UTAH POLLUTANT DISCHARGE ELIMINATION SYSTEM

PERMIT AND ENFORCEMENT GUIDANCE DOCUMENT FOR WHOLE EFFLUENT TOXICITY

Utah Division of Water Quality

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FOREWORD

This document outlines guidance to be used by Utah Division of Water Quality (DWQ) staff for implementation of Whole Effluent Toxicity (WET) controls through the Utah Pollutant Discharge Elimination System (UPDES) permit program pursuant to the federal National Pollutant Discharge Elimination System (NPDES) requirements and state water quality standards.

This document updates and wholly replaces the previous DWQ *Permitting and Enforcement Guidance Document for Whole Effluent Toxicity Control*, dated February 15, 1991.

This updated guidance addresses both permit and enforcement aspects of WET. It is intended to assist Permit Writers in developing logical and consistent WET requirements in UPDES permits and to serve as an administrative guide for enforcement.

A Great Salt Lake specific WET policy is also included in this document to address the uniqueness of the Lake.

This document is intended solely as guidance, and as such, cannot be relied upon to create any rights, substantive or procedural, enforceable by any party in litigation with the State. The WET permit language provided in Appendix A shall prevail in any conflict with this guidance.

Lastly, many people contributed to the development of this guidance including multiple representatives of DWQ, EPA, and the wastewater treatment industry. Special thanks to Kim Shelley, Mike Herkimer, and Chris Bittner with DWQ, Lee Rawlings of South Valley Sewer District, Leland Myers of Central Davis Sewer District, and VelRey Lozano and Amy Clark, with EPA Region 8.

INTRODUCTION AND BACKGROUND

Section 101(a)(3) of the Federal Clean Water Act (CWA) states that:

". . . it is national policy that the discharge of toxic pollutants in toxic amounts be prohibited."

In addressing concerns of human health and aquatic biota protection, the Environmental Protection Agency (EPA) and the states use an integrated strategy consisting of both biological and chemical methods to identify and control the release of toxic chemicals from industrial and municipal sources. The control of toxics in wastewater effluent is an important objective of the Utah Pollutant Discharge Elimination System (UPDES) program. The integration of biomonitoring requirements, known as Whole Effluent Toxicity (WET) testing, with the most stringent of technology-based and water quality standard-based numeric permit limits, is a means to accomplish this objective.

The CWA requires that UPDES permits contain effluent limitations and conditions to ensure compliance with state water quality standards. Both federal and state regulations dictate that UPDES permits control any pollutant or pollutant parameter that causes, has the reasonable potential to cause, or contributes to an instream excursion above an applicable water quality standard, which are established to protect designated uses. Where state standards contain numeric criteria for toxic pollutants, permits contain effluent limits necessary to assure compliance with these standards.

The integrated approach to control and assess water quality based toxics includes the use of WET testing and WET limits, chemical specific testing and limits, and the use of biological criteria through bioassessments/biosurveys. The purpose of WET is to detect and eliminate toxicity in those cases where its presence is unanticipated, unknown, or caused by interaction between otherwise innocuous substances. It follows that WET limits in UPDES permits comprise an important element for protection of water quality, which includes the narrative standard below:

"It shall be unlawful, and a violation of [state rules], for the permittee to discharge or place any waste or other substance in such a way as will be or may become offensive such as unnatural deposits, floating debris, oil, scum or other nuisances such as color, odor or taste; or cause conditions which produce undesirable aquatic life or which produce objectionable tastes in edible aquatic organisms; or result in concentrations or combinations of substances which produce undesirable physiological responses in desirable resident fish, or other desirable aquatic life, or undesirable human health effects, as determined by bioassay or other tests performed in accordance with standard procedures…"

Utah DWQ established a WET program that is suited to the unique circumstances and needs of the state. The Utah program is consistent with the goals of the national program, and meets minimum EPA regulations and policy requirements. The DWQ will integrate WET requirements into UPDES permits as described in this guidance.

GUIDANCE FOR WET UPDES PERMIT REQUIREMENTS

DWQ's policy is that the discharge of toxics must be controlled consistent with water quality standards and the beneficial use of the stream or body of water to which the discharge is made. As such, all permits will contain the following:

1. The Narrative Standards, Utah Administrative Code (UAC) R317-2-7.2, and a specific prohibition for discharging acutely toxic effluent.

2. A WET reopener clause allowing the Director to modify, following the required administrative procedures, the WET testing requirements during the permit cycle.

3. Requirements for WET monitoring to provide data to determine reasonable potential for toxicity. Initially, WET testing with at least two test species will be required for new dischargers.

4. WET limits will be included with other effluent limitations when discharges are determined by the Director to have reasonable potential for toxicity. Reasonable potential for toxicity will be determined when sufficient WET testing data are available.

5. Clearly referenced WET toxicity testing species and protocols:

    a. WET testing will be conducted, consistent with EPA-approved WET methods, to be representative of the receiving water and effluent in the mixing zone The acute test can be run at different temperatures (20° or 25°C) and for different time periods (48 and 96 hour), therefore, the WET Coordinator in conjunction with other DWQ staff may specify the exact variables in a protocol for that permittee.

    b. The required rigor of the testing (e.g., frequency and number of test species) will be tiered, based on size and type of facility and can be reduced based on WET test results that support that the effluent has a low potential for toxicity in addition to consideration of the other factors.

    c. The permit will include as a minimum, acute and/or chronic monitoring, accelerated testing, and triggers requiring toxicity investigations.

    d. Monitoring frequency will be increased subsequent to a WET test failure. These additional tests only determine whether or not a pattern of toxicity is established; they do <u>not</u> replace the original test results.

Other permit principles to support WET Enforcement Actions include:

6. Clear, unambiguous language to allow enforceability.

7. Clearly documented rationale for the WET requirements in the Fact Sheet/Statement of Basis (FSSOB).

8. Formal compliance schedules and dates will be used to change WET testing requirements or to reestablish compliance with WET limits, if needed.

9. Corrective action requirements, such as Toxicity Identification Evaluation/Toxicity Reduction Evaluations (TIE/ TREs) will be used with the goal of assisting the Permitee to identify reasons for noncompliance with WET requirements.

10. Implementation of corrective action requires the permittee and the Permit Writer to coordinate closely to insure that the compliance status with permit requirements is clearly documented and understood by both parties.

11. Formal enforcement action is discretionary by the Director and will consider factors such as actual environmental damage (i.e. fish kills and /or damage to other aquatic organisms in their food chain), significant potential for environmental damage, public health risk, negligence, or a lack of good faith effort by the permittee. When violations require penalty considerations, the State's Civil Penalty Policy, *Penalty Criteria for Civil Settlement Negotiations, Utah Administrative Code (UAC) R317-1-8,* will apply.

12. Active, transparent communication between the Permittee, Permit Writer, WET Coordinator, and Director on all WET permit decisions.

Determining Permit Requirements

The general approach for determining the specific WET requirements for a permit is summarized in Figure 1.

The following text provides additional detail for the corresponding decision points in Figure 1. Also, standard permit language is provided in Appendix A.

1. Reasonable Potential (RP) to Discharge Toxics

The Director determines whether or not a facility has reasonable potential to discharge toxics using the factors listed below:

- **POTWs**: Per 40 CFR 122.21(j)(5), publicly-owned treatment works (POTWs) with a pretreatment program or a design flow greater than 1 MGD, must submit WET testing results as part of their application and are therefore presumed to have reasonable potential to discharge toxics. Other factors considered are the prevalence of commercial and categorical industrial users that discharge priority pollutants.

- **Industrial dischargers**: Is the industry a "categorical industry" subject to technology-based effluent limits for priority pollutants? If so, there may be RP.

- **Variability of the pollutant**: Does the pollutant or pollutant parameter in the permittee's effluent vary? Is the facility's treatment process reliable? Do they have pollution prevention or minimization programs? Has the permittee made changes in the wastewater treatment processes?

- **Receiving water characteristics:** Is there potential for toxic impacts of the effluent based on the volume of effluent, receiving water dilution, and water quality status per Utah's 303d listings?

- **Overall compliance history**: How is the facility performing? Is there any historical information that should be considered?

- **Other relevant information:** Is there other readily available information such as inspection reports, data from existing WET testing, data from effluent monitoring, and/or data from ambient monitoring?

2. Permit Conditions

Acute toxicity occurs when there is 50% or greater mortality for the test species at any effluent concentration. In accordance with UAC R317-2-5 CFR §122.44(d)(1)(iv) and/or 40 CFR § 122.44(d)(1)(v), at no time shall concentrations within the mixing zone be acutely lethal as determined by bioassay or other approved procedures. Therefore, WET requirements shall limit acute toxicity to end of pipe, i.e., no toxicity in 100 % effluent.

Chronic toxicity occurs when the 25 % inhibition concentration (IC25), calculated based on test organism survival, growth or reproduction, is less than or equal to the percent effluent in the receiving water as calculated in accordance with UAC R317-2-5.

For most cases, either acute or chronic WET testing is recommended to determine toxicity, although the permit may ultimately require both. When the receiving water dilution, estimated in accordance with UAC R317-2-5, is less than 20:1 (receiving water to effluent), chronic WET testing is recommended.

Acute WET testing is recommended when the dilution is greater than or equal to 20:1. Acute testing is conducted using 100% effluent (no dilution) and chronic testing allows dilution in the mixing zone and sets limits at the receiving water concentration. Although the acute test cannot detect chronic toxicity, chronic WET testing can be an indicator of acute toxicity.

- **<u>Test Species</u>**

WET test species must be the most sensitive, EPA-approved species. Table 1 shows the approved freshwater species as of 2015. Test species should be selected to be as representative of the receiving water as possible. The potential sources of toxicity in the effluent should also be considered because some taxa are more sensitive to certain pollutants.

Absent existing WET data for a specific effluent, WET testing using an invertebrate and vertebrate species (two species) is recommended. WET testing requirements can be modified to single species testing upon approval of the Director, providing one test species is reliably demonstrated to be more sensitive.

Table 1. EPA-Approved Freshwater Whole Effluent Toxicity Test Organisms http://www.epa.gov/cwa-methods/whole-effluent-toxicity-methods, 2,3)

Taxon	Acute	Chronic
Ceriodaphnia dubia	X	X
Daphnia puplex	X	
Daphnia magna	X	
Pimephales promelas (Fathead Minnow)	X	X
Cyprinella leedsi (Bannerfin Shiner)	X	
Oncorhynchus mykiss (Rainbow Trout)	X	
Salvelinus fontinalis (Brook Trout)	X	
Selenastrum capricornutum (Green Alga)		X

- **Test Frequency**

Test frequency is primarily based on discharge volume. For larger facilities, either POTWs discharging greater than 20 million gallons per day (MGD) or industrial facilities discharging more than 10 MGD, monthly testing is recommended. Quarterly testing is recommended for minor facilities where it has been determined that there is reasonable potential to discharge toxics. These requirements may be modified based on the same site-specific conditions evaluated for reasonable potential and will be documented in the permit Fact Sheet and Statement of Basis (FSSOB).

Under no circumstances shall monitoring for WET at any major facility be reduced to less than quarterly. Minor facilities may be less than quarterly if approved by the Director.

3. Permit Limits are Established

If WET is demonstrated, and if the toxicity is attributable to a specific toxicant, the toxicant must be controlled in the permit by WET limits or by specific numerical limits for the toxicant(s) or an indicator, or by both methods as required in 40 CFR 122.44 (d) (1) (v). If the Director determines that the toxicant(s) in question is, or will be, in compliance with existing water quality standards, WET testing or sampling procedures may be modified, or in some cases, the effluent limit as derived from applicable numeric and narrative water quality standards, may be modified for good cause in any manner that ensures protection of beneficial uses.

Compliance with WET limits does not exclude the imposition of additional numeric limits on specific pollutants, when appropriate. These limits may be based on the more stringent of water quality standards and WET results. As discussed in EPA's *Technical Support Document for Water Quality-based Toxics Control* (1993) and reaffirmed in the July 21, 1995 memorandum from Tudor T. Davies, EPA OST, each of these controls: chemical-specific effluent limits, WET testing, and bioassessments of the receiving waters, are independently applicable.

Compliance with one of the controls is not sufficient to demonstrate compliance with the other controls.

When WET testing has demonstrated either acute or chronic toxicity, reasonable potential for toxicity will be rigorously evaluated. DWQ staff will work directly with the Permitee as WET permit requirements are developed. A detailed explanation of the decision to include or exclude WET testing and/or limits, and all associated variations (species type, alternation of species, CO_2 atmosphere, etc.) shall be included in the FSSOB for each permit to insure proper documentation of the decision.

Reasonable potential should be re-evaluated any time the factors in Step 1 or 2 of Figure 1 change and the permit requirements modified as appropriate.

WET TESTING AND REPORTING PROCEDURES

The permittee is required to follow the WET monitoring and reporting requirements outlined in their permit. Violations of WET permit requirements are enforceable and DWQ can take specific actions to bring a permittee back into compliance. The following provides additional detail for WET monitoring and reporting procedures:

1. **No Toxicity Observed**

   If no toxicity is observed for 10 consecutive tests, testing frequency **may be reduced** if approved by the Director in accordance with administrative procedures for modifying the permit. The justification for the change in testing frequency should include an evaluation of the applicable factors used for evaluating reasonable potential. In addition, the existing WET results should be reviewed. In some cases, toxicity may be shown, but not enough to cause failure of the acute or chronic test. These tests will be considered in evaluating whether a reduction in WET testing frequency is appropriate. Under no circumstances shall monitoring for WET at any major facility be reduced less than quarterly. Minor facilities may be less than quarterly if approved by the Director.

2. **Failure of WET Test**

   Failure of WET tests will result in enhanced testing by the facility as outlined in its UPDES permit. These include accelerated testing and additional testing to determine if there is a pattern of toxicity which can include Toxicity Identification Evaluations (TIEs) and Toxicity Reduction Evaluations (TREs) when necessary. The results of these investigations will be considered when evaluating reasonable potential and test frequency in future permit renewals.

   - **Accelerated Testing**

   When whole effluent toxicity is observed during routine effluent WET testing, the permit will require an accelerated schedule of WET testing to establish whether a pattern of toxicity exists. Accelerated testing will begin within fourteen days after the permittee becomes aware of the WET test failure: once every week for up to five consecutive weeks for acute and once every two weeks up to ten consecutive weeks for chronic.

   - **Pattern of Toxicity**

   A pattern of acute toxicity is determined using a series of up to five acute WET tests pursuant to the accelerated testing requirements, using a full dilution series and the single species found to be most sensitive. A pattern of chronic toxicity is determined using a series of up to five chronic WET tests over a ten week period pursuant to the accelerated testing requirements, using the receiving water concentration dilution plus four other dilutions (two above and two below the receiving water concentration) and the species found to be most sensitive.

A pattern of toxicity is observed:

1. If two (2) consecutive test results (not including the scheduled test which triggered the search for a pattern of toxicity) exhibit WET, OR;

2. If consecutive tests continue to yield differing results, the permittee will be required to conduct up to a maximum of five (5) tests (not including the scheduled test which triggered the need to establish a pattern of toxicity). If three out of five test results exceed the acute or chronic toxicity criteria, this will constitute an established pattern of toxicity.

