# CITY OF MONTEREY PARK

## OPERATION, MAINTENANCE AND MONITORING PLAN FOR WELLS NO. 1, NO. 3, NO. 10 AND FERN LIQUID PHASE GRANULAR ACTIVATED CARBON TREATMENT FACILITY AT DELTA PLANT

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# SECTION I

# INTRODUCTION

## I.1 PLAN ORGANIZATION

This Operation, Maintenance and Monitoring Plan ("Plan") is for the City of Monterey Park (City) Wells No. 1, No. 3, No. 10 and Fern Liquid Phase Granular Activated Carbon (LPGAC) Treatment Facility (Treatment Facility). It is intended as an instructional and reference guide for system operators on the fundamental operation of the Treatment Facility. This Plan is not intended as a detailed instructional guide on the operation of plant equipment, but rather as a general guide on the operation, maintenance, reporting and record keeping procedures for the Treatment Facility. For this reason, system operators are trained in the operation of all plant equipment and were provided with training by USFilter Westates (USFilter) prior to performing any of the stated procedures. Operators not familiar with this Plan will not be allowed to operate the equipment. Detailed operation and maintenance information for the equipment provided by US Filter is available at the City Delta Plant located at 2657 North Delta Avenue in the City of Rosemead and at the City office.

The Plan consists of five sections.

- Section I presents a general description of the Treatment Facility and site.
- Section II presents the system operating procedures. Each mode of operation for the Treatment Facility is discussed including the setup procedures.
- Section III presents the water quality monitoring and testing procedures. The water quality monitoring plan, sampling procedures and laboratory analytical procedures are discussed.
- Section IV covers the safety plan and procedures. Only a general reference to safety and emergency procedures is made in this Plan. The safety procedures to be employed at the Treatment Facility are discussed in the Health and Safety Plan prepared as a separate document.
- Section V presents the reporting and record keeping procedures. The reporting and record keeping procedures for operation, maintenance, and water quality monitoring are discussed.

System operators should become familiar with the content of this Plan prior to conducting operational procedures. The manufacturer's data should also be reviewed and comprehended. In addition, City system operators have received training and certification from US Filter, the manufacturer of the LPGAC system.

As procedures change or equipment is changed, this Plan will be updated accordingly to maintain an accurate reference resource. This Plan should be reviewed periodically to verify the information contained herein is current or changed to reflect current conditions. This Plan is considered a "living" document. The as-built plans of the Treatment Facility are included herein as Appendix A. The as-built plans will be updated to reflect changes as they occur.

## I.2 BACKGROUND

City Wells No. 1, No. 3, No. 10 and Fern are four of twelve production wells owned by the City. City Well No. 1 is located at 2745 Delta Avenue in the City of Rosemead; City Well No. 3 is located at the City's Delta Plant in the City of Rosemead, City Well No. 10 is located at 2719 North Gladys Avenue in the City of Rosemead, and City Well Fern is located at the City's Delta Plant in the City of Rosemead as shown on Plate 1. Water from these wells historically has been discharged into the two settling tanks at City's Delta Plant located at 2657 Delta Avenue in the City of Rosemead, as shown on Plate 2.

City Well No. 1 was drilled in 1904. It is 450 feet deep and is perforated from 370 feet to 391 feet below ground surface (bgs). City Well No. 1 has a design pumping capacity of approximately 900 gallons per minute (gpm), but has a pumping capacity of approximately 500 gpm as of May 2007. It historically has produced up to 1,242 acre-feet per year (af/yr) (fiscal year 1999-00) and the average production from this well is approximately 655 af/yr. City Well No. 3 was drilled in 1946. It is 1,505 feet deep and is perforated from 210 feet to 1,110 feet bgs. City Well No. 3 has a design pumping capacity of approximately 900 gpm, but has a pumping capacity of approximately 550 gpm as of May 2007. It historically has produced up to 884 af/yr (fiscal year 2000-01) and the average production from this well is approximately 236 af/yr. City Well No. 10 was drilled in 1961. It is 670 feet deep and is perforated from 180 feet to 624 feet bgs. City Well No. 10 has a design pumping capacity of approximately 2,000 gpm, but has a pumping capacity of approximately 1,750 gpm as of May 2007. It historically has produced up to 2,974 af/yr (fiscal year 1996-97) and the average production from this well is approximately 1,105 af/yr. City Well Fern was drilled in 1988. It is 1,460 feet deep and is perforated from 310 feet to 1,170 feet bgs. City Well Fern has a design pumping capacity of approximately 1,500 gpm, but has a pumping capacity of approximately 1,200 gpm as of May 2007. It historically has produced up to 1,788 af/yr (fiscal year 1993-94) and the average production from this well is approximately 925 af/yr.

VOCs, primarily Tetrachloroethylene (PCE), have been detected at all twelve of the City's wells. PCE was first detected at City Well No. 1 in July 1996 and the concentration reached the historic high of 24 micrograms per liter (ug/l) in May 2004. PCE was first detected at City Well No. 3 in December 1992 and the concentration reached the historic high of 21 ug/l in May 2004. PCE was first detected at City Well No. 10 in October 1991 and the concentration reached the historic high of 14 ug/l in May 2004. PCE was first detected at the City Well Fern in January 1992 and

the concentration reached the historic high of 9.7 ug/l in December 2002. The Maximum Contaminant Level (MCL) for PCE is 5 ug/l. City Wells No. 1, No. 3, No. 10 and Fern had all previously been taken out of service and were previously on standby status because of PCE contamination. The historic PCE concentration trends for City Wells No. 1, No. 3, No. 10 and Fern are shown on Plate 3. As shown on Plate 3, the PCE concentration has increased in recent years.

The site map of the Delta Plant is shown on Plate 2. The City uses the existing LPGAC system at the Delta Plant to treat water from City Wells No. 1, No. 3, No. 10 and Fern.

## I.3 DESCRIPTION OF THE TREATMENT FACILITY

The existing LPGAC system at the Delta Plant consists of twelve vessels, each with 20,000 pounds of GAC. The vessels are arranged in six pairs in a lead-lag design, with each pair treating approximately 665 gpm of flow from Wells No. 1, No. 3, No. 10 and Fern, for a total of approximately 4,000 gpm (Total pumping capacity of City Wells No. 1, No.3, No. 10 and Fern: 500 gpm + 550 gpm + 1,750 gpm + 1,200 gpm = 4,000 gpm as of May 2007). However, each pair of vessels is designed to treat up to 750 gpm of flow in series. The total capacity of the LPGAC is approximately 4,500 gpm (6 x 750 gpm). The Treatment Facility is operated to remove all VOCs, including PCE, to non-detectable levels. An on-line Nitrate analyzer has been installed to continuously monitor Nitrate concentrations in the treated water from the six pairs of LPGAC units, as shown on Plate 2.

