Engineering Report
For the Consideration of a Revised Permit for
City of Shafter
System No. 1510019
Kern County
December 2009

Southern California Branch
Drinking Water Field Operations
California Department of Health Services
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I. INTRODUCTION

1.1 Purpose of Report

On January 4, 2008, the State Department of Public Health (Department) received a permit amendment application from the City of Shafter (City) for the addition of a new groundwater well, Well No. 17. In addition another permit amendment application was also received on February 13, 2009 to provide granular activated carbon (GAC) treatment at Well No. 14 for the removal of 1,2,3-trichloropropane (1,2,3-TCP).

The City of Shafter (City) is currently operating the water system under the authority of a domestic water supply permit (No. 68-14) issued by the State of California Department of Public Health on March 26, 1968. At that time there were eight wells in the system, designated Nos. 2, 3, 4, 5, 6, 7, 8, and 9. Well No. 10 was added in 1976, and Wells Nos. 2, 3, 4, and 5 were destroyed sometime before 1982. This permit has been amended five times since 1968. A summary of the permit amendments are listed below:

Permit Amendment No.	Issue Date	Purpose
7-16-1982	July 16, 1982	Add Well No. 11
03-89-000	May 2, 1989	Add Well No. 12
03-93-000	October 5, 1993	Add Minter Field Airport District
03-12-97P-000	March 10, 1997	Allow continuous chlorination of all wells
03-12-99PA-009	September 30, 1999	Add Well No. 14

The Department has elected to issue a revised permit as the existing permit and its amendments do not adequately describe the water system as it exists today. The City is currently operating under water quality rules and regulations that have changed significantly since the issuance of the original permit. In addition, this engineering report will describe the new Well No. 17 and the GAC treatment for the removal 1,2,3-trichloropropane (1,2,3-TCP) at Well No. 14.

1.2 Brief Description of System

The City of Shafter's mailing address is 336 Pacific Avenue, Shafter, CA 93265. The City is classified as a community water system. At the end of 2008 the City had a permanent population of about 15,609 persons that were served through approximately 4,090 service connections. The water system is divided into seven geographic areas: the City Water Service Area, the East Shafter Water Improvement Area, the Southeast Shafter Water Improvement Area (previously known as the Industrial Park Improvement Area), the North Shafter Water Improvement Area, the South Shafter Water Improvement Area, the Southwest Shafter Water Improvement Area and the Maple School addition. A description of these areas is appended.

The City's source of domestic water supply is groundwater from eight active wells, Wells Nos. 6, 7, 8, 10, 11, 12, and 14, including the new Well No. 17. The water system consists of three (3) distinct pressures zones, one serving the general municipal area of the City along with some unincorporated areas, the second pressure zone is serving the needs of the East Shafter Water Improvement Area and the third serving the Southeast Shafter Improvement Area. The water from all of the active wells is chlorinated prior to entering the distribution system. The City has four storage reservoirs, a 0.75 million gallon (MG) tank (Tank No. 1), a 2.3 MG tank (Tank No. 2) and two 0.8 MG tanks (Tanks Nos. 3 and 4). There are also two inactive wells, Wells No. 1-Airport and Well No. 9. Both of these inactive wells showed concentrations of nitrate above the maximum contaminant level (MCL) and are therefore not used. Although, Well No. 10 does not presently exceed any chemical standard, the City has minimized the use of this well due to its proximity to an old fertilizer plant that has confirmed soil contamination and is seriously considering the inactivation of this well. However, until further notice, the well remains active and continues to be sampled accordingly.

1.3 Enforcement History

Citation No. 03-238, issued in January 1993.
The City failed to comply with the total coliform MCL for the months of December 1992 and January 1993.
The City returned to compliance in April 1993.

Citation No. 03-177, issued in March 1993.
The City failed to comply with the total coliform MCL for the month of March 1993.
The City fully complied.

Citation No. 03-12-94C-011, issued in February 1994.
The City failed to comply with the total coliform MCL for the month of January 1994.
The City fully complied.

Citation No. 03-12-94C-012, issued in March 1994.
The City failed to reimburse the Department for costs incurred by the Department for conducting activities relating to the issuance of domestic water supply permits, inspections, monitoring, surveillance, and water quality evaluation.
The City fully complied.

Citation No. 03-12-94C-174, issued in August 1994.
The City failed to comply with the total coliform MCL for the month of July 1994.
The City returned to compliance in October 1994.

Citation No. 03-12-97C-004, issued in January 1997.
The City failed to comply with the total coliform MCL for the month of January 1997. One of the directives required installation of continuous chlorination equipment on the discharge of all wells.
The City fully complied.

Citation No. 03-12-99C-009, issued in February 1999.
The City failed to comply with the total coliform MCL for the month of December 1998.
The City fully complied.

1.4 Production Data and Adequacy of Supply

A public water system must have sufficient source capacity to meet the system's maximum day demand (MDD). The total production capacity of the active operating wells (excluding Well No. 17) is approximately 9,700 gallons per minute (gpm) or 14.0 million gallons per day (MGD). With the exception of the year 2007, the City's sources were able to meet the MDD and the peak hour demand (PHD). Historical water production and usage statistics are summarized in Table 1 below. The addition of Well No. 17 provides the system with 11,700 gpm in total production capacity.

Systems that have insufficient source capacity for meeting the peak hour demand are allowed to utilize storage in order to meet the PHD. Peak hour demand is defined as the demand equal to four hours of peak demand flowrate. The highest PHD from the year 2007 [4 hours x 11,354 gpm x 60min/hr = 2,725,000 gallons] equates to 2.73 MG for four hours of peak demand. The City can provide approximately 2.32 MG based on MDD [4 hours x 7,569 gpm x 60min/hr = 2,328,000 gallons]. This leaves a difference of 0.397 MG which would have to be supplied by storage. The total storage capacity available to the City is 4.65 MG which is adequate for meeting the peak hour demand. Table 2 presents a listing of the City's sources and their respective source capacities as well as the total system water supply capacity.

Table 1: Water System Statistics

Year	Population	Active Service Connections	Annual Production (MG)	Max. Day Demand ~~MG~~ (gpm)	Peak Hour Demand (gpm)*
1999	11,645	4,029	1,375	4,931	7,396
2000	11,895	3,110	1,440	5,208	7,813
2001	13,216	3,283	1,479	5,833	8,750
2002	13,895	3,476	1,516	5,486	8,229
2003	13,343	3,517	1,590	6,111	9,167
2004	13,692	3,652	1,540	5,764	8,646
2005	14,113	3,774	1,527.7	6,181	9,271
2006	14,501	3,863	1,592.7	6,250	9,375
2007	14,982	4,220	1,554.4	7,569	11,354
2008	15,609	4,090	1,714	6,319	9,479

*The peak hour demand (PHD) is calculated by multiplying the maximum day demand (MDD) by a peaking factor of 1.5.

