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MINE ENGINEERING
MINE RECLAMATION
CIVIL ENGINEERING
CONST. MANAGEMENT

Via Electronic Transmittal

October 20, 2020

Rob Zuber
Division of Reclamation, Mining & Safety
1313 Sherman St., Room 215
Denver, CO 80203

Re: Bowie Resources, LLC, Bowie No. 2 Mine
Instrumentation Monitoring,
Gob Pile #2 & #3
Permit C-1996-083

Dear Mr. Zuber:

On behalf of Bowie Resources, LLC, please find the referenced report for the 3rd quarter of 2020.

Please call if you have any questions.

Sincerely,

Tamme Bishop

Tamme Bishop, P.E.
Project Engineer

cc: Basil Bear

Huddleston-Berry
Engineering & Testing, LLC

2789 Riverside Parkway
Grand Junction, Colorado 81501
Phone: 970-255-8005
Info@huddlestonberry.com

October 12, 2020
Project#01349-0001

Bowie Resources, LLC
43659 Bowie Road
Paonia, Colorado 81428

Attention: Mr. Basil Bear

Subject: Summary of Instrumentation Monitoring
3rd Quarter 2020
Bowie Coal Waste Disposal Area No. 2
Paonia, Colorado

Reference: *Summary of Instrumentation Monitoring, 2nd Quarter 2020, Bowie Coal Waste Disposal Area No. 2, Paonia, Colorado* by Huddleston-Berry Engineering & Testing, LLC for Bowie Resources, LLC, July 9, 2020.

Stability Evaluation, Technical Revision #85, Gob Pile #2 Drying Area, Bowie No. 2 Mine by Huddleston-Berry Engineering & Testing, LLC for Bowie Resources, LLC, June 3, 2014.

Dear Mr. Bear,

At the request of the Colorado Division of Reclamation, Mining and Safety (DRMS), Huddleston-Berry Engineering & Testing, LLC (HBET) prepared this letter regarding quarterly monitoring of vibrating wire piezometers and inclinometers at Coal Waste Disposal Area No. 2 (CWDA No. 2) at the Bowie mine near Paonia, Colorado. The intent of the monitoring was to detect significant changes in the pore water pressures or significant displacements within the coal waste which may impact the stability of the waste pile.

Inclinometers

In 2005, three inclinometers, designated BG05-04, BG05-05, and BG05-07, were installed at CWDA No. 2 through the coal refuse and into the native foundation soils. The inclinometers have been monitored quarterly since August 2005. The 2nd Quarter 2020 monitoring was completed by DOWL on September 21st, 2020. The monitoring report prepared by DOWL includes a site plan showing the locations of the inclinometers and cumulative displacement curves relative to the baseline readings in 2005. Axis "A" reflects deformation with depth in the direction of anticipated movement perpendicular to the face of the gob. Axis "B" reflects deformation with depth parallel to the face of the gob.

Discussion of Inclinometer Monitoring

The latest inclinometer readings indicate no major movements since the last quarterly reading. In general, the 3rd Quarter 2020 monitoring data does not provide any indication of instability in CWDA No. 2.

Vibrating Wire Piezometers

Between 2005 and 2012, a total of ten vibrating wire piezometers were installed in CWDA No. 2. However, several of the piezometers have been damaged or have otherwise ceased to function. Currently, five of the piezometers are functional.

Monitoring of the functioning piezometers was completed by DOWL September 21st, 2020. The attached monitoring report prepared by DOWL includes the piezometer monitoring data and the data is summarized in the following table.

VWP ID	Initial Pore Pressure (psi)	06/25/20 Pore Pressure (psi)	09/21/20 Pore Pressure (psi)	Difference Since Installation (psi)	Difference Since Last Reading (psi)
VWP-05	6.8	1.5	2.0	-4.8	+0.5
VWP-06	11.3	11.7	11.8	+0.5	+0.1
VWP-08	8.2	8.6	8.5	+0.3	-0.1
VWP-09	2.8	2.9	3.0	+0.2	+0.1
VWP-10	-1.9	-1.7	-1.6	+0.3	+0.1

Discussion of Vibrating Wire Piezometers

VWP-05

VWP-05 was installed on August 3, 2005 near the toe of CWDA No. 2 adjacent to the access road/bench. The pore pressures recorded at VWP-05 have shown some seasonal fluctuations; however, the range of pore pressure changes is fairly small. In general, HBET does not believe that the pore pressures in VWP-05 are cause for concern regarding stability of the gob pile.

VWP-06

VWP-06 was installed on June 5, 2009 near the existing top of CWDA No. 2. The pore pressures recorded at VWP-06 have fluctuated since installation. In general, the fluctuations have been seasonal and reflect the level of coal mine waste placement activity on top of CWDA No. 2. In general, HBET does not believe that the measured pore pressures are an indication of any instability in CWDA No. 2.

VWP-08

VWP-08 was installed on June 5, 2009 at a slightly lower elevation than VWP-06. The pore pressures recorded at VWP-08 have fluctuated since installation. However, the fluctuations have generally been within a narrow range of values. The measured pore pressures are generally consistent with the level of coal mine waste placement activity at CWDA No. 2.

As indicated in the referenced *Stability Evaluation* report, the stability of CWDA No. 2 is sensitive to increases in pore pressures in VWP-08. An increase in the pore pressure of 7 psi in VWP-08 would result in a reduction of the Factor of Safety to below 1.5.

The current pore pressure reflects a piezometric surface elevation of approximately 6096 feet which is much less than the critical elevation of 6113 feet. As a result, HBET does not believe that the measured pore pressures in VWP-08 are any indication of instability in CWDA No. 2.

VWP-09

VWP-09 was installed on May 18, 2012 near the toe of CWDA No. 2. The pore pressures recorded at VWP-09 have been fairly steady since installation. This suggests that dewatering of the gob in this area is likely nearly complete. It is anticipated that the pore pressures at VWP-09 will remain fairly steady over time.