The treated groundwater from the LPGAC Treatment Facility is discharged into the two settling tanks at the Delta Plant. The treated water is pumped into settling tanks along with water from the other City wells and, if needed, purchased water from San Gabriel Valley Water Company (SGVWC). The water is pumped to the City's distribution system after disinfection. The Treatment Facility process diagram is shown on Plate 4.

The characteristics of the Treatment Facility are as follows:

| COMPONENT | DIMENSION |
|---|---|
| I. Model HP1020-L-75 | |
| Quantity | 12 (six sets of two) |
| Design Water Flow | 750 gpm /set |
| Design Raw Water Concentration | 20 µg/l PCE |
| Design Treated Water Concentration | <0.5 µg/l PCE |
| Maximum Flow Rate | 4,500 gpm |
| Carbon Content | 20,000 lbs/vessel |
| Hydraulic loading rate ($gpm/ft^2$) | 9.55 $gpm/ft^2$ at 750 gpm |
| Empty Bed Contact Time | 7 minute/vessel at 750 gpm |
| Carbon Type | Coal Carbon |

The schematic of the Treatment Facility is included as Plate 5. Each of the six LPGAC vessels operates as two vessels in series. The flow to each set of the vessels is regulated by the City operator **manually** adjusting a valve to the inflow for each set of vessels. Equal flow through each set of vessels is verified with a flow meter dedicated to each of the six sets of LPGAC vessels.

Water enters at the top of the lead vessel and flows down. Water exits the lead vessel and enters the top of the lag vessel. The fully treated water flows in a common pipeline to the settling tanks at the Delta Plant. US Filter's process drawings of the LPGAC system are included in Appendix B. Sample ports are located at the inflow to the lead vessels, at the cross over point between each of the six sets of LPGAC vessels and at the discharge of the lag vessel. Additional sample ports are also located on each vessel. The following table lists carbon specifications.

| DESCRIPTION | SPECIFICATIONS |
|---|---|
| Trade Name | Westates AquaCarb 830 |
| Manufacturer | USFilter Westates |
| Type | Bituminous Coal |
| PSD, U.S. Standard Mesh Size | 8x30 mesh, 5% max over, 4% max under |
| Iodine Number, mgl2/g | 900 min |
| Abrasion Number | 75 min |
| Hardness Number, wt. % | 90 min |
| Mean Particle Diameter, mm | 1.5-1.7 |
| Effective Size, mm | 0.8-1.1 |
| Uniformity Coefficient | 2.1 max |
| Moisture as Packed, wt. % | 2% max |
| Apparent Density, g/cc | 0.47-0.52 |
| Total Ash Content, wt. % | 15% max |

USFilter has contracted with Underwriters Laboratories (UL) to perform all inspections and testing to certify that USFilter virgin carbons meet ANSI/NSF Standard 61 for potable water applications.

The City shall change out the carbon in the lead LPGAC vessel when any VOC is detected at the MCL at the cross-over point (interstage). After change-out, the lead LPGAC vessel shall be placed into service as the lag LPGAC vessel and the previous lag LPGAC vessel shall be switched to the lead position. If any VOC is detected in the 50 percent sampling port of the lag LPGAC vessel, the carbon in the lead LPGAC vessel shall be changed out. After change-out, the lead LPGAC vessel shall be placed into service as the lag LPGAC vessel and the previous lag LPGAC vessel shall be switched to the lead position. The water quality monitoring is described in more detail in Section III. In addition, if no breakthrough has occurred after three years of operation, USFilter recommends the City change out the carbon in each of the LPGAC vessel. LPGAC vessel carbon change out procedures and time requirements are found in Section II.6 of this Plan.

## I.4 NITRATE ANALYZER

A Nitrate analyzer has been installed to analyze the Nitrate level in the combine effluent of the LPGAC vessels and prior to the settling tanks at the Delta Plant. The Nitrate analyzer automatically records Nitrate concentrations and is connected to the SCADA system. In the event a Nitrate concentration of 36 mg/l is detected, the Nitrate Analyzer sends a signal to SCADA to shut down the treatment process.

## I.5 CHLORINATION

The City owns an on-site chlorine generator manufactured by Clor Tech at the Delta Plant as shown on Plate 2. The on-site chlorine generator is capable of generating 100 pounds of chlorine per day and may provide a chlorine dosage of up to 3 mg/l in the water exiting the settling tanks at the Delta Plant. The City tries to maintain a 0.4 mg/l chlorine residual entering the distribution system. Chlorine is injected to the effluent line of the settling tanks at the Delta Plant continuously and an on-line chlorine residual analyzer continuously monitors chlorine residual exiting Delta Plant. The City maintains a free chlorine residual of 0.2 mg/l throughout the distribution system. The Alarms on the chlorine residual analyzer are activated if the chlorine residual entering the distribution system is below the set point of 0.4 mg/l. The SCADA system notifies operators to address the problem immediately. The chlorine injection pump is equipped with a variable frequency drive (VFD). The chlorine injection rate can be adjusted automatically to reflect changes in the flow rate entering the distribution system.

## I.6 CENTRAL COMPUTER SYSTEM

The Central Computer System (CCS) uses programmable logic controllers (PLC) to monitor water delivery from City Wells No. 1, No. 3, No. 10 and Fern; the LPGAC system; the Nitrate analyzer and the settling tanks at the Delta Plant water level. One PLC is located near the LPGAC, inside the Fern Well control panel approximately 40 feet from the LPGAC. Signals for flows and pressures are transmitted to the SCADA system. Alarms created at this site are transmitted to the SCADA system and the SCADA system creates the visual and audio alarms and shuts the system down as needed. The SCADA system also dials out to contact operator during after hours. Monitoring, historical information, and the operation of the wells and the LPGAC system can be conducted from this location. Any alarms created at the wells are transmitted to the SCADA system and the SCADA system creates the visual and audio alarm. The SCADA system also dials out to contact operator during after hours.

