Bureau of Reclamation

WaterSMART: Drought Resiliency Project, FY-17

Date: February 14, 2017

Project Title: Mountain Park Master Conservancy District (MPMCD) Groundwater Supply Augmentation Project

Applicant: Mountain Park Master Conservancy District
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Technical Proposal Executive Summary

The U.S. Department of Interior's (Department) WaterSMART (Sustain and Manage America's Resources for Tomorrow) Program establishes a framework to provide Federal leadership and assistance on the efficient use of water; integrating water and energy policies to support the sustainable use of all natural resources; forming strong diverse partnerships with states, tribes and local entities and coordinating with other department bureaus and offices on water conservation activities. Through WaterSMART's Drought Response Program, eligible entities are provided the opportunity to both develop drought contingency plans and build long-term solutions to drought.

This proposed MPMCD Groundwater Supply Augmentation Project, which is seeking federal assistance through Reclamation's Drought Resiliency Project funding opportunity, is consistent with the WaterSMART initiative in that it will increase the District's water supply reliability of water supply, improve water management and provide direct and indirect benefits for fish, wildlife, and the environment to mitigate impacts caused by drought. Specifically, this project—the first phase of a larger initiative arising from the existing Southwest Oklahoma Water Supply Action Plan (SWAP), attached to this application under Appendix B—will help fund establishment of emergency, supplemental groundwater supply downstream of Tom Steed dam.

MPMCD, a long-time partner and cooperator in achieving the Bureau of Reclamation's essential federal mission, is pleased to submit this application for grant funding under the Drought Resiliency Projects/Drought Response Program.

Date:	February 2017
Applicant Name:	Mountain Park Master Conservancy District
City/County/State:	Mountain Park, Kiowa County, Oklahoma

Background Data

MPMCD oversees the Mountain Park Project and Tom Steed Reservoir, constructed by the Bureau of Reclamation in 1975. The project provides supplemental municipal and industrial water supply to Altus, Snyder and Frederick as well as Hackberry Flat Wildlife Management Area (WMA). The project also provides flood control, recreation, and fish and wildlife and environmental quality benefits. Principal features are Mountain Park Dam, on West Otter Creek in Kiowa County about 6 miles northwest of Snyder, Oklahoma, two pumping plants, and an aqueduct system to service the three cities and Hackberry Flat WMA. Project facilities include Bretch Diversion Dam on Elk Creek in Kiowa County and Bretch Diversion Canal, which diverts and conveys Elk Creek flow into the watershed upstream from Mountain Park Dam to supplement the natural flow of West Otter Creek into Tom Steed Reservoir.

Figure 1: Proposed Project Area

Tom Steed Reservoir is authorized to provide water supply, flood control, recreation and fish and wildlife benefits. It contains 88,160 acre-feet of water supply storage yielding 16,000 acre-feet per year. All water rights are held by MPMCD, which contracts with the three member cities, including some 40,000 water users. According to the 2012 Update of the Oklahoma Comprehensive Water Plan (OCWP), surface water in the Tom Steed watershed is fully allocated, limiting future diversions to existing OWRB-permitted amounts. The estimated combined 2060 water demand for Altus, Frederick and Snyder is 8,285 AFY, or approximately 7.4 million gallons per day (MGD). Due to frequent drought, unauthorized upstream uses that reduce inflow to the lake and related issues, District water managers struggled to meet record demands approaching 5 MGD during the unprecedented 2010-15 drought episode. The ongoing Upper Red River Basin Study, a cooperative investigation between Reclamation and MPMCD, will seek to address these critical water supply issues and related matters. Talks have also begun with OWRB officials to address the unauthorized upstream water rights and withdrawals that are impacting lake storage and yield. In addition, formal discussions with Corps of Engineers officials are planned to investigate the potential for adjusting Tom Steed's existing water control plan to allow for more flexibility in releasing flood storage, perhaps through a seasonal pool plan or related strategy.

Project Description

This drought resiliency project, a major initiative of the Southwest Oklahoma Water Supply Action Plan (SWAP), seeks to establish a redundant, emergency drought supply in Tom Steed Reservoir through the development of wells immediately downstream of the dam. This new source will

account for approximately 14 percent of the ultimate project goal of 2 MGD of augmented groundwater supply.

A primary goal of SWAP providers is achieving a better balance of water supply portfolios and securing additional supplies of groundwater, which is much more prevalent in the region and generally more dependable than surface sources, depending upon availability and quality. Both the City of Altus and Mountain Park Master Conservancy District have been extremely proactive in implementing this particular solution.

This project culminates Phase 1 of the MPMCD Groundwater Supply Augmentation Plan 1, an ongoing District-sponsored plan initiated in 2014 to permanently augment the system with available groundwater supplies in the area. This $1.2 million project has been financed by member cities to investigate the addition of wells to directly augment supply in Tom Steed Reservoir and increase water delivery capacity to customers. An initial geologic study has been completed and engineers have drilled numerous test holes in the region to identify specific sites of suitable quantity and quality.

MPMCD officials have expressed optimism that quality could be improved through blending of the lake's current supply with the new groundwater well supply, thus mitigating THM issues. This water would be distributed to Altus and/or Snyder through direct transmission via existing raw water lines. New wells are anticipated to account for at least 20 percent (approximately 1 MGD) of the current water demand on the reservoir.

Performance Measures

The benefits of this project, once implemented, will be measured by the District's ability and efficiency in serving its customers. While Phase 1 of the Groundwater Supply Augmentation Project will provide much-needed immediate benefits, full implementation of this regional planning initiative—including further groundwater well development—will be required to meet the District's ultimate goal: providing 100-percent water supply reliability, even under the most severe drought episodes.

Evaluation Criteria

Criterion A—Project Benefits

Up to 40 points may be awarded based on the expected drought resiliency benefits of the proposed project. Proposals containing a well-supported and detailed description of both quantifiable and qualitative benefits will receive the most points under this criterion. For projects that do not make additional water supplies available, please describe how the project will improve water management. For projects that make additional water supplies available AND improve water management, please respond to all questions under this criterion.

Please describe how the proposed project will improve drought resiliency:

First and foremost, this project—Phase 1 of a larger plan to bring approximately 2 million gallons per day (MGD) of groundwater into the Mountain Park Master Conservancy District (MPMCD) system—will increase the amount of water supply available to District customers during all-to-frequent drought episodes in southwest Oklahoma. This supplemental and redundant supply-

acquired through proposed development of alluvial groundwater deposits immediately downstream of Tom Steed Reservoir dam—will be relied upon during drought, thus slowing inevitable lake level declines and augmenting yield. During wet periods when the lake is full, the wells will be taken offline and afforded an opportunity to recover. This new groundwater supply will also greatly enhance the overall reliability and efficiency of the District's water system.

This project culminates Phase 1 of the MPMCD Groundwater Supply Augmentation Plan 1, an ongoing District-sponsored plan that was initiated in 2014 to permanently augment the system with available groundwater supplies in the area. Initial investigations focused on private land and several promising well sites were tested. However, to reduce costs and take advantage of existing infrastructure that will be utilized for the blending of prospective well water with existing surface supplies, the focus area of the project was recently moved to existing Bureau of Reclamation land near Tom Steed dam and District pumping facilities.

- **Will the project make additional water supplies available?**
  Yes. This project will create a wholly new, redundant/backup source of water supply for use during drought emergencies and other times of high-demand. This new groundwater source, which will be blended with existing surface supplies, will also serve as a supplemental source during times of average water demand.

  - **If so, what is the estimated quantity of additional supply the project will provide and how was this estimate calculated?**
    Pumping tests conducted by Layne Christensen, a Texas water well drilling firm, revealed that a combined 170 gallons per minute (GPM), at a minimum, will be yielded by the two most promising well locations (test holes #2 and #6) identified during investigations sponsored by District member communities in 2016. However, Mountain Park water managers estimate that actually up to 195 GPM could be provided by the wells, which represents about 14 percent of the eventual District goal of 2 MGD. Accurate Environmental Laboratories (Guthrie, OK) also determined that, with treatment, the quality of the proposed wells is sufficient for use as a drinking water source.

  - **What percentage of the total water supply does the additional water supply represent? How was this estimate calculated?**
    MPMCD water managers anticipate that groundwater from the two wells (Phase 1 of the MPMCD Groundwater Supply Augmentation Plan) will result in an increase of at least 7 percent in emergency supply available during drought episodes, as determined through comprehensive pumping tests conducted by Layne Christenson compared to data from the recent record drought episode when the District's water demand reached 4-5 MGD. Assuming that the City of Altus fully implements an independent project to establish a municipal wellfield, thus reducing its reliance on Tom Steed Reservoir, the District's water managers estimate that the new groundwater source enabled through this Reclamation grant could represent as much as 30 percent of its total supply portfolio.

Ultimately, full implementation of the District's long-term Groundwater Augmentation Plan (Phase 1 and 2) is expected to result in a groundwater supply ratio that could exceed 50 percent during drought episodes.

- **Provide a brief qualitative description of the degree/significance of the benefits associated with the additional water supplies.**

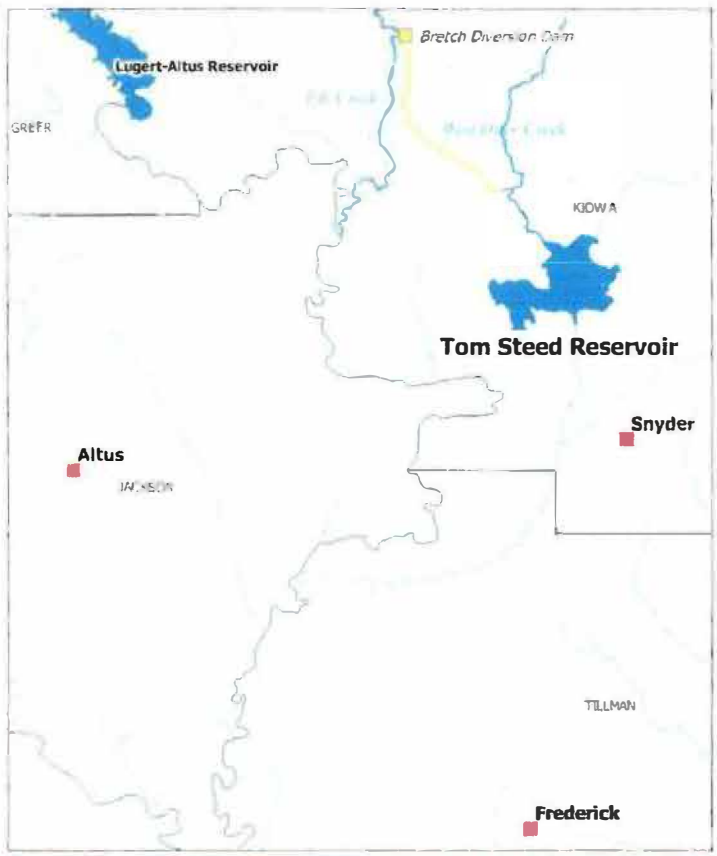

Figure 2: Tom Steed Reservoir, Member Communities & Bretch Diversion

The 2010-15 statewide drought, which impacted southwest Oklahoma water users particularly hard, revealed numerous vulnerabilities related to Tom Steed Reservoir's ability to provide reliable water supply to its 40,000 customers in Altus, Snyder, Frederick and other areas in the region. [Figure 2 displays Tom Steed Reservoir and its member communities as well as the location of the Bretch Diversion Dam and canal, which diverts and channels runoff from the Elk Creek watershed to the lake.] Despite aggressive conservation measures to reduce consumption (some reaching 40 percent reductions in use), this record drought led to alarming decreases in lake levels, reducing the conservation pool to less than 30 percent of normal, which represents the lowest level since the reservoir was constructed in 1970. State-of-the-art yield projections performed by Reclamation staff in 2014 revealed that the lake's supply was within 20 months of depletion. Today, cities dependent upon the reservoir—including some who rely upon Tom Steed as their sole source of supply—fear that the next, inevitable drought of record could lead to an unprecedented regional water emergency. Lake managers and users also remain concerned about significant unauthorized water development in the Tom Steed watershed, which is believed to have a considerable detrimental impact upon the reservoir's yield. In addition, that yield was originally based on the previous drought of record in the 1950s, which will likely be exceeded by the 2010-15 drought.

Through implementation of a conjunctive water management scheme enabled through the new groundwater source, the District will be able to provide a more reliable supply to its customers. It is anticipated that well water will be available even when drought and increased evaporation have led to significant reductions in lake levels. During normal times, the addition of groundwater—a more stable, secondary source—to the District's supply portfolio enhances the MCD's overall flexibility in treating and delivering water to member communities.

The regional significance of this project cannot be understated in that all of the MPMCD member cities are wholesale water providers to additional stakeholders in the southwest Oklahoma. This includes Altus Air Force Base, home of the prominent 97th Air Mobility Wing, a major employer which trains airlift and aerial refueling aircrews. And more than a dozen cities and rural water systems depend upon the District, including the Quartz Mountain Regional Water Authority, which provides water to four additional customers (including power generation to 3,000 meters throughout portions of Harmon, Greer, Jackson, Kiowa and Beckham Counties).

- Q **How will the project build long-term resilience to drought? How many years will the project continue to provide benefits?**

  The addition of a separate secondary source of supply will provide both increased water reliability and drought resilience resulting in significant long-term benefits for the District and its many customers. The goal of the full Groundwater Supply Augmentation Project is to permanently augment the MPMCD system with available groundwater sources.

- Q **How will the project improve the management of water supplies? For example, will the project increase efficiency, increase operational flexibility, or facilitate water marketing (e.g., improve the ability to deliver water during drought or access other sources of supply)? If so, how will the project increase efficiency or operational flexibility?**

  As mentioned, this project creates a reliable secondary source of water supply that enhances the operational flexibility of MPMCD's water system, including the maintenance of certain infrastructure that would be allowed to be taken off-line when required due to the addition of redundant supply. This project will also compliment the City of Altus' ongoing groundwater development effort (mentioned earlier) as well as a separate project, funded in part through a Reclamation Drought Resiliency Program grant awarded in 2016, to rehabilitate the City's municipal reservoir so that it is capable of storing available flows from Tom Steed Reservoir during normal/wet periods for use by the City during dry times.

