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August 14, 2014

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Montana Department of Environmental Quality
State of Montana
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Re: BUTTE MINE FLOODING SITE CD, CV 02-35 Bu-RFC, 2014 Second Quarter Report

Dear Ms. Capdeville, Mr. Elsen, Mr. Greene and Mr. Reed:

The Settling Defendants (Atlantic Richfield Company and the MR Group, as defined in the Consent Decree) continue to implement the remedial action requirements as specified in the Statement of Work to the Consent Decree. The attached report summarizes those activities conducted during the second quarter of 2014. This advance electronic copy will be followed by the hardcopy via certified mail. This second quarter report submittal was deemed timely as the electronic copy has been submitted on the fourteenth day of the August 2014 as required under section X. Reporting Requirements of the CD and the Request for Change of Submittal Date approved by the Agencies on June 16, 2014 .

Please contact us if you would like to schedule a meeting to discuss the implementation of the RA or the BMFOU 2014 Second Quarter Report.

On behalf of the Settling Defendants,

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**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 2, 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 second 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 “SD”) in the second 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.

The SDs continue to monitor three inclinometers/piezometers, six extensometers and six TDR monitoring devices in piezometer wells, eighteen survey points and operate

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.

four dewatering wells for slope stability issues in and near the Berkeley Pit. Please see the attachment to this report for the summary of the monitoring information requested by the Agencies.

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 SD’s in attendance. **STRATA Geotechnical** consulting firm completed the scope of work as submitted to the Agencies and provided draft reports to the SD’s on July 9, 2014. The SD’s requested an extension of the report on July 25, 2014 to August 15, 2014 to allow appropriate time for internal review. On July 29, 2014 EPA approved the extension.

The SD’s are continuing with the completion of the *Evaluation* and formulating the next steps to make recommendations as to the safety and necessity of continuing sampling and waterfowl hazing. The **Draft Site Activity Schedule** submitted to the Agencies on June 30, 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. 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.

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, the Horseshoe Bend Ditch was cleaned out below the MBMG V-notch weir monitoring station on June 16, 2014, cleaned out above the station on July 15, 2014 and the framework for the sonic water level detection device was bolstered with a new stabilizing brace and footing that same date to improve the accuracy of flow measurement.

- 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 Q2 2014. However, the committee and the Agencies’ representatives did

respond to questions from the public that were provided through the PitWatch website.

- 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 second quarter of 2014, 100% of the flow from HsB was treated as influent into the HsBWTP and no flow of HsB influent was bypassed to the Berkeley Pit. This is significant in that MR’s Concentrator was shut down for maintenance on April 9 and June 25, 2014 and HsB flows could not be integrated into the milling circuit on that day but surge capacity was available due to appropriate planning and plant management prior to the down days. However, there may or will be times in the future (because of MR operational considerations) that there will be insufficient surge capacity to keep all HsB flows from being diverted to Berkeley Pit.

The original lime unloading system installed during construction of the plant did not perform to the design specifications for the dry lime unloading rate of 1,000 pounds per minute. This issue was identified as a deficiency in the design of the system and the SD’s notified the design company U.S. Filter/Veolia of the deficiency. Following negotiations with U.S. Filter/Veolia modifications to the lime unloading system that were necessary to bring the rate up to the design specification were made. These modifications to the lime unloading system were completed on May 21, 2014. The lime unloading rate has been increased from approximately 640 to 1,150 pounds of dry lime per minute.

Stage One of the HsBWTP was taken out of service for annual cleanout and inspection operations on May 19, 2014 and the entire flow of HsB water has been treated in Stage Two with the effluent incorporated into the MR milling circuit. During the cleanout, the SD’s discovered a crack in the concrete of the floor of the reactor and the SD’s notified the Agencies on July 8, 2014. Ground water was observed leaking into the emptied reactor. In July (Q3), two pumping wells and one monitoring well were drilled and completed to lower the ground water level so that repairs could be accomplished. A submersible pump was installed in one of the

pumping wells and pumping has succeeded in lowering the ground water level by eight to thirty-two feet (depending on the well location.)