Another PLC associated with the LPGAC is the Nitrate Analyzer. Although, this piece of equipment is one full package, there is logic in this system that monitors the Nitrate levels at the LPGAC effluent. A 4-20 milliamp signal is sent out to the SCADA. The alarm set point for Nitrate is 80 percent of the MCL or 36 mg/l. Alarms created at this site are transmitted to the SCADA system and the SCADA

system creates the visual and audio alarms and shuts the system down as needed. The SCADA system also dials out to contact operator during after hours.

## I.7 WATER QUALITY OBJECTIVES

The Treatment Facility is designed to remove all VOCs to non-detectable concentrations. In the event any VOC is detected in the fully treated water, the City operator shall immediately shut down the treatment process and notify California Department of Health Services (CDHS) staff. The City shall implement the following to minimize water quality concerns.

The following sections of the Plan provide more detail on the procedures for operation of the Treatment Facility.

# CITY OF MONTEREY PARK

## OPERATION, MAINTENANCE AND MONITORING PLAN

FOR

## WELL NO. 5 TREATMENT FACILITY

LOCATED AT

2450 NORTH CHARLOTTE AVENUE
ROSEMEAD, CALIFORNIA

AUGUST 2006

STETSON ENGINEERS INC.
Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

# SECTION I

# INTRODUCTION

## I.1 PLAN ORGANIZATION

This Operation, Maintenance and Monitoring Plan ("Plan") is for the City of Monterey Park (City) Well No. 5 Treatment Facility (Treatment Facility). It is intended as an instructional and reference guide for system operators on the fundamental operation of the Treatment Facility. This Plan is not intended as a detailed instructional guide on the operation of plant equipment, but rather as a general guide on the operation, maintenance, reporting and record keeping procedures for the Treatment Facility. For this reason, system operators are trained in the operation of all plant equipment and were provided with training by Calgon Carbon Corporation (Calgon), the manufacturer of the liquid-phase granular activated carbon (LPGAC) treatment system, prior to performing any of the stated procedures. Operators not familiar with this Plan will not be allowed to operate the equipment. Detailed operation and maintenance information for the equipment provided by Calgon is available at the City office.

The Plan consists of five sections.

- Section I presents a general description of the Treatment Facility and site.
- Section II presents the system operating procedures. Each mode of operation for the Treatment Facility is discussed including the setup procedures.
- Section III presents the water quality monitoring and testing procedures. The water quality monitoring plan, sampling procedures and laboratory analytical procedures are discussed.
- Section IV covers the safety plan and procedures. Only a general reference to safety and emergency procedures is made in this Plan. The safety procedures to be employed at the Treatment Facility are discussed in the Health and Safety Plan prepared as a separate document.
- Section V presents the reporting and record keeping procedures. The reporting and record keeping procedures for operation, maintenance, and water quality monitoring are discussed.

System operators shall become familiar with the content of this Plan prior to conducting operational procedures. The manufacturer's data shall also be reviewed and comprehended.

As procedures change or equipment is changed, this Plan will be updated accordingly to maintain an accurate reference resource. This Plan shall be reviewed

periodically to verify the information contained herein is current or changed to reflect current conditions. This Plan is considered a "living" document.

## I.2 BACKGROUND

City Well No. 5 is located at 2450 North Charlotte Avenue in the City of Rosemead (see Plates 1 and 2). It was drilled in 1972 by the reverse rotary method to a depth of 610 feet below ground surface (bgs). It is perforated at a depth of 170 feet to 570 feet bgs. Because of the reconfiguration of the LPGAC vessels and the requirement for maintaining a sufficient empty bed contact time (EBCT), the production of this well is limited to between 1,400 gallons per minute (gpm) to 1,600 gpm by throttling down the valve on the well discharge line.

City Well No. 5 was placed into inactive status in 1998 due to the elevated tetrachloroethylene (PCE) concentration in the well. It was reactivated in 1999 after the installation of an LPGAC treatment facility. In February 2002, City Well No. 5 was again removed from service because the State of California Department of Health Services (CDHS) lowered the perchlorate Notification Level (NL) from 18 micrograms per liter (ug/l) to 4 ug/l. In 2005, CDHS adopted a NL of 6 ug/l for perchlorate. City Well No. 5 had a historic high perchlorate concentration of 6.5 ug/l on February 28, 2001. The latest sampling result indicated a perchlorate concentration of less than 2.0 ug/l on February 23, 2006.

City Well No. 5 was identified in the United States Environmental Protection Agency (EPA) Interim Record of Decision (Interim ROD) for the South El Monte Operable Unit (SEMOU) issued in September 2000, as one of the potential extraction wells to control the western migration of the SEMOU plumes. The City agreed to assist the EPA with implementation of the cleanup plan because it is consistent with the City's water supply plan.

The contaminant PCE was first detected in City Well No. 5 in May 1989. Since then, the PCE concentration in City Well No. 5 fluctuated. The PCE concentration remained below the maximum contaminant level (MCL) of 5 ug/l until the first quarter of 1998. After the first quarter of 1998, the PCE concentration in City Well No. 5 exceeded the MCL and although it was still fluctuating, it exhibited a general upward trend. The highest PCE concentration detected in City Well No. 5 was 20 ug/l, in a sample collected on February 5, 2002. The latest sampling result indicated a PCE concentration of 11 ug/l on February 23, 2006.

Concentrations of trichloroethylene (TCE), cis-1,2-dichloroethylene (cis-1,2-DCE) and 1,1-dichloroethane (1,1-DCA) in City Well No. 5 varied and did not demonstrate any trend. TCE concentrations in City Well No. 5 exceeded the MCL of 5 ug/l. The highest TCE concentration detected in City Well No. 5 was 7 ug/l in a sample collected in January 1992. The latest sampling result indicated a TCE concentration of 3.8 ug/l on February 23, 2006. The maximum cis-1,2-DCE and 1,1-DCA concentrations were 2 ug/l (November 2001) and 1.1 ug/l (November 2001), respectively. The latest sampling results for cis-1,2-DCE and 1,1-DCA were 1.3 ug/l and 0.7 ug/l, respectively

on February 23, 2006. The contaminant 1,1-DCE had been detected in a sample collected in August 2001 (0.61 ug/l) and November 2001 (0.71 ug/l).

