



Fact Sheet

Aquifer Protection Permit #P-100579
 Place ID 3347, LTF 47531
 City of Phoenix – 91st Avenue WWTP
 SIGNIFICANT AMENDMENT

The Arizona Department of Environmental Quality (ADEQ) proposes to issue an amendment to the Aquifer Protection Permit for the subject facility that covers the life of the facility, including operational, closure, and post-closure periods unless suspended or revoked pursuant to A.A.C. R18-9-A213. This document gives pertinent information concerning the issuance of the permit. The requirements contained in this permit will allow the permittee to comply with the two key requirements of the Aquifer Protection Program: 1) meet Aquifer Water Quality Standards at the Point of Compliance; and 2) demonstrate Best Available Demonstrated Control Technology (BADCT). The purpose of BADCT is to employ engineering controls, processes, operating methods or other alternatives, including site-specific characteristics (i.e., local subsurface geology) to reduce discharge of pollutants to the greatest degree achievable before they reach the aquifer, or to keep pollutants from reaching the aquifer.

I. FACILITY INFORMATION

Name and Location

Name of Permittee:	City of Phoenix
Mailing Address:	Water Services Department, Compliance and Regulatory Affairs Office 200 W Washington St, 9 th Floor Phoenix, Arizona 85003
Facility Name and Location:	91 st Avenue Wastewater Treatment Plant 5615 S 91st Ave Tolleson, Arizona 85353 (Maricopa County)

Regulatory Status

The original Aquifer Protection Permit (APP) for this facility was issued on October 4, 2002. A Significant APP Amendment was issued on September 28, 2005. An application for a Significant APP Amendment was received by ADEQ on May 12, 2008. A National Pollutant Discharge Elimination System (NPDES) permit (No. AZ0020524) was issued for this facility on November 19, 1999 and has subsequently been renewed. At time of permit issuance, there are no active Notices of Violation (NOVs) and the permittee is considered to be in compliance with the existing APP.

Facility Description

The City of Phoenix is authorized to operate the 91st Avenue Wastewater Treatment Plant (WWTP), a 230 million gallons per day (mgd) facility that employs secondary treatment with nitrogen removal. The WWTP consists of a) Plants 1, 2 and 3; b) the Unified Plant; and c) the Hayfield Wetlands Site (HWS) and the Tres Rios Flow Regulating Wetlands (FRW). There are four destinations for effluent from the 91st Avenue WWTP: direct outfall to the Salt River,

polishing in the Hayfield Wetlands Site or the Tres Rios FRW followed by outfall to the Salt River, delivery to Palo Verde Nuclear Generating Station, and beneficial reuse.

Plants 1, 2, and 3

Effluent from Plants 1, 2, and 3 is pumped to PVNGS (without disinfection), directed to the Salt River outfall (after chlorination and dechlorination), delivered to HWS (after chlorination, but not dechlorination), or beneficially reused.

The Unified Plant

The Unified Plant consists of Unified Plant – 2001 (UP-01), Unified Plant – 2005 (UP-05), and the Unified Plant Pump Station. Effluent from UP-01 and UP-05 will be chlorinated in the Unified Plant Pump Station when it becomes operational, then directed to the Palo Verde Main pipeline, pumped to the Tres Rios FRW, pumped to PVNGS, or beneficially reused. Unified Plant effluent directed to the Tres Rios FRW may or may not be dechlorinated, at the discretion of the City of Phoenix.

Hayfield Wetlands Site (HWS) and Tres Rios Flow Regulating Wetland (FRW)

Effluent directed to the Hayfield Wetlands Site and the Tres Rios FRW is polished, then discharged to the Salt River under AZPDES permit No. AZ0020524. Until the Unified Plant Pump Station begins operation, the Hayfield Wetlands Site will receive effluent from Plants 1, 2, 3, and UP-01. After the Unified Plant Pump station begins operation, the Hayfield Wetlands site will receive effluent from Plants 1, 2, and 3, and the Tres Rios FRW will receive effluent from UP-01 and UP-05. Nitrogen levels are expected to drop by approximately one-half as water flows through the Tres Rios FRW, from an expected influent level of 6mg/l to 3 mg/l in the wetlands effluent.

