



DRAFT PERMIT

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ADEQ Inventory No. 102469
LTF No. 63311

Permit No. AZ0023621
Place ID No. 1922

AUTHORIZATION TO DISCHARGE NON-DOMESTIC WASTEWATER UNDER THE ARIZONA POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of Arizona Revised Statutes (A.R.S.) Title 49, Chapter 2, Article 3.1; the Federal Water Pollution Control Act, (33 USC §1251 et. seq., as amended), and Arizona Administrative Code (A.A.C.) Title 18, Chapter 9, Article 9, and amendments thereto,

United States Department of the Interior- National Park Service
Indian Gardens Potable Water Pump Station
P. O. Box 129
Grand Canyon, AZ 86023-0129

is authorized to discharge chlorinated groundwater from the Indian Gardens Pumping Station located approximately 2.5 miles north of Grand Canyon South Rim Village, Coconino County, Arizona to Garden Creek, a tributary to Pipe Creek, in the Upper Colorado River Basin at:

Outfall No.	Latitude	Longitude	Legal
001	36°04' 30" N	112°07' 04" W	Township 31 N, Range 2 E, Section 13

in accordance with effluent limitations, monitoring requirements and other conditions set forth herein, and in the attached "Standard AZPDES Permit Conditions."

Annual Registration Fee [A.R.S. 49-255.01 and A.A.C. R18-14-104]

The annual registration fee for this permit is payable to ADEQ each year. For the purposes of the annual fees, this permit is a Minor permit. If the facility is not yet constructed or is incapable of discharge at this time, the permittee may be eligible for reduced fees under rule. Send all correspondence requesting reduced fees to the Water Quality Division of ADEQ. Please reference the permit number, LTF number and why reduced fees are requested under rule.

This permit shall become effective on _____, 2016.

This permit and the authorization to discharge shall expire at midnight, _____, 2021.

Signed this _____ day of _____, 2016.

Trevor Baggiore, Director
Water Quality Division
Arizona Department of Environmental Quality

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PART I. DISCHARGE LIMITATIONS AND MONITORING REQUIREMENTS

A. Discharge Limitations and Monitoring Requirements

The permittee shall limit and monitor discharges from Outfalls 001 as specified in Tables 1 and 2 which follow. These requirements are based on a design capacity of 1.25 MGD.

TABLE 1: Discharge Limitations and Monitoring Requirements

Parameter	Maximum Allowable Discharge Limits				Monitoring Requirement (2)	
	Mass Limits		Concentration in µg/L unless otherwise specified			
	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	Monitoring Frequency	Sample Type
Discharge Flow (MGD)	REPORT (1)	REPORT			Continuous	Metered
Chlorine, Total Residual (TRC)	43 g/day	85 g/day	9.0 µg/L	18 µg/L	1x / week	Discrete
pH (3)	Not less than 6.5 standard units (S.U.) nor greater than 9.0 S.U.				1x / week	Discrete

Footnotes:

- (1) Monitoring and reporting required. No limit set at this time. In addition to the average and maximum flows reported on the Discharge Monitoring forms, daily discharge flow shall be recorded on the Discharge Flow Record provided in Appendix B. See Part II.B for reporting requirements.
- (2) At a minimum, one sample must coincide with one of the Whole Effluent Toxicity Test (WET) samples taken once during the 4th year of the permit term. See Part IV of the permit.
- (3) pH must be measured at the time of sampling and does not require use of a certified laboratory.

B. Trace Substance Monitoring

The permittee shall monitor discharges from Outfall 001 as specified in Table 2. Monitoring results above the Assessment Levels (ALs) listed below do not constitute a permit violation, but may trigger evaluation of Reasonable Potential (RP) by ADEQ. The permittee shall use an approved analytical method with a Limit of Quantitation (LOQ) lower than the AL values as described in Part II.A.4.

TABLE 2: Trace Substance Monitoring Requirements

Parameter	Assessment Levels(1)(2)		Monitoring Requirements(3)(4)	
	Monthly Average	Daily Maximum	Monitoring Frequency	Sample Type
Cyanide	7.9 µg/L	16 µg/L	1x/6 months	Discrete
Mercury	0.01 µg/L	0.02 µg/L	1x/6 months	Discrete
Selenium	2 µg/L	3 µg/L	1x/6 months	Discrete
Sulfides(5)	(5)	(5)	1x/6 months	Discrete
Hydrogen sulfide(5)	2 µg/L	3 µg/L	1x/6 months	Discrete
Total Dissolved Solids (TDS)	N/A	650 mg/L	1x/6 months	Discrete

Footnotes:

- (1) Concentration values are calculated based on Arizona Water Quality Standards. Monitoring and reporting required.
- (2) All metals effluent Assessment Levels are for total recoverable metals
- (3) Testing must coincide with the Whole Effluent Toxicity Test (WET) samples, if any, taken during that monitoring period as per Part I.C, Table 3 of the permit. See Part IV of the permit.
- (4) If discharge is infrequent see Part I.D for minimum effluent characterization monitoring requirements.
- (5) With a detection limit no higher than 100 µg/L, any detection of sulfides shall trigger monthly monitoring for hydrogen sulfide for the remainder of the permit term. Monitoring for hydrogen sulfide is only required if sulfide is detected.

