

**SETTLING DEFENDANTS BMFOU QUARTERLY REPORT
CONSENT DECREE FOR THE
BUTTE MINE FLOODING SITE CD, CV 02-35 Bu-RFC
REMEDIAL ACTION – IMPLEMENTATION OF THE REMEDY
QUARTER 3, 2014

FINAL REPORT**

The Settling Defendants¹ continue to implement the remedial action requirements specified in the Statement of Work to the Consent Decree. This report summarizes those activities conducted during the third quarter of 2014 as required under section **X. Reporting Requirements, Paragraph 31** of the Consent Decree. **The headings (a-g) in the following report correspond to the categories identified in paragraph 31. The sections captioned Issues Encountered and Information about MR Operations have been added at the request of the EPA.**

a) Actions Taken Toward Achieving Compliance with the Consent Decree

To achieve compliance with the Consent Decree, the Settling Defendants conducted remedial action activities under the seven components identified in the Statement of Work for Remedial Design/Remedial Action (“SOW”) which is part of the Consent Decree. These seven components and the remedial action activities undertaken by the Settling Defendants (hereinafter referred to as “SDs”) in the third quarter of this year include:

- 1. Monitoring Program** - The Montana Bureau of Mines and Geology (“MBMG”) conducted all monitoring activities as required by the SOW with the exception of the semi-annual Berkeley Pit water quality sampling program. A rotational slump of the highwall in the southeast sector of the Berkeley Pit occurred on February 8, 2013. This slope failure and the potential of continuing slope instability in the eastern sector of the Berkeley Pit has created a safety issue for persons assigned to sample the Berkeley Pit and other components of the RA. At the request of the Agencies, the SDs are evaluating the necessity for near-term water quality sampling of the Berkeley Pit and potential, safe alternative sampling methods and additional migratory waterfowl mitigation efforts.

¹ The term Settling Defendants as used in this report collectively refers to Atlantic Richfield Company, Montana Resources, Inc., Montana Resources, LLP and Dennis Washington.

To this end, **STRATA Geotechnical** consulting firm completed the scope of work for the **BMFOU Berkeley Pit Slope Stability Evaluation** ("*Evaluation*") and the Report was submitted to the agencies on August 15, 2014. SDs continue to monitor three inclinometers/piezometers, six extensometers and six TDR monitoring devices in piezometer wells, eighteen survey points and operate four dewatering wells for slope stability issues in and near the Berkeley Pit. Please see Attachment 1 to this report for the summary of the slope stability monitoring information requested by the Agencies.

The SDs are following the recommendations provided in the *Evaluation* and continuing to formulate the concepts to safely enable resumed sampling and potentially waterfowl hazing and mortality counting while mitigating risk to sampling personnel. The following preliminary ideas for spatial sampling of the pit lake are provided to update the Agencies of the progress in this regard and some are based on previous experience and input from the MBMG.

- Aerial sampling from helicopter.
- Sample using boom truck/crane to deploy sample tube by using the boom on the crane to reach out into the pit and lower the sample tubing. Depth intervals would be limited due to the short horizontal distance reached and the 45⁰ subsurface pit slope.
- One time barge construction/deployment with remote sampling from shore: A barge would be constructed (out of the pit) with 3 sampling ports for tubing to be set at pre-determined depths and the tubing would be run back to the shore and anchored. The barge would be deployed once and anchored in the location desired.
- Resume sampling from MR's pontoon boat as was previously conducted only after a comprehensive slope instability risk assessment and potential mitigation is completed and instrumentation and early warning slope movement detection devices are installed and fully functional.

The SDs have selected the third option-barge construction and onshore sampling-as the most feasible option and are completing further evaluation.

The **Draft Site Activity Schedule** for the Remedial Action Adequacy Review ("RAAR") which was submitted on June 30, 2014 and approved by the Agencies on September 11, 2014 includes evaluations of water quality and pilot studies of potential alternative sources of water to meet the requirements of the CD among other tasks. Sampling, blending and testing of Berkeley Pit water for future water

treatment is included in the RAAR. Additionally, the current waterfowl mitigation efforts have been successful despite the absence of the boat operation for water-surface hazing of birds and bi-monthly mortality counts as specified in the Waterfowl Mitigation Plan. The evaluation of options to resume this requirement of the CD will continue into 2015.

Normal waterfowl mitigation efforts continue according to plan; only on-water inspections using the pontoon boat have been suspended.

The SDs cooperated with and assisted the MBMG personnel by providing safe access to the on-site sampling locations. Additionally, a Parshall Flume was installed on August 27, 2014 in the Clearwater Ditch to monitor flow from the Continental Pit and collect data for the RAAR. MBMG personnel installed a transducer in the Parshall Flume on August 28, 2014 to provide continuous recording of flow information that will be utilized in the RAAR site-wide water balance.

- 2. Public Education and Involvement** – The SDs are represented on the Berkeley Pit Public Education Committee which directs the publication of the PITWatch and the website www.PITWATCH.ORG. These are the primary vehicles for educating the public about BMFOU status and activities. The PITWatch committee did not meet during Q3 2014.

- 3. Horseshoe Bend (“HsB”) Inflow Control** – The SOW requires integration of the HsB flow into mine operations and/or release of treated water into Silver Bow Creek. Since the issuance of the ROD in 1994 and integration of the entire flow of HsB water into the mining and milling process on April 15, 1996, the flow has become an integral part of the water balance required for efficient active mining and milling operations at Montana Resources, LLP (“MR”). The entire flow of treated HsBWTP effluent has been integrated into MR’s milling water circuit since the HsBWTP was commissioned in November 2003. For the third quarter of 2014, nearly 100% of the flow from HsB was treated as influent into the HsBWTP. Currently, there is no flow measurement device installed in the ditch bypass to the Berkeley Pit. The SDs are investigating flow measurement devices that could potentially be installed to record intermittent bypass flow to the Pit so that any such future flows can be measured and recorded.

There were two instances during the third quarter where HsB flow bypassed to the Berkeley Pit. During the August 22 to August 25 time period, 1.36-inches of rain were recorded in the Butte area. This event caused problems throughout Butte in

both the BMFOU and the BPSOU (please see the August 2014 BPSOU report.) The MBMG measuring gauge in the HsB channel also recorded a significant increase in flow during that time. MR had a Concentrator down day on August 20 and the HsBWTP was not operable but the HsB flow during the downtime was wholly contained in the surge capacity of the influent lagoon. The level of influent in the lagoon could not be drawn down to the minimum target level prior to the storm events because of timing, thus reducing the available surge capacity. On Saturday August 23, 2014 the Berkeley Pit Bypass flow detector recorded a flow to the Berkeley Pit. Currently, there is no flow measurement device installed in the ditch bypass to the Berkeley Pit and it is difficult to estimate flow that bypassed to the pit.

On Friday, September 19, 2014 both effluent pumps experienced electrical problems that caused erratic flow rate operation and a decrease in flow rate through the plant. This caused a decrease in surge capacity in the lagoon for that day. On Saturday September 20, 2014, the effluent pumps experienced motor drop outs that also drop out the influent pumps so that there is no water flow through the plant. The lagoon level reached 100% and water backed up into the HsB ditch, filled the capacity in the ditch and began overflowing at the Bypass. HsBWTP operations and maintenance personnel were at the plant working on the problem when the General Foreman on-shift inspected the Bypass and reported the overflow that topped the weir boards and bypass structure at 6:30 PM. The bypass flow was terminated at 1:00 AM on Sunday September 21, 2014.

Stage One of the HsBWTP remained out of service for maintenance during the third quarter. Stage Two has been effectively treating the entire flow of HsB influent brought into the Influent Lagoon and 100% of the effluent has been incorporated into the MR milling circuit.