VWP-10

VWP-10 was installed on May 18, 2014 near the toe of CWDA No. 2. The pore pressures recorded at VWP-10 have been fairly steady since installation. This suggests that dewatering of the gob in this area is likely nearly complete. It is anticipated that the pore pressures at VWP-10 will remain fairly steady over time.

General

In general, based upon the results of the recent VWP and inclinometer monitoring data, HBET does not believe that there is any reduction in the stability of CWDA No. 2. Due to the limited activity at the mine, HBET recommends that the monitoring frequency be reduced to semi-annually.

We are pleased to be of service to your project. Please contact us if you have any questions or comments regarding the contents of this report.

Respectfully Submitted:
Huddleston-Berry Engineering and Testing, LLC

Michael A. Berry, P.E.
Vice President of Engineering

ATTACHMENTS

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970-249-6828 ■ 800-865-9847 (fax) ■ 222 South Park ■ Montrose, Colorado 81401 ■ www.dowl.com
Alaska ■ Arizona ■ Colorado ■ Montana ■ Oregon ■ Washington ■ Wyoming

September 29, 2020

Mr. Mike Berry, PE
Huddleston-Berry Engineering and Testing, LLC
2789 Riverside Parkway
Grand Junction, CO 81501

SUBJECT: Summary Report, 3rd Quarter 2020, Inclinometer and Active Vibrating Wire Piezometer Data July – September 2020, Bowie Mine #2 Coal Waste Disposal Area (CWDA) #2

Greetings Mr. Berry:

DOWL conducted quarterly monitoring of inclinometers and vibrating wire piezometers (VWP) at Coal Waste Disposal Area #2 (CWDA #2), Bowie Resources, LLC Bowie Mine #2. This report covers the period of July through September 2020. Inclinometer and VWP data were recorded on 9/21/20. Per Colorado Division of Reclamation, Mining & Safety (CDRMS) and your instructions, vibrating wire piezometer and inclinometer readings for all active instruments are recorded and reported quarterly.

Vibrating Wire Piezometers

The physical locations of the piezometers are shown on the attached Instrumentation Site Plan (Map 1). As seen on this map, five of the original VWP's were damaged and some were replaced. Currently, there are five active VWP's, and three of them are adjacent to inclinometers. The graph of historical VWP data from 5/16/05 through 5/21/14 is presented for reference as Figure 1. A graph of measured pore pressures of active piezometers is presented on the attached Figure 2 and is presented numerically in Table 1 below.

Table 1. Summary of VWP Pore Pressure Readings

VWP ID #	Measured Pore Pressures (psi)				Pore Pressure Difference (psi)		
	Installation	Last Year (Qtr 3) 9/30/2019	Last Quarter (Qtr 2) 6/25/2020	Current (Qtr 3) 9/21/2020	Since Installation	Last Year (Qtr 3)	Last Quarter (Qtr 3)
VWP-05	6.8	1.9	1.5	2.0	-4.8	0.1	0.5
VWP-06	11.3	12.0	11.7	11.8	0.5	-0.2	0.1
VWP-08	8.2	8.8	8.6	8.5	0.3	-0.3	-0.1
VWP-09	2.8	2.8	2.9	3.0	0.2	0.2	0.1
VWP-10	-1.9	-1.8	-1.7	-1.6	0.3	0.2	0.1

As seen on Figure 2, the VWP readings and trends are consistent with recent and historic readings. Pore pressure readings varied very little (by 0 to $\pm$0.1 psi) since the 2nd quarter readings except for VWP-05, which had an increase of 0.5 psi. When compared with a year ago (Q3 2019), pore pressures varied from $\pm$0.1 to 0.3 psi for all of the piezometers. Since installation, four of the piezometers experienced 0.5 psi or less, while VWP-05 had a pore pressure that decreased by 4.8 psi.

Inclinometers

Three inclinometers (designated BG05-4, BG05-5, and BG05-7) were installed at CWDA #2 in August 2005. The inclinometers were installed through the coal refuse and approximately 20 feet into the native foundation soils. The locations of the inclinometers are shown on the attached Instrumentation Site Plan (Map 1). Baseline readings were taken on 8/10/05 and subsequent readings have generally been taken quarterly since that time. Displacement curves for each of the three inclinometers for the current and the prior three readings are presented as attachments to this letter in Figure 3. Axis "A" reflects deformation with depth in the direction of anticipated movement (downslope), while Axis "B" is orthogonal to Axis A.

As described in previous reports, historic displacements indicated on the plots for the approximate upper ten feet of the inclinometers since installation in 2005 are due to placement of cover soil on the face of the waste pile during revegetation operations in late 2006 and early 2007. This man-caused displacement is documented in a report by Buckhorn Geotech dated September 22, 2008 to Bowie Resources called *Revised Stability Evaluations for Coal Mine Waste Disposal Area No. 2, Bowie No. 2 Mine*.

Based on the current inclinometer readings, there hasn't been downslope movement (Axis A) in any of the inclinometers since 2007 and they are generally consistent with previous readings. Some "noise" which is understood to be relatively common in orthogonal direction (Axis B) readings, was observed over the past few years for inclinometer BG05-5B. This can be due to a number of mechanical or installation causes that are unrelated to slope movement. For example, grout voids, poor grout coverage, or soil settlement around the instrument can all contribute to vibrations and pipe movement that impacts inclinometer readings. Software bias adjustments were applied which filtered this noise. All readings were consistent with previous ones and the "displacement" error was within equipment tolerances and not deemed to be due to slope movement.

It should be noted that water was standing in the BGI05-04 inclinometer pipe at a depth of about 3 feet below grade (while it as at 1 foot during our Q2 site visit). Based on our observations there has always been water in this pipe. We measured water around 10 feet in inclinometer BGI05-07 during our recent Q3 readings and there was no water in the BGI05-05 pipe.

If you have any questions regarding this letter or the instrumentation monitoring at CWDA #2, please contact me at (970) 497-8821 or LBrandt@dowl.com.