C. Whole Effluent Toxicity Monitoring

The permittee shall monitor discharges from Outfall 001 for Whole Effluent Toxicity (WET) as specified in Table 3 which follows. If toxicity is detected above an action level specified as follows, the permittee must perform follow-up testing and, as applicable, follow the TIE/TRE processes in Part IV.D of the permit.

TABLE 3: WET Testing

Effluent Characteristic (1)	Action Levels		Monitoring Requirements	
	Daily Maximum (2) (3)	Monthly Median (3)	Monitoring Frequency (4)	Sample Type
Chronic Toxicity <i>Selenestrum capricornutum</i> (Green algae) (5)	1.6 TUc	1.0 TUc	1x / 4 th year of permit term	Discrete
Chronic Toxicity <i>Pimephales promelas</i> (Fathead minnow)	1.6 TUc	1.0 TUc	1x / 4 th year of permit term	Discrete
Chronic Toxicity <i>Ceriodaphnia dubia</i> (Water flea)	1.6 TUc	1.0 TUc	1x / 4 th year of permit term	Discrete

Footnotes:

- (1) See Part IV for additional requirements for testing and reporting Whole Effluent Toxicity (WET).
- (2) Since completion of one chronic WET test takes more than 24 hours, the daily maximum is considered to be the highest allowable test result.
- (3) Any exceedance of these values requires the permittee to conduct follow-up testing. See Part IV.D of the permit for details.
- (4) If discharge is infrequent see Part I.D for minimum effluent characterization monitoring requirements.
- (5) Also known as *Raphidocelis subcapitata*.

C. Discharge Characterization Testing

The permittee shall monitor discharges from Outfall 001 to characterize the facility's discharge for the parameters listed in Tables 3.a & b. No limits or ALs are established, but the LOQ must be low enough to allow comparison of the results to the applicable surface water quality standards (SWQS). If a LOQ below the SWQS cannot be achieved, then the permittee shall use the method expected to achieve the lowest LOQ, as defined in Appendix A of this permit. Samples are to be representative of any seasonal variation in the discharge:

TABLE 3.a: Discharge Characterization Testing – General Chemistry and Microbiology

Parameter	Reporting Units	Monitoring Requirements	
		Monitoring Frequency (1)	Sample Type
Ammonia (as N) (2)	mg/L	once /year in years 2 & 4 of permit term	Discrete
Chlorine, Total Residual (TRC)	µg/L	once /year in years 2 & 4 of permit term	Discrete
Dissolved Oxygen (3)	mg/L	once /year in years 2 & 4 of permit term	Discrete
Nitrate/Nitrite (as N)	mg/L	once /year in years 2 & 4 of permit term	Discrete
Nitrogen, Total Kjeldahl (TKN)	mg/L	once /year in years 2 & 4 of permit term	Discrete
pH (3)	S.U.	once /year in years 2 & 4 of permit term	Discrete
Phosphorus	mg/L	once /year in years 2 & 4 of permit term	Discrete
Temperature (3)	°Celsius	once /year in years 2 & 4 of permit term	Discrete

Total Dissolved Solids (TDS)	mg/L	once /year in years 2 & 4 of permit term	Discrete
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Footnotes:

- (1) If more frequent monitoring of any of these parameters is required by another part of this permit, those sampling results may be used to satisfy Table 4.a. requirements.
- (2) When sampling for ammonia, temperature and pH must be determined concurrently and the results recorded on the Ammonia Data Log provided in Appendix C. See Part II.B for reporting requirements.
- (3) Temperature, pH, TRC and dissolved oxygen must be measured at the time of sampling and do not require use of a certified laboratory. See Part II.A.6 for methods of analyses for chlorine.

TABLE 3.b: Discharge Characterization Testing – Selected Metals, Trace Substances and WET

Parameter (1)	Reporting Units	Monitoring Requirements	
		Monitoring Frequency (2)	Sample Type
Antimony	µg/L	once /year in years 2 & 4 of permit term	Discrete
Arsenic	µg/L	once /year in years 2 & 4 of permit term	Discrete
Beryllium	µg/L	once /year in years 2 & 4 of permit term	Discrete
Cadmium	µg/L	once /year in years 2 & 4 of permit term	Discrete
Chromium (3)	µg/L	once /year in years 2 & 4 of permit term	Discrete
Chromium VI (3)	µg/L	once /year in years 2 & 4 of permit term	Discrete
Copper	µg/L	once /year in years 2 & 4 of permit term	Discrete
Lead	µg/L	once /year in years 2 & 4 of permit term	Discrete
Mercury	µg/L	once /year in years 2 & 4 of permit term	Discrete
Nickel	µg/L	once /year in years 2 & 4 of permit term	Discrete
Selenium	µg/L	once /year in years 2 & 4 of permit term	Discrete
Silver	µg/L	once /year in years 2 & 4 of permit term	Discrete
Thallium	µg/L	once /year in years 2 & 4 of permit term	Discrete
Zinc	µg/L	once /year in years 2 & 4 of permit term	Discrete
Hardness	mg/L	once /year in years 2 & 4 of permit term	Discrete
Cyanide	µg/L	once /year in years 2 & 4 of permit term	Discrete

Footnotes:

- (1) All metals analyses shall be for total recoverable metals, except Chromium VI, which is dissolved.
- (2) If more frequent monitoring of any of these parameters is required by another part of this permit, those sampling results may be used to satisfy Table 4.b. requirements.
- (3) If total chromium exceeds 8 µg/L, the permittee must conduct sampling for chromium VI for the remainder of the permit. Otherwise, monitoring for chromium III and/or chromium VI is not required.