- Q **Will the project make new information available to water managers? If so, what is that information and how will it improve water management?**

  Rather than specific new information or data, the primary project benefit will be associated with enhanced flexibility afforded to MPMCD water managers.

- Q **Will the project have benefits to fish, wildlife, or the environment? If so, please describe those benefits.**

  It is anticipated that this project will provide greater flexibility in managing impacts to lake levels at Tom Steed Reservoir, which also provides water to both a wetlands/wildlife area at

the lake and nearby Hackberry Flats Wildlife Management Area (WMA), each managed by the Oklahoma Department of Wildlife Conservation (ODWC). The WMA is comprised of 7,120 acres of upland and wetland habitat and contains approximately 90 water control structures, 35 miles of dikes, 4 miles of water distribution canals and 25 wetland units. The Hackberry Flats WMA represents one of the most ecological important WMAs in North America and is home to several endangered or threatened species, including the Whooping Crane, Snowy Plover and Interior Least Tern. WMA management efforts focus on producing native wildlife foods such as wild millets, sedges, smartweeds, pigweeds, ragweeds and sunflower. Agriculture crops such as milo, foxtail millet, Japanese millet, and wheat are planted on approximately 1,300 acres annually. PL. 103-434 added environmental quality as a project purpose. Consequently Hackberry Flats WMA was allocated 2,352 AFY to provide environmental benefits to the region.

At conservation pool, the Reservoir also provides benefits to more than 5,954 acres of land-based public recreation at Great Plains State Park and 6,402 surface acres of water based recreation. Tom Steed Reservoir is noted for as one of the best fishing lakes in southwestern Oklahoma.

- **What is the estimated quantity of water that will be better managed as a result of this project? How was this estimate calculated?**
  The addition of groundwater to the District's system will enable improved management of its entire supply system through balancing source treatment and distribution in relation to evolving demands, climate conditions and related factors.

- **What percentage of the total water supply does the water better managed represent? How was this estimate calculated?**
  As described earlier, the additional supply will represent between 7 percent (initially) to 50 percent or more (in the near future, when the City of Altus' groundwater supply is fully developed) of the District's total estimated drought water demand.

- **Provide a brief qualitative description of the degree/significance of anticipated water management benefits.**
  In addition to balancing supply sources and associated mitigation of lake level declines, drinking water quality will be improved through blending of the lake's current supply with the new groundwater well supply, thus mitigating existing issues with trihalomethanes (THMs). THMs are disinfection by-products primarily resulting from surface water rich in organic matter that pose a potential health risk. The blended water would be distributed to Altus and/or Snyder through direct transmission via existing raw water lines. All three communities who are District members, as well as Altus AFB, are currently suffering from THM levels exceeding federal drinking water standards.

If the proposed project includes any of the following components, please provide the applicable additional information:

Salt Water Barriers
N/A.

Wells

What is the estimated capacity of the new well(s), and how was the estimate calculated?

As detailed previously, pumping tests and related information estimate the combined capacity of the two proposed wells at 170-195 GPM.

How much water do you plan to extract through the well(s)?

No limit will be imposed on the extraction during drought emergencies. However, the revised management scheme will include periods of non-use as required to allow for recovery.

Will the well(s) be used as a primary supply or supplemental supply when there is a lack of surface supplies?

The wells will be used as a primary/emergency source during drought when insufficient surface supply (the usual primary source) is available and as a supplemental source during typical demand scenarios to maintain reservoir levels as much as possible.

Provide information documenting that proposed well(s) will not adversely impact the aquifer it/they are pumping from (overdraft or land subsidence). At a minimum, this should include aquifer description, information on existing or planned aquifer recharge facilities, a map of the well location and other nearby surface water supplies, and physical descriptions of the proposed well(s) (depth, diameter, casing description, etc.). If available, information should be provided on nearby wells (sizes, capacities, yields, etc.), aquifer test results, and if the area is currently experiencing aquifer overdraft or land subsidence.

Utilization of the proposed wells (Test Holes #2 and #6, Figure 3) is not expected to negatively impact the North Fork alluvium as they exhibit relatively moderate yields (testing results are presented in Appendix A; Test Hole #2 is incorrectly referred to as #3 on some pages). No such impacts, such as overdrafts or land subsidence, are known to currently exist in the area.

The North Fork of the Red River alluvial aquifer, one of two major alluvial formations in southwest Oklahoma (the other being the Tillman Terrace), averages 70 feet in thickness, according to the Oklahoma Water Resources Board (OWRB). (Major alluvial aquifers are considered by the OWRB to yield, on average, at least 150

Figure 3: Test Holes #2 & #6 (Prospective Well Sites) Downstream of Dam

GPM.) The formation consists of silt and clays grading into fine to coarse sand. The water is hard to very hard and of a generally calcium magnesium bicarbonate type. Total dissolved solids values are usually less than 1,100 mg/L. The North Fork of the Red River aquifer exhibits an average recharge rate of 2.3 inches/year. The OWRB has completed a maximum annual yield study of the aquifer and has assigned an equal proportionate share of 1.0 AFY/acre.

The aquifer underlies about 11 percent of the Tom Steed Reservoir watershed. According to the 2012 Update of the Oklahoma Comprehensive Water Plan (OCWP), only 100 AFY of water rights are currently appropriated in this portion of the North Fork of the Red River aquifer. The OCWP envisions no major water supply issues for the watershed (Planning Basin 35) through 2060. In addition, no major aquifer recharge/recovery projects are planned for the area. However, the OCWP Aquifer Recharge Workgroup identified a site on the North Fork of the Red River near Elk City (site # 21) as potentially feasible for aquifer recharge and recovery of the North Fork aquifer in that area. However, the recharge site is located at a considerable distance from the District's proposed project area; therefore, no impacts would be anticipated.

Please describe the groundwater monitoring plan that will be undertaken and the associated monitoring triggers for mitigation actions. Describe how the mitigation actions will respond to or help avoid any significant adverse impacts to third parties that occur due to groundwater pumping.

The proposed project will be located on BoR property and no major groundwater (or surface water) users currently exist in the immediate area. In addition, associated state well spacing requirements will be followed by the District. As a result, no advanced mitigation measures will be required for this project. However, District water managers will closely monitor water levels in the two wells as part of its new conjunctive management scheme.

New Water Marketing Tool or Program

N/A.

Metering/Water Measurement Projects

N/A.

Environmental/Wildlife Projects

- **What are the types and quantities of environmental benefits provided, such as the types of species and their numbers benefited, acreage of habitat improved, restored or protected, or the amount of flow provided? How was this estimate calculated?**

  Other than benefits associated with the Hackberry Flats WMA and the nearby wetlands area, this project is not directly intended to result in environmental and/or habitat/species improvement.

- **What is the status of the species of interest (i.e. endangered, threatened, etc.)? How has the drought impacted the species?**

  N/A.

- **If the proposed project will benefit federally listed threatened or endangered species please consider the following elements:**
  - **Is the species subject to a recovery plan or conservation plan under the ESA?**
    N/A.
  - **What is the relationship of the species to water supply?**
    N/A.
  - **What is the extent of the proposed project that would reduce the likelihood of listing, or would otherwise improve the status of the species?**
    N/A.
  - **Is the species adversely affected by a Reclamation project?**
    N/A.

Criterion B—Drought Planning and Preparedness

Up to 20 points may be awarded for a proposal based on the extent that the proposed drought resiliency project(s) is supported by an existing drought plan. Proposals that demonstrate that the proposed project is clearly supported by an existing drought plan will be awarded the most points under this criterion. Please note that this criterion does not address the benefits of the project and the description should be limited to the extent to which a plan supports the project. Project benefits are addressed under E.1.1. Evaluation Criterion A—Building Drought Resiliency, above.

For purposes of evaluating this criterion, please:

- **Attach a copy of the applicable drought plan, or sections of the plan, as an appendix to your application. *These pages will not be included in the total page count for the application.***
  A copy of the Southwest Oklahoma Water Action Plan (SWAP) is provided in Appendix B.

- **Explain how the applicable plan addresses drought. Proposals that reference plans clearly intended to prepare for and address drought will receive more points under this criterion.**
  The SWAP was developed as a direct result of the statewide drought of 2010-15, which caused particularly devastating impacts in this region. Created in May 2014 and updated in July 2015, the plan brought together all area stakeholders to establish a strategy to mitigate the wide-ranging economic and social impacts associated with drought in southwest Oklahoma. The initial Plan revealed that the region is largely over-reliant on limited surface water sources—especially at Tom Steed Reservoir, which is routinely stretched to the limit during high-demand drought events—and offered numerous strategies to 1) augment supplies through groundwater development, 2) modify and balance water management schemes, 3) initiate major water infrastructure improvements and 3) improve water conservation and efficiency.

  - **Explain whether the drought plan was developed with input from multiple stakeholders. Was the drought plan developed through a collaborative process?**

Stakeholders responsible for SWAP development were the region's primary water users—including MPMCD member cities and local communities, rural water and irrigation districts, and recreational and wildlife interests—who met regularly to develop the Plan and its specific strategies to mitigate drought and enhance water reliability. Supported by the combined efforts of local, state and federal agencies (such as Reclamation, Corps of Engineers, federal Department of Defense and Oklahoma Water Resources Board)—as well as the permanent SWAP Task Force, which meets monthly—the Plan has already made significant progress. The Task Force is also cooperating with the Western States Federal Agency Support Team (WestFAST)—a group of 11 federal agencies committed to collaboration and to leveraging technical resources to address water-related issues in the West—to facilitate SWAP implementation consistent with ongoing federal initiatives.

- Q **Does the drought plan include consideration of climate change impacts to water resources or drought?**

  Absolutely. It is the material threat of a potentially drier climate in the future—established by the current prevailing scientific evidence of ongoing climate change—and subsequent impact to the reliability of limited water supplies that spawned SWAP development. The southwest Oklahoma economy relies upon water so stakeholders are obliged to prepare for and mitigate future drought impacts.

- Q **Describe how your proposed drought resiliency project is supported by an existing drought plan.**

  Increasing the reliability of Tom Steed Reservoir, the region's major public water supply source, is a primary SWAP initiative. A major near-term recommendation of the Plan is "Mountain Park Groundwater Supply Augmentation," which includes this proposed drought resiliency project.

  - Q **Does the drought plan identify the proposed project as a potential mitigation or response action?**

    Yes. Consistent with this funding request, the SWAP Groundwater Supply Augmentation strategy includes the following language: "Mountain Park MCD has also initiated a $1.2 million project, financed by member cities, to investigate the addition of wells to directly augment supply in Tom Steed Reservoir and increase water delivery capacity to customers. The initial geologic study is complete and engineers have begun drilling test holes just downstream of Tom Steed dam to identify specific sites of suitable quantity and quality. MPMCD officials have expressed optimism that quality could be improved through blending of the lake's current supply with the new groundwater well supply, thus mitigating THM issues. This water would be distributed to Altus and/or Snyder through direct transmission via existing raw water lines."

  - Q **Does the proposed project implement a goal or need identified in the drought plan?**

    Yes. As mentioned, increasing the reliability of Tom Steed—in part, through groundwater supply augmentation—is a goal of the SWAP.

- **Describe how the proposed project is prioritized in the referenced drought plan?**

  This project is considered a "near-term" goal, which is considered the highest priority of SWAP initiatives. The Plan also includes "mid-term" and "long-term" drought mitigation and water reliability strategies.

Criterion C—Severity of Actual or Potential Drought Impacts to be Addressed by the Project

Up to 20 points may be awarded based upon the severity of actual or potential drought impacts to be addressed by the project. Proposals that address more urgent needs and more severe drought impacts will receive higher priority consideration on this criterion than proposals that address less significant needs and impacts.

Describe the severity of the impacts that will be addressed by the project:

- **What are the ongoing or potential drought impacts to specific sectors in the project area if no action is taken (e.g., impacts to agriculture, environment, hydropower, recreation and tourism, forestry), and how severe are those impacts? Impacts should be quantified and documented to the extent possible.**

  Public Water Supply Impacts: If no action is taken, 40,000 users who depend upon Tom Steed Reservoir will remain vulnerable to Oklahoma's frequent and severe drought episodes. In short, the economic vitality of the region—particularly, the communities of Altus, Snyder, and Fredrick and Altus, the economic hub of southwest Oklahoma—will be compromised. In addition, as mentioned, this project would facilitate the blending of water, which will reduce THM issues.

  The project is especially important in maintaining the vitality of Altus Air Force Base, a federal entity relying on local resources for water sustenance. In turn, the region depends upon the Air Force Base to stimulate local economies. The Base employs more than 4,000 workers (about 60 percent of total employment in Altus), and the nation's security is dependent upon the facility whose strategic location serves as a wartime aerial port of embarkation.

  Agricultural Impacts: Altus currently utilizes Lugert-Altus Reservoir, which is particularly susceptible to drought impacts, as an emergency supply source. This will continue if no action is taken. However, this proposed project—in conjunction with current efforts to develop an independent groundwater supply system and rehabilitate its municipal reservoir—would virtually eliminate the City's need for Lugert-Altus water, thereby freeing up additional supply for irrigation, frequently when it is needed most. Lugert-Altus Irrigation District (LAID) is primarily responsible for the region's lucrative cotton industry, which averages some $200 million per year in crop production and supports a vibrant economy and quality of life in Altus and surrounding communities. During the 2010-15 drought, for the first time in decades, LAID farmers were totally deprived of lake water supply during the irrigation season.

  Fish & Wildlife/Environmental Impacts: If no action is taken, reservoir levels will continue to be susceptible to declines, which increase water salinity in Tom Steed and heighten

susceptibility to golden algae blooms. As a result, Tom Steed Reservoir's fishery could become unsustainable. Project water was originally allocated to Hackberry Flats WMA to ensure environmental quality compliance, as directed by PL. 103-434. Without action, MPCD may no longer be able to deliver water to Hackberry Flats WMA, adversely impacting the environmental/ecological health of the region and potentially damaging threatened and endangered species.

Recreational Impacts: If no action is taken, lowering lake levels will continue to have adverse impacts on the water-based recreation associated with Great Plains State Park and Tom Steed Reservoir. Visitor use days at these facilities fell significantly as the most recent drought episode worsened in intensity. This had a direct negative impact on local economies.