Table 2: Source Capacity

Source	Capacity (gpm) 2003 BSSP
Well No. 06	800
Well No. 07	1,200
Well No. 08	1,000
Well No. 10	1,000
Well No. 11	1,200
Well No. 12	2,000
Well No. 14	2,500
Well No. 17	2,000
Total	11,700

With the addition of Well No. 17 the total source capacity available to the City will be approximately 11,700 gpm. Even with the City's highest producing well offline (Well No. 14) and the exclusion of Well No. 10, the system should be able to meet the maximum day demand but must use the storage capacity to meet the peak hour demand.

1.5 Sources of Information

On March 13, 2009, Mrs. Ramirez met with Mr. Michael James, Public Works Director and conducted a field inspection of Well No. 17. Mrs. Pena-Pomeroy of the Department was also in attendance. Mr. Fischer of the Department met with Mr. James on August 27, 2009, for the purpose of conducting a field inspection of the treatment facilities for Well No. 14. Information from these inspections and water system files at the Department were used in preparation of this engineering report. Mr. Fischer and Mrs. Ramirez are responsible for the investigation, analysis and preparation of this engineering report.

II. INVESTIGATION AND FINDINGS

2.1 Description of Proposed System Changes

The City of Shafter water system proposed to add one well, Well No. 17, to the system and provide granular activated carbon (GAC) treatment at Well No. 14 for the removal of 1,2,3-trichloropropane (1,2,3-TCP). These changes are listed below.

New Water System Facilities

New Well No. 17

Well No. 17 was drilled in 2008 to a depth of 870 feet. A cement annular seal extends from the ground surface to a depth of 525 feet. The well is gravel packed and is equipped with an oil-lubricated Fairbanks Morse deep well vertical turbine pump powered by a 400 HP U.S. Electric Motor and can produce approximately 2,000 gpm. The well is also equipped with a variable frequency drive (VFD) that controls the well pump and allows for the conservation of electricity and ease of operation. The well site is completely fenced in and is surrounded by fallow land that can be utilized for discharging to waste if needed. The raw water sampling tap is located upstream of the chlorination injection point. The well is equipped with a right angle drive for the purpose of supplying auxiliary power in the event of an emergency. A 6,000 gallon pressure tank is onsite for surge protection. A copy of the well completion report is on file with the Department. The well appears to meet the construction and separation standards as noted in the Department of Water Resources Standards.

By letter dated June 25, 2009, the Department allowed the temporary use of this well due to the inability to meet system demand without it. The well was placed online shortly thereafter.

Treatment Changes

Disinfection Treatment at Well No. 17

Continuous hypochlorination is provided to the water delivered from Well No. 17 and all of the City's remaining wells. The chemical used is 12.5 percent NSF approved sodium

hypochlorite solution. The solution and chlorination equipment are serviced by McMor Chlorination Company of Bakersfield.

Granular Activated Carbon (GAC) Treatment for Well No. 14

Well No. 14 produces raw water with 1,2,3-Trichloropropane (1,2,3-TCP) concentrations historically between 0.02 and 0.12-micrograms per liter (µg/L). 1,2,3-TCP is an unregulated chemical that requires monitoring with both a notification level (NL) and detection limit for purposes of reporting (DLR) of 0.005-µg/L. The current response level (RL) for 1,2,3-TCP is one hundred times the NL or 0.5-µg/L; at the response level, the Department recommends the source be taken out of service. In August 2009, the Office of Environmental Health Hazard Assessment (OEHHA) released a draft public health goal (PHG) for TCP of 0.0007-µg/L. It should be noted that the NL and DLR of 0.005-µg/L coincides with the detection limit of the analytical method used for laboratory analysis. To be clear, currently there is no laboratory procedure to detect 1,2,3-TCP at concentrations less than 0.005-µg/L.

Historical results for 1,2,3-TCP sampling at Well No. 14 are provided below in Figure 1. As stated above and displayed in Figure 1, 1,2,3-TCP concentrations range between 0.02 and 0.12-µg/L. Although there has been no formal indication from the Department, the City anticipates future regulation of 1,2,3-TCP and in a proactive effort installed GAC treatment at Well No. 14. Additionally, the City moved forward with this project as the data and experience from implementation of this project will be applied to other City wells should 1,2,3-TCP regulation develop and other City wells require treatment. Figure 2 provides the most recent 1,2,3-TCP sampling results for all of the City's wells.

Figure 1: Well No. 14 Raw Water 1,2,3-TCP Sampling Results

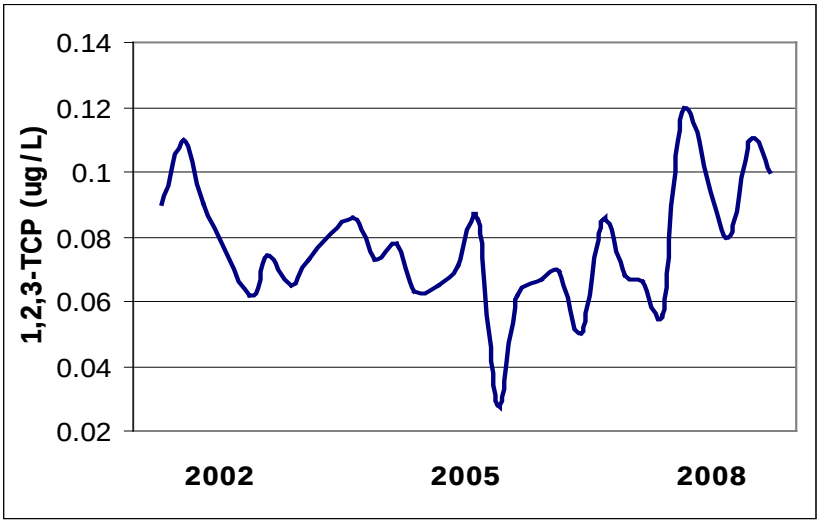

Figure 2: Most Recent 1,2,3-TCP Sampling Results (Collected 6/23/2009)

Source Name	Sample Result (µg/L)
Well No. 6	0.01
Well No. 7	0.01
Well No. 8	0.071
Well No. 10	0.24
Well No. 11	0.044
Well No. 12	0.16
Well No. 14	0.1
Well No. 17	No sample collected

The media utilized for 1,2,3-TCP removal is NSF/ANSI 61 certified granular activated carbon (GAC) manufactured by Calgon Carbon Corporation. Calgon markets this particular GAC product as Filtrasorb-300.

