STATE OF CALIFORNIA - HEALTH AND HUMAN SERVICES AGENCY GRAY DAVIS, *Governor*

DEPARTMENT OF HEALTH SERVICES
DRINKING WATER FIELD OPERATIONS BRANCH
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March 26, 2001

Mr. Donald Froelich, P.E.
Water Services Administrator
City of Glendale
Public Services Department
141 North Glendale Avenue, 4th Level
Glendale, CA 91206-4496

Dear Mr. Froelich:

SYSTEM NO. 1910043 – AMENDED DOMESTIC WATER SUPPLY PERMIT NO. 04-15-00PA-000

Enclosed please find a revision to our letter to the City of Glendale dated July 28, 2000. This letter includes revisions to the monitoring provisions of the permit amendment for the Glendale Operable Unit facilities. These revisions do not add any substantial new requirements.

Provision was 3 was revised to reflect the new operator certification regulations. Provision 28 was revised to give the City flexibility in diverting some of the blending water directly into the Grandview Basins. Provision 38 was revised to clarify procedures to be followed when uncalibrated peaks are found during GC/MS analysis. In addition, corrections to the PS codes listed in Provision 33 were made and the term, "method 8270m" was replaced with, "method 8270 modified." Redundancies between Provisions 73 and 74 were corrected.

In addition, please replace pages 37 through 58 and the Table of Contents of the Engineering Report with the enclosed Table of Contents and pages 37 through 59 which reflect these changes. Finally, we have also enclosed a revised Vulnerability Assessment Table for the Glendale OU which reflects the new California Unregulated Chemical Monitoring Rule and corrects several minor errors. The revised table should replace the Vulnerability Assessment Table in Appendix G of the Engineering Report.

If you have any questions, please contact Alan Sorsher at (213) 580-5777.

Sincerely,

Vera M. Vecchio

Vera Melnyk Vecchio, P.E., Chief
Los Angeles Region

Enclosures: July 28, 2000 letter
Pages 37 – 59
Vulnerability Assessment Table

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I. INTRODUCTION

1.1 *PURPOSE OF REPORT*

The City of Glendale (hereinafter, City) has submitted an application, dated June 29, 1999, for an amended permit to use water that has been extracted, treated and disinfected as part of the United States Environmental Protection Agency (USEPA) Superfund cleanup of contaminated groundwater in the southwest portion of the City. The application includes the addition of eight (8) extraction wells, and the extracted water will be treated at a new treatment plant consisting of two (2) parallel packed tower aerators (PTAs), followed by eight (8) parallel granular activated carbon (GAC) adsorption filters and disinfection. The capacity of the plant is 5,000 gallons per minute (gpm). The treated, disinfected water would then flow to the refurbished Grandview Pumping Station, where it would be chloraminated and blended with purchased water from the Metropolitan Water District of Southern California (MWD) prior to entering the City's distribution system. The application is supplemented by a report prepared in accordance with the Department's Guidance for Direct Domestic Use of Extremely Impaired Sources, Policy Memo No. 97-005.

The purpose of this report is to document the engineering review, evaluate the proposed design and operation of the extraction wells, treatment plant, blending facility and appurtenances and to make recommendations regarding the issuance of an amendment to the City's Domestic Water Supply Permit No. 04-15-99P-006.

1.2 *BACKGROUND AND BRIEF DESCRIPTION OF SYSTEM*

The City currently operates under a revised permit issued by the State Department of Health Services (DHS) on March 25, 1999. A copy of the City's water system schematic diagram is included in Appendix A (Figure 1). The City's sources currently consist of three (3) wells in the Verdugo basin with a maximum capacity of 2,000 gpm and a shallow groundwater pick-up system in the same basin, which is treated using a diatomaceous earth filtration plant with a capacity of 1,150 gpm. The City's groundwater sources currently provide only about 10 percent of the total demand. The remainder of the City's demand is supplied through three (3) connections to the MWD system.

The distribution system is comprised of seven (7) pressure zones utilizing 30 storage reservoirs and tanks with a total capacity of approximately 185 million gallons and 25 booster pumping stations.

The City is bordered by the Cities of Los Angeles and Burbank to the west, Eagle Rock and Pasadena to the east, and La Canada-Flintridge, La Crescenta and the San Gabriel Mountains to the north. The service area extends southward near Los Feliz Road, eastward to approximately Allen Avenue, and northward to around Markridge Road. The eastern boundary runs through canyons separating Pasadena from Glendale (Appendix A, Figures 2 and 3). The service area covers approximately 30.6 square miles and varies in elevation from 416 feet to 5,503 feet above mean sea level. The City's office is located on the corner of Wilson and Glendale Avenues, at 141 North Glendale Avenue, 4th floor, Glendale, California 91206-4496.

In 1884, residents located around the base of the Verdugo Mountains and in the Verdugo Canyon area selected the name of Glendale for their small community. The City of Glendale became incorporated in 1906 having a population of 1,186 and an area of 2.3 square miles. City residents were served water by at least 14 private and mutual water companies that produced water from the San Fernando Basin and from surface and groundwater supplies in the Verdugo Canyon. The City annexed the Verdugo Canyon in March, 1912 and began operation of its water supply system at that time. A bond issue was placed before the citizens of Glendale in July 1914 for an amount of $248,000 to buy the 14 water utilities serving the City. The bond measure passed three to one and the City's municipal water system began operating under the Electric System Branch of the Public Service Department.

In 1915, the City purchased an acre of land from Mr. L.C. Brand that included one (1) well [redacted]. From 1916 to 1921 the City drilled four (4) more wells [redacted] gave the City an additional source capacity of around 9 MGD. As the City continued to grow it became apparent that local supplies would not be able to sustain the City's increased demand for water, and in 1928, 13 southern California cities, including the City of Glendale, formed the Metropolitan Water District of Southern California. In 1931, voters approved a $200,000,000 bond issue to construct the Colorado River Aqueduct to import water to Southern California. The aqueduct was completed in 1941 and the City began taking its first MWD deliveries of Colorado River water in 1946.

The City's reliance on MWD water gradually increased from 1.5 percent in 1946 to about 10 percent in the mid 1960's. In 1968, the Los Angeles Superior Court ruled that the City of Glendale could only extract 12,405 acre-feet (AF) a year from the San Fernando Basin. Since the Grandview wells were [redacted] the City's reliance on MWD water increased to around 30 percent following the Superior Court ruling. The City of Los Angeles continued proceedings to obtain exclusive water rights to the San Fernando Basin and in 1975 obtained a favorable decision from the State Supreme Court in which it was determined that the City of Los Angeles owned all local water rights in the San Fernando Basin under Pueblo Rights. Following the 1975 Court decision, it became necessary for the City to obtain as much as 80 percent of its water supply from MWD. However, the Court determined that 20 percent of the water used in the City percolated into the San Fernando Basin aquifer from local runoff originating in the City, and that the City was entitled to pump the same amount of groundwater each year from the San Fernando Basin using the Grandview Wells. Based upon the adjudicated rights this is equivalent to about 5,200 AF per year.

In 1992, the City discontinued the use of the Grandview wells due to operational difficulties complying with the standards for volatile organic chemical compounds in the water, and began obtaining over 90 percent of its total water supply from MWD, with the remaining percentage being supplied from the three (3) Glorietta wells and the Verdugo

Park Treatment Plant, a 1150 gpm filtration plant in the Verdugo Basin. The City has water rights to 3,856 AF/year from the Verdugo Groundwater Basin, but due to decreased flows in the basin, the City has not been able to extract their full adjudicated entitlement of water from that basin.

The City is not a responsible party in the USEPA superfund groundwater cleanup project in the San Fernando Basin. The industry group believed to be responsible for the contamination, known as the Glendale Respondents Group (GRG), will pay the costs to mitigate the contaminant plume in the aquifer by pumping the water to a centralized treatment plant that will be operated by the City. The water treatment plant will remove VOCs and blend the treated water with MWD water to assure acceptable levels of nitrate, vanadium, chlorate and other inorganics.

II. INVESTIGATION AND FINDINGS

Information used to prepare this report was gathered from the files of the Drinking Water Field Operations Branch (DWFOB), Metropolitan District, from City personnel, and from Camp, Dresser and McKee (CDM), the engineering consultant and construction project manager for the GRG.

During October 1999 and January 2000, field inspections were conducted of the well sites, the treatment plant and the Grandview Pumping Station. During the field inspections information was obtained from various City personnel: Miriam Sykes, Principal Water Quality Specialist; Martin Nixt, P.E., Principal Civil Engineer; Donald Froelich, P.E., Water Services Administrator; Wil Wilson, P.E., Civil Engineer II, Trang Nguyen, P.E., Civil Engineer II, Keith Benzer, Water System Supervisor III; and Gene Conklin, Water Facilities Supervisor I. Information was also obtained from Suzanne Rowe, C. HG., Richard Haller, P.E., Erick Jorgensen, P.E. and R. Bruce Chalmers, P.E. of CDM.

The investigation, analyses, and preparation of this report were undertaken primarily by Alan Sorsher, P.E., Associate Sanitary Engineer of the Metropolitan District, reviewed and approved by Vera Melnyk Vecchio, P.E., District Engineer, Metropolitan District and Gary H. Yamamoto, P.E., Chief, Technical Programs Branch.

2.1 *DESCRIPTION OF PROPOSED ADDITIONS AND MODIFICATIONS*

Definitions

Operable Unit (OU)	A focused study area that allows the USEPA to take action in that area as part of an overall, basinwide site cleanup. Each San Fernando Valley OU has a selected interim remedy that will be incorporated into the final basinwide remedy.

North Operable Unit (NOU)	A portion of the San Fernando Valley in the northwestern portion of the City which has been identified by the USEPA as requiring remediation of groundwater contamination.
South Operable Unit (SOU)	A portion of the City, south of the NOU, along the east bank of the Los Angeles River.
Glendale Operable Unit (GOU)	This is the combination of the NOU and the SOU. It can also refer to the associated groundwater monitoring, extraction and treatment equipment.
Glendale Water Treatment Plant (GWTP)	The groundwater treatment facility [redacted] paid for by the GRG, consisting of air stripping, also known as Packed Tower Aerators (PTAs), liquid and vapor phase granular activated carbon (LPGAC and VPGAC), and sodium hypochlorite and polyphosphate addition. It will be operated by the City's Water Division.
GOU Facilities	The extraction wells, transmission pipelines, GWTP and Grandview Pumping Station.
Grandview Pumping Station (GVPS)	Two (2) 1.25 million gallon covered basins and pumping facilities formerly used by the City of Glendale for storage of the waters produced by the Grandview wells. The City has refurbished the GVPS and added facilities to feed ammonia into the treated water received from the GWTP to form a chloramine residual. To control inorganic chemicals, the GVPS includes facilities for mixing the chloraminated water with blending water supplied from an MWD connection.
Point of Introduction into the System	A point downstream of the GVPS and the blending point, prior to the treated water reaching the first customer.

2.2 *SUPERFUND BACKGROUND*

Since 1980, federal, state and local agencies have been investigating groundwater contamination due to volatile organic compounds (VOCs) in four areas of the eastern San Fernando Valley. In the western portion of the City of Glendale and portions of the Cities of Los Angles and Burbank, the USEPA identified two areas with elevated levels of VOCs. They are the NOU and SOU. These two areas were identified as requiring additional investigation and interim remediation within the San Fernando Valley Superfund Site. The USEPA then completed a Remedial Investigation (RI) and a Feasibility Study (FS) for each OU in 1992. Each FS evaluated the nature and extent of the contamination and interim remediation alternatives. As a result of comments by the City on the FS for the NOU (July 1992) and for the SOU (September 1992), indicating that the City had sufficient water credits to accept the treated water from both OUs, USEPA determined that the treatment facilities for both OUs would be combined such that the treated water could be conveyed to the City for distribution to supplement its existing water supply.

On June 19, 1993, USEPA signed Records of Decision (RODs) for both OUs, which define the remedy which the USEPA selected to meet the overall objectives of:

- Inhibiting the vertical and horizontal migration of groundwater contamination, and
- Begin to remove the contaminant mass from the upper zone of the aquifer.

On March 30, 1994 the USEPA and 25 Respondents (the GRG) signed an Administrative Order on Consent (AOC) for the purpose of designing the interim remedy. CDM was retained by the GRG to develop a design for the interim remedy for approval by both USEPA and the State Department of Health Services (Department). CDM began work on the remedial design at the end of March 1994.

A series of remedial design deliverables were produced which progressively defined the project facilities, including detailed bid documents for construction of the facilities. The Final Remedial Design Report dated September 1996 included the use of Alternative 3, with a combined extraction rate of 5,000 gpm, using seven (7) shallow wells with a total capacity of 3,400 gpm along with one (1) 1,600 gpm deep well. The original site for the treatment plant was purchased by DreamWorks for a new studio, and the treatment plant location had to be changed. The treatment plant was subsequently built next to the City's paper and glass recycling center on land leased from the City.

2.3 *GROUNDWATER CONTAMINATION*

As part of USEPA's RI, a series of groundwater monitoring wells were installed in the San Fernando Valley, including both OUs. In addition, a number of the industrial and commercial facilities within the OUs operate monitoring wells. The USEPA has established a data base which contains the water quality data from all of these wells for the period from January 1980 to December 1997. Sampling is performed on a quarterly basis by USEPA's consultant. Table 1 in Appendix B was prepared for the GRG by CDM and is a statistical summary of the data for both OUs as well as a flow weighted combination of the data.

Table 1 in Appendix B shows that about 74 organic chemicals, and 29 heavy metals have been detected in the RI monitoring wells. USEPA and CDM have mapped several plumes showing a small number of hot spots surrounded by larger areas of lower levels of contamination. Some of the more prominent chemicals in the monitoring wells and their maximum concentration detected are summarized and presented in Table 2 of

Appendix B. The concentrations in that table represent only the highest recorded values at the monitoring wells at or near a hotspot. The typical concentration reaching the extraction wells are significantly lower since these wells are located downstream of the hot spots, have much longer screened intervals in the well casing than the monitoring wells, and concentrations are apparently reduced during subsurface movement due to dilution, retardation, and biodegradation.

Tables 3 and 3A in Appendix B shows the results of the two (2) Title 22 analyses of the eight (8) proposed new wells. Table 4 in Appendix B summarizes the VOCs detected in the influent to the GWTP and PTA effluents, after the extraction wells and the PTAs were tested for five days during late January and early February 2000.

A discussion of the treatability considerations is presented in section 2.5.4.1 and section III. Many of the organic compounds are easily strippable or adsorbable on the GAC. Inorganic contaminants such as nitrate, vanadium, and chromium as well as any organic compounds which may be present that are not treatable by air stripping or GAC adsorption, will have to be controlled by blending at the GVPS or by adjusting the pumping of the extraction wells. This approach is already used at other water systems.

2.4 *BRIEF DESCRIPTION OF PROJECT*

Four (4) shallow extraction wells were drilled for the SOU. GS-1 through GS-4 discharge into a 16-inch pipeline which runs [redacted] and enters the GWTP. Three (3) shallow extraction wells were drilled for the NOU. GN-1, GN-2 and GN-3 and one (1) deep well, GN-4, discharge into a 20-inch pipeline [redacted] the GWTP. The GWTP is located [redacted] and consists of influent piping from the extraction wells, two (2) parallel 2,500 gpm PTAs with foundations, blowers, and ductwork, six (6) VPGAC vessels for cleaning the solvent laden air, eight (8) parallel LPGAC vessels, foundations for the VPGACs and LPGACs, a LPGAC backwash system, intermediate pumps, sodium hypochlorite disinfection system, polyphosphate feed system for scale control, electrical systems and controls, a chemical storage and feeding building and a single story operations and control building. The GWTP will discharge finished water through a 24-inch pipeline to the GVPS. The GVPS has been refurbished by the City and consists of two (2) 1.25 million gallon (MG) basins within a covered building, two (2) booster pumps, and associated electrical services and controls. The GVPS also will use an ammonia solution to convert the free chlorine residual in the GWTP effluent to a monochloramine residual which will be compatible with the MWD water used for blending. The discharge of the GVPS will flow through a venturi nozzle installed in the piping in order to facilitate the mixing of the treated groundwater with the MWD water that will be used for blending of the inorganic chemicals. Figure 4 in Appendix A is a map showing the location of all the facilities proposed to provide drinking water.

