



APPENDIX E

**SITE INSPECTION REPORT FOR MILLER ROAD TREATMENT FACILITY,
AREA 7 GROUNDWATER EXTRACTION AND TREATMENT SYSTEM, AND
AREA 12 GROUNDWATER EXTRACTION AND TREATMENT SYSTEM**

INSPECTION REPORT
Groundwater Treatment Plants

North
Indian Bend Wash
Superfund Site

The graphic features two sets of wavy lines. The top set consists of three light blue waves. The bottom set consists of three teal waves, positioned below the top set.

Prepared for:
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Region IX

Prepared by:
NIBW Participating Companies
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INSPECTION REPORT

Groundwater Treatment Plants

North Indian Bend Wash Superfund Site

Scottsdale, Arizona

1.0 INTRODUCTION

This report documents the activities and findings for the North Indian Bend Wash (NIBW) groundwater treatment plant inspections conducted in accordance with Section VI.B.4.d of the NIBW Statement of Work (SOW). The purpose of the inspections, as described in the SOW, is to identify malfunctions, deterioration, operator practices or errors, and discharges that may be causing or could result in a release of untreated groundwater. The inspections were coordinated and conducted by the NIBW Participating Companies (PCs) on November 27 and 28, 2006 and attended by the U.S. Environmental Protection Agency (EPA) Remedial Project Manager.

2.0 OVERVIEW

The groundwater remedy for the NIBW Superfund Site addresses aquifer restoration by monitoring, containment, and treatment of groundwater affected by volatile organic compounds (VOCs) that are the following five NIBW contaminants of concern (COCs): trichloroethene (TCE), tetrachloroethene (PCE), 1,1-dichloroethene (DCE), 1,1,1-trichloroethane (TCA), and chloroform. Treatment of the NIBW COCs is to levels set forth in the Amended Consent Decree (ACD). Four separate groundwater extraction and treatment systems were constructed to extract and treat NIBW COC-affected groundwater at the Site. These systems are referred to as the Central Groundwater Treatment Facility (CGTF), Miller Road Treatment Facility (MRTF), Area 7 Groundwater Extraction and Treatment System (GWETS), and Area 12 GWETS.

Complete descriptions of the individual facilities and associated operation and maintenance (O&M) activities are presented in the “Feasibility Study Addendum, North Indian Bend Wash Superfund Site”, dated November 15, 2000 (FSA), “Record of Decision Amendment – Final Operable Unit, Indian Bend Wash Area”, dated September 27, 2002 (AROD), and the respective individual draft O&M Plans for each treatment plant.



The NIBW treatment facilities are operated in accordance with the procedures described in the individual O&M Plans included in the EPA-approved Sitewide O&M Plan, dated June 26, 2006.

3.0 INPECTION PROCEDURES

3.1 Routine Inspections

The operators routinely inspect the entire treatment facilities on a routine basis, either daily or weekly. These inspections include complete facility walk-throughs, observations of equipment usually by sight, sound, and feel; and testing of critical components such as bearings using temperature measuring instruments. Also, routine data logging by hand or by computer is performed. The operators review the data for trends and anomalies to evaluate the overall operation of the treatment systems.

Due to the size and disposition of treated water to the respective drinking water systems, the NIBW PCs coordinate and conduct operational review meetings on an approximate monthly basis for the CGTF and MRTF. These meetings include discussions of current operations issues, routine maintenance issues, planning for upcoming non-routine maintenance such as column cleaning, and equipment and/or systems upgrades. The NIBW PCs may also perform facility a walk-through during these operational review meetings

Monthly and/or quarterly data and operating reports are submitted by the facility operators. These reports are reviewed by the NIBW PCs to document operation and maintenance issues and confirm treatment effectiveness of each plant.

3.2 Annual Inspections

Inspections are conducted annually in accordance with the SOW and Amended Consent Decree. This is the fourth such inspection.

Annual inspections of the four groundwater treatment plants were conducted on November 27 and 28, 2006. The inspections at each facility lasted approximately one hour. The inspections included a facility walk-through, interview with the primary operator, visual inspections of the treatment equipment, waste storage areas and groundwater containment systems. Description of the inspections and results follows.