Plans to repair the crack in the concrete of the floor of the reactor (which the SDs notified the Agencies of on July 8, 2014) and work to complete this task were advanced during the third quarter. Engineering controls completed in the third quarter have reduced the rate of inflow of ground water that was observed leaking into the emptied reactor by approximately 85%. The engineering controls implemented are intended to eliminate the inflow and reduce the groundwater level beneath the entire footprint of the HsBWTP. The actual repair of the crack will commence once this has been completed. As of the date of this report, a total of five strategically placed dewatering wells and one piezometer monitoring well have been completed.

Structural Systems Repair Group from Cincinnati, OH has been selected to complete repairs and improvements, perform structural reconnaissance on all four of the vessels and provide improvements, if necessary. Inspection coring of the floors of all four vessels and ground penetrating radar scans of all of the floors are included in the scope of work for this project in addition to repairing the crack in the floor of Stage One reactor.

The crack will be repaired as part of the normal annual maintenance and Stage One will be placed back into service when repairs are complete. At the appropriate time, Stage Two will be taken down for annual maintenance and inspection. This situation is not considered an unresolved delay and does not impact the future schedule or implementation of the Work as required in the SOW.

- 4. HsB Water Treatment Plant Upgrade/Sludge Repository** – The SDs have initiated the Remedial Action Adequacy Review and submitted the **Preliminary Draft Site Activity Schedule** to the Agencies on June 30, 2014. Per the Agencies request, a user friendly version of the schedule was also submitted on October 9, 2014 (see Attachment 2). The comprehensive list of activities in the schedule was identified to meet the milestones required in the CD and also to complete important precursor activities to meet those requirements to insure future protectiveness of the remedy. The schedule also responds to the issues raised by the Agencies in the February 20, 2014 letter to the SDs regarding the Agencies response to the BMFOU Five-Year Review Issues. The SDs have prepared a scope of work for the RAAR work and have vetted and selected potential, third-party consulting firms capable of completing the work. Other activities on the schedule have been initiated.

The Explanation of Significant Differences, Appendix A to the CD allows for placement of sludge into the Berkeley Pit. During Q3, all of the sludge generated by treating HsB acid rock drainage (“ARD”) was placed into the Berkeley Pit. The evaluation of sludge disposal in the Berkeley Pit is also included as an activity on the RAAR schedule.

- 5. West Camp System** –Operations of the West Camp Pump Station (WCP-1) continued through Q3 2014. During the third quarter of 2014, approximately 19.5 million gallons of water were pumped from the West Camp pump station to the Lower Area One (LAO) for treatment in the Butte Treatment Lagoons (BTL) system.

Operators of the BTL continued to draw water levels down during the third quarter of 2014 in preparation for Butte-Silver Bow (B-SB) dewatering activities that may be

performed during the 4th quarter of 2014 and the 1st quarter of 2015. The water level at the end of the quarter was 5422.43'.

6. **Waterfowl Mitigation** – During the reporting period, the SDs conducted monitoring, active and passive hazing efforts and reporting as required by the Berkeley Pit Migratory Waterfowl Mitigation Plan, (Exhibit 5 to the CD). The SDs continued to perform waterfowl mitigation efforts under the variance from this requirement of the Waterfowl Mitigation Plan.

On August 29th and October 8th, 2014 the SDs submitted the July and August 2014 **Berkeley Pit Migratory Waterfowl Mitigation Monthly Reports** which included the Observation and Hazing logs as attachments to the report letters. Please reference these reports for a description of the detail of mitigation efforts.

7. **Institutional Controls** – Full SD compliance with this component of the RA SOW was completed by funding provided in 2002 by the SDs past and future cost cash out provisions of the Consent Decree. The Butte Alluvial and Bedrock Controlled Ground Water Area (“BABCGWA”) was established by the MT DNRC in October 2009 with Butte-Silver Bow as the petitioner. Implementation and monitoring of the BABCGWA was assigned to the MBMG and funding from the SDs cash out amount that was provided in 2002. The outer perimeter of the area was determined and covers approximately 8.11 square miles². Please reference the **Butte Mine Flooding Operable Unit, Water-Level Monitoring and Water-Quality Sampling, 2012 Consent Decree Update, 1982-2012** and consult Mr. Terrence E. Duaine, Project Manager of the Montana Bureau of Mines and Geology for more detailed information.

Access - The SDs have fully complied with the CD requirement to provide access to the Agencies. A site inspection was made by the PMs for the Agencies and the Project Coordinators for the SDs on Monday August 18, 2014. A small area within the boundary of the Berkeley Pit was viewed as a possible spoil site for waste material from the BPSOU Continental Roadside Channel. The SDs have fully cooperated with the MBMG Monitoring Program during the reporting period.

b) Summary of all results of sampling and tests and all other data generated by Settling Defendants in the previous quarter

² Please reference the **Butte Mine Flooding Operable Unit, Water-Level Monitoring and Water-Quality Sampling, 2012 Consent Decree Update 1982-2012** report dated September 2013 and prepared by the MBMG.

The following table summarizes the performance of the HsBWTP in Quarter 3 2014:

Period	Influent (MG)	Effluent (MG)	Sludge Wasted (MG)	Lime Delivered (tons)	Average Influent Flow (MGD)	Average Lime Usage (mg/L)
Quarter 3	430	403	70	5,674	4.7	3,161
YTD	1,229	1,182	157	15,410	4.5	3,004

Additionally, Horseshoe Bend water is sampled at multiple locations including the HsBWTP influent, effluent, Stage 1 Clarifier overflow (analytes measured include calcium, magnesium, sodium, potassium, ferrous/ferric iron, manganese, aluminum, cadmium, copper, zinc, sulfate, pH and acidity to titration to pH 10.7 and alkalinity to pH 4.5.) This test work demonstrates that the current operation of the HsBWTP satisfactorily complies with the requirement of the CD to treat HsB water that is to be incorporated in MR's milling circuit.

Engineering controls completed in the third quarter include the installation of ground water monitoring and dewatering wells around the HsBWTP. Please see Attachment 3 to this report for a summary of this work conducted in the third quarter.

c) Identify all work plans and other deliverables required by this Consent Decree completed and submitted in the previous quarter

The Draft Work Plan for the BMFOU Berkeley Pit Slope Stability Evaluation (“*Evaluation*”) was submitted to the agencies on January 31, 2014 and the Agencies granted verbal approval to proceed on February 11, 2014. A project kickoff meeting was held on February 18, 2014 with representatives of the Agencies and SDs in attendance. **STRATA Geotechnical** consulting firm completed the scope of work as submitted to the Agencies and provided draft reports to the SDs on July 9, 2014. The SDs requested and received an extension of the submittal of the report document on July 25, 2014 to August 15, 2014 to allow appropriate time for internal review. On July 29, 2014 EPA approved the extension. The **BMFOU Berkeley Pit Slope Stability Evaluation STRATA Report** was submitted to the agencies on August 15, 2014. The **BMFOU Berkeley Pit Slope Stability Evaluation Final Work Plan** was formally approved by the Agencies and submitted by the SDs on September 25, 2014.

The **Draft Site Activity Schedule** for the Remedial Action Adequacy Review (“RAAR”) which was submitted to the Agencies on June 30, 2014 and SDs received their approval

on September 11, 2014. The RAAR includes a comprehensive study of the optimization of the existing HsBWTP, an update of the site-wide water balance (from the original RIFS in 1994) that include evaluations of potential ARD treatment scenarios with consideration of both mine operating and mining suspension flow rates, evaluations of water quality and pilot studies of potential alternative sources of water to meet the requirements of the CD among other tasks. This work is to culminate in the preparation of The HsBWTP Technical Memorandum which is scheduled for Q3 and Q4 2018, Q1 2019 with submission to the Agencies in Q2 2019.