Two concrete repair specialty companies, Structural Systems Repair Group from Cincinnati, OH and Concrete Stabilization Technologies, Inc. from Denver, CO were solicited to provide assessments of the reactor and provide quotations to complete repairs and improvements. These companies were asked to address the following tasks in their assessment:

1. Identify the cause of the crack;
2. Make recommendations to address the cause of the cracking;
3. Assess and identify other areas of the bottom of the reactor that could have been impacted by the root cause of the crack;
4. Describe work necessary to fix the cause of the cracking and prevent future recurrence;
5. Repair the crack and seal the bottom of the reactor if necessary.

These tasks are to include both nondestructive testing and coring of the floor of the reactor to determine the extent of the work necessary. The SD's have received the assessments and quotations to perform the preliminary work. These proposals are under review and will be used to develop the final scope of work.

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 that 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 SD's have initiated a plant optimization study and remedial action adequacy review and submitted the **Preliminary Draft Site Activity Schedule** to the Agencies on June 30, 2014. 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 SD's regarding the Agencies response to the BMFOU Five-Year Review Issues. Two of the items on this schedule have been or are nearing completion: lime unloading system upgrades are completed and the Berkeley Pit Slope Stability Evaluation study is completed and the report is to be submitted August 15, 2014.

Other activities on the schedule have been initiated. The HsBWTP Technical Memorandum preparation is scheduled for Q3 and Q4 2018, Q1 2019 and scheduled for submission in Q2 2019.

The Explanation of Significant Differences, Appendix A to the CD allows for placement of sludge into the Berkeley Pit. During Q2, all of the sludge generated by maintaining compliance with the inflow component requirement of the SOW was placed into the Berkeley Pit. The evaluation of sludge disposal in the Berkeley Pit is also included as an activity on the schedule and the technical memo

5. **West Camp System** –Operations of the West Camp Pump Station (WCP-1) continued through Q2 2014. Approximately 21 million gallons of water was pumped through WCP-1 to the Lower Area One (LAO) for treatment in the Butte Treatment Lagoons (BTL) system under the Butte Priority Soils Operable Unit. The water level at the end of the Q2 was 5424.05 feet and was drawn down in preparation for Butte-Silver Bow (B-SB) dewatering activities for the Metro Sewer construction upgrades that are anticipated to occur in Q3 2014.
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 May 15th and June 13th, 2014 the SDs submitted the April and May **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 (“BABCOWA”) was established by the MT DNRC in October 2009 with Butte-Silver Bow as the petitioner. Implementation and monitoring of the BABCOWA 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**

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.

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. During the reporting period the SDs have fully cooperated with the MBMG Monitoring Program.

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

The following table summarizes the performance of the HsBWTP in Quarter 2 2014:

Period	Influent (MG)	Effluent (MG)	Sludge Wasted (MG)	Lime Delivered (tons)	Average Influent Flow (MGD)	Average Lime Usage (mg/L)
Quarter 2	403	404	50	5,023	4.3	2,984
YTD	799	779	87	9,736	4.4	2,920

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.

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

Please see the response in **Actions Taken Toward Achieving Compliance, 1. Monitoring Program** for details to the answers to this reporting requirement.

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 second quarter 2014 activity summary is as follows:

1. The Monitoring Plan will continue to be implemented during the next quarter and the SD's will continue to provide unfettered access, cooperation and any assistance to the MBMG requested in performing this task.
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 SD's will continue along with monthly meetings of the SD technical advisory team. The Inflow Control requirement will continue to be met with 100% of the HsBWTP effluent integrated into the mining and milling operations. The Operations and Maintenance Plan and Health and Safety Plan will be completed in the third quarter and submitted to the Agencies.
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 Q3 of 2014 to maintain West Camp water levels below the CWL.
6. Waterfowl mitigation efforts will be continued during Q3 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 Site Activity Schedule will be followed and modified as needed. HsBWTP optimization and evaluation will continue. The BMFOU water balance update will commence using third party consultants.
8. 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.

Future Work Plans – The SDs have no plans to submit Future Work Plans as required by the CD to the Agencies during Q3 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 slope stability evaluation, determination of near term necessity and additional slope stability monitoring and/or controls if deemed necessary.

