

## ARIZONA POLLUTANT DISCHARGE ELIMINATION SYSTEM (AZPDES)

This document gives pertinent information concerning the reissuance of the AZPDES permit listed below. This facility is a publicly owned treatment works (POTW) with a design capacity of 12 million gallons per day (mgd) and thus is considered to be a major facility under the NPDES program. The effluent limitations contained in this permit will maintain the Water Quality Standards listed in Arizona Administrative Code (A.A.C.) R18-11-101 et. seq. This permit is proposed to be issued for a period of 5 years.

Permittee's Name:	City of Yuma
Permittee's Mailing Address:	155 W. 14 <sup>th</sup> Street Yuma, Arizona 85364
Facility Name:	Figueroa Avenue Water Pollution Control Facility (WPCF)
Facility Address or Location:	289 N. Figueroa Avenue Yuma, Arizona 85364
County:	Yuma
Contact Person(s): Phone/e-mail address	Ward Seibel, Wastewater Treatment Manager (928) 373-4591 / Ward.Seibel@YumaAZ.gov
AZPDES Permit Number:	AZ0020443
Inventory Number:	100799
LTF Number:	67539

<b>I. STATUS OF PERMIT(s)</b>	
AZPDES permit applied for:	Renewal
Date application received:	August 16, 2017
Date application was determined administratively complete:	April 30, 2018. The application was incomplete due to the requirement for the Permittee to submit a new mixing zone study to reevaluate the mixing zone.
Previous permit number (if different):	N/A
Previous permit expiration date:	February 21, 2018

**208 Consistency:**

In accordance with A.A.C. R18-9-A903(6), a permit cannot be issued for any discharge inconsistent with a plan or plan amendment approved under section 208(b) of the Clean Water Act.

Based on review of the application, there are no changes to the facility that require a new determination of consistency with the Regional Water Quality Management Plan.

City of Yuma has the following permits issued by ADEQ applicable to the Figueroa Avenue Water Pollution Control Facility:

Type of Permit	Permit Number	Purpose
Aquifer Protection Permit (APP)	P 100799	Regulates discharges to the local aquifer
Multi-Sector General Permit (MSGP)	AZMSG 2010-002	Regulates stormwater discharge

**II. GENERAL FACILITY INFORMATION**

Type of Facility:	Publicly owned treatment works (POTW)
Facility Location Description:	The Figueroa Avenue WPCF is located west of City of Yuma, ¼ mile south of the Colorado River.
Permitted Design Flow:	12 million gallons per day (mgd)
Constructed Design Flow:	12 mgd
Treatment level (WWTP):	Secondary treatment level
Treatment Processes (include sludge handling and disposal/use):	The treatment process consists of bar screens, grit chambers, primary clarifiers, aeration basins, secondary clarifiers, chlorine contact basins, dechlorination, anaerobic sludge digesters and gravity sludge thickener. Digested and thickened sludge is hauled from the WPCF by an independent contractor (AG Tech, LLC) and utilized for agricultural land application.
Nature of facility discharge:	Domestic wastewater from residential, commercial and industrial sources in the City of Yuma.
Number of significant industrial dischargers (SIUs):	There are 15 significant industrial dischargers (SIUs) connected to the treatment works. Six (6) of the SIUs are categorical SIUs, and the other nine (9) SIUs are non-categorical. See <b>Appendix C</b> of the permit for Significant Industrial User Data.

Average flow per discharge:	The applicant indicates that the average flow per discharge is approximately 6.59 mgd.
Service Area:	City of Yuma, Arizona Fort Yuma Indian Reservation Marine Corps Air Station – Yuma and Town of Winterhaven, California
Service Population:	City of Yuma, Arizona – Approximately 94,906 people Fort Yuma Indian Reservation - Approximately 2,189 people Marine Corps Air Station – Yuma - Approximately 11,995 people Town of Winterhaven, California - Approximately 494 people
Reuse / irrigation or other disposal method(s):	N/A
Continuous or intermittent discharge:	Continuous discharge

**Background Info –Side Channel Conveyance to Colorado River Main Channel and Mixing Zone**

The effluent from the Figueroa treatment facility is discharged to a side channel of the Colorado River adjacent to the main channel within the floodplain. The effluent is conveyed down the side channel for approximately 1000 meters (3300 feet) until it reaches the confluence of the Colorado River main channel. The existing AZPDES permit for the Yuma treatment facility has an approved mixing zone for ammonia and WET. The basis of the mixing zone approval was from a mixing zone study completed in 1997. The mixing zone conditions in the current permit require the Permittee to achieve compliance with the mixing zone parameters while sampling in the main stem of the river, 500 meters downstream from the point of confluence of the effluent side channel to the main channel.

ADEQ required the City of Yuma to submit a new mixing zone study as part of this permit application. During the development of the new mixing zone study, ADEQ inspected and sampled the side channel for total nitrogen, nitrate/nitrite, ammonia, phosphorus, pH and dissolved oxygen (DO). The samples were taken from 3 locations in the side channel – (1) at the outfall location, (2) approximately 500 meters downstream of the outfall and (3) near the confluence of the main channel. The data of these samples demonstrated the ammonia concentrations remained consistent throughout the side channel and the DO results were all below 3 mg/L, with one being below 1 mg/L.

ADEQ met with representatives from the City of Yuma and went over the sample data. ADEQ concluded the current approved mixing zone where the boundary of the mixing zone extends the entire length of side channel (approximately 1000 meters) and extends 500 meters downstream of the main channel, no longer conforms to the Arizona mixing zone requirements set in A.A.C. R18-11-114. Specifically, ADEQ concluded the mixing zone does not conform with R18-11-114(A) that prohibits a mixing zone where there is no water available for dilution and does not conform to R18-11-114(E)(1) that states a mixing zone shall not exceed 500 meters in length.

As part of a permit condition described in Part V.B. of the permit, the City of Yuma is to develop and engineer a plan to discharge the effluent directly into the Colorado River main channel, thus abandoning the

side channel. The permit details a timeframe for the permittee to develop a final design of a new outfall structure that will convey the effluent directly to the main stem of the Colorado River. This new outfall structure is to be complete as specified in Part V.A Special Conditions of the permit. Yuma is also required to submit a revised mixing zone study as part of the next permit renewal application.