SD Atlantic Richfield requested a change in Project Coordinator for the BMFOU on July 22, 2014 as specified in the CD, Section XII, Paragraph 43. Agency approval for the change was granted by the Agencies on July 29, 2014. Therefore, Atlantic Richfield Project Coordinators are Tim Hilmo and Cord Harris.

d) Describe all actions, data collection and implementation or work plans that may be required under this CD scheduled for the next quarter and provide other information relating to the progress of the work

RA Activity - The RA activity required in this section is congruent with that reported at the beginning of this document and is aligned with the seven general components of the SOW and RA. The inclusion of an eighth component to follow the Remedial Action Adequacy Review required by the SOW has been added as an additional activity for the fourth quarter. The fourth quarter 2014 activity summary is as follows:

1. The Monitoring Plan will continue to be implemented during the next quarter and the SDs will continue to provide unfettered access, cooperation and any assistance to the MBMG requested in performing this task. SDs will advance the plans for safe methods of resumed spatial sampling of Berkeley Pit water by means of a remotely operated barge.
2. The SDs will provide information to the Agencies as requested and participate in any public education meetings or activities that the Agencies deem necessary to fulfill this requirement of the CD.
3. The HsBWTP will continue to operate in the next quarter with the goal of capturing and treating 100% of the flow emanating from the HsB area. Plant optimization efforts by SDs will continue. The Inflow Control requirement will continue to be met with 100% of the HsBWTP effluent integrated into the mining and milling operations. Plans are to finalize the Operations and Maintenance Plan and

Health and Safety Plan in the fourth quarter and submit them to the Agencies. Operation of the dewatering wells around the HsBTWP will continue and the Stage 1 reactor crack will be repaired.

4. Sludge from the HsBWTP will continue to be placed into the Berkeley Pit during the next quarter.

5. Pumping from WCP-1 will continue during Q4 of 2014 to maintain West Camp water levels below the CWL.

6. Waterfowl mitigation efforts will be continued during Q4 as required by the Berkeley Pit Migratory Waterfowl Mitigation Plan, Exhibit 5 to the CD (with the approved exemption from bi-monthly surface inspections) with frequency of observations commensurate with the migratory season. Monthly reports will continue to be submitted to the Agencies.

7. The Institutional Controls required by the CD will continue to be met with full access provided to the Agencies, the MBMG and all SDs at all reasonable times. MR plans to continue to operate the active mining and milling operation within the 70,000 tpd crushing and concentration of ore and active leaching of dumps at less than 350-acres stipulations of **IX. Access and Institutional Controls** section of the CD.

8. The RAAR Site Activity Schedule will be followed and modified as needed with modifications approved by the Agencies. The third party consultant selection for the RAAR will be completed and the HsBWTP optimization, BMFOU site-wide water balance update and alternatives study will commence.

Future Work Plans – The SDs have no plans to submit Future Work Plans as required by the CD to the Agencies during Q4 unless requested to do so.

e) **Include information regarding unresolved delays encountered or anticipated that may affect the future schedule for implementation of the Work.**

Unresolved delays include in part, waterfowl mitigation and water quality sampling of the pit water, due to safety issues and resumption is contingent upon the completion of the final slope stability evaluation, determination of near term necessity and additional slope stability monitoring and/or controls and risk assessment study or adoption of alternative sampling monitoring technique. (Please see the discussion in section 1 of this report regarding the preliminary conceptual ideas for resumed sampling.)

- f) **Include any modifications to the RA or RD Work Plans or other work plans or schedules that Settling Defendants have proposed to EPA or that have been approved by the EPA.**

There are no current, requested modifications to the RA or RD Work Plans or schedules proposed to the EPA.

- g) **Describe all activities undertaken in support of the Community Relations Plan during the previous quarter and those to be undertaken in the next quarter**

Please see the response in **Actions Taken Toward Achieving Compliance, 2. Public Education and Involvement** for details to the answers to this reporting requirement.

- h) **Issues Encountered**

The current issue that has impacted the mandated BMFOU remedy was the occurrence of slope instability problems in the Berkeley Pit in 2012 and 2013. Please see the attachment to this report titled “**Berkeley Pit Slope Stability Quarterly Summary**”.

- i) **Other**

The following information is not part of the BMFOU RA but is being included in this report at the request of the Agencies.

The U.S. EPA has requested that MR, Atlantic Richfield and BNSF Railway Company complete the work identified in the ***BPSOU Final Third Cycle Best Management Practices (BMP's), Continental Roadside Channel Work Plan***. A site inspection was made by the PM's for the Agencies and the Project Coordinators for the SDs on Monday August 18, 2014. A small area within the boundary of the Berkeley Pit was viewed as a possible spoil site for waste material from the BPSOU Continental Roadside Channel. The SDs requested permission to utilize this area on August 21, 2014 and received Agency authorization to proceed on August 25, 2014. Work on this project commenced during the third quarter and spoiling of waste material from this BPSOU project to areas within the BMFOU boundary (specifically, the dump located on the slope of the Berkeley Pit above the 5410 elevation) was conducted. None of this waste material was dumped below the critical water level or into the pit lake as per the Agency approval.

Information about MR Operations

At the request of EPA, and to facilitate a more comprehensive understanding of its mining activities regulated under State-issued permits within the Butte Active Mine Area Operable Unit, MR solely provides the following information about its operations in this report:

MR has not placed material into the Berkeley Pit below the 5410 elevation in Q3 2014 nor does it plan to place fill into the Berkeley Pit in the Q4 2014 or conduct any work on the slopes above the critical water level in the Berkeley Pit.

BMFOU QUARTERLY REPORT

Q3 2014

ATTACHMENT 1:

Berkeley Pit Slope Stability Quarterly Summary



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Butte, Montana USA 59701
(406) 496-3200
(406) 723-9542 fax
www.montanaresources.com

MEMORANDUM

TO: Stephen Walsh
FROM: S. Czehura
DATE: October 23, 2014
SUBJECT: Berkeley Pit Slope Stability Third Quarter Summary 2014

Overall, during this period “no significant or reportable movement” was detected as per our MSHA approved monitoring plan with the monitoring network incorporating an array of 18 survey points, six wire extensometers, three inclinometer/piezometer wells, and nine TDR/ piezometer wells (Plate I, attached). However, the eastern most extensometer in the Southeast Sector is beginning to exhibit a slow progressive movement. Further, extended surface cracking has been observed in this sector telltale of incipient movement at depth. Vigilant monitoring continues.

Four survey points in the Bird Watch Sector, four survey points in the Concentrator Sector, seven survey points in the Southeast Sector and three prisms in the Pittsmtom Sector were monitored throughout this period. Survey points in the Bird Watch Sector are checked bimonthly. The western two survey points in the Concentrator Sector are, likewise, monitored bimonthly and the two eastern points are monitored daily. Seven survey points in the Southeast Sector and three prisms in the Pittsmtom Sector are monitored daily. Wire extensometers, i.e. Section 2 (West), in the Concentrator Sector are, routinely, checked three times on dayshift and once on nightshift. Wire extensometers, i.e. Section 1 (East), in the Southeast Sector are, routinely, monitored three times per shift. Work is in progress, however, installing string-pots and instrumentation for automated monitoring of the six extensometers. All inclinometers are read daily. All TDR wells are read weekly.

Bird Watch Sector: Four survey points were checked in this sector during this period with “no abnormal movement” being indicated, but slow displacement of the outer portion of the dump continues at a rate of less than 0.6 inch per month. These monitor points are surveyed once a week. The TDR cable in B06-1 showed no progressive distress.

Concentrator Sector: Four survey points were checked in this sector during the second quarter with “no significant movement” being indicated. Two of monitor points are surveyed daily and two of the monitor points are surveyed once a week.

However, on September 13th, Point A37438 showed 0.113 foot of movement compared to the previous day. The General Foreman was notified in compliance with our MSHA approved monitoring plan. But, the next day (September 14th 2014), the point returned to a normal position leading us to believe that the GPS may have lost accuracy due to satellite position on September 13th.

The three extensometers in this sector, likewise, showed no reportable or progressive movement during this time period. The extensometers are routinely monitored two to three times per shift. No repairs to these extensometers were performed during this time period.