2.5 *PROJECT DESCRIPTION*

2.5.1 *EXTRACTION WELLS*

The four (4) wells in the SOU are numbered GS-1, GS-2, GS-3, and GS-4, and are aligned along [redacted]. The four (4) wells in the NOU are numbered GN-1, GN-2, GN-3, and GN-4. GN-1, GN-2 and GN-4 are located [redacted] GN-3 is located [redacted]

Seven (7) of the wells are drilled in the upper zone to a depth of [redacted] to extract 3,400 gpm. One well (GN-4) to extract 1,600 gpm is drilled [redacted] Well GN-4 was drilled to provide additional water to supplement the City's water supply. USEPA's assessment suggests that only 3,400 gpm is required for plume containment.

The detailed information on each well is provided in the data sheets and drawings in Appendix C. GS-1 is located [redacted], but the other wells are [redacted] All the borings were drilled using the reverse circulation method with water as the drilling fluid. Each well has a conductor casing, is gravel packed and constructed with copper bearing steel casing. Well Nos. GN-1, GN-2 and GN-4 use Roscoe-Moss Ful-Flo shutter screening. The remaining wells are constructed with continuous slot wire wrap screens. The well casings are [redacted] except for GN-4 which is [redacted] Each well has at least [redacted] sanitary seal [redacted] Capacity may vary up to 700 gpm for GN-1, GN-2 and GN-3, and up to 1700 gpm for GN-4. Capacity may vary up to 600 gpm for GS-1, GS-2, GS-3 and GS-4. Table 1 summarizes some of the well features.

Table 1

WELL	PRIMARY STATION (PS) CODE	WELL DEPTH (feet)	SCREENED INTERVAL (feet below ground surface)	LENGTH OF SANITARY SEAL (ft) AND THICKNESS (in.)	AVERAGE FLOW RATE (gpm)
GS-1	[redacted]	[redacted]	[redacted]	[redacted]	425
GS-2	[redacted]	[redacted]	[redacted]	[redacted]	425
GS-3	[redacted]	[redacted]	[redacted]	[redacted]	425
GS-4	[redacted]	[redacted]	[redacted]	[redacted]	425
GN-1	[redacted]	[redacted]	[redacted]	[redacted]	565
GN-2	[redacted]	[redacted]	[redacted]	[redacted]	565
GN-3	[redacted]	[redacted]	[redacted]	[redacted]	565
GN-4	[redacted]	[redacted]	[redacted]	[redacted]	1600

2.5.1.1 Water Quality of Extraction Wells

As shown in Appendix B, Tables 3 and 3A, the extraction wells were sampled and analyzed when they were initially test pumped and again in February 2000. The February 2000 sampling was performed after the wells had been online at their design capacity for four (4) days during performance testing of the PTAs.

The major organic contaminant was trichloroethane (TCE) which ranged from 0.6 to 1200 μg/L, and had a flow weighted average of 208 μg/L. Tetrachloroethylene (PCE) ranged from 0.5 to 100 μg/L and had a flow weighted average of 26.5 μg/L Carbon tetrachloride ranged from non-detectable (ND) to 25 μg/L with a weighted average of 2.36 μg/L. 1,1-Dichloroethylene ranged from ND to 76 μg/L with a weighted average of 9.1 μg/L. Traces of other volatile organics were also detected in some of the wells.

With respect to inorganic contaminants, nitrate ranged from 1.8 to 9.3 mg/L as N, and averaged 6 mg/l which is 60 percent of the MCL. Perchlorate was found in GN-3 and GS-4 at levels of 5.2 and 4.0 μg/L. Total chrome was found in all the wells at levels ranging from 22 to 61 μg/L. All the wells except GS-1 had detectable levels of chlorate, which is not a regulated compound. Vanadium which also is unregulated, was also found in all the wells at low levels.

GS-1, GS-3 and GS-4 in the SOU are located close to other potential sources of contamination as follows:

GS-1 is located [redacted] discharges tertiary treated wastewater to the river about 150 feet north of this well location. The driller's log for this well indicates that the static water level was first found only 22 feet below ground surface. The well also exhibited slightly higher sodium, total dissolved solids and specific conductance than the other seven (7) wells. GS-1 also exhibits manganese (185 μg/L) in excess of the MCL of 50μg/L. Lithium, iodide, N-nitrosodimethylamine (NDMA) and ammonia nitrogen were detected at low levels in this well and is likely related to the recycled water in the Los Angeles River. Chlorate was absent in GS-1, in contrast to the other extraction wells. A microscopic particulate analysis of the well water was also done but did not provide any substantive information. [redacted] discharge into the Los Angeles River through NPDES permits issued by the Regional Water Quality Control Board.

An assessment was performed by CDM for the GRG to determine the influence of recycled water on this well. Using the existing groundwater model for the basin and inserting parameters for recycled water, it was determined that in time the well would be influenced by recycled water. Since the three (3) wastewater treatment plants have been discharging for more than 10 years, infiltration into the aquifer has already occurred based upon the monitoring results for this well which include the presence of

NDMA, ammonia nitrogen, and MBAS, typical constituents in the effluent from recycled water plants.

The model predicted that recycled water from the river could reach the well in 70 days and after one and a half years the water extracted from this well could have a 20 percent recycled water contribution. After 10 years this contribution could reach 36 percent.

It is the Department's recommendation that GS-1 not be approved as a source of supply at this time. In order to fully evaluate the influence of recycled water and the contribution to GS-1, the City may prepare an amendment to the existing Policy Memo 97-005 document, to focus on the issue of recycled water at GS-1. The 97-005 will allow the Department to make a final decision on this well.

GS-3 is located [redacted]. During the Department's site inspection prior to the drilling, the Department had recommended drilling several yards further west than its originally planned site. However, the well was installed [redacted]. The foundation of the plating company building had visible green stains, possibly caused by heavy metal contamination. A monitoring well [redacted] has detected high levels of chromium. Once the cone of influence is established, this well may have high concentrations of these contaminants. This well shall be monitored for inorganic chemicals (heavy metals) monthly.

GS-4 is located [redacted] In late 1998, [redacted] Company installed an additional pipeline [redacted] the well location. The Department required [redacted] to encase the pipeline in an extra polyethylene liner [redacted] of the well, and the installation of a number of soil vapor probes to detect any leakage from the pipeline in the vicinity of the well. The liner was installed, but to date the probes have not been installed. GS-4 shall be monitored monthly for total petroleum hydrocarbons as part of the sampling plan. The probes must be installed and monitored for total hydrocarbon vapors with a portable flame ionization detector.

2.5.2 *WELLHEAD FACILITIES*

Seven (7) of the eight (8) wellhead facilities (all wells except GS-1) are housed in below ground vaults. Figure 2-2 in Appendix C shows the layout of a typical wellhead facility above and below grade installations, and Figure 2-3 in Appendix C shows the typical control schematic for each well. The at-grade installation at GS-1 includes an extraction well pump, motor, electrical service, piping, control instrumentation, and appurtenances. All extraction well pumps are vertical line shaft, turbine-type pumps. Each vertical turbine pump's shaft assembly is water lubricated by extracted groundwater during operation. During pump start-ups, the shaft assembly is pre-lubricated by a 1-inch line which connects the discharge piping to a pre-lubrication connection on the pump discharge head. The pre-lubrication flow is controlled by a solenoid valve and timer and is shut off after pump start-up.

Typical wellhead vault installations utilize comparable equipment and instrumentation to the at-grade installation. The wells have air/vacuum relief valves, check valves, sampling ports, flow meters, casing vents, and a 3-inch gravel feed tube which can be used to top off settling gravel and to feed disinfectant into the gravel pack. The relief valves and casing vents are screened and terminate near the ceiling of the vaults. The wells do not have the typical pump-to-waste capability. However, each well is equipped with a blind flanged tee, where piping may be temporarily installed and connected to a portable tank or tank truck. In addition, the water could be sent to the GWTP for treatment and discharge to the Los Angeles River if necessary.

Each vault is equipped with an exhaust fan, inlet and exhaust vents and a sump. Each sump is equipped with a submersible pump, piping, appurtenances and water level switches. The submersible pump, to remove any water buildup in the sump, is equipped with a float switch which activates and deactivates the pump. In addition, the sump employs two (2) other switches; the first activates an alarm light at the GWTP indicating the sump is nearly full and the second indicates vault flooding and turns the extraction well pump off. These send a signal to the GWTP control room and starts an auto-dialer to notify the operator. The second switch is located approximately 2 inches above the vault floor. If an undetected leak occurs in the vault, the sump pump acts as secondary protection against flooding and possible damage to the extraction well pump motor. Sump effluent is pumped to a French drain adjacent to the vault. Vault exhaust fans operate continuously, providing 60 air changes per hour. Air is drawn into the vault through a wall penetration approximately 6 feet above the vault floor. The exhaust fan inlet is approximately one foot above the vault floor opposite the inlet. This configuration ensures air is drawn across the vault for optimum ventilating conditions. Each vault service control panel and transformer is located at-grade on a concrete equipment pad.

2.5.3 *TRANSMISSION PIPELINES*

Pipelines are constructed of ductile iron pipe (DIP) below ground, and cement mortar lined (CML) steel pipe or DIP above ground. Collector pipelines are isolated pipelines that are used to transport water from individual wells to the transmission pipeline. The SOU transmission line is [redacted] ranging in size from [redacted]. The NOU transmission line is [redacted] with the well collector pipelines ranging in size from [redacted]

In the SOU, a [redacted] transmission main (see Appendix A, Figure 4) transports the pumped water from the collector pipelines to the GWTP located within the NOU. Routing for the SOU collector pipeline follows [redacted] and the transmission main then transverses [redacted]. Routing for the NOU collector pipeline for Wells GN-1, GN-2, and GN-4 follows [redacted]

[redacted], picking up groundwater extracted by GN-3 at a point near [redacted]

Treated groundwater from the GWTP is to be transferred to the Grandview Pump Station through the GWTP's [redacted] discharge pipeline (see Appendix A, Figure 4). A new [redacted] pipeline was installed inside the existing [redacted] pipelines. Because of their age and condition, the [redacted] pipelines serve as casings for the HDPE. A concrete slurry backfill was used to fill the void between the [redacted] and the existing pipeline.

2.5.4 *GLENDALE WATER TREATMENT PLANT*

Air stripping in two (2) parallel PTAs followed by eight (8) parallel LPGAC to remove VOCs from the groundwater, and a fixed bed VPGAC system treats the air leaving the PTAs. The plant is designed to treat up to 5,000 gpm of groundwater. Hydraulically the plant can process 5,700 gpm. The plant is restricted to 5,000 gpm. Figure 2-4 in Appendix D provides the site plan for the GWTP. Figure 2-5 in Appendix D provides a basic process flow diagram for reference. Data sheets for the PTAs, the LPGAC and the disinfection systems are also included in Appendix D.

In order to develop operational criteria for all anticipated types of constituents that may be in the GWTP influent, the City has proposed definitions of strippability, adsorbability and treatability. Figure 1 in Appendix D is a logic diagram to determine the treatability of a chemical constituent in the influent water for the GWTP. A constituent is considered strippable in the PTAs if its Henry's constant is equal to or greater than that for 1,2-Dichloroethane (1,2-DCA). The PTA design was adjusted for an influent concentration of this compound of 2.8 ppb and 90 percent removal in the PTA.

A constituent is considered adsorbable if it is characterized as an average or good adsorber using the criteria of 4 mg/g for a 1 mg/L solution developed and presented by the Calgon Corporation in the Advanced Oxidation Treatment (AOT) Handbook. Any constituent that does not meet this criterion of adsorbable is considered non-adsorbable.

If the concentration of a constituent is greater than 2.5 times its MCL or AL, and it is not both adsorbable and strippable, then it may not be sufficiently treated in the GWTP and would have to be blended at the GVPS in order to meet water quality standards. Such a constituent would be considered not treatable at the GWTP.

The following provides descriptions of the GWTP systems:

2.5.4.1 *Packed Tower Aerator System*

Air stripping is provided by two (2) PTA units in a parallel flow arrangement. A data sheet for these units is in Appendix D. Each PTA consists of the fiberglass tower with an integral reservoir, tower internals, packing (mass transfer media), overflow connection, intermediate booster pump, blower and controls. Each PTA is [redacted] in diameter, with an overall height [redacted] The tower internals include the liquid distribution system, mist eliminator pad and the packing support. The packing is Lantech Products' 3.5 inch LANPAC which is a random packed, non-nesting polypropylene media, with a [redacted] bed. The PTA towers are designed for a maximum flow rate of 2,500 gpm each and have the capability of a 4:1 turndown ratio. Figure 2-6 in Appendix D shows the control schematic for the PTA system.

The PTAs utilize a forced draft, counter-current design. In operation, half the combined raw groundwater flow from the extraction wells continuously enters the top of each tower and flows downward over the packing while fresh air is blown into the tower below the packing support. 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 transfer of VOCs is caused by the VOC concentration in the water being greater than that in the air. The processed water accumulates in the reservoir at the bottom of each tower. The exhaust air, now containing the VOCs, exits the top of the tower and is treated in the VPGAC system before the air discharges back to the atmosphere.

The holding reservoir at the bottom of each tower will contain at least two (2) minutes of storage (5,000 gallons) and provides a submerged inlet for the appurtenant intermediate booster pumps. To prevent flooding of the blowers, each PTA reservoir has an overflow which discharges, in an emergency, through an air-gap outlet into the onsite storm drain system. The mist eliminator pad provided in each PTA reduces the amount of water droplets discharging into the VPGAC system.

Each PTA has a dedicated blower designated as B-1 and B-2. The blowers are designed to force air through the PTA and VPGAC off-gas treatment system. The blowers are a centrifugal design (squirrel cage type) with 75 hp. variable frequency electric drives (VFDs) to control airflow into the PTAs. The discharge ducts from both blowers are interconnected to allow distribution of air to both towers if one (1) blower is out of service. Under those circumstances, the remaining blower can provide the 30.4:1 air to water (A/W) ratio to both PTAs by operating at a higher speed. While the PTAs are designed to operate at a volumetric air-to-water ratio of 30.4:1, each blower is oversized to supply an air-flow of up to 16,700 cfm (A/W ratio of approximately 50:1). At this air flowrate, each blower can develop a total static pressure head of 16 inches water column at approximately 2,400 rpm and 66 hp.

An inlet silencer attenuates the blower noise. Pleated air filters, also on the inlet side of the blowers, remove dirt, bacteria, fungi and other particulates from the inlet air. The filters are 4 inches thick and have a minimum media area of 7 square feet per foot of face area. The filters are listed by the Underwriters Laboratory (UL) as Class 2. The weatherproof filter elements are housed in a side access housing for easy inspection and replacement.

The A/W design ratio of the PTA is 30.4:1 and was based on TCE as the controlling contaminant at the design concentration of 490 ppb. The PTA process was originally designed to remove the influent VOCs to the design objectives in the Interim Remedial Design prepared for the USEPA, except for 1,1,2,2-tetrachloroethane (1,1,2,2-TCA) and

1,2-dichloroethane (1,2-DCA). These two contaminants may only be partially removed by air stripping, with additional removal occurring in the LPGAC absorbers. However, even the 1,1,2,2-TCA and the 1,2-DCA may be removed to below the design objectives by the PTA process since the actual anticipated influent VOC concentrations are significantly less than the estimated design influent concentrations. Testing performed during February 2000 did not detect these compounds in the wells or plant influent. As an additional safety factor, and for additional operational flexibility, before the towers were constructed, the design was re-calculated for 90 percent removal of 1,2-DCA (at an air/water ratio of 42) and an additional two (2) feet of packing was added bringing the overall packing [redacted] and tower [redacted]

Initial testing of the PTAs was performed in February, 2000 using all eight (8) extraction wells with the PTA effluent discharged to the L.A. River The influent and effluent concentrations were as indicated in Table 2. Other organic constituents were not detected in the combined influent.