### III. RECEIVING WATER

The State of Arizona has adopted water quality standards to protect the designated uses of its surface waters. Streams have been divided into segments and designated uses assigned to these segments. The water quality standards vary by designated use depending on the level of protection required to maintain that use.

Receiving Water :	Colorado River – Topock Marsh to Morelos Dam
River Basin:	Colorado / Lower Gila River Basin
Outfall Location:	Outfall 001: Township 16 S, Range 22 E, Section 28 Latitude 32° 43' 59" N, Longitude 114° 39' 53" W

The outfall discharges to, or the discharge may reach, a surface water listed in Appendix B of A.A.C. Title 18, Chapter 11, Article 1.

Designated uses for the receiving water listed above:	Aquatic and Wildlife warm water (A&Ww) Full Body Contact (FBC) Fish Consumption (FC) Agricultural Irrigation (AgI) Agricultural Livestock watering (AgL) Domestic Water Supply (DWS)
Is the receiving water on the 303(d) list?	Yes. The Colorado River (from the Main Canal to the Mexico border (reach segment no. 15030107-001) was listed as impaired for selenium and dissolved oxygen in year 2006. According to the 2016 Water Quality - Assessment Report the segment remains impaired for selenium and is no longer impaired for dissolved oxygen. Development of the Total Maximum Daily Loads (TMDLs) for selenium has not been started due to the surface water quality standard for selenium being re-evaluated. A TMDL for nitrogen and phosphorus was established for the Lower Colorado River from the Yuma USGS Gage (0952110) to the International Border. This permit contains wasteload allocations for nitrogen and phosphorus as described in the TMDL.

Given the uses stated above, the applicable narrative water quality standards are described in A.A.C. R18-11-108, and the applicable numeric water quality standards are listed in A.A.C. R18-11-109 and in Appendix A thereof. There are two standards for the Aquatic and Wildlife uses, acute and chronic. In developing AZPDES permits, the standards for all applicable designated uses are compared and effluent limitations that will protect for all applicable designated uses are developed based on the standards.

**IV. DESCRIPTION OF DISCHARGE**

Because the facility is in operation and discharges have occurred, effluent monitoring data are available. The following is the measured effluent quality reported in the application.

Parameters	Units	Maximum Daily Discharge Concentration
Biochemical Oxygen Demand (BOD)	mg/L	13
Total Suspended Solids (TSS)	mg/L	9.3
Total Kjeldahl Nitrogen (TKN)	mg/L	47
<i>E. coli</i>	MPN / 100 mL	727.0

Facility design removal rates:	BOD 85 % TSS 85 %
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**V. STATUS OF COMPLIANCE WITH THE EXISTING AZPDES PERMIT**

Date of most recent inspection:	March 15, 2017; no potential violations were noted as a result of this inspection.
DMR files reviewed:	March 2013 through December 2017
Lab reports reviewed:	March 2013 through December 2017
DMR Exceedances:	Total Residual Chlorine (TRC) (April 2013, June 2013, October 2013, and March 2017) ; <i>E. Coli</i> (November 2013, and January 2014) ; and Total Nitrogen (February 2015, April and May 2016). No other exceedances were noted.
NOVs issued:	None
NOVs closed:	N/A
Compliance orders:	None
Pre Treatment Program Compliance:	ADEQ audited the City's pretreatment program on 10/12/2017. As part of the audit the City was required to finalize its Sewer User Ordinance (SUO) and Enforcement Response Plant (ERP). On March 29, 2018, the City submitted an electronic copy of the draft SUO for ADEQs review. ADEQ approved the revised SUO on December 4, 2018.

<b>VI. PROPOSED PERMIT CHANGES</b>			
The following table lists the major changes from the previous permit in this draft permit.			
<b>Parameter</b>	<b>Existing Permit</b>	<b>Proposed permit</b>	<b>Reason for change</b>
Reporting Location	Mail in hard copies of DMRs and other attachments	DMRs and other reports to be submitted electronically through myDEQ portal	Language added to support the NPDES electronic DMR reporting rule that became effective on December 21, 2015.
Ammonia	Monitoring with floating effluent limitations based on pH and Temperature.	Monitoring with effluent limitations using an Ammonia Impact Ratio (AIR).	The AIR is a trackable numeric value. See Section VII for details.
Copper, Thallium and Selenium	Limited	Effluent characterization	Data submitted indicated no reasonable potential (RP) for an exceedance of a standard.
Chromium VI	Assessment level	Effluent characterization	Data submitted indicated no reasonable potential (RP) for an exceedance of a standard.
Iron	Assessment level	Effluent characterization	Data submitted indicated no reasonable potential (RP) for an exceedance of a standard.
Special Condition – New Outfall Structure	N/A	Permit establishes schedule for the Permittee to convey the discharge directly into the main channel of the Colorado River	To establish immediate mixing in the main channel of the Colorado River to conform with the Arizona mixing zone requirements in A.A.C. R 18-11-114

Anti-backsliding considerations – “Anti-backsliding” refers to statutory (Section 402(o) of the Clean Water Act) and regulatory (40 CFR 122.44(l)) requirements that prohibit the renewal, reissuance, or modification of an existing NPDES permit that contains effluent limitations, permit conditions, or standards that are less stringent than those established in the previous permit. The rules and statutes do identify exceptions to these circumstances where backsliding is acceptable. This permit has been reviewed and drafted with consideration of anti-backsliding concerns.

Effluent limitations for the following parameters have been removed from the permit because evaluation of current data allows the conclusion that no reasonable potential (RP) for an exceedance of a standard exists:

- Copper
- Thallium
- Selenium

This is considered allowable backsliding under 303(d)(4). The effluent limitations in the current permit for these parameters were based on state standards, the respective receiving waters are in attainment for these parameters, and the revisions are consistent with antidegradation requirements. See Section XII for information regarding antidegradation requirements.

