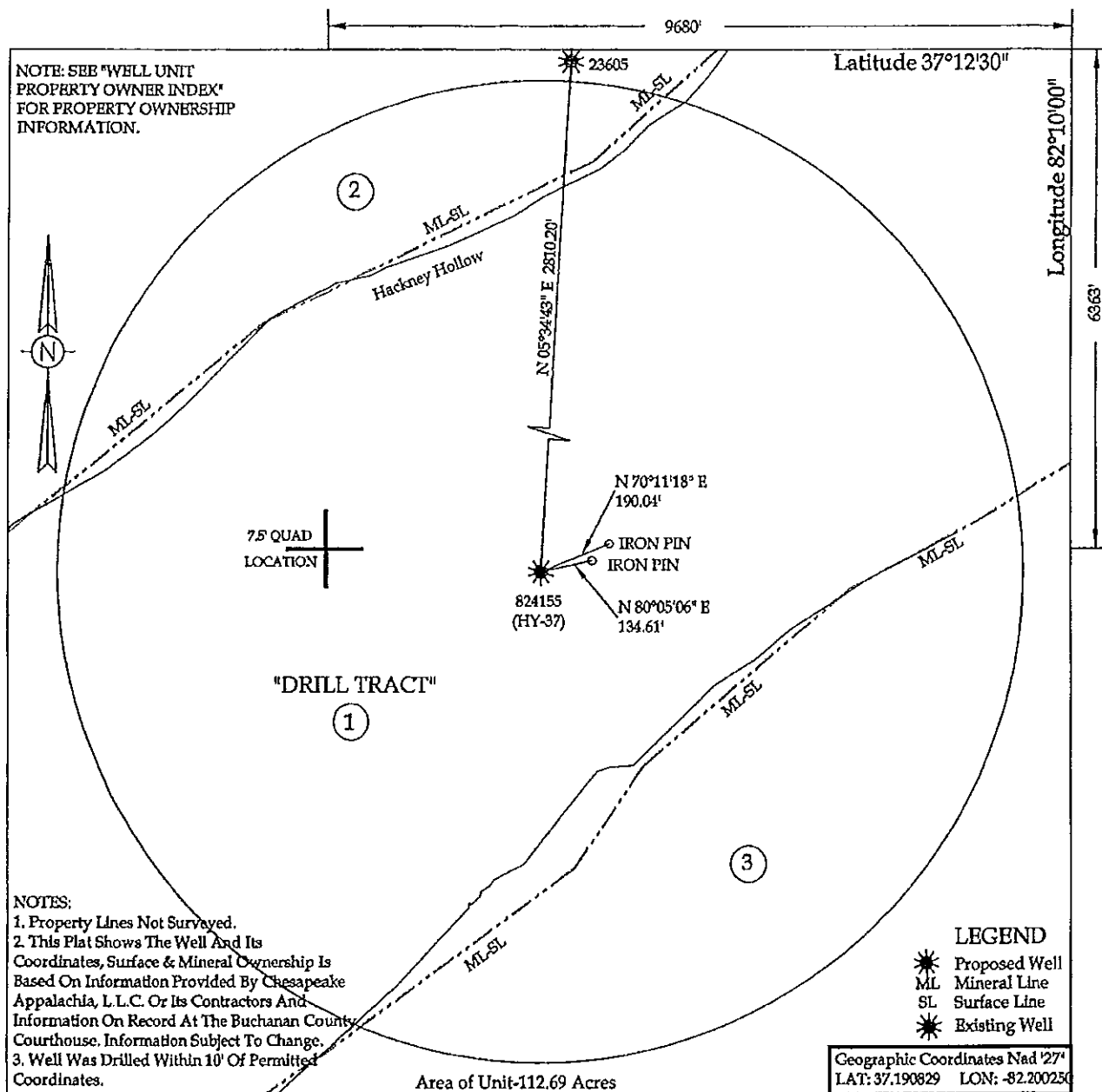
INTERNAL USE ONLY

Submit Date: 10/19/2007

Status: Inspr Approved

Date: 10/23/2007

Final PDF Date: 10/23/2007



WELL LOCATION PLAT

Company Chesapeake Appalachia, LLC Well Name or Number 824155 (HY-37)

Tract No. Samuel J. Breeding, Jr. (218.98 Ac. Tract) Quadrangle Prater

District Prater

Well Coordinates (Virginia State Plane) N 333,317.97 E 922,416.69

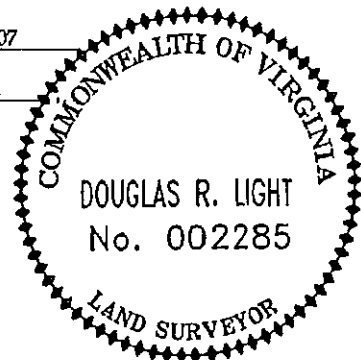
Elevation: 2002.25 Method Used to Determine Elevation: Trig. Levels from GPS derived elevation.

County Buchanan Scale: 1" = 400' Date 6-21-07

This Plat is a new plat _____; an updated plat _____; or a final location plat X

+ Denotes the location of a well on United States topographic maps, scale 1 to 24,000, latitude and longitude lines being represented by border lines as shown.

Douglas R. Light
 Licensed Professional Engineer or Licensed Land Surveyor



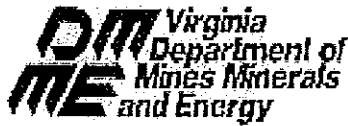
Well 824155 COAL BEDS				MINING IN AREA		
NAME	TOP	BOTTOM	THICKNESS	YES	NO	MINED OUT
Unknown	650	652	2		X	No
Unknown	780	782	2		X	No
Unknown	870	872	2		X	No
Unknown	972	974	2		X	No
Unknown	1012	1014	2		X	No

Well 824155 SURVEY RESULTS

Depth of Survey	Direction/Distance/Degree From True Vertical
200	1/4 degree
414	1/4 degree
626	1/4 degree
845	1/4 degree
1064	1/4 degree
1251	1/4 degree
1689	1/4 degree
1876	1/4 degree
2064	1/4 degree

Well 824155 CASING PROGRAM							
Casing Type	Casing Size	Casing Interval	Hole Size	Cement Used In Cubic Feet	Cemented To Surface Yes/No	Date Cemented	Packers Or Bridge Plugs
Conductor	13-3/8"	30'KB	17 1/2"	Driven			
Surface	9-5/8"	451'KB	12-3/8"	295	Yes	5/31/2007	Grout basket at 98'KB
Intermediate	7"	2217'KB	8-7/8"	465.5	Yes	6/3/2007	Grout basket at 98'KB
Production	4-1/2"	6602'KB	6-1/4"	391	No	6/9/2007	

Well#24155DRILLER'S LOG		Geological Age		Formation		General Lithology		Color		Depth		Depth		Thickness		Remarks	
										Top		Bottom					
Penn		Lee				Siltstone & Shale/Coal				0		1234		1234			
Penn		Salt Sand				Sandstone				1234		2082		848			
Miss		Pennington				Siltstone & Shale				2082		2542		460			
Miss		Ravenc Cliff				Sandstone				2542		2564		22			
Miss		Pennington				Siltstone & Shale				2564		2820		256			
Miss		Upper Maxon				Sandstone				2820		2862		42			
Miss		Pennington				Siltstone & Shale				2862		3084		222			
Miss		Middle Maxon				Sandstone				3084		3184		100			
Miss		Pennington				Siltstone & Shale				3184		3364		180			
Miss		Lower Maxon				Sandstone				3364		3496		132			
Miss		Pennington				Siltstone & Shale				3496		3547		51			
Miss		Bradley				Sandstone				3547		3593		46			
Miss		Pennington				Siltstone & Shale				3593		3646		53			
Miss		Little Lime				Limestone				3646		3692		46			
Miss		Big Lime				Limestone				3692		4254		562			
Miss		Pennington				Siltstone & Shale				4254		4418		164			
Miss		Weir				Sandstone				4418		4473		55			
Miss		Pocono				Shale				4473		4919		446			
Miss		Sunbury				Shale				4919		4940		21			
Miss		Berea				Sandstone				4940		4985		45			
Devonian		Devonian				Shale				4985		5810		825			
Devonian		Lower Huron				Shale				5810		6038		228			
Devonian		Java				Shale				6038		6135		97			
Devonian		Angola				Shale				6135		6202		67			
Devonian		Rhinestreet				Shale				6202		6526		324			
Devonian		Marcellus				Shale				6526		6537		11			
Devonian		Onondaga				Limestone				6537		6630		93			



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Box 1416; Abingdon, VA 24212
Telephone: (276) 676-5423

Tracking Number: 686
Company: Chesapeake Appalachia, LLC
File Number: BU-3349
Operations Name: 824155 (HY-37) W/PL
Operation Type: Gas/Pipeline
Completion Report Type: Original

COMPLETION REPORT (DGO-GO-15)

Well Type:	Gas/Pipeline	Date Well Completed:	7/4/2007
Driller's Total Depth:	6,625	Log's Total Depth:	6,630

1. Changes In Casing/Tubing from Approved Drilling Report

Description	FileName
-------------	----------

2. Stimulation Record

☒ Stimulated ☐ Not Stimulated ☐ Gob

Description	FileName
Stimulation Record Well #824155	Stimulation Record 824155.doc

3. Final Production

Description	FileName
Final Production Well #824155	FinalProduction 824155.xls

4. Comments

Notes:

5. Signature

Permittee: Chesapeake Appalachia, LLC Date: 10/19/2007 2:47:06 PM (Company)

By: Chad L Satterfield Title: Drilling Engineer (Signature)

INTERNAL USE ONLY

Submit Date: 10/19/2007

Status: Inspr Approved

Date: 10/23/2007

Final PDF Date: 10/23/2007

Stimulation Record Well 824155

Zone 1

Name Marcellus/Rhinestreet

Formation Stimulated With: Nitrogen

Perforated from 6205' to 6530'

Number of Perforations 60

Perforation Size .44

Formation Broke Down at 4220 (PSIG)

Average Injection Rate 41,322 (SCFM)

ISIP: 3492 PSIG 5 Min SIP 3110 PSIG

Average Treating Pressure 1346 PSIG

Stimulated Yes Date 06/22/2007

Zone 2

Name Lower Huron

Formation Stimulated With: Nitrogen

Perforated from 5698' to 6024'

Number of Perforations 60

Perforation Size .44

Formation Broke Down at 4069 (PSIG)

Average Injection Rate 74,812 (SCFM)

ISIP: 2936 (PSIG) 5 Min SIP 2699 (PSIG)

Average Treating Pressure 4184 (PSIG)

Stimulated Yes Date 06/22/2007

Zone 3

Name: Big Lime

Formation Stimulated With: 65% Quality Foam

Perforated from 4229' to 4239'

Number of Perforations 31

Perforation Size .44

Formation Broke Down at 3695 (PSIG)

Average Injection Rate 15(BPM)

ISIP: 2688 (PSIG) 5 Min SIP 2270 (PSIG)

Average Treating Pressure 2728 (PSIG)

Stimulated Yes Date 06/22/2007

Well 824155 FINAL PRODUCTION

Final Production After Stimulation					
	BOD	MCFD	Hours Tested	Rock Pressure	Hours Tested
Zone 1					
Zone 2					
Zone 3					
Final/Commingled Zones		561	48	1007 psig	192



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Box 1416; Abingdon, VA 24212
Telephone: (276) 676-5423

Tracking Number: 920
Company: Chesapeake Appalachia, LLC
File Number: BU-3396
Operations Name: 826203 (HY-145) W/PL
Operation Type: Gas/Pipeline
Drilling Report Type: Original

DRILLING REPORT (DGO-GO-14)

1. Drilling Data

Date drilling commenced: 8/3/2007 Drilling Contractor: S.W. Jack Drilling
Date drilling completed: 8/18/2007 Rig Type: ☒ Rotary ☐ Cable Tool
Driller's Total Depth (feet): 6,720
Log Total Depth (feet): 6,728 Formation At Total Depth Onandoga

2. Final Location Plat (as required by 4 VAC25-150-360.C.)

Permitted State Plane X 925,002 Final Plat State Plane X: 925,002
Permitted State Plane Y: 334,559 Final Plat State Plane Y: 334,559

☐ Plat Previously Submitted Or...

List of Attached Items:

Description	FileName
Final Plat Well #826203	Final Plat 826203.pdf

3. Geological Data

Fresh Water At:

Depth (in feet)	Rate	Unit of Measure
446	Damp	
46	Damp	

Salt Water At:

Depth (in feet)	Rate	Unit of Measure
2,015	Damp	

Coal Seams

List of Attached Items:

Description	FileName
Coal Seams Well #826203	CoalBeds 826203.xls

Gas and Oil Shows

List of Attached Items:

Description	FileName
-------------	----------

4. Electric Logs (As required by 4VAC25-150-280.A.)

List all logs run: GR,CNL,LDT,SIB,TEMP,AUDIO

Did logs disclose vertical locations of a coal seam? ☒ Yes ☐ No

5. Survey Results (As required by 4VAC25-150-280.B.2)

List of Attached Items:

Description	FileName
Survey Results Well #826203	Survey Results 826203.xls

6. Casing and Tubing Program

List of Attached Items:

Description	FileName
Casing Program Well # 826203	Casing Program 826203.xls

7. Remarks

Use this space to note any conditions or occurrences, such as lost circulation, fishing jobs, junk left in hole, sidetracks, squeeze jobs, etc., not shown above. Include data and depth of condition/occurrence.

9 5/8" Job: Job locked up into displacement of the plug, grouted back to surface w/ 25 sks Class A cement

8. Drillers Log

Compiled By: Chad L Satterfield

List of Attached Items:

Description	FileName
Drillers Log Well # 826203	DrillersLog 826203.xls

9. Comments

10. Signature

Permitee: Chesapeake Appalachia, LLC Date: 12/11/2007 (Company)

Signed By: Chad L. Satterfield Title: Drilling Engineer (Signature)

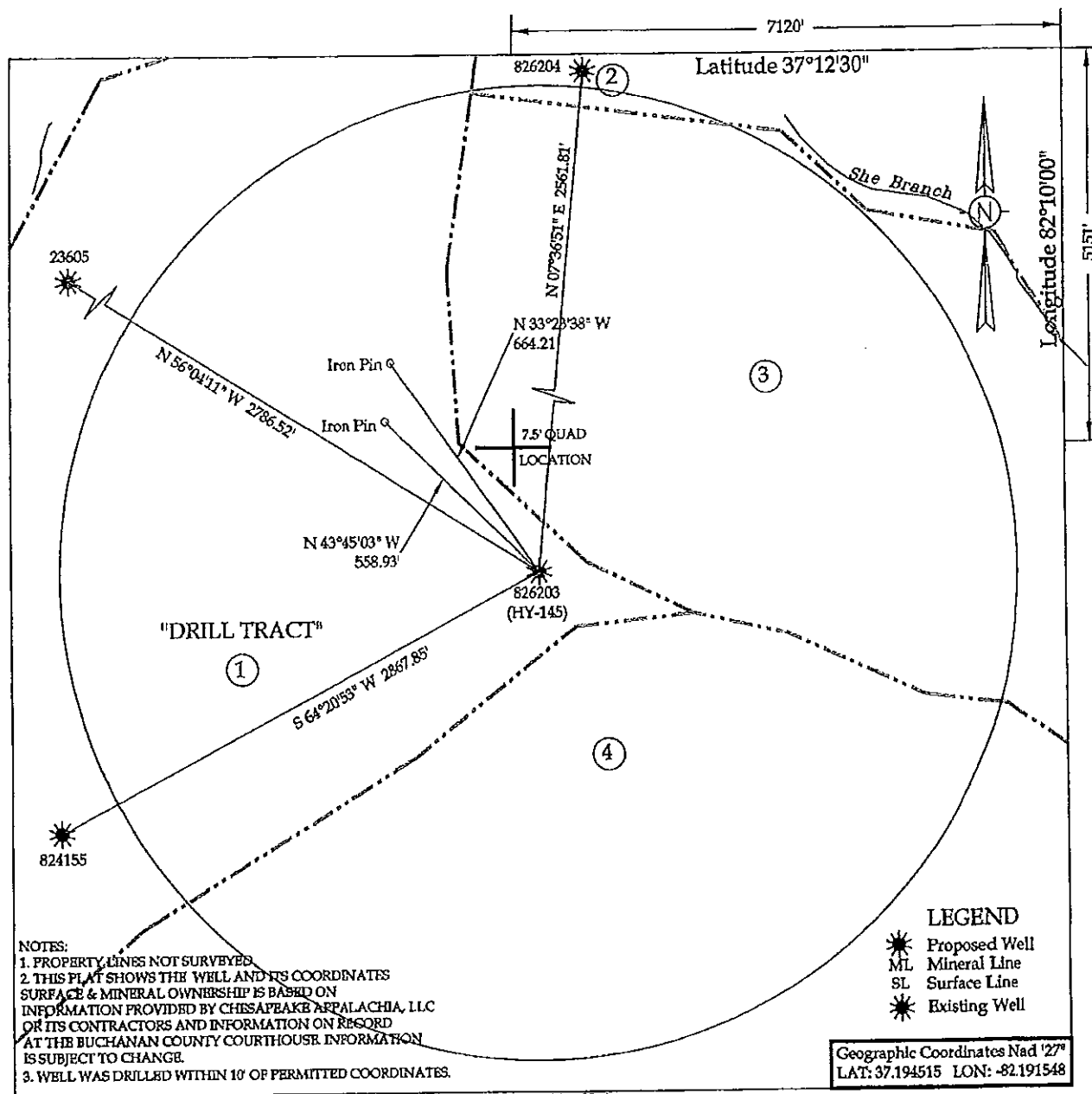
INTERNAL USE ONLY

Submit Date: 12/11/2007

Status: Inspr Approved

Date: 12/11/2007

Final PDF Date: 12/12/2007



Area of Unit-112.69 Acres
WELL LOCATION PLAT

Company Chesapeake Appalachia, LLC Well Name or Number 826203 (HY-145)

Tract No. Samuel J. Breeding, Jr. Quadrangle Prater

District Prater

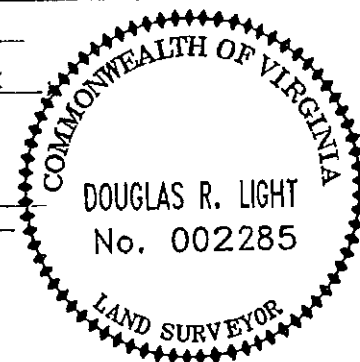
Well Coordinates (Virginia State Plane) N 334,559.47 E 925,001.88

Elevation: 2173.80 Method Used to Determine Elevation: Trig. Levels from GPS derived elevation.