D. The discharge shall be free from pollutants in amounts or combinations that:

1. Settle to form bottom deposits that inhibit or prohibit the habitation, growth or propagation of aquatic life;
2. Cause objectionable odor in the area in which the surface water is located;

3. Cause off-flavor in aquatic organisms;
 4. Are toxic to humans, animals, plants or other organisms;
 5. Cause the growth of algae or aquatic plants that inhibit or prohibit the habitation, growth or propagation of other aquatic life or that impair recreational uses;
 6. Change the color of the surface water from natural background levels of color.
- E.** The discharge shall be free from oil, grease and other pollutants that float as debris, foam, or scum; or that cause a film or iridescent appearance on the surface of the water; or that cause a deposit on a shoreline, bank or aquatic vegetation.
- F.** The discharge shall not cause an increase in the ambient water temperature of more than 3.0 degrees Celsius.
- G.** The discharge shall not cause the dissolved oxygen concentration in the receiving water to fall below 6 mg/L unless the percent saturation of oxygen remains equal to or greater than 90%.
- H.** The discharge shall not cause the receiving water to exceed 80 mg/L for suspended sediment concentration.
- I.** Samples taken for the monitoring requirements specified in Part I shall be collected at the point of discharge (at the Indian Garden Potable Water Pumping Station) and prior to discharge into the diversion channel 700 feet before the confluence with Garden Creek.

PART II. MONITORING AND REPORTING

A. Sample Collection and Analysis

1. The permittee is responsible for the quality and accuracy of all data required under this permit.
2. Quality Assurance (QA) Manual

The permittee shall keep a QA Manual on site that describes the sample collection and analyses processes. If the permittee collects samples or conducts sample analyses in house, the permittee shall develop a QA Manual that addresses these activities. If a third party collects and/or analyzes samples on behalf of the permittee, the permittee shall obtain a copy of the applicable QA procedures. The QA Manual shall be available for review by ADEQ upon request. The QA Manual shall be updated as necessary to reflect current conditions, and shall describe the following:

- a. Project Management, including:
 - Purpose of sample collection and sample frequency;
 - When and where samples will be collected;
 - How samples will be collected;
 - Who will collect samples and their qualifications;

- Laboratory(s) that will perform analyses;
 - Any field tests to be conducted (detail methods and specify equipment, including a description of any needed calibrations); and
 - Pollutants or analytes being measured and for each, the permit-specific limits, Assessment Levels, or thresholds, (e.g. the associated detection limits needed.)
- b. Sample collection procedures including
- Equipment to be used;
 - Type and number of samples to be collected including QA/QC samples (i.e., background samples, duplicates, and equipment or field blanks);
 - Types, sizes, and number of sample bottles needed;
 - Preservatives and holding times for the samples (see methods under 40 CFR 136 or 9 A.A.C. 14, Article 6 or any condition within this permit that specifies a particular test method); and
 - Chain of custody procedures.
- c. Specify approved analytical method(s) to be used and include;
- Limits of Detection (LOD) and Limits of Quantitation (LOQs);
 - Required quality control (QC) results to be reported (e.g., matrix spike recoveries, duplicate relative percent differences, blank contamination, laboratory control sample recoveries, surrogate spike recoveries, etc.) and acceptance criteria; and
 - Corrective actions to be taken by the permittee or the laboratory as a result of problems identified during QC checks.
- d. How the permittee will perform data review; complete DMRs and records used to report results to ADEQ; resolve data quality issues; and identify limitations on the use of the data.
3. Sample collection, preservation and handling shall be performed as described in 40 CFR 136 including the referenced Edition of *Standard Methods for the Examination of Water and Wastewater*, or by procedures referenced in A.R.S Title 9, Chapter 14 of the Arizona Department of Health Services (ADHS) Laboratory Licensure rules. The permittee shall outline the proper procedures in the QA Manual, and samples taken for this permit must conform with these procedures whether collection and handling is performed directly by the permittee or contracted to a third-party.
4. Analytical requirements
- a. The permittee shall use a laboratory licensed by the ADHS Office of Laboratory Licensure and Certification that has demonstrated proficiency within the last 12 months under R9-14-609, for each parameter to be sampled under this permit. However, this requirement does not apply to parameters which require analysis at the time of sample collection as long as the testing methods used are approved by ADHS or ADEQ. (These parameters may include flow, dissolved oxygen, pH, temperature, and total residual chlorine.)
 - b. The permittee must utilize analytical methods specified in this permit. If no test procedure is specified, the permittee shall analyze the pollutant using:

- i. A test procedure listed in 40 CFR 136 which is also approved under A.A.C. R9-14-610;
 - ii. An alternative test procedure approved by EPA as provided in 40 CFR 136 and which is also approved under A.A.C. R9-14-610;
 - iii. A test procedure listed in 40 CFR 136, with modifications allowed by EPA or approved as a method alteration by ADHS under A.A.C. R9-14-610(C); or
 - iv. If no test procedure for a pollutant is available under (3)(b)(i) through (3)(b)(iii) above, any Method approved under A.A.C. R9-14-610(B) for wastewater may be used, except the use of field kits is not allowed unless otherwise specified in this permit. If there is no approved wastewater method for a parameter, any other method identified in 9 A.A.C. 14, Article 6 that will achieve appropriate detection and reporting limits may be used for analyses.
- c. For results to be considered valid, all analytical work, including those tests conducted by the permittee at the time of sampling (see Part II.A.4.a), shall meet quality control standards specified in the approved methods.
 - d. The permittee shall use analytical methods with a Limit of Quantitation (LOQ) that is lower than the effluent limitations, Assessment Levels, Action Levels, or other water quality criteria, if any, specified in this permit. If all methods have LOQs higher than the applicable water quality criteria, the Permittee shall use the approved analytical method with the lowest LOQ.
 - e. The permittee shall use a standard calibration curve when applicable to the method, where the lowest standard point is equal to or less than the LOQ.
 - f. If requested, the permittee shall participate in the annual NPDES DMR/QA study and submit the results of this study to ADEQ and ADHS for all laboratories used in monitoring compliance with this permit.

5. Mercury Monitoring

The permittee shall use an ADHS-certified low-level mercury analytical method such as EPA method 245.7 or 1631E to achieve a reporting limit at or below the discharge limitations or assessment levels for mercury as specified in this permit. The permittee shall also use a “clean hands/dirty hands” sampling technique such as EPA Method 1669 if necessary to achieve these reporting limits.

6. Chlorine Monitoring

Because of the short holding time for chlorine, TRC samples may be analyzed on-site using Hach Method No. 10014. Other methods are also acceptable for chlorine if the Method has a LOQ lower than discharge limits specified in this permit.

7. Metals Analyses

In accordance with 40 CFR 122.45(c), all effluent metals concentrations, with the exception of chromium VI, shall be measured as “total recoverable metals”. Discharge Limits and

Assessment Levels in this permit, if any, are for total metals, except for chromium VI for which the levels listed are dissolved.

B. Reporting of Monitoring Results

1. The permittee shall report monitoring results on Discharge Monitoring Report (DMR) forms supplied by ADEQ, to the extent that the results may be entered on the forms. The permittee shall submit results of all monitoring required by this permit in a format that will allow direct comparison with the limitations and requirements of this permit. If no discharge occurs during a reporting period, the permittee shall specify "No discharge" on the DMR. The results of all discharge analyses conducted during the monitoring period shall be included in calculations of the monthly average and daily maximums reported on the DMRs if the analyses were by methods specified in Part II.A above, as applicable.
2. DMRs and attachments are to be submitted (see Appendix A- definitions) by the 28th day of the month following the end of a monitoring period. For example, if the monitoring period ends January 31st, the permittee shall submit the DMR by February 28th. The permittee shall submit original copies of these and all other reports required in this Part, signed by an authorized representative, to the address or fax number listed below or submit by any other alternative mode as specified by ADEQ.

Arizona Department of Environmental Quality
Data Unit, Water Quality Compliance Section
1110 W. Washington St.
Phoenix, AZ 85007

or fax to (602) 771-4505.

For each month, the permittee shall complete and submit a copy of the **AZPDES Discharge Flow Record** (found in Appendix B) with the DMR for that month, along with copies of the original lab results for all parameters monitored during the reporting period.

3. The permittee shall submit results of the NPDES DMR/QA study to ADEQ and ADHS for all laboratories used in monitoring compliance with this permit by December 31st of each year. The permittee shall also participate in the DMR-QA study for any DMR-QA parameters that the permittee analyzes (typically pH and chlorine) and submit the results along with the laboratory results. The results shall be submitted to the following addresses:

Arizona Department of Environmental Quality
AZPDES Individual Permits Unit, Mailcode: 5415B-3
1110 W. Washington St.
Phoenix, AZ 85007

Arizona Department of Health Services
Attn: Office of Laboratory Licensure and
Certification
250 N 17th Avenue
Phoenix, AZ 85007

4. For the purposes of reporting, the permittee shall use the Limit of Quantitation.
5. For parameters with Daily Maximum Limits or Daily Maximum Assessment Levels in this permit, the permittee shall review the results of all samples collected during the reporting period and report as follows:

Use the following tables for information on how to report data on the DMR when the LOQ for a parameter is greater than the permit limits or standards:

For Daily Maximum Limits/Assessment Levels	The Permittee shall Report on the DMR
When the maximum value of any analytical result is greater than or equal to the LOQ	The maximum value of all analytical results
When the maximum value detected is greater than or equal to the laboratory's LOD but less than the LOQ (1)	The numeric result with E4 flag as applicable (AZ qualifier)
When the maximum value is less than the laboratory's LOD (2)	"< LOD" with E8 flag as applicable (AZ qualifier) (specify the LOD level, i.e., < 10 µg/L)

Footnotes:

- (1) Not Quantifiable
- (2) Below Detection

6. For parameters with Monthly Average Limits or Monthly Average Assessment Levels in this permit, the permittee shall review the results of all samples collected during the reporting period and report:

For Monthly Average Limits/Assessment Levels		The Permittee shall Report on the DMR
If only one sample is collected during the reporting period (monthly, quarterly, annually, etc.) (In this case, the sample result is the monthly average.)	When the value detected is greater than or equal to the LOQ	The analytical result
	When the value detected is greater than or equal to the laboratory's LOD, but less than the LOQ	The numeric result with E4 or E8 flag as applicable (AZ qualifier)
	When the value is less than the laboratory's LOD	"< LOD" with E8 flag as applicable (AZ qualifier) (specify the LOD level, i.e., < 10 µg/L)
If more than one sample is collected during the reporting period	All samples collected in the same calendar month must be averaged. <ul style="list-style-type: none"> ▪ When all results are greater than or equal to the LOQ, all values are averaged ▪ If some results are < LOQ, use the LOD value in the averaging ▪ Use '0' for values less than the LOD 	The highest monthly average which occurred during the reporting period

7. For all field testing, or if the information below is not included on the laboratory reports required by Part II.B.2, the permittee shall attach a bench sheet or similar documentation to each DMR that includes, for all analytical results during the reporting period:
 - a. The analytical result.
 - b. The number or title of the approved analytical method, preparation and analytical procedure utilized by the laboratory, and LOD and the LOQ for the analytical method for the pollutant.

- c. any applicable data qualifiers using the most current revision of the Arizona Data Qualifiers (available on line at <http://www.azdhs.gov/lab/license/resources/resources.htm>).

C. Twenty-four Hour Reporting of Noncompliance

The permittee shall orally report any noncompliance which may endanger the environment or human health within 24 hours from the time the permittee becomes aware of the event to:

ADEQ 24 hour hotline at (602) 771-2330

by phone call or voice mail by 9 a.m. on the first business day following the noncompliance. The permittee shall also notify the ADEQ Water Quality Compliance Section in writing within 5 days of the noncompliance event. The permittee shall include in the written notification: a description of the noncompliance and its cause; the period of noncompliance, including dates and times, and, if the noncompliance has not been corrected, the time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

D. Monitoring Records

The permittee shall retain records of the following monitoring information:

1. Date, exact location and time of sampling or measurements performed, preservatives used;
2. Individual(s) who performed the sampling or measurements;
3. Date(s) the analyses were performed;
4. Laboratory(s) which performed the analyses;
5. Analytical techniques or methods used;
6. Chain of custody forms;
7. Any comments, case narrative or summary of results produced by the laboratory. These comments should identify and discuss QA/QC analyses performed concurrently during sample analyses and should specify whether analyses met project requirements and 40 CFR 136. If results include information on initial and continuing calibration, surrogate analyses, blanks, duplicates, laboratory control samples, matrix spike and matrix spike duplicate results, sample receipt condition, or holding times and preservation, these records must also be retained.
8. Summary of data interpretation and any corrective action taken by the permittee.

PART III. WHOLE EFFLUENT TOXICITY TESTING REQUIREMENTS

A. General Conditions

1. The permittee shall conduct 1x/4th year of the permit term chronic toxicity tests on 3 discrete samples of the final effluent.
2. Final effluent samples must be taken following all treatment processes, including chlorination and dechlorination, and prior to mixing with the receiving water. The required WET tests must be performed on unmodified samples of final effluent. **WET tests conducted on samples that are dechlorinated after collection are not acceptable for compliance with this permit.**
3. Chemical testing for all the parameters listed in Part I.A of this permit whose required sample type is a composite shall be performed on a split of at least one of the three composite samples taken for one chronic WET test. For those parameters listed in Part I.A of this permit whose required sample type is discrete, the testing shall be performed on a discrete sample collected currently with one sample, discrete or composite, collected for an acute or chronic WET test.
4. Definitions related to toxicity are found in Appendix A.

B. Chronic Toxicity

1. The permittee shall conduct short-term chronic toxicity tests on three species: the waterflea, *Ceriodaphnia dubia* (survival and reproduction test); the fathead minnow, *Pimephales promelas* (larval survival and growth test); and the green alga, *Selenastrum capricornutum* (growth test).
2. The permittee must follow the USEPA 4th edition manual, "*Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms* (EPA/821-R-02-013) for all chronic compliance toxicity testing.
3. The chronic toxicity action levels are any one test result greater than 1.6 TUC or any calculated monthly median value greater than 1.0 TUC. If chronic toxicity is detected above these values, follow-up testing is required per Part IV, Section D. A chronic toxicity unit (TUC) shall be calculated as $TUC = 100/NOEC$.
4. The chronic WET test shall be conducted using a series of five dilutions and a control. The following dilution series must be used: 12.5, 25, 50, 75, and 100% effluent.

C. Quality Assurance

1. Effluent samples must be maintained between 0 and 6°C from collection until utilized in the toxicity testing procedure. When a composite sample is required, each aliquot making up the composite must be chilled after collection and throughout the compositing period. The single allowable exception is when a grab sample is delivered to the performing laboratory for test initiation no later than 4 hours following the time of collection.
2. Control and dilution water should be receiving water or lab water as appropriate, as described in the 40 CFR Part 136.3 approved method. If the dilution water used is different from the culture water, a second control, using culture water shall also be used.