Effluent limitations are retained in the draft permit for parameters where reasonable potential (RP) for an exceedance of a standard continues to exist or is indeterminate. In these cases, effluent limitations will be recalculated using the most current Arizona Water Quality Standards (WQS). If less stringent effluent limitations result due to a change in the WQS then backsliding is allowed in accordance with 303(d)(4) if the new effluent limitations limits are consistent with antidegradation requirements and the receiving water is in attainment of the new standard; see Section XII for information regarding antidegradation requirements.

No effluent limitations are less stringent due to a change in the WQS in this permit.

## VII. DETERMINATION OF EFFLUENT LIMITATIONS and ASSESSMENT LEVELS

When determining what parameters need monitoring and/or effluent limitations included in the draft permit, both technology-based and water quality-based criteria were compared and the more stringent criteria applied.

### **Technology-based Limitations:** As outlined in 40 CFR Part 133:

The regulations found at 40 CFR §133 require that POTWs achieve specified treatment standards for BOD, TSS, and pH based on the type of treatment technology available. Therefore, technology-based effluent limitations (TBELs) have been established in the permit for these parameters. Additionally, oil & grease will be monitored with an assessment level based on best professional judgment (BPJ). The average monthly assessment level of 10 mg/L and daily maximum of 15 mg/L for oil and grease are commonly accepted values that can be achieved by properly operated and maintained WWTPs. This level is also considered protective of the narrative standard at A.A.C. R18-11-108(B).

**Numeric Water Quality Standards:** As outlined in A.A.C. R18-11-109 and Appendix A:

Per 40 CFR 122.44(d)(1)(ii), (iii) and (iv), discharge effluent limitations must be included in the permit for parameters with “reasonable potential” (RP), that is, those known to be or expected to be present in the effluent at a level that could potentially cause any applicable numeric water quality standard to be exceeded. RP refers to the possibility, based on the statistical calculations using the data submitted, or consideration of other factors to determine whether the discharge may exceed the Water Quality Standards. The procedures used to determine RP are outlined in the *Technical Support Document for Water Quality-based Toxics Control (TSD)* (EPA/505/2-90-001). In most cases, the highest reported value for a parameter is multiplied by a factor (determined from the variability of the data and number of samples) to determine a “highest estimated value”. This value is then compared to the lowest applicable Water Quality Standard for the receiving water. If the value is greater than the standard, RP exists and a water quality-based effluent limitation (WQBEL) is required in the permit for that parameter. RP may also be determined from BPJ based on knowledge of the treatment facilities and other factors. The basis for the RP determination for each parameter with a WQBEL is shown in the table below.

Ammonia water quality criteria vary based on the receiving water pH and temperature at the time of effluent sampling. As a result, no single ammonia concentration can be included as a permit limit. To overcome this, an Ammonia Impact Ratio (AIR) of 1 for the monthly average and a value of 2 for the maximum daily limits has been established as the permit effluent limitations for ammonia. The AIR is calculated by dividing the ammonia concentration in the effluent by the applicable ammonia standard based on the receiving water pH and temperature at the time of sampling. AIR values will be reported on DMRs and on the Ammonia Data Log which is included as Appendix B in the permit.

It is assumed that RP exists for exceedance of water quality criteria for the pollutants *E. coli* and, if chlorine or bromine is used in the treatment process, total residual chlorine (TRC). These parameters have been shown through extensive monitoring of WWTPs to fluctuate greatly and thus are not conducive to exclusion from limitation due to a lack of RP. Therefore, the draft permit contains WQBELs for *E. coli* and TRC.

The proposed permit effluent limitations were established using a methodology developed by EPA. Long Term Averages (LTA) were calculated for each designated use and the lowest LTA was used to calculate the average monthly limit (AML) and maximum daily limit (MDL) necessary to protect all uses. This methodology takes into account criteria, effluent variability, and the number of observations taken to determine compliance with the limit and is described in Chapter 5 of the TSD. Effluent limitations based on A&W criteria were developed using the “two-value steady state wasteload allocation” described on page 99 of the TSD. When the limit is based on human health criteria, the monthly average was set at the level of the applicable standard and a daily maximum limit was determined as specified in Section 5.4.4 of the TSD.

**Mixing Zone:** Arizona water quality rules require that water quality standards be achieved without mixing zones unless the permittee applies and is approved for a mixing zone. The previous permit for Figueroa WPCF contained a mixing zone for ammonia and whole effluent toxicity (WET) and the City of Yuma requested this mixing zone be renewed.

As described in the background section above, this permit requires the City to execute a plan to discharge the effluent directly into the Colorado River main stem thus abandoning the discharge to the side channel. The steps and milestones to achieve the plan are detailed as a special condition in Part V.B. of the permit. To allow time for the new outfall structure to be designed and constructed, this permit will reestablish the mixing



zone conditions set in the current permit. The ammonia and WET effluent limitations shall be achieved 500 meters downstream of the confluence of the side channel and the main channel of the Colorado River.

### **Mixing Zone Study**

The City of Yuma submitted a draft mixing zone study to ADEQ in April, 2018. The purpose of the mixing zone study was to update the mixing zone approval and to aid in the development of future effluent limitations using a dilution factor determined by a hydrodynamic model.

The mixing zone study was completed by Carollo Engineers. During initial technical meetings with the City, ADEQ determined there was not immediate mixing of the effluent with the receiving water because the effluent created a separate channel in the bed of the Colorado River (separated by a sandbar) that traveled approximately 1000 meters before mixing with the main stem of the river. ADEQ and the City agreed to resolve the issue, by requiring the City to design and construct a new outfall structure with a conveyance to the main stem of the river in order to achieve more immediate mixing. For the mixing zone analysis, the City modeled the discharge starting from the confluence of the side channel with the main stem of the river. The figure below depicts where the mixing zone is established.