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.**

The change in the submittal date of Quarterly Reports from ten days to forty-five days after the end of the quarter was approved by the Agencies on June 16, 2016.

The change in the submittal date of the BMFOU Berkeley Pit Slope Stability Evaluation from July 25, 2014 to August 15, 2014 was approved by the Agencies on July 29, 2014.

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 discussion regarding “The Draft Work Plan for the BMFOU Berkeley Pit Slope Stability Evaluation” on pages 2 and 3 of this report and 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***. The Work Plan was approved by the EPA on June 12, 2014. Because of the close proximity to the BMFOU there may be interplay of activities such as spoiling of excess material from this BPSOU project to areas within the BMFOU boundary and accessing topsoil and fill material from MR's property within the BMFOU to complete the BPSOU remedial action to specifications.

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 in Q2 2014 nor does it plan to place fill into the Berkeley Pit in the Q3 2014.

BMFOU QUARTERLY REPORT

Q2 2014

ATTACHMENT:

Berkeley Pit Slope Stability Quarterly Summary



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MEMORANDUM

TO: Stephen Walsh
FROM: S. Czehura
DATE: July 31, 2014
SUBJECT: Berkeley Pit Slope Stability Second Quarter Summary 2014

During this period “no movement” was detected 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). Three TDR/piezometer wells were added to the monitoring network in April 2014 (Figure 1) as a result of the ongoing “BMFOU Berkeley Pit Slope Stability Evaluation.”

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 Pittsmont 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 Pittsmont 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. 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 movement” being indicated. The fifth point has not been checked for some time due to safety concerns. Surficial cracking at the crest of highwall in this area prevents the outer point from being measured directly by GPS. Extensometers, however, adequately cover the area. These, likewise, showed no progressive movement during this time period. The extensometers are routinely monitored two to three times per shift. No repairs to the 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: The seven survey points monitored showed no progressive movement. One of the monitor points (A37232) was run over by a pickup truck on May 3, 2014; however, the point was reestablished. The wire extensometers showed random movement ($< \pm 1/4$ inch) throughout this period. All movement appeared to be random and not progressive. These extensometers are scheduled to be monitored three times per shift. No repairs to the extensometers were performed during this time period.

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 2014 on the "B" axis of PZF12-4 at 255 feet, remains stable.

During the weekend of May 17-18, 2014 operators reported surficial collapse of localized overhanging materials along the crest of the pit highwall in this sector. Engineers checked this area as well as Pittsmont Sector on Monday, May 19th 2014 and no new tension cracks were observed. Old cracks were examined for movement as well and nothing of concern was observed.

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

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

Dewatering Well	April		May		June	
	Flow (gpm)	Availability	Flow (gpm)	Availability	Flow (gpm)	Availability
PZF12-1	82.5	100%	80.1	100%	76.9	100%
PZF12-2	38.3	94%	37.9	100%	37.7	100%
PZF12-3	21.6	100%	22.0	100%	22.4	100%
LP-15	43.0	100%	43.0	100%	43.0	100%

The pump in Well PZF12-2 dropped out a few times during April, but otherwise has 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 second quarter with no indicated distress. However, the TDR cable in PZF 14-1

completed during the previous quarter with 395 feet of casing left in the ground began showing a possible distress event in April 2014 starting approximately 356 feet below the ground surface and extending to the bottom of the well. Another possible distress event was identified 252 feet below the ground. The second possible distress event is located in the same area as one of the welded joints on the steel casing. Based on the location of the event and weld, it is believed that the weld could have broken causing the ground to shift and kink the cable. The possible distress event at the bottom of the cable continued to move upward throughout April and stabilized around 342 feet mid-May 2014. Since that time there hasn't been any drastic changes. The possible distress event was not observed in the other two wells located nearby and no new cracking was observed at surface in the immediate area. Therefore, based on the location of the possible event and its progression upward, it is thought that water is causing a "short" in the cable as a result of damage that occurred during completion and subsequent abandonment of the well. Diligent monitoring, however, continues.

