Shale Hills CZO

Monitor Well Rehabilitation / Re-Construction
New Well Construction

November 16, 17, 21 – 2017
Mountain Research, LLC

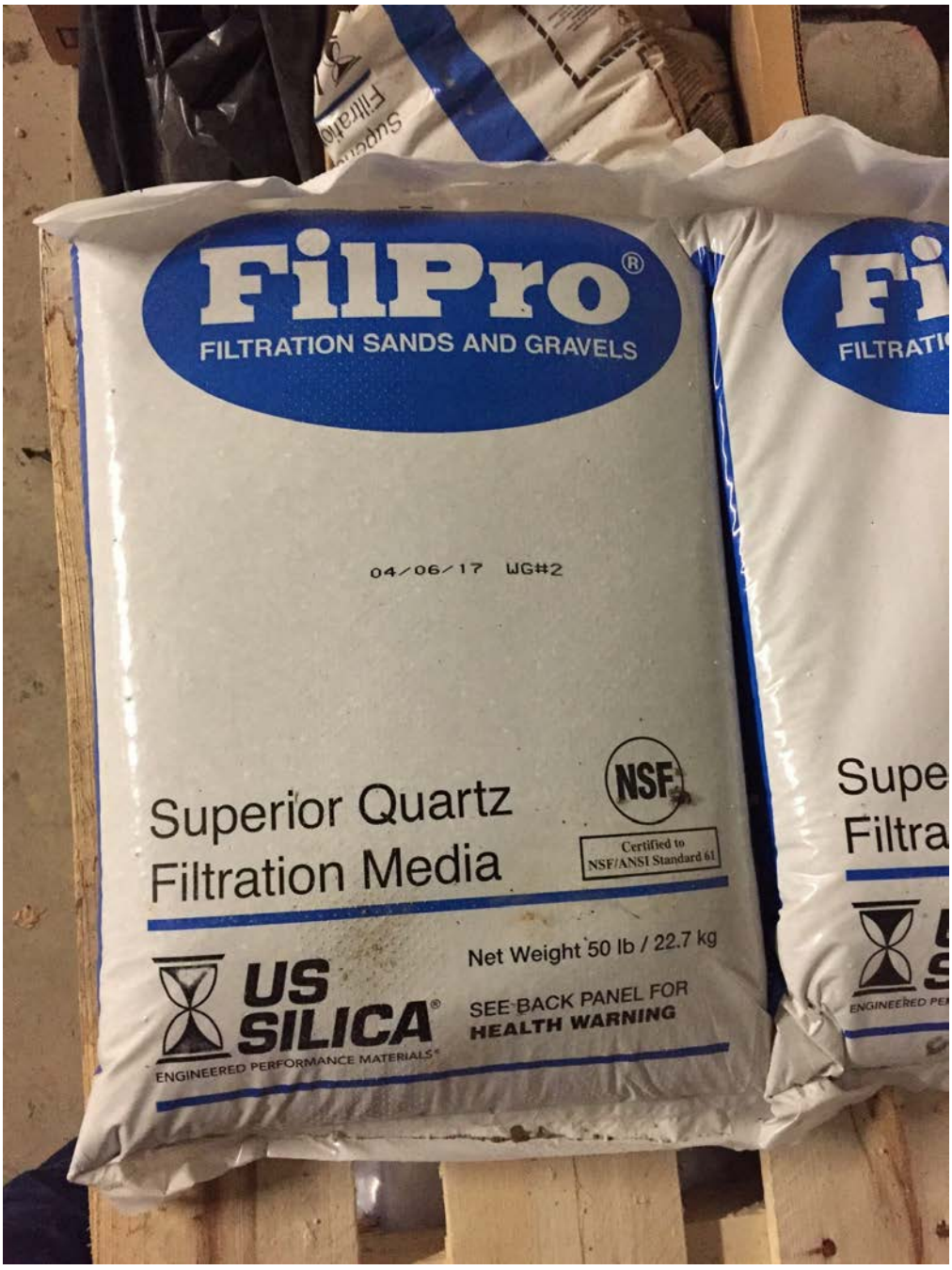
SUMMARY OF TASKS / EQUIPMENT

- Acker Soil Scout® Track Mounted Drill Rig
- 6.25 I.D. Hollow Stem Augers (HSA)
- Direct Push Sampling Apparatus
- Ingersoll Rand® 375/CFM-125 P.S.I. Air Compressor
- Mission® SD-4 & SD-6 Down-Hole Pneumatic Driven Rotary Percussion Hammers
- Protective Mats

