California Department of Public Health
Southern California Field Operations Branch

PERMIT AMENDMENT 1910092PA-009

CITY OF MONTEREY PARK

Los Angeles County

System No. 1910092

August 2011

1. INTRODUCTION

1.1. PURPOSE OF REPORT

The City of Monterey Park, Public Works Department, Water Utility Division (hereinafter, the City) submitted an application dated August 19, 2010, for an amended permit for the removal of perchlorate treatment from the Wells 9, 12, and 15 Treatment Facility with the implementation of the Contingency Plan for the Suspension of Perchlorate Treatment dated June 15, 2011. The existing Wells 9, 12, and 15 Treatment Facility is designed to remove volatile organic chemicals (VOCs) by air striper and liquid phase granular activated carbon (LPGAC) and perchlorate by ion exchange (IX) from the water produced by Wells 9, 12, and 15. The treatment trains include, inline blending, air stripping for VOC removal, hydrochloric acid injection to control precipitation, ion exchange for perchlorate removal, LPGAC system as a secondary barrier for VOCs, followed by sodium hydroxide injection to raise pH levels back to system norms. The removal of the perchlorate treatment portion of the Wells 9, 12, and 15 Treatment Facility is being requested since perchlorate has not been detected in the water produced by Wells 9, 12, and 15 for over two years. The permit amendment application is appended in Appendix A of this report.

The purpose of this report is to document the engineering review; evaluate the proposed modification and operation of the treatment plant; and to make recommendations regarding the issuance of an amendment to the City's domestic water supply permit.

1.2. BACKGROUND INFORMATION

The City is operating under the authority of a full domestic water supply permit (Permit No. 68-58) issued on December 13, 1968. Since that time, numerous amendments have been made. The permit and permit amendments issued to the City are summarized in Table 1.

Table 1: City of Monterey Park Permit and Amendments

Issue Date	Permit Type	Permit No.	Description	Status
12/13/1968	Full	68-58	Full Permit	Current
04/09/1990	Amendment	04-07-90PA-000	Add Fern Well	Current
05/24/1995	Amendment	04-07-95PA-000	Add an Emergency Interconnection with MWD	Current
09/17/1999	Amendment	04-07-99PA-000	Add Well 5 LPGAC Treatment Facility to	Superseded

Issue Date	Permit Type	Permit No.	Description	Status
			remove VOCs from water produced by Well 5	
02/22/2002	Amendment	04-07-02PA-000	Add Well 12 Air Stripper Treatment Facility to remove VOCs from water produced by Well 9	Current
05/30/2003	Amendment	1910092PA-001	Add an Interconnection with SGVWC	Current
09/10/2003	Amendment	1910092PA-002	Modify Well 5 LPGAC Treatment Facility by using coconut shell based GAC to remove VOCs and perchlorate from water produced by Well 5	Current
01/16/2004	Amendment	1910092PA-003	Reactivate Well 12 and modify the Well 12 air stripper Treatment Facility by adding an ion exchange system and a LPGAC system to remove perchlorate and VOCs from water produced by Wells 9 and 12	Current
07/09/2004	Amendment	1910092PA-004	Operate the LPGAC treatment system at Delta Plant to remove VOCs from water produced by Wells 1, 3 and 10	Current
05/17/2005	Amendment	1910092PA-005	Operate Wells 9 and 12 Treatment Facility to treat water produced by Wells 9 and 12, the treatment trains include inline blending, air stripping process, hydrochloric acid injection, ion exchange, a LPGAC, followed by sodium hydroxide injection	Current
08/16/2006	Amendment	1910092PA-007	Blend water produced by Well 5 LPGAC Treatment Plant with water from Delta Settling Tanks for perchlorate at Well 5 Perchlorate Blending	Current

Issue Date	Permit Type	Permit No.	Description	Status
			Facility	
08/18/2006	Amendment	1910092PA-006	Add new extraction Well 15 to the existing Wells 9, and 12 Treatment Facility	Current
04/14/2008	Amendment	1910092PA-008	Activate standby Fern Well and add Fern Well as a source of supply for the City's existing Wells 1, 3 and 10 Treatment Facility for VOCs treatment and use the existing Delta Settling Tanks as an arsenic blending facility for Fern Well and Well 9	Current
2011	Amendment	1910092PA-009	Modify the existing Wells 9, 12, and 15 Treatment Facility by removing the ion exchange, which treats for perchlorate from the water produced by Wells 9, 12, and 15	New

The City's water system serves consumers in the City of Monterey Park and vicinity. Its service area covers approximately 7.72 square miles and is generally bounded by San Bernardino Freeway on the north, New Avenue on the east, Pomona Freeway on the south and Long Beach Freeway on the west. Based on the Annual Report to the Drinking Water Program submitted by the City to the Department in May 2011, for the Year 2010, the City produced 2,752 MG from its own active wells and purchased 1.95 MG. It served a population of 62,183 through 13,418 metered service connections, which includes 12,429 general and residential, 896 commercial, 7 industrial, and 86 agricultural connections. That translates to approximately 4.6 people per service connection. The area served is primarily residential with some commercial establishment.