Table 2

CONTAMINANT, PPB	MAXIMUM CONTAMINANT LEVEL (MCL)	PEAK DESIGN CONCEN-TRATION	COMBINED INFLUENT, FEBRUARY 2000	PTA 1 EFFL. 30:1	PTA 2 EFFL. 30:1	PTA 1 EFFL. 42:1	PTA 2 EFFL. 42:1
1,2-DCA	.5	2.8	ND	ND	ND	ND	ND
1,1,2,2-TCA	10	0.9	ND	ND	ND	ND	ND
PCE	5	19.1	23.5	ND	ND	ND	ND
TCE	5	490.5	270	1.7	1.3	1	0.9
cis-1,2 DCE	6	18.2	4.3	ND	ND	ND	ND
1,1-DCE	6	107.1	10	ND	ND	ND	ND
trans-1,2-DCE	10	-	1	ND	ND	ND	ND
Carbon Tetrachloride	.5	3.4	2.1	ND	ND	ND	ND
Chloroform	No Std.	-	1.4	ND	ND	ND	ND
MTBE*,	5	-	3.8	5.9	4	3.2	3.5
Methylene chloride*	5	10	0.7	1.3	1.3	0.6	0.8
Di-n-butylphthalate†	No Std		2.7	ND	ND	ND	2.5

*Apparent lab/sampling contaminant. †Non-strippable, lab or trace contaminant from new plastic equipment, expected to be removed by the granular activated carbon.

In this instance, the 1,2-DCA and 1,1,2,2-TCA were not present at detectable levels in the combined influent. The TCE removal efficiency was 99.37 percent at the A/W of 30:1 and 99.63 percent at the A/W of 42:1. Other constituents which were present in the combined influent were removed to levels below the detection limit of 0.5 parts per billion (ppb).

Having two (2) treatment trains allows for continued partial operation of the plant in case one (1) treatment train is out of service for cleaning and/or maintenance. The cleaning solution would be a 3 percent solution of hydrochloric acid but it is not stored on-site, and would be provided by an outside contractor.

A single pump designated P-1 is provided to recycle cleaning solution through the PTAs for periodic tower cleaning of carbonate scale if necessary. The PTA cleaning pump has a capacity of 1,000 gpm at 49 feet total dynamic head (TDH). The pump suction is connected to the intermediate booster pump suction line from the reservoir at the bottom of the PTA. The discharge line connects to the PTA influent pipe. The PTA cleaning pump system is fitted with hose connections to apply acid to the recycle water from a portable acid supply system. The portable acid supply system will be rented on an "as needed" basis. The PTA cleaning pump system is constructed of corrosion resistant materials adequate for carrying water with a pH of 3-5.

Spent cleaning solutions will be transferred from the PTA reservoir to portable tanks approved by the Federal Department of Transportation (DOT) and transported to an approved off-site facility for neutralization and disposal by a contract industrial cleaning service.

Spent bag filters and minimal amount of solids removed from the PTA reservoir will be characterized as hazardous or non-hazardous and sent to an appropriate landfill. Spent air filters will be transferred to the on-site dumpsters for disposal as non-hazardous solid waste.

For the rare case where a PTA needs to be disinfected, the plant was designed so that sodium hypochlorite (NaOCl) solution can be circulated within the PTAs. A solution of 1 percent or less sodium hypochlorite could be used periodically to eliminate media bio-fouling. Under normal operating conditions, the pipe connection between the hypochlorite supply and the PTAs should be physically disconnected to eliminate any possibility of acid contacting the hypochlorite. Disinfection procedures would utilize the PTA cleaning pump.

2.5.4.2 *Intermediate Pumping System*

The intermediate pumping system transfers water from the PTAs through the LPGAC treatment system to the GVPS basins. The intermediate pumps designated IP-1 and IP-2 are vertical turbine, can-type pumps, with a maximum capacity of 5,200 gpm at 73 feet TDH. Each is sized to pump the entire GWTP flow should one (1) of the pumps fail. The pumps have VFDs which are paced from the water level in the reservoir at the bottom of the packed tower (see Figure 2-6 in Appendix D).

2.5.4.3 *Liquid Phase GAC (LPGAC) System*

The LPGAC system is designed to remove residual VOCs and semi-volatile contaminants from the PTA effluent and produce treated water which meets the finished water discharge requirements. Figure 2-7 shows the control schematic for the LPGAC system. The LPGAC system consists of eight (8) GAC vessels designated as VL-1 to VL-8 operated in parallel. The normal flow rate is 625 gpm per vessel. The LPGAC vessels are standard vertical, downflow ASME, 100 PSIG pressure vessels holding 20,000 lbs. of LPGAC. Each vessel has a diameter of 10 feet and a GAC bed depth of approximately 9 feet. The LPGAC vessels have sampling ports at quarter points to allow for testing of the treated water for breakthrough estimation. Rupture disks are provided for each LPGAC vessel to prevent over-pressurization of the vessels.

The empty bed contact time (EBCT) for a flow of 5,000 gpm with eight (8) GAC vessels on-line will be 8.6 minutes. Vessels are designed for slurry replacement of LPGAC, using water and air pressure from specially-designed transport trucks. The LPGAC vessels have air/vacuum valve assemblies to vent air from the vessels.

Section 13410 of the project construction specifications requires that the LPGAC be virgin, granular and manufactured from bituminous coal combined with suitable binders as required. The material shall be visually free of clay, dirt and deleterious material and shall be free of pathogenic contamination as measured by coliform tests of the GAC filtrate. The LPGAC must meet the following specifications and physical properties:

Properties	Value
Sieve Size	8x30 mesh
Shape	Granular
Maximum retained on No.8 mesh.	15 percent
Maximum passing through No. 30 mesh.	4 percent
Minimum Iodine Number.	900 mg/g
Minimum Abrasion number	75
Maximum moisture, as packed.	2 percent
Maximum water soluble ash.	1 percent
Maximum water soluble phosphate, as PO_4.	0.1 percent
Effective size.	0.80 – 1.0 mm
Maximum uniformity coefficient	2.10
Bulk Density.	28 – 30.5 lb./cu ft

The construction specification further states that the LPGAC shall be Filtersorb 300 as manufactured by Calgon Corporation, AQUA-Carb CO-401 as manufactured by Westates Carbon, or equal.

Other carbons may be considered if they can be shown to provide equivalent or superior performance compared to LPGAC specification above.

Virgin carbon will also be used when replacement carbon is required, as stated in the Final Remedial Design Report.

The LPGAC vessel internals and piping are designed to facilitate the backwashing of carbon fines from the bed which is necessary when a new load of carbon is installed. Backwash water is supplied from the treated water header using a 1,000 gpm low head pump. Fresh charges of activated carbon shall be backwashed to remove carbon fines and the adsorber shall not discharge to the plant effluent until it is verified that no visible carbon fines are present in the adsorber's effluent. After returning the adsorber to service, the effluent from that absorber shall be checked daily for total suspended solids for the next five (5) days to ensure that no carbon fines are present.

Recommendations include testing the combined vessel effluent for total coliforms and heterotrophic plate count on a schedule described in Section IV.

2.5.4.4 *Vapor Phase GAC (VPGAC) Off-Gas Treatment System*

The GWTP must meet the substantive permitting requirements (ARARs) of the South Coast Air Quality Management District (SCAQMD) for discharges to the atmosphere. The VPGAC Off-Gas Treatment System provides removal of VOC contaminants from the PTA off-gas air stream prior to discharge of the air stream to the atmosphere. The system consists of dehumidification heaters, VPGAC vessels, air flow meters, discharge duct and stacks.

Two (2) treatment trains are provided, one (1) for each PTA system. The PTA off-gas stream flows through a dehumidification heater designated as ME-1 and ME-2 to increase VPGAC adsorption capacities. Each dehumidification heater provides heat to lower the relative humidity of the air stream from 100 percent to 50 percent at both a 30.4:1 air to water ratio and a 50:1 air to water ratio. A maximum relative humidity of 50 percent is maintained for air into the VPGAC vessels.

Each train has three (3) VPGAC vessels designated as VV-11, VV-12 and VV-13; and VV-21, VV-22 and VV-23, respectively, operated in parallel. The VPGAC vessels are standard upflow 10 psig-rated FRP vessels holding 10,000 lbs. of GAC. Each vessel has a diameter of 12 feet and a GAC bed depth of approximately 3 feet. Inlet and outlet ducts have sample ports for taking air samples.

Air flow to the VPGAC vessels is supplied from a common off-gas header, with valves (dampers) to control the distribution of airflow. Flow meters are installed on the outlet ducts from the VPGAC vessels to balance airflow through the vessels. Discharge from the individual VPGAC vessels flows into a common discharge header so that each train has only one (1) discharge source. Velocities through fixed-bed VPGAC vessels is limited to a maximum 50 to 60 feet per minute (fpm). Actual velocities are normally less, depending on the number of VPGAC vessels in service. VPGAC changeout is limited to one (1) vessel per train at a time. Headloss across the GAC media is limited to 10 inches of water column maximum.

The VPGAC must meet the following specifications and physical properties:

Properties	Value
Sieve Size	4x8 mesh
Shape	Granular
Total surface area	1200 $\pm$ 50 mg^2/g
Maximum retained on No.4 mesh	10 percent
Maximum passing through No. 8 mesh	1.5 percent

Minimum Iodine Number	1200 mg/g
Minimum Hardness	98
Maximum moisture, as packed	3 percent
Maximum ash	4 percent
Minimum butane activity	23.8 wt percent
Minimum apparent density	0.41 grams/cc

The specification further states that the VPGAC shall be PCB (a type of coconut based carbon) granular carbon manufactured by Calgon Corporation, VOCarb as manufactured by Westates Carbon, or equal.

Virgin carbon will also be used when replacement carbon is required, as stated in the Final Remedial Design Report. Other carbons may be considered if they can be shown to provide equivalent or superior performance than the above specification.

2.5.4.5 *Antiscalant Feed System*

The antiscalant feed system provides a blended polyphosphate solution to the raw influent groundwater to control scaling conditions which could decrease performance of the PTAs and the LPGAC. Figure 2-8 in Appendix D provides a piping and instrumentation diagram of the antiscalant feed system. Dilution water is available so the polyphosphate can be delivered to the inlet pipe diluted or neat. The polyphosphate is fed into the influent pipe to each of the PTAs on a continuous basis as needed. The design polyphosphate dosage rate is 2.7 milligrams per liter (mg/L) at a flowrate of 0.6 gallons per hour (gph) of undiluted antiscalant. The antiscalant shall have National Sanitary Foundation (NSF) approval for potable water use.

The polyphosphate is delivered in liquid form, and stored in a storage tank (T-5). The fiberglass reinforced plastic (FRP) storage tank has a capacity of 1,000 gallons. The solution level in the storage tank is measured continuously and both high and low level alarms are sent to the programmable logic controller (PLC). The alarm setpoints are one (1) foot from the bottom tank and six (6) inches from the top of the tank.

Two (2) variable speed metering pumps designated as P-50 and P-51 located adjacent to the storage tank in the chemical storage building, pump polyphosphate solution into the PTA influent pipe. Each pump has a maximum design capacity of 1.2 gph at 66 psig (151 ft). Each pump is dedicated to a PTA and will be in service when the PTAs are operating. Valve configuration allows one pump to serve both PTAs in the event of pump failure. The pump speed is set manually based on the plant flowrate and antiscalant dosage set point. Stroke adjustment is accomplished manually with the manual adjustment knob at each pump. The metering pumps have pressure indication and high pressure shut-off.

The antiscalant feed system is located in a containment area within the chemical storage building. A level switch located in the containment area detects high level in the containment area and sends an alarm to the PLC. The chemical storage building has climate control and an emergency generator is provided to supply power to the chemical storage building ventilation fans in case of power outage.

2.5.4.6 *Chlorination System*

The chlorination system supplies a 12.5 percent sodium hypochlorite solution to the treated water for disinfection. The sodium hypochlorite shall be NSF or UL approved as a drinking water additive. Figure 2-8 in Appendix D provides a piping and instrumentation diagram of the chlorination system. Sodium hypochlorite may also be used for biofouling control of the PTAs, the Waste Backwash Storage Tank and the backwash supply system.

Dilution water is available so the sodium hypochlorite can be delivered to the finished water pipe diluted or neat. The design sodium hypochlorite dosage rate to the finished water is 3.0 mg/L chlorine at a 12.5 percent sodium hypochlorite solution flow rate of 5.35 gallons per hour (gph). The sodium hypochlorite is introduced into the finished water pipe through a diffuser. The diffuser is a small diameter pipe which is inserted into the finished water line at a 90 degree angle and ends about 1/3 of the way into the line. Before the sampling point for the chlorine analyzer, there is about 30 feet of pipe and four (4) 90 degree elbows. This provides adequate mixing before the sample is analyzed.

Sodium hypochlorite is delivered in liquid form and stored in a storage tank designated T-7. The storage tank has a capacity of 1,000 gallons and is constructed of FRP. The solution level in the storage tank is measured continuously and both high and low level alarms are sent to the PLC. The alarm setpoints are one (1) foot from the bottom tank and six (6) inches from the top of the tank.

Two (2) variable speed metering pumps designated P-70 and P-71 located adjacent to the storage tank in the chemical storage building, pump sodium hypochlorite solution to the treated water and/or biofouling control points. Each pump has a maximum capacity of 8.56 gph at 65 psig (150 ft). One pump is in service for metering of hypochlorite to the treated water, while the other pump is a standby for biofouling control.

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 for biofouling application is set manually based on the desired chlorine dose. 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. The metering pumps have pressure indicators and high pressure shut-off valves.

The chlorination system is located in a containment area within the chemical storage building. A level switch located in the containment area detects high level in the containment area and sends an alarm to the PLC. The chemical storage building has climate control and an emergency generator is provided to supply power to the chemical building ventilation fans in case of power outage.

2.5.4.7 *LPGAC Backwash System*

The main purpose of the LPGAC Backwash System is to supply water for removing carbon fines which are present in fresh charges of the GAC. The system can also used at a lower flow rate to gently decompress the bed after long periods of flow in one direction.

Effluent from the LPGAC system can be used to backwash the GAC vessels (see Appendix D, Figure 2-5). The backwash water is supplied from a dedicated backwash supply pump designated P-5 using the treated unchlorinated LPGAC effluent. The LPGAC backwash supply pump is an end suction centrifugal pump with a capacity of 1,000 gpm at a TDH of 27 ft. Waste backwash water from the LPGAC vessels flows to the waste backwash storage tank.

The waste backwash storage tank designated as T-1 is a cone-bottomed steel tank with a nominal capacity of 35,000 gallons. The tank has a diameter of 20 feet and a height of 21 feet. The tank is constructed according to AWWA D-100 requirements. The backwash storage tank is equipped with a tank mixer designated M-5. The mixer is a 3 HP vertical shaft turbine mixer and is used to assist in mixing of any solids which might settle to the bottom of the tank and require resuspension to remove. No backwash water is allowed to be recirculated back into the GWTP.

2.5.4.8 *LPGAC Backwash Recycle System*

Recycled backwash water is pumped from the waste backwash storage tank through filters to the drainage sump. The backwash recycle pump station consists of a 50 gpm vertical non-clog vortex pump designated as P-10 and two (2) bag filter units designated F-10 and F-11.

The bag filter units remove suspended solids, such as LPGAC fines, from the recycled backwash water. The bag filter units operate in series and have a minimum of 7 bags each. The filter bags are interchangeable double length bags available in various mesh sizes ranging from greater than 25 microns to 1 micron. A maximum headloss of 10 psi is available through each filter unit. Each filter unit has a total capacity of approximately 35 lbs. of solids.