4.0 FACILITY INSPECTIONS

4.1 Miller Road Treatment Facility

MRTF is located at 5975 Miller Road, at the southeast corner of the intersection of Miller Road and McDonald Drive in Scottsdale, Arizona. The facility is owned and operated by Arizona American Water Company (AAWC). The plant consists of an individual treatment train for each of the three MRTF groundwater production wells (AAWC-14, AAWC-15, and PCX-1). Each treatment train includes a counter-current, forced-draft air stripper with appurtenant equipment such as air blower. Each air stripper column was designed to remove the NIBW COCs to below MCLs at flow rates up to 2,100 gpm with an overall capacity of 6,300 gpm. The facility was designed for operational flexibility through a common tower influent header to allow water from specific wells to be routed to any one of the three columns.

The treated water is collected in a sump at the bottom of each air stripper column where the water can be directed to either the Arizona Canal or to the common clearwell. Treated water in the clearwell is pumped, using an array of three vertical turbine pumps, to AAWC's potable water distribution system.

Currently, the off-gas from the air stripper passes through a mist eliminator; then through ducting to one of three granular activated carbon (GAC) adsorbers before discharge to the atmosphere.

Well AAWC-14 currently is pumped directly to AAWC's water treatment plant located on Cattletrack Road (formerly, Miller Road) north of McDonald since NIBW COCs have not been detected in groundwater samples collected from that well. Currently, AAWC-15 and PCX-1 are treated by air stripping at MRTF.

All of the treatment equipment except the GAC adsorbers is located inside the treatment building. The treatment building consists of several rooms including the air stripper room which houses the air stripper columns, blowers, and distribution pumps; the electrical room which supports the motor control center (MCCs), starters, Remote Terminal units (RTUs), Remote Input/Output (RIO) cabinets, transformers, and other electrical equipment; and the control room, where the human machine interface (HMI), laboratory, and records are located.

For security and aesthetics, the facility is surrounded by a masonry wall with several access gates.



4.1.1 MRTF Maintenance and Condition

The MRTF is maintained by the full time operator provided by AAWC. The operator makes daily inspections of the equipment and grounds at MRTF. The operator also maintains operations logs and data spreadsheets at the facility. The logs and spreadsheets were presented for review by the inspection team.

The MRTF has operated almost continuously (up to 97%) for the last year. The operator indicated that the plant was shutdown for a total of approximately 10 hours due to routine maintenance such as control systems updates and pump replacements and intermittent power outages.

Based on operating data that is provided in the 2006 Site Monitoring Report, MRTF has consistently met performance criteria set forth in the ACD.

No spills or releases of untreated groundwater occurred in the last year at MRTF.

In general, the facility appeared clean with no apparent leaks of untreated groundwater. The equipment is clean, well marked, and maintained.

All pumps have operated consistently in the last year. The pump in PCX-1 was replaced in early 2006. That pump had been continuously operating for almost six years.

The blowers appeared to run smoothly. The operator indicated that the blowers were last aligned and belts replaced in October 2005

Scale removal was last performed on the air stripper columns between March and June 2005. Visual inspection through the viewports on the air stripper column during the inspection indicated moderate scale on packing in Tower 3, almost no scale in Tower 2 and relatively little scale in Tower 1. Minor leakage on the east side at the base of Tower 2 was noted. AAWC indicated that finished water leaks at start-up of the Tower, but stops after several hours of operation.

Minor amounts of condensate accumulate in the air handling system. This is due primarily to the difference in temperatures between the air stripper offgas and ambient temperatures. The condensate is collected in the sump and discharged to the sanitary sewer.

AAWC replaced the air valve on Distributive Pump 2 to minimize release of minor amounts of finished water during the pump start-up.

The process control system is monitored continuously. The operator indicated that alarms are tested routinely to verify operation of the system.



The air handling system appeared to be in good condition. The exterior of the GAC vessels was refinished and sealed in the spring of 2006.

4.1.2 Results

Based on the inspection at MRTF, no treatment performance problems, hazards, significant deterioration, or equipment malfunctions were apparent.

