STATE OF NEW MEXICO
WATER QUALITY CONTROL COMMISSION

IN THE MATTER OF: PROPOSED AMENDMENTS TO STANDARDS FOR INTERSTATE AND INTRASTATE SURFACE WATERS 20.6.4 NMAC — **WQCC 20-51(R)**

REBUTTAL TESTIMONY OF SHELLY LEMON

I. INTRODUCTION

My name is Shelly Lemon, and I am the Bureau Chief of the New Mexico Environment Department ("NMED" or "Department") Surface Water Quality Bureau ("SWQB") and have held this position since March 2017 and was the acting Bureau Chief for 7 months prior to that from August 2016 to March 2017. My resume is provided as **NMED Exhibit 5** in the Department's Notice of Intent to Present Technical Testimony ("NOI"), filed with the Water Quality Control Commission ("WQCC" or "Commission") on May 3, 2021.

My rebuttal focuses on the direct testimonies of John Toll (**LANL Exhibit 7**), on behalf of Triad National Security, LLC and the U.S. Department of Energy - National Nuclear Security Administration ("Triad and DOE-NNSA"); Rachel Conn (**Amigos Bravos Exhibit 3**) and Jamie DeWitt, Ph.D. (**Amigos Bravos Exhibit 9)** on behalf of Amigos Bravos; and Jane DeRose-Bamman (**SJWC 2**) on behalf of San Juan Water Commission ("SJWC") in relation to proposed amendments in the following Sections of 20.6.4 New Mexico Administrative Code ("NMAC"):

- Overall availability of information.
- Amendments proposed by parties other than the Department.
- 20.6.4.6 NMAC objective.
- 20.6.4.7(C) NMAC definition of "climate change."
- 20.6.4.7(B) NMAC definition of "baseflow."

- 20.6.4.7(E) NMAC definition of "effluent dominated."
- 20.6.4.12 NMAC compliance with water quality standards.
- 20.6.4.14 NMAC sampling and analysis.
- 20.6.4.105 and 106 NMAC classified waters in the Rio Grande Basin.

II. REBUTTAL TESTIMONY REGARDING GENERAL AVAILABILITY OF INFORMATION.

<u>Summary of SJWC's Testimony</u>

On page 2 of Ms. DeRose-Bamman's testimony (**SJWC 2, 2020 TR SJWC-0005**), SJWC states that review and analysis of the proposed amendments was "hampered…because of insufficient information concerning the technical basis or other reasons" and "almost no bases for the proposals," in comparison to prior Triennial Reviews.

<u>Department's Response</u>

The Department rebuts SJWC's assertion that it provided insufficient information for this rulemaking. As described in Ms. Fullam's direct testimony (**NMED Exhibit 4**), the Department engaged with tribes, stakeholders, and the public numerous times in an effort to provide opportunity for meaningful engagement. In addition to outreach, the Department filed a Petition to amend the *Standards for Interstate and Intrastate Surface Waters* (20.6.4 NMAC) and Request for Hearing on August 19, 2020, almost a year prior to the hearing, and provided proposed amendments and a statement of reasons for each proposed amendment. The Department provided information and opportunity for dialogue regarding the proposed amendments over the past 18 months and does not find support regarding SJWC's assertion that information was not provided.

III. REBUTTAL REGARDING PROPOSED AMENDMENTS BY OTHER PARTIES NOT BEING PETITIONED BY THE DEPARTMENT

Summary of Triad and DOE-NNSA's Testimony

In Triad and DOE-NNSA's proposed amendments to 20.6.4 NMAC (**LANL Exhibit 1**), Triad and DOE-NNSA propose to include all perennial waters within lands managed by DOE within Los Alamos National Laboratory ("LANL") in 20.6.4.126 NMAC, including newly identified portions of Pajarito Canyon and Arroyo de La Delfe.

Additionally, beginning on page 5 of Mr. Toll's direct testimony (**LANL Exhibit 7, 2020 TR LANL-00189**), Triad and DOE-NNSA propose amendments to 20.6.4.12(E) NMAC to limit sampling and analysis to only approved U.S. Environmental Protection Agency ("EPA") methods in 40 Code of Federal Regulations ("C.F.R.") Section 136 (**NMED Exhibit 111**). As part of this amendment, Triad and DOE-NNSA propose to replace "minimum quantification level" (MQL) to "lowest minimum level" (ML) of the analytical methods approved by EPA under 40 [C.F.R.] part 136…" to which the water quality standard is enforceable only at the lowest minimum level "… of the sufficiently sensitive method approved by EPA under 40 [C.F.R.] part 136." According to Triad and DOE-NNSA, the basis for this proposed change is to increase clarity for the undefined "minimum quantification level" and reduce ambiguity as it pertains to compliance monitoring associated with National Pollutant Discharge Elimination System ("NPDES") permits in accordance with 40 C.F.R. § 122.44 (**NMED Exhibit 112**).

Beginning on page 10 of Mr. Toll's direct testimony (**LANL Exhibit 7, 2020 TR LANL-00194**), Triad and DOE-NNSA propose amendments to language in 20.6.4.14(A) NMAC to limit sampling and analytical methods to just those approved by EPA in 40 C.F.R. § 136 (**NMED**

Exhibit 111). Triad and DOE-NNSA assert the basis for this proposed amendment is to ensure consistency with the federal Clean Water Act ("CWA").

Beginning on page 10 of Mr. Toll's direct testimony (**LANL Exhibit 7, 2020 TR LANL-00194**), Triad and DOE-NNSA propose a new definition for "sufficiently sensitive" to provide reference for their proposed changes to 20.6.4.12(E) NMAC and 20.6.4.14(A) NMAC. The basis, as provided by Triad and DOE-NNSA, is to maintain consistency with EPA's amended regulations for NPDES application, compliance monitoring and analytical methods regulations adopted in 2014.

<u>Department's Response</u>

In regard to proposed amendments to 20.6.4.126 NMAC, the Department does not find Triad and DOE-NNSA's proposed amendments appropriate at this time. This is predominately due to the regulatory restrictions for modifying a designated use that is not an existing use to one with less stringent criteria, as in the case here. Triad and DOE-NNSA want to amend 20.6.4.126 NMAC to include all perennial waters within lands managed by DOE within LANL, including newly identified portions of Pajarito Canyon from 0.5 miles below Arroyo de La Delfe upstream to Homestead Spring and Arroyo de La Delfe from Pajarito Canyon to Kieling Spring. The waters being proposed for amendment are either assumed perennial (i.e., all perennial waters) or were determined perennial (i.e., Pajarito Canyon, Arroyo de La Delfe) through Hydrology Protocol surveys. The proposed perennial waters currently are not described in 20.6.4.101-899 NMAC and therefore are unclassified waters. As such, these unclassified perennial waters have designated uses in 20.6.4.99 NMAC, which include primary contact, warmwater aquatic life, livestock watering, and wildlife habitat. As further discussed in Ms. Fullam's rebuttal testimony (**NMED Exhibit 109**), the designated primary contact use protective of unclassified perennial waters in

20.6.4.99 NMAC may not be amended to secondary contact, as designated 20.6.4.126 NMAC, without a Use Attainability Analysis ("UAA").

Designated uses established under the State's Water Quality Standards may be removed or made less stringent only if a UAA demonstrates that attaining the current designated use is not feasible due to one of the factors listed in 40 C.F.R. § 131.10(g) (**NMED Exhibit 22**). In accordance with 20.6.4.15(D) NMAC regarding UAAs conducted by entities other than the Department, Triad and DOE-NNSA must submit a work plan to EPA Region 6 and the Department for review and comment. Only upon approval of the work plan by the Department may the party develop a UAA to demonstrate the primary contact use is not attainable due to one of the factors in 40 C.F.R. § 131.10(g) (**NMED Exhibit 22**). To date, Triad and DOE-NNSA have not submitted a draft work plan for such a proposed amendment in accordance with 20.6.4.15(D) NMAC nor completed a UAA to demonstrate these waters cannot achieve primary contact. Therefore, the Department requests the Commission reject the proposed amendments.

Regarding the other proposed amendments to 20.6.4.12(E) NMAC, 20.6.4.14(A) NMAC, and 20.6.4.7(S) NMAC, the Department rebuts the proposed amendments being brought forth by Triad and DOE-NNSA based on the fact these amendments are not a logical outgrowth of any amendments being proposed by the Department, as the petitioner. The Department does not object to Triad and DOE-NNSA petitioning the Commission independently but finds the relevance in this proceeding misplaced. The Department did not petition the Commission to hear these amendments, therefore adequate notification and opportunity for meaningful engagement on these proposed amendments was absent from the Department's petition and activities leading up to the petition. As such, the Department requests the Commission exclude these amendments from this Triennial Review proceeding, until such a time that Triad and DOE-NNSA provide adequate engagement with the public, tribes, and stakeholders such as EPA Region 6 and the Department prior to petitioning the Commission for a hearing on the matter. If the Commission determines these proposed amendments are appropriate to be heard in this matter, the Department, with the limited information provided in Triad and DOE-NNSA's testimony, has some concerns.

Regarding proposed amendments to 20.6.4.12(E) NMAC, the Department disagrees that the language proposed by Triad and DOE-NNSA provides clarity and reduces ambiguity as it pertains to permit compliance. The Department rebuts Triad and DOE-NNSA's assertion that the term "minimum quantification level" is ambiguous given this term is defined in 20.6.4.7(M)(4) NMAC, as initially proposed by LANL and adopted in 2000. In addition, EPA Region 6, the NPDES permitting authority in the State of New Mexico, has used the term "minimum quantification level" to implement water quality-based effluent limits and evaluate NPDES permit compliance since 1992 (**NMED Exhibit 125**).

The language in 20.6.4.12(E) NMAC was initially adopted February 23, 2000 (under 20.6.1.1104) as part of the 1998 Triennial Review. On page 8 of the Commission's Statement of Reasons dated January 21, 2000, regarding minimum quantification limits (**NMED Exhibit 114**), the Commission adopted the language in 20.6.1.1104(D) (now 20.6.4.12(E) NMAC) based on the Hearing Officer's report recommending adoption of LANL's proposed language to "best balance flexibility with reliability of testing." The adopted language also included a definition for "minimum quantification level." The use of the minimum quantification level was specifically adopted instead of a "practical quantification limit" based on LANL's testimony during the 1998 Triennial Review where "an enforcement level should be set at a level at which the existence of a contaminant can be measured with reasonable certainty" and with the addition of LANL's definition for "minimum quantification level," the language as adopted was considered appropriate.

According to EPA Region 6, "[minimum quantification levels] establish a benchmark to assure that analytical methodologies with acceptable sensitivities are used for NPDES permitting purposes" (**NMED Exhibit 125**). The sensitivity of an analytical method is important because it allows the data user (i.e., regulator, permittee, public) to evaluate the water or effluent quality against the established criterion. If an analytical method has a minimum quantification level that is above the criterion, there is no way of knowing if the pollutant exceeds the water quality criterion, meaning there is no way to evaluate compliance with the criterion nor the permit limit, which are set at limits that protect human health and aquatic life.

Furthermore, it is commonly known that many pollutants, including toxic pollutants, do not have EPA approved methods under 40 C.F.R. § 136 that are sensitive enough to evaluate against the criteria or established effluent limits. There are approximately 18 pollutants or pollutant parameters under 20.6.4 NMAC that do not have EPA approved methods under 40 C.F.R. § 136. In other words, the list of pollutants with EPA approved method(s) under 40 C.F.R. § 136 is much shorter and not equivalent to the list of pollutants with numeric criteria under 20.6.4.900 NMAC that are established at levels that protect human health and aquatic life. Yet, Triad and DOE-NNSA are proposing to restrict analytical methods used for permit compliance and CWA Section 401 state certifications to "those approved by EPA under 40 C.F.R. part 136 for the measured pollutant or pollutant parameter."

According to EPA's Permit Writer's Manual, without analytical methods for a pollutant or pollutant parameter, a permit writer can (and should) specify the analytical method to be used to evaluate compliance with the permit (**NMED Exhibit 136**). Federal regulations also allow for approval of alternative test methods (**NMED Exhibit 111**). One example of an alternative test method is EPA Method 1668C (or later revisions), which has a minimum quantification level that is at or below the established criteria for polychlorinated biphenyls (PCBs) in 20.6.4.900 NMAC. Method 1668C is the only known, least restrictive, and readily available laboratory wastewater sampling method that can evaluate compliance with the criteria and any water quality-based effluent limits that are calculated from the criteria. In addition, pursuant to 20.6.4.14(A)(3) NMAC as currently written, Method 1668C is a State approved method for testing surface wastewater discharges, which provides additional leverage for state certifications to ensure protection of water quality because it is codified in the state's regulations. The Triad and DOE-NNSA proposed amendments eliminate any flexibility to specify or use alternative methods to evaluate compliance when a criterion or effluent limit is less than the minimum quantification limit of the EPA approved 40 C.F.R. § 136 methods if one exists for that pollutant or pollutant parameter. The proposed amendments also eliminate the ability of the Department to identify and condition alternative methods into federal permits to ensure compliance with state water quality standards. If compliance with state water quality standards cannot be ensured, the Department must deny the permit. The Department asserts that the proposed amendments are contradictory to the intent of the State's *Standards for Interstate and Intrastate Surface Waters* (20.6.4 NMAC), which protect the public health or welfare, enhance the quality of water and are consistent with and serve the purposes of the federal CWA.

The Department has not proposed amendments to 20.6.4.12(E) NMAC nor 20.6.4.14(A) NMAC and does not find compelling evidence or demonstration in Triad and DOE-NNSA's testimony on how the current rule language is problematic or overly burdensome. Therefore, the Department requests the Commission reject language proposed by Triad and DOE-NNSA for both

20.6.4.12(E) NMAC and 20.6.4.14(A) NMAC until such a time that it can be demonstrated that a change in this language is fully warranted.

Regarding the proposed new definition for "sufficiently sensitive," the Department does not support the inclusion of this new definition. Based on the several lines evidence rebutting proposed amendments to 20.6.4.12(E) NMAC and 20.6.4.14(A) NMAC, and the fact EPA has been defining "sufficiently sensitive" in more recent NPDES permits under Part II of the permit, the Department finds this definition unnecessary.

IV. REBUTTAL TESTIMONY REGARDING OBJECTIVE (20.6.4.6 NMAC)

Summary of Amigos Bravos' Testimony

Beginning on page 4 of Ms. Conn's direct testimony (**Amigos Bravos Exhibit 3**), Amigos Bravos does not support the Department's proposed new language for an objective pertaining to climate change because it is not accurate given water quality standards do not address climate change by a means of resolving threats posed to water quality in response to climate change. However, Amigos Bravos encourages the Department to adopt surface water quality standards that respond to the threats posed by climate change. Amigos Bravos provides alternative language to the Department's proposed language in 20.6.4.6(D) NMAC (**Amigos Bravos Exhibit 1**).

Department's Response

The Department reviewed the alternative language proposed by Amigos Bravos and recognizes the term "address" may not fully capture the goal or objective that the water quality standards have on providing resiliency against adverse impacts of climate change on water quality. However, the Department does not support the language as proposed by Amigos Bravos for several reasons. First, an objective, as defined in the dictionary, is a goal. The goal, as it pertains to the States *Standards for Interstate and Intrastate Surface Waters* (20.6.4 NMAC) should be clear, tangible, measurable, and attainable. The alternative language proposed by Amigos Bravos' is not an objective, but rather a proclamation of the current understanding of evolving science related to climate change and its impacts on watersheds and water quality. The Department finds the adoption of such language will become outdated, contrary to the intent of an objective. As such the Department does not support the alternative language as proposed by Amigos Bravos.

Second, it is not the intent of the Department to change implementation of water quality standards. The intent of including this objective is to recognize that climate change is a real threat and the State's water quality standards, particularly the protection of existing uses under the antidegradation policy, provide resiliency against this threat. In order to lessen or remove a designated use, including when the surface water is impacted by pollutants associated with climate change, the Commission must evaluate the proposed amendment through the UAA process to determine if and ensure that existing uses are still protected. Because the antidegradation policy protects against degradation of existing uses, the most stringent water quality that has been attained, any time after November 28, 1975, may not be degraded, even through the UAA process. For example, the reduction in flow, increased sediment loading, and increased water temperatures, all associated with impacts from climate change, may not be sufficient evidence to amend a designated use to one with less stringent criteria. Therefore, it is the goal of these standards to protect against the impacts of climate change, given that standards must always strive to achieve the designated uses and not allow degradation below existing uses. This provides resiliency with respect to the protection of water quality that supports aquatic life and recreation in and on the water, as intended in the CWA. The Department rejects the alternative language as proposed because it is not an objective. The Department offers the following amended language to reflect the intended objective: "<u>These surface water quality standards serve to respond to the inherent</u>

threats of climate change and provide resiliency for the continued protection and enhancement of water quality."

Summary of SJWC's Testimony

Beginning on page 4 of Ms. DeRose-Bamman's direct testimony (**SJWC 2, 2020 TR SJWC-0007**), SJWC states the intent of including a new objective is unknown and should not be incorporated to indicate the water quality standards are directed toward alleviating climate change because water quality does not cause climate change. SJWC states that neither the federal CWA nor the state WQA provide authority to address climate change since the authority lies in the regulation of pollutants into the water, not greenhouse gases.

Further, Ms. DeRose-Bamman states that "[c]limate change is not a designated use, a water quality criterion, or an antidegradation policy. Rather climate change may be considered a type of threat to water quality…that is not a regulated discharge of a pollutant." (**SJWC 2, 2020 2020 TR SJWC-0008**).

On page 6 of Ms. DeRose-Bamman's direct testimony (**SJWC 2, 2020 TR SJWC-0009**), SJWC finds that singling out climate change as a goal when it is not the only cause of water quality impairment will cause confusion resulting in unintended consequences. Therefore, it is the opinion of SJWC to reject the addition of this objective as proposed by the Department.

Department's Response

The Department believes the concerns posed by SJWC regarding reasoning for the inclusion of a new objective regarding climate change have been addressed in my direct testimony (**NMED Exhibit 1**).

The Department rebuts SJWC's statement that neither the federal CWA nor the state WQA provide authority to protect against climate change. Since the objective of the CWA is to restore and maintain the chemical, physical and biological integrity of the Nation's waters by protecting fish, shellfish and wildlife and recreation in and on the water, wherever possible, water quality standards must be adopted to define the quality of water necessary (i.e., numeric and narrative criteria) to achieve this objective. Similarly, the WQA states that, "[water quality] standards shall at a minimum protect the public health or welfare, enhance the quality of water, and serve the purposes of the [WQA]." The *Standards for Interstate and Intrastate Surface Waters* further state that water quality standards must be consistent with and serve the purposes of the WQA and the CWA. Finally, the WQA also requires the Commission to adopt water quality standards based on credible scientific data and other evidence appropriate under the WQA [§74-6-4 NMSA 1978] (**NMED Exhibit 14**). As such, the CWA and WQA provide authority to "address" climate change by protecting water quality against adverse impacts associated with climate change. The Department recognizes the term "address" may not fully capture the goal or objective that the water quality standards have on providing resiliency against adverse impacts of climate change on water quality. For example, currently, the water quality standards already have narrative and numeric criteria for pollutants associated with climate change including but not limited to temperature, dissolved oxygen, plant nutrients, bottom deposits and suspended or settleable solids, and metals.