County Buchanan Scale: 1" = 400' Date 8-13-07

This Plat is a new plat _____; an updated plat _____; or a final location plat X

+ Denotes the location of a well on United States topographic maps, scale 1 to 24,000, latitude and longitude lines being represented by border lines as shown.



DGO-7 Supplement
WELL UNIT PROPERTY OWNER INDEX
Chesapeake Appalachia, L.L.C.
826203 (HY-145) with pipeline

(1)
"Drill Tract"

Surface, Oil & Gas
Samuel J. Breeding, Jr.
218.98 Ac. Tract
40.36 Ac. ~ 35.82% of 112.69 Ac.

Coal:
ACIN, LLC
WBRD, LLC

(2)
Henry M. Owens Heirs, et al
92 Ac. Tract
0.54 Ac. ~ 0.48% of 112.69 Ac.

(3)
George W. Owens Heirs (3/13 Int.) & of Henry M. Owens Heirs (10/13 Int.)
57.5 Ac. Tract
37.08 Ac. ~ 32.90% of 112.69 Ac.

(4)
War Fork Coals Partnership
410 Ac. Tract
34.71 Ac. ~ 30.80% of 112.69 Ac.

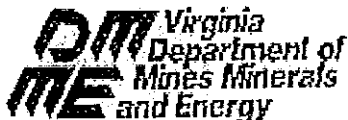
Well 826203 COALBEDS				MINING IN AREA		
NAME	TOP	BOTTOM	THICKNESS	YES	NO	MINED OUT
Unknown	443	446	3		X	NO

Well 826203 SURVEY RESULTS

Depth of Survey	Direction/Distance/Degree From True Vertical
200	1/4 degree
446	1/4 degree
600	1/4 degree
813	1/4 degree
1001	1/4 degree
1220	1/4 degree
1345	1/4 degree
1532	1/4 degree
1751	1/4 degree
1970	1/4 degree

Well 826203 CASING PROGRAM							
Casing Type	Casing Size	Casing Interval	Hole Size	Cement Used in Cubic Feet	Cemented To Surface Yes/No	Date Cemented	Packers Or Bridge Plugs Kind/Size/Set
Conductor	20"	30' KB	26"	Driven	No		
Surface	13 3/8"	378' KB	17 1/2"	354	Yes	8/5/2007	Grout basket at 98' KB
Surface #2	9-5/8"	583' KB	12-3/8"	354	Yes	8/6/2007	Grout basket at 98' KB
Intermediate	7"	2306' KB	8-7/8"	479.4	Yes	8/9/2007	Grout basket at 98' KB
Production	4-1/2"	6687' KB	6-1/4"	381.45	No	8/18/2007	

Well 1826203 (DRI) LITHO LOG		Geologic Age		Formation		General Lithology		Color		Depth		Depth		Thickness		Remarks	
										Top		Bottom					
Penn		Lee				Siltstone & Shale/Coal				0		1404		1404			
Penn		Salt Sand				Sandstone				1404		2234		830			
Miss		Pennington				Siltstone & Shale				2234		2330		96			
Miss		Ravencloft				Sandstone				2330		2399		69			
Miss		Pennington				Siltstone & Shale				2399		2660		261			
Miss		Upper Maxon				Sandstone				2660		2712		52			
Miss		Pennington				Siltstone & Shale				2712		2980		268			
Miss		Middle Maxon				Sandstone				2980		3009		29			
Miss		Pennington				Siltstone & Shale				3009		3227		218			
Miss		Lower Maxon				Sandstone				3227		3273		46			
Miss		Pennington				Siltstone & Shale				3273		3732		459			
Miss		Bradley				Sandstone				3732		3756		24			
Miss		Pennington				Siltstone & Shale				3756		3852		96			
Miss		Little Lime				Limestone				3852		3883		31			
Miss		Big Lime				Limestone				3883		4392		509			
Miss		Pocono				Shale				4392		4576		184			
Miss		Weir				Sandstone				4576		4642		66			
Miss		Pocono				Shale				4642		5089		447			
Miss		Sunbury				Shale				5089		5111		22			
Miss		Berea				Sandstone				5111		5152		41			
Devonian		Devonian				Shale				5152		5997		845			
Devonian		Lower Huron				Shale				5997		6208		211			
Devonian		Java				Shale				6208		6317		109			
Devonian		Angola				Shale				6317		6404		87			
Devonian		Rhinestreet				Shale				6404		6623		219			
Devonian		Marcellus				Shale				6623		6632		9			
Devonian		Onondaga				Limestone				6632		6728		96			



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Box 1416; Abingdon, VA 24212
Telephone: (276) 676-5423

Tracking Number: 875
Company: Chesapeake Appalachia, LLC
File Number: BU-3396
Operations Name: 826203 (HY-145) W/PL
Operation Type: Gas/Pipeline
Completion Report Type: Original

COMPLETION REPORT (DGO-GO-15)

Well Type:	Gas/Pipeline	Date Well Completed:	9/3/2007
Driller's Total Depth:	6,720	Log's Total Depth:	6,728

1. Changes In Casing/Tubing from Approved Drilling Report

Description	FileName
-------------	----------

2. Stimulation Record

☒ Stimulated ☐ Not Stimulated ☐ Gob

Description	FileName
Stimulation Record Well # 826203	Stimulation Record 826203.doc

3. Final Production

Description	FileName
Final Production Well # 826203	FinalProduction 826203.xls

4. Comments

Notes:

5. Signature

Permittee: Chesapeake Appalachia, LLC Date: 12/11/2007 1:17:23 PM (Company)

By: Chad L Satterfield Title: Drilling Engineer (Signature)

INTERNAL USE ONLY	
Submit Date: <u>12/11/2007</u>	
Status: <u>Inspr Approved</u>	Date: <u>12/11/2007</u>
Final PDF Date: <u>12/12/2007</u>	

Stimulation Record Well 826203

Zone 1

Name: Marcellus/Rhinestreet

Formation Stimulated With: Nitrogen

Perforated from 6410' to 6628'

Number of Perforations 60

Perforation Size .44

Formation Broke Down at 3648 (PSIG)

Average Injection Rate 69,500 (SCFM)

ISIP: 3080 (PSIG) 5 Min SIP 2892 (PSIG)

Average Treating Pressure 4162 (PSIG)

Stimulated Yes Date 08/21/2007

Zone 2

Name: Lower Huron

Formation Stimulated With: Nitrogen

Perforated from 5884' to 6199'

Number of Perforations 60

Perforation Size .44

Formation Broke Down at 3701 (PSIG)

Average Injection Rate 81,967 (SCFM)

ISIP: 2279 (PSIG) 5 Min SIP 2218 (PSIG)

Average Treating Pressure 3770 (PSIG)

Stimulated Yes Date 08/21/2007

Zone 3

Name: Weir

Formation Stimulated With: 75% Quality Foam

Perforated from 4582' to 4608'

Number of Perforations 44

Perforation Size .44

Formation Broke Down at 2751 (PSIG)

Average Injection Rate 25 (BPM)

ISIP: 2192 (PSIG) 5 Min SIP 2090 (PSIG)

Average Treating Pressure 1903 (PSIG)

Stimulated Yes Date 08/21/2007

Zone 4

Name: Big Lime

Formation Stimulated With: 65% Quality Foam

Perforated from 4216' to 4228'

Number of Perforations 37

Perforation Size .44

Formation Broke Down at 3389 (PSIG)

Average Injection Rate 15 (BPM)

ISIP: 3150 (PSIG) 5 Min SIP 3015 (PSIG)

Average Treating Pressure 2777 (PSIG)

Stimulated Yes Date 08/21/2007

Well 826203 FINAL PRODUCTION

Final Production After Stimulation					
	BOD	MCFD	Hours Tested	Rock Pressure	Hours Tested
Zone 1					
Zone 2					
Zone 3					
Final/Commingled Zones		1,030	48	950 psig	48



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Box 1416; Abingdon, VA 24212
Telephone: (276) 676-5423

Tracking Number: 897
Company: Chesapeake Appalachia, LLC
File Number: BU-3391
Operations Name: 826204 (HY-146) W/PL
Operation Type: Gas/Pipeline
Drilling Report Type: Original

DRILLING REPORT (DGO-GO-14)

1. Drilling Data

Date drilling commenced: 7/19/2007 Drilling Contractor: S.W. Jack Drilling
Date drilling completed: 8/1/2007 Rig Type: ☒ Rotary ☐ Cable Tool
Driller's Total Depth (feet): 6,707
Log Total Depth (feet): 6,708 Formation At Total Depth Onandoga

2. Final Location Plat (as required by 4 VAC25-150-360.C.)

Permitted State Plane X 925,341 Final Plat State Plane X: 925,341
Permitted State Plane Y: 337,098 Final Plat State Plane Y: 337,099

☐ Plat Previously Submitted Or...

List of Attached Items:

Description	FileName
Final Plat Well #826204	final plat 826204.pdf

3. Geological Data

Fresh Water At:

Depth (in feet)	Rate	Unit of Measure
45	Damp	
450	Damp	

Salt Water At:

Depth (in feet)	Rate	Unit of Measure
1,452	Damp	

Coal Seams

List of Attached Items:

Description	FileName
Coal Seams Well #826204	CoalBeds 826204.xls

Gas and Oil Shows

List of Attached Items:

Description	FileName
-------------	----------

4. Electric Logs (As required by 4VAC25-150-280.A.)

List all logs run: GR,CNL,LDT,SIB,TEMP,AUDIO

Did logs disclose vertical locations of a coal seam? ☒ Yes ☐ No

5. Survey Results (As required by 4VAC25-150-280.B.2)

List of Attached Items:

Description	FileName
Survey Results Well #826204	Survey Results 826204.xls

6. Casing and Tubing Program

List of Attached Items:

Description	FileName
Casing Program Well # 826204	Casing Program 826204.xls

7. Remarks

Use this space to note any conditions or occurrences, such as lost circulation, fishing jobs, junk left in hole, sidetracks, squeeze jobs, etc., not shown above. Include data and depth of condition/occurrence.

13 3/8" csg Job: Open Mine 347-352, Grout Basket @ 290', Grouted back to surface w/200 sks Class A cement

8. Drillers Log

Compiled By: Chad L Satterfield

List of Attached Items:

Description	FileName
Drillers Log Well # 826204	DrillersLog 826204.xls

9. Comments

10. Signature

Permitee: Chesapeake Appalachia, LLC Date: 12/4/2007 (Company)

Signed By: Chad L Satterfield Title: Drilling Engineer (Signature)

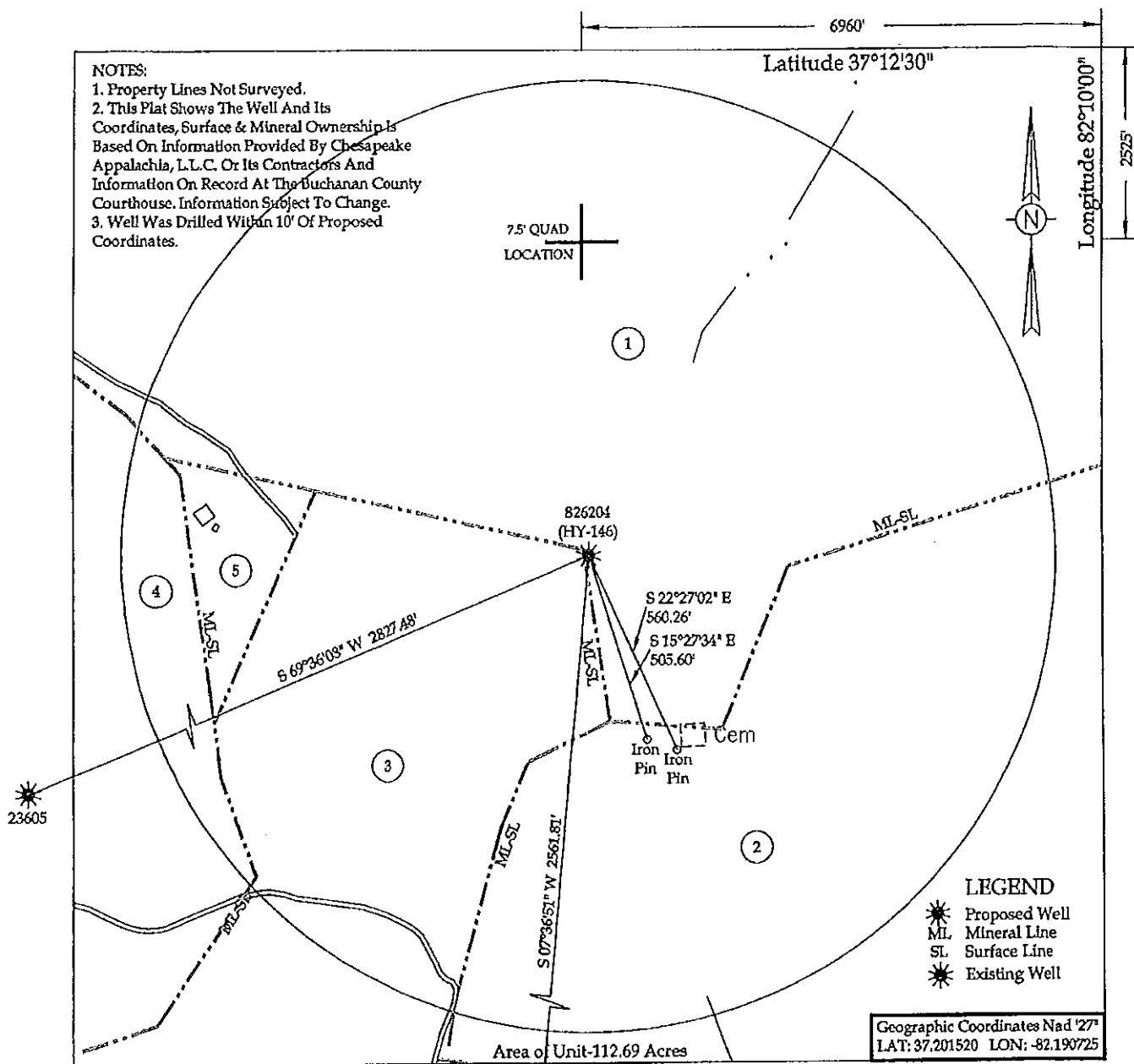
INTERNAL USE ONLY

Submit Date: 12/4/2007

Status: Inspr Approved

Date: 12/10/2007

Final PDF Date: 12/11/2007



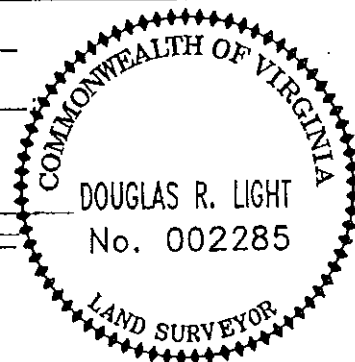
WELL LOCATION PLAT

826203

Company Chesapeake Appalachia, LLC Well Name or Number 826204 (HY-146)
 Tract No. Henry M. Owens Heirs ~ 50 Acres Quadrangle Prater
 District Prater
 Well Coordinates (Virginia State Plane) N 337,098.69 E 925,341.33
 Elevation: 2161.87 Method Used to Determine Elevation: Trig. Levels from GPS derived elevation.
 County Buchanan Scale: 1" = 400' Date 8-13-07

This Plat is a new plat _____; an updated plat _____; or a final location plat X

+ Denotes the location of a well on United States topographic maps, scale 1 to 24,000, latitude and longitude lines being represented by border lines as shown.



DGO-7 Supplement
WELL UNIT PROPERTY OWNER INDEX
Chesapeake Appalachia, L.L.C.
826204 (HY-146) with pipeline

(1)

"Drill Tract"

Fee:

Henry M. Owens Heirs

50 Acre Tract

55.12 Ac. ~ 48.91% of 112.69 Ac.

(2)

Henry M. Owens Heirs, et al

92 Acre Tract

29.53 Ac. ~ 26.20% of 112.69 Ac.

(3)

Samuel J. Breeding, Jr

218.98 Acre Tract

21.28 Ac. ~ 18.89% of 112.69 Ac.

(4)

Pine Mountain Oil & Gas, Inc.