- **Are there public health concerns or social concerns associated with current or potential drought conditions (e.g., water quality concerns including past or potential violations of drinking water standards, increased risk of wildfire, or past or potential shortages of drinking water supplies? Does the community have another water source available to them if their water service is interrupted?)**
  As mentioned, THMs have become a major public water supply issue related to Tom Steed Reservoir. This project would significantly mitigate that problem. Also as mentioned, Tom Steed is the sole source of water for many of its customers.

- **Are there ongoing or potential environmental impacts (e.g., impacts to endangered, threatened or candidate species or habitat)?**
  As mentioned, Hackberry Flats, whose habitat is supported by flows from Tom Steed Reservoir, is home to several endangered and threatened bird species.

- **Are there ongoing, past or potential, local, or economic losses associated with current drought conditions (e.g., business, agriculture, reduced real estate values)?**
  In addition to drought-related impacts associated with tax receipts, property taxes and related maintenance and improvements to roads, hospitals, schools and retail businesses, city leaders in Altus are particularly concerned about sustaining their essential military facility. The U.S. Air Force is currently conducting a new Installation Complex Encroachment Management Action Plan (ICEMAP) study of the Altus water system and its ability to provide a secure, long-term water source—even during drought episodes—that enables Altus AFB to fulfill its federal mission. The last ICEMAP report identified several quantity and quality concerns with the Altus water supply.

- **Are there are other drought-related impacts not identified above (e.g., tensions over water that could result in a water-related crisis or conflict).**
  N/A.

- **Describe existing or potential drought conditions in the project area.**
  According to the U.S. Drought Monitor, the project area is considered "abnormally dry": however, the area is geographically on the cusp of "moderate drought" as conditions begin to worsen statewide. More than 3.4 million Oklahomans are currently affected by drought.

According to the federal seasonal drought outlook, from mid-January through the end of April, conditions are likely to improve in the western part of the state.

- X **Is the project in an area that is currently suffering from drought or which has recently suffered from drought? Please describe existing or recent drought conditions, including when and the period of time that the area has experienced drought conditions (please provide supporting documentation, [e.g., Drought Monitor, droughtmonitor.unl.edu]).**

No region of Oklahoma suffered as much or for so long from the state's five-year drought as the southwest. Beginning in the summer of 2010, lack of rainfall and runoff, rapid evaporation and increasing demand consumed surface water supplies, especially Tom Steed and Lugert-Altus Reservoirs, upon which most in the region rely (Figure 4). According to the U.S. Drought Monitor, the MPMCD area was in Severe Drought, Extreme Drought or Exceptional Drought (except for a brief period of Moderate Drought in mid-2012) from inception of the drought through its conclusion in 2015.

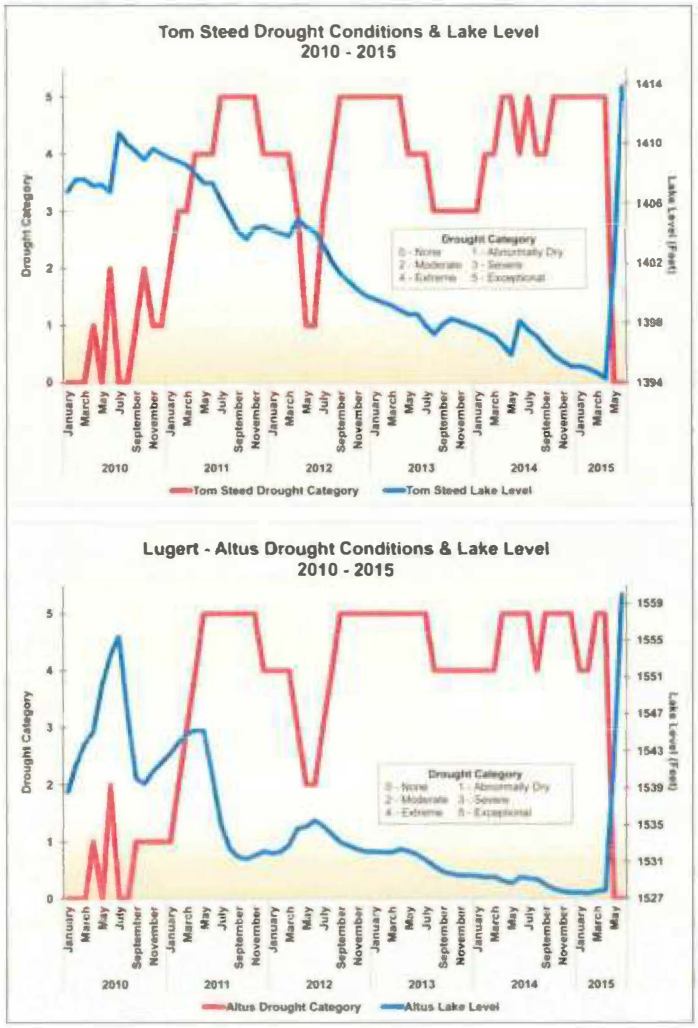

Figure 4: Lake Levels & Drought Conditions at Tom Steed and Lugert-Altus Reservoirs, 2010-15.

- X **Describe any projected increases to the severity or duration of drought in the project area resulting from climate change. Provide support for your response (e.g., reference a recent climate change analysis, if available).**

An analysis of global climate models and greenhouse gas emission scenarios selected for a recent cooperative study—"Impacts of Climate Change on Flows of the Red River Basin," between the Chickasaw Nation and University of Oklahoma—generally indicate potentially higher temperatures and less rainfall for the western portion of the Red River Basin, including the MPMCD region, through 2099. Obviously, such changes would negatively impact streamflows, reservoir levels and general water availability in the region. Results of the ongoing Upper Red River Basin Study, in which MPMCD and Reclamation are

partnering, will provide further insight into future climate change scenarios as well as focus SWAP implementation on the most effective drought mitigation strategies.

Criterion D—Project Implementation

Up to 10 points may be awarded based upon the extent to which the proposed project is capable of proceeding upon entering into a financial assistance agreement. Applicants that describe a detailed plan (e.g., estimated project schedule that shows the stages and duration of the proposed work, including major tasks, milestones, and dates) will receive the most points under this criterion.

- C **Describe the implementation plan of the proposed project. Please include an estimated project schedule that shows the stages and duration of the proposed work, including major tasks, milestones, and dates.**

  The entire MPMCD Groundwater Supply Augmentation Project, recommended by the SWAP, has been underway since 2014 as water managers have expended significant time and resources in search of appropriate well sites, including those proposed for this project (Phase 1). It is important to point out that this is only the initial phase of a much larger 12- to 15-month project to acquire approximately 2 MGD of supplementary/emergency groundwater supply for the District.

  See the table below for a summary outline of Phase 1 tasks and dates.

Estimated Schedule: MPMCD Groundwater Supply Augmentation Project, Phase 1		
Major Tasks	**Duration**	**Completion Date**
Geologic Investigation	6 months	September 2015
Preliminary Siting Investigation	6 months	September 2016
Prospective Site Testing	9 months	January 2017
Engineering & Design	6 months	August 2017
Permitting & Easements/Rights-of-Way	6 months	August 2017
Well Construction & Infrastructure Development	3 months	November 2017
Bring Wells Online	1 month	November 2018

- C **Describe any permits that will be required, along with the process for obtaining such permits.**

  Water rights will be acquired from the OWRB, the state's water management agency. In addition, construction will take place in a designated flood zone, so appropriate permits and/or variances will need to be acquired. While NEPA requirements must be followed for the construction portion of the proposed project, no significant environmental impacts are anticipated.

- C **Identify and describe any engineering or design work performed specifically in support of the proposed project.**

  To date, considerable work has been conducted in search of Phase 1 well sites with desired quantity and quality, both on and outside of Reclamation land. However, no formal engineering or specific design work has been conducted to date.

- **Describe any new policies or administrative actions required to implement the project.**

  This project requires clarification concerning the issue of Reclamation infrastructure potentially being utilized to carry non-Project water (i.e., groundwater from the new wells).

  In 2013, the MPMCD and City of Altus initiated discussions concerning the transmission of non-Project groundwater (rather than Project surface water) during drought episodes from prospective wells near Tom Steed dam through the existing federally-owned aqueduct to the City. In conversations between the BoR Oklahoma-Texas Area Office and MPMCD officials, Reclamation stated that they "believe [temporary] conveyance of non-Project groundwater may be allowable under Section 14 of the Reclamation Act of 1939" under certain specified conditions. A copy of this correspondence in included in Appendix C. In any case, further discussions must take place to ensure that the newly developed groundwater supply constitutes "project water" of Mountain Park MCD.

Criterion E—Nexus to Reclamation

Up to 10 points may be awarded based on the extent that the proposal demonstrates a nexus between the proposed project and a Reclamation project or activity. Describe the nexus between the proposed project and a Reclamation project or activity, including:

- **How is the proposed project connected to a Reclamation project or activity?**

  The Mountain Park Project was constructed by the Bureau of Reclamation in response to the pressing need for municipal and industrial water supply in southwest Oklahoma. Tom Steed Dam and appurtenant facilities are owned by Reclamation. MPMCD oversees Tom Steed's critically important water supply function, providing for some 40,000 customers residing in Altus, Frederick and Snyder. In turn, Altus supplies Jackson County Water Corporation, Quartz Mountain Water Authority, Creta Water Company and the nearby towns of Duke, Blair, Olustee and Martha.

- **Will the project help Reclamation meet trust responsibilities to any tribe(s)?**

  Indirectly only.

- **Does the applicant receive Reclamation project water?**

  Yes. Mountain Park MCD is actually *responsible for* Reclamation project water.

- **Is the project on Reclamation project lands or involving Reclamation facilities?**

  Yes, consistent with a primary goal of this project, the proposed wells would be constructed on Reclamation property and involve relevant Reclamation facilities to treat and deliver the well water.

- **Is the project in the same basin as a Reclamation project or activity?**

  Yes.

- **Will the proposed work contribute water to a basin where a Reclamation project is located?**

  Yes.

Appendix A

Well Testing Results

Layne Christensen

Customer **Mountain Park**
Well No. **Test Well # 3**
Date **12/7/2016**
Tested By **Todd List**
SWL **16.7** Pump Settting

Sheet **24 HR. Test**
Pg. 1

Elapsed Time	Flow Rate	Pumping Level	Drawdown	Specific Capacity	Discharge Pressure(PSI)	Comments Sand
1	70	18.40	1.70	41.18		
2						
3						
4						
5	70	27.10	10.40	6.73		
7						
9						
11						
15	70	27.15	10.45	6.70		
20						
25						
30	70	27.10	10.40	6.73		
35						
40						
45						
50						
60	70	27.20	10.50	6.67		
70						
80						
90	70	27.10	10.40	6.73		
100						
120	70	27.10	10.40	6.73		
150	70	27.10	10.40	6.73		
180	70	27.10	10.40	6.73		
210	70	27.10	10.40	6.73		
240						
270						
300						
330						
360						
390						
420						
450						

Layne Christensen

Customer **Mountain Park**
Well No. **Test Well # 3**
Date **12/7/2016**
Tested By **Todd List**
SWL **16.7** Pump Setting

Sheet **Recovery Test**

Elapsed Time	Flow Rate	Water Level	Drawdown	Specific Capacity	Discharge Pressure (PSI)	Comments
1	OFF	20.90	4.20			
2	OFF					
3	OFF					
4	OFF					
5	OFF	19.50	2.80			
7	OFF					
9	OFF					
11	OFF					
15	OFF	18.90	2.20			
20	OFF					
25	OFF	18.00	1.30			
30	OFF					
35	OFF					
40	OFF	17.90	1.20			
45	OFF					
50	OFF					
60 (1HR)	OFF					
70	OFF					
80	OFF					
90	OFF					
100	OFF					
120 (2HR)	OFF					
140	OFF					
160	OFF					
180 (3HR)	OFF					
200	OFF					
220						
240						
260						
280						
300						

Accurate
Environmental Laboratories

December 28, 2016

Client: Layne Christensen

4691 NE Hwy 33

Guthrie, OK 73044

Requested By: -

National Environmental Laboratory Accreditation Program
Kansas CERT # E-10219

Sample Project Name:	Mountain Park
Date Samples Received:	December 08, 2016 Time: 13:55 sample temp upon arrival at lab = 1°C - On Ice
Matrix:	Drinking Water
Lab Log Numbers:	**6L08052-01** **6L08052-02**
Work Order:	6L08052
Report #	6L08052-1228160900
EPA Lab ID#'s:	**Stillwater OK00092 Tulsa OK00983 OKC OK00129 ICR OK 001**
Oklahoma Certification:	Stillwater WasteWater, DEQ 8316/ Drinking Water, DEQ D9602
	Tulsa WasteWater. DEQ 9905 / Drinking Water, DEQ D9901
	Oklahoma City WasteWater DEQ 7202 / Drinking Water, DEQ D9937
Kansas Certification:	Stillwater NELAP CERT # E-10219
New Jersey Certification:	Oklahoma City Drinking Water NELAP CERT # OK005
Texas Certification:	Stillwater Drinking Water NELAP CERT # T105704533-14-1
Method Reference:	40 CFR 136, 141, and 261 Methods for Chemical Analysis of Water and Wastes EPA-600/4-79-020, March 1983. Test Methods for Evaluating Solid Wastes, SW-846. Final Update III. Standard Methods 1998 (20th Edition), Standard Methods 2005 (21st Edition) and Standard Methods 2011 (22nd Edition) for the Examination of Water and Wastewater.
Analysis Reference:	If qualifiers present in "Prep Info" or "Analysis Info", then analysis performed as follows: @= Tulsa Lab and * = OKC Lab. If no qualifiers present, then analysis performed at Stillwater Lab.

Accurate Environmental Laboratories certify that the test results performed at the Stillwater lab meet all requirements of NELAP. Any exceptions to this can be found in the report footer or Quality Control Section of the report.

This report is to only be replicated in its entirety.

Accurate Enviornmental sampling protocol was followed for any sampling performed by Accurate Field Services.