4.2 Central Groundwater Treatment Facility

Background and details of the City of Scottsdale (COS) CGTF are provided in the O&M Plan developed for this facility. The O&M Plan was revised on March 1, 2006 and approved by EPA on June 26, 2006 as part of the Sitewide O&M Plan. The CGTF O&M Plan describes the facility, the major pieces of equipment, control strategies, and performance monitoring of the treatment plant. Design parameters and performance of CGTF have been validated and documented in the O&M Plan and annual data reports for the NIBW Site. The following is a brief summary of the treatment plant.

The CGTF is located at 8650 E. Thomas Road in Scottsdale, Arizona at the northeast corner of Pima Park, a City municipal park. Other nearby COS facilities include the CGTF wells and Reservoir 80 into which treated water from the CGTF is discharged for beneficial use as a supply to the COS potable water system.

The CGTF uses air stripping to remove NIBW COCs, primarily TCE from groundwater. The CGTF is comprised of three separate, parallel treatment trains. Each treatment train consists of a packed column, a process air fan, and an off-gas vapor treatment system that removes NIBW COCs prior to discharge to the atmosphere. Each column has a design capacity of 3,150 gallons per minute (gpm). The overall capacity of the CGTF is approximately 9,450 gpm. The separate treatment trains allow for one or more columns to be removed from service while the other column(s) continue to operate.

Groundwater is pumped from wells COS-75A, COS-71, COS-72, and COS-31 through transmission pipelines to the CGTF. Influent water combines in a common raw water header and is evenly distributed into the available columns where it flows top-to-bottom through the column packing while airflow is pulled through the tower in a counter-current direction.

The treated water is collected in individual sumps at the bottom of each column and then flows by gravity into a common sump. The treated water is discharged to the City's potable system or to the SRP irrigation system. (The capacity of the connection to the SRP irrigation system varies based on several factors, with a current maximum of approximately 4,000 gpm.) Blending of CGTF treated water



with other water supplies occurs in the potable water storage facility, Reservoir 80, just south of the site.

A process air fan is used to pull air through an intake filter then upward through the packed column counter-current to the water flow. The off-gas is currently directed through a mist eliminator, a natural gas-fired duct heater, and a GAC contactor prior to discharge to the atmosphere. The duct heater reduces relative humidity prior to VOC adsorption in the GAC contactors.

The majority of the treatment equipment, except the duct heaters, GAC contactors, and chlorination equipment, is located inside the CGTF treatment building. The treatment building consists of several rooms, including: the air stripper room which houses the packed columns and process air fans; the electrical equipment room which supports the motor control centers, starters, RTUs, Remote Input/Output cabinets, transformers, and other electrical equipment; and the laboratory. Chlorination equipment is located in a separate building at the Reservoir 80 booster station.

For security and aesthetics, the facility is surrounded by a masonry wall with several locking access gates.

4.2.1 CGTF Maintenance and Condition

The CGTF is maintained by a full time COS operator. The operator makes daily inspections of the equipment and grounds at CGTF. The operator also maintains operations logs and data spreadsheets at the facilities. The logs and spreadsheets were presented for review by the inspection team. Specialty staff from COS operations such as mechanics and instrumentation technicians also provide maintenance assistance, as needed.

CGTF has operated continuously for the last year except for short periods due to power outages and inspections and maintenance.

Based on operating data, CGTF has consistently met performance criteria set forth in the ACD.

In general, the facility appeared clean with no apparent leaks or significant deterioration. The equipment is clean, well marked, and maintained.

The blowers appeared to run smoothly. The blowers are serviced during each GAC service event on the associated column. There was corrosion on the blower housings due to moisture. The blowers will be upgraded and installed during major plant rehabilitation activities to be implemented in early 2007.

Scale removal was last performed on the air stripper columns in March 2005. Operating data collected after the column cleaning activities indicated less



obstruction in the packing and higher air flow rates up to 16,000 cubic feet per minute. Visual inspection through the viewports at the bottom of the air stripper columns during the inspection indicated moderately scaled packing. As part of the plant rehabilitation project, all of the packing will be removed from the columns and replaced with new packing.