ADEQ contracted with PG Environmental to review the mixing zone report. PG Environmental submitted a technical memorandum to ADEQ on July 23, 2018 and gave the following summary of findings and recommendations to ADEQ:

#### *Summary of Findings and Recommendations*

- *PG recommends revising the 1Q10 and 7Q10 model inputs to include a larger historical data window. PG recommends at least 20 years of data be utilized in this instance.*
- *The above recommendation aside, it is PG's opinion that a mixing zone sufficient to result in immediate compliance with effluent limitations (370 meters and a dilution credit or factor of 14.5) will be authorizable and protective of WQS in the receiving water.*

ADEQ presented PG the recommendations to the City of Yuma and the City revised the study based on PG Environmental’s recommendations. The final mixing zone study was submitted to ADEQ on December 18, 2018.

The mixing zone analysis utilized existing water quality data for direct toxicity analysis and hydrodynamic modeling using the CORMIX software. The purpose of the model was to determine the behavior and dilution of the effluent in the Colorado River downstream of the Yuma WPCF outfall. The following is summary of the mixing zone study.

Estimated Critical Conditions:

<u>Aquatic Life Criteria</u>	<u>Receiving Water Flow</u>	<u>Facility Flow</u>
Acute	1Q10: 233	Maximum Daily: 7.7
Chronic	7Q10: 288	Maximum Monthly Average: 7.1

Critical low flow receiving water values were estimated based on 20 years (April 1997 – March 2017) of receiving water data collected from USGS station 09251100 located on the Colorado River.

The following conclusions and observations from the Yuma mixing zone study were as follows:

1. Historical sampling data collected per the FAWPCF AZPDES requirements indicate that the ammonia concentrations measured at the point of compliance have been within the allowable limits.
2. Historical sampling data collected per the FAWPCF AZPDES requirements on days where river flows approach the 1Q10 and 7Q10 values indicate the ammonia concentrations measured at the point of compliance have been within the allowable limits.
3. The Cormix modeling results indicate that the zone of initial dilution (“ZID”) (near field) mixing zone requirements are within allowable limits in terms of ammonia concentrations, travel time through the ZID, and mixing plume width.
4. The Cormix modeling results indicate that the CMZ (far field) mixing zone requirements are not met for the 1Q10 condition (both mixing zone length, mixing zone width, and time of passage) and are not met for the 7Q10 (mixing zone width and time of passage).
5. The disparity between the modeling results and the historical sampling data indicates that there may be variables that are not being accounted for in the way the model represents mixing and dispersion in the system.
6. Background ammonia concentrations as well as seasonal changes in pH and temperature in the Colorado River can impact the effluent dilution in the River. These factors should be considered if the modeling results reported here are used to develop end of pipe (EOP) ammonia effluent limitations.

As indicated in conclusion #3, the concentrations of ammonia modeled within the ZID were allowable in terms of ammonia concentrations and travel time it takes for a free swimming organism to pass through the ZID. This demonstrates there will be no acute toxicity in the mixing zone and the size of the ZID prevents lethality to organisms passing through.

The study results indicate the modeled far field concentrations mixing zone requirements were not met for both the 1Q10 and 7Q10 modeled scenarios. However, because Yuma has historically sampled at 500 meters downstream in the river, actual receiving water data demonstrates the ammonia concentrations downstream are in compliance with the water quality standards. The following table (as submitted in the mixing zone

study) demonstrates the City’s compliance with the ammonia effluent limitation at the end of the mixing zone.

Table 12 FAWPCF - Selection of Historical Sampling Data

Date <sup>(1)</sup>	FAWPCF			Colorado River			Ammonia			
	Flow (cfs)	Effluent Temp (deg C)	pH	Flow (cfs)	River Temp (deg C)	pH	AZPDES Permit Limit <sup>(2)</sup> (mg/L)	River Upstream Measured Concentration (mg/L)	FAWPCF Measured Concentration (mg/L)	Measured Concentration at End of Mixing Zone / POC (mg/L)
3/12/2014	11.9	24	7.2	552	18	8	1.94	0.25	30.3	0.41
10/4/2017	12.4	30	7.2	444	24	8	1.32	0.34	22.0	0.37
10/7/2015	11.9	31	7.4	498	22	8	1.50	0.13	22.1	0.24
10/4/2011	10.1	NA	NA	500	24	8	1.32	0.54	34.1	0.40
12/1/2009	10.6	NA	NA	516	15	8.3	1.39	0.09	20.7	0.24
3/13/2013	12.1	22	7.4	531	19	8	1.71	0.17	36.4	0.36

Notes:

- (1) Selected from City's AZPDES Permit sampling data to correspond with river flow days similar to the 1Q10 (360 cfs) and 7Q10 (4446 cfs) values (11/2007 - 11/2017 period).
- (2) From "A&W Designated Uses" Table, page 44 - 45 of City's AZPDES Permit (No. AZ0020443).

ADEQ reauthorizes the mixing zone as established in the previous permit. The proposed permit requires the City to submit a revised mixing zone study as part of the next permit renewal application after the new outfall conveyance to the main channel is constructed.

**Assessment Levels (ALs):** ALs are listed in Part I.B of the permit. An AL differs from a discharge limit in that an exceedance of an AL is not a permit violation. Instead, ALs serve as triggers, alerting the permitting authority when there is cause for re-evaluation of RP for exceeding a water quality standard, which may result in new permit limitations. The AL numeric values also serve to advise the permittee of the analytical sensitivity needed for meaningful data collection. Trace substance monitoring is required when there is uncertain RP (based on non-detect values or limited datasets) or a need to collect additional data or monitor treatment efficacy on some minimal basis. A reopener clause is included in the draft permit should future monitoring data indicate water quality standards are being exceeded.

The requirement to monitor for these parameters is included in the draft permit according to A.A.C. R18-11-104(C) and Appendix A. Except for oil and grease, ALs listed for each parameter were calculated in the same manner that a limit would have been calculated (see Numeric Water Quality Standards Section above). The ALs for oil and grease were determined based on BPJ as described above.

**Hardness:** The permittee is required to sample hardness as CaCO<sub>3</sub> at the same time the trace metals are sampled because the water quality standards for some metals are calculated using the water hardness values. The hardness value of 396 mg/L (the average hardness of the receiving stream as supplied in the application) was used to calculate the applicable water quality standards and any assessment levels or effluent limitations for the hardness dependent metals (cadmium, chromium III, copper, lead, nickel, silver and zinc).