The City's water system currently includes eight active wells, Wells 1, 3, 5, 9, 10, 12, 15 and Fern Well; three standby wells; Wells 7, 8, and 14; one inactive well, Well 6, and three treatment facilities: Wells 1, 3, 10, and Fern Treatment Facility, Well 5 Treatment Facility and Wells 9, 12 and 15 Treatment Facility. All of the City's active wells, inactive wells and treatment facilities are located outside of the City's services areas in the City of Rosemead.

Water produced from Wells 1, 3, 10 and Fern is treated with the LPGAC system for VOCs at the Delta Plant prior to being discharged into the Delta Settling Tanks for

arsenic blending. The Wells 9, 12, and 15 Treatment Facility is located at the Well 12 site and Delta Plant. Water produced from Wells 9, 12, and 15 is treated at the Wells 9, 12, and 15 Treatment Facility prior to being discharged into the Delta Settling Tanks for arsenic blending. Water is then pumped from these settling tanks into the distribution system. Well 5 LPGAC Treatment Facility is located at Well 5 site; it treats water produced by Well 5 for VOCs. Treated water is then blended with water from the Delta Settling Tanks for perchlorate blending then discharged into the distribution system.

In addition to wells, the City has one active and four emergency interconnections with other water agencies. The active interconnection with SGVWC is located at Well 7 site. It is a one-way interconnection from SGVWC to the City with a maximum capacity of 4,500 gpm. Due to the difference in hydraulic grade lines, the emergency interconnection with the Golden State Water Company (GSWC) serves only as a source of supply to the GSWC water system from the City. Two two-way emergency interconnections with the California Water Service Company (CWSC) have an estimated capacity of 1,000 gpm each. These sources are suited for supplying localized area around the interconnections. The interconnection with MWD (Turnout MP-1) has a capacity of approximately 7,000 gpm and serves as a source of emergency supply for the City.

The City's water distribution system is comprised of twelve pressure zones utilizing eleven storage reservoirs with a total capacity of approximately 20 million gallons (MG) and eleven pumping stations.

All of the City's wells withdraw water from the aquifers within the United States Environmental Protection Agency's (USEPA) South El Monte Operable Unit (SEMOU) located at San Gabriel Valley. The SEMOU is officially part of the EPA San Gabriel Valley Area 1 Superfund Site. Groundwater in the SEMOU area was found contaminated by VOCs, primarily tetrachloroethylene (PCE) and trichloroethylene (TCE) as well as other contaminants such as perchlorate, and 1,4-dioxane. Detailed descriptions of the SEMOU and the compliance of the Department's 97-005 Policy for the direct domestic use of extremely impaired sources are in the engineering report for the Permit Amendment No. 1910092PA-006, which was issued to the City on August 18, 2006. Currently, all of the City's active wells are being treated for VOCs and/or perchlorate at the City's three treatment facilities. The City operates these treatment facilities according to the approved OMMPs. Monthly water quality and operational records for each treatment facility are submitted to the Department for review. The City has complied with the provisions listed in the permit amendments for the treatment facilities.

2. INVESTIGATION AND FINDINGS

2.1 SOURCE OF INFORMATION

Information used to prepare this report was gathered from the files of the Department's Drinking Water Field Operations Branch, Hollywood District; City personnel; a field visit

to the City's water system on August 2, 2011; a Contingency Plan for suspension of perchlorate treatment for Wells 9, 12, and 15 dated June 15, 2011 and an Operation, Maintenance and Monitoring Plan for the Wells 9, 12, and 15 Treatment Facility dated June 15, 2011 submitted by the City.

The investigation, analysis, and preparation of this report were undertaken by Mr. David Chang, a Sanitary Engineer with the Hollywood District. The report was reviewed and approved by Mr. Paul Williams, P.E., District Engineer, Hollywood District.

Because the purpose of this permit amendment is to permit the modification of the existing Wells 9, 12, and 15 Treatment Facility by removing the ion exchange, which treats for perchlorate from the water produced by Wells 9, 12, and 15, this section of report primarily describes the permit amendment activities. Detailed descriptions of the SEMOU, the Department's 97-005 Policy compliance and Wells 9, 12, and 15 Treatment Facility are in the Engineering Report for Permit Amendment No. 1910092PA-006, which was issued on August 18, 2006.

2.2 DESCRIPTION OF WELLS 9, 12 and 15 TREATMENT PLANT

The City is applying for a permit amendment is to remove perchlorate treatment from the Wells 9, 12, and 15 Treatment Facility and to implement a contingency plan dated June 15, 2011 after the removal of perchlorate treatment. The City has also submitted a revised OMMP for the Wells 9, 12, and 15 Treatment Facility dated June 15, 2011. This revised OMMP reflects the suspension of the IX system operation. A copy of the OMMP is on file with the Department

Operation of the wells, influent blending process, PTA, acid injection system, intermediate pumping, LPGAC vessels, caustic soda injection system, and chlorination system remains unchanged from the previous permit except that there will be no subsequent operation of cartridge filters and IX vessels. The City will use Wells 12 and 15 as primary sources for the Wells 9 and 12 Treatment Plant. Well 9 will be used as a back-up well only when Well 12 or Well 15 is not available.