The GAC treatment plant consists of two steel pressure vessels configured in parallel. Each steel pressure vessel is 22-feet high and 10-feet in diameter and contains approximately 20,000-pounds of Filtrasorb-300 GAC, providing a GAC volume of approximately 720-cubic feet. Well No. 14 production capacity is approximately 2,000-gallons per minute (gpm). Raw water discharge from the well will split; approximately 1,000-gpm will be treated by the GAC plant while approximately 1,000-gpm will by pass the GAC plant. The treated flow stream will be split in order to direct half of the flow to each GAC treatment vessel. The resultant 500-gpm flow through each vessel corresponds to a maximum surface loading rate of 6.37-gpm/ft2 and an empty bed contact time (EBCT) of 10.8 minutes for each vessel. The initial operation goal is 1,2,3-TCP concentration of 0.038-µg/L in water delivered to the distribution system.

Water effluent from the GAC treatment vessels will be blended with raw water from Well No. 14 using an inline static mixer. After mixing, the combined flow will be chlorinated using NSF approved 12.5% sodium hypochlorite solution before discharge into the on-site 2.3-million gallon (MG) storage tank. Chlorine residual at the entrance to the distribution system is maintained at approximately 1.0-milligrams per liter (mg/L).

The City does not plan to backwash the treatment plant as no backwash facilities have been constructed. GAC typically is not regenerated when the adsorption capacity is exhausted; rather, spent GAC media is disposed of and replaced with new GAC media to form a new bed. To determine when adsorption capacity of the GAC is nearing exhaustion, the City proposes to conduct monitoring of 1,2,3-TCP concentrations from sampling ports at 88-inches, 62-inches, 36-inches and 24-inches above the base of each

vessel. GAC media will be changed out based on this sampling as the data will be used to anticipate breakthrough.

Calgon Carbon Corporation has developed GAC media preparation and handling procedures for media installation, plant startup, normal operations, and shutdown. This document can be found in the Operation and Maintenance Plan (Plan) for 1,2,3-TCP GAC Treatment at Well No. 14 which is on file at the Visalia District Office (Dated October 2009). The Plan should be reviewed and updated periodically to ensure that it is kept current in accordance with the operations being conducted.

It should be noted that operation of this treatment plant may need to be modified should a MCL be developed for 1,2,3-TCP. If a MCL for 1,2,3-TCP is implemented, the City will be required to submit a revised operations plan to address operation of the plant to ensure delivery of water meeting the 1,2,3-TCP MCL. It should be further noted that revision of the current operations plan in this regard would be premature at this time as not only has an MCL not been developed, but laboratory analysis methods cannot produce results below 0.005-µg/L.

2.2 Source of Supply

The sources of supply consist of ground water from the remaining seven (7) active wells (Wells Nos. 6, 7, 8, 10, 11, 12 and 14) within the City Water Service Area. Wells Nos. 6 and 8 are controlled by PLC; the operation of these wells is controlled by the level in the 750,000-gallon storage tank (Tank No. 1) at the Corporation Yard.

Well No. 7, [redacted] is generally used continuously barring repair, testing or maintenance work. Wells Nos. 6 and 8 are activated based on the water levels at Tank No. 1 via a telephone data connection. During the summertime or high demand periods, Well No. 8 generally operates as the lead well while Well No. 6 is set as the secondary well. During the wintertime or low demand periods, this well order is reversed.

The primary purpose of Well No. 14 is to fill the 2.3-MG storage tank (Tank No. 2) located on the same site. This well can also discharge directly into the distribution system should Tank No. 2 be down for repair or maintenance.

Wells Nos. 11 and 12 are currently operated manually to meet high demand or if Wells Nos. 6, 7, or 8 are down for repairs or maintenance.

Well No. 10 is used only as a back in the event of an emergency.

The following is a summary description of the existing wells:

Active Wells

Well No. 6 was drilled in 1954 to a depth of 712 feet. The completed well is 712 feet deep and contains 14-inch diameter steel casing. The perforated interval begins at a depth of 512 feet. Well No. 6 has an annular seal from the ground surface to a depth of 150 feet. The well is gravel-packed. A 26-inch diameter conductor casing is present from the ground surface to a depth of 150 feet. The well is equipped with a 150 HP Peabody-Floway submersible pump that can produce 743 gpm, however, this well is presently out of service due to a motor failure. No auxiliary power is available. A copy of the well completion report is on file with the Department.

Well No. 6 discharges to the distribution system via a pressure tank. The well and the pressure tank are enclosed in a wood-framed building.

Well No. 7 was drilled in 1957 to a depth of 700 feet and contains 14-inch diameter steel casing. The distance to the perforations is 500 feet. The well is gravel-packed and its cement annular seal extends from the surface to a depth of 150 feet. Thirty-inch diameter conductor casing is present from the ground surface to a depth of 150 feet. The well is equipped with a Smithway oil-lubricated deep well turbine (DWT) pump powered by a 265-HP natural gas engine and can produce 1,031 gpm. The gas engine was installed in September 1998 to replace a diesel engine and reduce emissions into the air. Auxiliary power is provided by an electric engine. A copy of the well completion report is on file with the Department.

Well No. 7 can discharge to either Tank No. 1 or to the distribution system via a pressure tank.

Well No. 8 was drilled in 1961 to a depth of 700 feet and contains 700 feet of 14-inch diameter steel casing. The perforated interval begins at a depth of 500 feet. An annular seal is present from the ground surface to a depth of 150 feet. 26-inch diameter steel casing is present from the ground surface to a depth of 150 feet. The well is gravel-packed. Well No. 8 is equipped with an oil-lubricated deep well turbine (DWT) pump powered by a 250 HP U.S. Electric motor and can produce 1,500 gpm. There is no well log for this well in Department files, and the City of Shafter and the Department of Water Resources were unable to provide a well log for Well No. 8.

Well No. 8 discharges to the distribution system via a pressure tank. The nearest sewer line is about 35 feet from the well.

Well No. 10 was drilled in 1976 to a depth of 710 feet and contains 700 feet of 16-inch diameter steel casing. The depth to the perforations is 500 feet. The well is gravel-packed and has an annular seal that extends from the ground surface to a depth of about 160 feet. A 36-inch diameter conductor casing is present from the ground surface to a depth of 20 feet.