**Whole Effluent Toxicity (WET):** This permit contains a mixing zone for Whole Effluent Toxicity (WET). The mixing zone is 500 meters in length and extends across the width of the river. WET testing is required in the draft permit (Parts I.C, IV and V. A) to evaluate the discharge according to the narrative toxic standard in A.A.C. R18-11-108(A)(5), as well as whether the discharge has RP for WET per 40 CFR 122.44(d)(iv). At a minimum, the results reported on an AZPDES application must include quarterly testing for a 12-month period within the past year using multiple species or the results from four tests performed at least annually in the 4.5 years prior to the application.

ADEQ does not have a numeric standard for Whole Effluent Toxicity. However, ADEQ adopted the EPA recommended chronic toxicity benchmark of 1.0 TUC for a four day exposure period. Using this benchmark, the action levels for WET included in the draft permit were calculated in accordance with the methods specified in the TSD. The species chosen for WET testing are as recommended in the TSD and in Regions 9 & 10 Guidance for Implementing Whole Effluent Toxicity Testing Programs.

The draft permit requires monitoring once every 6 months at the end of the mixing zone for one species *Ceriodaphnia dubia* (water flea) representing the invertebrate phyla. Monitoring conducted during the previous permit terms demonstrated that *C. dubia* is the most sensitive species. An exceedance of an action level will trigger follow-up testing for all 3 species as indicated in Part I.C, Table 3 of the permit to determine if effluent toxicity is persistent. If toxicity above an action level is found in a follow-up test, the permittee will be required to conduct a Toxicity Reduction Evaluation (TRE) and possibly a Toxicity Identification Evaluation (TIE) to identify the source of toxicity and reduce toxicity. These conditions are required to ensure that toxicants are not discharged in amounts that are toxic to organisms [A.A.C. R18-11-108(A)(5)]. A reopener clause is included in accordance with 40 CFR Parts 122 and 124 and AAC R18-9-B906.

WET testing for chronic toxicity shall be conducted 1x/6 months on the species *C. dubia* at the end of the mixing zone. A more frequent sampling requirement is triggered if any of the WET action levels listed in the permit are exceeded. The permit also contains provisions for investigating the sources of toxicity, if detected. Three composite samples are required to complete one WET test. A 3-part composite sample from the mixing zone is required for WET testing. WET sampling must coincide with testing for all the parameters in Parts I.A and B of the draft permit, when testing of those parameters is required, to aid in the determination of the cause of toxicity if toxicity is detected. Additional procedural requirements for the WET test are included in the proposed permit.

The required WET monitoring frequency for this facility is consistent with the WET testing frequency required for facilities with a similar design flow. The draft permit requires WET test results to be reported on discharge monitoring reports and submittal of the full WET lab report to ADEQ.

**Effluent Characterization (EC):** In addition to monitoring for parameters assigned either a limit or an AL, sampling is required to assess the presence of pollutants in the discharge at certain minimum frequencies for additional suites of parameters, whether the facility is discharging or not. This monitoring is specified in Tables 4.a. through 4.f., *Effluent Characterization Testing*, as follows:

- Table 4.a. – General Chemistry and Microbiology: ammonia, BOD-5, *E. coli*, total residual chlorine (TRC), dissolved oxygen, total Kjeldahl nitrogen (TKN), nitrate/nitrite, oil and grease, pH, phosphorus, temperature, total dissolved solids (TDS), and total suspended solids (TSS)

- Table 4.b. – Selected Metals, Hardness, Cyanide, and WET
- Table 4.c. – Selected Volatile Organic Compounds
- Table 4. d. – Selected Acid-Extractible Compounds
- Table 4. e. – Selected Base-Neutral Compounds
- Table 4.f. – Additional Parameters Based on Designated Uses (from Arizona Surface Water Quality Standards, Appendix A, Table 1 and 2)

NOTE: Some parameters listed in Tables 4.a. and 4.b. are also listed in Tables 1 or 2. In this case, the data from monitoring under Tables 1 or 2 may be used to satisfy the requirements of Tables 4.a. and / or 4.b., provided the specified sample types are the same. In the event the facility does not discharge to a water of the U.S. during the life of the permit, EC monitoring of representative samples of the effluent is still required.

The purpose of EC monitoring is to characterize the effluent and determine if the parameters of concern are present in the discharge and at what levels. This monitoring will be used to assess RP per 40 CFR 122.44(d)(1)(iii)). EC monitoring is required in accordance with 40 CFR 122.43(a), 40 CFR 122.44(i), and 40 CFR 122.48(b) as well as A.R.S. §49-203(A)(7). If pollutants are noted at levels of concern during the permit term, this permit may also be reopened to add related effluent limitations or conditions.

**Permit Effluent Limitations and Monitoring Requirements:**

The table that follows summarizes the parameters that are limited in the permit and the rationale for that decision. Also included are the parameters that require monitoring without any limitations or that have not been included in the permit at all and the basis for those decisions. The corresponding monitoring requirements are shown for each parameter. In general, the regulatory basis for monitoring requirements is per 40 CFR §122.44(i) *Monitoring requirements*, and 40 CFR §122.48(b), *Required monitoring*; all of which have been adopted by reference in A.A.C. R18-9-A905, *AZPDES Program Standards*.