Outfall to the Salt River

Effluent from Plants 1, 2, and 3 is delivered through the Final Effluent Channel to the Salt River at the 91st Avenue outfall under Arizona Pollutant Discharge Elimination System (AZPDES) permit No. AZ0020524. Until the Unified Plant Pump Station begins operation, effluent from UP-01 will also be pumped through the Final Effluent Channel to the 91st Avenue outfall.

Effluent Use at Palo Verde Nuclear Generating Station (PVNGS)

Currently, un-chlorinated effluent from Plants 1, 2, and 3 and UP-01 is pumped to Palo Verde Nuclear Generating Station for use as cooling water under a Type 3.01 General APP (P-100388). Once UP-05 and the Unified Plant Pump Station become operational, 91st Avenue WWTP will deliver a mixture of unchlorinated effluent from Plants 1, 2, and 3 and chlorinated effluent from UP-01 and UP-05 to PVNGS.

Reclaimed Water

Reclaimed water is pumped from three reclaimed water pump stations and chlorinated before it is reused.

The 91st Avenue WWTP produces reclaimed water meeting Class B+ Reclaimed Water Standards (A.A.C. R18-11, Article 3) that may be delivered for beneficial use under a valid reclaimed water permit under A.A.C. R18-9, Article 7. Reclaimed water delivered for beneficial reuse will be disinfected by chlorination.

Sub-Regional Operating Group

The 91st Avenue WWTP receives wastewater from the five member cities of the Sub-Regional Operating Group (SROG). Created in 1979, the SROG is the result of an agreement (SROG Agreement) between the cities of Glendale, Mesa, Phoenix, Scottsdale, and Tempe pertaining to liability, ownership and operation of the 91st Avenue WWTP. Each SROG city implements an appropriate Industrial Pretreatment Program within its own jurisdiction.

Biosolids and General Information

Screenings and grit are removed from the process and hauled off-site for management and disposal at a state approved landfill. Sludge, including scum, undergoes anaerobic digestion and thickening, and is then hauled off-site for management and disposal at state approved land application sites and/or landfills. In addition to the APP conditions pertaining to treatment and disposal of sewage sludge, the permittee must also comply with the requirements for sewage sludge disposal, use, and transportation in 40 Code of Federal Regulations (CFR) Part 503 and 18 A.A.C. 9, Article 10.

Depth to groundwater at the WWTP site is approximately 10 to 50 feet, and the direction of groundwater flow is primarily to the west-northwest. The Tres Rios Flow Regulating Wetlands and UP-05 were designed and constructed according to plans approved by the ADEQ APP and Reuse Unit.

Amendment Description

The purpose of this amendment is to increase permitted flow to 230 mgd and add the Unified Plant Pumping Station, UP-05, and the Tres Rios Flow Regulating Wetlands to the WWTP. The amendment will also add chlorination to UP-01 and remove the Cobble Wetlands Site. The amendment will remove Points of Compliance (POCs) MW-L and MW-K and their associated monitoring wells, and add two new POCs. Groundwater monitoring will be required at one of the new POCs. The APP has also been updated to conform to the current framework language.

UP-05 includes the following units:

1. One catenary mechanical bar screen, one grit basin and one grit cyclone and grit washer,
2. Two circular primary sedimentation basins,
3. Two aeration basins with anoxic and aeration zones, and
4. Two circular secondary clarifiers.

II. BEST AVAILABLE DEMONSTRATED CONTROL TECHNOLOGY (BADCT)

The Wastewater Treatment Plant will be designed, constructed, operated, and maintained to meet the treatment performance criteria for new facilities as specified in A.A.C. R18-9-B204, except

for pathogen removal. The facility will have fecal coliform limits of 200 Colony Forming Units (CFU)/100ml for four out of seven samples per week, and a single sample maximum of 800 CFU/100 ml. The limits for pathogen removal are less stringent than those in A.A.C. R18-9-B204(B)(4) because the facility has demonstrated, as per A.A.C. R18-9-B204(D), that the nitrogen reduction benefit of operating the Tres Rios Flow Regulating Wetlands outweighs the risk of increased pathogens, which would be naturally elevated due to the presence of wildlife in the wetlands.