Well No. 10 is equipped with a Layne and Bowler oil-lubricated DWT pump that can produce about 660 gpm. The well pumps to an on-site surge tank prior to delivery to the distribution system and is powered by a 200 HP Cummins GH 55 natural gas engine. There is a 12-volt battery onsite that is used to power the chlorinator and start the gas engine. If the City has an extended electrical power outage, Well No. 10 could be used. A copy of the well completion report is on file with the Department.

There is an old Brown and Bryant fertilizer plant that was located about 20 feet north of Well No. 10 that has confirmed soil contamination. The fertilizer facility was used from 1955-1989 for the formulation and repackaging of agricultural chemicals including pesticides, fumigants, and fertilizers. In 1983 Cal-EPA, Department of Toxic Substances Control issued an Order and Schedule of Compliance to the Brown and Bryant facility to correct several violations, which included improper and negligent handling, storage, and disposal of hazardous materials. Although, Well No. 10 does not presently exceed any chemical standard, the City has minimized the use of this well due to its proximity to the old fertilizer plant and is seriously considering the inactivation of this well. However, until further notice, the well remains active and continues to be sampled accordingly.

Helena Fertilizers, which primarily distributes fertilizers, is less than 200 feet from Well No. 10. The City supplies water to Helena Fertilizers and used to supply the Brown and Bryant facility before it was closed.

Well No. 11 was drilled in 1982 to a depth of 830 feet and contains 800 feet of 16-inch diameter steel casing. The perforated interval begins at a depth of 500 feet. Thirty-inch diameter conductor casing is present from the ground surface to a depth of 50 feet. A cement annular seal extends from the ground surface to a depth of 50 feet. The well is gravel-packed, but is also cemented between the depths of 420 feet and 490 feet. Well No. 11 is equipped with a Peerless oil-lubricated DWT pump powered by a 150 HP Newman electric motor and can produce about 1,123 gpm. There is a sewer main approximately 65 feet south of the well and a sewage lift station approximately 150 feet from the well. A copy of the well completion report is on file with the Department.

Well No. 11 discharges to the distribution system through a 9,926-gallon pressure tank. The pressure of water entering the distribution system from this location is about 50 psi.

Well No. 12 was drilled in 1994 to a depth of 830 feet and contains 800 feet of 16-inch steel casing. The screened interval is from a depth of 500 feet to the bottom of the well. Thirty-inch diameter conductor casing is present from the ground surface to a depth of 50 feet. A cement annular seal extends from the ground surface to a depth of 480 feet. The well is gravel packed. Well No. 12 is equipped with an oil-lubricated Worthington DWT pump powered by a 300 HP U.S. Electric motor and can produce 2,021 gpm. Well No. 12 discharges to the distribution system. There are surge valves on this well that control forward and backward surges. A copy of the well completion report is on file with the Department.

Well No. 14 was drilled in 1999 to a depth of 820 feet. The well contains 801 feet of 16-inch diameter steel casing. The perforated interval extends from a depth of 501 feet to a depth of 801 feet. A cement annular seal extends from the ground surface to a depth of 480 feet. The well is gravel–packed. Conductor casing is present from the ground surface to a depth of 50 feet. A copy of the well completion report is on file with the Department.

The City of Shafter water system initially proposed to add Well No. 13, to the system back in May of 1999. Well No. 13 was drilled and cased in May 1999, but the well collapsed. The hole was filled with cement and a new well, Well No. 14, was drilled approximately 20 feet from the destroyed Well No. 13.

Inactive Wells
Re-activation of any inactive source requires the submittal of a permit amendment application to the Department for review and approval.

Well No. 1 is housed in a corrugated metal building and was drilled in 1957 to a depth of 700 feet. The well casing is steel and there is a surface seal. The diameter of the well casing, and the distance to the highest perforations are not known. There is no information on whether or not there is a gravel pack, the depth of annular seal, or if there is a second casing. Well No. 1 (Airport) is equipped with a Peerless oil-lubricated DWT pump powered by a 60 HP electric engine. There is no well log for this well in Department files.

1,2-Dichloropropane and chloroform were detected in samples collected from Well No. 1 (Airport) in 1991 at concentrations below the MCLs. The nitrate concentrations in water produced by Well No. 1 were above the MCL. **This well is to be used only in an emergency or for fire suppression.**

Well No. 9 is an inactive well and was drilled in 1967 to a depth of 690 feet and contains 690 feet of 14-inch diameter steel casing. The depth to the perforations is 500 feet. The wells is gravel-packed and has an annular seal that extends from the ground surface to a depth of 150 feet. Thirty-inch diameter steel casing is present from the ground surface to a depth of 150 feet. The well is equipped with a Jacuzzi 150-HP oil-lubricated DWT pump and can produce 1,400 gpm. A copy of the well completion report is on file with the Department. Well No. 9 has not been used in the system for several years because concentrations of nitrate have been above the Maximum Contaminant Level (MCL). DBCP has been found at the MCL and 1,2-dichloropropane and 1,2,3-trichloropropane have also been detected.

2.3 Storage

The City maintains four (4) storage reservoirs, Tank No. 1 (0.75-MG capacity), Tank No. 2 (2.3-MG capacity), Tank No. 3 (0.8-MG capacity) and Tank No. 4 (0.8-MG capacity). Each of the storage tanks was last inspected in 2007. Tank No. 1 is constructed of pre-

stressed concrete and was installed in 1968. Water from this tank is pumped to the distribution system via two booster pumps; each has a capacity of 1,000 gpm.

Tank No. 2 was installed in 1998 and the inlet of the 24-foot high tank is at the top on the east side. The outlet is at the bottom, about 30 feet to the north of the inlet. There is a 16-inch diameter overflow on the south side of the tank that needs to be screened. Water from Tank No. 1 is currently pumped to the distribution system via a one (1) fixed speed and one (1) variable speed drive motor for a combined flow pumping capacity of 1,500 gpm. A diesel-powered booster pump back-up is also on-site with a capacity of 1,500 gpm.

Tank No. 3 was installed in 2001 to supply storage and booster station pumping for the Southeast Shafter Water Improvement Area. This tank is equipped with three (3) booster pumps of both fixed and variable speed outputs that have a combined capacity of 4,500 gpm.

Tank No. 4 was installed in 2004 to replace a 0.35-MG reservoir that has been inactivated and destroyed. Tank No. 4 is used to supply the East Shafter Water Improvement Area and is equipped with four (4) booster pumps of both fixed and variable speed outputs that have a combined capacity of 4,000 gpm.

