

**SOAH DOCKET NO. 473-20-4204  
PUC DOCKET NO. 50997**

**APPLICATION OF SOUTHWESTERN § BEFORE THE STATE OFFICE  
ELECTRIC POWER COMPANY FOR § OF  
AUTHORITY TO RECONCILE FUEL § ADMINISTRATIVE HEARINGS  
COSTS §  
§**

**REDACTED VERSION**

**Direct Testimony of Devi Glick**

**On Behalf of Sierra Club**

**January 7, 2021**

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1 **1. INTRODUCTION AND PURPOSE OF TESTIMONY**

2 **Q Please state your name and occupation.**

3 **A** My name is Devi Glick. I am a Senior Associate at Synapse Energy Economics,  
4 Inc. (“Synapse”). My business address is 485 Massachusetts Avenue, Suite 3,  
5 Cambridge, Massachusetts 02139.

6 **Q Please describe Synapse Energy Economics.**

7 **A** Synapse is a research and consulting firm specializing in energy and  
8 environmental issues, including electric generation, transmission and distribution  
9 system reliability, ratemaking and rate design, electric industry restructuring and  
10 market power, electricity market prices, stranded costs, efficiency, renewable  
11 energy, environmental quality, and nuclear power.

12 Synapse’s clients include state consumer advocates, public utilities commission  
13 staff, attorneys general, environmental organizations, federal government  
14 agencies, and utilities.

15 **Q Please summarize your work experience and educational background.**

16 **A** At Synapse, I conduct economic analysis and write testimony and publications  
17 that focus on a variety of issues related to electric utilities. These issues include  
18 power plant economics, utility resource planning practices, valuation of  
19 distributed energy resources, and utility handling of coal combustion residuals  
20 waste. I have submitted expert testimony on unit-commitment practices, plant  
21 economics, utility resource needs, and solar valuation before state utility  
22 regulators in Texas, Arizona, Connecticut, Florida, Indiana, Michigan, New  
23 Mexico, North Carolina, South Carolina, Wisconsin, and Virginia. In the course

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1 of my work, I develop in-house electricity system models and perform analysis  
2 using industry-standard electricity system models.

3 Before joining Synapse, I worked at Rocky Mountain Institute, focusing on a  
4 wide range of energy and electricity issues. I have a master's degree in public  
5 policy and a master's degree in environmental science from the University of  
6 Michigan, as well as a bachelor's degree in environmental studies from  
7 Middlebury College. I have more than seven years of professional experience as a  
8 consultant, researcher, and analyst. A copy of my current resume is attached as  
9 Exhibit DG-1.

10 **Q On whose behalf are you testifying in this case?**

11 **A** I am testifying on behalf of Sierra Club.

12 **Q Have you testified previously before the Texas Public Utility Commission**  
13 **(“Commission”)?**

14 **A** Yes, I submitted testimony in PUC Docket No. 49831, Application of the  
15 Southwestern Public Service Company for the Authority to Change Rates.

16 **Q What is the purpose of your testimony in this proceeding?**

17 **A** In this proceeding, I review and evaluate the prudence of the coal and lignite  
18 expenses incurred by Southwestern Electric Power Company (“SWEPCO” or the  
19 “Company”) and the Company’s unit-commitment decisions at all its coal and  
20 lignite plants for the period March 1, 2017 through December 31, 2019.  
21 Specifically, I review and evaluate the costs SWEPCO incurred at the Oxbow  
22 mine under the Lignite Mine Agreement (“LMA”), the Company’s daily

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1 operational decisions at its coal and lignite plants, and SWEPCO's reporting of its  
2 daily unit-commitment decisions.

3 **Q How is your testimony structured?**

4 **A** In Section 2, I summarize my findings and recommendations for the Commission.

5 In Section 3, I evaluate the actual economic performance of SWEPCO's coal and  
6 lignite units during the reconciliation period, including the periods of sustained  
7 losses at those units. I also discuss the costs that uneconomic commitment  
8 practices will impose on ratepayers if approved for recovery in this proceeding.

9 In Section 4, I evaluate how SWEPCO committed its coal and lignite units into  
10 the Southwest Power Pool ("SPP") energy market; I evaluate the information that  
11 SWEPCO had at the time it made each unit-commitment decision; and I quantify  
12 the customer net revenue losses resulting from the Company's decisions to "self-  
13 commit" units at each of its coal and lignite plants during the reconciliation  
14 period. I also review the costs the Company uses to make its unit-commitment  
15 decisions.

16 In Section 5, I review SWEPCO's management of its lignite mining contract at  
17 the Dolet Hills Mine; I examine the analysis the Company completed to justify  
18 mine expansion; and I outline SWEPCO's obligation to regularly evaluate the  
19 respective costs of staying in, versus terminating, the mining contract. I discuss  
20 the Company's proposal to retain its overcollection balance from across its fleet to  
21 pay down mining balance costs from the Dolet Hills Mine and the Oxbow Mine. I  
22 also evaluate whether the Company's expenditures meet the requirement of being  
23 used and useful.

1 In Section 6, I outline recommended reporting requirements for future fuel  
2 reconciliation dockets that will allow the Commission to evaluate the prudence of  
3 the Company's unit-commitment practices.

4 **Q What documents do you rely upon for your analysis, findings, and**  
5 **observations?**

6 **A** My analysis relies primarily upon the workpapers, exhibits, and discovery  
7 responses of SWEPCO witnesses. I also rely on public information from prior  
8 SWEPCO proceedings and other publicly available documents.

9 **2. FINDINGS AND RECOMMENDATIONS**

10 **Q Please summarize your findings.**

11 **A** My primary findings are:

- 12 1. During the reconciliation period, SWEPCO's lignite units had some of the  
13 highest fuel costs among all solid-fuel units in the country, yet SWEPCO  
14 continued to imprudently invest in operating and maintaining the units. As  
15 explained in Section 3, the Henry W. Pirkey Power Plant ranked in the top  
16 81<sup>st</sup>–85<sup>th</sup> percentile for most expensive fuel costs, and Dolet Hills Power  
17 Station ranked as the most expensive for fuel costs from 2017–2019.
- 18 2. During the reconciliation period, SWEPCO relied on a unit-commitment  
19 decision-making process that was systematically incorrect, and a resource  
20 planning process that was fundamentally incomplete. As a result, within  
21 the 34-month period from March 1, 2017 through December 31, 2019,  
22 SWEPCO's operational practices at its coal and lignite plants caused the  
23 Company to incur net operational losses:

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- 1 a. At its coal units, during [REDACTED] months at Turk Unit 1; [REDACTED] months at  
2 Welsh Units 1 and 3. Net losses during these months totaled [REDACTED]  
3 million.
- 4 b. At its lignite units, during [REDACTED] months at Dolet Hills; and [REDACTED] months  
5 at Pirkey. Net losses during these months totaled [REDACTED]  
6 [REDACTED] million incurred (net of minimal revenues)  
7 during the entire reconciliation period [REDACTED] million at Pirkey  
8 and [REDACTED] million at Dolet Hills).
- 9 3. As explained in Section 4, SWEPCO regularly self-commits all its coal-  
10 fired units into the SPP market.
- 11 4. These unit-commitment practices at Dolet Hills led to over [REDACTED] million  
12 in net losses between March 1, 2017 and December 31, 2019; net of start-  
13 up costs, SWEPCO imprudently cost ratepayers an unnecessary loss of  
14 [REDACTED] million. These losses, outlined in Section 4, represent a portion of  
15 the [REDACTED] million in losses discussed in Section 3.
- 16 5. As explained in detail in Section 5, SWEPCO did not prudently manage  
17 its lignite contracts at Dolet Hills and Pirkey during the reconciliation  
18 period by failing to evaluate whether it was reasonable to remain in each  
19 contract and continuing to maintain (or in the case of Dolet Hills, expand)  
20 the mine, or to terminate each contract and close the plant.
- 21 6. As a result, SWEPCO allowed the Dolet Hills Lignite Company  
22 (“DHLC”) to incur \$170.7 million at the Oxbow Mine under the LMA to  
23 expand mining into Mine Area U and obtained only [REDACTED] of the  
24 lignite it projected it would need before ceasing operation of the mine.  
25 Those costs were incurred imprudently and were for assets and  
26 infrastructure that are not fully used and useful. As discussed in Section 5,  
27 SWEPO has already passed some of these costs on to ratepayers through  
28 its monthly fuel costs.



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- 1           7. SWEPCO can only charge customers fuel costs when it operates its units,  
2           therefore, it has an incentive to self-commit and uneconomically operate  
3           its units when it has a fuel balance to pass on. During the reconciliation  
4           period, the Company had this incentive at Dolet Hills with its  
5           outstanding mine expenses.
- 6           8. SWEPCO's proposal to carry forward its system-wide over-collected fuel  
7           balance to pay imprudently incurred fixed and undepreciated mining costs  
8           at the Dolet Hills and Oxbow mines is unreasonable.
- 9           9. SWEPCO did not adequately report and describe its unit-commitment  
10          practices in its fuel reconciliation application. The Company should have  
11          included documentation of its daily decision-making process and its  
12          reasoning for frequent self-commitment.

13   **Q     Please summarize your recommendations.**

14   **A     Based on my findings, I offer the following chief recommendations:**

- 15          1. As discussed in Section 3, SWEPCO incurred for Texas ratepayers [REDACTED]  
16          and [REDACTED] million in net operational losses at its coal and lignite units  
17          respectively as a result of sustained uneconomic operational decisions  
18          during specific months of the reconciliation period, and also, for the  
19          lignite units especially, the decision to continue maintaining the units  
20          despite them having some of the highest fuel costs in the country.
- 21              a. These losses at all units were avoidable if SWEPCO had  
22              economically committed its coal units with a market status.  
23              Therefore, going forward, the Commission should require that  
24              SWEPCO calculate and report its net margins from the prior month  
25              in its monthly fuel cost report, and justify months with net negative

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- 1 margins. If it fails to justify its losses, the Commission should  
2 disallow the net losses incurred during the reported month.
- 3 b. These losses at the lignite plants were also avoidable if SWEPCO  
4 evaluated the economics of continuing to maintain and operate the  
5 units relative to alternatives. Because the utility failed to do so, the  
6 Commission should make a formal finding that SWEPCO failed to  
7 adequately evaluate the economics of continuing to operate Pirkey  
8 and Dolet Hills, and the mines that serve them, relative to  
9 alternatives.
- 10 2. As discussed below in Section 4, the Commission should disallow  
11 recovery of [REDACTED] million, which represents Texas’s jurisdictional share of  
12 the Company’s imprudently incurred fuel losses resulting from  
13 SWEPCO’s uneconomic unit-commitment practices at Dolet Hills during  
14 specific stretches of time. These losses would have been avoided if  
15 SWEPCO had followed the results of its own contemporaneous price-  
16 based process, and therefore they should not be charged to ratepayers.
- 17 3. As explained in Section 5, the Commission should disallow recovery of  
18 \$2.8 million related to the failed expansion of the Oxbow Mine. This  
19 represents Texas’s jurisdictional share of the imprudently incurred mine  
20 expansion costs billed to SWEPCO by DHLC, adjusted to exclude the  
21 portion that overlaps with the prior recommended disallowance for  
22 imprudent unit commitment practices. Specifically:
- 23 a. \$1.1 million, the adjusted Texas jurisdictional share of the \$4.2  
24 million in depreciation expenses billed to SWEPCO during the  
25 reconciliation period and associated with the expansion of the  
26 Oxbow Mine in the U area.

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- 1                   b. \$0.7 million, the adjusted Texas jurisdictional share of SWEPCO’s  
2                   portion of the one-time \$6.9 million cost incurred to transport the  
3                   dragline excavators to the U area, and
- 4                   c. \$0.9 million, the adjusted Texas jurisdictional share of SWEPCO’s  
5                   portion of the \$8.5 million increase in asset retirement obligation  
6                   (“ARO”) during the reconciliation period.
- 7                   d. If the Commission does not make a disallowance recommendation  
8                   on the basis of the Company’s unit commitment practices at Dolet  
9                   Hills, the adjustment should be removed, and the entire  
10                  disallowance related to the expansion of the Oxbow Mine should  
11                  instead be \$3.8 million.
- 12                  4. The Commission should not allow SWEPCO to carry forward its system-  
13                  wide fuel over-collection balance to pay for fixed and undepreciated  
14                  mining balance costs associated with the lignite mines.
- 15                  5. Finally, the Commission should require SWEPCO to provide a detailed  
16                  report describing its daily unit-commitment decisions and practices as part  
17                  of future fuel reconciliation applications. SWEPCO should provide the  
18                  following information as part of each reconciliation filing, to streamline  
19                  the prudence review of its unit-commitment practices:
- 20                      a. All 6-day forecast sheets used to develop the Company’s daily  
21                      unit-commitment decisions and market bids.
- 22                      b. The reason for any deviation between the commitment decision  
23                      suggested by the Company’s forward-looking price-based analysis  
24                      and the Company’s actual commitment decision (e.g., where the  
25                      Company’s analysis suggests negative energy margins from a self-  
26                      commit decision, and the Company self-commits the unit anyway).
- 27                      c. Hourly data sufficient for the Commission to calculate the net  
28                      revenues that each plant actually incurred in each reconciliation

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1 period, including total unit generation, accounting “as burned” fuel  
2 cost, marginal or “replacement” fuel cost, total variable operations  
3 and maintenance (“O&M”) cost, unit locational marginal price  
4 (“LMP”), day-ahead commitment status, energy and ancillary  
5 market revenues, and actual outages.

6 **3. SWEPCO IMPRUDENTLY INCURRED AVOIDABLE NET OPERATIONAL LOSSES OF** [REDACTED]  
7 **MILLION AT ITS COAL UNITS AND** [REDACTED] **MILLION AT ITS LIGNITE UNITS DURING**  
8 **MANY MONTHS BETWEEN MARCH 1, 2017 AND DECEMBER 31, 2019.**

9 **Q Please summarize this section.**

10 **A** In this section, I review the actual net revenue and losses that resulted from  
11 SWEPCO’s operation of its coal and lignite power plants. I find that the lignite  
12 units together incurred net revenue losses of over [REDACTED] million relative to the  
13 market during the reconciliation period. Further, I find that three of the  
14 Company’s coal units and both lignite units incurred net losses relative to the  
15 market during at least [REDACTED], and as many as [REDACTED], of the 34 months in the  
16 reconciliation period. I find that SWEPCO incurred nearly [REDACTED] million in  
17 avoidable net revenue losses at its coal plants during the months with negative net  
18 revenue.

19 **Q Describe SWEPCO’s lignite and coal-fired power stations.**

20 **A** The Company has two lignite plants. The Dolet Hills Power Station is a 650 MW,  
21 lignite, mine-mouth plant co-owned by SWEPCO (40.234 percent), Cleco Power  
22 LLC (“Cleco”), and two other nonaffiliated minority owners. The plant is located  
23 at the site of the Dolet Hills Mine and the Oxbow Mine. The Henry W. Pirkey  
24 Power Plant is a 675 MW, lignite, mine-mouth plant operated by SWEPCO and  
25 co-owned with two other nonaffiliated minority owners (SWEPCO share is

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1 85.936 percent). The plant is located next to the Marshall South lignite reserve,  
2 which, along with the Rusk lignite reserves nearby, provides lignite to operate the  
3 mine.

4 The Company also has four coal units. Units 1 and 3 at the Welsh Power Plant  
5 together have a capacity of 1,053 MW. The units are owned 100 percent by  
6 SWEPCO. The Flint Creek Power Plant has a capacity of 516 MW and is co-  
7 owned (50 percent each) with the Arkansas Electric Cooperative Corporation. The  
8 Turk Plant has a capacity of 650 MW capacity and is owned 73.33 percent by  
9 SWEPCO. All of the Company's coal plants are fueled by sub-bituminous coal  
10 from the Powder River Basin.<sup>1</sup>

11 **Q Please summarize the actual performance of SWEPCO's units between**  
12 **March 1, 2017 and December 21, 2019 based on the Company's actual**  
13 **operational data.**

14 **A** I reviewed data reported by SWEPCO on the actual variable costs that the  
15 Company incurred (fuel and variable O&M) and the actual energy market  
16 revenues that SWEPCO earned from operation of its coal fleet. As shown in Table  
17 1, I found that during the reconciliation period, the lignite units together lost  
18 [REDACTED] million in net revenue relative to the market while the coal units earned  
19 net revenue of [REDACTED] million relative to the market.<sup>2</sup>

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<sup>1</sup> Direct testimony of Amy Jeffries, pp. 6-7.

<sup>2</sup> SWEPCO responses to: Sierra Club 1.02 CONFIDENTIAL Attachment f; Sierra Club 1.2g – SWEPCO 1217 CONFIDENTIAL-E.xls; Sierra Club 1.2g – SWEPCO 1218 CONFIDENTIAL-E.xls; Sierra Club 1.2g – SWEPCO 1219 CONFIDENTIAL-E.xls; Sierra Club 1.02 CONFIDENTIAL Attachment j; Sierra Club 1.02 CONFIDENTIAL Attachment l,n,p; Sierra Club 1.02 CONFIDENTIAL Attachment m,o.

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1

**Table 1: CONFIDENTIAL Annual net operational revenues (\$Millions)**

<b>Year</b>	<b>Dolet Hills</b>	<b>Flint Creek</b>	<b>Turk</b>	<b>Pirkey</b>	<b>Welsh 1</b>	<b>Welsh 3</b>
2017	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] 6
2018	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
2019	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] 6
<b>Total</b>	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

2

**Source:** SWEPCO responses to: Sierra Club 1.02 CONFIDENTIAL Attachment f; Sierra Club 1.2g – SWEPCO 1217 CONFIDENTIAL-E.xls; Sierra Club 1.2g – SWEPCO 1218 CONFIDENTIAL-E.xls; Sierra Club 1.2g – SWEPCO 1219 CONFIDENTIAL-E.xls; Sierra Club 1.02 CONFIDENTIAL Attachment j; Sierra Club 1.02 CONFIDENTIAL Attachment l,n,p; Sierra Club 1.02 CONFIDENTIAL Attachment m,o.

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4

5

6

7

**Q Does this mean that the coal plants were a good deal for ratepayers and the lignite plants were not, during the reconciliation period?**

8

9

**A** SWEPCO’s lignite units were clearly and foreseeably a bad deal for customers.

10

Although the Company’s coal units performed better than its lignite units,

11

aggregating the net revenues at the annual level masks the avoidable net losses

12

that occurred over a number of months at each of the coal-fired units. On a

13

monthly basis, as shown in Table 2, SWEPCO’s self-commitment of Pirkey and

14

Dolet Hills resulted in avoidable net losses in and [REDACTED]

15

[REDACTED] months, respectively, out of the 34 months in the reconciliation period.

16

SWEPCO’s operational decisions also resulted in avoidable net losses in [REDACTED] of 34

17

months in the reconciliation period at Turk; and [REDACTED] out of the 34 months at

18

Welsh Units 1 and 3. Further, in many months, the coal-fired units are operating

19

in an extremely narrow band (earning net revenues of less than [REDACTED]). We

20

would anticipate these revenues to turn negative as more renewables and battery

21

storage resources come online.

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1 **Table 2: CONFIDENTIAL Monthly Net Revenue (\$Million)**

<b>Month</b>	<b>Dolet Hills</b>	<b>Flint Creek</b>	<b>Turk</b>	<b>Pirkey</b>	<b>Welsh 1</b>	<b>Welsh 3</b>
Mar-17						
Apr-17						
May-17						
Jun-17						
Jul-17						
Aug-17						
Sep-17						
Oct-17						
Nov-17						
Dec-17						
Jan-18						
Feb-18						
Mar-18						
Apr-18						
May-18						
Jun-18						
Jul-18						
Aug-18						
Sep-18						
Oct-18						
Nov-18						
Dec-18						
Jan-19						
Feb-19						
Mar-19						
Apr-19						
May-19						
Jun-19						
Jul-19						
Aug-19						
Sep-19						
Oct-19						
Nov-19						
Dec-19						
<b>Total</b>						

2 **Source:** See Table 1.

1 **Q How were the values in Table 1 and Table 2 calculated?**

2 **A** I calculated the values in Table 1 and Table 2 based on the Company's own cost  
3 and operational revenue data. SWEPCO provided daily marginal variable  
4 production costs<sup>3</sup> (which includes fuel and variable O&M), actual monthly fuel  
5 cost reports,<sup>4</sup> and hourly generation data.<sup>5</sup> I summed actual fuel costs<sup>6</sup> with the  
6 variable O&M (broken out from the marginal variable production cost), and then  
7 applied that to the hourly generation data to get a total variable production cost. I  
8 then compared the calculated variable production costs to the operational  
9 revenues (day-ahead and real-time energy<sup>7</sup> and ancillary service<sup>8</sup> revenues)  
10 provided by the Company to get net operational revenues (or losses).<sup>9</sup>

11 **Q Why is it notable that SWEPCO incurred net revenue losses at many of its**  
12 **units over many months during the reconciliation period?**

13 **A** It is understandable that SWEPCO may incur net revenue losses on a daily or  
14 even weekly basis as a result of the longer start-up and shut-down costs associated  
15 with coal and lignite units. These units may accept a loss in a few hours of the day

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<sup>3</sup> SWEPCO response to Sierra Club 1.02, CONFIDENTIAL Attachment j.

<sup>4</sup> SWEPCO response to Sierra Club 1.02, Sierra Club 1.2g – SWEPCO 1217  
CONFIDENTIAL-E.xls; Sierra Club 1.2g – SWEPCO 1218 CONFIDENTIAL-E.xls;  
Sierra Club 1.2g – SWEPCO 1219 CONFIDENTIAL-E.xls.

<sup>5</sup> SWEPCO response to Sierra Club 1.02, CONFIDENTIAL Attachment f.

<sup>6</sup> I used the actual fuel consumed from the monthly fuel reports as that represents the fuel costs being collected from customers in this docket. I removed non-recoverable expenses of fly ash, coal handling, lignite handling, and Mine Closing charges for Pirkey from the total fuel expenses.

<sup>7</sup> SWEPCO response to Sierra Club 1.02, CONFIDENTIAL Attachment l,n,p.

<sup>8</sup> SWEPCO response to Sierra Club 1.02, CONFIDENTIAL Attachment m,o.

<sup>9</sup> I removed losses incurred during planned and unplanned outages as identified in SWEPCO response to Sierra Club 1.5a.



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1 or week in order to be online during peak hours. But it is not reasonable for  
2 SWEPCO to incur losses over a sustained period of time. Losses of this nature are  
3 avoidable through better unit-commitment decisions and indicate that SWEPCO  
4 is either (1) not using robust and relevant input data to inform its unit-  
5 commitment decisions, or (2) ignoring the results of its unit-commitment analysis.

6 **Q Can you identify avoidable losses from this analysis?**

7 **A** Yes, as shown in Table 3, I find that during the reconciliation period, SWEPCO  
8 could have avoided at least [REDACTED] million in net losses relative to the market at its  
9 coal plants (and likely even more). These losses were avoidable if the Company  
10 had made better unit-commitment decisions, or else committed the units with a  
11 market status, and purchased energy from the market instead when the units did  
12 not run. Over half of these avoidable losses were incurred in 2019. This is notable  
13 because the SPP energy market prices have been steadily declining in recent  
14 years<sup>10</sup> due to low gas prices and renewable uptake, and therefore 2019 is more  
15 representative of what we expect to see from the market going forward relative to  
16 years prior.

17 SWEPCO's lignite units incurred net operational losses in an overwhelming  
18 majority of months in the analysis period, such that positive revenues for Dolet  
19 Hills and Pirkey combined totaled only [REDACTED] million. Of this, [REDACTED] million was  
20 earned at Pirkey in a single month: January 2018, in which there was a polar

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<sup>10</sup> *Southwest Power Pool Inc. Market Monitoring Unit. State of the Market Report, Winter 2020.* May 2018. Available at <https://www.spp.org/documents/62193/winter%202020%20quarterly%20state%20of%20the%20market%20report.pdf>.

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1 vortex event which brought rare winter temperatures to Texas.<sup>11</sup> Meager earnings  
2 during extreme weather events hardly justify keeping these units online,  
3 particularly given that the units are incurring millions of dollars in net operational  
4 losses in all other months of the year.

5 **Table 3: CONFIDENTIAL Monthly net revenue by fuel type (\$Million)**

	Months with negative net revenues		All Months	
	Reconciliation Period	2019	Reconciliation Period	2019
Lignite plants	█	█	█	█
Coal plants	█	█	█	█
<b>Total solid-fuel fleet</b>	█	█	█	█

6 Source: See Table 1.

7 **Q Does this analysis represent the total net losses or revenue incurred by**  
8 **ratepayers as a result of SWPECO operating its coal and lignite plants?**

9 **A** No, this analysis looks only at whether energy market revenues are covering fuel  
10 and variable operating costs; it says nothing about whether the plant is covering  
11 its total forward-looking costs to operate, or whether it is the lowest-cost resource  
12 for ratepayers. But if a unit is not covering its variable production costs with its  
13 energy market revenues, then it is definitely not making any contribution towards  
14 covering its forward-going fixed O&M and capital costs.

15 At all of SWEPCO’s solid fuel plants, the units’ fuel, O&M, and capital expenses  
16 exceeded its energy market revenue every year during the reconciliation period.

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<sup>11</sup> See, e.g., Robert Downen, “Houston Huddles down for another day of cold.” *Houston Chronicle*, Jan 16, 2018. Available at [www.houstonchronicle.com/news/houston-texas/houston/article/Houston-huddles-down-for-another-day-of-cold-12502948.php](http://www.houstonchronicle.com/news/houston-texas/houston/article/Houston-huddles-down-for-another-day-of-cold-12502948.php).

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1 At Pirkey and Dolet Hills, this was true even when I valued each unit’s capacity at  
2 the cost of new entry (“CONE”) for SPP (Table 4).<sup>12</sup> This is an extremely  
3 conservative assumption, as CONE significantly over-values the capacity from  
4 each of the lignite units. It does so by first accepting the premise that the  
5 Company needs the capacity from both units ( [REDACTED]  
6 [REDACTED] throughout the reconciliation period),<sup>13</sup> and  
7 then valuing that capacity the same as a new gas-fired peaking facility that would  
8 offer significantly more services and flexibility than an old lignite unit.

9 **Table 4: CONFIDENTIAL Net Revenue at SWEPCO’s lignite units (\$Million)**

Year	With capacity value		W/out capacity value	
	Pirkey	Dolet Hills	Pirkey	Dolet Hills
2017	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
2018	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
2019	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
<b>Total</b>	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

10 **Source:** SPP OATT, FERC Form 1, SWEPCO Responses to: Sierra Club 1.02  
11 CONFIDENTIAL Attachment f; Sierra Club 1.2g – SWEPCO 1217 CONFIDENTIAL-  
12 E.xls; Sierra Club 1.2g – SWEPCO 1218 CONFIDENTIAL-E.xls; Sierra Club 1.2g –  
13 SWEPCO 1219 CONFIDENTIAL-E.xls; Sierra Club 1.02 CONFIDENTIAL Attachment  
14 j; Sierra Club 1.02 CONFIDENTIAL Attachment l,n,p; Sierra Club 1.02  
15 CONFIDENTIAL Attachment m,o.

16  
17 The results of this analysis confirm that the lignite units are completely  
18 uneconomic on both a short-run marginal basis and a long-term basis. It also  
19 shows the imprudence of SWEPCO’s continued investment and operation of the  
20 lignite plants. It shows that ratepayers would have definitively been better off if

<sup>12</sup> Southwest Power Pool - Open Access Transmission Tariff (“OATT”), Sixth Revised Volume No. 1 - Attachment AA Resource Adequacy - Attachment AA Section 14. Available at <https://spp.org/documents/58599/cone-effective%207-1-2018.pdf>.

<sup>13</sup> SWEPCO Response to CARD 4-7, CONFIDENTIAL Attachment 1.

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1           SWEPCO had purchased market energy and/or constructed new generation  
2           resources instead of continuing to operate and invest in its lignite units and mines.

3       **Q     How do the fuel costs at SWEPCO’s lignite units compare to those of other**  
4       **solid-fuel plants across the country?**

5       **A**Pirkey and Dolet Hills have some of the highest fuel costs among solid fuel plants  
6           in the country. Specifically, the lignite used at Pirkey costs between  
7           \$2.78/MMBtu and \$2.96/MMBtu during the reconciliation period. This puts  
8           Pirkey in the top 80<sup>th</sup> to 85<sup>th</sup> percentile for most expensive fuel in the country.<sup>14</sup>  
9           And its fuel costs will likely continue to rise, given the recent upturn shown in  
10          Figure 1.

11          Dolet Hills has an even higher variable production cost. The lignite used by Dolet  
12          Hills during the reconciliation period cost between \$5.2/MMBtu and  
13          \$7.1/MMBtu. This made the lignite at Dolet Hills the most expensive solid fuel in  
14          the country.<sup>15</sup> This continues the trend seen in prior analysis which found that the  
15          lignite used at Dolet Hills between 2015 and 2017 cost between \$3.5/MMBtu and  
16          \$5.0/MMBtu and was, at the low end, in the 95<sup>th</sup> percentile most expensive fuel in  
17          the country, and at the high end, the most expensive fuel in the country.<sup>16</sup> Further,  
18          I expect the unit’s fuel costs will continue to increase in 2020 and 2021, through  
19          the plant’s closure date. This increase seen at Dolet Hills is in contrast to  
20          SWEPCO’s other solid-fuel units where, except for the recent uptick at Pirkey,<sup>17</sup>

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<sup>14</sup> EIA Form 923, 2017–2019.

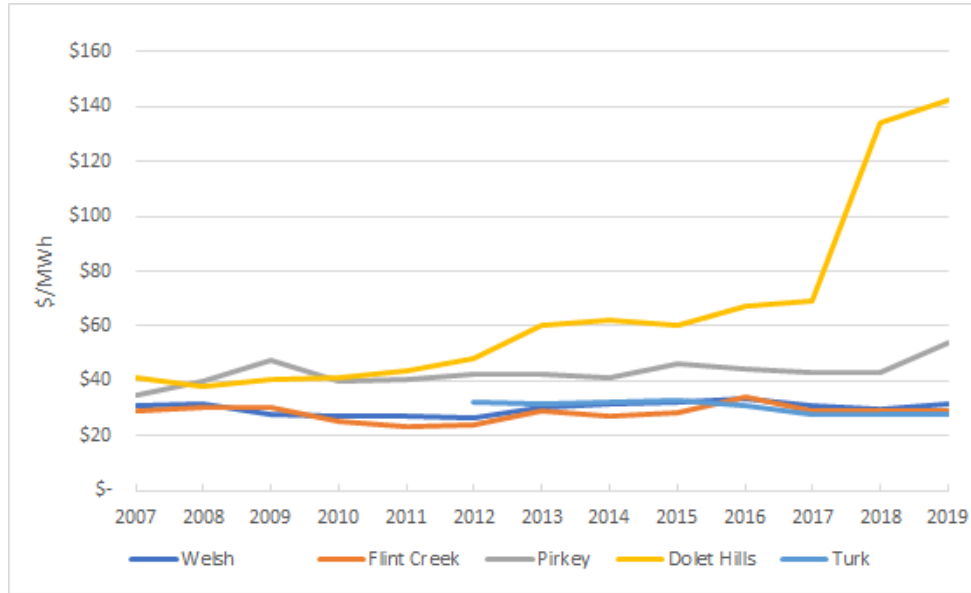
<sup>15</sup> *Id.*

<sup>16</sup> This analysis uses EIA Form 923 data, from 2015 – 2017. LPSC DOCKET NO. I-34715, Sierra Club’s Comments on Southwestern Electric Power Company’s Integrated Resource Plan Description of Studies and Study Assumptions. Available at [http://www.apscservices.info/pdf/07/07-011-U\\_35\\_1.pdf](http://www.apscservices.info/pdf/07/07-011-U_35_1.pdf).

<sup>17</sup> EIA Form 923, 2017 – 2019.

1 fuel costs have remained relatively constant on a \$/MWh basis, as shown in  
 2 Figure 1.

3 **Figure 1: Total Production Expense (\$/MWh)**



4  
 5 **Source:** FERC Form 1, 2007–2019.

6 **4. SWEPCO SELF-COMMITTED ITS COAL AND LIGNITE UNITS A MAJORITY OF THE**  
 7 **TIME THEY WERE AVAILABLE AND IMPRUDENTLY INCURRED SIGNIFICANT NET**  
 8 **LOSSES AT SOME OF ITS UNITS.**

9 **Q Please summarize this section.**

10 **A** In this section, I explain how dispatchable power plants operate within the SPP  
 11 market. I define the practice of uneconomic self-commitment and discuss the  
 12 impacts this practice can have on ratepayers, if utilities are permitted to pass along  
 13 the avoidable losses that result. I describe the tools that SWEPCO uses to make its  
 14 unit-commitment decisions. I then review the Company’s own data and find that  
 15 SWEPCO self-commits all its coal and lignite units (*i.e.*, with a must-run status)  
 16 the majority of the time the units are available. I also find at least three sustained

1 instances where the Company kept Dolet Hills online and sustained significant  
2 losses over substantial stretches of time, despite its own unit-commitment analysis  
3 indicating a benefit to ratepayers in turning the unit off. Finally, I discuss my  
4 concerns with the large discrepancy between the Company's actual fuel costs  
5 passed on to customers in this docket, and the variable fuel costs that it uses to  
6 make unit-commitment decisions.

7 **Q Why are you evaluating unit-commitment practices during a fuel**  
8 **reconciliation docket?**

9 **A** The fuel reconciliation proceedings cover the reasonableness of fuel costs  
10 incurred by the Company to provide electricity to ratepayers during the time  
11 between March 1, 2017 and December 31, 2019. The magnitude of SWEPCO's  
12 incurred fuel costs is directly tied to the operation of each of its units, and thus its  
13 unit-commitment decisions.

14 **Q How does the analysis in this section differ from the analysis presented in**  
15 **Section 3?**

16 **A** In Section 3, I present analysis on how SWEPCO's units *actually* performed  
17 during the reconciliation period using data available after the fact (*i.e.*, the net  
18 revenue and losses that SWEPCO incurred by operating its units rather than  
19 purchasing energy from the market). I show the total harm that SWEPCO seeks to  
20 pass on to ratepayers as a result of its decisions to uneconomically maintain and  
21 operate its solid fuel fleet.

22 In contrast, in this section, I evaluate the data, projections, and analysis that  
23 SWEPCO had at the time that it made its daily unit-commitment decisions. I  
24 identify the periods of time when the Company projected it would incur net losses

1 by operating its units, but yet still opted to operate its units and then predictably  
2 incurred significant net losses. I then calculate the net losses incurred during just  
3 that subset of days, which SWEPCO seeks to pass on to ratepayers.

4 *i. SWEPCO regularly self-committed its units regardless of economics.*

5 **Q Please describe how dispatchable power plants are generally committed**  
6 **within the SPP wholesale market.**

7 **A** Generators operating within the SPP market commit their units with one of five  
8 statuses: self-commit (must-run), market (economic), outage, reliability, and not-  
9 participating. In SPP, utilities generally commit dispatchable generating units  
10 with a status of “market.”<sup>18</sup>

11 When a unit is committed with a market status, the market operator has the  
12 responsibility for making unit-commitment decisions. SPP algorithms prioritize  
13 reliability, and then compare the variable cost of operating (and starting) a unit to  
14 the variable production costs of all other units available to the market for the next  
15 day. A market-committed plant will be committed if it is the least-cost option  
16 available to the market. Once a plant is online, the market operator may  
17 economically dispatch the unit by ramping it up and down from that minimum  
18 operating level. This process generally ensures customers are served (reliably) by  
19 the lowest-cost resources.

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<sup>18</sup> In my testimony, I will use the term “unit-commitment” to refer to the decision made by the utility or the market on whether to operate a unit at its minimum operating level and therefore make it available to the market. I will use the term “unit dispatch” to refer to the decision by the utility or the market on how to operate a unit above its minimum operating level once the unit has been committed online.

1    **Q**    **In practice, are all power plants actually committed in that way?**

2    **A**    No. For units with long start-up and shut-down times, such as solid-fuel fired  
3           power plants, utilities such as SWEPCO often elect to maintain control of unit-  
4           commitment decisions and design independent processes outside of the SPP  
5           market to determine when to commit a unit.<sup>19</sup> Unlike the market operator,  
6           generation owners may choose to ignore costs when making operational  
7           decisions.

8           The process of committing a unit outside the market is called self-commitment. A  
9           self-committed unit (*i.e.*, one designated as must-run) will operate with a power  
10          output no less than its minimum operating level—no matter how the prevailing  
11          market price compares to the unit’s operating economics. The unit receives  
12          market revenue (and incurs variable operational costs) but does not set the market  
13          price of energy. If the market price of energy falls below a unit’s operational cost,  
14          that self-committed unit will continue to operate and incur losses. The utility often  
15          seeks to recover these losses from ratepayers nevertheless, as SWEPCO is doing  
16          here.

17   **Q**    **What does the phrase “uneconomic self-commitment” mean?**

18   **A**    The term uneconomic self-commitment refers to a utility’s practice of committing  
19          a unit into a wholesale energy market (in this case the SPP market) with a “self-  
20          commitment” (or must-run) status when the utility knows, or should know, that

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<sup>19</sup> Minimum operating level is an output threshold often determined operationally, and below which a generator is either less stable or operates inefficiently. Once the unit-commitment decision is made, the level of generation output (above the minimum) is generally left to the market. The operating level is based upon the marginal running cost assumptions provided by the owner in the form of offers or bids to SPP.



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1 the unit's revenues from market energy and ancillary service will not be sufficient  
2 to cover the unit's variable production costs.

3 **Q What tools does SWEPCO have to inform its unit-commitment decisions?**

4 **A** SWEPCO conducts price-based forward-looking analysis every day. The  
5 Company records all information it has at the time on market prices and unit  
6 costs, as well as its commitment decisions that result from the analysis process, on  
7 a sheet I will refer to as the 6-day forecast.<sup>20</sup> Specifically, the Company projects  
8 market prices out over the next two weeks and compares the expected market  
9 revenue to projected variable production costs for each unit for each of the next  
10 six days.<sup>21</sup>

11 **Q How should SWEPCO be using the results of its price-based analysis to**  
12 **inform unit-commitment decisions?**

13 **A** Except in the case of unit testing or other extenuating circumstances, SWEPCO  
14 should elect to self-commit its units only if it expects ratepayers to see positive  
15 energy market margins over a reasonable near-term time period (incorporating  
16 consideration of start-up and shut-down costs). Conversely, the Company should  
17 either take its units offline, or it should commit its units with a market status with  
18 the expectation they will not run if the Company projects they will operate at a  
19 loss. Operating the units otherwise would be imprudent, because self-committed  
20 operation will predictably result in net losses that could have been avoided.  
21 Therefore, the Company should document any deviations between its final

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<sup>20</sup> The Company produced its daily forecasts in response to 1.07(b), HIGHLY SENSITIVE Attachments (1,0355 total).

<sup>21</sup> SWEPCO response to Sierra Club Request 1.07(a) and (b).

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1           commitment decision and the decision that is projected to be prudent based on its  
2           6-day forecast.

3   **Q     Should a utility be considered to have made an imprudent decision any time**  
4           **it does not maximize actual revenues to ratepayers?**

5   **A**Not necessarily. Utilities are expected to use accurate cost and pricing information  
6           and robust processes to make prudent decisions, but they are not expected to  
7           always be right based on perfect hindsight. If market prices deviate significantly  
8           from what the utility projected, the utility's self-commitment decisions may not  
9           maximize net revenues during a multi-day period. If the utility's own  
10          contemporaneous analysis was robust and indicated that operating the unit would  
11          maximize net revenues, it is not necessarily an imprudent decision.

12          But, if the losses are part of a pattern in which the utility is consistently and  
13          systematically wrong and has neglected to modify its decision-making process,  
14          the decision may be imprudent. The accuracy of the utility's daily unit-  
15          commitment decision-making process should itself be a feedback into its  
16          decision-making process, with modifications incorporated when the current  
17          process is falling short.

