Royall Pump & Well Company, Inc.
2958 Anderson Highway
Powhatan, VA 23139
T 804.598.8147
INFO@ROYALLPUMPANDWELL.COM

Town of Mineral Virginia
Ms. Nicole Washington, Town Manager
312 Mineral Avenue
Mineral, Virginia 23117

Well 4 Investigation Report:
337 Spring Street
Mineral, Va.

June 25, 2025:

The service crew was dispatched to Well 4 as approved to perform a comprehensive inspection of the original steel-cased well, including the pump system, total depth measurement, and preparation for a 24-hour yield test.

1. Existing Pump - Goulds Model 120L15 HP with a Franklin 15HP 200Volt 3Ph 6" Series electric Motor Dated M14(2014-year model). Physical condition of the pump was observed with no signs of mineral buildup or physical damage.
2. Insulation resistance readings on the pump motor were consistent at 1.9 MO across all legs.
3. Motor winding resistance was recorded as follows in ohms:
   • Black to Red – 0.31
   • Red to Yellow – 0.32
   • Black to Yellow – 0.29
4. The electrical wire going down the well to the pump was a Heavy-Duty Double Jacketed 6-3AWG. Found to be in good condition for with no signs of needing replacement until motor is replaced.
5. The pump was set 168ft of 3" Galvanized Steel Riser Pipe. This pipe is very deteriorated with rust and electrolysis – holes were found in a 3" nipple attached to the 3" check valve contained within the well. This 3" Riser pipe will be replaced before resetting of production pump.
6. The well itself- Records indicated the well to be constructed in 1957 as a 8 Inch diameter well to a final depth of 200ft producing 275GPM. Camera Inspection of Well 4 revealed.
   *The 8" Diameter well casing has been relined with 6" Diameter steel Pipe and grouted in place to a depth of 98ft.
   *The 6" Diameter pipe looked to be in good condition with minimal mineral build-up. The interior of the Rock walls of the well inspected good also with minimal mineral deposits present. Cleaning of the well bore is not viewed as necessary.
   *The last 6ft of the well contained a 6ft section of PVC Pipe- most likely a section of flow sleeve which fell off a pump sometime before the well was sleeved with 6 Inch Steel Pipe inside the 8 Inch.

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7. Yield Testing: A 10HP 77GPM Series test pump was installed into the well to a depth of 168ft on 2" Galvanized Steel Riser.

Yield Testing commenced at 11am on 06/30/2025:

Time:	Water Level		Discharge Rate
11:30AM	55ft Static		50
11:35AM	56ft		50
11:40AM	56.3ft		50
11:45AM	56.5ft	Adjusted to	80
11:50AM	57.0ft		80
11:55AM	57.4ft		80
12: Noon	57.6ft		80
12:30PM	59.8ft		80
1:00PM	61.3ft		80
1:30PM	62.6ft		80
2:00PM	63.8ft		80
2:30PM	64.4ft		80
3:00PM	65.1ft		80
3:30PM	65.6ft		80
4:00PM	65.9ft		80
4:30PM	66.3ft		80
5:00PM	66.7ft		80

Yield Testing Terminated – 10HP Test Pump will be removed and a larger pump shall be installed to continue testing on 07/01/2025

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8. 07/01/2025- Yield Testing continued with the 15HP 200Volt 120 GPM Series Goulds Pump set on 3" Galvanized Steel Riser Pipe.

Yield Testing Resumed at 11AM on 07/01/2025:

Time:	Water Level	Discharge Rate
11:00AM	55ft Static	105
11:30AM	58.4ft	105
12: Noon	60.1ft	105
12:30PM	62.1ft	105
1:00PM	62.9ft	105 increased to 135GPM
1:30PM	63.4ft	135
2:00PM	63.7ft	135
2:30PM	64.1ft	135
3:00PM	64.9ft	135 Increased to 150GPM
3:30PM	66.1ft	150
4:00PM	66.7ft	150 Increased to 180GPM
4:30PM	67.4ft	180
5:00PM	67.8ft	180
5:30PM	68.3ft	180 Pump Off/Recovery
	RECOVERY	
5:35PM	66.5ft	
5:40PM	64.7ft	
5:45PM	64.1ft	
5:50PM	63.7ft	
5:55PM	63.4ft	
6:00PM	62.1ft	

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9. 07/02/2025- Yield Testing continued with the 15HP 200Volt 120 GPM Series Goulds Pump set on 3" Galvanized Steel Riser Pipe.

