FREEPORT-McMoRan
COPPER & GOLD

Copper Queen Branch/Freeport-McMoRan Corporation
36 West Highway 92
Bisbee, Arizona 85603

May 29, 2014

Ms. Mindi Cross
Water Quality Compliance Section
Arizona Department of Environmental Quality
1110 West Washington Street
Phoenix, Arizona 85007

Re: Feasibility Study and Mitigation Plan for Drinking Water Supplies that May be Affected by Sulfate In the Future
Mitigation Order on Consent No. P-121-07

Dear Ms. Cross:

Freeport-McMoRan Corporation, Copper Queen Branch (CQB) submits the following documents to the Arizona Department of Environmental Quality (ADEQ) as requested in your April 2, 2014 letter which approved the Draft Feasibility Study for Drinking Water Supplies that May be Affected in the Future:

- Feasibility Study for Drinking Water Supplies that may be Affected by Sulfate in the Future, Mitigation Order on Consent Docket No. P-121-07, dated May 28, 2014
- Mitigation Plan for Sulfate with Respect to Drinking Water Supplies, Mitigation Order on Consent Docket No. P-121-07, dated May 28, 2014

The draft FS submitted to ADEQ on July 30, 2013 was revised as outlined in CQB's February 27, 2014 responses to ADEQ's comments, which were discussed in our March 19, 2013 meeting. At that meeting, ADEQ provided the following clarifications to several of its comments:

- Comment 1 – ADEQ clarified that its request that all mitigation alternatives include an annual review of Arizona Department of Water Resources (ADWR) domestic well records was focused on the area east of the Black Gap Fault where the plume is in bedrock and there is limited potential to mitigate affected wells through connection to a public water supply. Consistent with its comment response, CQB agreed to include an annual review of ADWR well records in each mitigation alternative, but clarified that additional mitigation actions, including sampling, only apply to existing drinking water supply wells, not to proposed wells that have not been installed. This comment is addressed in both the Feasibility Study and Mitigation Plan.

- Comment 4 – ADEQ clarified that it requested additional information on North and South Tailing Impoundment reclamation activities to "close the loop" as noted in ADEQ's December 2011 DOA letter, which in turn noted that actions taken to control

sources of sulfate to groundwater would be described in the Feasibility Study. To address this comment, additional discussion of the reclamation activities is included in the Feasibility Study.

- Comment 13 – CQB resolved an ambiguity that ADEQ suggested could be misunderstood to suggest that CQB may elect to implement an alternative other than Alternative 1if the AWC or NWC well fields are impacted or are about to be impacted. CQB clarified that if monitoring results indicate that a public supply could be affected in the future, it may decide to implement a different alternative in time to prevent sulfate concentrations from exceeding 250 mg/L. CQB indicated that this situation would be addressed in the Mitigation Plan using adaptive management. The Mitigation Plan specifies actions that will be taken to monitor sulfate at the AWC and NWC wellfields and to respond to the monitoring results.

- Comment 14 – ADEQ clarified that CQB should cite additional sources of information (e.g., census figures or County growth projections) supporting the assumption that substantial changes in groundwater pumping are not expected in the future and that CQB should periodically review this assumption. The Feasibility Study includes information on the historical and projected future population of the Bisbee area to support the groundwater pumping assumptions of the numerical groundwater flow model.

Based on these clarifications, ADEQ agreed that CQB did not need to revise its February 27, 2014 comment responses, and that ADEQ would issue a letter approving the Feasibility Study and requesting that CQB submit a Mitigation Plan. ADEQ issued the approval letter on April 2, 2014.

Also, during the March 19, 2014 meeting, CQB reviewed the expanded groundwater monitoring program. ADEQ agreed with the proposed monitoring well locations and construction.

If you have any questions regarding our summary of the March 19, 2014 meeting or the enclosed documents, please contact me at (602) 366-8303.

Sincerely,

Stuart Brown
Sr. Director, Remediation Projects
Freeport-McMoRan Corporation

cc: Robert Quintanar/Freeport-McMoRan Corporation, Copper Queen Branch
Jim Norris/Clear Creek Associates
Sheila Deely/Freeport-McMoRan Copper and Gold

MITIGATION PLAN FOR SULFATE WITH RESPECT TO DRINKING WATER SUPPLIES

MITIGATION ORDER ON CONSENT DOCKET NO. P-121-07

Prepared for:

FREEPORT-MCMORAN CORPORATION,
COPPER QUEEN BRANCH
36 West Highway 92
Bisbee, Arizona 85603

Prepared by:

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221 North Court Avenue, Suite 101
Tucson, Arizona 85701

May 28, 2014

MITIGATION PLAN FOR SULFATE WITH RESPECT TO DRINKING WATER SUPPLIES

MITIGATION ORDER ON CONSENT DOCKET NO. P-121-07

Prepared for:

FREEPORT-MCMORAN CORPORATION,
COPPER QUEEN BRANCH
36 West Highway 92
Bisbee, Arizona 85603

Approved by:

James R. Norris
Arizona Registered Geologist No. 30842

May 28, 2014

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1.0 PROPOSED MITIGATION ACTION

1.1 Background

This Mitigation Plan describes the process that will be followed to implement the mitigation action[1] for sulfate in groundwater that may affect[2] existing[3] drinking water supplies in the vicinity of Naco, Arizona (Figure 1). The Mitigation Plan is a requirement of Section III.D of Mitigation Order on Consent No. P-121-07 (Mitigation Order) (ADEQ, 2007) between Arizona Department of Environmental Quality (ADEQ) and Freeport-McMoRan Corporation Copper Queen Branch (CQB). Sulfate is a naturally occurring inorganic salt that, in high enough concentrations, may influence the taste of water. The Mitigation Order requires mitigation of existing drinking water supplies exceeding 250 milligrams per liter (mg/L) sulfate, if the sulfate originates from the CQB Concentrator Tailing Storage Area (CTSA).

Drinking water supplies in the vicinity of the CTSA do not exceed the sulfate action level of 250 mg/L at this time because CQB mitigated previously affected supplies under a separate Mitigation Plan (Clear Creek Associates, 2012) which was approved by ADEQ (ADEQ, 2012) under the Mitigation Order and has been implemented by CQB (CQB, 2013). Therefore, this Mitigation Plan is forward looking and pertains to actions that will be taken to monitor and, if needed, mitigate an existing drinking water supply.

[1] The term mitigation action as used in this document encompasses all actions implemented under the Mitigation Plan. Initially, the term includes the measures described in this Mitigation Plan. If a contingent mitigation measure is implemented or implemented measures are changed due to adaptive management, then the term mitigation action encompasses the contingency or change.

[2] The terms "affect" and "affected", with reference to a drinking water supply, are defined for the purpose of the Mitigation Plan as indicating a water supply with an average sulfate concentration exceeding 250 milligrams per liter due to sulfate originating from the Concentrator Tailing Storage Area.

[3] Section III.E of the Mitigation Order applies to existing drinking water supplies that are determined to be affected based on water sampling and analysis, not to future proposed supplies, such as proposed new wells that have not been installed, cannot be sampled, and do not supply water.

Sulfate concentrations greater than 250 mg/L occur in a groundwater plume[4] north of Naco. Figure 2 illustrates the extent of the sulfate plume in the first quarter of 2014. The plume is migrating to the west, the naturally occurring direction of groundwater flow. Figure 3 shows water level elevations and the direction of groundwater flow in the first quarter of 2014.

Since 2007, CQB has studied the nature and extent of the sulfate plume (Clear Creek Associates, 2010), conducted groundwater monitoring at drinking water supplies and monitoring wells (e.g., Clear Creek Associates, 2014a), and mitigated affected drinking water supplies (Clear Creek Associates, 2012) pursuant to the requirements of the Mitigation Order. In July 2013, CQB submitted a draft Feasibility Study (draft FS) to ADEQ (Clear Creek Associates, 2013) that evaluated various mitigation alternatives that could be taken to address potential future effects to drinking water supplies. The draft FS described the mitigation action objective and recommended a mitigation alternative for implementation.

ADEQ reviewed the draft FS and provided comments on it in January 2014 (ADEQ, 2014a). ADEQ agreed with the recommended mitigation alternative, but requested that CQB respond to ADEQ's comments before revising the draft FS for final submittal. CQB's responses to ADEQ's comments were submitted in February 2014 (CQB, 2014) and CQB met with ADEQ in March 2014 to discuss the comments. ADEQ approved the FS on April 2, 2014 (ADEQ, 2014b), and requested that a revised FS and a Mitigation Plan be submitted within 60 days. The revised FS (Clear Creek Associates, 2014b) was submitted to ADEQ with the Mitigation Plan.

1.2 Mitigation Action Objective

The mitigation action objective defined in the Mitigation Order and described in the FS is to "practically and cost effectively provide a drinking water supply that meets applicable standards and with sulfate concentrations less than 250 mg/L to the owner(s)/operator(s) of existing drinking water supplies determined…to have an average sulfate concentration in excess of 250 mg/L…as a result of the sulfate plume originating from the PDCTSA". There is no health based water quality standard for sulfate, although the U.S. Environmental Protection Agency (EPA) (EPA, 2003) has issued an advisory for sulfate when present in drinking water at or above 500 mg/L due to possible acute laxative effects for those unaccustomed to drinking water with sulfate at that level.

[4] The term plume is defined as groundwater that exceeds 250 milligrams per liter due to sulfate originating from the Concentrator Tailing Storage Area. The plume edge is defined as the 250 mg/L sulfate concentration contour inferred from groundwater monitoring data as shown on Figure 2.

1.3 Description of the Approved Mitigation Alternative

The FS recommended Alternative 1C based on a comparative analysis of the effectiveness, implementability, cost, and environmental effects of the mitigation alternatives considered. ADEQ approved Alternative 1C as the mitigation alternative based on its review of the FS and consideration of comments from interested parties. Alternative 1C contains the following actions:

- a water supply study to identify a potential alternate groundwater source for public water supply mitigation, if needed,
- expanded groundwater monitoring to track plume migration in the vicinity of Arizona Water Company (AWC) wellfield and Naco Water Company (NWC) Naco area water supply (Figure 4) and to monitor the sulfate concentration at the leading edge of the plume for the purposes of establishing sentinel wells with action levels that, if exceeded, would trigger a contingent mitigation action at a public supply, if needed,
- long term plume monitoring to monitor sulfate at public and private drinking water supplies and to describe the large scale geometry of the plume over time, and
- annual review of Arizona Department of Water Resources (ADWR) well registry records for wells within a mile of the plume to identify new drinking water supply wells for sampling.

Under Alternative 1C, the sulfate plume will slowly migrate westward under the natural hydrologic gradient in the aquifer. The potential future movement of the plume was evaluated using a numerical model for groundwater flow and sulfate transport under assumed future aquifer conditions, as described in the FS. Figure 5 shows the predicted future location of the sulfate plume under Alternative 1C based on the numerical model results.