City Well No. 5 functions as one of the upgradient monitoring wells for Golden State Water Company's (GSWC) San Gabriel Plant. In October 2002, City Well No. 5 was sampled for 1,4-dioxane and N-nitrosodimethylamine (NDMA), as required by the permit issued to GSWC. The contaminants 1,4-Dioxane and NDMA were not detected in City Well No. 5 during this sampling event. City Well No. 5 was re-sampled for 1,4-dioxane on April 22, 2003 with a concentration of 0.289 ug/l. The latest sampling results on November 7, 2005 indicated a 1,4-dioxane concentration of less than 3 ug/l and an NDMA concentration of less than 0.002 ug/l.

The highest nitrate concentration detected in City Well No. 5 was 20 milligrams per liter (mg/l) on August 5, 2002. The latest sampling result indicated a nitrate concentration of 17.8 mg/l on February 23, 2006.

The total chromium result for City Well No. 5 was 5 ug/l on August 2, 1989 but total chromium has not been detected since then. The latest sampling result indicated a total chromium concentration of less than 10 ug/l on September 30, 2003. The hexavalent chromium analysis for City Well No. 5 was conducted in November 2000 (2.6 ug/l) and May 2001 (4.3 ug/l).

## I.3 DESCRIPTION OF TREATMENT FACILITY

The existing City Well No. 5 LPGAC system consists of five Calgon Modular Model 10 LPGAC vessels. These LPGAC vessels were originally arranged in a parallel configuration and each of them held approximately 20,000 pounds of bituminous-based carbon. The flow rate to each LPGAC vessel was between 440 gpm (all five vessels in operation) and 550 gpm (when one vessel was taken out of service for carbon change out or maintenance).

The City reconfigured the piping between the LPGAC vessels to form two treatment trains with two vessels in series in each train. This was done by adding a pipeline to connect each pair of LPGAC vessels and isolate the fifth LPGAC vessel. Spent carbon was removed from the fifth LPGAC vessel and this vessel is currently empty. The Calgon Modular Model 10 LPGAC vessels are standard vertical, down flow carbon steel vessels with design pressures of 125 pounds per square inch gauge (psig) at 140 degrees Fahrenheit. The LPGAC vessel lining is Plasite 4110 vinyl ester coating. Each LPGAC vessel has a diameter of 10 feet.

City Well No. 5 is operated at a rate of 1,400 gpm to 1,600 gpm. The flow is distributed between the two treatment trains so that each train treats a flow rate of 700 gpm to 800 gpm. The City installed flow meters that are tied into the SCADA system. The Treatment Facility will be shut down if either of the two treatment trains receives more than 800 gpm of water. The LPGAC vessels have sampling ports at 25 percent, 50 percent and 75 percent of the bed depth to allow for testing of the treated

water breakthrough estimation. Pressure relief valves are provided for the LPGAC vessels to prevent over pressurization of the vessels.

The Treatment Facility is operated to remove all VOCs to non-detectable levels. An on-line nitrate analyzer has been installed to continuously monitor nitrate concentrations in the raw water and treated water from the LPGAC vessels, as shown on Plate 3.

The treated groundwater from the Treatment Facility is discharged into the City's distribution system after disinfection and blending with water from the Delta Reservoir Settling Tanks. The Treatment Facility process diagram is shown on Plate 3.

The characteristics of the Treatment Facility are as follows:

| COMPONENT | DIMENSION |
|---|---|
| I. Model 10 | |
| Quantity | 4 (two sets of two) |
| Design Water Flow | 800 gpm /set |
| Design Raw Water Concentration | 20 µg/l PCE |
| Design Treated Water Concentration | <0.5 µg/l PCE |
| Maximum Flow Rate | 1,600 gpm |
| Carbon Content | 20,000 lbs/vessel |
| Hydraulic loading rate (gpm/ft$^2$) | 9.55 gpm/ft$^2$ at 750 gpm |
| Empty Bed Contact Time | 7 minute/vessel at 750 gpm |
| Carbon Type | Coal Carbon |

Each of the four LPGAC vessels operates as two vessels in series. The flow to each set of LPGAC vessels shall be regulated by the City operator by **manually** adjusting a valve to the inflow of each set of vessels. Equal flow through each set of LPGAC vessels is verified with a flow meter dedicated to each of the two sets of LPGAC vessels.

Water enters at the top of the lead LPGAC vessel and flows down. Water exits the lead LPGAC vessel and enters the top of the lag (polish) LPGAC vessel. The fully treated water flows in a common pipeline to the adjacent 18-inch transmission line where the treated water is blended with water from the Delta Reservoir Settling Tanks to ensure that the perchlorate level is maintained below 80 percent of the NL of 6 ug/l. Calgon's process drawings of the LPGAC system are included in the LPGAC Operation and Maintenance (O&M) Manual (Appendix A). Sample ports are located at the inflow to the lead LPGAC vessels, at the cross-over point between each of the two sets of LPGAC vessels and at the discharge of the lag LPGAC vessels. Sample ports are also located at the 25 percent, 50 percent, and 75 percent of the bed depth of each LPGAC vessel. The following table lists the carbon specifications.

| DESCRIPTION | SPECIFICATIONS |
|---|---|
| Trade Name | AQUACARB 830 |
| Manufacturer | US Filter Westates |
| Type | Bituminous Coal |
| PSD, U.S. Standard Mesh Size | 8x30 mesh, 5% max over, 4% max under |
| Iodine Number, $mgI_2/g$ | 900 min |
| Abrasion Number | 75 min |
| Hardness Number, wt. % | 90 min |
| Mean Particle Diameter, mm | 1.5-1.7 |
| Effective Size, mm | 0.8-1.1 |
| Uniformity Coefficient | 2.1 max |
| Moisture as Packed, wt. % | 2% max |
| Apparent Density, g/cc | 0.47-0.52 |
| Total Ash Content, wt. % | 15% max |

Only carbon that meets American National Standards Institute/National Sanitation Foundation (ANSI/NSF) Standard 61 for potable water applications shall be used.

The carbon in the lead LPGAC vessel shall be changed out when any VOC is detected at the MCL at the cross-over point (interstage). After change-out, the lead LPGAC vessel shall be placed into service as the lag LPGAC vessel and the previous lag LPGAC vessel shall be switched to the lead position. If any VOC is detected in the 50 percent sampling port of the lag LPGAC vessel, the carbon in the lead LPGAC vessel shall be changed out. After change-out, the lead LPGAC vessel shall be placed into service as the lag LPGAC vessel and the previous lag LPGAC vessel shall be switched to the lead position. The water quality monitoring is described in more detail in Section III. In addition, if no breakthrough has occurred after three years of operation, US Filter recommends the City change out the carbon in each of the LPGAC vessels. LPGAC vessel carbon change out procedures and time requirements are found in Section II.6 of this Plan.