Rather than recycling this filtered water, which still may contain bacteriological contaminants from the tank, this relatively small stream will be discharged to the Los Angeles River in a manner similar to the discharge of collected and treated storm water.

2.5.4.9 *LPGAC Storm Water Treatment System*

Storm water which collects in the vicinity of the major process equipment, including the PTAs, VPGAC vessels, LPGAC vessels, and chemical systems is contained onsite and treated before discharge to minimize the risk of stormwater contamination from GWTP processes. A treatment system with two (2) LPGAC vessels in series treats all captured storm water and dry weather flows contaminated with VOCs, unless they are shown not to be contaminated. The treated storm water is then discharged to the Los Angeles River through a storm drain across the Grayson Power Plant site. All other paved areas are drained to Flower Street, except a small portion of the exit road at the southeast corner of the site near the rear exit of the WTP, which drains to the Grayson Power Plant.

The LPGAC storm water treatment system has a capacity of 50 gpm. The system consists of a duplex strainer designated as F-15, basket filters designated as F-20 and F-21 and a pair of LPGAC vessels designated as V-1 and V-2 configured for series operation. Each LPGAC vessel holds 2,000 lbs. of GAC. Sump pumps designated as P-15 and P-16 are installed in the drainage sump to pump to the treatment system. The sump pumps are submersible grinder pumps with a capacity of 50 gpm at 124 feet TDH. The sump pumps are activated by level switches installed in the drainage sump.

2.5.4.10 *Finished Water Distribution System*

Finished water from the GWTP is then pumped by the intermediate pumping station to the City's Grandview Pumping Station (GVPS) through the finished water transmission line. The finished water distribution system consists of the necessary motorized valves designated as V-5 and V-6, controls, piping and appurtenances to route the finished water to either the GVPS or the Los Angeles River (see Appendix D, Figure 2-5). During start-up of the GWTP and in cases where Grandview cannot accept the water, flow is diverted to the Los Angeles River bypass, or the GWTP is shut down.

The bypass includes an air-gap structure and a 24-inch diameter pipe to the Los Angeles River. The VOC treated water from the GWTP is not chlorinated when the water is diverted to the bypass.

2.6 GRANDVIEW PUMPING STATION

2.6.1 *BRIEF DESCRIPTION OF FACILITIES*

Elevated nitrate and chromium concentrations in the groundwater have been detected in monitoring wells in the GOU. In some areas and at certain times of the year, nitrate levels in the monitoring wells have exceeded the state Maximum Contaminant Level (MCLs) for drinking water of 10 mg/L as nitrogen. The highest nitrate detected in the extraction wells during the February 2000 sampling was 9.3 mg/L as nitrogen in GN-1, and the weighted average of all extraction wells was 6 mg/L as nitrogen. The MCL for total chromium is 50 μg/L. Results of the February 2000 sampling of the extraction wells indicated 61 μg/L and 49 μg/L total chromium at Wells GN-3 and GS-3, respectively. Nitrate, chromium (and other inorganic constituents if necessary to meet MCLs or ALs in the extracted and VOC treated groundwater) can be reduced by blending to meet standards before introduction into the City of Glendale's potable water system. To allow for uncertainties and variations in water quality, the City has targeted the design concentration for nitrate at the level of 30 mg/L for the purposes of sizing the blending water pipeline.

Blending shall be applied to other constituents, which are not removed at the GWTP, to meet MCLs or ALs. Based on the February 2000 sampling, no constituents were present that exceeded an MCL or AL.

Constituents which do not have MCLs or ALs and are not removed at the GWTP shall be blended at the GVPS in a manner which optimizes the reduction of the concentration of such constituents towards levels found in other sources utilized by the City. The only such constituents found in more than one well to date are vanadium and chlorate.

The GVPS is located [redacted]. The City is responsible for the design, construction and operation of the blending facilities, using the water from MWD's G-3 connection serving the City. The GVPS consists of a concrete reservoir that is divided into two (2) basins, inlet and outlet piping, and an adjacent building containing the booster pumps, electrical switchgear, controls, monitoring equipment, and the ammonia storage and metering equipment. The blending facilities located within the GVPS property include the flow meter, flow switch and alarm instrumentation on the incoming blend water, the tee connection between the blend water and the booster pump discharge line, and a sampling location for the blended water. Figure 4 in Appendix A shows the route of the MWD water supply pipeline, and Figures 1 and 2 in Appendix E are a plan layout of the GPVS and a schematic of the telemetry system.

The GVPS utilizes aqua ammonia for chloraminating the effluent from the GWTP before it is blended with the MWD water. An ammonia feed system has been installed at the GVPS to achieve a 5:1 chlorine to ammonia ratio to match the chloramine residual level in MWD's supply. The facility is equipped with appropriate high and low level alarms and the operation will be controlled through a Supervisory Control and Data Acquisition –Programmable Logic Controller (SCADA-PLC) system.

Continuous monitoring stations are located to test the GVPS influent water (from the GWTP) as well as the product water after blending with MWD water. Individual grab samples may also be obtained manually. Detailed data sheets on the GVPS basins, pump station and chloramination facilities are provided in Appendix E.

2.6.2 *GRANDVIEW BASINS*

The GVPS includes a 2.5 MG reservoir divided into two (2) 1.25 MG water storage basins within a covered structure. The reservoir was constructed in 1947 and renovated in 1999. Each basin measures [redacted] The sides and floors are constructed of concrete, and the roof is concrete beneath a soil cover.

Incoming water from the GWTP enters an inlet well where the metered ammonia solution is added. The inlet water then overflows this well and flows into the two (2) parallel storage basins. The basins have been fitted with baffles. Each basin has an outlet structure which is connected to the supply header of the booster pumps.

The GVPS basin storage operation is anticipated to be set between the 5 foot to 12 foot levels as follows:

Overflow Elevation	14.0 feet of water
High-High Alarm	13.0 feet of water
Pump Turns On	12.0 feet of water
Pump Turns Off	5.0 feet of water
Low-Low Alarm	4.0 feet of water

2.6.3 *MONITORING EQUIPMENT AND SAMPLING LOCATIONS*

A ¾-inch copper line taps into the 42-inch influent line and furnishes water to a continuous chlorine analyzer located within the pump building. This analyzer is a DPD colorimetric unit, Hach Model CL17 which measures free chlorine. An electrical signal from this analyzer is one of the inputs to the ammonia controller. In addition, an Eclipse Model 88 manual sampling station is installed outside the pump building and provides for manual sampling of the influent water to the GVPS.

A 2-inch service line samples the blended effluent water. This connection also supplies water for the ammonia feed line. The sampling point is on the 42-inch blended water line, about 10 feet beyond the elbow as shown on piping plan, Figure 1 in Appendix E. After passing through the ammonia storage room, the blended water sample line, which has been reduced to ½-inch, continues to the laboratory room on the second floor. The sample is then furnished to two (2) Hach APA 6000 analyzers: one (1) for nitrate and one (1) for free ammonia and for monochloramine. The APA 6000 analyzers utilize ion selective electrodes. Catalog sheets for all three (3) Hach analyzers are included in Appendix E.

Another Eclipse Model 88 manual sampling station is installed on the above 2-inch service line and can be used to obtain grab samples of the blended water for nitrate and inorganic analysis.

2.6.4 *CHLORAMINATION SYSTEM*

The SCADA system provides a flow rate signal from the GWTP which, along with the signal from the Hach free chlorine analyzer, are inputs into the Ecometrics Series 1400 controllers. The Ecometrics controllers combine these signals and pace the ammonia metering pumps to achieve a 5:1 chlorine:ammonia ratio which will create a monochloramine disinfectant compatible with the blend water. The ammonia metering pumps only operate if there is a flow signal from the GWTP.

The ammonia system consists of two (2) 1,235 gallon aqua ammonia tanks, two (2) Prominent Model 1006 metering pumps with Ecometrics Series 1400 controllers, an ammonia gas detector in the storage room, the residual free chlorine analyzer and an injection pump.

In order to generate a chloramine concentration of approximately 2.5 mg/L, 0.5 mg/L of ammonia will be added to the GWTP effluent which will contain approximately 2.5 mg/L of free chlorine. The ammonia feed pumps are capable of delivering 1.5 gallons per hour at 145 psi and 1.9 gallons per hour at 73 psi. Incoming water from the GWTP enters an inlet well where the metered ammonia solution is added. The inlet water then overflows this well and flows into the two (2) parallel storage basins. The basins have been fitted with baffles to prevent short-circuiting and to further encourage the mixing of the ammonia into the water.

A data sheet on the disinfection equipment is included in Appendix E along with manufacturer's information.

2.6.5 *BOOSTER PUMPS*

The pump room has dedicated spaces for four (4) pumps, but only two (2) pumps have been refurbished and will be utilized in an alternating mode. Each pump is capable of pumping 7,000 gpm. Since this is greater than the output from the GWTP, the booster pumps will operate with an off-cycle as the basins re-fill up to the level which activates the pump. It is expected that the pumps will be in service about 17 hours per day. The discharge header is an existing 42-inch pipe. A detailed data sheet for these pumps is provided in Appendix E.

The venturi type flowmeter on the pump discharge line described below, reports the rate of flow to the central SCADA system. Manufacturer's information on this meter is included in Appendix E.

2.6.6 *BLENDING FACILITIES*

A [redacted] pipeline has been installed from the G-3 connection to provide blend water to the blending facilities at the GVPS. This 16-inch water pipeline has a capacity to deliver up to 5500 gpm for blending. Table 3-1 of the GVPS Operational and Maintenance Manual sets forth the required amount of MWD blend water needed for various amounts of nitrate in the GWTP finished water. The blend water rate is controlled by a Cla-val rate-of-flow mechanical valve. A Sensus Model 102 propeller type totalizing flowmeter is installed in the blending water supply line and wired into the SCADA system. The flowmeter has an accuracy of ±2 percent of its reading, and must be calibrated at least annually as recommended by the manufacturer. If a low flow condition is detected, this meter sends an alarm to the GVPS control room and the Howard Substation where 24 hour a day monitoring occurs. In addition, a Flotect No. V4-SS-2U flow switch is installed, which activates an alarm and immediate shut down of the booster pumps in a low flow condition, 800 – 1400 gpm.

The 42-inch pump station outlet pipe has been fitted with a 24-inch by 15-inch venturi flowmeter mounted on a 42-inch flange. See Appendix E, Figure 1. At the blending point, which is about 15 feet (4.3 pipe diameters) beyond the venturi flowmeter, the MWD blend water line tees in to the pump discharge line. Mixing is accomplished by the turbulence in the 42-inch pipe, the additional turbulence caused by the venturi, and an additional 90 degree elbow in the line prior to the sampling point. The sampling point is on the 42-inch blended water line, about 10 feet beyond the elbow as shown on the layout.

The venturi flowmeter includes a pressure recovery zone and information provided by the flowmeter's manufacturer indicates that the blend water connection will not affect the meter's accuracy. See Appendix E.

Since the booster pumps discharge approximately 7,000 gpm, and the MWD blending water rate can be set to between 1,400 gpm and 5,500 gpm, a reduction of the concentration of any constituent will be between 17 percent and 44 percent.

The blended water will be monitored continuously for nitrate and free ammonia and equipped with high level alarms. For nitrate, an alarm will be sent to the SCADA system at 30 mg/L as NO_3, and the booster pumps will be shut down at 35 mg/L. The Hach APA 6000 Ammonia Analyzer will trigger an alarm signal if it detects free ammonia above 0.1 mg/L in the blended water and it will shut down the GVPS pumps if the ammonia is above 0.2 mg/L. The continuous monochloramine analyzer will generate a low level alarm signal to the SCADA system if the monochloramine level drops to approximately 1.5 – 1.8 mg/L.

The continuous samples must be taken, recorded, and the range reported in the monthly report, along with the daily calculation of necessary blend water anticipated.

2.7 OPERATIONS AND MAINTENANCE

The extraction wells, pipelines and the GWTP have been installed and constructed by the GRG. The City will operate and be responsible for the operations of the GOU facilities and for the quality of the water delivered to the distribution system. The GOU facilities shall be operated by certified water treatment plant operators.

2.7.1 *RELIABILITY – DISCUSSION OF ALARMS AND STAFFING*

The GWTP and GVPS are highly automated and designed to operate with minimal operator attention. All key items will signal an alarm in a failure mode at the GWTP control room. Trouble signals are also transmitted to the City's existing Howard Substation, where the entire water system is monitored 24 hours a day, seven (7) days a week through a SCADA system. The well alarms also trigger an autodialer to contact the operator.

In addition to the alarms mentioned elsewhere in this report, the alarm modes and conditions that will automatically shut down the GOU facilities are:

- High water level in either of the PTA reservoirs
- Low water level in an active train PTA reservoir
- PTA blower not in running or in failure mode
- Intermediate water pump not running or failed
- Both treatment train inlet valves closed
- Dehumidifier high temperature or failed
- Low and high GWTP influent flow
- GWTP power failure
- GWTP high or low chlorine residual in treated water

- Flow imbalance between GWTP influent and treated water flow
- Unmatched PTA bypass valve conditions
- Failure of effluent valve to close properly on bypass to the LA River
- Low flow of blend water in to GVPS
- High nitrate concentration GVPS blended water
- High free ammonia in GVPS blended water

Plant operators and supervisors are required to be on call 24 hours a day, seven (7) days a week. In the event of an alarm situation after hours, the City has indicated that it will provide personnel within 30 minutes. Operators and supervisors have pagers and can also access the SCADA system through their portable computers.

The GWTP and GVPS will normally operate unattended. During the initial shakedown period when the effluent will be discharged to the Los Angeles River, the facilities may be manned up to 24 hours a day. After the shakedown period, the number of hours that the facilities are manned will be gradually reduced. However, both facilities will be inspected daily, including weekends and holidays.

2.7.2 *MAINTENANCE*

The GOU facilities are expected to operate for 335 days per year with 30 days off for maintenance. The City must follow all manufacturer's recommendations for calibrating and maintaining alarms, instrumentation especially water and air flowmeters. This is particularly important for any constituent having acute health effects which is controlled by blending at the GVPS. The City must maintain records of these activities for at least five (5) years.

Manufacturer's recommendations for inspection and maintenance of moving parts and rotating equipment must also be followed. Air filters on the PTA blowers must be replaced when dirty or clogged. Internal inspections of LPGAC beds must be performed whenever the bed is changed. Internal inspections of the PTAs must be performed on an as needed basis. Annual leak testing of critical valves such as the bypass valves on the PTAs must be performed.

The Operation and Maintenance Manuals for the GWTP and GVPS shall be updated based on the first year's operational experience. The updated manuals shall be submitted within 15 months after receipt of this water system permit amendment.

2.7.3 *OPERATOR CERTIFICATION*

The GWTP can treat up to 7.2 MGD and GVPS can produce over 10 MGD of blended water. The GWTP shall be operated by a Grade 3 or higher operator and the GVPS shall be operated by a Grade 2 or higher operator. Both the GWTP and the GVPS shall have 24 hour per day on-call supervision by a Grade 3 or higher operator. The City plans to contract out the operation of the GWTP, but the certification requirements must still be complied with.

2.7.4 *CROSS CONNECTION CONTROL*

In October 1999 the GWTP and the GVPS was inspected by the cross connection control specialists from the City and by the Los Angeles County Department of Health. Three (3) reduced pressure principle (RP) devices are used on the potable water entering the GWTP, and three (3) single check valves are used for further protection in the chemical feeding building. At the GVPS, a single RP device is on the 2-inch potable water line. These must be tested annually be a licensed tester.

2.8 WATER MONITORING REQUIREMENTS

Water samples from five (5) upgradient monitoring wells, the seven (7) extraction wells, and at various stages of the treatment and blending processes are collected to monitor the treatment efficiency and water quality. In addition to the sampling and analysis scheduled in the Operational Sampling and Analysis Plan prepared by CDM for the GRG, additional samples shall be collected and analyzed according to the provisions of the permit. The sampling locations with the assigned DHS Primary Station Codes are summarized in Table 4 in Section IV of this report. The City shall ensure that the Primary Station Codes are properly utilized by the sample collection personnel and by the certified laboratory performing the analysis, and that the results are transmitted to the DHS water quality data base electronically (EDT). See Section IV for all of the specific monitoring requirements.