The sulfate plume is predicted to migrate westward and north of the AWC and NWC wellfields near Naco, although it is projected to migrate to within 1,000 feet of the AWC wells. Sulfate concentrations at the AWC and NWC wellfields are not predicted to exceed 250 mg/L. According to model projections, there are three private drinking water supply wells in the region where the plume is predicted to migrate in the next 30 to 100 years and that could be affected by the plume.

The numerical model was developed to simulate the large-scale movement of the sulfate plume for use in evaluating potential mitigation alternatives for the FS. The construction and calibration of the model are described in detail in the Aquifer Characterization Report (Clear Creek Associates, 2010) and the FS. Although based on the best available information, the model predictions have a degree of uncertainty and need to be verified by ongoing groundwater monitoring.

Alternative 1C contains specific actions for an expanded groundwater monitoring program focused on quantifying the small scale movement of the plume in the vicinity of existing AWC and NWC wells in the Naco area. The expanded groundwater monitoring will include identification of sentinel wells with action levels that, if exceeded, would trigger a contingent mitigation action. Alternative 1C also contains provisions for long term plume monitoring to track the large scale movement of the plume and to monitor sulfate concentrations over time at private and public drinking water supplies. An annual review of ADWR well registry records will be used to identify new drinking water supplies within a mile of the plume for sampling. The need for a contingent mitigation action for a drinking water supply would be based on the results of the expanded groundwater monitoring and long term plume monitoring programs.

Potential contingent mitigation actions, if needed, would vary for public and private water supplies. This is because public supplies provide service to a larger number of people than do private water supplies. Public supplies also have associated distribution systems to maintain and compliance requirements to meet for ADEQ and the Arizona Corporation Commission.

Alternative 1C assumes a contingent mitigation action of an alternate water supply if the AWC or NWC public supplies in the Naco area are determined through monitoring to be likely to be affected. A water supply study will be conducted to determine whether an alternative groundwater source could be developed to augment or replace the AWC or NWC wells. The water supply study will identify potential sources based on regional hydrogeologic data and will conduct drill testing of potential sources to evaluate their aquifer characteristics and water quality. If development of an alternative water supply is infeasible, large scale reverse osmosis (RO) water treatment would be a fallback technology for contingent mitigation.

If a private water supply is affected by average concentrations of sulfate in excess of 250 mg/L, the supply will be mitigated based on an analysis of potentially applicable actions in the context of site specific conditions. The contingent mitigation action for a private well would be determined in consultation with the well owner and could include well replacement, connection to a public supply, water treatment, or bottled water, depending on conditions.

The Mitigation Plan described in Section 2 provides the process for implementing the components of Alternative 1C. The Mitigation Plan addresses the following mitigation action components:

- water supply study (Section 2.1),
- expanded groundwater monitoring (Section 2.2),
- long term plume monitoring (Section 2.3),

- annual review of ADWR well registry records (Section 2.4),
- contingent mitigation of drinking water supply wells, if needed (Section 2.5),
- the adaptive management approach that will be used to modify, if necessary, and ultimately terminate the mitigation action (Section 3), and
- the mitigation performance review process to be used to assess the mitigation action with respect to the mitigation action objective (Section 3.2).

The Mitigation Plan also identifies reporting (Section 4) and community involvement (Section 5) activities.

2.0 MITIGATION PLAN

This section describes the Mitigation Plan components of the water supply study, expanded groundwater monitoring, long term plume monitoring, annual review of ADWR well records, and possible contingent drinking water supply mitigation.

2.1 Water Supply Study

CQB will work in consultation with AWC to conduct a water supply study with the objective of identifying and evaluating potential alternate water supply sources. The water supply study will compile hydrogeologic data to identify prospective water sources as exploration targets. One or more exploration targets will be explored by drilling pilot boreholes to determine hydrogeology and by installing test wells to determine the aquifer characteristics and quality of groundwater at each target. Depth specific water quality sampling will be conducted to characterize major and minor element concentrations in groundwater over the depth extent of the target. Depending on the hydrogeology and water quality determined by drilling and water sampling, a small diameter test well may be constructed for hydraulic testing to estimate the water producing characteristics of the aquifer and for additional water quality sampling for drinking water analysis.

The water supply study will be completed by July 1, 2016 (Section 2.2) unless exploration drilling is delayed by logistical factors beyond CQB's control, such as land access. If an alternate supply is identified, CQB will work with AWC to prepare a preliminary implementation schedule for the engineering design, permitting, procurement, and construction tasks needed to develop the supply. The implementation schedule would be used in the development of sulfate action levels so that the alternate supply, if needed, could be implemented before the average sulfate concentration of the AWC supply exceeds 250 mg/L. In the event that an alternate supply is infeasible, large scale RO water treatment would be the contingent mitigation, unless other lower cost alternatives are identified through the adaptive management process (Section 3.1). The implementation timeframe for large scale RO water treatment would be identified for the expanded groundwater monitoring program if an alternate supply is not found.

2.2 Expanded Groundwater Monitoring

The expanded groundwater monitoring program will monitor the position of the plume in the immediate vicinity of the existing AWC and NWC public water supplies near Naco for the purpose of identifying sentinel well locations and sulfate action levels for the sentinel wells that would, if exceeded, initiate a contingent mitigation. Expanded groundwater monitoring will

include the preliminary work that needs to be completed to provide data for identification of sentinel wells and action levels, including monitoring well installation, water level measurement, water quality sampling for sulfate, hydraulic testing, and data analysis to detail hydrogeologic and sulfate concentration conditions between the plume and the public supplies. These data will be used to identify sentinel wells and to develop action levels for the sentinel wells. The NWC water supply well NWC-04 near Bisbee Junction is not included in the expanded groundwater monitoring because the plume is believed to be moving away from this well. Instead, NWC-04 will continue to be monitored under the long term plume monitoring program (Section 2.3).

Under the expanded groundwater monitoring program additional monitoring wells will be installed upgradient of the existing AWC and NWC wellfields near Naco. The new monitoring wells would be placed between the plume and the public supplies in a manner that would allow direct measurement of plume velocity (i.e., the time for the leading edge of the plume to migrate between monitoring wells) and the rate of change of sulfate concentrations at the leading edge of the plume (i.e., how long does it take for concentrations to increase from low levels to a concentration of 250 mg/L).

New monitoring wells are expected to be installed at six locations within 2000 feet of the plume edge. The wells will be installed in the basin fill aquifer, the primary aquifer from which the public supplies draw water. Two separate monitoring wells will be drilled and installed at each monitoring location. One well will be screened over the lower portion of the basin fill aquifer and one well over the upper portion of the aquifer. Hydraulic testing will be conducted at the new monitoring wells to determine hydraulic properties for the basin fill near the existing Naco area public supplies. Water sampling and sulfate analysis at the new wells will be conducted quarterly for at least eight quarters to establish sulfate concentration trends. One or more of the new monitoring wells or existing wells may be used as sentinel wells.

The groundwater monitoring data will be used to track plume movements and sulfate concentration trends near the public supplies to provide information needed to assess the potential for sulfate to affect a supply. The water table configuration, aquifer hydraulic properties, plume velocity, and sulfate concentration distribution over time at the leading edge of the plume are key factors for updating the conceptual and numerical models for the plume and for assessing the risk that the plume could migrate to and affect a public supply. Monitor well installation and testing results, and the monitoring data collected under the expanded groundwater monitoring program will be incorporated into the annual groundwater monitoring report to be submitted to ADEQ (Section 4.1).

The results of expanded groundwater monitoring will be used to identify sentinel well locations and develop sulfate action levels. The sentinel wells and action levels will identify the specific locations and average sulfate concentrations at which CQB would implement a contingent mitigation action. Action levels for sulfate would also be set at the point of use of the public water supply. The action levels would be an average concentration to be verified by repeated samplings that will be set with the objective of providing sufficient lead time to allow the design, permitting, construction, and startup of the mitigation action prior to sulfate exceeding 250 mg/L at a public supply.

Two action levels will be set at sentinel wells and public supplies, and sequenced to trigger different actions at specific sulfate concentrations. Figure 6 illustrates how action levels would be applied at sentinel wells and public water supplies. The first action level would trigger written notice to ADEQ and the water supply operator, and require selection of the contingent mitigation action and development of a 90% engineering design. The 90% engineering design would be of a sufficient level of detail and completion to describe the treatment system design basis, components, and requirements. The second action level would trigger additional written notice to ADEQ and the water supply operator, and preparation of the 100% engineering design, development of a bid specification, contractor selection, and initiation of permitting, procurement, and construction.

The establishment of sentinel wells and setting of action levels requires an understanding the plume velocity, the rate of change of sulfate concentration at the leading edge of the plume, and the implementation timeframe for the selected mitigation actions. For example, the time needed to design and construct the contingent mitigation actions can be multiplied by the plume velocity to determine a distance from a drinking water supply that a sentinel well could be located to provide the time needed to implement the design and construction phases of a mitigation action. Action levels and sentinel well locations cannot be specified until results are available from the expanded groundwater monitoring program and implementation timeframes are developed for a mitigation action. The implementation timeframe would estimate the time needed for potential critical path activities such as land acquisition, right of way development, permitting, engineering design, bid solicitation, procurement, construction, and startup of the mitigation. Considering these factors, CQB will conduct the following work to identify sentinel well locations and action levels:

- install and test new monitoring wells by October 1, 2015, and complete eight quarters of sampling and analysis for sulfate by October 1, 2017 unless drilling is delayed by logistical factors beyond CQB's control, such as land access,

- complete the alternate water supply study by July 1, 2016 (Section 2.1) unless drilling is delayed by logistical factors beyond CQB's control, such as land access, and

- in consultation with AWC, develop a conceptual design and critical path analysis to identify the implementation timeframe for an alternate water supply by July 1, 2017. If an alternate supply is infeasible, the conceptual design and critical path analysis will be developed for a large scale RO treatment system by July 1, 2017.

Based on the results of expanded groundwater monitoring, the outcome of the water supply study, and the identification of implementation timeframes, CQB will recommend sentinel well locations, sulfate action levels, and the action(s) to be implemented if the action levels are exceeded. A report describing the development of action levels and sentinel well recommendations will be prepared by April 1, 2018 and submitted to ADEQ.

A temporary action level will be used for the AWC wellfield prior to the April 1, 2018 report identifying sentinel wells and action levels. If the temporary action level of 150 mg/L sulfate is exceeded at an AWC supply well, CQB would notify ADEQ and AWC in writing and begin development of a 90% engineering design for an alternate water supply if one has been identified or a large scale RO treatment facility for the AWC wellfield if an alternate supply is not identified. The 90% engineering design would be of a sufficient level of detail and completion to describe the treatment system design basis, components, and requirements. Proceeding on subsequent implementation steps, such as preparation of the 100% engineering design, development of a bid specification, contractor selection, procurement, and construction would be based on the observed rate of increase of sulfate at the AWC wells. The temporary action level will be superseded by the sentinel well and action level recommendations of the April 1, 2018 report.