## I.4 NITRATE ANALYZER

The on-line nitrate analyzer collects samples at four locations: LPGAC influent, lead LPGAC vessels effluent (interstages) and combined LPGAC effluent. When the nitrate concentration in the combined LPGAC effluent exceeds 30 mg/l, an alarm will be sent to the control center at the Delta Avenue Pumping Plant. A certified operator shall then be dispatched to the Treatment Facility to manually divert the LPGAC effluent to the drain; the LPGAC effluent shall be discharged following National Pollutant Discharge Elimination System (NPDES) requirements. The Treatment Facility will automatically shut down when the nitrate concentration in the combined LPGAC effluent reaches 36 mg/l (80 percent of the MCL).

## I.5 CHLORINATION

The effluent from the LPGAC vessels flows to a common effluent line where the treated water is continuously disinfected with sodium hypochlorite solution generated on site by a Clor-Tec On-Site Sodium Hypochlorite Generation System (Model B-13, with maximum capacity of 13.2 pounds per day) prior to delivery to the distribution system. A 225-gallon storage tank is provided to store the 0.8 percent hypochlorite solution produced by the on-site generation system. This solution is pumped by an Alldos chemical feed pump with a maximum capacity of 13.7 gallons per hour (gph) at 165 pounds per square inch (psi) into the common effluent line.

The chlorination facility is housed in a block building with lights, lock and ventilation, and shall be checked daily by the operators. The City currently maintains a chlorine residual of 0.4 mg/l at the entry point to the distribution system and the operators shall take daily chlorine residual readings.

## I.6 BLENDING

Water from City Well No. 5 is currently treated for VOCs by a LPGAC treatment system with a capacity not to exceed 1,600 gpm. Effluent water from the Delta Reservoir Settling Tanks flows past City Well No. 5 in an 18-inch transmission pipeline routed along Graves Avenue. Booster pumps at the Delta Plant are used to deliver treated water from the Delta Reservoir Settling Tanks to the Russell Reservoir.

The discharge line of the Well No. 5 Treatment Facility is 12 inches in diameter and connects to the adjacent 18-inch transmission pipeline. Treated water from the Treatment Facility is blended with water from the Delta Reservoir Settling Tanks in the 18-inch transmission pipeline. Water from the Delta Reservoir Settling Tanks is monitored to ensure compliance with current State and Federal Drinking Water Standards.

After blending, the treated water travels approximately 1 mile in the 18-inch transmission pipeline before it reaches the first customer as shown on Plate 1. An inline static mixer has been installed downstream of the blending point to provide mixing. The turbulence in the pipeline created by bends when the pipeline crosses obstructions provides additional mixing of the treated water before it reaches the first customer.

A flow meter has been installed on the 18-inch transmission pipeline just downstream of its connection to the 12-inch Treatment Facility discharge line. The flow meter is connected to the City's Supervisory Control and Data Acquisition (SCADA) system. Whenever the flow rate in the 18-inch transmission pipeline falls below 2,400 gpm, City Well No. 5 will be automatically turned off by the SCADA system. City Well No. 5 will also be automatically turned off by the SCADA system whenever the pumping rate exceeds 1,600 gpm.

A pressure transducer monitors the water level in the Russell Reservoir. When the water level in the Russell Reservoir drops, a telemetry signal is sent to automatically turn on the booster pumps at the Delta Plant and if the water level reaches a high point of 22 feet, a telemetry signal is sent to automatically turn off the booster pumps at the Delta Plant and wells. When the Russell Reservoir reaches a high point of 22 feet, City Well No. 5 will be turned off first. The SCADA system will not allow the starting of City Well No. 5 unless the flow in the 18-inch transmission pipeline is maintained at or above 2,400 gpm, and an alarm will be sounded if the flow is below 2,400 gpm in the 18-inch transmission pipeline to alert the operator.

The treated water perchlorate concentration after blending is calculated using the historic high perchlorate concentration of 6.5 ug/l detected in City Well No. 5 and a conservative value of 2 ug/l for the non-detected perchlorate concentration in the effluent of the Delta Reservoir Settling Tanks. The calculation is provided below:

(1,600 gpm * 6.5 ug/l + 2,400 gpm * 2 ug/l) / (1,600 gpm + 2,400 gpm) = 3.8 ug/l

As shown above, the calculated treated water perchlorate concentration after blending is 3.8 ug/l, which is less than 80 percent of the perchlorate NL of 6 ug/l (4.8 ug/l).

The booster pumps at the Delta Plant and City Well No. 5 are controlled by the City's SCADA system. The booster pumps and well pumps are turned on and off automatically based on the pre-set water levels in the Russell Reservoir. The flow rate in the 18-inch transmission pipeline and the flow rate at City Well No. 5 are operating parameters for turning City Well No. 5 on or off. The well and booster pump efficiency tests are conducted annually. In addition, all the City wells and boosters are equipped with flow meters. The flow meters shall be calibrated annually to ensure accurate measurement of the flow.

Daily perchlorate samples shall be collected at the Treatment Facility discharge. In addition, perchlorate shall be sampled weekly at the Delta Reservoir Settling Tank effluent, all the active wells that discharge into the Delta Reservoir Settling Tanks, and at City Well No. 5.

The daily blending calculations and monthly compliance report for perchlorate shall be submitted to CDHS by the 10th day of the month following the month when the analyses of all perchlorate samples were completed. Example blank forms for documenting the daily blending calculations and monthly compliance reports for perchlorate are provided in Appendix B.

## I.7 CENTRAL COMPUTER SYSTEM

The Central Computer System (CCS) uses programmable logic controllers (PLCs) to monitor water delivery from City Well No. 5, the LPGAC system and the nitrate analyzer. Signals for flows and pressures are transmitted to the SCADA system.

Alarms created at the Treatment Facility are transmitted to the SCADA system and the SCADA system creates the visual and audio alarms and shuts the system down as needed. Monitoring, historical information, and the operation of the well and the LPGAC system can be conducted from this location. Any alarms created at the well are transmitted to the SCADA system and the SCADA system creates the visual and audio alarm. The SCADA system will also dial out to contact the operator during after hours.