Sample: ***Test Well #2 Mountain Park*** **Location Code:** **PWSID#:**

Collection Type: Grab Sample Time: 12/7/16 14:00 **Lab Log#** 6L08052-01

Method/Parameter	Test	Result		Notes	PQL#	Prep Info	Analysis Info
Alkalinity, Total (CaCO3) SM2320B	Alkalinity	291.6	mg/L		10.0	12/16/16 10:52 CWK	12/16/16 15:38 CWK
Chloride EPA 300.0	Chloride	97.6	mg/L		5.00	12/09/16 13:00 ALM	12/22/16 20:09 BM
Conductivity SM2510 B	Conductivity	972.0	umho/cm		2.0	12/12/16 15:11 AM	12/12/16 15:11 AM
Fluoride EPA 300.0	Fluoride	0.83	mg/L		0.10	12/09/16 13:00 ALM	12/22/16 19:46 BM
Nitrate+Nitrite EPA 300.0	Nitrate + Nitrite as N	BPQL	mg/L		0.25	12/09/16 13:00 ALM	12/22/16 19:46 BM
pH in Lab SM4500H+B	pH	7.28	pH	#03	0.01	12/12/16 15:45 RND	12/12/16 15:45 RND
Turbidity SM2130 B	Turbidity	1.84	NTU	MCL	0.10	12/09/16 13:15 BM	12/09/16 13:20 BM
Sulfate EPA 300.0	Sulfate	83.0	mg/L		5.00	12/09/16 13:00 ALM	12/22/16 20:09 BM
Total Dissolved Solids SM2540 C	Total Dissolved Solids	592	mg/L	MCL	25.0	12/13/16 10:45 RND	12/14/16 16:15 RND
Hardness, Total (CaCO3) SM2340 C	Hardness	258	mg/L	###	15.0	12/13/16 14:20 AM	12/13/16 14:20 AM
Mercury (Hg), Soluble EPA 245.1	Mercury	BPQL	ug/L		0.20	12/12/16 12:00 ZR	12/13/16 14:41 ZR
Antimony (Sb), Soluble - EPA 200.8	Antimony	BPQL	mg/L		0.005	12/13/16 14:00 DM	12/15/16 11:44 LF
Arsenic (As), Soluble - EPA 200.8	Arsenic	BPQL	mg/L		0.005	12/13/16 14:00 DM	12/15/16 11:44 LF
Barium (Ba), Soluble - EPA 200.8	Barium	0.195	mg/L		0.005	12/13/16 14:00 DM	12/15/16 11:44 LF
Beryllium (Be), Soluble - EPA 200.8	Beryllium	BPQL	mg/L		0.001	12/13/16 14:00 DM	12/15/16 11:44 LF
Cadmium (Cd), Soluble EPA 200.8	Cadmium	BPQL	mg/L		0.001	12/13/16 14:00 DM	12/15/16 11:44 LF
Chromium (Cr), Soluble - EPA 200.8	Chromium	BPQL	mg/L		0.010	12/13/16 14:00 DM	12/15/16 11:44 LF
Copper (Cu), Soluble - EPA 200.8	Copper	BPQL	mg/L		0.010	12/13/16 14:00 DM	12/15/16 11:44 LF
Iron (Fe), Soluble - EPA 200.7	Iron	BPQL	mg/L		0.250	12/13/16 14:00 DM	12/15/16 12:50 LF
Lead (Pb), Soluble - EPA 200.8	Lead	BPQL	mg/L		0.005	12/13/16 14:00 DM	12/15/16 11:44 LF
Manganese (Mn), Soluble - EPA 200.7	Manganese	1.06	mg/L	MCL	0.025	12/13/16 14:00 DM	12/15/16 12:50 LF
Nickel (Ni), Soluble - EPA 200.8	Nickel	BPQL	mg/L		0.010	12/13/16 14:00 DM	12/15/16 11:44 LF
Selenium (Se), Soluble - EPA 200.8	Selenium	BPQL	mg/L		0.005	12/13/16 14:00 DM	12/15/16 11:44 LF
Sodium (Na), Soluble - EPA 200.7	Sodium	122	mg/L		5.00	12/13/16 14:00 DM	12/16/16 14:19 LF
Thallium (Tl), Soluble EPA 200.8	Thallium	BPQL	mg/L		0.001	12/13/16 14:00 DM	12/15/16 11:44 LF
Zinc (Zn), Soluble - EPA 200.8	Zinc	BPQL	mg/L		0.010	12/13/16 14:00 DM	12/16/16 15:20 LF
Volatile Organic Compounds by EPA 524.3	1,1,1,2-Tetrachloroethane	BPQL	ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	1,1,1-Trichloroethane	BPQL	ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	1,1,2,2-Tetrachloroethane	BPQL	ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	1,1,2-Trichloroethane	BPQL	ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	1,1-Dichloroethane	BPQL	ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	1,1-Dichloroethene	BPQL	ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	1,1-Dichloropropene	BPQL	ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	1,2,3-Trichloropropane	BPQL	ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	1,2,4-Trichlorobenzene	BPQL	ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP

Sample: **Location Code:** **PWSID#:**

Collection Type: Grab Sample Time: 12/7/16 14:00 **Lab Log#** 6L08052-01

Method/Parameter	Test	Result	Notes	PQL#	Prep Info	Analysis Info
Volatile Organic Compounds by EPA 524.3	1,2-Dichlorobenzene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	1,2-Dichloroethane	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	1,2-Dichloropropane	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	1,3,5-Trimethylbenzene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	1,3-Dichloropropane	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	1,4-Dichlorobenzene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	2-Chlorotoluene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	4-Chlorotoluene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	Benzene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	Bromobenzene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	Bromochloromethane	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	Bromodichloromethane	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	Bromoform	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	Bromomethane (Methyl bromide)	BPQL ug/L		1.00	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	Carbon tetrachloride	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	Chlorobenzene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	Chloroform	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	Chloromethane (Methyl chloride)	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	cis-1,2-Dichloroethene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	cis-1,3-Dichloropropene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	Dibromochloromethane	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	Dibromomethane	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	Dichlorodifluoromethane	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	Ethylbenzene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	Isopropylbenzene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	m,p-Xylene	BPQL ug/L		1.00	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	Methyl t-butyl ether (MtBE)	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP

Sample: **Location Code:** **PWSID#:**

Collection Type: Grab Sample Time: 12/7/16 14:00 **Lab Log#** 6L08052-01

Method/Parameter	Test	Result	Notes	PQL#	Prep Info	Analysis Info
Volatile Organic Compounds by EPA 524.3	Methylene Chloride	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	n-Propylbenzene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	o-Xylene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	sec-Butylbenzene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	Styrene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	tert-Butylbenzene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	Tetrachloroethene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	Toluene	4.01 ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	Total Xylenes	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	trans-1,3-Dichloropropene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	trans-1,2-Dichloroethene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	Trichloroethene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	Trichlorofluoromethane	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	Vinyl chloride	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	Naphthalene	BPQL ug/L		1.00	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	Hexachlorobutadiene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	n-Butylbenzene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	p-Isopropyltoluene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	1,2,3-Trichlorobenzene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	1,3-Dichlorobenzene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP
Volatile Organic Compounds by EPA 524.3	2,2-Dichloropropane (Screen)	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:06 KP

Sample: ***Trip Blank*** **Location Code:** **PWSID#:**

Collection Type: Grab Sample Time: 12/7/16 14:00 **Lab Log#** 6L08052-02

Method/Parameter	Test	Result	Notes	PQL#	Prep Info	Analysis Info
Volatile Organic Compounds by EPA 524.3	1,1,1,2-Tetrachloroethane	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	1,1,1-Trichloroethane	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	1,1,2,2-Tetrachloroethane	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP

Sample: **Location Code:** **PWSID#:**

Collection Type: Grab Sample Time: 12/7/16 14:00 **Lab Log#** 6L08052-02

Method/Parameter	Test	Result	Notes	PQL#	Prep Info	Analysis Info
Volatile Organic Compounds by EPA 524.3	1,1,2-Trichloroethane	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	1,1-Dichloroethane	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	1,1-Dichloroethene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	1,1-Dichloropropene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	1,2,3-Trichloropropane	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	1,2,4-Trichlorobenzene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	1,2-Dichlorobenzene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	1,2-Dichloroethane	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	1,2-Dichloropropane	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	1,3,5-Trimethylbenzene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	1,3-Dichloropropane	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	1,4-Dichlorobenzene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	2-Chlorotoluene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	4-Chlorotoluene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	Benzene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	Bromobenzene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	Bromochloromethane	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	Bromodichloromethane	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	Bromoform	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	Bromomethane (Methyl bromide)	BPQL ug/L		1.00	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	Carbon tetrachloride	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	Chlorobenzene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	Chloroform	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	Chloromethane (Methyl chloride)	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	cis-1,2-Dichloroethene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	cis-1,3-Dichloropropene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	Dibromochloromethane	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP

Sample: **Location Code:** **PWSID#:**

Collection Type: Grab Sample Time: 12/7/16 14:00 **Lab Log#** 6L08052-02

Method/Parameter	Test	Result	Notes	PQL#	Prep Info	Analysis Info
Volatile Organic Compounds by EPA 524.3	Dibromomethane	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	Dichlorodifluoromethane	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	Ethylbenzene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	Isopropylbenzene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	m,p-Xylene	BPQL ug/L		1.00	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	Methyl t-butyl ether (MtBE)	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	Methylene Chloride	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	n-Propylbenzene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	o-Xylene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	sec-Butylbenzene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	Styrene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	tert-Butylbenzene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	Tetrachloroethene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	Toluene	BPQL ug/L	Z-01	0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	Total Xylenes	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	trans-1,3-Dichloropropene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	trans-1,2-Dichloroethene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	Trichloroethene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	Trichlorofluoromethane	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	Vinyl chloride	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	Naphthalene	BPQL ug/L		1.00	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	Hexachlorobutadiene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	n-Butylbenzene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	p-Isopropyltoluene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	1,2,3-Trichlorobenzene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	1,3-Dichlorobenzene	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP
Volatile Organic Compounds by EPA 524.3	2,2-Dichloropropane (Screen)	BPQL ug/L		0.500	12/14/16 09:05 KP	12/14/16 14:30 KP

Notes and Definitions

Z-01	Toluene was detected in the trip blank (old, May24), but was BPQL.
#03	This sample was received outside of EPA recommended holding time.
MCL	Analyte concentration may exceed Maximum Contaminant Limit (MCL) for EPA Primary or Secondary Drinking Water Regulations
###	Analyte concentration may exceed regulatory limit.
PQL	Practical Quantitation Limit - the method reporting limit (MRL) adjusted for any dilutions or other changes made to the sample to deal with interferences/matrix effects
BPQL	Below Practical Quantitation Limit (if applicable).

The "Prep Date" of the QC analysis coincides with the characters of the appropriate QC Lab ID. (Example: S 9 A 02 15 - BLK = 2009, Jan 2, Batch #15 - Blank)

Lab Manager

Quality Control Data

Blank Data

QC Lab #	Test Group	Test	Result	PQL	Flags
S6L1630-BLK1	Alkalinity, Total (CaCO3) SM2320B	Alkalinity	BPQL mg/L	10.0	
S6L0938-BLK1	Chloride EPA 300.0	Chloride	BPQL mg/L	0.500	
S6L1229-BLK1	Conductivity SM2510 B	Conductivity	BPQL umho/cm	2.0	
S6L0938-BLK1	Fluoride EPA 300.0	Fluoride	BPQL mg/L	0.10	
S6L0938-BLK1	Nitrate+Nitrite EPA 300.0	Nitrate + Nitrite as N	BPQL mg/L	0.25	
S6L0936-BLK1	Turbidity SM2130 B	Turbidity	BPQL NTU	0.10	
S6L0938-BLK1	Sulfate EPA 300.0	Sulfate	BPQL mg/L	0.500	
S6L1331-BLK1	Total Dissolved Solids SM2540 C	Total Dissolved Solids	BPQL mg/L	25.0	
S6L1345-BLK1	Hardness, Total (CaCO3) SM2340 C	Hardness	BPQL mg/L	15.0	
S6L1324-BLK1	Mercury (Hg), Soluble EPA 245.1	Mercury	BPQL ug/L	0.20	
S6L1342-BLK1	Antimony (Sb), Soluble - EPA 200.8	Antimony	BPQL mg/L	0.005	
S6L1342-BLK1	Arsenic (As), Soluble - EPA 200.8	Arsenic	BPQL mg/L	0.005	
S6L1342-BLK1	Barium (Ba), Soluble - EPA 200.8	Barium	BPQL mg/L	0.005	
S6L1342-BLK1	Beryllium (Be), Soluble - EPA 200.8	Beryllium	BPQL mg/L	0.001	
S6L1342-BLK1	Cadmium (Cd), Soluble EPA 200.8	Cadmium	BPQL mg/L	0.001	
S6L1342-BLK1	Chromium (Cr), Soluble - EPA 200.8	Chromium	BPQL mg/L	0.010	
S6L1342-BLK1	Copper (Cu), Soluble - EPA 200.8	Copper	BPQL mg/L	0.010	
S6L1344-BLK1	Iron (Fe), Soluble - EPA 200.7	Iron	BPQL mg/L	0.250	
S6L1342-BLK1	Lead (Pb), Soluble - EPA 200.8	Lead	BPQL mg/L	0.005	
S6L1344-BLK1	Manganese (Mn), Soluble - EPA 200.7	Manganese	BPQL mg/L	0.025	
S6L1342-BLK1	Nickel (Ni), Soluble - EPA 200.8	Nickel	BPQL mg/L	0.010	
S6L1342-BLK1	Selenium (Se), Soluble - EPA 200.8	Selenium	BPQL mg/L	0.005	
S6L1344-BLK1	Sodium (Na), Soluble - EPA 200.7	Sodium	BPQL mg/L	0.50	
S6L1342-BLK1	Thallium (Tl), Soluble EPA 200.8	Thallium	BPQL mg/L	0.001	
S6L1342-BLK1	Zinc (Zn), Soluble - EPA 200.8	Zinc	BPQL mg/L	0.010	

Quality Control Data

Blank Data (cont'd)