Regarding SJWC's concern about climate change being one of the elements for a water quality standard, the Department does not disagree with the statement that climate change is not a designated use, criterion or antidegradation policy and that the pollutants associated with climate change are a threat to water quality. Although SJWC is not supporting the inclusion of this new objective, the Department finds SJWC's statement to be consistent with the intent of the Department's proposed objective regarding climate change.

Pollutants associated with climate change, although similar to pollutants associated with other sources, pose an existential threat that cannot be mitigated by on-the-ground watershed-based projects alone. Climate change has been directly linked to increases in air temperature that result in increases in water temperature and decreases in dissolved oxygen levels, which lead to excessive stress on aquatic life. Climate change has been shown to affect surface flows during critical times of the year, which are necessary for aquatic life and New Mexico's outdoor recreation economy, and when combined with higher temperatures and nutrient loads may lead to harmful algal blooms, leading to additional impacts on recreation and drinking water supplies. Climate change is known to influence climate patterns resulting in more severe droughts, more precipitation falling as rain, and more intense precipitation events, which lead to increased runoff and flooding, increased pollutant loading, and powerful scouring events that impact aquatic life, recreation, public water supplies, and irrigation. Another adverse impact on water quality from climate change is the increase in wildfires, which (depending on the intensity and severity of the fire) increases sediment and nutrient transport in storm runoff and introduces heavy metals and other contaminants from the burned area.

Given that climate change is a very real and considerable threat to our water resources (not just in New Mexico) and there is an abundance of credible science that demonstrates real and projected impacts of climate change on our water resources, the Department rebuts SJWC's arguments and asserts that it is important and necessary to recognize climate change is a threat to water quality and explicitly acknowledge that the standards protect against this threat. The Department proposed explicit language to clarify this intent. As noted previously, the water quality standards currently provide resiliency against pollutants associated with climate change through the protection of existing uses and through the requirement of a UAA to lessen or remove a designated use.

V. REBUTTAL TESTIMONY REGARDING THE DEFINITION OF "BASEFLOW" (20.6.4.7(B) NMAC)

Summary of Amigos Bravos' Testimony

Beginning on page 11 of Ms. Conn's testimony (**Amigos Bravos Exhibit 3**), Amigos Bravos finds the inclusion of the Department's proposed definition for "baseflow" in 20.6.4.7(B) NMAC serves no regulatory purpose. Further in Ms. Conn's testimony (**Amigos Bravos Exhibit 3**), Amigos Bravos provides alternative language for the definition for baseflow which removes any reference of baseflow derived from effluent dominated systems.

Department's Response

The Department rebuts Amigos Bravos' assertion that the inclusion of a definition serves no regulatory purposes. The State's *Standards for Interstate and Intrastate Surface Waters* (20.6.4 NMAC) are regularly referenced in implementation, particularly as it pertains to NPDES permitting and Total Maximum Daily Load ("TMDL") development. Therefore, a definition in 20.6.4 NMAC is applicable beyond the regulations and is therefore relevant.

The Department does not support the proposed language for "baseflow" as proposed by Amigos Bravos. Baseflows for surface waters of the state may have one or more sources, natural or anthropogenic. This is recognized in several areas of the federal regulations but in particular, when amending a designated use to one with less stringent criteria as found in 40 C.F.R. 131.10(g)(2) (**NMED Exhibit 22**) where "[n]atural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges…to enable uses to be met." This language acknowledges alternate sources for baseflow in surface waters are acceptable for supporting designated uses. Limiting the definition to just natural baseflow conditions is insufficient and could pose implications for implementing water quality standards. Therefore, the Department rebuts the language as proposed by Amigos Bravos.

Summary of SJWC's Testimony

On page 7 of Ms. DeRose-Bamman's direct testimony (**SJWC 2, 2020 TR SJWC-0010**), SJWC disagrees with inclusion of a definition for "baseflow" because the term is not used elsewhere within 20.6.4 NMAC. The inclusion is premature and could create confusion concerning applicability to other water quality standards.

Department's Response

The Department disagrees with SJWC's reasoning. As described in my direct testimony (**NMED Exhibit 1**), regulations and their associated definitions are regularly used to implement the water quality standards, particularly as it pertains to TMDL development, NPDES permitting, and state certification pursuant to Section 401 of the CWA (33 U.S.C. 1341) (**NMED Exhibit 115**).

VI. REBUTTAL TESTIMONY REGARDING THE DEFINITION OF "CLIMATE CHANGE" (20.6.4.7(C) NMAC)

Summary of Amigos Bravos' Testimony

Beginning on page 5 of Ms. Conn's direct testimony (**Amigos Bravos Exhibit 3**), Amigos Bravos provides support for the Department's proposed definition for "climate change" for the same reasons it supports referring to climate change in 20.6.4.6 NMAC. Amigos Bravos finds the Department's proposed definition to be consistent with other climate science organizations. However, Amigos Bravos recommends the Department consider a definition similar to the definition provided by the U.N. Framework Convention on Climate Change which distinguishes between climate change caused by human activity and natural climate variability.

<u>Department's Response</u>

The Department appreciates Amigos Bravos' support for the inclusion of the proposed definition for "climate change." The Department considered various sources when developing the definition and, based on the applicability for surface water quality, determined the Department's proposed definition meets the needs of the State.

<u>Summary of SJWC's Testimony</u>

Beginning on page 6 of Ms. DeRose-Bamman's direct testimony (**SJWC 2, 2020 TR SJWC-0009**), SJWC rejects the Department's proposed definition of "climate change" on the basis it is not a term currently used in the *Standards for Interstate and Intrastate Surface Waters* (20.6.4 NMAC) and therefore unnecessary. Additionally, SJWC argues the source of the definition was not provided by the Department and it is not found in either the federal CWA or the State's WQA.

<u>Department's Response</u>

The Department provided reasoning and the source of the definition in my direct testimony (**NMED Exhibit 1**) and finds that it has addressed SJWC's concern.

The Department rebuts SJWC's assertion that because the term "climate change" is not currently used in the *Standards for Interstate and Intrastate Surface Waters* (20.6.4 NMAC), it is unnecessary. The term "climate change" does not need to be directly referenced in the Acts to be implementable. The inclusion of the definition for "climate change" is directly related to the inclusion of the objective, which establishes that the standards protect against climate change by protecting water quality necessary to maintain existing aquatic life and recreation uses.

VII. REBUTTAL TESTIMONY REGARDING THE DEFINITION OF "EFFLUENT DOMINATED" (20.6.4.7(E) NMAC)

Summary of Amigos Bravos' Testimony

Beginning on page 11 of Ms. Conn's testimony (**Amigos Bravos Exhibit 3**), Amigos Bravos finds the inclusion of the Department's proposed definition for "effluent dominated" in 20.6.4.7(E) NMAC serves no regulatory purpose. Additionally, Amigos Bravos finds the definition could set up the framework to impose lesser protections for effluent dominated waters. Evidence for this concern is from discussions Amigos Bravos participated in during an EPA sponsored event in 2006.

Department's Response

The Department rebuts Amigos Bravos' assertion that the inclusion of a definition is only applicable when it is referenced in other sections of the standards. As described in my direct testimony (**NMED Exhibit 1**), regulations and their associated definitions are regularly used to implement the water quality standards, particularly as it pertains to TMDL development, NPDES permitting, and state certification pursuant to Section 401 of the CWA (33 U.S.C. 1341) (**NMED Exhibit 115**). Therefore, a definition in 20.6.4 NMAC is applicable beyond the regulations and is relevant.

The Department understands the concerns of Amigos Bravos as they pertain to the potential application of the term effluent dominated to lessen or remove water quality protections, however the Department disagrees. The objective and goals in Section 101(a)(2) of the CWA (33 U.S.C. § 1251) (**NMED Exhibit 10**) require protection of waters for aquatic life and recreation. In order to achieve these goals and objectives, water quality standards must have three elements: designated uses, water quality criteria that protect for those uses, and an antidegradation policy that protects, at the very least, the existing uses, which are those uses that have been attained any time after November 28, 1975. When establishing a use associated with those in Section 101(a)(2) of the CWA (33 U.S.C. § 1251) (**NMED Exhibit 10**), the Commission must consider the highest use that may be attainable in the waterbody. If it is shown that the waterbody attains a more stringent water quality, in accordance with 40 C.F.R. § 131.10(i) (**NMED Exhibit 22**), the designated use must be amended to achieve the more stringent water quality. As water quality improves, the protections increase for all waters, regardless of source, natural fed or effluent supplemented. In addition, and in accordance with 40 C.F.R. § 131.10(g) (**NMED Exhibit 22**), a designated use may not be amended to one with less stringent criteria based on low-flow conditions if those conditions can be offset by permitted discharges to the tributary. Therefore, federal regulations support protections for effluent dominated waters. These waters are not exempt from federal or state regulatory processes.

Summary of SJWC's Testimony

On page 7 of Ms. DeRose-Bamman's direct testimony (**SJWC 2, 2020 TR SJWC-0010**), SJWC disagrees with inclusion of a definition for "effluent dominated" because the term is not used elsewhere within 20.6.4 NMAC. The inclusion is premature and could create confusion concerning applicability to other water quality standards.

Department's Response

The Department rebuts SJWC's assertion that the inclusion of a definition is only applicable when it is referenced in other sections of the standards. As described in my direct testimony (**NMED Exhibit 1**), regulations and their associated definitions are regularly used to implement the water quality standards, particularly as it pertains to TMDL development, NPDES permitting, and state certification pursuant to Sections 401 of the CWA (33 U.S.C. 1341) (**NMED**

Exhibit 115). Therefore, a definition in 20.6.4 NMAC is applicable beyond the regulations and is therefore relevant.

VIII. REBUTTAL TESTIMONY REGARDING COMPLIANCE WITH WATER QUALITY STANDARDS (20.6.4.12 NMAC)

Summary of Triad and DOE-NNSA's Testimony

On page 4 of Mr. Toll's direct testimony (**LANL Exhibit 7, 2020 TR LANL-00188**), Triad and DOE-NNSA state they do not have objections to the Department's proposed amendments to 20.6.4.12(G) NMAC.

Department's Response

The Department appreciates Triad and DOE-NNSA's input regarding this proposed amendment.

IX. REBUTTAL TESTIMONY REGARDING SAMPLING AND ANALYSIS (20.6.4.14 NMAC)

Summary of Amigos Bravos' Testimony

On page 9 of Dr. DeWitt's testimony (**Amigos Bravos Exhibit 9**), Amigos Bravos proposes new language which would allow the Department to require "sampling and monitoring of contaminants of emerging concern as a condition in a federal permit under Section 401 of the Clean Water Act." Amigos Bravos states that the Department should be able to require dischargers to establish a baseline and monitor contaminants of emerging concern. This data would then provide the Department information sufficient to characterize these compounds more effectively.

Department's Response

The Department does not disagree with Amigos Bravos' proposed language; however, the Department reasons the State already has authority under Section 401 of the CWA (33 U.S.C.

1341) (**NMED Exhibit 115** to require monitoring if the EPA, as the permitting authority in New Mexico, fails to do so in a draft permit. Pursuant to 40 C.F.R. §122.44(d)(1)(i) (**NMED Exhibit 112**), effluent limits "…must control all pollutants or pollutant parameters (either conventional, nonconventional or toxic pollutants)… [that] are or may be discharged at a level [that] will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including narrative criteria for water quality." Where facility-specific data are lacking to properly characterize the effluent, the permitting or certifying authority can use a variety of factors and information to determine whether a discharge causes, has the reasonable potential to cause, or contributes to an excursion of a numeric or narrative water quality criterion. These factors include but are not limited to dilution, type of industry, type of publicly owned treatment works, existing data on toxic pollutants, receiving water, and designated use (**NMED Exhibit 138**). If the permitting or certifying authority, after evaluating all available information on the effluent, in the absence of effluent monitoring data, is not able to properly characterize the effluent to determine whether the discharge causes, has the reasonable potential to cause, or contributes to, an excursion above a numeric or narrative criterion, they can (and should) require pollutant-specific monitoring, analysis, and reporting to gather further evidence. In such a case, the permittee may be required to monitor prior to permit issuance, if sufficient time exists, or monitoring will be included as a condition of the issued or reissued permit (**NMED Exhibit 138**). The Department finds the proposed language unnecessary but does not oppose it. In the event that the Commission chooses to adopt language regarding this issue, the Department proposes the following changes to Amigos Bravos' proposed language for 20.6.4.14(F) NMAC: "**Effluent Characterization:** The department may ~~include sampling and~~ require monitoring, analysis, and reporting of a pollutant of concern, including contaminants of emerging concern, as a condition ~~in~~ of a federal permit under Section 401 of the federal Clean Water Act."

X. REBUTAL TESTIMONY REGARDING CLASSIFIED WATERS IN THE RIO GRANDE BASIN (20.6.4.105 and 20.6.4.106 NMAC)

Summary of SJWC's Testimony

On page 20 of Ms. DeRose-Bamman's direct testimony (**SJWC 2, 2020 TR SJWC-0023**), SJWC opposes the addition of proposed language referencing 20.6.4.2 NMAC in 20.6.4.105 and 106 NMAC. The citation in the State's regulations for *Ground and Surface Water Protection* (20.6.2 NMAC) that is being referenced in 20.6.4.105 and 106 NMAC is a requirement for effluent quality, not a water quality criterion. Further, SJWC argues that the scope is limited and only applicable to "community sewerage systems that discharge to the Rio Grande Basin (from the headwaters of Elephant Butte Reservoir upstream to the Angostura Diversion Dam) and has been discharging in violation of its NPDES permit conditions for more than 30 days after receipt of a notice of violation."

Finally, SJWC raises issue with the use of "community sewerage systems" since this term is not defined in either 20.6.2 NMAC or 20.6.4 NMAC, making the scope unclear.

Department's Response

The Department agrees with SJWC that the referenced citation is for effluent limits with very specific conditions. However, the Department rebuts that it is not appropriate to reference other applicable regulatory conditions regarding the protection of surface waters, particular to this geographic region. It is not uncommon for both state and federal regulations to reference other applicable laws, as already found throughout 20.6.4 NMAC.

The language as proposed merely references the *Ground and Surface Water Protection* regulations (20.6.2 NMAC) and does not assert any additional requirements for waters that do not meet the applicability criteria. The inclusion of this language aids in the implementation of appropriate water quality protections that apply to waters in this region, particularly as they pertain to sewerage systems.

The Department does recognize SJWC's concerns with the use of the term "criteria" and has proposed to amend the language in 20.6.4.105(B)(3) NMAC and 20.6.4.106(B)(3) NMAC to reflect "effluent condition" more accurately (**NMED Exhibit 110**).

The Department rebuts SJWC's final argument that there is no definition for "community sewerage system" rendering the scope unclear. In 20.6.2(7)(S)(3) NMAC, a "sewerage system" means a system for disposing wastes, either by surface or underground methods, and includes sewer systems, treatment works, disposal wells and other systems. The use of the term "community" is that of general common English usage and therefore does not need further defining as it pertains to the application of these regulations.

XI. CONCLUSIONS

This rebuttal testimony addressed direct testimony regarding:

- Overall availability of information.
- Amendments proposed by parties other than the Department.
- 20.6.4.6 NMAC objective.
- 20.6.4.7(B) NMAC definition of "baseflow."
- 20.6.4.7(C) NMAC definition of "climate change."
- 20.6.4.7(E) NMAC definition of "effluent dominated."
- 20.6.4.12 NMAC compliance with water quality standards.

- 20.6.4.14 NMAC sampling and analysis.
- 20.6.4.105 and 106 NMAC classified waters in the Rio Grande Basin.

Based on the testimony, the Department is proposing amended language in 20.6.4 NMAC for the following:

- 20.6.4.6(D) NMAC amending the language to reflect the intent of the climate change objective more accurately.
- If the Commission chooses to adopt language based on Amigos Bravos' testimony, 20.6.4.14(F) NMAC revising Amigos Bravos' language to better align with certification process.
- 20.6.4.105(B)(3) NMAC amending the language to reflect more accurately "effluent condition."
- 20.6.4.106(B)(3) NMAC amending the language to reflect more accurately "effluent condition."

XII. PROPOSED AMENDMENTS

In conclusion, the Department thereby requests the Commission approve the Department's proposed amended language to the State's *Standards for Interstate and Intrastate Surface Waters* (20.6.4 NMAC) as revised based on the testimony submitted in this matter and filed as **NMED Exhibit 110**.

This concludes my rebuttal testimony.

STATE OF NEW MEXICO
WATER QUALITY CONTROL COMMISSION

IN THE MATTER OF: PROPOSED AMENDMENTS TO STANDARDS FOR INTERSTATE AND INTRASTATE SURFACE WATERS 20.6.4 NMAC **WQCC 20-51(R)**

REBUTTAL TESTIMONY OF KRIS BARRIOS

I. INTRODUCTION

My name is Kris Barrios. I am currently employed as the Program Manager for the Monitoring, Assessment, and Standards Section for the New Mexico Environment Department ("Department" or "NMED") Surface Water Quality Bureau ("SWQB") and have held this position since August 2017. I have provided my resume as **NMED Exhibit 6** in the Notice of Intent ("NOI") to present technical testimony filed with the Water Quality Control Commission ("WQCC") on May 3, 2021. My rebuttal focuses on the direct testimonies of Dr. Bryan Dail, Barry Fulton, and David DeForest, on behalf of Triad National Security, LLC ("Triad") and the U.S. Department of Energy-National Nuclear Security Administration ("DOE-NNSA"); David Gratson on behalf of the New Mexico Mining Association ("NMMA"); Rachel Conn and Dr. Jamie DeWitt on behalf of Amigos Bravos; and Jane DeRose-Bamman on behalf of the San Juan Water Commission ("SJWC") concerning proposed amendments in the following Sections of 20.6.4 NMAC:

- 20.6.4.7(C)(7) NMAC definition for "contaminants of emerging concern";
- 20.6.4.7(T)(2) NMAC definition for "toxic pollutants";
- 20.6.4.7(U)(1) NMAC definition for "unclassified waters of the state";
- 20.6.4.11(G) NMAC applicability of human health-organism only criteria;
- 20.6.4.13(F) NMAC general criterion for toxic pollutants;

- 20.6.4.900(I) NMAC hardness-dependent numeric criteria; and
- 20.6.4.900(J) NMAC chronic aquatic life criterion for iron.

II. REBUTTAL TESTIMONY REGARDING DEFINITION FOR CONTAMINANTS OF EMERGING CONCERN (20.6.4.7 NMAC)

Summary of Triad and NNSA's Testimony

NMED's proposed definition for "contaminants of emerging concern" ("CECs") is consistent with the U.S. Environmental Protection Agency's ("EPA's") definition provided in LANL Exhibit 49 (**2020 TR LANL-00854**). However, the proposed definition should be removed since the inclusion of CECs in the narrative criterion for toxic pollutants 20.6.4.13(F) NMAC is inappropriate because the proposed amendment would create regulatory uncertainty.