2.8.1 *Early Monitoring Wells*

CDM has proposed the use of five (5) existing monitoring wells to be sampled in order to provide an "early warning" detection of possible previously undetected contaminants and also to detect any significant change of concentration of contaminants moving towards the extraction wells.

The monitoring wells chosen are upgradient to the extraction wells and CDM has estimated a time of travel between the monitoring and extraction wells in the range of 1,300 to almost 2,000 days.

The monitoring wells should be sampled at least annually and for a wide range of organic and inorganic contaminants. Detailed recommendations are provided in Section V.

2.8.2 *Extraction Wells (Sources), General*

The extraction wells, which are the sources of drinking water should be monitored monthly. These wells should be tested monthly for VOCs, metals and for chlorate. Additional parameters should be tested less frequently as specified in the Vulnerability Assessment Table (Appendix G) and in Section IV.

2.8.3 *Special Monitoring*

As described in Section 2.5.1, Well GS-4 is located close to oil pipelines. It must be monitored for total petroleum hydrocarbons to ensure that these are not leaking into the into the aquifer near this well. Vapor probes to detect petroleum hydrocarbons must also be monitored to provide an early warning of any leakage from the oil pipelines.

The special monitoring requirements for this well are detailed in Section IV.

2.8.4 *Treatment Plant Influent*

The combined water from the extraction wells must be monitored frequently to be able to determine the removal efficiency of VOCs and other organics and to ensure that the contaminant levels do not exceed the plant's removal capability.

2.8.5 *PTAs*

In order to verify the removal efficiency in the PTAs, the effluent from each tower must also be tested frequently. In addition, the effluents should be tested regularly to determine the levels of semi-volatile compounds which are not removed in the PTAs but are removed in the LPGAC beds. Any of the rare organic compounds which are not adequately removed by the PTAs or LPGACs must also be identified and tracked.

2.8.6 *LPGAC*

The LPGAC vessels are equipped with sampling ports at the ¼, ½, and ¾ depths of the carbon beds. These sampling ports shall be sampled on a prescribed schedule to track the adsorption of the organic contaminants, and also to know when to change the bed. The effluent of the beds must also be checked to ensure that no uncontrolled bacteriological activity is occurring within the bed.

2.8.7 *GWTP Effluent*

The combined effluent from the eight (8) LPGAC vessels must be tested for organic chemicals, VOCs, metals, total coliform and heterotrophic plate counts weekly to verify the quality of the treated water. Other contaminants may be tested for on a less frequent basis, but the frequency shall increase, depending if they are detected in the wells or PTA effluent.

Before leaving the GWTP, the water is hypochlorinated and the free chlorine residual shall be monitored continuously.

2.8.8 *Grandview Pumping Station*

As described in Section 2.6.3, the level of free chlorine entering the GVPS is continuously monitored so that the proper amount of ammonia will be fed to form the monochloramine disinfectant. The influent water must be checked daily for nitrate using the Hach APA 6000 analyzer. The effluent must be tested weekly for nitrate, and monthly for chlorate, vanadium and any other constituents that are not removed at the GWTP, so that the reduction by blending with the MWD water to control these compounds may be determined.

Continuous monitoring and recording of nitrate, free ammonia and monochloramine in the blended water should be performed.

III. APPRAISAL OF HEALTH AND SANITARY HAZARDS AND SAFEGUARDS

EVALUATION OF POLICY MEMO NO. 97-005 SUBMITTAL BY THE GRG'S CONSULTANT

On November 5, 1997, the Department issued Policy Memo No. 97-005, Policy Guidance for Direct Domestic Use of Extremely Impaired Sources (See Appendix F). In order to assist the Department in evaluating any request to use extremely impaired sources, the policy lists items which must be included with the permit application. The GRG's consultant, CDM, has prepared a report dated May 2000 on behalf of the City covering these items:

1. Introduction
2. Source Water Assessment
3. Characterization of Raw Water Quality
4. Source Protection
5. Effective Monitoring and Treatment
6. Human Health Risks Associated with Failure of the Proposed Treatment
7. Identification of Alternatives to the Use of the Impaired Sources

The GRG and CDM incorporated many of the studies and remedial investigation reports previously prepared under the Superfund activities for the San Fernando Basin and the Glendale Operable Unit.

In addition, the City adopted a CEQA Notice of Determination (NOD) for this project on December 19, 1997. The Notice of Determination was posted by the Los Angeles County Registrar-Recorder from December 23, 1997 to January 22, 1998. The Department received the City's application for the water system permit amendment to use the treated water on July 1, 1999 but all information, including the 97-005 submittal was not available at that time. A copy of the City's permit amendment application and NOD are included in Appendix A.

Overall Evaluation:

The GWTP employs proven, established technology, and as designed and constructed, is capable of reliably removing those organic contaminants which are amenable to air stripping and/or adsorption on granular activated carbon. The Grandview Pumping Station and appurtenances are capable of reducing the concentrations of other constituents by blending up to 44 percent.

The San Fernando Basin is also contaminated by nitrates, chromium and other metals and inorganics besides organic chemicals. The extraction well samples and plant influent sample collected in February, 2000 indicate that the concentration of these constituents are low enough that the combined plant influent and effluent will meet the current MCLs. Current Department policy allows for public water systems which have one or more of these contaminants present in their wells to continue to utilize those wells provided that the water system meets the MCLs in the distribution system using blending to reduce the levels. As is the case in all public water systems, if concentrations of these contaminants rise significantly, or if MCLs are lowered or new MCLs established, the City will have to either provide additional treatment or cease using these wells.

Since these extraction wells are drawing from an aquifer contaminated with numerous organic and inorganic contaminants, the Department requires more monitoring than is required in Title 22 of the California Code of Regulations.

Section 2, Source Water Assessment

This section requires an examination of the vulnerability of the aquifer to contaminating activities, in terms of contaminant sources, the chemicals used, aquifer properties and capture zones.

The GRG and CDM were able to employ information from the remedial investigation report and conceptual design report which were previously developed on the aquifer characteristics, groundwater modeling, groundwater quality and chemical usage as a result of the EPA's investigations and studies which began in the 1980's. CDM's report provides:

- A hydrogeological description of the GOU including the general depth and direction of groundwater flow.
- A discussion of the capture zone, including computer modeling and the associated maps.
- The locations of past known sources of VOCs and of reported chemical usage.
- Identification of types of businesses with typical chemical usage.
- A summary of water quality throughout the contaminated area, including lists of all chemicals and water quality parameters which have been analyzed for in the EPA's groundwater data base and a list of chemicals used in the area based on questionnaires used as part of the Superfund process.
- A discussion of estimated distributions and trends of PCE and TCE.
- A listing and discussion of existing and future regional cleanup actions under the direction of the Regional Water Quality Control Board and the Department of Toxic Substances Control.

Evaluation:

As part of the San Fernando Basin Superfund site, the GOUs have been subject to past activities leading to groundwater contamination. Several of the members of the GRG have or had facilities located within the GOU. The area continues to be used for light to medium industrial and commercial activities. The hydrogeology of the area has been extensively investigated and the continuing extensive program of monitoring wells has provided a significant data base of chemical results dating back almost 20 years.

It is not expected that the nature of the groundwater contamination in the GOU will worsen appreciably in the foreseeable future. Ongoing Superfund cleanups at the North Hollywood OU and the Burbank OU are designed to contain and remediate similar contamination which would otherwise eventually move towards the GOU. A listing of past and current cleanups under the direction of the Regional Water Quality Control Board is included in Table 1 in Appendix F. State and Federal regulatory programs for hazardous waste management and hazardous materials that are now in place should prevent or minimize any future spreading of contamination from new releases. The City will take an active role in these programs to protect its groundwater resources. See the evaluation of Section 4.

Section 3, Characterization of Raw Water Quality

This section requires a thorough characterization of the raw water which would be entering the GWTP.

- Over the course of the Superfund Remedial Investigation (RI), a data base was created for the results of 37 RI monitoring wells and a number of private monitoring wells located in the GOU. CDM prepared a statistical summary of these results. CDM used this information to prepare a list of the contaminants that may potentially be present in the extraction (source) wells.

- In addition, two (2) sets of samples were taken from the extraction wells, once when the wells were at the end of their development test pumping, and again in February, 2000 when the wells were pumped at their design rate for 5 days and the treatment plant was partially operated for testing purposes.

- During the February 2000 sampling, CDM was instructed by the Department to analyze for a wide range of chemicals in order to detect the presence of any chemicals on EPA's usage list that had not been previously tested for. Beyond the typical Title 22 drinking water methods such as 524 and 525, samples were also tested using method 624 and 625/8270. The GC/MS chromatograms were compared against the laboratory's library of approximately 57,000 compounds in order to find any that were not previously tested for and an attempt was made to identify several unidentified compounds. These compounds include phthalates and other high molecular weight organics which are expected to be removed by the GAC.

  Inorganic compounds not previously tested for were also checked. Only one new inorganic (chlorate) was identified.

- As part of the design of the GWTP required under the Superfund order, CDM estimated the plant influent concentrations of TCE and PCE and about 10 other VOCs over a 12 year period.

- The lists developed in Section 2 were compared against existing regulatory standards such as drinking water standards and Proposition 65. A screening methodology was used to find any other compounds which may be of concern in the plant influent water. These were further examined in Section 5.

Evaluation:

The results of the February 2000 sampling event were generally as expected. TCE (270 μg/L) and PCE (23.5 μg/L) were the major organic contaminants found in the treatment plant influent water, along with lesser amounts of 1,1-DCE (10 μg/L), cis-1, 2 DCE (4.3 μg/L), carbon tetrachloride (2.1 μg/L) and trans-1,2-DCE (1 μg/L). All the VOCs were reduced to levels below detection using only the PTAs, except for 1.5 μg/L of TCE. This is below the MCL of 5 μg/L, and is expected to be further reduced to non detectable when the LPGAC adsorbers are used.

Methylene chloride (0.6 – 1.3 μg/L) was reported in the wells and at the treatment plant and MTBE (3.2 – 5.9 μg/L) at the plant. These analyses will need to be confirmed as they may be laboratory or sampling contaminants. In addition, n-dibutylphtalate was detected at low levels, but this is expected to be removed by the GAC.

A single detection of 1,4-dioxane (3.8 μg/L) and a very low trace of atrazine (0.06 μg/L), below the Detection Limit for Reporting Purposes (DLR) of 1μg/L , were reported for GN-3, which is the most contaminated of the extraction wells. This well also had the second highest reading of chlorate, which among other things, is used as a herbicide and mixed with other herbicides listed in the Title 22 list of contaminants.

The following table summarizes the inorganic species reported during the February 2000 sampling (see Appendix B, Tables 3 and 4). It should be emphasized that these are concentrations measured before any treatment or blending. Some of these constituents were measured at the plant influent and some are weighted averages of the individual well results and are so indicated. Some constituents were only found in one well.

Table 3

Constituent	Concentration	MCL*	AL
Nitrate-N, mg/L	6	10 primary	
Chlorate†, μg/L	66‡		
Manganese, μg/L	34	50 secondary	
Total chromium, μg/L	23	50 primary	
Hex chromium, μg/L	5.7		
Nickel, μg/L	11	100 primary	
Vanadium, μg/L	7.5‡		50**
Lead μg/L,..	2.1		15 at tap
Cadmium, μg/L	0.11‡	5 primary	
Perchlorate, μg/L	ND		18
Iodide†, μg/L	1.7‡		
Lithium†, μg/L	1.28‡		
Cobalt†, μg/L	0.24‡		
Gross Alpha pCi/L	4.6‡	15 pCi/L	

		primary	
Sp. Conductance	800	900-1600 secondary	
TDS, mg/L	490	500-1000 secondary	
NDMA ng/L	0.425‡		2

*Primary and Secondary drinking water standards. **Proposed Action Level ‡ Weighted average of the 8 wells. † No regulatory or advisory level for drinking water.

At the time of the February, 2000 sampling, all the inorganics are below their respective MCLs in the raw water coming into the plant (combined influent). Chlorate and vanadium do not have Action Levels (ALs) and have limited toxicological information. Traces of boron were found at very low levels, far below its AL of 1 mg/L. Gross alpha was 8.3, 7.6 and 7.8 pCi/L in Wells Nos. GN-1, GN-3 and GS-2, respectively. The gross alpha consists mostly of uranium which was present at up to about half of its MCL of 20 pCi/L.

During the February 2000 well testing, the weighted average of nitrate (as nitrogen) found in the combined plant influent was 60 percent of the MCL (10 mg/L as nitrogen). The highest well was GN-1 with 9.28 mg/L. These levels may vary over time, but they are less than was originally anticipated.

In the February 2000 sampling, total chromium was present in all eight (8) wells and ranged from 22 μg/L in GN-4 and GS-4 up to 61 μg/L in GN-3 with the weighted average being 32 μg/L. Hexavalent chromium was approximately 10 percent to 50 percent of the total chromium. Well GS-3 had 49 μg/L total chromium and is located adjacent to a plating shop. Plume maps prepared by the US EPA indicate this well is close to a chromium plume. All the extraction wells will be monitored frequently for chromium and other heavy metals as GN-3 already exceeds the MCL for chromium.

Well No. GS-1 in the SOU is located about 150 feet from the Los Angeles River. Several wastewater treatment plants discharge excess recycled water into the river. The initial testing of this well included a microscopic particulate analysis. Analytical results showed detectable amounts of iodine, lithium, cobalt, ammonia nitrogen and a trace of MBAS were reported only in Well GS-1 during the February, 2000 testing, and were diluted in the combined influent to the GWTP. N-nitrosodimethylamine (NDMA) was detected in GS-1 at a level of 5 parts per trillion (ppt).

Well GS-4 is located near two (2) petroleum pipelines. Vapor probes will be installed around the well and they will be monitored for total hydrocarbon vapors. There were no indications of petroleum detected at Well GS-4 during the February 2000 sampling.

Section 4, Source Protection

This section requires a program to control the level of contamination.

CDM's document enumerates the various regulatory programs for the management of hazardous wastes, storage tanks (both underground and aboveground), oil spill prevention and response, hazardous materials management, the Uniform Fire Code, and water and wastewater programs. The City has agreed to implement communication and involvement with the California Department of Toxic Substances Control, the Regional Water Quality Control Board and the USEPA. The City will maintain contact to determine:

- The status of any investigations in the area
- Any newly discovered releases or other threats to groundwater
- The status of on-going remediation activities
- Establishment of new businesses that may pose a potential threat to the City's groundwater resources will be coordinated with the City's established cross connection control program.

The City will be involved with meetings and hearings on these issues and will request to be placed on all appropriate mailing lists. A permit provision will require the City to prepare an annual report to the Department on its activities under this program.

Evaluation:

Given the large number of commercial and industrial activities in the GOU area, the proposed program relying on regulatory oversight seems reasonable. When the City's water department establishes new commercial or industrial connections, they will be reviewed for potential risks to groundwater resources.