The City storage reservoirs have a total capacity of 4.65 million gallons. According to the 2008 Annual Report to the Drinking Water Program, 1,714 million gallons were produced by the system in 2008, which is equivalent to an average daily demand of 4.7 million gallons. Based on the average daily demand in 2008, the City reservoirs represent about 1 day's storage.

2.4 Distribution System

The system is within two distinct pressure zones, one (1) serving the general municipal needs of the City and unincorporated areas lying south and north of the core service area. Another pressure zone serves the Minter Field Airport District area and Shafter Airport Industrial Park which are supplied by the East Shafter Water Improvement Area. The Southeast Shafter Water Improvement Area makes up the third pressure zone.

The distribution system consists of asbestos-cement pipelines (35-40%), with the remaining piping consisting of C-900 PVC or C-905 PVC (60-65%). The old asbestos-cement pipes are being replaced with PVC. All new mains are installed in accordance with the AWWA construction and disinfection standards.

Distribution pressure in the City Water Service Area is maintained at between 42 and 52 psi. Pressure variations are minimal within the City Water Service Area, as that part of the system is completely looped. The pressure in the Minter Field Airport area is about 50 psi.

The City exercises its valves as time allows and tries to exercise valves at the airport every few months. City staff has mapped the locations of all lines and valves on AutoCAD. Field personnel are provided with diagrams and figures to use.

The system contains 97 dead ends, 55 of which are provided with blowoff valves and flushed triennially. All breaks and leaks are repaired and/or replaced as discovered.

2.5 Operation and Maintenance

The City's operation and maintenance are under the supervision of the Public Works Director, Mr. Michael James. Mr. James is the Chief Operator and is responsible for day to day operation of the water system.

Organization and Personnel

The Operator Certification requirements for the City of Shafter are as follows:

Table 3: Water System Operator Classifications

Facility	Classification
Well No. 14 GAC 1,2,3-TCP Treatment Facility	T2
Distribution System	D3

Mr. James maintains a D3 operator certification and the City also employs three (3) other staff members that possess D2 operator certification.

Based on GAC treatment provided at Well No. 14, the City is required to have a T2 certified chief operator. The City has retained the services of McMor Chlorination, Inc for the purpose of overseeing the operation of the GAC treatment. McMor Chlorination, Inc. employs personnel that hold water treatment operator certifications ranging from a T1 through a T5.

When treatment and/or distribution facilities are added or modified, the City shall evaluate and update, if necessary, the applicable distribution and treatment classifications. The Chief and Shift Operator shall meet the minimum certification requirements according to Sections 63766 and 63770 of Chapter 13, Division 4, Title 22.

Technical, Managerial and Financial Capacity (TMF)

The City of Shafter has adequate TMF.

Cross Connection Control Program

The City contracts the services of the Kern County Health Department to administer their cross-connection control program which is coordinated by Mr. Kelly Harrington (Certification No. AWWA 01778). According to the 2008 ARDWP, there are approximately 253 backflow prevention assemblies in the distribution system. The ARDWP reports that about 47 devices were installed in 2008 and 252 devices were tested in 2008, of which 54 were repaired or replaced.

Complaint Program

The City maintains records of customer complaints. The complaints are investigated and corrections made. As reported in the 2008 ARDWP, the City received and investigated four (4) complaints in 2008.

Emergency Response Plan (ERP)
The City submitted an ERP dated January 7, 2005. By letter dated June 7, 2005, the Department noted that the ERP appeared to be satisfactory and included the following two (2) recommendations:

- Training for water system personnel on the ERP should be conducted annually, at a minimum, and
- Tabletop exercises should also be conducted annually, at a minimum for all staff that will respond to an emergency.

Consumer Confidence Report (CCR)
The City completed a Consumer Confidence Report (CCR) for 2008. A copy of this report is on file and is in compliance with the requirements. The Department also has on file Consumer Confidence Reports for the years 1999 through 2007. The CCRs have been distributed before July 1, of the year following the year of the report, in conformance with the CCR regulations. The 2009 CCR is due to be sent to consumers by July 1, 2010 and certification form sent to the Department by October 1, 2010.

Emergency Notification Plan (ENP)
The most current Emergency Notification Plan on file with the Department, dated March 21, 2008, identifies Michael James, Public Works Director; Kevin Gibson and Rick Sharp as emergency contacts for the City of Shafter.

According to the plan, in a water emergency that would pose a danger to public health, the City would notify local television and radio stations to broadcast the warning in English and Spanish. A sound truck would also be used to notify consumers in outlying water service areas. The City estimates notification by radio and television will take a relatively short time to accomplish and about one hour for notification by sound truck.

2.6 California Drinking Water Source Assessment and Protection Program (DWSAP)

Vulnerability Source Water Assessment for Well No. 17
A source water assessment is required for all sources. The assessment would define the protective zones around each well and identify possible contaminating activities within these zones. Our files indicate that a source water assessment has not been completed for Well No. 17. The Department will be finalizing the report with the City's assistance.

Vulnerability Source Water Assessment for Wells No. 6, 7, 8, 10, 11, 12 and 14
The drinking water source assessments for Wells No. 6, 7, 8, 10, 11, 12 and 14 were completed in 1999. The assessments indicated that the sources are considered most vulnerable to the following activities associated with contaminants detected in the water supply: fertilizer, pesticide/herbicide application and known contaminant plumes. In addition, the sources are considered most vulnerable to these activities: automobile gas stations; leaking underground storage tanks; dry cleaners; historic gas stations; automobile repair shops; commercial, industrial, or residential sewer collection systems;

machine shops; farm chemical distributor/application services; and pesticide/fertilizer/petroleum storage and transfer areas.

2.7 California Environmental Quality Act (CEQA)

CEQA for Well No. 17

The City filed a Notice of Exemption (NOE) through the Kern County Clerk's Office on December 27, 2007, and the State's Office of Planning and Research State Clearinghouse (SCH #2007108168) on October 10, 2007. The City determined that this project was exempt from CEQA under a Class 3 exemption pursuant to Title 22 CCR Section 60101(c)(1) and Title 14 CCR Section 15303(d).

2.8 Water Quality Monitoring

The analytical results from all source water chemical samples are required to be submitted electronically to the Department's water quality database via Electronic Data Transfer (EDT). The electronic data is due to the Department by the 10th day of the month following the collection of the samples. A monitoring schedule for the existing sources is attached as Appendix D. This schedule would also be used for Well No. 17 after all initial monitoring has been completed.