After the removal of IX system, water produced from Well 15 will be conveyed to the Well 12 site and blended with water produced from Well 12 before entering the air stripper located at the Well 12 site for VOCs treatment. Water from air stripper is subsequently conveyed in an 18-inch pipeline to the LPGAC system. Hydrochloric acid is injected to the wet well effluent of the air stripper to control pH values. Following the air stripper, the treated water pass through LPGAC system, the second VOCs removal facility, located at the Delta Plant. Sodium hydroxide is injected into the LPGAC system combined effluent to maintain pH value. After the LPGAC combined effluent, the water is chlorinated then discharged into the Delta Settling Tanks, which also receive water produced from the Wells 1, 3 and 10 Treatment Plant. Water from these two treatment plants are blended in the Delta Settling Tanks then pumped into the City's distribution system through booster pumps. The City also has a chlorine injection point at the effluent of the tanks to maintain the desired chlorine residuals before water pumped to the distribution system. The total capacity of the booster pumps is approximately

14,000 gpm. The Delta Settling Tanks are interconnected, the storage capacity is 0.17 MG for each tank.

2.2.1. WELLS DESCRIPTION

WELL 12

Well 12 was drilled in 1968 with 20 inches in diameter and 817 feet deep. It has a single perforation interval between 201 feet and 771 feet bgs. Annular seal of 203 feet and surface seal are provided for the well. It is equipped with a submersible Byron Jackson pump with a pumping capacity of approximately 2,400 gpm.

The well is equipped with appropriate appurtenances such as air/vacuum release valve, water meter, check valve and sampling tap. The air/vacuum release valves are properly inverted at the end of the discharge line and screened. There is a dedicated wasteline with a discharge valve provided. This well can be pumped to waste to the storm drain located in the well site.

WELL 9

Well 9 was drilled in 1960, is 16 inches in diameter and 1,600 feet deep. It is perforated from 230 feet to 500 feet bgs and from 504 feet to 1,404 feet bgs with a 93.5 feet annular seal and was surface sealed. It is equipped with a Byron Jackson submersible pump with a pumping capacity of approximately 1,900 gpm.

The well is equipped with appropriate appurtenances such as air/vacuum release valve, water meter, check valve and sampling tap. The air/vacuum release valves are properly inverted at the end of the discharge line and screened. There is a dedicated wasteline with a discharge valve provided for the well, screens and air-gap is provided, the well can be pumped to waste to the surrounding ground.

WELL 15

Well 15 was drilled on April 4, 2003 as part of EPA's SEMOU extraction plan and completed on May 21, 2003 to a depth of 445 feet using the reverse rotary method. A 42-inch diameter conductor hole was drilled to a depth of 50 feet with a 32-inch diameter 3/8-inch thick wall steel conductor casing installed and sealed with cement grout to ground level. A 30-inch diameter borehole was drilled to a depth of 240 feet and a 26-inch borehole was drilled from 240 bgs to a depth of 445 feet with a 16-inch diameter 0.312 inch thick steel casing installed to a depth of 445 feet. 16-inch diameter low carbon steel wire wrap screens with 0.07-inch slots were installed from a depth of 240 feet to 325 feet, 350 feet to 360 feet, and from a depth of 390 feet to 425 feet. The total length of the screened intervals is 130 feet. The well is sealed with cement grout from 50 feet to 100 feet and gravel-packed between the casing and the borehole from a depth of 100 feet to 445 feet. The well is surface sealed. The aquifer materials for the well consist of rock, clay, fine sand, sand, and gravel.

It is equipped with a 250 hp vertical turbine pump. The results of the 72 hours pump test conducted on May 21, 2003 indicate that the well produced 3,000 gpm with approximately 54 feet drawdown. At the time of the pump test, the static level was at a depth of 57 feet and the pumping water level was at a depth of 111 feet.

The well is equipped with appropriate appurtenances such as air/vacuum release valve, water meter, check valve and sampling tap. The air/vacuum release valves are properly inverted at the end of the discharge line and screened. There is a dedicated wasteline with a discharge valve provided. This well can be pumped to waste to the surrounding ground. Detailed specifications and information for Wells 9, 12 and 15 are listed in the Wells 9, 12 and 15 Data Sheets in the Department's file.

2.2.2. WATER QUALITY BACKGROUND

Groundwater in Well 12 has been impacted by VOCs contamination since the 1980s. PCE concentration began to increase steadily but slowly during 1987 to 1994. From 1994, PCE concentration in Well 12 had increased drastically and reached the maximum concentration of 85 µg/L in a sample collected on January 22, 2002. No further samples were collected from this well between January 2002 and June 2003. From July 2003, the PCE concentrations were ranging from 24 µg/L to 58 µg/L with the most recent data from sampling conducted in May 25, 2011 showing a PCE concentration of 52 µg/L.