412 Acre Tract

3.93 Ac. ~ 3.49% of 112.69 Ac.

(5)

Tim & Amy Ratliff

2.83 Ac. ~ 2.51% of 112.69 Ac.

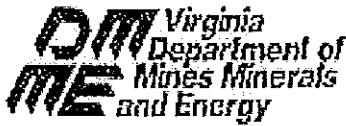
Well 826204 COALBEDS				MINING IN AREA		
NAME	TOP	BOTTOM	THICKNESS	YES	NO	MINED OUT
Unknown	347	352	5'		X	YES
Unknown	934	936	2'		X	NO

Well 826204 SURVEY RESULTS	
Depth of Survey	Direction/Distance/Degree From True Vertical
200	1/4 degree
409	1/4 degree
626	1/4 degree
844	1/4 degree
1063	1/4 degree
1282	1/4 degree
1564	1/4 degree
1750	1/4 degree
1969	1/4 degree

Well 826204 CASING PROGRAM							
Casing Type	Casing Size	Casing Interval	Hole Size	Cement Used In Cubic Ft.	Cemented To Surface Yes/No	Date Cemented	Packers Or Bridge Plugs Kind/Size/Set
Conductor	20"	22 KB	26"	Driven	No		
Open Mine	13 3/8"	417' KB	17 1/2"	330.4	Yes	7/20/2007	Grout basket at 98' KB
Surface	9-5/8"	582' KB	12-3/8"	354	Yes	7/21/2007	Grout basket at 98' KB
Intermediate	7"	2264' KB	8-7/8"	493.3	Yes	7/28/2007	Grout basket at 98' KB
Production	4-1/2"	6677' KB	6-1/4"	352.8	No	8/2/2007	

Well 026204-DRILLER-SITE LOG									
Geologic Age	Formation	General Lithology	Color	Depth Top	Depth Bottom	Thickness	Remarks		
Penn	Lee	Siltstone & Shale/Coal		0	1393	1393			
Penn	Salt Sand	Sandstone		1393	2197	804			
Miss	Pennington	Siltstone & Shale		2197	2950	753			
Miss	Upper Maxon	Sandstone		2950	2983	33			
Miss	Pennington	Siltstone & Shale		2983	3317	334			
Miss	Middle Maxon	Sandstone		3317	3359	42			
Miss	Pennington	Siltstone & Shale		3359	3484	125			
Miss	Lower Maxon	Sandstone		3484	3522	38			
Miss	Pennington	Siltstone & Shale		3522	3690	168			
Miss	Bradley	Sandstone		3690	3715	25			
Miss	Pennington	Siltstone & Shale		3715	3774	59			
Miss	Little Lime	Limestone		3774	3815	41			
Miss	Big Lime	Limestone		3815	4347	532			
Miss	Pocono	Shale		4347	4522	175			
Miss	Weir	Sandstone		4522	4594	72			
Miss	Pocono	Shale		4594	5031	437			
Miss	Sunbury	Shale		5031	5050	19			
Miss	Berea	Sandstone		5050	5090	40			
Devonian	Devonian	Shale		5090	5891	801			
Devonian	Lower Huron	Shale		5891	6132	241			
Devonian	Java	Shale		6132	6246	114			
Devonian	Angola	Shale		6246	6473	227			
Devonian	Rhinestreet	Shale		6473	6601	128			
Devonian	Marcellus	Shale		6601	6612	11			
Devonian	Onondaga	Limestone		6612	6708	96			

Well#26204DRILLER'S LOG							Depth		Thickness	Remarks	
Geologic Age	Formation	General Lithology	Color	Top	Bottom		Top	Bottom			
Penn	Lee	Siltstone & Shale/Coal		0	1393		1393	1393			
Penn	Salt Sand	Sandstone		1393	2197		2197	804			
Miss	Pennington	Siltstone & Shale		2197	2950		2950	753			
Miss	Upper Maxon	Sandstone		2950	2983		2983	33			
Miss	Pennington	Siltstone & Shale		2983	3317		3317	334			
Miss	Middle Maxon	Sandstone		3317	3359		3359	42			
Miss	Pennington	Siltstone & Shale		3359	3484		3484	125			
Miss	Lower Maxon	Sandstone		3484	3522		3522	38			
Miss	Pennington	Siltstone & Shale		3522	3690		3690	168			
Miss	Bradley	Sandstone		3690	3715		3715	25			
Miss	Pennington	Siltstone & Shale		3715	3774		3774	59			
Miss	Little Lime	Limestone		3774	3815		3815	41			
Miss	Big Lime	Limestone		3815	4347		4347	532			
Miss	Pocono	Shale		4347	4522		4522	175			
Miss	Weir	Sandstone		4522	4594		4594	72			
Miss	Pocono	Shale		4594	5031		5031	437			
Miss	Sunbury	Shale		5031	5050		5050	19			
Miss	Berea	Sandstone		5050	5090		5090	40			
Devonian	Devonian	Shale		5090	5891		5891	801			
Devonian	Lower Huron	Shale		5891	6132		6132	241			
Devonian	Java	Shale		6132	6246		6246	114			
Devonian	Angola	Shale		6246	6473		6473	227			
Devonian	Rhinestreet	Shale		6473	6601		6601	128			
Devonian	Marcellus	Shale		6601	6612		6612	11			
Devonian	Onondaga	Limestone		6612	6708		6708	96			



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Box 1416; Abingdon, VA 24212
Telephone: (276) 676-5423

Tracking Number: 812
Company: Chesapeake Appalachia, LLC
File Number: BU-3391
Operations Name: 826204 (HY-146) W/PL
Operation Type: Gas/Pipeline
Completion Report Type: Original

COMPLETION REPORT (DGO-GO-15)

Well Type:	Gas/Pipeline	Date Well Completed:	8/21/2007
Driller's Total Depth:	6,707	Log's Total Depth:	6,708

1. Changes In Casing/Tubing from Approved Drilling Report

Description	FileName
-------------	----------

2. Stimulation Record

☒ Stimulated ☐ Not Stimulated ☐ Gob

Description	FileName
Stimulation Record Well # 826204	Stimulation Record 826204.doc

3. Final Production

Description	FileName
Final Production Well # 826204	FinalProduction 826204.xls

4. Comments

Notes:

5. Signature

Permittee: Chesapeake Appalachia, LLC Date: 12/4/2007 2:33:31 PM (Company)

By: Chad L Satterfield Title: Drilling Engineer (Signature)

INTERNAL USE ONLY

Submit Date: 12/4/2007

Status: Inspr Approved

Date: 12/10/2007

Final PDF Date: 12/11/2007

Stimulation Record Well 826204

Zone 1

Name: Marcellus/Rhinestreet

Formation Stimulated With: Nitrogen

Perforated from 6336' to 6606'

Number of Perforations 60

Perforation Size .44

Formation Broke Down at 4275 (PSIG)

Average Injection Rate 30,289 (SCFM)

ISIP: 3450 (PSIG) 5 Min SIP 3190 (PSIG)

Average Treating Pressure 4127 (PSIG)

Stimulated Yes Date 08/08/2007

Zone 2

Name: Lower Huron

Formation Stimulated With: Nitrogen

Perforated from 5776' to 6124'

Number of Perforations 60

Perforation Size .44

Formation Broke Down at 3997 (PSIG)

Average Injection Rate 80,940 (SCFM)

ISIP: 2565 (PSIG) 5 Min SIP 2478 (PSIG)

Average Treating Pressure 3967 (PSIG)

Stimulated Yes Date 08/08/2007

Zone 3

Name: Weir

Formation Stimulated With: 75% Quality Foam

Perforated from 4530' to 4552'

Number of Perforations 44

Perforation Size .44

Formation Broke Down at 2213 (PSIG)

Average Injection Rate 20 (BPM)

ISIP: 2425 (PSIG) 5 Min SIP 2351 (PSIG)

Average Treating Pressure 2019 (PSIG)

Stimulated Yes Date 08/08/2007

Zone 4

Name: Big Lime

Formation Stimulated With: 50% Quality Foam

Perforated from 4182' to 4190'

Number of Perforations 25

Perforation Size .44

Formation Broke Down at 4136 (PSIG)

Average Injection Rate 12 (BPM)

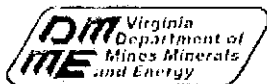
ISIP: 3411 (PSIG) 5 Min SIP 3133 (PSIG)

Average Treating Pressure 3071 (PSIG)

Stimulated Yes Date 08/08/2007

Well 826204 FINAL PRODUCTION

Final Production After Stimulation					
	BOD	MCFD	Hours Tested	Rock Pressure	Hours Tested
Zone 1					
Zone 2					
Zone 3					
Final/Commingled Zones		801	48	820 psig	48



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Drawer 159, Lebanon, VA 24266
Telephone: (276) 415-9700

Tracking Number:	3126
Company:	Range Resources-Pine Mountain
File Number:	BU-4608
Operations Name:	900004 W/PL
Operation Type:	Gas/Pipeline
Drilling Report Type:	Original

DRILLING REPORT (DGO-GO-14)

1. Drilling Data

Date drilling commenced:	12/21/2010	Drilling Contractor:	Noah Horn #87
Date drilling completed:	1/5/2011	Rig Type:	☒ Rotary ☐ Cable
Driller's Total Depth (feet):	4930.00		
Log Total Depth (feet):	4936.00	Formation At Total Depth	Cleveland Shale

2. Final Location Plat (as required by 4 VAC25-150-360.C.)

Permitted State Plane X:	10405439.8400	Final Plat State Plane X:	10405441.5700
Permitted State Plane Y:	3611650.0800	Final Plat State Plane Y:	3611654.0500

Plat Previously Submitted Or... ☐

List of Attached Items:

Description	FileName
900004 final plat	900004 Final Plat.pdf

3. Geological Data

Fresh Water At:

Depth (in feet)	Rate	Unit of Measure
130	.75	INCH

Salt Water At:

Depth (in feet)	Rate	Unit of Measure
1205	damp	

Coal Seams:

List of Attached Items:

Description	FileName
900004 coals	900004_Coal.xls

Gas and Oil Shows:

List of Attached Items:

Description	FileName
900004 gas shows	Shows.xls

4. Electric Logs (As required by 4VAC25-150-280.A)

List all logs run: Hi Res GR/Dens/Temp/Audio/PE/Caliper Data Pack

Did logs disclose vertical locations of a coal seam? ☒

5. Survey Results (As required by 4VAC25-150-280.B.2)

List of Attached Items:

Description	FileName
900004 survey	Survey.xls

6. Casing and Tubing Program

List of Attached Items:

Description	FileName
900004 casing	Casing.xls

7. Remarks

Use this space to note any conditions or occurrences, such as lost circulation, fishing jobs, junk left in hole, sidetracks, squeeze jobs, etc., not shown above. Include data and depth of condition/occurrence.

8. Drillers Log

Compiled By: Range Resources

List of Attached Items:

Description	FileName
900004 log	900004_Log.xls

9. Comments

10. Signature

Permittee: Range Resources-Pine Mountain Date: 10/21/2011

Signed By: Jonathan Horne Title: Engineering Tech

INTERNAL USE ONLY

Submit Date: 10/21/2011

Status: A

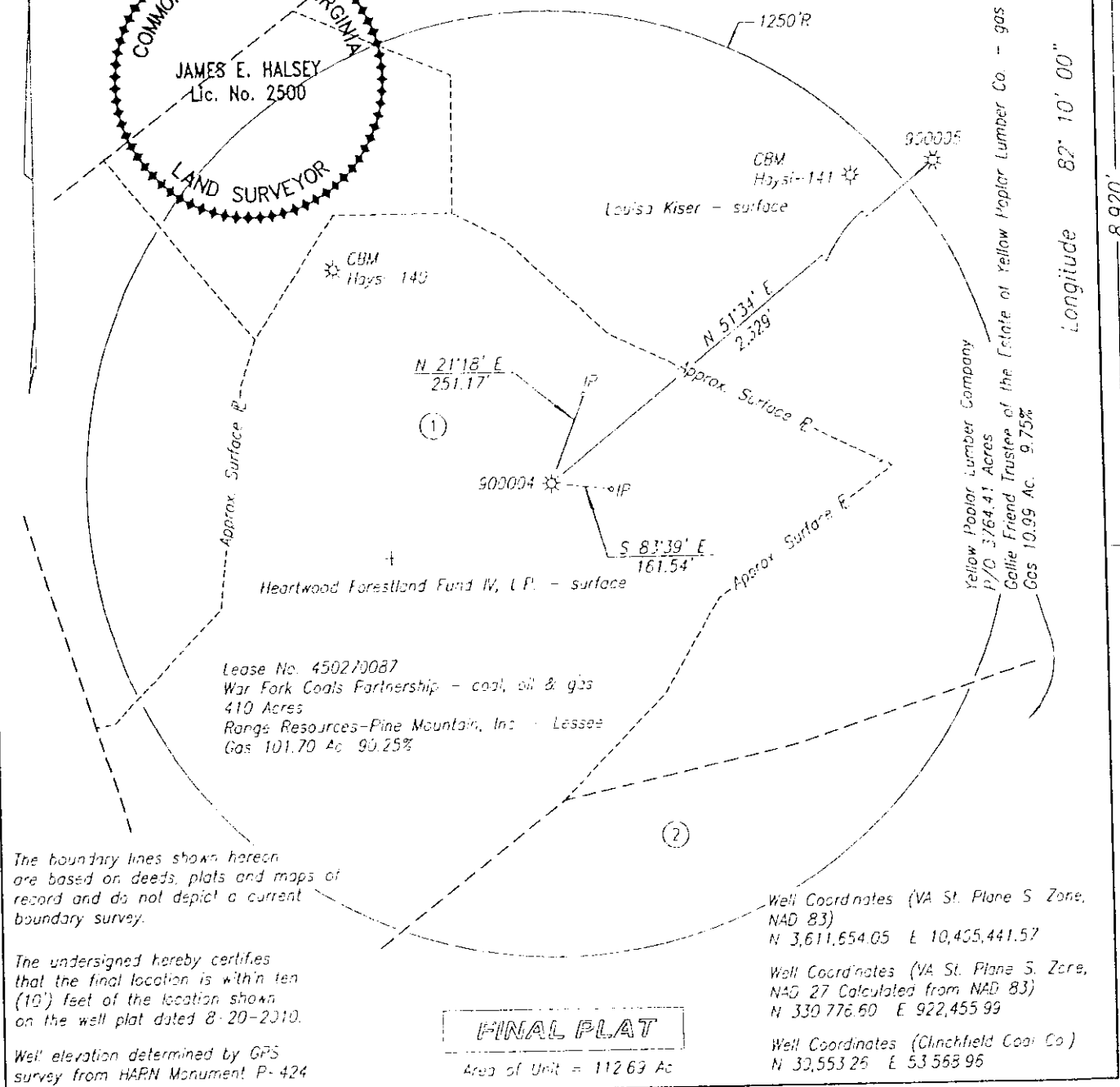
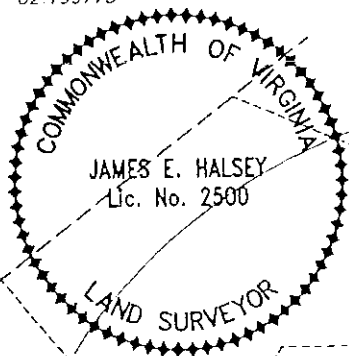
Date: 3/1/2012

Final PDF Date: 3/5/2012

Well Coordinates. (Geographic N27)
37.183859° -82.199773°

Latitude 37° 12' 30"

----- Mineral Line
----- Surface Line



The boundary lines shown herein are based on deeds, plats and maps of record and do not depict a current boundary survey.

The undersigned hereby certifies that the final location is within ten (10') feet of the location shown on the well plat dated 8-20-2010.

Well elevation determined by GPS survey from HARN Monument P-424

FINAL PLAT

Area of Unit = 112.63 Ac

Well Coordinates (VA St. Plane S. Zone, NAD 83)
N 3,611,654.05 E 10,405,441.57

Well Coordinates (VA St. Plane S. Zone, NAD 27 Calculated from NAD 83)
N 330,776.60 E 922,455.99

Well Coordinates (Clinchfield Coal Co.)
N 32,553.25 E 53,563.96

WELL LOCATION PLAT

COMPANY Range Resources-Pine Mountain, Inc. WELL NAME AND NUMBER 900204
TRACT NO. War Fork Coals Part ELEVATION 1,832.09' QUADRANGLE Prater
COUNTY Buchanan DISTRICT Prater SCALE 1" = 400' DATE 12-21-2010
This Plat is a new plat ; an updated plat ; or a final location plat
+ Denotes the location of a well on United States topographic Maps, scale 1 to 24,000, latitude and longitude lines being represented by border lines as shown

James E. Halsey
Licensed Professional Engineer or Licensed Land Surveyor

Coal Seams		V-900004				
				MINING IN AREA		
NAME	TOP	BOTTOM	THICKNESS	YES	NO	MINED OUT
COAL	15	16	1	NO	NO	
COAL	110	112	2	NO	NO	
COAL	263	265	2	NO	NO	
COAL	485	487	2	NO	NO	
COAL	835	837	2	NO	NO	
COAL	1164	1167	3	NO	NO	
COAL	1900	1902	2	NO	NO	

Gas and Oil Shows

FORMATION	DEPTH	THICKNESS	IPF (MCFD/BOPD)	PRESSURE	HOURS TESTED
Ravenclyff	2923		NS		
Maxton	3488		NS		
Big Lime	4090		NS		
Berea	4820		odor		

Survey Results

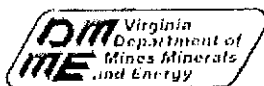
Depth of Survey	Direction/Distance/Degree From True Vertical
193'	$\frac{1}{4}^{\circ}$
408'	$\frac{1}{4}^{\circ}$
594'	$\frac{1}{4}^{\circ}$
815'	$\frac{1}{2}^{\circ}$
1001'	$\frac{1}{4}^{\circ}$
1189'	$\frac{1}{2}^{\circ}$
1405'	$\frac{1}{2}^{\circ}$
1593'	$\frac{3}{4}^{\circ}$
1814'	$\frac{3}{4}^{\circ}$
2005'	1°
2196'	$\frac{3}{4}^{\circ}$
2395'	$\frac{3}{4}^{\circ}$

Casing Program

	Casing	Casing	Hole	Cement Used	Cemented To Surface	Date
Casing Type	Size	Interval	Size	In Cubic Ft.	Yes/No	Cemented
Conductor	13 ³ / ₈ "	0-40'	15"			
Water Protection	9 ⁵ / ₈ "	0-344'	12 ¹ / ₄ "	224 ft ³	Yes	12/22/10
Coal Protection	7"	0-2286'	8 ⁷ / ₈ "	492 ft ³	Yes	12/31/10
Production Casing	4 ¹ / ₂ "	0-4903'	6 ¹ / ₄ "	374 ft ³	No	01/06/11
Other Casing And Tubing Left In Well	2 ³ / ₈ "	0-4248'				
Liners						

Packers Or Bridge Plugs	Cement Baskets
Kind/Size/Set	(ft)
	84'
	298'
	3846' 4308'

