



# Fact Sheet

Aquifer Protection Permit 102478  
Place ID #126397, LTF # 43018  
Site Code 070319-02  
SIGNIFICANT AMENDMENT  
City of Surprise SPA-1 WRF

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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). BADCT's purpose is to employ engineering controls, processes, operating methods or other alternatives, including site-specific characteristics (i.e., the local subsurface geology), to reduce discharge of pollutants to the greatest degree achievable before they reach the aquifer or to prevent pollutants from reaching the aquifer.

## I. FACILITY INFORMATION

### Name and Location

Permittee's Name:	City of Surprise.
Mailing Address:	12425 West Bell Rd., Suite D-100 Surprise, Arizona 85374
Facility name and location:	Surprise SPA-1 Water Reclamation Facility 11401 N. 136 <sup>th</sup> Avenue Surprise, Arizona 85379

### Regulatory Status

<b>Individual APP Type:</b>	<b>Date Issued:</b>
Original APP	April 7, 1994
Minor Amendment	October 11, 1995
Significant Amendment	November 7, 1997
Significant Amendment	January 3, 2005
Significant Amendment	May 1, 2007
Minor Amendment	May 23, 2007

This Significant Amendment Application was received by ADEQ on September 5, 2006. An Expedited Permit was requested on January 14, 2008. This Amendment proposes a significant modification to the City of Surprise SPA-1 Wastewater Reclamation Facility (WRF), Special Planning Area 1 (SPA-1) for construction of additional recharge capacity.

**Facility Description**

The Surprise SPA-1 covers approximately 187 acres bounded by Litchfield Road on the west, Cactus Road on the north, the ½ mile between Litchfield and Dysart Roads to the east, and Peoria Road to the south. The facility and site are owned by the City of Surprise and are located in Township 3 North, Range 1 West, Section 22, Gila and Salt River Base Line and Meridian.

This current significant amendment will include vadose zone recharge of treated effluent. Previous significant amendments were issued for the expansion of treatment capacity from 8.3 to 16.3 million gallons per day (mgd). Currently, the City of Surprise is authorized to operate Surprise SPA-1 WRF at a capacity of 16.3 mgd.

The secondary treatment process utilizes oxidation ditches, secondary clarifiers, filters, optional back-up ultra-violet (UV) disinfection (only at Plant I/II) and chlorination disinfection systems, and effluent pump station. Effluent meets Class A+ reclaimed water quality (A.A.C. R18-9-303) for use under a valid reclaimed water permit as per A.A.C. R18-9, Article 7. However, the permittee is also authorized to use the UV system to provide backup disinfection at plants I & II.

Currently, the Surprise SPA-1 WRF has a discharge capacity of 16.3 mgd. Existing recharge permits issued by Arizona Department of Water Resources (ADWR) allow an annual recharge of 8,066 acre-feet per year (approximately 7.2 mgd) using nine recharge basins totaling 65.6 acres. The Underground Storage Facility Permit application is currently in process at ADWR to add vadose zone recharge well technology to the facility

Two groundwater monitoring well points of compliance are included in this SPA-1 WRF permit. However, ADEQ may determine that additional groundwater monitoring wells be placed at the edge of the Pollutant Management Area (PMA), downgradient of the new recharge wells for this area-wide APP.

The Surprise SPA-1 WRF treats typical domestic wastewater from residential and commercial areas in City of Surprise, Maricopa County, Arizona. All industrial hookups and other non-residential hookups to the treatment system shall conform to Section 307 of the Federal Water Pollution Control Act and shall be authorized according to the federal pretreatment program, or as otherwise approved by federal, state or local regulations.

**Amendment Description**

This permit is being significantly amended to increase recharge capacity by the addition of discharging locations in the form of vadose zone recharge wells. Additionally, the nitrogen limits at POC# 1 have been revised to the Aquifer Water Quality Standards, prior to this modification levels were set at 27.4 mg/L based on the groundwater ambient and historic levels.

**II. BEST AVAILABLE DEMONSTRATED CONTROL TECHNOLOGY (BADCT)**

The phased expansion of Surprise SPA-1 has included Plants IV and V, each with additional treatment capacities of 4.0 mgd, for a total treatment capacity of 16.3 mgd.

Pretreatment: The facility meets the requirements for pretreatment by conducting monitoring as required in this permit.