3. Preliminary Toxicity Investigations (PTI)

An established pattern of toxicity requires the permittee to automatically begin a Preliminary Toxic Investigation (PTI) or voluntarily go directly to a TIE/TRE. The goal of the PTI is to allow the permittee to save time and money if they already have information indicating the likely cause(s) of toxicity. DWQ allows permittees15 days to identify the cause of the toxicity and propose methods to eliminate it. It is recommended that close coordination and communication with the Permit Writer and WET Coordinator is maintained to ensure that the permittee remains in compliance with the permit. The results of the PTI may not be conclusive in identifying the cause of toxicity but may identify the need for further investigations/studies or modification of the WET testing requirements or effluent limits.

4. Toxicity Identification Evaluation (TIE)/Toxicity Reduction Evaluations (TRE)

If a PTI does not identify a toxicant and/or the permittee is uncertain of what the toxicant could be, the permittee could move on a voluntary basis directly to a TIE/TRE without accelerated testing or establishing a pattern of toxicity.

- By choosing to skip the Pattern of Toxicity and the PTI, the permittee acknowledges that the facility is out of compliance with the permit WET limits. The permittee shall notify the Director in writing within 48 hours of becoming aware of the failure and that it has voluntarily chosen to do a TIE/TRE so that its progress in completing the investigation can be tracked.

- The procedures to be followed in a TIE/TRE are unique and should be tailored to the specific circumstances. Therefore, a prescriptive approach to the TIE portion of a TRE is NOT specified and flexibility is granted to the permittee for the purpose of rapidly and efficiently determining the source of the toxicity. However, the Permitee must coordinate closely with the Permit Writer and WET Coordinator to ensure that the TIE/TRE is appropriate to address the WET violation and permit requirements will be met.

- For the TIE portion of a TRE, a schedule should be agreed to by the permittee and the Permit Writer and WET Coordinator. A completion date for the TIE does not need to be specified if interim milestones and reports are required to be submitted monthly or quarterly along with a final report when the TIE

portion is completed. This schedule is considered a compliance schedule and if not followed may result in enforcement.

- All TIE/TREs must be completed by a WET laboratory certified by the State Health Laboratory.

- Initial TIE/TRE efforts are expected to focus on characterization and identification of the toxicant(s). EPA has published TIE/TRE Guidance outlining procedures for rapidly narrowing the possibilities to certain groups of pollutants such as metals, non-polar organics, oxidants, etc. **This information has been widely distributed, and is available at http://water.epa.gov/polwaste/npdes/basics/EPA-NPDES-WET-Guidance-Documents.cfm.**

- Once the source of toxicity has been identified, the objective is to eliminate the source by process controls, pretreatment controls, combined waste stream treatment, local enforcement or other measures necessary. If the cause of toxicity is a pollutant whose source and method of correction is known, the TIE/TRE can be terminated, and new permit requirements developed.

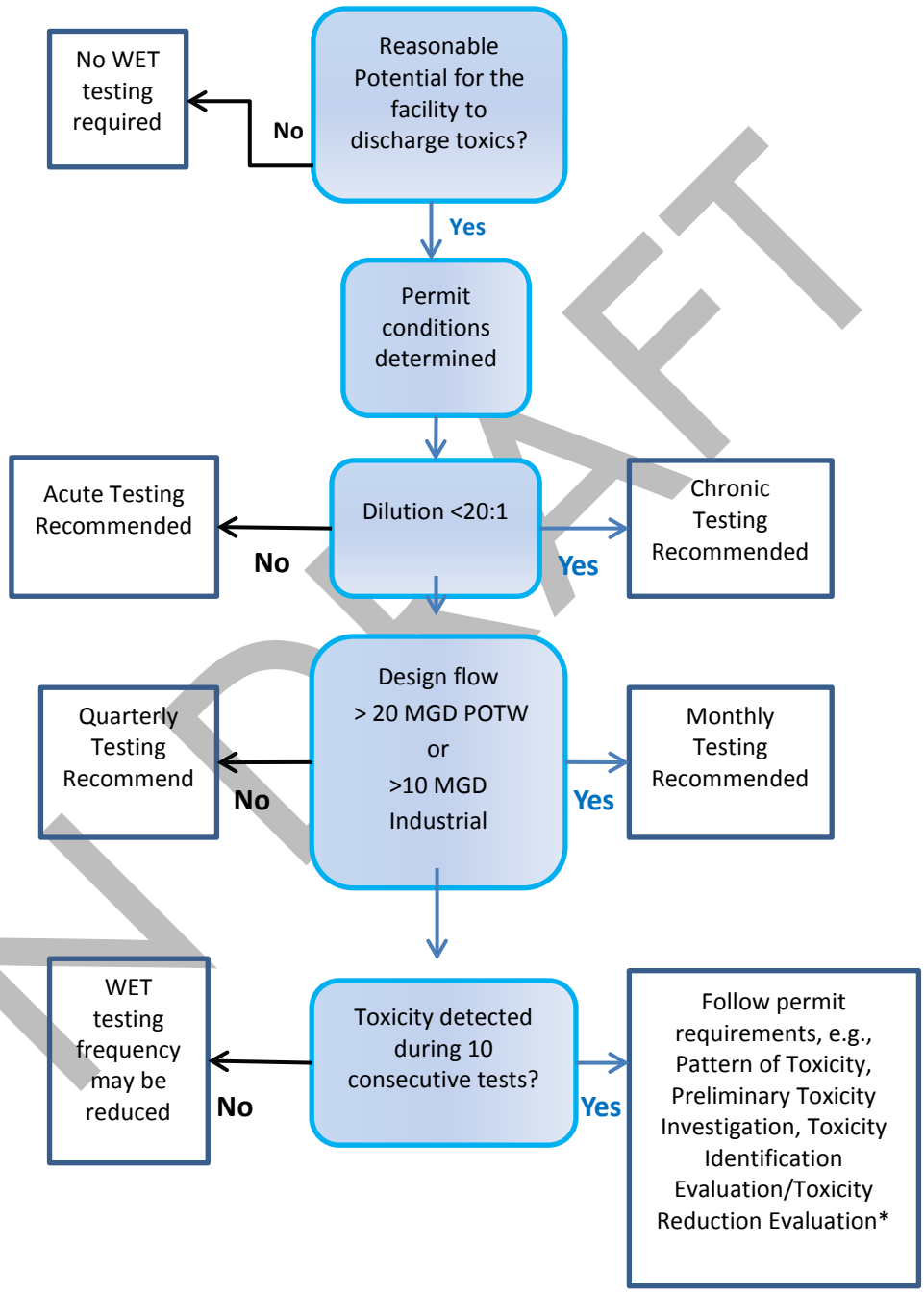
- It is anticipated that toxicity will be controlled in most cases by following the above procedures. However, there may be situations when a thorough and acceptable TIE/TRE will reveal toxicity requiring additional study to resolve. On a case-by-case basis, the Director may grant additional time to eliminate the source of toxicity.

5. Examples of Modified WET Testing

In limited situations, it may be appropriate to modify the WET testing protocol on an interim basis to mask the effects of the identified toxicant. As an example, if it is established that WET is caused by metal concentrations in the effluent, and the discharger is on an acceptable compliance schedule to reduce the effluent metal concentrations, the WET protocol could be modified to mask the effect of the toxic metal. This allows other potential sources of toxicity to be detected until the known metals toxicity is resolved. Once the toxicity control measures are implemented, unmodified WET testing must be conducted shortly after the facility has returned to normal operation and no toxicity is observed on two different species as specified by the Director.

Another potential modification of WET protocols is the use of the CO_2 to control pH drift that can be observed during the WET test. The use of more radical procedures, such as acid addition or zeolite treatment, is prohibited. If pH control is necessary, the results should be interpreted in the context of the pH of the effluent and receiving water in the mixing zone. The use of CO_2 is intended to reduce the drift but is limited in that it cannot target a specific pH. The pH must remain within the acceptable ranges defined by the EPA protocols. All WET testing modifications are facility specific and require communication between the Permittee, Permit Writer, and WET Coordinator.

Figure I: Summary of WET Procedures



** If necessary, the permittee can be given a formal compliance schedule in the permit if construction is needed for compliance with WET limitations. This would necessitate re-opening and modifying the permit following proper administrative procedures (inclusive of a public notice).*

Enforcement of WET Limit Violations, Permittee Performance, Enforcement Liability, Civil Penalty Policy

The state's enforcement philosophy is built on the premise that similar violations will be handled in a similar manner, and that more serious violations will be addressed with more stringent enforcement responses. While violations are subject to the full range of enforcement responses, it is essential to maintain flexibility to encourage innovative approaches to resolving WET, where regulations allow. Enforcement discretion is an essential element to the state's enforcement response plan and may be of particular importance in instances where a permittee has done everything technically feasible, but is still unable to identify or control toxicity.

Enforcement of WET Limit Violations

When WET test failures occur, the goal is to rapidly identify and eliminate the toxicity. In nearly all cases, enforcement will be reserved for situations where in-stream use impairment occurs in association with a WET test failure, or when accelerated testing establishes a pattern of toxicity after the first test failure and beneficial use impairment occurs. Beneficial use impairment caused by negligence on the part of the permittee will result in enforcement by the Director.

Permittee Performance

Enforcement of WET limit violations will, in part, be based on the permittee's performance in pursuing the necessary investigations and elimination of the source of toxicity. Upon a WET testing failure, the permit automatically triggers accelerated testing. Accelerated testing may establish a pattern of toxicity which will require the permittee to undertake a PTI within a specified time frame or begin a TIE/TRE.

Based on the results of the PTI, the Director may also direct the permittee to undertake a TIE/TRE which could include (1) Phase I - Toxicity Characterization, (2) Phase II - Toxicity Identification Procedures, (3) Phase III - Toxicity Confirmation Procedures, and/or (4) other additional procedures for source evaluation and control. In determining the appropriate enforcement response, the permittee's performance as it relates to conducting the accelerated testing and the acceptable completion of investigations within the specified time frames, or good faith efforts to investigate and resolve the issue, will be considered.

Enforcement Liability

For facilities with WET limits, establishment of an acute and/or chronic pattern of toxicity is a presumptive violation of the permit. The number of days of violation will be determined by the Director. Enforcement actions containing additional liabilities may also be pursued when, in the opinion of the Director, the permittee is not diligently pursuing a resolution to the established pattern of toxicity, such as completion of a TIE/TRE.

Individual WET test failures are not considered a violation of the permit; however the passage or failure of these individual tests will establish whether or not a pattern of toxicity exists. It is the establishment of a pattern of toxicity that is a presumed violation of the permit. WET test failures occurring during monitoring performed during the course of investigations and conducted to identify

and eliminate a source of toxicity (TIE/TRE) are not in and of themselves permit violations, but the data may be considered in evaluating violations of WET.

Enforcement Factors

The Director will evaluate the following factors in determining the degree of enforcement action to be taken for WET violations.

1. Damage or Severity Considerations:

   a. Beneficial use impairment

      This factor considers the actual or potential harm to one or more of the beneficial uses of the receiving water caused by WET test failures. The phrase "use impairment" refers to events such as an in-stream fish kill, the need for recreational restrictions such as for whole body contact, closure of water supply intake, agricultural diversion, or bioaccumulation and sediment build up containing undesirable amounts of toxic materials.

      For permittees with WET requirements who are discharging to segments not classified for aquatic life use, the Director will consider any available information regarding why that use was not deemed attainable in exercising enforcement discretion for WET non-compliance. If attainability is limited by nonpoint sources of pollution, or other point sources, from which the impact may be eliminated or minimized in the future, the full range of biomonitoring requirements may be applied. Such requirements may be appropriate to ensure that permitted discharges will not cause toxicity that limits the options for overall improvement of the water quality.

   b. Pattern of Toxicity

      Any single WET failure is not a permit violation. Upon a single WET failure, permits require accelerated testing to establish a pattern of toxicity. If a pattern of toxicity is demonstrated, it is indicative of an ongoing discharge of toxicity and potential use impairment. **At this point, the permittee is considered in presumptive non-compliance with the permit WET requirements.**

2. Fault Considerations:

   Fault will be assessed using factors such as: degree of intent; any derived economic benefit; the strength of the correlation between any observed adverse impact(s) to the designated uses of the receiving waters during the WET limit exceedance; the impact of the violation(s) on water quality; and, the frequency with which similar instances have occurred.

   a. Ability to Control Toxicity

      Industrial dischargers are expected to have control over the quality of their effluent. This is because specific processes that are supervised and directed by the industrial facility's management result in the discharge. However, variability in influent water and/or raw material and unforeseeable process upsets may limit this control.

Toxicity incidents specific to publicly owned treatment works may arise from any of the following: commercial or industrial users of the system, household chemical or insecticide disposal, or illicit dumping into the collection system. Such waste streams are difficult to control. While aggressive implementation of industrial pretreatment programs is expected to reduce toxicity from industrial users, toxicity from households can only be controlled through education programs or product bans imposed.

The problem of illegal dumping into collection systems must be addressed through a combination of monitoring, system security measures, and criminal enforcement as a deterrent.

b. Inadequate Facility Design, Operation and Maintenance

Toxicity in the effluent of a permitted facility may be present as a result of operation and maintenance deficiencies within the permittee's control. An example is when a permittee should have been aware of a treatment process or other equipment being offline, which led to the WET limit violation(s). Other examples include improper facility design or modification, or inadequate preparation for reasonably foreseeable circumstances (e.g., weather extremes, inadequate facility monitoring or maintenance of adequate chemical supplies, flood protection, etc.).

c. Intentional (Knowing/Willful) Actions

Any case where violations resulted from an intentional action or inaction on the part of the permittee (e.g. failure to operate equipment), or where the permittee had specific knowledge (e.g. inspection report, internal communications etc.) that violation(s) were imminent and did not take steps to prevent them, may be determined to be knowing and willful. Failure to follow an operation and maintenance (O&M) manual, where one has been developed, will be considered to fall within this category. Where the permittee has benefitted economically from non-compliance with the WET limit, through savings on delayed design and construction costs, monitoring costs, etc., the violation(s) are considered to be more serious. In this case, a detailed accounting of the economic benefit using EPA's BEN program or a similar procedure will be made, and those costs recouped with interest by the penalty portion of any enforcement action that arises as a result.

3. Prior History Considerations:

The Permittee's history of toxicity in the discharge will be a factor in the decision to pursue enforcement for violations of WET limits, especially where it is determined that the toxicity could have been prevented by proper and responsible operation of the facility. Those facilities that have a history of accelerated testing and have demonstrated a pattern of toxicity at least twice in a one year period will be closely reviewed and if appropriate, the Director will pursue an enforcement action. The Permittee's history of cooperation in other compliance and enforcement matters will also be considered.

4. Administrative (Compliance Schedule) Considerations:

The principal type of administrative violation for which penalties will be assessed under this guidance will be failure to submit items and follow through with required actions in accordance with permit requirements, compliance schedules, or other required processes established by the Director.