III. HYDROGEOLOGIC SETTING

The City of Phoenix – 91st Avenue WWTP is located in the Basin and Range physiographic province, in which large alluvial valleys separate mountain ranges typically comprised of crystalline rocks. The facility’s location is in the West Salt River Valley Sub-basin of the Phoenix Active Management Area (AMA).

Aquifers

The primary aquifers in the vicinity of the facility are the Upper Alluvial Unit (UAU), Middle Alluvial Unit (MAU), the Lower Alluvial Unit (LAU), and the underlying crystalline bedrock. The UAU in the area is composed primarily of gravel, cobbles, sand, and silt. The UAU is about 280 feet thick at the facility. The MAU underlies the UAU, and is generally composed of silt and clay with some sand and gravel. The MAU at the facility is believed to be more than 700 feet thick. The LAU underlies the MAU, and is composed of fluvial, playa, alluvial, and evaporite deposits. It is estimated to be about 500 feet thick in the area. The lowermost unit is the crystalline bedrock unit, which is not utilized for water production in the area. It is thought to be comprised of intrusive and metamorphic rocks at depths of 1,800 to 2,000 feet below land surface.

Depth to Water

Recharge to the UAU in the area is due to incidental recharge from agricultural irrigation and recharge from flows in the Salt River. Because of the location downgradient from the Phoenix metropolitan area and adjacent to the river, area water levels are comparatively shallow. The applicant has reviewed water levels within a half mile radius of the WWTP, and reports that water levels range from 10 to 50 feet below land surface. The applicant states that UAU groundwater flow appears to be to the west-northwest, but that flow direction may vary according to factors such as seasonal agricultural pumping and dewatering for construction in the area.

Water Quality

Water quality in the facility area is generally poor with respect to major cations and anions. The ADEQ Water Quality Database (WQDB) has cation and anion water quality data in Section 27, T 1 N, R 1 E from the period 1936-1980. The most recent samples, collected on July 1, 1980, indicated the following analytical results:

TDS	2,390 mg/l
Sulfate	330 mg/l
Nitrate	6.6 mg/l

Fluoride 0.2 mg/l
Chloride 1,100 mg/L

The applicant has submitted summaries showing the results of groundwater monitoring at existing Point of Compliance (POC) wells. Analyses for metals and VOCs submitted by the applicant for the POC wells indicate no exceedances of Aquifer Water Quality Standards (AWQSs). There have been scattered exceedances of ALs for nitrate, and fecal and total coliform bacteria in the period 2005-2007. The applicant states that these exceedances may be attributable to local dairy operations.

Infiltration Rate

The Tres Rios Flow Regulating Wetlands are anticipated to be similar to the existing Hayfield and Cobble demonstration wetlands. Because there will be no wet and dry cycles to reduce clogging, it is assumed that a similar clogging layer will form at the Tres Rios FRW. Over the past eight years, the Hayfield wetlands have exhibited infiltration rates ranging from 0.08 to 0.11 feet per day. Infiltration at the Tres Rios FRW is expected to be very low due to the formation of a clogging layer by accumulation of suspended solids and blockage by microorganisms and their byproducts. Statistical modeling of Tres Rios FRW infiltration rates indicates an infiltration rate ranging between 0.01 and 0.1 feet per day. For this reason, the great majority of discharges from the Tres Rios FRW is anticipated to be through the effluent channel to the Salt River, with a very minor amount of discharge to groundwater.

IV. STORM WATER/SURFACE WATER CONSIDERATIONS

The City of Phoenix provided a 2004 FEMA map indicating the Salt River floodplain in the vicinity of the WWTP. The facility is adjacent to the 100-year floodplain, but lies outside of it. The Salt River in this area has infrequent flows that result from releases from upstream reservoirs on the Salt and Verde Rivers.