Odor, Noise, & Aesthetic Controls and Setbacks: Applicant acknowledges that odor and noise control is managed by setbacks. Odor control at headworks was provided.

Effluent Quality: The Surprise SPA-1 WRF is designed to produce Class A+ Reclaimed Water.

Sludge Disposal: All sludge including screenings, grit, and scum will be hauled off-site for disposal in accordance with State and Federal regulations.

WRF Leakage Potential: WRF units are constructed of reinforced concrete. There should be no leakage of wastewater from the WRF.

Emergency Operation: The Emergency Operation Plan adequately addresses all the emergency situations accepted by ADEQ.

Storm Water and Surface Water Considerations: The Surprise SPA-1 WRF site is located within the 100-year flood plain and is protected by berms and ditches around the facility and each of the basins to divert the flow from the 100-year, 24-hour storm event.

Discharge Monitoring Requirements in the APP: Monitoring is required to demonstrate compliance with the treatment performance standards for new facility in R18-9-B204.

### **III. COMPLIANCE WITH AQUIFER WATER QUALITY STANDARDS**

The permittee is required to show that pollutants discharged will not cause or contribute to a violation of AWQS at the POC. The location of the points of compliance (POCs) is ~~determined~~ bydetermined 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, to verify BADCT performance, and to allow early detection of potential impact from the WRF discharges.

The pollutant management area (PMA) is described in A.R.S. §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. The PMA for this facility is defined by a line circumscribing all wastewater treatment plants, all effluent storage ponds, vadose zone recharge wells, and the two recharge basins.

The discharge impact area (DIA) is defined by A.R.S. §49-201.13. The DIA means the potential areal extent of pollutant migration, as projected on the land surface, as the result of a discharge from a facility. The DIA analysis typically evaluates the distance a particle of a “pollutant” may travel from the point of recharge. A groundwater mound with a maximum height of about 203 feet may be expected from this recharge after 20 years.

The Area of Impact Analysis (AOI), required for ADWR recharge permits, was used to estimate

the maximum increase in water levels if recharge were to occur continuously at the maximum recharge capacity for this site. The AOI measures only the changes in water levels due to the recharge with the extent generally defined by a rise in the water table of one foot or more. Changes in water level may or may not be similar to the distance a particle [of a pollutant] may travel depending on site conditions. A maximum AOI was calculated as 11.3 miles over a 20-year life for the Surprise SPA-1 WRF at the maximum recharge capacity of 8,066 acre-feet per year.

To ensure that site operations do not negatively impact groundwater, discharge monitoring will be required for pathogens, total nitrogen, metals, and volatile organic compounds (VOCs) as described in the permit. Groundwater monitoring will be conducted at Point of Compliance (POC) wells.

**Point(s) of Compliance (POC)**

Two Points of Compliance (POC) have been designated for this facility and are located at:

POC	Descriptive Location	Latitude	Longitude
POC#1 SRF-MW-1 (55-564527)	Southwest corner of Storage Basin #2	33° 35' 09" N	112° 21' 24" W
POC#2 SRF-MW-2 (55-572867)	Located along the northeast boundary of the property	33° 35' 33.24" N	112° 21' 1.57" W

Monitoring will be required at POC #1 and POC #2 as part of this permit. The Director may designate additional points of compliance if information on groundwater gradients or groundwater usage indicates the need.

**Monitoring and Reporting Requirements**

To ensure that the site operations do not negatively impact the groundwater, discharge monitoring will be required for pathogens (total and fecal coliform), total nitrogen, metals, and volatile organic compounds (VOCs), as described in the permit. Groundwater monitoring will be conducted at the POC wells.

The permittee shall monitor the effluent according to Section 4.0, TABLE IA, IB, and IC (1 to 3) of the APP at the point of discharge from each plants shown in Section 2.1 (see attached map for detail) and in Section 4.0, Tables IA, and IB, of the permit. There is one effluent sampling point (SP) for the facility as identified below:

Sampling Points	Flow Measurement Location	Latitude	Longitude
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4	Discharge from the disinfection contact basins (combined discharge from Plant I, II, III, IV and V for Reuse) <sup>1</sup>	33° 35' 15" N	112° 21' 17" W
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The permittee shall monitor groundwater according to Section 4.0, TABLE II of the APP at the point of compliance (POC) wells. Aquifer Quality Limits (AQLs) at the POC are set at the applicable AWQS for all parameters.