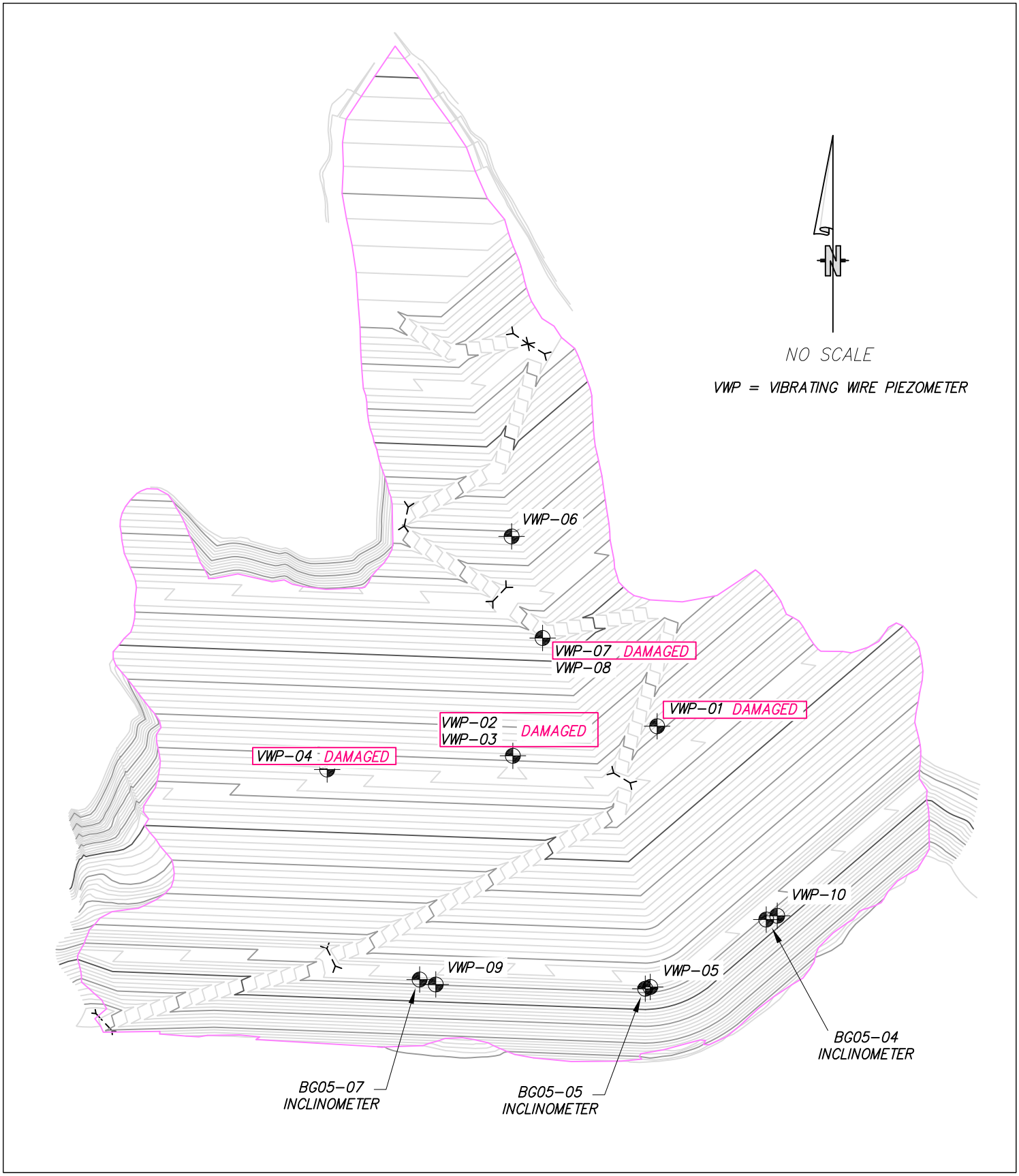
Respectfully Submitted,
DOWL

Laurie Brandt, CPG
Professional Geologist

Dennis A. Russell, P.E.
Geotechnical Engineer

Enclosures: Map 1 – Instrumentation Location Plan
Figure 1 – Active and Damaged Piezometer Data Graph (2005-2014)
Figure 2 – Active Vibrating Wire Piezometer Data Graph (installation to present)
Figure 3 – Inclinometer Displacement Curves

INSTRUMENTATION SITE PLAN



Map 1 OF 1	DATE 2017 JOB NO. 7131.74699.01	Huddleston-Berry BOWIE #2 GOB PILE DELTA COUNTY, COLORADO	DOWL WWW.DOWL.COM 222 South Park Avenue Montrose, Colorado 81401 970-249-6828

Figure 1 - Bowie Mine #2 - CWDA #2
Active and Damaged Vibrating Wire Piezometer Data