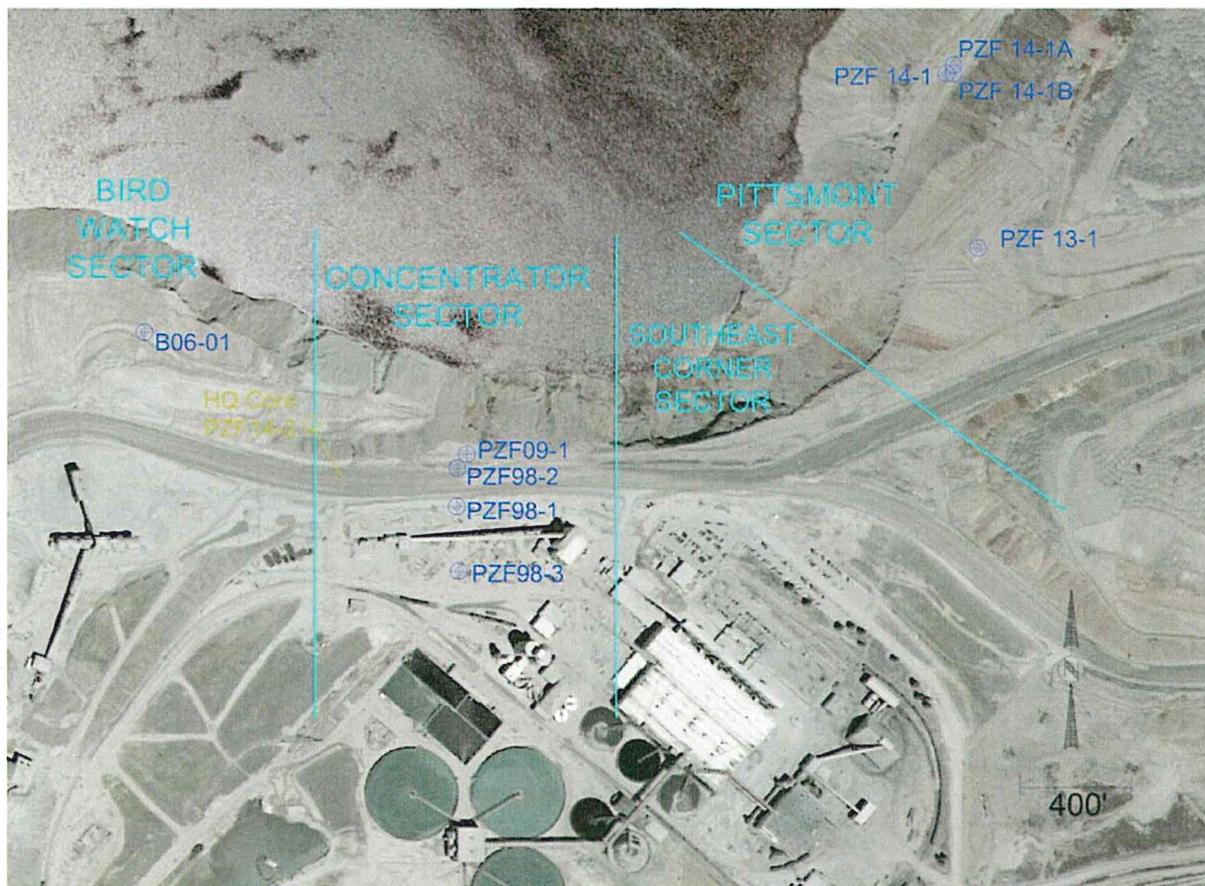


Figure 1. TDR wells monitored weekly.

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.