V. COMPLIANCE WITH AQUIFER WATER QUALITY STANDARDS

Monitoring and Reporting Requirements

To ensure that site operations do not violate Aquifer Water Quality Standards at the point of compliance, representative samples of the effluent from Plants 1, 2 and 3 will be collected prior to outfall to the Salt River. Representative samples of the effluent from UP-01 and UP-05 will be collected at the influent of the Tres Rios Flow Regulating Wetlands. The permittee will monitor the effluent daily for flow rate and fecal coliform, monthly for total nitrogen, and quarterly for metals, VOCs, indicator parameters, radionuclides, and pesticides and polychlorinated biphenyls (PCBs) (see Section 4.2, Table IA in the permit).

To ensure that site operations do not violate the Reclaimed Water Quality Standards for the beneficial use of Class B+ reclaimed water, the permittee will monitor the reclaimed water from Plants 1 and 2 at Reuse Pump Station #2, monitor the reclaimed water from Plant 3 at Reuse Pump Station #3, and monitor the reclaimed water from UP-01 and UP-05 at a sampling port near UP-01 Aeration Basin #1. The permittee will monitor the reclaimed water daily for flow rate and fecal coliform, and monthly for total nitrogen (see Section 4.2, Table IB in the permit).

To ensure that site operations do not violate Aquifer Water Quality Standards at the point of compliance, the permittee will monitor the groundwater at five monitoring wells. The permittee will monitor the groundwater quarterly for asbestos, nitrogen, turbidity, total coliform, metals, VOCs, indicator parameters, radionuclides, and pesticides and PCBs (see Section 4.2, Table II in the permit).

Facility inspection and operational monitoring will be performed on a routine basis (see Section 4.2, Table III in the permit).

Points of Compliance (POCs)

The location of the POCs is determined by an analysis of the Pollutant Management Area (PMA), the Discharge Impact Area (DIA), and locations and uses of groundwater wells in the area. The POC locations are selected to protect off-site uses of groundwater, verify BADCT performance, and allow early detection of potential impact from facility discharges.

The PMA is described in ARS §49-244 as the limit projected in the horizontal plane of the area on which pollutants are or will be placed. The PMA includes horizontal space taken up by any liner, dike or other barrier designed to contain pollutants in the facility. If the facility contains more than one discharging activity, the PMA is delineated by an imaginary line circumscribing the several discharging activities. The PMA for this facility includes Plants 1, 2, and 3, UP-01 and UP-05, the HWS and the Tres Rios FRW, and the Salt River outfalls from Plants 1, 2, and 3, the HWS, and the Tres Rios FRW.

The discharge impact area (DIA) is defined by ARS §49-201.13. The DIA means the potential aerial extent of pollutant migration, as projected on the land surface, as the result of a discharge from a facility. The DIA for this facility extends from the WWTP to approximately 1.1 mile downgradient of the Tres Rios FRW outfall to the Salt River.

The hazardous/non-hazardous POCs are located as follows:

POC	POC Location	Latitude	Longitude
MW-A	Northwest corner of Sludge Bed 45	33° 23' 57" N	112° 14' 44" W
MW-D	Southeast corner of Sludge Bed 10	33° 23' 22" N	112° 14' 45" W
MW-L	Northeast corner of the WWTP site	33° 23' 94" N	112° 15' 24" W
MW-M	Northeast of the discharge point to the Salt River, on the north side of the effluent channel	33° 23' 35" N	112° 15' 21" W
POC Well	Downgradient of the Tres Rios Flow Regulating Wetlands	33°23'28.7"N	112°15'59.6"W
Theoretical POC	Western edge of the WWTP site	33° 23' 30" N	112° 17' 09" W

The Director may amend the permit to designate additional points of compliance if information on groundwater gradients or groundwater usage indicates the need.