Department's Response

The Department concurs that the definition proposed in 20.6.4.7(C)(7) NMAC is consistent with EPA's definition. However, the Department stands by the need for the definition given the Department's proposed amendment to the narrative criterion for toxic pollutants 20.6.4.13(F) NMAC. The Department's proposed definition provides the public, regulated entities, and regulators with information on the substances considered CECs. The Department considers its proposed addition of CECs to the narrative criterion for toxic pollutants 20.6.4.13(F) NMAC appropriate as described on page 3 of my technical testimony (**NMED Exhibit 2**) and futher in Section VI, below.

Summary of Amigos Bravos's Testimony

Amigos Bravos supports the amendment adding a definition for CECs proposed by the Department as 20.6.4.7(C)(7) NMAC. Further, Amigos Bravos proposes the addition of "per- and polyflouroalkyl substances" ("PFAS") and "and are not already considered "toxic pollutants" by the department" to the Department's proposed definition for CECs. The testimony of both Ms. Conn and Dr. DeWitt includes evidence of the environmental harm caused by some constituents of this class of chemicals, and the extent these compounds are present and persist in aquatic ecosystems.

Department's Response

The Department concurs with the addition of "per- and polyflouroalkyl substances" to the constituents named in the proposed definition for CECs in 20.6.4.7(C)(7) NMAC based on the testimony of Ms. Conn and Dr. DeWitt. The Department has revised its proposed amendments to the State's *Standards for Interstate and Intrastate Surface Waters* (20.6.4 NMAC) as submitted (**NMED Exhibit 110**). However, the Department disagrees with the addition of "and are not already considered "toxic pollutants" by the department" to the definition since some CECs meet the definition for "toxic pollutants" in 20.6.4.7(T)(2) NMAC. Also, the Department finds Amigos Bravos proposed language inconsistent with the Department's proposed amendment to add CECs to the general criterion for toxic pollutants in 20.6.4.13(F) NMAC.

Summary of SJWC's Testimony

On page 18 of Ms. DeRose-Bamman's technical testimony (**2020 TR SJWC-0021**), she states the Department did not provide reasoning behind its proposed amendment adding "contaminants of emerging concern" to the general criterion for toxic pollutants in 20.6.4.13(F)(1) NMAC. The SJWC opposes the addition of CECs to the narrative criterion as described in testimony regarding 20.6.4.13(F)(1) NMAC; therefore, the definition in 20.6.4.7 NMAC is unncessary.

Department's Response

The Department provided the basis for the proposed amendment in its notice of intent to present technical testimony filed on May 3, 2021. The Department disagrees with SJWC's position that the proposed amendment to 20.6.4.13(F)(1) NMAC is unwarranted and therefore rebuts that the definition for CECs is not needed.

<u>Summary of NMMA's Testimony</u>

NMMA states on page 4 of its NOI, in an overview of potential non-technical testimony, that the Department's proposed definition of CECs is vague, unscientific, and objectionable considering the proposed amendment adding CECs to the narrative criterion for toxic pollutants in 20.6.4.13(F) NMAC.

<u>Department's Response</u>

The Department's proposed definition for CECs is largely consistent with the definition provided at the EPA's website for contaminants of emerging concern (**NMED Exhibit 35**). However, as worded, the Department recognizes that the proposed definition may be interpreted to allow arbitrary assignment of the "CEC" label to substances with no demonstrated environmental harm. The Department has revised the proposed definition in its revised proposed amendments to the State's *Standards for Interstate and Intrastate Surface Waters* (20.6.4 NMAC) as submitted (**NMED Exhibit 110**) to the following (including Amigos Bravos's proposed addition of "per- and polyflouroalkyl substances"):

> **(7) "Contaminants of emerging concern"** or "CECs" refer to water contaminants including, but not limited to, per- and polyflouroalkyl substances, pharmaceuticals, and personal care products that may cause significant ecological or human health effects, particularly at low concentrations. CECs are generally chemical compounds recognized as having deleterious effects at environmental

concentrations whose negative impacts have not been fully quantified and may not have regulatory numeric criteria.

III. REBUTTAL TESTIMONY REGARDING THE DEFINITION OF TOXIC POLLUTANTS (20.6.4.7(T)(2) NMAC)

Summary of Triad and NNSA's Testimony

On page 8 of Dr. Dail's technical testimony (**2020 TR LANL-00147**), he proposes an amendment to the definition of "toxic pollutant" in 20.6.4.7(T)(2) NMAC to the following:

> "Toxic pollutant" means those pollutants or combination of pollutants[~~, including disease causing agents, that after discharge and upon exposure, ingestion, inhalation or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will cause death, shortened life spans, disease, adverse behavioral changes, reproductive or physiological impairments or physical deformation in such organisms or their offspring~~] listed by the EPA Administrator under section 307(a) of the federal Clean Water Act, 33 U.S.C. § 1313(a) or in the list below.

Department's Response

The Department disagrees with Dr. Dail's proposed amendment to the definition for toxic pollutants. The current definition for toxic pollutants (20.6.4.7(T)(2) NMAC) is in agreement nearly word for word with the definition provided in Section 502 of the Clean Water Act (33 U.S. Code § 1362) (**NMED Exhibit 116**). Section 101(a)(3) of the CWA (33 U.S. Code § 1251(a)(3)) (**NMED Exhibit 10**) states "it is the national policy that the discharge of toxic pollutants in toxic amounts be prohibited."

Amended as a result of the 1976 Toxics Consent Decree, Section 307(a) of the CWA requires numeric effluent limits for the priority pollutants listed in Table 1 of Committee Print Numbered 95–30 of the Committee on Public Works and Transportation of the House of Representatives, established as EPA's Priority Pollutant List. The Priority Pollutant List of 126 substances has not been updated since 1981 and is recognized as outdated by EPA (**NMED Exhibit 117**), which considers a broader range of pollutants for the development of effluent guidelines. Dr. Dail appears to base his proposed definition for toxic pollutants on the definition of toxic pollutants in 40 C.F.R. § 122.2 (**NMED Exhibit 137**). Although the federal rule does contain this definition, in this case it applies specifically to substances required to have numeric effluent limits. However, as stated in 40 C.F.R. § 122.44 (**NMED Exhibit 112**), numeric effluent limits must control all pollutants, not just the toxic pollutants as defined, which may be discharged and will cause, or have the reasonable potential to cause, an excursion of either numeric or narrative criteria. Relying on this list for identification of toxic pollutants in New Mexico disregards the numerous compounds recognized to have toxic effects over the past 40 years, and would leave New Mexico well behind established science. For example, EPA's current national recommended human health criteria, published in accordance with Section 304(a) of the CWA, includes twelve toxic contaminants not included on the Priority Pollutant List. Although the Department proposes adopting the EPA's recommended criteria for these twelve substances, they are not established in 20.6.4.900 NMAC. The Department would evaluate any proposed discharge of these substances under the toxic pollutant general criterion, 20.6.4.13(F) NMAC. Also, EPA's Integrated Risk Information System ("IRIS") currently contains assessments for 571 substances, many of which do not have established numeric criteria guidance published by EPA, nor do they have numeric criteria adopted by New Mexico. While individual substances could be added to a toxic pollutant list, the process would be time-consuming and limit the Department's ability to respond to new information. A list is also unnecessary given that 20.6.4.13(F)(5) NMAC requires the Department to petition the WQCC to adopt human health and aquatic life numeric criteria for toxic pollutants not listed in 20.6.4.900 NMAC after the issuance of a final NPDES permit with the selected or calculated numeric criteria.

Summary of NMMA's Testimony

On page 5 of NMMA's NOI, describing non-technical testimony, NMMA proposes an amendment to the definition of "toxic pollutant" in 20.6.4.7(T)(2) NMAC identical to that proposed by Dr. Dail. In its NOI, NMMA describes the current definition as creating regulatory uncertainty and identifies a need to provide the regulated community certainty regarding the substances regulated as toxic pollutants.

Department's Response

The Department disagrees with NMMA's proposed amendment to the definition for toxic pollutants. As with LANL's proposal, NMMA appears to base its proposed definition on the definition for toxic pollutants in 40 C.F.R. § 122.2 (**NMED Exhibit 137**). The current definition for toxic pollutants (20.6.4.7(T)(2) NMAC) is entirely consistent (nearly word for word) with the definition provided in Section 502 of the Clean Water Act (33 U.S. Code § 1362) (**NMED Exhibit 116**). Section 101(a)(3) of the CWA (33 U.S. Code § 1251(a)(3)) (**NMED Exhibit 10**) states "it is the national policy that the discharge of toxic pollutants in toxic amounts be prohibited." In its NOI, NMMA provides the citation from 40 C.F.R. § 131.11(a)(2) that provides the requirements for toxic pollutant criteria under the CWA. The current regulations for determining numeric criteria for toxic pollutants not listed in 20.6.4.900 NMAC and identified in the general criterion, 20.6.4.13(F)(2) through (4) NMAC, satisfy the narrative criteria requirements of 40 C.F.R. § 131.11(a)(2).

In all other aspects, the Department's rebuttal response to NMMA's non-technical testimony regarding the proposed definition for toxic pollutants is identical to the Department's response to Dr. Bryan Dail's testimony (**LANL Exhibit 5**).

IV. REBUTTAL TESTIMONY REGARDING DEFINITION FOR UNCLASSIFIED WATERS OF THE STATE (20.6.4.7 NMAC)

Summary of SJWC's Testimony

On page 10 of Ms. DeRose-Bamman's technical testimony (**2020 TR SJWC-0013**), she states that adding a definition for "unclassified waters of the state" as 20.6.4.7(U)(1) NMAC and removing the paragraph from 20.6.4.11 NMAC is unnecessary and confusing. She states that the Department does not describe how this change will achieve consistency. Only the first sentence in the proposed amendment is a definition and the remainder of the paragraph should remain in 20.6.4.11 NMAC, Applicability of Water Quality Standards.

Department's Response

The Department believes that definitions are appropriate in the Definitions section, 20.6.4.7 NMAC, where the public and interested parties may more easily find them. Definitions embedded in other sections of 20.6.4 NMAC may be harder to find and reference. However, the Department agrees that only the first sentence in the proposed amendment belongs with the definition. The Department has revised its proposed amendments (**NMED Exhibit 110**) to retain the remaining language in the paragraph in its original location, 20.6.4.11(H) NMAC.

V. REBUTTAL TESTIMONY REGARDING APPLICABILITY OF HUMAN HEALTH-ORGANISM ONLY CRITERIA (20.6.4.11(G) NMAC))

Summary of Triad and NNSA's Testimony

On page 16 of Mr. Fulton's technical testimony (**2020 TR LANL-00171**), he proposes an amendment to 20.6.4.11(G) NMAC. This subsection describes the applicability of human health-organism only (HH-OO) criteria. The proposed amendment is as follows:

> "Human health-organism only criteria in Subsection J of 20.6.4.900 NMAC apply to those waters with a designated, existing or attainable [~~aquatic life~~] fish consumption use. If a tributary does not have an attainable fish consumption use, then HH-OO criteria do not apply to the tributary. If the fish consumption designated use is not attained in the first downstream segment with an attainable fish consumption designated use, then the tributary should be assigned a load allocation as required by 40 CFR Part 130. [~~When limited aquatic life is a designated use, the human health organism only criteria apply only if adopted on a segment-specific basis. The human health-organism only criteria for persistent toxic pollutants, as identified in Subsection J of 20.6.4.900 NMAC, also apply to all tributaries of waters with a designated, existing or attainable aquatic life use.~~]"

Mr. Fulton asserts that as currently worded, human health-organism only criteria should not apply to waters without fish or shellfish present due to natural low flow conditions or physical habitat.

Department's Response

The Department finds the proposed amendment problematic for several reasons. First, New Mexico has not adopted a fish consumption designated use nor determined which standards sections would include a fish consumption use. Second, the proposed change largely ignores connected hydrology, except for immediate tributaries, and the transport of persistent toxic pollutants (identified in 20.6.4.900(J)(1) NMAC) downstream. Third, any direct tributary of a waterbody not attaining a 'fish consumption use' would require a load allocation through the Total Maximum Daily Load process whether or not the tributary is impaired itself. Lastly, in certain circumstances, Mr. Fulton's proposed amendment would add non-persistent HH-OO criteria to waterbodies with a limited aquatic life use. The Department disagrees with the proposal and finds Mr. Fulton did not provide supporting information for the amendment.

In addition to the deficiencies described above, the matter regarding the application of persistent toxic pollutant criteria to upstream tributaries in 20.6.4.11(G) NMAC is addressed in case law. Following the adoption of the amendments that provide much of the structure and language related to the toxic pollutant general criterion, LANL (though the Regents of the University of California) challenged the Commission's adoption of the sentence applying persistent toxic pollutant criteria to upstream tributaries with fisheries (now described as aquatic life) designated use. In its ruling (**NMED Exhibit 132**), the Court of Appeals of the State of New Mexico found in favor of the Commission's adoption of the rule (*The Regents of the University of California v. New Mexico Water Quality Control Commission.* 2004-NMCA-073, 136 N.M. 45). The Appeals Court concluded that the Commission acted in accordance with law, that the Commission provided sufficient reasoning behind its decision, that the adoption of the rule met statutory requirements, that the Commission's based its action on substantial evidence, and, lastly, that the Commission's action was neither arbitrary nor capricious.

VI. REBUTTAL TESTIMONY REGARDING THE ADDITION OF CECs AND THE TOXIC POLLUTANTS IDENTIFIED IN 20.6.2 NMAC TO THE GENERAL CRITERIA FOR TOXIC POLLUTANTS (20.6.4.13(F) NMAC)

Summary of Triad and NNSA's Testimony

Beginning on page 6 of his technical testimony (**2020 TR LANL-145**), Dr. Dail states that the inclusion of CECs and the toxic pollutants identified in 20.6.2 NMAC causes uncertainty since the regulated community nor the State knows what monitoring should occur and what level is considered detrimental to aquatic life and human health. There is also uncertainty regarding the entity responsible for monitoring CECs. It is unclear why the State currently conditions permits to monitor PFAS constituents with no toxicological information and how regulators decide which dischargers are required to do so. The accepted process for adding these criteria is to adopt the EPA's most recent CWA Section 304(a) guidance and the WQCC to state the numeric criteria and applicability (designated uses) in 20.6.4.900 NMAC. The inclusion of the reference to the toxic pollutants identified in 20.6.2 NMAC is problematic since some of these substances do not have numeric criteria. As a result of the inclusion of CECs in the proposed amendment, the regulated community will face increased uncertainty.

In his testimony, Dr. Dail proposes the addition of the word "duration" to the general criterion for toxic pollutants (20.6.4.13(F)(1) NMAC). Dr. Dail also proposes an amendment to 20.6.4.13(F)(5) NMAC changing the 90-day timeline for petition of permit-developed criterion to the WQCC from the date of EPA's permit issuance to the date of State certification in accordance with Section 401 of the CWA (33 U.S.C. 1341) ("401 Certification"), and removal of references to paragraphs 2, 3, and 4 of 20.6.4.13(F) NMAC.

Department's Response

The Department disagrees that the proposed amendment to the general criterion for toxic pollutants in 20.6.4.13(F) NMAC leads to increased uncertainty. Whether or not specifically named, the narrative criterion currently covers CECs with harmful effects on aquatic life or human health that do not otherwise have published numeric criteria. Likewise, the Department's proposed amendment to include those contaminants listed in 20.6.2.7(T)(2) NMAC does not expand the Department's ability to regulate substances under the toxic pollutant narrative criterion; it merely clarifies that the State has already recognized the contaminants as toxic pollutants in its Ground and Surface Water Regulations (20.6.2 NMAC). The proposed addition of CECs and 20.6.2.7(T)(2) NMAC toxic pollutants provides clarity to the regulated community, regulators, and the public that these substances are included but do not change the general criterion's implementation. The procedures in 20.6.4.13(F)(2) through 20.6.4.13(F)(4) NMAC ensure that EPA follows a consistent approach for the calculation of effluent limits for substances without numeric criteria in 20.6.4.900 NMAC.

The general criterion for toxic pollutants in 20.6.4.13(F) NMAC is a narrative criterion for harmful substances without numeric criteria in 20.6.4.900 NMAC. In addition, 20.6.4.13(F)(2) through (4) NMAC provides information regarding the methods necessary to derive numeric criteria for human health-organism only or aquatic life criteria when numeric values are not provided 20.6.4.900 NMAC nor provided as national recommended criteria in accordance with Section 304(a) of the CWA. EPA regulations in 40 C.F.R. 122.44(d)(1)(vi) (**NMED Exhibit 112** require NPDES permits to contain effluent limits where there is no numeric criterion for a pollutant that is present in the discharge at a concentration that causes, has the reasonable potential to cause, or contributes to an excursion above a narrative criterion. These effluent limits are determined on a case by case basis as outlined in Chapter 6 (Water Quality-Based Effluent Limitation) of the

EPA's NPDES Permit Writer's Manual, available at https://www.epa.gov/npdes/npdes-permit-writers-manual. Chapter 5 of the EPA's NPDES Permit Writer's Manual (Technology-Based Effluent Limitations) contains information on the derivation of technology-based effluent limits for cases when toxicological information is available. These implementation guidelines provide the regulated community a consistent approach to the interpretation of narrative criteria.

Regarding Dr. Dail's proposed amendment to 20.6.4.13(F)(5) NMAC, the Department disagrees that the 401 Certification should start the 90-day timer for a WQCC petition. EPA's issuance of a permit marks the appropriate start for the 90-day timeline to petition the WQCC. As discussed during the 2002 hearing adopting the subsection as currently written (**NMED Exhibit 133**), changes to permit limits are possible following 401 Certification, therefore any limits described in a draft permit are not final until EPA issues the final permit. Ultimately, the Commission adopted, and EPA approved, the timeline of 90 days from permit issuance.

The Department also disagrees with removing the references to paragraphs 2, 3, and 4 of 20.6.4.13(F) NMAC. Maintaining the paragraph references provides the applicable references within the subsection for implementation purposes specific to the the intended protection (i.e., human health and aquatic life). Removing the paragraph references and replacing them with a general subsection reference poses implications for implementation and is therefore not supported by the Department.

The Department concurs with Dr. Dail's proposed addition of the word "duration" to the general criterion for toxic pollutants in 20.6.4.13(F)(1) NMAC. The recommended criteria for toxic pollutants usually include a duration component. Although minor, this clarification may be useful in implementing the narrative criterion for certain substances. The Department has updated its revised proposed amendments to 20.6.4 NMAC (**NMED Exhibit 110**) with the addition of "duration" to the general criterion for toxic pollutants in 20.6.4.13(F)(1) NMAC.