Majority of samples collected from Well 12 had TCE levels varied between 1.6 to 5.4 µg/L. The most recent TCE data for this well is 3.3 µg/L in May 25, 2011. Other VOCs detected in this well included cis-1,2-DCE (ranging from 0.7 to 1.4 µg/L), 1,1-DCA (ranging from 0.6 to 1.1 µg/L), 1,1-DCE (ranging from ND to 0.72 µg/L). The most recent data from sampling conducted in May 25, 2011 for cis-1,2-DCE, 1,1-DCA, and 1,1-DCE, are 1.1 µg/L, 0.94 µg/L, and ND, respectively. 1,3-DCP was detected twice on July 9, 2008 and August 5, 2008 with concentrations of 0.74 µg/L and 0.97 µg/L respectively.

1,2,3-TCP was first detected in Well 12 in 2003, the level is ranging from ND to 0.010 µg/L between 2003 and 2008. The NL for 1,2,3-TCP is 0.005 µg/L. 1,2,3-TCP was last detected in Well 12 in August 5, 2008 with a concentration of 0.005 µg/L.

Well 9 is located approximately 400 feet north-northeast of Well 12. However, it was perforated to a deeper depth than Well 12. PCE was not detected in this well until 1996. Once detected, it has increased steadily to around 11.0 µg/L in 2004. Well 9 PCE levels are ranging from ND to 11.0 µg/L with two peaks in the sample taken on December 22, 2004 and November 14, 2006 which has PCE concentrations of 49.0 µg/L and 68.0 µg/L respectively. The most recent PCE data for this well is ND in May 2011. Well 9 TCE levels are ranging from ND to 1.20 µg/L with two peaks in the sample taken on December 22, 2004 and November 14, 2006 which has PCE concentrations of 3.5 µg/L and 2.1 µg/L respectively. TCE has been ND since March 2007 for Well 9. Cis-1,2-DCE, 1,1-DCA and 1,2,3-TCP were detected only once on December 22, 2004 with concentration of 1.0 µg/L, 0.7 µg/L, and 0.008 µg/L, respectively.

Well 15 was activated in August 2006, PCE concentrations were ranging from 59 µg/L to 128 µg/L with the most recent data from sampling conducted in May 25, 2011 showing a PCE concentration of 81 µg/L. TCE concentrations were ranging from 1.6 µg/L to 3.4 µg/L with the most recent data from sampling conducted in May 25, 2011 showing a TCE concentration of 2.6 µg/L. Cis-1,2-DCE had been detected since September 2008 with concentrations ranging from 0.50 to 0.78 µg/L with the most recent data from sampling conducted on May 25, 2011 showing a concentration of 0.62 µg/L. 1,3-DCP was detected twice on February 3, 2009 and March 18, 2011 with concentrations of 0.62 µg/L and 0.56 µg/L, respectively. 1,2,3-TCP was detected twice on September 19, 2006 and July 9, 2008 with concentrations of 0.005 µg/L for both samples.

Monitoring for 1,4-dioxane are quarterly for Wells 9, 12, and 15. The Department has reduced the notification level of 1,4-dioxane to 1 µg/L (from 3 µg/L), and the response level to 35 µg/L (from 300 µg/L) in November 2010 to reflect changes in US EPA's cancer risk assessment for 1-4-dioxane. 1,4-Dioxane has been detected in Wells 12 and 15. Table 2.1 below shows the sampling results for Wells 12 and 15 since May 2003.

Table 2.1: Wells 12 and 15 1-4-dioxane Sampling Results

1,4-Dioxane	5-20-2003	11-4-2008	1-7-2009	4-7-2009	7-7-2009	10-6-2009	1-12-2010-	4-7-2010	7-7-2010	10-5-2010	2-2-2011	5-3-2011
Well 12	4.6	1.9	2.0	2.4	1.7	2.0	1.6	1.9	1.9	2.0	---	2.1
Well 15	2.1	1.4	2.0	2.2	1.4	1.3	1.4	1.2	1.3	---	2.1	1.5

1,4-Dioxane has been detected twice in Well 9 at the concentrations of 0.061 µg/L and 0.41 µg/L for samples collected on April 2, 2002 and April 2, 2003, respectively. It has been ND since February 2004 with most recent result of ND in May 2011.

Nitrate concentrations in Well 12 were around 20 mg/L between 2003 and 2005 with highest concentration of 24 mg/L detected on July 1, 2003. In 2006 and 2007, nitrate levels varied between 13.0 to 18.0 mg/L with a peak of 27.2 mg/L in the sample taken on August, 13, 2007. Since January 2008, nitrate levels varied between 12.0 to 15.0 mg/L with the most recent nitrate result of 14.0 mg/L in June 2011.

Nitrate levels in Well 9 have been relatively stable between 1997 and 2006, and are around 4 mg/L except for the sample taken on December 22, 2004 and November 14, 2006 with concentrations of 21 mg/L and 20 mg/L respectively. After January 2007, nitrate levels were ranging from ND to 4.4 mg/L except for a sample taken on July 9, 2008 with concentration of 13.0 mg/L. The most recent nitrate result for Well 9 is ND in May 2011. Nitrate levels for well 15 varied between 12.9 to 23.0 mg/L since September 2006 with most recent result of 19.0 mg/L in June 2011.

Perchlorate had been found in concentrations as high as 14.0 µg/L (September 1997) in Well 12 and has declined to 4.1 µg/L in October 2006. After October 2006, perchlorate levels are all ND. Well 9 only detected once for perchlorate with concentration of 6.9

µg/L on December 22, 2004. Well 15 only detected once for perchlorate with concentration of 4.1 µg/L on August 27, 2008. A copy of perchlorate sampling results from the Department's Water Quality Database for the Wells 9, 12, and 15 is attached in Appendix B.