18   **Q     Does SWEPCO use its price-based analysis to make its unit-commitment**  
19          **decision at its coal and lignite units?**

20   **A**No. Based on the Company's own data, I find that SWEPCO regularly self-  
21          commits the units, and it does so regardless of what its price-based analysis  
22          projects about unit performance. Specifically, during the reconciliation period, the

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1 Company self-committed all six of its coal and lignite units [REDACTED] of the  
2 time that the units were available.<sup>22</sup>

3 **Table 5: CONFIDENTIAL Unit-commitment decisions for SWEPCO coal and lignite**  
4 **units (non-outage hours)<sup>23</sup>**

	March 1, 2017 – Dec 31, 2019		
	Self	Market	Reliability
Dolet Hills	[REDACTED]	[REDACTED]	[REDACTED]
Flint Creek	[REDACTED]	[REDACTED]	[REDACTED]
Pirkey	[REDACTED]	[REDACTED]	[REDACTED]
Turk	[REDACTED]	[REDACTED]	[REDACTED]
Welsh 1	[REDACTED]	[REDACTED]	[REDACTED]
Welsh 3	[REDACTED]	[REDACTED]	[REDACTED]

5 *Sources: SWEPCO Response to Sierra Club Data Request 1.2(d), SC 1-02 CONFIDENTIAL*  
6 *Attachment\_d.xlsx.*

7 **Q Why is it concerning that SWEPCO is self-committing its coal- and lignite-**  
8 **fired generating units so frequently?**

9 **A** It may be reasonable for SWEPCO to take control of its unit-commitment  
10 decisions if the utility demonstrates that its internal decision-making process  
11 consistently produces greater net revenues and a more-economic outcome than  
12 relying solely on the SPP market. But SWEPCO has not done so.

<sup>22</sup> SWEPCO response to Sierra Club Data Request 1.2(d), SC 1-02 CONFIDENTIAL Attachment\_d.xlsx.

<sup>23</sup> I excluded data from all planned and unplanned outage periods, as identified by the Company, from all analysis performed throughout my testimony in order to focus only on the commitment elections when economics are the predominant consideration facing a unit. During an outage, a generator has operational considerations outside of short-term energy market prices.

1 In fact, I find that the Company regularly self-commits its units, Dolet Hills in  
2 particular, with variable production costs above the market price is it paid for the  
3 energy.<sup>24</sup> Therefore, if the Commission approves SWEPCO's request to pass on  
4 to customers the entirety of the fuel costs incurred, customers will be paying more  
5 for energy than necessary. Specifically, they will be paying more than if  
6 SWEPCO had used the market to commit its units.

7 *ii. SWEPCO incurred over [REDACTED] in avoidable net revenue losses as a result*  
8 *of uneconomic self-commitment decisions.*

9 **Q What did you find in reviewing the Company's individual 6-day forecast**  
10 **sheets?**

11 **A** I find that in [REDACTED] months, the Company regularly self-committed Dolet  
12 Hills despite its 6-day forecast analysis projecting net operational losses of over  
13 [REDACTED] from doing so.<sup>25</sup> While this speaks only to the prudence of the  
14 Company's decision and not the actual net revenues that resulted, as discussed in  
15 the previous section, I find that the Company actually incurred net revenue losses  
16 of [REDACTED] million at Dolet Hills over the reconciliation period as a result of  
17 ignoring its own analysis.<sup>26</sup>

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<sup>24</sup> The market revenue SWEPCO receives includes energy and ancillary market revenue from both the day-ahead and real-time markets.

<sup>25</sup> Calculations based on data provided in SWEPCO response to Sierra Club 1-07(b) HIGHLY SENSITIVE Attachments (1,035 total).

<sup>26</sup> SWEPCO Responses to: Sierra Club 1.02 CONFIDENTIAL Attachment f; Sierra Club 1.2g – SWEPCO 1217 CONFIDENTIAL-E.xls; Sierra Club 1.2g – SWEPCO 1218 CONFIDENTIAL-E.xls; Sierra Club 1.2g – SWEPCO 1219 CONFIDENTIAL-E.xls; Sierra Club 1.02 CONFIDENTIAL Attachment j; Sierra Club 1.02 CONFIDENTIAL Attachment l,n,p; Sierra Club 1.02 CONFIDENTIAL Attachment m,o.

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1 I also found three specific periods of time I will refer to as “events” when  
2 SWEPCO projected net losses from self-committing a unit, self-committed the  
3 unit anyways, and then incurred significant *actual* net revenue losses. In these  
4 instances, Dolet Hills would not have been selected if committed with a market  
5 status (based on its high variable cost relative to other market generators), and  
6 therefore would have been taken offline.

7 The details of each “event” are shown in Table 6 below. For each event, net losses  
8 are compared to and exceed the unit cold-start costs of \$23,372.<sup>27</sup> This cold-start  
9 cost represents the incremental cost that the Company would incur if it commits a  
10 unit with a market status, and the unit shuts down and then re-starts. In total, these  
11 events incurred [REDACTED] in net losses and cost ratepayers an unnecessary  
12 [REDACTED] inclusive of start-up costs.

13 **Table 6: HIGHLY SENSITIVE Events from SWEPCO's 6-day forecasts for Dolet**  
14 **Hills**

Date(s) analysis covered	6-day forecast findings	Utility commitment decision	Actual net operational losses
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

<sup>27</sup> SWEPCO response to Sierra Club 1.5(a).

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Date(s) analysis covered	6-day forecast findings	Utility commitment decision	Actual net operational losses
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

1 **Sources:** SWEPCO response to Sierra Club 1-07(b) HIGHLY SENSITIVE Attachments  
2 (1,035 total); Sierra Club 1.5a; Sierra Club 1.02 CONFIDENTIAL Attachment f; Sierra  
3 Club 1.2g – SWEPCO 1217 CONFIDENTIAL-E.xls; Sierra Club 1.2g – SWEPCO 1218  
4 CONFIDENTIAL-E.xls; Sierra Club 1.2g – SWEPCO 1219 CONFIDENTIAL-E.xls;  
5 Sierra Club 1.02 CONFIDENTIAL Attachment j; Sierra Club 1.02 CONFIDENTIAL  
6 Attachment l,n,p; Sierra Club 1.02 CONFIDENTIAL Attachment m,o.

7 **Q How did you calculate these values discussed above?**

8 **A** I reviewed all 1,035 of the 6-day forecast sheets that the Company prepared  
9 between March 1, 2017 and December 31, 2019. To calculate the *projected*

1 revenue or losses displayed in Table 6, I summed the daily *projected* net revenues  
2 or losses from the 6-day forecast sheet for the date range indicated. To calculate  
3 the actual net revenue or losses associated with those days, I summed the actual  
4 fuel and variable O&M costs and the market revenues to find a total net market  
5 revenue. Finally, I compared the net market revenue to the unit start-up cost to  
6 determine if the utility would have been better off taking the unit offline.

7 **Q Have other state commissions and regional transmission organizations**  
8 **(“RTO”) raised concerns about self-commitment in the wholesale markets?**

9 **A** Yes. Numerous commissions as well as RTOs around the country have begun to  
10 recognize the importance of this issue, with some considering unit commitment as  
11 part of existing dockets and others initiating separate dockets dedicated to  
12 evaluating unit-commitment practices. These include the following:

- 13 • The Minnesota Public Utility Commission opened a docket titled  
14 *Investigation into Self-Commitment and Self-Scheduling of Large*  
15 *Baseload Generation Facilities* to review the unit-commitment practices  
16 for Minnesota Power, Ottertail Power, and Xcel Energy. This docket is  
17 ongoing.<sup>28</sup>
- 18 • The Indiana Utility Regulatory Commission opened a subdocket earlier  
19 this year to evaluate the prudence of Duke Energy Indiana unit-  
20 commitment practices after receiving evidence of uneconomic unit-  
21 commitment practices in a Fuel Adjustment Clause (“FAC”) proceeding.<sup>29</sup>  
22 This docket is ongoing.

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<sup>28</sup> Minnesota Public Utility Commission Docket No. E99/CI-19-704.

<sup>29</sup> Indiana Utility Regulatory Commission Cause No. 38707-FAC123 S1.

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- 1           • The Missouri Public Service Commission has a fuel prudence review  
2           docket that occurs every 18 months. In Missouri, this prudence review  
3           supplements quarterly FAC filings.<sup>30</sup>
- 4           • The Market Monitoring Unit (“MMU”) of SPP itself published a report in  
5           December 2019 which found that nearly half of all megawatts generated  
6           between March 2014 and August 2019 came from self-committed units,  
7           and that this was impacting market prices and the efficiency of market  
8           operations. The MMU recommended that “SPP and stakeholders work to  
9           reduce the incidence of self-commitments.”<sup>31</sup> In September of this year,  
10          SPP staff released a subsequent report evaluating the impact of self-  
11          commitment practices in SPP. Their analysis found that around 10 percent  
12          of self-committed generation would not have been chosen for commitment  
13          and dispatch on a least-cost basis.<sup>32</sup>
- 14          • MISO (another RTO) published a brief analysis earlier this year which  
15          found that 12 percent of generation came from uneconomically committed  
16          units.<sup>33</sup>

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<sup>30</sup> Missouri Public Service Commission, Docket No. EW-2019-0370.

<sup>31</sup> *Southwest Power Pool Market Monitoring Unit, Self-committing in SPP markets: Overview, impacts, and recommendations*, Southwest Power Pool (Dec. 2019), at 2. Available at <https://spp.org/documents/61118/spp%20mmu%20self-commit%20whitepaper.pdf>.

<sup>32</sup> *Southwest Power Pool Staff, Self-Commitment in SPP’s Day-Ahead Market*. (September 2020). Available at <https://spp.org/documents/63092/2020%2009%2028%20commitments%20in%20spps%20integrated%20marketplace.pdf>.

<sup>33</sup> Catherine Morehouse, *MISO: Majority of coal is self-committed, 12% was uneconomic over 3-year period*, Utility Dive (May 2020) Available at <https://www.utilitydive.com/news/miso-majority-of-coal-is-self-committed-12-was-uneconomic-over-3-year-pe/577508/>.



1 iii. SWEPCO is classifying significant portions of its fuel costs, across both its coal  
 2 and lignite units, as fixed and therefore omitting them from its unit-  
 3 commitment decisions.

4 **Q Do you have any concerns with the unit-commitment data SWEPCO has**  
 5 **provided?**

6 **A** Yes, SWEPCO appears to be excluding a significant portion of its fuel expenses  
 7 from the variable cost of production that it uses to make its unit-commitment  
 8 decisions. Specifically, the Company’s reported variable fuel costs omit between  
 9 ■ and ■ percent of actual fuel costs at its coal plants, and over half (■ percent  
 10 at Pirkey and ■ percent at Dolet Hills) of the actual fuel cost at its lignite plants  
 11 (see Table 7).

12 **Table 7: CONFIDENTIAL Percent of actual fuel expense included in variable**  
 13 **production costs**

	Reconciliation period total	
Turk		
Pirkey		
Welsh 1		
Welsh 3		
Flint Creek		
Dolet Hills		

14 **Source:** See Table 1.

15 Variable fuel costs<sup>34</sup> represent the cost SWEPCO would pay today to replace the  
 16 fuel that it burns. SWEPCO calculates the replacement cost of coal based on a  
 17 ■. <sup>35</sup> Actual fuel costs,

<sup>34</sup> SWEPCO response to Sierra Club 1.02, CONFIDENTIAL Attachment j.

<sup>35</sup> SWEPCO response to Sierra Club 5-7(b), CONFIDENTIAL.

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1           however, represent the cost of the fuel that SWEPCO actually uses for generation  
2           at each plant. The Company seeks to recover actual fuel expenses<sup>36</sup> from  
3           ratepayers in this docket.

4   **Q     How does this discrepancy in reported fuel costs impact the Company's unit-**  
5           **commitment decision-making?**

6   **A**As discussed above, units are committed by the market based on their operating  
7           costs (fuel and variable O&M) until enough units are committed to meet load in a  
8           given hour. Lower operating costs therefore make it more likely that a unit will be  
9           committed. If the variable fuel costs used for making unit-commitment decisions  
10          and market offer curves represent only a portion of the actual cost of fuel, then a  
11          unit will appear more economic than it actually is, and the unit will be over-  
12          committed and over-dispatched as a result.

13          Full fuel costs are still passed on to ratepayers either through the fuel  
14          reconciliation process or rates (for the variable component), regardless of what  
15          cost is used to make unit-commitment decisions. But these costs will be higher  
16          than if the plant was committed and operated based on its actual fuel cost. For this  
17          reason, the Commission should be concerned about which fuel costs the Company  
18          is using for different purposes and how those costs are calculated.

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<sup>36</sup> SWEPCO responses to: Sierra Club 1.02 CONFIDENTIAL Attachment f; Sierra Club 1.2g – SWEPCO 1217 CONFIDENTIAL-E.xls; Sierra Club 1.2g – SWEPCO 1218 CONFIDENTIAL-E.xls; Sierra Club 1.2g – SWEPCO 1219 CONFIDENTIAL-E.xls.

1 **Q What accounts for the difference between SWEPCO's variable and actual**  
2 **fuel costs at its coal plants?**

3 **A** SWEPCO does not fully account for this observed omission of █ to █ percent of  
4 the cost of fuel in the variable cost it uses to make its unit-commitment decisions  
5 at its coal plants.

6 Company witness Jeffries indicated that SWEPCO utilized a fuel procurement  
7 strategy that relied on flexible, short-term coal purchases.<sup>37</sup> Indeed, during the  
8 reconciliation period, approximately █ of SWEPCO's coal supply came  
9 from contracts of one year or less.<sup>38</sup> With short-term and spot contracts, the coal  
10 price in the contract and the replacement price the Company would pay on the  
11 spot market should not differ significantly. Additionally, with short-term and spot  
12 contracts, the Company has more flexibility to adjust its purchase based on need  
13 (compared with long-term contracts that tend to contain a minimum annual take).  
14 When prudently negotiated, short-term contracts should not lock ratepayers into  
15 significant fixed costs.

16 **Q Is SWEPCO classifying a significant portion of fuel cost at its coal plants as**  
17 **fixed?**

18 **A** Very likely, yes. The difference observed here between variable and actual costs  
19 indicates that SWEPCO likely is in fact classifying a significant portion of its fuel  
20 expenses as fixed costs. While we know that SWEPCO includes mincar  
21 depreciation expenses in fuel costs, it is unclear where on the coal supply chain  
22 the remainder of these costs are being incurred (the mine, in transport, or  
23 elsewhere), and whether it is reasonable and prudent to consider these costs fixed.

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<sup>37</sup> Direct testimony of Amy Jeffries, p. 5.

<sup>38</sup> HS Schedule, FR-7 Workpaper Coal Contracts.

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1 But it is clear that signing fuel contracts that lock the Company into significant  
2 fixed costs regardless of need is not in the best interest of ratepayers.

3 Fixed costs are generally not included in unit-commitment decisions, and as  
4 discussed above, a lower production cost makes it more likely that the unit will be  
5 committed in the market and operated. When that lower production cost does not  
6 represent the actual full cost to operate a unit, as is the case here, ratepayers are  
7 stuck paying for any net revenue losses that result from operation. This is why,  
8 despite the Company's coal units netting positive revenues over the reconciliation  
9 period, SWEPCO still incurred significant and avoidable net revenue losses  
10 during many months, as discussed in Section 3.

11 **Q What accounts for the difference between SWEPCO's variable and actual**  
12 **fuel costs at its lignite plants?**

13 **A** The difference between variable and actual costs at the lignite plants is also  
14 attributed in large part to fixed costs.<sup>39</sup> SWEPCO passes on to ratepayers the  
15 entire cost of operating the mines that serves each of the lignite plants through its  
16 monthly fuel costs. The Company classifies some of the mine costs as fixed and  
17 others as variable.

18 At Pirkey, [REDACTED] of the cost of fuel is omitted from the variable cost.

19 At Dolet Hills, SWEPCO classifies [REDACTED] percent of the total selling price of lignite  
20 as fixed.<sup>40</sup> But, I find that [REDACTED] of actual fuel expenses were omitted

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<sup>39</sup> Lignite is mined on-site, not purchased through long-term or spot contracts, as coal is.

<sup>40</sup> SWEPCO response to Sierra Club 1-6, CONFIDENTIAL Attachment 1-6.

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1 from the variable fuel cost that SWEPCO used to make unit-commitment  
2 decisions during the reconciliation period.<sup>41</sup>

3 **Q What accounts for this increase in fixed costs at Dolet Hills during the**  
4 **reconciliation period?**

5 **A** The increase in the fixed costs included in fuel costs during this reconciliation  
6 period is driven in part by the inclusion of substantial costs associated with (1) the  
7 failed Oxbow mine expansion project—which I detail below in the next section,  
8 (2) updated estimates of final reclamation costs (also likely driven by the failed  
9 mine expansion), and (3) the retirement and accelerated depreciation of  
10 Dragline 3 and associated mining equipment.<sup>42</sup> The first two items will be  
11 discussed in depth in the next section. The third, the retirement of Dragline 3,  
12 caused the associated depreciation expense charged to SWEPCO, and in turn  
13 passed on to ratepayers through fuel costs, to jump from just over \$31,000 per  
14 month to \$1.7 million per month.<sup>43</sup>

15 **Q Is it reasonable for SWEPCO to commit Dolet Hills and Pirkey based on a**  
16 **variable production cost that omits half to three-quarters of the unit’s fuel**  
17 **costs?**

18 **A** No. When Dolet Hills in particular was available during the reconciliation period,  
19 SWEPCO appears to have regularly self-committed the unit with a low variable

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<sup>41</sup> SWEPCO responses to: Sierra Club 1.02 CONFIDENTIAL Attachment f; Sierra Club 1.2g – SWEPCO 1217 CONFIDENTIAL-E.xls; Sierra Club 1.2g – SWEPCO 1218 CONFIDENTIAL-E.xls; Sierra Club 1.2g – SWEPCO 1219 CONFIDENTIAL-E.xls; Sierra Club 1.02 CONFIDENTIAL Attachment j; Sierra Club 1.02 CONFIDENTIAL Attachment l,n,p; Sierra Club 1.02 CONFIDENTIAL Attachment m,o.

<sup>42</sup> SWEPCO response to Sierra Club 7-6(b).

<sup>43</sup> SWEPCO response to Sierra Club 7-6, Attachment 3.

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1 cost in an effort to pass as much of the outstanding mine expenses on to  
2 ratepayers as possible before the plant closes. This is because SWEPCO only  
3 charges customers fuel costs when a unit actually operates. Therefore, with an  
4 uneconomic unit, the only way to ensure that it operates, and therefore to actually  
5 pass the outstanding mine expenses on to customers, is to self-commit the unit.

6 While SWEPCO is responsible for all expenses at its lignite mines that serve  
7 Pirkey and Dolet Hills, ratepayers should not be expected to cover all the costs  
8 associated with some of the most expensive solid-fuel supplies in the country,  
9 especially those not prudently incurred and adequately planned for. And they  
10 certainly should not be expected to cover these costs across multiple units on an  
11 accelerated timeline.

12 **5. SWEPCO DID NOT PROPERLY MANAGE ITS LIGNITE CONTRACTS AND ALLOWED**  
13 **DHLC TO IMPRUDENTLY INCUR \$170.7 MILLION IN MINE EXPANSION COSTS AT THE**  
14 **OXBOW MINE ON A PROJECT THAT FAILED TO DELIVER VALUE TO RATEPAYERS.**

15 **Q Please summarize this section.**

16 **A** In this section, I review SWEPCO's management of its lignite mining contract at  
17 Dolet Hills and Pirkey. I also discuss SWEPCO's very limited actions to evaluate  
18 the prudence of the Oxbow Mine expansion project, both prior to and during the  
19 expansion. I evaluate what the Company actually knew at the time it worked to  
20 expand the Oxbow mine and find that the Company did not make a prudent  
21 decision to undertake the mine expansion.

22 Then, I review the specific mine expansion costs that the Company seeks to  
23 recover as part of this reconciliation docket. I find that despite the DHLC

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1 spending at \$170.7 million<sup>44</sup> to expand and develop area U of the Oxbow Mine,  
2 the Company recovered only around ██████████<sup>45</sup> of the lignite it originally  
3 projected when it began the mine expansion project. I find that the project fails to  
4 meet both the prudence and used and useful standard.<sup>46</sup> Therefore, the costs  
5 associated with the mine expansion should not be recovered from ratepayers.

6 ***i. SWEPCO failed to conduct the economic analysis required to properly manage***  
7 ***its lignite contracts during the reconciliation period.***

8 **Q Describe the lignite plants' fuel sources.**

9 **A** The Dolet Hills Power Station is located at the site of the Dolet Hills Mine and the  
10 Oxbow Mine. These mines operate solely to provide lignite to the Dolet Hills  
11 Power Station. The mines are owned or controlled by SWEPCO and Cleco and  
12 operated by DHLC.<sup>47</sup> The terms of mine operations are dictated by the Amended  
13 and Restated LMA last amended in December 2009.<sup>48</sup>

14 The Henry W. Pirkey Power Plant is located next to the Marshall South lignite  
15 reserve, which along with the Rusk lignite reserves nearby, provides lignite to

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<sup>44</sup> SWEPCO response to Sierra Club 10-2, Attachment 1; Direct testimony of Dennis Meyer, pp. 7, 23-24.

<sup>45</sup> SWEPCO response to Sierra Club 7-7, HIGHLY SENSITIVE Attachment 2; SWEPCO Response to Sierra Club 7-7, HIGHLY SENSITIVE Attachment 3; SWEPCO Response to Sierra Club 7-7, HIGHLY SENSITIVE Attachment 4; SWEPCO response to Sierra Club 8-7, Attachment 1.

<sup>46</sup> The Public Utilities Regulatory Act provides that “rates shall be based on the original cost, less depreciation, of property used by and useful to the utility in providing service.” PURA sec. 53.053.

<sup>47</sup> DHLC is a wholly owned subsidiary of Cleco and SWEPCO and was formed in April 2001 for the purpose of operating and managing the Dolet Hills Mine.

<sup>48</sup> HS Schedule FR7 Workpaper Lignite.

1 operate the mine. The mines are owned by SWEPCO and operated by the  
2 SABINE Mining company (“SABINE”). The terms of mine operation are dictated  
3 by the Third Restatement of Lignite Mining Agreement (“RLMA”) last amended  
4 in January 2008.

5 **Q Who is responsible for paying the costs to develop and operate the mines?**

6 **A** [REDACTED]  
7 [REDACTED]  
8 [REDACTED]  
9 [REDACTED]  
10 [REDACTED]  
11 [REDACTED]  
12 [REDACTED]<sup>49</sup>

13 **Q How does SWEPCO recover the costs of developing and operating the**  
14 **mines?**

15 **A** SWEPCO passes on the costs to develop and operate the mine to its ratepayers, as  
16 eligible fuel expenses. Eligible lignite fuel expenses include leasehold costs,  
17 mining costs, cost of coordinating mining activities, mine closing costs and  
18 related costs (some of which are billed by DHLC).<sup>50</sup> Based on the terms of the  
19 LMA, DHLC bills SWEPCO and Cleco for the cost of producing lignite, which

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<sup>49</sup> HS Schedule FR7 Workpaper Lignite, Amended and Restated Lignite Mine Agreement, Article 12; Direct testimony of Dennis Meyer, p. 16; HS Schedule FR7 Workpaper Lignite, Third Restatement of Lignite Mining Agreement, Article XII, Section 2.

<sup>50</sup> Direct testimony of Teresa Kraske, p. 12.



1 includes capital-related costs. These capital costs are depreciated and amortized  
2 over the asset life and included in the eligible fuel expenses charged to  
3 ratepayers.<sup>51</sup>

4 **Q What are SWEPCO’s obligations with regards to management of its mine**  
5 **contracts?**

6 **A** SWEPCO is obligated to regularly evaluate whether its current mine and fuel  
7 contracts best serve its ratepayers. To do so, the Company needs to evaluate the  
8 cost and term of each fuel contact relative to: (1) the contract termination fees and  
9 cost to procure fuel from an alternative source, or (2) the cost to procure  
10 electricity and all needed grid services from a different set of resources.

11 **Q Why does SWEPCO need to evaluate the economics of the entire mining and**  
12 **plant complexes at Dolet Hills and Pirkey, not just the cost of the mine**  
13 **contract relative to an alternative fuel supply?**

14 **A** Both Dolet Hills and Pirkey are mine-mouth plants. The mines that serve these  
15 plants operate solely to provide lignite to their respective power stations. If either  
16 plant retires, the lignite cannot be transported elsewhere for a reasonable cost, and  
17 therefore the mine is no longer needed and shuts down. On the other hand, if the  
18 mine cannot produce lignite anymore, the plant would likely shut down. The costs  
19 to operate the plant and the mine are therefore directly intertwined. SWEPCO  
20 acknowledged this fact when discussing the Company’s decision to cease mining  
21 at the Dolet Hills and Oxbow mines, stating that “the amount of economically

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<sup>51</sup> Direct testimony of Teresa Kraske, p. 14.

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1 recoverable reserves were depleted, and the expected cost associated with  
2 continued operation of the plant exceeded anticipated market revenues.”<sup>52</sup>

3 Therefore, to prudently manage the mine contract, the Company should regularly  
4 evaluate whether each unit is projected to continue to operate economically into  
5 the future under a range of likely scenarios.

6 **Q Did SWEPCO evaluate the economics of continuing to operate Dolet Hills  
7 and Pirkey relative to retiring the plant prior to the mine expansion or at any  
8 time during the reconciliation period?**

9 **A** No. When asked to provide the Company’s most recent analysis “of the economic  
10 viability and profitability of operations of each SWEPCO’s generating units,” the  
11 Company asserted that it had not conducted analysis quantifying the economic  
12 viability of SWEPCO generating unit during the reconciliation period.<sup>53</sup> This  
13 continues a concerning trend seen also in Texas PUC Docket No. 46449 and  
14 Arkansas PSC Docket No. 19-008-U of SWEPCO failing to prudently evaluate  
15 the economics of operating Dolet Hills before moving forward with major capital  
16 investments (in that case, for compliance with the Mercury and Air Toxics  
17 Standards).<sup>54</sup>

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<sup>52</sup> SWEPCO response to TIEC 8-2(a).

<sup>53</sup> SWEPCO response to CARD 1-25.

<sup>54</sup> In this case, SWEPCO relied on faulty analysis prepared by Cleco.

1        *ii. SWEPCO allowed DHLC to undertake the Oxbow Mine expansion project*  
2        *imprudently, without performing any economic analysis prior to or during the*  
3        *project.*

4        **Q        Did SWEPCO or any of its mine operators undertake any major mine-**  
5        **expansion projects during this reconciliation period?**

6        **A        Yes, during the reconciliation period, DHLC expanded mining operation to the U**  
7        **area of the Oxbow mine that serves Dolet Hills. The Company faced substantial**  
8        **geologic and flooding challenges at the site during the expansion process, and**  
9        **eventually shut down the U area after extracting only around [REDACTED] of the**  
10       **lignite it projected it needed.<sup>55</sup>**

11       **Q        What analysis should SWEPCO have conducted prior to DHLC expanding**  
12       **mining operations at the Oxbow Mine?**

13       **A        Prior to DHLC undertaking the Oxbow Mine expansion project, SWEPCO should**  
14       **have assessed the forward-going economics of continuing to operate Dolet Hills**  
15       **Power Station with lignite from the Oxbow Mine, inclusive of the mine expansion**  
16       **costs, and compared these costs to reasonable alternatives. The reasonable**  
17       **alternatives should have included (1) continuing to operate Dolet Hills with fuel**  
18       **from another source (which is likely not feasible in this case); (2) operating Dolet**  
19       **Hills Power Station on a reduced or seasonal basis using only the lignite from the**  
20       **original Dolet Hill Mine and purchasing any necessary energy from the market;**

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<sup>55</sup> SWEPCO response to Sierra Club 7-7, HIGHLY SENSITIVE Attachment 2; SWEPCO Response to Sierra Club 7-7, HIGHLY SENSITIVE Attachment 3; SWEPCO Response to Sierra Club 7-7, HIGHLY SENSITIVE Attachment 4. SWEPCO response to Sierra Club 8-7, Attachment 1.

1 (3) retiring the Dolet Hills Power Station and replacing the energy and capacity  
2 with new resources and market energy.

3 **Q What analysis did SWEPCO conduct prior to undertaking the mine**  
4 **expansion project?**

5 **A** SWEPCO admits that it conducted no contemporaneous analysis while DHLC  
6 planned or began the mine expansion project.<sup>56</sup> The Company further defends this  
7 decision, stating that because expansion of the mine was “contemplated” at the  
8 time it acquired the Oxbow Mine (in 2009),<sup>57</sup> it would not have performed  
9 analysis “unless a significantly change in circumstances was experienced.”<sup>58</sup>

10 But a prudent utility manager would never undertake a project of this magnitude  
11 on the basis that it was “contemplated” in a planning document created more than  
12 five years prior. Instead, they would have recognized the impact that significant  
13 changes in the market and in regulations had on plant economics in the time since  
14 the Mine was acquired (a “significant change in circumstances”), and therefore  
15 would have conducted subsequent analysis before moving forward with the  
16 expansion project.

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<sup>56</sup> SWEPCO response to Sierra Club 9-1(b); *See also*, SWEPCO response to CARD 1-25 indicated no economic analysis was conducted on the economic viability of operating any of its units during the reconciliation period; SWEPCO response to Sierra Club 8-6 (referenced by SWEPCO in response to Sierra Club 8-1 and 8-2) provides analysis conducted for the 2018 IRP process, after the mine expansion decisions were made; SWEPCO response to CARD 2-6 (referenced by Sierra Club 6-1) provides recent analysis conducted after the mine expansion failed.

<sup>57</sup> SWEPCO response to TIEC 3-11.

<sup>58</sup> SWEPCO response to Sierra Club 9-1(b).

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1 **Q Provide a timeline for the mine-expansion project.**

2 **A** A full timeline of activities is listed in Table 8. In 2016, DHLC obtained its  
3 National Pollutant Discharge Elimination System (“NPDES”) permits, required  
4 by the Clean Water Act, needed to expand mining activities at the Oxbow mine in  
5 an area known as the U area. Throughout 2017, DHLC continued with  
6 infrastructure development activities, including installing a groundwater-  
7 dewatering system at the mine and construction of slurry walls and levee systems;  
8 building haul roads and sedimentation ponds; building a 5-mile overland  
9 conveyor system; building a bridge over Bayou Pierre; and building a new office,  
10 maintenance, and warehouse facility. As part of the expansion, DHLC also  
11 relocated two dragline excavators, transporting them across Interstate 49 (one on  
12 May 16 and one on June 28) to the U area of the Oxbow mine.<sup>59</sup>

13 During 2017 and 2018, DHLC faced several Force Majeure events at the U area  
14 due to tropical storms, hurricanes, and flooding. By early 2018, the Company  
15 encountered adverse geologic conditions at the U area. DHLC brought in experts  
16 to evaluate the mine and, sometime in the summer of 2019, decided to shut down  
17 the U area and to retire one of the three dragline excavators it had transported  
18 over to the site.

19 **Table 8: Timeline of development and closure for Oxbow Mine Area U**

Date	Activity
2013 – 2015	Consultant engaged to conduct drilling and laboratory testing, completed geotechnical and ground control plants, and perform hydrology and slurry wall analysis in the U area. <sup>60</sup> Unclear whether this analysis was robust, as they missed the geologic anomalies that later led to the area being un-minable.

<sup>59</sup> Direct testimony of Dennis Meyer, p. 16.

<sup>60</sup> *Id.* at 17-18.

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July & August 2016	DHLC obtained NPDES permits for the Oxbow mine <sup>61</sup>
2017	Infrastructure development activities continued throughout 2017. Installation of groundwater-dewatering system at the mine, construction of slurry walls and levee systems; haul roads and sedimentation ponds; an additional five-mile overland conveyor system; a bridge over Bayou Pierre; and a new office, maintenance, and warehouse facility. <sup>62</sup> Mining activities began at Oxbow in 2017. <sup>63</sup>
May 2017	Mining equipment relocated to the U area of the Oxbow. One dragline excavator transported across the highway (May 16). <sup>64</sup>
June 2017	Tropical Storm Cindy hit the area. Slowed the development of mining activities slowed the development of Oxbow mine U area. <sup>65</sup> Second dragline excavator transported across the highway (June 28). <sup>66</sup>
August 2017	Miner Force Majeure declared based on prior conditions. Then Hurricane Harvey hit and caused heavy flooding. <sup>67</sup>
December 2017	Force Majeure terminated. <sup>68</sup> DHLC contacts Barr Engineering Company (Barr) to review current ground conditions and mineability in the U Area at Oxbow Mine. <sup>69</sup>
February – March 2018	Heavy rainfall. Miner Force Majeure called. <sup>70</sup>
March 2018	Barr provides results of mineability assessment to AEP in letter. <sup>71</sup> Results indicate that all likely mining scenarios will incur higher costs and lower mine output than originally anticipated.

<sup>61</sup> Louisiana Department of Environmental Quality, Water Permits Division Actions Q3 2016, available at [https://deq.louisiana.gov/assets/docs/Permits/PA\\_Q3\\_2016.pdf](https://deq.louisiana.gov/assets/docs/Permits/PA_Q3_2016.pdf).

<sup>62</sup> Direct testimony of Dennis Meyer, p. 18.

<sup>63</sup> *Id.* at 19.

<sup>64</sup> *Id.* at 16.

<sup>65</sup> *Id.* at 19.

<sup>66</sup> *Id.* at 16.

<sup>67</sup> *Id.* at 19.

<sup>68</sup> *Id.*

<sup>69</sup> SWEPCO response to TIEC 5-2, Attachment 1.

<sup>70</sup> Direct testimony of Dennis Meyer, p. 19.

<sup>71</sup> SWEPCO response to TIEC 5-2, Attachment 1.

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April 2018	Force Majeure terminated. <sup>72</sup> John T. Boyd Company submits to AEP its report “Geologic Assessment of Unstable Overburden, U Pit, Oxbow Mine.” <sup>73</sup> Recoverable reserves of the U area were reduced to 44 percent. <sup>74</sup>
Post April 2018	T area of the mine returned to normal lignite condition. Mining at the U area was shut down. <sup>75</sup>
November 2018	Mine transitioned from three dragline excavators to one. Two of the three dragline excavators alternated operation at the T area of the mine; a third was retired in March 2019. <sup>76</sup>
December 2018	Cleco agreed to switch Dolet Hills Power Station to seasonal operations. <sup>77</sup>
2018	DHLC staff identified scope changes and updated assumption associated closure-related costs; updated ARO liability estimate by \$46 million to a new total of \$112.3 million. <sup>78</sup>
March 2019	Retirement of a dragline excavator; service life was modified. Certain other equipment was taken out of service. Increase in amortization and depreciation expenses of \$21 million during Reconciliation period. <sup>79</sup>
June 2019	Dolet Hills Power Station began seasonal operations. <sup>80</sup>
January 2020	SWEPSCO announces intent to retire Dolet Hills Power Station by 2026.
March 2020	DHLC determined that it would cease development of additional mining areas.

<sup>72</sup> Direct testimony of Dennis Meyer, p. 19.

<sup>73</sup> SWEPSCO response to TIEC 3-10, Attachment 1.

<sup>74</sup> SWEPSCO response to TIEC 5-3.

<sup>75</sup> Direct testimony of Dennis Meyer, p. 19-20.

<sup>76</sup> *Id.* at 21.

<sup>77</sup> Gavin Bade. 2019. “Greens, consumer advocates split as Louisiana approves \$1B Cleco plant deal.” *Utility Dive*. January 18. Available at [www.utilitydive.com/news/greens-consumer-advocates-split-as-louisiana-approves-1b-cleco-plant-deal/546402](http://www.utilitydive.com/news/greens-consumer-advocates-split-as-louisiana-approves-1b-cleco-plant-deal/546402).

<sup>78</sup> Direct testimony of Dennis Meyer, p. 23.

<sup>79</sup> *Id.* at 22.

<sup>80</sup> *Id.* at 21.

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May 2020	Mining activities ceased at the Oxbow Mine. <sup>81</sup> SWEPCO indicated intent to retire Dolet Hills by September 2021 in Form 10-Q filing for the SEC based on the remaining estimated fuel supply available. <sup>82</sup>
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1    **Q     Did SWEPCO take action to manage and evaluate the mine expansion**  
2           **project in light of the changing conditions experienced in 2017 and 2018?**

3    **A     No. SWEPCO failed to demonstrate that it had in place a system to monitor the**  
4           **economics of the mine expansion project or of continuing to operate the Dolet**  
5           **Hills plant while it was undertaking the expansion. Changing market conditions**  
6           **and unpredictable weather events are, to a large extent, outside of the Company’s**  
7           **control. But the Company does control how it responds to these events.**

8           A reasonable utility manager would have recognized that a series of weather  
9           events extreme enough to cause two Force Majeure declarations within a year  
10          would likely impact mine development. A reevaluation of the continued  
11          investment and economics of the mine expansion project should have reasonably  
12          followed. But there is no evidence that SWEPCO made any attempt to do this, or  
13          more importantly to evaluate the events’ impact on the overall cost to operate  
14          Dolet Hills. If the cost to expand the mine drove lignite prices up above the cost  
15          the plant needs to net a positive margin, the mine expansion would no longer be  
16          prudent. The Company had an obligation to regularly evaluate this to ensure that  
17          continuing with the expansion of the mine was in fact in the best interest of  
18          ratepayers, and it did not do so. Therefore, the Company did not prudently  
19          manage the mine-expansion project.

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<sup>81</sup> *Id.* at 25.

<sup>82</sup> Darren Sweeney. 2020. “SWEPCO, Cleco eye 2021 retirement of Dolet Hills coal plant in Louisiana.” *S&P Global*. May 13.



1        **iii. The Oxbow Mine U area expansion does not qualify as “used and useful” and**  
2        **therefore should be excluded from fuel costs.**

3        **Q        What is the concept of “used and useful”?**

4        **A** The concept of “used and useful” is assessed separately from the concept of  
5        prudence discussed above. Prudence focuses on the reasonableness of a decision  
6        based on what the utility knew or should have known at the time it made a  
7        decision. The concept of used and useful focuses on the outcome and whether  
8        ratepayers are actually deriving a benefit from the utility’s investment, prudently  
9        incurred or not.

10       To meet the “used” part of the standard a utility must demonstrate that an asset is  
11       physically providing value and service to customers. For example, a nuclear  
12       power plant that never entered service, environmental compliance equipment that  
13       is not operated, or meters that have been taken out of service as part of a meter  
14       replacement program would all be considered equipment that is not “used” to  
15       provide service.

16       To meet the “useful” part of the standard, an asset must be economically useful.  
17       This standard may not be met if, for example, a plant or mine is planned prudently  
18       but operates at a cost significantly higher than its output value for reasons beyond  
19       the utility’s control; the plant or mine is effectively conferring no economic  
20       benefit on ratepayers.

21       **Q        Why is this concept important in this docket?**

22       **A** SWEPCO seeks to pass significant infrastructure development costs on to  
23       customers without receiving Commission approval. Normally, the Commission  
24       evaluates whether an investment meets the standard for used and useful before

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1 allowing the project into the rate base. In this case, the mine development costs  
2 are passed on to ratepayers through fuel costs and evaluated in this docket, not  
3 passed on through rates and evaluated in a rate case.<sup>83</sup> But the cost recovery  
4 mechanisms should not impact the standard for evaluation. The used and useful  
5 principal should still apply here. Indeed, the Public Utilities Regulatory Act  
6 provides that "rates shall be based on the original cost, less depreciation, of  
7 property *used by and useful* to the utility in providing service."<sup>84</sup>

8 With a mine-mouth plant like Dolet Hills, ratepayers are essentially captive to the  
9 mine that serves the plant. Commission action is necessary here to ensure  
10 SWEPCO customer are only paying for mine development costs that provide  
11 value.

12 **Q Does SWEPCO provide any evidence that the infrastructure and assets at the**  
13 **U area of the mine meet the definition of used and useful?**

14 **A** No. The mine produced very little lignite—only around [REDACTED] of what the  
15 Company originally estimated it would need<sup>85</sup>—for use at Dolet Hills; and the  
16 mine never provided any other value to SWEPCO ratepayers. Therefore, all of the  
17 costs incurred for the development of the U area should be disallowed from  
18 recovery in this fuel reconciliation docket. This includes the costs incurred to  
19 move the two dragline excavators across the street, as that also never resulted in  
20 any significant value for ratepayers and was unnecessary if the plant retired.