<u>Summary of SJWC's Testimony</u>

Beginning on page 16 of Ms. DeRose-Bamman's technical testimony (**2020 TR SJWC-0019**), the SJWC expresses concern that the proposed amendment expands the Department's authority to regulate CECs and toxic pollutants listed in 20.6.2 NMAC. Ms. DeRose-Bamman states that the Department has not explained the justification for the proposal. Water quality standards must be based on sound scientific rationale and credible scientific data. Contaminants that are only "suspected to potentially have impacts" do not meet the requirement for sound or credible scientific data and should not be conflated with "toxic pollutants," which, by definition in 20.6.4.7(T)(2) NMAC, are substances that <u>will</u> have impacts. Further, 20.6.4.13(F) NMAC currently provides the Department the authority to regulate CECs that meet the definition of "toxic pollutants."

<u>Department's Response</u>

The Department disagrees that the proposed amendment expands the Department's regulatory authority over substances without defined numeric criteria. Whether or not specifically named, the narrative criterion for toxic pollutants in 20.6.4.13(F) NMAC currently covers CECs with harmful effects on aquatic life, other organisms, or human health; or that may result in unacceptable organoleptic properties. The procedures identified in 20.6.4.13(F)(2) through (F)(4) NMAC describe how numeric criteria to protect human health and aquatic life may be derived using credible and sound scientific data. In addition, EPA regulations described in 40 C.F.R. 122.44(d)(1)(vi) (**NMED Exhibit 112**) require EPA to establish effluent limits where there is no numeric criterion for a pollutant that is present in the discharge at a concentration that causes, <u>has</u>

the reasonable potential to cause, or contributes to an excursion above a narrative criterion. The EPA's NPDES Permit Writer's Manual, available at https://www.epa.gov/npdes/npdes-permit-writers-manual, provides additional information on the establishment of numeric effluent limits for narrative criteria. The Department contends that the State and EPA currently have the authority to regulate CECs and that the proposed amendment provides clarification to the regulated community and public that the general criterion for toxic pollutants includes these substances.

Summary of NMMA's Testimony

On pages 4-5 of its NOI, in an overview of non-technical testimony, NMMA states that the Department's proposed definition for CECs in 20.6.4.7(C)(7) NMAC is ill-defined and adds poorly studied contaminants to the general criterion for toxic pollutants (20.6.4.13(F)(1) NMAC). NMMA continues that the proposed definition is in conflict with the definition of toxic pollutants in 20.6.4.7(T)(2) NMAC, provides unlimited discretion to the Department in regulating any substance, and regulates these compounds without scientific backing.

Department's Response

The Department has updated the proposed definition for CECs in its revised proposed amendments to 20.6.4 NMAC (**NMED Exhibit 110**), in part to address NMMA's concerns regarding the phrase "suspected to potentially have impacts." The Department disagees that the proposed definition is in conflict with the definition for toxic pollutants. There are substances considered CECs that meet the definition for toxic pollutants. For example, 1,4-Dioxane, a synthetic industrial chemical, is listed as an emerging contaminant (synonymous with CEC) at EPA's website for contaminants of concern at federal facilities (**NMED Exhibit 118**). The EPA's IRIS lists 1,4-Dioxane as having non-carcinogenic and carcinogenic effects and provides a chronic oral reference dose of 0.03 mg/kg-day (**NMED Exhibit 119**). The Department would evaluate a proposed discharge of 1,4-Dioxane consistent with the general criterion for toxic pollutants (20.6.4.13(F) NMAC).

The general criterion for toxic pollutants (20.6.4.13(F) NMAC) currently covers a broad range of substances that do not have established numeric criteria in 20.6.4.900 NMAC. The addition of CECs to the general criterion does not expand the Department's regulatory authority. Given that there are specific regulatory processes identified for generating numeric criteria in 20.6.4.13(F)(2) through (F)(4) NMAC, and establishing permit limits in 40 C.F.R. 122.44 (**NMED Exhibit 112**), the Department finds no evidence to suggest that it has an unfettered ability to regulate any substance. The regulation of a substance through the general criterion depends on identifying a potential discharge of the substance during the permit application/renewal processs. The Department rejects the argument that regulation of CECs lacks scientific backing. The general criterion for toxic pollutants prescribes the procedure, based on the review of scientific literature, for generating a numeric criterion for a substance without published numeric criteria in either 20.6.4.900 NMAC or provided in EPA national recommendations in accordance with Section 304(a) of the CWA. Contaminants of emerging concern are acknowledged as substances in need of further study. However, that does not limit the Department's ability to protect the environment as new information becomes available.

VII. REBUTTAL TESTIMONY REGARDING SIGNIFICANT FIGURES FOR THE NUMERIC CRITERIA IDENTIFIED IN 20.6.4.900 NMAC.

Summary of NMMA's Testimony

Mr. Gratson's technical testimony (**NMMA Exhibit 1**) relates to the treatment of significant figures and rounding of hardness-based calculated criteria in 20.6.4.900(I) NMAC. The NMMA is concerned that significant figures for numeric criteria either listed or generated from equations and coefficients provided in 20.6.4.900 NMAC may exceed the precision specified in analytical method 200.7 or reported by laboratories. Specifically, EPA Method 200.7 (Determination of Metals and Trace Elements in Water and Wastes by Inductively Coupled Plasma-Atomic Emission Spectrometry) analysis allows for the reporting of three significant figures at most. In comparison, 20.6.4.900 NMAC lists some numeric criteria for metals with four or five significant figures. Mr. Gratson states on page 3 of his technical testimony (**NMMA Exhibit 1**) that using different significant figures between laboratory reporting and standards creates an inability to compare results and causes uncertainties for the regulated community. The specific example Mr. Gratson provides is a hypothetical reported total recoverable aluminum result of 1700 µg/L versus a hardness-based acute aquatic life criterion of 1699 µg/L (at a hardness of 60 mg/L $CaCO_3$). Mr. Gratson offers two solutions to address the problem. One proposal involves changing the significant figures for numeric criteria listed in 20.6.4.900 NMAC to match the precision specified in approved analytical methods. The alternative proposed solution adds a narrative describing how to round numeric standards to a reported analytical result.

<u>Department's Response</u>

The Department concurs that appropriate significant figures are essential for scientific rigor, but disagrees that accuracy and precision of an individual laboratory's analytical methods should override published values determined to be protective of human health and the environment. The Department also finds rounding criteria to match a reported concentration resolution objectionable since there is a potential for abuse in "rounding into compliance." The Department does not find that a disparity between analytical and water quality standard significant figures causes uncertainty.

In the case of New Mexico's hardness-based criteria in 20.6.4.900(I) NMAC, input variables and coefficients govern the appropriate number of significant figures. Following guidance provided in *Standard Methods for the Examination of Water and Wastewater, 23rd Edition* (**NMED Exhibit 120**), the calculated criterion should have no more significant figures than the least precise input parameter. The tables in 20.6.4.900(I)(1) and (2) NMAC aid in determining numeric criteria based on the hardness-based algorithms. Although the algorithms include fixed input variables and conversion factors, the resolution of the input hardness value is dependent on the analytical precision of the reporting laboratory. Therefore, an instantaneous hardness-based water quality criterion may have fewer significant figures than the select values listed in 20.6.4.900(I)(3) NMAC.

The Department reviewed the significant figures for New Mexico's hardness-based criteria and proposes updating the table values listed in 20.6.4.900(I)(3) NMAC based on a hardness precision of three significant figures. It is appropriate to report the numeric criteria provided in 20.6.4.900(I)(3) NMAC at three significant figures given that a precision of three significant figures is the maximum resolution available for hardness calculated from dissolved calcium and magnesium concentrations reported using EPA Method 200.7. The exceptions are hardness-based acute criteria calculated for silver as the formula includes a conversion factor with only two significant figures.

The Department recognizes that an instantaneous hardness-based water quality criterion may have fewer than three significant figures than used in the reference table in 20.6.4.900(I)(3) NMAC. Therefore, the Department proposes the addition of the following sentence to 20.6.4.900(I) NMAC:

"Calculated criteria must adhere to the treatment of significant figures and rounding identified in *Standard Methods For The Examination Of Water And Wastewater*, latest edition, American public health association."

The language in *Standard Methods* regarding the handling of significant figures and rounding treats these operations in the same manner proposed by Mr. Gratson. Accordingly, the Department has revised its proposed amendments as **NMED Exhibit 110**.

VIII. REBUTTAL TESTIMONY REGARDING THE EPA's 2018 RECOMMENDED NATIONAL AMBIENT WATER QUALITY CRITERION FOR ALUMINUM (20.6.4.900 NMAC)

Summary of Triad and NNSA's Testimony

Beginning on page 4 of his testimony (**2020 TR LANL-00201**), Mr. DeForest discusses the Department's proposed amendment to 20.6.4.900(I)(1) and (2) NMAC that clarifies the hardness-dependent aquatic life criterion for aluminum only applies at pH ranges of 6.5 – 9.0 and that outside that pH range, dissolved criteria of 87 µg/L chronic and 750 µg/L acute apply. Mr. Deforest disagrees with the proposed amendment, noting that the original 1988 recommended national ambient water quality criterion ("AWQC") for aluminum was limited to a pH range of 6.5 – 9.0, and, therefore, it should not apply to pH below 6.5 or above 9.0. Mr. DeForest lists four options to address the discrepancy for waters with pH outside the approved hardness-based criterion range. One option Mr. DeForest provides is adopting the EPA's 2018 AWQC for aluminum since the recommended pH range is 5.0 – 10.5. Mr. DeForest states that the Department prefers the WQCC not adopt the 2018 AWQC for aluminum.

Department's Response

The Department provides the bulk of its response to Mr. DeForest's testimony in Jennifer Fullam's rebuttal testimony (**NMED Exhibit 109**). Mr. DeForest is correct that the Department does not support the adoption of the 2018 AWQC for aluminum during this Triennial Review. The Department's detailed reasoning is provided in my testimony filed with the WQCC on May 3, 2021 as **NMED Exhibit 2** and summarized as follows. The Department currently does not have the resources to analyze concurrent dissolved organic carbon ("DOC") and finds that default or ecoregional values do not capture the variability of DOC concentration in New Mexico. Also, the 2018 AWQC for aluminum does not address the isolation of toxic, bioavailable forms of aluminum from terrigenous forms. The Department is working with the Department of Health Scientific Laboratory Division to build analytical capacity for DOC and is following developments in methods that may better discriminate toxic forms of aluminum. The Department cannot confidently implement the 2018 AWQC for aluminum, and adoption would be premature.

IX. REBUTTAL TESTIMONY REGARDING PROPOSED IRON AQUATIC LIFE CRITERIA IN 20.6.4.900 NMAC.

Summary of NMMA's Testimony

On page 7 of NMMA's NOI, in its description of non-technical testimony, NMMA states that it supports the Department's proposal to add chronic aquatic life use criterion for iron. However, NMMA disagrees with the Department's use of total recoverable iron and proposes a dissolved iron criterion instead. NMMA's reasoning is that iron bound in suspended sediment is not bioavailable, resulting in an overestimation of toxic amounts of iron reported as total iron. NMMA provides a 1993 memorandum from the EPA (**NMMA Exhibit 5/NMED Exhibit 134**) providing guidance in replacing total metals criteria with a dissolved fraction.

Department's Response

The Department recognizes that a chronic aquatic life use criterion based upon total recoverable iron may be conservative since a reported concentration may contain some amount of iron that is not bioavailable. However, NMMA does not provide any data or references to determine an appropriate concentration of dissolved iron that protects aquatic life. The EPA's 1993 memo regarding implementing aquatic life metals criteria (**NMMA Exhibit 5**/**NMED Exhibit 134**) provides guidance on translating total criteria to dissolved criteria for some metals. Iron, however, is not included in the guidance. Therefore, the Department does not find any justification for the adoption of a dissolved iron criterion. The Department adheres to its proposal to adopt EPA's recommended total recoverable iron chronic aquatic life use criterion of 1000 µg/L.

X. CONCLUSIONS

The Department proposes amended language for the following:

- Proposed definition for "contaminants of emerging concern" 20.6.4.7(C)(7) NMAC: revision to remove vague statements and the addition of "per- and polyflouroalkyl substances."
- Proposed definition for "unclassified waters of the state" 20.6.4.7(U)(1) NMAC: removal of the second and third sentences of the proposed definition and reversion to their original location under Applicability of Water Quality Standards, 20.6.4.11(H) NMAC.
- General Criterion for Toxic Pollutants 20.6.4.13(F)(1): addition of the word "duration" to the general criterion for toxic pollutants.
- Hardness-dependent acute and chronic aquatic life criteria, 20.6.4.900(I) NMAC: addition of statement regarding the treatment of significant figures and rounding, update of table value criteria in 20.6.4.900(I)(3) NMAC to reflect appropriate significant figures.

XI. PROPOSED AMENDMENTS

In conclusion, the Department hereby requests the Commission approve the proposed amended language to the State's *Standards for Interstate and Intrastate Surface Waters* (20.6.4 NMAC) as revised based on the testimony submitted in this matter and filed as **NMED Exhibit 110**.

This concludes my rebuttal testimony.

STATE OF NEW MEXICO
WATER QUALITY CONTROL COMMISSION

IN THE MATTER OF: PROPOSED AMENDMENTS TO STANDARDS FOR INTERSTATE AND INTRASTATE SURFACE WATERS 20.6.4 NMAC — **WQCC 20-51(R)**

REBUTTAL TESTIMONY OF DIANA ARANDA

I. INTRODUCTION

My name is Diana Aranda, and I work for the Standards, Planning and Reporting Team as an Environmental Scientist/Specialist-Advanced with the New Mexico Environment Department's ("Department") Surface Water Quality Bureau ("SWQB"), and have held this position for more than two years since February 2019. My resume is provided as **NMED Exhibit 7** in the Department's Notice of Intent to Present Technical Testimony ("NOI"), filed May 3, 2021.

My rebuttal testimony will address comments regarding these topics:

- adding a definition of the term "hardness" (20.6.4.7(H)(1) NMAC);
- amendments to the antidegradation policy and implementation plan (20.6.4.8(A)(2) NMAC);
- designated use amendments for selected classified waters with a secondary contact recreational use; and
- designated use amendments for selected classified non-perennial waters.

The San Juan Water Commission ("SJWC") filed the Direct Technical Testimony of Jane DeRose-Bamman (**SJWC 2**) on May 3, 2021. The SJWC was the only party that provided testimony regarding these topics.

II. REBUTTAL TESTIMONY REGARDING DEFINITION OF HARDNESS (20.6.4.7(H)(1) NMAC)

Summary of SJWC's Testimony

The SJWC recommends removing the word "dissolved" before "hardness" in 20.6.4.12(F) and 20.6.4.900(I) NMAC, such that it aligns with the new definition, to eliminate redundancy and to clarify the term.

Department's Response

The Department concurs with SJCW's recommendation and has removed the word "dissolved" before "hardness" in 20.6.4.12(F) and 20.6.4.900(I) NMAC in its proposed amendments to 20.6.4 NMAC (**NMED Exhibit 110)**.

III. REBUTTAL TESTIMONY REGARDING AMENDMENTS TO THE ANTIDEGRADATION POLICY AND IMPLEMENTATION PLAN (20.6.4.8 NMAC (A)(2))

Summary of SJWC's Testimony

The following points were stated in SJWC testimony regarding amendments to 20.6.4.8(A)(2) NMAC: the Department did not provide a detailed explanation for these amendments prior to the submittal of its NOI; the current language in 20.6.4.8(A)(2) NMAC has been implemented historically and that it is verbatim to the language in C.F.R. § 131.12(a)(2); it was requested that the Department provide clarification for adding the words "the established" and "level of"; SJWC opposes the addition of the words "the established" and "level of" because they are unnecessary, and instead, to add language that refers to the water quality criteria specified in 20.6.4.97-20.6.4.900 NMAC.

<u>Department's Response</u>

The Department recognizes that the language as proposed does not provide the clarification as intended. Therefore, the Department proposes retaining the current language in 20.6.4.8(A)(2) NMAC. The Department has updated its revised proposed amendments to 20.6.4 NMAC (**NMED Exhibit 110**) with this change.

For clarification purposes, the SJWC proposes to add language to the antidegradation policy and implementation plan to reference those levels "established in 20.6.4.97-20.6.4.900 NMAC" (**SJWC 2**). The Department's use of "established levels" and "level of" in the proposed amendments was not restricted to "existing levels of numeric criteria associated with designated uses." As stated above, the Department recognizes that the language as proposed does not provide clarification and consequently removed this wording in its revised proposed amendments to 20.6.4 NMAC (**NMED Exhibit 110**). Given that the Department agrees that the language did not provide additional clarity, the Department's use of "established levels" was not intended to be restricted to only existing levels of numeric criteria, and the Department modified its proposed amendments to remove the questionable language, the WQCC should reject SJWC's proposal to restrict high-quality waters to, "…levels established in 20.6.4.97-20.6.4.900 NMAC…". Waters that surpass some or all water quality criteria as established in the State's standards and exceed the goals set forth in Section 101(a)(2) of the Clean Water Act ("CWA") (33 U.S.C. § 1251), can be considered high-quality waters and should be protected accordingly. If the water quality levels of a waterbody are found to exceed the goals set forth in Section 101(a)(2) of the CWA, these new goals may not fall within the referenced sections. The recommendation of constraining the protections to only 20.6.4.97-20.6.4.900 NMAC could potentially exclude a novel designated use based on an existing use and exclude any other protective standards that fall outside this reference like the general criteria protections in 20.6.4.13 NMAC.

IV. REBUTTAL TESTIMONY REGARDING DESIGNATED USE AMENDMENTS FOR SELECT CLASSIFIED WATERS WITH A SECONDARY CONTACT RECREATIONAL USE

Summary of SJWC's Testimony

The testimony of SJWC states that the Department did not provide the Existing Use Analysis ("EUA") as supporting evidence before submitting the Department's NOI. Therefore, SJWC recommends that the Water Quality Control Commission ("WQCC") does not adopt the proposed amendments for that reason, and because those proposed amendments are premature.

The testimony of SJWC also states that the Department proposed the same amendment in the prior triennial and that the WQCC rejected the amendment based on SJWC objections claiming a lack of evidence. Currently, SJWC states that the same rationale holds. Nevertheless, SJWC asserts that even if the Department provides the appropriate documentation, SJWC finds amending a designated use to one with more stringent criteria through an EUA is premature because language in 20.6.4.10(B) NMAC regarding existing use should be pre-approved and defined by the WQCC first.

Department's Response

The Department has submitted an EUA (**NMED Exhibit 56**) to support the proposed amendment in recognition that in the prior Triennial Review [WQCC 14-05(R)], the WQCC discussed and requested an evidence-based approach. This EUA (**NMED Exhibit 56**) was made public prior to the hearing in accordance with 40 C.F.R. § 131.20(b) (**NMED Exhibit 21**).

Additionally, the Department conducted stakeholder and tribal outreach to communicate the proposed changes in waters that could directly affect them (**NMED Exhibits 57 and 58**). It was important for the Department to get stakeholder and tribal input during the drafting stages of the EUA. Due to this outreach effort, the Pueblo of Jemez and Mayor Louie Gallegos (on behalf of the Village of Fort Sumner Wastewater Treatment Plant) spoke with the Department. As a result, they had no outstanding concerns regarding the proposed amendment. The Department has not received any other communications from the tribes or stakeholders regarding this amendment.