No leaks of untreated or finished water were observed. Some condensate accumulates inside the air ducting. The minor amount of condensate collected in the air handling system is primarily due to the difference in temperatures between the air stripper offgas and ambient temperatures. The condensate is drained and disposed in the sanitary sewer.

The process control system is monitored continuously. All control switches and alarms are tested on a routine basis, but at a minimum, on an annual basis.

The air handling system appeared tight and in good condition.

COS noted that security cameras had been installed at CGTF and are monitored by a security crew at the Scottsdale Water Campus.

4.2.2 Results

Based on the inspection at CGTF, no treatment performance problems, hazards, significant deterioration, or equipment malfunctions were apparent.

4.3 Area 7 Groundwater Extraction and Treatment System

NIBW Area 7 is located at the southeast corner of 75th Street and 2nd Street in Scottsdale. The groundwater treatment system is located in the southeast corner of Area 7 in an area approximately 56 feet by 75 feet. The facility includes the treatment system and control equipment. Groundwater extraction is performed using three remote MAU groundwater extraction wells (7EX-3aMA, 7EX-4MA, and 7EX-5MA) and one UAU groundwater extraction well (7EX-1UA). Treated water is discharged to the UAU using two remote groundwater reinjection wells (7IN-1UA and 7IN-2UA).

The major components of the GWETS include submersible water pumps, well head equipment, piping from the well heads to the treatment plant, a 5,000-gallon equalization tank, an ultraviolet oxidation (UV/Ox) reactor, a low-profile air stripper, and a vapor-phase GAC treatment system.

During normal operation, treated groundwater is reinjected into the UAU via wells 7IN-1UA and 7IN-2UA. The GWETS has capabilities to discharge treated groundwater to the COS sanitary sewer under limited circumstances during non-routine maintenance or following major work on the system.



In its current configuration, the groundwater treatment system is designed to treat up to 500 gpm of NIBW COC-affected groundwater with an overall hydraulic capacity of 570 gpm. As described in the Design Report, the Area 7 GWETS was designed to treat groundwater from a maximum anticipated TCE concentration of approximately 7,000 ppb to less than the MCL.

The groundwater treatment plant includes a building, which houses the major treatment equipment such as the UV/Ox and air stripper systems. A control room is integral with the building and is equipped with the MCC and HMI, main control center, and motor drives.

An equalization tank and GAC adsorbers are located outside the building on the north side of the treatment plant area. A double-contained hydrogen peroxide tank is located on the south side of the treatment plant area in a contained concrete foundation with a six-inch berm. The entire treatment plant area is paved with concrete and surrounded by a two-inch berm for containment.

The treatment plant is surrounded by a block wall for security. Access to the plant is provided through three steel gates, two located on the west wall and one on the south wall.

4.3.1 Area 7 Maintenance and Condition

The Area 7 GWETS is maintained by an engineering consultant who makes twice daily remote checks on the system and visits the GWETS on a weekly basis. The operator makes weekly inspections of the equipment and grounds at Area 7. The operator also maintains operations logs and data spreadsheets at the facilities. The logs and spreadsheets were presented for review by the inspection team.

The Area 7 GWETS has operated up to 88 percent of the time for the last year. Down time is attributed to maintenance and power outages.

Based on operating data, the Area 7 GWETS has consistently met performance criteria set forth in the ACD.

No releases of untreated groundwater occurred at Area 7 in the last year.

In general, the facility appeared clean with no apparent leaks or significant deterioration. The equipment is clean, well marked, and maintained.

Groundwater extraction pump in well 7EX-5MA was replaced in October 2006 due to excessive wear from sand production from that well. The groundwater extraction pump had operated continuously for several years.



The UV/Ox system appeared to be operating as designed during the inspection. There was some minor corrosion noted at the bottom of the stainless steel shell on Reactor 2. This did not appear to present a problem or show signs of leaks. This issue was noted last year and didn't appear any worse this year.

The blower appeared to run smoothly. The blower is operated via a variable frequency drive which maintains the speed of the fan. The operator indicated that the blower has performed well, and no service has been required. The belts are checked on a semi-annual basis.