Well 12 was tested for hexavalent chromium in 2000, 2003, 2007 and 2010, the results were ranged from 3.2 µg/L to 4.6 µg/L. Well 9 was tested for hexavalent chromium on November 2, 2000, May 9, 2001 and January 12, 2010, the results were 3.4 µg/L, 2.5 µg/L and 2.8 µg/L, respectively. Well 15 was tested for hexavalent chromium in 2006, 2007 and 2010, the results were ranged from 2.3 µg/L to 2.9 µg/L.

Total chromium has been sampled for Well 12 in 2003, 2004, 2007 and 2010. Only two samples taken in July 2003 have detection of total chromium of 3.2 µg/L and 4.7 µg/L respectively. Seven samples were taken for Well 9 between 1994 and 2010 and the result were all non-detected. Total chromium has not been detected in Well 15.

Arsenic levels in Well 9 were ranging from 6.6 to 11.0 µg/L before 2007, with two ND results for the samples taken on December 22, 2004 and November 14, 2006. After 2007, the levels were ranging from 8.4 to 15.0 µg/L with most recent concentration of 13.0 µg/L in May 2011. Arsenic has not been detected in Wells 12 and 15.

NDMA and other nitrosamines (NDEA, NDPA, NDBA, NMEA, NPIP, and NPYR) were sampled for Wells 9, 12, and 15. NDMA was monitored quarterly, NDEA and NDPA were monitored semi-annually, all other nitrosamines were monitored annually with all sampling results being ND.

Wells 12 and 15 produce very hard water. Well 12 has TDS levels exceeding the secondary standard recommended maximum levels of 500 mg/L. The most recent TDS and specific conductance levels in this well are 520 mg/L and 820 µS/cm, respectively, for a sample collected in May 2011. The most recent total hardness is 350 mg/L as $CaCO_3$ for a sample collected in March 2010. Well 15 has TDS levels also exceeding the secondary standard recommended maximum levels of 500 mg/L. The most recent TDS and specific conductance levels in this well are 570 mg/L and 850 µS/cm, respectively, for a sample collected in May 2011. The most recent total hardness is 410 mg/L as $CaCO_3$ for a sample collected in July 2009.

Water produced from Well 9 has moderately hard with TDS and specific conductance levels below their respective secondary standard recommended levels. The most recent TDS and specific conductance levels in Well 9 are 200 mg/L and 310 µS/cm, respectively, for a sample collected in May 2011. The most recent total hardness in Well 9 is 62 mg/L as $CaCO_3$, for a sample collected in September 2008.

2.2.3. TREATMENT PLANT

2.2.3.1. INFLUENT BLENDING PROCESS

Water pumped from Wells 12 and 15 is blended in the influent piping prior entering the PTA. Well 9 is used as a back-up water source in the event that Well 12 or Well 15 is unavailable. Well 9 historically had arsenic concentrations exceeding the MCL of 10 µg/L. When Well 9 is used, the City will implement the arsenic blending according to the approved Arsenic Blending Plan at the Settling Tanks in addition to the required arsenic monitoring listed in the Wells 9, 12, and 15 Treatment Plant OMMP.

2.2.3.2. PACKED TOWER AERATION SYSTEM

Air stripping is provided by a PTA unit manufactured by DEI systems, Inc.. The PTA tower and associated intermediate pumping system and VPGAC are located at the Well 12 site. The PTA tower is designed for a maximum flow rate of 4,500 gpm. The air to water (A/W) design ratio of the PTA is 30:1 and was based on PCE as the controlling contaminant at the design concentration of 67.4 ppb. The PTA unit consists of the fiberglass reinforced plastic (FRP) tower with tower internals, packing media, blower and controls. The tower is 12.09 feet in diameter, with an overall height of 52 feet. It is cylindrically shaped and is provided with lifting and anchor lugs, manholes for access to internals, drain, overflow, pump suction, discharge, air inlet and outlet fittings, level connections and internal supports.

The tower internals include the liquid distribution system, mist eliminator and the packing support. Water is uniformly distributed over the packing media through a series of fiberglass pipe headers, stainless steel parting boxes, and lateral troughs. The distributor is designed to evenly and uniformly distribute the liquid and minimize the risk of plugging. The liquid distributor sits on a circumferential support ring and I-beam. A polypropylene wire mesh "mist eliminator" was installed to remove any entrained drops prior to discharge into the VPGAC system.

The packing support plate is a fiberglass grating cut into sections to allow installation through the vessel manways. The packing support plate sits on a circumferential support ring and box beam manufactured from FRP.

A New York Blower Company AF-Forty Fan, which is capable of delivering 18,050 cfm of air at 22.5 inches water static pressure, is provided for the tower. The blower is designed to force air through the PTA and VPGAC off-gas treatment system.