Inception (5/16/05) through 5/21/14

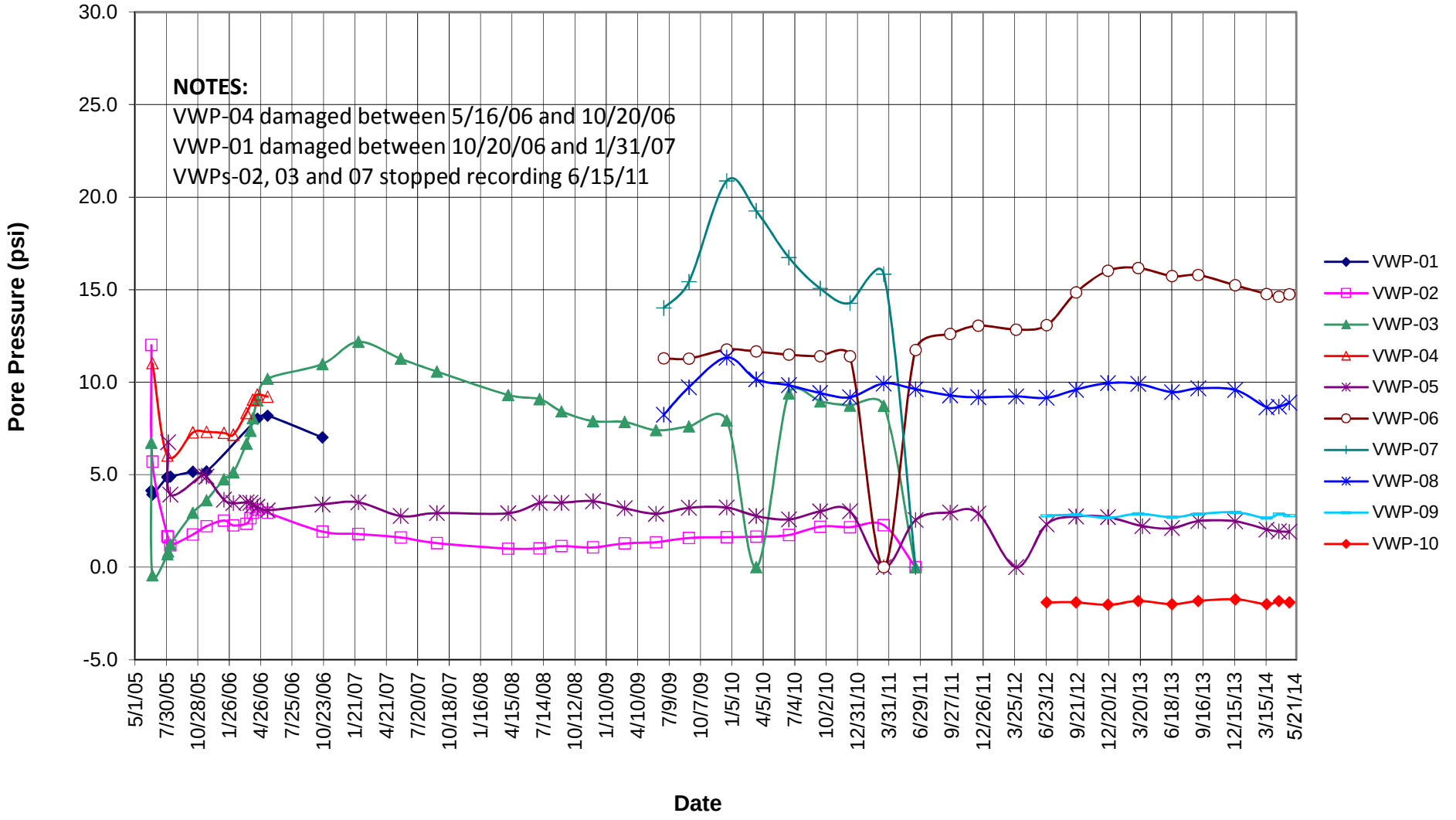


Figure 2 - Bowie Mine #2 - CWDA #2
Active Vibrating Wire Piezometer Data

