

TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

5/20/2019

TO: Internal File

THRU: Steve Christensen, Coal Program Manager *SKC*

FROM: Priscilla Burton, Inspector *PB*

RE: Degas Well Abandonment Andalex Resources, Inc, Centennial Mine, Permit #007/0019. Division Order 19A.

SUMMARY:

Division Order 2019 A requires final closure of degas wells above relinquished leases. The Permittee provided a notice of closure for GVH wells 3, 4, 5A, 6, 7, 7A and 11. The information includes a description of closure which I have summarized from the top of the hole, down to the perforated steel casing as follows:

3 ft soil
5 ft cement
2,365 ft Super Plug grout (Abantonite, 15% solids)
15 ft. Cement + CaCl₂
13 ft. Hole Plug (sodium bentonite)
Rubber plug packer

The solar panels, corrugated metal stand pipe and other equipment on the degas well pads belongs to Liberty Pioneer. They were recently notified and have been given 30 days to remove their equipment. The certified notice to the Dave & Mildred Cave, landowners, was returned undelivered. (personal communication with K. Madsen, 5/20/2019).

TECHNICAL MEMO

RECLAMATION PLAN

MINE OPENINGS

Regulatory Reference: 30 CFR Sec. 817.13, 817.14, 817.15; R645-301-513, -301-529, -301-551, -301-631, -301-748, -301-765, -301-748.

Analysis:

The closure method meets the requirements of R645-301-529, because the wells will be sealed consistent with the requirements of 30 CFR Section 75.1711 which states :

§ 75.1711-1 Sealing of shaft openings.

Shaft openings required to be sealed under [§ 75.1711](#) shall be effectively capped or filled. Filling shall be for the entire depth of the shaft and, for the first 50 feet from the bottom of the coalbed, the fill shall consist of incombustible material. Caps consisting of a 6-inch thick concrete cap or other equivalent means may be used for sealing. Caps shall be equipped with a vent pipe at least 2 inches in diameter extending for a distance of at least 15 feet above the surface of the shaft.

The Centennial Degas well closure method is from the 7 inch casing or from the point of damage in the 9.625 inch casing to the top of the hole. The method prevents access to the coal seam by water or the atmosphere. The closure method does not have the prescribed vent pipe, however, the closure method was reviewed and discussed with a member of the Oil & Gas field inspection team. His comments were that the closure method was adequate.

A graphic of the closure method is shown below, based on the product yield stated on the product information sheets.