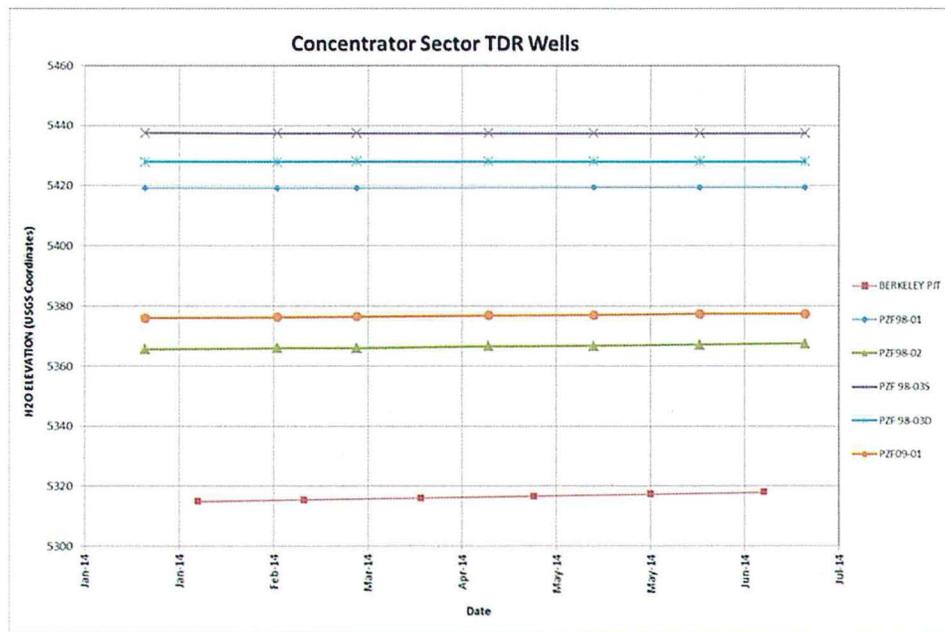


Figure 3. Hydrographs Concentrator Sector.

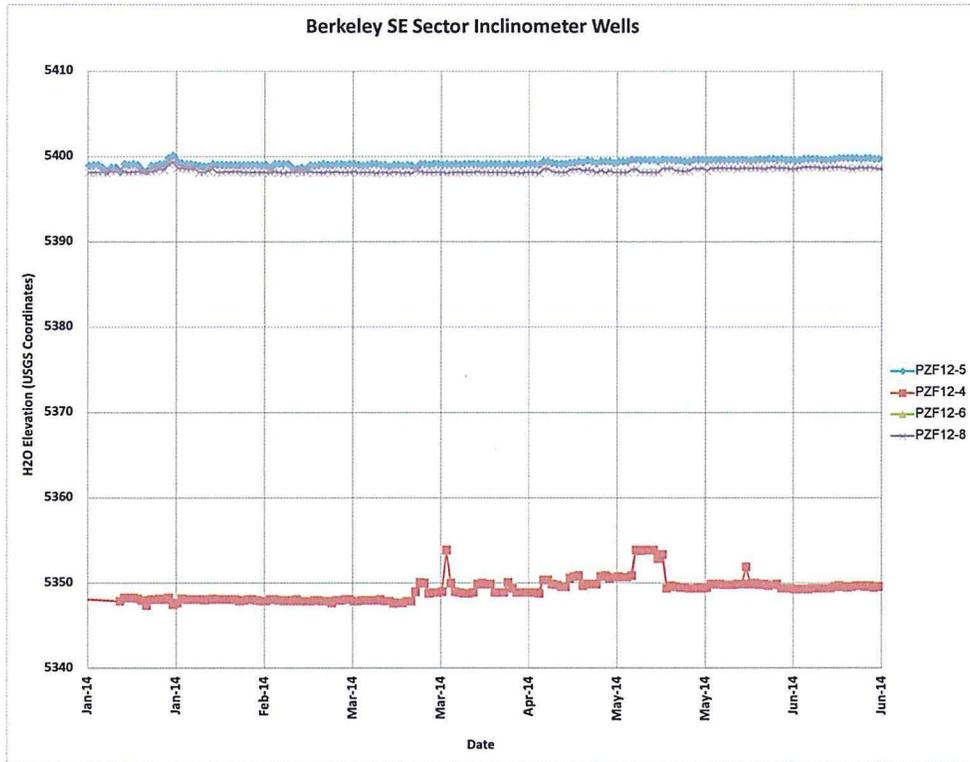


Figure 4. Hydrograph Southeast Sector inclinometer wells.