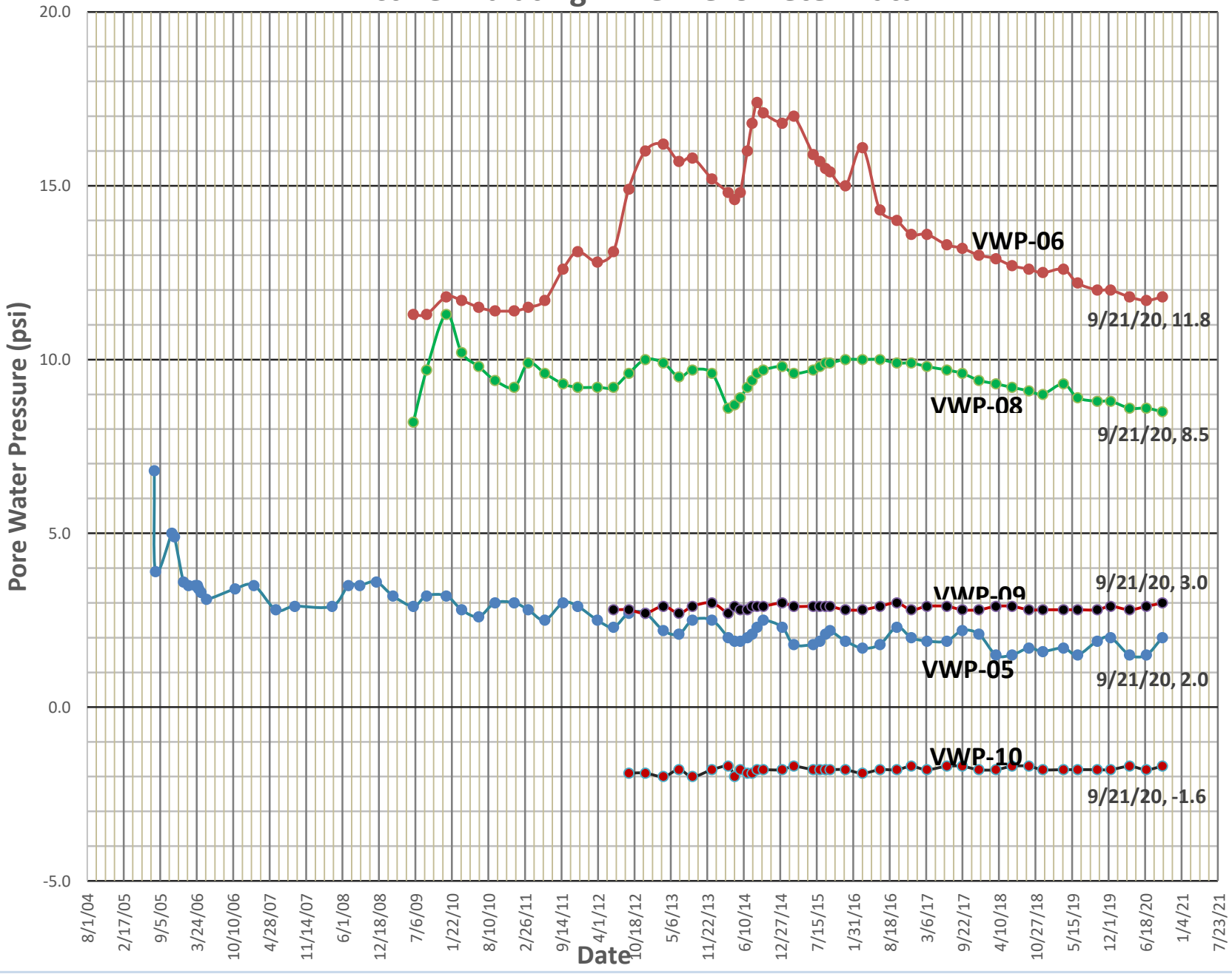
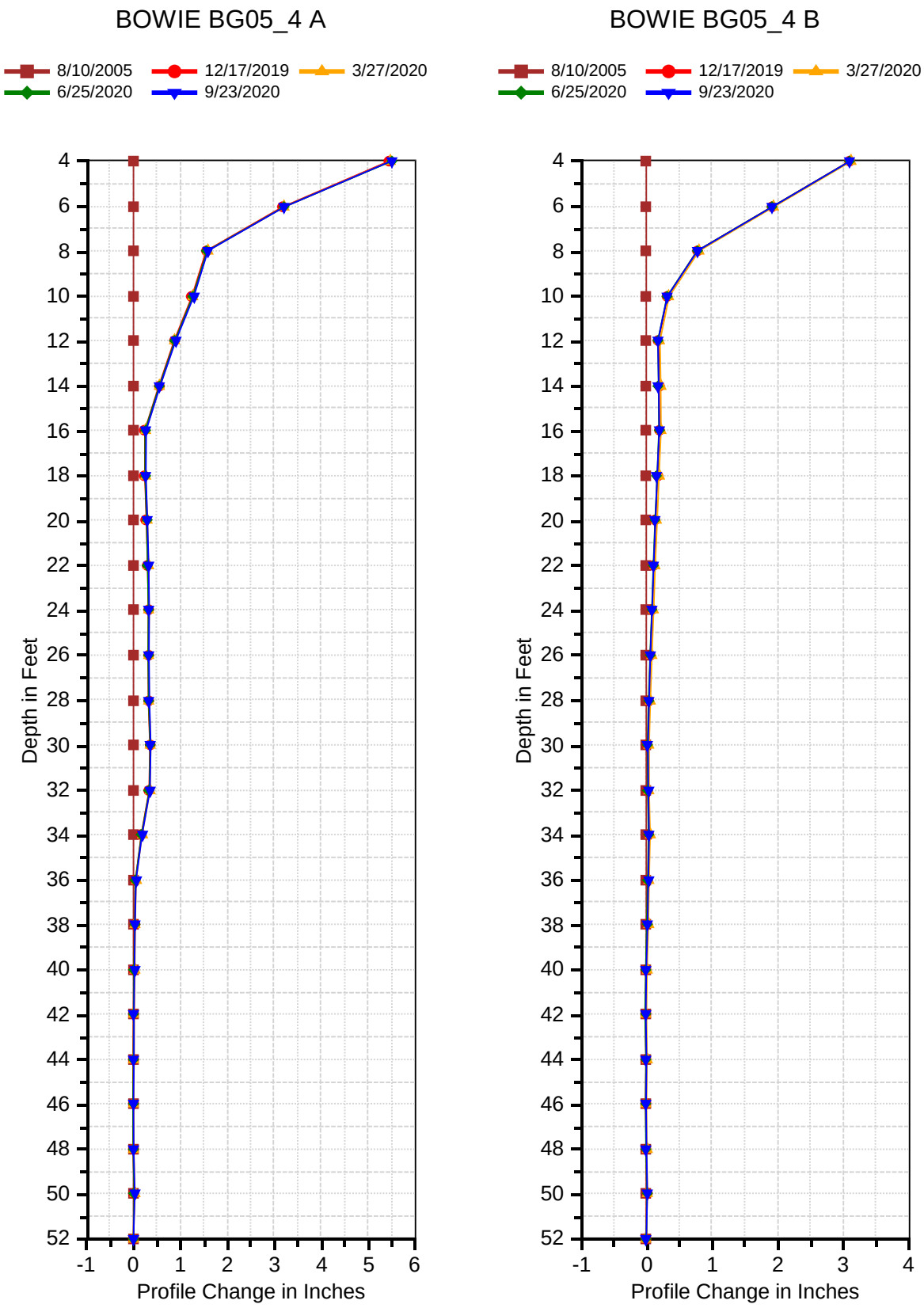
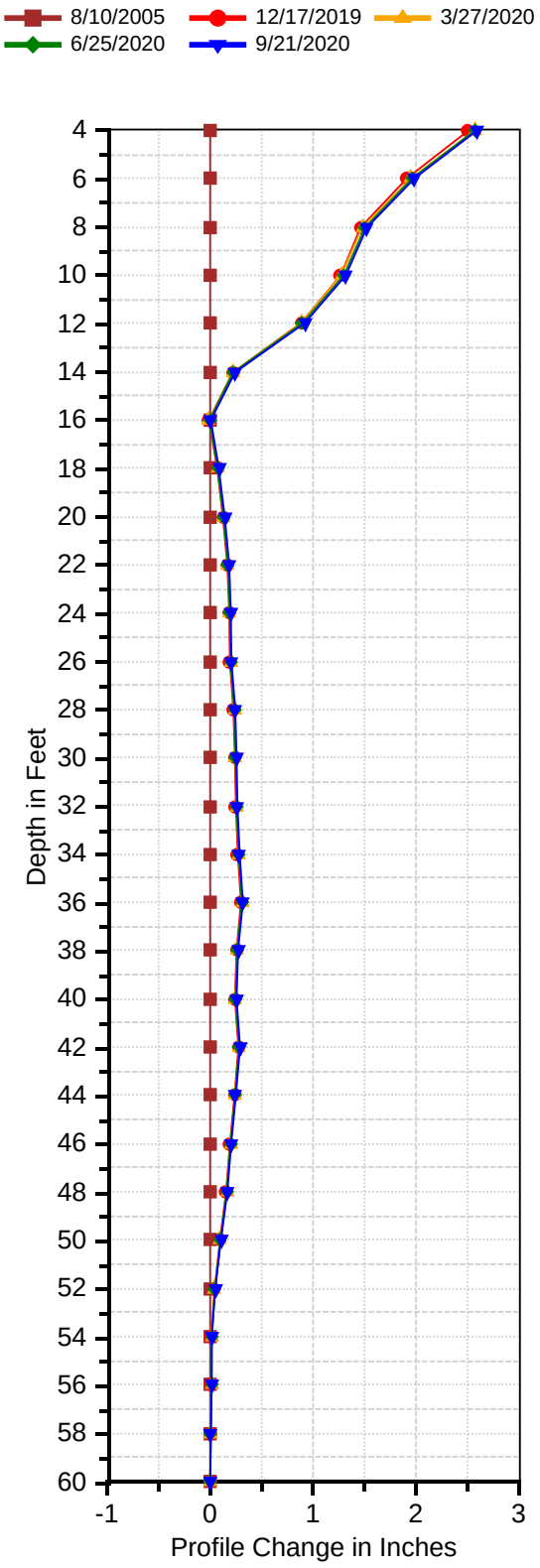