Civil Penalty Policy for WET Violations

In determining whether a civil penalty should be pursued, the Director will consider the following factors:

1. The degree of documented environmental harm or the potential for such harm;
2. Response and/or investigative costs incurred by the State or others;
3. Any economic advantage incurred by the POTW or Industry or others;
4. Recidivism of the violator;
5. Good faith efforts by the violator;
6. Ability of the violator to pay;
7. Possible deterrent effect.

The following describes the Director's approach for determining reasonable and appropriate penalties for WET violations as outlined in R317-1-8, Penalty Policy for Civil Settlement Negotiations.

Categories of violation applicable to whole effluent toxicity (WET) are as follows:

Category A - $7,000 to $10,000 per day. Violations with high impact on public health and the environment:

These are toxic discharges which result in documented public health impacts or use impairment. The impacts/impairment may be as a result of a one-time discharge or discharge while establishing a pattern of toxicity.

The phrase "use impairment" refers to a condition when the water quality is insufficient to support the designated uses. High impacts include events such as in-stream fish kill, the need for recreational restrictions such as for whole body contact, or closure of a water supply intake or agricultural diversion or bioaccumulation, and sediment build up containing undesirable amounts of toxic material.

Category B - $2,000 to $7,000 per day. Violations with high potential for public health impacts and/or use impairment impacts:

These are toxic discharges with a high potential for public health and/or use impairment impacts.

The concept of "potential public health impact/use impairment" is relevant when the Director does not have site-specific data to accurately characterize the impact the violation(s) had on public health or the beneficial uses of the receiving water. For example, when a pattern of

toxicity is established, it is presumptively considered a violation of the WET permit limit, and may fall under this category.

Category C - $500 to $2,000 per day. Violations of a less severe nature than Category A or B:

Toxic discharges with low potential for adverse public health effects and/or environmental damage, due to dilution, stream classification, or type of toxic material discharged. For example, Compliance Schedule violations.

Category D - up to $500 per day. Minor violations of effluent toxicity limits not meeting Category A, B or C criteria to include:

Toxicity resolves spontaneously and/or not traceable to a specific cause, or cause is determined and corrected. For example, a WET effluent violation with no known or observable effects and a low potential to cause those effects.

Once a category is established to determine where the penalty amount will fall within the range, certain factors must be taken into account. The applicability of the following factors will be determined on a case-by-case basis:

1. History of compliance or non-compliance. History of non-compliance includes consideration of previous violations and degree of recidivism.
2. Degree of willfulness and/or negligence. Factors to be considered include how much control the violator had over and the foreseeability of the events constituting the violation, whether the violator made or could have made reasonable efforts to prevent the violation, whether the violator knew of the legal requirements which were violated, and degree of recalcitrance.
3. Good faith efforts to comply. Good faith takes into account the openness in dealing with the violations, promptness in correction of problems, and the degree of cooperation with the Director.

GREAT SALT LAKE WET POLICY

The WET policy for Great Salt Lake was previously included with Interim Methods for Evaluating Use Support for Great Salt Lake Utah Pollution Discharge Elimination System (UPDES) Permits. The Interim Methods were developed with extensive stakeholder input including outreach, two information meetings in March of 2013 and 2014 where comments were solicited, and culminated in a formal public comment period in November 2014. After responding to comments, the Interim Methods were issued January 4, 2016 and the WET policy portion was moved to this Statewide WET guidance. In 2017, the policy was updated to be consistent with subsequent changes to the statewide policy.

This section outlines the interim policy for WET testing specific to Great Salt Lake (Lake) discharges (Classes 5A, 5B, 5C, 5D, and 5E) (UAC R317-2-6) and discharges to Class 3E when the Class 3E water discharges to Class 5. EPA has established and requires the use of specific WET methods and species for application in National Pollutant Discharge Elimination permits including UPDES permits.

However, as discussed in the Great Salt Lake Water Quality Strategy[5], the Lake supports a unique ecosystem that is different than either fresh or marine water ecosystems. The data gaps and uncertainties regarding the Lake ecosytems are the primary reason that only one numeric criterion is currently available for the Lake. Component 1 of the Strategy[6] proposes to develop specific salinity classes for the Lake and to define the resident aquatic life for each of these salinity classes. After the residents are defined, then numeric criteria can be derived for each of the salinity classes.

The data gaps and uncertainties regarding the aquatic life communities and appropriate numeric criteria are also applicable to WET testing. Reliance on EPA-approved WET test organisms developed for fresh water and marine ecosystems to evaluate the potential toxicity of effluents for the Lake is uncertain because these test organisms may have different tolerances than those inhabiting the Lake. Consider the following example to illustrate this concept. If WET tests using EPA-approved test organisms were conducted using Gilbert Bay water as a hypothetical effluent, the Lake water would be concluded to be toxic. Using test organisms that cannot survive in the receiving waters introduces the potential for errors when interpreting the WET test results. These errors could result in decisions that are either under- or overprotective of the receiving waters. In addition, water-effects ratios (using receiving water for dilution in chronic testing versus laboratory water) cannot always be evaluated for the more saline locations in Great Salt Lake.

An interim WET policy that modifies the statewide policy is needed until the data are sufficient for DWQ to make a determination what species are appropriate to test for effluent toxicity for the Lake. As with all Utah waters, the determination of whether a Great Salt Lake UPDES permit includes a requirement for WET testing considers the reasonable potential to discharge toxic pollutants (Figure 1). When WET testing is required, this interim policy for Great Salt Lake changes the following procedures from the statewide implementation guidance:

- Statewide, fresh water test organisms are required for implementing WET testing for Utah fresh waters. Specific to Great Salt Lake discharges, the decision for selecting either a freshwater or salt water test organism(s) should be based on effluent and receiving water salinity (Table 2) in selecting an EPA-approved test organism.
- When WET testing is required for Great Salt Lake discharges, acute testing should always be included regardless of dilution. Acute toxicity occurs when there is 50% or greater mortality for the test species at any effluent concentration. In accordance with UAC R317-2-5, CFR §122.44(d)(1)(iv) and/or 40 CFR § 122.44(d)(1)(v), at no time shall concentrations within the

mixing zone be acutely lethal as determined by bioassay or other approved procedures. Therefore, WET requirements shall limit acute toxicity to end of pipe, i.e., no toxicity in 100 % effluent. As shown in Figure 1, not meeting the acute test criteria can be a basis for a reasonable potential for toxicity determination that would result in WET effluent limits in the permit.

- If chronic WET testing is required based on dilution (Figure 1), the chronic WET tests are conducted in addition to the acute WET tests. At the permittee's option and as documented in the permit, the chronic test may be conducted so that acute endpoints are also measured or a separate acute test may be conducted to meet the acute testing requirement. Unique to Great Salt Lake discharges, results from the chronic WET tests are interpreted as indicators. That is, if no chronic effects are observed, then no chronic effects are predicted for Great Salt Lake organisms. Confidence in this conclusion is limited by the lack of directly applicable data to compare the sensitivity of Great Salt Lake aquatic life to EPA-approved test organisms. If chronic effects are observed, further investigation may be necessary to interpret the results in the context of Great Salt Lake resident organisms.

Table 2. Recommendations for Selection of Whole Effluent Toxicity Testing Organisms for Great Salt Lake

	Receiving water salinity likely supports freshwater organisms, e.g., <1.5%[a]	**Receiving water salinity unlikely to support freshwater organisms, e.g., >1.5%[a]**
Effluent salinity likely supports freshwater organisms, e.g., <1.5%[a]	Freshwater WET testing species recommended	Freshwater WET testing species recommended. Marine organism can be considered with salinity adjustment of effluent[b].
Effluent salinity unlikely to support freshwater organisms, e.g., >1.5%[a]	Freshwater WET testing species recommended	Marine WET testing species should be attempted
Notes: [a]These salinities are approximate and the Permit Writer may modify in the UPDES permit Fact Sheet / Statement of Basis based on site-specific considerations [b]For instance, see Section 9.5 in reference 2 and Section 7.2.3 in reference 3		

These changes are further explained in the following paragraphs. All other procedures, such as frequency of testing, notifications, and toxicity identification evaluations, are the same for Great Salt Lake as for the rest of Utah waters. Appendix E provides recommended text for WET testing for UPDES permits discharging to Great Salt Lake. After WET testing is determined to be appropriate for a specific permit, the decision to conduct acute only, or acute and chronic WET testing is based on the receiving water dilution as determined by the mixing zone analyses. If dilution is less than 20:1,

chronic WET testing is recommended in addition to acute testing. If dilution is greater than 20:1, then acute WET testing only is recommended.

With appropriate documentation in the UPDES Fact Sheet/ Statement of Basis, the Permit Writer can deviate from 20:1 dilution criterion for determining if acute only or acute and chronic WET testing is more appropriate.

The goal of evaluating dilution is to determine whether chronic or acute WET testing has the appropriate sensitivity. When chronic WET testing is conducted, the organisms are exposed to effluent diluted as calculated by the mixing zone analyses whereas acute WET testing uses 100 percent effluent. In atypical cases, acute testing may be more protective than chronic testing at dilutions less than 20:1. With appropriate documentation in the UPDES Fact Sheet/ Statement of Basis, DWQ Permit Writers can deviate from 20:1 dilution criterion for determining if acute only or acute and chronic WET testing is more appropriate

When dilution is less than 20:1, chronic testing is anticipated to be more sensitive than acute testing because of longer test duration and endpoints such as growth that can be more sensitive than survival. With the more sensitive nonlethal endpoints, the importance of using an appropriate test organism increases. Using test organisms that are not representative of the resident species in the receiving waters introduces the potential for errors when interpreting the WET test results. These errors could result in decisions that are either under- or overprotective of the receiving waters. In addition, water-effects ratios (using receiving water for dilution in chronic testing versus laboratory water) cannot always be evaluated for Great Salt Lake.

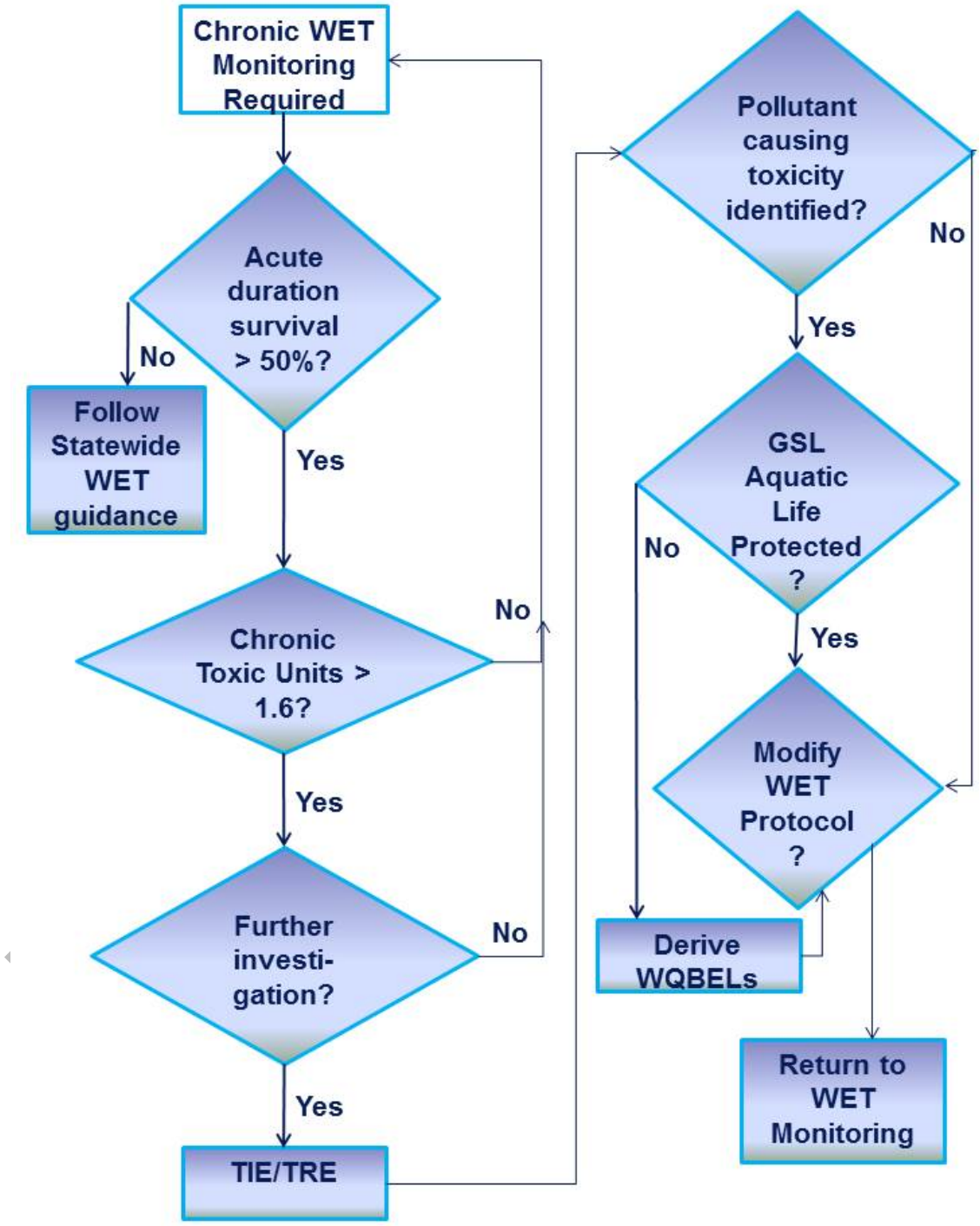
Until the chronic WET test organisms are concluded to represent Great Salt Lake resident species, the chronic WET testing endpoints of survival[1], growth, and reproduction are not considered an absolute determinant of the potential toxicity of the effluent for Great Salt Lake but are instead interpreted as indicators. As an indicator, an absence of effects during chronic WET testing are presumed to be protective of the Great Salt Lake biota and demonstrate compliance with the Narrative Standards. If effects are observed, the conclusion is that adverse effects to Great Salt Lake biota are possible. The permittee has the option of eliminating the cause of effects observed in the WET testing or conducting additional investigations. An example of an additional investigation to evaluate the potential effects specifically for Great Salt Lake biota would be toxicity testing using Great Salt Lake resident species.

The acute tests demonstrate that "no toxics in toxic amounts" are being discharged. In accordance with the 2017 statewide WET policy, failing acute WET test results in either an acute WET test or during the acute exposure phase of a chronic WET test could lead to a finding of reasonable potential for toxicity and WET limits in the permit.

[1] Specifically, effects to survival observed at durations longer than an acute test. The interpretations of acute results (no dilution, acute exposure duration) from the chronic test are unchanged from the statewide procedures.

FIGURE 2

SUMMARY OF CHRONIC WET TESTING PROCEDURES FOR GREAT SALT LAKE DISCHARGES



Survival > 50%. When chronic testing is required and the permittee elects not to conduct a parallel acute test, survival must be reported for acute duration of the test. For instance, the duration of a chronic fathead minnow test is 7 days and the acute test is 4 days. Therefore, survival after day 4 in 100 percent effluents will be reported. Consistent with the statewide WET guidance, acute test results are considered passing if survival is 50% or greater. Acute test results and any required follow up are shown on Figures 1 and 2.