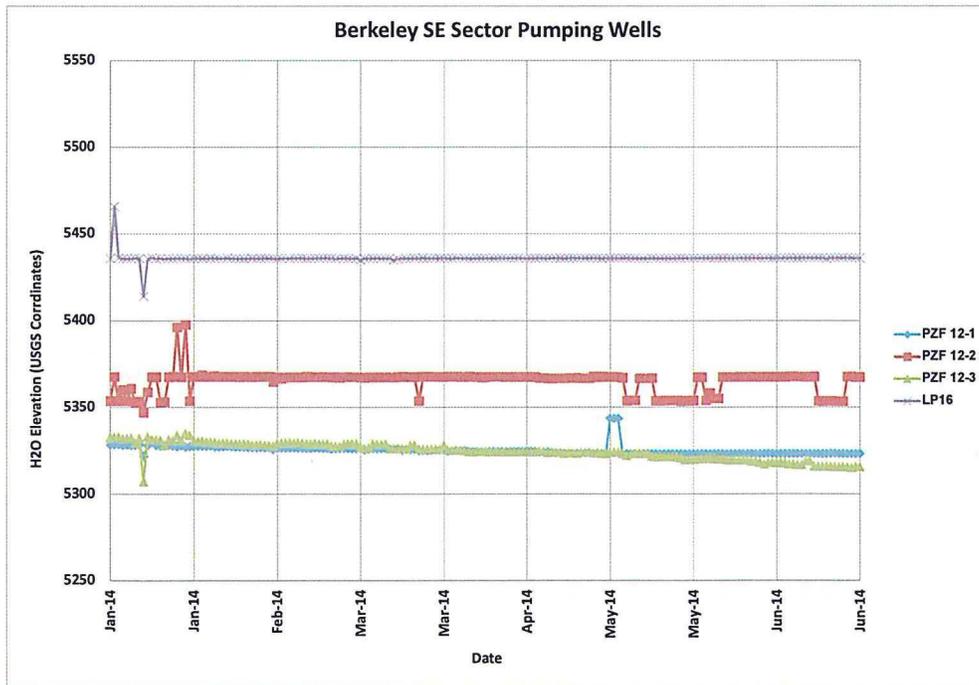


Figure 5. Hydrographs Southeast Sector pumping wells.