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<sup>83</sup> Direct testimony of Teresa Kraske, pp. 12 and 14.

<sup>84</sup> PURA sec. 53.053.

<sup>85</sup> SWEPCO response to Sierra Club 7-7, HIGHLY SENSITIVE Attachment 2; SWEPCO Response to Sierra Club 7-7, HIGHLY SENSITIVE Attachment 3; SWEPCO Response to Sierra Club 7-7, HIGHLY SENSITIVE Attachment 4. SWEPCO response to Sierra Club 8-7, Attachment 1.

1        *iv. SWEPCO allowed DHLC to imprudently incur \$170.7 million in mine*  
2        *expansion costs and began to pass those costs on to ratepayers through fuel*  
3        *expenses during this reconciliation period.*

4        **Q**        **What costs were incurred for the mine expansion activities outlined above?**

5        **A**        DHLC spent approximately \$117.8 million<sup>86</sup> on the failed infrastructure  
6        development activities at U area (SWEPCO's share was \$47.4 million).<sup>87</sup> The  
7        costs of these projects were capitalized, meaning they were straight-line  
8        amortized over the life of the Mine (which was 2036 during the reconciliation  
9        period), and then billed to SWEPCO and Cleco as monthly depreciation  
10       expenses.<sup>88</sup> DHLC also incurred a one-time cost of \$6.9 million to move the  
11       dragline excavators and other equipment across Interstate as part of the mine  
12       expansion.<sup>89</sup> This was billed to SWEPCO and Cleco, and SWEPCO immediately  
13       expensed it's portion and added it to the cost of lignite.<sup>90</sup> Additionally, DHLC  
14       updated its estimates for the ARO cost in 2018, following the failed mine  
15       expansion project. The updates increased the liability by approximately \$46  
16       million.<sup>91</sup> It is likely that a large part of this increase is required to reclaim and  
17       close the newly developed U area. This increased ARO costs by \$8.5 million  
18       during the reconciliation period.<sup>92</sup>

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<sup>86</sup> SWEPCO response to Sierra Club 10-2, Attachment 1.

<sup>87</sup> *Id.*

<sup>88</sup> SWEPCO response to Sierra Club 10-2(c).

<sup>89</sup> Direct testimony of Dennis Meyer, p. 24.

<sup>90</sup> SWEPCO response to Sierra Club 7-5(c); SWEPCO response to TIEC 9-1(a).

<sup>91</sup> Direct testimony of Dennis Meyer, p. 23.

<sup>92</sup> *Id.*

1 **Q How are these costs passed on to ratepayers?**

2 **A** SWEPCO passes these mine development costs on to customers as a fuel expense.  
3 Specifically, they are recorded as eligible fuel expenses and recorded in FERC  
4 Account 501 as lignite inventory. SWEPCO utilizes an “average cost inventory  
5 valuation method” to calculate cost of the fuel it uses each month.<sup>93</sup> Between  
6 March 2017 and December 2019, SWEPCO was charged \$4.2 million by DHLIC  
7 for depreciation expenses related to the failed expansion of Oxbow Mine. The  
8 Company would have in turn included these expenses in its average fuel inventory  
9 cost, and then passed them on to ratepayers during the reconciliation period,<sup>94</sup> (the  
10 Company refused to provide any more detailed analysis on this final step of the  
11 process).<sup>95</sup>

12 Following SWEPCO’s decision to retire Dolet Hills by the end of 2021,<sup>96</sup> the  
13 Company implemented in April 2020 an accelerated depreciation schedule for the  
14 outstanding mine expansion costs.<sup>97</sup> This dramatically increased the mine  
15 depreciation cost passed on to ratepayers each month and will continue to do so  
16 through the end of 2021 when the plant and mine retires. A substantial portion of  
17 the failed mine expansion costs will be incurred by ratepayers in the next fuel  
18 reconciliation period. As part of its plan to pay down these expenses, the  
19 Company seeks to retain and use the over-collection balance that it collected from  
20 across all its plants during this reconciliation period.<sup>98</sup>

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<sup>93</sup> SWEPCO response to Sierra Club 10-2(c).

<sup>94</sup> SWEPCO response to Sierra Club 10-2(c).

<sup>95</sup> SWEPCO response to TIEC 9-1(c).

<sup>96</sup> Darren Sweeney. 2020. “SWEPCO, Cleco eye 2021 retirement of Dolet Hills coal plant in Louisiana.” *S&P Global*. May 13.

<sup>97</sup> SWEPCO response to TIEC 3-6, Attachment 3.

<sup>98</sup> Direct testimony of Teresa Kraske, p. 20.

1 **Q Describe the Company’s proposal for its over-collection balance from this**  
2 **reconciliation period.**

3 **A** An over-collection balance represents the difference between the fuel expenses  
4 incurred by the Company and the fuel factor revenue that the Company recovers  
5 from its retail customers. At the end of the reconciliation period, SWEPCO had a  
6 cumulative over-collection balance of \$10,041,895.<sup>99</sup>

7 The Company asserts that it will not remain in a state of over-collection and is  
8 requesting not to issue a refund, despite exceeding the 4 percent materiality  
9 threshold above which the Company is required to refund its over-collection  
10 balance back to ratepayers.<sup>100</sup>

11 **Q Is this proposal by the Company reasonable and fair to ratepayers?**

12 No. But for the inclusion of the mine development expenses on an accelerated  
13 depreciation schedule, SWEPCO would remain in a state of over-collection.  
14 Given that these mine development costs were imprudently incurred, and the  
15 assets were not used and useful, as discussed above, the Commission should  
16 require SWEPCO to refund the over-collection balance to ratepayers.

17 **Q Should ratepayers be obligated to pay for any of the costs associated with the**  
18 **expansion of the U area of the Oxbow Mine?**

19 **A** No. SWEPCO is obligated, per the terms of the LMA, to pay for the mine  
20 expansion costs. But SWEPCO allowed DHLC to spend \$117.78 million to  
21 expand the Oxbow Mine (as detailed above) without any consideration before or

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<sup>99</sup> Application of SWEPCO for Authority to Reconcile Fuel Costs, p. 3.

<sup>100</sup> *Id.* at 4.

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1 during the expansion of whether Dolet Hills was actually projected to be  
2 profitable and economic to operate into the future. Because the Company did not  
3 prudently evaluate whether it was economic to invest in the mine expansion  
4 project relative to terminating the mine contract, and also (independently) because  
5 the mine assets are not used and useful, ratepayers should not be responsible for  
6 those costs.

7 The Commission should disallow from recovery during this reconciliation period  
8 all fuel expenses associated with the failed mine expansion project, specifically,  
9 as shown in the Texas jurisdictional share<sup>101</sup> of the DHLC costs charged to  
10 SWEPCO<sup>102</sup>: (1) the depreciation expenses associated with the \$117.78 million  
11 DHLC incurred to expand the Oxbow Mine in the U area; (2) the one-time cost of  
12 \$6.9 million incurred to transport the dragline excavators to the U area; and (3)  
13 the \$8.5 million in increased ARO expenses during this reconciliation period (out  
14 of the total \$46 million increase in ARO expenses following the failed mine  
15 expansion project), that very likely would not have been incurred but for the mine  
16 expansion project.

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<sup>101</sup> Texas jurisdictional share of SWEPCO's costs was 36.09% during the reconciliation period. Schedule FR-21.

<sup>102</sup> SWEPCO share of the DHLC costs is 42.234%. Direct testimony of Denis Meyer, p. 7.

1 **6. RECOMMENDATIONS FOR THE COMMISSION**

2 **Q What information specifically do you recommend that SWEPCO provide in**  
3 **each reconciliation filing to allow a review of the prudence of its unit-**  
4 **commitment practices?**

5 **A** I recommend that SWEPCO compile and file as workpapers in its reconciliation  
6 application all 6-day forecasts sheets (in their native, e.g., Excel, spreadsheet file  
7 formats) prepared for each day that falls within the reconciliation period. Along  
8 with these sheets, SWEPCO should provide a brief description memorializing the  
9 reason for any deviance between the results of the Company’s forward-looking  
10 price-based analysis and the Company’s actual commitment decisions. In  
11 addition, SWEPCO should provide hourly data sufficient for the Commission to  
12 calculate the net revenues that each plant actually incurred in each reconciliation  
13 period including total unit generation, accounting “as burned” fuel cost, marginal  
14 or “replacement” fuel cost, total variable O&M, unit LMP, day-ahead  
15 commitment status, energy and ancillary market revenues, and actual outages.

16 **Q What are you recommending in this docket relating to SWEPCO’s**  
17 **uneconomic commitment practices at its coal or lignite units?**

18 **A** As discussed in Section 3, SWEPCO incurred for Texas ratepayers [REDACTED] and [REDACTED]  
19 million in net operational losses at its coal and lignite units respectively. These  
20 losses resulted from sustained uneconomic operational decisions during specific  
21 months of the reconciliation period, and, for the lignite units especially, the  
22 decision to continue maintaining the units despite them having some of the  
23 highest fuel costs in the country.

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1           These losses at all units were avoidable if SWEPCO had economically committed  
2           its coal units with a market status. Therefore, going forward, I recommend that the  
3           Commission require that SWEPCO calculate and report its net margins from the  
4           prior month in its monthly fuel cost report, and justify months with net negative  
5           margins. If it fails to justify its losses, the Commission should disallow the net  
6           losses incurred during the reported month.

7           These losses at the lignite plants were also avoidable if SWEPCO evaluated the  
8           economics of continuing to maintain and operate the units relative to alternatives.  
9           Because the utility failed to do so, I recommend that the Commission make a  
10          formal prudence finding that SWEPCO failed to adequately and robustly evaluate  
11          the economics of continuing to operate Pirkey and Dolet Hills, and the mines that  
12          serve them, relative to alternatives.

13   **Q     Are you recommending a disallowance at Dolet Hills for the times when the**  
14   **Company's contemporaneous analysis showed it knew it was making an**  
15   **imprudent decision?**

16   **A     Yes, based on my review of the Company's unit-commitment decision-making**  
17   **analysis coupled with the units' performance, I recommend that the Commission**  
18   **disallow [REDACTED] in fuel costs incurred at Dolet Hills during times when**  
19   **SWEPCO blatantly ignored the results of its own analysis. Specifically, this**  
20   **represents Texas's share of the [REDACTED] total fuel costs, (out of the total**  
21   **[REDACTED] in variable costs) incurred at Dolet Hills unnecessarily (net of start-**  
22   **up costs) during the events I identified above. Namely when the Company**  
23   **imprudently decided to keep a unit online despite its own projections indicating**  
24   **that the unit was very likely to lose money over that period.**



1    **Q**    **What are your recommendations regarding the costs incurred to develop and**  
2           **expand the Oxbow Mine?**

3    **A**    The Commission should disallow from recovery during this reconciliation period  
4           all fuel expenses associated with the failed mine expansion project. This  
5           recommendation represents just the portion of uneconomic fuel costs already  
6           charged to SWEPCO by DHLC and then passed on to Texas ratepayers in fuel  
7           expenses and excludes the approximately 26.2 percent<sup>103</sup> that is likely already  
8           counted in the [REDACTED] recommended disallowance related to unit  
9           commitment.

10           Specifically, as shown in Table 9, \$2.8 million, of the total \$10.4 million in mine  
11           expansion costs billed and expensed to SWEPCO by DHLC during the  
12           reconciliation period, composed of: (1) \$1.1 million of the \$4.2 million in  
13           depreciation expenses associated with the expansion of the Oxbow Mine in the U  
14           area billed to SWEPCO; (2) \$0.7 million of the \$6.9 million one-time cost  
15           incurred to transport the dragline excavators to the U area; and (3) \$0.9 million,  
16           which represents SWEPCO's adjusted Texas's share of the \$8.5 million in  
17           increased ARO expenses during the reconciliation period. This was added to the

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<sup>103</sup> This adjustment represents the portion of SWEPCO's depreciation expenses associated with the expansion of the mine that were incurred during the three imprudent "events" I identified in section 4. In SWEPCO response to Sierra Club 10-2, Attachment the Company provided a monthly breakdown of the depreciation expenses associated with the mine expansion as well as the total depreciation expenses incurred throughout the reconciliation period. I calculated the proportion of expenses attributed to each of the 34 months in the reconciliation period. Then, for the events, I calculated the proportion of each month with an event that was covered by the event. Finally, I combined the two values to find the total proportion of mine expansion expenses that were incurred during the events.

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1 ARO balance following the U area development activities, and very likely would  
 2 not have been incurred but for the mine expansion project.

3 **Table 9: Costs and expenses associated with the expansion of the Oxbow mine**

<i>(\$Million)</i>  <b>Item</b>	<b>Total costs incurred</b>		<b>Cost charged to ratepayers during reconciliation period</b>		
	<b>Total</b>	<b>SWEPCO share<sup>4</sup></b>	<b>Total</b>	<b>Texas share<sup>3</sup></b>	<b>Dis-allowance<sup>5</sup></b>
<b>Cost to move dragline across the road <sup>1</sup></b>	\$6.9	\$2.8	\$2.8	\$1.0	\$0.7
<b>Increase in ARO expenses <sup>1</sup></b>	\$46.0	\$18.5	\$3.4	\$1.2	\$0.9
<b>Oxbow mine expansion costs <sup>2</sup></b>	\$117.8	\$47.5	\$4.2	\$1.5	\$1.1
<b>Total</b>	<b>\$170.8</b>	<b>\$68.7</b>	<b>\$10.4</b>	<b>\$3.8</b>	<b>\$2.8</b>

4 <sup>1</sup> Direct Testimony of Dennis Meyer, pages 23 and 24. <sup>2</sup> SWEPCO Response to Sierra  
 5 Club 10-2, Attachment 1. <sup>3</sup> Texas jurisdictional allocator is 36.09%; Schedule FR-21.  
 6 <sup>4</sup> SWEPCO share of Dolet Hills is 40.234%; Direct testimony of Dennis Meyer, page 7.  
 7 <sup>5</sup> Final disallowance includes adjustment to reduce Texas share by 26.2%, which  
 8 represents the portion of mine costs expensed during months that overlap with “events;”  
 9 this avoids any potential double counting with the recommended unit commitment  
 10 disallowance.

11 **Q Does this conclude your testimony?**

12 **A** Yes.



## Devi Glick, Senior Associate

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### PROFESSIONAL EXPERIENCE

**Synapse Energy Economics Inc.**, Cambridge, MA. *Senior Associate*, April 2019 – Present, *Associate*, January 2018 – March 2019

Conducts research and provides expert witness and consulting services on energy sector issues.

Examples include:

- Modeling for resource planning using PLEXOS and Encompass utility planning software to evaluate the reasonableness of utility IRP modeling.
- Modeling for resource planning to explore alternative, lower-cost and lower-emission resource portfolio options.
- Providing expert testimony in rate cases on the prudence of continued investment in, and operation of, coal plants based on the economics of plant operations relative to market prices and alternative resource costs.
- Providing expert testimony and analysis on the reasonableness of utility coal plant commitment and dispatch practice in fuel and power cost adjustment dockets.
- Serving as an expert witness on avoided cost of distributed solar PV, and submitting direct and surrebuttal testimony regarding the appropriate calculation of benefit categories associated with the value of solar calculations.
- Reviewing and assessing the reasonableness of methodologies and assumptions relied on in utility IRPs and other long-term planning documents in Arizona, Kentucky, New Mexico, Florida, South Carolina, North Carolina, South Africa, Newfoundland, and Nova Scotia for expert reports.
- Co-authoring public comments on the adequacy of utility coal ash disposal plans, and federal coal ash disposal rules and amendments.
- Analyzing system-level cost impacts of energy efficiency at the state and national level.

**Rocky Mountain Institute**, Basalt, CO. August 2012 – September 2017

*Senior Associate*

- Led technical analysis, modeling, training and capacity building work for utilities and governments in Sub-Saharan Africa around integrated resource planning for the central electricity grid energy. Identified over one billion dollars in savings based on improved resource-planning processes.
- Represented RMI as a content expert and presented materials on electricity pricing and rate design at conferences and events.
- Led a project to research and evaluate utility resource planning and spending processes, focusing specifically on integrated resource planning, to highlight systematic overspending on conventional resources and underinvestment and underutilization of distributed energy resources as a least-cost alternative.

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### *Associate*

- Led modeling analysis in collaboration with NextGen Climate America which identified a CO2 loophole in the Clean Power Plan of 250 million tons, or 41 percent of EPA projected abatement. Analysis was submitted as an official federal comment which led to a modification to address the loophole in the final rule.
- Led financial and economic modeling in collaboration with a major U.S. utility to quantify the impact that solar PV would have on their sales, and helped identify alternative business models which would allow them to recapture a significant portion of this at-risk value.
- Supported the planning, content development, facilitation, and execution of numerous events and workshops with participants from across the electricity sector for RMI's Electricity Innovation Lab (eLab) initiative.
- Co-authored two studies reviewing valuation methodologies for solar PV and laying out new principles and recommendations around pricing and rate design for a distributed energy future in the United States. These studies have been highly cited by the industry and submitted as evidence in numerous Public Utility Commission rate cases.

**The University of Michigan**, Ann Arbor, MI. *Graduate Student Instructor*, September 2011 – July 2012

**The Virginia Sea Grant at the Virginia Institute of Marine Science**, Gloucester Point, VA. *Policy Intern*, Summer 2011

Managed a communication network analysis study of coastal resource management stakeholders on the Eastern Shore of the Delmarva Peninsula.

**The Commission for Environmental Cooperation (NAFTA)**, Montreal, QC. *Short Term Educational Program/Intern*, Summer 2010

Researched energy and climate issues relevant to the NAFTA parties to assist the executive director in conducting a GAP analysis of emission monitoring, reporting, and verification systems in North America.

**Congressman Tom Allen**, Portland, ME. *Technology Systems and Outreach Coordinator*, August 2007 – December 2008

Directed Congressman Allen's technology operation, responded to constituent requests, and represented the Congressman at events throughout southern Maine.

## **EDUCATION**

**The University of Michigan**, Ann Arbor, MI

Master of Public Policy, Gerald R. Ford School of Public Policy, 2012

Master of Science, School of Natural Resources and the Environment, 2012

Masters Project: *Climate Change Adaptation Planning in U.S. Cities*

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**Middlebury College**, Middlebury, VT

Bachelor of Arts, 2007

Environmental Studies, Policy Focus; Minor in Spanish

Thesis: *Environmental Security in a Changing National Security Environment: Reconciling Divergent Policy Interests, Cold War to Present*

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Hansen, L., V. Lacy, D. Glick. 2013. *A Review of Solar PV Benefit & Cost Studies*. Rocky Mountain Institute.

## TESTIMONY

**Michigan Public Service Commission (Docket No. U-20224):** Direct Testimony of Devi Glick in the application of Indiana Michigan Power Company for Reconciliation of its Power Supply Cost Recovery Plan (Case No. U-20223) for the 12-month period ending December 31, 2019. On behalf of Sierra Club. October 23, 2020.

**Public Service Commission of Wisconsin (Docket No. 3270-UR-123):** Surrebuttal Testimony of Devi Glick in the application of Madison Gas and Electric Company for authority to change electric and natural gas rates. On behalf of Sierra Club. September 29, 2020.

**Public Service Commission of Wisconsin (Docket No. 6680-UR-122):** Surrebuttal Testimony of Devi Glick in the application of Wisconsin Power and Light Company for approval to extend electric and natural gas rates into 2021 and for approval of its 2021 fuel cost plan. On behalf of Sierra Club. September 21, 2020.

**Public Service Commission of Wisconsin (Docket No. 3270-UR-123):** Direct Testimony and Exhibits of Devi Glick in the application of Madison Gas and Electric Company for authority to change electric and natural gas rates. On behalf of Sierra Club. September 18, 2020.

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**Public Service Commission of Wisconsin (Docket No. 6680-UR-122):** Direct Testimony and Exhibits of Devi Glick in the application of Wisconsin Power and Light Company for approval to extend electric and natural gas rates into 2021 and for approval of its 2021 fuel cost plan. On behalf of Sierra Club. September 8, 2020.

**Indiana Utility Regulatory Commission (Cause No. 38707-FAC125):** Direct Testimony and Exhibits of Devi Glick in the application of Duke Energy Indiana, LLC for approval of a change in its fuel cost adjustment for electric service. On behalf of Sierra Club. September 4, 2020.

**Indiana Utility Regulatory Commission (Cause No. 38707-FAC123 S1):** Direct Testimony and Exhibits of Devi Glick in the Subdocket for review of Duke Energy Indian, LLC's Generation Unit Commitment Decisions. On behalf of Sierra Club. July 31, 2020.

**Indiana Utility Regulatory Commission (Cause No. 38707-FAC124):** Direct Testimony and Exhibits of Devi Glick in the application of Duke Energy Indiana, LLC for approval of a change in its fuel cost adjustment for electric service. On behalf of Sierra Club. June 4, 2020.

**Arizona Corporation Commission (Docket No. E-01933A-19-0028):** Rely to Late-filed ACC Staff Testimony of Devi Glick in the application of Tucson Electric Power Company for the establishment of just and reasonable rates. On behalf of Sierra Club. May 8, 2020.

**Indiana Utility Regulatory Commission (Cause No. 38707-FAC123):** Direct Testimony and Exhibits of Devi Glick in the application of Duke Energy Indiana, LLC for approval of a change in its fuel cost adjustment for electric service. On behalf of Sierra Club. March 6, 2020.

**Texas Public Utility Commission (PUC Docket No. 49831):** Direct Testimony of Devi Glick in the application of Southwestern Public Service Company for authority to change rates. On behalf of Sierra Club. February 10, 2020.

**New Mexico Public Regulation Commission (Case No. 19-00170-UT):** Testimony of Devi Glick in Support of Uncontested Comprehensive Stipulation. On behalf of Sierra Club. January 21, 2020.

**Nova Scotia Utility and Review Board (Matter M09420):** Expert Evidence of Fagan, B, D. Glick reviewing Nova Scotia Power's Application for Extra Large Industrial Active Demand Control Tariff for Port Hawkesbury Paper. Prepared for Nova Scotia Utility and Review Board Counsel. December 3, 2019.

**New Mexico Public Regulation Commission (Case No. 19-00170-UT):** Direct Testimony of Devi Glick regarding Southwestern Public Service Company's application for revision of its retail rates and authorization and approval to shorten the service life and abandon its Tolk generation station units. On behalf of Sierra Club. November 22, 2019.

**North Carolina Utilities Commission (Docket No. E-100, Sub 158):** Responsive testimony of Devi Glick regarding battery storage and PURPA avoided cost rates. On behalf of Southern Alliance for Clean Energy. July 3, 2019.

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**State Corporation Commission of Virginia (Case No. PUR-2018-00195):** Direct testimony of Devi Glick regarding the economic performance of four of Virginia Electric and Power Company's coal-fired units and the Company's petition to recover costs incurred to company with state and federal environmental regulations. On behalf of Sierra Club. April 23, 2019.

**Connecticut Siting Council (Docket No. 470B):** Joint testimony of Robert Fagan and Devi Glick regarding NTE Connecticut's application for a Certificate of Environmental Compatibility and Public Need for the Killingly generating facility. On behalf of Not Another Power Plant and Sierra Club. April 11, 2019.

**Public Service Commission of South Carolina (Docket No. 2018-3-E):** Surrebuttal testimony of Devi Glick regarding annual review of base rates of fuel costs for Duke Energy Carolinas. On behalf of South Carolina Coastal Conservation League and Southern Alliance for Clean Energy. August 31, 2018.

**Public Service Commission of South Carolina (Docket No. 2018-3-E):** Direct testimony of Devi Glick regarding the annual review of base rates of fuel costs for Duke Energy Carolinas. On behalf of South Carolina Coastal Conservation League and Southern Alliance for Clean Energy. August 17, 2018.

**Public Service Commission of South Carolina (Docket No. 2018-1-E):** Surrebuttal testimony of Devi Glick regarding Duke Energy Progress' net energy metering methodology for valuing distributed energy resources system within South Carolina. On behalf of South Carolina Coastal Conservation League and Southern Alliance for Clean Energy. June 4, 2018.

**Public Service Commission of South Carolina (Docket No. 2018-1-E):** Direct testimony of Devi Glick regarding Duke Energy Progress' net energy metering methodology for valuing distributed energy resources system within South Carolina. On behalf of South Carolina Coastal Conservation League and Southern Alliance for Clean Energy. May 22, 2018.

**Public Service Commission of South Carolina (Docket No. 2018-2-E):** Direct testimony of Devi Glick on avoided cost calculations and the costs and benefits of solar net energy metering for South Carolina Electric and Gas Company. On behalf of South Carolina Coastal Conservation League and Southern Alliance for Clean Energy. April 12, 2018.

**Public Service Commission of South Carolina (Docket No. 2018-2-E):** Surrebuttal testimony of Devi Glick on avoided cost calculations and the costs and benefits of solar net energy metering for South Carolina Electric and Gas Company. On behalf of South Carolina Coastal Conservation League and Southern Alliance for Clean Energy. April 4, 2018.

*Resume updated January 2021*



**SOAH DOCKET NO. 473-20-4204**  
**PUC DOCKET NO. 50997**  
Direct Testimony of Devi Glick, Exhibit DG-2

**Exhibit DG-2**

**SWEPCO Responses to Requests for Information, Public**

<b>Data Request</b>	<b>File Type</b>
SWEPCO response to Sierra Club 1-2	PDF
SWEPCO response to Sierra Club 1-5	PDF
SWEPCO response to Sierra Club 1-6	PDF
SWEPCO response to Sierra Club 1-7	PDF
SWEPCO response to Sierra Club 7-5	PDF
SWEPCO response to Sierra Club 7-6	PDF
SWEPCO response to Sierra Club 7-7	PDF
SWEPCO response to Sierra Club 8-6	PDF
SWEPCO response to Sierra Club 8-7	PDF
SWEPCO response to Sierra Club 8-7, Attachment 1	PDF
SWEPCO response to Sierra Club 9-1	PDF
SWEPCO response to Sierra Club 10-2	PDF
SWEPCO response to Sierra Club 10-2, Attachment 1	PDF
SWEPCO response to CARD 1-25	PDF
SWEPCO response to CARD 2-6	PDF
SWEPCO response to CARD 4-7	PDF
SWEPCO response to TIEC 3-6	PDF
SWEPCO response to TIEC 3-6, Attachment 3	PDF
SWEPCO response to TIEC 3-10	PDF
SWEPCO response to TIEC 3-10, Attachment 1	PDF
SWEPCO response to TIEC 3-11	PDF
SWEPCO response to TIEC 5-2	PDF
SWEPCO response to TIEC 5-2, Attachment 1	PDF
SWEPCO response to TIEC 8-2	PDF

**SOAH DOCKET NO. 473-20-4204  
PUC DOCKET NO. 50997**

**SOUTHWESTERN ELECTRIC POWER COMPANY'S RESPONSE TO  
SIERRA CLUB'S FIRST SET OF REQUESTS FOR INFORMATION**

**Question No. Sierra Club 1.2:**

For each of the Company's coal and lignite generating units, provide the following hourly information for the Reconciliation Period (March 1, 2017 to December 31, 2019). If not available at an hourly scale, explain why not and provide at the most temporally granular scale available.

- a. Price (\$/MWh) of offers submitted into the SPP energy market.
- b. Quantity (MW) of offers submitted into the SPP energy market.
- c. For each offer, whether that offer was accepted by SPP.
- d. Day-ahead generator commitment offer, including "economic," "self," "reliability," "outage," "not participating," or other recorded purpose.
- e. Real-time generator commitment status, including economic, self, reliability, unavailable (outage), or other recorded purpose.
- f. Net generation (MWh).
- g. Accounting fuel costs (\$/MWh).
- h. Marginal (variable) fuel costs (\$/MWh).
- i. Accounting variable costs of production (\$/MWh), including fuel, variable O&M, and any other variable operating costs.
- j. Marginal variable costs of production (\$/MWh), including fuel, variable O&M, and any other variable operating costs.
- k. Locational marginal price received (\$/MWh).
- l. Energy market revenues, including all types of energy market payments such as energy uplift credits and lost opportunity cost credits (\$).
- m. Ancillary market revenues (\$).
- n. Congestion revenues (\$).
- o. Any other revenues received (\$).
- p. Marginal loss (\$).
- q. Heat rate (Btu/kWh).

**Response No. Sierra Club 1.2:**

- a.-b. Please see Sierra Club 1-02 CONFIDENTIAL Attachment a&b for the requested information.
- c. Please see Sierra Club 1-02 CONFIDENTIAL Attachment c for the requested information.
- d. Please see Sierra Club 1-02 CONFIDENTIAL Attachment d for the requested information.
- e. Please see Sierra Club 1-02 CONFIDENTIAL Attachment e for the requested information.
- f. Please see Sierra Club 1-02 CONFIDENTIAL Attachment f for the requested information.

- g. SWEPCO's accounting books and records do not contain hourly information for its coal and lignite generating units. Instead, SWEPCO's books and records are kept on a monthly basis. Each month, SWEPCO files with the PUCT a Fuel Efficiency Report that contains the monthly \$/MWH. The Fuel Efficiency Report was file under Project 46730 for 2017, Project No. 48006 for 2018 and Project No. 49065 for 2019.

Link:

2017

<http://interchange.puc.texas.gov/Search/Filings?UtilityType=A&ControlNumber=46730&ItemMatch=Equal&DocumentType=ALL&SortOrder=Ascending>

Link:

2018 <http://interchange.puc.texas.gov/Search/Filings?UtilityType=A&ControlNumber=48006&ItemMatch=Equal&DocumentType=ALL&SortOrder=Ascending>

Link:

2019 <http://interchange.puc.texas.gov/Search/Filings?UtilityType=A&ControlNumber=49065&ItemMatch=Equal&DocumentType=ALL&SortOrder=Ascending>

- h. The variable costs of production are not updated on a daily or hourly basis. These costs carry forward until the next iteration in which they are published. Please see Sierra Club 1-02 CONFIDENTIAL Attachment h for the most granular data available.
- i. SWEPCO's accounting books and records are maintained in accordance with the FERC Uniform System of Accounts as required by PUCT 16 TAC § 25.72 (c). The FERC Uniform System of Accounts does not specify variable O&M which SWEPCO does not maintain in its accounting records. As described earlier, SWEPCO's accounting books and records do not contain hourly information. Please see highly sensitive schedule FR-16 for eligible fuel expense for SWEPCO's coal and lignite power plants.
- j. The variable costs of production are not updated on a daily or hourly basis. These costs carry forward until the next iteration in which they are published. Please see Sierra Club 1-02 CONFIDENTIAL Attachment j for the most granular data available.
- k. Please see Sierra Club 1-02 Attachment k for the requested information. This attachment is Voluminous and is provide via the PUC Interchange.
- l, n, & p. Please see Sierra Club 1-02 CONFIDENTIAL Attachment l, n, & p for the requested information.
- m & o. Please see Sierra Club 1-02 CONFIDENTIAL Attachment m & o for the requested information.
- q. The heat rates are not updated and published on a daily or hourly basis. Please see Sierra Club 1-02 CONFIDENTIAL Attachment q for the most granular data available.

The attachments responsive to this request are CONFIDENTIAL under the terms of the Protective Order. The Confidential information is available for review at the Austin offices of American Electric Power Company (AEP), 400 West 15<sup>th</sup> Street, Suite 1520, Austin, Texas, 78701, (512) 481-4562, during normal business hours.

Prepared By: Scott E. Mertz

Title: Regulatory Consultant Staff

Sponsored By: Scott E. Mertz

Title: Regulatory Consultant Staff

**SOAH DOCKET NO. 473-20-4204  
PUC DOCKET NO. 50997**

**SOUTHWESTERN ELECTRIC POWER COMPANY'S RESPONSE TO  
SIERRA CLUB'S FIRST SET OF REQUESTS FOR INFORMATION**

**Question No. Sierra Club 1.5:**

For each of the Company's coal or lignite generating units, please identify:

- a. Average cold startup costs.
- b. Average warm startup costs.
- c. Shutdown costs.
- d. Average cold startup time.
- e. Average warm startup time.
- f. Average cool-down to cold time
- g. Average cool-down to warm time.
- h. Estimated increase in maintenance and capital costs related to unit cycling.
- i. If any of the requested information is not available for any individual unit, please explain why.

**Response No. Sierra Club 1.5:**

- a. Start costs include the cost from the beginning of the start-up process to breaker close. The average cold start costs during the period March 1, 2017 – December 31, 2019:
  - Dolet Hills: \$23,372
  - Flint Creek: \$55,036
  - Pirkey: \$33,086
  - Turk: \$42,783
  - Welsh 1: \$81,471
  - Welsh 3: \$79,433
- b. Start costs include the cost from the beginning of the start-up process to breaker close. The average warm start costs during the period March 1, 2017 – December 31, 2019:
  - Dolet Hills: \$16,293
  - Flint Creek: \$32,619
  - Pirkey: \$19,443
  - Turk: \$21,798
  - Welsh1: \$52,913
  - Welsh 3: \$51,546

- c. SWEPCO does not calculate Shutdown costs for their generating units.
- d-g. Please see Sierra Club 1-5 Attachment 1 for each of SWEPCO's coal or lignite generating units average cold startup, warm startup, cool-down to warm, and cool-down to cold times.
- h. SWEPCO has not performed a study on increase in maintenance and capital costs related to unit cycling on the Company's coal or lignite generating units.

Prepared By: Scott E. Mertz

Title: Regulatory Consultant Staff

Prepared By: Paul D. Flory

Title: Regulatory Consultant Sr

Sponsored By: Scott E. Mertz

Title: Regulatory Consultant Staff

Sponsored By: Russell A. Gedeon

Title: Regional Engineering Svcs Mgr

**SOUTHWESTERN ELECTRIC POWER COMPANY  
COAL AND LIGNITE GENERATING UNITS STARTUP and COOLDOWN TIMES  
Reconciliation Period March 1, 2017 - December 31, 2019**

<b>Unit</b>	<b>Average Cold Startup [Hrs]</b>	<b>Average Warm Startup [Hrs]</b>	<b>Average Cooldown to Cold [Hrs]</b>	<b>Average Cooldown to Warm [Hrs]</b>
Flint Creek 1	24	12	85	15
Pirkey 1	16	12	54	18
Turk 1T	24	16	120	60
Welsh 1	22	16	96	36
Welsh 3	22	16	96	36
Dolet Hills 1	24	12	65	29

**SOAH DOCKET NO. 473-20-4204  
PUC DOCKET NO. 50997**

**SOUTHWESTERN ELECTRIC POWER COMPANY'S RESPONSE TO  
SIERRA CLUB'S FIRST SET OF REQUESTS FOR INFORMATION**

**Question No. Sierra Club 1.6:**

Regarding the development of the Company's hourly energy market generator commitment offers (including decisions on whether to self-commit up to the minimum operating level of a unit) during the Reconciliation Period:

- a. Indicate which production costs are considered variable on a short-term basis by the Company for the purposes of deciding generator commitment offer status at the coal and lignite units (e.g., fuel costs, variable operations and maintenance costs, emissions costs, effluent costs, etc.).
- b. Indicate what production cost are considered fixed on short-term basis by the Company for the purposes of deciding generator commitment offer status at the coal and lignite units (e.g., fuel costs, variable operations and maintenance costs, emissions costs, effluent costs, etc.).
- c. Indicate if any costs are considered variable for the purposes of committing a unit but not for the purpose of dispatching it above the minimum operating level.
- d. Identify if there are any fuel costs for the coal and lignite units that the Company considers fixed for the purposes of commitment, dispatch, or both. If so, provide a detailed explanation of how the fixed component is determined and provide a workpaper demonstrating the fixed and variable breakdown.
- e. Please explain how unit start up and shut down times and costs are incorporated into the Company's unit commitment and dispatch decision-making.

**Response No. Sierra Club 1.6:**

- a. Only the variable (incremental) costs of production are included in the generation offers for the purpose of determining commitment offer status for coal and SWEPCO's Pirkey Power Station (lignite). Variable costs include fuel, maintenance, emissions and consumables. However, not all fuel and maintenance costs are variable.

At times, SWEPCO's co-owned Dolet Hills Power Station (lignite) includes both fixed and variable components (refer to the response to 1.6 d. below).

- b. Fixed costs, such as the non-variable component of fuel and O&M costs, are not included in the generation offers and are not considered for the purpose of determining commitment offer status for coal and SWEPCO's Pirkey Power Station (lignite).

At times, SWEPCO's co-owned Dolet Hills Power Station (lignite) includes both fixed and variable components (refer to the response to 1.6 d. below).

- c. The same variable costs of production are considered for both unit commitment as well as unit dispatch.
- d. Non-variable components of fuel cost, such as the fixed components of coal transportation agreements and the depreciation of capital investment in lignite mining equipment, are not considered for the purpose of commitment or dispatch of the units for the coal units and SWEPCO's Pirkey Power Station (lignite).

At times, SWEPCO's co-owned Dolet Hills Power Station (lignite) included both fixed and variable components for the purpose of unit commitment and unit dispatch.

During the majority of 2017, SWEPCO offered its ownership share of the Dolet Hills plant into the SPP integrated market at incremental cost. In December of 2017, SWEPCO began offering its 50% share of the Dolet Hills plant utilizing both the fixed and variable lignite cost as part of the unit commitment decisions in an effort to address the limited ability of the mine to supply the required lignite on an annual basis using only variable costs. The challenges faced at the Dolet Hills mine during this time are generally discussed in the direct testimony of SWEPCO witness Dennis Meyer.

Once SWEPCO began seasonal operation (June 1st – September 30th) of the Dolet Hills plant in 2019, the company began offering the unit into SPP utilizing its variable cost component during the seasonal operating period. During the anticipated non-seasonal operating period the company utilized the fixed and variable fuel costs as part of the unit commitment decisions to facilitate seasonal operation of the Dolet Hills plant and maximize the value of the energy produced by the plant.

Sierra Club 1-06 CONFIDENTIAL Attachment 1 provides a detailed breakdown of the fixed and variable cost components by category.

- e. The parameters and costs surrounding start-up are considered and submitted to the market on an hourly basis for each resource.

When making unit commitment decisions for an off-line resource, the forecasted margin over the next week and two week period are considered. The start costs are compared to the forecasted margin over a projected run time. The SPP market (via a day-ahead or real time award) or AEP can make the decision to start the unit.

When making unit commitment decisions for an on-line resource, the forecasted margin over the next week and two week period are considered. If a resource is forecasted to be uneconomic for a short period and then forecasted to become economic again, the anticipated loss is compared to the start cost and associated risk of cycling the unit for the short duration the unit was forecasted to be uneconomic. The minimum down time of the unit and time to re-start are considered in the decision making process. The SPP market (via a day-ahead or real time award) or AEP can make the decision to keep the unit on-line.

Once a unit is on-line, the dispatch decisions are made by SPP and executed by SWEPCO. SPP sends basepoints every five minutes of the desired output of each unit based off of all parameters and offers submitted to the SPP IM.

The attachment responsive to this request is CONFIDENTIAL under the terms of the Protective Order. The Confidential information is available for review at the Austin offices of American Electric Power Company (AEP), 400 West 15th Street, Suite 1520, Austin, Texas, 78701, (512) 481-4562, during normal business hours.

Prepared By: Scott E. Mertz

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**SOAH DOCKET NO. 473-20-4204  
PUC DOCKET NO. 50997**

**SOUTHWESTERN ELECTRIC POWER COMPANY'S RESPONSE TO  
SIERRA CLUB'S FIRST SET OF REQUESTS FOR INFORMATION**

**Question No. Sierra Club 1.7:**

Regarding the Company's unit commitment decision process for the coal and lignite units during the Reconciliation Period, indicate whether the Company performs a forward-looking economic analysis to inform its unit commitment decisions for the coal and lignite units (i.e., decisions regarding whether to self-commit a generator in the day-ahead energy)?

- a. If not, explain why not.
- b. If so, provide all such analyses conducted during the Reconciliation Period in native, machine readable format.

**Response No. Sierra Club 1.7:**

AEP performs a six-day forecasted economic analysis regarding its unit commitment decisions on a daily basis. The data is stale shortly after it is produced because Commercial Operations constantly incorporates changes in load expectations, LMP forecasts, etc. The daily analyses are not updated every time one of the variables change. They provide a snapshot in time that is used as a starting point to determine what is ultimately sent to SPP as the offered unit commitment status. An example of the initial analysis is attached as Sierra Club 1-07 HIGHLY SENSITIVE CONFIDENTIAL Attachment 1.