QC Lab #	Test Group	Test	Result		PQL	Flags
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	1,1,1,2-Tetrachloroethane	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	1,1,1-Trichloroethane	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	1,1,2,2-Tetrachloroethane	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	1,1,2-Trichloroethane	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	1,1-Dichloroethane	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	1,1-Dichloroethene	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	1,1-Dichloropropene	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	1,2,3-Trichloropropane	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	1,2,4-Trichlorobenzene	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	1,2-Dichlorobenzene	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	1,2-Dichloroethane	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	1,2-Dichloropropane	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	1,3,5-Trimethylbenzene	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	1,3-Dichloropropane	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	1,4-Dichlorobenzene	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	2-Chlorotoluene	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	4-Chlorotoluene	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	Benzene	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	Bromobenzene	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	Bromochloromethane	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	Bromodichloromethane	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	Bromoform	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	Bromomethane (Methyl bromide)	BPQL	ug/L	1.00	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	Carbon tetrachloride	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	Chlorobenzene	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	Chloroform	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	Chloromethane (Methyl chloride)	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	cis-1,2-Dichloroethene	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	cis-1,3-Dichloropropene	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	Dibromochloromethane	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	Dibromomethane	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	Dichlorodifluoromethane	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	Ethylbenzene	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	Isopropylbenzene	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	m,p-Xylene	BPQL	ug/L	1.00	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	Methyl t-butyl ether (MtBE)	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	Methylene Chloride	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	n-Propylbenzene	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	o-Xylene	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	sec-Butylbenzene	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	Styrene	BPQL	ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	tert-Butylbenzene	BPQL	ug/L	0.500	

Quality Control Data

Blank Data (cont'd)

QC Lab #	Test Group	Test	Result	PQL	Flags
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	Tetrachloroethene	BPQL ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	Toluene	BPQL ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	Total Xylenes	BPQL ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	trans-1,3-Dichloropropene	BPQL ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	trans-1,2-Dichloroethene	BPQL ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	Trichloroethene	BPQL ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	Trichlorofluoromethane	BPQL ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	Vinyl chloride	BPQL ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	Naphthalene	BPQL ug/L	1.00	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	Hexachlorobutadiene	BPQL ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	n-Butylbenzene	BPQL ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	p-Isopropyltoluene	BPQL ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	1,2,3-Trichlorobenzene	BPQL ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	1,3-Dichlorobenzene	BPQL ug/L	0.500	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	2,2-Dichloropropane (Screen)	BPQL ug/L	0.500	

Duplicate Sample Data

QC Lab #	Test Group	Test Name	Dup Result	Samp Result	% RPD	RPD Limit	Flags
S6L1229-DUP1	Conductivity SM2510 B	Conductivity	969.0	972.0	0.3	20	
S6L0936-DUP1	Turbidity SM2130 B	Turbidity	1.84	1.84	0	10	
S6L1331-DUP1	Total Dissolved Solids SM2540 C	Total Dissolved Solids	595	592	0.5	10	

Quality Control Data

Laboratory Control Sample Data

Lab QC#	Test Group	Test Name	LCS Result	Spike Level	Units	% Rec.	Control Limits	Flags
S6L1630-BS1	Alkalinity, Total (CaCO3) SM2320B	Alkalinity	104.4	100.0	mg/L	104	80 - 120	
S6L0938-BS1	Chloride EPA 300.0	Chloride	2.90	3.000	mg/L	97	90 - 110	
S6L0938-MRL1	Chloride EPA 300.0	Chloride	0.638	0.5000	mg/L	128	50 - 150	
S6L1229-BS1	Conductivity SM2510 B	Conductivity	1410	1413	umho/cm	100	90 - 110	
S6L0938-BS1	Fluoride EPA 300.0	Fluoride	1.90	2.000	mg/L	95	90 - 110	
S6L0938-MRL1	Fluoride EPA 300.0	Fluoride	0.08	0.1000	mg/L	84	50 - 150	
S6L0938-BS1	Nitrate+Nitrite EPA 300.0	Nitrate + Nitrite as N	8.49	8.350	mg/L	102	91.2 - 108	
S6L0938-MRL1	Nitrate+Nitrite EPA 300.0	Nitrate + Nitrite as N	0.35	0.3506	mg/L	99	50 - 150	
S6L1231-BS1	pH in Lab SM4500H+B	pH	7.00	7.000	pH	100	98.5 - 101.5	
S6L0936-BS1	Turbidity SM2130 B	Turbidity	15.0	15.20	NTU	99	90 - 110	
S6L0938-BS1	Sulfate EPA 300.0	Sulfate	14.1	15.00	mg/L	94	90 - 110	
S6L0938-MRL1	Sulfate EPA 300.0	Sulfate	0.705	0.5000	mg/L	141	50 - 150	
S6L1331-BS1	Total Dissolved Solids SM2540 C	Total Dissolved Solids	980	1000	mg/L	98	80 - 120	
S6L1345-BS1	Hardness, Total (CaCO3) SM2340 C	Hardness	106	100.0	mg/L	106	80 - 120	
S6L1324-BS1	Mercury (Hg), Soluble EPA 245.1	Mercury	1.8	1.667	ug/L	110	85 - 115	
S6L1324-MRL1	Mercury (Hg), Soluble EPA 245.1	Mercury	0.04	0.05000	ug/L	88	50 - 150	
S6L1342-BS1	Antimony (Sb), Soluble - EPA 200.8	Antimony	0.095	0.1000	mg/L	95	85 - 115	
S6L1342-MRL1	Antimony (Sb), Soluble - EPA 200.8	Antimony	0.004	0.005000	mg/L	85	50 - 150	
S6L1342-BS1	Arsenic (As), Soluble - EPA 200.8	Arsenic	0.097	0.1000	mg/L	97	85 - 115	
S6L1342-MRL1	Arsenic (As), Soluble - EPA 200.8	Arsenic	0.003	0.005000	mg/L	57	50 - 150	
S6L1342-BS1	Barium (Ba), Soluble - EPA 200.8	Barium	0.096	0.1000	mg/L	96	85 - 115	
S6L1342-MRL1	Barium (Ba), Soluble - EPA 200.8	Barium	0.004	0.005000	mg/L	77	50 - 150	
S6L1342-BS1	Beryllium (Be), Soluble - EPA 200.8	Beryllium	0.095	0.1000	mg/L	95	85 - 115	
S6L1342-MRL1	Beryllium (Be), Soluble - EPA 200.8	Beryllium	0.003	0.005000	mg/L	69	0 - 200	
S6L1342-BS1	Cadmium (Cd), Soluble EPA 200.8	Cadmium	0.095	0.1000	mg/L	95	85 - 115	
S6L1342-MRL1	Cadmium (Cd), Soluble EPA 200.8	Cadmium	0.004	0.005000	mg/L	74	0 - 200	
S6L1342-BS1	Chromium (Cr), Soluble - EPA 200.8	Chromium	0.095	0.1000	mg/L	95	85 - 115	
S6L1342-MRL1	Chromium (Cr), Soluble - EPA 200.8	Chromium	0.003	0.005000	mg/L	61	50 - 150	
S6L1342-BS1	Copper (Cu), Soluble - EPA 200.8	Copper	0.093	0.1000	mg/L	93	85 - 115	
S6L1342-MRL1	Copper (Cu), Soluble - EPA 200.8	Copper	0.003	0.005000	mg/L	54	50 - 150	
S6L1344-BS1	Iron (Fe), Soluble - EPA 200.7	Iron	1.85	2.000	mg/L	93	85 - 115	
S6L1342-BS1	Lead (Pb), Soluble - EPA 200.8	Lead	0.095	0.1000	mg/L	95	85 - 115	
S6L1342-MRL1	Lead (Pb), Soluble - EPA 200.8	Lead	0.003	0.005000	mg/L	70	50 - 150	
S6L1344-BS1	Manganese (Mn), Soluble - EPA 200.7	Manganese	2.10	2.000	mg/L	105	85 - 115	
S6L1342-BS1	Nickel (Ni), Soluble - EPA 200.8	Nickel	0.093	0.1000	mg/L	93	85 - 115	
S6L1342-MRL1	Nickel (Ni), Soluble - EPA 200.8	Nickel	<0.010	0.005000	mg/L	69	0 - 200	
S6L1342-BS1	Selenium (Se), Soluble - EPA 200.8	Selenium	0.095	0.1000	mg/L	95	85 - 115	
S6L1342-MRL1	Selenium (Se), Soluble - EPA 200.8	Selenium	0.005	0.005000	mg/L	91	50 - 150	
S6L1344-BS1	Sodium (Na), Soluble - EPA 200.7	Sodium	1.92	2.000	mg/L	96	85 - 115	

Quality Control Data

Laboratory Control Sample Data (cont'd)

Lab QC#	Test Group	Test Name	LCS Result	Spike Level	Units	% Rec.	Control Limits	Flags
S6L1342-BS1	Thallium (Tl), Soluble EPA 200.8	Thallium	0.094	0.1000	mg/L	94	85 - 115	
S6L1342-MRL1	Thallium (Tl), Soluble EPA 200.8	Thallium	0.004	0.005000	mg/L	89	0 - 200	
S6L1342-BS1	Zinc (Zn), Soluble - EPA 200.8	Zinc	0.088	0.1000	mg/L	88	85 - 115	
S6L1342-MRL1	Zinc (Zn), Soluble - EPA 200.8	Zinc	0.004	0.005000	mg/L	84	0 - 200	

Quality Control Data

Laboratory Control Sample Data (cont'd)

Lab QC#	Test Group	Test Name	LCS Result	Spike Level	Units	% Rec.	Control Limits	Flags
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	1,1,1,2-Tetrachloroethane	25.8	25.00	ug/L	103	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	1,1,1,2-Tetrachloroethane	0.480	0.5000	ug/L	96	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	1,1,1-Trichloroethane	25.9	25.00	ug/L	104	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	1,1,1-Trichloroethane	0.560	0.5000	ug/L	112	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	1,1,2,2-Tetrachloroethane	24.4	25.00	ug/L	97	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	1,1,2,2-Tetrachloroethane	0.540	0.5000	ug/L	108	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	1,1,2-Trichloroethane	26.0	25.00	ug/L	104	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	1,1,2-Trichloroethane	0.480	0.5000	ug/L	96	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	1,1-Dichloroethane	26.0	25.00	ug/L	104	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	1,1-Dichloroethane	0.510	0.5000	ug/L	102	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	1,1-Dichloroethene	23.0	25.00	ug/L	92	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	1,1-Dichloroethene	0.500	0.5000	ug/L	100	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	1,1-Dichloropropene	25.7	25.00	ug/L	103	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	1,1-Dichloropropene	0.520	0.5000	ug/L	104	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	1,2,3-Trichloropropane	24.6	25.00	ug/L	98	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	1,2,3-Trichloropropane	0.550	0.5000	ug/L	110	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	1,2,4-Trichlorobenzene	23.3	25.00	ug/L	93	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	1,2,4-Trichlorobenzene	0.530	0.5000	ug/L	106	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	1,2-Dichlorobenzene	25.0	25.00	ug/L	100	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	1,2-Dichlorobenzene	0.500	0.5000	ug/L	100	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	1,2-Dichloroethane	25.9	25.00	ug/L	104	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	1,2-Dichloroethane	0.530	0.5000	ug/L	106	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	1,2-Dichloropropane	26.3	25.00	ug/L	105	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	1,2-Dichloropropane	0.480	0.5000	ug/L	96	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	1,3,5-Trimethylbenzene	24.5	25.00	ug/L	98	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	1,3,5-Trimethylbenzene	0.520	0.5000	ug/L	104	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	1,3-Dichloropropane	25.9	25.00	ug/L	104	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	1,3-Dichloropropane	0.500	0.5000	ug/L	100	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	1,4-Dichlorobenzene	24.9	25.00	ug/L	100	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	1,4-Dichlorobenzene	0.530	0.5000	ug/L	106	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	2-Chlorotoluene	24.6	25.00	ug/L	99	70 - 130	

Quality Control Data

Laboratory Control Sample Data (cont'd)

Lab QC#	Test Group	Test Name	LCS Result	Spike Level	Units	% Rec.	Control Limits	Flags
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	2-Chlorotoluene	0.530	0.5000	ug/L	106	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	4-Chlorotoluene	24.4	25.00	ug/L	98	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	4-Chlorotoluene	0.530	0.5000	ug/L	106	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	Benzene	26.0	25.00	ug/L	104	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	Benzene	0.510	0.5000	ug/L	102	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	Bromobenzene	24.8	25.00	ug/L	99	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	Bromobenzene	0.490	0.5000	ug/L	98	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	Bromochloromethane	26.6	25.00	ug/L	107	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	Bromochloromethane	0.490	0.5000	ug/L	98	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	Bromodichloromethane	25.6	25.00	ug/L	102	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	Bromodichloromethane	0.410	0.5000	ug/L	82	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	Bromoform	25.6	25.00	ug/L	102	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	Bromoform	0.470	0.5000	ug/L	94	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	Bromomethane (Methyl bromide)	22.9	25.00	ug/L	91	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	Bromomethane (Methyl bromide)	0.500	0.5000	ug/L	100	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	Carbon tetrachloride	26.2	25.00	ug/L	105	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	Carbon tetrachloride	0.510	0.5000	ug/L	102	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	Chlorobenzene	26.1	25.00	ug/L	104	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	Chlorobenzene	0.530	0.5000	ug/L	106	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	Chloroform	26.0	25.00	ug/L	104	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	Chloroform	0.490	0.5000	ug/L	98	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	Chloromethane (Methyl chloride)	25.2	25.00	ug/L	101	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	Chloromethane (Methyl chloride)	0.490	0.5000	ug/L	98	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	cis-1,2-Dichloroethene	26.0	25.00	ug/L	104	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	cis-1,2-Dichloroethene	0.500	0.5000	ug/L	100	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	cis-1,3-Dichloropropene	24.8	25.00	ug/L	99	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	cis-1,3-Dichloropropene	0.510	0.5000	ug/L	102	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	Dibromochloromethane	25.4	25.00	ug/L	102	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	Dibromochloromethane	0.490	0.5000	ug/L	98	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	Dibromomethane	26.4	25.00	ug/L	106	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	Dibromomethane	0.510	0.5000	ug/L	102	50 - 150	

Quality Control Data

Laboratory Control Sample Data (cont'd)