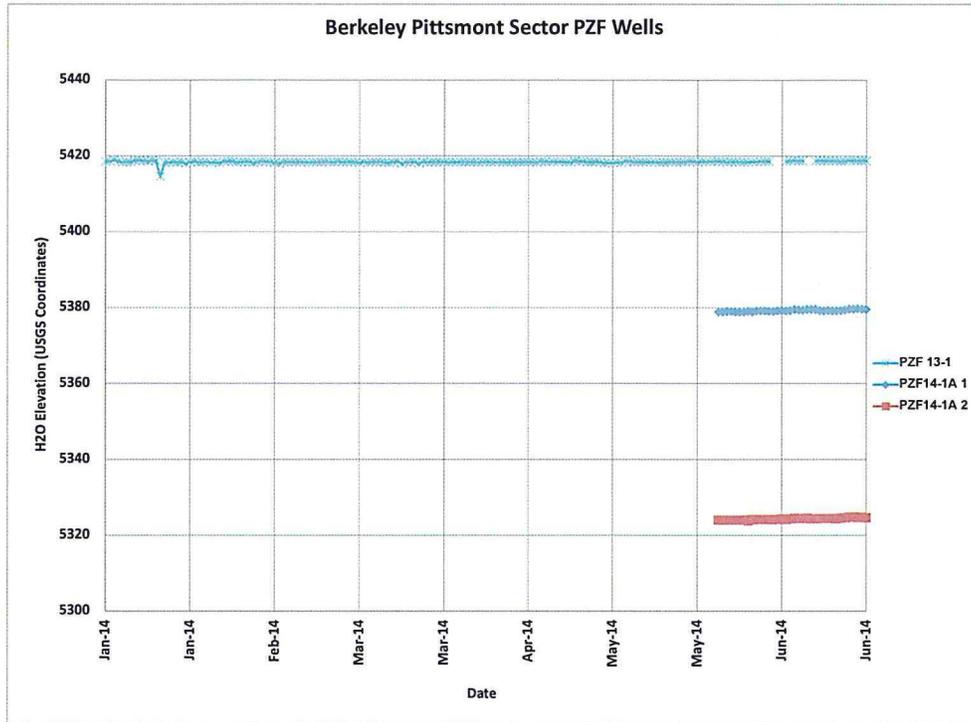
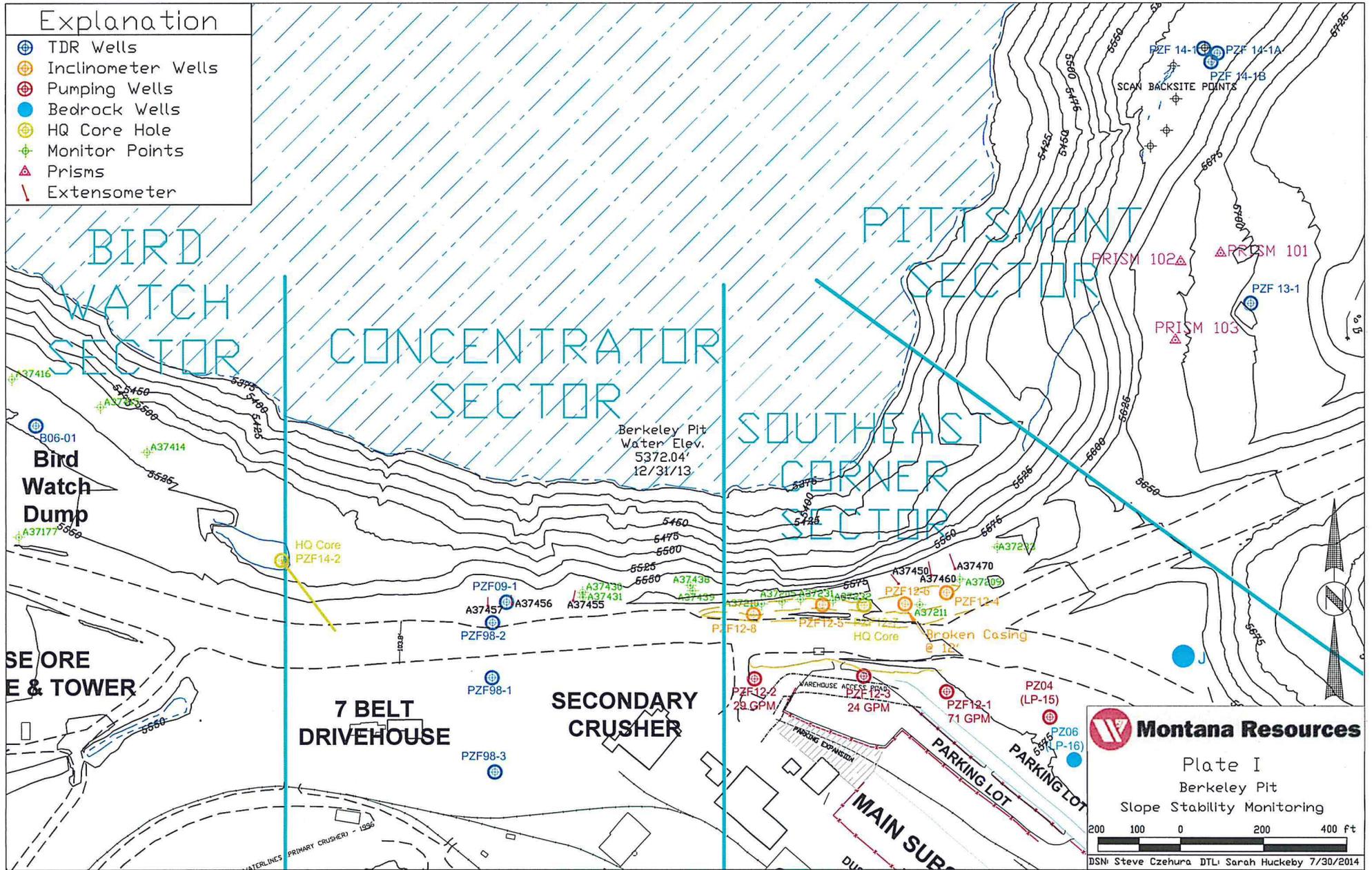


Figure 6. Hydrographs Pittsmont Sector.