i.e. 80 lbs cement = 0.6 ft³

50 lbs Abandonite/33 gal water = 12.6 ft³

50 lbs Holeplug = 0.7 ft³

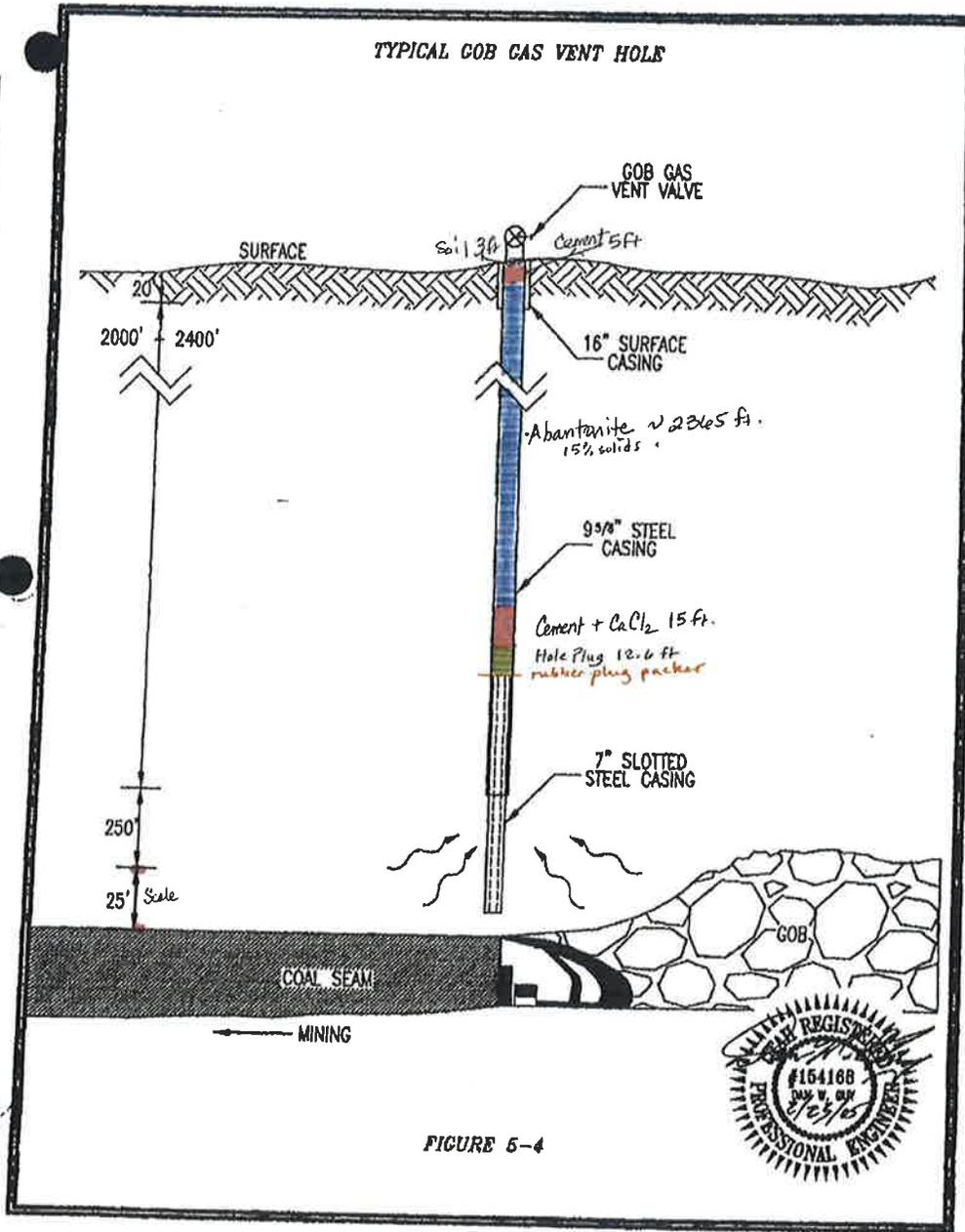
Findings:

The well closure should proceed as described.

RECOMMENDATIONS:

Road reclamation should follow reclamation of the degas wells.

TECHNICAL MEMO





HOLEPLUG®

Graded Sodium Bentonite

Description HOLEPLUG® naturally occurring Wyoming sodium bentonite clay is a sized and graded chip material used to seal and plug earthen boreholes.

HOLEPLUG bentonite is available in two particle size grades:

- HOLEPLUG® 3/4" bentonite (100% of particles pass through 3/4" screen; all particles retained on 3/8" screen)
- HOLEPLUG® 3/8" bentonite (100% of particles pass through 3/8" screen; all particles retained on 1/4" screen)

Applications/Functions The use of HOLEPLUG sodium bentonite assists or promotes the following:

- Grouting annulus in all types of wells, particularly environmental monitoring well applications
- Sealing above gravel packs
- Plugging decommissioned boreholes
- Stemming shotholes
- Sealing around conductor pipe
- Sealing lost circulation zones
- Shutting off artesian flow

- Advantages**
- Helps prevent entry of surface water into boreholes
 - High swelling potential
 - In situ swelling to provide a superior seal with excellent casing stabilization
 - Easier to apply than pellets
 - Cost effective
 - Simple to apply, mixing not required
 - Helps prevent vertical movement of fluids in the hole between porous zones
 - Helps form a permanent, flexible downhole seal
 - Helps allow hole re-entry
 - Rehydratable
 - NSF/ANSI Standard 60 certified