Lab QC#	Test Group	Test Name	LCS Result	Spike Level	Units	% Rec.	Control Limits	Flags
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	Dichlorodifluoromethane	26.4	25.00	ug/L	106	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	Dichlorodifluoromethane	0.450	0.5000	ug/L	90	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	Ethylbenzene	25.0	25.00	ug/L	100	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	Ethylbenzene	0.510	0.5000	ug/L	102	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	Isopropylbenzene	25.5	25.00	ug/L	102	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	Isopropylbenzene	0.470	0.5000	ug/L	94	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	m,p-Xylene	51.1	49.99	ug/L	102	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	m,p-Xylene	1.01	0.9998	ug/L	101	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	Methyl t-butyl ether (MtBE)	24.9	25.00	ug/L	100	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	Methyl t-butyl ether (MtBE)	0.520	0.5000	ug/L	104	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	Methylene Chloride	25.8	25.00	ug/L	103	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	Methylene Chloride	0.430	0.5000	ug/L	86	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	n-Propylbenzene	24.3	25.00	ug/L	97	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	n-Propylbenzene	0.510	0.5000	ug/L	102	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	o-Xylene	25.6	25.00	ug/L	103	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	o-Xylene	0.500	0.5000	ug/L	100	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	sec-Butylbenzene	24.4	25.00	ug/L	97	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	sec-Butylbenzene	0.510	0.5000	ug/L	102	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	Styrene	26.0	25.00	ug/L	104	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	Styrene	0.520	0.5000	ug/L	104	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	tert-Butylbenzene	24.8	25.00	ug/L	99	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	tert-Butylbenzene	0.520	0.5000	ug/L	104	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	Tetrachloroethene	25.8	25.00	ug/L	103	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	Tetrachloroethene	0.510	0.5000	ug/L	102	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	Toluene	25.2	25.00	ug/L	101	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	Toluene	0.520	0.5000	ug/L	104	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	trans-1,3-Dichloropropene	24.6	25.00	ug/L	98	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	trans-1,3-Dichloropropene	0.520	0.5000	ug/L	104	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	trans-1,2-Dichloroethene	25.7	25.00	ug/L	103	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	trans-1,2-Dichloroethene	0.520	0.5000	ug/L	104	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	Trichloroethene	25.9	25.00	ug/L	104	70 - 130	

Quality Control Data

Laboratory Control Sample Data (cont'd)

Lab QC#	Test Group	Test Name	LCS Result	Spike Level	Units	% Rec.	Control Limits	Flags
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	Trichloroethene	0.490	0.5000	ug/L	98	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	Trichlorofluoromethane	25.8	25.00	ug/L	103	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	Trichlorofluoromethane	0.510	0.5000	ug/L	102	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	Vinyl chloride	25.2	25.00	ug/L	101	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	Vinyl chloride	0.540	0.5000	ug/L	108	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	Naphthalene	22.1	25.00	ug/L	88	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	Naphthalene	0.520	0.5000	ug/L	104	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	Hexachlorobutadiene	24.6	25.00	ug/L	98	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	Hexachlorobutadiene	0.530	0.5000	ug/L	106	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	n-Butylbenzene	24.4	25.00	ug/L	97	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	n-Butylbenzene	0.540	0.5000	ug/L	108	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	p-Isopropyltoluene	24.6	25.00	ug/L	98	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	p-Isopropyltoluene	0.530	0.5000	ug/L	106	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	1,2,3-Trichlorobenzene	22.9	25.00	ug/L	92	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	1,2,3-Trichlorobenzene	0.510	0.5000	ug/L	102	50 - 150	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	1,3-Dichlorobenzene	25.0	25.00	ug/L	100	70 - 130	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	1,3-Dichlorobenzene	0.570	0.5000	ug/L	114	50 - 150	
S6L1303-CCV1	Volatile Organic Compounds by EPA 524.3	2,2-Dichloropropane (Screen)	0.520	0.5000	ug/L	104	50 - 150	

Quality Control Data

Surrogate Recovery Data

QC Lab#	Test Group	Test Name	% Recovery	Recovery Limits	Flags
6L08052-01	Volatile Organic Compounds by EPA 524.3	1,2-Dichlorobenzene-d4	110	70 - 130	
6L08052-01	Volatile Organic Compounds by EPA 524.3	4-Bromofluorobenzene	90	70 - 130	
6L08052-01	Volatile Organic Compounds by EPA 524.3	Methyl t-butyl ether-d3	104	70 - 130	
6L08052-02	Volatile Organic Compounds by EPA 524.3	1,2-Dichlorobenzene-d4	108	70 - 130	
6L08052-02	Volatile Organic Compounds by EPA 524.3	4-Bromofluorobenzene	91	70 - 130	
6L08052-02	Volatile Organic Compounds by EPA 524.3	Methyl t-butyl ether-d3	101	70 - 130	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	1,2-Dichlorobenzene-d4	104	70 - 130	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	4-Bromofluorobenzene	92	70 - 130	
S6L1303-BLK1	Volatile Organic Compounds by EPA 524.3	Methyl t-butyl ether-d3	104	70 - 130	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	1,2-Dichlorobenzene-d4	100	70 - 130	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	4-Bromofluorobenzene	104	70 - 130	
S6L1303-BS1	Volatile Organic Compounds by EPA 524.3	Methyl t-butyl ether-d3	98	70 - 130	

Accurate Environmental Labs

Client Name: Layne Christensen Co.

Project Name: Mountain Park

Accurate Work Order #	Date Sample Taken	Time Sample Taken	Matrix (Source) (Refer below)	Grab (G) or Comp (C)	Client I.D. / Sample Location / DEQ / EPA Location Code	Field Results (pH, Temp, Chlorine, note analysis & units)	Container / Analysis Requested / # of Container			
							1gal	40ml		
610852-01	12-7-16	1400	DW	G	Test Well #3		See Attached	VOC's	TTHM	Trip Blank
-02	12-7-16				Mountain Park			3		
					Trip Blank			1		

On-Site Info: Raw Alkalinity ____ mg/L; TOC Raw ____ mg/L; Turbidity ____ NTU; Color ____ CU; Other ____

Matrix Codes: DW = Drinking water; WW = Wastewater; SL = Sludge; O = Other; E.Coli Source: FW = Flowing stream; RL = Reservoir / lake; GWUDI = Groundwater under direct influence of surface water

Field Instrument Calibration

Meter Type	Standards	Final Read	Date / Time	Initials

Comments: Filter Sample

All Bacti containers provided by Accurate Labs have Teflon lined lids

Samples are scheduled to be disposed of in 4 weeks of receipt at Accurate; if standing samples will be returned to client or will be disposed of for a fee

Certification by Company Official: I hereby certify that the above sampling occurred during a period that the samples are representative of a typical operating day discharge for the above facility

Signature: ____ Date/Time: ____

Sampled By: Todd List Company: Layne Sample Method: ____

Relinquished By: [signature] Date/Time: 12/7/16 1355 Received By: ____ Date/Time: ____

Relinquished to Lab By: ____ Date/Time: ____ Received at Lab By: [signature] Rec'd °C: 1.6 Date/Time: 12/7/16 @ 1355

Reporting Requirements (standard TAT = 7 working days): ____

Compliance Reporting? (DMR, PWS): ____

Oklahoma PWS ID #: ____

RUSH Request (if available): ____ (Working Days)

Mail Report To: Layne Christensen Co.
Address: 4691 NE Hwy 33
Guthrie, OK 73044
Phone #: 405-920-1083
Email: Tim.Bertucci@Layne.com

Mail Invoice To: ____
Address: ____
Bid #: ____
PO #: ____
Phone #: ____ Fax #: ____

Tim Bertucci Vol UP655

From: Mayes, Tammy <Tammy.Mayes@deq.ok.gov>
Sent: Thursday, March 06, 2014 7:52 AM
To: Tim Bertucci
Subject: RE: test Kit

In a new test well

Chlorides
n/n
specific conductance
dissolved solids
total hardness
fluoride
ph
sulfates
total alkalinity
turbidity

METALS
Arsenic
Cadmium
Nickel
Antimony
Mercury
Beryllium
Zinc
Chromium
Iron
Manganese
Selenium
Sodium
Thallium
Lead
Copper
Barium
Uranium

Radiochemistry
Gross alpha/beta
Radium 227
Radium 228

Voc's

Field Boring Log

Layne Christensen Company

Project: Mtn Park,OK	**Boring No. TH 2**
Location:	**Date: 12/5/16**
Job Number: 43763	**Crew: List/Scarborough**

Drilling Method: HSA _ CFA ____ Rotary Wash ___ Rock Coring ____ Drilling Fluid X

DEPTH, ft.		*Description*	*Sample*			*SPT Blows N/6"*
From	To		Type	Depth	Recovery	
0	2	Sandy top soil				
2	5	Gray clay				
5	9	Silty sand, gray				
9	16	Gray silt				
16	17.5	Brown sand				
17.5	24	Gray clay				
24	35	Sand and small gravel, well rounded				
35	36.5	Granite, very hard				
		36.5' TD				

Water Level Observations

During Drilling ft.

At Completion ____ft.

After _____ hrs. _____ ft.

After _____ hrs. _____ ft.

After _____ hrs. _____ ft.

Piezometer Installed ___ NO ___ YES- Depth ___ ft.

NOTES:

Borehole was reamed out and a 6" pvc screened test well was installed. Slotted pvc screen from 24' to 34'. Filter Packed. Well was test pumped at appox 70gpm for 4 hrs. Had 11' draw down.

Layne Christensen

Customer **Mountain Park**
Well No. **TW # 6**
Date **1/11/2017**
Tested By **Todd List**
SWL **11** Pump Settting

Sheet **24 HR. Test**
Pg. 1

Elapsed Time	Flow Rate	Pumping Level	Drawdown	Specific Capacity	Discharge Pressure(PSI)	Comments Sand
1	100	20.70	9.70	10.31		
2	100	21.20	10.20	9.80		
3	100	21.30	10.30	9.71		
4	100	21.35	10.35	9.66		
5	100	21.40	10.40	9.62		
7	100	21.50	10.50	9.52		
9	100	21.55	10.55	9.48		
11	100	21.60	10.60	9.43		
15	100	21.80	10.80	9.26		
20	100	21.80	10.80	9.26		
25	100	21.90	10.90	9.17		
30	100	22.00	11.00	9.09		
35	100	22.10	11.10	9.01		
40	100	22.20	11.20	8.93		
45	100	22.30	11.30	8.85		
50	100	22.30	11.30	8.85		
60	100	22.30	11.30	8.85		
70	100	22.50	11.50	8.70		
80	100	22.55	11.55	8.66		
90	100	22.55	11.55	8.66		
100	100	22.65	11.65	8.58		
120	100	22.80	11.80	8.47		
150	100	23.00	12.00	8.33		
180	100	23.00	12.00	8.33		
210	100	23.20	12.20	8.20		
240	100	23.30	12.30	8.13		
270	100	23.30	12.30	8.13		
300	100	23.40	12.40	8.06		
360	100	23.70	12.70	7.87		
420	100	23.70	12.70	7.87		
480	100	23.80	12.80	7.81		

Layne Christensen

Customer **Mountain Park**
Well No. **TW # 6**
Date **1/11/2017**
Tested By **Todd List**
SWL **11** Pump Setting

Sheet **Recovery Test**

Elapsed Time	Flow Rate	Water Level	Drawdown	Specific Capacity	Discharge Pressure (PSI)	Comments
1	OFF	13.80				
2	OFF	13.50				
3	OFF	13.30				
4	OFF	13.00				
5	OFF	13.00				
7	OFF	12.90				
9	OFF	12.80				
11	OFF	12.75				
15	OFF	12.70				
20	OFF	12.50				
25	OFF	12.40				
30	OFF	12.00				
35	OFF	12.00				
40	OFF	12.00				
45	OFF	12.00				
50	OFF	11.90				
60 (1HR)	OFF	11.60				
70	OFF	11.50				
80	OFF	11.50				
90	OFF	11.45				
100	OFF	11.40				
120 (2HR)	OFF	11.35				
140	OFF					
160	OFF					
180 (3HR)	OFF					
200	OFF					
220						
240						
260						
280						
300						

Accurate Environmental Laboratories

January 24, 2017

Client: Layne Christensen

4691 NE Hwy 33

Guthrie, OK 73044

Requested By: -

National Environmental Laboratory Accreditation Program
Kansas CERT # E-10219

Sample Project Name:	Mt Park Water Conservation
Date Samples Received:	January 12, 2017 Time: 16:20 sample temp upon arrival at lab = 3°C - On Ice
Matrix:	Drinking Water
Lab Log Numbers:	**7A12107-01**
Work Order:	7A12107
Report #	7A12107-0124170925
EPA Lab ID#'s:	**Stillwater OK00092 Tulsa OK00983 OKC OK00129 ICR OK 001**
Oklahoma Certification:	Stillwater WasteWater, DEQ 8316/ Drinking Water, DEQ D9602
	Tulsa WasteWater, DEQ 9905 / Drinking Water, DEQ D9901
	Oklahoma City WasteWater DEQ 7202 / Drinking Water, DEQ D9937
Kansas Certification:	Stillwater NELAP CERT # E-10219
New Jersey Certification:	Oklahoma City Drinking Water NELAP CERT # OK005
Texas Certification:	Stillwater Drinking Water NELAP CERT # T105704533-14-1
Method Reference:	40 CFR 136, 141, and 261 Methods for Chemical Analysis of Water and Wastes EPA-600/4-79-020, March 1983. Test Methods for Evaluating Solid Wastes, SW-846, Final Update III. Standard Methods 1998 (20th Edition), Standard Methods 2005 (21st Edition) and Standard Methods 2011 (22nd Edition) for the Examination of Water and Wastewater.
Analysis Reference:	If qualifiers present in "Prep Info" or "Analysis Info", then analysis performed as follows: @= Tulsa Lab and * = OKC Lab. If no qualifiers present, then analysis performed at Stillwater Lab.

Accurate Environmental Laboratories certify that the test results performed at the Stillwater lab meet all requirements of NELAP. Any exceptions to this can be found in the report footer or Quality Control Section of the report.

This report is to only be replicated in its entirety.

Accurate Enviornmental sampling protocol was followed for any sampling performed by Accurate Field Services.