Growth or Reproduction Effect > 1.6 Toxic Unit (TUc). Consistent with the statewide WET guidance, Great Salt Lake chronic WET tests have growth and reproduction endpoints in addition to survival. However, the reporting of the results differs from the statewide guidance because the results are reported as toxic units (TUc) 1. Toxic unit chronic (TUc) is the reciprocal of the effluent concentration /receiving water concentration (RWC) that causes no observable effect on the test organisms by the end of the chronic exposure period and is calculated as RWC/IC25. For examples, if the receiving water is effluent dependent, the RWC=100% and the IC25=50%, the TUc=2. If the RWC=60% and the IC25=37.5%, the TUc=1.6

For Great Salt Lake, chronic effects are observed when the individual test TUc is greater than 1.6 and the receiving water mixing zone is effluent dominated[8] which is anticipated to be the case for most direct discharges to Great Salt Lake. If the receiving water mixing zone is not effluent dominated, chronic effects are observed when the TUc is greater than 1. Receiving water dilutions are calculated in accordance with the Mixing Zone Policy, UAC R317-2-5. If effects greater than 1.6 TUc are observed, additional chronic WET tests are initiated (within fourteen days after the permittee becomes aware of the TU_c exceeding 1.6 to determine if a pattern of toxicity exists and further Investigation is required

Further Investigation. Further investigations are required if a pattern of toxicity is demonstrated. A pattern of chronic toxicity is determined using a series of up to five chronic WET tests over a ten week period, using the receiving water concentration dilution plus four other dilutions (two above and two below the receiving water concentration) and the species found to be most sensitive. The permittee may elect to skip the pattern of toxicity and go directly to a Preliminary Toxicity Investigation (PTI).

A pattern of toxicity is observed:

1. If two (2) consecutive test results (not including the scheduled test which triggered the search for a pattern of toxicity) exhibit TUc>1.6, OR;

2. If consecutive tests continue to yield differing results, the permittee is required to conduct up to a maximum of five (5) tests (not including the scheduled test which triggered the need to establish a pattern of toxicity). If three out of five test results exceed TU_c>1.6, this will constitute an established pattern of toxicity.

Preliminary Toxicity Investigations (PTI)

An established pattern of chronic toxicity requires the permittee to automatically begin a Preliminary Toxic Investigation (PTI) or voluntarily go directly to a TIE/TRE. The goal of the PTI is to allow the permittee to save time and money if they already have information indicating the likely cause(s) of chronic toxicity. For Great Salt Lake, DWQ allows 15 days to identify the cause of the toxicity and propose methods to eliminate it or submit a report within 30 days that at minimum:

a. Summarizes the WET testing results and cause(s) of toxicity.

b. Includes an assessment of why the Great Salt Lake aquatic life uses are unlikely to be impaired by the effluent.

c. If appropriate, includes a plan and schedule for further investigations to address remaining uncertainties. The Director must approve this plan and schedule. The schedule is considered a compliance schedule and if not followed may result in enforcement.

It is recommended that close coordination and communication with the Permit Writer and WET Coordinator is maintained to ensure that the permittee remains in compliance with the permit. The results of the PTI may not be conclusive in identifying the cause of toxicity but may identify the need for further investigations/studies or modification of the WET testing requirements or effluent limits.

Toxicity Identification Evaluation (TIE)/Toxicity Reduction Evaluations (TRE)

If a PTI does not identify a toxicant and/or the permittee is uncertain of what the toxicant could be, or the Director has not approved a plan to does not have the permittee could move on a voluntary basis directly to a TIE/TRE.

- By choosing to skip the pattern of toxicity and the PTI, the permittee acknowledges that a pattern of toxicity exists and further investigation is required. The permittee shall notify the Director in writing within 48 hours of becoming aware of the exceedance and that it has voluntarily chosen to do a TIE/TRE so that its progress in completing the investigation can be tracked.

- The procedures to be followed in a TIE/TRE are unique and should be tailored to the specific circumstances. Therefore, a prescriptive approach to the TIE portion of a TRE is NOT specified and flexibility is granted to the permittee for the purpose of rapidly and efficiently determining the source of the toxicity. However, the Permitee must coordinate closely with the Permit Writer and WET Coordinator to ensure that the TIE/TRE is appropriate to address the TU_c>1.6 and permit requirements will be met.

- For the TIE portion of a TRE, a schedule should be agreed to by the permittee and the Permit Writer and WET Coordinator. A completion date for the TIE does not need to be specified if interim milestones and reports are required to be submitted monthly or quarterly along with a final report when the TIE portion is completed. The schedule is considered a compliance schedule and if not followed may result in enforcement.

- All TIE/TREs must be completed by a WET laboratory certified by the State Health Laboratory.

- Initial TIE/TRE efforts are expected to focus on characterization and identification of the toxicant(s). EPA has published TIE/TRE Guidance outlining procedures for rapidly narrowing the possibilities to certain groups of pollutants such as metals, non-polar organics, oxidants, etc. **This information has been widely distributed,**

and is available at http://water.epa.gov/polwaste/npdes/basics/EPA-NPDES-WET-Guidance-Documents.cfm.

- Once the source of toxicity has been identified, the objective is to eliminate the source by process controls, pretreatment controls, combined waste stream treatment, local enforcement or other measures necessary. If the cause of toxicity is a pollutant whose source and method of correction is known, the TIE/TRE can be terminated, and new permit requirements developed. Alternatively, the permittee may demonstrate to the Director's satisfaction that the receiving waters are unlikely to be harmed by the observed chronic WET toxicity.

- It is anticipated that toxicity will be controlled in most cases by following the above procedures. However, there may be situations when a thorough and acceptable TIE/TRE will reveal toxicity requiring additional study to resolve or other investigations to evaluate protection of the receiving water uses. On a case-by-case basis, the Director may grant additional time to eliminate the source of toxicity or to provide additional evidence that the Great Salt Lake aquatic life uses will not be impaired.

Pollutant causing effects identified? If the pollutant causing the effects cannot be identified through the TIE/TRE process, the permittee should consult DWQ to determine if modifications of the permit's WET monitoring requirements are appropriate. In some cases, the Director may conclude that chronic WET testing is technically impractical or further chronic WET testing would not be informative. In this situation, further chronic WET testing may be terminated.

If the pollutant causing the effects is identified, the pollutant may be further evaluated relative to Great Salt Lake's aquatic life uses.

Great Salt Lake aquatic life uses protected? If the concentrations of the pollutant causing the exceedance of 1.6 TU_c cannot be concluded to be protective of Great Salt Lake's aquatic life uses, then DWQ will derive water quality-based effluent limit(s), based on protection of Great Salt Lake's aquatic life uses. The permit must be modified to implement the effluent limit(s). In some cases, modifications to the chronic WET monitoring requirements may also be appropriate.

Standard WET testing organisms may be more sensitive than the aquatic life community in Great Salt Lake because for example, differences in sensitivities between the organisms or dissolved salts in the effluent being tested. If data are available to provide a reasonable basis for concluding that the aquatic life uses in the receiving waters will not be impaired by the pollutants identified as having caused $TU_c > 1.6$, the Permittee should consult the Permit Writer to determine what modifications to the permit's WET monitoring requirements are appropriate. For instance, the salinity in the effluent may exceed the tolerance of the test organisms. Under these circumstances, continued chronic WET monitoring could result in a wasteful endless loop of tests exceeding a TU_c of 1.6 and TIEs/TREs without providing useful information regarding protection of Great Salt Lake aquatic life uses. Modifications to the WET testing protocol may include using a threshold other than a TU_c of 1.6 or cessation of chronic WET testing.

Unless otherwise stated in the UPDES permit, substantive changes to the WET requirements include public notice requirements as part of the modification process.

BIBLIOGRAPHY AND REFERENCES

1. "Technical Support Document for Water Quality Based Toxins Control", EPA/505/2-90-001, U.S. EPA, March 1991.

2. "Methods for Measuring Acute Toxicity of Effluent and Receiving Waters to Freshwater and Marine Organisms," Fifth Edition EPA-821-R02-012, U. S. EPA, October 2002.

3. "Short Term Methods for Estimating the Chronic Toxicity of effluents and Receiving Waters to Freshwater Organisms, Fourth Edition". EPA-821-R-02-013, U.S. EPA, October 2002.

4. "Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms", Third Edition. EPA-821-R-02-014, U.S. EPA, October, 2002

5. TRE/TIE procedures and other WET method publications: http://cfpub.epa.gov/npdes/wqbasedpermitting/wetdocs.cfm (top right corner "Search EPA.gov", type in TIE/TRE).

6. Utah Division of Water Quality (DWQ). 2012. Draft "A Great Salt Lake Water Quality Strategy". April.

7. Utah Division of Water Quality (DWQ). 2014. "Core Component 1: Developing Aquatic Life Criteria for Priority Pollutants A Great Salt Lake Water Quality Strategy". September.

8. United States Environmental Protection Agency (EPA). 2004. "National Whole Effluent Toxicity (WET) Implementation Guidance Under the NPDES Program" Draft. EPA 832-B-04-003

APPENDIX A: STANDARD PERMIT LANGUAGE

WHOLE EFFLUENT TOXICITY LIMITS IN PART I OF THE PERMIT

Effective immediately and lasting through the life of this permit, there shall be no *acute or chronic* toxicity in the effluent from Outfall(s) as defined in *Part* , and determined by test procedures described in *Part I* of this permit.

Example of entry in the monitoring tables of a permit:

Parameter	Effluent Limitations			
	Maximum Monthly Avg.	Maximum Weekly Avg.	Daily Minimum	Daily Maximum
WET Acute Biomonitoring	NA	NA	NA	$LC_{50} \geq$ 100% Effluent;
WET Chronic Biomonitoring	NA	NA	NA	$IC_{25} \geq$ % Effluent (RWC)

NA – Not Applicable

Self-Monitoring and Reporting Requirements a/			
Parameter	Frequency	Sample Type	Units
WET, Acute Biomonitoring* or Chronic Biomonitoring*	Monthly/Quarterly	Grab/Composite	Pass/Fail

* Enter specifics for alternating species, if applicable.

RWC = Receiving water concentration determined in accordance with R317-2-5

USE THIS PAGE WHEN ACUTE TOXICITY IS LIMITED OR MONITORING IS REQUIRED

Specific Limitations and Self-Monitoring Requirements

a. Whole Effluent Testing - Acute Toxicity.

Starting on_____, the permittee shall (monthly, quarterly, semi-annually), conduct acute static renewal toxicity tests on a (grab/composite) sample of the final effluent at Outfall(s). The sample shall be collected at the point of compliance before mixing with the receiving water.

The monitoring frequency for acute tests shall be (monthly, quarterly semi-annually) unless a sample is found to be acutely toxic during a routine test. If that occurs, the monitoring frequency shall become weekly (See *Part , Accelerated Testing*). Unless otherwise approved by the Director, samples shall be collected on a two day progression; i.e., if the first sample is on a Monday, during the next sampling period, the sampling shall begin on a Wednesday, etc.

The replacement static acute toxicity tests shall be conducted in general accordance with the procedures set out in the latest revision of *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition, October 2002, EPA-821-R-02-012* as per *40 CFR 136.3(a) TABLE IA-LIST OF APPROVED BIOLOGICAL METHODS*. The permittee shall conduct the 48-hour static renewal toxicity test using *Ceriodaphnia dubia* and the acute 96-hour static renewal toxicity test using *Pimephales promelas* (fathead minnow) Based on the Test Acceptability Criteria included in Utah Pollutant Discharge Elimination System (UPDES) Permit and Enforcement Guidance Document for Whole Effluent Toxicity Control (Biomonitoring) January, 2017, the Director may require acceptable variations in the test, i.e. temperature, carbon dioxide atmosphere, or any other acceptable variations in the testing procedure.) If possible dilution water should be taken from the receiving stream. A valid replacement test is required within the specified sampling period to remain in compliance.

Acute toxicity occurs when 50 percent or more mortality is observed for either species at any effluent concentration. Mortality in the control must simultaneously be 10 percent or less for the results to be considered valid. If more than 10 percent control mortality occurs, the test shall be repeated until satisfactory control mortality is achieved. The permittee shall meet all QA/QC requirements of the acute WET testing method listed in this Section of the permit.

If the permit contains a total residual chlorine limitation such that it may interfere with WET testing ($\geq$0.20 mg/L), the permittee may dechlorinate the sample in accordance with approved USEPA methods for WET testing the sample. If dechlorination is affecting the test, the permittee may collect the sample just before chlorination with Director approval.

(Monthly, Quarterly, semi-annual) test results shall be reported along with the Discharge Monitoring Report (DMR) submitted for the end of the required reporting period (month, quarter or semi-annual) e.g., biomonitoring results for the calendar quarter ending March 31 shall be reported with the DMR due April 28, with the remaining biomonitoring reports submitted with DMRs due each July 28, October 28, and January 28. Monthly test results shall be reported along with the DMR submitted for that month. The format for the report shall be consistent with Appendix C of "Utah Pollutant Discharge Elimination System (UPDES) Permitting and Enforcement Guidance Document for Whole Effluent Toxicity (Biomonitoring), Utah Division of Water Quality, January 2017.

If the results for ten consecutive tests indicate no acute toxicity, the permittee may request a reduction in acute toxicity testing by a reduction in monitoring frequency, alternating species, or using only the most sensitive species. The Director may approve or deny the request. If the request is approved, the test procedures are to be the same as specified above for the test species. Under no circumstances shall monitoring for WET at major facilities be reduced less than quarterly. Minor facilities may be less than quarterly at the discretion of the Director.

USE THIS PAGE WHEN CHRONIC TOXICITY IS LIMITED OR MONITORING IS REQUIRED

Specific Limitations and Self-Monitoring Requirements

a. Whole Effluent Toxicity Testing - Chronic Toxicity

Starting on _____ , the permittee shall (monthly, quarterly, semi-annually), conduct chronic static renewal toxicity tests on a grab or composite sample of the final effluent at Outfall(s) . The sample shall be collected at the point of compliance before mixing with the receiving water.

Three samples are required and samples shall be collected on Monday, Wednesday and Friday of each sampling period or collected on a two day progression for each sampling period. This may be changed with Director approval.

The chronic toxicity tests shall be conducted in general accordance with the procedures set out in the latest revision of *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms, Fourth Edition, October 2002, EPA—821-R-02-013* as per *40 CFR 136.3(a) TABLE IA-LIST OF APPROVED BIOLOGICAL METHODS*. Test species shall consist of *Ceriodaphnia dubia* and *Pimephales promelas* (fathead minnow).