The EUA (**NMED Exhibit 56**) for existing recreational use (primary or secondary), provides evidence in support of the appropriate recreational use for the proposed waters. The findings of the EUA propose to amend the recreational use to reflect the uses actually being attained. This amendment fulfills the requirements of 40 C.F.R. § 131.10(i) (**NMED Exhibit 22**), "*[w]here existing water quality standards specify designated uses less than those which are presently being attained, the State shall revise its standards to reflect the uses actually being attained.*"

The Department has submitted the entitled "Existing Use Analysis" demonstration to provide a concise referenceable document to aid in the understanding and determination of the proposed amendment pursuant to 40 C.F.R. § 131.10(i) (**NMED Exhibit 22**). However, 40 C.F.R. § 131.10(i) (**NMED Exhibit 22**) does not contain a formally named demonstration requirement, nor does it mandate the submittal of an evidence-based analysis explaining the basis of support for a more stringent designated use. In contrast, when downgrading a use, 40 C.F.R. § 131.10(g) (**NMED Exhibit 22**) requires petitioners to submit a Use Attainability Analysis ("UAA") that discusses the scientifically defensible and regulatory rationale of the factors that affect the attainment of a use.

The Department, in accordance to 40 C.F.R. § 131.10(i) (**NMED Exhibit 22**), has revised the water quality standards of these waters to reflect the appropriate recreational use. Furthermore, the Environmental Protection Agency ("EPA") Region 6, provided comments in support of the proposed amendment for recreational use. The following is one example of EPA's support for one of the segments, but the same language was used for all of the proposed segments: "*The EPA supports the revision to the primary contact use and the applicable criteria for segment 20.6.4.103. This is consistent with the latest EPA recommendations for recreational contact and CWA 101(a) goals (77 FR 71191, November 29, 2012).*" (**NMED Exhibit 88**). The Department does not consider the proposed amendment to be premature. The EUA is in response to the WQCC's request during the last triennial review for an evidence-based approach for these proposed amendments.

V. REBUTTAL TESTIMONY REGARDING DESIGNATED USE AMENDMENTS FOR SELECT CLASSIFIED NON-PERENNIAL WATERS.

Summary of SJWC's Testimony

The SJWC opposes any modification of a water quality standard without technical justification because the Department did not provide any evidence-based documentation prior to submitting its NOI.

Department's Response

The Department has submitted a UAA (**NMED Exhibit 59**) as part of its NOI pursuant to 40 C.F.R. § 131.10(g) (**NMED Exhibit 22**) and 20.6.4.15 NMAC. The Department made this document public prior to the hearing in accordance with 40 C.F.R. § 131.20(b) (**NMED Exhibit 21**). The Department therefore asserts that it has addressed SJWC's opposition regarding this proposed amendment.

VI. CONCLUSIONS

This rebuttal testimony addressed Direct Testimony comments regarding:

- adding a definition of the term "hardness" (20.6.4.7(H)(1) NMAC);
- amendments to the antidegradation policy and implementation plan (20.6.4.8(A)(2) NMAC);
- designated use amendments for classified waters with a secondary contact recreational use; and
- designated use amendments for selected classified non-perennial waters.

The SJWC was the only party that submitted comments regarding these topics (**SJWC 2**).

Concerning adding a definition of the term "hardness" [20.6.4.7(H)(1) NMAC], the Department agrees with SJWC's proposed language that is consistent with the new definition and recommends removing the word "dissolved" before "hardness" in 20.6.4.12(F) and 20.6.4.900(I) NMAC.

Concerning amendments to the antidegradation policy and implementation plan [20.6.4.8 (A)(2) NMAC], the Department agrees with SJWC's recommendations to remove "the established" and "level of" and recommends defaulting to the current language of 20.6.4.8(A)(2) NMAC. However, the Department does not agree with adding the proposed SJWC language, "established in 20.6.4.97-20.6.4.900 NMAC", and recommends not adopting this language because it is restrictive and does not encompass all protections within the standards.

Concerning the designated use amendments for classified waters with a secondary contact recreational use (**NMED Exhibit 56**) and designated use amendments for selected classified non-perennial waters (**NMED Exhibit 59**), the Department has submitted evidence-based documentation as part of the Department's NOI for the hearing in this matter.

VII. PROPOSED AMENDMENTS

The Department thereby requests that the WQCC adopt the proposed amendments to the State's *Standards for Interstate and Intrastate Surface Waters* (20.6.4 NMAC) as revised based on the rebuttal testimony submitted in this matter and filed as **NMED Exhibit 110**.

This concludes my rebuttal testimony.

STATE OF NEW MEXICO
WATER QUALITY CONTROL COMMISSION

IN THE MATTER OF: PROPOSED AMENDMENTS TO STANDARDS FOR INTERSTATE AND INTRASTATE SURFACE WATERS 20.6.4 NMAC **WQCC 20-51(R)**

REBUTTAL TESTIMONY OF JENNIFER FULLAM

I. INTRODUCTION

My name is Jennifer Fullam. I am employed as the Standards, Planning and Reporting Team Supervisor and serve as the Water Quality Standards Coordinator with the New Mexico Environment Department ("Department") and have been employed in this capacity for four years. My resume has been provided as **NMED Exhibit 8** in the Notice of Intent to Present Technical Testimony ("NOI") filed on May 3, 2021. My rebuttal testimony focuses on the direct testimonies of Dr. Richard Meyerhoff (**LANL Exhibit 2**), Robert Gallegos (**LANL Exhibit 3**), Tim Goering (**LANL Exhibit 4**), Dr. Bryan Dail (**LANL Exhibit 5**), Barry Fulton (**LANL Exhibit 6**) and David DeForest (**LANL Exhibit 8**), on behalf of Triad National Security, LLC and the U.S. Department of Energy - National Nuclear Security Administration ("Triad and DOE-NNSA"); Rachel Conn (**Amigos Bravos Exhibit 3**) on behalf of Amigos Bravos; New Mexico Mining Association's ("NMMA's") non-technical testimony as submitted in their NOI filed on May 3, 2021; and Jane DeRose-Bamman (**SJWC 2**) on behalf of San Juan Water Commission ("SJWC") in relation to proposed amendments in the following Sections of 20.6.4 New Mexico Administrative Code ("NMAC"):

- 20.6.4.7 NMAC definitions for aquatic life uses;
- 20.6.4.7(E) NMAC definition for "existing use";
- 20.6.4.10 NMAC, Review of Standards; Need for Additional Studies;

- 20.6.4.15 NMAC Use Attainability Analysis ("UAA");
- 20.6.4.126 NMAC specifically described classified perennial waters within Los Alamos National Laboratory ("LANL");
- 20.6.4.128 NMAC classified non-perennial waters within LANL;
- 20.6.4.140 NMAC newly proposed specifically described classified intermittent waters within LANL; and
- 20.6.4.900(I) NMAC hardness-based criteria associated with aluminum.

II. REBUTTAL TESTIMONY REGARDING DEFINITIONS FOR AQUATIC LIFE USES (20.6.4.7 NMAC)

Summary of SJWC's Testimony

On page 9 of Ms. DeRose-Bamman's direct testimony (**SWJC 2, 2020 TR SJWC-0012**), she states that the reasoning for proposed amendments to 20.6.4.7(M) NMAC was not provided. Therefore, according to her testimony, removing the maximum temperature criteria in the definition is not supported. Particularly when the marginal warmwater definition was not amended in a similar manner.

*The Department provided justification in my direct testimony (**NMED Exhibit 4**) for the proposed amendment and distinguishes why marginal warmwater was not amended in a similar manner. The Department believes it has satisfied SJWC's concerns in regard to this comment.*

Summary of Triad and DOE-NNSA's Testimony

Beginning on page 5 of Mr. Fulton's testimony (**LANL Exhibit 6, 2020TR LANL-00170**) regarding the proposed amendments for the definition of marginal coldwater [20.6.4.7(M)(1) NMAC], Triad and DOE-NNSA recommend that all appropriate temperature criteria be included in the definitions for all aquatic life uses. Mr. Fulton uses the argument that the marginal warmwater definition has a reference to temperature in its definition, and therefore, so should the definition for marginal coldwater.

The Department rebuts this proposal for two reasons. First, there are many criteria associated with aquatic life uses. Listing all these criteria in the definition is impractical. Second, the assessable and enforceable ("attainable") criteria for these designated uses are codified in 20.6.4.900 NMAC, "Criteria applicable to Existing, Designated or Attainable Uses Unless Otherwise Specified in 20.6.4.97 through 20.6.4.899 NMAC." The inclusion of all temperature criteria is likely to lead to misapplication of the standards and is unnecessary. As described in EPA's key concepts for Water Quality Standards[1]*, a designated use is "an expression of goals for the water, such as supporting aquatic life and human activities." The use has criteria determined to be necessary to support the use without ill-effect, in most cases, the criteria are not the use itself and should not be incorporated in the definition describing the use.*

*Of the seven designated aquatic life uses with associated criteria in 20.6.4.900 NMAC, marginal coldwater is the only one with a duration-based (6T3) temperature criterion in the definition. Therefore, removing the 6T3 temperature criterion for marginal coldwater makes the definition consistent with the other six designated aquatic life use definitions. I discuss the justification for removing the 6T3 temperature criterion beginning on page 6 of my direct testimony (**NMED Exhibit 4**). The Department's proposed language provides uniformity between the aquatic life use definitions, and is consistent with the fundamental concept that "designated uses" are an expression of the goals of a waterbody; they are used to determine water quality criteria – the criteria do not determine the designated use.*

[1] https://www.epa.gov/wqs-tech/key-concepts-module-2-use

Beginning on page 5 of Mr. Fulton's testimony (**LANL Exhibit 6, 2020 TR LANL-00170**) regarding the proposed amendments for the definition of marginal coldwater [20.6.4.7(M)(1) NMAC], Triad and DOE-NNSA assert that the hydrologic regimes should be included in the definitions for all aquatic life uses. Mr. Fulton argues that 20.6.4 NMAC describes the hydrologic regime for the high-quality coldwater and marginal warmwater aquatic life uses.

*I discuss the Department's justification for amending language regarding hydrologic regime in the definitions for limited aquatic life and marginal coldwater beginning on page 2 of my direct testimony (**NMED Exhibit 4**). The Department believes it has satisfied Triad and DOE-NNSA's concerns regarding this comment.*

Beginning on page 6 of Mr. Fulton's testimony (**LANL Exhibit 6, 2020 TR LANL-00171**) regarding the definition for marginal coldwater [20.6.4.7(M)(1) NMAC], Triad and DOE-NNSA assert that the timeframe in the definition is vague, increasing regulatory uncertainty. Triad and DOE-NNSA recommend defining "at least some portion of the year."

The Department disagrees with Triad and DOE-NNSA's assertion that there is uncertainty in the application based on the Department's proposed language. The definitions for designated aquatic life uses are not the criteria, so the amended language would not add uncertainty to regulatory application. A waterbody's ability to attain a designated aquatic life use is based on the water quality criteria, codified in 20.6.4.900 NMAC, not the definition.

Beginning on page 7 of Mr. Fulton's testimony (**LANL Exhibit 6, 2020 TR LANL-00172**) regarding the definition of limited aquatic life in 20.6.4.7(L)(2) NMAC, Triad and DOE-NNSA recommend, for the same reasons as presented for marginal warmwater, the applicable hydrologic conditions remain as part of the definition. Triad and DOE-NNSA state they agree with the addition of "low-flow" in NMED's proposed amendments dated March 12, 2021. However, Triad and DOE-NNSA recommend the language describe low-flow conditions for ephemeral, intermittent and perennial waters. Triad and DOE-NNSA agree limited aquatic life may be the appropriate designated aquatic life use for any hydrologic regime, however the complete removal of the types of regimes would add confusion in implementation. Mr. Fulton provides an example on page 9 of his direct written testimony (**LANL Exhibit 6, 2020 TR LANL-00174**) where surface waters derived from geothermal sources exhibit unique temperature regimes and/or pH conditions capable of supporting only a limited aquatic life community.

The Department disagrees that the inclusion of all three hydrologic regimes provides any further clarity to the definition. The Department proposes removing specific references to hydrologic class, in part, to avoid the misinterpretation that perennial waters cannot be designated with a limited aquatic life use. Triad and DOE-NNSA's proposed addition of "ephemeral, intermittent, or perennial" is unnecessary.

*Furthermore, the Department disagrees with the example provided on page 9 of Mr. Fulton's testimony (**LANL Exhibit 6, 2020 TR LANL-00174**). The use of "limited aquatic life" in this statement is likely referring to Sulphur Creek, where specialized aquatic organisms have adapted to a pH range lower than typically found in New Mexico's surface waters. Although Sulphur Creek is designated with a limited aquatic life use, it has site-specific criteria more stringent than limited aquatic life. In accordance with 20.6.4.10 NMAC, this scenario would trigger a site-specific criterion since uses in Section 101(a)(2) of the federal Clean Water Act ("CWA") (33 U.S. Code § 1251) (**NMED Exhibit 10**) are being supported and must be protected. Therefore, in the case presented in Mr. Fulton's testimony, it would be highly unlikely that a designated limited aquatic life use, without site-specific criteria, would be appropriate, even if low-flow conditions were present. The Department finds the other examples ill-fitted as well; in* *accordance with 40 Code of Federal Regulations ("C.F.R.") Section 131.10(g) (**NMED Exhibit 22**), a petitioner must demonstrate that the designated use is the highest attainable use. In the scenarios presented, the waterbody supports aquatic life; therefore, limited aquatic life, with only acute exposure criteria, would be inadequate to protect the existing use unless the water was not persistent for a period long enough for chronic exposure. The Department cautions against overgeneralizing the application of the limited aquatic life use designation. As such, the Department does not support Triad and DOE-NNSA's proposed revised language. The Department does not recommend including all hydrologic regimes recognized in 20.6.4 NMAC as proposed by Triad and DOE-NNSA.*

III. REBUTTAL TESTIMONY REGARDING THE DEFINITION FOR EXISTING USE (20.6.4.7 NMAC)

<u>Summary of Amigos Bravos' Testimony</u>

Amigos Bravos' proposed new language for the definition of "existing use" in 20.6.4.7(E) NMAC. The new language includes language describing how an existing use can be established through demonstration that fishing, swimming, or other uses have actually occurred since November 28, 1975; or that water quality is suitable to allow the use to be attained. Amigos Bravos states the current definition is vague, and the term "attained" has various applications throughout 20.6.4 NMAC. Amigos Bravos references the U.S. Environmental Protection Agency ("EPA") Water Quality Standards Handbook, which states an existing use can be determined by demonstrating either the use has occurred since November 28, 1975, or the water quality is suitable to allow the use to be attained. Amigos Bravos also references the amendments to the Gallinas River as an example of an amendment to a primary contact designated use based on the documented presence of the use [WQCC 03-05(R)].

The Department does not support the amendment of the definition for "existing use," as proposed by Amigos Bravos, for several reasons.

*First, the language is not consistent with a definition, but rather it describes an overgeneralized regulatory mechanism for a process. A definition should be limited to what something is, not how to demonstrate it. Second, the observed use in a water is not the only determining factor if the water quality is such that it causes negative impacts to aquatic life or human health. The EPA provides guidance in Chapters 2 and 4 of the Water Quality Standards Handbook through a letter from EPA Headquarters in Washington D.C. to Derek Smithee with the State of Oklahoma Water Resource Board ("Smithee Letter") (**NMED Exhibit 62**). The Smithee Letter outlines the various ways in which an existing use should be evaluated and determined, all of which are based on site-specific conditions. The Department concurs with the Smithee Letter and finds it inappropriate to generalize an existing use through simple observation without evaluating all of the supporting evidence to ensure the use is sustainable without causing harm to aquatic life or human health.*

In the Smithee Letter, EPA provides an example where people recreate in combined sewer overflows (CSOs). Although the activity has occurred, the water quality cannot support the activity without due harm, so it would be inappropriate to assert primary contact as an existing use since the use is not actually supported. Further, even though the standards discuss designated uses, the State implements water quality protections and antidegradation policies for the criteria that protect those uses. As such, EPA recommends an analysis of all available information to produce an informed determination of existing use. The definition proposed by Amigos Bravos oversimplifies the process which could lead to inappropriate and unattainable uses. Existing uses, once established, are not permitted to be degraded and could impose unnecessary burdens to *restore a water to an unachievable quality. Therefore, the Department does not support the language as proposed because the observation of a use does not automatically mean the use can be supported and therefore may not always be considered an existing use.*

*The existing uses are not required to be in the State's Water Quality Standards, nor are they required to be described the same as a designated use. In fact, in the Smithee Letter (**NMED Exhibit 62**) which is referenced in both Chapters 2 and 4 of EPA's Water Quality Standards Handbook*[2]*, EPA "considers the phrase 'existing uses are those uses actually attained' to mean the use and water quality necessary to support the use that have been achieved in the waterbody on or after November 28, 1975." In addition, as also provided in the Smithee Letter (**NMED Exhibit 62**), the existing use "should describe existing uses more specifically where necessary to meet the intent of the existing use requirements."*

*The Department also takes particular exception to the reference to "fishing and swimming" as these are not all the uses protected under Section 101(a)(2) of the CWA (33 U.S. Code § 1251) (**NMED Exhibit 10**). The inclusion of these as examples should be avoided in regulatory language as it could inadvertently limit the scope of an existing use. The language in 20.6.4.7(E) NMAC as currently written is consistent with the definition in the federal regulation 40 C.F.R. § 131.3 (**NMED Exhibit 26**) and maintains consistency for purposes of the CWA.*

The Department recommends retaining the definition as currently written.

[2] https://www.epa.gov/sites/production/files/2014-10/documents/handbook-chapter2.pdf and https://www.epa.gov/sites/production/files/2014-10/documents/handbook-chapter4.pdf

IV. REBUTTAL TESTIMONY REGARDING REVIEW OF STANDARD: NEED FOR ADDITIONAL STUDIES (20.6.4.10 NMAC)

<u>Summary of SJWC's Testimony</u>

On page 12 of Ms. DeRose-Bamman's testimony (**SJWC 2, 2020 TR SJWC-0015**), SJWC expressed concerns regarding the consistency in citing federal regulations, particularly in 20.6.4.10 and 20.6.4.15 NMAC. There are some sections that provide the direct federal citation while other sections provide the narrative as found in the federal citation. The SJWC finds that jumping back and forth between federal narrative and federal citations to be neither feasible nor necessary to incorporate all the pertinent federal regulations into 20.6.4 NMAC.

*The Department recognizes the concern expressed by SJWC and although Ms. DeRose-Bamman's testimony (**SJWC 2**) was discussing concerns in 20.6.4.10 NMAC, it appears the specific reference provided is in 20.6.4.15 NMAC. The Department has not proposed any amendments to language or references already adopted in 20.6.4 NMAC as it pertains to narrative or federal citations.*

The Department did review the various references to federal regulations and although there is no statutory guidance, as a general rule, it appears that narrative language similar, but not always identical, to federal regulation is used either when it is short or clearly described and aids in implementation. There are other cases where the language is not identical to the federal regulations because adoption of the federal language as written would lead to ambiguous interpretations. In these cases, it is important for implementation purposes to provide clarifying language, which may be slightly different from that of the federal regulation.