As currently understood based on numerical modeling described in the FS, the plume is moving slowly to the west at rates of approximately 50 to 100 feet per year. The expanded groundwater monitoring program is meant to verify the plume migration rate. Thus, the plume is expected to migrate 400 feet or less during the expanded groundwater monitoring and development of action levels. In the event that sulfate concentration data after the first several years of monitoring are insufficient for estimating plume velocity and setting action levels due to the slow movement of the plume (i.e., plume movement is so slow that significant concentration changes are not observed at the new monitoring wells), groundwater monitoring would be continued and reassessed annually until adequate data are available.

2.3 Long Term Plume Monitoring

The long term plume monitoring program will monitor the sulfate concentration at public and private drinking water supplies, and collect water level and sulfate measurements at monitoring wells over time to track the large scale geometry and concentration of the plume. The objectives of long term plume monitoring are:

- determination of the sulfate concentration in drinking water supplies within a one-mile radius of the outer edge of the sulfate plume (i.e., the 250 mg/L sulfate concentration contour),

- identification of the plume margin for ongoing delineation of the plume extent and assessment of plume migration (plume edge monitoring),

- documentation of the sulfate concentrations in the plume and areas distal to the plume to monitor long term concentration trends (regional monitoring), and

- measurement of water levels in the vicinity of the plume to document potentiometric conditions.

Long term plume monitoring will be conducted in conjunction with expanded groundwater monitoring (Section 2.2), which has similar objectives, but is focused on public water supplies near Naco.

Groundwater samples for analysis of sulfate will be collected from both dedicated monitoring wells and private wells. The private wells consist of both drinking water supply wells and wells that are inactive or used for non-potable purposes. Sampling from private wells is dependent on the voluntary participation of the well owner and the operational status of the well. The sulfate analyses will be used to document the sulfate concentration in drinking water supplies, the extent of the plume (i.e., the 250 mg/L sulfate concentration contour), concentrations within the plume, and concentration changes over time in the aquifer.

Water levels will be measured to document the potentiometric conditions in the aquifer. Water level measurements are specified for monitoring points upgradient of, within, and downgradient of the plume to provide information for characterizing potentiometric conditions in a large area around the plume area. The potentiometric data describe the driving force for groundwater flow and are used to evaluate the direction of groundwater flow, the hydraulic gradient (i.e., the change in water elevation with distance), and the change in water elevations over time. All of these factors can influence the movement of the plume.

Table 1 lists the monitoring schedule for long term plume monitoring. Figure 7 shows well locations and sampling frequency for long term plume monitoring. The sampling frequencies for the long term plume monitoring schedule were developed considering the hydrogeologic understanding of the plume developed over the seven years of water supply sampling, aquifer monitoring, and hydrogeologic analysis conducted since 2008. The long term plume monitoring schedule will be implemented to replace the current ADEQ-approved groundwater monitoring

plan (ADEQ, 2010). The wells monitored over time may change as conditions such as the location of the plume boundary change.

2.3.1 Drinking Water Supply Sampling

Drinking water supplies are divided into four types for the purpose of monitoring: public water supplies, private drinking water supplies less than 2,000 feet from the plume edge, private drinking water supplies between 2,000 feet and mile of the plume edge, and private drinking water supplies installed below the plume as a mitigation action. Pursuant to the long term plume monitoring schedule, sulfate sampling will be conducted semiannually at public drinking water supply wells and at private drinking water supplies within 2,000 feet of the plume edge. An exception to semiannual sampling is NWC-04 at Bisbee Junction which will be sampled quarterly. NWC-04 is proximal to the plume and has had sulfate concentrations between 167 and 240 mg/L since 2008 (e.g., Clear Creek Associates, 2014a). Annual sulfate sampling will be conducted at private drinking water wells between 2,000 feet and one mile from the plume and private drinking water supplies installed below the plume as mitigation actions.

Drinking water supply wells that on their initial sampling have a sulfate concentration between 135 and 250 mg/L sulfate will be assessed by a period of more frequent sampling to develop baseline information on the sulfate concentrations and their trend, if any. The supply will be sampled monthly for no less than 5 consecutive months to establish a steady, increasing, or decreasing trend. Subsequent monitoring at the well would be based on the results of this monthly sampling.

As discussed in Section 2.4, an annual review of ADWR records will be conducted to identify new drinking water supply wells installed within a mile of the plume. New drinking water supply wells within a mile of the plume will be added to the monitoring schedule as they are identified. Sampling at new monitoring wells would be contingent on owner approval.

2.3.2 Plume Characterization Sampling

Water level measurement and sulfate sampling for ongoing characterization of the plume will be conducted at monitor wells and non-drinking water private wells according to the long term plume monitoring schedule. The results of drinking water supply monitoring will also provide data used for plume characterization. Monitoring for plume characterization will track plume migration over time based on concentrations in wells marginal to the plume edge (plume edge monitoring)

and will determine the overall plume geometry based on concentrations in, around, and distal to the plume (regional monitoring).

Monitoring sites are differentiated by three monitoring purposes: lateral plume edge monitoring, plume edge monitoring below the plume, and regional monitoring. Because the plume is moving slowly, semiannual sampling will be conducted at wells that define the lateral edge of the plume. Lateral plume edge monitoring wells are non-drinking water wells that are outside of the plume and within 2000 feet horizontally of the inferred 250 mg/L sulfate concentration contour. Monitoring the lateral edge of the plume will track the horizontal location and movement of the plume over time. Additionally, the expanded groundwater monitoring program will add to the number and geographic coverage of monitoring locations at the leading edge of the plume to collect information on the plume location and rate of migration.

Samples collected from below the plume monitor its lower edge. Plume edge monitoring wells below the plume will be sampled annually because the rate of vertically downward migration is expected to be small compared to the rate of lateral migration.

Sulfate samples will be collected from regional monitoring wells within the plume boundary and distal (greater than 2000 feet horizontally) from the plume edge. Sulfate sampling at regional monitoring wells will be conducted biennially because monitoring data collected since 2008 show that conditions within and distal to the plume are not changing quickly. The monitoring of sulfate within and distal to the plume will provide data for describing the long term evolution of the plume. These data are not expected to provide information of significance for tracking the short term migration of the plume.

Table 1 identifies wells for water level measurement only, including semiannual water level measurement at wells that are sampled for sulfate annually or biennially. Water level monitoring is specified to collect data from throughout the plume area (i.e., upgradient, mid-plume, and downgradient) to characterize the hydraulic gradient for groundwater flow over time. Water level measurements only are also specified semiannually at wells in the vicinity of the leading edge of the plume near Naco to collect information to support the expanded groundwater monitoring program.

2.3.3 Methods and Data Use

CQB will conduct long term plume monitoring using the sample collection and analysis methods described in the Quality Assurance Project Plan contained in Appendix F of the report titled *Work Plan to Characterize and Mitigate Sulfate with Respect to Drinking Water Supplies in the Vicinity*

of the Concentrator Tailing Storage Area (Hydro Geo Chem, Inc., 2008). These sampling and analysis methods have been used for all Mitigation Order groundwater monitoring conducted since 2008 to maintain the comparability of the data. Dissolved sulfate is the only constituent monitored.

Long term plume monitoring data will be used to confirm the plume migration predicted for Alternative 1C by tracking groundwater sulfate concentrations and the plume edge over time. The monitoring data will also be used to update and validate the conceptual and numerical models used to develop Alternative 1C.

The data collected under the long term plume monitoring program will be reported annually with data collected for expanded groundwater monitoring as described in Section 4.1. The annual groundwater monitoring report will contain exhibits such as tables of water level and sulfate measurements, water level and sulfate concentration maps, and time series graphs of sulfate concentration at drinking water supplies or other monitoring locations. CQB may propose changes to increase or decrease the location or frequency of long term plume monitoring depending on prevailing conditions as described in annual groundwater monitoring reports (Section 4.1) or mitigation performance reviews (Section 4.2).

2.4 Annual ADWR Well Registry Records Review

Groundwater wells installed in Arizona are required to register with the ADWR. The ADWR well registry records will be reviewed annually to identify new existing wells installed within one mile of the plume. Water use at new wells will be determined from the ADWR registry record and by inquiry with the well owner. CQB will offer to sample a new drinking water supply well within a mile of the plume and the well would be added to the long term plume monitoring schedule (Table 1) with a sampling frequency based on the well location (Section 2.3.1). The ability to sample any new wells would depend on permission from the well owner to access the well. The results of the annual well registry review will be reported in the annual groundwater monitoring report (Section 4.1).

2.5 Contingent Mitigation of Drinking Water Supplies

Section III.E of the Mitigation Order indicates that drinking water supply mitigation applies to existing drinking water supplies that are determined to be affected based on water sampling and analysis, not to future proposed supplies, such as proposed new wells that have not been installed, cannot be sampled, and do not supply water. Contingent mitigation of drinking water supplies, if needed, would be used to provide a drinking water supply meeting the mitigation action objective

of 250 mg/L sulfate. As described in the FS, public drinking water supplies are not predicted to exceed 250 mg/L sulfate in the future, but three existing private drinking water supply wells may be affected in 30 to 100 years. The term contingent is used because it is uncertain whether a drinking water supply would be affected in the future to require mitigation. CQB will monitor public and private drinking water supplies under the long term plume monitoring program (Section 2.3) and would mitigate a drinking water supply that monitoring determines warrants a mitigation action.

The FS identified potential mitigation actions for public and private drinking water supplies. Contingent mitigation actions are described separately for public and private water supplies because of their inherent differences in the number of service connections, pumping rates, and regulatory requirements. In either case, CQB would work with the owner or operator of the drinking water supply to consider site specific conditions in determining the most appropriate mitigation action from those identified in the FS.

2.5.1 Public Drinking Water Supplies

Mitigation of a public water supply would be more complex than mitigation of a private water supply due to the larger number of service connections, the larger volume of water pumped by the public supply wells, and the need to comply with public drinking water supply regulations. Mitigation actions potentially applicable to a public water supply, as described in the FS, include alternate water supply by well replacement outside the plume, blending, and large scale RO water treatment.

With regards to public drinking water supplies, the expanded groundwater monitoring program (Section 2.2) is specifically designed to monitor conditions proximal to the AWC and NWC water supplies near Naco while long term plume monitoring would measure the sulfate concentration of the supplies. The NWC water supply near Bisbee Junction (NWC-04) is not included in expanded groundwater monitoring because it is not in the projected direction of plume migration and will be monitored under the long term plume monitoring program. If the results of monitoring indicate a need for a contingent mitigation at a public water supply, CQB would work with either AWC or NWC to develop a mitigation action.

Based on the results of numerical modeling described in the FS, the AWC wellfield is the public water supply expected to be closest to the plume over time (Figure 5). For this reason, Alternative 1C explicitly identifies a contingent mitigation action of alternate water supply for the AWC wellfield, if needed. An alternate water supply could consist of one or more new water supply

wells developed at a location outside the plume. The alternate water supply could be used to blend with or replace the AWC supply. The new supply wells would need to be sited, installed, equipped, and plumbed into the existing system.