TDR cables were read weekly during this time period in four wells and no progressive movement was detected.

Southeast Sector: Overall the survey points monitored during quarter showed no reportable or progressive movement.

Below is a list of the current monitor points being surveyed:

- A37210,
- A37205,
- A37231,
- A37163,
- A37161,
- A37209, and
- A37233.

From time to time a monitoring point is damaged and removed from the monitoring array, but another is installed immediately. A few days are allowed for settlement, before surveying resumes. On average six points were maintained in the Southeast Sector throughout the quarter.

The two western most wire extensometers in the Southeast Sector showed random, non-progressive, movement ($< \pm 1/4$ inch) throughout quarter. However, the eastern most extensometer appeared to have 1.625 inches of cumulative movement during the quarter. A total of 1.125 inches of movement occurred over a three week period, August 25th to September 14th 2014. Also, on August 30th a small 1/8 inch crack appeared. The crack extended from approximately 30 feet west of the middle extensometer to approximately 90 feet east of the eastern extensometer.

The crack curves about 1.7 feet behind the east extensometer post. At the end of the quarter the crack did not appear to have changed in width or extent.

The eastern extensometer wire had to be repaired three times during the quarter, July 27th, September 24th, and September 29th due to deer damaging the wire. The center extensometer did not have to be repaired. The west extensometer had to be repaired

once during the quarter on July 27th 2014. The extensometers in this sector are scheduled to be monitored three times per shift.

Daily monitoring of inclinometers PZF12-4, PZF12-5, and PZF12-8 is ongoing. To date, there has been no significant movement in any of the wells. The incipient movement, noticed in January on the B axis of PZF12-4 at 255 feet, remains stable.

All four dewatering pumps in the Southeast Sector ran throughout the third quarter as indicated in Table 1.

Table 1. Average flows for dewatering wells (Third Quarter 2014).

Dewatering Well	July		August		September	
	Flow (gpm)	Availability	Flow (gpm)	Availability	Flow (gpm)	Availability
PZF12-1	73.5	100%	70.1	100%	66.5	100%
PZF12-2	37.2	100%	37.1	100%	37.0	100%
PZF12-3	22.3	100%	22.6	96%	22.7	100%
LP-15	42.9	100%	43.0	100%	43.0	100%

The pump in Well PZF12-3 was down for 32 hours during August (August 12-13, 2014), but otherwise operated without interruption.

Pittsmont Sector: Three prisms on the Pittsmont dump were surveyed once a day, on average of five days per week during the quarter with a total station. No slope movements have been detected to date.

The TDR cables in Wells PZF13-1, PZF14-1A, and PZF14-1B were read weekly during the third quarter with no indicated distress.

Hydrographs: Water levels are tracked in all sectors. No excursions were noted during the quarter. Hydrographs detailing the piezometric surface in each sector follow (Figures 2 through 6).

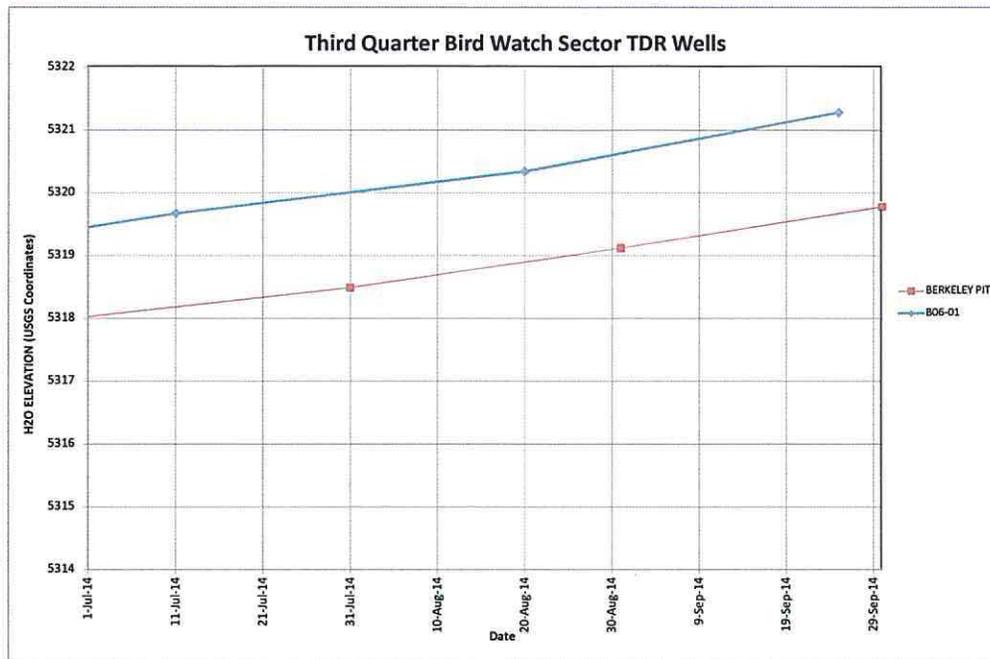


Figure 2. Hydrographs Bird Watch Sector.

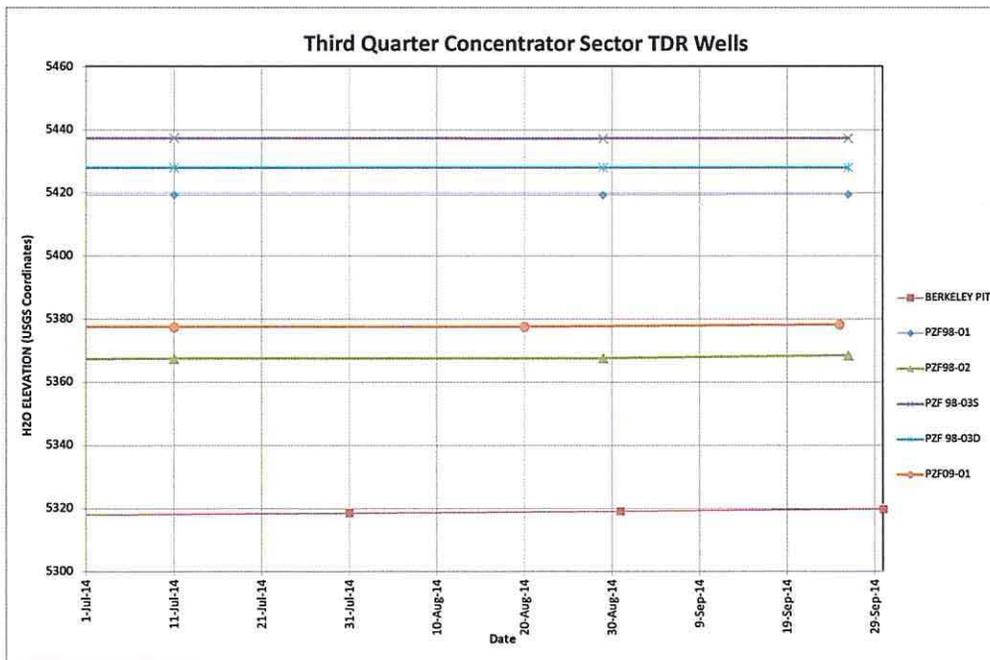


Figure 3. Hydrographs Concentrator Sector.