Parameter	Lowest Standard / Designated Use	Maximum Reported Daily Value	No. of Samples	Estimated Maximum Value	RP Determination	Proposed Monitoring Requirement/ Rationale (1)
Flow	---	---	---	---	---	Discharge flow is to be monitored on a continual basis using a flow meter.
Biological Oxygen Demand (BOD) and Total Suspended Solids (TSS)	30 mg/L 30-day average 45 mg/L 7-day average/ Technology-based limits 40 CFR 133.102	BOD: 13 mg/L TSS: 9.3 mg/L	BOD: 387 TSS: 297	N/A	TBELs for BOD and TSS are always applicable to WWTPs.	Monitoring for influent and effluent BOD and TSS to be conducted using composite samples of the influent and the effluent. The sample type required was chosen to be representative of the discharge. The requirement to monitor influent BOD and suspended solids is included to assess compliance with the 85% removal requirement in this permit. At least one sample must coincide with WET testing to aid in the determination of the cause of toxicity, if toxicity is detected.
Chlorine, Total Residual (TRC)	11 µg/L/ A&Wedw chronic	<35	51	N/A	RP always expected when chlorine or bromine is used for disinfection.	TRC is to be monitored as a discrete sample and a WQBEL remains in the permit. 40 CFR Part 136 specifies that discrete samples must be collected for chlorine. At least one sample per month must coincide with WET testing to aid in the determination of the cause of toxicity, if toxicity is detected.
<i>E. coli</i>	30-day geometric mean: 126 cfu /100 mL or MPN (4 sample minimum) Single sample maximum: 235 cfu /100 mL/ FBC or MPN	727 MPN	227	N/A	RP always expected for WWTPs. See explanation above.	<i>E. coli</i> is to be monitored as a discrete sample and a WQBEL remains in the permit.
pH	Minimum: 6.5 Maximum: 9.0 A&Ww and FBC A.A.C. R18-11-109(B)	7.7 S.U.	240	N/A	WQBEL or TBEL is always applicable to WWTPs.	pH is to be monitored using a discrete sample of the effluent and a WQBEL is set. 40 CFR Part 136 specifies that grab samples must be collected for pH. At least one sample must coincide with WET testing to aid in the determination of the cause of toxicity if toxicity is detected. pH sampling must also coincide with ammonia sampling when required.
Temperature	No applicable numeric standard	35°C	51	N/A	N/A	Effluent temperature is to be monitored for effluent characterization by discrete sample. 40 CFR Part 136 specifies that discrete samples must be collected for temperature. Temperature sampling must also coincide with ammonia sampling when required.
Total Dissolved Solids (TDS)	No applicable standard	1270 mg/L	54	N/A	N/A	Monitoring required for effluent characterization

Parameter	Lowest Standard / Designated Use	Maximum Reported Daily Value	No. of Samples	Estimated Maximum Value	RP Determination	Proposed Monitoring Requirement/ Rationale (1)
Ammonia	Standard varies with temperature and pH	0.42 mg/L (at point of compliance in mixing zone) 40.1 mg/L (at end of pipe)	51 - at point of compliance in mixing zone as well as at end-of pipe.	N/A	RP Exists (effluent only)	Ammonia is to be monitored by discrete sample. A mixing zone has been granted for ammonia and the standard applied at the end of mixing zone. The permit contains an ammonia table that the permittee must refer to determine what applicable standard is each time ammonia, pH, temperature are samples. Effluent limitations applicable to the mixing zone at the time of sampling will be determined from table in Appendix B of the permit. The permit contains the requirement to submit an ammonia data log annually. WQBEL in the form of an ammonia impact ratio (AIR) of 1 is set in the permit (2). An ammonia data log with concurrent pH and temperature monitoring is also required. One sample must coincide with WET sampling to aid in the determination of the cause of toxicity, if toxicity is detected.
Nutrients (Total Nitrogen and Total Phosphorus)	Applicable standard for nitrogen and phosphorous at the international boundary south of the discharge. Wasteload allocations (WLAs) were set for discharges from the Figueroa WPCF in the 1992 TMDL report, <i>Recommended nutrient standards for the lower Colorado river.</i>	N – 96 mg/L P – 0.95 mg/L	N – 60 P - 51	N/A	N/A	Effluent limitations were set at the same levels as in the previous permit. Those limits were determined from the mass loadings allocated to the WPCF in the TMDL report back calculated to discharge limits. Daily maximum is the WLA from the report plus 2 standard deviations at a flow of 12 MGD. The monthly average is the WLA from the report plus 1 standard deviation at a flow of 12 MGD.
Oil & Grease	BPJ Technology-Based Level of 10 mg/L monthly average and 15 mg/L daily maximum	11 mg/L	21	N/A	N/A	Monitoring required and an assessment level remains in the permit.
Antimony	6 µg/L/ DWS	< 2 µg/L	8	N/A	No RP	Monitoring required for effluent characterization.
Arsenic	10 µg/L/ DWS	1.5 µg/L	8	4.95 µg/L	No RP	Monitoring required for effluent characterization.
Barium	2,000 µg/L/ DWS	48 µg/L	4	226 µg/L	No RP	Monitoring required for effluent characterization.
Beryllium	4 µg/L/ DWS	< 1 µg/L	8	N/A	No RP	Monitoring required for effluent characterization.
Boron (3)	1,000 µg/L/ Agl	510 µg/L	66	816 µg/L	No RP	Monitoring required for effluent characterization
Cadmium (4)	5 µg/L / DWS	< 1 µg/L	8	N/A	No RP	Monitoring required for effluent characterization.