*Conversely, federal citations, rather than narratives, tend to be used either when the federal language is a requirement but overly lengthy, such as 40 C.F.R. § 131.10(g) (**NMED***

Exhibit 22*), or when inclusion of the language is already most aptly described as written in the federal regulations.*

The Department finds the references to federal regulations in 20.6.4 NMAC, both as narrative statements and citations, to be appropriate.

On page 14 of Ms. DeRose-Bamman's testimony (**SJWC 2, 2020 TR SJWC-0017**), regarding 20.6.4.10(B) NMAC, SJWC states the Department uses the term "higher quality water" in 20.6.4.10(B) NMAC but this description is not used in 40 C.F.R. § 131.10(i) (**NMED Exhibit 22**) where the focus is on the use rather than the water quality and, therefore, 20.6.4.10(B) NMAC conflicts with federal regulations.

*The Department recognizes the choice of language can potentially create confusion. However, the Department disagrees that the use of "water quality" conflicts with the federal regulations. The language in 40 C.F.R. § 131.10(i) (****NMED Exhibit 22****) states "[w]here existing <u>water quality standards</u> specify designated uses less than those which are presently being attained, the State <u>shall revise its standards</u> to reflect the uses actually being attained" (emphasis added). To implement this federal requirement, it is vital to define what a water quality standard is, as that is what is required to be amended. Consistent with the definition for "water quality standard" in 40 C.F.R. § 131.3 (****NMED Exhibit 26****) and pursuant to 40 C.F.R. § 131.6 (****NMED Exhibit 23****), water quality standards are required to have a designated use, criteria to protect for that use, and an antidegradation policy. Therefore, in order to protect for a use, the water quality (criteria) must be protected to provide conditions suitable for the use, thus the term water quality standards. So, support and protection of the use is actually achieved through the quality of the water, not the use.*

*Contrary to SJWC's testimony, the Department finds that the term "water quality" is in accord with the federal regulations which require protection of the water quality as a means to protect for the uses in Section 101(a)(2) of the CWA (33 U.S. Code § 1251) (**NMED Exhibit 10**).*

*The Department concurs that stringency is not applicable to a use, but rather the criteria protecting for that use. Therefore, the Department proposes amended language (**NMED Exhibit 110**) in 20.6.4.10(B) NMAC to reflect that any designated use with criteria less stringent than the existing use must be amended.*

On page 14 of Ms. DeRose-Bamman's testimony (**SWJC 2, 2020 TR SJWC-0017**), regarding 20.6.4.10(B) NMAC, SJWC asserts that the Department has not explained what it means by "higher quality water" and how that is determined.

*The Department recognizes SJWC's concern and is proposing amended language (**NMED Exhibit 110**) to clarify that any designated use with criteria less stringent would be amended in accordance with 40 C.F.R. § 131.10(i) (**NMED Exhibit 22**).*

On page 14 of Ms. DeRose-Bamman's testimony (**SJWC 2, 2020 TR SJWC-0017**), regarding 20.6.4.10(B) NMAC, SJWC finds the Department's proposed use of "supporting evidence" is not defined. The SJWC is concerned with the requirements for an existing use analysis ("EUA"). The SJWC requests that elements required in an EUA be codified in 20.6.4 NMAC, similar to what is described in 20.6.4.15 NMAC. As such, SJWC recommends the WQCC consider specifying such requirements and procedures in the State's Water Quality Standards or Water Quality Management Plan and Continuing Planning Process ("WQMP/CPP").

The Department disagrees with SJWC's assertion that the elements are not codified. An amendment based on existing uses is considered a water quality standard amendment, just as any other amendments to 20.6.4 NMAC and as such, must undergo the established processes pursuant *to the CWA, 40 C.F.R. § 25 (**NMED Exhibit 28)**, 40 C.F.R. § 131.20 (**NMED Exhibit 21**), 40 C.F.R. § 131.6 (**NMED Exhibit 23**), the State Water Quality Act, the State Rules Act, 20.1.6 NMAC, 20.6.4 NMAC and the State's approved WQMP/CPP. Although the EPA does not require any evidence to amend a designated use to one with more stringent criteria, the WQMP/CPP does have a process for Water Quality Standards amendments, including the public participation and public hearing process. This regulatory mechanism allows the public to participate and the Commission to decide on the proposed amendment based on some line of evidence or reasoning. This process is consistent with other proposed amendments, generally brought forth as part of the Triennial Review.*

As currently found in 20.6.4.10 NMAC, designated uses must be amended if the existing use has criteria more stringent than the designated use. The regulatory basis is not the same as a UAA; and as such, there are no required "elements" for a water quality standards amendment based on existing use, other than providing evidence of the exiting use. In part, this is attributable to environmental complexity and variability including temporally sensitive, site-specific conditions, such as seasonal and diurnal fluctuations in streamflow, dissolved oxygen, and temperature. Therefore, prescriptive elements are not applicable or appropriate.

*As described in the Smithee Letter (**NMED Exhibit 62**), the existing use for each water must be evaluated independently based on all available evidence of use and water quality. Therefore, the supporting evidence will vary depending on the water quality and uses supported for any particular tributary.*

The Department used the term "Existing Use Analysis" as a descriptive title for two documents filed as part of this Triennial Review to describe the document and work conducted by the Department supporting proposed amendments to several tributaries. The Department *prepared these demonstrations to provide the public and the Commission the line of evidence considered for the proposed water quality standards amendments. Actions amending these designated uses, based on existing use, are supported by EPA (**NMED Exhibit 88**). However, it is at the Commission's discretion to determine if sufficient evidence has been presented to warrant the amendment, such as with other amendments in 20.6.4 NMAC.*

*The Department finds the "formal process" has been defined and, therefore, is not proposing to include any additional language or description for designated use amendments completed in accordance with 40 C.F.R. § 131.10(i) (**NMED Exhibit 22**). However, the Department recognizes the value of some general guidance when determining existing uses, as they pertain to water quality standards, and will consider inclusion of such language in the Standards section of the WQMP/CPP during the next revision.*

On page 15 of Ms. DeRose Bamman's testimony (**SJWC 2, 2020 TR SJWC-0018**) regarding 20.6.4.10(B) NMAC, SJWC clarifies that the term "stringent" is applicable to criteria, not uses.

*The Department concurs with the comment and has proposed amended language in **NMED Exhibit 110** to reflect it is the criteria for a use that have stringency.*

Beginning on page 15 of Ms. DeRose-Bamman's testimony (**SWJC 2, 2020 TR SJWC-0018**), regarding 20.6.4.10(D) NMAC, SJWC finds that the Department's proposed language regarding when a UAA is required is already in 20.6.4.15 NMAC. The SJWC finds that adding duplicative language throughout 20.6.4 NMAC adds confusion and recommends language relating to UAAs be limited to 20.6.4.15 NMAC.

The Department disagrees that inclusion of language in 20.6.4.10 NMAC, referencing a UAA as one of the mechanisms to review a water quality standard, adds confusion. The function *of 20.6.4.10 NMAC is to provide regulatory language for the different mechanisms used to review or amend water quality standards. Prior to the proposed language, there was no provision in 20.6.4.10 NMAC for amending a water quality standard through a UAA. For consistent implementation of water quality standards and the processes used to amend those standards, the Department proposes adding a brief clause and reference to UAAs. The Department recognizes that duplicative language may lead to confusion, especially if future revisions are not consistent throughout; however, as proposed, the language in 20.6.4.10(D) NMAC only refers to the UAA as a mechanism to amend a designated use and provides reference to the section of NMAC that prescribes the process and requirements. This reference is similar to site-specific criteria, where 20.6.4.10(B) NMAC, in part, describes the means for the mechanism, but the elements to conduct that particular type of amendment are further described in 20.6.4.10(F) NMAC. For this reason, the Department recommends adopting the amended language as proposed by the Department in* ***NMED Exhibit 110****.*

Summary of Triad and DOE-NNSA's Testimony

Beginning on page 10 of Mr. Fulton's testimony (**LANL Exhibit 6, 2020 TR LANL-00175**) regarding 20.6.4.10 NMAC, Triad and DOE-NNSA recommend the use of the term "stringent" be limited to references to criterion, as the term is not applicable to attainable, designated, or existing uses.

*The Department recognizes that stringency does not apply to uses, and that it is the criteria that protect for those uses that demonstrate stringency. Therefore, the Department has proposed amended language in 20.6.4.10(B) NMAC, 20.6.4.15(A) NMAC, and 20.6.4.15(D)(2)(c) NMAC to reflect this clarification (****NMED Exhibit 110****).*

On page 13 of Mr. Fulton's testimony (**LANL Exhibit 6, 2020 TR LANL-00178**) regarding the limitations for developing site-specific criteria in 20.6.4.10(F) NMAC, Mr. Fulton states that the Department is proposing language in this section.

The Department has not proposed any amendments to 20.6.4.10(F) NMAC, except for updating appropriate references to other sections of NMAC.

On page 13 of Mr. Fulton's testimony (**LANL Exhibit 6, 2020 TR LANL-00178**), Triad and DOE-NNSA assert that there are conditions in which natural background is appropriate for amending these types of uses associated with human health.

*The Department reiterates that it has not proposed any amendments to language in 20.6.4.10(F) NMAC, contrary to Mr. Fulton's assertion, except for updating appropriate references to other sections of 20.6.4 NMAC. Nor has the Department proposed any changes to 20.6.4.10(G) NMAC – Site-specific criteria based on natural background, which the Department believes is section that Mr. Fulton is actually referring to on page 13 of his testimony (**LANL Exhibit 6, 2020 TR LANL-00178**).*

The Department disputes that the language, as already adopted by the Commission and EPA, is inappropriate. Restricting the use of site-specific criteria based on natural background for domestic water supply, primary or secondary contact, and human health-organism only uses is necessary because the criteria associated with these uses are human health-based criteria. That is, the criteria for these uses represent specific concentrations of pollutants or conditions in a waterbody that are not expected to cause adverse effects to human health. Setting criteria to natural background levels that are higher than existing criteria will not protect these uses because higher concentrations are known to cause adverse impacts to human health. The current language is further supported by EPA's 1997 memo establishing policy regarding site-specific aquatic life *criteria (**NMED Exhibit 123**), where EPA states the "…policy does not apply to human health uses. For human health uses, where the natural background concentration is documented, this new information should result in, at a minimum, a re-evaluation of the human health use designation."*

*As proposed by Triad and DOE-NNSA, "[d]omestic water supply, primary or secondary contact, or human health-organism only criteria shall not be modified based on natural background <u>unless such uses would be protected at natural background concentrations</u>." However, EPA develops and recommends criteria for these uses at levels that protect for human health. States can use the recommendations as guidance when setting their own water quality standards to protect human health. The Department finds Triad and DOE-NNSA's proposed language inappropriate, as the goal of the CWA is to restore and maintain the integrity of the nation's waters by controlling discharge of pollutants into surface waters and by achieving levels of water quality for recreation in and on the water. Allowing harmful levels of a contaminant, natural or anthropogenic, in a waterbody is contrary to the objective of Section 101(a)(2) of the CWA (33 U.S. Code § 1251) (**NMED Exhibit 10**). Therefore, the Department does not support the amendments proposed by Triad and DOE-NNSA to 20.6.4.10(F) NMAC.*

Beginning on page 32 of Mr. Gallegos' direct testimony (**LANL Exhibit 3, 2020 TR LANL-00062**), regarding 20.6.4.10(C) and (D) NMAC, Mr. Gallegos states that the proposed amendments to replace the language from "will" to "may" increases the discretion provided to the Department and as such recommends deleting 20.6.4.10(C) NMAC in its entirety.

Specifically related to the use of "may" in the proposed amendment to 20.6.4.10(C) NMAC, the Department does not decide what "will" be adopted into rule. The Department, or any other entity, may propose amendments to 20.6.4 NMAC based on what it considers sufficient *data and information. However, the adoption of any amendment is contingent on Commission and subsequent EPA approval. The language as currently found in 20.6.4.10(C) and (D) NMAC implies that only the Department has the authority to amend a water quality criterion. This is not in accord with other parts of 20.6.4 NMAC, where a party other than the Department may petition for a site-specific criterion, given adequate evidence. Other factors may also preclude the Department from petitioning the Commission for an amendment, including any potential implications to violating the antidegradation policy or the Endangered Species Act.*

The Department also rejects Triad and DOE-NNSA's recommendation to delete 20.6.4.10(C) NMAC in its entirety as this would leave a gap in provisions for conducting a site-specific criterion in accordance with 20.6.4.10(F) NMAC. For this reason, the Department recommends retaining the existing language in 20.6.4.10(C) NMAC.

On page 33 of Mr. Gallegos' testimony (**LANL Exhibit 3, 2020 TR LANL-00092**) regarding 20.6.4.10(B) NMAC, Triad and DOE-NNSA support the addition of a new subsection to clarify when a designated use must be amended to one that has criteria at least as stringent as the existing use. However, Triad and DOE-NNSA recommend that language be included to clarify that these types of amendments are only permitted after the Commission has established formal procedures through the WQMP/CPP.

The Department disagrees with Triad and DOE-NNSA's assertion that there is no formal process to amend designated uses based on attainability. Several examples illustrate that the Commission has adopted or amended designated uses based on demonstrations that a water has attained water quality sufficient enough to support a particular designated use.

First, as presented in Amigos Bravos' testimony during the 2005 Triennial Review [WQCC 03-05(R)], the WQCC adopted a recreational contact use for perennial reaches of the Gallinas

*River from its mouth upstream to the diversion for the Las Vegas municipal reservoir based on evidence that the existing use was supporting primary contact. This amendment was, in part, adopted in accordance with both state [20.6.4.10(B) NMAC] and federal (40 C.F.R. § 131.10(i) and 40 C.F.R. § 131.20) regulations (**NMED Exhibits 22 and 21**) which require the State to amend a designated use if it has criteria less stringent than the existing use.*

The process to adopt these designated uses are included in Section II.D of the WQMP/CPP under the "General Process for Establishing or Revising Water Quality Standards." This formal process includes public engagement as prescribed in Section XIV of the WQMP/CPP and a formal rulemaking process in accordance with the Rulemaking Procedures for the WQCC (20.1.6 NMAC).

Second, the inclusion of the language recommended by Triad and DOE-NNSA would be contradictory with the State and federal requirements to amend a designated use, causing the State to violate the regulations. As such, the Department disagrees with Triad and DOE-NNSA's proposal.

On page 34 of Mr. Gallegos' testimony (**LANL Exhibit 3, 2020 TR LANL-00093**), he states that "[b]efore an EUA is used for attainability decisions, especially where the WQCC has determined existing uses for the waters in question and those waters are classified waters of the state…."

*Triad and DOE-NNSA's statement is misleading. First, the designated uses for any water of the State, including classified waters, are only as applicable as the information used to establish the designated use. In accordance with 40 C.F.R. § 131.20 (**NMED Exhibit 21**), standards, including the designated use and the criteria to protect that use, must be re-evaluated if new information becomes available. Designated uses are goals, based on available information, and* *are recognized to be subject to change, as they should be, given the goals and objectives of the CWA are to restore and maintain chemical, physical, and biological integrity by improving water quality wherever attainable for the protection and propagation of fish, shellfish and wildlife and recreation in and on the water. The existing use is the minimum target for ensuring protection is continually improving towards the objective established in the CWA. Therefore, it is inappropriate to assert or imply that a previous determination of existing or designated uses for any water is permanent. Therefore, Triad and DOE-NNSA's assertions are inaccurate.*

On page 34 of Mr. Gallegos' testimony (**LANL Exhibit 3, 2020 TR LANL-00093**) regarding the process to amend a designated use based on an existing use with more stringent criteria, Mr. Gallegos states that it "is inappropriate for [the Department] to use an ill-defined existing use analysis process that has not been reviewed or approved by the WQCC or the general public, to unilaterally, and without consideration of all available evidence, downgrade and declassify existing classified waters." Mr. Gallegos reiterates this sentiment again beginning on page 35 (**LANL Exhibit 3, 2020 TR LANL-00094)** where he states that "[m]ethods for developing or performing and EUA are not included in either the WQMP/CPP or the WQCC regulations, 20.6.4 NMAC."

*This statement appears to be in reference to two separate issues. The first issue, as found in the second part of Mr. Gallegos' statement, where Triad and DOE-NNSA assert that an action occurred which "downgraded" and "declassified" existing classified waters. The Department is assuming Triad and DOE-NNSA are not referring to the EUA for three intermittent waters within LANL, but rather a procedure implemented by the Department, in accordance with the State's approved WQMP/CPP (**NMED Exhibit 64**), regarding several unclassified perennial waters within LANL.*

*Several tributaries within LANL have recently been determined, through Hydrology Protocol surveys, to be perennial. The Department assumed these waters were non-perennial waters classified in 20.6.4.128 NMAC until new information resulting from a Hydrology Protocol survey indicated the presence of perennial reaches. Since these newly identified perennial reaches are not described in classified sections 20.6.4.101 – 20.6.4.899 NMAC, the Department implements standards for these waters as "unclassified waters of the state" as defined in 20.6.4.11(H) NMAC. Page II-6 of the State's approved WQMP/CPP (**NMED Exhibit 64**) states, "[f]or waterbodies that are perennial but have not been classified under 20.6.4.101 to 899 NMAC, the State asserts perennial protections for these waters under 20.6.4.99 NMAC." Given these waters are perennial and there is no described classification in 20.6.4.101-899 NMAC, in accordance with the WQMP/CPP and 20.6.4.11(H) NMAC, these waters are unclassified perennial waters of the State and have the designated uses described in 20.6.4.99 NMAC. In addition. the criteria associated with the designated recreational use in 20.6.4.99 NMAC are more stringent than those of 20.6.4.128 NMAC. The Department did not "downgrade" or "declassify" any water of the State. Therefore, Triad and DOE-NNSA's assertion that any such action(s) occurred is incorrect.*

*As it pertains to the first part of Mr. Gallegos' statement, regarding the EUA demonstration, the Department collaborated with Triad and DOE-NNSA to determine the appropriate designated uses for non-perennial waters in LANL in partial fulfillment of the 2015 Joint Stipulation between Amigos Bravos, the U.S. Department of Energy, Los Alamos National Security, LLC, and the New Mexico Environment Department ("2015 Joint Stipulation") (**NMED Exhibit 72**). All parties agreed that, based on available information, these three waterbodies support at least a marginal warmwater aquatic life use. Based on the regulatory mechanisms to* *amend a designated use and the available information not considered previously, the Department, with consensus from the other parties and in accordance with the 2015 Joint Stipulation, prepared the demonstration necessary to amend the designated uses for the three waterbodies.*

*The Department did not evaluate the highest attainable aquatic life use but rather focused on the existing aquatic life use. The title of the demonstration included "Existing Use Analysis" to describe the line of evidence used to determine the designated uses. The title of this demonstration to be ill-defined. The EUA has undergone all the necessary elements required in the WQMP/CPP for a water quality standards amendment. Stakeholder meetings were held to discuss the type of amendment and the supporting evidence the Department was proposing to present, as demonstrated in the incomplete **NMED Exhibit 82** and refiled as **NMED Exhibit 122**. Other elements included public meetings (see **NMED Exhibit 87)** at which the Department provided more information regarding the demonstrations planned to amend the designated uses; and the evidence (the "EUA") as presented in the NOI filed by the Department with the Commission on May 3, 2021.*

The Department's amendment, as proposed, was well defined, appropriately titled based on the line of evidence pursued in accordance with both State and Federal regulations and underwent the required processes for any water quality standard amendment in accordance with the WQMP and the State's rulemaking regulations. Triad and DOE-NNSA's assertions otherwise, as presented in Mr. Gallegos' testimony, are therefore incorrect.