3. Reference toxicity tests, (a check of the laboratory and test organisms' performance), shall be conducted at least 1 time in a calendar month for each toxicity test method conducted in the laboratory during that month. Additionally, any time the laboratory changes its source of test organisms, a reference toxicity test must be conducted before or in conjunction with the first WET test performed using the organisms from the newer source. Reference toxicant testing must be conducted using the same test conditions as the effluent toxicity tests (i.e. same test duration, etc.).
4. If either the reference toxicant test or the effluent test does not meet all test acceptability criteria as specified in the 40 CFR Part 136.3 approved WET methods, then the permittee must re-sample and re-test within 14 days of receipt of the test results. The re-sampling and re-testing requirements include laboratory induced error in performing the test method.
5. The chronic reference toxicant and effluent tests must meet the upper and lower bounds on test sensitivity as determined by calculating the percent minimum significant difference (PMSD) for each test result. The test sensitivity bound is specified for each test method (see Section 10, Table 6 in EPA/821-R-02-013). There are five possible outcomes based on the PMSD result.
 - a. *Unqualified Pass*- The test's PMSD is within bounds and there is no significant difference between the means for the control and the effluent. The regulatory authority would conclude that there is no toxicity.
 - b. *Unqualified Fail*- The test's PMSD is larger than the lower bound (but not greater than the upper bound) in Table 6 and there is a significant difference between the means for the control and the effluent. The regulatory authority would conclude that there is toxicity.
 - c. *Lacks Test Sensitivity*- The test's PMSD exceeds the upper bound in Table 6 and there is no significant difference between the means for the control and the effluent. The test is considered invalid. An effluent sample must be collected and another toxicity test must be conducted within 14 days of receipt of the test results.
 - d. *Lacks Test Sensitivity*- The test's PMSD exceeds the upper bound in Table 6 and there is a significant difference between the means for the control and the effluent. The test is considered valid. The regulatory authority will conclude that there is toxicity.
 - e. *Very Small but Significant Difference*- The relative difference between the means for the control and effluent is smaller than the lower bound in Table 6 and this difference is statistically significant. The test is acceptable and the NOEC should be determined.

D. Toxicity Identification Evaluation (TIE)/Toxicity Reduction Evaluation (TRE) Processes

1. If chronic toxicity is detected above a WET action level or limit specified in this permit and the source of toxicity is known (for instance, a temporary plant upset), the permittee shall conduct one follow-up test within two weeks of receipt of the sample results that exceeded the action level. The permittee shall use the same test and species as the failed toxicity test. If toxicity is detected in the follow-up, the permittee shall immediately begin developing a TRE plan and submit the plan to ADEQ for review and approval within 30 days after receipt of the toxic

- result. Requirements for the development of a TRE are listed in paragraph 3 below. The permittee must implement the TRE plan as approved and directed by ADEQ.
2. If chronic toxicity is detected above an action level or limit specified in this permit and the source of toxicity is unknown, the permittee shall begin additional toxicity monitoring within two weeks of receipt of the sample results that exceeded the action level. The permittee shall conduct one WET test approximately every other week until either a test exceeds an action level (or limit) or four tests have been completed. The follow-up tests must use the same test and species as the failed toxicity test. For intermittent discharges, testing shall be conducted on the next four discharge events using the same test and species as the failed toxicity test.
 - a. If none of the four tests exceed a WET action level or limit, then the permittee may return to the routine WET testing frequency specified in this permit.
 - b. If a WET action level or limit is exceeded in any of the additional tests, the permittee shall immediately begin developing a TRE plan and submit the plan to ADEQ for review and approval within 30 days after receipt of the toxic result. Requirements for the development of a TRE are listed in subsection 3, below. The permittee must implement the TRE plan as approved and directed by ADEQ.
 3. The permittee shall use the EPA guidance manual *Toxicity Reduction Evaluation Guidance for Municipal Wastewater Treatment Plants*, 1999 (EPA/833/B-99/002) in preparing a TRE plan. The TRE plan shall include, at a minimum, the following:
 - a. Further actions to investigate and identify the causes of toxicity, if unknown. The permittee may initiate a TIE as part of the TRE process using the following EPA manuals as guidance: *Toxicity Identification Evaluation: Characterization of Chronically Toxic Effluents, Phase I*, 1992 (EPA/600/6-91/005F); *Methods for Aquatic Toxicity Identification Evaluations: Phase I, Toxicity Characterization Procedures*, 2nd Edition, 1991 (EPA/600/6-91/003); *Methods for Aquatic Toxicity Identification Evaluations: Phase II, Toxicity Identification Procedures for Samples Exhibiting Acute and Chronic Toxicity*, 1993 (EPA/600/R-92/080); and *Methods for Aquatic Toxicity Identification Evaluations: Phase III, Toxicity Confirmation Procedures for Samples Exhibiting Acute and Chronic Toxicity*, 1993 (EPA/600/R-92/081).
 - b. Action the permittee will take to mitigate the impact of the discharge and to prevent the recurrence of toxicity; and
 - c. A schedule for implementing these actions.