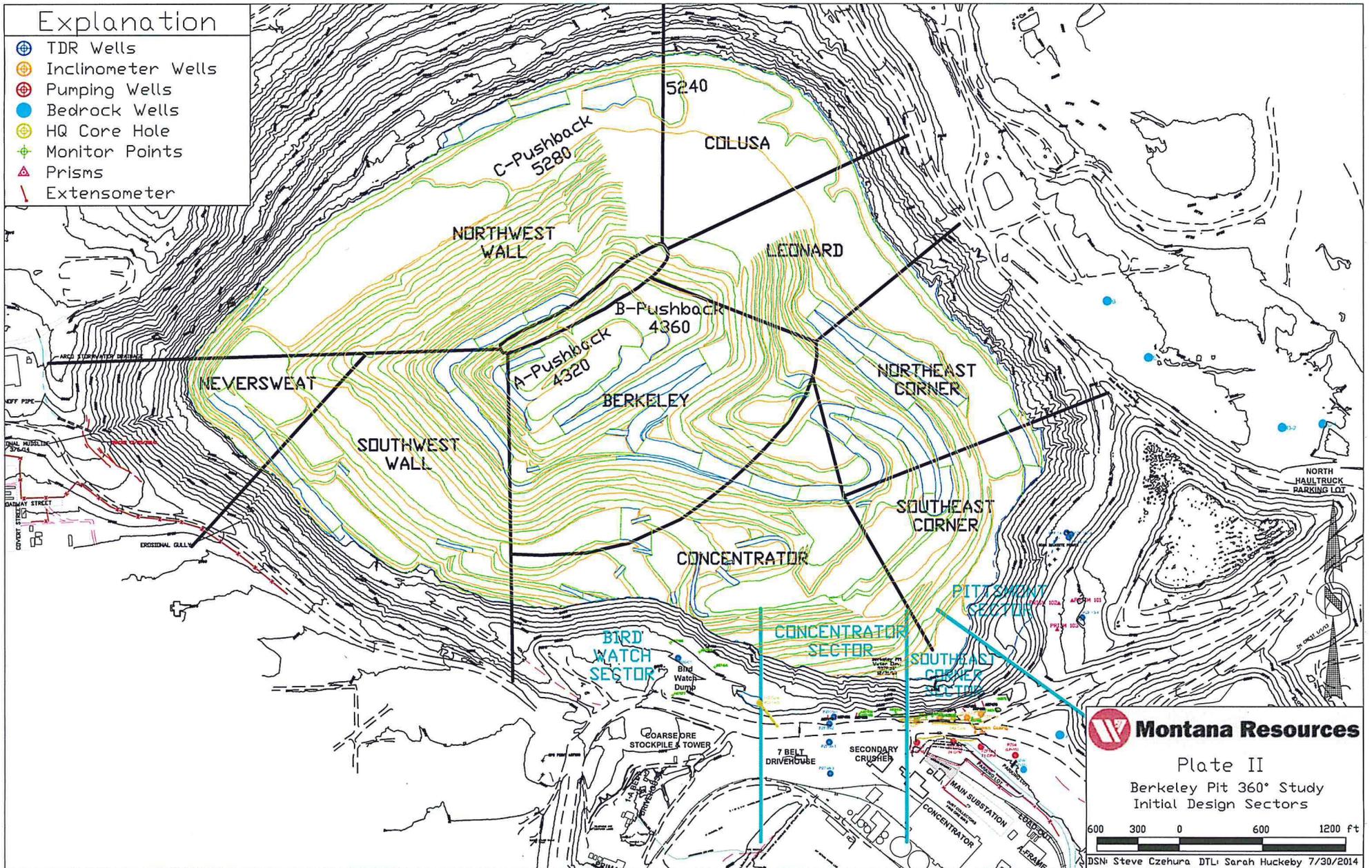
Explanation

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



Explanation

-  TDR Wells
-  Inclinometer Wells
-  Pumping Wells
-  Bedrock Wells
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-  Monitor Points
-  Prisms
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 **Montana Resources**

Plate II
Berkeley Pit 360° Study
Initial Design Sectors

600 300 0 600 1200 ft

DSN: Steve Czehura DTL: Sarah Huckeby 7/30/2014