The PTA utilizes a forced draft, counter-current design. In operation, combined raw ground water flow from Well 12, and extraction Well 15 is introduced into the top of the tower and, after passing through a special designed liquid distributor to insure even distribution, flows by gravity down through the packed bed which consists of the packing media designed to maximize the contact with the air stream. As the water flows downward through the packing, the bulk of the VOCs are transferred to the air stream, which is moving upward through the packing. The processed water accumulates in the

wet well at the bottom of the tower. The exhaust air, containing the VOCs, exits the top of the tower and is treated in the VPGAC system before discharging to the atmosphere.

The wet well at the bottom of the tower will contain at least 2 minutes of storage (9094 gallons) and provides a submerged inlet for the appurtenant intermediate booster pumps. To prevent flooding of the blowers, the wet well has an overflow which discharges to the onsite storm drain system through an air-gap outlet.

In March 2011, the City replaced the old 3.5-inch polypropylene packing media made by LanTec Products with new 3.5-inch polypropylene packing media made by Jaeger Products due to the heavy scale build-up on the old packing media. The geometric surface area, packing factor, void space and bulk density for the new 3.5-inch Jaeger Tri-packs are 38 ft^2/ft^3, 12, 95 percent and 3.3 lb/ft^3, respectively. The total packing media depth is 30 feet. The packing media is installed in a random manner to fill all the space in the packed bed section of the tower. The 3.5-inch Jaeger Tri-packs was designed based on PCE as the controlling contaminant. The design was to treat PCE with influent concentrations of 67.4/100/150 ppb to 0.368/0.546/0.819 ppb effluent concentrations based on the flow rate of 4,500 gpm. However, based on the water quality results in the Department's database and the report submitted by the City, the PTA is failing to perform according to the design capacity. The City should consult with the PTA and packing media vendors to troubleshoot the PTA performance. The table below shows the PTA influent and effluent PCE concentrations since March 2011.

Table 2.2: PTA Flow Rate/PCE Data

Date	3-18	3-21	3-28	4-5	4-12	4-19	4-26	5-3	5-10	5-17	5-23	5-25
Flow rate	4317	3497	3736	2778	4029	4432	3929	3921	4450	4000	3954	3915
air/water ratio	37.7	33.6	31.2	34.9	36.7	33.6	36.4	35.0	40.4	40.6	37.9	31.0
Influent PCE ug/L	72	73	57	53	48	54	45	52	55	49	51	53
Effluent PCE ug/L	1.1	1.0	.82	.86	.86	2.0	2.8	1.8	4.7	3.2	4.6	3.7

2.2.3.3 ACID INJECTION SYSTEM

The acid injection system consists of one 9,250-gallon double wall polyester tank, one 320-gallon fume collection tank, and one acid metering pump with a capacity of 68 gallons per hour (gph). The control of the acid addition is through the existing Well 12 air stripper programmable logic controller (PLC). A 31.5 percent National Sanitation Foundation/American National Standards Institute (NSF/ANSI) 60 certified hydrochloric acid is automatically injected into the effluent of the air stripper wet well. An on-line pH meter continuously monitors the pH in the effluent of air stripper wet well after acid injection.

After the removal of perchlorate treatment system, the pH will be set approximately at 7.7. The acid pump is activated only when at least one of the well pumps and the air stripper wet well pumps are operating.

2.2.3.4. INTERMEDIATE PUMPING SYSTEM

The intermediate pumping system transfers water from the wet well at the bottom of the tower to the Delta Plant. Two intermediate pumps designated Booster Pump 1 and Booster Pump 2 are vertical turbine type pumps, with a maximum capacity of 2,500 gpm at 113 feet TDH, 200 HP and 1190 RPM. The pumps have VFDs which are paced from the water level in the wet well at the bottom of the packed tower.

2.2.3.5. VAPOR PHASE GAC (VPGAC) OFF-GAS TREATMENT SYSTEM

The Wells 9, 12 and 15 Treatment Plant must meet the permitting requirements of the South Coast Air Quality Management District (SCAQMD) for discharges to the atmosphere. The VPGAC Off-Gas Treatment System provides removal of VOCs from the PTA off-gas air stream prior to discharge of the air stream to the atmosphere. The system consists of a VPGAC vessel with dual bed design, six sampling probe ports (three ports at 25 percent, 50 percent and 75 percent bed depth of each bed), a differential pressure gauge, discharge duct and stacks.

2.2.3.6. CARTRIDGE FILTERS (INACTIVE)

Two F-102 Cartridge Filters were used to remove solids from water before IX system. The City will remove the bag filters from the housings and continue to pump water through the empty housings after the IX system is taken offline.

2.2.3.7. ION EXCHANGE SYSTEM (INACTIVE)

Upon the activation of this permit amendment, the City will bypass and isolate IX vessels, remove and dispose the resin, conduct vessels inspection, repair and/or restore the vessels to operable condition, dry the interiors of the vessels, seal shut the vessels and conduct annual inspection to maintain the state of readiness of the vessels to bring it back to service when needed. The City will also label the removed pipe spools of the IX system and retained them onsite for possible reuse in the future. Detailed procedures are listed in the Contingency Plan.