E. WET Reporting

1. The permittee shall report chronic toxicity results on DMRs in Chronic Toxicity Units (TUc). The TUc for DMR reporting shall be calculated as $TUc = 100/NOEC$.
2. In addition to reporting WET results on DMRs, the permittee shall submit a copy of the full lab report(s) for all WET testing conducted during the monitoring period covered by the DMR. The lab report should report TUc as 100/NOEC **and** as 100/IC₂₅. If the lab report does not contain any of the following items, then these must also be supplied in a separate attachment to the

- report: 1) sample collection and test initiation dates, 2) the results of the effluent analyses for all parameters required to be tested concurrently with WET testing as defined in Part I, Tables 1 and 2, and Part III, Section A.3 of this permit, and 3) copies of completed “AZPDES Discharge Flow Records” for the months in the WET monitoring period.
3. WET lab reports and any required additional attachments shall be submitted to ADEQ by the 28th day of the month following the end of the WET monitoring period, or upon request. The results shall be submitted to either the address listed below, via e-mail to AZPDES@azdeq.gov or by an alternative mode as specified by ADEQ.

Arizona Department of Environmental Quality
AZPDES Individual Permits Unit, Mailcode: 5415B-3
1110 W. Washington St.
Phoenix, AZ 85007

(NOTE: This is not the same ADEQ address as the one specified under Part II.B.1 of this permit.)

PART IV. SPECIAL CONDITIONS

A. REOPENER

This permit may be modified per the provisions of A.A.C. R18-9-B906, and R18-9-A905 which incorporates 40 CFR Part 122. This permit may be reopened 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.

APPENDIX A PART A: ACRONYMS

A.A.C.	Arizona Administrative Code
ADEQ	Arizona Department of Environmental Quality
ADHS	Arizona Department of Health Services
EQ	Exceptional Quality (biosolids)
AZPDES	Arizona Pollutant Discharge Elimination System
A.R.S.	Arizona Revised Statutes
CFR	Code of Federal Regulations
CFU	Colony Forming Units
Director	The Director of ADEQ or any authorized representative thereof
DMR	Discharge Monitoring Report
EPA	The U.S. Environmental Protection Agency
kg/day	kilograms per day
MGD	Million Gallons per Day
mg/L	milligrams per Liter, also equal to parts per million (ppm)
MPN	Most Probable Number
NPDES	National Pollutant Discharge Elimination System
PFU	Plaque-Forming Unit
QA	Quality Assurance
SSU	Sewage Sludge Unit
TBEL	Technology-based effluent limitation
ug/L	micrograms per Liter, also equal to parts per billion (ppb)
WQBEL	Water quality-based effluent limitation

APPENDIX A PART B: DEFINITIONS

ACUTE TOXICITY TEST is a test used to determine the concentration of effluent or ambient waters that produces an adverse effect (lethality) on a group of test organisms during a short-term exposure (e.g., 24, 48, or 96 hours). Acute toxicity is measured using statistical procedures (e.g., point estimate techniques or hypothesis testing) and is reported as PASS/FAIL or in TUas, where $TU_a = 100/LC_{50}$.

ACUTE-to-CHRONIC RATIO (ACR) is the ratio of the acute toxicity of an effluent or a toxicant to its chronic toxicity. It is used as a factor for estimating chronic toxicity on the basis of acute toxicity data, or for estimating acute toxicity on the basis of chronic toxicity data.

CHRONIC TOXICITY TEST is a test in which sublethal effects (e.g., reduced growth or reproduction) are measured in addition to lethality. Chronic toxicity is measured as $TU_c = 100/NOEC$ or $TU_c = 100/E_{cp}$ or $100/IC_p$. The IC_p and E_{cp} value should be the approximate equivalent of the NOEC calculated by hypothesis testing for each test method.

DAILY MAXIMUM CONCENTRATION LIMIT means the maximum allowable discharge of a pollutant in a calendar day as measured on any single discrete sample or composite sample.

DISCRETE or GRAB SAMPLE means an individual **sample of at least 100 mL** collected from a single location, or over a period of time not exceeding 15 minutes.

EFFECT CONCENTRATION POINT (ECP) is a point estimate of the toxicant (or effluent) concentration that would cause an observable adverse effect (e.g., survival or fertilization) in a given percent of the test organisms, calculated from a continuous model (e.g., USEPA Probit Model).

FLOW PROPORTIONAL COMPOSITE SAMPLE means a sample that combines discrete samples collected over time, based on the flow of the discharge being sampled. There are two methods used to collect this type of sample. One collects a constant sample volume at time intervals that vary based on stream flow. The other collects discrete samples that are proportioned into aliquots of varying volumes based on stream flow, at constant time intervals (i.e. flow-weighted

composite sample).

HARDNESS means the sum of the calcium and magnesium concentrations, expressed as calcium carbonate (CaCO₃) in milligrams per liter.

HYPOTHESIS TESTING is a statistical technique (e.g., Dunnetts test) that determines what concentration is statistically different from the control. Endpoints determined from hypothesis testing are NOEC and LOEC. The two hypotheses commonly tested in WET are:

- Null hypothesis (H₀): The effluent is not toxic.
- Alternative hypothesis (H_a): The effluent is toxic.

INHIBITION CONCENTRATION (IC) is a point estimate of the toxicant concentration that would cause a given percent reduction in a non-lethal biological measurement (e.g., reproduction or growth) calculated from a continuous model (e.g., USEPA Interpolation Method). IC₂₅ is a point estimate of the toxicant concentration that would cause a 25% reduction in a non-lethal biological measurement.