Driller's Log	V-900004	General	Depth	Depth	Thickness	Remarks
Geologic Age	Formation	Lithology	Color	Top	Bottom	Thickness
		OVERBURDEN		0	15	15
PENNSYLVANIAN		COAL		15	16	1
PENNSYLVANIAN		SANDSTONE		16	110	94
PENNSYLVANIAN		COAL		110	112	2
PENNSYLVANIAN		SANDY SHALE		112	263	151
PENNSYLVANIAN		COAL		263	265	2
PENNSYLVANIAN		SANDY SHALE		265	290	25
PENNSYLVANIAN		SANDSTONE		290	485	195
PENNSYLVANIAN		COAL		485	487	2
PENNSYLVANIAN		SANDSTONE		487	515	28
PENNSYLVANIAN		SANDY SHALE		515	626	111
PENNSYLVANIAN		SANDSTONE		626	690	64
PENNSYLVANIAN		SANDY SHALE		690	784	94
PENNSYLVANIAN		SANDSTONE		784	815	31
PENNSYLVANIAN		SANDY SHALE		815	835	20
PENNSYLVANIAN		COAL		835	837	2
PENNSYLVANIAN		SANDY SHALE		837	846	9
PENNSYLVANIAN		SANDSTONE		846	878	32
PENNSYLVANIAN		SANDY SHALE		878	1164	286
PENNSYLVANIAN		COAL		1164	1167	3
PENNSYLVANIAN		SANDY SHALE		1167	1900	733
PENNSYLVANIAN		COAL		1900	1902	2
PENNSYLVANIAN		SANDY SHALE		1902	2065	163
PENNSYLVANIAN	RED ROCK	SHALE		2065	2081	16
PENNSYLVANIAN		SANDSTONE		2081	2222	141
PENNSYLVANIAN	RED ROCK	SHALE		2222	2268	46
PENNSYLVANIAN		SANDY SHALE		2268	2650	382
MISSISSIPPIAN	RAVENCLIFF	SANDSTONE		2650	2910	260
MISSISSIPPIAN	MAXTON	SANDSTONE		2910	3478	568
MISSISSIPPIAN	LITTLE LIME	LIMESTONE		3478	3704	226
MISSISSIPPIAN	BIG LIME	LIMESTONE		3704	4090	386
MISSISSIPPIAN	WEIR	SILTSTONE		4090	4340	250
MISSISSIPPIAN	WEIR SHALE	SHALE		4340	4690	350
MISSISSIPPIAN	SUNBURY	SHALE		4690	4775	85
MISSISSIPPIAN	BEREA	SANDSTONE		4775	4820	45
DEVONIAN	CLEVELAND	SHALE		4820		



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Drawer 159, Lebanon, VA 24266
Telephone: (276) 415-9650

Tracking Number: 3098
Company: Range Resources-Pine Mountain
File Number: BU-4608
Completion Report Type: Original

COMPLETION REPORT (DGO-GO-15)

Well Type:	<u>Gas/Pipeline</u>	Date Well Completed:	<u>1/20/2011</u>
Driller's Total Depth:	<u>4930.00</u>	Log's Total Depth:	<u>4936.00</u>

1. Changes In Casing/Tubing from Approved Drilling Report

Description	FileName
-------------	----------

2. Stimulation Record

Stimulation Status: ☒ Stimulated ☐ GOB ☐ Not Stimulated ☐ Service Well

Description	FileName
900004 stimulation	900004 Stimulation.doc

3. Final Production

Description	FileName
900004 final production	Final_Prod.xls

4. Comments

Notes:

5. Signature

Permittee: Range Resources-Pine Mountain Date: 11/8/2011 (Company)

By: Jonathan Horne Title: Engineering Tech (Signature)

INTERNAL USE ONLY

Submit Date: 11/8/2011

Status: Approved

Date: 3/5/2012

Final PDF Date: 3/6/2012

STIMULATION RECORD

ZONE 1: Berea Formation Stimulated With: 75Q Foam
Perforated 4823 to 4835 feet No. of Perforations 25 Perforation Size .52
Formation Broke down at: 1507 PSIG Average Injection Rate: 25 BPM
ISIP 0 PSIG 2 Min SIP 0 PSIG Average Downhole Injection Pressure 2022 PSIG
Stimulated: ☒ Yes ☐ No Date Stimulated: 1/21/2011

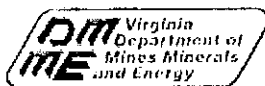
ZONE 2: Weir Formation Stimulated With: 65Q Foam
Perforated 4278 to 4327 feet No. of Perforations 19 Perforation Size .52
Formation Broke down at: 2204 PSIG Average Injection Rate: 15 BPM
ISIP 1245 PSIG 2 Min SIP 1171 PSIG Average Downhole Injection Pressure 2978 PSIG
Stimulated: ☒ Yes ☐ No Date Stimulated: 1/21/2011

ZONE 3: Big Lime Formation Stimulated With: 60Q Foam
Perforated 3584 to 4128 feet No. of Perforations 48 Perforation Size .33
Formation Broke down at: 2978 PSIG Average Injection Rate: 20.5 BPM
ISIP 1230 PSIG 2 Min SIP 0 PSIG Average Downhole Injection Pressure 2296 PSIG
Stimulated: ☒ Yes ☐ No Date Stimulated: 1/21/2011

ZONE 4: Maxton Formation Stimulated With: 65Q Foam
Perforated 3008 to 3040 feet No. of Perforations 21 Perforation Size .42
Formation Broke down at: 2430 PSIG Average Injection Rate: 30 BPM
ISIP 1234 PSIG 2 Min SIP 0 PSIG Average Downhole Injection Pressure 2820 PSIG
Stimulated: ☒ Yes ☐ No Date Stimulated: 1/21/2011

ZONE 5: Ravencliff Formation Stimulated With: 75Q Foam
Perforated 2685 to 2697 feet No. of Perforations 25 Perforation Size .42
Formation Broke down at: 0 PSIG Average Injection Rate: 0 BPM
ISIP 0 PSIG 2 Min SIP 0 PSIG Average Downhole Injection Pressure 0 PSIG
Stimulated: ☐ Yes ☒ No Date Stimulated: 1/21/2011

Final Production After Stimulation				
	BOD	MCFD	Hours Tested	Rock Pressure
Zone 1				
Zone 2				
Zone 3				
Final/Commingle Zones		527	3	400



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Drawer 159, Lebanon, VA 24266
Telephone: (276) 415-9700

Tracking Number:	3127
Company:	Range Resources-Pine Mountain
File Number:	BU-4554
Operations Name:	900005
Operation Type:	Gas/Pipeline
Drilling Report Type:	Original

DRILLING REPORT (DGO-GO-14)

1. Drilling Data

Date drilling commenced:	11/30/2010	Drilling Contractor:	Noah Horn #87
Date drilling completed:	12/6/2010	Rig Type:	☒ Rotary ☐ Cable
Driller's Total Depth (feet):	5188.00		
Log Total Depth (feet):	5202.00	Formation At Total Depth	Cleveland Shale

2. Final Location Plat (as required by 4 VAC25-150-360.C.)

Permitted State Plane X:	10407265.6100	Final Plat State Plane X:	10407265.6400
Permitted State Plane Y:	3613102.6200	Final Plat State Plane Y:	3613101.9200

Plat Previously Submitted Or... ☐

List of Attached Items:

Description	FileName
900005 final plat	900005 FINAL PLAT.pdf

3. Geological Data

Fresh Water At:

Depth (in feet)	Rate	Unit of Measure
-----------------	------	-----------------

Salt Water At:

Depth (in feet)	Rate	Unit of Measure
-----------------	------	-----------------

Coal Seams:

List of Attached Items:

Description	FileName
900005 coals	900005_Coal.xls

Gas and Oil Shows:

List of Attached Items:

Description	FileName
900005 gas shows	Shows.xls

4. Electric Logs (As required by 4VAC25-150-280.A)

List all logs run: Hi Res GR/Dens/Temp/Audio/PE/Caliper Data Pack

Did logs disclose vertical locations of a coal seam? ☒

5. Survey Results (As required by 4VAC25-150-280.B.2)

List of Attached Items:

Description	FileName
900005 survey	Survey.xls

6. Casing and Tubing Program

List of Attached Items:

Description	FileName
900005 casing	Casing.xls

7. Remarks

Use this space to note any conditions or occurrences, such as lost circulation, fishing jobs, junk left in hole, sidetracks, squeeze jobs, etc., not shown above. Include data and depth of condition/occurrence.

8. Drillers Log

Compiled By: Range Resources

List of Attached Items:

Description	FileName
900005 log	900005_Log.xls

9. Comments

10. Signature

Permitee: Range Resources-Pine Mountain Date: 10/21/2011
Signed By: Jonathan Horne Title: Engineering Tech

INTERNAL USE ONLY	
Submit Date: <u>10/21/2011</u>	
Status: <u>A</u>	Date: <u>3/1/2012</u>
Final PDF Date: <u>3/5/2012</u>	

Well Coordinates (Geographic NAD 83)
 37 186020' R2 19 52' 11"

Latitude 37° 12' 30"

Miner's Line
 Surface Line

Approx. Loc
 824155

Approx. Loc
 826703

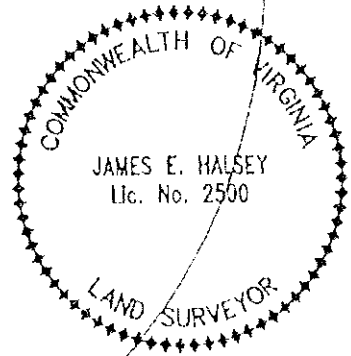
30 Days 15'

N 37°55' W
 112.45'

N 18°55' E
 300.43'

Lease 1 & 2 - surface

Lease No. 4507/0087
 Warlick Coal Landholding, Inc. et al. et al.
 410 Acres
 Range Resources, Inc. et al. et al. et al.
 112.61 Acres



The boundary lines shown herein are based
 on deeds, plans and maps of record and do not
 depict a current boundary survey

The undersigned hereby certifies
 that the well location is within ten
 (10') feet of the location shown
 on the well plat dated 11-09-2010

Well coordinates determined by GPS
 survey from USAN Document P-424

WELL LOCATION PLAT

Area of Oil 112.61 A-

Well Coordinates (NAD 83)
 N 3613,101.92 E 10,404,295.64

Well Coordinates (NAD 83)
 NAD 27 Calculated from NAD 83
 N 312,224.32 E 924,280.01

Well Coordinates (Geographic NAD 83)
 N 37,041.56 E 55,337.59

WELL LOCATION PLAT

COMPANY Range Resources, Pine Mountain, Inc. WELL NAME AND NUMBER 300000
 LEASE NO. Lease No. 4507/0087 ELEVATION 2,066.43' Q ADJUTANT, Pinner
 COUNTY Buchanan DISTRICT Potter SCALE 1" = 402' DATE 11-09-2010
 This Plat is a new plat or amended plat or a combined plat
 Denotes the location of a well on United States topographic Maps scale 1" to
 24,000', altitude and longitude lines being represented by border lines as shown

James E. Halsey

Licensed Professional Engineer or Licensed Land Surveyor

11-09-2010

Coal Seams

V-900005

				MINING IN AREA		
NAME	TOP	BOTTOM	THICKNESS	YES	NO	MINED OUT
COAL	51	53	2		NO	NO
COAL	185	186	1		NO	NO
COAL	420	422	2		NO	NO
COAL	685	687	2		NO	NO
COAL	850	852	2		NO	NO
COAL	1009	1011	2		NO	NO
COAL	1046	1048	2		NO	NO
COAL	1105	1107	2		NO	NO
COAL	1211	1213	2		NO	NO
COAL	1232	1234	2		NO	NO
COAL	1407	1409	2		NO	NO
COAL	2145	2147	2		NO	NO
COAL	2302	2304	2		NO	NO

Gas and Oil Shows

FORMATION	DEPTH	THICKNESS	IPF (MCFD/BOPD)	PRESSURE	HOURS TESTED
	383		NS		
Ravenclyff	2638		odor		
Ravenclyff	3174		NS		
Maxton	3774			60 mcf	
Big Lime	4400			84 mcf	
Berea	5188			119 mcf	
	5188 w/csg			158 mcf	

Survey Results

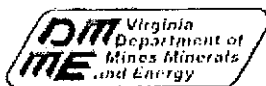
Depth of Survey	Direction/Distance/Degree From True Vertical
195'	$\frac{1}{4}^{\circ}$
409'	$\frac{1}{4}^{\circ}$
600'	$\frac{1}{4}^{\circ}$
819'	$\frac{1}{4}^{\circ}$
1007'	$\frac{1}{4}^{\circ}$
1196'	$\frac{1}{4}^{\circ}$
1417'	$\frac{1}{2}^{\circ}$
1604'	$\frac{1}{4}^{\circ}$
1793'	$\frac{1}{4}^{\circ}$
2014'	$\frac{1}{4}^{\circ}$
2202'	$\frac{1}{2}^{\circ}$
2390'	$\frac{1}{2}^{\circ}$
2638'	$\frac{3}{4}^{\circ}$

Casing Program

Casing Type	Casing Size	Casing Interval	Hole Size	Cement Used In Cubic Ft.	Cemented To Surface Yes/No	Date Cemented
Conductor	13 ³ / ₈ "	0-40'	15"			
Water Protection	9 ⁵ / ₈ "	0-345'	12 ¹ / ₄ "	224 ft ³	Yes	11/30/10
Coal Protection	7"	0-2584'	8 ⁷ / ₈ "	624 ft ³	Yes	12/03/10
Production Casing	4 ¹ / ₂ "	0-5136'	6 ¹ / ₄ "	411 ft ³	No	12/08/10
Other Casing And Tubing Left In Well	2 ³ / ₈ "	0-5078'				
Liners						

Packers Or Bridge Plugs Kind/Size/Set	Cement Baskets (ft)
	84'
	294'
	4118' 4579'

Driller's Log	V-900005						
Geologic Age	Formation	General	Color	Depth Top	Depth Bottom	Thickness	Remarks
		OVERBURDEN		0	19	19	
PENNSYLVANIAN		SANDSTONE		19	51	32	
PENNSYLVANIAN		COAL		51	53	2	
PENNSYLVANIAN		SANDSTONE		53	146	93	
PENNSYLVANIAN		SANDY SHALE		146	185	39	
PENNSYLVANIAN		COAL		185	186	1	
PENNSYLVANIAN		SANDSTONE		186	306	120	
PENNSYLVANIAN		SANDY SHALE		306	358	52	
PENNSYLVANIAN		SANDSTONE		358	420	62	
PENNSYLVANIAN		COAL		420	422	2	
PENNSYLVANIAN		SANDSTONE		422	640	218	
PENNSYLVANIAN		SANDY SHALE		640	685	45	
PENNSYLVANIAN		COAL		685	687	2	
PENNSYLVANIAN		SANDY SHALE		687	850	163	
PENNSYLVANIAN		COAL		850	852	2	
PENNSYLVANIAN		SANDSTONE		852	980	128	
PENNSYLVANIAN		SANDY SHALE		980	1009	29	
PENNSYLVANIAN		COAL		1009	1011	2	
PENNSYLVANIAN		SANDY SHALE		1011	1046	35	
PENNSYLVANIAN		COAL		1046	1048	2	
PENNSYLVANIAN		SANDSTONE		1048	1105	57	
PENNSYLVANIAN		COAL		1105	1107	2	
PENNSYLVANIAN		SANDSTONE		1107	1211	104	
PENNSYLVANIAN		COAL		1211	1213	2	
PENNSYLVANIAN		SANDSTONE		1213	1232	19	
PENNSYLVANIAN		COAL		1232	1234	2	
PENNSYLVANIAN		SANDSTONE		1234	1407	173	
PENNSYLVANIAN		COAL		1407	1409	2	
PENNSYLVANIAN		SANDSTONE		1409	1518	109	
PENNSYLVANIAN		SANDY SHALE		1518	1540	22	
PENNSYLVANIAN		SANDSTONE		1540	1605	65	
PENNSYLVANIAN		SANDY SHALE		1605	1731	126	
PENNSYLVANIAN		SANDSTONE		1731	2145	414	
PENNSYLVANIAN		COAL		2145	2147	2	
PENNSYLVANIAN		SANDSTONE		2147	2302	155	
PENNSYLVANIAN		COAL		2302	2304	2	
PENNSYLVANIAN		SANDSTONE		2304	2395	91	
PENNSYLVANIAN		SANDY SHALE		2395	2475	80	
PENNSYLVANIAN	REDROCK	SHALE		2475	2509	34	
PENNSYLVANIAN		SANDY SHALE		2509	2632	123	
PENNSYLVANIAN		SANDSTONE		2632	2900	268	
MISSISSIPPIAN	RAVENCLIFF	SANDSTONE		2900	3158	258	
MISSISSIPPIAN	MAXTON	SANDSTONE		3158	3740	582	
MISSISSIPPIAN	LITTLE LIME	LIMESTONE		3740	3960	220	
MISSISSIPPIAN	BIG LIME	LIMESTONE		3960	4380	420	
MISSISSIPPIAN	WEIR	SILTSTONE		4380	4605	225	
MISSISSIPPIAN	WEIR SHALE	SHALE		4605	4970	365	
MISSISSIPPIAN	SUNBURY	SHALE		4970	5036	66	
MISSISSIPPIAN	BEREA	SANDSTONE		5036	5085	49	
DEVONIAN	CLEVELAND	SHALE		5085			



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Drawer 159, Lebanon, VA 24266
Telephone: (276) 415-9650

Tracking Number: 3097
Company: Range Resources-Pine Mountain
File Number: BU-4554
Completion Report Type: Original

COMPLETION REPORT (DGO-GO-15)

Well Type:	Gas/Pipeline	Date Well Completed:	12/22/2010
Driller's Total Depth:	5188.00	Log's Total Depth:	5202.00

1. Changes In Casing/Tubing from Approved Drilling Report

Description	FileName
-------------	----------

2. Stimulation Record

Stimulation Status: ☒ Stimulated ☐ GOB ☐ Not Stimulated ☐ Service Well

Description	FileName
900005 stimulation	900005 Stimulation.doc

3. Final Production

Description	FileName
900005 final production	Final_Prod.xls

4. Comments

Notes:

5. Signature

Permittee: Range Resources-Pine Mountain

Date: 11/8/2011 (Company)