Because a multi-year lead time would be needed to site, develop, design, construct, and permit an alternate water supply, a water supply study (Section 2.1) will be conducted in advance to determine the feasibility of developing an alternative supply and the lead time for development. If an alternate supply is infeasible, large scale RO treatment system would be the default contingent mitigation action. The FS estimated a minimum lead time of 24 months to design, procure, and construct an RO water treatment plan capable of treating water from the AWC wellfield. The implementation timeframes for alternate water supply or RO water treatment will be further evaluated so that sulfate action levels can be established that would trigger phased implementation of a contingent mitigation (Section 2.2). The intent of having two action levels at sentinel wells (Section 2.2) is to trigger different levels of actions (Figure 6) within a sufficient timeframe such that the mitigation can be implemented before the sulfate concentration of the public supply exceeds 250 mg/L.

The exceedance of an action level at a sentinel well would not mean that a drinking water supply would necessarily be affected by sulfate in excess of 250 mg/L. For example, a situation could exist in which the plume migrates close enough to a public supply for sulfate to increase and trigger action levels, but not exceed 250 mg/L sulfate at the supply. This situation could lead to a false positive assessment in which a mitigation action might be taken and the supply never exceeds 250 mg/L. To guard against a false positive assessment in the event an action level is triggered, CQB reserves the right, working with the supply owner/operator, to conduct additional characterization of hydrologic conditions and plume movement to assess the risk to the public supply. Such work could include installation of additional monitoring wells, and identification of different sentinel wells and action levels based on the new information and considering the implementation timeframe for a mitigation action. Should an action level be triggered for implementation of procurement and construction activities, CQB reserves the right to update the analysis of potential contingent mitigation actions under the adaptive management provisions of Section 3.1.

The NWC drinking water supplies are not in the projected direction of plume movement, although NWC-04 at Bisbee Junction is proximal to the plume (Figure 2). The NWC water supplies have fewer service connections and pump less water than the AWC supply. The smaller size of the NWC supplies would influence mitigation action selection and lead times. The NWC supply near Naco will be monitored under both the expanded groundwater monitoring and long term plume monitoring programs. CQB would work with NWC to develop a mitigation action for the NWC

Naco supply, if exceedance of an action level indicates a need for mitigation. NWC-04 will be monitored quarterly under the long term plume monitoring program. CQB would work with NWC to develop a mitigation action for NWC-04 if the average sulfate concentration were to eventually exceed 250 mg/L in this well as a result of migration of the plume.

2.5.2 Private Drinking Water Supplies

Private drinking water supplies tend to be private wells supplying a single property or a well shared by several properties. CQB will continue to monitor existing private drinking water supplies within a mile of the plume under the long term plume monitoring program. If the average sulfate concentration of a private water supply is determined to exceed 250 mg/L, CQB would provide bottled water as an interim action while it works with the water supply owner to select a mitigation action from the following actions for mitigation of private drinking water supplies identified in the FS, considering site specific conditions:

- well replacement on the property with the affected well, if the hydrogeology and aquifer water quality is permissive,
- connection to public water supply,
- full house RO,
- point of Use RO, and
- bottled water.

CQB has successfully used connection to public water supply, well replacement, point of use RO treatment, and bottled water for prior mitigation projects (Clear Creek Associates, 2012). However, the applicability of a potential mitigation action for a specific property will depend on site-specific factors such local hydrogeologic conditions and proximity to a private water supply.

Working in consultation with the well owner, CQB would develop a private well mitigation action that is feasible for site specific conditions. CQB would use a screening process like the one previously used to select mitigation actions for affected drinking water supplies (Clear Creek Associates, 2012). The lead time needed for mitigation of a private well is generally on the order of months, during which time bottled water would be provided to the service connections of the private supply. CQB would report the private water supply mitigation to ADEQ in writing within 30 days of completing the action.

3.0 ADAPTIVE MANAGEMENT AND MITIGATION PERFORMANCE REVIEWS

Section III.D of the Mitigation Order stipulates "The Mitigation Plan may use an adaptive management approach that allows for the adjustment of mitigation measures from time to time based on information obtained concerning the performance of implemented measures and/or the identification of additional supply wells that could be impacted by sulfate concentrations exceeding 250 mg/L". The adaptive management approach will be used to evaluate and respond to new information or conditions that may affect the operation of the mitigation action. Mitigation performance reviews will be used to periodically evaluate monitoring data and to assess the progress of the mitigation action over time. The Mitigation Plan actions would be modified using adaptive management if the performance reviews identify new information that warrants a change to monitoring or contingent mitigation actions, or if business conditions arise that impose new constraints on Mitigation Plan actions.

3.1 Adaptive Management

Adaptive management is a process of review, analysis, and adaptation used for decision making for environmental projects. Adaptive management relies on an iterative process of data gathering and analysis to improve decision making in a changing or uncertain environment.

The processes of monitoring and performance review are integral to adaptive management because these activities will collect data on plume migration and evaluate the data against the expected migration and the mitigation action objective. If the expected plume migration is not being realized, CQB may use adaptive management to evaluate the situation and to modify the Mitigation Plan actions based on groundwater monitoring data and/or modeling.

The adaptive management process can be triggered by factors internal or external to the Mitigation Plan actions. Examples of internal factors are a determination by the performance review that the mitigation action is not meeting the mitigation action objective or the exceedance of an action level. External factors could include administrative (e.g., the development of new environmental quality or water supply laws), technical (e.g., new or improved water treatment technologies), or business (e.g., changes in mine status) developments that may impact the Mitigation Plan actions. Adaptive management would be used to manage changes in administrative or business conditions that may impact attainment of the mitigation action objective.

New information and/or changing conditions may trigger the need to adjust the Mitigation Plan actions from time to time. If the exceedance of a sulfate action level triggers procurement and

construction for mitigation of a public supply, CQB may update the analysis of potential mitigation actions given conditions at the time. The update could include reconsideration of FS Alternatives 2, 3, and 4, evaluation of new water treatment technologies, or consideration of new water management opportunities. If another mitigation action is found to be more cost effective than the contingent mitigation actions of alternate supply or large scale RO water treatment, and can be implemented before sulfate exceeds 250 mg/L at the supply, CQB may use the adaptive management process to recommend the more cost effective mitigation.

3.2 Mitigation Performance Reviews

Mitigation performance reviews will be conducted and submitted to ADEQ annually for the first five years of the Mitigation Plan actions and every five years thereafter; although CQB reserves the right to propose changing the frequency of mitigation performance reviews depending on prevailing conditions and notice to ADEQ prior to implementation. Mitigation performance reviews will assess whether the Mitigation Plan actions are performing as expected with respect to the mitigation action objective and numerical model predictions of plume migration. The performance reviews will evaluate whether the Mitigation Plan actions need modification to meet the mitigation action objective or can be terminated.

The mitigation performance review will evaluate the data CQB collects under the expanded groundwater monitoring and long term plume monitoring programs. The monitoring data will be used to evaluate sulfate trends at downgradient monitoring wells, plume edge monitoring wells, and drinking water supply wells. Water level data will be used to evaluate the apparent groundwater flow direction and velocity in the vicinity of the plume. The mitigation performance review will compare the monitoring results to the model-predicted plume migration to identify and evaluate differences. The performance review may recommend modifications to long term plume monitoring and expanded groundwater monitoring if warranted based on prevailing conditions.

The numerical model for groundwater flow and sulfate transport will be updated for each mitigation performance review to incorporate the actual well pumping and monitoring data collected during the review period. The model will be used to predict the future plume migration based on existing conditions and any new data on the regional water balance or hydrogeology. Adaptive management (Section 3.1) would be used to evaluate and modify the Mitigation Plan actions in the event that the performance review determines that the plume is migrating in a way that is significantly different from the predicted migration.

3.3 Termination of Mitigation Action

The mitigation performance review will evaluate when the plume extent is at a point that the mitigation action can be terminated. CQB may request termination of the Mitigation Plan and the Mitigation Order upon a demonstration satisfactory to ADEQ that the mitigation action objective would continue to be met without additional action.

4.0 REPORTING

This section identifies reports that will be prepared for the Mitigation Plan described in Section 2.

4.1 Groundwater Monitoring Reports

Groundwater monitoring reports will provide the water quality and water level data collected under the expanded groundwater monitoring (Section 2.2) and long term plume monitoring (Section 2.3) programs. The results of well drilling, installation, testing, and monitoring for expanded groundwater monitoring will be incorporated into the groundwater monitoring report as the wells are installed and data become available. The annual ADWR well records review (Section 2.4) will also be provided in the groundwater monitoring report. Any new drinking water wells identified within a mile of the plume will be added to the long term plume monitoring schedule. Groundwater monitoring reports will be submitted to ADEQ annually. The reporting period will be a calendar year (i.e., January 1 through December 31). The groundwater monitoring report will be submitted by March 31 of the year following the reporting period.

The groundwater monitoring report will contain tables listing the results of sampling and sulfate analysis and water level measurements. Water level contour and sulfate concentration contour maps will be prepared to illustrate the monitoring data. Time series graphs of water levels or sulfate data may be used to portray trends at key locations. Field data forms, laboratory analysis reports, and quality assurance/quality control documentation will also be provided in the groundwater monitoring reports. Data contained in the groundwater monitoring reports will be used for periodic updates of the groundwater flow model as described in Section 4.2.

Well installation and testing for the expanded groundwater monitoring program will be reported in the groundwater monitoring reports. Geologic logs, well construction logs, field sampling water quality sampling results, and the results and interpretation of hydraulic tests conducted at new monitoring wells to characterize the basin fill aquifer proximal to Naco area public water supplies.

The groundwater monitoring reports will transmit data to ADEQ with little interpretation. Evaluation of the monitoring data with respect to the development of action levels and the comparison of actual and predicted plume migration would be provided in the action level and mitigation performance review reports described below.

4.2 Mitigation Performance Review Reports

Mitigation performance reviews will assess whether the Mitigation Plan actions are performing as expected with respect to the mitigation action objective and model-predicted plume migration. The mitigation performance review reports will include interpretation of the results of the long term plume monitoring and expanded groundwater monitoring programs with respect to the direction and rate of plume migration. The numerical model for groundwater flow and sulfate transport will be updated with new information and used to simulate future plume migration. The mitigation performance review report will provide an analysis of the actual and predicted migration of the plume, and discuss the attainment of the mitigation action objective. Water level and sulfate data for the leading edge of the plume will be used to assess the migration of the plume. Sulfate data for drinking water supplies will be used to assess attainment of the mitigation action objective. If the expected migration of the plume is not being realized, CQB may use the adaptive management process (Section 3.1) to evaluate the situation and, if warranted, modify the Mitigation Plan actions based on groundwater monitoring data and/or modeling.