Another PLC associated with the LPGAC system is the nitrate analyzer. Although, this piece of equipment is one full package, there is logic in this system that monitors the nitrate concentration in the raw influent water and the LPGAC effluent water. A 4-20 milliamp signal is sent to the SCADA. The alarm set point for nitrate is 30 mg/l and the Treatment Facility will be shut down automatically if the nitrate concentration in the LPGAC effluent reaches 36 ug/l. Alarms created at this site are transmitted to the SCADA system and the SCADA system creates the visual and audio alarms and shuts the system down as needed. The SCADA system also dials out to contact the operator during after hours.

## I.8 WATER QUALITY OBJECTIVES

The Treatment Facility is designed to remove all VOCs to non-detectable concentrations. The treated water is blended with water from the Delta Reservoir Settling Tanks to ensure that the perchlorate level is maintained below 80 percent of the NL of 6 ug/l. In the event any VOC is detected in the fully treated water or the perchlorate concentration in the blended water is above 80 percent of the NL of 6 ug/l, the City operator shall immediately shut down the treatment process and notify CDHS staff.

The following sections of the Plan provide more details on the procedures for operating the Treatment Facility. These procedures shall be implemented to minimize water quality concerns.

# City of Monterey Park

## ARSENIC BLENDING PLAN
## FOR
## DELTA PLANT

**MARCH 2008**

STETSON ENGINEERS INC.
Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

The current capacity of City Well No. 3 is approximately 600 gpm. The maximum Arsenic concentration detected at City Well No. 3 is 12.9 ug/l (August 2, 1989) and the most recent Arsenic concentration detected at City Well No. 3 is 5.8 ug/l (May 24, 2007). Arsenic has not exceeded 10 ug/l since July 1998 at City Well No. 3.

The current capacity of City Well No. 7 is approximately 600 gpm. The maximum Arsenic concentration detected at City Well No. 7 is 28.4 ug/l (July 1, 1996) and the most recent Arsenic concentration detected at City Well No. 7 is 2.3 ug/l (May 24, 2007). Arsenic has not exceeded 10 ug/l since July 1996 at City Well No. 7.

The current capacity of City Well No. 8 (standby) is approximately 1,800 gpm. The maximum Arsenic concentration detected at City Well No. 8 is 38 ug/l (August 15, 2005) and the most recent Arsenic concentration detected at City Well No. 8 is 37 ug/l (May 24, 2007).

The current capacity of City Well No. 9 is approximately 1,800 gpm. The maximum Arsenic concentration detected at City Well No. 9 is 11 ug/l (September 21,1999) and the most recent Arsenic concentration detected at City Well No. 9 is 11 ug/l (May 24, 2007).

The current capacity of City Well No. 10 is approximately 1,700 gpm. The maximum Arsenic concentration detected at City Well No. 10 is 6.7 ug/l (July 22, 1998) and the most recent Arsenic concentration detected at City Well No. 10 is 3.9 ug/l (May 24, 2007).

The current capacity of City Well No. 12 is approximately 2,000 gpm. The maximum Arsenic concentration detected at City Well No. 12 is less than 2 ug/l (May 24, 2007) and the most recent Arsenic concentration detected at City Well No. 12 is also less than 2 ug/l (May 24, 2007).

gallons. Groundwater from City Wells 1, 3, 7, 9, 10, 12, 15 and Fern enters the Delta Reservoir as shown on Figure 2.

A six-inch cast iron pipe is installed between Tank No. 2 and Tank No. 3 at about six-inches above the bottom of the two settling tanks to equalize the water in the two settling tanks as shown on Figure 2. Separate 24-inch gate valves at the inlet of Tank No. 2 and Tank No. 3, as shown on Figure 2, will be open at all times.

There are also six booster pumps at the Delta Plant as shown on Figure 2. Four booster pumps (Booster No. 1, No. 2, No. 3 and No. 4) deliver water from the Delta Reservoir to the Russell Reservoirs through two 18-inch pipelines, as shown on Figure 2. The other two booster pumps (Booster No. 5 and No. 6) deliver water from the Delta Reservoir to the La Loma Reservoir through one 24-inch pipeline, as shown on Figure 2. The total capacity of the six booster pumps is 12,700 gpm. The booster pumps have the capacity to pump the maximum storage in the Delta Reservoir (350,000 gallons) in about 30 minutes. Consequently, the Delta booster pumps are turned on and off in response to the pre-set water levels in the Russell Reservoirs and La Loma Reservoir.

**Existing Treatment**

The City has received permits from the California Department of Public Health (CDPH) to operate seven different wells through three separate groundwater treatment facilities. These treatment facilities currently address groundwater contaminants other than Arsenic, making these wells the most reliable sources of supply to the City.

**Delta Treatment Plant (Wells 9, 12 and 15 Treatment Plant)**

City Wells No. 12 and 15 are the primary sources of supply treated at the Delta Treatment Plant. (In the event either Wells No. 12 or 15 are unavailable, the City is permitted to operate its Well No. 9 until such time the out-of-service

a total treated capacity of 4,200 gpm.) In addition, the City intends to operate its Well No. 7, which currently does not require any treatment. Well No. 7 pumps exclusively to the Delta Reservoir. In addition, City Well No. 5 pumps directly to the distribution system. These wells and the anticipated blended Arsenic water quality are shown on Table 2. The combined capacity of these wells is about 9,700 gpm.

The average water demand is about 7,400 gpm. As shown on Table 2, the City currently has significant operational flexibility to meet average demand without operating Wells No. 8, No. 14 and Fern, the wells with higher Arsenic concentrations. Consequently, a blending plan for Arsenic is not needed for average demand.

However peak demand could be as high as 10,700 gpm. The City may need to activate its Fern Well to meet peak demand. Table 3 indicates that the City Fern Well could be included in a blend plan, based on current (May 2007) and historic high water quality data, and achieve the MBG of 8 ug/l. In doing so, the available capacity could be increased to 10,900 gpm.

Table 4 indicates that in the event City Well No. 9 must be activated because with Well No. 12 or No. 15 is out of service, then the City must be vigilant in its monitoring program. The blend plan indicates a hypothetical exceedance of the MBG using the historical high for each of the wells when Fern Well is in operation.