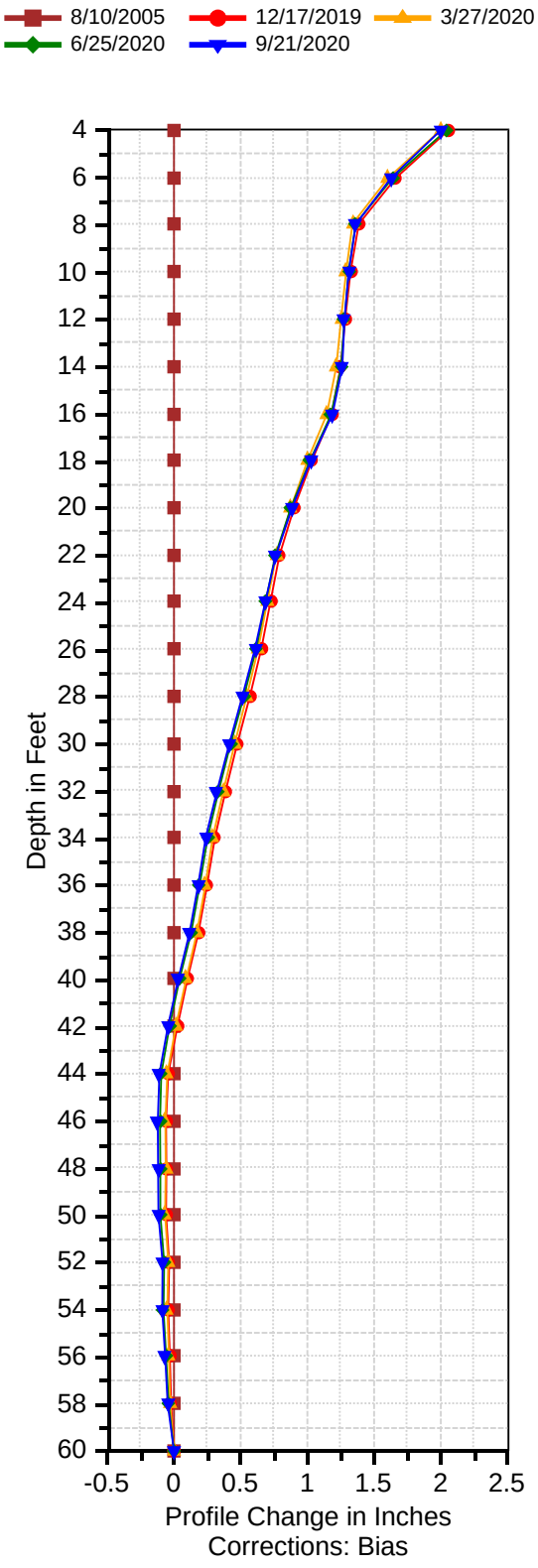
Figure 3 - Inclinometer Displacement Curves