Mitigation performance review reports will be prepared annually for the first five years after approval of the Mitigation Plan and every five years thereafter. The initial mitigation performance review report will be submitted to ADEQ by April 30, 2015.

4.3 Water Supply Study Report

The water supply study (Section 2.1) will identify and test potential alternate water sources for public supplies in the Naco area. The identification of exploration targets and the results of exploration drilling and testing will be summarized in a water supply study report to be submitted to ADEQ by July 1, 2016 unless exploration drilling is delayed by logistical factors beyond CQB's control, such as land access. The report will contain geologic logs, well construction logs, water quality results, the results and interpretation of hydraulic tests conducted at exploration wells to characterize the quantity and quality of the water source. If the July 1, 2016 submittal date cannot be met because work is still underway due to logistical factors, CQB will notify ADEQ in writing and provide an alternate submittal schedule for the water supply study report.

4.4 Action Level Report

Data collected by the expanded groundwater monitoring program, the water supply study, and the conceptual design and critical path analysis to determine the mitigation implementation timeframe will be used to identify sentinel well locations and action levels near public water supplies in the Naco area (Section 2.2). CQB will work with owners/operators of the public water supplies to

develop the action levels. A report describing the action levels, their development, and sentinel well recommendations will be submitted to ADEQ by April 1, 2018. If the April 1, 2018 submittal date cannot be met because work is still underway because monitoring results are inconclusive, CQB will notify ADEQ in writing and provide an alternate submittal schedule for the action level report.

5.0 COMMUNITY INVOLVEMENT

5.1 Community Advisory Group

A Community Advisory Group (CAG) was formed for the purpose of improving the public's access and understanding of information regarding the Mitigation Order. A CAG consisting of five persons selected from a cross section of the community will be maintained to meet annually throughout the term of the Mitigation Order or as needed based on community interest.

5.2 Public Information Repository

CQB will continue to maintain the information repository at the Copper Queen Library in Bisbee. Copies of correspondence and reports submitted to ADEQ for the Mitigation Order will be placed in the library for public access.

5.3 Internet Document Repository

CQB will continue to maintain the internet document repository at http://www.fcx.com/bisbee/bisbee.htm. Copies of correspondence and reports submitted to ADEQ for the Mitigation Order will be placed on the public access internet website for on-line review and/or download.

6.0 REFERENCES

Arizona Department of Environmental Quality (ADEQ). 2007. Mitigation Order on Consent Docket No. P-121-07, In the Matter of: Phelps Dodge Corporation, Copper Queen Branch, located at 36 West Highway 92, Bisbee, Arizona, ADEQ Identification Number 100531. November 14, 2007.

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ADEQ. 2014b. Correspondence from Mindi Cross, ADEQ, to Stuart Brown, Freeport-McMoRan Copper & Gold, Re: Review of Feasibility Study Report, Mitigation Order on Consent Docket No. P-121-07, Arizona, dated July 30, 2013, prepared by Clear Creek Associates, P.L.C. April 2, 2014.

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U.S. Environmental Protection Agency (EPA). 2003. Drinking Water Advisory: Consumer Acceptability Advice and Health Effects Analysis on Sulfate. EPS 822-R-03-007. February 2003.

TABLES

TABLE 1
Schedule for Long Term Plume Monitoring

Well Name	ADWR 55 Registry Number	Well Use	Monitoring Purpose	Semiannual Sampling First Quarter	Annual Sampling Third Quarter	Biennial Sampling Third Quarter
ANDERSON 396	613396	PNDW	RM	WLO	WLO	✓
ANDERSON 458	221458	PDWS	DWS (Mit)		✓	
ASLD 435	616435	STOCK	RM	WLO	WLO	
AWC-02	616586	PWS	DWS (>2000)	✓	✓	
AWC-03	616585	PWS	DWS (>2000)	✓	✓	
AWC-04	616584	PWS	DWS (>2000)	✓	✓	
AWC-05	590620	PWS	DWS (>2000)	✓	✓	
BANKS 986	647986	PDWS	DWS (>2000)		✓	
BANKS 987	647987	PNDW	RM	WLO	WLO	
BARTON 919	644919	PNDW	RM	WLO	WLO	
BIMA	577927	PNDW	RM			✓
BMO-2008-1G	909474	MW	PE (Lateral)	✓	✓	
BMO-2008-3B	909147	MW	PE (Lateral)	✓	✓	
BMO-2008-4B	910096	IRR	PE (Below)	WLO	✓	
BMO-2008-5B	909653	PDWS	DWS (<2000)	✓	✓	
BMO-2008-5M	909552	MW	PE (Lateral)	✓	✓	
BMO-2008-6B	909146	MW	PE (Lateral)	✓	✓	
BMO-2008-6M	909019	MW	PE (Lateral)	✓	✓	
BMO-2008-7M	908794	MW	PE (Below)	WLO	✓	
BMO-2008-8B	910097	MW	RM	WLO	WLO	✓
BMO-2008-8M	909711	MW	PE (Below)	WLO	✓	
BMO-2008-9M	909255	MW	PE (Below)	WLO	✓	
BMO-2008-10GL	909435	MW	RM	WLO	WLO	✓
BMO-2008-10GU	909272	MW	RM	WLO	WLO	✓
BMO-2008-11G	909434	MW	PE (Lateral)	✓	✓	
BMO-2008-13B	909551	MW	RM	WLO	WLO	✓
BMO-2008-13M	909760	MW	RM	WLO	WLO	✓
BMO-2010-1M	219957	MW	PE (Below)	WLO	✓	
BMO-2010-2M	219958	MW	RM	WLO	WLO	✓
BMO-2010-3B	219970	MW	PE (Lateral)	✓	✓	
BMO-2010-3M	219969	MW	PE (Lateral)	✓	✓	
BMO-2012-1M	221388	MW	PE (Lateral)	✓	✓	
BOOTH	914931	PDWS	DWS (<2000)	✓	✓	
BURKE	212268	PDWS	DWS (>2000)		✓	
CHAMBERS	629807	PDWS	DWS (>2000)		✓	
COB MW-1	903992	MW	RM	WLO	WLO	✓
COB MW-2	903984	MW	PE (Lateral)	✓	✓	
COB MW-3	906823	MW	RM	WLO	✓	
COB WL	593116	MW	PE (Lateral)	✓	✓	
COOPER	623564	PDWS	DWS (<2000)	✓	✓	
COOPER C	637069	MW	RM		✓	
DODSON	644927	PDWS	DWS (<2000)	✓	✓	
DOUGLASS 791	592791	PNDW	RM		WLO	
DOUGLASS 792	592792	PNDW	RM		WLO	
EAST	599796	PDWS	DWS (>2000)		✓	
ECHAVE	219449	PDWS	DWS (>2000)		✓	
EPPELE 641	805641	PDWS	DWS (>2000)		✓	
FRANCO 383	221383	PDWS	DWS (Mit)		✓	
FULTZ	212447	PDWS	RM		✓	
GARNER 557	558557	PNDW	RM	WLO	WLO	

TABLE 1
Schedule for Long Term Plume Monitoring

Well Name	ADWR 55 Registry Number	Well Use	Monitoring Purpose	Semiannual Sampling First Quarter	Annual Sampling Third Quarter	Biennial Sampling Third Quarter
GARNER 635	587635	PDWS	DWS (Mit)		✓	
GOAR RANCH	610695	PNDW	RM	WLO	WLO	
HOBAN	805290	MW	RM	WLO	✓	
HOWARD NR	NR	PNDW	RM	WLO	WLO	✓
HOWARD 312	221312	PDWS	DWS (Mit)		✓	
KEEFER	209744	PDWS	DWS (>2000)		✓	
LADD 251	520251	PNDW	RM	WLO	WLO	
LADD 538	505538	PNDW	RM	WLO	WLO	
LADD 837	519837	PNDW	RM	WLO	WLO	
LADD 977	642977	STOCK	RM	WLO	WLO	
MARCELL	NR	PNDW	RM			✓
MCCONNELL 265	539265	PNDW	RM	WLO	WLO	✓
MCCONNELL 459	221459	PDWS	DWS (Mit)		✓	
METZLER	35-71891	PNDW	RM	WLO	WLO	
MOORE	538847	PDWS	DWS (>2000)		✓	
NESS	509127	PDWS	DWS (>2000)		✓	
NOTEMAN	212483	PNDW	RM			✓
NSD-02	527587	MW	RM	WLO	WLO	
NSD-03	527586	MW	RM	WLO	WLO	
NWC-02	562944	PWS	DWS (>2000)	✓	✓	
NWC-03 CAP	627684	PNDW	RM	WLO	WLO	
NWC-04	551849	PWS	DWS (<2000)	Quarterly		
NWC-06	575700	PWS	DWS (>2000)	✓	✓	
OSBORN	643436	PDWS	DWS (>2000)		✓	
PALMER	578819	PDWS	DWS (>2000)		✓	
PANAGAKOS	35-76413	PDWS	PE (Lateral)	✓	✓	
PARRA	576415	PNDW	RM			✓
PIONKE 395	613395	PNDW	RM	WLO	WLO	✓
PIONKE 517	221517	PDWS	DWS (Mit)		✓	
POOL	509518	PDWS	DWS (>2000)		✓	
POWER 639	222639	PDWS	DWS (<2000)	✓	✓	
RAMIREZ	216425	PDWS	DWS (>2000)	WLO	✓	
RAY	803772	PDWS	DWS (>2000)		✓	
ROGERS 596	573596	PNDW	RM	WLO	WLO	
ROGERS 803	641803	PDWS	DWS (<2000)	✓	✓	
ROGERS E	216018	PDWS	DWS (>2000)		✓	
RUIZ	531770	PDWS	DWS (<2000)	✓	✓	
SCHWARTZ	210865	PDWS	DWS (<2000)	✓	✓	
STEPHENS	808560	PNDW	RM	WLO	WLO	
SWAN	NR	PDWS	DWS (>2000)		✓	
THOMPSON 151	612151	PNDW	RM	WLO	WLO	
THOMPSON 341	218341	PDWS	DWS (>2000)		✓	
TM-02A	522574	MW	RM	WLO	WLO	✓
TM-06 MILLER	522695	MW	RM	WLO	WLO	✓
TM-07	522576	MW	PE (Lateral)	✓	✓	
TM-10 USBP	522696	MW	RM	✓	✓	
TM-15 MILLER	522699	MW	RM		✓	
TM-16	522578	MW	RM	WLO	WLO	✓
TM-19A	522580	MW	RM		✓	
TM-42	562554	MW	RM	WLO	WLO	✓