By: Jonathan Horne

Title: Engineering Tech (Signature)

INTERNAL USE ONLY

Submit Date: 11/8/2011

Status: Approved

Date: 3/5/2012

Final PDF Date: 3/6/2012

STIMULATION RECORD

ZONE 1: Berea Formation Stimulated With: 75Q Foam
Perforated 5054 to 5079 feet No. of Perforations 23 Perforation Size .52
Formation Broke down at: 2671 PSIG Average Injection Rate: 38 BPM
ISIP 335 PSIG 2 Min SIP 0 PSIG Average Downhole Injection Pressure 2770 PSIG
Stimulated: ☒ Yes ☐ No Date Stimulated: 12/22/2010

ZONE 2: Weir Formation Stimulated With: 75Q Foam
Perforated 4526 to 4555 feet No. of Perforations 24 Perforation Size .52
Formation Broke down at: 3082 PSIG Average Injection Rate: 38 BPM
ISIP 296 PSIG 2 Min SIP 0 PSIG Average Downhole Injection Pressure 2611 PSIG
Stimulated: ☒ Yes ☐ No Date Stimulated: 12/22/2010

ZONE 3: Big Lime Formation Stimulated With: 60Q Foam
Perforated 4161 to 4345 feet No. of Perforations 39 Perforation Size .32
Formation Broke down at: 1881 PSIG Average Injection Rate: 18 BPM
ISIP 2219 PSIG 2 Min SIP 0 PSIG Average Downhole Injection Pressure 3388 PSIG
Stimulated: ☒ Yes ☐ No Date Stimulated: 12/22/2010

ZONE 4: Maxton Formation Stimulated With: 75Q Foam
Perforated 3259 to 3287 feet No. of Perforations 33 Perforation Size .43
Formation Broke down at: 2716 PSIG Average Injection Rate: 30 BPM
ISIP 1640 PSIG 2 Min SIP 0 PSIG Average Downhole Injection Pressure 3177 PSIG
Stimulated: ☒ Yes ☐ No Date Stimulated: 12/22/2010

ZONE 5: Ravencliff Formation Stimulated With: 75Q Foam
Perforated 2909 to 2942 feet No. of Perforations 37 Perforation Size .43
Formation Broke down at: 1559 PSIG Average Injection Rate: 30.5 BPM
ISIP 2468 PSIG 2 Min SIP 2235 PSIG Average Downhole Injection Pressure 2917 PSIG
Stimulated: ☒ Yes ☐ No Date Stimulated: 12/22/2010

Final Production After Stimulation				
	BOD	MCFD	Hours Tested	Rock Pressure
Zone 1				
Zone 2				
Zone 3				
Final/Commingle Zones		1274	3	500



June 25, 2025

Mr. Ryan Hancharick
Source Water & UIC Section
Water Division
U.S. EPA Region 3
Four Penn Center
1600 John F. Kennedy Blvd.
Philadelphia, PA 19103

Mr. Hancharick:

EnerVest is submitting this additional information for the permit application in response to NOD, to renew proposed Permit #VAS2D955BBUC Class II-D fluid disposal well in the Prater area of Buchanan County, Virginia.

Please contact me with any questions and/or further requested information (276) 730-5617.

Sincerely,

Jon Lawson

Jon Lawson
Sr. HSE Specialist
jlawson@enervest.net



REGION 3

PHILADELPHIA, PA 19103

March 10, 2025

Mr. Jon Lawson
Senior HSE Specialist
EnerVest Operating, LLC
809 Happy Valley Dr.
Clintwood, Virginia 24228

Re: Notice of Deficiency; EnerVest Operating, LLC (EnerVest) Permit Application; VAS2D955BBUC
Underground Injection Control (UIC) Program; Class IID Injection Well 900146

Dear Mr. Lawson:

On January 22, 2025, the U.S. Environmental Protection Agency (the EPA) received your UIC permit renewal application for one (1) disposal injection well (Class IID) in Buchanan County, Virginia.

The technical review for the application began on January 22, 2025. Critical information regarding the wells within the Area of Review (AOR), zone of endangering influence, underground source(s) of drinking water (USDW), the injection well schematic, and the list of property owners around the injection well was found to be incomplete or missing. The EPA requires that EnerVest submit additional information to address certain deficiencies before we can continue processing the application. The deficiencies are as follows:

1. For all wells found to be within the AOR and identified on the maps within the permit application, the applicant must also submit wellbore records reasonably available from public records or otherwise known to the applicant on all wells within the AOR included on the maps. Specifically, key information for the BU-3236 (Haysi 26) and BU-3244 (Haysi 24) wells is not provided. While EnerVest did provide information including well name, well type, and the date the well was drilled, the following information is missing from the permit application:
 - well construction that includes casing and cement details, including demonstrated or calculated top of cement,
 - cement bond logs (if available), and
 - record of well completion and plugging (if applicable).
2. The EPA requests that a zone of endangering influence (ZEI) calculation be completed and included in the permit application to ensure the fixed radius ¼-mile AOR is

adequate. For more information on how to calculate the ZEI using the modified Theis equation, refer to 40 C.F.R. 146(a).

3. Although the permit application states that, “The proposed UIC well will be properly separated from all USDW’s by thousands of feet of confining strata”, no evidence of the location of the lowermost USDW is provided. The permit application does not identify any relevant USDW. The geologic name (if known) and depth to bottom of USDW which may be affected by injection is required to be included in the permit application. The depth of the lowermost USDW needs to be provided.
4. The injection well schematic requires clearly labeled depth of the lowermost USDW, injection zone location and name, and confining zone locations and names, as applicable to this injection well.
5. The list of property owners around the injection well is required to extend to ½-mile beyond the injection well. The table that was provided in this permit application only lists property owners within ¼-mile radius of the well.

Please send the requested information to Ryan Hancharick at R3_UIC_Mailbox@epa.gov. Once the EPA has received the necessary information, we can proceed with processing the draft permit and statement of basis. Thank you for your cooperation on this matter. If you have any questions or concerns, please contact Ryan Hancharick at 215-814-3278.

Sincerely,

**KAREN
CRUMLISH**

Karen E. Crumlish, Chief
Drinking Water and Source Water Protection Branch

Digitally signed by KAREN
CRUMLISH
Date: 2025.03.10 13:17:02
-04'00'



Commonwealth of Virginia
Virginia Department of Energy
Gas and Oil
3405 Mountain Empire Road, Big Stone Gap, VA 24219
Telephone: (276) 415-9700

DRILLERS REPORT

Beginning Drilling Date: 01/01/1991

Ending Drilling Date: 4/9/2025

Sorted By: County

Type: Completed

Counties: ALL

Operation Types: ALL

Companies: EnerVest Operating, LLC

File Numbers: Haysi #24 W/PL - BU-3244 - 450270324400

File # Permit #	Company Name Operation Name	API/US Well #	Quadrangle County	Coordinates	Started Completed	Operation Type Status	Form TD
BU-3244 7581-01	EnerVest Operating, LLC Haysi #24 W/PL	450270324400	PRATER BUCHANAN	10403562.0000 3616454.6700	12/27/2006 1/11/2007	Coalbed/Pipeline Producing	2454.00



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Box 1416; Abingdon, VA 24212
Telephone: (276) 676-5423

Tracking Number: 613
Company: Pine Mountain Oil & Gas
File Number: BU-3244
Operations Name: Haysi #24 W/PL
Operation Type: Coalbed/Pipeline
Drilling Report Type: Original

DRILLING REPORT (DGO-GO-14)

1. Drilling Data

Date drilling commenced: 12/27/2006 Drilling Contractor: Noah Horn
Date drilling completed: 1/11/2007 Rig Type: ☒ Rotary ☐ Cable Tool
Driller's Total Depth (feet): 2,454
Log Total Depth (feet): 2,451 Coal Seam At Total Depth POCAHONTAS #2

2. Final Location Plat (as required by 4 VAC25-150-360.C.)

Permitted State Plane X 920,574 Final Plat State Plane X: 920,577
Permitted State Plane Y: 335,571 Final Plat State Plane Y: 335,576

☐ Plat Previously Submitted Or...

List of Attached Items:

Description	FileName
Haysi 24 Plat	Haysi 24 Plat.pdf

3. Geological Data

Fresh Water At:

Depth (in feet)	Rate	Unit of Measure
250	1.5	GPM

Salt Water At:

Depth (in feet)	Rate	Unit of Measure
1,420	Damp	

Coal Seams

List of Attached Items:

Description	FileName
Haysi 24 Coal	Haysi 24 Coal.xls

Gas and Oil Shows

List of Attached Items:

Description	FileName
Haysi 24 Shows	Haysi 24 Shows.xls

4. Electric Logs (As required by 4VAC25-150-280.A.)

List all logs run: Hi Res GR/Dens/Temp/Audio/Pe/Caliper (Data Pack)

Did logs disclose vertical locations of a coal seam? ☐ Yes ☒ No

5. Survey Results (As required by 4VAC25-150-280.B.2)

List of Attached Items:

Description	FileName
Haysi 24 Survey	Haysi 24 Survey.xls

6. Casing and Tubing Program

List of Attached Items:

Description	FileName
Haysi 24 Casing	Haysi 24 Casing.xls

7. Remarks

Use this space to note any conditions or occurrences, such as lost circulation, fishing jobs, junk left in hole, sidetracks, squeeze jobs, etc., not shown above. Include data and depth of condition/occurrence.

Circ trace to surf on 8"?; grout w/ 23sx CI A.; Circ 3 bbl to surf. Broke bit @ 1875', partial fishing success; several unsuccessful kick-plugs. Kick off @ 1800', broke cone off bit. Fished out cone. Trip into hole w/ 6¼", drill to TD. Circ 30+ bbl t

8. Drillers Log

Compiled By: Noah Horn

List of Attached Items:

Description	FileName
Haysi 24 Log	Haysi 24 Log.xls

9. Comments

10. Signature

Permitee: Pine Mountain Oil & Gas Date: 8/16/2007 (Company)

Signed By: Christian D. Moore Title: Permit/GIS Specialist (Signature)

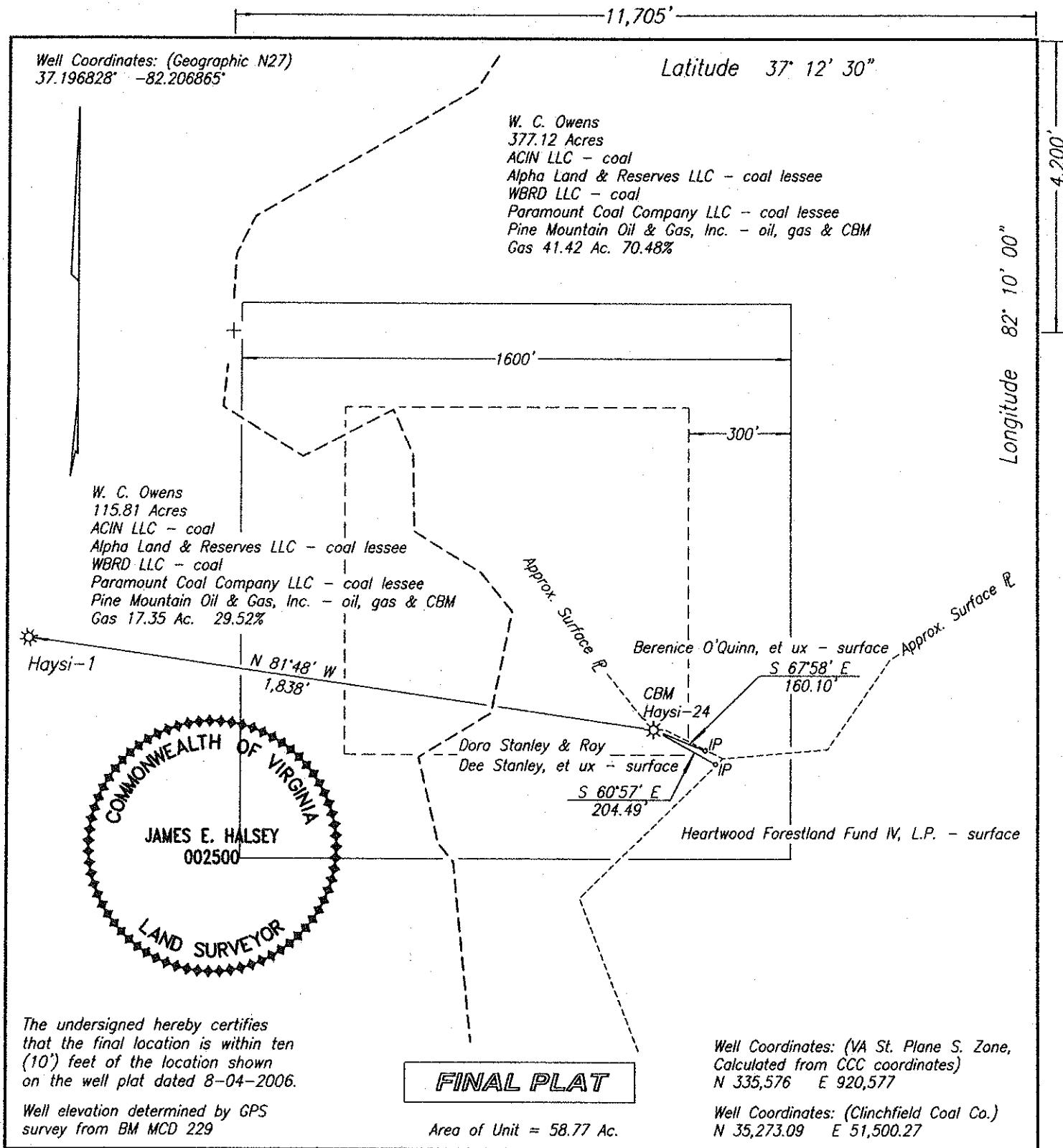
INTERNAL USE ONLY

Submit Date: 8/16/2007

Status: Inspr Approved

Date: 8/30/2007

Final PDF Date: 8/30/2007



WELL LOCATION PLAT

COMPANY Pine Mountain Oil & Gas, Inc. WELL NAME AND NUMBER Haysi-24
TRACT NO. W.C. Owens ELEVATION 2,016.91' QUADRANGLE Prater
COUNTY Buchanan DISTRICT Prater SCALE 1" = 400' DATE 12-27-2006
This Plat is a new plat ; an updated plat ; or a final location plat x
+ Denotes the location of a well on United States topographic Maps, scale 1 to 24,000, latitude and longitude lines being represented by border lines as shown.

James E. Halsey
Licensed Professional Engineer or Licensed Land Surveyor

Coal Seams

				MI	
NAME	TOP	BOTTOM	THICKNESS	YES	NO
Aily	876	877	1		NO
Raven	964	965	1		NO
Raven	975	976	1		NO
Jawbone Rider	1079	1081	2		NO
Jawbone	1114	1115	1		NO
Tiller	1185	1186	1		NO
Upper Seaboard	1302	1304	2		NO
Upper Seaboard	1307	1308	1		NO
Greasy Creek	1428	1431	3		NO
Upper Horsepen	1565	1566	1		NO
Middle Horsepen	1624	1625	1		NO
War Creek	1698	1699	1		NO
Beckley	1790	1791	1		NO
Lower Horsepen	1825	1826	1		NO
Poco 4	2160	2161	1		NO
Poco 3	2192	2195	3		NO
Poco 2	2257	2258	1		NO

[illegible]

Gas and Oil Shows

FORMATION	TOP	BOTTOM	THICKNESS	IPF (MCFD/BOPD)	PRESSURE	HOURS TESTED
Open Hole TD				1.5M		

Survey Results

Depth of Survey	Direction/Distance/Degree From True Vertical
220'	0°
420'	0°
600'	0.5°
810'	0.5°
1020'	0.25°
1200	0°
1410'	0.25°
1620'	0.25°
1800'	0.25°
2010'	0.25°
2220'	0°

Casing Program

	Casing	Casing	Hole	Cement Used	Cemented To Surface	Date
Casing Type	Size	Interval	Size	In Cubic Ft.	Yes/No	Cemented
Conductor	13 ³ / ₈ "	0-16'	15"			
Surface	8 ⁵ / ₈ "	0-311'	12 ¹ / ₄ "	208	No, Grouted	12/27/2006
Water Protection	4 ¹ / ₂ "	0-2401'	6 ¹ / ₂ /6 ¹ / ₄ "	464	Yes	1/11/2007
Tubing	2 ³ / ₈ "	0-2307'				

Packers Or Bridge Plugs
Kind/Size/Set

Driller's Log

		General		Depth	Depth
Geologic Age	Formation	Lithology	Color	Top	Bottom
PENN	Lee	SS, SH, Thin Coals		0	876
PENN	Lee	Coal		876	877
PENN	Lee	SS, SH, Thin Coals		877	964
PENN	Lee	Coal		964	965
PENN	Lee	SS, SH, Thin Coals		965	975
PENN	Lee	Coal		975	976
PENN	Lee	SS, SH, Thin Coals		976	1079
PENN	Lee	Coal		1079	1081
PENN	Lee	SS, SH, Thin Coals		1081	1114
PENN	Lee	Coal		1114	1115
PENN	Lee	SS, SH, Thin Coals		1115	1185
PENN	Lee	Coal		1185	1186
PENN	Lee	SS, SH, Thin Coals		1186	1302
PENN	Lee	Coal		1302	1304
PENN	Lee	SS, SH, Thin Coals		1304	1307
PENN	Lee	Coal		1307	1308
PENN	Lee	SS, SH, Thin Coals		1308	1428
PENN	Lee	Coal		1428	1431
PENN	Lee	SS, SH, Thin Coals		1431	1565
PENN	Lee	Coal		1565	1566
PENN	Lee	SS, SH, Thin Coals		1566	1624
PENN	Lee	Coal		1624	1625
PENN	Lee	SS, SH, Thin Coals		1625	1698
PENN	Lee	Coal		1698	1699
PENN	Lee	SS, SH, Thin Coals		1699	1790
PENN	Lee	Coal		1790	1791
PENN	Lee	SS, SH, Thin Coals		1791	1825
PENN	Lee	Coal		1825	1826
PENN	Pocahontas	SS, SH, Thin Coals		1826	2160
PENN	Pocahontas	Coal		2160	2161
PENN	Pocahontas	SS, SH, Thin Coals		2161	2192
PENN	Pocahontas	Coal		2192	2195
PENN	Pocahontas	SS, SH, Thin Coals		2195	2257
PENN	Pocahontas	Coal		2257	2258
PENN	Pocahontas	SS, SH, Thin Coals		2258	2451