The attachment responsive to this request is HIGHLY SENSITIVE under the terms of the Protective Order. The Confidential information is available for review at the Austin offices of American Electric Power Company (AEP), 400 West 15<sup>th</sup> Street, Suite 1520, Austin, Texas, 78701, (512) 481-4562, during normal business hours.

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**SOAH DOCKET NO. 473-20-4204  
PUC DOCKET NO. 50997**

**SOUTHWESTERN ELECTRIC POWER COMPANY'S RESPONSE TO SIERRA  
CLUB'S SEVENTH SET OF REQUESTS FOR INFORMATION**

**Question No. SC 7-5:**

Refer to the direct testimony of D. Meyer, page 18, and the one-time cost associated with transporting DHLC's mining equipment from the Dolet Hills mine to the Oxbow mine.

- a. Indicate whether this cost has been approved by the Commission.
- b. Indicate whether SWEPCO is receiving a rate of return on this cost.
- c. Provide an accounting of this cost.

**Response No. SC 7-5:**

- a. The costs associated with transporting DHLC's mining equipment from the Dolet Hills mine to the Oxbow mine have been included in the delivered cost of fuel to Dolet Hills.
- b. No, SWEPCO is not receiving a rate of return on this cost.
- c. See CARD 3-13 Attachment 4 which summarizes by vendor the costs associated with the transport of equipment from Dolet Hills mine to the Oxbow mine. All of these costs were recorded as expense and included in the fuel bill to SWEPCO; thus, as noted in a., have been included in the delivered cost of fuel to Dolet Hills.

Prepared By: Trudi B. Cohn

Title: Accountant Prin

Sponsored By: Dennis J. Meyer

Title: Dir Land & Mineral Development

**SOAH DOCKET NO. 473-20-4204  
PUC DOCKET NO. 50997**

**SOUTHWESTERN ELECTRIC POWER COMPANY'S RESPONSE TO SIERRA CLUB'S  
SEVENTH SET OF REQUESTS FOR INFORMATION**

**Question No. SC 7-6:**

Refer to the direct testimony of D. Meyer, page 18, and the retirement of two of the three dragline excavators.

- a. Indicate the purchase date and cost of each dragline.
- b. Provide the amortization and depreciation schedule for each of three dragline excavators.
- c. Indicate whether the Company has sought or received approval from the Commission for the accelerated amortization and depreciation schedule for the two retired draglines.
- d. Indicate whether the Company collects a rate of return on the cost of the three draglines as part of its fuel costs incurred under the DHLC LMA.

**Response No. SC 7-6:**

For the period under evaluation, only one dragline (#3 - a Marion 7820) was retired and its depreciation accelerated. DHLC did become a "one-dragline operation" as noted in the testimony; however, as the two remaining draglines were able to be used interchangeably, both were left in-service.

- a. See part b. and the referenced attachments. Dragline #1 was purchased new in 1985, dragline #2 was purchased used in 1999, both prior to DHLC's 2001 acquisition of the mine and its assets. Dragline #3 was purchased used by the Red River mining in 1989 and was acquired by DHLC in December 2009.
- b. Sierra Club 7-6 Attachments 1, 2 and 3 show the depreciation schedules for each of the three draglines. Note that the depreciation for Dragline #3, (Attachment 3) was accelerated for the period December 2018 - March 2019. This brought the Net Book Value for this dragline to zero at the end of March 2019.
- c. The Commission approved the DHLC-LMA, which provides for the depreciation of assets over their useful life in accordance with GAAP. Under GAAP, accelerated depreciation is required once the end of useful life of an asset has been reached. DHLC complied with this principal and accelerated depreciation over the remaining useful life of the dragline (December 2018 - March 2019). SWEPCO received and paid the fuel bills from DHLC that included this accelerated cost.
- d. The Company does not collect a rate of return on the cost of the draglines. The draglines are carried as assets on the books of DHLC, and consequently, the associated monthly depreciation charges are billed as a part of fuel cost to SWEPCO.

Prepared By: Trudi B. Cohn

Title: Accountant Principal

Sponsored By: Dennis J. Meyer

Title: Dir Land & Mineral Development

**SOAH DOCKET NO. 473-20-4204  
PUC DOCKET NO. 50997**

**SOUTHWESTERN ELECTRIC POWER COMPANY'S RESPONSE TO SIERRA  
CLUB'S SEVENTH SET OF REQUESTS FOR INFORMATION**

**Question No. SC 7-7:**

Refer to Schedule FR-7 and the DHLC LMA contract.

- a. Indicate whether the unavailability of Mine Coal the majority of the time between October 19, 2018 and December 10, 2018 constitutes a Miner Default as defined in Article 19.1.
  - i. If yes, indicate whether the Company sought remedy as defined by section 19.2.1.
  - ii. If no, indicate why the Miner's failure to provide coal did not constitute a Miner Default.
- b. Confirm or Deny: Under Article 2.2, SWEPCO has the right to terminate the Agreement provided notice is given by October 1 of the year preceding the year of termination.
- c. Confirm or Deny: SWEPCO does not have to pay a termination fee if it closes the mine in accordance with Article 2.2.
- d. Provide the "Initial Life of Mine Plan" outlined under Article 4.2.2.
- e. Provide all Annual Mine plans as outlined under article 4.2.3 prepared during the period March 1, 2017 and December 31, 2019.
- f. Provide an accounting of Total Compensation by category, as outlined in Article 9.2 (Cost of Production, Management Fee, and Executive Committee Costs), that is included in ratepayers fuel costs during the period March 1, 2017 – December 31, 2019.
- g. Provide an accounting of Cost of Production by category, as outlined in Article 9.3 (Production, Maintenance, Delivery and Accounting Costs + General and Administrative Costs + Capital Related Costs + Other Credits / Charges to the Cost of Production), that is included in ratepayers fuel costs during the period March 1, 2017 – December 31, 2019.
  - i. Provide an accounting of the return on equity for Capital Related Costs incurred and include in ratepayer fuel costs during the period March 1, 2017 – December 31, 2019.
- h. Provide an accounting of all Loan and Lease Obligations and Loan and Lease Principal Obligations that were included in ratepayers fuel costs during the period March 1, 2017 – December 31, 2019.

**Response No. SC 7-7:**

- a. The Mine worked diligently to restore lignite production, and no party to the contract declared a Miner Default.
- b. The circumstances to which SWEPCO is obligated to pay DHLC a termination fee are set forth in Article 2.2 of the DHLC-LMA, which states:  
"Pursuant to the rights and obligations of Article 20 (including the obligation to pay a Termination Fee as set forth in Exhibit "H"), CLECO and SWEPCO shall each have the unilateral right to terminate this Agreement based upon prudent business reason(s)

effective January 1, of each calendar year after 2002, with notice given to the other Parties on or before October 1 of the year preceding the year of intended termination."

- c. The circumstances to which SWEPCO is obligated to pay DHLC a termination fee are set forth in Article 2.2 of the DHLC-LMA.
- d. Please see Sierra Club HS 7-7 Attachment 1.
- e. Please see Sierra Club HS 7-7 Attachment 2, for the 2017 Annual Mine Plan, Sierra Club HS 7-7 Attachment 3 for the 2018 Annual Mine Plan and Sierra Club HS 7-7 Attachment 4 for the 2019 Annual Mine Plan.
- f. Please see the Company's response to TIEC 1-2, Attachment 1. Executive Committee Costs are no longer tracked separately, but included in either the "AEP Overheads" or "Direct Billings" line items.
- g. Please see the Company's response to TIEC 1-2, Attachment 1
  - i. Please reference Sierra Club 7-7 Attachment 5 for an accounting of return on equity included in ratepayer fuel costs. Please note that prior period tax-related adjustments were made and included in the calculation in August and September of 2017.
- h. Please reference Sierra Club 7-7 Attachment 6 for an accounting of Loan and Lease Obligations that were included in ratepayers' fuel costs during the period.

The attachments responsive to this request are HIGHLY SENSITIVE under the terms of the Protective Order. The Highly Sensitive information is available for review at the Austin offices of American Electric Power Company (AEP), 400 West 15<sup>th</sup> Street, Suite 1520, Austin, Texas, 78701, (512) 481-4562, during normal business hours.

Prepared By: Michael H. Ward

Title: Regulatory Consultant Staff

Prepared By: Trudi B. Cohn

Title: Accountant Prin

Sponsored By: Dennis J. Meyer

Title: Dir Land & Mineral Development

Sponsored By: Amy E. Jeffries

Title: Coal Procurement Mgr

**SOAH DOCKET NO. 473-20-4204  
PUC DOCKET NO. 50997**

**SOUTHWESTERN ELECTRIC POWER COMPANY'S RESPONSE TO SIERRA  
CLUB'S EIGHTH SET OF REQUESTS FOR INFORMATION**

**Question No. SC 8-6:**

Explain how the Company values the capacity of its plants when evaluating the long-term economics of operating a plant relative to alternatives.

- a. If the Company has quantified the value of capacity for its existing plants, produce such capacity valuation for the Company's solid-fuel plants for the time period March 1, 2017 – December 31, 2019, or any part of that time period that is available.

**Response No. SC 8-6:**

The Company values the capacity of its plants through a long-term resource planning process which evaluates the economics of continuing to operate a plant versus retiring the plant and replacing it with the optimal mix of capacity resources.

- a. During the 2018 Arkansas IRP process, IRP stakeholders requested that the Company perform a unit disposition analysis on an Early Solid Fuel Retirement scenario. The Company performed a unit disposition analysis on the Pirkey unit in response to that stakeholder request. Please see SC 8-6 Attachment 1 for a summary of that analysis. Please see SC 8-6 Highly Sensitive Attachment 2 and SC 8-6 Highly Sensitive Attachment 3 for the Dolet Hills analysis conducted in 2019. See SC 8-6 Highly Sensitive Attachment 4 and SC 8-6 Highly Sensitive Attachment 5 for Mark Becker's Rebuttal and Sur-surrebuttal testimony filed in Arkansas.  
Please see the response to CARD 2-6 for the most recent Dolet Hills unit disposition analysis.

The attachments responsive to this request are HIGHLY SENSITIVE under the terms of the Protective Order. The Highly Sensitive information is available for review at the Austin offices of American Electric Power Company (AEP), 400 West 15<sup>th</sup> Street, Suite 1520, Austin, Texas, 78701, (512) 481-4562, during normal business hours.

Prepared By: Mark A. Becker

Title: Mng Dir Res Plnning&Op Anlysis

Sponsored By: Scott E. Mertz

Title: Regulatory Consultant Staff

**SOAH DOCKET NO. 473-20-4204  
PUC DOCKET NO. 50997**

**SOUTHWESTERN ELECTRIC POWER COMPANY'S RESPONSE TO SIERRA  
CLUB'S EIGHTH SET OF REQUESTS FOR INFORMATION**

**Question No. SC 8-7:**

Refer to the Direct Testimony of Company Witness Meyer, regarding the Company's expansion of mining to the U-Mine Area of the Oxbow Mine.

- a. Provide a monthly break-down of the quantity of lignite that came from each of the T-Mine Area and U-Mine Area of the Oxbow Mine during the reconciliation period March 1, 2017 – December 31, 2019.
- b. Provide a monthly break-down of the quantity of lignite that came from the DoletHills mine during the reconciliation period March 1, 2017 – December 31, 2019.
- c. Provide the cost of each month's production identified in response to subparts (a)and

**Response No. SC 8-7:**

- a. Please see Sierra Club 8-7 Attachment 1 for the monthly break-down of the quantity of lignite that came from each of the T-Mine Area and U-Mine Area of the Oxbow Mine during the reconciliation period March 1, 2017 – December 31, 2019.
- b. Please see Sierra Club 8-7 Attachment 1 for the monthly break-down of the quantity of lignite that came from the Dolet Hills mine during the reconciliation period March 1, 2017 – December 31, 2019.
- c. As part of its normal operations, DHLC did not separate production costs by area nor by mine.

Prepared By: Dennis J. Meyer

Title: Dir Land & Mineral Development

Sponsored By: Dennis J. Meyer

Title: Dir Land & Mineral Development

SOAH Docket No. 473-20-4204  
 PUC Docket No. 50997  
 SC 8th RFI, Q. # SC 8-7  
 Attachment 1  
 Page 1 of 1

	Tons Removed		Tons Removed	
	U-Area	T-Area	Dolet Hills	Oxbow
Mar-17	-	74,224	208,225	74,224
Apr-17	-	51,928	185,613	51,928
May-17	-	111,175	83,974	11,175
Jun-17	-	9,382	-	9,382
Jul-17	38,374	24,593	-	62,967
Aug-17	33,311	31,962	-	65,273
Sep-17	3,505	10,969	-	14,474
Oct-17	65,513	59,094	-	124,607
Nov-17	75,520	71,303	-	146,823
Dec-17	87,597	48,560	-	136,157
Jan-18	32,371	74,314	-	106,685
Feb-18	9,271	25,907	-	35,178
Mar-18	7,558	28,989	-	36,547
Apr-18	23,800	41,139	-	64,939
May-18	33,300	102,760	-	136,060
Jun-18	34,185	154,305	-	188,490
Jul-18	43,083	160,603	-	203,686
Aug-18	36,019	88,700	-	124,719
Sep-18	23,266	104,459	-	127,725
Oct-18	17,758	85,157	-	102,915
Nov-18		59,333	-	59,333
Dec-18		89,824	-	89,824
Jan-19		78,031	-	78,031
Feb-19		95,149	-	95,149
Mar-19		133,793	-	133,793
Apr-19		107,009	-	107,009
May-19		88,484	-	88,484
Jun-19		145,918	-	145,918
Jul-19		121,947	-	121,947
Aug-19		193,902	-	193,902
Sep-19		108,669	-	108,669
Oct-19		117,162	-	117,162
Nov-19		164,129	-	164,129
Dec-19		99,769	-	99,769



**SOAH DOCKET NO. 473-20-4204  
PUC DOCKET NO. 50997**

**SOUTHWESTERN ELECTRIC POWER COMPANY'S RESPONSE TO SIERRA  
CLUB'S NINTH SET OF REQUESTS FOR INFORMATION**

**Question No. SC 9-1:**

At the time that SWEPCO decided to expand mining into Mine Area U of the Oxbow mine, did SWEPCO conduct any analysis on the economics of expanding the mine and continuing to operate Dolet Hills relative to the cost of retiring Dolet Hills?

- a. If yes, provide all analysis, including inputs, the model with formulas intact, and outputs that the Company conducted at the time that evaluated the prudence of expanding mining operations.
  
- b. If no, explain what evaluations or analysis the Company undertook to ensure it was prudent to expand mining operations.

**Response No. SC 9-1:**

- a. Please see the response to b.
  
- b. Mining of the U Area of the Oxbow mine was contemplated at the time of the acquisition of the Oxbow mine and was reflected in the Life of Mine plans developed by DHLC and approved by the Dolet Hills Executive Committee thereafter. Therefore, in moving mining operations into the U Area, DHLC was executing its Life of Mine plan and would not have performed a Dolet Hills unit/mine disposition analysis unless a significant change in circumstances was experienced.

Prepared By: Dennis J. Meyer

Title: Dir Land & Mineral Development

Sponsored By: Dennis J. Meyer

Title: Dir Land & Mineral Development

**SOAH DOCKET NO. 473-20-4204  
PUC DOCKET NO. 50997**

**SOUTHWESTERN ELECTRIC POWER COMPANY'S RESPONSE TO SIERRA  
CLUB'S TENTH SET OF REQUESTS FOR INFORMATION**

**Question No. SC 10-2:**

Refer to the Direct Testimony of Company Witness Meyer, pages 17 – 20, regarding the development and mining of Mine Area U at the Oxbow mine.

- a. Please provide an accounting and description of all costs incurred to develop and mine Area U.
- b. Please provide an accounting and description of all costs incurred to develop and mine Area U during the reconciliation period.
- c. Explain how these costs will be amortized and recovered from Texas customers and identify the time-period over which they will be amortized.
- d. Indicate the amount billed to customers during the reconciliation period, broken down into the categories of Production Costs as shown on SWEPCO response to TIEC 1-2 HS Attachment 1.

**Response No. SC 10-2:**

Schedules are provided to illustrate the costs to develop the Oxbow Mine. The Oxbow mine was developed and accounted for as a whole, and likewise the mining of the Oxbow Mine which includes the U Area.

- a. Please see Sierra Club 10-2 Attachment 1 for a schedule of costs to develop the Oxbow Mine.
- b. Please see Sierra Club 10-2 Attachment 2 for a schedule of Oxbow Mine development costs that occurred in the reconciliation period.
- c. During the Reconciliation Period, amortization of these costs was to be over the remaining life of the mine; that is, until 2036. All such capitalized costs are straight-line amortized over the expected life of the assets and SWEPCO's share of the monthly amortization is billed through the lignite bill from DHLC to SWEPCO. These costs are later recovered from Texas customers as an eligible fuel cost recorded in FERC Account No. 501 as the lignite inventory at the Dolet Hills plant is burned to produce electricity. As discussed in the direct testimony of Teresa Kraske (later adopted by Frances Bourland), SWEPCO uses an average cost inventory valuation method to calculate the cost of fuel burned during each month of the Reconciliation Period.
- d. As noted in subsection (c) above, customers are not billed by DHLC directly. Instead, customers are charged for the cost of lignite burned and recorded in FERC Account No. 501. SWEPCO uses an average cost inventory valuation method to calculate the cost of fuel burned during each month of the Reconciliation Period. Please see Sierra Club 10-2 Attachment 3 for the amounts billed by

DHLC to SWEPCO via amortization of the capitalized costs associated with the Oxbow Mine development costs, in the reconciliation period.

Prepared By: Dennis J. Meyer

Title: Dir Land & Mineral Development

Prepared By: Randall W. Hamlett

Title: Dir Regulatory Acctg Svcs

Sponsored By: Dennis J. Meyer

Title: Dir Land & Mineral Development

Sponsored By: Frances K. Bourland

Title: Regulatory Acctg Case Mgr.

DG-2

**OXBOW MINE DEVELOPMENT COSTS - SWEPCO SHARE**

Sum of total_cost	funding_project	work_order_number	description	in_service_date	Total
	000020554 - DHLC Oxbow Office/Shop	42242244	OXBOW DEV - SHOP/OFFICE FACILI	10/16/2017	8,041,233
	000020557 - DHLC Adm/Contingency	42306298	OXBOW DEV - ADM/CONTINGENCY	4/1/2019	1,542,287
	000020578 - DHLC Slurry Wall Bayou Barrier	42242245	OXBOW DEV - SLURRY WALL/LEVEE	8/29/2016	2,809,222
	000023229 - DHLC Develop Oxbow Reserve	42242249	OXBOW DEVELOPMENT - MINE DEVEL	4/17/2018	16,271,788
	000023232 - DHLC Conveyor Upgrades	42242235	OXBOW DEV - OVERLAND CONVEYOR	12/22/2017	12,872,632
		42797870	DLH AUX COAL LOADING EQUIP-OXB	5/21/2018	330,144
		42797871	DLH COAL LOADING EQUIP FOR OVE	4/1/2019	2,056,518
	000023236 - DHLC Oxbow Pierre Bayou Bridge	42242247	OXBOW DEV - BAYOU PIERRE BRIDG	2/6/2018	2,896,763
	000023239 - DHLC Oxbow 69KVA & Substation	42242237	OXBOW DEV - MINE ELECTRICAL PO	6/23/2017	565,179
	<b>Grand Total</b>				<b>47,385,765</b>

**SOAH DOCKET NO. 473-20-4204  
PUC DOCKET NO. 50997**

**SOUTHWESTERN ELECTRIC POWER COMPANY'S RESPONSE TO  
CITIES ADVOCATING REASONABLE DEREGULATION'S  
FIRST SET OF REQUESTS FOR INFORMATION**

**Question No. CARD 1-25:**

Provide SWEPCO's most recent analysis of the economic viability and profitability of operations of each SWEPCO generating unit, including co-owned units.

**Response No. CARD 1-25:**

SWEPCO has not conducted an analysis quantifying the profitability and economic viability of each SWEPCO generating unit during the Reconciliation Period. However, SWEPCO did conduct an analysis in Arkansas PSC Docket No. 19-008-U quantifying the revenues from its' solid fuel units against the incremental cost of its solid fuel units. The analysis was conducted for calendar years 2015, 2016, 2017 and 2018. That analysis shows that SWEPCO earned \$338 million in revenues in excess of the incremental cost of operating those units. In other words, SWEPCO economically bid its units into the SPP market for the benefit of its customers. Please see CARD 1-25 HIGHLY SENSITIVE Attachment 1 for the 2015, 2016, 2017 and 2018 analysis.

CARD 1-25 CONFIDENTIAL Attachment 1 responsive to this request is HIGHLY SENSITIVE under the terms of the Protective Order. Highly Sensitive information is available for review at the Austin offices of American Electric Power Company (AEP), 400 West 15th Street, Suite 1520, Austin, Texas, 78701, (512) 481-4562, during normal business hours.

Prepared By: Scott E. Mertz

Title: Regulatory Consultant Staff

Sponsored By: Scott E. Mertz

Title: Regulatory Consultant Staff

**SOAH DOCKET NO. 473-20-4204  
PUC DOCKET NO. 50997**

**SOUTHWESTERN ELECTRIC POWER COMPANY'S RESPONSE TO  
CITIES ADVOCATING REASONABLE DEREGULATION'S  
SECOND SET OF REQUESTS FOR INFORMATION**

**Question No. CARD 2-6:**

Provide the current status of future operations and the planned retirement date for the Dolet Hills plant along with the most recent studies supporting the current planned retirement date of the plant.

**Response No. CARD 2-6:**

SWEPCO and CLECO plan to operate Dolet Hills plant on a seasonal basis—typically from June through September— unless called upon by the SPP for SWEPCO or Midcontinent Independent System Operator (MISO) for CLECO. The planned retirement date is no later than December 31, 2021.

See CARD\_2-6\_HS Attachments 1 and 2.xlsx for recent analysis supporting the current planned retirement date.

CARD 2-6 HS Attachments 1 and 2 responsive to this request are HIGHLY SENSITIVE under the terms of the Protective Order. Highly Sensitive information is available for review at the Austin offices of American Electric Power Company (AEP), 400 West 15th Street, Suite 1520, Austin, Texas, 78701, (512) 481-4562, during normal business hours.

Prepared By: Dennis J. Meyer

Title: Dir Land & Mineral Development

Sponsored By: Dennis J. Meyer

Title: Dir Land & Mineral Development

**SOAH DOCKET NO. 473-20-4204  
PUC DOCKET NO. 50997**

**SOUTHWESTERN ELECTRIC POWER COMPANY'S RESPONSE TO  
CITIES ADVOCATING REASONABLE DEREGULATION'S  
FOURTH SET OF REQUESTS FOR INFORMATION**

**Question No. CARD 4-7:**

Please provide SWEPCO's total system firm capacity (generating capacity plus purchased capacity), total system peak demand (MW), and reserve capacity (MW) for each month of the reconciliation period.

**Response No. CARD 4-7:**

Please see CARD 4-07 CONFIDENTIAL Attachment 1 for the annual Capability, Demand and Reserves forecast for the Reconciliation Period.

The attachment responsive to this request is CONFIDENTIAL under the terms of the Protective Order. The Confidential information is available for review at the Austin offices of American Electric Power Company (AEP), 400 West 15<sup>th</sup> Street, Suite 1520, Austin, Texas, 78701, (512) 481-4562, during normal business hours.

Prepared By: Scott E. Mertz

Title: Regulatory Consultant Staff

Sponsored By: Scott E. Mertz

Title: Regulatory Consultant Staff

**SOAH DOCKET NO. 473-20-4204  
PUC DOCKET NO. 50997**

**SOUTHWESTERN ELECTRIC POWER COMPANY'S RESPONSE  
TO TEXAS INDUSTRIAL ENERGY CONSUMERS'  
THIRD REQUEST FOR INFORMATION**

**Question No. TIEC 3-6:**

Please provide a detailed breakdown of billed costs to SWEPCO under the DHLC- LMA, by month, from the end of the reconciliation period through the most recent available. In responding, please provide workpapers showing the calculation for each month of depreciation expense and final reclamation expense.

**Response No. TIEC 3-6:**

See TIEC 3-6 Attachment 1 for the detailed breakdown of the billed costs; TIEC 3-6 Attachment 2 for the depreciation expense; and TIEC 3-6 Attachment 3 for the final reclamation expense.

Prepared By: Trudi B. Cohn

Title: Accountant Principal

Sponsored By: Frances K. Bourland  
Sponsored By: Dennis J. Meyer

Title: Regulatory Acctg Case Mgr.  
Title: Dir Land & Mineral Development



DG-2

company_id	description	liability_account	beginning_liability	liability_incurred	liabilities_settled	accretion	revisions	gain_loss	ending_liability	adjust	start_month	end_month	SWEPCO Share
245	MINE Dolet Hills Lignite Mine	2300001	71,258,493.96	-	(743,328.35)	271,362.52	-	-	70,786,528.13	-	1/1/2020 0:00	1/1/2020 0:00	109,180.00
245	MINE Dolet Hills Lignite Mine	2300001	70,786,528.13	-	(796,718.48)	269,683.03	-	-	70,259,492.68	-	2/1/2020 0:00	2/1/2020 0:00	108,504.27
245	MINE Dolet Hills Lignite Mine	2300001	70,259,492.68	-	(953,540.33)	267,802.73	41,832,914.31	-	111,406,669.39	-	3/1/2020 0:00	3/1/2020 0:00	107,747.75
245	MINE Dolet Hills Lignite Mine	2300001	111,406,669.39	-	(604,360.01)	338,472.70	-	-	111,140,782.08	-	4/1/2020 0:00	4/1/2020 0:00	136,181.11
245	MINE Dolet Hills Lignite Mine	2300001	111,140,782.08	-	(893,213.40)	337,322.51	-	-	110,584,891.19	-	5/1/2020 0:00	5/1/2020 0:00	135,718.34
245	MINE Dolet Hills Lignite Mine	2300001	110,584,891.19	-	(1,290,357.90)	335,113.29	-	-	109,629,646.58	-	6/1/2020 0:00	6/1/2020 0:00	134,829.48
245	MINE Dolet Hills Lignite Mine	2300001	109,629,646.58	-	(1,502,562.80)	331,344.27	-	-	108,458,428.05	-	7/1/2020 0:00	7/1/2020 0:00	133,313.05
245	MINE Dolet Hills Lignite Mine	2300001	108,458,428.05	-	(2,453,700.55)	326,612.33	-	-	106,331,339.83	-	8/1/2020 0:00	8/1/2020 0:00	131,409.20
245	MINE Dolet Hills Lignite Mine	2300001	106,331,339.83	-	(2,320,910.67)	318,215.59	-	-	104,328,644.75	-	9/1/2020 0:00	9/1/2020 0:00	128,030.86

Monthly accretion expense is calculated by multiplying the ending liability balance for an ARO layer times the discount rate for an ARO layer divided by 12.  
Accretion expense amounts are calculated and journal entries generated by the Company's plant accounting system.

**SWEPCO Share**  
125,872.08  
125,872.03  
125,872.09  
21,447,353.56  
10,404,927.44  
10,404,927.44  
-  
-  
-

gl_posting_mo_yr	init_life	remaining_life	beg_asset_dollars	net_plant_change	beg_reserve_month	depr_reserve	curr_depr_expense	description	company_desc
1/1/2020 0:00	385	205	83,041,641.44	-	18,907,402.00	19,220,252.03	312,850.03	MINE Dolet Hills Lignite Mine	Dolet Hills Lignite Co.
2/1/2020 0:00	385	204	83,041,641.44	-	19,220,252.03	19,533,101.93	312,849.90	MINE Dolet Hills Lignite Mine	Dolet Hills Lignite Co.
3/1/2020 0:00	385	203	83,041,641.44	41,832,914.31	19,533,101.93	19,845,951.98	312,850.05	MINE Dolet Hills Lignite Mine	Dolet Hills Lignite Co.
4/1/2020 0:00	385	3	124,874,555.75	-	19,845,951.98	73,152,492.61	35,009,534.24	MINE Dolet Hills Lignite Mine	Dolet Hills Lignite Co.
5/1/2020 0:00	385	2	124,874,555.75	-	73,152,492.61	99,013,524.18	25,861,031.57	MINE Dolet Hills Lignite Mine	Dolet Hills Lignite Co.
6/1/2020 0:00	385	1	124,874,555.75	-	99,013,524.18	124,874,555.75	25,861,031.57	MINE Dolet Hills Lignite Mine	Dolet Hills Lignite Co.
7/1/2020 0:00	385	0	124,874,555.75	-	124,874,555.75	124,874,555.75	-	MINE Dolet Hills Lignite Mine	Dolet Hills Lignite Co.
8/1/2020 0:00	385	0	124,874,555.75	-	124,874,555.75	124,874,555.75	-	MINE Dolet Hills Lignite Mine	Dolet Hills Lignite Co.
9/1/2020 0:00	385	0	124,874,555.75	-	124,874,555.75	124,874,555.75	-	MINE Dolet Hills Lignite Mine	Dolet Hills Lignite Co.

**April 2020 Depreciation Adjustment Not Shown in Report Data Above**

APR Depreciation

Set of Books: SEC

Asset Id: 62544628 Eng In Service Year: 06/2010

Asset Description: MINE Dolet Hills Lignite Mine

Company: Dolet Hills Lignite Co.

Dept Group: Dolet Hills 101/6 39919 Lignite

Accounting Month:	04/2020	Depreciation Base:	\$195,029,503.77	Mid Period Method:	at
Initial Life(mo):	385	Beginning Reserve:	\$19,845,951.98	Mid Period Conv:	0
Remaining Life:	3	Current Dept Expense:	\$35,009,534.24	Depreciation Method:	Dolet Hills 101/6
Monthly Calc. Rate:	33.3333%	Input Expense Adj:	\$18,297,006.39	Begin Year Reserve:	\$18,307,402.00
Est. Salvage Pct:	0.0000%	Calc Expense Adj:	\$0.00	YTD Dept Exp:	\$35,948,084.22
Beginning Value:	\$124,874,555.75	Reserve Adj:	\$0.00	YTD Expense Adj:	\$18,297,006.39
Net Add / Adj:	\$0.00	Reserve Trans In:	\$0.00	Prior YTD Dept Exp:	\$1,251,399.48
Retirements:	\$0.00	Reserve Trans Out:	\$0.00	Prior YTD Expense Adj:	\$0.00
Transfers In:	\$0.00	Other Credits / Adj:	\$0.00	Account Distribution Details:	
Transfers Out:	\$0.00	Cost of Removal:	\$0.00	True-Up Reserve:	Depn Adjustment
Current Value:	\$124,874,555.75	Salvage Proceeds:	\$0.00	Adjustment History:	Audits
= NOTE: Ending Reserve is not calculated until Depreciation Approval has been run.		Loss (Gain):	\$0.00		
		*Ending Reserve:	\$73,152,492.61		

Note - depreciation and accretion expense amounts are calculated and journal entries generated by the Company's plant accounting system. The Dolet Hills Lignite Mine ARO asset is fully depreciated as of June 30, 2020. Additional depreciation expense will not be recorded on this ARO asset - assuming no new ARO additions for the forecast period.

**SOAH DOCKET NO. 473-20-4204  
PUC DOCKET NO. 50997**

**SOUTHWESTERN ELECTRIC POWER COMPANY'S RESPONSE  
TO TEXAS INDUSTRIAL ENERGY CONSUMERS'  
THIRD REQUEST FOR INFORMATION**

**Question No. TIEC 3-10:**

Referring to page 20 of the Direct Testimony of Dennis J. Meyer, please provide all analyses, studies, or reports created by the John T. Boyd Company regarding the Oxbow mine.

**Response No. TIEC 3-10:**

Please refer to TIEC 3-10 Attachment 1.

Prepared By: Dennis J. Meyer  
Sponsored By: Dennis J. Meyer

Title: Dir Land & Mineral Development  
Title: Dir Land & Mineral Development

**GEOLOGIC ASSESSMENT OF  
UNSTABLE OVERBURDEN, U PIT,  
OXBOW MINE**

Prepared For  
**AEP/DOLET HILLS MINING COMPANY**

By  
**John T. Boyd Company**  
Mining and Geological Consultants  
Pittsburgh, Pennsylvania



Report No. 2354.024  
APRIL 2018



**John T. Boyd Company**  
Mining and Geological Consultants

**Chairman**  
James W. Boyd

**President and CEO**  
John T. Boyd II

**Managing Director and COO**  
Ronald L. Lewis

**Vice Presidents**  
Robert J. Farmer  
Russell P. Moran  
John L. Weiss  
Michael F. Wick  
William P. Wolf

**Managing Director - Australia**  
Ian L. Alexander

**Managing Director - China**  
Jisheng (Jason) Han

**Managing Director - South America**  
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April 19, 2018  
File: 2354.024

Mr. Curtis L. Lightle  
Mine Engineering Superintendent  
AEP/Dolet Hills Mining Company  
2002 Crow Lane  
Pelican, LA 71063

**Subject: Geologic Assessment of  
Unstable Overburden, U Pit,  
Oxbow Mine**

Dear Mr. Lightle:

This report presents our findings of the geologic assessment of unstable overburden in U Pit at Oxbow Mine, located in DeSoto and Natchitoches Parrish, Louisiana (See Figure 1). In late December 2017, the John T. Boyd Company (BOYD) was retained by Dolet Hills Mining Company (Dolet Hills) to assess overburden conditions within the remaining mine plan area in the U Pit.

### **Introduction**

The unstable overburden in U Pit consists of a mixture of sand and mud that is saturated with water. However, since many of the pores between the sand grains are plugged with mud, the stratum cannot be effectively dewatered prior to mining. Once this material is disturbed, it undergoes liquefaction (i.e., the phenomenon whereby a saturated or partially saturated material substantially loses strength and stiffness in response to an applied stress, or other sudden changes in stress condition, causing it to flow like a liquid). At U Pit the primary source of disturbance is the removal of the strata by the dragline from the highwall and placement of it in the spoil. This disturbance causes the material to flow back into the pit and the dragline has to frequently rehandle this

material to remove it from the active pit. This in turn, reduces lignite production from the pit. There are also occasional highwall failures since the unstable stratum occurs immediately above the lignite, and when it fails after being uncovered, the overlying competent strata also fails.

BOYD has experience completing geological assessments involving this type of strata at other gulf coast lignite mines, and initially asked Dolet Hills to provide geophysical logs from various areas to determine if the problem stratum could be identified and mapped. Logs were provided from three pit locations where overburden conditions were judged to be good, fair, and poor. Our evaluation of these logs showed the following:



The Gamma Ray log (left of each log) from the good condition area in Pit TW shows a clean sand strata at the top of the hole (colored yellow) underlain by mudstone to the Blue Lignite Seam. The fair condition area is in the northeastern part of U pit and shows a clean sand at the top of the hole with some muddy sand material (circled) occurring above the Blue Seam. The poor condition area is in the northwestern part of U Pit and shows a clean sand underlain by a thick muddy sand stratum. This evaluation showed good agreement between the interpretation of the geophysical logs and the reported pit conditions. Following this initial geophysical log review, a site visit by BOYD personnel was scheduled.

A site visit was then conducted on January 23, 2018, to determine if the material identified on the logs corresponded to the unstable material in the pits. The site visit confirmed that the problem strata identified in the logs was the unstable material

occurring in the pits and therefore, could be identified and mapped throughout the U Pit Area. The following picture shows the unstable strata in the U Pit highwall.



The light grey material at the top of the highwall is the clean sand which is underlain by the grey muddy sand, or dirty sand material. The following photograph shows a highwall failure in the pit due to the failure of the dirty sand.



The following picture gives an overview of the mined area of U Pit and the unstable material that has flowed in the previous pits.



The following picture illustrates the good overburden conditions at TW Pit:



The clean sand can be seen at the top of the photo. The underlying strata consists of a stable bedded mudstone.

After the site visit, it was decided that BOYD would identify, map, and evaluate the clean and dirty sand strata in all of U Pit. This took place in several stages as Dolet Hills provided the geophysical logs in several shipments to BOYD during February and March. On February 14, BOYD presented initial findings at the mine offices for U Pit through plan year 2021 (one-third of U Pit Area). A follow-up visit to the mine office was completed March 27 through March 29. During this visit, Mr. Anderson provided training to mine personnel and made a final presentation of the entire U Pit through year 2037. This report contains our geologic assessment findings of unstable overburden at U Pit.



## Geology

The coal bearing strata occur in the Wilcox group of Eocene age. There are four lignite seams and three sand strata that occur in U Pit as follows:



The log on the left shows the four lignite seams.

The Yellow Seam only occurs in a relatively small area in the later years of the mine plan (See Exhibit 1).

The main mineable seams are the Blue and Red Seams. The Blue Seam occurs 80 ft below the Yellow Seam and is the main seam of the deposit. The Blue Seam is about 5 ft to 6 ft thick in the current mine area. However, Blue Seam abruptly thickens on the southern side of a fault that crosses the pit, and is up to 10 ft thick in the remaining mine plan area. This thickening is due to the sudden occurrence of a lower bench that rapidly merges with the upper bench. The Blue Seam splits and pinches out abruptly, and this feature defines the northwestern edge of U Pit.

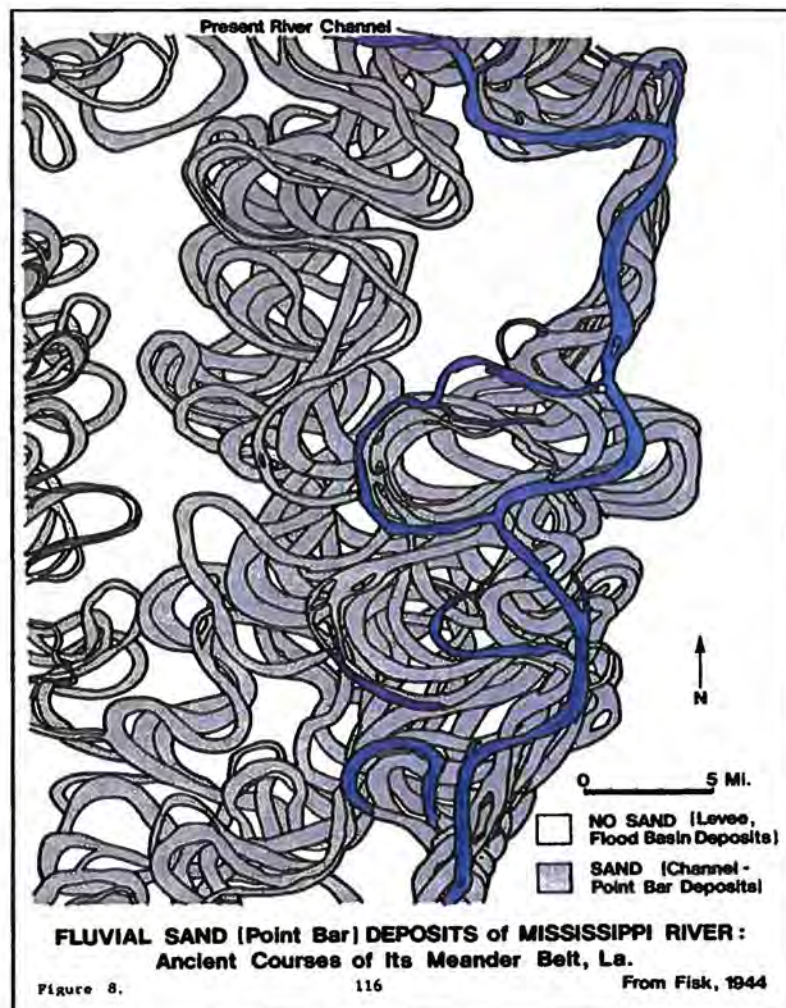
The Red Seam is approximately 3 ft to 4 ft thick. In the current mine area, it only occurs in the northeastern part of the pit and is 70 ft below the Blue Seam. Due to the thick interval below the Blue Seam, it was not economic to recover the Red Seam. However, on the southern side of the fault that crosses the pit, the interval abruptly changes to 35 ft and the seam becomes economically recoverable. The Red Seam is subject to

abrupt splitting and thinning, and pinches out along an area of non-deposition in the northeastern and central part of the mine plan area.