Yield Testing Resumed at 8:30AM on 07/02/2025:

Time	Water Level	Discharge Rate
8:30AM	55ft Static	180GPM
8:45AM	63.2ft	180
9:00AM	64.8ft	180
9:15AM	65.5ft	180
9:30AM	66.4ft	180
9:45AM	66.8ft	180
10:00AM	67.4ft	180
10:15AM	67.9ft	180
10:30AM	68.3ft	180
10:45AM	68.9ft	180
11:00AM	69.3ft	180
11:15AM	69.7ft	180
11:30AM	70.2ft	180
11:45AM	70.3ft	180
12:00PM Noon	70.8ft	180
12:15PM	71.1ft	180
12:30PM	71.3ft	180
12:45PM	71.8ft	180
1:00PM	72.0ft	180
1:15PM	72.3ft	180
1:30PM	72.6ft	180
1:45PM	73.1ft	180
2:00PM	73.2ft	180
2:30PM	73.4ft	180
2:45PM	73.8ft	180
3:00PM	74.1ft	180
3:15PM	74.0ft	180
3:30PM	73.9ft	180
3:45PM	74.0ft	180
4:00PM	74.1ft	180
4:15PM	74.1ft	180

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4:30PM	74.0ft	180
4:45PM	74.0ft	180
5:00PM	74.1ft	180 Pump Off Recovery Started
	Recovery	
5:15PM	66.3ft	
5:20PM	66.0ft	
5:25PM	66.0ft	
5:30PM	66.0ft	
5:35PM	65.8ft	
5:40PM	65.5ft	
5:45PM	64.8ft	
6:50PM	64.1ft	
6:55PM	63.8ft	
7:00PM	63.5ft	
7:05PM	63.4ft	
7:10PM	63.1ft	
7:15PM	62.9ft	
7:20PM	62.7ft	
7:25PM	62.5ft	
7:30PM	62.3ft	
7:35PM	62.1ft	
7:40PM	61.9ft	
7:45PM	61.7ft	
7:50PM	61.5	
7:55PM	61.4ft	
8:00PM	61.3ft	
8:05PM	61.1ft	
8:10PM	60.0ft	
8:15PM	60.0ft	
8:20PM	59.9ft	
8:25PM	59.8ft	
8:30PM	59.8ft	
8:35PM	59.8ft	
8:40PM	59.9ft	
8:45PM	59.8ft	
8:50PM	59.8ft	
8:55PM	59.7ft	
9:00PM	59.7ft	

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10. Conclusion-

    The overall condition of the well and pump are in good condition. In review of this inspection, we would recommend formal contact be Made with VDH/ODW to request this well be returned to service. The Department will have a procedure you will need to follow, and they may require a continuous yield test to be performed with a collection of water samples during different times of the test period.

    The Yield testing of the well resulted in 180GPM flow at a stabilized pumping water level at 74.1ft

The historical yield testing reports supplied to Royall for review showed much lower static water levels with lower discharge rates than originally and observed during this inspection.

Royalls Crew observed the electronic measured static water level reading in the pump house not accurately recording the water level within the well.

The Electronic Transducer measured a static water level of 125ft on the day of pump removal with an actual physical reading taken by our crew of 55ft for the static – a discrepancy of the water works controls showing the water level in the well 70ft deeper than actual depth.

Additionally, the recent yield testing performed showing the well yield to be 33GPM leaves one to wonder what occurred over these three years.

1. It could be a blockage within the fracture network restricting the water from coming to the well that has now cleared itself, very rare but possible.
2. It could also be a combination of a few conditions. The faulty water level meter, the holes within the 3" Nipple along with a faulty valve sticking partly closed causing high backpressure.
3. In doing the recent test, the other testing company relied on the existing water level indicator and pumped the water through the existing meter and valving to service or open discharge. Would skew the results of the previous test.
4. Royall suggest the Main shut off valve, the Calval and the inline check valves of the discharge line be inspected for proper operation. These valves could be faulty, not opening fully, to allow full flow.

The other observation is the existing pump is sized to provide 75GPM at 425ft TDH, this is extremely close to the maximum 465ft of TDH this pump can produce before it reaches it shut off flow. In testing the existing pump, its performance meets the manufacturer's performance curve. Royall would suggest an alternate pump size (Goulds 95L15) be considered for future replacement.

Finally, the capacity of this Well 4 is still representative of its original design yield of 75GPM at 425TDH. Inspection of the waterworks valving and controls should be examined before return to service.

Sincerely,

Robert W. Royall, Sr.