Table 5 indicates that if the Delta Treatment Plant for Wells No. 9, No. 12 and No. 15 is out of service, the City may not be able to meet its water demand and the MBG for Arsenic at the same time using Wells No. 1, 3, 10, Fern, 7, and 5. The combined pumping capacity is 6,400 gpm while the average demand is about 7,400 gpm. Consequently, City may need to activate its interconnection with SGVWC. The capacity of the interconnection is 4,500 gpm and Arsenic has

on a daily basis. That calculated blend shall be compared to the laboratory blend water quality data collected each week. Although the Arsenic MCL is based on chronic (long-term) exposure, City staff shall request a five-day turnaround from its laboratory for Arsenic water quality results.

When the laboratory analysis result of a blended Arsenic sample exceeds the MBG of 8 ug/l, a confirmation sample for Arsenic at the blend will be collected immediately with a 48-hour turnaround requested from the laboratory. If it is confirmed that the blend concentration exceeds the MBG, the well(s) with the highest Arsenic concentration will be taken off line and the interconnection activated, if necessary. A sample of the new blend will be collected and submitted to the City's laboratory to confirm the adjusted blend complies with the MBG. In the event a water quality sample indicates the Arsenic MCL has been exceeded, the City shall immediately notify CDPH and collect a confirmation sample. In the event, the confirmation sample indicates an Arsenic MCL exceedance, the well(s) with the highest Arsenic concentration shall be removed from service and City staff shall implement additional procedures as directed by CDPH.

**Reporting**

All Arsenic samples will be analyzed at a CDPH certified laboratory. The monthly raw water results will be submitted to CDPH by electronic data transfer (EDT) by the 10th of the following month when the analysis is complete and the weekly reservoir blended water results will be submitted to CDPH weekly by EDT. In addition, the City will submit the monthly compliance report with the theoretical Arsenic blending calculation to CDPH by the 10th of the following month when all the analytical results are received from the laboratory, using forms in Appendix A.

# TABLE 1
## WELL CHARACTERISTICS AND WATER QUALITY AT PRODUCTION WELLS FOR CITY OF MONTEREY PARK WELLS

| NAME | RECORDATION | DEPTH (1) | PERFORATIONS (1) | CAPACITY (GPM) | USAGE | STATUS (2) | CONCENTRATION (UG/L) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | HISTORIC HIGH | | MOST RECENT | |
| | | | | | | | CONTAMINANT | VALUE | DATE | VALUE | DATE |
| 1 | 1900453 | 450 | 370-391 | 700 | MUNICIPAL | ACTIVE | ARSENIC | ND | 07/06 | ND | 05/07 |
| 3 | 1900455 | 1505 | 214-414<br>444-764 | 600 | MUNICIPAL | ACTIVE | ARSENIC | 12.9 | 08/89 | 5.8 | 05/07 |
| 5 | 1900457 | 610 | 170-570 | 1600 | MUNICIPAL | ACTIVE | ARSENIC | ND | 07/96 | ND | 11/06 |
| 6 | 1900458 | 604 | 150-425<br>490-496<br>580-586 | 600 | MUNICIPAL | STANDBY | ARSENIC | 2.2 | 09/00 | ND | 08/02 |
| 7 | 1902372 | 1560 | 250-460<br>510-900 | 600 | MUNICIPAL | ACTIVE | ARSENIC | 28.4 | 07/96 | 2.3 | 05/07 |
| 8 | 1902373 | 1560 | 240-504 | 1800 | MUNICIPAL | STANDBY | ARSENIC | 38.0 | 08/05 | 37.0 | 05/07 |
| 9 | 1902690 | 1600 | 230-500<br>504-1404 | 1800 | MUNICIPAL | ACTIVE | ARSENIC | 11.0 | 09/99 | 11.0 | 05/07 |
| 10 | 1902818 | 670 | 180-624 | 1700 | MUNICIPAL | ACTIVE | ARSENIC | 6.7 | 07/98 | 3.9 | 05/07 |
| 12 | 1903033 | 817 | 201-771 | 2000 | MUNICIPAL | ACTIVE | ARSENIC | ND | 05/07 | ND | 05/07 |
| 14 | 1903092 | 600<br>filled and caped<br>below 600 | 200-509 | 700 | MUNICIPAL | STANDBY | ARSENIC | 41.0 | 08/05 | 39.0 | 03/06 |
| 15 | NA | 465 | 240-325<br>350-425 | 2500 | MUNICIPAL | ACTIVE | ARSENIC | ND | 05/07 | ND | 05/07 |
| FERN | 8000126 | 1190 | 310-1170 | 1200 | MUNICIPAL | ACTIVE | ARSENIC | 17.0 | 05/07 | 17.0 | 05/07 |

# TABLE 2

## EXISTING WELL OPERATION WITHOUT BLEND PLAN

| Wells | Pumping Rate (gpm) | Arsenic Conc. (ug/l) | | Calculated Blend (ug/l) | | Total Pumping Capacity | Well Run Priority | |
|---|---|---|---|---|---|---|---|---|
| | | Current | Historic High | Current | Historic High | | On | Off |
| No. 15 | 2,500 | 2 | 2 | 2 | 2 | 2,500 | 1 | 6 |
| No. 12 | 2,000 | 2 | 2 | 2 | 2 | 4,500 | 2 | 5 |
| No. 1 | 700 | 2 | 2 | 2 | 2 | 5,200 | 3 | 4 |
| No. 10 | 1,700 | 3.9 | 6.7 | 2.5 | 3.2 | 6,900 | 4 | 3 |
| No. 3 | 600 | 5.8 | 12.9 | 2.7 | 3.9 | 7,500 | 5 | 2 |
| No. 7 | 600 | 2.3 | 28.4 | 2.7 | 5.7 | 8,100 | 6 | 1 |
| **Subtotal** | **8,100** | – | – | | | | | |
| No. 5 | 1,600 | 2 | 2 | | | | | |
| **TOTAL** | **9,700** | | | | | | | |