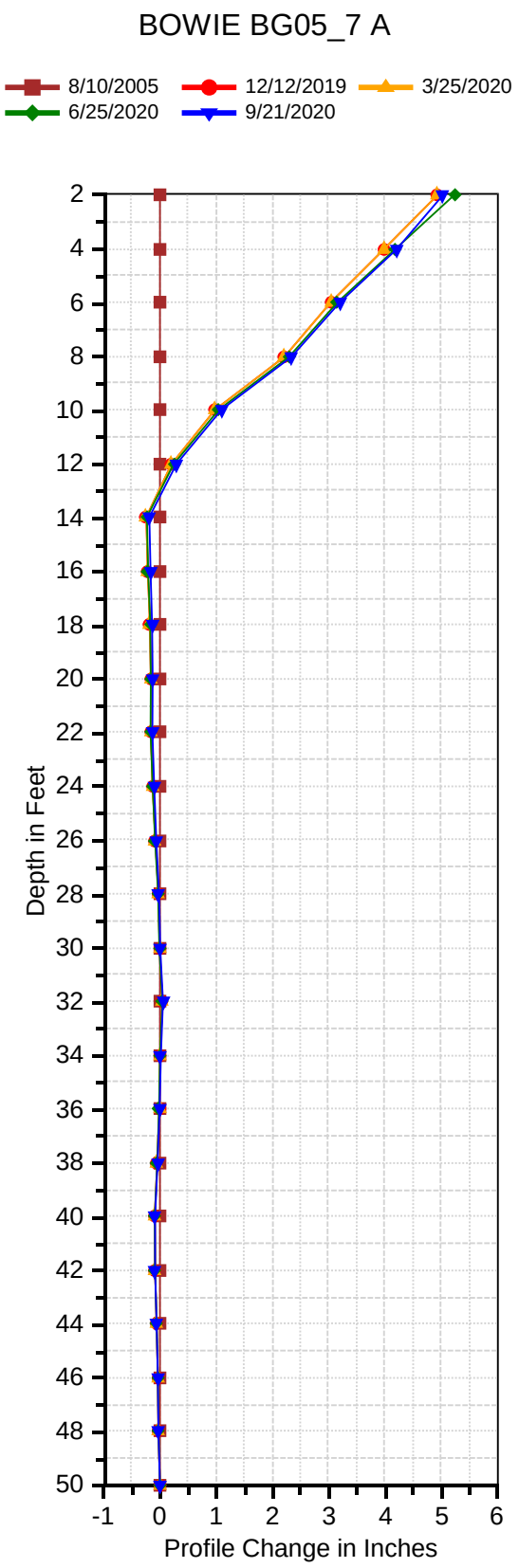


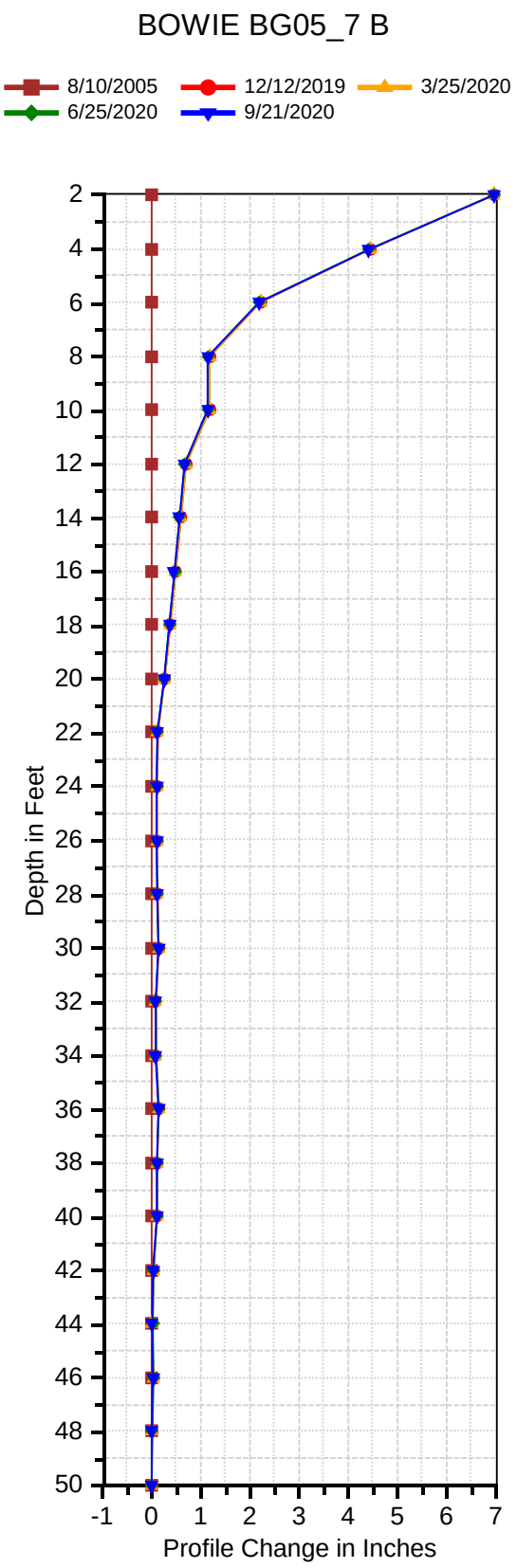
BOWIE BG05_5 A



BOWIE BG05_5 B




BOWIE BG05_7 A
8/10/2005
12/12/2019
3/25/2020
6/25/2020
9/21/2020
Depth in Feet
Profile Change in Inches


BOWIE BG05_7 B
8/10/2005
12/12/2019
3/25/2020
6/25/2020
9/21/2020
Depth in Feet
Profile Change in Inches

Huddleston-Berry
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October 12, 2020
Project#01349-0001

Bowie Resources, LLC
43659 Bowie Road
Paonia, Colorado 81428

Attention: Mr. Basil Bear

Subject: Summary of Instrumentation Monitoring
3rd Quarter 2020
Bowie Coal Waste Disposal Area No. 3
Paonia, Colorado

Reference: *Summary of Instrumentation Monitoring, 2nd Quarter 2020, Bowie Coal Waste Disposal Area No. 3, Paonia, Colorado* by Huddleston-Berry Engineering & Testing, LLC for Bowie Resources, LLC, July 9, 2020.

Stability Evaluation, Gob Pile #3, Bowie No. 2 Mine by Huddleston-Berry Engineering & Testing, LLC for Bowie Resources, LLC, July 15, 2014.

Dear Mr. Bear,

At the request of the Colorado Division of Reclamation, Mining and Safety (DRMS), Huddleston-Berry Engineering & Testing, LLC (HBET) prepared this letter regarding quarterly monitoring of vibrating wire piezometers at Coal Waste Disposal Area No. 3 (CWDA No. 3) at the Bowie mine near Paonia, Colorado. The intent of the monitoring was to detect significant changes in the pore water pressures within the coal waste which may impact the stability of the waste pile.

Vibrating Wire Piezometers

Five vibrating wire piezometers were installed in CWDA No. 3 in October 2014. The piezometers were installed at three locations within the footprint of the gob pile. Monitoring of the functioning piezometers was completed by DOWL on September 21st, 2020. The attached monitoring report prepared by DOWL includes the piezometer monitoring data and the data is summarized in the following table.

VWP ID	Initial Pore Pressure 10/31/14 (psi)	06/25/20 Pore Pressure (psi)	09/21/20 Pore Pressure (psi)	Difference Since Installation (psi)	Difference Since Last Reading (psi)
VWP-A Deep	10.4	4.5	4.1	-6.3	-0.4
VWP-A Shallow	4.7	3.0	2.9	-1.8	-0.1
VWP-B Deep	0.2	0.1	0.4	+0.2	+0.3
VWP-B Shallow	13.9	8.6	8.3	-5.6	-0.3
VWP-D	7.1	4.4	4.3	-2.8	-0.1

Huddleston-Berry
Engineering & Testing, LLC

Discussion of Vibrating Wire Piezometers

VWP-A Deep

VWP-A Deep was installed on October 6, 2014 near the northern edge of CWDA No. 3. VWP-A Deep was installed in the foundation soil approximately eight feet below the bottom of the gob. The pore pressures recorded at VWP-A Deep generally decreased since installation until September 2015. After that, the pore pressures fluctuated within a narrow range until the 2nd and 3rd Quarters of 2019 where increases were reported. However, the 1st Quarter 2020 pore pressure was down before another slight increase in the 2nd Quarter. The pore pressures again decreased in the 3rd Quarter. In general, HBET does not believe that the pore pressure changes in VWP-A Deep are an indication of instability in CWDA No. 3.