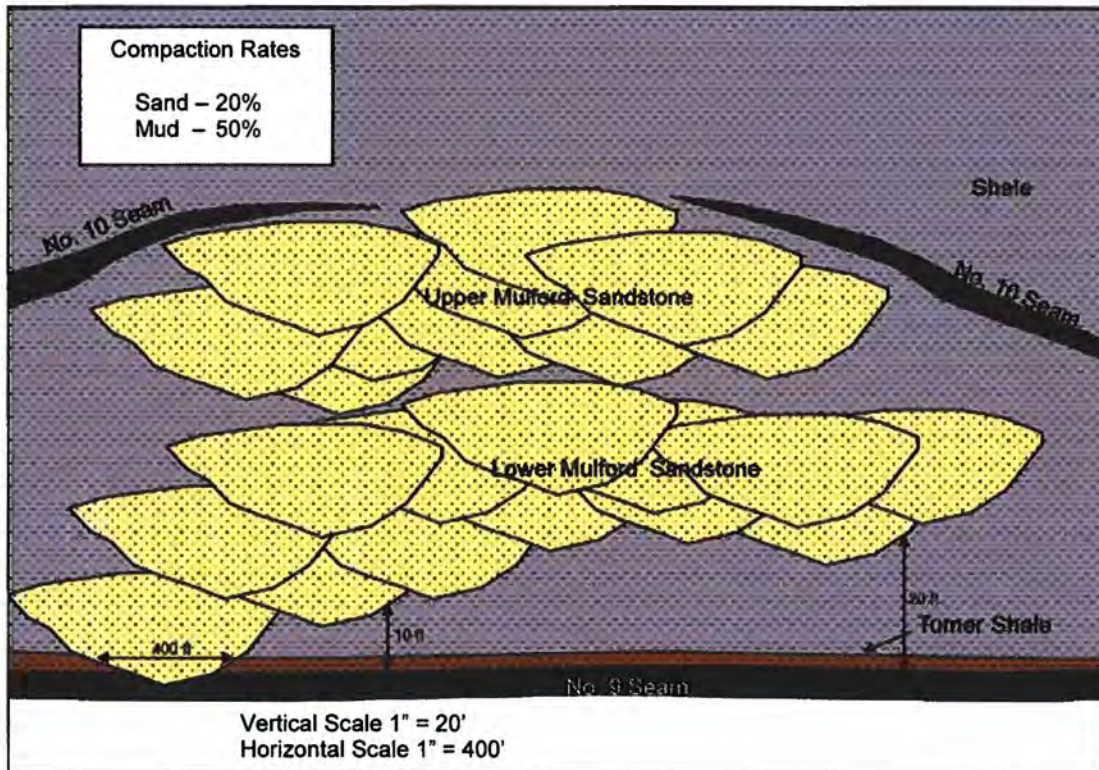
The Green Seam lies approximately 80 ft below the Red Seam. It is thin and is not economically recoverable, but is a consistent marker bed in the deposit.

The overburden and interburden strata for the mineable Blue and Red seams consist of clean sands, dirty sands and mudstones. The interburden between the Red and Blue seams is a mudstone that will provide for stable conditions in the highwall, will not cause spoil stability issues, and therefore, is not an issue in this geologic assessment.

The overburden above the Blue Seam consists of clean sands and dirty sands and mudstone. Clean sands are deposited in ancient river channels or paleochannels. The following diagram illustrates clean sand deposition in past channels of the Mississippi River Meander Belt.



As shown, when channels fill up with sand, they are abandoned and the river develops a new unobstructed channel. Also as the area subsides, these channels become stacked vertically as shown in the following diagram.



A clean sand strata correlated as CS25 (see Page 5), occurs throughout the U Pit area and ranges in thickness from 10 ft to over 80 ft thick depending on how many stacked channels are adjacent. We have identified at least five stacked channels in the clean sand sequence. These channels are typically 500 ft wide and 20 ft to 30 ft thick. The thick clean sand sequence is dominant in most of the northwestern part of the pit area and frequently lies adjacent to the Blue Seam. In the Southeastern part of the pit, the clean sand sequence is thinner and is underlain by a dirty sand that has been correlated as DS20. The DS20 Sand is variable in thickness from 5 ft to 40 ft. The CS25 must be dewatered prior to mining or it will flow into and flood the pit. The area that must be dewatered prior to mining is shown on Exhibit 1. All clean sands southwest of this line must be dewatered prior to mining.

Similar occurrence of thick clean sand at Sandow Mine was dewatered and as shown in the following photos, provided stable conditions in the highwall and spoil.



Impure, tight, or dirty sands are deposited when a river floods, and breaks through its natural levy depositing a mixture of sand and mud in its adjacent floodplain, as shown below. This deposition is called a crevasse splay as the material is deposited via a break, or crevasse, in the levy from which a mixture of mud and sand splays out into the floodplain.



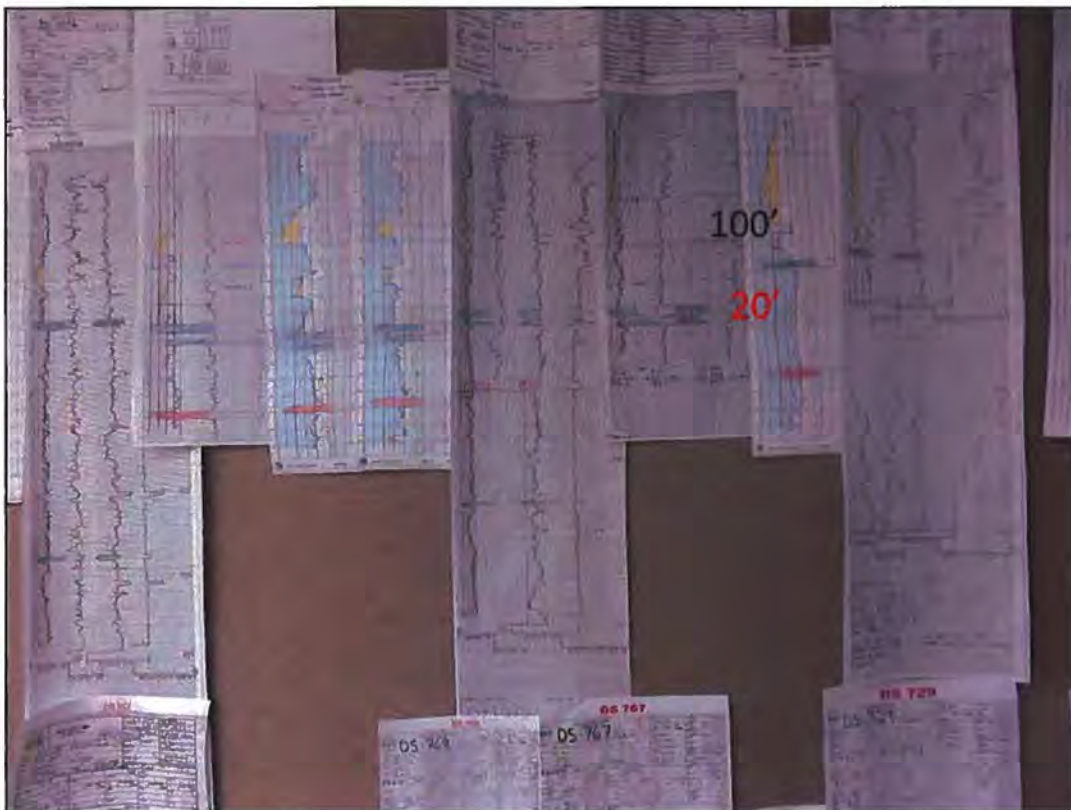
As previously described, this splay material is saturated with water but many of the pores between the sand grains are plugged with mud. As a result, the stratum cannot be effectively dewatered prior to mining. Once this material is disturbed it undergoes liquefaction (i.e., a phenomenon whereby a saturated or partially saturated material substantially loses strength and stiffness in response to an applied stress, causing it to flow like a liquid) as experienced in U Pit. DS20 is the major dirty sand in the Blue Seam overburden, and occurs between the Blue Seam and the overlying clean sand CS25. There is also a localized dirty sand above the CS25 which we have identified as the DS27. It occurs at the surface and will be part of the prestripped material, and, therefore, it is not expected to have a significant impact on mining.

Since clean sands must be dewatered prior to mining, and dirty sands must be selectively handled, we have identified and correlated both strata throughout U Pit for addition to geologic model.

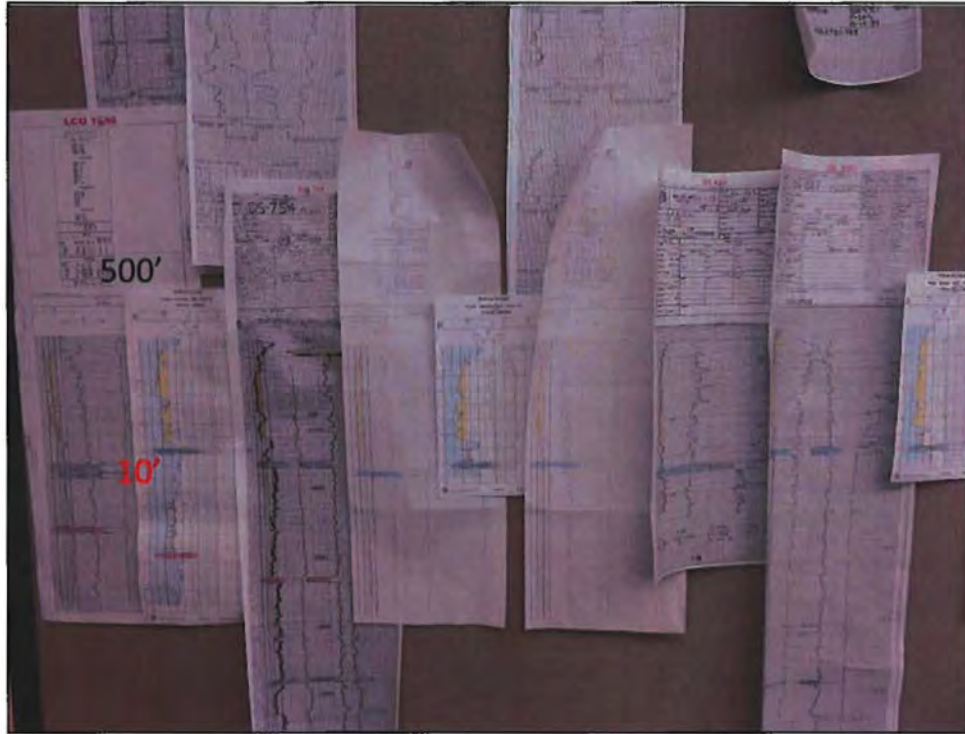
During our review of the logs, we identified a fault which crosses the mine plan area between drill lines 7, 8, and 9 (see Exhibit 1). On the north side of this fault, the Blue Seam is thinner and the interval between the Blue and Red seams is 75 ft. On the south side of the fault, the Blue Seam is thicker and occurs in two benches, which merge to the south where the seam is up to 10 ft thick. Also on the south side of the fault, the interval between the Blue and Red seams is 35 ft thick. This abrupt change in seam intervals and change in Blue Seam thickness occurs in as little as 100 ft horizontally. These abrupt changes are due to a fault with an approximate 20 ft to 30 ft vertical displacement and also a large lateral displacement.

The following photographs show these abrupt changes with the black number showing the distance between holes and the red number the vertical fault displacement.

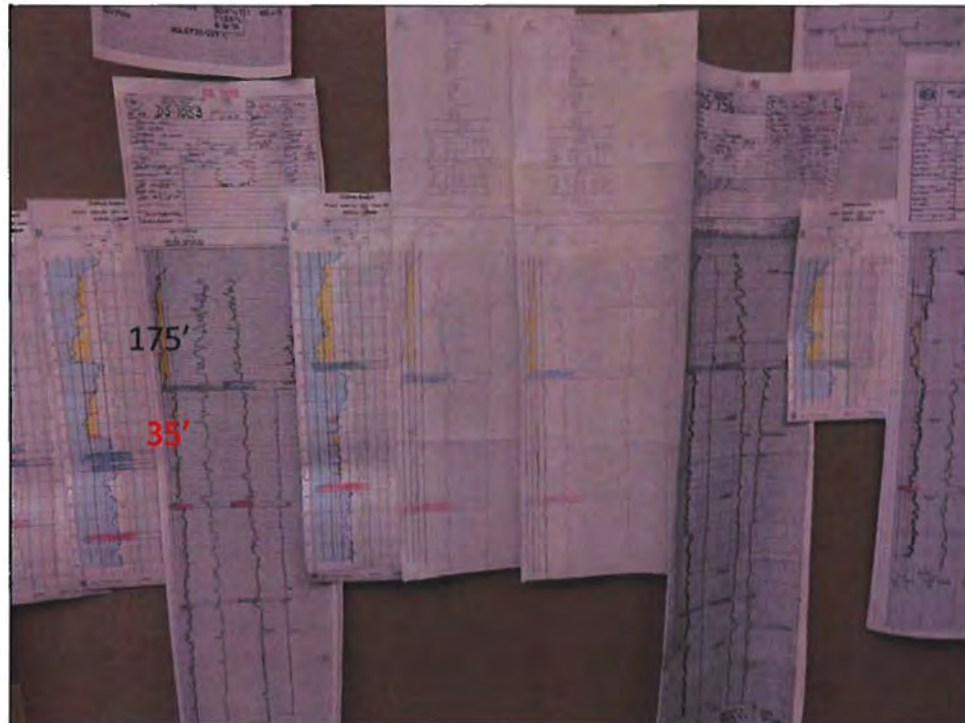
**DS0434 LCU1621**



**LCU1630 LCU1622**



**DS0774 LCU1629**

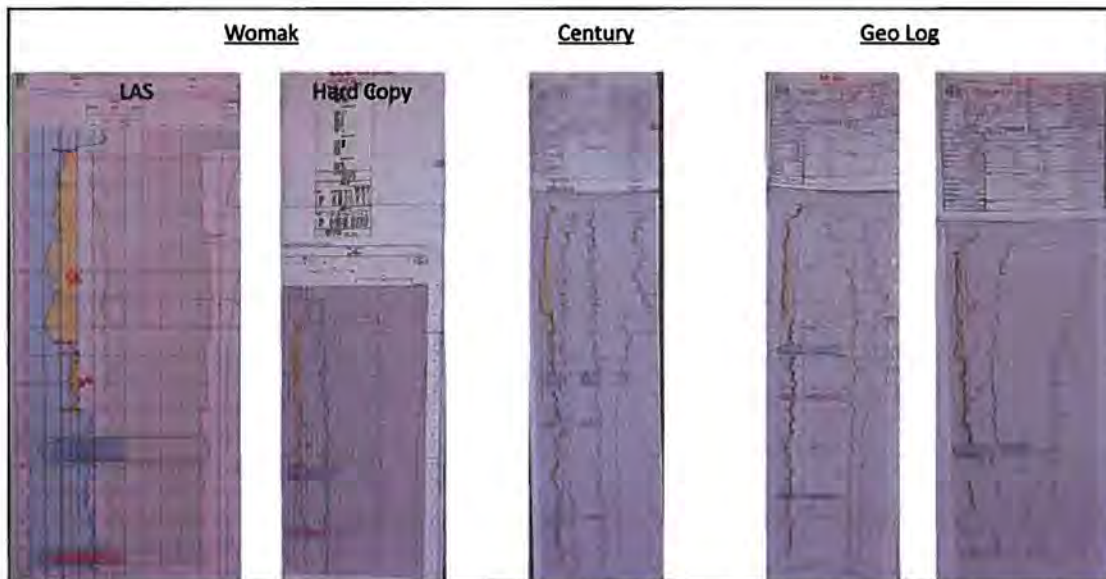


Since the fault is subparallel with the pit we expect very poor condition as mining crosses the fault.

### Source Data

A total of 522 geophysical logs were interpreted in order to map the clean and dirty sands in the U Pit overburden. The drill holes in U Pit initial mining area are typically drilled on drill lines that are on 500 ft spacings, with holes also on 500 ft centers along the lines (See Exhibit 1). As shown on Exhibit 1, this spacing occurs from Row 1 through 14. Beyond Row 14, the spacing is on approximately 1,000 ft extending through Row 17, and on a wider irregular spacing for the rest of the mine plan area to Row 27. Therefore, the reliability of our mapping is directly related to the drill hole spacing. We recommend that Dolet Hills drill the pit on 500 ft centers, five years ahead of mining.

Geophysical logs in U Pit were run by three different logging companies as shown in the following picture:



The Womak logs were run in recent drilling programs conducted by Dolet Hills. Some of the Womak logs were available in electronic LAS files, and their scales could be enhanced; other logs were only available in hard copy.

The Century and Geo Log logs were run in drilling programs conducted by Phillips Coal Company mainly in the late 1970s. All Century and Geo Log logs were provided as hard copies since electronic versions did not exist in the 1970s.

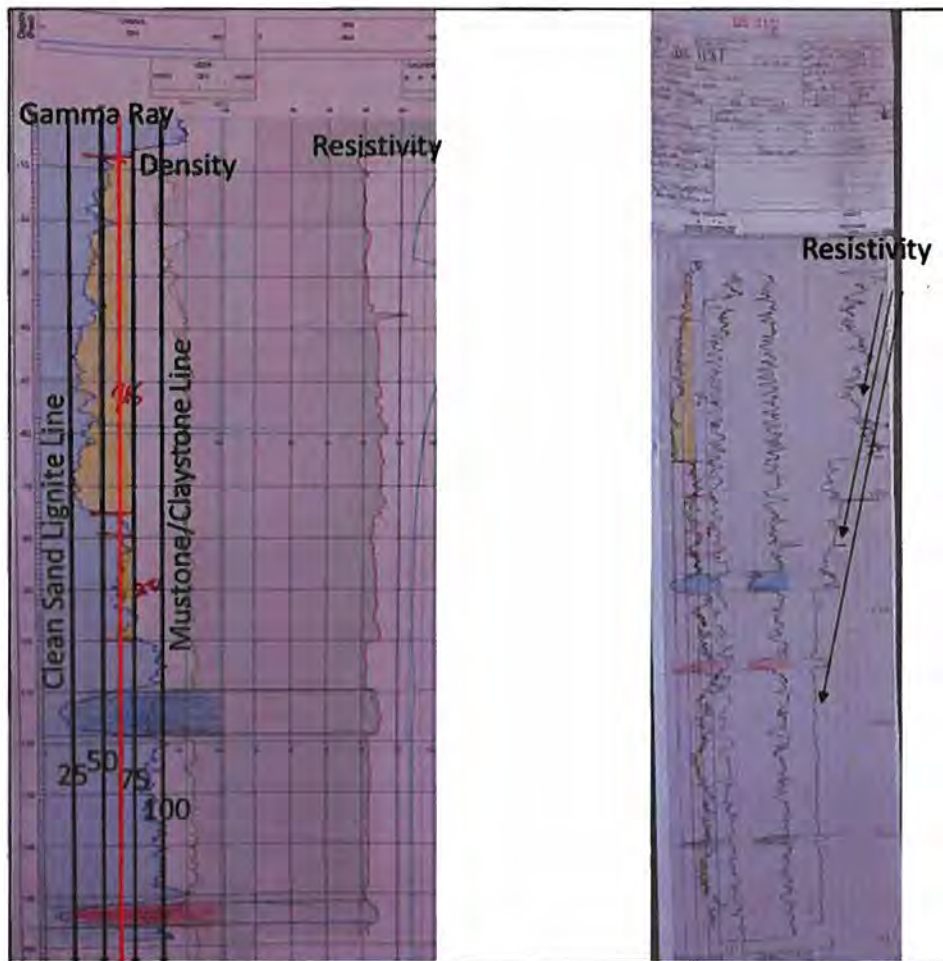
All geophysical logs and base maps were provided by Dolet Hills. Geophysical logs of a few holes were not available and are shown on Exhibit 1, and these omissions have a minimal impact on our mapping and evaluation.



### Geophysical Log interpretation

Clean and dirty sand are identified using the Gamma Ray and Resistivity logs. The typical suite of logs run include: Gamma Ray, Density, Resistivity, and Caliper. Since clean and dirty sands have similar densities, the density log does not differentiate between these materials. The Caliper log measures hole diameter to identify collapsed portions of the hole and therefore, is not useful in identifying materials.

The Gamma Ray log measures natural radioactivity in the strata. The main source of radioactivity is Potassium 40, which occurs in muds and clays. As a result, the clean sands and lignites show very low radioactivity, as seen on the logs below. The dirty sand shows slightly higher radioactivity (since it is a mixture of sand and mud). The mudstone above the Blue Seam and between the Blue and Red seams, shows higher radioactivity.



In the logs, the dirty sands were identified by gamma ray responses falling between a clean sand lignite line, and a mudstone line. In the Wommak Logs, this response was

between 50 and 75 counts per second per inch. This response was approximated in the Century and Geo Log holes.




The Resistivity log shows the formations ability to conduct an electrical current. In a clean sand where the pores between the sand grains are not plugged with mud, the strata are a very good conductor and the current flows unimpeded, as shown on the preceding picture, the log on the right. The underlying dirty sand with partially plugged pores is shown to be a poorer conductor, and the mudstone between the Blue and Red seams is a very poor conductor.

The resistivity responses on the Womak logs are muted, as shown in the preceding picture on the left, and were not as useful as the good responses on the Century and Geo Log holes.

There was good general agreement between the different log types. We are confident that almost all logs were able to differentiate between the sand types.

### **Overburden Evaluation**

All 522 logs were interpreted to define clean and dirty sand occurrence. The logs with the clean and dirty sand correlations are to be added to by Dolet Hills computerized geologic model database. Each interpreted hole was then color coded on a pit map. The color codes were as follows:

-  Good – Clean Sand
-  Fair – Clean Sand underlain by a minor thickness of Dirty Sand
-  Poor – Clean and underlain by thick Dirty Sand

Good condition areas are defined as have a thick clean sand with minimal or no underlying dirty sand. Most of these holes have no underlying dirty sand and in many cases, the clean sand is adjacent to the Blue Seam. The deposition in this Good conditions area is a stacked paleochannel sequence, as described in the geology section of this report.

Fair conditions are defined as having clean sand underlain by minimal dirty sand (<10 ft thick). These conditions represent transition areas along the channel margins between the paleochannels in the Good areas and the Poor conditions in the thick dirty sand splay deposit areas. This can also represent where the splay deposits pinch out along the splay margins (see splay picture in geology section).

Poor conditions are defined as having clean sand underlain by thick dirty sand (>10 ft thick). The thick dirty sand represents deposition in the main crevasse splay areas.

Exhibit 1 presents our map of overburden conditions for the U Pit mine plan area. The green areas are areas with good conditions with stacked clean sand paleochannels. The yellow areas are transition areas to the red areas with clean sand underlain by thick dirty sands. As shown, the initial pit areas had poor conditions in the northwest and fair conditions in the northeast. The current pit is currently at drill line Row 3 in the northeast. As shown on the map, we expect conditions in this pit will deteriorate as the pit advances towards the fault located between Rows 7, 8, and 9, and would become very difficult when the fault is encountered since it is subparallel with the pit.

A large green (Good condition) area measuring approximately one mile by three miles, is shown along the northwestern half of the U Pit area south of the fault. Possible plans are to move the dragline to the green area once dewatering of the clean sand is completed. The new pit would be located parallel with the northwest edge of this area and perpendicular with the previous pit layout. This possible relocation of the pit would allow the pit to advance southeast toward the splay area and pit conditions could then be evaluated as the poor condition area is reached. It should also be noted that with this alignment, the area where Red Seam is not present could also be avoided and easily bypassed, since this area will have a loss of tonnage and an increased overburden ratio.

In closing, this geologic assessment has identified a large area of good overburden conditions that offer the mine planning options to increase mine productivity.

Following this page is:

Figure 1: General Location Map

Exhibit 1: U Pit Overburden Assessment.

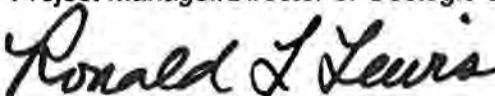
Respectfully submitted,

JOHN T. BOYD COMPANY

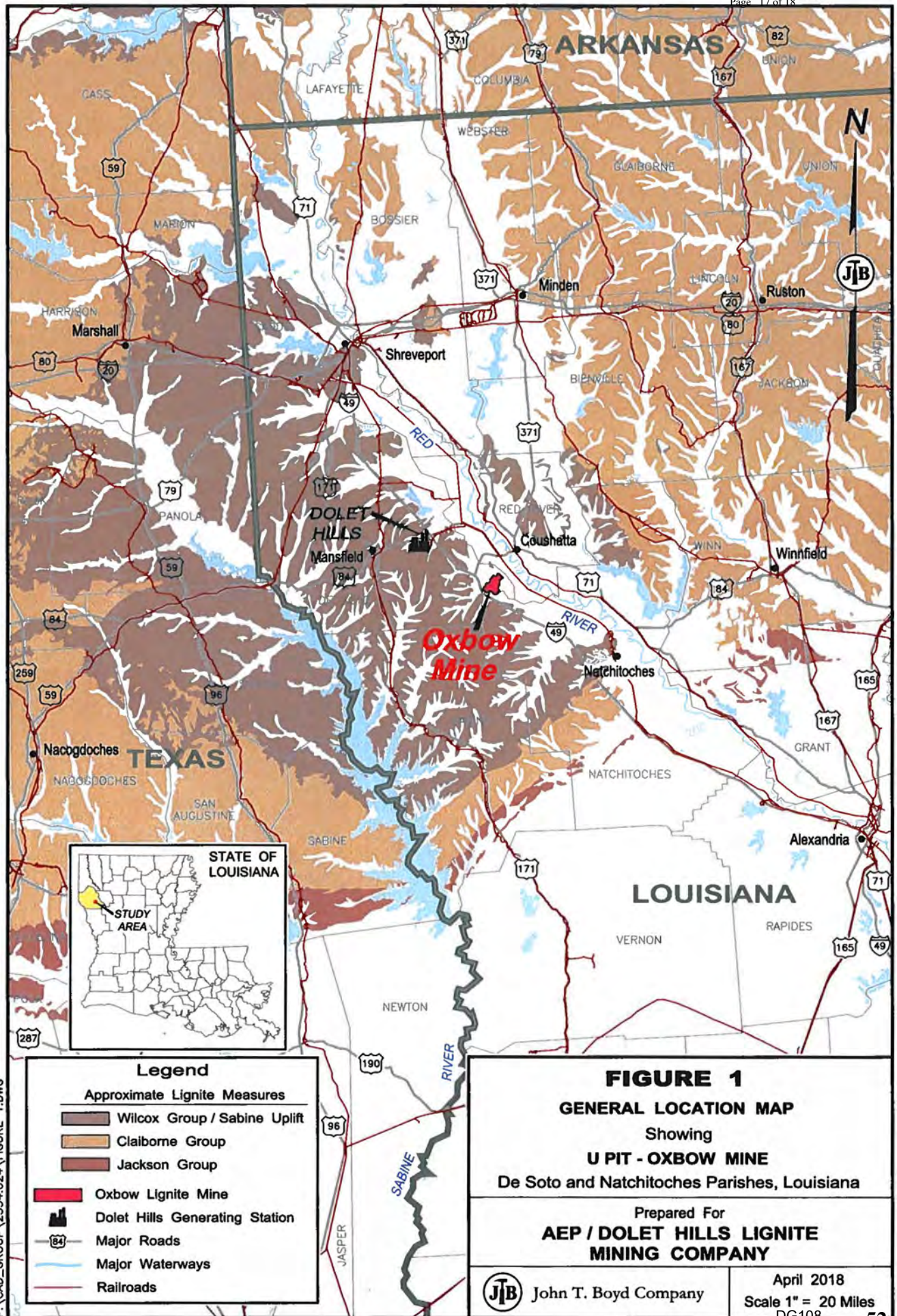
By:



Paul D. Anderson  
Project Manager/Director of Geologic Services



Ronald L. Lewis  
Managing Director and COO



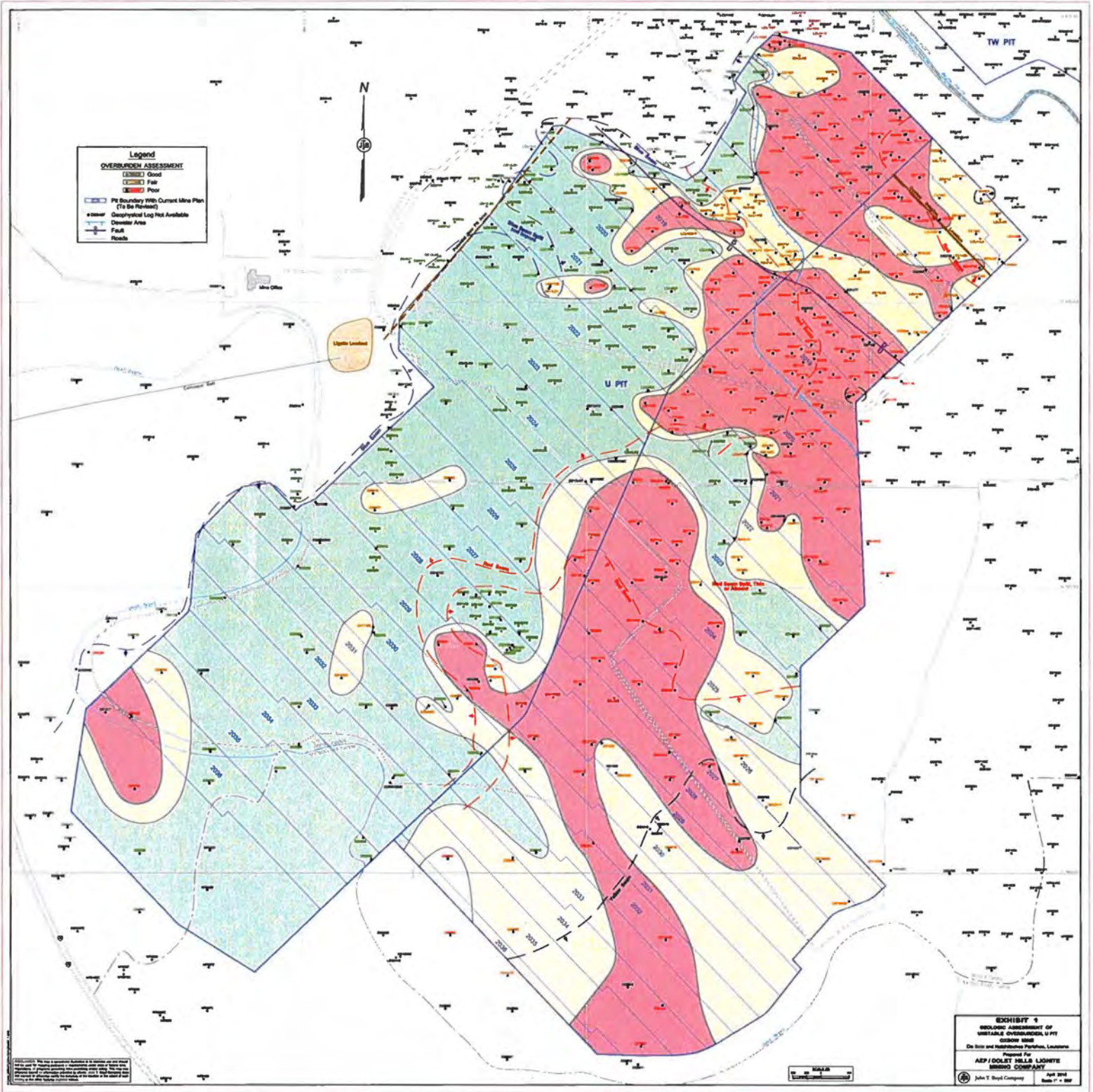
**FIGURE 1**  
**GENERAL LOCATION MAP**  
 Showing  
**U PIT - OXBOW MINE**  
 De Soto and Natchitoches Parishes, Louisiana

Prepared For  
**AEP / DOLET HILLS LIGNITE**  
**MINING COMPANY**

John T. Boyd Company

April 2018  
 Scale 1" = 20 Miles  
 DG-108

P:\CAD\_GROUP\2354.024\FIGURE 1.DWG



**SOAH DOCKET NO. 473-20-4204  
PUC DOCKET NO. 50997**

**SOUTHWESTERN ELECTRIC POWER COMPANY'S RESPONSE  
TO TEXAS INDUSTRIAL ENERGY CONSUMERS'  
THIRD REQUEST FOR INFORMATION**

**Question No. TIEC 3-11:**

Please provide all analyses, studies, or reports created by or for SWEPCO, CLECO, or DHLC regarding geological conditions at the Oxbow mine prior to its acquisition in 2009.

**Response No. TIEC 3-11:**

There were no specific analyses, studies, or reports created by or for SWEPCO, CLECO, or DHLC regarding geological conditions at the Oxbow mine prior to its acquisition in 2009. DHLC conducted due diligence of North American Coal Company (NAC) records concerning the Oxbow mine prior to acquisition and relied upon the studies NAC had completed or commissioned.

Prepared By: Dennis J. Meyer  
Sponsored By: Dennis J. Meyer

Title: Dir Land & Mineral Development  
Title: Dir Land & Mineral Development

**SOAH DOCKET NO. 473-20-4204  
PUC DOCKET NO. 50997**

**SOUTHWESTERN ELECTRIC POWER COMPANY'S RESPONSE  
TO TEXAS INDUSTRIAL ENERGY CONSUMERS'  
FIFTH REQUEST FOR INFORMATION**

**Question No. TIEC 5-2:**

When did DHLC first discover the geological anomalies discussed in the Direct Testimony of Dennis J. Meyer? In responding, please provide all documents and communications, including internal communications, concerning the discovery of the geological anomalies.

**Response No. TIEC 5-2:**

Initial dragline operations in the U area, proceeded as expected. When opening the box pit, or first pit, DHLC encountered ground water inflow, once that inflow was safely managed with ditches and pumps, mining proceeded normally.

As mining continued, extreme precipitation from Tropical Storm Cindy and Hurricane Harvey impacted the ground conditions of the Oxbow mine. Although DHLC was successful in recovering from these events, successive pit advancement experienced deteriorating geologic conditions. In December 2017, DHLC engaged John T. Boyd Company (Boyd) to assess the mineability of the U area, see TIEC 3-10 Attachment 1. Additionally, DHLC engaged Barr Engineering Co. to review hydrological impacts of the ground conditions of the U area, see TIEC 5-2 Attachment 1.

Please see SWEPCO's response to TIEC 5-4a &b for additional responsive information.

Prepared By: Dennis J. Meyer

Title: Dir Land & Mineral Development

Sponsored By: Dennis J. Meyer

Title: Dir Land & Mineral Development

resourceful. naturally.  
engineering and environmental consultants



March 8, 2018

Mr. Curt Lightle  
Mine Engineering Supt.  
Dolet Hills Lignite Company (DHLC), American Electric Power (AEP)  
2002 Crow Lane  
Pelican, LA 71063

Re: Summary of Mineability Assessment in Oxbow—U Area at Dolet Hills Mine

Dear Mr. Lightle:

This letter report is provided as a summary of the mineability assessment performed for Oxbow U-area. In December 2017, American Electric Power (AEP) contacted Barr Engineering Co. (Barr) to review current ground conditions and mineability in the U Area at Oxbow mining area, Dolet Hills Lignite Company (DHLC). During recent mining operations, ground conditions that result in low spoil angles and difficult dragline bench conditions have been encountered, making mining to the target pit geometry challenging. The result is a reduction in lignite production rates due to pit cross sections that are significantly different than those expected to be achieved in the range diagrams. DHLC expressed interest in looking at existing data to better understand these challenging conditions and gain insight about expected future conditions. Ultimately, DHLC is looking at options to modify mining operations to increase production rates while handling the ground conditions in a safe and efficient manner. This report provides a summary of the work performed by Barr along with recommendations for consideration and future implementation by DHLC.

## Background

Dolet Hills began mining in the U Area mining blocks with two 1570-W draglines in 2017 (Attachment A, Figure 1). To date, mining conditions have been very difficult and there have been numerous spoil slides in the area, notably around Station 97+00 and Station 78+00. The result has been that coal deliveries have been well below the planned levels. Therefore, it has become necessary to (1) determine the nature of the problem, (2) assess whether the area is mineable, and (3) determine a path forward that will allow coal production to be brought up to planned levels.

Barr has been involved with recent geotechnical studies in the Tango West area in response to a slide in May 2017 and in the U area working on ground-control plan revision associated with single and double seam lignite operations. The tasked mineability assessment reviewed available existing data to better understand material present in the current operational area and how that compares with future U Area material. The work performed to date is outlined below:

### Timeline of events

- December 12, 2017 – AEP/DHLC first contacts Barr regarding interest in a mineability study



- December 22, 2017 – Barr provides proposal for services related to mineability study
- January 2018 – Barr obtained elogs from the mine and processed the data to allow for import into Vulcan software
- February 1–2, 2018 – Lyall Workman, Michael Haggerty, and Brian Anderson at Barr conducts first onsite visit to review the ground conditions and discuss findings of elog analysis with AEP and DHLC personnel
- February 14, 2018 – Lyall Workman makes second onsite trip to discuss findings with AEP/DHLC personnel and listen and participate in discussion around J.T. Boyd’s presentation of findings
- February 19, 2018 – Lyall Workman submits “Memorandum of meetings held at Dolet Hills on February 14, 2018,” summarizing the meeting outputs and action items
- February 21, 2018 – Barr conducts follow-up call with DHLC to review scope and discuss possible future activities and other ongoing work items.

## Purpose

The purpose of this assessment is to summarize the existing elog data, laboratory testing performed, site observations, analysis of the problems, and summary of anticipated future conditions along with recommendations for further consideration. The ultimate goal is to provide a clearer understanding of expected conditions in the U area such that DHLC can better understand options for adjusting mine operations.

For this work it is important to understand the geology and how the geologic layers are categorized into various materials and mined. The following provides a brief summary of the geology as reported in the Oxbow permit (PBW, 2016), followed by a summary of the geological units as they are referred to in this report.

## Geological Information from Oxbow Permit (Section 4, Geology)

Oxbow U area is located in a low-lying flood plain of the meandering Red River. The ground surface elevation varies between approximately 115 feet and 130 feet above mean sea level. The U area is underlain by Holocene alluvial deposits of the Red River floodplain, Pleistocene terrace surfaces, and Tertiary (Paleocene-Eocene) coastal plain deposits of the Wilcox Group. The Wilcox Group is subdivided into the Cow Bayou Formation, the Dolet Hills Formation, and Naborton Formation (listed from youngest to oldest). These formations were manifested by progradational fluvial-deltaic and transgressive marine progresses and reflect depositional patterns characteristic of Gulf Coast Plain. The Cow Bayou Formation is not well developed in the U-area.

The Chemard Lake Lentil (the C Seam) is the thickest (3–10 feet) and most continuous lignite seam in the U area. The C Seam is the uppermost unit in the Naborton Formation and marks the boundary between the Naborton Formation and the overlying Dolet Hills Formation. Strike of the C Seam is generally oriented southwest-northeast and dip is approximately 31 feet per mile (0.34 degrees). The B Seam that lies below the C Seam in the Naborton Formation is present in the western portion of the proposed mine area. The B Seam is typically located approximately 35 to 80 feet below the C Seam and averages about 3

to 4 feet in thickness. Local and substantial undulations occur in the B Seam and it is discontinuous in the northeast portion of the U area.

The upper portion of the Red River Alluvium consists mostly of reddish-brown silty clay (Moreland Clay). Occasional silt or sand units with trace gravel have been observed in the upper portion of the Red River Alluvium.

The Dolet Hills Formation (Wilcox and D Seam) consists of gray to brownish-gray sand, interbedded silts and clays, and a few thin, discontinuous lignite seams.

The Naborton Formation lies below the Dolet Hills Formation and is the lowest stratigraphy unit of the Wilcox Group in the U area. The Naborton Formation primarily consists of gray silts; interbedded sand, silts, and clays; and a few discontinuous sand bodies. The Naborton Formation is the primary lignite-bearing formation in the U area. The underburden in the U area is composed entirely of material of Naborton Formation. In the area where the B Seam will be mined, the Naborton Formation also forms portions of the overburden/interburden interval. Figure 1, below, provides a depiction of the stratigraphy in the Oxbow area.