On page 36 of Mr. Gallegos' testimony (**LANL Exhibit 3, 2020 TR LANL-00095**), Triad and DOE-NNSA state that the Department's proposed use of the term "supporting evidence" is not supported through EPA guidance on the matter. Triad and DOE-NNSA provide evidence through "EPA's guidance" that EPA expects states and tribes to consider all available data as completely as possible to resolve any apparent discrepancies.

*Mr. Gallegos' reference to "EPA's guidance" appears to refer to the Smithee Letter (**NMED Exhibit 62** and **LANL Exhibit 32**) regarding existing use.*

*Additionally, the Department's use of the term "supporting evidence" directly in line with the Smithee Letter (**NMED Exhibit 62)** and the multitude of scenarios to establish an existing use. Each existing use determination is dependent on the available information and the site-specific conditions occurring at a particular point in time. Contrary to Triad and DOE-NNSA's assertion that using the term "supporting evidence" is not supported in EPA's letter to Smithee, it is both appropriate and applicable.*

On page 36 of Mr. Gallegos' testimony (**LANL Exhibit 3, 2020 TR LANL-00095**) regarding language in 20.6.4.10(B) NMAC, Triad and DOE-NNSA argue that the use of the language "supporting evidence" could lead to arbitrary existing use determinations.

*The Department is responsible for implementing the antidegradation policy, which protects for existing uses. State and federal regulations, as well as the WQMP/CPP, define the process for amending standards and designated uses based on an existing use with more stringent criteria. The process requires a public hearing for rulemaking and the opportunity for public participation. In addition, the WQCC is the delegated authority for adopting water quality standards for implementation for State purposes [see NMSA 1978, Section 74-6-3(E)], and in accordance with 40 C.F.R. § 131.20 (**NMED Exhibit 21**), EPA's Region 6 Administrator must approve the amendment for purposes of the CWA. Triad and DOE-NNSA's assertions as presented by Mr. Gallegos are therefore unfounded. Based on 40 C.F.R. § 131.20 (**NMED Exhibit 21**), a petitioner may present new information demonstrating that a water may be able to attain a* *designated use with more stringent criteria than previously assumed. Thus, the regulation requires states to review and modify standards, accordingly, no less than every three years as part of the Triennial Review. For these reasons, Triad and DOE-NNSA's statement is unfounded, and the Department therefore does not support Triad and DOE-NNSA's proposed language for 20.6.4.10(B) NMAC as presented in Mr. Gallegos' testimony.*

On page 37 of Mr. Gallegos' testimony (**LANL Exhibit 3, 2020 TR LANL-00096**) regarding 20.6.4.10(B) NMAC, Triad and DOE-NNSA assert that the EUA procedure "should undergo a thorough vetting process that includes a review and final approval by the WQCC."

*As it pertains to amending a designated use based on existing uses in accordance with 40 C.F.R. § 131.10(i) (**NMED Exhibit 22**), there are already several processes established in state and federal regulations, as well as in the WQMP/CPP, which not only require review and final approval by the WQCC, but review and approval by EPA Region 6. The Department, along with any other entity other than the Department, can conduct an analysis of existing uses. These analyses may or may not conclude that a designated use amendment is warranted. It is not the analysis that requires the WQCC's approval, but the findings should they support amendments to applicable water quality standards. Designated uses may be amended if new information determines that the existing use has changed (the water quality is attaining more stringent criteria), or new information indicates the water can either attain a designated use with more or less stringent criteria. Designated uses are goals, as more information becomes available those goals are permitted to be amended, following the appropriate regulations and WQMP/CPP.*

An amendment to the designated use may be warranted based on an assessment of new information. These assessments, or analyses, are site-specific, data-driven, and time-sensitive, *and are therefore not static. As such, the process to determine an existing use may depend on various elements, each particular to the conditions for that waterbody.*

Beginning on page 38 of Mr. Gallegos' testimony (**LANL Exhibit 3, 2020 TR LANL-00097**), Triad and DOE-NNSA present information regarding the Department's proposed language in 20.6.4.10(C) NMAC and recommend deleting 20.6.4.10(C) NMAC in its entirety, or using the language as proposed on page 39 of Mr. Gallegos' testimony (**LANL Exhibit 3, 2020 TR LANL-00098**).

There is no supporting evidence to remove 20.6.4.10(C) NMAC in its entirety, as that would leave a gap in regulatory processes for site-specific criterion development prescribed in 20.6.4.10(F) NMAC.

*The Department did amend language based on Triad and DOE-NNSA's January 6, 2021, comments to the draft language (**NMED Exhibit 90**), including moving the last sentence referring to UAAs to a separate subsection [20.6.4.10(D) NMAC].*

*The Department disagrees with Triad and DOE-NNSA's recommendation that a site-specific criterion can be modified based on "background" rather than "natural conditions" for several reasons. In accordance with 40 C.F.R. § 131.11(b)(1) (**NMED Exhibit 25**), states are authorized to adopt criteria modified from EPA's recommended criteria based on site-specific conditions. However, in accordance with 40 C.F.R. § 131.5(a)(2) (**NMED Exhibit 121)**, EPA reviews State water quality standards to determine whether a State has adopted criteria to protect the designated uses. Therefore, site-specific criteria may be adopted but are required to support the designated use. In EPA's 1997 Memo to Water Management Division Directors (**NMED Exhibit 123**), EPA acknowledges that there may be circumstances to which "natural background" conditions, absent any interference by humans, are exceeding a criterion but still support aquatic* *life uses. This policy, consistent with the language currently being proposed in 20.6.4.10(B) NMAC, does not provide for site-specific aquatic life criteria development based on "background" conditions. The term "background" is undefined and can, in many cases, refer to conditions that have been impacted through anthropogenic activities and do not support the highest attainable condition for a particular water. Applying criteria based on elevated background conditions, particularly those that are anthropogenic in nature, is not appropriate for protecting designated uses. This problem is evident in Los Alamos where historical application of dichlorodiphenyltrichloroethane ("DDT") by the U.S. Forest Service to the areas in and around LANL has altered the "background" water quality. This "background" would not be supportable evidence for amending the criterion for DDT or its daughter products since concentrations of a contaminant above toxicological levels that impose harm to aquatic life would not be supportive of the aquatic life designated use. There are cases where the natural conditions, such as the exceptionally low pH observed in Sulphur Creek, are beyond the pH conditions that generally support aquatic life, but the aquatic life in the creek has been demonstrated to have adapted and is supported. Therefore, the Department does not support Triad and DOE-NNSA's recommendation to amend language in 20.6.4.10(B) NMAC as presented in Mr. Gallegos' testimony.*

V. REBUTTAL TESTIMONY REGARDING USE ATTAINABILITY ANALYSIS (20.6.4.15 NMAC)

Summary of NMMA's Testimony

On page 6 of NMMA's NOI, NMMA states they may present non-technical testimony to limit the application of UAAs to only those subject to federal jurisdiction. The reasoning provided is based on the Department's assertion that amendments were proposed to maintain consistency with federal regulations applicable to Waters of the United States, which not all surface waters of the state are.

There does not appear to be any reasoning or evidence in NMMA's NOI to support limiting the application of UAAs in this manner. The Standards for Interstate and Intrastate Surface Waters (20.6.4 NMAC) are required to comply with the CWA but are not restricted in jurisdictional application to only those recognized as Waters of the United States. Therefore, the assertion the State's water quality standards are only applicable to Waters of the United States is false. The Commission has authority to adopt water quality standards for surface and ground waters of the state pursuant to the Water Quality Act, NMSA 1978, Section 74-6-4(D).

On page 7 of NMMA's NOI, NMMA states there are conditions when a UAA is not required and when the "highest attainable use" does not need to be determined.

*The Department concurs that there are conditions in which a UAA is not required, as provided in 40 C.F.R. 131.10 (**NMED Exhibit 22**). References to these provisions are already provided in 20.6.4.15(A) NMAC. As such, these concerns posed by NMMA have been addressed.*

Continuing on page 7 of the NOI, NMMA states there are discrepancies between UAAs conducted by the Department and those conducted by parties other than the Department. This includes the exclusion of third-parties to file an expedited UAA, which is only afforded to the Department. NMMA also points out discrepancies in the use of language. The Department's proposed language states the Department can petition to remove a designated use and establish the highest attainable use whereas a third party is authorized to modify the designated use.

*There is no discrepancy in the process for amending a designated use to one with less stringent criteria through a UAA in accordance with 40 C.F.R. 131.10 (**NMED Exhibit 22**) but does recognize the apparent discrepancy in the use of language proposed by the Department* *between these two subsections. Therefore, the Department has proposed amended language in 20.6.4.15 NMAC to consistently reflect the function of a UAA is to remove a designated use and establish the highest attainable use (**NMED Exhibit 110**).*

<u>Summary of SJWC's Testimony</u>

On page 18 of Ms. DeRose-Bamman's testimony (**SJWC 2, 2020 TR SJWC-0021**), regarding 20.6.4.15 NMAC, SJWC recommends revising or removing the headers to the subparts as they are not aptly described.

*The Department has revised the titles to more accurately reflect the content of each section (**NMED Exhibit 110**).*

Beginning on page 18 of Ms. DeRose-Bamman's testimony (**SJWC 2, 2020 TR SJWC-0021**), regarding 20.6.4.15(A) NMAC, SJWC asserts this section would be clearer and non-duplicative if limited to describing only those instances where a UAA is required. As such, the SJWC recommends rejection of the language referring to when a UAA is not required.

*The Department disagrees that the proposed language reduces clarity. The Department added the language in response to Amigos Bravos' comment on the draft proposed amendments (**NMED Exhibit 95**), which recommended reference back to 20.6.4.10 NMAC. As rebutted earlier, regarding 20.6.4.10 NMAC, the proposed language in 20.6.4.10(D) NMAC identifies the UAA as a mechanism to amend a designated use and refers to 20.6.4.15 NMAC for the process and requirements. Given that the language for UAAs is in a different section than the section which provides the regulatory mechanisms for other types of amendments, the reference back to 20.6.4.10 NMAC is appropriate. Therefore, SJWC's recommendation for removal is not supported.*

Beginning on page 18 of Ms. DeRose-Bamman's testimony (**SJWC 2, 2020 TR SJWC-0021**), SJWC asserts that the "stringency" applies to the criteria, not the use. The SJWC recommends removing reference to language regarding when a UAA is not required.

*The Department agrees that stringency is applicable to the criteria, not the use and has proposed amended language in 20.6.4.15 NMAC accordingly (**NMED Exhibit 110**).*

Beginning on page 18 of Ms. DeRose-Bamman's testimony (**SJWC 2, 2020 TR SJWC-0021**) states that the header for 20.6.4.15(D) NMAC, titled "Process to amend a designated use through a use attainability analysis" leads to confusion since Subsections A-C imply applicability to all amendments being proposed using a UAA however Subsection E specifically discusses the requirements for parties other than the Department petitioning for an amendment using a UAA. As such, SJWC recommends renaming the headers to be more appropriate to the content and applicability.

*The Department acknowledges there is no clarification that Subsections A through D are applicable for all UAAs. To clarify this, the Department has proposed language in 20.6.4.15(E) NMAC (**NMED Exhibit 110**) which references Subsections A-D as being applicable; with the exception of an expedited UAA which is already identified to be limited in use to the Department.*

<u>Summary of Triad and DOE-NNSA's Testimony</u>

Beginning on page 10 in Mr. Fulton's testimony (**LANL Exhibit 6, 2020 TR LANL-00175**) regarding 20.6.4.15 NMAC, Triad and DOE-NNSA recommend the use of the term "stringent" be limited to references to criterion, not attainable, designated, or existing uses.

The Department recognizes that stringency is not applicable to uses, as they are neither more or less stringent than the other, and it is the criteria that protect for those uses that demonstrates stringency in relation to one another.

*However, the Department does not concur with the language as proposed by Triad and DOE-NNSA. As proposed, the language does not clarify what a "higher level of protection" means. The Department has therefore proposed alternative language in 20.6.4.10(B) NMAC, 20.6.4.15(A) NMAC and 20.6.4.15(D)(2)(c) NMAC to provide the specification warranted for implementation (**NMED Exhibit 110**).*

Beginning on page 13 of Dr. Dail's testimony (**LANL Exhibit 5, 2020 TR LANL-00152**) regarding 20.6.4.15(A)(1) and 20.6.4.15(D)(2) NMAC, the references to "not an existing use" and "that are not existing uses," Triad and DOE-NNSA assert this reiteration is redundant, as 20.6.4.10 NMAC already includes this language. Triad and DOE-NNSA recommend the language remain only in 20.6.4.10 NMAC, which is more clearly and accurately stated.

The Department's proposed amendment to 20.6.4.10 NMAC does not have language regarding amending a designated use that is "not an existing use." The Department disagrees that the reiteration is redundant given the existing use is the limiting factor for amending a designated use to one with less stringent criteria.

In 20.6.4.15(E) NMAC, Triad and DOE-NNSA have requested delineated timelines for review and response to a third-party work plan for the sake of regulatory certainty, stating this would be consistent with other EPA and NMED processes such as permit applications and review. On page 16 of Dr. Dail's Testimony **(LANL Exhibit 5, 2020 TR LANL-00155**) Triad and DOE-NNSA assert that a "predictable timeline is of utility to NMED, while ignoring the need for predictable review of the work plan requested in LANL's response to the initial petition." Dr. Dail reiterates this statement on page 22 of his testimony (**LANL Exhibit 5, 2020 TR LANL-00161**) regarding 20.6.4.15(E) NMAC. Triad and DOE-NNSA request the inclusion of timelines for the

Department and EPA to provide review and approval on submitted work plans, stating that the language as proposed holds the petitioner to a higher standard than the Department.

The timeline requested by the Department in the work plan allows for reasonable expectations of the lengthy and routinely underestimated timeframes required to conduct a rulemaking; this can and has had implications on third parties that have regulatory obligations under an NPDES permit. Therefore, identifying these time constraints is in the petitioner's best interest, not the Department's.

The Department recognizes that a definitive period of review provides a level of assurance to potential petitioners for a proposed standards amendment; however, it would be disingenuous and potentially costly if the petitioner were to proceed without input from the Department at the work plan stage. Given the latitude afforded to parties other than the Department to determine the geographical and regulatory extent for the types of designated amendments they wish to seek, the extent of information in any given work plan varies greatly, making it infeasible to commit to a particular timeline for the Department's review of such proposals. The processes for permitting, which have regulatory timelines, are those that are associated with enforceable actions. These processes have been developed to be prescriptive and do not provide as much latitude with conceptual development as a standards amendment.

Elements such as completeness of the work plan; geographical extent; interest among stakeholders, tribes, and the public; available defensible data (or lack thereof); technical complexity; and priorities and resources of the third party and Department all play a part in the ability to provide a timely response and approval for such work plans. As such, work plans have a wide range of diversity which the Department evaluates individually.

There is no provision in 20.6.4 NMAC for the Department to provide comment on a draft UAA. The UAA work plan is the only mechanism the Department has to ensure that a proposed standards amendment, based on a UAA, follows the applicable regulations. The Department has limited staff dedicated to the review of standards proposals, and there are often other significant rulemaking proceedings occurring that would make strict adherence to a timeline difficult to achieve. For example, a work plan submitted during the preparation and proceedings for this Triennial Review would be given a lower priority by necessity. Thus, the Department's approval of a UAA work plan based on a specified timeline could lead to a petition for a standards amendment without the necessary elements to ensure a successful hearing. This requirement would undoubtedly impose unnecessary financial and human resource burdens on the third party and on the Department.

The Department is committed to working with parties interested in standards amendments and communicates openly regarding its workload and timelines for work plan review. There have been two recent proposals for water quality standard amendments by LANL over the past several years. The timeframes in which NMED responded were related to the information provided by the petitioner. LANL submitted an initial work plan to the Department on June 27, 2018, regarding a potential UAA for a designated aquatic life use amendment for Sandia Canyon based on naturally occurring ambient air conditions preventing attainment. The Department provided comments to the work plan on September 14, 2018; LANL did not submit a revised work plan to the Department until May 28, 2019, and did not address the critical elements necessary for a defensible UAA. Therefore, in the best interest of ensuring a supportable UAA, the Department and EPA provided additional comments on August 22, 2019. Following a discussion with the Department regarding the comments, LANL submitted a revised work plan to the Department on February 10, 2020. The

Department approved the revised work plan on April 10, 2020. Despite monthly discussions between LANL and the Department regarding updates, the Department has not yet received a draft UAA based on the approved work plan. This example illustrates the benefits and shortcomings of providing flexibility for parties other than the Department to bring forth designated use amendments based on a UAA.

The Department has attempted to reduce some of the uncertainties found over the past several third-party UAAs by clarifying the work plan elements in 20.6.4 NMAC without reducing the flexibility provided to third-parties to petition for a wide array of types of amendments with ranging technical complexities. The Department does not support inclusion of a timeline in 20.6.4 NMAC, as this will reduce the functionality of this process for the petitioner, more so than it would for the Department.

Beginning on page 14 of Dr. Dail's testimony (**LANL Exhibit 5, 2020 TR LANL-00153**) regarding 20.6.4.15(D) NMAC, Triad and DOE-NNSA found the term "current use" to be undefined and assumed it to mean "existing use."

*The Department amended the language referred to in this comment in the revised petition filed on March 12, 2021, filed as **NMED Exhibit 9,** and in the revised amended language (**NMED Exhibit 110**). Therefore, the Department believes this has been addressed in its entirety and proposes no further amendments regarding this concern.*

Beginning on page 14 of Dr. Dail's testimony (**LANL Exhibit 5, 2020 TR LANL-00153**) regarding 20.6.4.15(B) NMAC, Triad and DOE-NNSA recommend renaming the heading to "Conducting a use attainability analysis."