LC50 is the toxicant (or effluent) concentration that would cause death in 50 percent of the test organisms.

LIMIT OF QUANTITATION (LOQ) means the minimum levels, concentrations, or quantities of a target variable such as an analyte that can be reported with a specific degree of confidence. The calibration point shall be at or below the LOQ. The LOQ is the concentration in a sample that is equivalent to the concentration of the lowest calibration standard analyzed by a specific analytical procedure, assuming that all of the method-specified sample weights, volumes, and processing steps have been followed.

LIMIT OF DETECTION (LOD) means an analyte and matrix-specific estimate of the minimum amount of a substance that the analytical process can reliably detect with a 99% confidence level. This may be laboratory dependent and is developed according to R9014-615(C)(7).

METHOD DETECTION LIMIT (MDL) - See LOD.

MIXING ZONE is an area where an effluent discharge undergoes initial dilution and may be extended to cover the secondary mixing in the ambient waterbody. A mixing zone is an allocated impact zone where water quality criteria can be exceeded as long as acutely toxic conditions are prevented.

MONTHLY OR WEEKLY AVERAGE CONCENTRATION LIMIT, other than for bacteriological testing, means the highest allowable average calculated as an arithmetic mean of consecutive measurements made during calendar month or week, respectively. The "monthly or weekly average concentration limit" for *E. coli* bacteria means the highest allowable average calculated as the geometric mean of a minimum of four (4) measurements made during a calendar month or week, respectively. The geometric mean is the nth root of the product of n numbers. For either method (CFU or MPN), when data are reported as "0" or non-detect then input a "1" into the calculation for the geometric mean.

NO OBSERVED EFFECT CONCENTRATION (NOEC) is the highest tested concentration of effluent or toxicant, that causes no observable adverse effect on the test organisms (i.e., the highest concentration of toxicant at which the values for the observed responses are not statistically significant different from the controls).

POINT ESTIMATE TECHNIQUES such as Probit, Interpolation Method, Spearman-Karber are used to determine the effluent concentration at which adverse effects (e.g., fertilization, growth or survival) occurred. For example, concentration at which a 25 percent reduction in fertilization occurred.

REFERENCE TOXICANT TEST is a toxicity test conducted with the addition of a known toxicant to indicate the sensitivity of the organisms being used and demonstrate a laboratory's ability to obtain consistent results with the test method. Reference toxicant data are part of the routine QA/QC program to evaluate the performance of laboratory personnel and test organisms.

RUNOFF means rainwater, leachate, or other liquid that drains over any part of a land surface and runs off of the land surface.

SIGNIFICANT DIFFERENCE is defined as statistically significant difference (e.g., 95% confidence level) in the means of two distributions of sampling results.

SINGLE CONCENTRATION ACUTE TEST is a statistical analysis comparing only two sets of replicate observations. In the case of WET, comparing only two test concentrations (e.g., a control and 100% effluent). The purpose of this test is to determine if the 100% effluent concentration differs from the control (i.e., the test passes or fails).

SUBMIT, as used in this permit, means post-marked, documented by other mailing receipt, or hand-delivered to ADEQ.

TEST ACCEPTABILITY CRITERIA (TAC) are specific criteria for determining whether toxicity tests results are acceptable. The effluent and reference toxicant must meet specific criteria as defined in the test method.

TOXIC UNIT (TU) is a measure of toxicity in an effluent as determined by the acute toxicity units or chronic toxicity units measured. Higher the TUs indicate greater toxicity.

TOXIC UNIT ACUTE (TU_a) is the reciprocal of the effluent concentration that causes 50 percent of the organisms to die by the end of an acute toxicity test (i.e., $TU_a = 100/LC_{50}$).

TOXIC UNIT CHRONIC (TU_c) is the reciprocal of the effluent concentration that causes no observable effect on the test organisms by the end of a chronic toxicity test (i.e., $TU_c = 100/NOEC$).

TOXICITY IDENTIFICATION EVALUATION (TIE) is a set of procedures used to identify the specific chemical(s) causing effluent toxicity.

TOXICITY REDUCTION EVALUATION (TRE) is a site-specific study conducted in a stepwise process designed to identify the causative agents of effluent toxicity, isolate the sources of toxicity, evaluate the effectiveness of toxicity control options, and then confirm the reduction in effluent toxicity.

TOXICITY TEST is a procedure to determine the toxicity of a chemical or an effluent using living organisms. A toxicity test measures the degree of effect of a specific chemical or effluent on exposed test organisms.

WHOLE EFFLUENT TOXICITY is the total toxic effect of an effluent measured directly with a toxicity test.

APPENDIX B

AZPDES Discharge Flow Record		
Indian Garden Pumping Station - AZ0023621		
Discharge to Garden Creek in the Upper Colorado River Basin At:		
Outfall No.:		
Location:		
Month:		Year:
DATE	Flow Duration ⁽¹⁾ (Total hours per day)	Flow Rate ⁽²⁾ (Total MGD per day)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		
Comment:		

footnotes:

- (1) Total time of discharge in hours per day. If actual time is not available, use an estimate of flow duration.
- (2) Report flow discharged in MGD. If no discharge occurs on any given day, report 'ND' for the flow for that day

Signature of Authorized Representative: _____