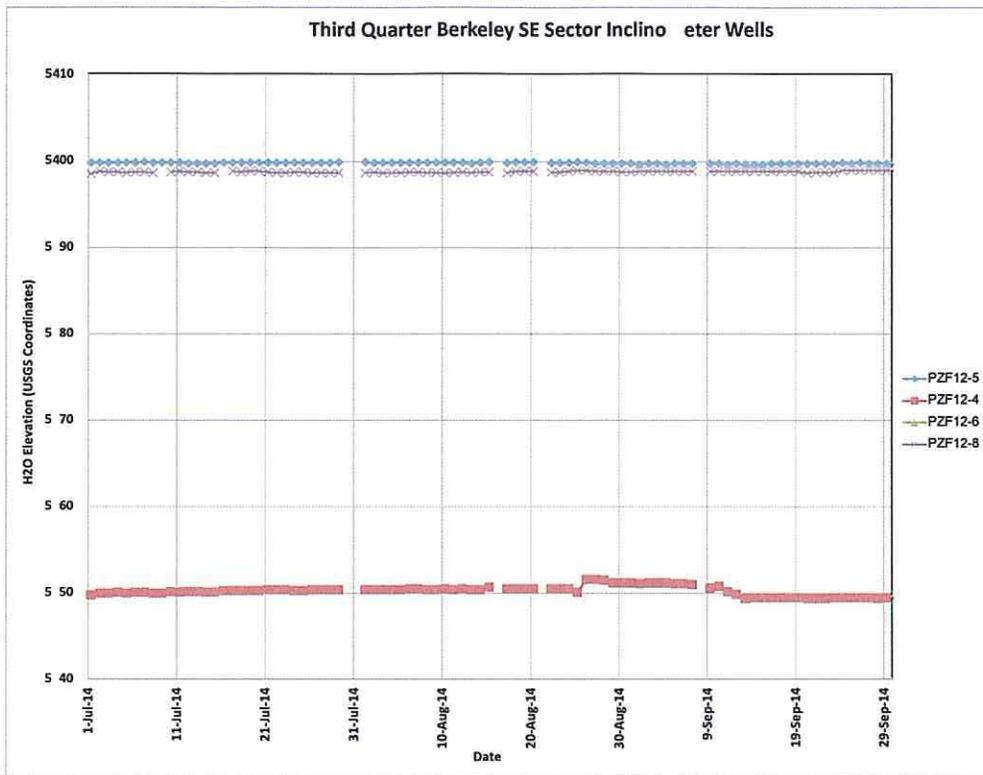


Figure 4. Hydrograph Southeast Sector inclinometer wells.

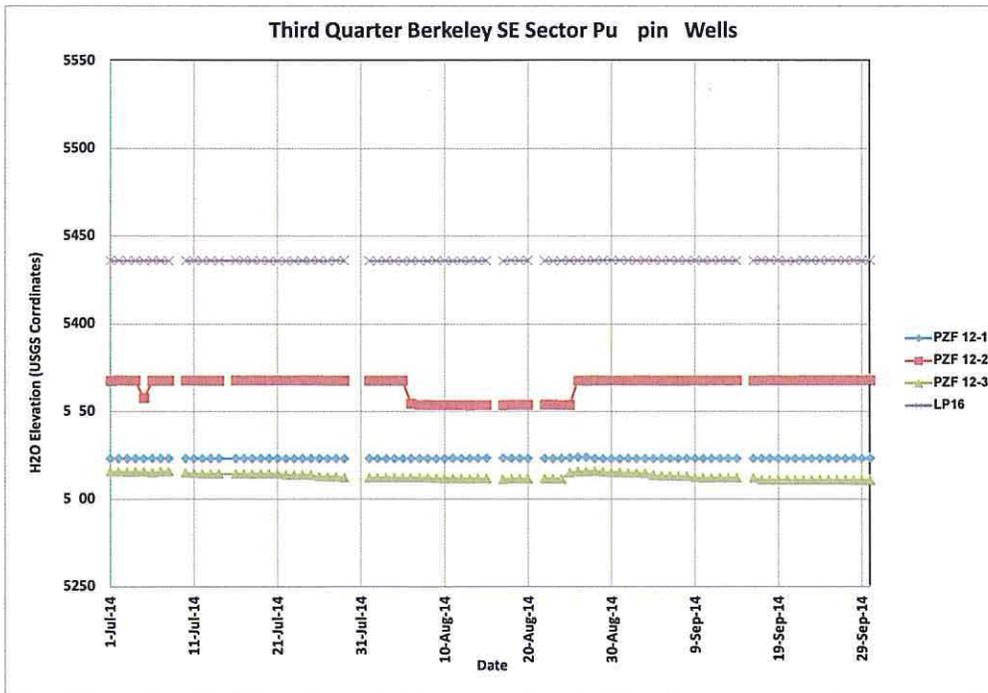


Figure 5. Hydrographs Southeast Sector pumping wells.

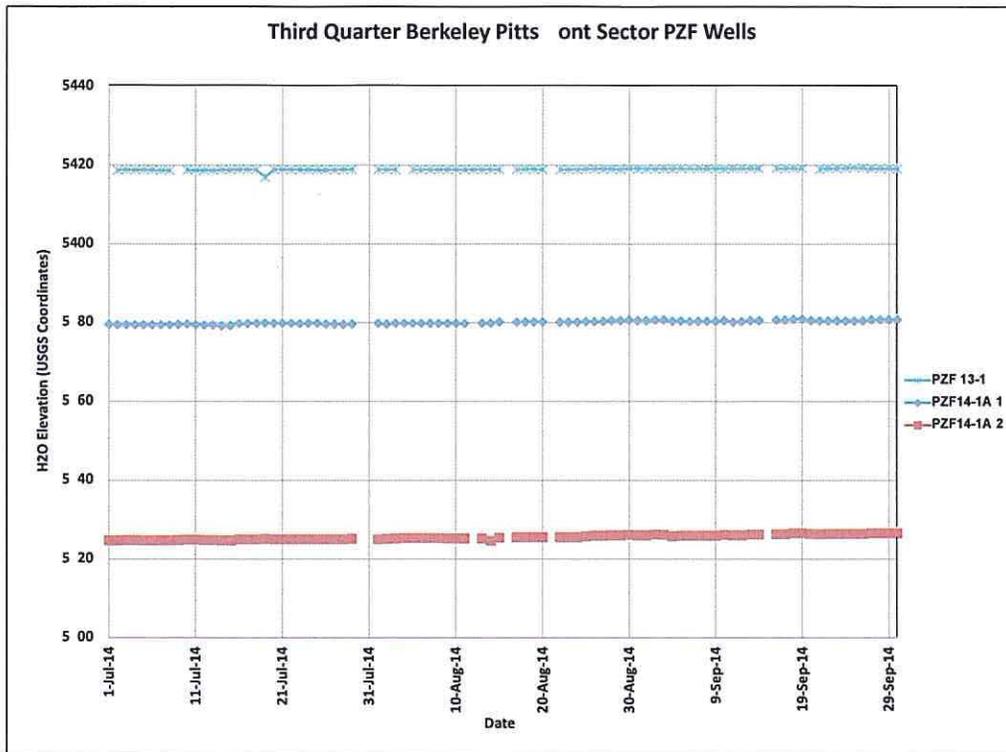
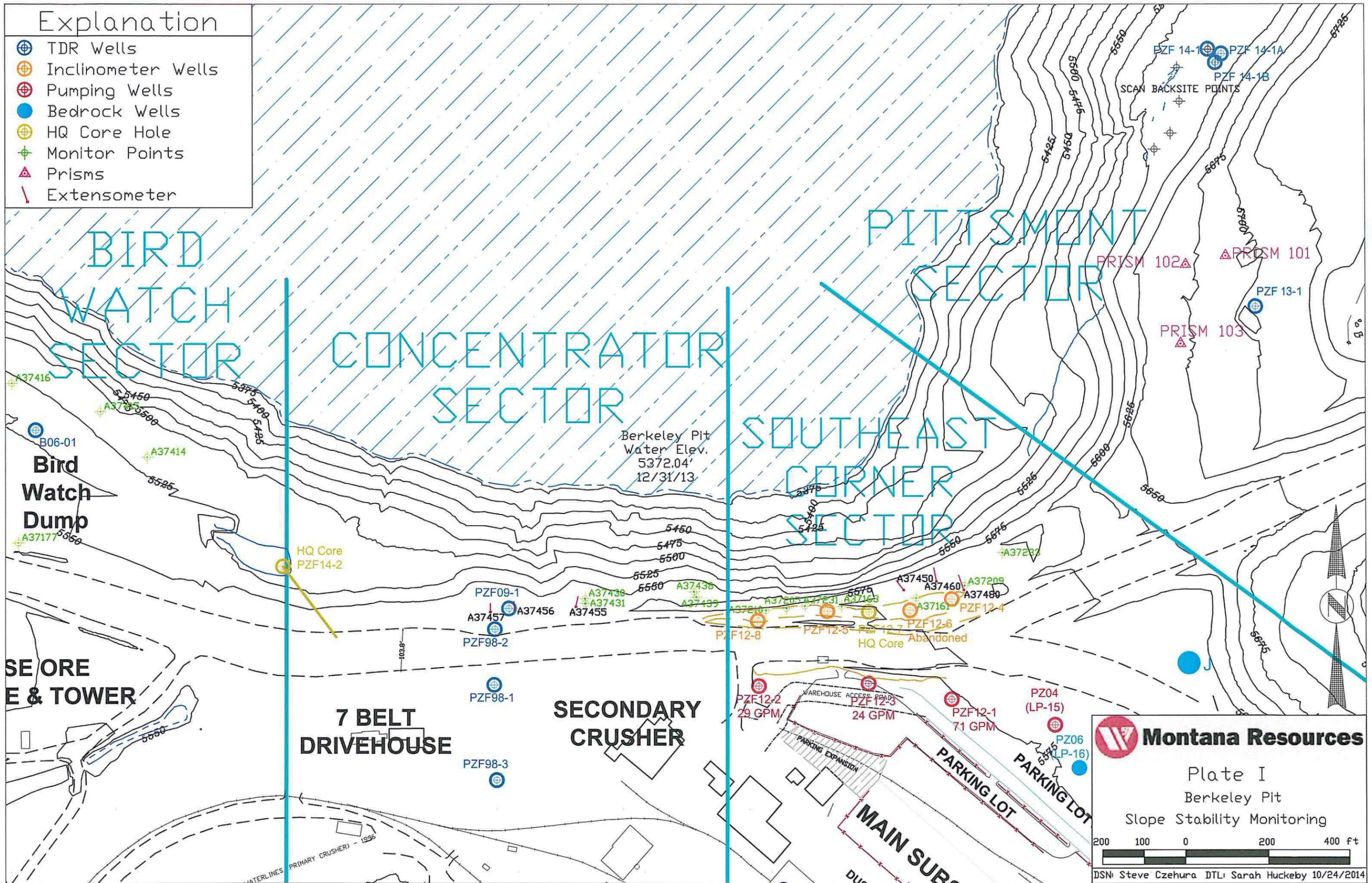