Thickness	Remarks
876	
1	
87	
1	
10	
1	
103	
2	
33	
1	
70	
1	
116	
2	
3	
1	
120	
3	
134	
1	
58	
1	
73	
1	
91	
1	
34	
1	
334	
1	
31	
3	
62	
1	
193	



Commonwealth of Virginia
Virginia Department of Energy
Gas and Oil
3405 Mountain Empire Road, Big Stone Gap, VA 24219
Telephone: (276) 415-9700

COMPLETION REPORT

Beginning Completion Dt: 01/01/1991

Ending Completion Dt: 4/9/2025

Sorted By: Operation Types

Counties: ALL

Operation Types: ALL

Companies: EnerVest Operating, LLC

File Numbers: Haysi #24 W/PL - BU-3244 - 450270324400

County	File # Permit #	Company Name Operation Name	API/US Well #	Completion Date Quadrangle	Type	Coordinates	Form	TD
BUCHANAN	BU-3244 7581-01	EnerVest Operating, LLC Haysi #24 W/PL	450270324400	2/8/2007 PRATER	Coalbed/Pipeline	10403562.0000 3616454.6700		2454.00



Commonwealth of Virginia
Virginia Department of Energy
Gas and Oil
3405 Mountain Empire Road, Big Stone Gap, VA 24219
Telephone: (276) 415-9700

COMPLETION REPORT

Beginning Completion Dt: 01/01/1991

Ending Completion Dt: 4/9/2025

Sorted By: Operation Types

Counties: ALL

Operation Types: ALL

Companies: EnerVest Operating, LLC

File Numbers: Haysi #26 W/PL - BU-3236 - 450270323600

County	File # Permit #	Company Name Operation Name	API/US Well #	Completion Date Quadrangle	Type	Coordinates	Form	TD
BUCHANAN	BU-3236 7543-02	EnerVest Operating, LLC Haysi #26 W/PL	450270323600	1/4/2007 PRATER	Coalbed/Pipeline	10404298.0300 3615295.6300		2394.00



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Box 1416; Abingdon, VA 24212
Telephone: (276) 676-5423

Tracking Number: 602
Company: Pine Mountain Oil & Gas
File Number: BU-3236
Operations Name: Haysi #26 W/PL
Operation Type: Coalbed/Pipeline
Completion Report Type: Original

COMPLETION REPORT (DGO-GO-15)

Well Type:	Coalbed/Pipeline	Date Well Completed:	1/4/2007
Driller's Total Depth:	2,394	Log's Total Depth:	2,330

1. Changes In Casing/Tubing from Approved Drilling Report

Description	FileName
Haysi 26 Comp Casing	Haysi 26 Comp Casing.xls

2. Stimulation Record

☐ Stimulated ☐ Not Stimulated ☐ Gob

Description	FileName
Haysi 26 Stimulation	Haysi 26 Stimulation.doc

3. Final Production

Description	FileName
Haysi 26 Final Prod	Haysi 26 Final Prod.xls

4. Comments

Notes:

5. Signature

Permittee: Pine Mountain Oil & Gas Date: 8/16/2007 2:56:11 PM (Company)

By: Christian D. Moore Title: Permit/GIS Specialist (Signature)

INTERNAL USE ONLY

Submit Date: 8/16/2007

Status: Inspr Approved

Date: 9/4/2007

Final PDF Date: 9/4/2007

Casing Program

	Casing	Casing	Hole	Cement Used	Cemented To Surface	Date
Casing Type	Size	Interval	Size	In Cubic Ft.	Yes/No	Cemented
Conductor	11 ³ / ₄ "	0-52'	15"			
Surface	8 ⁵ / ₈ "	0-310'	10 ⁷ / ₈ "	110 sx	No	11/28/2006
Water Protection	4 ¹ / ₂ "	0-2341'	6 ¹ / ₂ "	215 sx	Yes	12/1/2006
Tubing	2 ³ / ₈ "	0-2291'				

Packers Or Bridge Plugs
Kind/Size/Set

STIMULATION RECORD

ZONE 1: Poco 3, X seam x 2, Poco 2 & 1 Formation Stimulated With: Gel+N₂ Foam
 Perforated 2126 to 2244.4 feet No. of Perforations 12 Perforation Size 0.34
 Formation Broke down at: 2382 PSIG Average Injection Rate: 25.8 BPM
 ISIP 1492 PSIG 5 Min SIP 1415 PSIG Average Downhole Injection Pressure 2800 PSIG
 Stimulated: ☒ Yes ☐ No Date Stimulated: 1/4/07

ZONE 2: U & M Hpen, War Creek & L Hpen Formation Stimulated With: Gel+N₂ Foam
 Perforated 1500 to 1765 feet No. of Perforations 24 Perforation Size 0.33
 Formation Broke down at: 2805 PSIG Average Injection Rate: 23.6 BPM
 ISIP 1616 PSIG 5 Min SIP N/A PSIG Average Downhole Injection Pressure 2804 PSIG
 Stimulated: ☒ Yes ☐ No Date Stimulated: 1/4/07

ZONE 3: Upper Seaboard x 2 & Greasy Creek Formation Stimulated With: Gel+N₂ Foam
 Perforated 1193.5 to 1351.5 feet No. of Perforations 25 Perforation Size 0.33
 Formation Broke down at: 1497 PSIG Average Injection Rate: 24.5 BPM
 ISIP PSIG 5 Min SIP PSIG Average Downhole Injection Pressure 3188 PSIG
 Stimulated: ☒ Yes ☐ No Date Stimulated: 1/5/07

ZONE 4: Jawbone Rider, Jawbone & Tiller Formation Stimulated With: Gel+N₂ Foam
 Perforated 996.5 to 1099.5 feet No. of Perforations 30 Perforation Size 0.33
 Formation Broke down at: 1805 PSIG Average Injection Rate: 26.3 BPM
 ISIP 1016 PSIG 5 Min SIP N/A PSIG Average Downhole Injection Pressure 2920 PSIG
 Stimulated: ☒ Yes ☐ No Date Stimulated: 1/5/07

ZONE 5: Aily & Raven x2 Formation Stimulated With: Gel+N₂ Foam
 Perforated 806 to 902 feet No. of Perforations 25 Perforation Size 0.33
 Formation Broke down at: 1985 PSIG Average Injection Rate: 24 BPM
 ISIP 1634 PSIG 5 Min SIP 962 PSIG Average Downhole Injection Pressure 2427 PSIG
 Stimulated: ☒ Yes ☐ No Date Stimulated: 1/5/07

Final Production After Stimulation				
	BOD	MCFD	Hours Tested	Rock Pressure
Zone 1				
Zone 2				
Zone 3				
Final/Commingled Zones				



Commonwealth of Virginia
Virginia Department of Energy
Gas and Oil
3405 Mountain Empire Road, Big Stone Gap, VA 24219
Telephone: (276) 415-9700

DRILLERS REPORT

Beginning Drilling Date: 01/01/1991

Ending Drilling Date: 4/9/2025

Sorted By: County

Type: Completed

Counties: ALL

Operation Types: ALL

Companies: EnerVest Operating, LLC

File Numbers: Haysi #26 W/PL - BU-3236 - 450270323600

File # Permit #	Company Name Operation Name	API/US Well #	Quadrangle County	Coordinates	Started Completed	Operation Type Status	Form TD
BU-3236 7543-02	EnerVest Operating, LLC Haysi #26 W/PL	450270323600	PRATER BUCHANAN	10404298.0300 3615295.6300	11/20/2006 12/1/2006	Coalbed/Pipeline Producing	2394.00



Commonwealth of Virginia
Department of Mines, Minerals, and Energy
Division of Gas and Oil
P.O. Box 1416; Abingdon, VA 24212
Telephone: (276) 676-5423

Tracking Number: 614
Company: Pine Mountain Oil & Gas
File Number: BU-3236
Operations Name: Haysi #26 W/PL
Operation Type: Coalbed/Pipeline
Drilling Report Type: Original

DRILLING REPORT (DGO-GO-14)

1. Drilling Data

Date drilling commenced: 11/20/2006 Drilling Contractor: Noah Horn
Date drilling completed: 12/1/2006 Rig Type: ☒ Rotary ☐ Cable Tool
Driller's Total Depth (feet): 2,394
Log Total Depth (feet): 2,330 Coal Seam At Total Depth POCAHONTAS #2

2. Final Location Plat (as required by 4 VAC25-150-360.C.)

Permitted State Plane X 921,313 Final Plat State Plane X: 921,313
Permitted State Plane Y: 334,411 Final Plat State Plane Y: 334,417

☐ Plat Previously Submitted Or...

List of Attached Items:

Description	FileName
Haysi 26 Plat	Haysi 26 Plat.pdf

3. Geological Data

Fresh Water At:

Depth (in feet)	Rate	Unit of Measure
-----------------	------	-----------------

Salt Water At:

Depth (in feet)	Rate	Unit of Measure
1,110	Damp	

Coal Seams

List of Attached Items:

Description	FileName
Haysi 26 Coal	Haysi 26 Coal.xls

Gas and Oil Shows

List of Attached Items:

Description	FileName
Haysi 26 Shows	Haysi 26 Shows.xls

4. Electric Logs (As required by 4VAC25-150-280.A.)

List all logs run: Hi Res GR/Dens/Temp/Audio/Pe/Caliper (Data Pack)

Did logs disclose vertical locations of a coal seam? ☐ Yes ☒ No

5. Survey Results (As required by 4VAC25-150-280.B.2)

List of Attached Items:

Description	FileName
Haysi 26 Survey	Haysi 26 Survey.xls

6. Casing and Tubing Program

List of Attached Items:

Description	FileName
Haysi 26 Casing	Haysi 26 Casing.xls

7. Remarks

Use this space to note any conditions or occurrences, such as lost circulation, fishing jobs, junk left in hole, sidetracks, squeeze jobs, etc., not shown above. Include data and depth of condition/occurrence.

No Circ on 8" Hole, Grout w 30sx to surf. Circ 10 bbls to surf on 6½ hole.

8. Drillers Log

Compiled By: Noah Horn

List of Attached Items:

Description	FileName
Haysi 26 Log	Haysi 26 Log.xls

9. Comments

10. Signature

Permitee: Pine Mountain Oil & Gas Date: 8/16/2007 (Company)

Signed By: Christian D. Moore Title: Permit/GIS Specialist (Signature)

INTERNAL USE ONLY

Submit Date: 8/16/2007

Status: Inspr Approved

Date: 8/30/2007

Final PDF Date: 8/30/2007

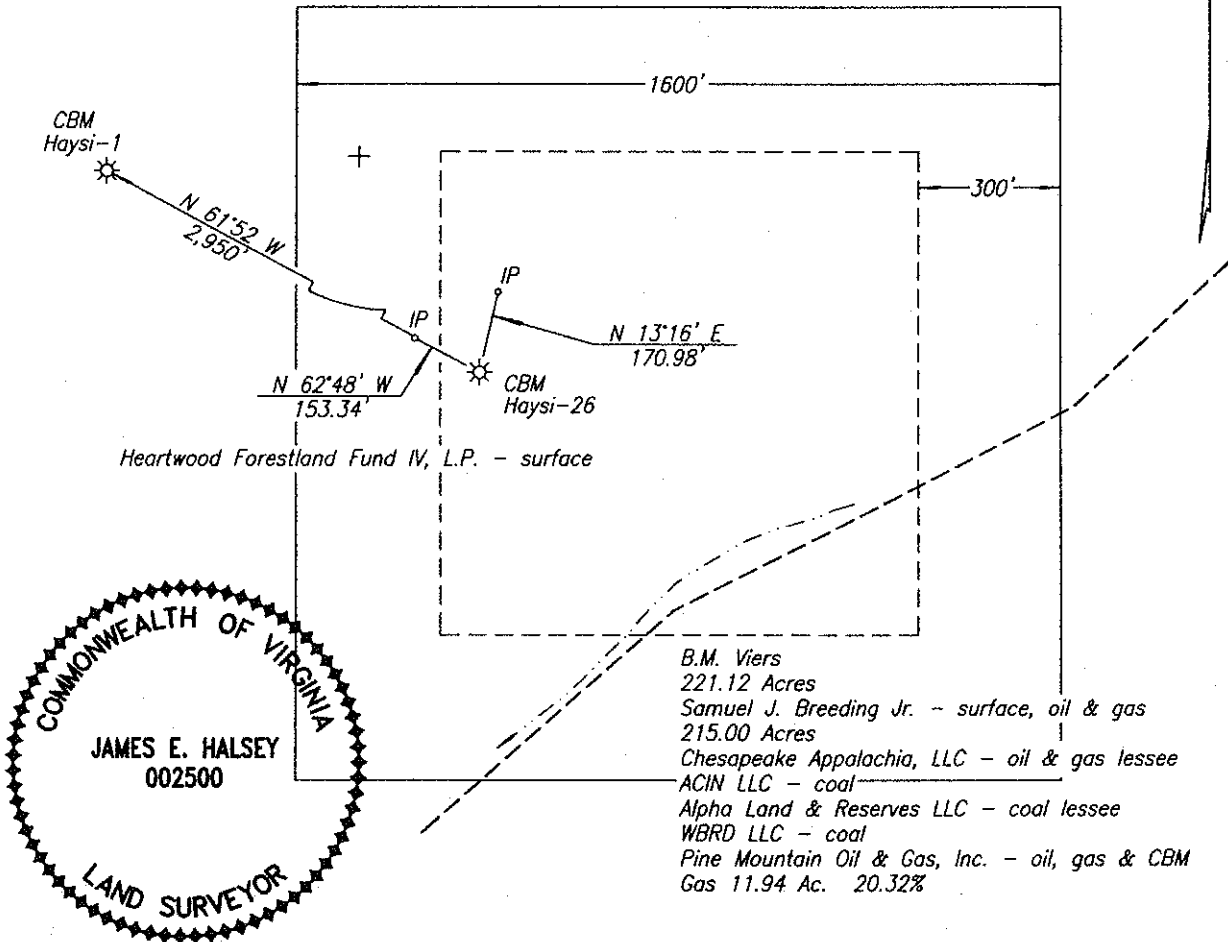
Well Coordinates: (Geographic N27)
37.193727° -82.204183°

Latitude 37° 12' 30"

W.C. Owens
377.12 Acres
ACIN LLC - coal
Alpha Land & Reserves LLC - coal lessee
WBRD LLC - coal
Paramont Coal Company Virginia, LLC - coal lessee
Pine Mountain Oil & Gas, Inc. - oil, gas & CBM
Gas 46.83 Ac. 79.68%

Longitude 82° 10' 00"

5,345'



The undersigned hereby certifies
that the final location is within ten
(10') feet of the location shown
on the well plat dated 8-17-2006.

Well elevation determined by
GPS Survey from BM MCD 229

FINAL PLAT

Area of Unit = 58.77 Ac.

Well Coordinates: (VA St. Plane S. Zone,
Calculated from CCC coordinates)
N 334,417 E 921,313

Well Coordinates: (Clinchfield Coal Co.)
N 34,143.85 E 52,282.72

WELL LOCATION PLAT

COMPANY Pine Mountain Oil & Gas, Inc. WELL NAME AND NUMBER Haysi-26
TRACT NO. W.C. Owens ELEVATION 1,997.10' QUADRANGLE Prater
COUNTY Buchanan DISTRICT Prater SCALE 1" = 400' DATE 11-28-2006

This Plat is a new plat ; an updated plat ; or a final location plat x

+ Denotes the location of a well on United States topographic Maps, scale 1 to
24,000, latitude and longitude lines being represented by border lines as shown.