Section 5, Effective Monitoring and Treatment

This part of the policy guidance requires an evaluation of:

- Best available treatment (BAT) technology
- Reliability features
- No bypassing of the treatment process
- The use of multi-barrier treatment processes
- Process optimization and the use of blending with other water sources prior to entry into the distribution as an additional safety factor
- Appropriate performance, process monitoring, operations and reporting
- Surveillance monitoring between the contamination source areas and the extraction wells

CDM's submittal includes:

- A description of the treatment processes, including a discussion of the performance of the PTAs in February, 2000
- A discussion of the performance standards which the plant will achieve
- A discussion of the operations and reliability features, including extra packing in the PTAs, variable speed motors, and spare capacity in blowers and pumps
- Process monitoring covering PTA influent and effluents, and the LPGAC bed monitoring
- Plant optimization

- Failure responses
- Shut down triggers are given in Section 6
- A proposed monitoring program covering the extraction wells, the "early warning" monitoring wells, the treatment plant finished water, nitrates and other inorganics at the Grandview Pump Station
- The use of five (5) "early warning" surveillance monitoring wells upgradient to the actual extraction wells
- Emergency Notification and Contingency Plan

Evaluation:

The GWTP was designed for the removal of VOCs and semi-volatile organics. The plant is equipped with both PTAs and LPGAC which are recognized in the Title 22 regulations as BAT for all organics listed (with the exception of glyphosate, which has not been detected in the GOU). Most of the San Fernando Basin has nitrate concentrations above the MCL, most likely resulting from past agricultural activities or private sewage disposal systems. Nitrates are mitigated by blending the water from the GWTP with water lower nitrate level purchased from MWD, at the Grandview Pumping Station. If necessary, blending can also be used to control other inorganics and any organics not amenable to removal by the PTA/LPGAC treatment.

The efficiency of the overall process, PTA/LPGAC/blending, can be easily monitored. These are not new or experimental technologies. All three (3) processes have been utilized and refined for several decades. The processes are mechanically simple and use pumps, blowers and several chemical feed pumps. The GWTP and GVPS are not subject to a drastically changing influent, as is a surface water treatment plant for example, which must adjust flocculent and coagulant dosages as influent turbidity varies with weather and other conditions.

State MCLs and ALs for VOCs and semi-volatile organics amenable to PTA/LPGAC treatment must be achieved in the finished water (FW) leaving the LPGAC vessels. The GWTP should easily be able to treat the water down to concentrations below the Detection Limits for Reporting Purposes (DLR) or non-detectable for these compounds. The LPGAC vessels are equipped with sampling ports within the depth of the carbon beds. It is expected that concentrations of adsorbable organics will be below the detection limit since the carbon beds will be changed out upon detection of an adsorbable organic at the ¾ port.

If the finished water leaving the GWTP does not meet all MCLs and ALs for treatable constituents, the plant will be manually shut down. If the blended water at the GVPS does not meet all MCLs and ALs, the GVPS will be manually shut down.

In the event that any non-treatable constituent is present at the GWTP influent at a concentration exceeding ten (10) times its MCL or AL based on chronic health effects or exceeding three (3) times its MCL or AL based on acute health effects, the constituent cannot be treated by blending alone since multi-barrier treatment is required. Additional treatment to include removal shall be provided.

Special monitoring provisions are being established in the domestic water supply permit. Chromium concentrations will be carefully monitored in all the wells since GN-3 is already above the MCL. Vapor probes will be installed around GS-4 and monitored for total hydrocarbon vapors to ensure it is not affected by nearby petroleum pipelines in the future.

Section 6, Human Health Risks Associated with Failure of the Proposed Treatment

The policy guidance calls for an evaluation of the risks of failure of the proposed treatment system and an assessment of potential health risks associated with such failures.

In CDM's submittal, 26 different scenarios were identified and evaluated including potential failure of a single equipment item and more complex sequences of events. Only 3 scenarios were identified as having a potential to degrade the treatment plant performance and result in delivery of partially treated water. CDM utilized the "event tree" evaluation process.

CDM then calculated the health effects if the above mentioned failures occurred. The calculations were actually done twice, once for the maximum expected influent concentrations and once based on the influent concentrations measured during the February 2000 testing of the PTAs.

Evaluation:

CDM concludes that the failure scenarios have very low probabilities of occurrence, and, in the unlikely event that they do occur, that they would have minimal risk to public health. Their conclusions are based on the following:

(1) The concentrations of contaminants in the blended water are relatively low, and do not exceed MCLs or ALs or acceptable risk-based levels, even during the failure scenarios. Further, the cumulative risks from the combined contaminants are not high.

A typical water source with a similar mixture of these contaminants present at comparable concentrations would not be considered in violation of the drinking water standards.

(2) The public's exposure to improperly treated drinking water during a failure episode would be of short duration. The time frame before such failure scenarios would be detected is relatively short, and exposures to water from failures would be terminated by immediate corrective action or by shutting down the plant. CDM's assessment factored in 66 hours or more of reduced treatment plant efficiency over a weekend period before a problem is detected. The permit will require daily inspection, including weekends. In addition, the City's internal notification system can call in personnel in about 30 minutes.

The analysis in this section underscores the need for proper inspection, and for diligent maintenance and calibration of equipment and instruments.

Section 7, Identification of Alternatives to the Use of the Impaired Sources

The policy guidance calls for an identification of alternative sources of drinking water and a comparison of the potential health risks.

CDM's submittal discusses:

- The continued use of water from the MWD and presents a comparison of MWD water, water from the City's sources in the Verdugo Basin, and the projected effluent from the Glendale Water Treatment Plant, including a table of the chemical composition of these three water sources
- The tendency for groundwater, especially those undergoing removal of VOCs, to generate less THMs than conventionally treated surface water
- The presence of nitrate, chromium and other inorganics in the GWTP effluent
- The findings of *cryptosporidium* and MTBE in the influent of MWD's treatment plants and the range of perchlorate concentration in MWD's effluents
- Assurance of supply and service interruptions
- Alternate disposal of the treated groundwater
- Conclusions and recommendations

Evaluation:

Table 7-1 of CDM's submittal compares water quality as reported in MWD's 1998 Annual Water Quality Report to the one-time test of the GWTP PTAs (the LPGACs were not used during this testing), and to water the City currently obtains from the Verdugo Basin.

It appears that the GWTP will produce equivalent water quality in terms of organic contaminants, and will have significantly lower THMs, especially when the LPGAC is utilized, and the last trace of TCE should be removed. Other systems have been observed to also have low THM numbers when groundwater is treated using PTAs or pumped through GAC prior to chlorination.

For the inorganics and microbiological parameters, while both waters meet the MCLs, for some parameters, there are lower concentrations in one source than the other. The projected GWTP effluent will likely be higher in chromium, nickel, nitrate, and vanadium, while the MWD water seems likely to be higher in aluminum (actually its upper range is above the secondary MCL of 200 ppb), and perchlorate.

CDM's submittal also discusses the benefits to the City of restoring the use of the San Fernando Basin in terms of having an independent source of supply, particularly in case of earthquakes, fires, or other interruptions in MWD's supply.

IV. CONCLUSIONS AND RECOMMENDATIONS:

The Department finds that the sources of supply, treatment works, and operation as described in this report are capable of producing a safe, wholesome, and potable water supply. The quality of the water served and the City's facilities and operations adequately meet the Department's Standards. Issuance of an amended domestic water supply permit by the Department to the City is recommended subject to the following provisions:

GENERAL PROVISIONS

1. The City shall comply with all state laws applicable to public water systems and any regulations and standards adopted thereunder.
2. No sources shall be added and no changes, modifications or additions in the treatment processes listed in Provision 15 shall be made without first receiving an amended domestic water permit from this Department.
3. All personnel who operate the GWTP and GVPS treatment facilities shall be certified in accordance with the California Code of Regulations, Title 22, Section 63765. Both the GWTP and the GVPS shall have 24 hour per day on-call supervision by a T3 or higher operator.

Facility	*Classification*	*Minimum Certification of Chief Operator*	*Minimum Certification of Shift Operator*
GWTP	T3	T3	T2
GVPS	T3	T3	T2

4. All plant operators and supervisory personnel involved with the operation or oversight of the GWTP or the GVPS shall have a copy of and shall be familiar with the conditions of this permit amendment. A copy of the conditions shall be maintained at both facilities for reference.
5. The City shall minimize vandalism and unauthorized entry to the extraction well sites, the GWTP and the GVPS facilities at all times.
6. The City shall comply with Title 17 of the California Code of Regulations (CCR), to prevent the water system and treatment facilities from being contaminated from possible cross-connections. The City shall maintain a program for the protection of the domestic water system against backflow from premises having dual or unsafe water systems in accordance with Title 17. All backflow prevention devices shall be tested annually.

WATER QUALITY

7. Unless listed below, water leaving the GWTP and transferred to the GVPS shall comply with all Maximum Contaminant Levels (MCLs) and Action Levels (ALs) established by this Department all times.

Metals and constituents including the following are not expected to be removed by the GWTP. If necessary, metals and constituents including the following constituents shall be controlled by blending at the GVPS to achieve the specified levels:

Nitrate, as NO_3	45 mg/L, MCL
Aluminum	1.0 mg/L, MCL
Antimony	0.006 mg/L, MCL
Cadmium	0.005 mg/L, MCL
Chromium	0.050 mg/L, MCL
Lead	0.015 mg/L, AL
Nickel	0.10 mg/L, MCL
Vanadium	0.015 mg/L, AL
Perchlorate	0.018 mg/L, AL
1,4-Dioxane	0.003 mg/L, AL

8. In the event that any non-treatable constituent is present at the GWTP influent at a concentration exceeding ten (10) times its MCL or AL based on chronic health effects or exceeding three (3) times its MCL or AL based on acute health effects, the constituent cannot be treated by blending alone. Additional treatment to include removal shall be provided.

9. The GWTP shall be operated in a manner which optimizes the removal efficiency of the organic compounds which are amenable to PTA and LPGAC treatment, with the goal of reducing these constituents to less than detectable concentrations in the finished water. If any organic compounds are detected in the finished water, the additive effects of multiple organic contaminants shall be considered. The following equation must be met by the GWTP effluent, when it can be accomplished in a cost effective manner:

$$\text{Hazard Index} = \sum_{i=1}^{n} \left\{ \frac{\text{Contaminant Concentration}}{\text{MCL or AL}} \right\}_i \leq 1$$

MCL = Maximum Contaminant Level (State Drinking Water Standard);

AL = Action Level

If the Hazard Index cannot be met, then the City shall notify this Department on the same day, unless the Department's office is closed, in which case, notification shall be made by 8:15 a.m. on the next day. Information on the extraction wells and the GWTP shall be provided to the Department.

10. The Hazard Index shall be calculated each time the GWTP effluent water is sampled for organic constituents. All calculations shall be submitted to this Department by the 20th day of the following month.

11. Constituents found in the GWTP effluent which do not have MCLs or ALs such as chlorate shall be blended at the GVPS in a manner which optimizes the reduction of the concentration of such constituents towards levels found in the blending water utilized by the City.

12. All water supplied by the City at the Point of Introduction into the System for domestic purposes shall meet all MCLs and ALs established by the Department. If the water quality does not comply with the California Drinking Water Standards, the City shall not use the GWTP effluent until the cause of the exceedance is remedied or additional treatment is provided to meet standards.

EXTRACTION WELLS

13. In addition to the sources approved in the permit issued to the City of Glendale on March 25, 1999, the following new sources are approved for use as domestic sources of supply:

- Four (4) new extraction wells drilled generally in a line running northeasterly within the [redacted]

Well	Primary Station Code	Depth, (feet)	Average Capacity* (gpm)	Status
GN-1	[redacted]	[redacted]	565	Active
GN-2	[redacted]	[redacted]	565	Active
GN-3	[redacted]	[redacted]	565	Active
GN-4	[redacted]	[redacted]	1,600	Active

*Capacity may vary up to 700 gpm for GN-1, GN-2 and GN-3, and up to 1,700 gpm for GN-4.

- Three (3) new extraction wells drilled generally in a line running [redacted]

Well	Primary Station Code	Depth, (feet)	Average Capacity* (gpm)	Status
GS-2	[redacted]	[redacted]	425	Active
GS-3	[redacted]	[redacted]	425	Active
GS-4	[redacted]	[redacted]	425	Active

*Capacity may vary up to 600 gpm for GS-2, GS-3 and GS-4.

- In addition, the City currently utilizes the following sources and connections:

Source	Primary Station Code	Status
Glorietta Well No. 3	[redacted]	Active
Glorietta Well No. 4	[redacted]	Active
Glorietta Well No. 6	[redacted]	Active
Verdugo Park Treatment Plant Influent (Pickup System, Wells A and B)	[redacted]	Active
MWD-G1 Connection	[redacted]	Active
MWD-G2 Connection	[redacted]	Active
MWD-G3 Connection	[redacted]	Active
Burbank, City of	[redacted]	Active and Emergency

14. The extraction wells shall be operated according to the Operation and Maintenance (O and M) Manual or its replacement or amendment. The replacement document or amendments shall be approved by this Department.

GOU WATER TREATMENT FACILITIES

15. The only treatment facilities approved for use for the treatment of extraction wells listed in Provision No. 13 by the City are:

Treatment Facility	*Treatment Processes*
GWTP	• Polyphosphate addition for scale control as necessary • Air stripping of volatile organic chemicals using PTAs • Adsorption of organic chemicals using LPGAC • Hypochlorination for disinfection
GVPS	• Ammonia addition for chloramination • Blending of nitrates, chlorate, vanadium and other metals and other constituents with purchased water from MWD

16. The City shall not exceed the GWTP's design capacity of 5,000 gpm at any time.

17. The City shall operate all treatment facilities listed in Provision 15. No processes shall be bypassed at anytime.

18. Recycling of condensates from the vapor phase treatment equipment or other contaminated liquids is prohibited. No backwash or other waters from the backwash or any utility tank shall be recycled back to the PTAs or the LPGAC adsorbers.

19. The PTAs and the VPGACs for treating the air from the packed tower aerators must be operated in compliance with the substantive requirements of the South Coast Air Quality Management District. Failure to so operate this equipment shall render this permit amendment null and void.

20. The City shall operate the treatment plant in accordance with the O and M Manual or its approved replacement or revision.

PACKED TOWER AERATORS (PTAs)

21. Each PTA shall not exceed its capacity of 2,500 gallons per minute at any time.

22. Each PTA shall be operated with an air/water ratio of at least 30.4 to 1 on a volumetric basis.

23. A polyphosphate scale inhibitor shall be added to the raw water as necessary to control the buildup of mineral scale within the PTAs and LPGAC vessels. This additive must be approved in accordance with Provision 80.link

LIQUID PHASE GRANULAR ACTIVATED CARBON (LPGAC) ADSORBERS

24. Except as provided for below, each of the eight (8) LPGAC vessels shall be operated at a flowrate of no more than 625 GPM. When a vessel is removed from service for carbon changeout or any other reason, the total plant influent rate shall be adjusted so that each of the remaining LPGAC vessels receives no more than 625 gpm. Each LPGAC vessel shall be operated with an Empty Bed Contact Time (EBCT) of at least 8.6 minutes at all times.

    If the City wishes to maintain the 5,000 gpm plant flow rate with one (1) LPGAC vessel out of service, the City shall submit an operation plan for review and approval. This plan shall include:

    a. Details on staggering the carbon bed changeouts such that if a bed is removed from service the remaining seven (7) beds shall not be close to exhaustion and additional changeouts shall not be quickly triggered.

b. Include additional monitoring of the beds remaining in service while one is out of service.

c. Include operational experience at this facility such as the monitoring results from ¼, ½, and ¾ ports.

d. Include a demonstration that the water quality of the remaining seven (7) beds does not deteriorate.

e. Include coordination with the LPGAC supplier so that the time of operation with seven (7) beds is limited to the time required for the physical, onsite carbon changeout and the backwashing of fines.

25. All initial and replacement carbon for the LPGAC adsorbers shall be virgin carbon and meet the requirements in the specifications of the Final Design Report, September 1996, Section 13410, as a minimum. Any change of the carbon specification shall be approved in writing by the Department.

26. Fresh charges of activated carbon shall be backwashed to remove carbon fines and the adsorber shall not discharge to the plant effluent until it is verified that no visible carbon fines are present in the adsorber's effluent.

27. Each time a carbon vessel is emptied, the vessel internals shall be inspected for evidence of damage, looseness, clogging or other problems. The condition of the lining shall be noted. Records of maintenance inspections shall be kept on file at the GWTP as specified in Provision 86.

    If entry into the vessel is necessary, the vessel shall be disinfected with a free chlorine solution of 50 mg/L and held for two (2) hours. The vessel shall be flushed to a residual of less than 0.1 mg/L prior to installing the fresh carbon.