TABLE 1
Schedule for Long Term Plume Monitoring

Well Name	ADWR 55 Registry Number	Well Use	Monitoring Purpose	Semiannual Sampling First Quarter	Annual Sampling Third Quarter	Biennial Sampling Third Quarter
TVI 236	802236	IRR	PE (Lateral)	✓	✓	
TVI 713	567713	PNDW	RM	WLO	WLO	
TVI 875	568875	IRR	RM		✓	
WEED	544535	PDWS	DWS (<2000)	✓	✓	
WEISKOPF 802	641802	PNDW	RM	WLO	WLO	✓
WEISKOPF 897	221897	PDWS	DWS (Mit)		✓	
ZANDER	205126	PDWS	DWS	WLO	✓	

Notes:

35-71891	ADWR 35 Database
ADWR	Arizona Department of Water Resources
NR	No Record

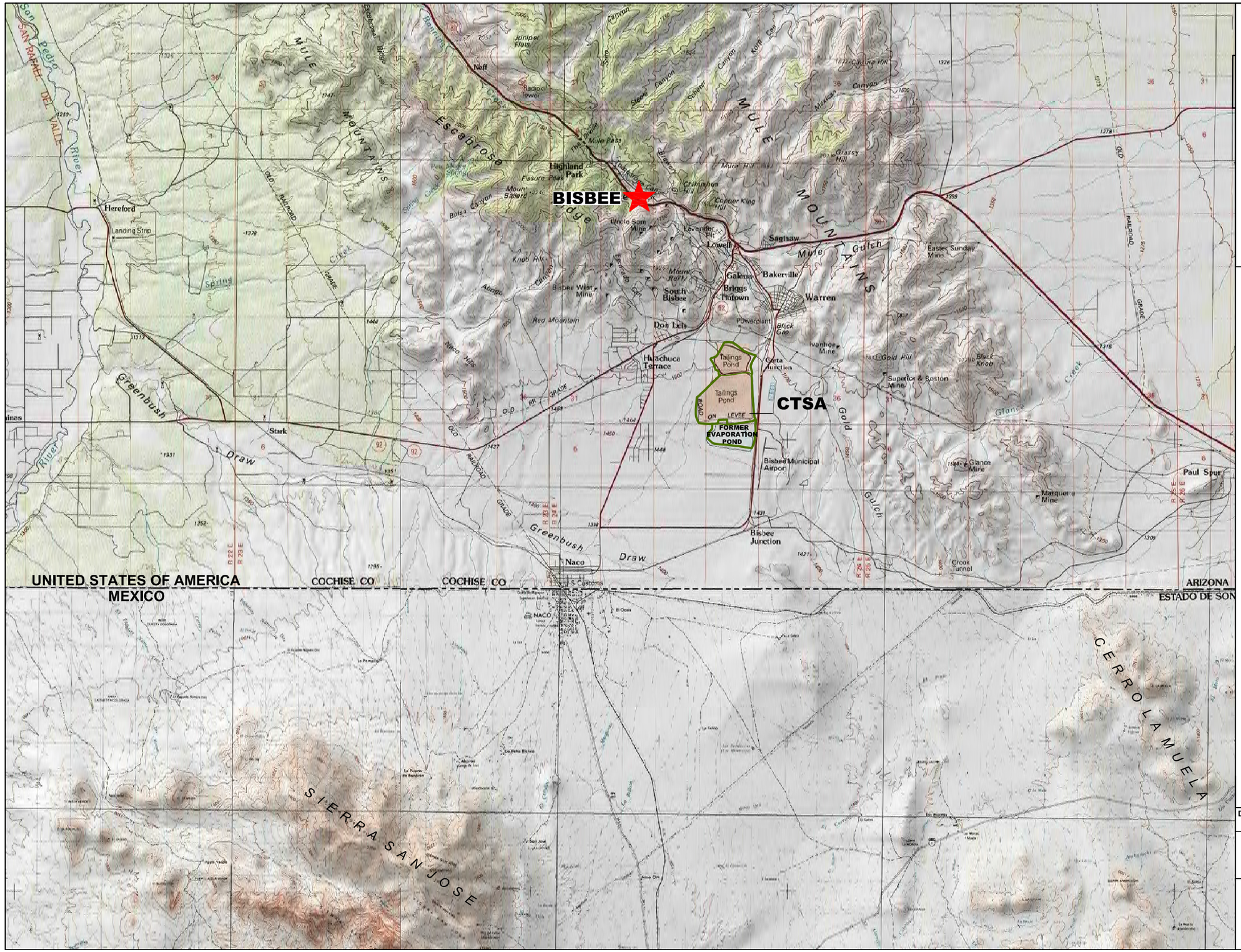
Well Use

PWS	Public Water Supply
PDWS	Private Drinking Water Supply
PNDW	Private Non-Drinking Water
IRR	Irrigation
MW	Monitoring Well
STOCK	Stock-Wildlife Watering

Monitoring Purpose

DWS (<2000)	Drinking Water Supply, Greater than 2000 feet from the plume
DWS (>2000)	Drinking Water Supply, Less than 2000 feet from the plume
DWS (Mit)	Drinking Water Supply, Mitigation well installed below plume
PE (Lateral)	Plume Edge Monitoring, Lateral to plume
PE (Below)	Plume Edge Monitoring, Below plume
RM	Regional Monitoring
WLO	Water Level Only

FIGURES



LEGEND

CTSA FACILITY

SCALE

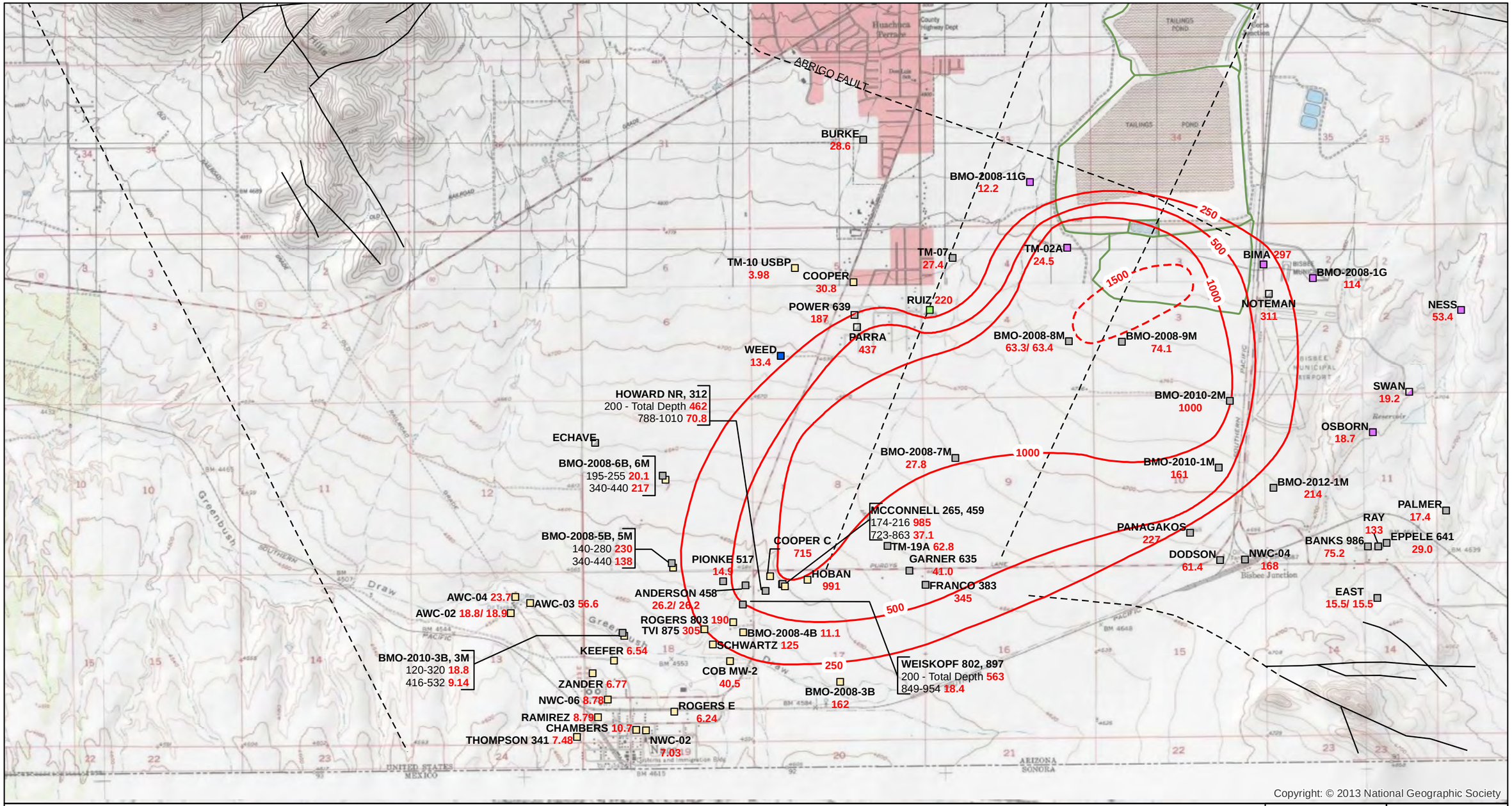
0 1 2 MILES

0 6000 12000 FEET

Date	File ID
04/29/2014	055038-239

CLEAR CREEK ASSOCIATES

FIGURE 1
PROJECT LOCATION MAP



Legend

- RAY 133 — Well ID; SO4 Concentration (mg/L)
- SO4 Concentration Contours (dashed where inferred)
- Faults (dashed where inferred)
- CTSA Facility

Co-located Wells
- Well ID
- Screen (ft bls): Sulfate Levels (mg/L)

Screened Formation
- Basin Fill
- Basin Fill and Undifferentiated Bisbee Group
- Undifferentiated Bisbee Group
- Undifferentiated Bisbee Group - Estimated
- Undifferentiated Bisbee Group and Glance Conglomerate
- Glance Conglomerate
- Glance Conglomerate - Estimated