(Leave if there is also surface water in syste ***General Minerals, Physicals and Inorganic Chemicals***

New Well No. 17 - The initial monitoring for Well No. 17 for the general mineral, general physical and inorganic chemical group was conducted on April 17, 2009, and all of these constituents were within the acceptable levels of concentrations with the respective standards. The City collected the second initial monitoring sample for perchlorate on September 25, 2009, which showed a concentration of 32-µg/L. Confirmation samples were collected on October 5th and 12th, 2009 and the results of these analyses were all non-detect for perchlorate. Based on the non-detectable results, the Department determined that the detection of perchlorate in Well No. 17 was not confirmed. Since this satisfies the initial monitoring requirements for perchlorate, the sampling frequency for perchlorate will be one (1) sample every three (3) years. With the exception of nitrate, which is required annually, the City is required to monitor the water from this well for general mineral, general physical, and inorganic chemical quality once every three years hereafter. Monitoring for general mineral, general physical and inorganic chemicals for Well No. 17 will be due again in the year 2012 and nitrate is due in 2010.

Wells Nos. 6, 7, 8, 10, 11, 12 and 14 - Except for asbestos, nitrate, and nitrite, which have different monitoring schedules, the City of Shafter, a community water system, is required to monitor ground water from each active source for inorganic chemicals, general minerals, and general physical quality every three years.

Wells Nos. 6, 7, 8, 10, 11, 12 and 14 were recently sampled for general mineral, general physical, and inorganic water quality on March 24, 2009. The quality of the water produced by these wells meets the general mineral, general physical, and inorganic water quality standards. Monitoring for general mineral, general physical and inorganic chemicals for Wells Nos. 6, 7, 8, 10, 11, 12 and 14 will be due again in the year 2012.

The nitrate concentrations in water produced by Wells Nos. 6, 7, 8, 10, 11, 12 and 14 have ranged from 8.0 mg/L up to 44 mg/L since January 1999. The City has conducted quarterly monitoring of all their wells since the year 1999. The data on file shows an upward trend in the nitrate concentrations, however, there have been no exceedances of the nitrate MCL of 45 mg/L. Typically, annual monitoring is acceptable when concentrations of nitrate are less than ½ the MCL of 45 mg/l, however, since the nitrate concentrations in water produced by Wells Nos. 6, 7, 8, 10, 11, 12, and 14 appear to be increasing and continue to fluctuate in some of the wells, the Department recommends that the City continue with quarterly monitoring for these wells.

Volatile and Synthetic Organic Chemicals (VOCs and SOCs)

New Well No. 17 - Two consecutive quarters of monitoring are required initially for VOCs and SOCs, with the exception of methyl-*tert*-butyl ether (MTBE) which requires four quarters of initial monitoring. The VOCs and SOCs were sampled on April 17 and September 22, 2009, and all of the chemical concentrations were non-detectable with the exception of DBCP (dibromochloropropane) in the April 17, 2009 sample which had a detectable result of 0.012-µg/L (micrograms per liter). A second sample for DBCP was collected on September 22, 2009, and that analytical result was non-detectable. Since the initial monitoring for the remaining VOC and SOC constituents has been satisfied, the number of chemicals to be sampled will be reduced along with the monitoring frequency. A majority of the constituents will be reduced to one sample every three years, while other constituents will be reduced to one sample every nine years. The City must sample in accordance with the water quality monitoring schedule provided in Appendix C.

Wells Nos. 6, 7, 8, 10, 11, 12 and 14 *(VOCs)* - According to Department records, Wells Nos. 6, 7, 8, 10, 11, 12 and 14 were last sampled for regulated VOCs in the year 2007. The only VOCs that were detected in these analyses was 1,2,3-trichloropropane (1,2,3-TCP) in all wells, all of the remaining VOCs were non-detectable. The City has been conducting quarterly monitoring for 1,2,3-TCP since 1999. 1,2-dichloropropane has an MCL of 5-µg/L and was detected in Well No. 12 in four (4) of six (6) samples collected from 2002 through 2007 at concentrations just above the DLR of 0.5 µg/L. The result from 2007 was non-detectable. Monitoring for VOCs for Wells Nos. 6, 7, 8, 10, 11, 12 and 14 will be due again in the year 2010. 1,2-dichloropropane should be sampled annually in Well No. 12.

1,2,3-TCP is an unregulated chemical with both a notification level (NL) and detection limit for purposes of reporting (DLR) of 0.005-µg/L. The current response level (RL) for

1,2,3-TCP is one hundred times the NL or 0.5-µg/L; at the response level, the Department recommends the source be taken out of service. The levels found in the water produced by Wells Nos. 6, 7, 8, 10, 12 and 14 are below the DLR and NL with the highest result reported in Well No. 12 of 0.29-µg/L collected on December 11, 2007. In the event that any 1,2,3-TCP result is in excess of the NL of 0.005-µg/L, the City is required to notify the governing body and should also consider notification to the consumers of the water system. The City may reduce monitoring for 1,2,3-trichloropropane to one (1) sample per year per well.

Wells Nos. 6, 7, 8, 10, 11, 12 and 14 *(SOCs)* - The Department has reduced the number of SOC constituents to be monitored down to a total of five (5). Alachlor, atrazine and simazine have a frequency of one (1) sample every nine (9) years and DBCP and ethylene dibromide (EDB) have a frequency of one (1) sample every three (3) years. Department records indicate that the City sampled its wells in 2007/2008 for alachlor, atrazine and simazine and the results were non-detectable.

The City has conducted quarterly monitoring for DBCP since 2002 in all of its wells and the results have ranged from non-detect up to 0.045-µg/L (micrograms per liter). Well No. 6 showed only one (1) detect of DBCP on December 9, 2008 of 0.018-µg/L and Well No. 12 has not had any detectable levels of DBCP. The results of quarterly monitoring since 2002 for EDB have been all non-detectable.

The City should sample for DBCP at a minimum of an annual frequency and EDB monitoring may be reduced to one (1) sample every three (3) years.

Radiochemicals

New Well No. 17 - The initial radiological monitoring frequency for Well No. 17 is based on the collection of four consecutive quarterly samples for gross alpha particle activity and radium-228. Two (2) quarterly samples have been collected and the analytical results for both quarters were below the respective DLRs of 3 pCi/L (pico curies per liter) for gross alpha particle activity. Since both of these results are below the DLR, the Department will waive the last two (2) quarterly samples and set the frequency for gross alpha particle activity at one (1) sample every nine (9) years. Four (4) consecutive quarterly samples must still be collected and analyzed for radium-228. If radium-228 is not detected (< 1 pCi/L) in the first two (2) quarters of monitoring, the final two quarters will be waived. Upon completion of the initial monitoring for radium-228, the Department will review and evaluate the radiological data for the purpose of establishing the subsequent monitoring frequency for radium-228.