Scale removal was last performed on the air stripper columns in April 2005. Scale removal is planned every two to three years, as necessary.

The short section of ducting is insulated, and therefore, little or no condensation is collected in the system.

The process control system is monitored continuously by the computer. The operator indicated that the alarms are not routinely tested. To address this issue, the operator will implement a program to test all switches and alarms on a routine basis.

4.3.2 Results

Based on the inspection of the Area 7 GWETS, no treatment performance problems, hazards, significant deterioration, or equipment malfunctions were apparent.

4.4 Area 12 Groundwater Extraction and Treatment System

The Area 12 GWETS is located at the former Motorola facility at 8201 East McDowell Road in Scottsdale, Arizona. At this site, the air stripping tower is located just east of the Chemical Operations Building, south of the Granite Reef Road entrance to the former Motorola facility on the west side of Granite Reef Road. Groundwater is extracted from two wells MEX-1MA and SRP well 23.6E-6.0N, also known as the Granite Reef well. The Granite Reef well is owned and operated by SRP. The treated groundwater is discharged to SRP's irrigation distribution system through a connection to an SRP lateral pipeline located in Granite Reef Road.

The Area 12 GWETS consists of two extraction wells and appurtenant pumping equipment, an air stripping system, and off-gas treatment system. Groundwater is pumped from the wells in individual pipes to a common manifold near the air stripper. The air stripper is a counter-current forced-draft, packed column where the NIBW COCs are removed from the water. The off-gas treatment system consists of a vapor-phase GAC polishing system. The treated groundwater is



discharged to SRP's irrigation distribution system under agreement between SRP and Motorola.

The Area 12 GWETS is designed to treat up to 1,850 gpm of groundwater and reduce NIBW COCs from a maximum concentration of 300 ug/L of TCE to less than its MCL.

Located at the treatment plant is the main control panel containing the system programmable logic controller (PLC). Each well pump system is connected to the PLC using an Ethernet connection with signals traveling via a fiber optic pathway. Each well site also contains a PLC to control the individual remote well operation. The remote well PLCs also interface with SRP systems to monitor and control well operation.

A small control room which is located at the treatment plant houses the HMI and various plant specific records. The HMI consists of a computer that supports a graphical user interface, logs operating data, and allows remote operation and data transfer using a telephone modem.

4.4.1 Area 12 Maintenance and Condition

The Area 12 GWETS is maintained by an engineering consultant who makes daily remote checks on the system via computer and approximately 10 visits to the GWETS each month. During the visits, the operator makes inspections of the equipment and grounds at Area 12. The operator also maintains operations logs and data spreadsheets at the facilities. The logs and spreadsheets were presented for review by the inspection team.

Except for the scheduled maintenance shut down in January and early February due to the SRP dry-up, the Area 12 GWETS has operated approximately 97% percent of the time for the last year. Down time is attributed to maintenance and power outages.

Based on operating data, the Area 12 GWETS has consistently met performance criteria set forth in the ACD.

No releases of untreated groundwater occurred at Area 12 in the last year.

In general, the facility appeared clean with no apparent leaks or significant deterioration. The equipment is clean, well marked, and maintained.

The main blower appeared to run smoothly. The operator indicated that that blower motor had been rebuilt in the last year. The secondary blower motor was scheduled to be rebuilt during the scheduled maintenance in early 2007. The blowers are typically serviced and balanced every two years. The next scheduled service on both blowers is planned for the scheduled shutdown in



early 2007. Scale removal was last performed on the air stripper columns in January 2006. The next scale removal activity is planned for early 2007.

Some minor leakage of condensate was observed from the overhead ducting. The condensate was apparently collecting in low spots and dead ends in the ducting. The condensate from the ducting and the GAC vessels is collected in a tray on the floor and pumped using a sump pump back into the air stripper.

The process control system is monitored continuously by the computer. The operator indicated that the alarms are routinely tested when the system shuts down.

4.4.2 Results

Based on the inspection of the Area 12 GWETS, no treatment performance problems, hazards, significant deterioration, or equipment malfunctions were apparent.