Figure 6. Hydrographs Pitts mont Sector.

Explanation

-  TDR Wells
-  Inclinometer Wells
-  Pumping Wells
-  Bedrock Wells
-  HQ Core Hole
-  Monitor Points
-  Prisms
-  Extensometer



 **Montana Resources**

Plate I
Berkeley Pit
Slope Stability Monitoring

DSN: Steve Czehura DTL: Sarah Huckeyby 10/24/2014

BMFOU Quarterly Report
Quarter 3, 2014
November 14, 2014

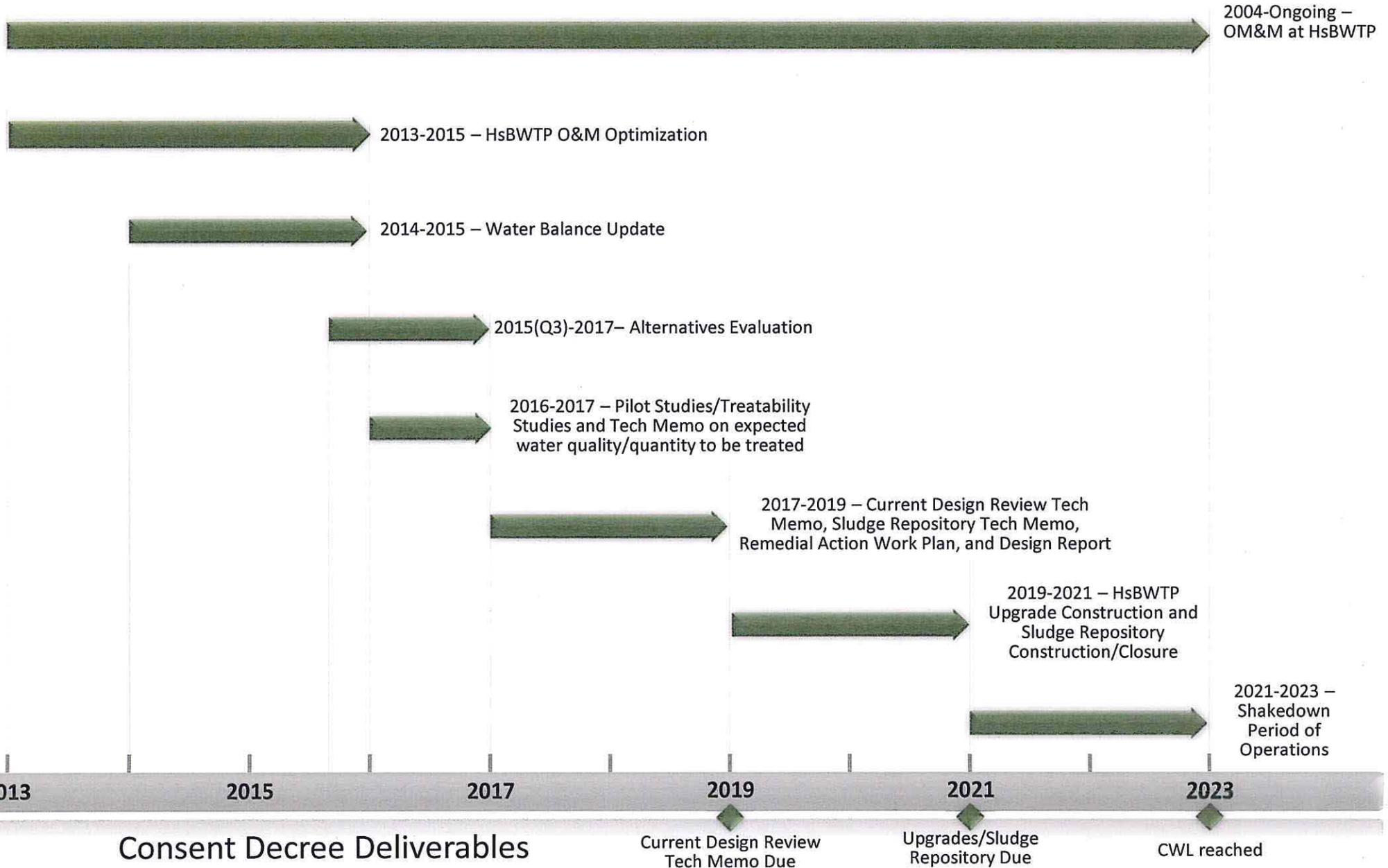
BMFOU QUARTERLY REPORT

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ATTACHMENT 2:

Simplified Preliminary Draft Site Activity Schedule

BMFOU 10-yr Schedule



BMFOU Quarterly Report
Quarter 3, 2014
November 14, 2014

BMFOU QUARTERLY REPORT

Q3 2014

ATTACHMENT 3:

Horseshoe Bend Water Treatment Plant Groundwater Level Reduction Engineering Controls Reports



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MEMORANDUM

TO: Steve Walsh, Steve Czehura

FROM: Amanda Griffith

DATE: September 25, 2014

SUBJECT: *Horseshoe bend dewatering and monitor wells H 14-1, H 14-2 and H 14-3 installation*

Overview

In July 2014, wells H 14-1, H 14-2, and H 14-3 were drilled around the Horseshoe Bend water treatment plant. The two wells closest to the tanks, H 14-1 and H 14-2 were completed with 12 inches steel casing and 8 inches schedule 40 PVC casing which could accommodate a submersible dewatering pump. H 14-3 was drilled down gradient and was completed with 4 inches schedule 40 PVC casing to be a monitor well.