Undifferentiated Bisbee Group: Cintura, Mural Limestone, and Morita Formations

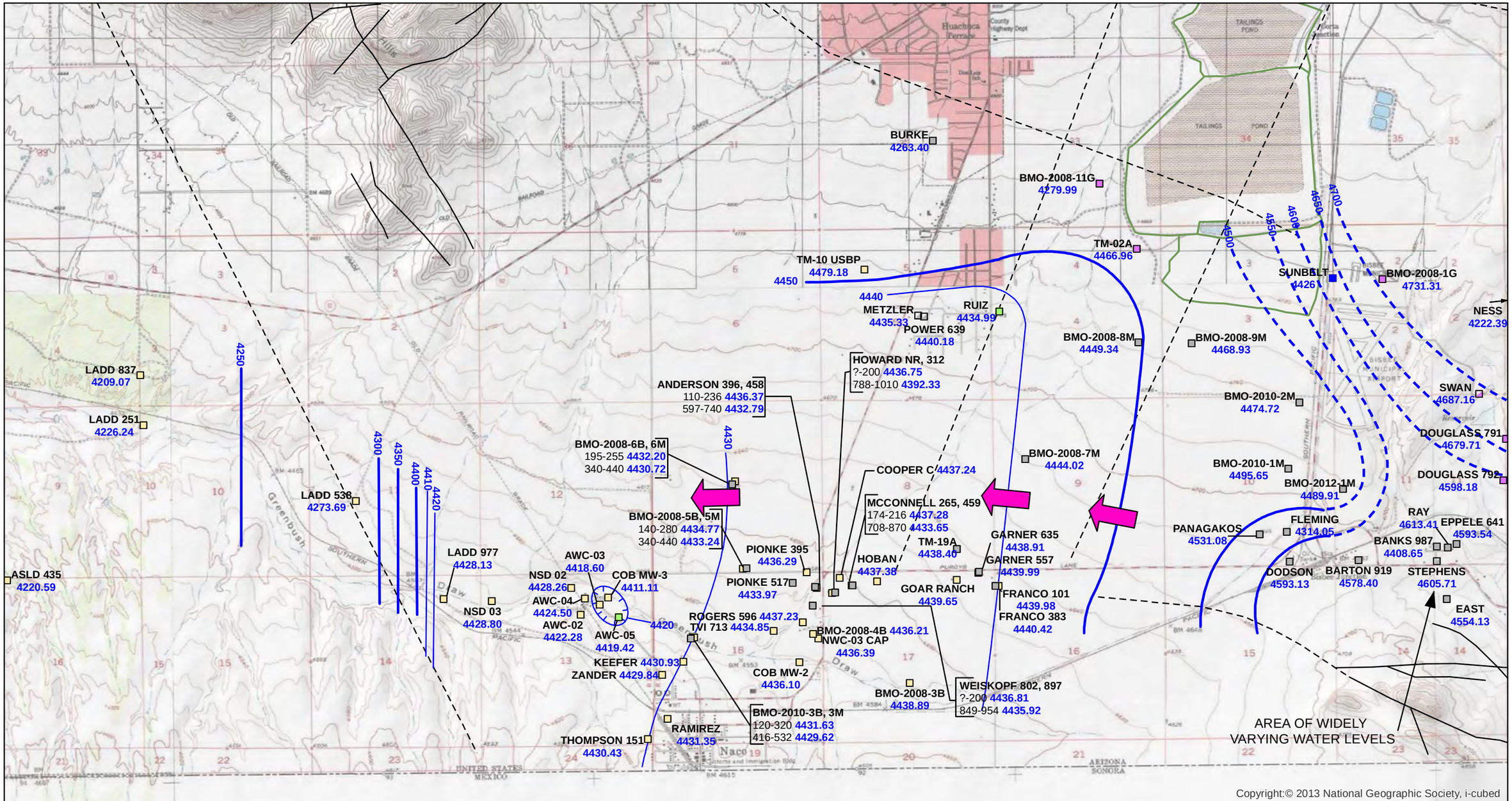
Scale (Feet): 0 — 3,000 — 6,000

Notes:
Projection: UTM Zone 12N NAD83
mg/L = milligrams per liter
ft bls = feet below land surface

Date 4/29/2014 | File ID 055038-360

CLEAR CREEK ASSOCIATES

FIGURE 2
SULFATE CONCENTRATIONS IN GROUNDWATER FOR FIRST QUARTER 2014



Legend

RAY — Well ID
4613.41 — Groundwater Elevation (ft amsl)

- Groundwater Elevation Contours (10 ft)
- Groundwater Elevation Contours (50 ft) (dashed where inferred)
- Faults (dashed where inferred)
- CTSA Facility
- Groundwater Flow Direction

Screened Formation

- Basin Fill
- Basin Fill and Undifferentiated Bisbee Group
- Undifferentiated Bisbee Group
- Undifferentiated Bisbee Group - Estimated
- Undifferentiated Bisbee Group and Glance Conglomerate
- Glance Conglomerate
- Glance Conglomerate-Estimated

Scale (Feet)
0 3,000 6,000

Projection: UTM Zone 12N NAD83
ft amsl = feet above mean sea level
bls = below land surface
Groundwater elevation contours are based on third quarter 2013 data and adjusted with current data.

Date: 3/24/2014
File ID: 055038-353

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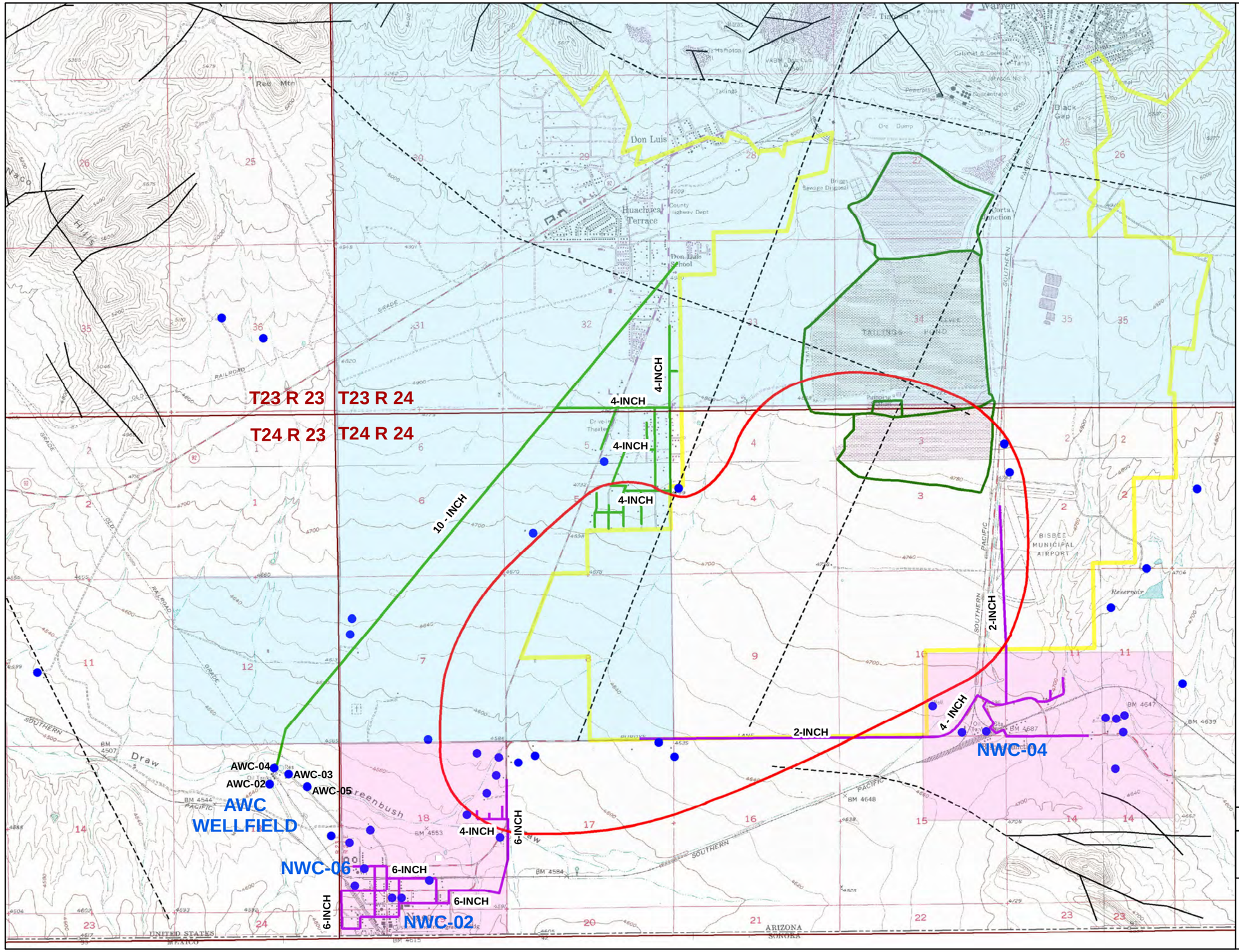
FIGURE 3
GROUNDWATER ELEVATIONS FOR FIRST QUARTER 2014



Legend

- Arizona Water Company Service Area
- Naco Water Company Service Area
- NWC Pipeline
- AWC Pipeline
- Drinking Water Supply Well
- Estimated 250 mg/L Sulfate Concentration Contour Q1 2013
- CQB Property Boundary
- CTSA Facility
- Fault (Dashed Where Inferred)
- Township and Range

Scale (Feet)

0 3,000 6,000

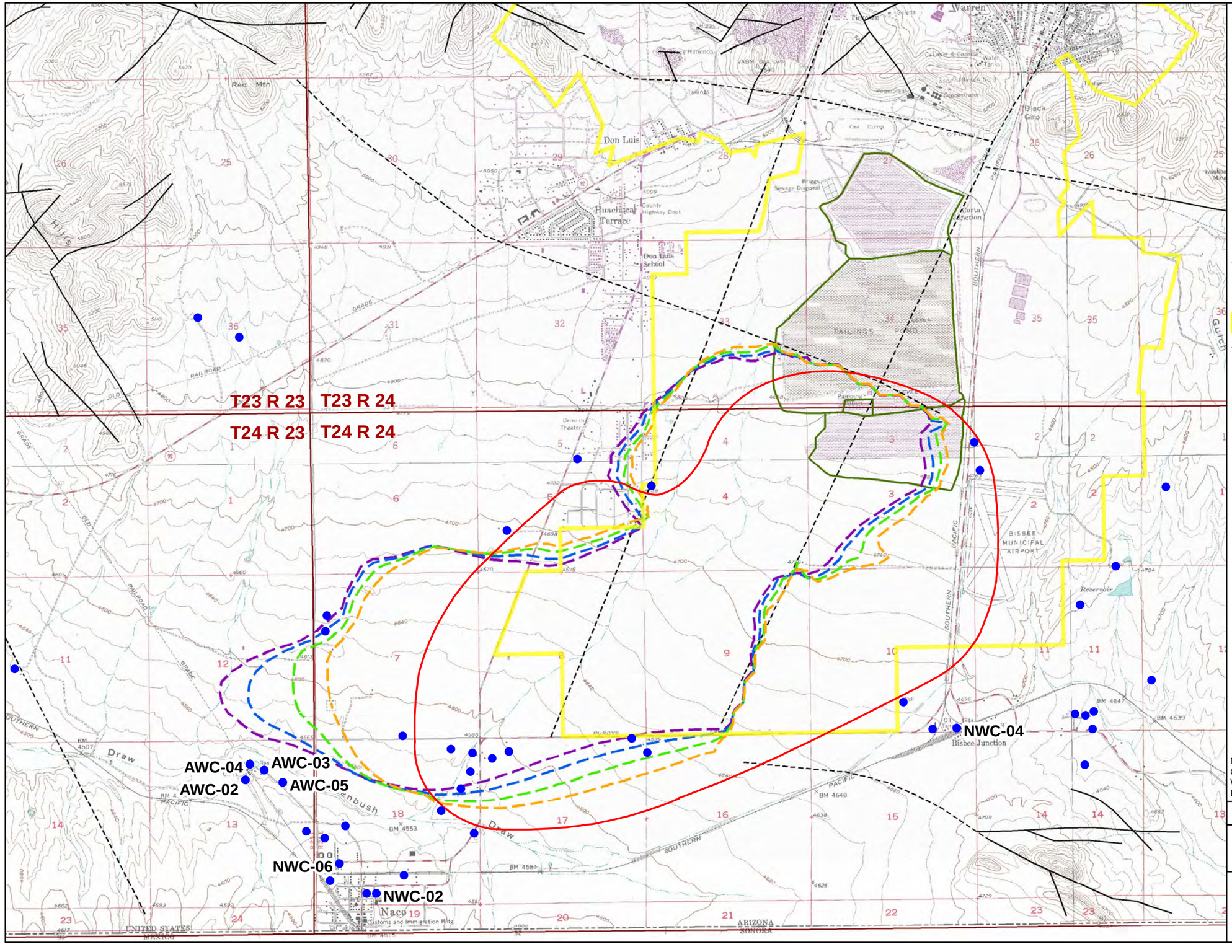
Notes:

Projection: UTM Zone 12N NAD83

Date	File ID
4/29/2014	055038-178B

CLEAR CREEK ASSOCIATES

FIGURE 4
SERVICE AREA MAP
FOR AWC AND NWC



Legend

- Simulated 250 mg/L Sulfate Concentration Contour in 2045 (30 Years)
- Simulated 250 mg/L Sulfate Concentration Contour in 2065 (50 Years)
- Simulated 250 mg/L Sulfate Concentration Contour in 2090 (75 Years)
- Simulated 250 mg/L Sulfate Concentration Contour in 2115 (100 Years)
- Estimated 250 mg/L Sulfate Concentration Contour for Q1 2013
- Drinking Water Supply Well
- CQB Property Boundary
- CTSA Facility
- Fault (Dashed Where Inferred)
- Township and Range

Scale (Feet)

0 3,000 6,000

NOTES:
Concentrations are highest value regardless of layer.
Well locations based on survey data where available.
Projection is UTM Zone 12 NAD 83

Date	File ID
4/28/2014	055038-281B

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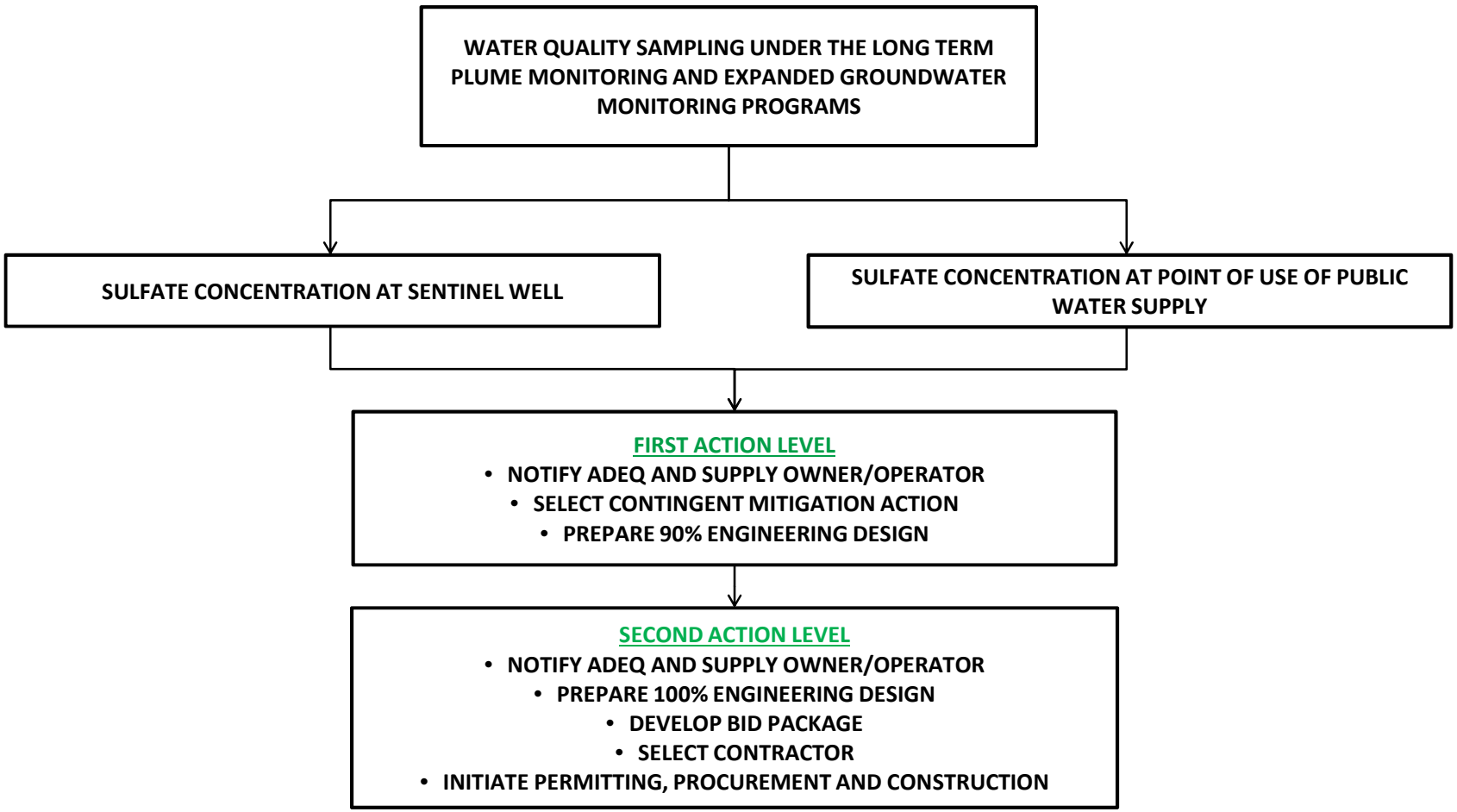
FIGURE 5
ALTERNATIVE 1C
SIMULATED 250 MG/L SULFATE CONTOUR AT 30, 50, 75, AND 100 YEARS



Note: Different action levels may be set for water supply wells and sentinel wells

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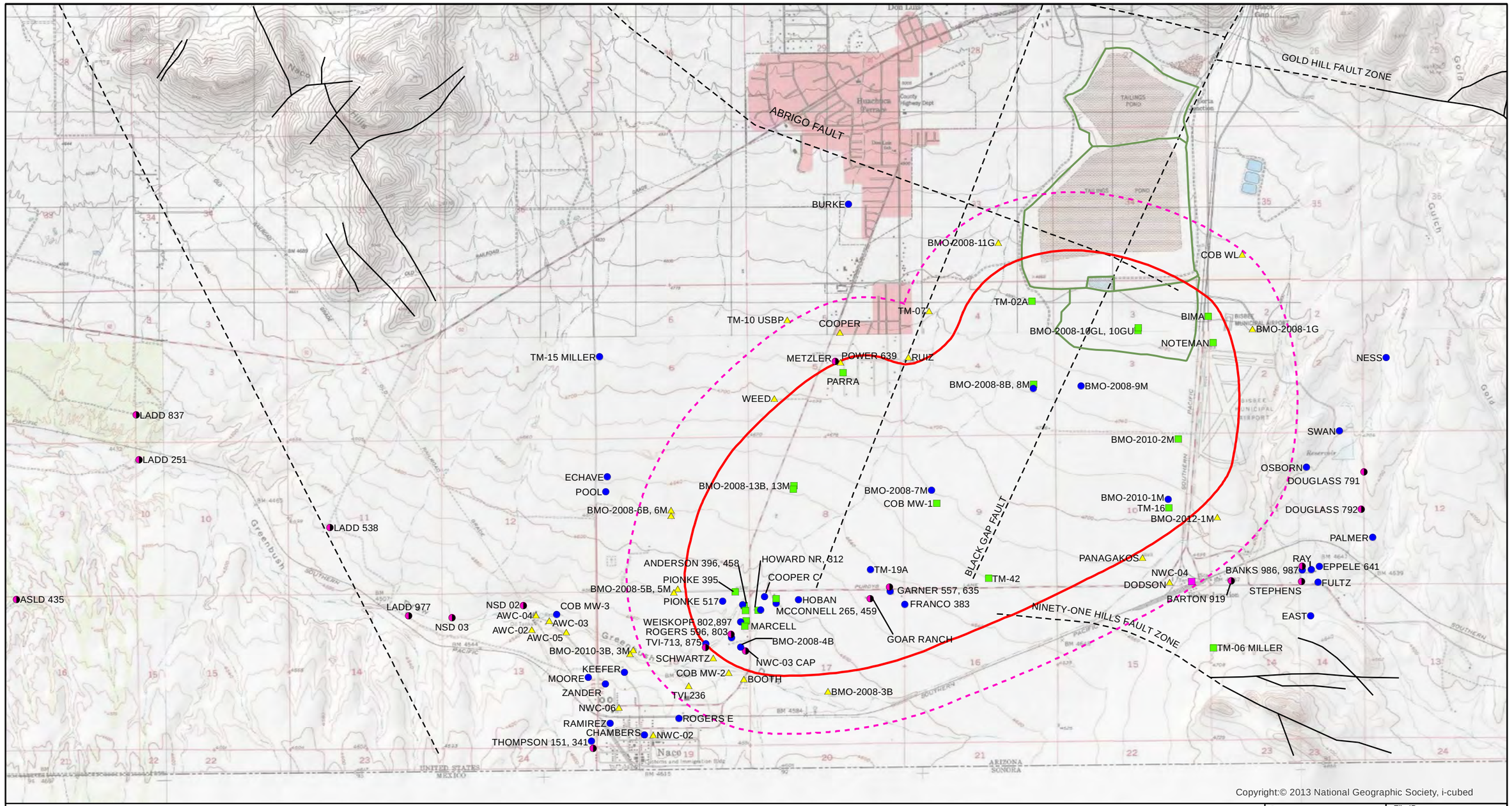
File ID

Date 4/28/2014

FIGURE 6
SULFATE MONITORING AND RESPONSE FOR PUBLIC DRINKING WATER SUPPLIES IN THE NACO AREA



Legend

Monitoring Frequency

- Quarterly Sampling (NWC-04 Only)
- Semiannual Sampling (First and Third Quarter)
- Annual Sampling (Third Quarter)
- Biennial Sampling (Third Quarter)
- Water Level Only (Semiannual, Annual, or Biennial)

- Q1 2014 Estimated 250 mg/L Sulfate Contour
- 2000 feet from Q1 2014 estimated 250 mg/L sulfate contour
- Faults (dashed where inferred)
- CTSA Facility

Scale (Feet)

0 3,750 7,500

Projection: UTM Zone 12N NAD83

Date	File ID
5/2/14	055038-359A

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FIGURE 7
LONG TERM PLUME MONITORING LOCATIONS