A multi dilution test consisting of at least five concentrations and a control is required at two dilutions below and two above the RWC, if possible. If test acceptability criteria are not met for control survival, growth, or reproduction, the test shall be considered invalid. A valid replacement test is required within the specified sampling period to remain in compliance with this permit. Chronic toxicity occurs when, during a chronic toxicity test, the 25% inhibition concentration (IC_{25}) calculated on the basis of test organism survival and growth or survival and reproduction, is less than or equal to _____ effluent concentration (equivalent to the RWC). If a sample is found to be chronically toxic during a routine test, the monitoring frequency shall become biweekly (see Part ___Accelerated Testing). (the Director may enter acceptable variations in the test procedure here based on the test acceptability criteria as contained in Utah Pollutant Discharge Elimination System (UPDES) Permitting and Enforcement Guidance Document for Whole Effluent Toxicity Control January, 2017). If possible, dilution water should be obtained from the receiving stream.

If the permit contains a total residual chlorine limitation such that it may interfere with WET testing ($\geq$0.20 mg/L), the permittee may dechlorinate the sample in accordance with the standard method. If dechlorination is negatively affecting the test, the permittee may collect the sample just before chlorination with Director approval.

(Monthly, Quarterly, semi-annual) test results shall be reported along with the Discharge Monitoring Report (DMR) submitted for the end of the required reporting period (e.g., biomonitoring results for the calendar quarter ending March 31 shall be reported with the DMR due April 28, with the remaining biomonitoring reports submitted with DMRs due each July 28, October 28, and January 28). Monthly test results shall be reported along with the DMR submitted for that month. The format for the report shall be consistent with Appendix C of "Utah Pollutant Discharge Elimination System (UPDES) Permitting and Enforcement Guidance Document for Whole Effluent Toxicity, Utah Division of Water Quality, January, 2017.

If the results for ten consecutive tests indicate no chronic toxicity, the permittee may submit a request to the Director to allow a reduction in chronic toxicity testing by alternating species, or using only the most sensitive species. The permit issuing authority may approve or deny the request based on the results and other available information without public notice. If the request is approved, the test procedures are to be the same as specified above for the test species. Under no circumstances shall monitoring for WET at major facilities be reduced less than quarterly. Minor facilities may be less than quarterly at the discretion of the Director.

USE THIS REOPENER LANGUAGE (USUALLY IN PART IV) IN THE PERMIT WHEN A TOXICITY LIMIT IS IN THE PERMIT OR MONITORING IS REQUIRED

Specific Limitations and Self-Monitoring Requirements

Toxicity Limitation - Reopener Provision

This permit may be reopened and modified, following proper administrative procedures, to include whole effluent toxicity (WET) limitations, a compliance schedule, a change in the whole effluent toxicity protocol, additional or modified numerical limitations, or any other conditions related to the control of toxicants if one or more of the following events occur;

1. Toxicity is detected, as per Part I. of this permit, during the permit period.
2. The TRE results indicate that the toxicant(s) represent pollutant(s) or pollutant parameter(s) that may be controlled with specific numerical limits, and the Director concludes that numerical controls are appropriate.
3. Following the implementation of numerical control(s) for toxicant(s), the Director concludes that a modified biomonitoring protocol is necessary to compensate for those toxicant(s) that are controlled numerically.
4. The TRE reveals other unique conditions or characteristics which the Director concludes justify the incorporation of unanticipated special conditions in the permit.

USE THIS REOPENER LANGUAGE WHEN A WHOLE EFFLUENT TOXICITY LIMIT OR MONITORING IS NOT IN THE PERMIT

Toxicity Limitation - Reopener Provision

This permit may be reopened and modified (following proper administrative procedures) to include whole effluent toxicity (WET) testing, a WET limitation, a compliance date, additional or modified numerical limitations, or any other conditions related to the control of toxicants if toxicity is suspected during the life of this permit.

STANDARD PERMIT LANGUAGE

Accelerated Testing

When whole effluent toxicity is indicated during routine WET testing as specified in this permit, the permittee shall notify the Director in writing within 5 days after becoming aware of the test result. The permittee shall perform an accelerated schedule of WET testing to establish whether a pattern of toxicity exists unless the permittee notifies the Director and commences a PTI, TIE, or a TRE. Accelerated testing or the PTI, TIE, or TRE will begin within fourteen days after the permittee becomes aware of the test result. Accelerated testing shall be conducted as specified under *Part I. Pattern of Toxicity*. If the accelerated testing demonstrates no pattern of toxicity, routine monitoring shall be resumed.

Pattern of Toxicity

A pattern of toxicity is defined by the results of a series of up to five biomonitoring tests pursuant to the accelerated testing requirements using a full set of dilutions for acute (five plus the control) and five effluent dilutions for chronic (five plus the control), on the species found to be more sensitive, once every week for up to five consecutive weeks for acute and once every two weeks up to ten consecutive weeks for chronic.

If two (2) consecutive tests (not including the scheduled test which triggered the search for a pattern of toxicity) do not result in an exceedance of the acute or chronic toxicity criteria, no further accelerated testing will be required and no pattern of toxicity will be found to exist. The permittee will provide written verification to the Director within 5 days of determining no pattern of toxicity exists, and resume routine monitoring.

A pattern of toxicity is established if one of the following occurs:

1. If two (2) consecutive test results (not including the scheduled test which triggered the search for a pattern of toxicity) exceed the acute or chronic toxicity criteria.
2. If consecutive tests continue to yield differing results each time, the permittee will be required to conduct up to a maximum of five (5) tests (not including the scheduled test which triggered the search for a pattern of toxicity). If three out of five test results exceed the acute or chronic toxicity criteria, this will constitute an established pattern of toxicity.

Preliminary Toxicity Investigation

1. When a pattern of toxicity is detected the permittee will notify the Director in writing within 5 days and begin an evaluation of the possible causes of the toxicity. The permittee will have 15 working days from demonstration of the pattern of toxicity to complete an optional Preliminary Toxicity Investigation (PTI) and submit a written report of the results to the

Director. The PTI may include, but is not limited to: additional chemical and biological monitoring, examination of pretreatment program records, examination of discharge monitoring reports, a thorough review of the testing protocol, evaluation of treatment processes and chemical use, inspection of material storage and transfer areas to determine if any spill may have occurred.

2. If the PTI identifies a probable toxicant and/or a probable source of toxicity, the permittee shall submit, as part of its final results, written notification of that effect to the Director. Within thirty days of completing the PTI the permittee shall submit to the Director for approval a control program to control effluent toxicity and shall proceed to implement such plan in accordance with the Director's approval. The control program, as submitted to or revised by the Director, will be incorporated into the permit. After final implementation, the permittee must demonstrate successful removal of toxicity by passing a two species WET test as outlined in this permit. With adequate justification, the Director may extend these deadlines.

3. If no probable explanation for toxicity is identified in the PTI, the permittee shall notify the Director as part of its final report, along with a schedule for conducting a Phase I Toxicity Reduction Evaluation (TRE) (see Part ___ *Toxicity Reduction Evaluation)*.

4. If toxicity spontaneously disappears during the PTI, the permittee shall submit written notification to that effect to the Director, with supporting testing evidence.

Toxicity Reduction Evaluation (TRE)

If a pattern of toxicity is detected the permittee shall initiate a TIE/TRE within 7 days unless the Director has accepted the decision to complete a PTI. With adequate justification, the Director may extend the 7-day deadline. The purpose of the TIE portion of a TRE will be to establish the cause of the toxicity, locate the source(s) of the toxicity, and the TRE will control or provide treatment for the toxicity.

A TRE may include but is not limited to one, all, or a combination of the following:

1. Phase I - Toxicity Characterization

2. Phase II - Toxicity Identification Procedures

3. Phase III - Toxicity Control Procedures

4. Any other appropriate procedures for toxicity source elimination and control

If the TRE establishes that the toxicity cannot be immediately eliminated the permittee shall submit a proposed compliance plan to the Director. The plan shall include the proposed approach to control toxicity and a proposed compliance schedule for achieving control. If the approach and schedule are acceptable to the Director, this permit may be reopened and modified.

If toxicity spontaneously disappears during the TIE/TRE, the permittee shall submit written notification to that effect to the Director.

If the TIE shows that the toxicity is caused by a toxicant(s) that may be controlled with specific numerical limitations, the permittee shall submit the following:

1. An alternative control program for compliance with the numerical requirements.

2. If necessary, as determined by the Director, provide a modified biomonitoring protocol which compensates for the pollutant(s) being controlled numerically.

This permit may be reopened and modified to incorporate any additional numerical limitations, a modified compliance schedule if judged necessary by the Director, and/or modified WET testing requirements without public notice.

Failure to conduct an adequate TIE/TRE plan or program as described above, or the submittal of a plan or program judged inadequate by the Director, shall be considered a violation of this permit. After implementation of TIE/TRE plan, the permittee must demonstrate successful removal of toxicity by passing a two species WET test as outlined in this permit.

APPENDIX B: GREAT SALT LAKE STANDARD PERMIT LANGUAGE

The following are the recommended revisions to the standard permit language for chronic WET testing for Great Salt Lake discharges. Yellow highlighting indicates Great Salt Lake-specific revisions to the standard permit text.

WHOLE EFFLUENT TOXICITY LIMITS IN PART I OF THE PERMIT

Effective immediately and lasting through the life of this permit, there shall be no *acute or chronic* toxicity in the effluent from Outfall(s) as defined in *Part* , and determined by test procedures described in *Part I* of this permit.

Example of entry in the monitoring tables of a permit:

Parameter	Effluent Limitations			
	Maximum Monthly Avg.	Maximum Weekly Avg.	Daily Minimum	Daily Maximum
WET Acute Biomonitoring	NA	NA	NA	$LC_{50} \geq$ 100% Effluent;
WET Chronic Biomonitoring	NA	NA	NA	NA

NA – Not Applicable

Self-Monitoring and Reporting Requirements			
Parameter	Frequency	Sample Type	Units
WET, Acute Biomonitoring*	Monthly/Quarterly	Grab/Composite	Pass/Fail
or			
Chronic Biomonitoring*	Monthly/Quarterly	Grab/Composite	$TU_c \leq 1.6$ or $TU_c \leq 1^a$

* Enter specifics for alternating species, if applicable.

a TUc is calculated by dividing the receiving water effluent concentration determined in accordance with R317-2-5 by the chronic test IC_{25}. [select one: $TU_c \leq 1.6$ when receiving water effluent concentration is >50%] The TUc is an indicator and an exceedance is not used for determining compliance.

USE THIS PAGE WHEN ACUTE TOXICITY IS LIMITED OR MONITORING IS REQUIRED

Specific Limitations and Self-Monitoring Requirements

a. Whole Effluent Testing - Acute Toxicity.

Starting on_____, the permittee shall (monthly, quarterly, semi-annually), conduct acute static renewal toxicity tests on a (grab/composite) sample of the final effluent at Outfall(s) . The sample shall be collected at the point of compliance before mixing with the receiving water.

The monitoring frequency for acute tests shall be (monthly, quarterly semi-annually) unless a sample is found to be acutely toxic during a routine test. If that occurs, the monitoring frequency shall become weekly (See *Part , Accelerated Testing*). Unless otherwise approved by the Director, samples shall be collected on a two day progression; i.e., if the first sample is on a Monday, during the next sampling period, the sampling shall begin on a Wednesday, etc.

The replacement static acute toxicity tests shall be conducted in general accordance with the procedures set out in the latest revision of *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition, October 2002, EPA-821-R-02-012* as per *40 CFR 136.3(a) TABLE IA-LIST OF APPROVED BIOLOGICAL METHODS*. The permittee shall conduct the __-hour static renewal toxicity test using _____ and the acute __-hour static renewal toxicity test using _____. Based on the Test Acceptability Criteria included in Utah Pollutant Discharge Elimination System (UPDES) Permitting and Enforcement Guidance Document for Whole Effluent Toxicity March 2017, the Director may require acceptable variations in the test, i.e. temperature, carbon dioxide atmosphere, or any other acceptable variations in the testing procedure.) If possible dilution water should be taken from the receiving stream. A valid replacement test is required within the specified sampling period to remain in compliance.

Acute toxicity occurs when 50 percent or more mortality is observed for either species at any effluent concentration. Mortality in the control must simultaneously be 10 percent or less for the results to be considered valid. If more than 10 percent control mortality occurs, the test shall be repeated until satisfactory control mortality is achieved. The permittee shall meet all QA/QC requirements of the acute WET testing method listed in this Section of the permit.

If the permit contains a total residual chlorine limitation such that it may interfere with WET testing (usually greater than 0.20 mg/L), the permittee may dechlorinate the sample in accordance with approved USEPA methods for WET testing the sample. If dechlorination is affecting the test, the permittee may collect the sample just before chlorination with Director approval.

(Monthly, Quarterly, semi-annual) test results shall be reported along with the Discharge Monitoring Report (DMR) submitted for the end of the required reporting period (month, quarter or semi-annual) e.g., biomonitoring results for the calendar quarter ending March 31

shall be reported with the DMR due April 28, with the remaining biomonitoring reports submitted with DMRs due each July 28, October 28, and January 28. Monthly test results shall be reported along with the DMR submitted for that month. The format for the report shall be consistent with Appendix C of "Utah Pollutant Discharge Elimination System (UPDES) Permitting and Enforcement Guidance Document for Whole Effluent Toxicity (Biomonitoring), Utah Division of Water Quality, March, 2017.

If the results for ten consecutive tests indicate no acute toxicity, the permittee may request a reduction in acute toxicity testing by a reduction in monitoring frequency, alternating species, or using only the most sensitive species. The Director may approve or deny the request. If the request is approved, the test procedures are to be the same as specified above for the test species. Under no circumstances shall monitoring for WET at major facilities be reduced less than quarterly. Minor facilities may be less than quarterly at the discretion of the Director.

USE THIS PAGE WHEN CHRONIC TOXICITY IS LIMITED OR MONITORING IS REQUIRED

Specific Limitations and Self-Monitoring Requirements

a. Whole Effluent Toxicity Testing - Chronic Toxicity

Chronic WET tests are considered an indicator for Class 5 waters (Great Salt Lake) because of uncertainties regarding the representativeness of the standard test species for Great Salt Lake. If a separate acute test is not conducted, the results of the acute duration portion of a chronic test are reported as specified in Part a. Whole Effluent Testing – Acute Toxicity. As an indicator, the chronic test results can demonstrate compliance with portions of the Narrative Standards (R317-2-7.2). However, the chronic WET test results alone do not demonstrate noncompliance with the Narrative Standards. As indicators, the chronic WET test results alone are not used for determining reasonable potential for toxicity or noncompliance with the permit.

Starting on _____ , the permittee shall (monthly, quarterly, semi-annually), conduct chronic static renewal toxicity tests on a grab or composite sample of the final effluent at Outfall(s) . The sample shall be collected at the point of compliance before mixing with the receiving water.

Three samples are required and samples shall be collected on Monday, Wednesday and Friday of each sampling period or collected on a two day progression for each sampling period. This may be changed with Director approval.

The chronic toxicity tests shall be conducted in general accordance with the procedures set out in the latest revision of (*Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms, Fourth Edition, October 2002, EPA—821-R-02-013* [or] *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Water to Marine and Estuarine Organisms, Third Edition, October 2002* EPA-821-R-02-014 [select one]) as per *40 CFR 136.3(a) TABLE IA-LIST OF APPROVED BIOLOGICAL METHODS*. Test species shall consist of _____ and _____.