James E. Halsey
Licensed Professional Engineer or Licensed Land Surveyor

Coal Seams

				MINING IN AREA		
NAME	TOP	BOTTOM	THICKNESS	YES	NO	MINED OUT
Aily	808	809	1		NO	
Raven	895	896	1		NO	
Raven	901	902	1		NO	
Jawbone Rider	998	1000	2		NO	
Jawbone	1032	1034	2		NO	
Tiller	1098	1099	1		NO	
Upper Seaboard	1194	1195	1		NO	
Upper Seaboard	1217	1218	1		NO	
Greasy Creek	1349	1351	2		NO	
Upper Horsepen	1501	1502	1		NO	
Middle Horsepen	1570	1571	1		NO	
War Creek	1640	1641	1		NO	
Lower Horsepen	1764	1765	1		NO	
Poco 3	2126	2129	3		NO	
Unknown	2136	2137	1		NO	
Unknown	2145	2146	1		NO	
Poco 2	2209	2210	1		NO	

Gas and Oil Shows

FORMATION	TOP	BOTTOM	THICKNESS	IPF (MCFD/BOPD)	PRESSURE	HOURS TESTED
Open Hole TD				Trace		
Cased Hole TD				0		

Survey Results

Depth of Survey	Direction/Distance/Degree From True Vertical
200	$\frac{1}{4}^{\circ}$
400	$\frac{1}{2}^{\circ}$
600	$\frac{1}{2}^{\circ}$
800	$\frac{1}{4}^{\circ}$
1000	$\frac{1}{4}^{\circ}$
1200	$\frac{1}{4}^{\circ}$
1400	$\frac{1}{4}^{\circ}$
1600	$\frac{1}{2}^{\circ}$
1800	$\frac{1}{2}^{\circ}$
2000	$\frac{3}{4}^{\circ}$

Casing Program

	Casing	Casing	Hole	Cement Used	Cemented To Surface	Date
Casing Type	Size	Interval	Size	In Cubic Ft.	Yes/No	Cemented
Conductor	11 ³ / ₄ "	0-52'	15"			
Surface	8 ⁵ / ₈ "	0-310'	10 ⁷ / ₈ "	110 sx	No	11/28/2006
Water Protection	4 ¹ / ₂ "	0-2341'	6 ¹ / ₂ "	215 sx	Yes	12/1/2006
Tubing	2 ³ / ₈ "	0-2291'				

Packers Or Bridge Plugs
Kind/Size/Set

Driller's Log

		General		Depth
Geologic Age	Formation	Lithology	Color	Top
PENN	Lee	SS, SH, Thin Coals		0
PENN	Lee	Coal		808
PENN	Lee	SS, SH, Thin Coals		809
PENN	Lee	Coal		895
PENN	Lee	SS, SH, Thin Coals		896
PENN	Lee	Coal		901
PENN	Lee	SS, SH, Thin Coals		902
PENN	Lee	Coal		998
PENN	Lee	SS, SH, Thin Coals		1000
PENN	Lee	Coal		1032
PENN	Lee	SS, SH, Thin Coals		1034
PENN	Lee	Coal		1098
PENN	Lee	SS, SH, Thin Coals		1099
PENN	Lee	Coal		1194
PENN	Lee	SS, SH, Thin Coals		1195
PENN	Lee	Coal		1217
PENN	Lee	SS, SH, Thin Coals		1218
PENN	Lee	Coal		1349
PENN	Lee	SS, SH, Thin Coals		1351
PENN	Lee	Coal		1501
PENN	Lee	SS, SH, Thin Coals		1502
PENN	Lee	Coal		1570
PENN	Lee	SS, SH, Thin Coals		1571
PENN	Lee	Coal		1640
PENN	Lee	SS, SH, Thin Coals		1641
PENN	Lee	Coal		1764
PENN	Pocahontas	SS, SH, Thin Coals		1765
PENN	Pocahontas	Coal		2126
PENN	Pocahontas	SS, SH, Thin Coals		2129
PENN	Pocahontas	Coal		2136
PENN	Pocahontas	SS, SH, Thin Coals		2137
PENN	Pocahontas	Coal		2145
PENN	Pocahontas	SS, SH, Thin Coals		2146
PENN	Pocahontas	Coal		2209

Depth		
Bottom	Thickness	Remarks
808	808	
809	1	
895	86	
896	1	
901	5	
902	1	
998	96	
1000	2	
1032	32	
1034	2	
1098	64	
1099	1	
1194	95	
1195	1	
1217	22	
1218	1	
1349	131	
1351	2	
1501	150	
1502	1	
1570	68	
1571	1	
1640	69	
1641	1	
1764	123	
1765	1	
2126	361	
2129	3	
2136	7	
2137	1	
2145	8	
2146	1	
2209	63	
2210	1	

WELL NAME ----- 900146
OPERATOR ----- Range Resources - Pine Mountain, Inc
PERMIT NUMBER ----- Proposed UIC Well Class II - D
DATE OF ANALYSIS ----- 7/24/2014
ANALYST ----- Range Resources - Pine Mountain, Inc

WELL AND FORMATION PARAMETERS

initial pressure at the top of the injection formation, p(i) (psia) -----
injection rate, q (bwpd) -----
length of injection time, (months) -----
viscosity, mu (cp.) -----
specific gravity of liquid -----
formation volume factor, beta (1 for aqueous liquids) -----
permeability, k (md.) -----
reservoir thickness, h (ft.) -----
compressibility, c(t) 1/psi) -----
porosity, phi, ratio -----
surface elevation KB, (ft.) -----
depth to injection zone, (ft) -----
end of cross-section, (ft.) -----

CALCULATION OF CRITICAL PRESSURE RISE

depth of concern, feet below KB (ft.) ----- 500
critical pressure rise to lift liquid to depth of concern, (psi) ----- 1430.831

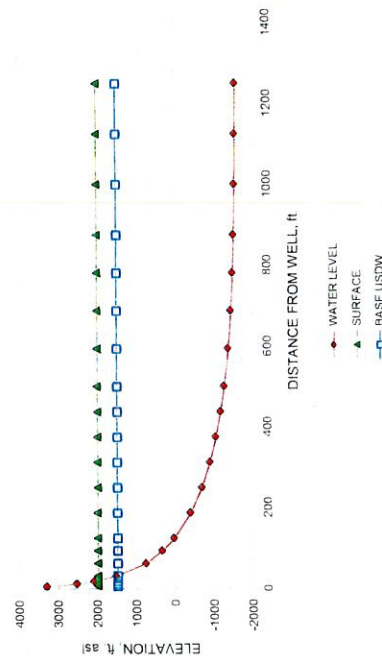
314.7 Note: add 14.7 to psig for psia
-217 Note: injection is negative

DISTANCE, ft.	pressure	WATER LEVEL	SURFACE	BASE USDW	INJECTION ZONE
6.25	2585.31	3304.13	2000	1500	-2250
12.5	2231.34	2543.67	2000	1500	-2250
18.75	2024.28	2098.84	2000	1500	-2250
31.25	1763.41	1538.41	2000	1500	-2250
62.5	1409.44	777.96	2000	1500	-2250
93.75	1211.95	353.69	2000	1500	-2250
125	1070.24	49.25	2000	1500	-2250
187.5	867.25	-386.85	2000	1500	-2250
250	732.94	-675.39	2000	1500	-2250
312.5	635.40	-884.94	2000	1500	-2250
375	566.21	-1033.59	2000	1500	-2250
437.5	507.48	-1159.76	2000	1500	-2250
500	460.75	-1260.15	2000	1500	-2250
593.75	411.98	-1364.92	2000	1500	-2250
687.5	377.77	-1438.42	2000	1500	-2250
781.25	355.04	-1487.25	2000	1500	-2250
875	339.85	-1519.88	2000	1500	-2250
1000	327.72	-1545.94	2000	1500	-2250
1125	321.95	-1558.34	2000	1500	-2250
1250	318.02	-1566.79	2000	1500	-2250

RADIAL DISTRIBUTION OF PRESSURE AROUND WELL OF CONCERN

linear term ----- -255.3367
E(t) term ----- 1.98E-06

HYDRAULIC HEAD RELATION TO SURFACE AND BASE OF USDW



HYDRAULIC HEADS



WELL NAME ----- 900146
OPERATOR ----- Range Resources - Pine Mountain, Inc
PERMIT NUMBER ----- Proposed UIC Well Class II - D
DATE OF ANALYSIS ----- 7/24/2014
ANALYST ----- Range Resources - Pine Mountain, Inc

WELL AND FORMATION PARAMETERS

initial pressure at the top of the injection formation, p(i) (psia) ----- 314.7 Note: add 14.7 to psig for psia
injection rate, q (bwpd) ----- -217 Note: injection is negative
length of injection time, (months) ----- 12
viscosity, mu (cp.) ----- 1
specific gravity of liquid ----- 1.075
formation volume factor, beta (1 for aqueous liquids) ----- 1
permeability, k (md.) ----- 1
reservoir thickness, h (ft.) ----- 60
compressibility, c(t) 1/psi ----- 0.000003
porosity, phi, ratio ----- 6
surface elevation KB, (ft.) ----- 2000
depth to injection zone, (ft) ----- 4250
end of cross-section, (ft.) ----- 5000

CALCULATION OF CRITICAL PRESSURE RISE

depth of concern, feet below KB (ft.) ----- 500
critical pressure rise to lift liquid to depth of concern, (psi) ----- 1430.831

DISTANCE, ft.	pressure	WATER LEVEL	SURFACE	BASE USDW	INJECTION ZONE
25	1877.36	1783.22	2000	1500	-2250
50	1523.39	1022.77	2000	1500	-2250
75	1321.75	589.57	2000	1500	-2250
125	1070.24	49.25	2000	1500	-2250
250	732.94	-675.39	2000	1500	-2250
375	566.21	-1033.59	2000	1500	-2250
500	460.75	-1260.15	2000	1500	-2250
750	361.43	-1473.53	2000	1500	-2250
1000	327.72	-1545.94	2000	1500	-2250
1250	318.02	-1566.79	2000	1500	-2250
1500	315.30	-1572.63	2000	1500	-2250
1750	314.79	-1573.72	2000	1500	-2250
2000	314.71	-1573.89	2000	1500	-2250
2375	314.70	-1573.92	2000	1500	-2250
2750	314.70	-1573.92	2000	1500	-2250
3125	314.70	-1573.92	2000	1500	-2250
3500	314.70	-1573.92	2000	1500	-2250
4000	314.70	-1573.92	2000	1500	-2250
4500	314.70	-1573.92	2000	1500	-2250
5000	314.70	-1573.92	2000	1500	-2250

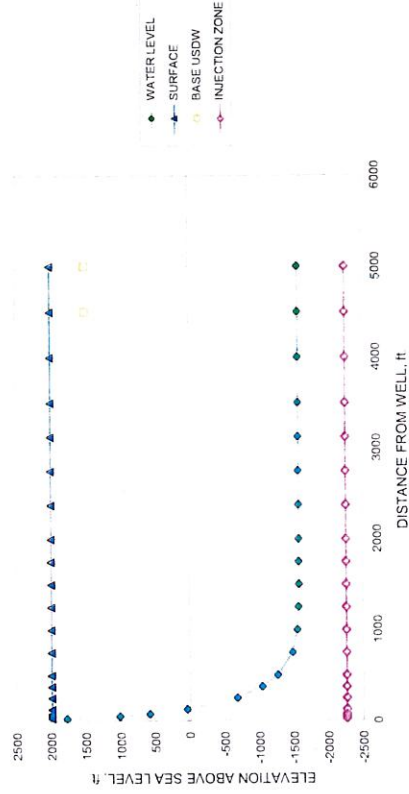
RADIAL DISTRIBUTION OF PRESSURE AROUND WELL OF CONCERN

linear term ----- -255.3367
E(t) term ----- 1.98E-06

HYDRAULIC HEAD RELATION TO SURFACE AND BASE OF USDW



HYDRAULIC HEADS



1.0 UNDERGROUND DRINKING WATER SOURCES

Underground sources of drinking water within the Area of Review are generally located within the unconsolidated alluvium/colluvium deposits and the associated Norton Formation along local stream elevation. Groundwater is typically found at depths within 300 feet of the topographic expression of the local stream grade.

The ground water user inventory conducted in the Area of Review identified no sources of drinking water.

Underground sources of drinking water would be expected to occur between depths of 200 feet and 760 feet related to the surface elevation of the SWD well, or approximately 3500 feet vertically above the target disposal zone.

2.0 GROUNDWATER DEPTHS

As stated in Section 1.0, no groundwater drinking water sources or users were found to exist within the ¼-mile radius the proposed well. The driller's log for the nearby SWD well (BU-1614 23606) reported no occurrence of fresh groundwater when the well was drilled, only "damp hole conditions" at 100 feet and 775 feet below the ground surface. No measurable flow of fresh groundwater was observed at any depth during the drilling of this well.

A review of the driller's log and completion reports for the coal bed methane wells within ¼-mile radius of this proposed well 900146 (VAS2D955BBUC) provided the following conditions:

- **Haysi 4:** A fresh groundwater zone was encountered at 70 feet below ground surface with a 1 gpm/1" stream.
- **Haysi 8:** No fresh groundwater zones were encountered.
- **Haysi 10:** No fresh groundwater zones were encountered.
- **Haysi 148:** "Damp Hole" at 194 feet.

3.0 GROUNDWATER PROTECTION

Groundwater and coal protection casings are proposed to be installed in Well 900146. These groundwater and coal protection casings are described as:

- 13 3/8-inch conductor casing installed at ground level and cemented along its entire length to ground surface.

- 9 5/8-inch water protection casing installed from ground depth through the groundwater zone and casings will be continuously cemented along its entire length to ground surface.
- 7-inch water and coal protection casing installed from ground level and continuously cemented along its entire length to ground surface.

These three (3) steel casings will be placed and individually cemented along their outside diameter from their set depth to ground surface. These three casings effectively seal the well's operations from the surrounding groundwater and coal seams.

The well's existing casing program and the placement of cement along the outside diameters of these casings will seal the well's operations from the surroundings, groundwater, coal seams, and the known gas production formations.

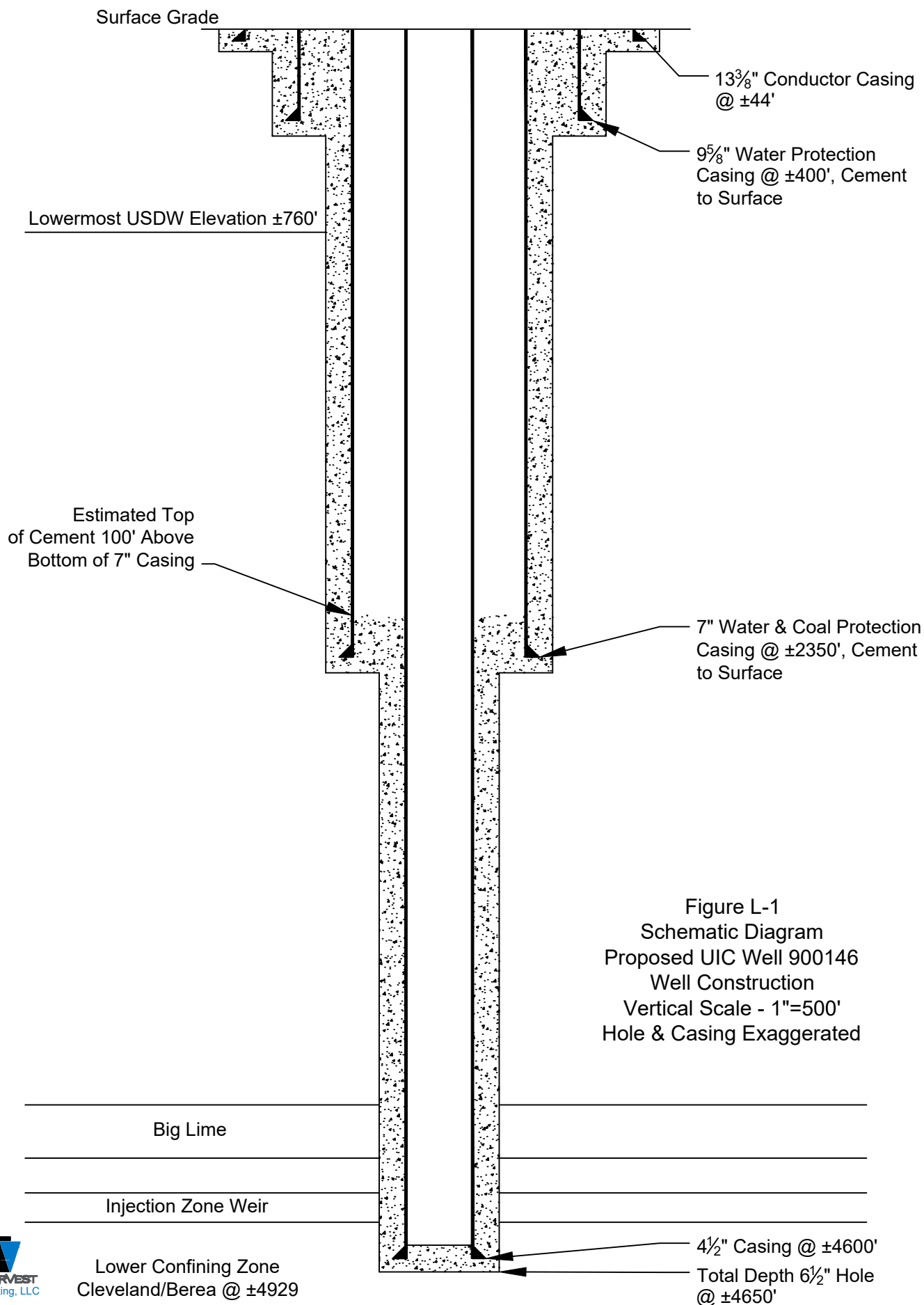
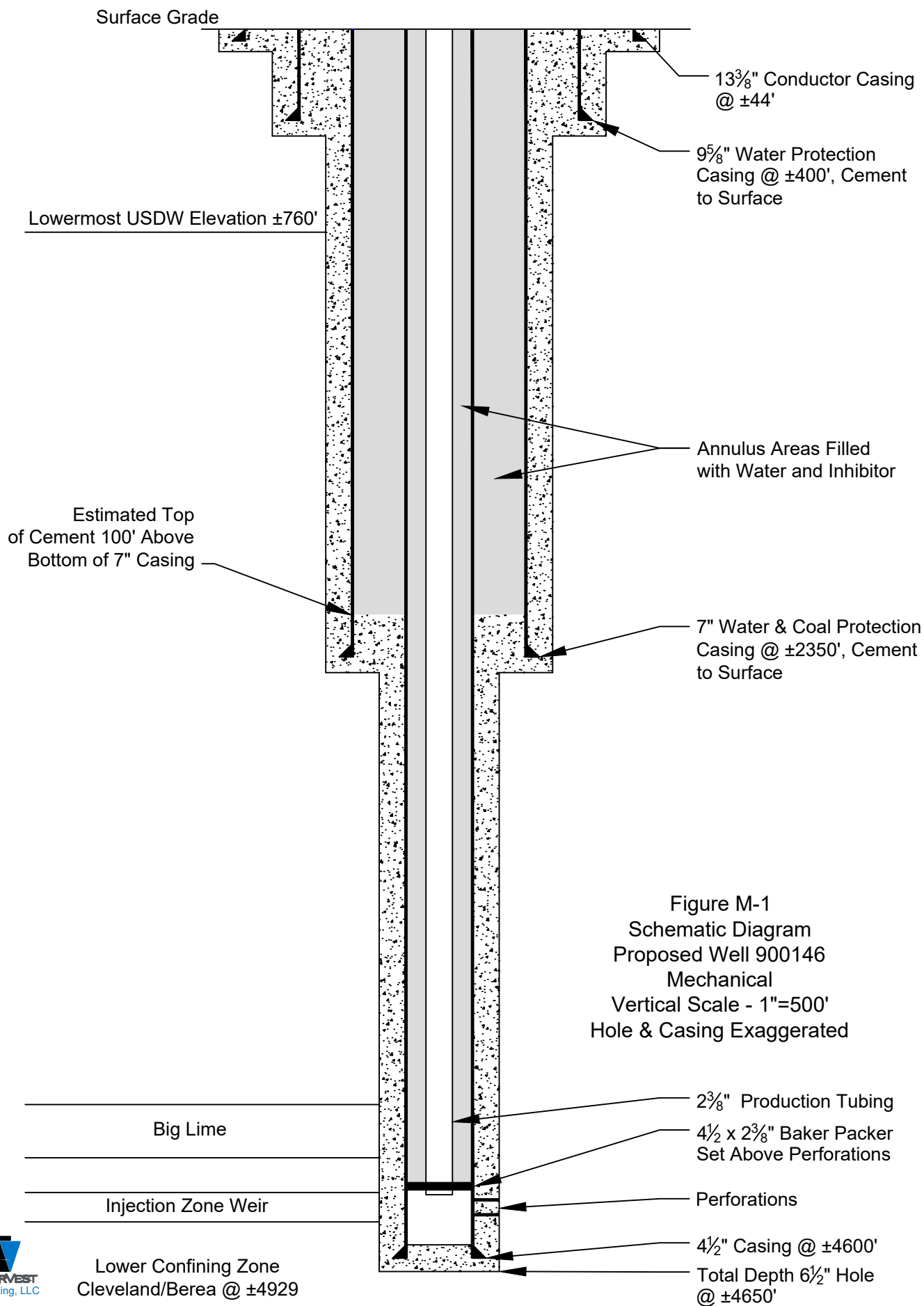