Sample: *Test Well #6* **Location Code:** **PWSID#:**

Collection Type: Grab Sample Time: 1/11/17 18:00 **Lab Log#** 7A12107-01

Method/Parameter	Test	Result		Notes	PQL#	Prep Info	Analysis Info
Alkalinity, Total (CaCO3) SM2320B	Alkalinity	340.8	mg/L		10.0	01/13/17 09:50 ALM	01/13/17 15:00 ALM
Chloride EPA300.0	Chloride	246	mg/L		25.0	01/13/17 08:01 ALM	01/13/17 18:03 ALM
Conductivity SM2510 B	Conductivity	1890	umho/cm		2.0	01/17/17 16:22 AM	01/17/17 16:22 AM
Fluoride EPA 300.0	Fluoride	0.51	mg/L		0.10	01/13/17 08:01 ALM	01/13/17 17:40 ALM
Nitrate+Nitrite EPA 300.0	Nitrate + Nitrite as N	0.40	mg/L		0.25	01/13/17 08:01 ALM	01/13/17 17:40 ALM
pH in Lab SM4500H+B	pH	7.48	pH	#03	0.01	01/13/17 16:15 ALM	01/13/17 16:30 ALM
Turbidity SM2130 B	Turbidity	0.25	NTU		0.10	01/13/17 09:30 CWK	01/13/17 11:09 CWK
Sulfate EPA 300.0	Sulfate	529	mg/L	MCL	25.0	01/13/17 08:01 ALM	01/13/17 18:03 ALM
Total Dissolved Solids SM2540 C	Total Dissolved Solids	1500	mg/L	MCL	25.0	01/17/17 09:05 CWK	01/23/17 17:16 CWK
Hardness, Total (CaCO3) SM2340 C	Hardness	850	mg/L	###	75.0	01/18/17 10:35 BM	01/18/17 11:30 BM
Mercury (Hg), Soluble EPA 245.1	Mercury	BPQL	ug/L		0.20	01/16/17 08:45 ZR	01/16/17 14:21 ZR
Antimony (Sb), Soluble - EPA 200.8	Antimony	BPQL	mg/L		0.005	01/16/17 09:40 LF	01/16/17 12:25 LF
Arsenic (As), Soluble - EPA 200.8	Arsenic	BPQL	mg/L		0.005	01/16/17 09:40 LF	01/16/17 12:25 LF
Barium (Ba), Soluble - EPA 200.8	Barium	0.037	mg/L		0.005	01/16/17 09:40 LF	01/16/17 12:25 LF
Beryllium (Be), Soluble - EPA 200.8	Beryllium	BPQL	mg/L		0.001	01/16/17 09:40 LF	01/16/17 12:25 LF
Cadmium (Cd), Soluble EPA 200.8	Cadmium	BPQL	mg/L		0.001	01/16/17 09:40 LF	01/16/17 12:25 LF
Chromium (Cr), Soluble - EPA 200.8	Chromium	BPQL	mg/L		0.010	01/16/17 09:40 LF	01/16/17 12:25 LF
Copper (Cu), Soluble - EPA 200.8	Copper	BPQL	mg/L		0.010	01/16/17 09:40 LF	01/16/17 12:25 LF
Iron (Fe), Soluble - EPA 200.7	Iron	BPQL	mg/L		0.250	01/16/17 10:13 LF	01/16/17 13:20 ZR
Lead (Pb), Soluble - EPA 200.8	Lead	BPQL	mg/L		0.005	01/16/17 09:40 LF	01/16/17 12:25 LF
Manganese (Mn), Soluble - EPA 200.7	Manganese	BPQL	mg/L		0.025	01/16/17 10:13 LF	01/16/17 13:20 ZR
Nickel (Ni), Soluble - EPA200.8	Nickel	BPQL	mg/L		0.010	01/16/17 09:40 LF	01/16/17 12:25 LF
Selenium(Se),Soluble - EPA 200.8	Selenium	BPQL	mg/L		0.005	01/16/17 09:40 LF	01/16/17 12:25 LF
Sodium (Na), Soluble - EPA 200.7	Sodium	186	mg/L		2.50	01/16/17 10:13 LF	01/16/17 14:44 ZR
Thallium (Tl), Soluble EPA 200.8	Thallium	BPQL	mg/L		0.001	01/16/17 09:40 LF	01/16/17 12:25 LF
Zinc (Zn), Soluble - EPA 200.8	Zinc	BPQL	mg/L		0.010	01/16/17 09:40 LF	01/16/17 12:25 LF

Notes and Definitions

#52	Analyte recoveries are outside of acceptance limits for the matrix spike sample. This failure does not invalidate data reported.
#03	This sample was received outside of EPA recommended holding time.
MCL	Analyte concentration may exceed Maximum Contaminant Limit (MCL) for EPA Primary or Secondary Drinking Water Regulations.
###	Analyte concentration may exceed regulatory limit.
PQL	Practical Quantitation Limit - the method reporting limit (MRL) adjusted for any dilutions or other changes made to the sample to deal with interferences/matrix effects
BPQL	Below Practical Quantitation Limit (if applicable).

The "Prep Date" of the QC analysis coincides with the characters of the appropriate QC Lab ID. (Example: S 9 A 02 15 - BLK = 2009, Jan 2, Batch #15 - Blank)

Lab Manager

Quality Control Data

Blank Data

QC Lab #	Test Group	Test	Result	PQL	Flags
S7A1337-BLK1	Alkalinity, Total (CaCO3) SM2320B	Alkalinity	BPQL mg/L	10.0	
S7A1305-BLK1	Chloride EPA 300.0	Chloride	BPQL mg/L	0.500	
S7A1726-BLK1	Conductivity SM2510 B	Conductivity	BPQL umho/cm	2.0	
S7A1305-BLK1	Fluoride EPA 300.0	Fluoride	BPQL mg/L	0.10	
S7A1305-BLK1	Nitrate+Nitrite EPA 300.0	Nitrate + Nitrite as N	BPQL mg/L	0.25	
S7A1324-BLK1	Turbidity SM2130 B	Turbidity	BPQL NTU	0.10	
S7A1305-BLK1	Sulfate EPA 300.0	Sulfate	BPQL mg/L	0.500	
S7A1710-BLK1	Total Dissolved Solids SM2540 C	Total Dissolved Solids	BPQL mg/L	25.0	
S7A1832-BLK1	Hardness, Total (CaCO3) SM2340 C	Hardness	BPQL mg/L	15.0	
S7A1644-BLK1	Mercury (Hg), Soluble EPA 245.1	Mercury	BPQL ug/L	0.20	
S7A1609-BLK1	Antimony (Sb), Soluble - EPA 200.8	Antimony	BPQL mg/L	0.005	
S7A1609-BLK1	Arsenic (As), Soluble - EPA 200.8	Arsenic	BPQL mg/L	0.005	
S7A1609-BLK1	Barium (Ba), Soluble - EPA 200.8	Barium	BPQL mg/L	0.005	
S7A1609-BLK1	Beryllium (Be), Soluble - EPA 200.8	Beryllium	BPQL mg/L	0.001	
S7A1609-BLK1	Cadmium (Cd), Soluble EPA 200.8	Cadmium	BPQL mg/L	0.001	
S7A1609-BLK1	Chromium (Cr), Soluble - EPA 200.8	Chromium	BPQL mg/L	0.010	
S7A1609-BLK1	Copper (Cu), Soluble - EPA 200.8	Copper	BPQL mg/L	0.010	
S7A1610-BLK1	Iron (Fe), Soluble - EPA 200.7	Iron	BPQL mg/L	0.250	
S7A1609-BLK1	Lead (Pb), Soluble - EPA 200.8	Lead	BPQL mg/L	0.005	
S7A1610-BLK1	Manganese (Mn), Soluble - EPA 200.7	Manganese	BPQL mg/L	0.025	
S7A1609-BLK1	Nickel (Ni), Soluble - EPA 200.8	Nickel	BPQL mg/L	0.010	
S7A1609-BLK1	Selenium (Se), Soluble - EPA 200.8	Selenium	BPQL mg/L	0.005	
S7A1610-BLK1	Sodium (Na), Soluble - EPA 200.7	Sodium	BPQL mg/L	0.50	
S7A1609-BLK1	Thallium (Tl), Soluble EPA 200.8	Thallium	BPQL mg/L	0.001	
S7A1609-BLK1	Zinc (Zn), Soluble - EPA 200.8	Zinc	BPQL mg/L	0.010	

Duplicate Sample Data

QC Lab #	Test Group	Test Name	Dup Result	Samp Result	% RPD	RPD Limit	Flags
S7A1726-DUP1	Conductivity SM2510 B	Conductivity	1900	1890	0.5	20	
S7A1347-DUP1	pH in Lab SM4500H+B	pH	7.50	7.48	0.3	20	
S7A1324-DUP1	Turbidity SM2130 B	Turbidity	0.27	0.25	9	10	
S7A1710-DUP1	Total Dissolved Solids SM2540 C	Total Dissolved Solids	1520	1500	1	10	
S7A1832-DUP1	Hardness, Total (CaCO3) SM2340 C	Hardness	850	850	0	20	

Quality Control Data

Laboratory Control Sample Data

Lab QC#	Test Group	Test Name	LCS Result	Spike Level	Units	% Rec.	Control Limits	Flags
S7A1337-BS1	Alkalinity, Total (CaCO3) SM2320B	Alkalinity	104.0	100.0	mg/L	104	80 - 120	
S7A1305-BS1	Chloride EPA 300.0	Chloride	2.90	3.000	mg/L	97	90 - 110	
S7A1305-MRL1	Chloride EPA 300.0	Chloride	0.649	0.5000	mg/L	130	50 - 150	
S7A1726-BS1	Conductivity SM2510 B	Conductivity	1413	1413	umho/cm	100	90 - 110	
S7A1305-BS1	Fluoride EPA 300.0	Fluoride	1.96	2.000	mg/L	98	90 - 110	
S7A1305-MRL1	Fluoride EPA 300.0	Fluoride	0.12	0.1000	mg/L	125	50 - 150	
S7A1305-BS1	Nitrate+Nitrite EPA 300.0	Nitrate + Nitrite as N	8.31	8.350	mg/L	100	91.2 - 108	
S7A1305-MRL1	Nitrate+Nitrite EPA 300.0	Nitrate + Nitrite as N	0.35	0.3506	mg/L	99	50 - 150	
S7A1347-BS1	pH in Lab SM4500H+B	pH	7.00	7.000	pH	100	98.5 - 101.5	
S7A1324-BS1	Turbidity SM2130 B	Turbidity	15.2	15.20	NTU	100	90 - 110	
S7A1305-BS1	Sulfate EPA 300.0	Sulfate	14.6	15.00	mg/L	97	90 - 110	
S7A1305-MRL1	Sulfate EPA 300.0	Sulfate	0.750	0.5000	mg/L	150	50 - 150	
S7A1710-BS1	Total Dissolved Solids SM2540 C	Total Dissolved Solids	1000	1000	mg/L	100	80 - 120	
S7A1832-BS1	Hardness, Total (CaCO3) SM2340 C	Hardness	100	100.0	mg/L	100	80 - 120	
S7A1644-BS1	Mercury (Hg), Soluble EPA 245.1	Mercury	1.8	1.667	ug/L	109	85 - 115	
S7A1644-MRL1	Mercury (Hg), Soluble EPA 245.1	Mercury	0.04	0.05000	ug/L	82	50 - 150	
S7A1609-BS1	Antimony (Sb), Soluble - EPA 200.8	Antimony	0.101	0.1000	mg/L	101	85 - 115	
S7A1609-MRL1	Antimony (Sb), Soluble - EPA 200.8	Antimony	0.004	0.005000	mg/L	79	50 - 150	
S7A1609-BS1	Arsenic (As), Soluble - EPA 200.8	Arsenic	0.100	0.1000	mg/L	100	85 - 115	
S7A1609-MRL1	Arsenic (As), Soluble - EPA 200.8	Arsenic	0.003	0.005000	mg/L	66	50 - 150	
S7A1609-BS1	Barium (Ba), Soluble - EPA 200.8	Barium	0.100	0.1000	mg/L	100	85 - 115	
S7A1609-MRL1	Barium (Ba), Soluble - EPA 200.8	Barium	0.003	0.005000	mg/L	70	50 - 150	
S7A1609-BS1	Beryllium (Be), Soluble - EPA 200.8	Beryllium	0.100	0.1000	mg/L	100	85 - 115	
S7A1609-MRL1	Beryllium (Be), Soluble - EPA 200.8	Beryllium	0.004	0.005000	mg/L	82	0 - 200	
S7A1609-BS1	Cadmium (Cd), Soluble EPA 200.8	Cadmium	0.101	0.1000	mg/L	101	85 - 115	
S7A1609-MRL1	Cadmium (Cd), Soluble EPA 200.8	Cadmium	0.003	0.005000	mg/L	65	0 - 200	
S7A1609-BS1	Chromium (Cr), Soluble - EPA 200.8	Chromium	0.099	0.1000	mg/L	99	85 - 115	
S7A1609-MRL1	Chromium (Cr), Soluble - EPA 200.8	Chromium	0.003	0.005000	mg/L	54	50 - 150	
S7A1609-BS1	Copper (Cu), Soluble - EPA 200.8	Copper	0.102	0.1000	mg/L	102	85 - 115	
S7A1609-MRL1	Copper (Cu), Soluble - EPA 200.8	Copper	0.003	0.005000	mg/L	54	50 - 150	
S7A1610-BS1	Iron (Fe), Soluble - EPA 200.7	Iron	1.88	2.000	mg/L	94	85 - 115	
S7A1609-BS1	Lead (Pb), Soluble - EPA 200.8	Lead	0.100	0.1000	mg/L	100	85 - 115	
S7A1609-MRL1	Lead (Pb), Soluble - EPA 200.8	Lead	0.004	0.005000	mg/L	72	50 - 150	
S7A1610-BS1	Manganese (Mn), Soluble - EPA 200.7	Manganese	1.93	2.000	mg/L	96	85 - 115	
S7A1609-BS1	Nickel (Ni), Soluble - EPA 200.8	Nickel	0.098	0.1000	mg/L	98	85 - 115	
S7A1609-MRL1	Nickel (Ni), Soluble - EPA 200.8	Nickel	<0.010	0.005000	mg/L		0 - 200	
S7A1609-BS1	Selenium (Se), Soluble - EPA 200.8	Selenium	0.101	0.1000	mg/L	101	85 - 115	
S7A1609-MRL1	Selenium (Se), Soluble - EPA 200.8	Selenium	0.004	0.005000	mg/L	84	50 - 150	
S7A1610-BS1	Sodium (Na), Soluble - EPA 200.7	Sodium	1.91	2.000	mg/L	95	85 - 115	