A multi dilution test consisting of at least five concentrations and a control is required at two dilutions below and two above the RWC, if possible. If test acceptability criteria are not met for control survival, growth, or reproduction, the test shall be considered invalid. A valid replacement test is required within the specified sampling period to remain in compliance with this permit. Chronic toxicity occurs when, during a chronic toxicity test, the TUc $\geq$ 1.6. Toxic unit chronic (TUc) is the reciprocal of the effluent concentration that causes no observable effect on the test organisms by the end of the chronic exposure period and is calculated as $100/IC_{25}$. If a sample is found to be chronically toxic during a routine test, the monitoring frequency shall become biweekly (see Part ___Accelerated Testing). (the Director may enter acceptable variations in the test procedure here based on the test acceptability criteria as contained in Utah Pollutant Discharge Elimination System (UPDES) Permitting and Enforcement Guidance Document for Whole Effluent Toxicity March 2017). If possible, dilution water should be obtained from the receiving stream.

If the permit contains a total residual chlorine limitation such that it may interfere with WET testing (0.20 mg/L), the permittee may dechlorinate the sample in accordance with the standard method. If dechlorination is negatively affecting the test, the permittee may collect the sample just before chlorination with Director approval.

(Monthly, Quarterly, semi-annual) test results shall be reported along with the Discharge Monitoring Report (DMR) submitted for the end of the required reporting period (e.g., biomonitoring results for the calendar quarter ending March 31 shall be reported with the DMR due April 28, with the remaining biomonitoring reports submitted with DMRs due each July 28, October 28, and January 28). Monthly test results (TU_c) shall be reported along with the DMR submitted for that month. The format for the report shall be consistent with Appendix C of "Utah Pollutant Discharge Elimination System (UPDES) Permitting and Enforcement Guidance Document for Whole Effluent Toxicity , Utah Division of Water Quality, March, 2017.

If the results for ten consecutive tests indicate no chronic toxicity, the permittee may submit a request to the Director to allow a reduction in chronic toxicity testing by alternating species, or using only the most sensitive species. The permit issuing authority may approve or deny the request based on the results and other available information without public notice. If the request is approved, the test procedures are to be the same as specified above for the test species. The Director may modify the frequency of chronic WET testing requirements including the cessation of chronic WET testing without a public notice, as warranted and appropriate. The Director will maintain the documentation that explains the bases for the changes.

USE THIS REOPENER LANGUAGE (USUALLY IN PART IV) IN THE PERMIT WHEN A TOXICITY LIMIT IS IN THE PERMIT OR MONITORING IS REQUIRED

Specific Limitations and Self-Monitoring Requirements

Toxicity Limitation - Reopener Provision

This permit may be reopened and modified, following proper administrative procedures, to include whole effluent toxicity (WET) limitations, a compliance date, a compliance schedule, a change in the whole effluent toxicity (biomonitoring) protocol, additional or modified numerical limitations, or any other conditions related to the control of toxicants if one or more of the following events occur;

1. Toxicity is detected, as per Part I. of this permit, during the permit period.

2. The TRE results indicate that the toxicant(s) represent pollutant(s) or pollutant parameter(s) that may be controlled with specific numerical limits, and the Director concludes that numerical controls are appropriate.

3. Following the implementation of numerical control(s) for toxicant(s), the Director concludes that a modified biomonitoring protocol is necessary to compensate for those toxicant(s) that are controlled numerically.

4. The TRE reveals other unique conditions or characteristics which the Director concludes justify the incorporation of unanticipated special conditions in the permit.

USE THIS REOPENER LANGUAGE WHEN A WHOLE EFFLUENT TOXICITY LIMIT OR MONITORING IS NOT IN THE PERMIT

Toxicity Limitation - Reopener Provision

This permit may be reopened and modified (following proper administrative procedures) to include whole effluent toxicity (WET) testing, a WET limitation, a compliance date, additional or modified numerical limitations, or any other conditions related to the control of toxicants if toxicity is suspected during the life of this permit.

STANDARD PERMIT LANGUAGE

Accelerated Testing

When whole effluent toxicity is indicated during routine WET testing as specified in this permit, the permittee shall notify the Director in writing within 5 days after becoming aware of the test result. The permittee shall perform an accelerated schedule of WET testing to establish whether a pattern of toxicity exists unless the permittee notifies the Director and commences a PTI, TIE, or a TRE. Accelerated testing or the PTI, TIE, or TRE will begin within fourteen days after the permittee becomes aware of the test result. Accelerated testing shall be conducted as specified under *Pattern of Toxicity*. If the accelerated testing demonstrates no pattern of toxicity, routine monitoring shall be resumed.

Pattern of Toxicity

A pattern of toxicity is defined by the results of a series of up to five biomonitoring tests pursuant to the accelerated testing requirements using a full set of dilutions for acute (five plus the control) and five effluent dilutions for chronic (five plus the control), on the species found to be more sensitive, once every week for up to five consecutive weeks for acute and once every two weeks up to ten consecutive weeks for chronic.

If two (2) consecutive tests (not including the scheduled test which triggered the search for a pattern of toxicity) do not result in a $TU_c \geq 1.6$, no further accelerated testing will be required and no pattern of toxicity will be found to exist. The permittee will provide written verification to the Director within 5 days of determining no pattern of toxicity exists, and resume routine monitoring.

A pattern of toxicity is established if one of the following occurs:

1. If two (2) consecutive test results (not including the scheduled test which triggered the search for a pattern of toxicity) exceed the acute or chronic toxicity criteria.

2. If consecutive tests continue to yield differing results each time, the permittee will be required to conduct up to a maximum of five (5) tests (not including the scheduled test which triggered the search for a pattern of toxicity). If three out of five test results exceed the acute or chronic toxicity criteria, this will constitute an established pattern of toxicity.

Preliminary Toxicity Investigations (PTI)

1. When a pattern of toxicity is detected the permittee will notify the Director in writing within 5 days and begin an evaluation of the possible causes of the toxicity. The permittee will have 15 working days from demonstration of the pattern of toxicity to complete an optional Preliminary Toxicity Investigation (PTI) and submit a written report of the results to the Director. The PTI may include, but is not limited to: additional chemical and biological monitoring, examination of pretreatment program records, examination of discharge monitoring reports, a thorough review of the testing protocol, evaluation of treatment processes and chemical use, inspection of material storage and transfer areas to determine if any spill may have occurred. For Great Salt Lake chronic testing, DWQ allows 15 days to identify the cause of the toxicity and propose methods to eliminate it or submit a report within 30 days that at minimum:

    a. Summarizes the chronic WET testing results and cause(s) of toxicity

    b. Includes an assessment of why the receiving water uses are unlikely to be impaired

    c. If appropriate, includes a plan and schedule for further investigations to address remaining uncertainties. The Director must approve this plan and schedule. The schedule is considered a compliance schedule and if not followed may result in enforcement.

2. If the PTI identifies a probable toxicant and/or a probable source of toxicity, the permittee shall submit, as part of its final results, written notification of that effect to the Director. Within thirty days of completing the PTI the permittee shall submit to the Director for approval a control program to control effluent toxicity and shall proceed to implement such plan in accordance with the Director's approval. The control program, as submitted to or revised by the Director, will be incorporated into the permit. After final implementation, the permittee must demonstrate successful removal of toxicity by passing a two species WET test as outlined in this permit. With adequate justification, the Director may extend these deadlines.

3. If no probable explanation for toxicity is identified in the PTI, the permittee shall notify the Director as part of its final report, along with a schedule for conducting a Phase I Toxicity Reduction Evaluation (TRE) (see Part ___ *Toxicity Reduction Evaluation*).

4. If toxicity spontaneously disappears during the PTI, the permittee shall submit written notification to that effect to the Director, with supporting testing evidence.

Toxicity Reduction Evaluation (TRE)

If a pattern of toxicity is detected the permittee shall initiate a TIE/TRE within 7 days unless the Director has accepted the decision to complete a PTI. With adequate justification, the Director may extend the 7-day deadline. The purpose of the TIE portion of a TRE will be to establish the cause of the toxicity, locate the source(s) of the toxicity, and the TRE will control or provide treatment for the toxicity.

A TRE may include but is not limited to one, all, or a combination of the following:

1. Phase I - Toxicity Characterization

2. Phase II - Toxicity Identification Procedures

3. Phase III - Toxicity Control Procedures

4. Any other appropriate procedures for toxicity source elimination and control

If the TRE establishes that the toxicity cannot be immediately eliminated the permittee shall submit a proposed compliance plan to the Director. The plan shall include the proposed approach to control toxicity and a proposed compliance schedule for achieving control. If the approach and schedule are acceptable to the Director, this permit may be reopened and modified.

If toxicity spontaneously disappears during the TIE/TRE, the permittee shall submit written notification to that effect to the Director.

If the TIE shows that the toxicity is caused by a toxicant(s) that may be controlled with specific numerical limitations, the permittee shall submit the following:

1. An alternative control program for compliance with the numerical requirements.

2. If necessary, as determined by the Director, provide a modified biomonitoring protocol which compensates for the pollutant(s) being controlled numerically.

For Great Salt Lake chronic WET testing, DWQ allows 15 days to identify the cause of the toxicity and propose methods to eliminate it or submit a report within 30 days that at minimum:

a. Summarizes the WET testing results and cause(s) of toxicity

b. Includes an assessment of why the receiving water uses are unlikely to be impaired

c. If appropriate, includes a plan and schedule for further investigations to address remaining uncertainties. The Director must approve this plan and schedule. The

schedule is considered a compliance schedule and if not followed may result in enforcement.

:

This permit may be reopened and modified to incorporate any additional numerical limitations, a modified compliance schedule if judged necessary by the Director, and/or modified WET testing requirements without public notice.

Failure to conduct an adequate TIE/TRE plan or program as described above, or the submittal of a plan or program judged inadequate by the Director, shall be considered a violation of this permit. After implementation of TIE/TRE plan, the permittee must demonstrate successful removal of toxicity by passing a two species WET test as outlined in this permit.

APPENDIX C: SUMMARY OF TEST CONDITIONS AND TEST ACCEPTABILITY CRITERIA FOR ACUTE AND CHRONIC WHOLE EFFLUENT TOXICITY TESTS

The following tables are included:

TABLE 1. Summary of test conditions and test acceptability criteria for ceriodaphnia dubia acute toxicity tests with effluents and receiving waters (test method 2002.0)

TABLE 2. Summary of test conditions and test acceptability criteria for fathead minnow, pimephales promeias, acute toxicity tests with effluents and receiving waters (test method 20000.0)

TABLE 3. Summary of test conditions and test acceptability criteria for daphnid, *ceriodaphnia dubia,* survival and reproduction toxicity tests with effluents and receiving waters (test method 1002.0

TABLE 4. Summary of test conditions and test acceptability criteria for fathead minnow, *pimephales promelas,* larval survival and growth toxicity tests with effluents and receiving waters (test method 1000.0)

TABLE 1. SUMMARY OF TEST CONDITIONS AND TEST ACCEPTABILITY CRITERIA FOR CERIODAPHNIA DUBIA ACUTE TOXICITY TESTS WITH EFFLUENTS AND RECEIVING WATERS (TEST METHOD 2002.0)[2]

1. Test type:	Static non-renewal, static-renewal, or flow-through (available options)
2. Test duration:	24, 48, or 96 h (available options)
3. Temperature:[2]	20°C ±1°C; or 25°C ±1°C (recommended) Test temperatures must not deviate (i.e., maximum minus minimum temperature) by more than 3°C during the test (required)
4. Light quality:	Ambient laboratory illumination (recommended)
5. Light intensity:	10-20 µE/m²/s (50-100 ft-c) (recommended) (ambient laboratory levels)
6. Photoperiod:	16 h light, 8 h darkness (recommended)
7. Test chamber size:	30 mL (recommended minimum)
8. Test solution volume:	15 mL (recommended minimum)
9. Renewal of test solutions:	After 24 h (required minimum)
10. Age of test organisms:	Less than 24-h old (required)
11. No. organisms per test chamber:	5 for effluent and receiving water tests (required minimum)
12. No. replicate chambers per concentration:	4 for effluent and receiving water tests (required minimum)
13. No. organisms per concentration:	20 for effluent and receiving water tests (required minimum)

1 Taken from "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms", Fifth Edition, October 2002, EPA-821-R-02-012, pages 51-52. For the purposes of reviewing WET test data submitted under NPDES permits, each test condition listed above is identified as required or recommended. Additional requirements may be provided in individual permits, such as specifying a given test condition where several options are given in the method.

2 Acute and chronic toxicity tests performed simultaneously to obtain acute/chronic ratios must use the same temperature and dilution water.

TABLE 1. SUMMARY OF TEST CONDITIONS AND TEST ACCEPTABILITY CRITERIA FOR CERIODAPHNIA DUBIA ACUTE TOXICITY TESTS WITH EFFLUENTS AND RECEIVING WATERS (TEST METHOD 2002.0) *CONTINUED*

14. Feeding regime:	Feed YCT and *Selenastrum* while holding prior to the test; newly released young should have food available a minimum of 2 h prior to use in a test; add 0.1 mL each of YCT and *Selenastrum* 2 h prior to test solution renewal at 48 h (recommended)
15. Test chamber cleaning:	Cleaning not required
16. Test chamber aeration:	None (recommended)
17. Dilution water:	Moderately hard synthetic water prepared using MILLIPORE MILLI-Q® or equivalent deionized water and reagent grade chemicals or 20% DMW (see Section 7, Dilution Water), receiving water, ground water, or synthetic water, modified to reflect receiving water hardness (available options)
18. Test concentrations:	Effluents: 5 and a control (required minimum) Receiving Waters: 100% receiving water and a control (recommended)
19. Dilution series:	Effluents: 0.5 dilution series (recommended) Receiving Waters: None, or 0.5 dilution series (recommended)
20. Endpoint:	Effluents: Mortality (required) Receiving Waters: Mortality (required)
21. Sampling and sample holding requirements:	Effluents: Grab or composite sample first used within 36 h of completion of the sampling period (required) Receiving Waters: Grab or composite sample first used within 36 h of completion of the sampling period (recommended)
22. Sample volume required:	1 L (recommended)
23. Test acceptability criterion:	90% or greater survival in controls (required)