Parameter	Lowest Standard / Designated Use	Maximum Reported Daily Value	No. of Samples	Estimated Maximum Value	RP Determination	Proposed Monitoring Requirement/ Rationale (1)
Bis (2-ethylhexyl) phthalate	3 µg/L/ FC	<11 µg/L	3	N/A	RP Indeterminate (High LOQ )(5)	Monitoring required and an assessment level remains in the permit.
Chromium (Total)	100 µg/L/ DWS	2.3 µg/L	18	5.52 µg/L	No RP	Monitoring required as an indicator parameter for Chromium VI.
Chromium VI	11 µg/L/ A&Ww chronic	No Data	0	N/A	No RP (Based on total chromium data)	Monitoring required for effluent characterization.
Copper (4)	26.9 µg/L/ A&Ww chronic	< 10 µg/L	51	N/A	No RP	Monitoring required for effluent characterization.
Cyanide	9.7 µg/L/ A&Ww chronic	98 µg/L	101	137 µg/L	RP Exists	Monitoring required and a WQBEL remains in the permit.
Hardness	No applicable standard. Hardness is used to determine standards for specific metal parameters.	470 mg/L	53	N/A	N/A	A&W standards for cadmium, chromium III, copper, lead, nickel, silver and zinc used for RP determinations were based on the average receiving water hardness value of 396 mg/L. Monitoring for hardness is required whenever monitoring for hardness dependent metals is required.
Hydrogen Sulfide	2 µg/L/ A&Ww chronic	No Data	0	N/A	RP Indeterminate (No Data)	Monitoring is required for sulfides as an indicator parameter for hydrogen sulfide. If sulfides are detected, monitoring for hydrogen sulfide is required for the remainder of the permit term.
Iron	1,000 ug/L / A&Ww chronic	530 µg/L	18	848 µg/L	No RP	Monitoring required for effluent characterization.
Lead (4)	9.89 µg/L / A&Ww chronic	1.03 µg/L	8	3.4 µg/L	No RP	Monitoring required for effluent characterization.
Manganese	980 µg/L / DWS	72 µg/L	4	338 µg/L	No RP	Monitoring required for effluent characterization
Mercury	0.01 µg/L/ A&Wedw chronic	< 0.2 µg/L	49	N/A	RP Indeterminate (High LOQ)	Monitoring required and a WQBEL remains in the permit.
Nickel (4)	140 µg/L / DWS	< 10 µg/L	8	N/A	No RP	Monitoring required for effluent characterization.
Selenium (6)	2 µg/L/ A&Ww chronic	1.2 µg/L	19	1.7 µg/L	No RP	Monitoring required for effluent characterization.
Silver (4)	29 µg/L/ A&Ww acute	< 1 µg/L	8	N/A	No RP	Monitoring required for effluent characterization.
Sulfides	No applicable standard	< 50 µg/L	18	N/A	N/A	Indicator parameter for hydrogen sulfide. Monitoring required. If sulfides are detected, monitoring for hydrogen sulfide is required for the remainder of the permit term.



Parameter	Lowest Standard / Designated Use	Maximum Reported Daily Value	No. of Samples	Estimated Maximum Value	RP Determination	Proposed Monitoring Requirement/ Rationale (1)	
Thallium(7)	2 µg/L/ DWS	< 0.2 µg/L	51	N/A.	No RP	Monitoring required for effluent characterization.	
Zinc (4)	370 µg/L/ A&Ww acute and chronic	< 50 µg/L	7	N/A	No RP	Monitoring required for effluent characterization.	
Whole Effluent Toxicity (WET)	No toxicity (A.A.C. R18-11-108(A)(6) )	<i>Pseudo-kirchneriella subcapitata</i> (8)	No Data	0	N/A	RP Indeterminate	No monitoring required unless there is an exceedance of an action level for C. dubia in the mixing zone as specified in Part I.C of the permit.
		<i>Pimephales promelas</i>	No Data	0	N/A	RP Indeterminate	No monitoring required unless there is an exceedance of an action level for C. dubia in the mixing zone as specified in Part I.C of the permit.is set.
		<i>Ceriodaphnia dubia</i>	1.0 TUc	9	N/A	RP Indeterminate	Monitoring required at the end of the mixing zone and an action level is set in the permit.

Footnotes:

- (1) The monitoring frequencies are as specified in the permit.
- (2) An AIR will be calculated by dividing effluent ammonia concentration by the applicable standard using the receiving water pH and temperature.
- (3) Used previous permit data (62 data points) to evaluated RP for this parameter.
- (4) Hardness-dependent metal - the standard for this parameter is based on the average receiving water hardness value of 389 mg/Las indicated above.
- (5) All three results were non-detect.
- (6) There were a total of 50 data points with 19 sample points above the detection limit. Used the detectable maximum reported daily value for RP analysis.
- (7) All 51 samples were non-detectable data points. 48 samples that had detection limits well below the standard.
- (8) Formerly known as *Selenastrum capricornutum* or *Raphidocelis subcapitata*.

## VIII. NARRATIVE WATER QUALITY STANDARDS

All narrative limitations in A.A.C. R18-11-108 that are applicable to the receiving water are included in Part I, Sections E and F of the draft permit.

## IX. MONITORING AND REPORTING REQUIREMENTS (Part II of Permit)

Section 308 of the Clean Water Act and 40 CFR Part 122.44(i) require that monitoring be included in permits to determine compliance with effluent limitations. Additionally, monitoring may be required to gather data for future effluent limitations or to monitor effluent impacts on receiving water quality.

Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance. Monitoring frequencies for some parameters may be reduced in second term permits if all monitoring requirements have been met and the effluent limitations or ALs for those parameters have not been exceeded during the first permit term.

For the purposes of this permit, a "24-hour composite" sample has been defined as a flow-proportioned mixture of not less than three discrete samples (aliquots) obtained at equal time intervals over a 24-hour period. The volume of each aliquot shall be directly proportional to the discharge flow rate at the time of sampling.

These criteria for composite sampling are included in order to obtain samples that are representative of the discharge given the potential variability in the duration, frequency and magnitude of discharges from this facility.

Discrete (i.e., grab) samples are specified in the permit for parameters that for varying reasons are not amenable to compositing.

Monitoring locations are specified in the permit (Part I.A and Part I.J) in order to ensure that representative samples of the influent and effluent are consistently obtained.

The requirements in the permit pertaining to Part II, Monitoring and Reporting, are included to ensure that the monitoring data submitted under this permit is accurate in accordance with 40 CFR 122.41(e). The permittee has the responsibility to determine that all data collected for purposes of this permit meet the requirements specified in this permit and is collected, analyzed, and properly reported to ADEQ.

The permit (Part II.A.2) requires the permittee to keep a Quality Assurance (QA) manual at the facility, describing sample collection and analysis processes; the required elements of the QA manual are outlined.

Reporting requirements for monitoring results are detailed in Part II, Sections B.1 and 2 of the permit, including completion and submittal of Discharge Monitoring Reports (DMRs), and Ammonia Data Logs. The permittee is responsible for conducting all required monitoring and reporting the results to ADEQ on DMRs or as otherwise specified in the permit.