Figure L-1
Schematic Diagram
Proposed UIC Well 900146
Well Construction
Vertical Scale - 1"=500'
Hole & Casing Exaggerated



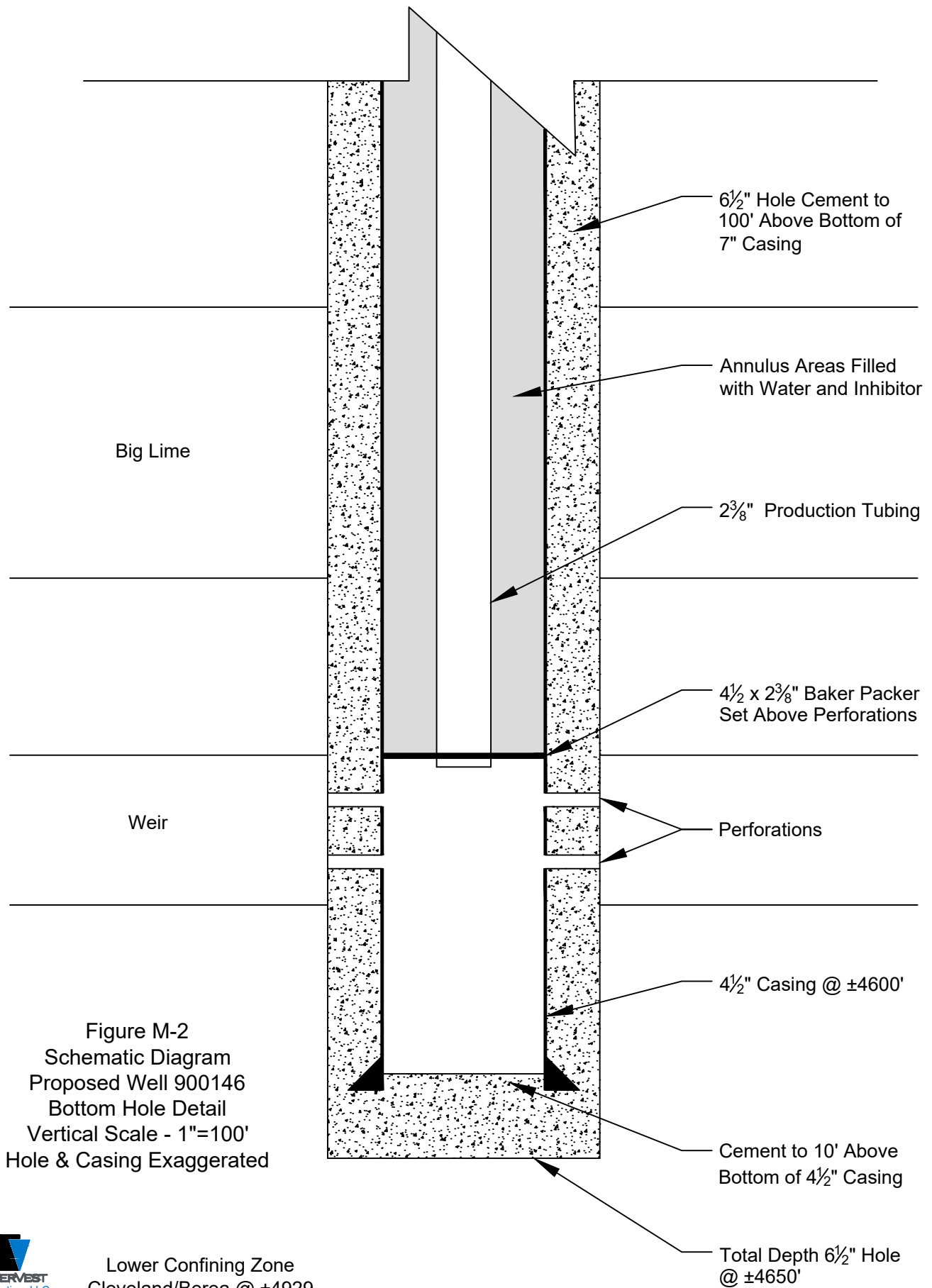
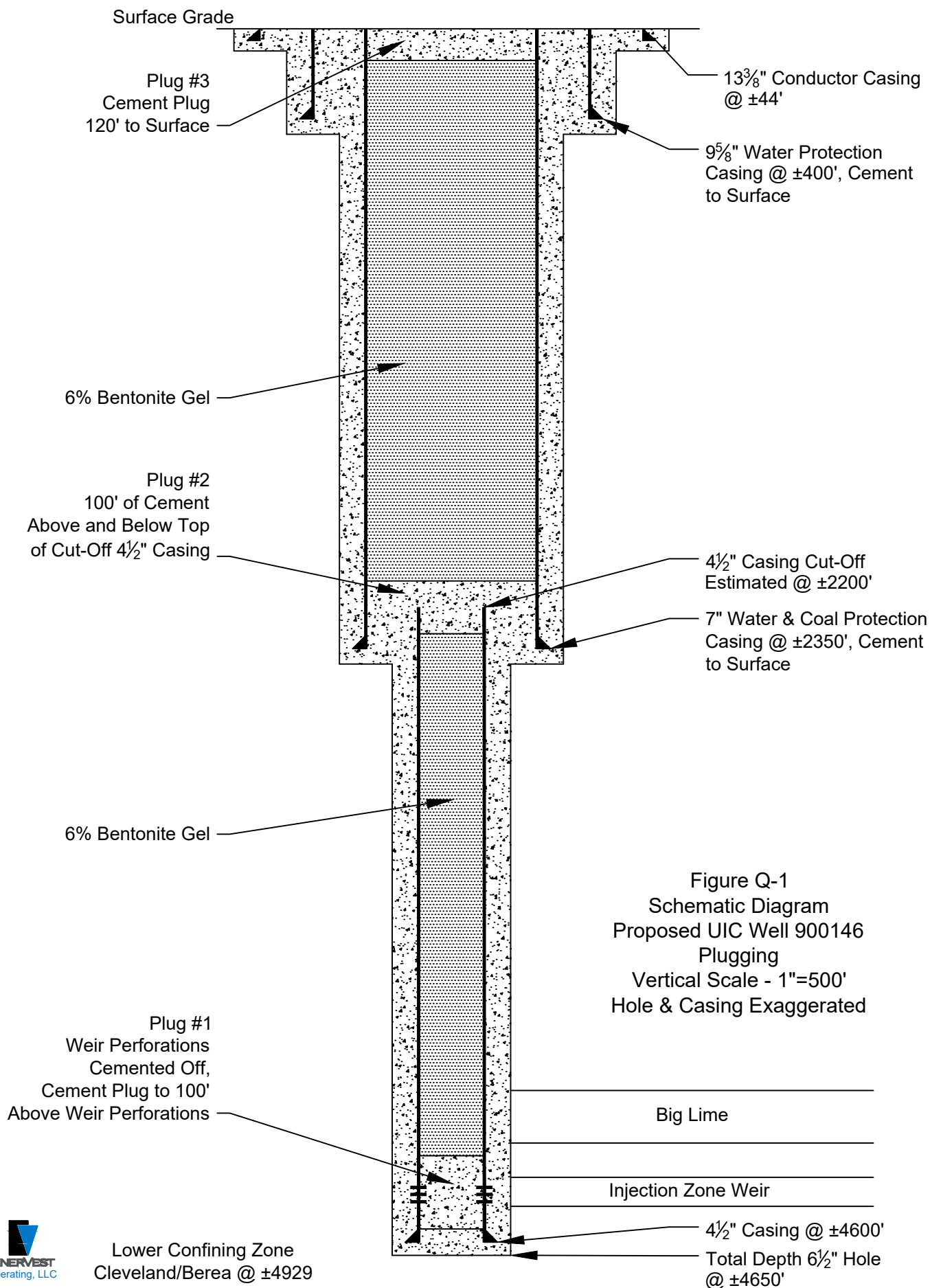
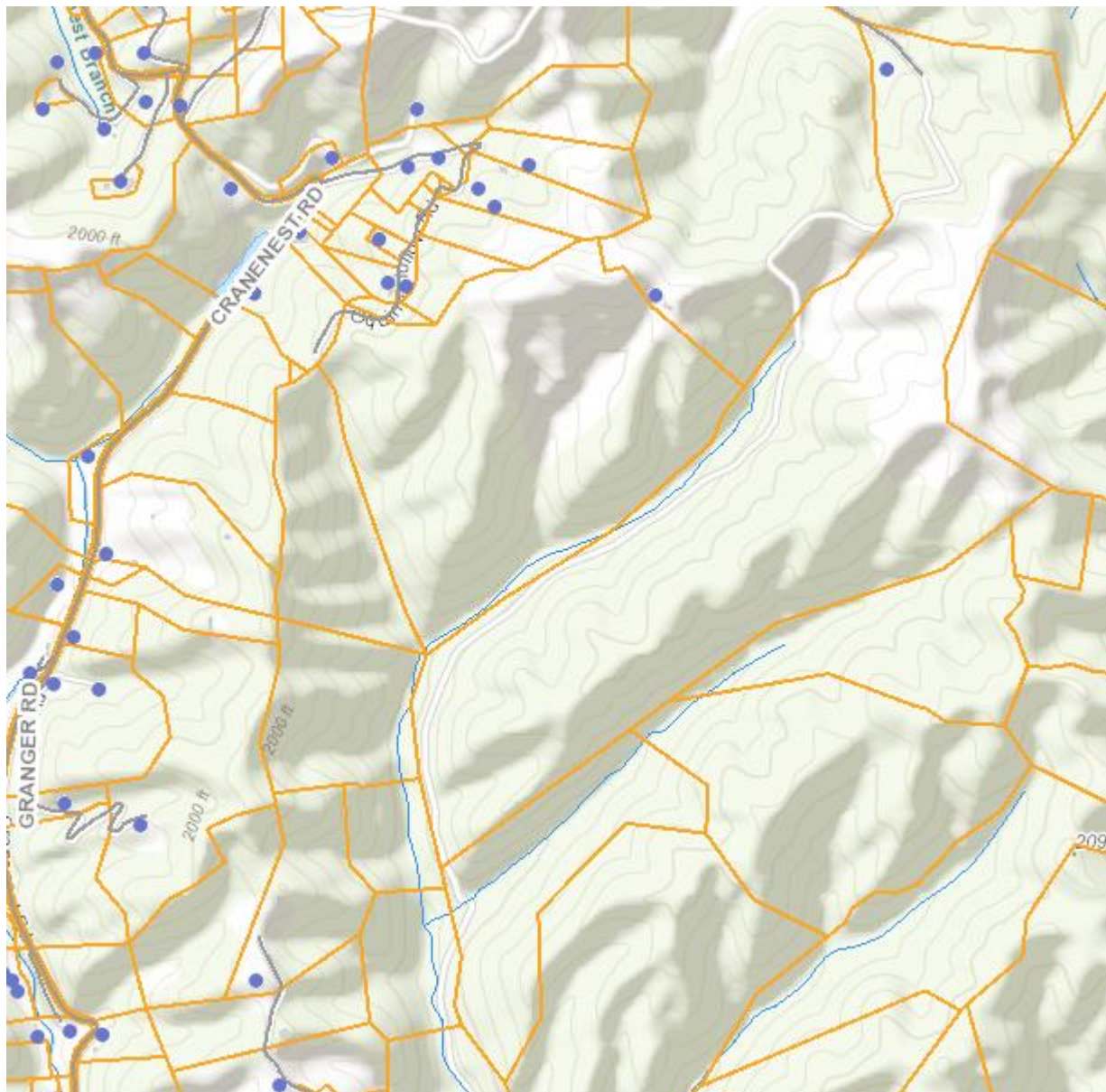


Figure M-2
Schematic Diagram
Proposed Well 900146
Bottom Hole Detail
Vertical Scale - 1"=100'
Hole & Casing Exaggerated





SURFACE OWNERSHIP MAP FROM COUNTY GIS ½ MILE FROM 900146

SURFACE OWNERS WITHIN 1/2 MILE OF 900146

ACCOUNT	OWNER	ADDRESS1	ADDRESS2	ADDRESS3	ZIPCODE1	DESCRIPT3	ACRES
12660	CF HIGHLANDS LLC		146 EAST MAIN ST	ABINGDON, VA	24210	AC 115	115
1797	THE NATURE CONSERVANCY		652 PETER JEFFERSON PKY STE190	CHARLOTTESVILLE, VA	22911	AC 163.541	163
9237	KISER, BUSTER WAYNE		1103 BUMSIDE STREET	HOPEWELL, VA	23860	AC 13	13
12647	CF HIGHLANDS LLC		146 EAST MAIN ST	ABINGDON, VA	24210	AC 26	26
12649	CF HIGHLANDS LLC		146 EAST MAIN ST	ABINDGON, VA	24210	AC 18	18
12514	OWENS, SAMMIE RAY & TERESA PAM		7611 RED BUD HWY	HONAKER, VA	24260	AC 4.7	4.7
12512	OWENS, BILLY RAY		696 LOWELL JONES RD	PINEYFLATS, TN	37686	AC 21.65	21.65
12476	OWENS, OCIE MAY & ANTHONY R COLEMAN		1883 CRANSNEST RD	VANSANT, VA	24656	AC 25	25
12477	OWENS, OCIE MAY & ANTHONY R COLEMAN		1883 CRANSNEST RD	VANSANT, VA	24656	AC 2	2
12109	AKERS, SHEILA A		PO BOX 341	GRUNDY, VA	24614	AC 37	37
12146	COLEMAN, DOUGLAS & LINDA LORETTA		2117 CRANES NEST RD	VANSANT, VA	24656	AC 8	8
12145	O'QUINN, RICE & EDGAR MAE	C/O BERNICE OQUINN	1423 OQUINN HOLLOW RD	VANSANT, VA	24656	AC 2.82	2.82
12145	O'QUINN, KIMBERLY NICOLE		1422 OQUINN HOLLOW RD	VANSANT, VA	24656	AC 2.82	2.82
20104	O'QUINN, BERENICE & ALICE JANE		1423 OQUINN HOLLOW RD	VANSANT, VA	24656	AC 3.87	3.87
2459	CHARLES, LESLIE RAY & SHAWNA JEANIN		PO BOX 476	HAYSI, VA	24256	AC 5	5
12454	DEEL, EUNICE FAY		7260 MEDICAL CENTER RD	AXTON, VA	24054	AC .22	0.22
4538	DEEL, EUNICE FAY		7260 MEDICAL CENTER RD	AXTON, VA	24054	AC .78	0.78
12405	DEEL, KERMIT & EUNICE FAYE		7260 MEDICAL CENTER RD	AXTON, VA	24054	AC .3	0.3
13105	CF HIGHLANDS LLC		146 EAST MAIN ST	ABINGDON, VA	24210	AC 5	5
13106	CF HIGHLANDS LLC		146 EAST MAIN ST	ABINGDON, VA	24210	AC 5	5
12144	O'QUINN, EDGAR MAE, JIMMY JERRY,		1289 OQUINN HOLLOW RD	VANSANT, VA	24656	AC 7.17	7.17
12144	O'QUINN, JIMMY JERRY, JIMMY ADAM,	c/o JIMMY OQUINN	1289 OQUINN HOLLOW RD	VANSANT, VA	24656	AC 7.17	7.17
3399	CF HIGHLANDS LLC		146 EAST MAIN ST	ABINDON, VA	24210	AC LOT	0.4
3113	COLEMAN, DOUGLAS & LINDA LORETTA		2117 CRANES NEST RD	VANSANT, VA	24656	AC 3	3
15588	YATES, JEFFERY LYN, DIANA KAY,		2169 CRANENEST RD	VANSANT, VA	24656	AC 3.25	3.25
378	O'QUINN, JIMMY JERRY, JIMMY ADAM,	c/o JIMMY OQUINN	1289 OQUINN HOLLOW RD	VANSANT, VA	24656	AC 3	3
12511	OWENS, SAMMIE RAY & DAVID SAMUEL		7611 RED BUD HWY	HONAKER, VA	24260	AC 10	10
17271	CF HIGHLANDS LLC		146 EAST MAIN ST	ABINGDON, VA	24210	AC 37.72	37.72
16888	BAILEY, EVERETT & TRULA		P.O. BOX 118	VANSANT, VA	24656	AC 15	15
16884	FLEMING, TOLLIE, KYLE & MELISSA		2056 ROSE RDG	CLINTWOOD, VA	24228	AC 16	16
5149	YATES, JEFFERY LYN & DIANA KAY		2169 CRANES NEST RD	VANSANT, VA	24656	AC 1	1
12119	O'QUINN, LOUIE & KAY		1098 DANCING WOLF RD	VANSANT, VA	24656	AC 68.5	68.5