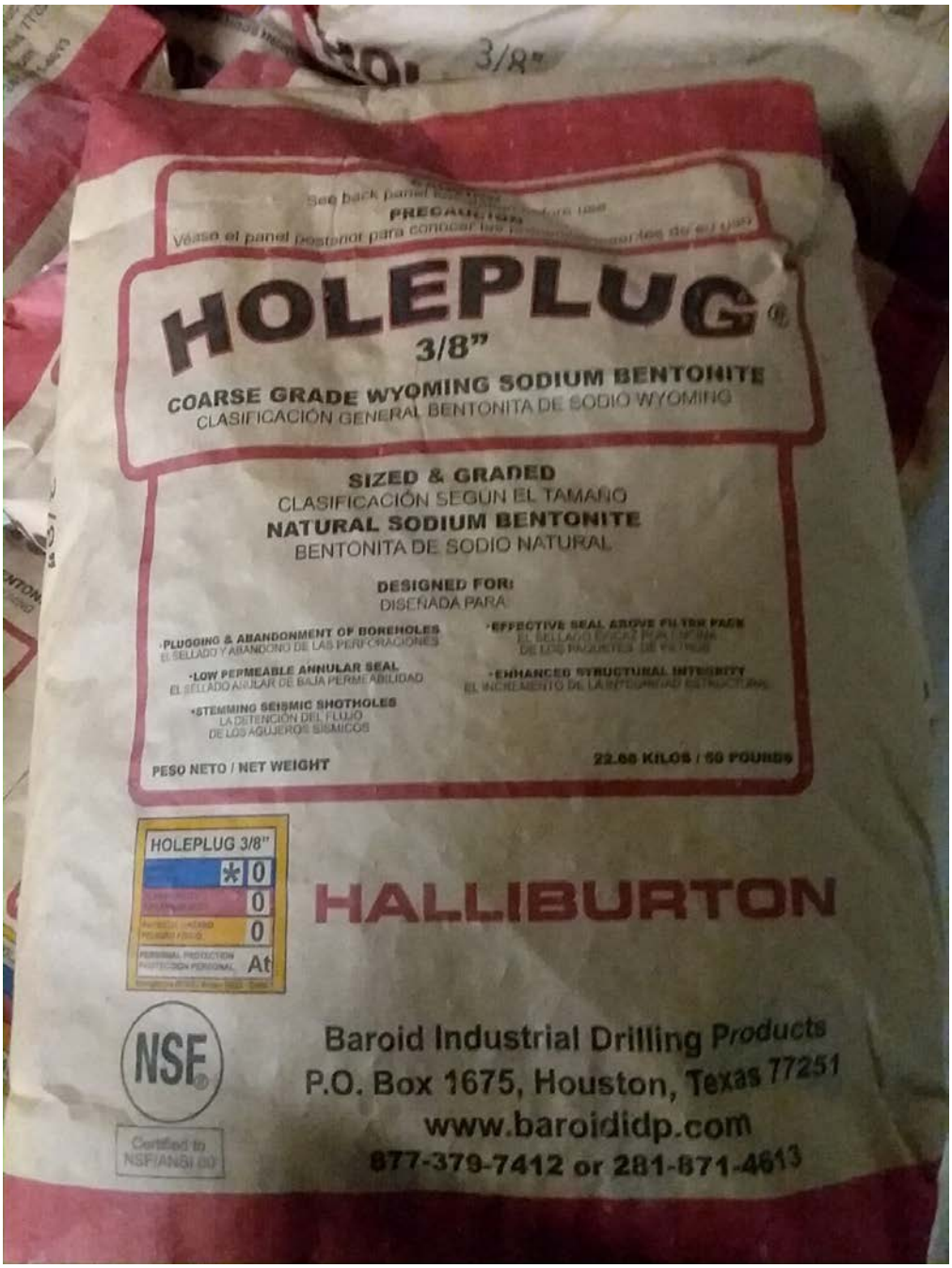
CZMW-10 (11-16-17, 11-20-17 & 11-21-17)

1. Set up the drill on the new monitoring well CZMW-10 location utilizing wooden cribbing so the drill rig is stable and level
2. Used direct push drilling methods to collect an overburden soil core from 0 to 10 feet bgs
3. Used 6.25 inch inner diameter HSA to auger from 0 to 10.0 feet bgs in the overburden material
4. Drilled from 10.0 to 40.0 feet bgs in weathered to competent bedrock using air rotary Mission SD 6 inch diameter down-hole pneumatic driven rotary percussion hammer. Competent bedrock was observed at 30 feet bgs
5. Installed 40.0 feet of 4 inch inner diameter PVC /riser casing and sealed annulus to 39.0' with 5 quantity 50 pound bags of 3/8 inch diameter bentonite chips. Bentonite chips (Halliburton Baroid Industrial Drilling Products) were subsequently hydrated with water
6. Drilled from 40.0 to 115.0 feet bgs using air rotary Mission SD 4 inch diameter down-hole pneumatic driven rotary percussion hammer in competent bedrock
7. Monitoring well CZMW-10 was completed as a 4 inch diameter open bedrock borehole from 40.0 to 115.0 feet bgs

ATTACHMENT A



FilPro Quartz Filtration Sand (#2 size) used as the filter pack in monitoring well CZMW-4



Halliburton Baroid Industrial Drilling Products; 3/8 inch diameter bentonite chips used for sealing the annular space between the borehole and PVC casing in monitoring well CZMW-4