**Electronic reporting.** The US EPA has published a final regulation that requires electronic reporting and sharing of Clean Water Act National Pollutant Discharge Elimination System (NPDES) program information instead of the current paper-based reporting (Federal Register, Vol. 80, No. 204, October 22, 2015). Beginning December 21, 2016 (one year after the effective date of the regulation), the Federal rule requires permittees to make electronic submittals of any monitoring reports and forms called for in their permits. ADEQ has created an online portal called myDEQ that allows users to submit their discharge monitoring reports and other applicable reports required in the permit.

The permit also requires annual submittal of an Ammonia Data Log that records the results for temperature, pH, and ammonia samples and date of sampling (Part II.B.3). Because the ammonia standards in 18 A.A.C. 11, Article 1, Appendix A are contingent upon the pH and temperature at the time of sampling for ammonia, the permittee must determine the applicable ammonia standard using the ammonia criteria table(s) and calculate the Ammonia Impact Ratio for that ammonia sample result. The AIR is recorded on the DMR.

Requirements for retention of monitoring records are detailed in Part II.D of the permit.

#### **X. BIOSOLIDS REQUIREMENTS (Part III in Permit)**

Standard requirements for the monitoring, reporting, record keeping, and handling of biosolids, as well as minimum treatment requirements for biosolids according to 40 CFR Part 503 are incorporated in the draft permit.

#### **XI. SPECIAL CONDITIONS (Part V in Permit)**

##### **Mixing Zone**

The permit includes previously approved mixing zone for WET and ammonia as requested for this permit term with some special conditions. See Part V.B of the permit for special conditions. In the current permit the mixing zone is 500 meters in length and extends across the width of the river. The entire width of the river is allowed since the 1997 mixing zone study indicated no acute toxicity was present within the mixing zone.

##### **Conveyance of Effluent to the Main Channel of the Colorado River**

The Permittee shall execute a plan to convey the effluent directly to the main channel of the Colorado River. See Part V.A of the permit.

##### **Pretreatment**

Standard requirements for implementing and enforcing an approved pretreatment plan are included in the draft permit.

##### **Operation**

This permit condition requires the permittee to ensure that the WWTP has an operator who is certified at the appropriate level for the facility, in accordance with A.A.C. R18-5-104 through -114. The required certification level for the WWTP operator is based on the class (Wastewater Treatment Plant) and grade of the facility, which is determined by population served, level of treatment, and other factors.

**Permit Reopener**

This permit may be modified based on newly available information; to add conditions or limits to address demonstrated effluent toxicity; to implement any EPA-approved new Arizona water quality standard; or to re-evaluate reasonable potential (RP), if assessment levels in this permit are exceeded [A.A.C. R18-9-B906 and 40 CFR Part 122.62 (a) and (b)].

**XII. ANTIDEGRADATION**

Antidegradation rules have been established under A.A.C. R18-11-107 to ensure that existing surface water quality is maintained and protected. The discharge from the Yuma Figueroa Avenue Water Pollution Control Facility will be to a perennial water with Tier 2 antidegradation protection. Tier-2 requirements state that the current water quality must be maintained and protected. An antidegradation review was conducted during the previous permit term. This is a renewal permit for an existing facility with no new or expanded discharge, and the existing uses have been maintained. Therefore, an antidegradation review is not required at this time. Effluent limitations and monitoring requirements have been established under the proposed permit to ensure that the discharge will meet the applicable water quality standards. As long as the permittee maintains consistent compliance with these provisions, the designated uses of the receiving water will be presumed protected, and the facility will be deemed to meet currently applicable antidegradation requirements under A.A.C. R18-11-107.

**XIII. STANDARD CONDITIONS**

Conditions applicable to all NPDES permits in accordance with 40 CFR, Part 122 are attached as an appendix to this permit.

**XIV. ADMINISTRATIVE INFORMATION****Public Notice (A.A.C. R18-9-A907)**

The public notice is the vehicle for informing all interested parties and members of the general public of the contents of a draft AZPDES permit or other significant action with respect to an AZPDES 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-A908)**

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-A908(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.

**EPA Review (A.A.C. R18-9-A908(C))**

A copy of this draft permit and any revisions made to this draft as a result of public comments received will be sent to EPA Region 9 for review. If EPA objects to a provision of the draft, ADEQ will not issue the permit until the objection is resolved.

**XV. ADDITIONAL INFORMATION**

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

Arizona Department of Environmental Quality  
Water Quality Division – AZPDES Individual Permits Unit  
Attn: Swathi Kasanneni  
1110 West Washington Street  
Phoenix, Arizona 85007

Or by contacting Swathi Kasanneni at (602) 771 – 4577 or by e-mail at [kasanneni.swathi@azdeq.gov](mailto:kasanneni.swathi@azdeq.gov).

**XVI. INFORMATION SOURCES**

While developing effluent limitations, monitoring requirements, and special conditions for the draft permit, the following information sources were used:

1. AZPDES Permit Application Form(s) 2A and 2S, received August 16, 2017, along with supporting data, facility diagram, and maps submitted by the applicant with the application forms.
2. ADEQ files on City of Yuma – Figueroa Avenue Water Pollution Control Facility.
3. ADEQ Geographic Information System (GIS) Web site
4. Arizona Administrative Code (AAC) Title 18, Chapter 11, Article 1, *Water Quality Standards for Surface Waters*, adopted January 31, 2009.
5. A.A.C. Title 18, Chapter 9, Article 9. *Arizona Pollutant Discharge Elimination System* rules.
6. Code of Federal Regulations (CFR) Title 40:
  - Part 122, *EPA Administered Permit Programs: The National Pollutant Discharge Elimination System*.
  - Part 124, *Procedures for Decision Making*.
  - Part 133. *Secondary Treatment Regulation*.
  - Part 503. *Standards for the Use or Disposal of Sewage Sludge*.

7. EPA Technical Support Document for Water Quality-based Toxics Control dated March 1991.
8. *Regions 9 & 10 Guidance for Implementing Whole Effluent Toxicity Testing Programs*, US EPA, May 31, 1996.
9. *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms* (EPA /821-R-02-013).
10. U.S. EPA NPDES Permit Writers' Manual, September 2010.

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