GRANDVIEW PUMPING STATION AND BLENDING FACILITY

28. The blending and disinfection operations at the GVPS facilities shall be conducted in accordance with this permit and the "Operational and Maintenance Manual and the Operational Sampling and Analysis Plan/Quality Assurance Project Plan for the IRA – Glendale OU Downstream Facilities" or any subsequently approved versions of these documents. The City may introduce a portion of the blending water into the Grandview Basins to improve the uniformity of water quality throughout the distribution system.

29. The operation of the GVPS shall be coordinated with the operation of the GWTP, and with the operation of the extraction wells. The operator of the GWTP plant will report daily to the GVPS operator as to which extraction wells are being utilized, and shall report any change of the source wells immediately to the GVPS.

30. If the nitrate level of the blended effluent at sample location Primary Station Code [redacted] exceeds 36 mg/L, immediate actions shall be taken to reduce the nitrate concentration.

31. The chloramine residual shall be compatible with that in the blend water obtained from the MWD. The disinfectant residual concentration in the GVPS effluent shall be within 0.5 mg/L of that in the MWD blend water.

MONITORING

GENERAL

32. Except for bacteriological analysis, all water quality monitoring results obtained at a certified laboratory shall be submitted to the Department using Electronic Data Transfer (EDT) utilizing the Primary Station (PS) Codes in Provision 33. Effective January 1, 2001, the submittal shall be made by the 10^{th} of the month following completion of the analyses.

33. The following PS codes shall be utilized for transmittal of water quality data:

Table 4

COMMON NAME	PRIMARY STATION CODE	WQI SOURCE NO.	DESCRIPTION
GN-1	[redacted]	025	GOU GN-1 DISCHARGE
GN-2		026	GOU GN-2 DISCHARGE
GN-3		027	GOU GN-3 DISCHARGE
GN-4		028	GOU GN-4 DISCHARGE
GS-1		029	GOU GS-1 DISCHARGE
GS-2		030	GOU GS-2 DISCHARGE
GS-3		031	GOU GS-3 DISCHARGE
GS-4		032	GOU GS-4 DISCHARGE
		024	GOU PTA-1 EFFLUENT
		033	GOU PTA-2 EFFLUENT
		034	GOU RAW WATER TO PTA-1
		035	GOU RAW WATER TO PTA-2
		036	GOU VL-1, ¼ PORT
		037	GOU VL-1, ½ PORT
		038	GOU VL-1, ¾ PORT
		039	GOU TREATED WATER VL-1
		040	GOU INTERMEDIATE TW TO LPGAC
	[redacted]	041	GOU VL-2, ¼ PORT
		042	GOU VL-2, ½ PORT
		043	GOU VL-2, ¾ PORT
		044	GOU TREATED WATER VL-2
		045	GOU VL-3, ¼ PORT
		046	GOU VL-3, ½ PORT
		047	GOU VL-3, ¾ PORT
		048	GOU TREATED WATER VL-3
		049	GOU VL-4, ¼ PORT

	[redacted]	050	GOU VL-4, ½ PORT
	[redacted]	051	GOU VL-4, ¾ PORT
	[redacted]	052	GOU TREATED WATER VL-4
	[redacted]	053	GOU VL-5, ¼ PORT
	[redacted]	054	GOU VL-5, ½ PORT
	[redacted]	055	GOU VL-5, ¾ PORT
	[redacted]	056	GOU TREATED WATER VL-5
	[redacted]	057	GOU VL-6, ¼ PORT
	[redacted]	058	GOU VL-6, ½ PORT
	[redacted]	059	GOU VL-6, ¾ PORT
	[redacted]	060	GOU TREATED WATER VL-6
	[redacted]	061	GOU VL-7, ¼ PORT
	[redacted]	062	GOU VL-7, ½ PORT
	[redacted]	063	GOU VL-7, ¾ PORT
	[redacted]	064	GOU TREATED WATER VL-7
	[redacted]	065	GOU VL-8, ¼ PORT
	[redacted]	066	GOU VL-8, ½ PORT
	[redacted]	067	GOU VL-8, ¾ PORT
	[redacted]	068	GOU TREATED WATER VL-8
Treated Water	[redacted]	069	TW BEFORE DISINFECTION
Finished Water	[redacted]	070	FINISHED WATER, DISINFECTED
	[redacted]	071	COMBINED SOU RAW WATER @AIR/VAC VALVE
	[redacted]	072	COMBINED NOU RAW WATER @ WTP
	[redacted]	073	INTERMED. TREATED WATER @ LPGAC HEADER
	[redacted]	074	INFLUENT TO GRANDVIEW PUMP STATION
	[redacted]	075	BLENDED EFFLUENT FROM GRANDVIEW PUMP STATION (POINT OF INTRODUCTION INTO THE SYSTEM)

34. Water samples for operational control purposes may be analyzed by field test kits, continuous monitors or benchtop units within the GWTP and GVPS. All water samples for compliance purposes shall be analyzed at a laboratory certified by the Department's Environmental Laboratory Accreditation Program (ELAP) for each analytical technique. If no certification is available for a particular compound, the method and detection limit shall be submitted for approval by the Department on a case by case basis.

35. Analysis for synthetic organic chemicals (SOCs), semi-volatile base, neutral, and acid extractable organic chemicals (BNAs), VOCs, chromium, nitrate, Methyl tert butyl ether (MTBE), and 1,2,3-trichloropropane (1,2,3-TCP) shall employ EPA

methods, Standard Methods for the Examination of Water and Wastewater or other drinking water methods certified by ELAP as follows. If samples need to be diluted for analyses, then a sample at the smallest dilution multiple possible shall also be analyzed to assure all analytes are reported at the lowest possible reporting limits.

The laboratory shall report full results of all analyses performed.

Table 5

Chemical	Analytical Methods
SOCs	EPA Method (If any unknown peaks show on chromatographs, they shall be reported to this Department)
Alachlor	505, 507, 525.2, 508.1
Aldicarb	531.1
Aldicarb Sulfone	531.1
Aldicarb Sulfoxide	531.1
Atrazine	505, 507, 525.2, 508.1
Bentazon	515.1
Benzo (a) pyrene	525.2, 550, 550.1
Carbofuran	531.1, 6610
Chlordane	505, 508, 525.2, 508.1
2,4-D	515.2, 555, 515.1
Dalapon	515.2, 515.1
Di (2-ethylhexyl) adipate	506, 525.2
Di (2-ethylhexyl) phthalate	506, 525.2
DBCP	504.1, 551
Dinoseb	515.2
Diquat	549.1
Endothall	548.1
Endrin	505, 508, 525.2, 508.1
Ethylene Dibromide (EDB)	504.1, 551
Glyphosate	547, 6651
Heptachlor	505, 508, 525.2, 508.1
Heptachlor Epoxide	505, 508, 525.2, 508.1
Hexachlorobenzene	505, 508, 525.2, 508.1
Hexachlorocyclopenta diene	505, 508, 525.2, 508.1
Lindane	505, 508, 525.2, 508.1
Methoxychlor	505, 508, 525.2, 508.1
Molinate	507
Oxamyl (Vydate)	531.1, 6610
Pentachlorophenol	515.2, 525.2, 555, 515.1
Picloram	515.2, 555, 515.1

PCBs	508A
Simazine	505, 507, 525.2, 508.1
Thiobencarb	507
Toxaphene	505, 508, 525.2
2,3,7,8-TCDD (Dioxin)	1613, 513
2,4,5-TP (Silvex)	515.2, 555, 515.1
Bromacil	507
Chlorothalonil	508
Diazinon	507
Dimethoate	507
Diuron	632
Naphthalene	525.2
Phthalates	506, 525.2
Prometryn	507
2,4,5-T	515.1
Aldrin	505, 508, 525.2
Butachlor	507, 525.2
Carbaryl	531.1
Dicamba	515.1
Dieldrin	505, 508, 525.2
3-Hydroxycarbofuran	531.1
Methomyl	531.1
Metolachlor	507, 525.2
Metribuzin	507, 508, 525.2
Propachlor	507, 525.2
Semi-Volatiles, including 1,4-Dioxane	EPA Method 8270, 8270 modified, 525.2 (If any unknown peaks show on chromatographs, they shall be identified and reported to this Department)
VOCs	EPA Method 524.2 or 502.2 (If any unknown peaks show on chromatographs, they shall be confirmed by method 524.2, identified, and reported to this Department)
MTBE, TAME, ETBE	EPA method 524.2 or 502.2
1,2,3-TCP	EPA method 524.2 or 504.1
Metals	EPA Method 200.7, 200.8 or 200.9, Standard Method 3113 B Mercury also by Method 245.1 or 245.2
Nitrate	EPA Method 300.0 or 353.2; or Standard Method 4500-NO_3F, 4500-NO_3E, 4500-NO_3D or 4110
Chlorate	EPA method 300.1
Perchlorate	EPA method 300.0 –IC or 314

For method 8270, the laboratory shall report results at the laboratory's drinking water reporting limits if applicable, or the lowest reproducible, achievable reporting limits whichever are lower. Reporting limits shall be subject to the Department's review and approval.

36. The laboratory performing method 8270 shall attempt to avoid carry over of contaminants within the GC/MS equipment. The laboratory should not batch water samples from the GOU with soil samples, wastewater samples or with water samples having high concentrations of semi-volatile contaminants. When using an automatic sampler, the samples from the GOU should be loaded to run first.

37. Sampling shall be performed in a manner which minimizes the chances for contamination of the sample. Sampling events shall be planned so that the cleaner samples (plant effluent, individual carbon adsorber effluent, and intermediate water) are sampled prior to taking influent samples. Alternatively, a different individual may be designated to take plant influent samples.

38. The laboratory performing the analyses shall be instructed to report all calibrated peaks on chromatographic analyses. Uncalibrated peaks on chromatographic analyses shall be reported if they are greater than 10 percent of the nearest internal standard and are not known artifacts produced by the instrument. All uncalibrated peaks that can be identified by the mass spectra shall be identified as "Tentatively Identified Compounds" (TICs). All TICs must be reported to the Department along with the other compounds.

    If unknown peaks on GC/MS chromatograms are not identified by the laboratory's existing library of spectra, the sample extracts shall be retained and the City or the laboratory shall consult with the Department within seven (7) days of this finding. For volatile organic analyses, additional sampling may be required. Following the consultation, and unless instructed otherwise by the Department, the laboratory analyst shall attempt to identify functional groups and/or tentatively identify the compound(s). This attempt shall be made and the Department notified of the results by telephone and fax within 14 days of the discovery of unknown peaks. The Department may require and allow time for additional work to positively identify the compound(s) and/or additional testing of the GWTP plant effluent to verify removal of the compound(s).

39. The City shall comply with any additional conditions which the Department deems necessary based on any newly identified constituents.

40. Where specified, low level analysis for 1,2,3-trichloropropane (1,2,3-TCP) shall be performed by an ELAP certified laboratory with the lowest achievable reporting limit or 2 parts per trillion (ppt). On a yearly basis, laboratories shall be evaluated to determine which laboratory can achieve the lowest reporting limit or 2 ppt. At this time, a reporting limit of 50 ppt or lower shall be achieved.

41. Where specified, analysis for N-nitrosodimethylamine (NDMA) shall be performed by an ELAP certified laboratory with the lowest achievable reporting limit or 2 ppt.

42. Analysis for metals shall include all metals listed in Title 22: aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, mercury, nickel, selenium, thallium, copper, iron, manganese, silver, and zinc. In addition, analysis shall include all metals which have action levels established by the Department or which have previously been detected in the GOU: lead, boron, lithium, vanadium and cobalt. The laboratory shall also report results for any other metal which may have been otherwise added to the laboratory's ICAP or ICAP/MS instruments, when using those methods.

43. If necessary, the Department may modify the monitoring provisions specified herein based on additional information. The City may request a modification of any monitoring provision based upon substantiating data at any time.

44. Prior to proceeding with the requirements for further monitoring following a detection of a chemical, the City may first confirm the analytical result, as follows: Within seven (7) days (24 hours for LPGAC ports, LPGAC effluent and GWTP effluent) from the notification of an initial detection from a laboratory reporting the presence of one or more chemicals in a water sample, the City shall collect and analyze one or two additional samples to confirm the initial finding. Confirmation of the initial finding shall be shown by the presence of the chemical in either the first or second additional sample, and the detected level of the contaminant for compliance purposes, if applicable, shall be the average of the initial and the confirmation sample(s). The initial finding shall be disregarded if two additional samples do not show the presence of the chemical.

    The City shall be responsible for, and require, the timely notification from the laboratory by telephone or fax of analytical results, particularly those which trigger additional sampling within time limits.

45. Analytical results of all samples received by the City in a calendar month shall be reported to the Department no later than the tenth day of the following month.

46. The City shall require all laboratory analyses to use updated analytical methods when promulgated by the Department or the US EPA.

47. The initial round of sampling under this permit amendment for the Early Warning Monitoring Wells and for the Extraction Wells shall be performed no sooner than 30 days after and no later than 90 days after the issuance of this permit.

EARLY WARNING MONITORING WELLS

48. The following monitoring wells owned by the USEPA shall be sampled and analyzed in order to provide early detection of any new constituents or significant changes of previously identified constituents that may effect the extraction wells:

MONITORING WELL	PRIMARY STATION CODE	WQI SOURCE NO.
CS-C03-100	[redacted]	076
CS-VPB-04	[redacted]	077
CS- VPB-08	[redacted]	078
CS-VPB-06	[redacted]	079
CS-VPB-10	[redacted]	080

Sampling shall be performed at the time that the USEPA or its contractor collects samples from these wells.

If these wells become unavailable, then the City shall drill replacement monitoring wells and continue the same monitoring program.

49. Samples from these wells shall be analyzed annually by the City for:

- All organic constituents (Title 22 VOCs and SOCs) in the Vulnerability Assessment Guideline (Appendix G). Report all detections and peaks as required in Provision 38.
- Semi-volatile organic chemicals, including 1-4 dioxane using method 8270 and 8270 modified respectively. Report all detections and peaks as required in Provision 38.
- Low level 1,2,3-TCP
- Perchlorate and chlorate
- Complete metals analysis per Provision 42.

EXTRACTION WELL (SOURCE) MONITORING

50. Each extraction well shall be sampled, at a minimum, in accordance with the attached Vulnerability Assessment and Monitoring Frequency Guidelines Appendix G or its replacement prepared by this Department. Previous analytical results may be used to comply with the monitoring requirements, and shall be submitted to this Department for review, when requesting a waiver.

In addition, each extraction well shall be analyzed for semi-volatile organic compounds including 1-4 dioxane using method 8270 and 8270 modified respectively, at least annually.

Any Title 22 SOCs detected in the Early Warning Monitoring Wells shall be tested for in the Extraction Wells at least annually.

51. In addition to the metals included in the Vulnerability Assessment and Monitoring Frequency Guidelines required in Provision 50, metals including vanadium shall be tested for monthly as required in Provision 42. Each extraction well shall be analyzed monthly for chlorate.

52. Low level analysis for 1,2,3-TCP shall be performed quarterly for each extraction well, unless this compound is detected in any of the early warning monitoring wells or the extraction wells, in which case the low level analysis for this compound shall be performed monthly at the extraction wells in the OU at which the detection occurred.

SPECIAL MONITORING FOR WELL GS-4

53. Well No. GS-4 shall be monitored quarterly for total petroleum hydrocarbons in the water using an EPA approved method. A plan for installing vapor probes around this well shall be submitted for review and approval prior to the installation of the probes as required in Provision 90. After installation of the vapor probes, they shall be tested quarterly for total hydrocarbon gases using a portable flame ionization detector. The survey results shall be included with the monthly report.

GWTP INFLUENT MONITORING

54. The raw water entering the GWTP (combined influent, PS code [redacted] shall be sampled biweekly during the first year of operation for VOCs to monitor and evaluate the removal efficiency and variability. After the first year, the monitoring may be decreased to monthly, based upon approval from this Department. A secondary sampling point, PS code [redacted] which is also representative of the combined plant influent, shall be utilized only if PTA-1 is out of service.