Historical nitrogen concentrations have been as high as 34 mg/l but data was incomplete or potentially anomalous. A statistical analysis of data collected from an upgradient well (Ag Well 32) during 2005 was used to set aquifer quality limits for nitrogen species at 27.4 mg/l based on a statistical analysis. However, current data indicate meeting the AWQS of 10 mg/l.

#### IV. STORMWATER AND SURFACE WATER CONSIDERATIONS

Storm water and surface water considerations include whether the facility was located within a 100-year flood plain and whether the discharge had the potential to impact adjacent surface water drainages.

The Surprise SPA-1 WRF is located in the Agua Fria River below Lake Pleasant sub-basin (HUC-10) in the Middle Gila surface water basin. Historic surface drainages in the area have been disturbed by agricultural activities but originally flow generally was east-southeast in ephemeral drainages towards the ephemeral Agua Fria River, located approximately two miles east of the facility.

There is a 100-year flood plain located on the east side of the facility along the western edge of the Atchison, Topeka and Santa Fe Railroad. A portion of Plants I and II and the unlined pond are located within this historic flood plain. Berming and ditches around these facilities have altered the flood plain such that they are no longer considered to be located within the historic flood area. The berms and ditches divert the flow away from all on-site ponds and treatment plants. The City has obtained a Floodplain Use Permit for the Surprise SPA-1 WRF from the Maricopa County Flood Control District after verification by the County that the plant site is protected from a 100-year flood event.

Monitoring of nearby drainages was not included as a permit condition because the facility does not directly discharge to any surface water.

#### VI. COMPLIANCE SCHEDULE

For each compliance schedule item listed below, the permittee shall 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 Water Quality Compliance Section, Data Unit.

<sup>1</sup> Discharge is either from Plants I and II, Plant III, IV and V, or all five plants.

No.	Completion/Submittal Date	Comments
<b>Groundwater Assessment</b>		
1	One year from date of permit issuance and every five years thereafter.	Submit a hydrogeologic report that includes an evaluation of groundwater flow conditions, recharge and groundwater monitoring and an evaluation of the adequacy of POC locations, identify data gaps, if any, and propose additional monitoring wells, as needed, to document compliance with permit conditions. This evaluation will be performed in order to update characterization of local groundwater conditions and evaluate the effectiveness of POC locations.
<b>Vadose Zone Recharge Wells</b>		
2	Prior to recharge of reclaimed water via vadose zone wells and within 90 days of completion of construction.	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 vadose zone wells are constructed according to the Department – approved design report or plans and specifications, as applicable.
3	Within 15 days of vadose zone well installation.	Notify ADEQ within 15 days of the installation and testing of the initial vadose zone or direct injection wells. Submit results of testing necessary to determine the available recharge rates and map showing location of the wells installed, including the latitudes and longitudes, within 30 days of the completion of testing.
4	Within 30 days of reaching 75% of effluent recharge capacity	The permittee shall submit a plan to ADEQ that includes a proposal to add additional recharge capacity. The plan shall indicate proposed recharge locations and volumes for each vadose zone recharge well and shall include signed, dated, and diagrams of proposed well construction sealed by an Arizona P.E. or R.G. The plan shall also include a schedule for well construction and testing, and commencement of recharge at each well.

**VII. OTHER REQUIREMENTS FOR ISSUING THIS PERMIT**

**Technical Capability**

The City of Surprise 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).

ADEQ requires that appropriate documents be sealed by an Arizona registered geologist or professional engineer. This requirement is a part of an on-going demonstration of technical capability. The permittee is expected to maintain technical capability throughout the life of the facility.

**Financial Capability**

The City of Surprise has demonstrated the financial responsibility 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-A203. The permittee is expected to maintain financial capability throughout the life of the facility. Closure and post-closure costs are estimated to be \$690,000.

**Zoning Requirements**

The City of Surprise SPA-1 WRF has been properly zoned for the permitted use and the permittee has complied with all Maricopa County zoning ordinances in accordance with A.R.S.

## **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 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. This permit will be public noticed in a local newspaper after a pre-notice review by the applicant and other affected agencies.

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

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. 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.

## **VIII. ADDITIONAL INFORMATION**

Additional information relating to this proposed permit may be obtained from:

Arizona Department of Environmental Quality  
Water Quality Division – Administration Unit  
Attn: Mason Bolitho  
1110 W. Washington St.  
Phoenix, Arizona 85007  
Phone: (602) 771- 4434