gpm = gallons per minute
ug/l = micrograms per liter

# TABLE 4

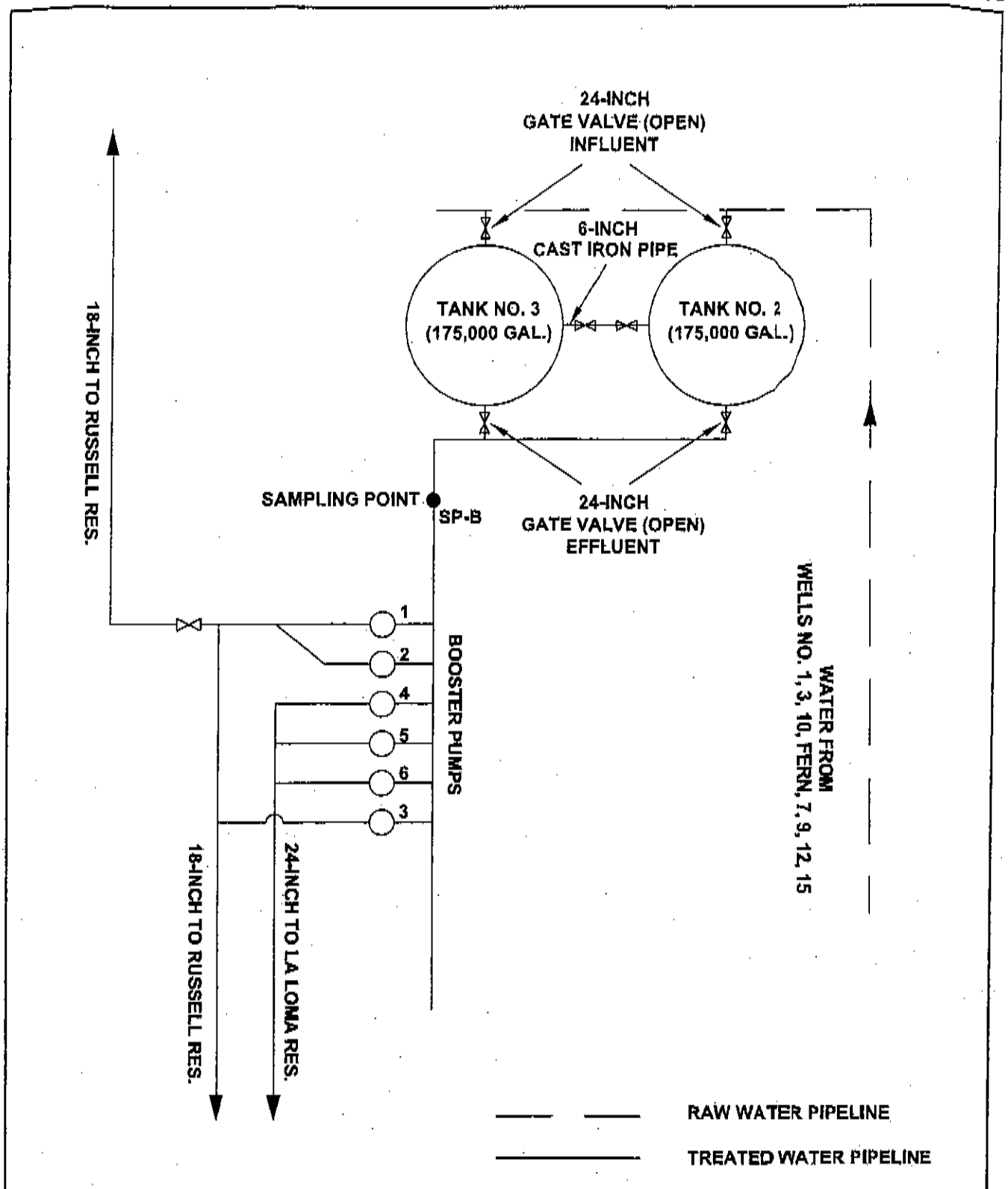
## CALCULATED ARSENIC BLEND WITH WELL NO. 9

| Wells | Pumping Rate (gpm) | Arsenic Conc. (ug/l) | | Calculated Blend (ug/l) | | Total Pumping Capacity | Well Run Priority | |
|---|---|---|---|---|---|---|---|---|
| | | Current | Historic High | Current | Historic High | | On | Off |
| No. 9 | 1,600 | 11 | 11 | 11 | 11 | 1,600 | 1 | 7 |
| No. 12 | 2,000 | 2 | 2 | 6.0 | 6.0 | 3,600 | 2 | 6 |
| No. 1 | 700 | 2 | 2 | 5.3 | 5.3 | 4,300 | 3 | 5 |
| No. 10 | 1,700 | 3.9 | 6.7 | 4.9 | 5.7 | 6,000 | 4 | 4 |
| No. 3 | 600 | 5.8 | 12.9 | 5.0 | 6.4 | 6,600 | 5 | 3 |
| No. 7 | 600 | 2.3 | 28.4 | 4.8 | 8.2 | 7,200 | 6 | 2 |
| Fem | 1,200 | 17 | 17 | 6.2 | 9.2 | 8,400 | 7 | 1 |
| **Subtotal** | **8,400** | – | – | | | | | |
| No. 5 | 1,600 | 2 | 2 | | | | | |
| **TOTAL** | **10,000** | | | | | | | |

gpm = gallons per minute
ug/l = micrograms per liter

FIGURES

FIGURE 2





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# CITY OF MONTEREY PARK

## DELTA PLANT SCHEMATIC

D:\JOBS\1952\17\Arsenic...\Figures\FIGURE_2.REV.DWG
D:\JOBS\1952\02\FIGURE_2.PC2

# APPENDICES

# DELTA PLANT
# ARSENIC MONTHLY COMPLIANCE REPORT

MONTH/YEAR _____

I. SOURCES

| Well Names | Capacity (gpm) | Total Monthly Production (MG | Arsenic Sampling Fequency | Sampling Date | Arsenic Concentration |
|---|---|---|---|---|---|
| Well No. 1 | | | Monthly | | |
| Well No. 3 | | | Monthly | | |
| Well No. 7 | | | Monthly | | |
| Well No. 9 | | | Monthly | | |
| Well No. 10 | | | Monthly | | |
| Well No. 12 | | | Monthly | | |
| Well No. 15 | | | Monthly | | |
| 5m Well | | | Monthly | | |

II. TREATED WATER (Delta Reservoir Blend) (SPB)

| | Date | Arsenic Conc. | Comments |
|---|---|---|---|
| Week1 | | | |
| Week2 | | | |
| Week3 | | | |
| Week4 | | | |
| Week5 | | | |
| Additional | | | |
| Additional | | | |
| Additional | | | |
| Additional | | | |