2.2.3.8. LIQUID PHASE GRANULAR ACTIVATED CARBON SYSTEM

The LPGAC system consists of 6 USFilter HP1020-L-75 high-pressure vessels in parallel configuration. The piping system includes influent, effluent, backwash, air vent line, carbon fill, carbon removal, compressed air and sampling connections. The USFilter HP 1021-L-75 vessels are vertical, downflow carbon steel vessels with design pressure of 75 psig @ 150°F and maximum flowrate of 750 gpm. Each vessel has a diameter of 10 feet, straight side height of 8 feet and elliptical top and bottom (overall height 17 feet and 10 inches). The interior surface of the vessels are coated with

ScotchKote 134 epoxy coating, a coating certified by NSF to be conformed to NSF/ANSI Standard 61.

The vessels are designed for down flow operation with a specially designed underdrain collection system to maximize the utilization of carbon as well as to allow for efficient and rapid removal of the spent carbon. Water enters the LPGAC system through the common inlet header. To maintain an equal flow distribution, the City's operators regulate the flow by manually adjusting the valve at the inlet piping to each vessel. In addition to a mastermeter that is provided at the common inlet header, meters are provided for each vessel. Equal flow distribution among the six trains of vessels will be verified with these individual flowmeters.

Feed water enters the vessel from the top, collected in the underdrain, then flows into the common outlet header. Sample ports are installed at the inlet and outlet of each vessel. Three sampling valves are also provided at three different levels of the vessel at the 25 percent, 50 percent and 75 percent length on each vessel.

The normal pressure drop across each of the LPGAC vessels is about 10 psi at the flowrate of 750 gpm. According to USFilter, backwash should be initiated when the pressure differential across each of the vessels reaches twice the initial pressure drop, which would be about 20 psi at the flowrate of 750 gpm. Pressure gages are installed at inlet and outlet piping of each vessel to monitor the pressure drop across the vessel.

20,000 lbs of GAC were loaded to each vessel. The City had been using Westates AQUACARB 830 GAC since the initial startup then replaced it with Carbon Activated COL- L60 carbon in July/August 2010. The change out was required due to the detection of PCE in the LPGAC Vessels 1, 4, and 6 at the 50 percent port. Both AQUACARB 830 and COL- L60 GAC are certified by Underwriters Lab to conform to the ANSI/NSF Standard 61. With the maximum flowrate of 750 gpm, each vessel will be operated with a maximum hydraulic loading of 9.5 gpm/ft2 and a minimum empty bed contact time of 7 minutes per vessel. It should be noted that flow to each vessel should not be less than 200 gpm, to avoid channeling caused by insufficient pressure drop across the vessel. The property of AQUACARB 830 and COL- L60 GAC is summarized in Table 2.3 below.

Table 2.3: Specifications for AQUACARB 830 and COL- L60

Properties	***AQUACARB830 Specifications***	***COL- L60 Specifications***
Type	Bituminous Coal	Bituminous Coal
PSD, U.S. Standard Mesh Size	8X30 mesh, 5% max. over, 4% max. under	8X30 mesh, 10% max. over, 4% max. under
Iodine Number, mg I2/g	900 min.	950-1050 min.
Abrasion Number	80 min.	80 min.
Hardness Number, wt%	90 min.	----
Mean Particle Diameter, mm	1.5 – 1.7	1.5 – 1.7
Effective Size, mm	0.8-1.1	0.8-1.1

Properties	*AQUACARB830 Specifications*	*COL- L60 Specifications*
Uniformity Coefficient	2.1 max.	2.0 max.
Moisture as Packed, wt%	2% max.	2% max.
Apparent Density, g/cc	0.46-0.54	0.47-0.52
Total Ash Content, wt.%	15% max.	12% max.

The City will change out the carbon in the LPGAC vessel when any VOC is detected at the 50 percent port. In addition, if no break through has occurred after three years of operation, USFilter recommends the City to change out the carbon in each of the LPGAC vessel.

Nitrate peaking at the ion exchange and LPGAC system effluent were examined during the ion exchange system and LPGAC system startup tests in July and October 2003. Nitrate peaking was observed only at the LPGAC system effluent with relatively small peaking magnitude. An on-line nitrate analyzer has been installed for the Treatment Plant. The analyzer will monitor nitrate levels in combined LPGAC system effluent continuously. A high nitrate cut off level of 36 mg/L has been set at the combine LPGAC effluent. The Treatment Plant will be shut down automatically if nitrate concentration reaches the cut off level at the plant effluent.

2.2.3.9. LPGAC BACKWASH SYSTEM

The main purpose of the LPGAC backwash system is to supply water for initial backwash to remove carbon fines, which are present in fresh charges of the GAC, to remove any remaining air from the bed, and to classify the GAC bed. The carbon fines may originate in the manufacture, transport, and transfer of GAC, and may cause high pressure drop or be carried into the treated water after startup, if they are not removed before startup. The purpose of classification of the GAC bed is to ensure that any subsequent backwash, if needed, will return the carbon to the same relative position in the bed. In addition, water-soluble components that are leached from the inorganic ash present in the carbon's structure and alkalinity caused by the interaction of water with specific sites on the carbon surface need to be flushed from the carbon bed, producing a more neutral pH for the effluent water. After the initial backwash, the effluent from the vessel shall be checked daily for total suspended solids for the next five days to ensure that no carbon fines are present.