Wells Nos. 6, 7, 8, 10, 11, 12 and 14 - The Department adopted a new radiological regulation that required four quarters of initial monitoring for radium-228 to be completed by December 31, 2007. Under this regulation the Department would also determine a frequency for future sampling of the gross alpha, uranium, radium-226, and radium 228 constituents based on initial quarterly monitoring conducted between January

1, 2001, and December 31, 2007. Based on results from 2003, the initial quarterly monitoring requirements for gross alpha particle activity, uranium and radium-226 have been completed for Wells Nos. 6, 7, 8, 10, 11, 12, and 14.

Table 4: Radiological Monitoring Frequencies

Source	Gross Alpha Particle Activity*	Uranium	Radium-226	Radium-228
Well No. 06	1 sample/6 years	**	**	1 sample/9 years
Well No. 07	1 sample/9 years	**	**	1 sample/9 years
Well No. 08	1 sample/9 years	**	**	1 sample/9 years
Well No. 10	1 sample/6 years	**	**	1 sample/9 years
Well No. 11	1 sample/9 years	**	**	1 sample/9 years
Well No. 12	1 sample/9 years	**	**	1 sample/9 years
Well No. 14	1 sample/9 years	**	**	1 sample/9 years
Well No. 17	1 sample/9 years	**	**	Due Now

****** If the gross alpha particle activity is more than 5 pCi/L, the sample must either be analyzed for radium-226 directly, *OR* the sample may be analyzed for uranium to obtain the radium-226 activity (Gross alpha – Uranium = Radium-226).

A frequency is not set for either Uranium or Radium 226 analysis since both of these constituents are dependent on the results of the gross alpha particle activity.

Bacteriological Source Monitoring

Source water bacteriological monitoring is required from all wells whose water supply is chlorinated. The City was required to install continuous chlorination equipment on the discharge of all wells due to a bacteriological total coliform failure that occurred in January 1997. Continuous disinfection of the water supply was permitted by the Department by permit amendment 03-12-97P-000 issued in March of 1997.

Raw water bacteriological samples must be collected at a location ahead of chlorination and shall be analyzed for total and fecal coliform or E.coli bacteria using a density analytical method with the analytical results reported in MPN/100 ml. The results of these samples shall be reported to the Department by the 10th day of the following month.

The City collected a raw water bacteriological sample from Well No. 17 on June 3, 2009 and the sample showed absent results for total coliform bacteria. Since the water from Well No. 17 is chlorinated, the raw water from this well is required to be sampled on a monthly basis for a minimum of a six (6) month period. The sample shall be collected at a point prior to the injection of chlorine. After six consecutive monthly samples do not show the presence of coliform bacteria, the City may submit a written request to the Department for a reduction in sampling to one (1) sample per quarter.

2.9 Treated Water Monitoring at Well No. 14

The City shall follow the sampling outlined in the table below. For purposes of Table 5, treated water refers to combined plant effluent prior to blending with raw water from Well No. 14 and blended treated water refers to a sample point downstream of blending, but prior to discharge into the storage tank.

Table 5: Well No. 14 GAC Treatment Plant Monitoring

	Raw Water	Treated Water	Blended Treated Water
1,2,3-TCP	Quarterly	Monthly***	Monthly
Nitrate	Quarterly	Weekly	Monthly
Total Coliform	Monthly	Monthly	--
HPC's	Monthly	Monthly	--

*** Sampling frequency shall increase to weekly when 1,2,3-TCP Concentration reaches 0.005-µg/L.

If one of the monthly bacteriological routine samples collected from the combined treatment plant effluent is returned positive, the City shall take repeat samples at the effluent of each individual vessel, from the raw water sample point and again at the combined treatment plant effluent. All bacteriological samples taken at Well No. 14, including samples associated with GAC treatment shall be taken upstream of chlorine injection.

Because raw water from Well No. 14 contains concentrations of nitrate over half of the MCL, weekly nitrate monitoring is required at the combined plant effluent. Additionally, any time the treatment plant is shutdown for a period exceeding 6-hours, the plant effluent shall be sampled for nitrate. Sampling must be conducted when the plant has been online for at least one hour but not exceeding three hours.

2.10 Distribution System Monitoring

Bacteriological Water Quality

The City collects routine bacteriological water samples from its distribution system in accordance with its bacteriological sample-siting plan (Plan), dated 2003. Based on the population served the City is required to collect a minimum of four (4) samples per week, however, the City has been collecting six (6) samples per week due to the geographical layout of the water system. The Plan identifies a total of nineteen (19) routine sampling locations with routine sites located in each geographical area. **The Plan will need to be updated to include the recent connection from the Maple School water system.**

The City has met the bacteriological water quality standards since 1995.

Asbestos

The regulations require monitoring of systems vulnerable to asbestos contamination within the distribution system at a tap served by asbestos-cement pipe. Distribution system monitoring for asbestos is required if asbestos-cement pipe is used and the water produced by the sources has an aggressive index of $\leq$ 11.5. The aggressive index is an indicator of the corrosivity, and correlates reasonably well with the release of asbestos fibers caused by dissolution of the cement matrix. The aggressive index (AI) may be determined by the following equation:

$$AI = pH + \log(AH)$$

where pH = measured pH of the water
A = alkalinity, mg/L as CaCO3
H = calcium hardness, mg/L as CaCO3

The aggressive index for each well is displayed in the table below. The aggressive indices for water produced by the City's wells ranged from 11.5 to 12.1. The Department has determined that water with an aggressive index between 10 and 12 would be considered moderately aggressive and may possibly be vulnerable to asbestos contamination in the distribution system. Since only one (1) of the wells served by City has an aggressive index equal to or below 11.5, ***monitoring of the distribution system for asbestos is waived.***

Table 6: Aggressive index for each well

Source	Sample Date	pH	A	Ca (mg/L)	H	AI	AI≤ 11.5
Well 06	3/24/09	8.2	47	39	97.5	11.9	No
Well 07	3/24/09	8.0	47	51	127.5	11.8	No
Well 08	3/24/09	7.8	38	79	197.5	11.7	No
Well 10	3/24/09	8.0	59	59	147.5	11.9	No
Well 11	3/24/09	7.8	33	77	192.5	11.6	No
Well 12	3/24/09	7.8	49	71	177.5	11.7	No
Well 14	3/24/09	7.8	33	58	145	11.5	Yes
Well 17	4/17/09	8.8	42	17	42.5	12.1	No

Lead and Copper Monitoring

The lead and copper concentrations in tap water samples collected throughout the City are in compliance with the regulatory action levels for these chemicals.