Elevation: 115-130 feet	
Red River Alluvium	Moreland Clay: Reddish-brown
	Alluvium Sand: Yellowish-brown
Dolet Hills Formation	Wilcox, Overburden: Sand, Silt, Clay, and discontinuous lignite seams
	D Seam: Not present in U area (present in Tango area)
	Wilcox, Overburden: Sand, Silt, and Clay
Naborton Formation	C (Blue) Seam: 3-10 feet thick
	Wilcox, Interburden: Primarily Silt, few very fine sand
	B (Red) Seam: 3-4 feet thick
	Wilcox, Underburden (Floor): Clay

Figure 1 Oxbow Geology Stratigraphy

### Site Geologic Model Layers for the Assessment

In general, the geologic layers and deposition described above results in a complicated intermixing of sands and clays. Low energy deposition environments deposit finer grained materials while high energy depositional environments deposit coarser, sandier materials. The interacting depositional environments

coupled with more recent erosion and deposition creates a network of sands and clays. In general, the layers are divided into the following units from shallowest to deepest:

#### Geology Layers in U Area

- Moreland clay
- Alluvium sand deposits
- Wilcox overburden (sand, silt, and clay)
- Lignite – C seam (blue)
- Wilcox interburden
- Lignite – B seam (red)

Figure 2 through 4 in Attachment A present thickness maps of the top of pre-mine topography to bottom of alluvium, thickness of alluvium, and thickness of the Wilcox overburden, respectively. The alluvium thickness increases as the U Area mine operations progress to the southwest (more cover/pre-strip) and the Wilcox thickness varies as the mine progresses. There do appear to be troughs which pass through the mine area and are represented by localized reduction in the Wilcox overburden thickness and a thickening of the alluvium sand.

The geologic model developed onsite by DHLC indicates stratigraphy breaks between the Moreland, alluvium, and Wilcox units in addition to the lignite seams. The boundary between these layers is based on exploration borings and elogs performed and reviewed by the mine. Barr did not adjust any of the layer boundaries for this assessment. In lignite surface mining the geology units can often be expected to remain relatively consistent with few changes in material behavior. Consistency in material translates into consistent behavior (strength and hydraulic properties), which ultimately translates into consistent operations and production rates. In the case of the U Area there can be a significant variation within the alluvium and Wilcox, defined as percentage between a clay-dominant and sand-dominant materials. Depending upon the material makeup, along with groundwater influence, the material strengths can vary and affect mining operations and spoiling. This can cause a deviation from target pit geometry and in a worst case lead to sloughing or failures. The variation between sand- and clay-dominant material in alluvium and Wilcox units can be observed using elogs. The elogs do not give a direct measure of the material strength but they do provide a means to gain insight into future expected consistency (clay versus sand) of the layer. As geotechnical and groundwater data is gathered and correlated to the elog data, a basis for expected operations and production can be developed.

## Elog Analysis

### LAS Data Review and Pre-Processing

Oxbow provided Barr with 348 electric Log ASCII Standard (LAS) files which were collected from previous drilling exploration programs. Two drillhole survey databases were also provided containing coordinates for 2,145 locations. The LAS files provided required several format corrections as they did not follow the standard Canadian Well Logging Society (CWLS) specifications necessary for import into Vulcan software.

Many geophysical software packages require that the data follow the CWLS format so that data can be easily plotted and/or manipulated. The following problems were documented with the Oxbow LAS files:

- 1) Header format within the LAS did not follow the CWLS syntax.

Existing Data	Corrected Data
~W	~Well

- 2) Variables within the Well Information Section of the LAS were not declared properly.

Existing Data	Corrected Data
Company	Company.

- 3) Data and description fields within the Well Information Section were not declared properly.

Existing Data	Corrected Data
Company : D.H.L.C	Company. D.H.L.C : Company Name

- 4) Drillhole names within LAS files did not match with the provided drillhole survey databases.
- 5) Coordinate information was not written within the LAS file.
- 6) Several repeat and/or partial LAS files were initially provided.

The first three problems were resolved by developing a Python software script that adjusted the file contents according to the CWLS syntax (<http://www.cwls.org>). The fourth problem was resolved by identifying that a suffix of "1" or "\_PILOT" had been added to several of the drillhole names within the LAS files themselves. It is critical that the drillhole name within the LAS have a matching name within a survey database; if there is not a match it will be ignored during the import process. A modified survey drillhole database was developed by adding the appropriate suffix, allowing the LAS file to match with a corresponding coordinate. The missing coordinate information was entered in the LAS files based on the matching coordinate information, if available, provided by DHLC. The last problem was not fully resolved during this project; it is recommended that it be resolved in the future. There were several LAS files with identical drillhole names that only contained data for select intervals. It is understood that this is usually caused by tooling or deployment issues in the field and that the LAS with the most recent date should be used as it contains the complete record.

Once the LAS files were modified and a new drillhole survey database was created the data was then imported into Vulcan. Only 177 LAS files of the original 348 were used in the analysis due to (1) files not having the matching survey coordinate for the drillhole or (2) duplicate or partial LAS files.

## Spatial Distribution Analysis

Vulcan software was used to import the LAS data and plot/visualize gamma variation across the U-Area as it relates to depth and geologic boundaries. DHLC provided Barr with the most recent geologic surfaces for the U-Area which included the roof and floor elevations for all coal seams and the alluvium sand layer. For this project, the alluvium sand and blue coal seam grid files were the only ones used.

The LAS files contain a "curve information" block with five channels of data: depth, gamma, caliper, density, and resistivity. Each of these channels have a recording at interval lengths of 0.25 feet. All of the channel data was reviewed, but gamma was carried forward for the visual analysis as it provided the most distinguishable curve signature corresponding to material properties.

Gamma measures the natural radiation emitted from formation materials. Clays and shales typically have more natural radiation, which corresponds to a higher gamma value during logging. Therefore, in general, higher gamma values are correlated with zones of clay or shale; lower gamma readings often correlate with a sandier material. It is important to note that gamma is not a direct measurement of lithology, but the amount of radioactive emission produced by the lithology. However, given the typical differences in radioactive emissions between clays and sands, a site-specific spectrum and sense of variability can be presented. Typical cutoffs for clay, silt, and sand materials are provided in Figure 2, below.

<b>Lithology</b>	<b>Gamma Ray Values (in API units)</b>
<a href="#">Sandstone</a> (quartz)	15–30 (rarely to 200)
<a href="#">Limestone</a>	10–40
<a href="#">Shale</a>	60–150
<a href="#">Organic-rich shale</a>	100–250
<a href="#">Coal</a>	15–150 (any value possible)

Figure 2 Typical Gamma Correlations to Material Type

Grid files were used to constrain the analysis among three geologic boundaries:

- *Alluvium-sand*: Floor and roof surfaces provided by Oxbow
- *Wilcox-overburden*: Assumed to be the interval between the floor of the Alluvial Sand to the roof of the Blue (C) Seam
- *Blue (C) Seam*: First recoverable coal seam in the U Area; floor and roof surfaces provided by DHLC

The geologic boundaries were flagged in the Vulcan database and composite databases were then created so that an average gamma value could be created at given electric logging locations. The average value was then contoured across the U Area to visualize how the data was spatially distributed. Attachment A figures contain all of the elog information reviewed and provided as part of this assessment report.

The first analysis was to visualize the average gamma constrained within the Alluvial Sand (Attachment A - Figure 3). The average gamma value within the Alluvial Sand ranged from 25 to 86 cps, with an overall average value of 41, weighted by area. The areas indicating higher gamma suggest a more clay-like material exists within the alluvium.

The average gamma constrained within the Wilcox-overburden was also visualized (Attachment A - Figure 4). The average gamma value within the Wilcox-overburden ranged from 31 to 98 cps, with an overall average value of 71 cps, weighted by area. The Wilcox data appeared to include outliers of lower gamma values within the data set, located to the east and north of the 2018 pit blocks. These outlier areas reported relatively low gamma (indicating a higher sand content) but also coincide with areas where the Wilcox-overburden appears to be thinning or pinching out.

The gamma content below the Blue Seam was mapped (Attachment A, Figure 7) with the idea that it could be used as a screening tool to help determine if there are any areas with very high gamma counts or high clay content shales. High gamma values, greater than 100 can suggest that an area should be further evaluated to determine if an organic fat clay is present. If a fat clay is present underneath the spoil material there is an increased chance that a block failure plane may develop along the clay/spoil boundary. The gamma analysis completed in Figure 7 was restricted to a zone 5 feet above and 10 feet below the floor of the Blue seam with the maximum gamma value recorded.

Figure 8 through Figure 11 in Attachment A were developed after the meeting on February 1 with Oxbow staff. The Wilcox-overburden was further analyzed to help identify areas of high clay content. It is expected that areas where the higher gamma count clay is thicker will provide more material to build a buckwall; behind this, poorer material can be placed on the spoil side. Figure 8 through Figure 10 in Attachment A apply a gamma cutoff (70, 75, and 80 respectively) to the analysis with anything above the cutoff being summed together and a total length calculated. Figure 11 of Attachment A takes a closer look at the gamma 75 cutoff analysis and applies a 5 foot minimum length filter before the intervals are summed together. There are two common trends that are revealed within these figures:

- The Wilcox-overburden within the Tango West area has material with a higher gamma content and thicker clay-dominate zones.
- The Wilcox-overburden in the U Area has lower average gamma content material relative to Tango West. U Area gamma values do improve as you move into the future mining years (2020), but even in these areas there are pockets of low gamma material.

It is understood that the remaining U-Area to the South has log data available but it is not in a digital format. It is recommended that the log data be converted to a digital format so that an analysis for the remaining mining area can be completed.

### Statistical Analysis

Vulcan was used to create a composite database for the gamma values broken down by a given geologic interval. An average gamma value within each geologic interval was then calculated at each of the electric logging locations. Histograms were developed using the software "R" to visualize the distribution of the gamma values within the Alluvial Sand and Wilcox-overburden geologic units and are presented in Figure 3 and Figure 4, below.

The mean, median, standard deviation (SD), and skewness of the gamma values were included on each histogram. If data is normally distributed, the mean and median (measures of central tendency) are equal, and the skewness (a measure of symmetry) is zero. Data with a skew value between -1 and 1 are generally close to symmetric. A positive skew value and a mean greater than the median indicates right-skewed data (Figure 4), and a negative skew value with median greater than the mean indicates left-skewed data (Figure 3). In general, a skewness between -2 and 2 are considered acceptable in order to prove normal univariate distribution. Therefore, based on distribution of the data a mean, or average, of the data is calculated and presented on the gamma maps in Attachment A.

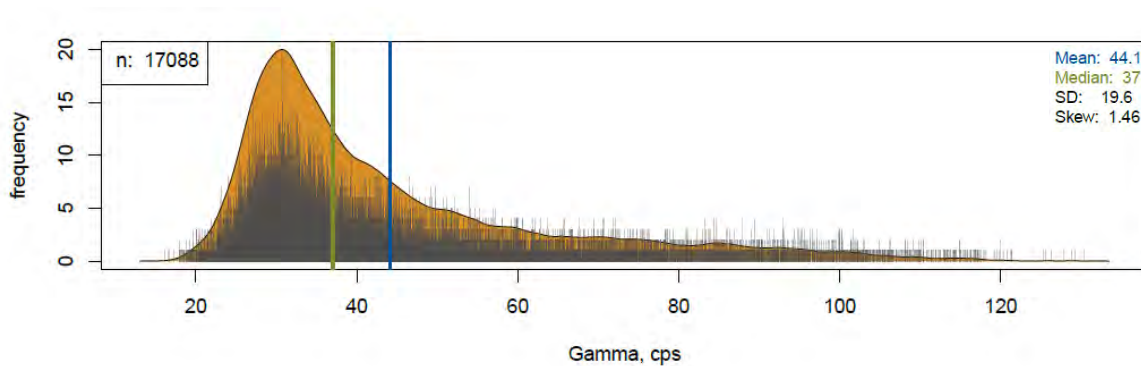


Figure 3 Alluvium Sand Histogram

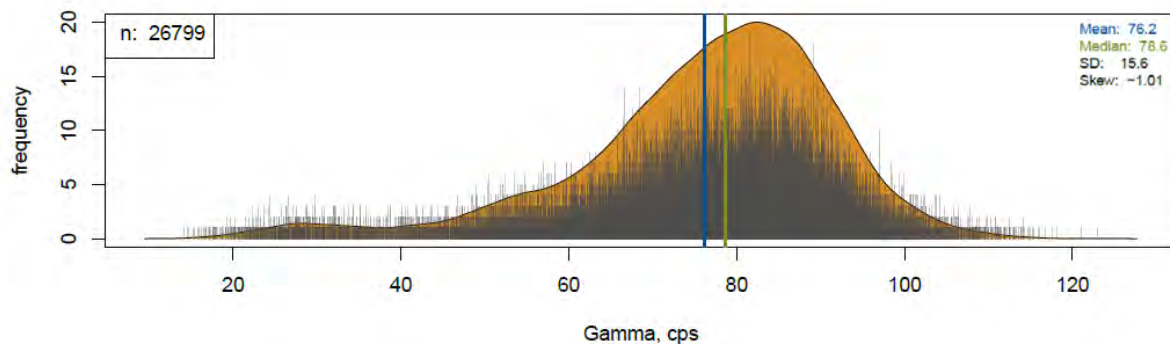


Figure 4 Wilcox-Overburden Histogram

## Site Visits

### First site visit – February 1 and 2, 2018

Three Barr staff conducted a site visit to DHLC in early February. The intent of the site visit was to witness firsthand the conditions in the active pit, present initial findings from our elog review, and discuss steps moving forward. Barr presented initial findings from the preliminary elog assessment with DHLC

personnel. Additionally, Barr staff visited the U Area and Tango West to observe conditions. Photographs taken during the site visit are included in Attachment B. In general, observations included the following:

- The current north end of the U Area was yielding challenging ground-control conditions. Spoil was wet and difficult to stack. Groundwater could be seen seeping from various points of the highwall.
- The southern end of the U area had better ground conditions but groundwater could still be observed in some places.
- The Tango West highwall slope looked very consistent, with minimal variation. The site staff said the pit was giving minimal problems.

Barr collected multiple bulk samples and some core samples DHLC had obtained. The sampling locations are presented on Figure 1 in Appendix A. Barr also reviewed the formatting recommendations for future LAS elog files so that future elogs can more easily be imported into the geologic model.

#### Second site visit 2 – February 14, 2018

Lyll Workman attended a meeting at DHLC on Wednesday February 18. The intent of this meeting was to listen to J.T. Boyd's presentation, delivered by Paul Anderson, regarding their future mine assessment based on elog review. J.T. Boyd stated that some seams at the mine were mislabeled due to offsets that displaced seams. This assessment is based on J.T. Boyd staff review of elogs; DHLC is addressing these findings. Lyll Workman also presented some of Barr's updated gamma maps (Attachment A, Figures 8 through 11). Group discussion revolved around options for adjustment in mining operations. These scenarios are described later in this report. Lyll Workman has submitted a brief document, name "Memorandum of meeting held at DHLC on February 14, 2018," summarizing the outputs of the meeting and action items on February 19, 2018.

## Laboratory Results

The following bulk samples from the spoil side were collected during the site visit on Feb 1, 2018.

- Mid ramp south side (Wilcox-overburden)
- Dragline bench mid ramp (Wilcox-overburden)
- Floor material (Wilcox), north side U area – Blue Seam Floor (Wilcox-Interburden)
- Mid ramp north side (Wilcox-overburden)

Sample locations can be viewed on Figure 1 in Attachment A. The following core materials were taken from a core storage facility

- Con-Core 7: 65-75, top sand; 65-75; 78-85
- Con-Core 1: SI-2, 30-40; 69-77
- OBTW1801: 47-57, upper; 76-86, 109-118



Particle size distribution and Atterberg limit tests were performed on the bulk samples to classify the spoil materials (Table 1).

Table 1 Summary of Laboratory Testing on Samples Taken on February 1, 2018

	Particle Size Distribution (%)				Atterberg Limit (%)		Classification (USCS)
	Gravel	Sand	Silt	Clay	Liquid Limit	Plasticity Index	
Mid ramp south side (Wilcox-overburden)	0.0	55.3	37.5	7.2	-	-	Silty sand (SM)
Dragline bench mid ramp (Wilcox-overburden)	0.3	52.3	39.5	7.9	-	-	Silty sand (SM)
Mid ramp north side (Wilcox-overburden)	0.0	49.3	43.9	6.8	27	2	Sandy silt (ML)
Floor material (Wilcox-interburden)	-	-	-	-	61	44	Fat clay with silt laminations (CH)

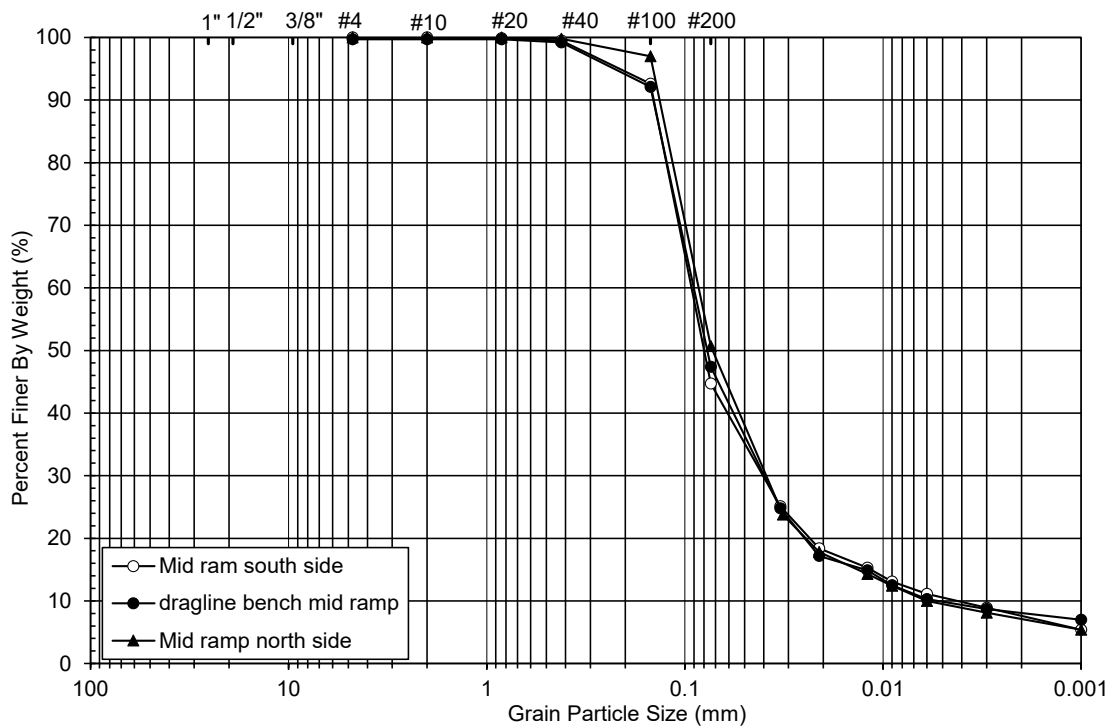


Figure 5 Wilcox Sample Gradations Collected on February 1, 2018

The spoil materials taken from three different locations (Wilcox-overburden) are very similar in gradation as shown in Figure 5, above. Fine contents (silt + clay) are high and vary in a very narrow range between 44.7 and 56.1%. The spoil materials from the Wilcox-overburden is expected to behave as an intermediate material, i.e., cohesive and frictional (clayey and sandy).

A bucket sample, dragline bench mid ramp was selected to run a direct shear test to obtain the shear strength parameters of the spoils. The specimens were reconstituted to a dry density of 105 pcf and as-received moisture content (18.2 %). The dry density of 105 was from the previous proctor test results reported in the *Oxbow Ground Control Plan Revision Report* (draft), June 2016. The normal stresses were determined to consider different spoil pile heights. Laboratory testing results indicate a cohesion of 500 psf and friction angle of 30 degrees from three direct shear test results (Figure 6, below). The strength applied in the previous June 2017 report is a cohesion of 250 psf and an angle of friction of 28 degrees.

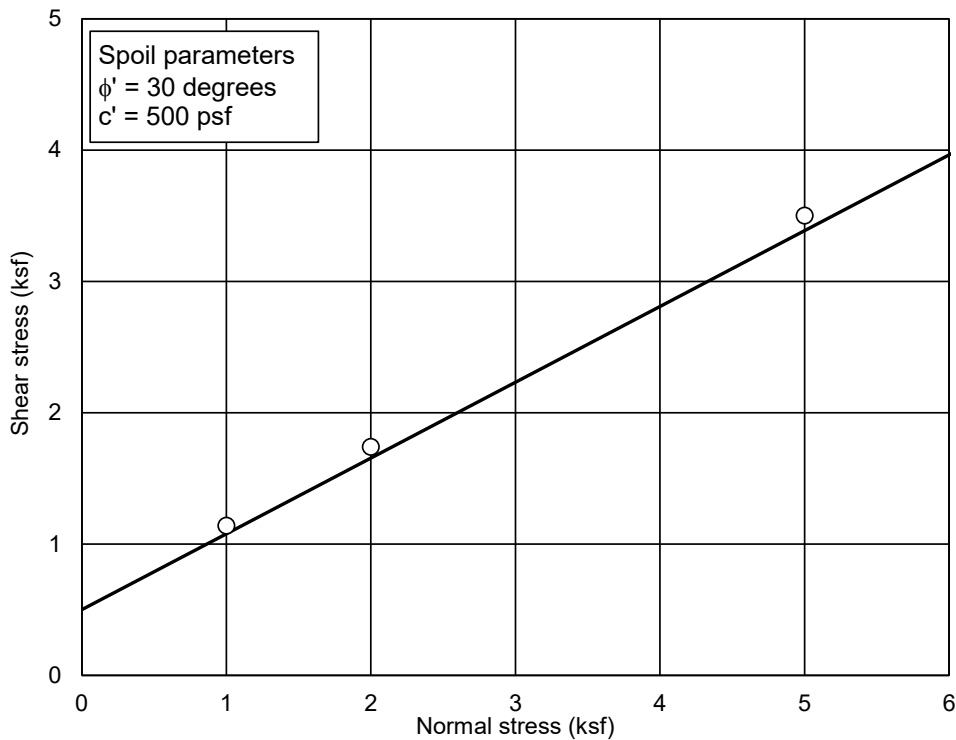


Figure 6 Spoil Strength Based on Laboratory Testing

### Data from Previous Third-Party Studies

The geology study reported by Pastor, Behling & Wheeler, LLC (PBW) indicated significant spatial variabilities in Alluvium and Wilcox layers in the U area. PBW presented numerous cross sections based on the geological drilling, elog profiles, continuous sampling, and laboratory testing. The geological study identified thicker sand layers within the Red River Alluvium toward the northwest direction. Furthermore, Wilcox (typically considered as clayey material) at the U area was reported to consist of silty sand, sandy silt, and silty clay. The geotechnical borings reported by CSC and TetraTech also indicated complex classification within the Wilcox layers. Laminations of sand, silt, and clay are commonly observed in the Wilcox layers reflecting its coastal and marine deposition.

The Oxbow mine dewatering Cell 7 drawings submitted by TetraTech (issued for construction) provided approximate stratigraphy and bottom elevation of the planned slurry wall along the northeast boundary of the U area. It appears that the slurry wall was intended to isolate water flow from Bayou Pierre to the U area, along with dewatering wells. Based on the drawings, the elevations of the bottom of the slurry wall ranged between 40 and 70 feet. Overall, the bottom of the slurry wall elevation is understood to be about 60 feet due to operational limitation on depth and was intended to be toed in the Wilcox group. The bottom of the slurry wall got deeper toward the southeast edge of the slurry wall.

The drawings identified groundwater tables along the planned slurry wall. The groundwater table varied from elevation 80–90 feet around station 0+00 and 14+00 (northwest, starting point) to elevation 100–110 feet around station 50+00 and 70+00. The groundwater tables on the drawings get higher (around elevation 100–110 feet) toward the end point (southeast). Considering the ground surface varies between elevation 115–130 feet, the groundwater tables would be 35 feet or so below ground surface (bgs) at the northwest corner and 10 feet or so bgs around the southeast corner of the U area. The slurry wall drawings, however, did not discern the sandy or clayey Wilcox that was identified in the geological cross sections (PBW). For example, at the C7-14-15 location, the slurry wall drawing (sheet 10 of 21, slurry wall plan and profile, Sta. 30+00-Sta. 40+00) shows that the bottom of the slurry wall lies at 62.4 feet bgs (i.e., at the top of the silty sand [SM] Wilcox layer). The water head between the inside and outside of the slurry wall could be substantial, forcing water to seep through the Wilcox layer that is sand, not clay. The sandy Wilcox layers that exist sporadically over the site could be conduits of groundwater flow if the slurry wall bottom is not deep enough. It is important to note that we have not seen as-built drawings of the slurry wall, so there could have been adjustments made during construction which are not indicated in the design drawings Barr reviewed. Notes on the design drawings for the slurry wall indicate the intent to tag and tie into the Wilcox. The depth to Wilcox varies and Attachment A - Figure 2 indicates depths ranging from 40 to 70 feet from the pre-mining topography to the bottom of the alluvium.

Dewatering wells in-front of the highwall side and pump operations at the site could lower the groundwater elevation to a certain degree. The slurry wall was designed and constructed to isolate the mining pits from the seeping groundwater from the nearby Bayou Pierre. When the bottom of the slurry wall is within the sandy Wilcox, the water from Bayou Pierre may seep through the sandy Wilcox layer making pit operation difficult.

## Conclusions

There are three major questions posed to better understand the future mineability in the U area (and other areas at Dolet Hills) these questions include:

1. Why are operations currently experiencing problems?
2. How much influence does material variability and groundwater play on current spoil and highwall behaviors?
3. What ground conditions can be expected in the future such that operations decisions can be made on what to do with the draglines to position for long-term success.

### Question 1: Reasons for Current Problems

Current mine operations are located in zones corresponding to sandier Wilcox. This claim is based on the analysis of the elogs along with the gradations taken and discussed above. A sandier material is not in and of itself more likely to be unstable; however, a saturated sandy Wilcox with relatively less clay or silt binder can more easily flow and erode when exposed to a gradient flow of groundwater. A gradient is present when groundwater is flowing through a unit. The higher the total head difference, the higher the hydraulic gradient and the more susceptible the sandy Wilcox material will be to erosion. Additionally, disturbed saturated sandy Wilcox, when placed on the spoil side, may hold a shallower angle. This situation appears to play out in the current spoil side slopes. The shallow angles observed are likely an indication of saturated or near-saturated material. More stable spoil material behavior has been seen in Tango West and in the southern end of the U area. Figure 5 of Attachment A shows the average gamma values associated with the Wilcox. Figure 11 of Attachment A shows the thickness of material within the Wilcox, which has continuous measurements of a gamma of 75 CPS or higher for thicknesses greater than 5 feet. When these maps are reviewed together it can be seen that thick, continuous layers of a clay-dominant Wilcox layer are not prevalent in the current U area and that materials have significantly less thickness than observed in the Tango West area. The thicker the high clay content material (gamma greater than 75 CPS) the better availability of material to use in building benches and buckwalls.

Tango West provides a good reference for comparison because operations have remained steady since recovery of the May 2017 slide. On Figure 5 of Attachment A, the Tango West Area (northern-most part of the map) shows average gamma values above 80 cps (generally). Additionally, the thickness of material with a gamma value of greater than 80 cps is generally 20–35 feet in Tango West. When this reference case is compared to the current U area (areas near the green samples triangles) the average gamma values are slightly lower but the availability of a thick layer of usable Wilcox with a gamma value greater than 70, 75, or 80 is relatively thinner (currently 10–15) and thinning to 0–10 feet in the middle of the 2018 mine block. The thickness of the clay layers within the Wilcox increases to 20 feet or more once operations approach the transition from the 2018 to the 2019 mine blocks as shown on Figure 11 of Attachment A.

The elog data indicate that the sand/clay layer interbedding in the U area may be more prevalent relative to Tango West which results in a lower overall average gamma and a significant reduction in continuous clay-dominant material.

In addition to the variability of Wilcox material there is thick alluvium and thin Wilcox in the current operations location within the U area. Attachment A - Figure 3 shows the thickness of the alluvium and Attachment A - Figure 4 shows the thickness of the Wilcox. There is a thickening of the alluvium in the middle of the 2018 mine block, on the west side of the 2020 and 2021 blocks, and through the western 2024, 2025, and 2026, and 2027 blocks. These areas correspond to Wilcox thicknesses which drop to between 10 to 20 feet. This means that the alluvium material will be the dominant material in these areas and not the Wilcox. It also means groundwater will flow more freely through the native layers, and if dewatering wells and/or a cutoff wall are not performing a continued flow and, therefore, gradient will exist on the highwall and possibly the spoil side. Attachment A - Figure 2 indicates that the thickness from the pre-mining surface to the bottom of the alluvium ranges from 60 to 100 feet in future mine areas. Alluvium is typically sandy and will continue to transmit water if the far-field groundwater table is higher than the mining operations. This leads to the second question about the importance of understanding the role and impact of groundwater.

Question 2: Role of Groundwater on Current Operations

Groundwater flow through sandy material can erode that material on the highwall side or on the spoil side. The geology in the U area has enough material variability and sand-dominant materials that flows may transmit through these layers, which can lead to highwall and spoil site operation issues. It is critical to understand the groundwater table elevation. A sense of the groundwater table can be obtained through total head measurements taken at individual piezometers. Existing piezometer data provided by DHLC for piezometers #1, #4, and #5 indicate that the total head between December 2016 and February 2018 ranges between 118 and 77 feet. A plot of this data is shown in Figure 7, below. The data shows that, in general, the total heads have decreased with time. This is often the case when a box cut is created as the pit serves as a local hydraulic sink for groundwater. If a dewatering system is operating, the goal is to draw down the groundwater table in advance of the pit. This trend is demonstrated in piezometer 5 (PZ 5). PZ 1 is located just downstream of the cutoff wall and the total head measured at this piezometer has had an upward trend since approximately October 2017. Reasons for an upward trend may be surficial infiltration associated with high precipitation in the summer and fall of 2017 or subsurface seepage through the sand layers from outside the mine area and into the spoil.

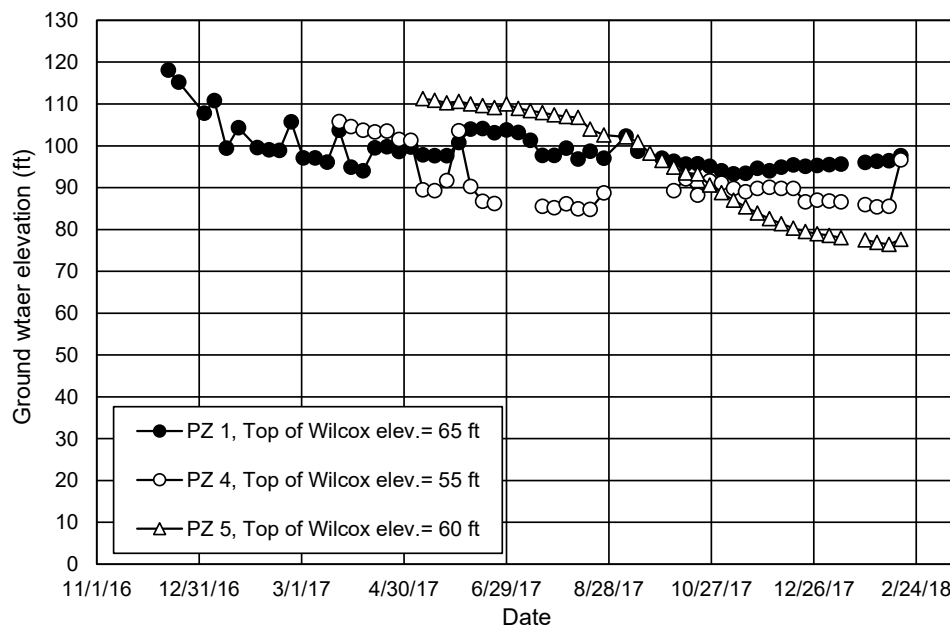


Figure 7 Water Level History as Measured by DHLC at Piezometers 1, 4, and 5

A cutoff wall was constructed along the U Area parallel to the bayou as shown on Figure 1 of Attachment A. If there is sandy material below the cutoff wall that transmits water it may be contributing to additional water buildup within the spoil material. Additional piezometer data is necessary to confirm this scenario.

Question 3: Future Expectations

The mineability review confirms the presence of variable ground conditions and calls attention to the need to understand the groundwater conditions to guide future decisions about mining and set expectations that can be controlled and met. Within the U Area the following can be said regarding the future mining conditions:

- The elog analysis contains all of the data available as digital .las which extends to the 2020 and 2021 mine block, as shown on Figures 5 through 11 of Attachment A. Additional incorporation of elog data would provide better long-term review of the expected conditions.
- Groundwater data is limited. Recent data obtained from the site indicate total head elevations between 77 and 98 feet (February 15, 2018, readings). Data indicates that the water level within the spoil may be higher than anticipated. This condition impacts stability of the spoil and highwall side of the pit.
- Groundwater on the highwall side is important to understand and confirm if dewatering wells are reaching target drawdown levels ahead of operations.
- The future mine areas indicate the presence of thick alluvium layers; particularly in the middle of the 2018 block there is a trough of thick alluvium coupled with very thin Wilcox. When the Wilcox is present there is not a lot of continuous clay-dominant material. From the data review it appears that the Wilcox gains more clay component near the 2019–2020 block boundary, as shown on Figure 11 of Attachment A. Groundwater conditions in this vicinity are not known at the time of this report. Alluvium is generally a sandier material which can be conducive to dewatering. It is critical to understand the groundwater ahead of operations so proper water control techniques can be applied.
- Data from Tango West indicate the material has a higher clay content and thicker continuous clay-dominant Wilcox material; this may be a reason for the consistent performance observed in that pit.

There remains some level of uncertainty about the best option to recommend for near-future operations. Below is a summary of possible mine scenarios discussed at the February 14 onsite meeting

## Dolet Hills Mining—Oxbow Mineability Scenarios

In considering the water conditions and analysis of many elogs of borings in the block, examined by both Barr and John T. Boyd & Company, the following five scenarios for future mining have been identified.

### Scenario 1: Continue to operate in the area of current mining but with the intent to have both machines operating and to do so safely

This is the base case. It will likely necessitate a conservative slope stability design and aggressive dewatering, possibly with pumps more closely spaced than would normally be required. In addition to the pumping, digging a trench farther south with a dragline and installing pumps in the trench to cut off the water could be considered. More prestripping with other equipment will likely also be required. Production rates in this configuration might not improve for a number of months given that the dewatering efforts may take time to implement and see results. Also, there will be inefficiencies while re-establishing regular pits from the current configurations. The result of this scenario could be increased

production but also significantly increased cost. The issues associated with bearing capacity for the machines are tied to the ability to control water and will likely take time to resolve.

**Scenario 2: Keep one dragline in the current area, mining as described in option 1, and move one machine farther south to areas considered better for mining**

The machine would be moved south to approximately section line 10 or 11 as drawn by Boyd. This is an area where we have mapped a greater amount of Wilcox formation with higher gamma.

This cannot happen immediately, however. The situation will not improve much unless adequate dewatering is done before moving the machine south. Therefore, it is important to determine the time required to sufficiently dewater the area. Vibrating wire piezometers should be used to monitor drawdown and confirm that target levels have been achieved. The dragline should not move until an acceptable water condition has been achieved. Thus, in this scenario, the situation will not improve a great deal until the area to the south has been dewatered. Additional geotechnical work should also be completed to avoid any surprises when the machine is moved to the area.

**Scenario 3: Keep one dragline operating in the current area mining as described in option 1; move one of the machines to Tango West**

Better mining conditions have been experienced in Tango West and this correlates with more clayey Wilcox and less of the sandy Wilcox in the U area. Moving one of the large draglines to Tango West may be the quickest way to increase coal shipments, but incurs the additional cost of moving the machine. This would provide 1½ to 2 years of mining; more, if the Tango West area is extended into additional reserves. During the time a machine is in Tango West, dewatering and preparation activities in the U area could be conducted to improve mineability when the dragline moves back.

**Scenario 4: Move both machines to Tango West, extend the mining block, and come back to the U area at a later time**

This could allow mining until about 2026. More information must be developed for Tango West before moving machines to insure there are not unknowns detrimental to success. This includes a study of geology, water, and slope stability requirements. Assuming there are no problems, this scenario may allow the most coal to be produced in the short-term, but has the added cost of moving two machines and may cause problems with future mine planning.

**Scenario 5: Boxcut along the east side of the U area from north to south and advance to the west**

This scenario could allow more time to dewater and prepare the increasingly difficult area to the west. However, the difficult mining conditions, in terms of Wilcox geology, will soon extend all the way to the east, albeit in a narrower band. Also, dewatering in the boxcut area should be conducted first. In addition, there may be issues around permitting and where the boxcut spoil can be placed.

It appears that the best options are either number 2 or number 3. In fact, the best option may be a combination of these. This would have one 1570-W moved to Tango-West. The other machine would stay in Oxbow and be moved south as soon as sufficient dewatering has been accomplished. This option will

allow more coal to be released sooner, due to a dragline being moved to Tango, and the second machine will increase production as soon as the area near section line 11 (Boyd) is ready for mining

## Recommendations

The reasons for the challenges encountered is likely due to a combination of variable material conditions (sandier Wilcox material than expected) and groundwater influences. The observed results of these conditions is a spoil which stacks at a shallow angle, seepage wet conditions on the highwall, and challenging operational conditions (weak dragline benches and issues stacking spoil).

It is understood that DHLC desires to get a clear set of triggers to monitor such that a more robust understanding of the future success of mining in the U area pit can be obtained and a basis for making decisions can be established. It is anticipated that the mine will progress with two types of operations in the U area: a short-term conservative system which is most closely described by Scenario 1 in the previous section and a long-term steady-state system which may be described by Scenarios 2 through 5 or some combination of these. The following recommendations are presented for consideration to achieve better understanding of the ground conditions and, therefore, mineability:

- Understanding of groundwater is paramount—install vibrating wire piezometers and map out total head across the U area. The water levels will be used in stability models and to assess possible groundwater flow from outside the U area (when reviewed in parallel with alluvium and Wilcox thickness and gamma maps).
- Augment the review of the gamma maps for the remainder of the U area. It is relatively easy to import additional elog data into the existing Vulcan model such that a better understanding of the Wilcox and alluvium can be developed. This will provide an encompassing look at material behavior, how it can be expected to change, and help define dewatering system needs for future parts of the pit.
- Conduct additional geotechnical drilling and testing for areas beyond the 2022 mine block. The elog maps can be used to target areas for drilling.
- Monitor flows from the existing dewatering wells. It is important to confirm performance of the dewatering wells. Monitoring of flow, coupled with the piezometer data, allows for a better understanding of how the system is performing and if it is meeting design goals.
- Complete short-term evaluation of spoil pile strength based on scan data and back analysis of existing conditions. The mine is likely faced with operating in a conservative mode until a final decision is made on operations. A revised spoil pile analysis based on strength from back analyses along with sensitivity to water is recommended. The result is a plot of spoil heights versus angle for different total heads in the spoil. Until piezometer data is obtained the appropriate total head level to use for planning will need to be discussed and agreed upon.
- Complete the two-seam analysis including groundwater sensitivity. Again, the final groundwater will need to be confirmed with piezometer data; however, in the interim, completion of this work with the sensitivity component will allow an understanding of stability outcomes depending on the groundwater levels.
- Conduct a cost-benefit analysis of dewatering wells and/or cutoff wall expansion. If the combination of groundwater and material conditions make achieving the desired pit geometry



difficult, a modification to the dewatering system and/or an expansion of the cutoff wall may be beneficial to the long-term mine operations. Present conditions which influence the costs of these two water-control measures include: thickness of the sand alluvium, groundwater levels through and adjacent to the U area, transmissivity of the water-bearing units, radius of influence of current wells, time to draw down to target levels, ability for water to back-saturate the soils from surrounding ground outside the U area, dewatering well spacing, lead time necessary for dewatering, and cost of cutoff wall construction to meet target depths.

If you have any questions regarding this report please call Lyall Workman at 701.255.5478, Mike Haggerty at 952.832.2944, or Jeong-Yun Won at 952.842.3653. Thank you for the opportunity to assist DHMC with this work.