VWP-A Shallow

VWP-A Shallow was installed on October 6, 2014 near the northern edge of CWDA No. 3. VWP-A Shallow was installed approximately ten feet above the base of the gob. After installation, the pore pressures dropped until November 2014. Between November 2014 and September 2015, increases in the pore pressures were recorded at VWP-A Shallow. However, between September 2015 and December 2016, the pore pressures decreased. Since then, the data have fluctuated within a narrow range. In general, HBET does not believe that the pore pressure changes in VWP-A Shallow are an indication of instability in CWDA No. 3.

VWP-B Deep

VWP-B Deep was installed on October 6, 2014 in the west-central portion of CWDA No. 3. VWP-B Deep was installed in the foundation soil approximately ten feet below the bottom of the gob. Since installation, the pore pressures recorded at VWP-B Deep have fluctuated within a narrow range. However, the 3rd Quarter 2019 reading showed a significant increase in pore pressures prior to coming back down in the 4th Quarter 2019 and remaining low in 2020. In general, HBET does not believe that the pore pressure changes in VWP-B Deep are an indication of instability in CWDA No. 3.

VWP-B Shallow

VWP-B Shallow was installed on October 6, 2014 in the west-central portion of CWDA No. 3. VWP-B Shallow was installed approximately ten feet above the base of the gob. Since installation, the pore pressures recorded at VWP-B Shallow have fluctuated with periods of slight increase and slight decrease. In general, HBET does not believe that the pore pressure changes in VWP-B Shallow are an indication of instability in CWDA No. 3.

VWP-D

VWP-D was installed on October 7, 2014 in the east-central portion of CWDA No. 3. VWP-D was installed approximately ten feet above the base of the gob. Since installation, the pore pressures recorded at VWP-D have fluctuated. The pore pressures increase slightly during the 3rd Quarter of 2017. However, this likely reflects the activity at CWDA No. 3 during the monitoring period and the pore pressures have decreased since September 2017. In general, HBET does not believe that the pore pressure changes in VWP-D are an indication of instability in CWDA No. 3.

General

Based upon the results of the most recent VWP monitoring data, HBET does not believe that there is any reduction in the stability of CWDA No. 3.

We are pleased to be of service to your project. Please contact us if you have any questions or comments regarding the contents of this report.

Respectfully Submitted:
Huddleston-Berry Engineering and Testing, LLC

Michael A. Berry, P.E.
Vice President of Engineering

ATTACHMENTS

DOWL
970-249-6828 ■ 800-865-9847 (fax) ■ 222 South Park ■ Montrose, Colorado 81401 ■ www.dowl.com
Alaska ■ Arizona ■ Colorado ■ Montana ■ Oregon ■ Washington ■ Wyoming

September 29, 2020

Mr. Mike Berry, PE
Huddleston-Berry Engineering and Testing, LLC
2789 Riverside Parkway
Grand Junction, CO 81501

SUBJECT: Summary Report, 3rd Quarter 2020, Vibrating Wire Piezometers
July – September 2020, Bowie Mine #2
Coal Waste Disposal Area (CWDA) #3

Greetings Mr. Berry,

DOWL conducted quarterly monitoring of installed vibrating wire piezometers (VWP) at Coal Waste Disposal Area #3 (CWDA #3), Bowie Resources, LLC Bowie Mine #2. This report is for the period of July through September 2020 (3rd Quarter). VWP data was recorded on 9/21/2020. Per the Colorado Division of Reclamation, Mining & Safety (CDRMS) and your instructions, vibrating wire piezometer readings for all active piezometers are taken quarterly.

We present a graph of measured pore pressures on the attached Figure 1 and numerically in Table 1 below. Table 1 is a summary of the initial, prior and current readings. In addition, we present the difference between the current pore pressures and those at the time of installation, the previous quarter, and previous year.

Table 1. Summary of Pore Pressure Readings

VWP ID #	Pore Pressure (psi)				Pressure Difference (psi)		
	10/31/2014 Installation	Last Year 9/30/2019	Last Quarter 6/25/2020	Current 9/21/2020	Since Installation	Last Year	Last Quarter
VWP-A Deep	10.4	6.2	4.5	4.1	-6.3	-2.1	-0.4
VWP-A Shallow	4.7	3.4	3.0	2.9	-1.8	-0.5	-0.1
VWP-B Deep	0.2	3.7	0.1	0.4	0.2	-3.3	0.3
VWP-B Shallow	13.9	9.3	8.6	8.3	-5.6	-1.0	-0.3
VWP-D	7.1	4.9	4.4	4.3	-2.8	-0.6	-0.1

As seen on Figure 1 and Table 1, when compared with the previous quarter, four of the five VWP's decreased in pore pressure and when compared to the 3rd quarter of last year, all five VWP's decreased in pore pressure since last year (a wetter year) and since installation. Although there is a general trend of decreasing pore pressure over time, three of the piezometers (VWP-A Deep, VWP-B-Deep and VWP-B Shallow) have more recent erratic behavior.

If you have any questions regarding this letter or the instrumentation monitoring at CWDA #3, please contact me at (970) 497-8821 or Lbrandt@dowl.com.

Respectfully Submitted,
DOWL

Laurie Brandt, CPG
Certified Professional Geologist

Dennis A. Russell, PE
Senior Geotechnical Engineer

Enclosure: Figure 1 – Vibrating Wire Piezometer Data Graph

Figure 1 - Bowie Mine #2 - CWDA #3
Vibrating Wire Piezometer Data