VI. COMPLIANCE SCHEDULE

For each compliance schedule item listed below, the permittee must submit the required information, including a cover letter that lists the compliance schedule items, to the Groundwater Section. A copy of the cover letter must also be submitted to the ADEQ Water Quality Compliance Section.

Description	Due by:
The permittee shall submit a signed, dated, and sealed Engineer’s Certificate of Completion in a format approved by the Department that confirms that the facility is constructed according to the Department-approved design report or plans and specifications, as applicable.	Prior to discharging under this permit and within 90 days after the completion of construction.
The permittee shall install a groundwater monitoring well at the POC located downgradient of the Tres Rios Flow Regulating Wetlands.	Within 180 days after the date of permit signature.
The permittee shall submit a Well Installation Report for the POC Well installed downgradient of the Tres Rios Flow Regulating Wetlands, including an as-built drawing stamped, dated, and signed (sealed) by an Arizona registered Professional Engineer (P.E.) or Registered Geologist (R.G.).	Within 30 days after the completion of well installation.

VII. OTHER REQUIREMENTS FOR ISSUING THIS PERMIT

Technical Capability

The City of Phoenix has demonstrated the technical competence necessary to carry out the terms and conditions of the permit in accordance with A.R.S. § 49-243(N) and A.A.C. R18-9-A202(B). The permittee is expected to maintain technical capability throughout the life of the facility.

The WWTP was designed as per the design report prepared and stamped, dated, and signed (sealed) by Charles Wolf, P.E. (Professional Engineer), dated March 2008, and subsequent sealed submittals that served as additions to the design report.

Financial Capability

The permittee has demonstrated financial capability under A.R.S. § 49-243(N) and A.A.C. R18-9-A203. The estimated dollar amount demonstrated for financial capability is \$40,000,000 for operations and maintenance, and \$3,696,700 for closure and post-closure care. The financial capability was demonstrated through R18-9-A203(B)(1)and(2). The permittee must maintain financial capability throughout the life of the facility.

Zoning Requirements

The 91st Avenue WWTP has been properly zoned for the permitted use and the permittee has complied with all zoning ordinances in accordance with A.R.S. § 49-243(O) and A.A.C. R18-9-A201(B)(3).

VIII. ADMINISTRATIVE INFORMATION

Public Notice (A.A.C. R18-9-108(A))

The public notice is the vehicle for informing all interested parties and members of the general public of the contents of a draft permit or other significant action with respect to a permit or application. The aquifer protection program rules require that permits be public noticed in a newspaper of general circulation within the area affected by the facility or activity and provide a minimum of 30 calendar days for interested parties to respond in writing to ADEQ. The basic intent of this requirement is to ensure that all interested parties have an opportunity to comment on significant actions of the permitting agency with respect to a permit application or permit.

The public notice for this permit was published in the (enter name of publication) on (enter date) under public notice no. (enter public notice number).

Public Comment Period (A.A.C. R18-9-109(A))

The Department shall accept written comments from the public before a significant permit amendment is made. The written public comment period begins on the publication date of the public notice and extends for 30 calendar days. After the closing of the public comment period, ADEQ is required to respond to all significant comments at the time a final permit decision is reached or at the same time a final permit is actually issued.

Public Hearing (A.A.C R18-9-109(B))

A public hearing may be requested in writing by any interested party. The request should state the nature of the issues proposed to be raised during the hearing. A public hearing will be held if the Director determines there is a significant amount of interest expressed during the 30-day public comment period, or if significant new issues arise that were not considered during the permitting process.

A public hearing was deemed to be (un)necessary for this significant permit amendment. (If a public hearing was held, include the details (location and date) in the final factsheet.)

IX. ADDITIONAL INFORMATION

Additional information relating to this permit may be obtained from:

Arizona Department of Environmental Quality
Water Quality Division - Groundwater Section - APP and Reuse Unit
Attn: Bob Manley
1110 West Washington Street, Mail Code 5415B-3
Phoenix, Arizona 85007
Phone: (602) 771-4498