Best regards,

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#### Reference

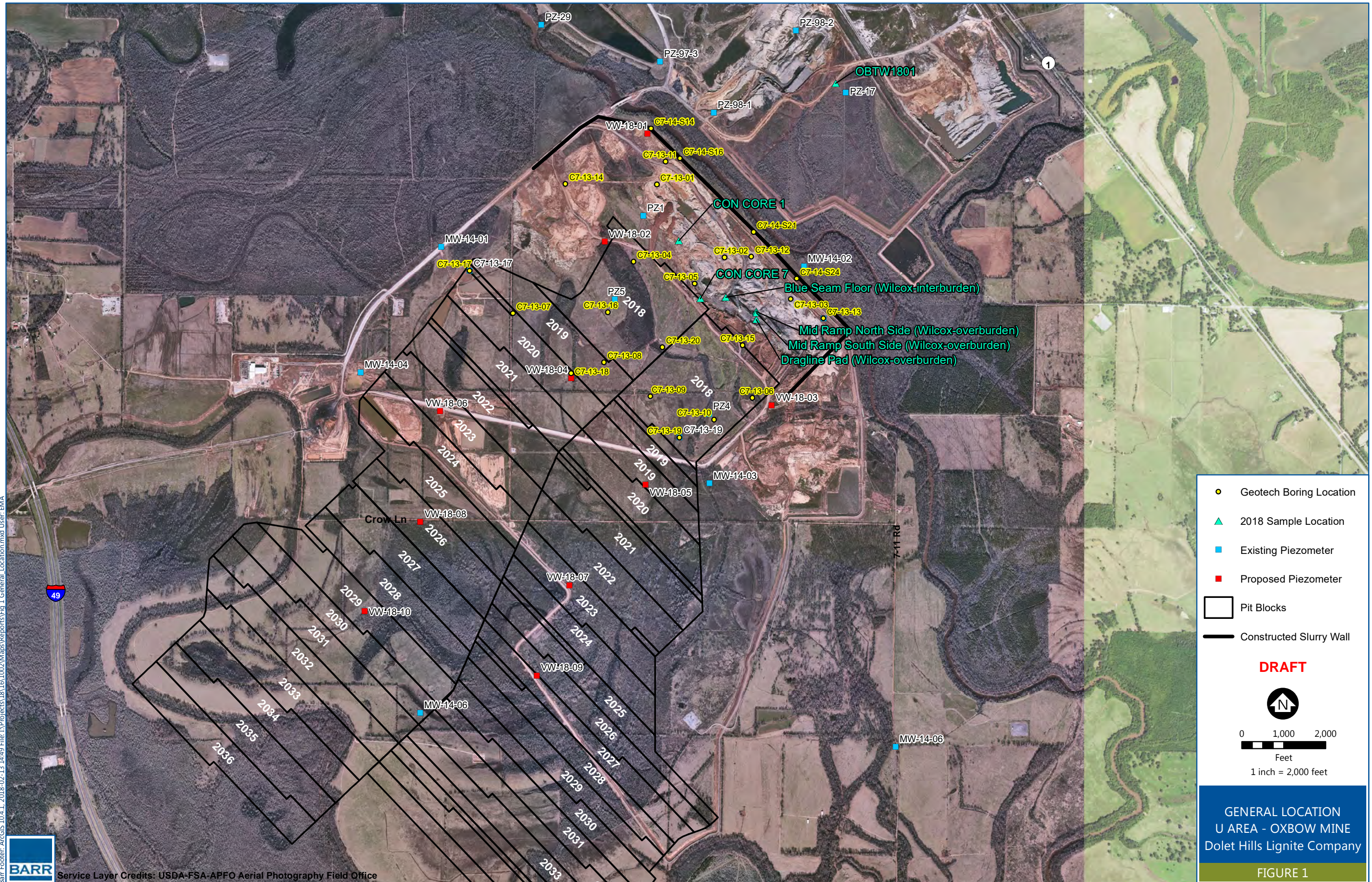
PBW (Pastor, Behling & Wheeler, LLC), Geology, Section 4 in Expansion/Revision Application, February 2016

#### Attachments

- A: Elog figures
- B: Photo log from site visits
- C: Laboratory testing results

Attachment A

Elog Figures



- Geotech Boring Location
- 2018 Sample Location
- Existing Piezometer
- Proposed Piezometer
- Pit Blocks
- Constructed Slurry Wall

**DRAFT**

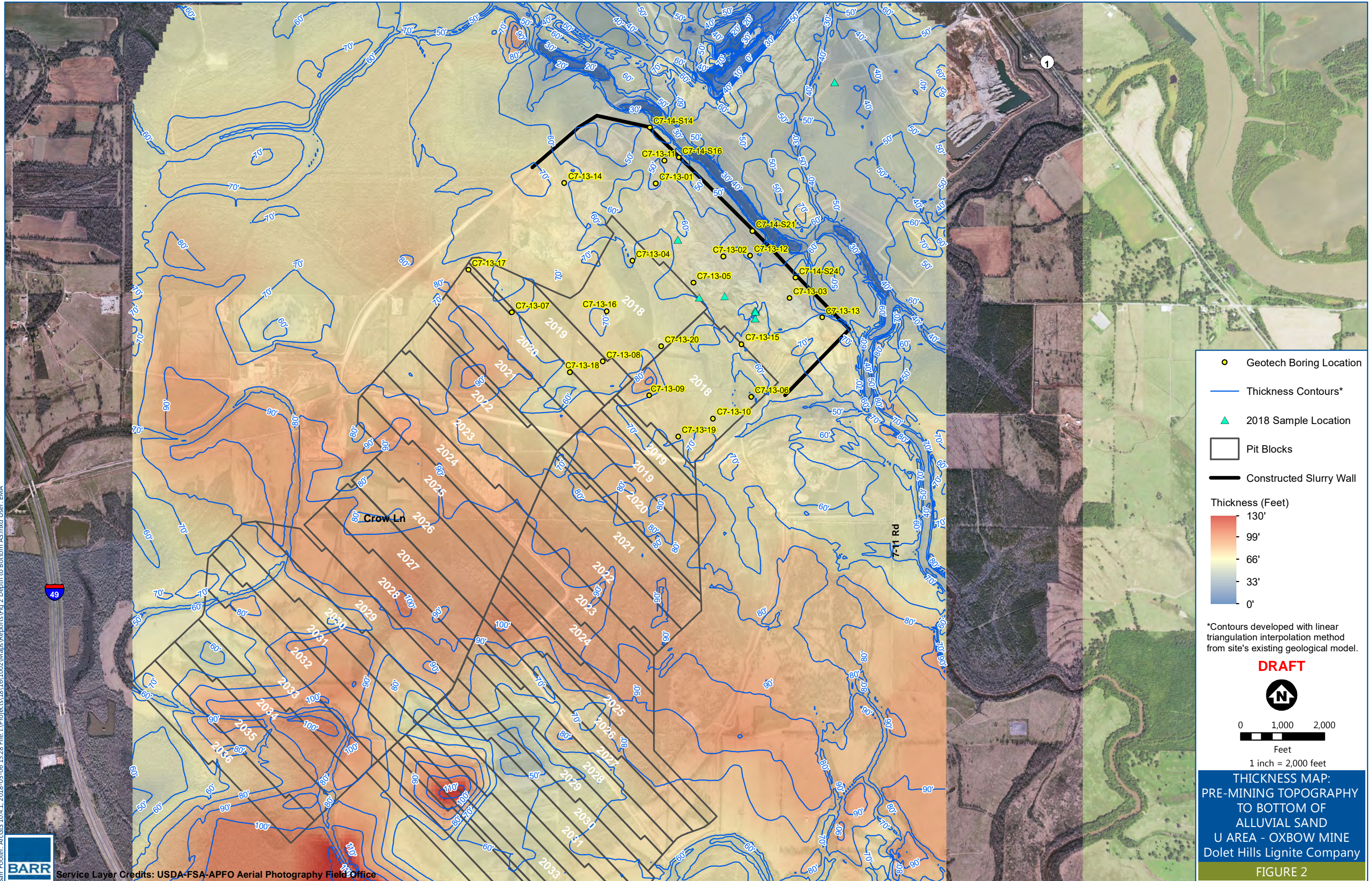
North Arrow

0 1,000 2,000  
Feet  
1 inch = 2,000 feet

**GENERAL LOCATION  
U AREA - OXBOW MINE  
Dolet Hills Lignite Company**

**FIGURE 1**

Barr Footer: ArcGIS 10.4.1, 2018-02-13 14:49 File: \\Projects\18\16\1002\Maps\Reports\Fig 1 General Location.mxd User: EMA



- Geotech Boring Location
- Thickness Contours\*
- ▲ 2018 Sample Location
- Pit Blocks
- Constructed Slurry Wall

Thickness (Feet)

130'

99'

66'

33'

0'

\*Contours developed with linear triangulation interpolation method from site's existing geological model.

**DRAFT**

0 1,000 2,000

Feet

1 inch = 2,000 feet

**THICKNESS MAP:  
PRE-MINING TOPOGRAPHY  
TO BOTTOM OF  
ALLUVIAL SAND  
U AREA - OXBOW MINE  
Dolet Hills Lignite Company**

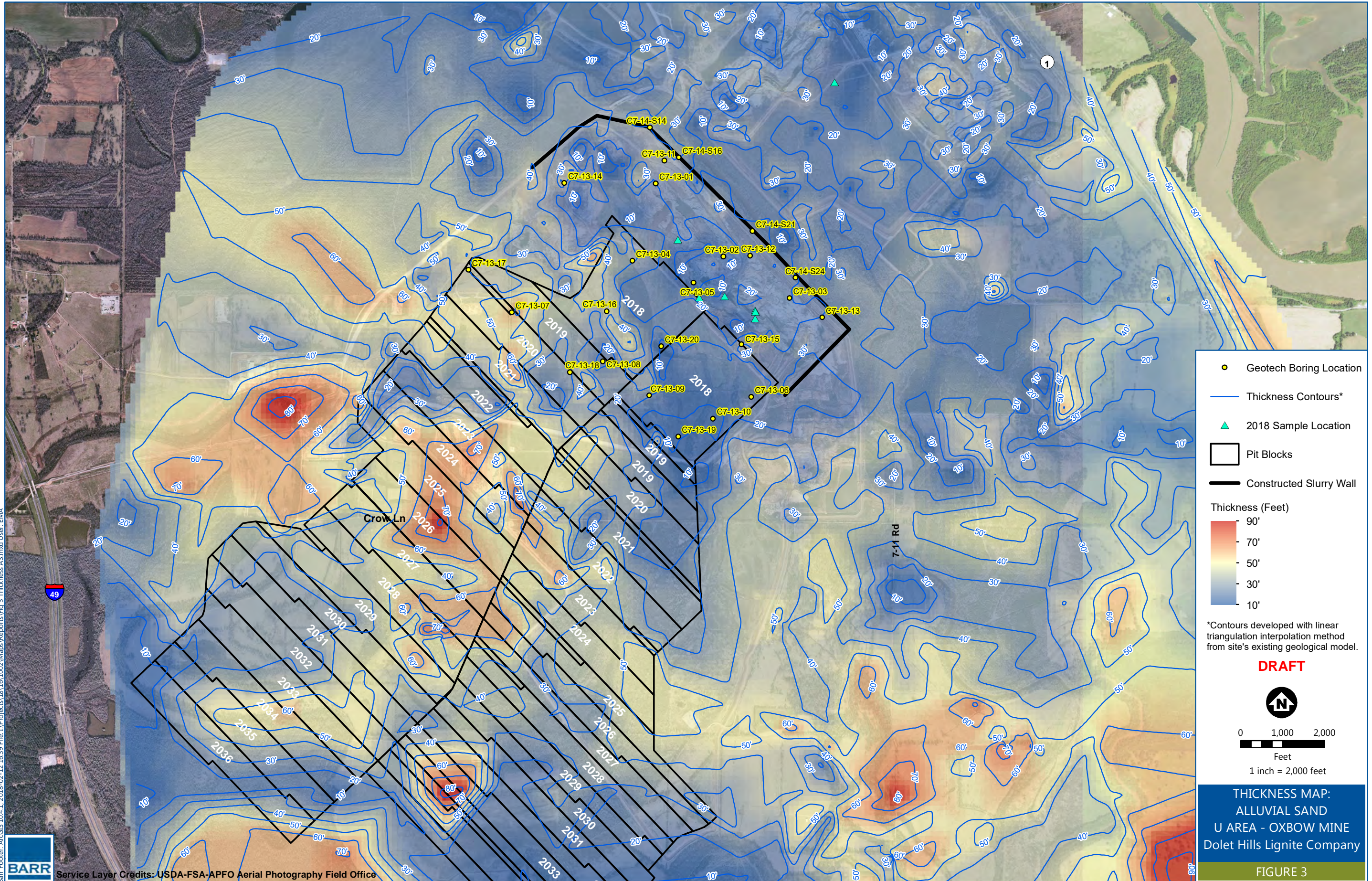
**FIGURE 2**

Barr Footer: ArcGIS 10.4.1, 2018-03-06 15:28 File: I:\Projects\1816\1002\Maps\Reports\Fig 2 Depth to Bottom AS.mxd User: EMA



Service Layer Credits: USDA-FSA-APFO Aerial Photography Field Office

SOAH Docket No. 473-20-4204  
PUC Docket No. 50997  
TIEC's 5th, Q. # TIEC 5-2  
Attachment 1  
Page 21 of 47



- Geotech Boring Location
- Thickness Contours\*
- ▲ 2018 Sample Location
- Pit Blocks
- Constructed Slurry Wall

Thickness (Feet)

90'

70'

50'

30'

10'

\*Contours developed with linear triangulation interpolation method from site's existing geological model.

DRAFT

0 1,000 2,000

Feet

1 inch = 2,000 feet

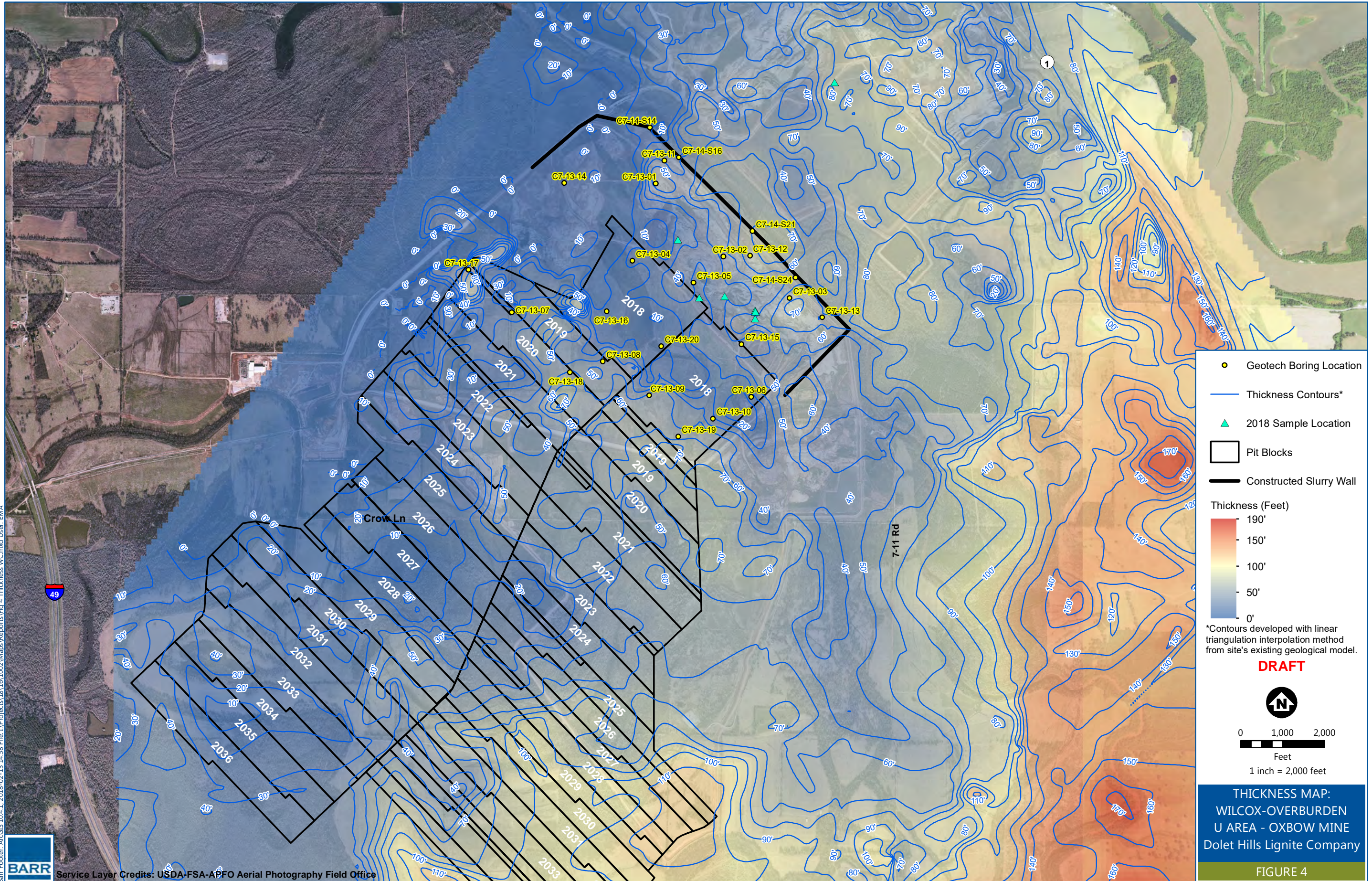
THICKNESS MAP:  
ALLUVIAL SAND  
U AREA - OXBOW MINE  
Dolet Hills Lignite Company

FIGURE 3

Barr Footer: ArcGIS 10.4.1, 2018-02-12 16:39 File: I:\Projects\1816\1002\Maps\Reports\Fig 3 Thickness A.S.mxd User: EMA



Service Layer Credits: USDA-FSA-APFO Aerial Photography Field Office



- Geotech Boring Location
- Thickness Contours\*
- ▲ 2018 Sample Location
- Pit Blocks
- Constructed Slurry Wall

Thickness (Feet)

190'  
150'  
100'  
50'  
0'

\*Contours developed with linear triangulation interpolation method from site's existing geological model.

**DRAFT**

0 1,000 2,000  
Feet  
1 inch = 2,000 feet

THICKNESS MAP:  
WILCOX-OVERBURDEN  
U AREA - OXBOW MINE  
Dolet Hills Lignite Company

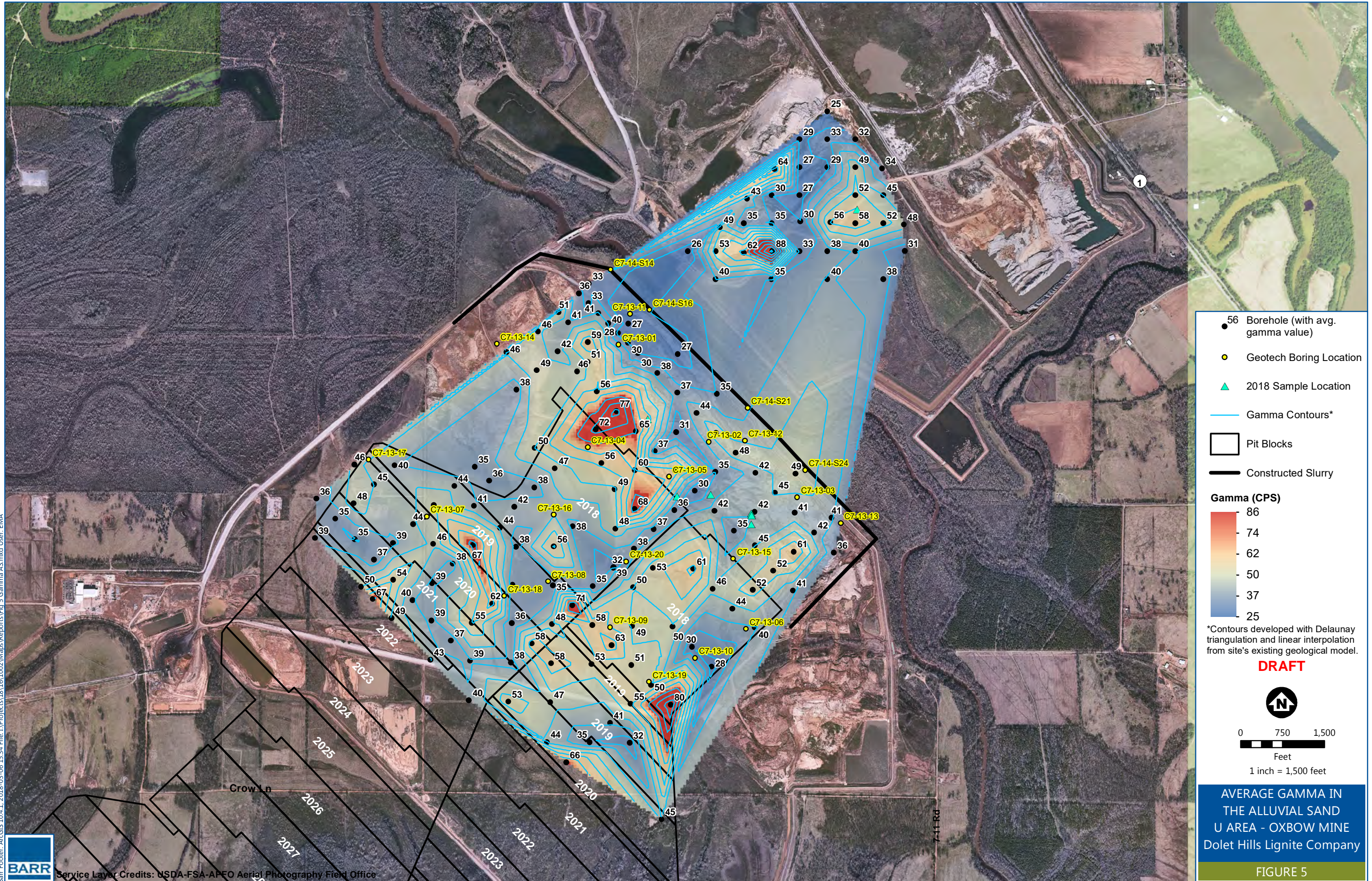
**FIGURE 4**

Barr Footer: ArcGIS 10.4.1, 2018-02-13 14:58 File: I:\Projects\18116\1002\Maps\Reports\Fig 4 Thickness WC.mxd User: EMA



Service Layer Credits: USDA-FSA-APFO Aerial Photography Field Office

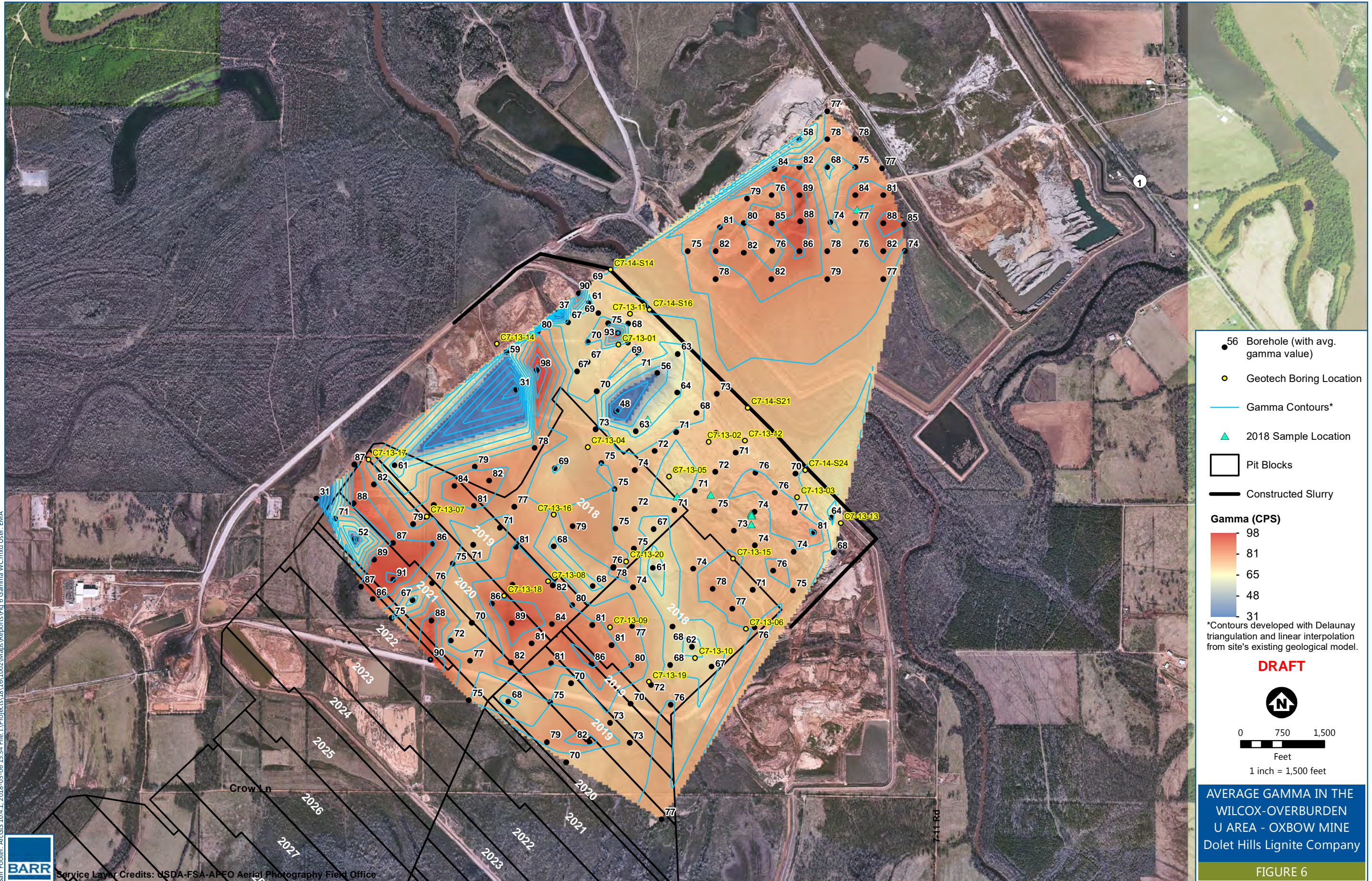
SOAH Docket No. 473-20-4204  
PUC Docket No. 50997  
TIEC's 5th, Q. # TIEC 5-2  
Attachment 1  
Page 23 of 47



Barr Footer: ArcGIS 10.4.1, 2018-03-06 15:34 File: I:\Projects\18116\1002\Maps\Reports\Fig 5 Gamma AS.mxd User: EMA



Service Layer Credits: USDA-FSA-APFO Aerial Photography Field Office



- 56 Borehole (with avg. gamma value)
  - Geotech Boring Location
  - Gamma Contours\*
  - ▲ 2018 Sample Location
  - Pit Blocks
  - Constructed Slurry
- Gamma (CPS)**
- |    |
|----|
| 98 |
| 81 |
| 65 |
| 48 |
| 31 |
- \*Contours developed with Delaunay triangulation and linear interpolation from site's existing geological model.

**DRAFT**

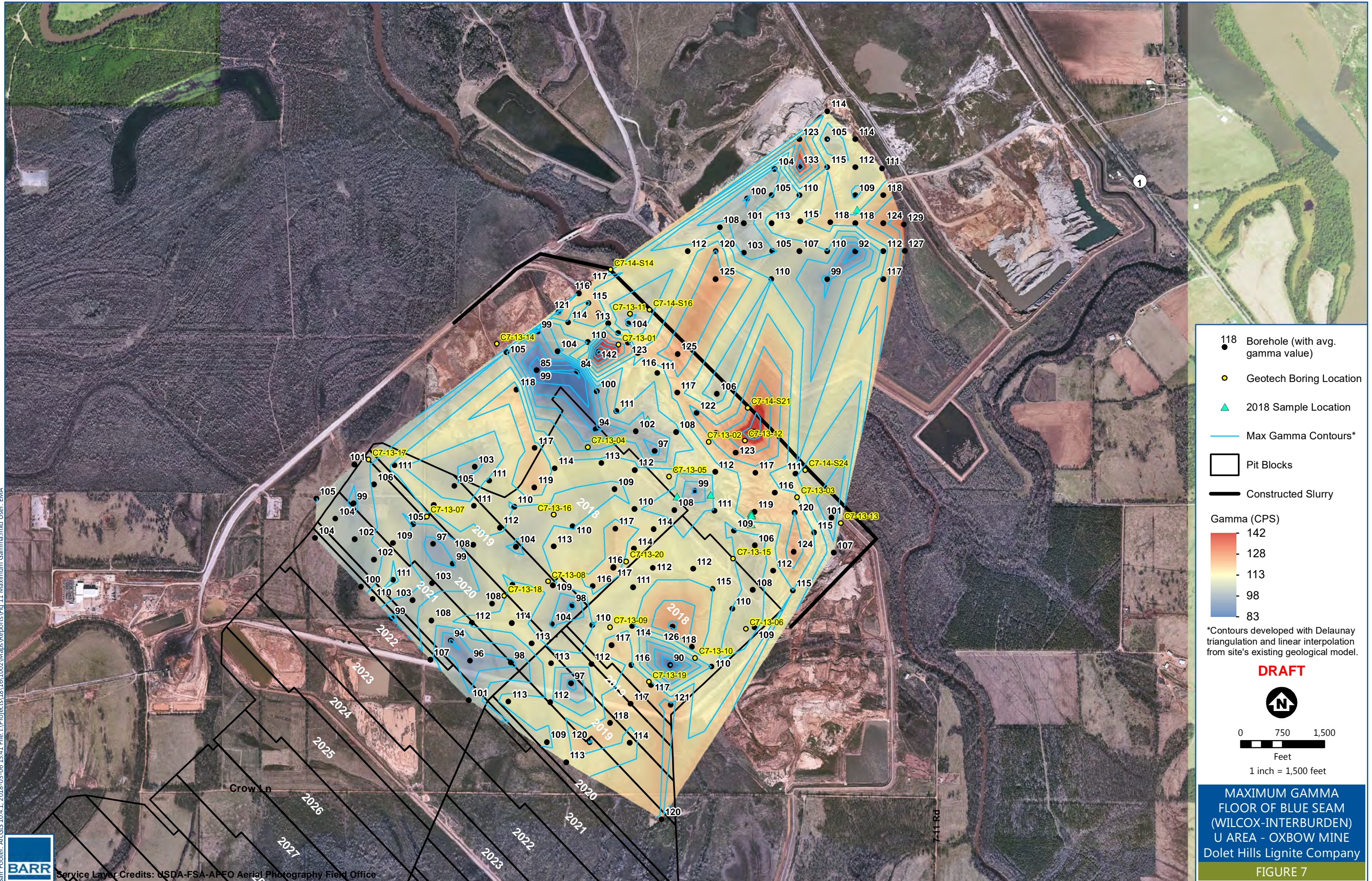
0 750 1,500  
Feet  
1 inch = 1,500 feet

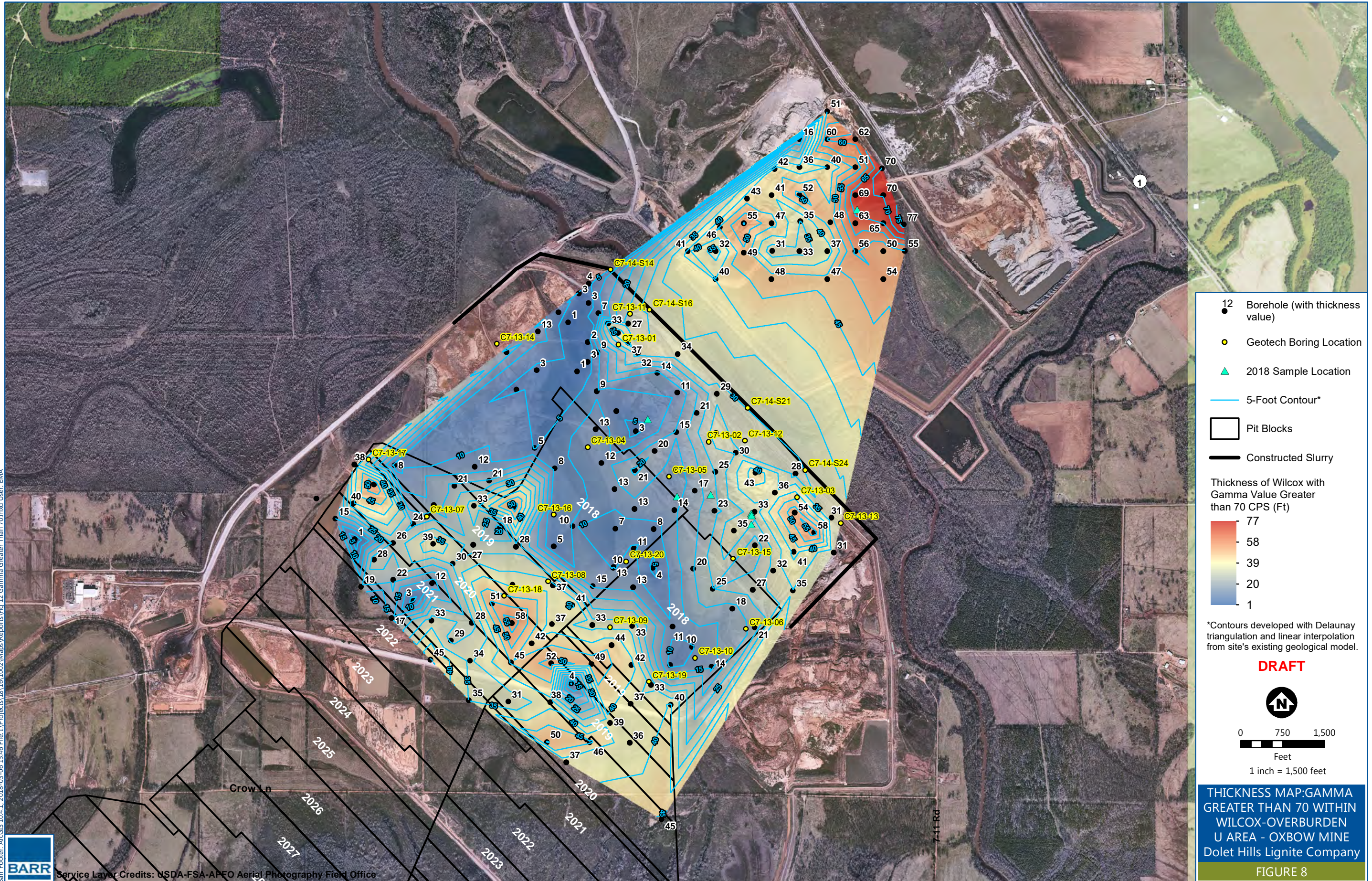
**AVERAGE GAMMA IN THE WILCOX-OVERBURDEN U AREA - OXBOW MINE**  
Dolet Hills Lignite Company

**FIGURE 6**

Barr Footer: ArcGIS 10.4.1, 2018-03-06 15:34 File: I:\Projects\18116\1002\Maps\Reports\Fig 6 Gamma WC.mxd User: EMA







- 12 Borehole (with thickness value)
  - Geotech Boring Location
  - ▲ 2018 Sample Location
  - 5-Foot Contour\*
  - Pit Blocks
  - Constructed Slurry
- Thickness of Wilcox with Gamma Value Greater than 70 CPS (Ft)
- 77
  - 58
  - 39
  - 20
  - 1

\*Contours developed with Delaunay triangulation and linear interpolation from site's existing geological model.

**DRAFT**



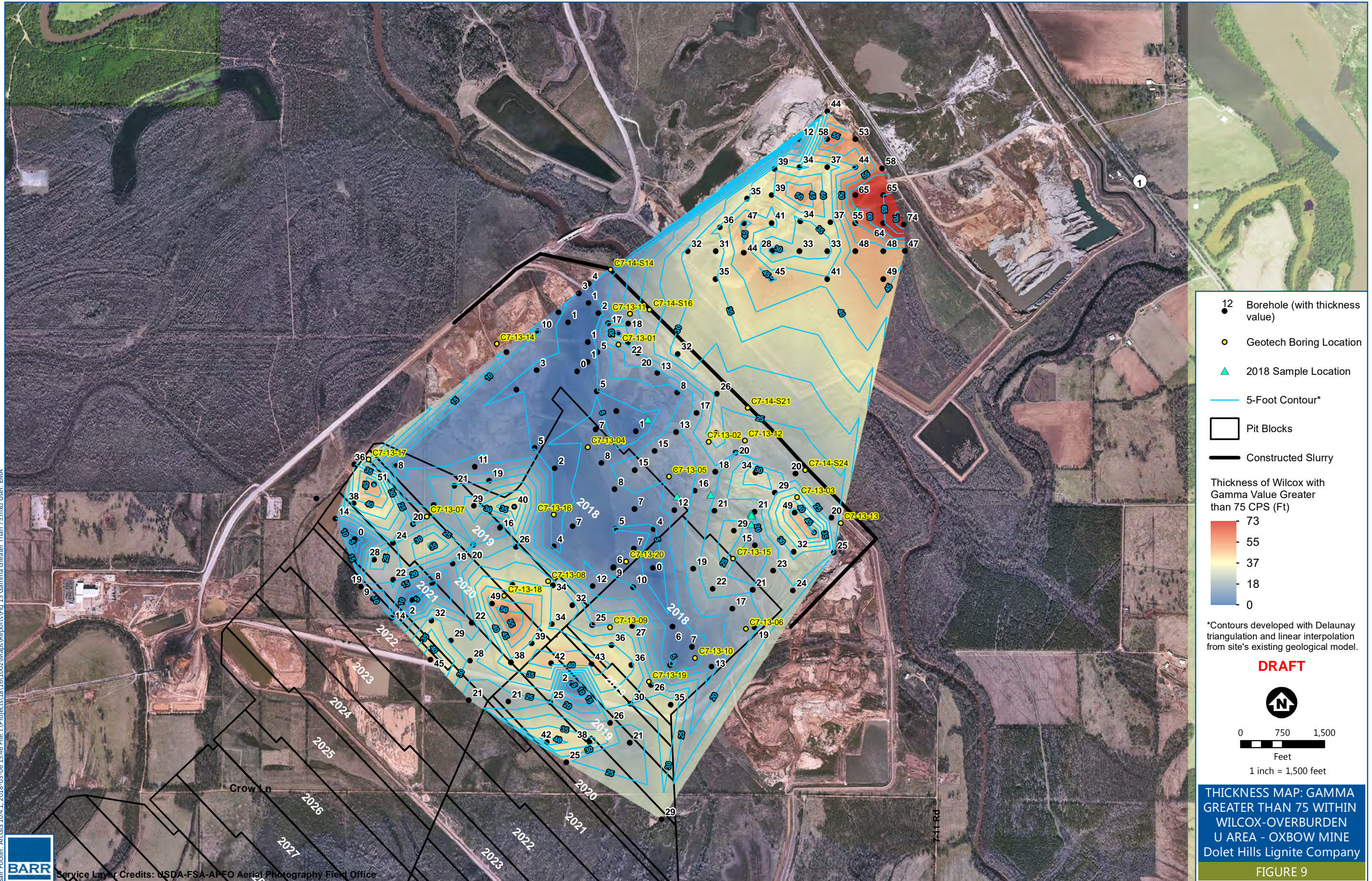
0 750 1,500  
Feet  
1 inch = 1,500 feet

**THICKNESS MAP: GAMMA GREATER THAN 70 WITHIN WILCOX-OVERBURDEN U AREA - OXBOW MINE**  
Dolet Hills Lignite Company  
**FIGURE 8**

Barr Footer: ArcGIS 10.4.1, 2018-03-06 15:46 File: I:\Projects\18116\1002\Maps\Reports\Fig 12 Gamma Greater Than 70.mxd User: EMA



Service Layer Credits: USDA-FSA-APFO Aerial Photography Field Office

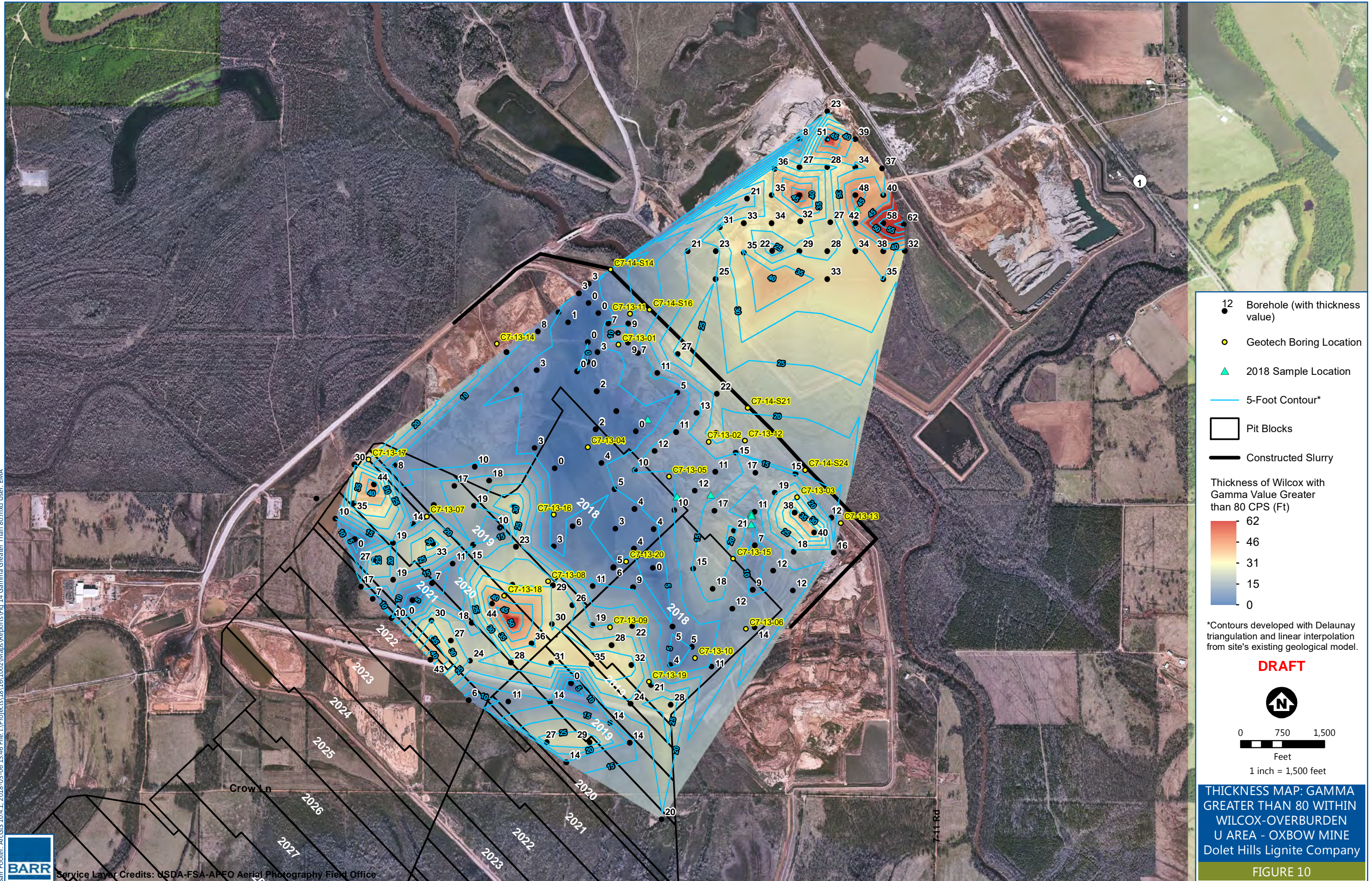


Barr Footer: ArcGIS 10.4.1, 2018-03-06 15:46 File: I:\Projects\18116\1002\Maps\Reports\Fig 13 Gamma Greater Than 75.mxd User: EMA



Service Layer Credits: USDA-FSA-APFO Aerial Photography Field Office

SOAH Docket No. 473-20-4204  
PUC Docket No. 50997  
TIEC's 5th, Q. # TIEC 5-2  
Attachment 1  
Page 28 of 47



- 12 Borehole (with thickness value)
  - Geotech Boring Location
  - ▲ 2018 Sample Location
  - 5-Foot Contour\*
  - Pit Blocks
  - Constructed Slurry
- Thickness of Wilcox with Gamma Value Greater than 80 CPS (Ft)
- 62
  - 46
  - 31
  - 15
  - 0

\*Contours developed with Delaunay triangulation and linear interpolation from site's existing geological model.