Since the City was in compliance with the lead and copper action levels after the initial monitoring and two subsequent years of annual reduced sampling, it was allowed to conduct triennial reduced sampling from twenty (20) sample sites. The number of sample

sites increased to thirty (30) due to an increase in the number of persons served. The City's lead and copper monitoring conducted to date may be found in Appendix F. The action levels for lead and copper are 0.015 mg/L and 1.3 mg/L, respectively. **The next round of lead and copper monitoring is due in June, July, August, or September 2012 from thirty (30) sites.**

Disinfection By-Products (DBPs)

Since the City provides chlorinated groundwater, it is subject to the Disinfection By-Products Rule (DBPR), which was adopted and effective on June 17, 2006 for California. Prior to this date, the City was required to comply with the federal DBPR. The City has an approved standard DBP monitoring plan on file and has been monitoring accordingly. Of the monitoring conducted since 2004, only two (2) samples have been greater than the MCL of 80-µg/L for total trihalomethanes; the running annual average has remained in compliance with the MCL based on their quarterly monitoring from one (1) site.

III. APPRAISAL OF SANITARY HAZARDS & PUBLIC HEALTH SAFEGUARDS

The City provides competent supervision with regards to the operation and maintenance of the water system. The addition of Well No. 17 will provide the City of Shafter with an adequate supply of water to meet maximum day demand but it must rely on storage capacity to meet the peak hour demand. Generally, the City's source of water supply is of adequate quality and currently meets all the primary drinking water standards. The City's water supply facilities consist of eight (8) active groundwater wells and four (4) storage tanks.

As previously mentioned, 1,2,3-Trichloropropane has been detected in water produced by seven (7) of the City's eight (8) active groundwater wells at concentrations that are above the notification level for this contaminant of 0.005-µg/L. Notification levels for a number of chemicals were established in anticipation of possible contaminations from hazardous waste sites containing pesticides or from a Superfund site. Although, 1,2,3 TCP remains unregulated, the City proactively installed GAC treatment at Well No. 14 in the event that an MCL is adopted for this contaminant and as a model for future treatment at the City's other well sites. Monitoring is recommended at a reasonable frequency along with local government notification and notification to the water system's consumers.

IV. CONCLUSIONS AND RECOMMENDATIONS

Issuance of a revised domestic water supply permit by the State Department of Public Health, Drinking Water Program to the City of Shafter for the addition of Well No. 17 and GAC treatment at Well No. 14 is recommended subject to the following provisions:

1. The City of Shafter shall comply with all the requirements set forth in the California Safe Drinking Water Act, California Health and Safety Code and any regulations, standards or orders adopted thereunder.

2. The only approved sources of domestic water supply for use by the City are listed in the table below.

Source Name	Primary Station Code	Status
Well No. 06	1510019-002	Active
Well No. 07	1510019-003	Active
Well No. 08	1510019-004	Active
Well No. 10	1510019-006	Active
Well No. 11	1510019-007	Active
Well No. 12	1510019-008	Active
Well No. 14	1510019-009	Active
Well No. 17	1510019-017	Active

3. All of the City's wells are approved to provide disinfection of the water supply using NSF approved 12.5% sodium hypochlorite solution.

4. The only approved treatment for use by the City is GAC treatment at Well No. 14 to reduce the 1,2,3-TCP concentration. The treatment plant shall be operated based on their approved Operations Plan.

Approved Treatment

Treatment	PS Code
Well No. 14- After GAC 123TCP	1510019-016

5. No additions, changes or modifications to the sources of water supply or treatment processes outlined in Provisions 2, 3 and 4 can be made unless an amended domestic water supply permit has been approved by the Department.

6. Under the operator certification regulation, the City's water system is classified as a D2 system. The City must have a chief distribution operator who is certified, at a minimum, as a D2 distribution system operator.

7. All treatment facilities shall be operated by personnel who have been certified in accordance with the Regulations relating to Certification of Water Treatment Facility Operation, CCR, Title 22. The GAC treatment plant at Well No. 14 is

classified as a T2 water treatment plant and as such, the minimum certification levels of the chief and shift operator are T2 and T1, respectively.

8. The City shall, at a minimum, follow the monitoring requirements presented below when Well No. 14 and corresponding GAC treatment plant is in use. The analytical results shall be submitted to the Department using electronic data transfer (EDT) and the PS Codes indicated. A summary report containing these results for any month when the plant is in operation shall be submitted by the 10th day of the following month to the Department. Daily operational records including, at a minimum, flow rates, total volume treated, daily chlorine residuals, operational changes, and unusual occurrences, shall be maintained by the City.

Well No. 14 GAC Treatment Plant Monitoring

	Raw Water	Treated Water	Blended Treated Water
1,2,3-TCP	Quarterly	Monthly***	Monthly
Nitrate	Quarterly	Weekly	Monthly
Total Coliform	Monthly	Monthly	--
HPC's	Monthly	Monthly	--

*** Sampling frequency shall increase to weekly when 1,2,3-TCP Concentration reaches 0.005-µg/L.

9. The City must conduct weekly monitoring of the GAC effluent for nitrate. Additionally, any time the treatment plant is offline for more than 6 hours, the City shall monitor the effluent nitrate concentration once the well has been back online for at least one hour but not more than three hours.

10. The City shall collect another sample for DBCP in the 3rd quarter of 2009 in order to confirm if the initial DBCP result from April 17, 2009 necessitates further monitoring to determine compliance with the DBCP MCL. All results shall be transmitted electronically to the Department via EDT.

11. The City shall sample the raw untreated water from Well No. 17 on a monthly basis for coliform bacteria. In the event that the presence of total coliform bacteria is detected, *E. coli* and fecal coliform bacteria shall also be analyzed utilizing an approved method that will provide the analytical results as a density in MPN/100ml (most probable number per 100 milliliters) units.

12. The City shall submit an annual report summarizing and assessing GAC treatment unit performance during the previous year to the Department by March 1 of each year. The annual report shall include the following:

    a) Comprehensive discussion of action taken in the previous year including carbon change outs, carbon disinfection procedures, vessel backwashing, treatment unit maintenance, monitoring changes, operational changes and

problems, nitrate dumping and other water quality problems and corrective actions.

b) An evaluation of the performance of each treatment vessel during the previous year.

APPENDICES

A: Geographical Areas
B: Photographs
C: Water Quality Monitoring Schedule for new wells
D: Water Quality Monitoring Schedule for existing wells (CLGA)
E: Next Sample Due Report
F: Lead and Copper Summary