TABLE 2 SUMMARY OF TEST CONDITIONS AND TEST ACCEPTABLITY CRITERIA FOR FATHEAD MNNOW, PIMEPHALES PROMELAS, ACUTE TOXICITY TESTS WITH EFFLUENTS AND RECEIVING WATERS (TEST METHOD 2000.0)[1,2]

l. Test type	Static non-renewal, static-renewal, or flow-through (available options)
2. Test duration:	24, 48, or 96 h (available options)
3. Temperature[3]	$20^0C \pm 1°C$; or $25^0C \pm 1^OC$ (recommended). Test temperatures must not deviate (i.e., maximum minus minimum temperature) by more than 3°C during the test (required)
4. Light quality:	Ambient laboratory illumination (recommended)
5. Light intensity:	10-20 $\mu E/m^2/s$ (50-100 ft-c). (ambient laboratory levels) (recommended)
6. Photoperiod:	16 h light, 8 h darkness (recommended)
7. Test chamber size:	250 ml, (recommended minimum)
8. Test solution volume:	200 ml, (recommended minimum)
9. Renewal of test solutions:	After 24 h (required minimum)
10. Age of test organisms:	1-14 days; less than or equal to 24-h range in age (required)
11. No. organisms per test chamber:	10 for effluent and receiving water tests (required minimum)
12. No. replicate chambers per concentration:	2 for effluent tests (required minimum). 4 for receiving water tests (required minimum)
13. No. organisms per concentration:	20 for effluent tests (required minimum) 40 for receiving water tests (required minimum)
14. Feeding regime:	Artemia nauplii are made available while holding prior to the test; add 0.2 mL Artemia nauplii concentrate 2 h prior to test solution renewal at 48 h (recommended)
15. Test chamber cleaning:	Cleaning not required
16. Test solution aeration:	None, unless DO concentration falls below 4.0 mg/L; rate should not exceed 100 bubbles/min (recommended)

1 Taken from, "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms", Fifth Edition, October 2002, EPA-821-R-02-012,

TABLE 2 SUMMARY OF TEST CONDITIONS AND TEST ACCEPTABLITY CRITERIA FOR FATHEAD MINN0W, PIMEPHALES PROMELAS, ACUTE TOXICITY TESTS WITH EFFLUENTS AND RECEIVING WATERS] (TEST METHOD 2000.0) (CONTINUED)

17. Dilution water:	Moderately hard synthetic water prepared using MILLIPORE MILLI-Q@ or equivalent deionized water and reagent grade chemicals or 20% DMW (see Section 7, Dilution Water), receiving water, ground water, or synthetic water, modified to reflect receiving water hardness. (available options)
18. Test concentrations:	Effluents: 5 and a control (required minimum) Receiving Waters: 100% receiving water and a control (recommended)
19. Dilution series:	Effluents: > 0.5 dilution series (recommended) Receiving Waters: None, or > 0.5 dilution series (recommended)
20. Endpoint:	Effluents: Mortality (required) Receiving Waters: Mortality (required)
21. Sampling and sample holding requirements:	Effluents: Grab or composite sample first used within 36 h of completion of the sampling period (required)
22. Sample volume required:	Receiving Waters: Grab or composite sample first used within 36 h of completion of the sampling period (recommended) 2 L for effluents and receiving waters (recommended)
23. Test acceptability	90% or greater survival in controls (required)

pages 55-56. Cyprinella leedsi (Bannerfish shiner, formerly Notropis leedsi; AFS, 1991) can be used with the test conditions in this table, where it is the required test organism in NPDES permits.

2 For the purposes of reviewing WET test data submitted under NPDES permits, each test condition listed above is identified as required or recommended (see Subsection 12.2 for more information on test review) .Additional requirements may be provided in individual permits, such as specifying a given test condition where several options are given in the method.

3 Acute and chronic toxicity tests performed simultaneously to obtain acute/chronic ratios must use the same temperature and dilution water.

TABLE 3. SUMMARY OF TEST CONDITIONS AND TEST ACCEPTABILITY CRITERIA FOR DAPHNID, *CERIODAPHNIA DUBIA*, SURVIVAL AND REPRODUCTION TOXICITY TESTS WITH EFFLUENTS AND RECEIVING WATERS (TEST METHOD 1002.0)[3]

1. Test type:	Static renewal (required)
2. Temperature °C:	25 ± 1°C (recommended) Test temperatures should not deviate (i.e., maximum minus minimum temperature) by more than 3°C during the test (required)
3. Light quality:	Ambient laboratory illumination (recommended)
4. Light intensity:	10-20 μE/m^2/s, or 50-100 ft-c (ambient laboratory levels) (recommended)
5. Photoperiod:	16 h light, 8 h dark (recommended)
6. Test chamber size:	30 mL (recommended minimum)
7. Test solution volume:	15 mL (recommended minimum)
8. Renewal of test solutions:	Daily (required)
9. Age of test organisms:	Less than 24 h; and all released within a 8-h period (required)
10. No. neonates per test chamber:	1 Assigned using blocking by known parentage (Subsection 13.10.2.4) (required)
11. No. replicate test chambers per concentration:	10 (required minimum)
12. No. neonates per test concentration:	10 (required minimum)
13. Feeding regime:	Feed 0.1 mL each of YCT and algal suspension per test chamber daily (recommended)
14. Cleaning:	Use freshly cleaned glass beakers or new plastic cups daily (recommended)
15. Aeration:	None (recommended)

[3] Taken from, "Short –term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms", Fourth Edition October 2002, pages 164-165. For the purposes of reviewing WET test data submitted under NPDES permits, each test condition listed above is identified as required or recommended. Additional requirements may be provided in individual permits, such as specifying a given test condition where several options are given in the method.

TABLE 3. SUMMARY OF TEST CONDITIONS AND TEST ACCEPTABILITY CRITERIA FOR DAPHNID, *CERIODAPHNIA DUBIA*, SURVIVAL AND REPRODUCTION TOXICITY TESTS WITH EFFLUENTS AND RECEIVING WATERS (TEST METHOD 1002.0)(CONTINUED)

16. Dilution water:	Uncontaminated source of receiving or other natural water, synthetic water prepared using MILLIPORE MILLI-Q® or equivalent deionized water and reagent grade chemicals or DMW (see Section 7, Dilution water (available options)
17. Test concentrations:	Effluents: 5 and a control (required minimum) Receiving Water: 100% receiving water (or minimum of 5) and a control (recommended)
18. Dilution factor:	Effluents: > 0.5 (recommended) Receiving Waters: None or > 0.5 (recommended)
19. Test duration:	Until 60% or more of surviving control females have three broods (maximum test duration 8 days) (required)
20. Endpoints:	Survival and reproduction (required)
21. Test acceptability criteria:	80% or greater survival of all control organisms and an average of 15 or more young per surviving female in the control solutions. 60% of surviving control females must produce three broods (required)
22. Sampling requirements:	For on-site tests, samples collected daily and used within 24 h of the time they are removed from the sampling device. For off-site tests, a minimum of three samples (e.g., collected on days one, three, and five) with a maximum holding time of 36 h before first use (see Section 8, Effluent and Receiving Water Sampling, Sample Handling, and Sample Preparation for Toxicity Tests, Subsection 8.5.4) (required)
23. Sample volume required:	1 L/day (recommended)

TABLE 4. SUMMARY OF TEST CONDITIONS AND TEST ACCEPTABILITY CRITERIA FOR FATHED MINNOW, PIMEPHALES PROMELAS, LARVAL SURVIVAL AND GROWTH TOXICITY TESTS WITH EFFLUENTS AND RECEIVING WATERS (TEST METHOD 1000.0)[4]

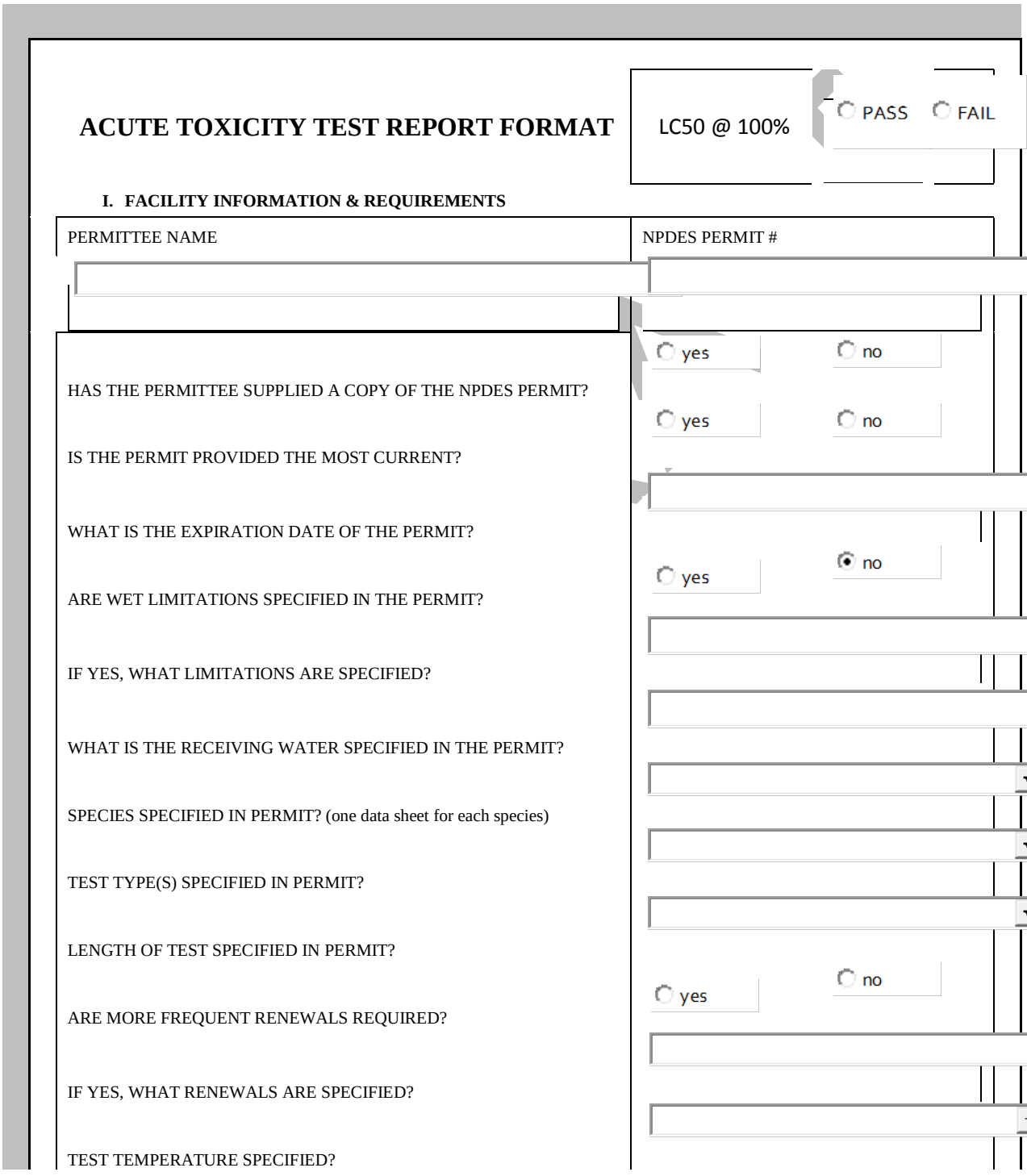
1.	Test type:	Static renewal (required)
2.	Temperature CC):	25 ± 1C (recommended) Test temperatures must not deviate (i.e., maximum minus minimum temperature) by more than 3^0C during the test (required)
3.	Light quality:	Ambient laboratory illumination (recommended)
4.	Light intensity:	10-20 µE/m^2/s (50-100 ft-c)(ambient laboratory levels) (recommended)
5.	Photoperiod:	16 h light, 8 h darkness (recommended)
6.	Test chamber size:	500 mL (recommended minimum)
7.	Test solution volume:	250 mL (recommended minimum)
8.	Renewal of test solutions:	Daily (required)
9.	Age of test organisms:	Newly hatched larvae less than 24 h old. If shipped, not more than 48 h old, 24 h range in age (required)
10.	No. larvae per test chamber:	10 (recommended)
11.	No. replicate chambers per concentration:	4 (required minimum)
12.	No. larvae per concentration	40 (required minimum)
13.	Source of food:	Newly hatched Artemia nauplii (less than 24 h old) (required)

[3] As taken from: EPA Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms", Fourth Edition, October 2002, pages 75 – 76. For the purposes of reviewing WET test data submitted under NPDES permits, each test condition listed above is identified as required or recommended (see Subsection 10.2 for more information on test review). Additional requirements may be provided in individual permits, such as specifying a given test condition where several options are given in the method.

TABLE 4. SUMMARY OF TEST CONDITIONS AND TEST ACCEPTABILITY CRITERIA FOR FATHED MINNOW, PIMEPHALESPROMELAS, LARVAL SURVIVAL AND GROWTH TOXICITY TESTS WITH EFFLUENTS AND RECEIVING WATERS (TEST METHOD 1000.0) (CONTINUED)

14. Feeding regime	On days 0-6, feed 0.1 g newly hatched (less than 24-h old) brine shrimp nauplii three times daily at 4-h intervals or, as a minimum, 0.15 g twice daily at 6-h intervals (at the beginning of the work day prior to renewal, and at the end of the work day following renewal): Sufficient nauplii are added to provide an excess. (recommended)
15. Cleaning:	Siphon daily, immediately before test solution renewal (required)
16. Aeration:	None, unless DO concentration falls below 4.0 mg/L. Rate should not exceed 100 bubbles/minimum (recommended)
17. Dilution water:	Uncontaminated source of receiving or other natural water, synthetic water prepared using MILLIPORE MILLI-QØ or equivalent deionized water and reagent grade chemicals, or DMW (SEE Section 7, Dilution Water) (available options)
18. Test concentrations:	Effluents: 5and a control (required minimum) Receiving Water: 100% receiving water (or minimum of 5) and a control (recommended)
19. Dilution factor:	Effluents: $\geq$ 0.5 (recommended) Receiving waters: None or $\geq$ 0.5 (recommended)
20. Test duration:	7 days (required)
21. Endpoints:	Survival and growth (weight) (required))
22. Test acceptability	80% or greater survival in controls; average dry weight per surviving organism in control chambers equals or exceeds 0.25 mg (required)
23. Sampling requirements	For on-site tests, samples collected daily, and used within 24 h of the time they were removed from the sampling device; For off-site tests, a minimum of three samples (e.g., collected on days one, three and five) with a minimum holding time of 36 h before first use (see Section 8, Effluent and Receiving Water Sampling, Sample Handling, and Sample Preparation for Toxicity Tests, Subsection 8.5.4) (required)
24. Sample volume required:	2.5L/day (recommended)

APPENDIX D: SUGGESTED FORMAT FOR ACUTE AND CHRONIC STATE WHOLE EFFLUENT TOXICITY REPORTING



ACUTE TOXICITY TEST REPORT FORMAT

LC50 @ 100% ○ PASS ○ FAIL

I. FACILITY INFORMATION & REQUIREMENTS

PERMITTEE NAME	NPDES PERMIT #

HAS THE PERMITTEE SUPPLIED A COPY OF THE NPDES PERMIT?	○ yes	○ no
IS THE PERMIT PROVIDED THE MOST CURRENT?	○ yes	○ no
WHAT IS THE EXPIRATION DATE OF THE PERMIT?		
ARE WET LIMITATIONS SPECIFIED IN THE PERMIT?	○ yes	◉ no
IF YES, WHAT LIMITATIONS ARE SPECIFIED?		
WHAT IS THE RECEIVING WATER SPECIFIED IN THE PERMIT?		
SPECIES SPECIFIED IN PERMIT? (one data sheet for each species)		
TEST TYPE(S) SPECIFIED IN PERMIT?		
LENGTH OF TEST SPECIFIED IN PERMIT?		
ARE MORE FREQUENT RENEWALS REQUIRED?	○ yes	○ no
IF YES, WHAT RENEWALS ARE SPECIFIED?		
TEST TEMPERATURE SPECIFIED?		