Backwash during operation is done when the bed pressure drop in each of the LPGAC vessels increases to approximately 20 psig, to remove sediment from the top of the bed, carbon fines that may be plugging the underdrain nozzles, and air that is binding the bed. The City's operators will read the pressure drop data for each vessel daily and initiate the backwash when the pressure drop limit is reached.

The USFilter HP1020-L-75 GAC vessel is designed to permit 25-30 percent bed expansion. Chlorinated system water will be used to backwash the LPGAC vessels. System pressure near the facility is around 90 psi and no pumping facility is required. A pipeline that is taped into an 18-inch transmission line is connected to the common

effluent header to provide the backwash water. A reduce pressure principle backflow prevention assembly is provided. To achieve a 25-30 percent expansion, the backwash rate will be 785 gpm. The backwash duration is dependent on the time required for the waste backwash water to reach the point of clarity. 20 minutes or longer might be needed for the initial backwash and 10 to 15 minutes for the subsequent backwash. Waste backwash water from the LPGAC vessels is carried by a waste-line that terminates at a shallow concrete basin. A waste-line that taps into the common effluent header and carries the LPGAC system effluent to waste is also terminated at the concrete basin. A dirt basin is located right next to the concrete basin. If high levels of carbon fines is present in the water, such as the water discharged right after the carbon change out, the water will be discharged into the concrete basin, then overflow to the nearby shallow dirt basin to allow the settlement of the carbon fines. If the discharge is free of carbon fines, a hose will connect the waste-line to a nearby storm drain. The City will hire an outside contractor to haul away any carbon fines accumulated in the dirt basin periodically.

2.2.3.10. CAUSTIC SODA INJECTION SYSTEM

The caustic soda (sodium hydroxide) injection system consists of one 5,400 gallon double wall polyester tank, one 16-inch static mixer, and one caustic metering pump with a capacity of 34 gph. A 25 percent ANSI/NSF 60 certified sodium hydroxide is automatically dosed into the combined effluent of the LPGAC system. An on-line pH meter continuously monitors the pH in the combined effluent line of the LPGAC system after a static mixer. After the removal of IX system, the City will use to the caustic soda injection system to fine tune the pH value at 7.7 to maintain a non-corrosive feed to the distribution system.

2.2.3.11. CHLORINATION SYSTEM

The effluent from the Wells 9, 12 and 15 Treatment Plant is chlorinated with sodium hypochlorite solution generated on site by a ClorTec On-Site Sodium Hypochlorite Generation System (Model 99MC-100) prior to discharged into Delta Settling Tanks, which also receive water from the Wells 1, 3, 10 and Fern Treatment Plant. After water from the treatment plants is blended in the settling tanks, touch-up chlorination is done to maintain the desired chlorine residual prior to delivery to the City's distribution system.

The chlorination system, including the ClorTec On-Line Sodium Hypochlorite Generator, solution tank and metering pumps, is located in a concrete blocks building.

The ClorTec Model 99MC-100 is capable of generating 100 lbs equivalent Cl_2 per day. It was installed in June 1999. The major components of this system include electrolytic cells, power supply/rectifier, control panel/PLC, brine tank and brine proportioning pump. A 1,200-gallon solution tank that stores 0.8 percent strength generated sodium hypochlorite solution is provided. The City stores 14 days supply of salt in the same building.

Two Alldos pumps located adjacent to the solution tank are used to inject the 0.8 percent strength sodium hypochlorite solution through a PVC feed line into the suction side of Delta Plant boosters. Each pump has a maximum capacity of 67.4 gph at 145 psig. The City conducts chlorine residual test three times a day at the discharge side of the Delta Plant Booster Station. The City currently maintains a chlorine residual of 0.5 mg/L at the entry point to the distribution system.

For disinfection, the pump speed is typically paced by a 4-20 milliamp direct current signal from the PLC, based on the plant flowrate, with the stroke adjustment used for chlorine residual trimming. The pump speed can be controlled manually from the PLC or from the local control panel. Stroke adjustment is accomplished manually with the manual adjustment knob at each pump.

2.3 OPERATION AND MAINTENANCE

2.3.1. OPERATIONS PLAN

The City has submitted a revised OMMP dated June 15, 2011. This revision of the OMMP reflects the suspension of the IX system operation. The revised OMMP outlines the proposed operation, maintenance, and monitoring schedule at the Wells 9, 12 and 15 Treatment Plant, which includes groundwater monitoring at the upgradient surveillance and source wells, blended raw water monitoring and treated water monitoring for organic chemicals, inorganic chemicals and bacteriological quality. The plan consists of five sections:

- Introduction
- System Operating Procedures
- Water Quality Monitoring and Testing
- Safety Plan and Procedures
- Reporting and Record Keeping

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. The plans should be updated to reflect changes as they occur.

Operations of the wells and treatment plant equipment are controlled and monitored by a SCADA System based in the City's operational office in Delta Plant.

In keeping with the procedures set forth in the OMMP, the City will need to have operators to perform local checks for the facilities located at Well 12 site and Delta Plant during each startup. An operator will also be on-site daily at both locations to perform inspections and to collect any required water samples.