**DRAFT**



0 750 1,500  
Feet  
1 inch = 1,500 feet

**THICKNESS MAP: GAMMA GREATER THAN 80 WITHIN WILCOX-OVERBURDEN U AREA - OXBOW MINE Dolet Hills Lignite Company**

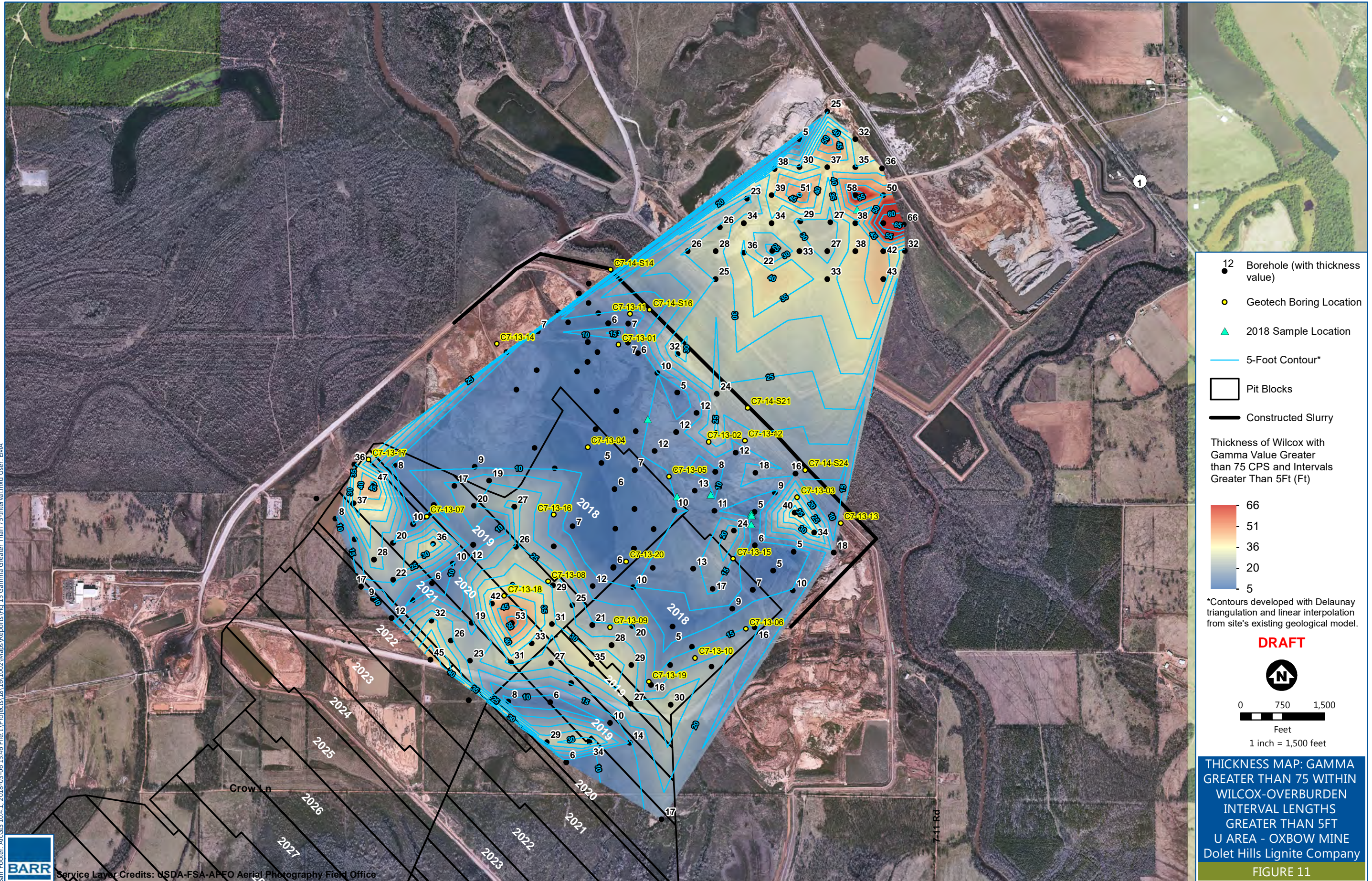
**FIGURE 10**

Barr Footer: ArcGIS 10.4.1, 2018-03-06 15:46 File: I:\Projects\18116\1002\Maps\Reports\Fig 14 Gamma Greater Than 80.mxd User: EMA



Service Layer Credits: USDA-FSA-APFO Aerial Photography Field Office

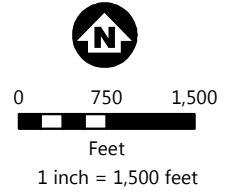
SOAH Docket No. 473-20-4204  
PUC Docket No. 50997  
TIEC's 5th, Q. # TIEC 5-2  
Attachment 1  
Page 29 of 47



- 12 Borehole (with thickness value)
  - Geotech Boring Location
  - ▲ 2018 Sample Location
  - 5-Foot Contour\*
  - Pit Blocks
  - Constructed Slurry
- Thickness of Wilcox with Gamma Value Greater than 75 CPS and Intervals Greater Than 5Ft (Ft)
- |    |
|----|
| 66 |
| 51 |
| 36 |
| 20 |
| 5  |

\*Contours developed with Delaunay triangulation and linear interpolation from site's existing geological model.

**DRAFT**



**THICKNESS MAP: GAMMA GREATER THAN 75 WITHIN WILCOX-OVERBURDEN INTERVAL LENGTHS GREATER THAN 5FT U AREA - OXBOW MINE Dolet Hills Lignite Company**

**FIGURE 11**

Barr Footer: ArcGIS 10.4.1, 2018-03-06 15:46 File: I:\Projects\18161002\Maps\Reports\Fig 15 Gamma Greater Than 75-Interval.mxd User: EMA



Service Layer Credits: USDA-FSA-APFO Aerial Photography Field Office

SOAH Docket No. 473-20-4204  
PUC Docket No. 50997  
TIEC's 5th, Q. # TIEC 5-2  
Attachment 1  
Page 30 of 47

Attachment B

Photo Log from Site Visits

DG-2



Barr Footer: ArcGIS 10.4.1, 2018-03-06 15:47 File: I:\Projects\18\_16\_1002\Maps\Reports\20180201\_Site\_Visit\_Inspection\_Photos\Site\_Visit\_Photo\_Locations.mxd User: jil2



- Photo Indicator
- Photo Location
- ▲ Sample Location
- Pit Blocks

Comment: Saturated spoils area in southern end of U-Area



Image Date: 2/1/2018



**SITE VISIT  
 PHOTO LOCATIONS**  
 Map 1 of 11  
 Oxbow Mine  
 Dolet Hills Lignite Company



Barr Footer: ArcGIS 10.4.1, 2018-03-06 15:47 File: I:\Projects\18\_16\_1002\Maps\Reports\20180201\_Site\_Visit\_Inspection\_Photos\Site\_Visit\_PhotoLocations.mxd User: jil2



- Photo Indicator
- Photo Location
- ▲ Sample Location
- Pit Blocks

Comment: Wilcox-overburden in southern end of U-Area. Groundwater flow/seepage observed from highwall.



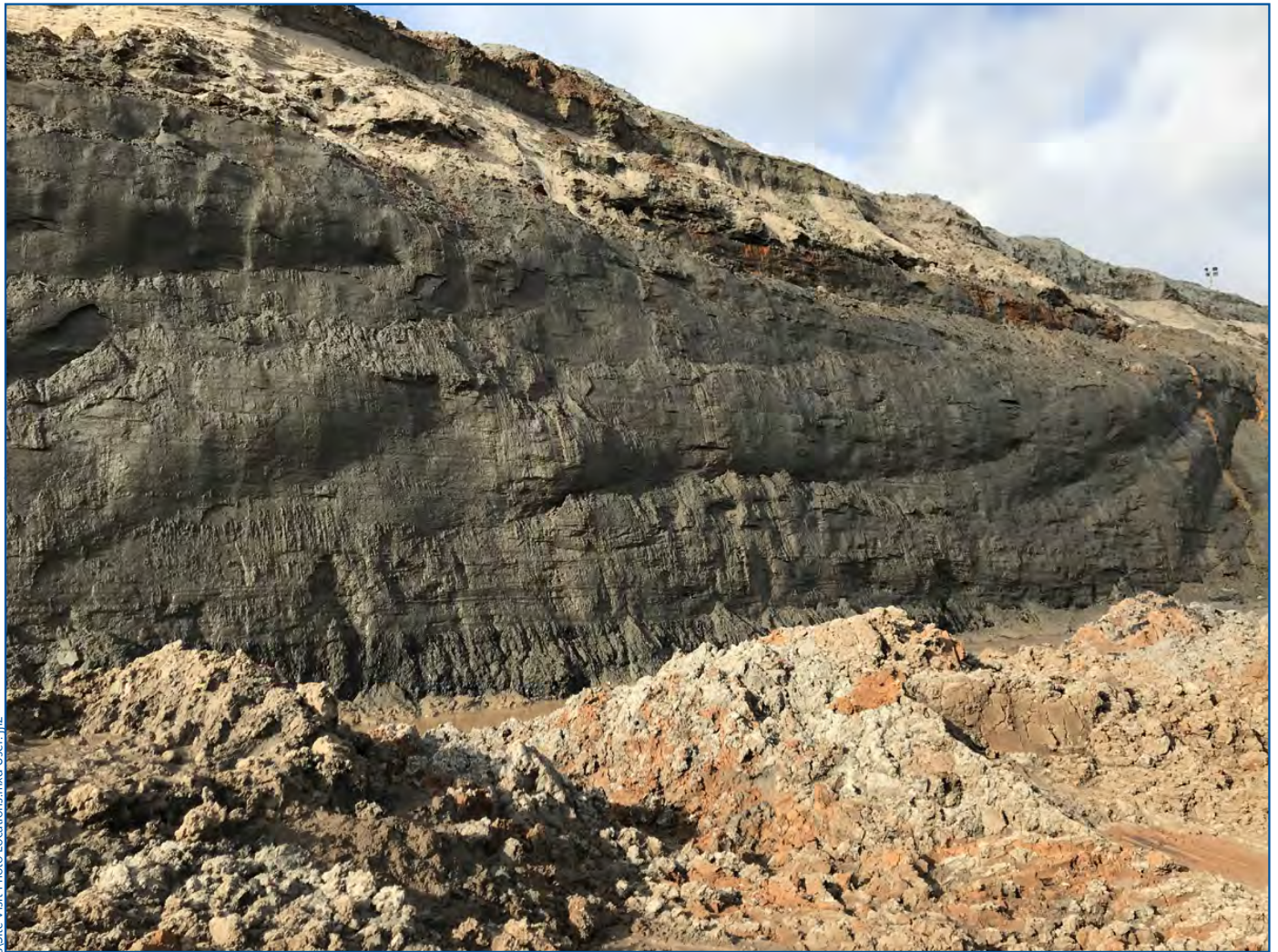
Image Date: 2/1/2018



**SITE VISIT  
 PHOTO LOCATIONS**

Map 2 of 11  
 Oxbow Mine  
 Dolet Hills Lignite Company





Barr Footer: ArcGIS 10.4.1, 2018-03-06 15:47 File: I:\Projects\18\_1\6\_1002\Maps\Reports\20180201\_Site\_Visit\_Inspection\_Photos\Site\_Visit\_PhotoLocations.mxd User: jlj2



- Photo Indicator
- Photo Location
- ▲ Sample Location
- Pit Blocks

Comment: Saturated Wilcox-overburden in southern end of U-Area. Site staff communicated this area has provided the best digging conditions on site to date.

N

Image Date: 2/1/2018

0 750 1,500 Feet

**SITE VISIT**  
**PHOTO LOCATIONS**  
Map 3 of 11  
Oxbow Mine  
Dolet Hills Lignite Company



Barr Footer: ArcGIS 10.4.1, 2018-03-06 15:47 File: I:\Projects\18\_16\_1002\Maps\Reports\20180201\_Site\_Visit\_Inspection\_Photos\Site\_Visit\_PhotoLocations.mxd User: jil2



- Photo Indicator
- Photo Location
- ▲ Sample Location
- Pit Blocks

Comment: Sump location near the current borrow area. Wilcox-interburden material sometimes used for constructing roads.



Image Date: 2/1/2018



**SITE VISIT  
PHOTO LOCATIONS**

Map 4 of 11  
Oxbow Mine  
Dolet Hills Lignite Company

DG-2



Barr Footer: ArcGIS 10.4.1, 2018-03-06 15:47 File: I:\Projects\18\_16\_1002\Maps\Reports\20180201\_Site\_Visit\_Inspection\_Photos\Site\_Visit\_Photo\_Locations.mxd User: jil2



- Photo Indicator
- Photo Location
- ▲ Sample Location
- Pit Blocks

Comment: Mid-ramp view of Wilcox-Interburden overlain by blue seam.



Image Date: 2/1/2018



**SITE VISIT  
PHOTO LOCATIONS**

Map 5 of 11  
Oxbow Mine  
Dolet Hills Lignite Company



Barr Footer: ArcGIS 10.4.1, 2018-03-06 15:47 File: I:\Projects\18\_16\_1002\Maps\Reports\20180201\_Site\_Visit\_Inspection\_Photos\Site\_Visit\_Photo\_Locations.mxd User: jil2



- Photo Indicator
- Photo Location
- ▲ Sample Location
- Pit Blocks

Comment: Mid-ramp facing south with virgin wilcox-overburden along west side of ramp.



Image Date: 2/1/2018



**SITE VISIT  
PHOTO LOCATIONS**

Map 6 of 11  
Oxbow Mine  
Dolet Hills Lignite Company



- Photo Indicator
- Photo Location
- ▲ Sample Location
- Pit Blocks

Comment: Mid-ramp facing south with virgin wilcox-overburden along east side of ramp.



Image Date: 2/1/2018



**SITE VISIT  
 PHOTO LOCATIONS**  
 Map 7 of 11  
 Oxbow Mine  
 Dolet Hills Lignite Company

Barr Footer: ArcGIS 10.4.1, 2018-03-06 15:47 File: I:\Projects\18\_1\6\_1002\Maps\Reports\20180201\_Site\_Visit\_Inspection\_Photos\Site\_Visit\_Photo\_Locations.mxd User: jil2



Barr Footer: ArcGIS 10.4.1, 2018-03-06 15:47 File: I:\Projects\18\_16\_1002\Maps\Reports\20180201\_Site\_Visit\_Inspection\_Photos\Site\_Visit\_Photo\_Locations.mxd User: jilz



- Photo Indicator
- Photo Location
- ▲ Sample Location
- Pit Blocks

Comment: Current operating conditions in Tango West with view of Wilcox-overburden.



Image Date: 2/1/2018



**SITE VISIT  
 PHOTO LOCATIONS**  
 Map 8 of 11  
 Oxbow Mine  
 Dolet Hills Lignite Company



Barr Footer: ArcGIS 10.4.1, 2018-03-06 15:47 File: I:\Projects\18\_16\_1002\Maps\Reports\20180201\_Site\_Visit\_Inspection\_Photos\Site\_Visit\_Photo\_Locations.mxd User: jil2



- Photo Indicator
- Photo Location
- ▲ Sample Location
- Pit Blocks

Comment: Current operating conditions in Tango West with view of Wilcox-overburden.



Image Date: 2/1/2018



**SITE VISIT  
PHOTO LOCATIONS**

Map 9 of 11  
Oxbow Mine  
Dolet Hills Lignite Company



Barr Footer: ArcGIS 10.4.1, 2018-03-06 15:47 File: I:\Projects\18\_1\6\_1002\Maps\Reports\20180201\_Site\_Visit\_Inspection\_Photos\Site\_Visit\_PhotoLocations.mxd User: jlj2



- Photo Indicator
- Photo Location
- ▲ Sample Location
- Pit Blocks

Comment: Current operating conditions in Tango West with view of Wilcox-overburden and Alluvial Sand.



Image Date: 2/1/2018



**SITE VISIT  
 PHOTO LOCATIONS**

Map 10 of 11  
 Oxbow Mine  
 Dolet Hills Lignite Company



DG-2



Barr Footer: ArcGIS 10.4.1, 2018-03-06 15:47 File: I:\Projects\18\_16\_1002\Maps\Reports\20180201\_Site\_Visit\_Inspection\_Photos\Site\_Visit\_PhotoLocations.mxd User: jlj2



- Photo Indicator
- Photo Location
- ▲ Sample Location
- Pit Blocks

Comment: Dragline pad on highwall side in U-area. Scarp observed on spoilside, may be related to overstacking of material.



Image Date: 2/1/2018



**SITE VISIT  
 PHOTO LOCATIONS**  
 Map 11 of 11  
 Oxbow Mine  
 Dolet Hills Lignite Company

Attachment C

Laboratory Testing Results

### Laboratory Test Summary

Project: Dolet Hills Mine - Louisiana Job: 11241  
Client: Barr Engineering Company Date: 2/13/2018

#### Sample Information & Classification

Location:	Mid Ramp South Side	Drag Line Back Mid Ramp	Mid Ramp North Side	Floor Material N Side U Area				
Sample #								
Depth (ft)								
Type or BPF	Bulk	Bulk	Bulk	Bulk				
Material Classification	Silty Sand (SM)	Silty Sand (SM)	Sandy Silt (ML)	Fat Clay w/laminations of silt (CH)				

#### Moisture Contents (ASTM:D2216) & Atterberg Limits (ASTM:D4318)

Moisture Content (%)	27.8	19.1	25.3	20.7				
Liquid Limit			27	61				
Plastic Limit			25	17				
Plasticity Index			2	44				

#### Sample Information & Classification

Location:								
Sample #								
Depth (ft)								
Type or BPF								
Material Classification								

#### Moisture Contents (ASTM:D2216) & Atterberg Limits (ASTM:D4318)

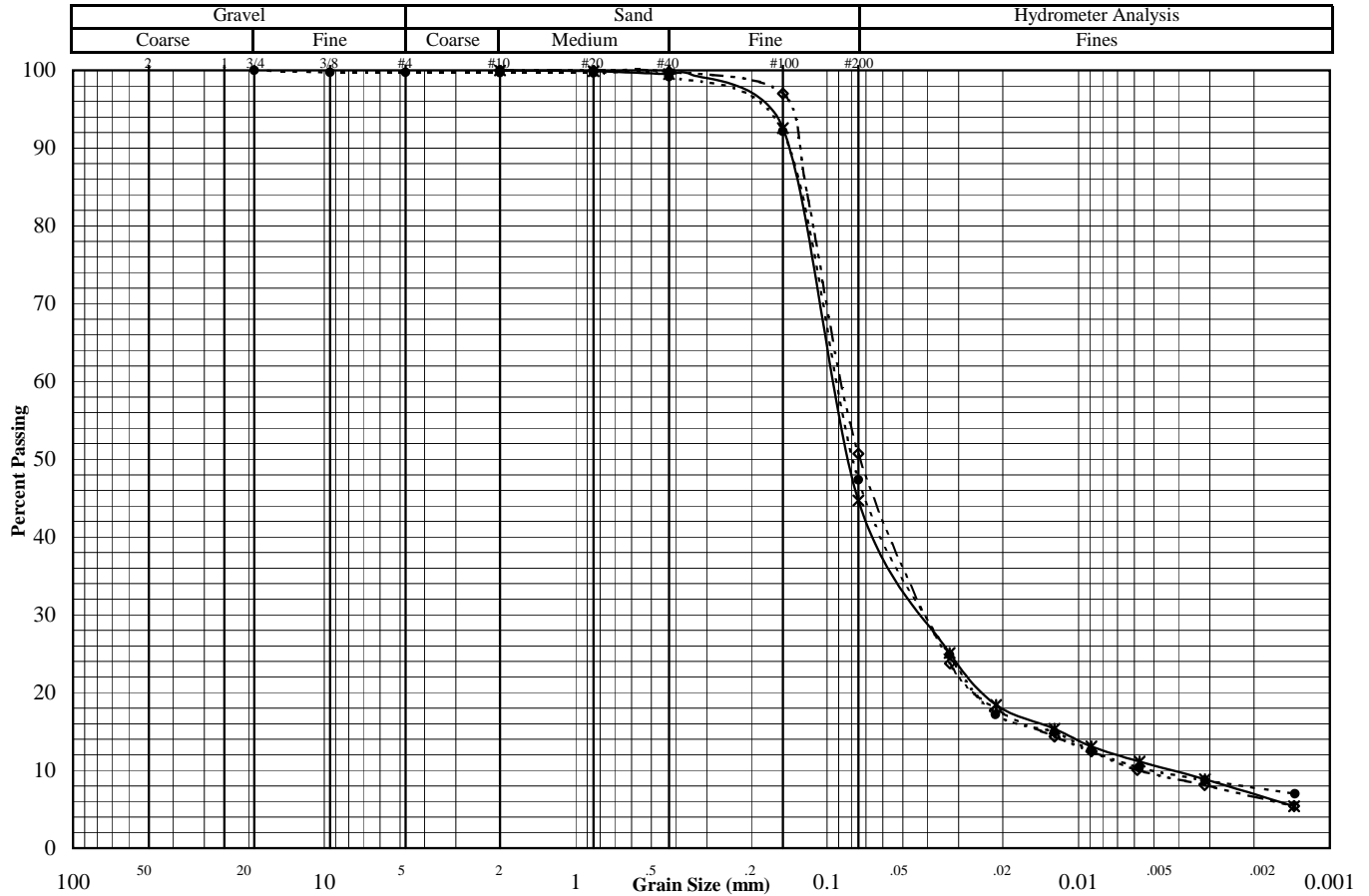
Moisture Content (%)								
Liquid Limit								
Plastic Limit								
Plasticity Index								

## Grain Size Distribution ASTM D422

Job No. : **11241**

Project: Dolet Hills Mine - Louisiana	Test Date: 2/9/18
Reported To: Barr Engineering Company	Report Date: 2/13/18

	Location / Boring No.	Sample No.	Depth (ft)	Sample Type	Soil Classification
*	Mid Ramp South Side			Bulk	Silty Sand (SM)
●	Drag Line Back Mid Ramp			Bulk	Silty Sand (SM)
◇	Mid Ramp North Side			Bulk	Sandy Silt (ML)



	*	●	◇
Liquid Limit			27
Plastic Limit			25
Plasticity Index			2
Water Content	27.8	19.1	25.3
Dry Density (pcf)			
Specific Gravity	2.68*	2.68*	2.68*
Porosity			
Organic Content			
pH			
Shrinkage Limit			
Penetrometer			
Qu (psf)			

(\* = assumed)

	Percent Passing		
	*	●	◇
Mass (g)	4116.2	10248.6	6729.8
2"			
1.5"			
1"			
3/4"		100.0	
3/8"		99.7	
#4		99.7	
#10	100.0	99.7	100.0
#20	99.9	99.7	100.0
#40	99.5	99.2	99.8
#100	92.6	92.1	97.0
#200	44.7	47.4	50.7

	*	●	◇
D <sub>60</sub>	0.09	0.089	0.087
D <sub>30</sub>	0.042	0.04	0.04
D <sub>10</sub>	0.004	0.0058	0.006
C <sub>u</sub>	22.50	15.34	14.50
C <sub>c</sub>	4.90	3.10	3.07

Remarks:

9530 James Ave South



Bloomington, MN 55431

## Grain Size Distribution ASTM D422

Job No. : **11241**

<b>Project:</b>	Dolet Hills Mine - Louisiana	<b>Test Date:</b>	2/9/18
<b>Reported To:</b>	Barr Engineering Company	<b>Report Date:</b>	2/13/18

	Location / Boring No.	Sample No.	Depth (ft)	Sample Type	Soil Classification
Spec 1	Mid Ramp South Side			Bulk	Silty Sand (SM)
Spec 2	Drag Line Back Mid Ramp			Bulk	Silty Sand (SM)
Spec 3	Mid Ramp North Side			Bulk	Sandy Silt (ML)

### Sieve Data

Specimen 1		Specimen 2		Specimen 3	
Sieve	% Passing	Sieve	% Passing	Sieve	% Passing
2"		2"		2"	
1.5"		1.5"		1.5"	
1"		1"		1"	
3/4"		3/4"	100.0	3/4"	
3/8"		3/8"	99.7	3/8"	
#4		#4	99.7	#4	
#10	100.0	#10	99.7	#10	100.0
#20	99.9	#20	99.7	#20	100.0
#40	99.5	#40	99.2	#40	99.8
#100	92.6	#100	92.1	#100	97.0
#200	44.7	#200	47.4	#200	50.7

### Hydrometer Data

Specimen 1		Specimen 2		Specimen 3	
Diameter (mm)	% Passing	Diameter	% Passing	Diameter	% Passing
0.033	25.1	0.033	24.8	0.032	23.8
0.021	18.4	0.021	17.2	0.021	17.8
0.012	15.3	0.012	14.9	0.012	14.3
0.009	13.1	0.009	12.5	0.009	12.4
0.006	11.1	0.006	10.3	0.006	10.0
0.003	8.9	0.003	8.7	0.003	8.1
0.001	5.4	0.001	7.0	0.001	5.4

### Remarks

Specimen 1	Specimen 2	Specimen 3

**Direct Shear Test**  
ASTM: D3080

**Job No.: 11241**

Project/Client: **Dolet Hills Mine / Barr Engineering Company**

Boring No.:

Location: **Drag Line Back Mid Ramp**

Sample Type: **Bulk**

Soil Type: **Silty Sand (SM)**

Test Date: **2/19/2018**

Date Reported: **2/22/2018**

Shear Rate

**0.001** (in/min)

Remarks: Specimens reconstituted given density using -#4 material; Inundated after applying normal load. Consolidated and sheared to given displacements at constant rate of 0.001 inches/minute.

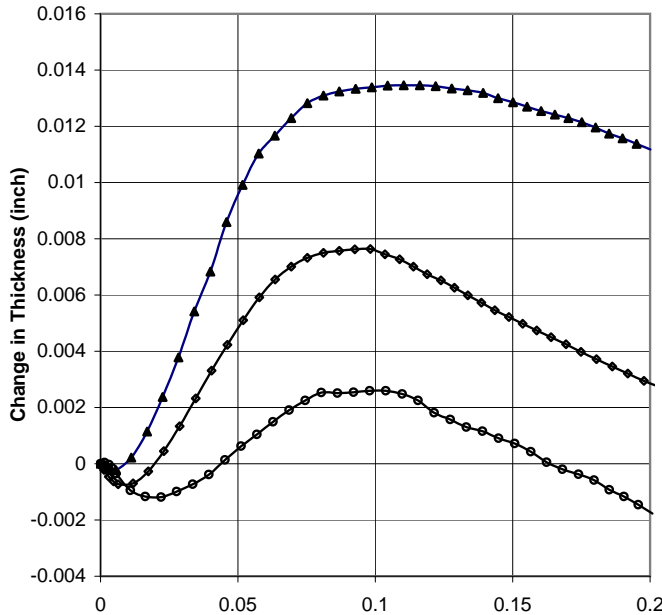
Liquid Limit:

Plastic Limit:

Plasticity Index:

(\*) = Assumed Specific Gravity

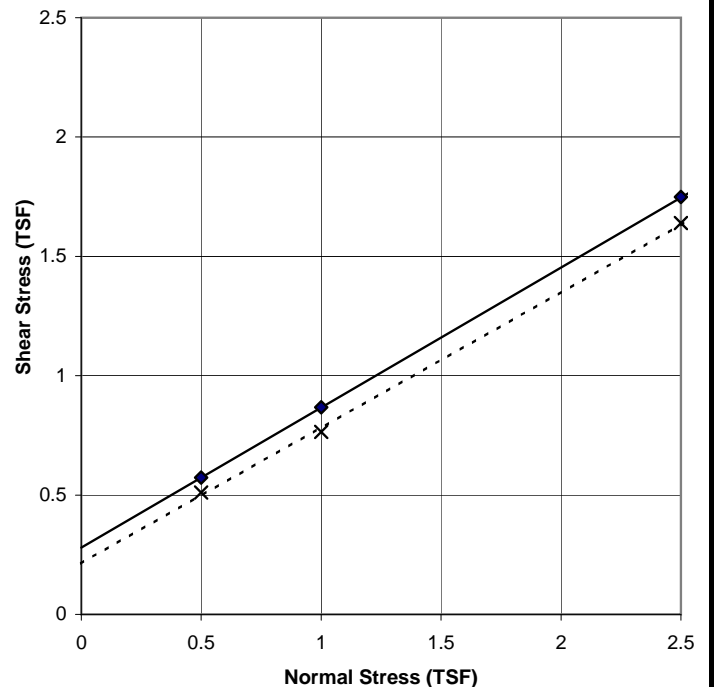
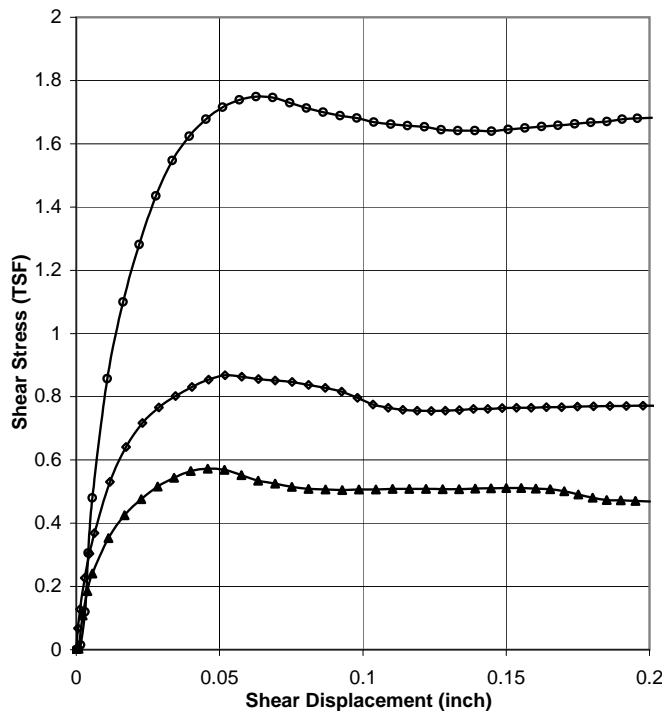
Specific Gravity (\*): **2.67**



Failure Criterion:				
Max Stress	A	B	C	D
Initial	▲	◇	○	X
Diameter (In.)	2.50	2.50	2.50	
Thickness (In.)	0.97	0.97	0.97	
Water Content (%)	18.2	18.2	18.2	
Dry Density (pcf)	105.0	105.0	105.0	
<i>Before Shear</i>				
Thickness (In.)	0.96	0.95	0.94	
Water Content (%)	21.6	21.1	20.7	
Dry Density (pcf)	105.6	106.6	107.4	
<i>After Shear</i>				
Normal Stress	0.50	1.00	2.50	
Shear Stress (Peak)	0.57	0.87	1.75	

"These tests are for informational purposes only and must be reviewed by a qualified professional engineer to verify that the test parameters shown are appropriate for any particular design."

◆ Peak Conditions	x At Given Shear Disp. Of: 0.15
Friction Angle: = <b>30.4 deg.</b>	Friction Angle: = <b>29.6 deg.</b>
Apparent Cohesion: <b>0.279 TSF</b>	Apparent Cohesion: <b>0.213 TSF</b>



**SOAH DOCKET NO. 473-20-4204  
PUC DOCKET NO. 50997**

**SOUTHWESTERN ELECTRIC POWER COMPANY'S RESPONSE  
TO TEXAS INDUSTRIAL ENERGY CONSUMERS'  
FIFTH REQUEST FOR INFORMATION**

**Question No. TIEC 5-3:**

Please explain how the geological anomalies discussed in the Direct Testimony of Dennis J. Meyer changed the estimate of economically recoverable lignite reserves at the Oxbow mine and provide supporting documents.

**Response No. TIEC 5-3:**

Economically recoverable lignite reserves are those which are mineable (recoverable) and those reserves which are used to produce electricity which in turn is marketable (economic). Mineable reserves are those that current technology can be used to safely extract the resource from the ground. According to the analysis completed by Boyd, recoverable reserves of the U area were reduced to approximately 44%. Please see Exhibit 1 of TIEC 3-10 Attachment 1.

Economic lignite reserves are a function of the mining cost and the cost to generate energy with that lignite, and ultimately whether the cost of that generation is competitive in the SPP energy market. If the mining cost is too high, which leads to an uncompetitive energy generation price in the SPP energy market, then the lignite is not economically recoverable.

Please see SWEPCO's response to CARD 2-6 HS Attachments 1 and 2 for the relevant economic analyses.

Prepared By: Dennis J. Meyer

Title: Dir Land & Mineral Development

Sponsored By: Dennis J. Meyer

Title: Dir Land & Mineral Development

**SOAH DOCKET NO. 473-20-4204  
PUC DOCKET NO. 50997**

**SOUTHWESTERN ELECTRIC POWER COMPANY'S RESPONSE TO TEXAS  
INDUSTRIAL ENERGY CONSUMERS' EIGHTH REQUEST FOR INFORMATION**

**Question No. TIEC 8-2:**

For each individual identified in TIEC 8-1, please:

- a. List all factors considered by the individual in deciding whether to cease mining at the Dolet Hills and Oxbow mines.
- b. Provide all documents reviewed or relied upon by the individual in deciding whether to cease mining at the Dolet Hills and Oxbow mines.
- c. Provide all communications sent to or from the individual concerning the Dolet Hills or Oxbow mines.

**Response No. TIEC 8-2:**

- a. The amount of economically recoverable reserves were depleted and the expected costs associated with continued operation of the plant exceeded anticipated market revenues. Additionally, anticipated environmental control costs would have increased operational expenses which would have then further increased the deficit with anticipated market revenues. Consideration of these factors is consistent with the order of the Louisiana Public Service Commission that SWEPCO operate the Dolet Hills plant and mines through at least 2026 contingent on the prudence of such continued operation considering economic, environmental, operational, and other similar factors (LPSC Docket No. U-30975).
- b. Please see TIEC 8-2 Attachment 1. See also the Company's response to CARD 2-6 HS attachments and TIEC 5-4 Attachment 1.
- c. Please refer to the response provided in TIEC 5-5.

Prepared By: Dennis J. Meyer

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**SOAH DOCKET NO. 473-20-4204**  
**PUC DOCKET NO. 50997**  
Direct Testimony of Devi Glick, Exhibit DG-3

**Exhibit DG-3**

**SWEPCO Responses to Requests for Information, Confidential**

<b>Data Request</b>	<b>File Type</b>
SWEPCO response to Sierra Club 1-2, CONFIDENTIAL Attachment d	Excel*
SWEPCO response to Sierra Club 1-2, CONFIDENTIAL Attachment f	Excel*
Sierra Club 1.2g – SWEPCO 1217 CONFIDENTIAL-E.xls	Excel*
Sierra Club 1.2g – SWEPCO 1218 CONFIDENTIAL-E.xls	Excel*
Sierra Club 1.2g – SWEPCO 1219 CONFIDENTIAL-E.xls	Excel*
SWEPCO response to Sierra Club 1-2, CONFIDENTIAL Attachment j	Excel*
SWEPCO response to Sierra Club 1-2, CONFIDENTIAL Attachment l,n,p	Excel*
SWEPCO response to Sierra Club 1-2, CONFIDENTIAL Attachment m,o	Excel*
SWEPCO response to Sierra Club 1-6, CONFIDENTIAL Attachment	Excel*
SWEPCO response to Sierra Club 5-7, CONFIDENTIAL	PDF
SWEPCO response to CARD 4-7, CONFIDENTIAL Attachment 1	PDF

\*CONFIDENTIAL Excel files were submitted via disk to the Commission pursuant to TAC § 22.71(d).

**SOAH DOCKET NO. 473-20-4204**  
**PUC DOCKET NO. 50997**  
Direct Testimony of Devi Glick, Exhibit DG-4

**Exhibit DG-4**

**SWEPCO Responses to Requests for Information, Highly Sensitive**

<b>Data Request</b>	<b>File Type</b>
SWEPCO response to Sierra Club 7-7, HIGHLY SENSITIVE Attachment 2	PDF
SWEPCO response to Sierra Club 7-7, HIGHLY SENSITIVE Attachment 3	PDF
SWEPCO response to Sierra Club 7-7, HIGHLY SENSITIVE Attachment 4	PDF