H 14-1 was the first to be fitted with a submersible pump. A second pump was next installed in H 14-2.

A third dewatering well, H 14-4, and a second monitor well, H 14-5, have been proposed to on the west side of the first stage clarifier tank. Location of current and proposed wells can be seen in Plate 1. Elevations are given in Anaconda Company Mining (ACM) datum first with USGS datum in parentheses.

Current Wells

H 14-1

H14-1 was drilled on July 11, 2014 and was intended to be a de-watering well. The well was drilled to a total depth of 70 feet below the ground level of 5632.25 (5579.62) feet. Twenty feet of 8 inch stainless steel screen was placed in the bottom of the well, from 50-70 feet, with 52.35 feet of 8 inch schedule 40 PVC set from 50 feet to 2.35 feet above ground level. Alluvium was logged on site and seven samples were taken during drilling. An appreciable flow of water was not noticed by the driller until 50 feet. Once completed the static water level of H 14-1 was 13.6 feet from the measure point, or 5621.08 (5568.45) feet above sea level. The completion log can be seen in Figures 1 and 2.

A pump test was performed on the well on July 14, 2014. A one Hp pump was placed at 50 feet below ground level, just above the screened interval. The pump was able to draw the well down 10.05 feet during 45 minutes of pumping 28-29 gpm.

The SWL was checked eight times over the following two weeks, and the water level fluctuated little, from 5620.73 to 5621.08 feet above sea level. The 7.5 Hp, 100 gpm pump wiring was completed and the pump turned on July 29, 2014. A stop probe was set at 45 feet below ground level and was initially set to restart the pump after a 10 minute recharge period. A level logger was also installed and set to take a water level reading every ten minutes. Since that time the water level cycled from approximately 5615 to 5588 feet every 6-8 hours until a flow meter was installed to control the flow. The water level has been maintained at ~45 feet over the last two weeks.

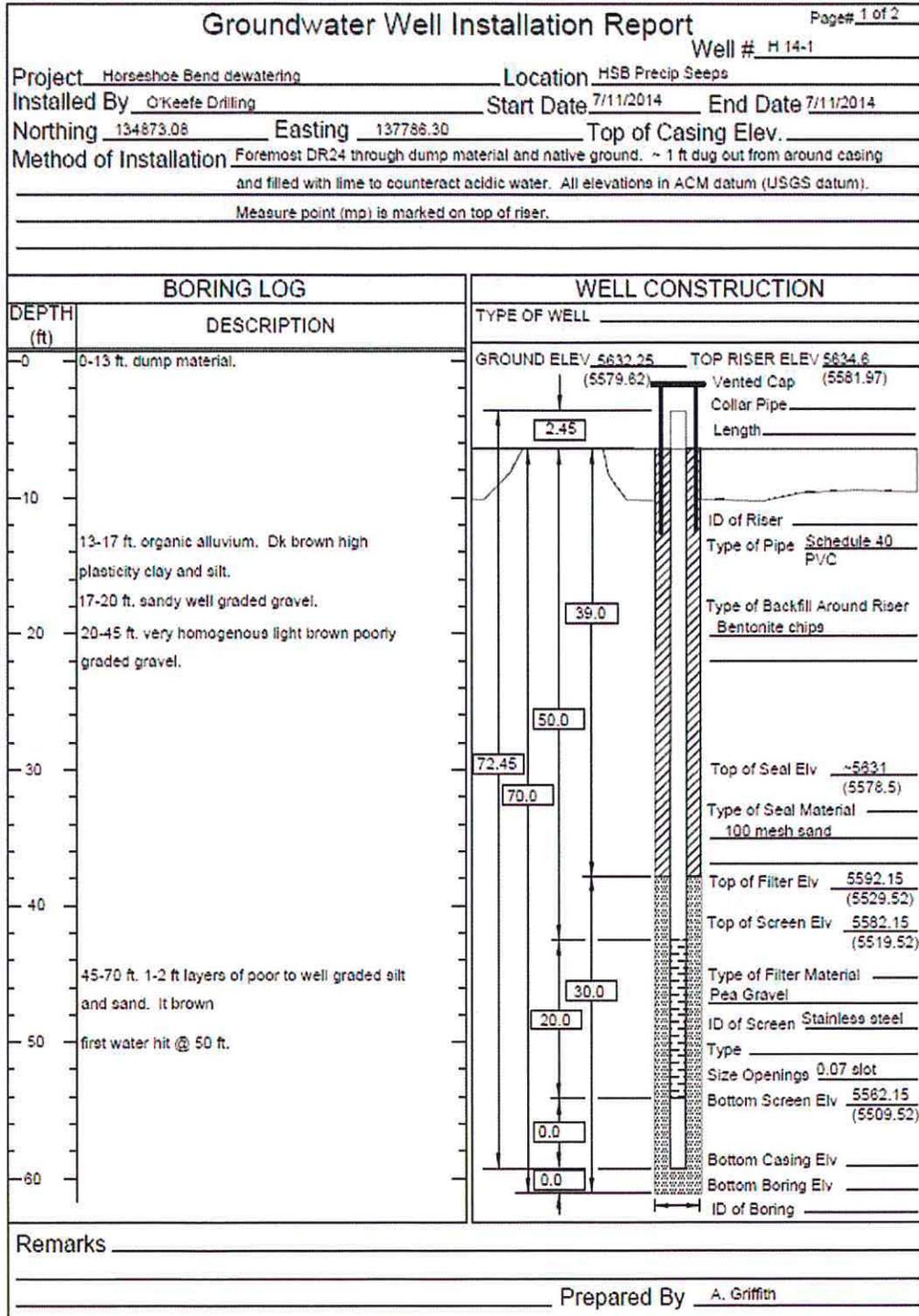


Figure 1 H 14-1 completion log, page 1.

H 14-2

H14-2 was drilled on July 14, 2014 and was intended to be a monitor well to monitor the drawdown from H 14-1, but was completed with a large enough diameter casing to be fitted with a second dewatering pump. The well was drilled to a total depth of 70 feet below the ground level, 5631.02 (5579.39) feet. Twenty feet of eight inch stainless steel screen was set in the bottom of the well, from 50-70 feet, with 52.45 feet of eight inch schedule 40 PVC set from 50 to 2.45 feet above ground level. Homogenous silty fill was logged on site and seven samples were taken during drilling. An appreciable flow of water was noticed at 35 feet by the driller. Once completed the static water level of H 14-2 was 13.7 feet from the measure point, 5619.77 (5567.14) feet above sea level. The completion log can be seen in Figures 3 and 4.

The SWL was checked seven times over the following two weeks, and the water level fluctuated 1 foot from 5619.77 (5567.14) to 5620.77 (5568.14) feet above sea level. A level logger was installed just before the dewatering pump in H 14-1 was turned on and set to take a water level reading every ten minutes. The water level has cycled approximately 3.5 feet from a low of 5612.0 (5559.37) to a high of 5615.8 (5563.17) every 6-8 hours.

A second submersible pump was installed in H 14-2 on September 3, 2014 and started on September 5, 2014. A 1 Hp, 25 gpm pump was chosen based on a pumping test performed just after the well was completed. The well was initially cycling between 46 feet below ground level, where the stop probe is located just above the intake, and 21.5 feet three times an hour. Several adjustments of the valve on the outgoing pipe have steadied the water level to approximately 5586 (5533.37) feet and decreased that to cycling once every 30-40 hours.