Quality Control Data

Laboratory Control Sample Data (cont'd)

Lab QC#	Test Group	Test Name	LCS Result	Spike Level	Units	% Rec.	Control Limits	Flags
S7A1609-BS1	Thallium (Tl), Soluble EPA 200.8	Thallium	0.100	0.1000	mg/L	100	85 - 115	
S7A1609-MRL1	Thallium (Tl), Soluble EPA 200.8	Thallium	0.004	0.005000	mg/L	80	0 - 200	
S7A1609-BS1	Zinc (Zn), Soluble - EPA 200.8	Zinc	0.094	0.1000	mg/L	94	85 - 115	
S7A1609-MRL1	Zinc (Zn), Soluble - EPA 200.8	Zinc	0.005	0.005000	mg/L	103	0 - 200	

Matrix Spike Data

QC Lab #	Test Group	Test Name	Sample Result	Units	Spike Result	Spike Level	% Rec.	Acceptance Limits	Flags
S7A1832-MS1	Hardness, Total (CaCO3) SM2340 C	Hardness	850	mg/L	1330	500.0	96	80 - 120	
S7A1644-MS1	Mercury (Hg), Soluble EPA 245.1	Mercury	BPQL	ug/L	1.8	1.667	107	85 - 115	
S7A1609-MS1	Antimony (Sb), Soluble - EPA 200.8	Antimony	BPQL	mg/L	0.103	0.1000	103	85 - 115	
S7A1609-MS1	Arsenic (As), Soluble - EPA 200.8	Arsenic	BPQL	mg/L	0.111	0.1000	108	85 - 115	
S7A1609-MS1	Barium (Ba), Soluble - EPA 200.8	Barium	0.037	mg/L	0.137	0.1000	100	85 - 115	
S7A1609-MS1	Beryllium (Be), Soluble - EPA 200.8	Beryllium	BPQL	mg/L	0.103	0.1000	103	85 - 115	
S7A1609-MS1	Cadmium (Cd), Soluble EPA 200.8	Cadmium	BPQL	mg/L	0.097	0.1000	97	85 - 115	
S7A1609-MS1	Chromium (Cr), Soluble - EPA 200.8	Chromium	BPQL	mg/L	0.102	0.1000	102	85 - 115	
S7A1609-MS1	Copper (Cu), Soluble - EPA 200.8	Copper	BPQL	mg/L	0.098	0.1000	98	85 - 115	
S7A1610-MS1	Iron (Fe), Soluble - EPA 200.7	Iron	BPQL	mg/L	1.89	2.000	95	85 - 115	
S7A1609-MS1	Lead (Pb), Soluble - EPA 200.8	Lead	BPQL	mg/L	0.101	0.1000	101	85 - 115	
S7A1610-MS1	Manganese (Mn), Soluble - EPA 200.7	Manganese	0.008	mg/L	1.90	2.000	94	85 - 115	
S7A1609-MS1	Nickel (Ni), Soluble - EPA 200.8	Nickel	BPQL	mg/L	0.101	0.1000	101	85 - 115	
S7A1609-MS1	Selenium (Se), Soluble - EPA 200.8	Selenium	0.004	mg/L	0.110	0.1000	107	85 - 115	
S7A1610-MS1	Sodium (Na), Soluble - EPA 200.7	Sodium	186	mg/L	163	2.000	-1160	85 - 115	#52
S7A1609-MS1	Thallium (Tl), Soluble EPA 200.8	Thallium	BPQL	mg/L	0.094	0.1000	94	85 - 115	
S7A1609-MS1	Zinc (Zn), Soluble - EPA 200.8	Zinc	0.003	mg/L	0.095	0.1000	92	85 - 115	

Quality Control Data

Matrix Spike Duplicate Data

QC Lab #	Test Group	Test Name	Sample Result	Spike Result	Spike Level	Units	% Rec.	Rec. Limits	% RPD	RPD Limit	Flags
S7A1644-MSD1	Mercury (Hg), Soluble EPA 245.1	Mercury	BPQL	1.8	1.667	ug/L	106	85-115	0.6	20	
S7A1609-MSD1	Antimony (Sb), Soluble - EPA 200.8	Antimony	BPQL	0.103	0.1000	mg/L	103	85-115	0.7	20	
S7A1609-MSD1	Arsenic (As), Soluble - EPA 200.8	Arsenic	BPQL	0.111	0.1000	mg/L	109	85-115	0.6	20	
S7A1609-MSD1	Barium (Ba), Soluble - EPA 200.8	Barium	0.037	0.139	0.1000	mg/L	102	85-115	1	20	
S7A1609-MSD1	Beryllium (Be), Soluble - EPA 200.8	Beryllium	BPQL	0.101	0.1000	mg/L	101	85-115	1	20	
S7A1609-MSD1	Cadmium (Cd), Soluble EPA 200.8	Cadmium	BPQL	0.098	0.1000	mg/L	98	85-115	0.9	20	
S7A1609-MSD1	Chromium (Cr), Soluble - EPA 200.8	Chromium	BPQL	0.103	0.1000	mg/L	103	85-115	1	20	
S7A1609-MSD1	Copper (Cu), Soluble - EPA 200.8	Copper	BPQL	0.098	0.1000	mg/L	98	85-115	0.4	20	
S7A1610-MSD1	Iron (Fe), Soluble - EPA 200.7	Iron	BPQL	1.81	2.000	mg/L	91	85-115	4	20	
S7A1609-MSD1	Lead (Pb), Soluble - EPA 200.8	Lead	BPQL	0.102	0.1000	mg/L	102	85-115	1	20	
S7A1610-MSD1	Manganese (Mn), Soluble - EPA 200.7	Manganese	0.008	1.83	2.000	mg/L	91	85-115	3	20	
S7A1609-MSD1	Nickel (Ni), Soluble - EPA 200.8	Nickel	BPQL	0.098	0.1000	mg/L	98	85-115	3	20	
S7A1609-MSD1	Selenium (Se), Soluble - EPA 200.8	Selenium	0.004	0.115	0.1000	mg/L	111	85-115	4	20	
S7A1610-MSD1	Sodium (Na), Soluble - EPA 200.7	Sodium	186	164	2.000	mg/L	-1090	85-115	0.8	20	#52
S7A1609-MSD1	Thallium (Tl), Soluble EPA 200.8	Thallium	BPQL	0.095	0.1000	mg/L	95	85-115	1	20	
S7A1609-MSD1	Zinc (Zn), Soluble - EPA 200.8	Zinc	0.003	0.096	0.1000	mg/L	93	85-115	1	20	

Accurate Environmental Labs

Client Name- Layne Christensen Co.

Project Name- MT. PARK Water Consv.

Field Results

Accurate Work Order #	Date Sample Taken	Time Sample Taken	Matrix (W Source) (Refer below)	Grab (G) or Comp (C)	Client I.D. / Sample Location / DEQ / EPA Location Code	(DH, Temp, Chlorine, note analysis & units)	Container #	Analysis Requested
7A12107-01	1-11-17	6:00PM	DW	G	Test Well #6		2	See attached.

On-Site Tests: Raw Alkalinity (TOC Raw) _____ mg/L; Turbidity (E. Color) _____ Units

Matrix Codes: DW = Drinking water; WW = Wastewater; SL = Sludge; O = Other _____

E.Coli Source: FS = Flowing Stream; RL = Reservoir Lake; GWUDI = Groundwater under direct influence of surface water

Field Instrument Calibration

Meter Type	Standards	Final Read	Date/Time	Initials

Comments:

All Glass containers provided by Accurate Labs have Teflon lined lids

All samples are scheduled to be disposed of in 4 weeks of receipt at Accurate

Hazardous samples will be returned to client or will be disposed of for a fee

COC Date: 1/12/2017

Certification by Company Official: I hereby certify that the above sampling occurred during a period when the sample(s) is/are representative of a typical operating day discharge for the above facility.

Signature: _____ Date/Time: _____

Sampled By: RANDY CROWL - Company: LAYNE

Sample Method: _____

Relinquished By: Travis Ewing Date/Time: 1-12-17 4:20pm

Received By: _____ Date/Time: _____

Relinquished to Lab By / Sent to Accurate From By: _____ Date/Time: _____

Received at Lab By: [illegible] Rec'd °C: 3.9 Date/Time: 1/13/17 @ 1020

Reporting Requirements (standard 10-15 working days)

Compliance Reporting? (Yes or No) DMR PWS

Oklahoma PWS ID #: _____

RUSH Request (if available) _____ (Working Days)

Mail Report To: Layne Christensen Co.

Address: 4691 NE Hwy 33, Guthrie, OK 73044

Phone #: 405-920-1083 Fax #: ( )

Email: Tim.Bertucci@Layne.com

Mail Invoice To: _____

Address: _____

Bid #: _____

PO #: _____

Phone #: _____ Fax #: _____

www.accuratelabs.com (800) 516-5227

505 South Lowry Street, Stillwater, OK 74074 Phone (405) 372-5300 Fax (405) 372-3396

6558 E. 40th Street, Tulsa, OK 74074 Phone (918) 663-5400 Fax (918) 663-5300

12036 N. Pennsylvania, Oklahoma City, OK 73120 Phone (405) 751-3117 Fax (405) 751-4108

Tim Bertucci 7/2/14

From: Mayes,Tammy <Tammy.Mayes@deq.ok.gov>
Sent: Thursday, March 06, 2014 7:52 AM
To: Tim Bertucci
Subject: RE: test Kit

In a new test well

Chlorides
n/n
specific conductance
dissolved solids
total hardness
fluoride
ph
sulfates
total alkalinity
turbidity

METALS
Arsenic
Cadmium
Nickel
Antimony
Mercury
Beryllium
Zinc
Chromium
Iron
Manganese
Selenium
Sodium
Thallium
Lead
Copper
Barium
Uranium

Radiochemistry
Gross alpha/beta
Radium 227
Radium 228

~~Voc's~~

SEP 17 2013

OK-LT
WTR-4.00

Mr. Will Archer
Manager
Mountain Park Master Conservancy District
P. O. Box 57
Mountain Park, Oklahoma 73559

Subject: Proposed Use of Altus Aqueduct to Convey Groundwater During Severe Drought, Mountain Park Project (Project), Oklahoma

Dear Mr. Archer:

This letter is in response to your letter dated July 16, 2013, regarding the continuing drought conditions in southwest Oklahoma and the proposed use of the Altus Aqueduct to convey groundwater in lieu of Project water from Tom Steed Reservoir during extreme drought conditions.

We have reviewed your proposal "in concept" and believe conveyance of non-Project groundwater may be allowable under Section 14 of the Reclamation Act of 1939 as long as the following conditions are met:

1. Use of the Altus Aqueduct to convey non-Project groundwater would be temporary, in consideration of the ongoing drought, and subject to contract requirements as mentioned in item 3 below.

2. Use of the Altus Aqueduct to convey non-Project groundwater would not result in an increase in the total quantity of water supplied by the District in a water year; i.e., the groundwater would "replace" an equal amount of Project water normally conveyed from Tom Steed Reservoir.

3. The District would enter into a contract with the Bureau of Reclamation for temporary conveyance of non-Project water. In accordance with Reclamation policy, these contracts typically include a carriage charge.

If the District and/or City of Altus (City) choose to move forward with a formal proposal for temporary use of the Altus Aqueduct to convey non-Project groundwater, upon receipt of the specific details and plans, we will work closely with the Commissioner's Office to seek the necessary approval. Please recognize that while we believe this proposal may have merit, any commitment of resources by the District or the City at this point is at your own risk.

Also, please note that Congressional authorization would likely be required if the District and/or City envision a more permanent use of the Altus Aqueduct to convey non-Project groundwater to augment the Project water supply and enable the District to deliver more water than allowed under its existing contracts and/or surface water permit. While Section 14 of the Reclamation Act of 1939 allows for "exchange or replacement" of Project water, it does not allow for expansion of the water supply. One possible exception might be for conveyance of groundwater pumped from wells located on Project lands since this water could be considered "Project water."

Please contact Mr. James Allard at 405-470-4810 if you have any questions or require additional information.

Sincerely,

MARK A. TREVIÑO

Mark A. Treviño
Area Manager

bc: GP-4100 (TKinsey)

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MOUNTAIN PARK MASTER CONSERVANCY DISTRICT

15797 N. 2240 RD.
MOUNTAIN PARK, OKLAHOMA 73559

PHONE: (580) 569-2742
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WILL ARCHER
DISTRICT MANAGER

July 16, 2013

Mr. Mark Treviño
Area Manager
Bureau of Reclamation
Oklahoma-Texas Area Office
5316 HWY 290 W, Suite 110
Austin, TX 78735-8931

Dear Mr. Treviño,

Due to continuing extreme drought conditions in southwest Oklahoma, the City of Altus (City) is searching for additional water resources to ensure the livelihood of the citizens of the City and protect the interests of the expanding Altus Air Force Base. The City is considering construction of a groundwater well field along Otter Creek, south of Tom Steed Reservoir, to supplement the water supply they currently receive from the Mountain Park Project (Project). They are proposing to deliver water from the well field to the City using the existing Altus Aqueduct which is owned by the United States and operated by the Mountain Park Master Conservancy District (District) as part of the Project.

The well field would be located just south of the Altus Pumping Plant, and would extend south approximately one half mile along Otter Creek. Some of the wells, if approved, would be located on Project lands. The groundwater wells would provide supplemental water to the City which would reduce demand on Tom Steed Reservoir in times of drought. The groundwater wells would also provide an emergency water supply should the Reservoir go dry.

There are several options for moving water from the well field to the Altus Aqueduct. If Reclamation approves this action in concept, the District will work with the City to identify a preferred option and to develop engineering plans for Reclamation review.

The District requests Reclamation's consideration of this "concept" proposal, and looks forward to your response. Please contact me if you have any questions or require any additional information.

Sincerely,

Will Archer

District Manager