IS DILUTION WATER SPECIFIED IN THE PERMIT?	○ yes ○ no
IF YES, WHAT TYPE OF WATER IS SPECIFIED AND HARDNESS?	
IS A DILUTION SERIES SPECIFIED?	○ yes ○ no
SAMPLE TYPE SPECFIED IN PERMIT?	○ grab ○ composite ○ not specified

II. LABORATORY SAMPLE INFORMATION UPON ARRIVAL & TEST INFORMATION

SAMPLE COLLECTION DATE		SAMPLE COLLECTION TIME	
TEST DATE		START & END TIMES	
TEST DURATION PERFORMED?			
TEST TYPE PERFORMED?			
SAMPLE RECEIVED?	○ grab ○ composite		
OUTFALL NUMBER OR LOCATION?			
TEMPERATURE °C		HARDNESS mg/L CaCO3	
CONDUCTIVITY		AMMONIA mg/l as N	
TOTAL RESIDUAL Cl mg/l		OTHER	
D.O.		OTHER	

III. LABORATORY ALTERATIONS PRIOR TO TEST

WAS SAMPLE DECHLORINATED?	○ yes	○ no
IS DECHLORINATION AUTHORIZED IN PERMIT?	○ yes	○ no

DESCRIBE DECHLORINATION (if any)	
WAS SAMPLE FILTERED?	○ yes ○ no
FILTER SIZE?	
WAS pH ADJUSTED?	○ yes ○ no
IS pH ADJUSTMENT AUTHORIZED IN PERMIT?	○ yes ○ no
WAS RECEIVED SAMPLE AERATED?	○ yes ○ no
OTHER ADJUSTMENTS? (if any, describe)	

IV. TEST ORGANISM INFORMATION

AGE OF ORGANISMS?	
CULTURED IN-HOUSE OR FROM EXTERNAL SUPPLIER?	○ internal culture ○ external supplier
FROM INDIVIDUAL CULTURE OR MASS CULTURE?	○ individual ○ mass culture
HAS MONTHLY REFTOX MET CONTROL CHART PARAMETERS?	○ yes ○ no
DATE AND TIME OF MOST RECENT REF TOX TEST AND TEST RESULT?	
HAVE ORGANISMS PERFORMED SUCCESSFULLY IN THE MONTHLY REFTOX?	○ yes ○ no

V. TEST SET-UP

IDENTIFY THE DILUENT (O_1) CONTROL (receiving water recommended)	DILUTIONS USED:	EFFLUENT	DILUENT
		- - -	500 mL
		mL	mL
(if used) IDENTIFY THE SECONDARY (O_2) CONTROL (MHRW recommended unless receiving water characteristics differ)	%	mL	mL
	%	mL	mL
		mL	mL
		500 mL	- - -

VI. TEST RESULTS

SURVIVAL MEASUREMENTS							
DILUTIONS	O_1	O_2 (if used)	--%	--%	--%	--%	100 %
# AT START OF TEST?							
# ALIVE AT 24 HOURS?							
# ALIVE AT 48 HOURS?							
PERCENT SURVIVAL							
TEMPERATURE MEASUREMENTS							
DILUTIONS	O_1	O_2 (if used)	--%	--%	--%	--%	100 %
MAX/MIN TEMPERATURE IN °C							
D.O. MEASUREMENTS							
DILUTIONS	O_1	O_2 (if used)	--%	--%	--%	--%	100 %
MAX/MIN D.O IN mg/L							
pH MEASUREMENTS							
DILUTIONS	O_1	O_2 (if used)	--%	--%	--%	--%	100 %
MAX/MIN pH IN s.u							
CONDUCTIVITY MEASUREMENTS							
DILUTIONS	O_1	O_2 (if used)	--%	--%	--%	--%	100 %
MAX/MIN IN mS/cm							
CO2 MEASUREMENTS (if used)							
DILUTIONS	O_1	O_2 (if used)	--%	--%	--%	--%	100 %
MAX/MIN AS CALCULATED							

ORGANISM OBSERVATIONS: (e.g. health of the organisms, was prodding required to determine death, were organisms responding in an abnormal manner, etc.)

VII. DATA ANALYSIS

METHOD USED TO CALCULATE DATA ENDPOINTS?

SOFTWARE USED TO PERFORM CALCULATIONS? ○ yes ○ no

HOW WERE ANY OUTLIERS REMOVED FROM CALCULATION? (describe)

FINAL DATA CALCULATIONS

48-HR LC50

96-HR LC50

DESCRIBE ANY DEVIATIONS FROM TEST METHODS OR APPROVED MODIFICATIONS ADMINISTERED (e.g. pH-overlay used and how administered, D.O. issues, aeration used-rate of bubbles per minute and duration, temperature issues, holding time issues, etc.)

ANALYST(S)

EPA Region 8 Suggested Acute Toxicity Test Report Format

EPA REGION 8 (Modified 12/2015)

Interactive version found at: https://www.epa.gov/region8/npdes-permits-document-download#5

CHRONIC TOXICITY TEST REPORT FORMAT

IWC= ○ PASS ○ FAIL

I. FACILITY INFORMATION & REQUIREMENTS

PERMITTEE NAME	
HAS THE PERMITTEE SUPPLIED A COPY OF THE NPDES PERMIT?	○ yes ○ no
IS THE PERMIT PROVIDED THE MOST CURRENT?	○ yes ○ no
WHAT IS THE EXPIRATION DATE OF THE PERMIT?	
ARE WET LIMITATIONS SPECIFIED IN THE PERMIT?	○ yes ○ no
IF YES, WHAT LIMITATIONS ARE SPECIFIED?	
WHAT IS THE RECEIVING WATER SPECIFIED IN THE PERMIT?	
SPECIES SPECIFIED IN PERMIT? (one data sheet for each species)	
TEST TYPE(S) SPECIFIED IN PERMIT?	
LENGTH OF TEST SPECIFIED IN PERMIT?	○ yes ○ no
ARE MORE FREQUENT RENEWALS REQUIRED?	
IF YES, WHAT RENEWALS ARE SPECIFIED?	
TEST TEMPERATURE SPECIFIED?	○ yes ○ no
IS DILUTION WATER SPECIFIED IN THE PERMIT?	
IF YES, WHAT TYPE OF WATER IS SPECIFIED?	
IS A DILUTION SERIES SPECIFIED?	○ yes ○ no
SAMPLE TYPE SPECFIED IN PERMIT?	○ grabs ○ composites ○ not specified

II. LABORATORY SAMPLE INFORMATION UPON ARRIVAL & TEST INFORMATION

SAMPLE 1 COLLECTION DATE		SAMPLE 1 COLLECTION TIME	
SAMPLE 2 COLLECTION DATE		SAMPLE 2 COLLECTION TIME	
SAMPLE 3 COLLECTION DATE		SAMPLE 3 COLLECTION TIME	
TEST DATE INTIATION		START & END TIMES	

TEST DURATION PERFORMED?

TEST TYPE PERFORMED? ○ grabs ○ composites

SAMPLE RECEIVED?

OUTFALL NUMBER OR LOCATION?

SAMPLE 1			
TEMPERATURE °C		HARDNESS mg/L CaCO3	
CONDUCTIVITY		AMMONIA mg/l as N	
TOTAL RESIDUAL Cl mg/l		OTHER	
D.O.		OTHER	

SAMPLE 2			
TEMPERATURE °C		HARDNESS mg/L CaCO3	
CONDUCTIVITY		AMMONIA mg/l as N	
TOTAL RESIDUAL Cl mg/l		OTHER	
D.O.		OTHER	

SAMPLE 3			
TEMPERATURE °C		HARDNESS mg/L CaCO3	
CONDUCTIVITY		AMMONIA mg/l as N	
TOTAL RESIDUAL Cl mg/l		OTHER	
D.O.		OTHER	

III. LABORATORY ALTERATIONS PRIOR TO TEST

WERE ANY SAMPLES DECHLORINATED?	○ yes ○ no
IS DECHLORINATION AUTHORIZED IN PERMIT?	○ yes ○ no
DESCRIBE DECHLORINATION (if any)	
WERE ANY SAMPLES FILTERED?	○ yes ○ no
FILTER SIZE?	
WAS pH ADJUSTED?	○ yes ○ no
IS pH ADJUSTMENT AUTHORIZED IN PERMIT?	○ yes ○ no
WERE ANY SAMPLES AERATED?	○ yes ○ no
OTHER ADJUSTMENTS? (if any, describe)	

IV. TEST ORGANISM INFORMATION

AGE OF ORGANISMS?	
CULTURED IN-HOUSE OR FROM EXTERNAL SUPPLIER?	○ internal culture ○ external supplier
FROM INDIVIDUAL CULTURE OR MASS CULTURE?	○ individual ○ mass culture
HAS MONTHLY REFTOX MET CONTROL CHART PARAMETERS?	○ yes ○ no
DATE AND TIME OF MOST RECENT REF TOX TEST AND TEST RESULT?	
HAVE ORGANISMS PERFORMED SUCCESSFULLY IN THE MONTHLY REFTOX?	○ yes ○ no

V. TEST SET-UP

IDENTIFY THE DILUENT (O_1) CONTROL (receiving water recommended)	DILUTIONS USED:	EFFLUENT	DILUENT
		- - -	500 mL
		mL	mL
(if used) IDENTIFY THE SECONDARY (O_2) CONTROL (MHRW recommended unless receiving water characteristics differ)	%	mL	mL
	%	mL	mL

									mL		mL
								500 mL		- - -	

VI. TEST RESULTS

SURVIVAL MEASUREMENTS (Typically 4 reps are required for vertebrates, 10 reps for invertebrates)											
REPLICATES	1	2	3	4	5	6	7	8	9	10	
CONTROL											
100											

REPRODUCTION OR GROWTH MEASUREMENTS (Typically 4 reps are required for vertebrates, 10 reps for invertebrates)											
REPLICATES	1	2	3	4	5	6	7	8	9	10	
CONTROL											
100											

TEMPERATURE MEASUREMENTS (MAX/MIN for test period)							
DILUTIONS	O_1	O_2 (if used)	--%	--%	--%	--%	100%
MAX/MIN TEMPERATURE IN °C							
D.O. MEASUREMENTS							
DILUTIONS	O_1	O_2 (if used)	--%	--%	--%	--%	100%
MAX/MIN D.O IN mg/L							
pH MEASUREMENTS							
DILUTIONS	O_1	O_2 (if used)	--%	--%	--%	--%	100%
MAX/MIN pH IN s.u							
CONDUCTIVITY MEASUREMENTS							

DILUTIONS	O_1	O_2 (if used)	--%	--%	--%	--%	100%
MAX/MIN IN mS/cm							
CO2 MEASUREMENTS (if used)							
DILUTIONS	O_1	O_2 (if used)	--%	--%	--%	--%	100%
MAX/MIN AS CALCULATED							

ORGANISM OBSERVATIONS: (e.g. health of the organisms, was prodding required to determine death, were organisms responding in an abnormal manner, etc.)

VII. DATA ANALYSIS

METHOD USED TO CALCULATE DATA ENDPOINTS?

SOFTWARE USED TO PERFORM CALCULATIONS?

HOW WERE ANY OUTLIERS REMOVED FROM CALCULATION? (describe)

FINAL DATA CALCULATIONS - SURVIVAL

% DATA CALCULATION

ULATION

FINAL DATA CALCULATIONS - GROWTH

% DATA CALCULATION

TUc CALCULATION

DESCRIBE ANY DEVIATIONS FROM TEST METHODS OR APPROVED MODIFICATIONS ADMINISTERED (e.g. pH-overlay used and how administered, D.O. issues, aeration used-rate of bubbles per minute and duration, temperature issues, holding time issues, etc.)

ANALYST(S)		

Interactive version found at: https://www.epa.gov/region8/npdes-permits-document-download#5

APPENDIX E: DEFINITIONS

"Acute Toxicity" occurs when 50 percent or more mortality is observed for either species at any effluent concentration. Mortality in the control must simultaneously be 10 percent or less for the effluent results to be considered valid.

"Chronic Toxicity" occurs when during a chronic toxicity test, the 25% inhibition concentration (IC_{25}) calculated on the basis of test organism survival and growth, or survival and reproduction, is less than or equal to the effluent dilution designated as the receiving water concentration (RWC)

"CO_2 Atmosphere" means a substantial increase of carbon dioxide over the test chambers during a toxicity test. The concept is to allow more absorption of carbon dioxide which has a tendency to lower the pH. This will hopefully reduce the rise of pH in the test solution which sometimes occurs.

"Director" means the Director of the Utah Division of Water Quality.

Fact Sheet Statement of Basis shall briefly set forth the principal facts and the significant factual, legal, methodological and policy questions considered in preparing the draft permit.

"IC_{25}" (inhibition concentration) is a point estimate of the toxicant concentration that would cause a 25% reduction in a biological measurement of the test organism, such as reproduction or growth.

"Major Facility" means any UPDES facility or activity classified as such by the Director in conjunction with the Regional Administrator. See UAC R317-8-1 and 40 CFR 122.22. A facility's classification as a major depends upon discharge flow rate (usually 1million gallons per day or greater), types of waste discharged and receiving water characteristics. EPA closely scrutinizes major facilities because of their potential impact on the environment.

"Minor Facility" means any facility that is not considered a major facility. Typically, minor facilities have a lesser potential to impact the environment.

"Mixing Zone" is an area where an effluent discharge undergoes initial dilution and is 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. See UAC R317-2-5.

"NOEC" (no observed effect concentration) is the highest tested concentration of an effluent or a toxicant at which no adverse effects are observed on the aquatic test organism at a specific time of observation. Determined using hypothesis testing.

"Preliminary Toxicity Investigation (PTI)" is an investigation by the permittee to determine the cause of toxicity where the toxicity is known or suspected, and development and implementation of a process to remove the toxicity.

"Receiving Water Concentration (RWC)" is the concentration of a toxicant or the parameter toxicity in the receiving water after mixing (formerly termed "instream waste concentration [IWC]).

"7Q10" Seven-day, consecutive low flow with a ten year return frequency; the lowest stream flow for seven consecutive days that would be expected to occur once in ten years.

"Standard Methods" as used in this document refers to USEPA approved WET testing protocols in 40 CFR 136, Table 1A.

"Toxicity Identification Evaluation (TIE)" is a set of procedures to identify the specific chemicals responsible for effluent toxicity. A TIE should be completed by a laboratory that has been certified by the State Health Laboratory to do WET testing.

"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 on exposed test organisms of a specific chemical or effluent.

"UPDES Permit Cycle" is the term which the UPDES permit will be effective and will not exceed five years.

"Whole Effluent Toxicity (WET)" is the total toxic effect of an effluent measured directly with a toxicity test.