PTA EFFLUENT MONITORING

55. The effluent from each PTA (PS codes [redacted]) shall be sampled biweekly during the first year of operation for VOCs to monitor and evaluate the removal efficiency and variability. Ambient air temperature shall also be measured at the time of sampling. After the first year, the monitoring may be decreased to monthly, based upon approval from this Department

56. The removal efficiency for TCE shall be plotted on a control chart along with the ambient temperature. If 1,2-DCA is present in the influent water, its removal efficiency shall also be calculated and plotted. The Department may require that the removal efficiency of additional compounds be plotted.

57. The combined effluent from the PTAs (PS code [redacted]) shall be tested quarterly for semi-volatile organic compounds including 1,4-dioxane using method 8270 and 8270 modified respectively, and for low level 1,2,3-TCP.

- If any semi-volatile organic compound or 1,2,3-TCP is detected in the PTA effluent, the respective analysis shall be performed monthly.

- If any semi-volatile organic chemical or SOC listed in Title 22 is detected by EPA method 525.2 (or future revision of that method) in an Early Warning Monitoring Well or Extraction Well, the PTA effluent shall be tested quarterly for that chemical using the same method. If the same compound is also found in the PTA effluent at levels exceeding its MCL or Action Level, the monitoring shall be performed monthly.

LPGAC MONITORING

58. Each LPGAC vessel shall be monitored as follows:

- When the carbon bed is fresh, sampling for VOCs shall be performed monthly at the ¼ port. Upon detection of any treatable VOC, a sample at the ½ port shall be taken and analyzed within seven (7) calendar days. Non-treatable compounds, if detected, such as 1,4-dioxane shall be controlled by blending or other treatment, if necessary. If 1,2,3-TCP is detected in the monitoring wells, extraction wells, or PTA effluent, testing of low level 1,2,3 TCP shall be included in the LPGAC testing.

- Sampling shall continue monthly at the ½ port until such time that any treatable VOC is detected. Upon detection of any VOC, a sample at the ¾ port shall be taken and analyzed seven (7) calendar days.

- Sampling shall then continue weekly at the ¾ port, until any treatable VOC is detected. When any treatable VOC is detected at the ¾ port, the laboratory shall be instructed to immediately notify the City, and the vessel effluent shall be sampled within 24 hours of the detection and analyzed within 48 hours of sampling. If any treatable VOC is above the DLR or reporting limit in the effluent sample, the vessel shall be immediately removed from service. If no treatable VOCs are detected in the effluent sample, the vessel may continue in service, but the effluent shall be tested for the constituent weekly, with the laboratory reporting results within 48 hours of the sampling, and the City shall arrange to change the carbon bed before there is a detection in the effluent.

- If the total of adsorbable semi-volatile constituents detected in the combined PTA effluent exceeds 10 µg/L, then in addition to the VOC analyses required in this provision, the LPGAC port monitoring shall include analyses by method 8270. Method 525.2 may be used if all the detected semi-volatile constituents are detectable by that method.

- If any treatable organic constituent is detected in the effluent from any LPGAC adsorber, the combined effluent at the GWTP and the influent and blended effluent of the GVPS shall be sampled within 24 hours of the detection and analyzed for that constituent within 24 hours.

- When sampling any LPGAC vessel port, the City may also collect a sample at the next lower port, archive the sample at the laboratory, and have the archived sample analyzed if required by this Provision. However all sample holding times specified in the approved method must be observed.

59. The Department may reduce the LPGAC sampling protocols based on changes in the groundwater concentration, actual plant performance data, and analytical capabilities.

60. If any LPGAC bed is backflushed and returned to normal downflow, the effluent from that vessel shall be run to waste or to the backwash tank. An effluent sample from that vessel shall be obtained after one (1) hour, checked for carbon fines and analyzed for adsorbable organics using methods 524.2 and 8270. If all adsorbable organics are non-detectable, the vessel may continue in normal service.

61. Each time an LPGAC bed is replaced, the effluent from that vessel shall be analyzed daily for total suspended solids for the initial (5) five days of service to ensure that no carbon fines are present.

TREATMENT PLANT EFFLUENT

62. Sampling and analysis for total coliform and heterotrophic plate count (HPC) bacteria shall be conducted weekly on the combined LPGAC effluent prior to chlorination (PS code [redacted]). If any sample is positive for total coliform, the laboratory shall automatically test for fecal coliforms.

63. If either total coliform is present or the HPC exceeds 500/mL, confirming samples shall be taken at the plant effluent before chlorination, the effluent of each vessel, and the water leaving the basins at the GVPS and analyzed as soon as practicable. The laboratory performing the tests shall notify the plant operator by telephone or fax as soon as results are available.

64. The City shall take the necessary steps to determine which bed(s) is responsible for the coliform problem and remove it from service and disinfect or replace the carbon, if flushing to waste does not correct the bacteriological problem.

65. Sampling and analysis for VOCs and metals shall be conducted weekly on the combined LPGAC effluent (treated water) prior to chlorination (PS code [redacted]

66. If 1,2,3-TCP is detected in the monitoring wells, extraction wells, or PTA effluent, monthly testing of low level 1,2,3 TCP in the finished water prior to chlorination (PS code [redacted] shall be performed. If 1,4-dioxane or any other semi-volatile organic chemical is detected in the monitoring wells, extraction wells, or PTA effluent, testing of the finished water prior to chlorination (PS code [redacted] for the detected chemical shall be performed monthly. The analysis of the semi-volatile chemical shall utilize drinking water methods if the chemical is amenable to those methods, otherwise, method 8270 shall be utilized. If the

detected chemical is listed as an SOC in Title 22, then it shall be monitored per Provision 67.

67. The finished water prior to chlorination (PS code [redacted] shall be tested quarterly for any Title 22 SOC which has been detected in the monitoring wells, extraction wells, or PTA effluent. If the concentration detected in the monitoring wells, extraction wells, or PTA effluent exceeds the MCL, the frequency shall be monthly using the drinking water methods.

68. Perchlorate and chlorate shall be tested for quarterly, prior to disinfection (PS code [redacted]

69. The Hazard Index shall be calculated weekly for VOCs and monthly for all organic chemicals at PS code [redacted]

70. The finished water after disinfection shall be continuously monitored for free chlorine using Primary Station Code [redacted]

BLENDING FACILITIES MONITORING

71. The influent water (P.S. Code [redacted] to the Grandview Basins (GVPS) shall be continuously monitored for free chlorine.

72. The concentration of nitrate in the inlet to the GVPS (PS Code [redacted] shall be checked daily with a benchtop UV spectrophotometer or ion selective electrode and the rate of MWD blend water shall be calculated and adjusted daily as needed to achieve the target of no more than 30 mg/L of nitrate as NO_3 in the blended water.

73. The blended water at the designated Point of Introduction to the System, (PS Code [redacted]) shall be continuously monitored for monochloramine, nitrate and free ammonia and the results recorded. A weekly sample shall be analyzed for nitrate by a certified laboratory. A sample shall be analyzed monthly by a certified laboratory for any chemical such as chlorate, which does not have an MCL or AL and is blended as required by Provision 11.

74. For any chemicals in the GWTP effluent such as chlorate, which do not have an MCL or AL and are blended as required by Provision 11, the City shall determine monthly, the concentration of those same constituents in the blending water.

75. If blending at the GVPS is necessary to meet MCLs or ALs as required in Provision 7, the blended effluent at the Point of Introduction Into the System shall be analyzed weekly for the constituent(s) requiring blending.

76. The chloraminated water leaving the GVPS (before being blended) shall be tested for low level NDMA at least once within the first two (2) months of operation and annually thereafter.

OPERATIONS AND MAINTENANCE

77. Except as specified in this permit, the GWTP and associated extraction wells, transmission piping and the GVPS shall be operated in accordance with the O and M Manuals For The Glendale NOU and SOU or subsequent approved revisions of these documents.

78. The status of the extraction wells shall be recorded daily, and the GWTP and GVPS shall be inspected daily for any abnormal occurrences including but not limited to leaks, unusual noises, or pressure readings. A checklist of items to be examined shall be filled out daily and maintained at the GWTP for a minimum of five (5) years.

79. Sampling ports and probes on each LPGAC vessel shall be maintained in good operating condition at the ¼, ½, and ¾ of the bed depths, and the vessel effluent.

80. All chemicals used for cleaning or disinfection of the PTAs or LPGAC beds shall be approved by the NSF or UL as meeting the NSF 60 standard for drinking water additives.

81. The polyphosphate anti-scalant shall be approved by the NSF or UL as meeting the NSF 60 standard for drinking water additives. The manufacturers recommended dosages and other instructions shall be followed. The dosage shall not exceed the concentration for which NSF approval has been obtained.

82. The hypochlorite lines feeding each of the PTAs shall be physically disconnected from the PTAs and blind-flanged. These connections shall be restored during disinfection. After disinfection of the PTAs is complete, the connection shall again be physically disconnected.

83. All water meters and analyzers, including the meter, which measures the flow rate of MWD water used at the GVPS, shall be calibrated at least as frequently as recommended by the manufacturer. Records of the calibrations shall be maintained for at least five (5) years.

RECORDS AND REPORTING

84. A monthly report of the operation of the GOU facilities shall be submitted to this Department by the 20th day of the following month unless otherwise specified. As a minimum, the report shall include:

    a. Analytical results of all samples received by the City in a calendar month shall be reported to the Department by the 10th day of the following month.

    b. A summary of all contaminants in the early warning monitoring wells, extraction wells, GWTP effluent and intermediate water detected at or above MCLs or Action Levels by the 10th day of the following month.

    c. A spreadsheet showing the influent nitrate concentration, daily calculations of the projected concentration of the nitrate in the blended GVPS effluent at the

Point of Introduction Into the System, the amount of blending water to be utilized, the actual nitrate concentration of the water leaving the blending point, and the correlation between the continuous nitrate analyzer and the laboratory confirmation sample.

d. A spreadsheet showing the weekly calculation of the projected concentration of the constituents requiring blending at the GVPS if blending at the GVPS is necessary to meet MCLs or ALs as required in Provision 7. Include the greater of the concentration in the GWTP treated water or a weighted average based on the monthly well analysis, the amount of blending water, and the actual concentration in the GVPS blended effluent at the Point of Introduction Into the System.

e. A spreadsheet showing the monthly calculation of the projected blended concentration of the constituents to be blended at the GVPS as required in Provision 11. Include the greater of the concentration in the GWTP treated water or a weighted average based on the monthly well analysis, the amount of blending water, and the actual concentration in the GVPS blended effluent at the Point of Introduction Into the System.

f. The daily operation, length of time in use and production of each extraction well,

g. The daily amount of water processed by the GWTP, and by the GVPS,

h. Daily air/water ratio and water flowrate through the two packed tower aerators,

i. Determinations of tower removal efficiencies for TCE, PCE, 1,2-DCA, ambient air temperature and any other compound requested by the Department,

j. The most recent graph of the removal efficiencies of the PTAs and the air to water ratios used,

k. A report indicating the status of each LPGAC bed in terms of the daily flowrate through each LPGAC bed, number of days in service, monitoring port status, what VOCs were detected and the concentration at the prior sample port, the weekly calculation of the Hazard Index, and bacterial analysis of the plant effluent prior to chlorination,

l. The daily polyphosphate injection rate (lb./day or gal/day), and the daily dosage rate (mg/L),

m. The amount of chlorine and ammonia used daily,

n. Daily free and total chlorine residuals at the GWTP and GVPS,

o. Operational schedule and problems, both scheduled interruptions and any unscheduled interruption,

p. The report shall also include a summary of all required analytical results of the wells, air stripping tower influent and effluent, LPGAC effluent and blended water.

85. Any change in the monitoring and reporting requirements shall be approved by the Department in writing.

86. Copies of reports, inspections and all records shall be kept for at least five (5) years. Water quality records shall be kept for 10 years.

87. The City shall prepare annual report to the Department, which shall include compliance with the permit provisions, the treatment plant's status, condition, and performance and any problems or difficulties. This report shall be due by March 30^{th} of the following year.

88. The City shall immediately inform the Department by telephone and fax, of any exceedance of any organic constituent's MCL or Action Level in the effluent of the GWTP or of any constituent in the blended water at the GVPS. If the Department is closed at the time, it shall be notified by telephone by 8:15 a.m. of the next day. The water shall not be supplied to the distribution system until such exceedance has been corrected.

COMPLIANCE SCHEDULE

89. Within 30 days after receipt of this water system permit amendment, the City shall submit for review and approval checklists for daily inspection of the GWTP and GVPS, and a weekly inspection checklist for the extraction wells.

90. Within 60 days after receipt of this water system permit amendment, the City shall submit for review and approval a proposal for the installation of vapor probes around Well GS-4. The installation of the vapor probes shall be completed within 60 days of approval of the proposal.

91. Within 90 days after receipt of this water system permit amendment, the City shall take steps to modify the LPGAC vessel flowmeters so that they shall be easier to read. The modification must be approved by the Department prior to correction.

92. After one (1) year of operation, the O and M Manuals for the GWTP and GVPS shall be updated based on the first year's operational experience. The O and M Manuals shall include a daily checklist of inspected items for each facility. The manuals shall include items identified in Section 6 (Reliability Analysis) of the Policy 97-005 Guidance Submittal prepared by CDM and annual leak testing of critical valves such as the bypass valves on the PTAs. The updated manuals shall be submitted within 15 months after receipt of this water system permit amendment.

93. The Department is developing ALs for chlorate, cobalt and isopropyl alcohol. When these ALs are adopted, they shall be met in the GVPS blended effluent, PS Code G19/043- FW86.

94. The City shall develop a cooperative agreement with the USEPA covering the monitoring wells identified in Provision 48. The agreement shall allow for the continued access and usage of these wells for monitoring. The agreement shall include a section on proper maintenance of these monitoring wells and any associated appurtenances. A copy of the agreement shall be provided to the Department within six (6) months of receipt of the amended permit.

V. PUBLIC HEARING AND COMMENTS

On June 22, 2000, a public hearing on the draft permit amendment was held at the Glendale Central Library. The hearing officer was Gary Yamamoto, and presentations were made by Bob Fitzgerald of the US EPA, Dick Corneille of CDM, Mel Blevins, Upper Los Angeles River Watermaster, and Don Froelich of the City of Glendale's Water Department. Vera Melnyk Vecchio presented the Policy Memo 97-005 document and the proposed permit amendment provisions.

At the hearing, four (4) members of public commented on the proposed amendment and all the comments were in favor of the amendment. Written comments were received from the US EPA and from Irell and Manella, attorneys for the GRG. Both the EPA and Irell and Manella requested that Well GS-1 be included with this permit amendment. Irell and Manella also requested:

- that the GWTP be allowed to operate above 5,000 gpm
- confirmation sampling when a contaminant triggers additional monitoring
- clarification of analytical methods for semi-volatile organics (BNAs) and less duplication of analysis
- clarification of required metals analysis
- a modification of the frequency of testing for semi-volatiles at the PTA effluent
- clarification of reporting due dates
- flexibility on the wording requiring readability of the LPGAC flowmeters
- the use of weighted averages in the engineering report

The Department will entertain a demonstration by the applicant that the GWTP can successfully meet its water quality requirements at a higher flow rate. This demonstration must include a verification that the conclusions reached in the Policy Memo 97-005 document for the 5000 gpm flow rate are still valid at the higher flow rate.

The Department will entertain an amendment to the Policy Memo 97-005 document focusing on the recycled water aspects of Well GS-1.

All of the other comments above have been complied with in the final permit amendment provisions, except that we have not modified the monitoring schedule for semi-volatile organics at the PTA effluent at this time. However, the City may request this modification of the monitoring schedule in the future, based upon actual monitoring results.

Based upon the comments received during the hearing and during the public comment period, the Department will issue the permit amendment with the provisions listed in Section IV.