Typical Properties Volume of 50-lb (22.7 kg) sack

HOLEPLUG 3/4" bentonite	0.73 ft ³ or 0.027 yd ³ or 0.021 m ³
HOLEPLUG 3/8" bentonite	0.70 ft ³ or 0.026 yd ³ or 0.020 m ³
Permeability	1.5 x 10 ⁻⁹ cm/sec (in fresh water)
Appearance	Beige to tan chips

note: $7 \times 18 = 12.6 \text{ ft}^3$

**Application
Amounts**

**Amounts of HOLEPLUG®* Graded Sodium Bentonite Required for
Plugging Applications**

Hole Diameter (inches)	Hole Volume (ft ³ /ft)	Pounds HOLEPLUG bentonite Needed to Fill One Foot	Feet Filled by One Bag HOLEPLUG bentonite	Bags HOLEPLUG bentonite Needed to Fill 100 ft
2	0.022	1.6	32.6	3.2
2.5	0.034	2.4	20.5	5.0
3	0.049	3.5	14.3	7.0
3.5	0.067	4.8	10.4	9.6
4	0.087	6.3	7.9	12.6
4.5	0.110	7.9	6.3	15.8
5	0.136	9.8	5.1	19.6
5.5	0.165	11.9	4.2	23.8
6	0.196	14.1	3.5	28.2
6.5	0.230	16.6	3.0	33.2
7	0.267	19.2	2.6	38.4
7.5	0.307	22.1	2.3	44.2
8	0.349	25.1	2.0	50.2
8.5	0.394	28.4	1.8	56.8
9	0.442	31.8	1.6	63.6
9.5	0.492	35.4	1.4	70.8
10	0.545	39.2	1.3	78.4
11	0.660	47.5	1.1	95.0
12	0.785	56.5	0.89	113.0
15	1.227	88.3	0.57	176.6
18	1.767	127.2	0.39	254.4
20	2.182	157.1	0.32	314.2
25	3.409	245.4	0.20	490.8
30	4.909	353.4	0.14	706.8

**The above calculations and resultant volumes of material required assume a gauge bore hole and are based on the use of HOLEPLUG 3/8" sodium bentonite where the average bulk density per bag is 0.7 ft³/50-lb bag. Required material volumes for HOLEPLUG 3/4" will differ slightly for the same size bore hole. In the event that questions arise or further information is needed, please contact your local Baroid IDP Representative for assistance*



ABANTONITE®

Product Information

Description

ABANTONITE® is patented product designed for use as an abandonment fluid or grouting material. It is 100% inorganic, non-toxic and environmentally safe. **ABANTONITE®** is designed to offer superior sealing characteristics where low permeability flexible seals are required. It is produced to meet State of Nevada minimum specifications for drill hole abandonment in mineral exploration activities.

Characteristics

Typical Slurry Characteristics

	33 Gallons	43 Gallons
Density	9.2 lbs/gal	9.0 lbs/gal
Fluid Loss	8.9 cc's	13.6 cc's
% Solids	15.4	12.1
Permeability	Less than 1×10^{-7} cm/sec	

Application

$$1 \text{ gal} = 0.133681 \text{ ft}^3$$

Mix one (1) 50 pound bag of **ABANTONITE®** with 33 to 43 gallons of water. Total slurry yielded is approximately 36 to 46 gallons. This mixture is pumpable with most pumping equipment available. Though progressive cavity or positive displacement pumps offer the best results, diaphragm or gear pumps can also be used.

TYPICAL CHEMICAL ANALYSIS %

SiO ₂	60.32	MgO	1.69
Al ₂ O ₃	20.19	CaO ₃	1.01
Fe ₂ O ₃	3.48	Na ₂ O	2.48
K ₂ O	0.10	H ₂ O	4.50
MnO	0.02		
L.O.I. *	3.21	*Loss on Ignition	

Packaging

ABANTONITE® is packaged in 50 pound multi-walled paper bags.