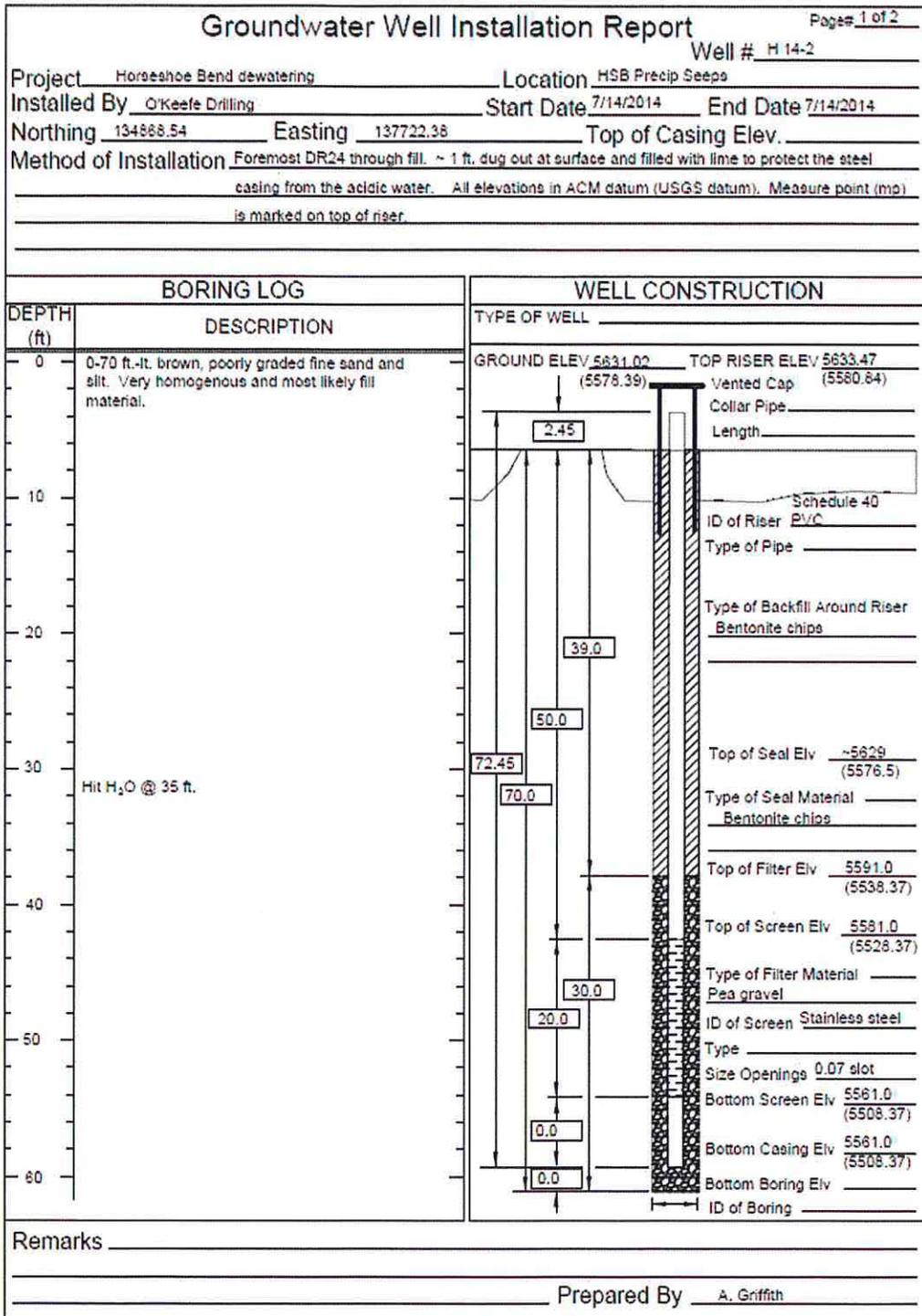


Figure 3 H 14-2 completion log, page 1.

Groundwater Well Installation Report		Page# 2 of 2
Project <u>Horseshoe Bend dewatering</u>		Well # <u>H 14-2</u>
Location <u>HSB Precip Seeps</u>		
Installed By <u>O'Keefe Drilling</u>	Start Date <u>7/14/2014</u>	End Date <u>7/14/2014</u>
Northing <u>134868.54</u>	Easting <u>137722.38</u>	Top of Casing Elev. _____
Method of Installation <u>Foremost DR24 through mostly fill. ~ 1 ft. dug out at surface and filled with lime to protect the steel casing from the acidic water. All elevations in ACM datum (USGS datum). Measure point (mp) is marked on top of riser.</u>		
BORING LOG		
DEPTH (ft)	DESCRIPTION	
60	0-70 ft.-lt. brown, poorly graded fine sand and silt. Very homogenous and most likely fill material.	
70	TD	
75		
80		
85		
90		
95		
100		
105		
110		
115		
120		
125		
130		
135		
140		
145		
150		
Remarks _____		
Prepared By _____		

Figure 4 H 14-2 completion log, page 2.

H 14-3

Monitor well H 14-3 was drilled on July 15, 2014 to a total depth of 60 feet below ground level, 5614.91 (5562.28). Water was hit at 50 feet. The well was completed with 20 feet of 4 inch schedule 40 PVC screen from 40-60 feet. The well was checked 6 times before the pump in H 14-1 was turned on and fluctuated only 0.2 feet between 5583.16 (5530.53) and 5583.36 (5530.73) feet. Since the two pumps in H 14-1 and H 14-2 have been running the water level has dropped 1.4 feet to 5581.96 (5529.33) feet. A completion log can be seen in Figure 5.

Groundwater Well Installation Report		Page# 1 of 1
Project _____		Well # H 14-3
Location HSB Precip Seeps		
Installed By O'Keefe Drilling	Start Date 7/15/2014	End Date 7/15/2014
Northing 134427.83	Easting 137881.48	Top of Casing Elev. _____
Method of Installation Foremost DR24 through alluvium. All elevations in ACM datum (USGS datum). Measure point (mp) is marked on top of riser.		
BORING LOG		WELL CONSTRUCTION
DEPTH (ft)	DESCRIPTION	TYPE OF WELL _____
0	0-10 ft.-it. brown-brown grey, well graded sand with minor organic content.	GROUND ELEV. 5614.91 (5562.28) TOP RISER ELEV. 5616.86 (5564.23)
10	10-20 ft.-it. brown-brown grey, poorly graded fine sand and minor silt and clay with little organic content.	Vented Cap _____
20	20-30 ft.-it. brown well graded sand and minor silt and clay.	Collar Pipe _____
30		Length _____
40		Schedule 40 _____
50	Hit H ₂ O @ 50 ft.	ID of Riser PVC _____
60	TD	Type of Pipe _____
		Type of Backfill Around Riser _____
		Bentonite chips _____
		Top of Seal Elev. 5614.8 (5562.23)
		Type of Seal Material _____
		Bentonite chips _____
		Top of Filter Elev. 5584.86 (5532.23)
		Top of Screen Elev. 5574.86 (5522.23)
		Type of Filter Material _____
		Pea gravel _____
		ID of Screen Stainless steel _____
		Type _____
		Size Openings 0.07 slot _____
		Bottom Screen Elev. 5554.86 (5502.23)
		Bottom Casing Elev. 5554.86 (5502.23)
		Bottom Boring Elev. _____
		ID of Boring _____
Remarks _____		
Prepared By A. Griffith		

Figure 5 H 14-3 completion report.

Proposed wells

Local drawdown

The water levels in both wells with pumps installed, H 14-1 and H 14-2, have steadied in the last two weeks. A flow meter was installed in H 14-1 to measure if the water level was below the intake as the high flow of the pump was tripping the stop probe on restart resulting in several hours of down time, instead of 10 minutes. Several adjustments of a valve on the outgoing pipe of the pump in H 14-2 resulted in a steady flow that only draws the well down to below the stop probe every 30-40 hours.

The proposed wells would be approximately 25 feet west of the first stage and second stage clarifier tanks. Locations of proposed wells H 14-4 and H 14-5 can be seen in Plate 1.

The dewatering well would be completed similar to the H 14-1 and H 14-2 with 12 inches steel casing, 8 inches stainless steel screen with 0.06 slot opening, and schedule 40 PVC casing.