The headers align with the federal regulations that provide the multi-level process for amending a designated use to a use with less stringent criteria. The language in 20.6.4.15(B)

*NMAC distills the parts in 40 C.F.R. § 131.10(g) (**NMED Exhibit 22**) into corresponding subsections and describes how these subparts can be achieved. The Department agrees that the headers could be more descriptive of the actual content to aid in implementation. Therefore, the Department counterproposes the following outline: A. Regulatory requirements for a use attainability analysis. B. Methods for developing a use attainability analysis. C. Determining the highest attainable use. D. Process to amend a designated use through a use attainability analysis (**NMED Exhibit 110**).*

On page 17 of Dr. Dail's testimony (**LANL Exhibit 5, 2020 TR LANL-00156**) regarding 20.6.4.15(A) NMAC, Triad and DOE-NNSA state that the process regarding amending a designated use to one with more stringent criteria based on existing uses is not defined. Dr. Dail acknowledges there is language in 20.6.4.10 NMAC regarding amending designated uses based on existing uses with more stringent criteria but argues that promoting greater protections requires supporting evidence and that supporting evidence should be the result of a comprehensive analysis of all existing data. As stated in LANL's comments on NMED's public comment draft (**NMED Exhibit 90**), there is concern that "an entity could engage, in good faith, in a lengthy and costly UAA process to demonstrate the highest attainable use. However, under new Section 10.B, NMED could subsequently, 'discover' some modicum of 'supporting evidence' not previously considered (or even previously considered by the WQCC and EPA, but now being reinterpreted unilaterally by NMED), then simply declare it has concluded there is a more protective existing use for a segment." LANL asserts that the process to amend designated uses, based on existing uses, should be similar to a UAA. LANL recommends the Department institute a codified, unbiased evidence-based approach for ascribing new designated uses since both UAAs and existing use demonstrations assign designated uses to a waterbody. Triad and DOE-NNSA recommend a change in language in 20.6.4.15(A) NMAC to reflect a UAA be the mechanism to amend any designated use to one with more stringent criteria, even though federal regulations do not require a UAA in this instance. Dr. Dail reiterates this sentiment, beginning on page 21 of his testimony (**LANL Exhibit 5, 2020 TR LANL-00160**) regarding 20.6.4.15(D) NMAC, where Triad and DOE-NNSA seek consistency in the process for determining an existing use and how that reflects in the amendment of designated uses. However, Triad and DOE-NNSA did not propose any amendments at this time.

The Department does not fully understand the reference to 20.6.4.15(D) NMAC in page 21 of Dr. Dail's testimony. Although the Department does not deny that any amendment of a designated use to one with more stringent criteria would not require a UAA, there are only two regulatory mechanisms that would provide for this type of amendment: 1. The existing use has criteria more stringent than the designated use and 2. New information is available that demonstrates a designated use with more stringent criteria is attainable. All amendments to 20.6.4 NMAC require evidence at multiple points in the rulemaking process. Dr. Dail's proposed amendments therefore do not appear to coincide with his supporting testimony.

On page 18 of Dr. Dail's testimony (**LANL Exhibit 5, 2020 TR LANL-00157**), regarding 20.6.4.15(A) NMAC, Triad and DOE-NNSA find that although the language is consistent with EPA regulations, the Department should implement a process similar to a UAA to determine the highest attainable use for amending designated uses based on existing uses.

The Department finds fault with this assertion, for several reasons. First, there is no defined process for determining the "highest attainable use," it is required when conducting a UAA, but there is no defined evidence required to make the demonstration. Second, an EUA only evaluates the existing uses in comparison to the current designated use. The federal regulation at

*40 C.F.R. § 131.10(i) (**NMED Exhibit 22**) does not require a re-evaluation of the "highest attainable use." The Department disagrees that a process for determining the highest attainable use is applicable for designated use amendments based on existing uses pursuant to 40 C.F.R. § 131.10(i) (**NMED Exhibit 22**).*

Beginning on page 18 of Dr. Dail's testimony (**LANL Exhibit 5, 2020 TR LANL-00157**), Triad and DOE-NNSA propose to move the description of a UAA to the definitions section (20.6.4.7 NMAC) to be consistent with other definitions.

*The Department finds this consistent with other amendments associated with definitions and has amended the proposed language accordingly (**NMED Exhibit 110**).*

On page 20 of Dr. Dail's testimony (**LANL Exhibit 5, 2020 TR LANL-00159**), in 20.6.4.15(C) NMAC, Triad and DOE-NNSA propose, purportedly for purposes of clarity, to add language to include the federal reference to the definition for "highest attainable use."

*Since the use of "highest attainable use" is limited in use and scope to the modified designated uses supported specifically by a UAA, The Department does not have issue with inclusion of this added language, as proposed by Triad and DOE-NNSA. Accordingly, the Department has revised the proposed amendments, as suggested, in **NMED Exhibit 110**.*

Beginning on page 32 of Mr. Gallegos' testimony (**LANL Exhibit 3, 2020 TR LANL-00091**), regarding 20.6.4.15(D)(2) NMAC, Triad and DOE-NNSA express concern with the language "may" as it pertains to the process to remove a designated use and establish the highest attainable use using an expedited UAA process. Triad and DOE-NNSA do not believe this process should be discretionary and, as such, recommend the language reflect that a UAA based on findings of a Hydrology Protocol survey shall be done using an expedited UAA process.

The Department rebuts Triad and DOE-NNSA's assertion that the Department is in any way required to amend a designated use based on an expedited UAA process. As described further in 20.6.4.15(D)(2) NMAC, a proposed amendment must meet many conditions before an expedited process would be permissible. Additionally, there are other circumstances under which the Department may choose to pursue a regular UAA process either based on technical complexity, public interest, or based on input from EPA Region 6, who may or may not find the evidence compelling to provide the technical approval necessary to make the determination implementable for purposes of the CWA.

The UAA is an analysis conducted to determine if a designated use amendment is supported. The findings of a UAA do not always lead to a recommended designated use amendment, nor does the recommendation always lead to an approved designated use amendment. Although the Department uses the term "UAA process" liberally to refer to those UAAs that have led to a recommendation and the subsequent rulemaking process to amend the destinated use, the term is somewhat of a misnomer. The UAA itself is only the analysis used to support a proposed amendment, but the entire process to amend such a designated use incorporates the rulemaking process as authorized by NMSA 1978, Section 74-6-4(D) and described in 20.1.6 NMAC, as is true for all proposed Water Quality Standards amendments.

*The WQMP/CPP (**NMED Exhibit 64**) describes the processes for both the regular UAA and an expedited UAA. The expedited UAA process is an alternative to the regular UAA process; however, it is not a substitute for the rulemaking process required in order to amend 20.6.4 NMAC. Given that the expedited UAA process is very limited in scope, Triad and DOE-NNSA's recommendation to use the term "will" or "shall" is inappropriate.*

VI. REBUTTAL TESTIMONY REGARDING WATERS WITHIN LANL (20.6.4.99 NMAC, 20.6.4.126 NMAC, 20.6.4.128 NMAC and 20.6.4.140 NMAC)

<u>Summary of Amigos Bravos' Testimony</u>

On page 15 of Ms. Conn's direct testimony (**Amigos Bravos Exhibit 3**), Amigos Bravos states that they support the proposed designated use amendments for these waters based on the Department's analysis.

The Department appreciates the work and support invested in this endeavor by Amigos Bravos and acknowledges that continued work is warranted for other waters within LANL. As such, the Department will continue the work to assess and propose amendments for other waters within LANL, as appropriate.

<u>Summary of Triad and DOE-NNSA's Testimony</u>

TESTIMONY FROM TRIAD AND DOE-NNSA REGARDING SUPPORT.

On page 25 of Mr. Gallegos' testimony (**LANL Exhibit 3, 2020 TR LANL-00084**), TRIAD AND DOE-NNSA provide support for the amended petition, which proposes to retain the language in 20.6.4.128 NMAC. Triad and DOE-NNSA support this approach as it provides the basis for a process to amend designated uses based on scientifically defensible data, as provided in 40 C.F.R. § 131.10(k)(3) (**NMED Exhibit 22**), which will aid in future amendments of similar nature.

*The Department appreciates the input from Triad and DOE-NNSA but would like to clarify that, in accordance with 40 C.F.R. § 131.10(i) (**NMED Exhibit 22**), states shall amend a designated use to have criteria no less stringent than the existing use. Amending designated uses based on an existing use with more stringent criteria is not novel for the State's Standards for Interstate and Intrastate Surface Waters (20.6.4 NMAC). The title "Existing Use Analysis" is the* *only element introduced by the Department; however, the necessary elements and procedural framework are those required for any water quality standard amendment.*

TESTIMONY FROM TRIAD AND DOE-NNSA REGARDING REFERENCE TO "RECLASSIFICATION."

Throughout Mr. Gallegos' testimony (**LANL Exhibit 3**), Mr. Goering's testimony (**LANL Exhibit 4**), and Dr. Meyerhoff's testimony (**LANL Exhibit 2**), the terms "reclassification" and "reclassify" are used when referring to the Department's proposal to amend designated uses for waters within LANL.

There has been no "reclassification" of waterbodies. The term "reclass" is not referenced in either 20.6.4 NMAC or the State's approved WQMP/CPP.

*There is a definition for "classified waters" in 20.6.4.7(C)(1) NMAC, which, in short, refers to a surface water of the State which has a segment description in 20.6.4.101-899 NMAC. Pending sufficient evidence and the regulatory mechanism, a designated use for a water may be amended, and if there is an established Section in 20.6.4 NMAC that has the appropriate designated uses within the applicable geographical location, the water may be listed in that classified section of 20.6.4 NMAC, but the water itself is not "reclassified." As such, and as it pertains to the testimony to which Triad and DOE-NNSA are referring, the Department is not proposing to "reclassify" any waters, but rather is proposing an amendment to the designated aquatic life use for three portions of tributaries within LANL, in accordance with 40 C.F.R. § 131.10(i) (**NMED Exhibit 22**). This clarification is important as the federal regulations do not contain provisions for "moving" or "reclassifying" waters, unless the designated uses have the same criteria, or the state is reformatting but not amending any uses. As such, EPA would likely* *not support "reclassifying" a water but could support amending the designated use based on an existing use with more stringent criteria.*

TESTIMONY FROM TRIAD AND DOE-NNSA REGARDING REFERENCES TO FORMER DRAFTS.

Beginning on page 24 and later beginning on page 26 of Mr. Gallegos' testimony (**LANL Exhibit 3, 2020 TR LANL-00083 and 2020 TR LANL-00085**), Mr. Gallegos discussed proposed language in 20.6.4.128 and 20.6.4.140 NMAC that the Department originally proposed in the petition for rulemaking and request for hearing, filed with the Commission on August 19, 2020. Similarly, on page 22 of Dr. Meyerhoff's testimony (**LANL Exhibit 2, 2020 TR LANL-00044**) he states that "NMED stated that the basis for the proposed changes to Section 128 was identification by NMED of ephemeral waters…."

Although the Department finds discrepancies with some of the statements made by both Mr. Gallegos and Dr. Meyerhoff, on behalf of Triad and DOE-NNSA, regarding the original petition filed on August 19, 2020, which the Department distributed for public comment on November 1, 2020, Triad and DOE-NNSA's comment irrelevant to the current proposed amendments, filed as an amended petition with the Commission on March 12, 2021. Therefore, the Department is not providing rebuttal to Triad and DOE-NNSA's comments on the petition filed on August 19, 2020.

Beginning on page 28 of Dr. Meyerhoff's testimony (**LANL Exhibit 2, 2020 TR LANL-00050**), he states that the "proposed re-classification included a finding that marginal warmwater aquatic life is the 'highest attainable use,' rather than other aquatic life uses, such as a warmwater aquatic life use or coldwater aquatic life use." Further on page 28 (**LANL Exhibit 2, 2020 TR**

LANL-0050), Dr. Meyerhoff states that a process is needed especially when the highest attainable use is also an existing use.

*The use of the term "highest attainable use" was used incorrectly in the initial draft work plan prepared for discussion purposes amongst the parties to the 2015 Joint Stipulation (**NMED Exhibit 72**). However, the demonstration itself, which has been corrected to reflect the correct spelling of "Twomile Canyon" and the appropriate reference to Pajarito Canyon in the title (See Testimony in Section VI. Regarding the EUA) "Existing Use Analysis for Effluent Canyon, Upper S-Site Canyon and Twomile Canyon from Pajarito Canyon upstream to its confluence with Upper Twomile Canyon" (**NMED Exhibit 124**) was limited in scope to just determining the existing use. Triad and DOE-NNSA's statement that the EUA evaluated or determined the existing use was the highest attainable use is therefore incorrect.*

Beginning on page 30 and continuing through page 32 of Dr. Meyerhoff's testimony (**LANL Exhibit 2, 2020 TR LANL-00052 through 2020 TR LANL-00054**), Triad and DOE-NNSA express concern with the elements of the draft work plan. In part, as found on page 31 of Dr. Meyerhoff's testimony (**LANL Exhibit 2, 2020 TR LANL-00053**), Triad and DOE-NNSA express "significant concern" with the outcomes of the EUA work plan as it would designate aquatic life uses with more stringent criteria for all tributaries that were intermittent or undetermined.

*The draft work plan is not relevant as it pertains to the proposed amendments based on the EUA filed as **NMED Exhibit 73** and retitled and resubmitted as **NMED Exhibit 110**.*

*A work plan was not required to develop a demonstration for amending a designated use based on an existing use with more stringent criteria in accordance with 40 C.F.R. § 131.10(i) (**NMED Exhibit 22**). The Department developed and presented the work plan to Amigos Bravos* *and Triad to facilitate discussions and reach a consensus on the appropriate protections for the non-perennial waters within LANL. The Department took the concerns expressed by Triad and DOE-NNSA into consideration and ultimately focused the EUA only on those waters to which all three parties agreed were priorities, had sufficient data, and needed further analysis to evaluate the appropriate and protective uses. The Department made significant modifications, based on feedback from the parties, from the initial draft work plan provided as* ***LANL Exhibit 34*** *to the EUA for Effluent Canyon, Upper Site Canyon and Twomile Canyon from Pajarito Canyon to Upper Twomile Canyon (****NMED Exhibit 124****). As such, Triad and DOE-NNSA's comments and concerns regarding the draft EUA work plan are irrelevant to the demonstration and proposed language in 20.6.4 NMAC (****NMED Exhibit 110****).*

TESTIMONY FROM TRIAD AND DOE-NNSA REGARDING HISTORY AND BACKGROUND.

On page 10 of Mr. Gallegos' testimony (**LANL Exhibit 3, 2020 TR LANL-00069**), Triad and DOE-NNSA assert the geographical extent of LANL spans across seven watersheds, based around seven major canyons on the Pajarito Plateau that drain into the Rio Grande basin.

The Department attempted to determine the hydrologic "watershed" as described by Triad and DOE-NNSA, however the map, provided as ***LANL Exhibit 37****, does not provide the delineation of these seven "watersheds" nor does it align with any commonly accepted delineations such as the U.S. Geologic Survey ("USGS") watershed or subwatershed hydrologic unit codes ("HUCs"). The Department was able to determine that LANL is located within two USGS watersheds, the Canada Ancha-Rio Grande watershed (HUC-10 1302020102) and a small portion of the Rio-Tesuque-Rio Grande watershed (HUC-10 1302010113). Within these two watersheds, LANL is located within three USGS subwatersheds including the Canada Ancha-Rio*

Grande subwatershed (HUC-12 130202010203), the Water Canyon-Rio Grande subwatershed (HUC-12 130202010204) and the Los Alamos Canyon subwatershed (HUC-12 130201011303).

The use of the term "watershed" without reference, scale or physical topographical delineation is ambiguous. The Department requests a description of how Triad and DOE-NNSA delineated the seven "watersheds" referenced in their testimony.

On page 10 of Mr. Gallegos' testimony (**LANL Exhibit 3, 2020 TR LANL-00069**), Triad and DOE-NNSA assert that there are approximately eight miles of perennial waters within LANL, and it is these eight miles of perennial waters referred to as "Section 126 waters."

The Department does not disagree that there may be eight miles of perennial waters within LANL, but Triad and DOE-NNSA have not provided evidence that these waters are classified in 20.6.4.126 NMAC. Currently, there are only four reaches of perennial waters within LANL that are named and classified in 20.6.4.126 NMAC. Section 126 currently reads: "Perennial portions of Cañon de Valle from Los Alamos national laboratory (LANL) stream gage E256 upstream to Burning Ground spring, Sandia canyon from Sigma canyon upstream to LANL NPDES outfall 001, Pajarito canyon from Arroyo de La Delfe upstream into Starmers gulch and Starmers spring and Water canyon from Area-A canyon upstream to State Route 501." As provided in Appendix A of the Department's 2020-2022 CWA § 303(d)/305(b) Integrated Report[3], the classified waters in 20.6.4.126 NMAC include Canon de Valle (LANL gage E256 to Burning Ground Springs) which is approximately 0.31 stream miles; Pajarito Canyon (Arroyo de la Delfe to Starmers Gulch) which is approximately 0.33 stream miles; Sandia Canyon (Sigma Canyon to NPDES Outfall 001) which is approximately 2.73 stream miles; and Water Canyon (Area-A Canyon to NM 501) which is approximately 1.31 stream miles. The total mileage of waters classified in 20.6.4.126 NMAC is

[3] *(https://www.env.nm.gov/surface-water-quality/wp-content/uploads/sites/25/2018/03/2020-2022-IR-Appendix-A-Integrated-List_012221.pdf)*

*approximately 4.68 stream miles. The Department, confirmed by Triad and DOE-NNSA (**NMED Exhibit 113**), identified an additional 1.68 miles of perennial waters through Hydrology Protocol surveys. And, as suggested by Triad and DOE-NNSA's testimony referencing approximately 8 miles of perennial streams, there are likely more waters that fit this condition. However, these waters are not currently classified since they are not described anywhere in 20.6.4.101-899 NMAC. The Department finds that there are only approximately 4.68 stream miles of classified perennial waters within LANL meeting the classification of "Section 126 waters." As such, Triad and DOE-NNSA's assertion there are approximately 8 miles of perennial waters that could be referred to as "Section 126 waters" is incorrect.*

Similarly, on page 12 of Mr. Gallegos' testimony (**LANL Exhibit 3, 2020 TR LANL-00071**), he testifies that there are approximately 20 and 52 miles of intermittent and ephemeral waters within LANL, respectively.

The Department finds no evidence demonstrating the validity of this claim. The Department disagrees with the estimated stream miles for both ephemeral and intermittent waters without reasonable evidence supporting Triad and DOE-NNSA's assertion delineating between the non-perennial hydrologic regimes. It is reasonable to estimate approximately 72 stream miles of non-perennial waters, which comprise both ephemeral and intermittent hydrology, within LANL, but without additional data and evidence to support this claim the total non-perennial stream miles cannot be specifically characterized as either intermittent or ephemeral.

On page 12 of Mr. Gallegos' testimony (**LANL Exhibit 3, 2020 TR LANL-00071**), he states that the Department assesses LANL surface waters every two years to determine water quality impairments.

The Department assesses available water quality data for waterbodies on the Pajarito Plateau every other assessment cycle (every four years). Although the Department assesses waters within LANL, it completes these assessments only to the extent that data are available for each waterbody. See Appendix A of the Department's 2020-2022 CWA § 303(d)/305(b) Integrated Report[4] *for the assessment status of LANL tributaries.*

On page 18 of Dr. Meyerhoff's testimony (**LANL Exhibit 2, 2020 TR LANL-00040**), he states that during the 2013 Triennial Review [WQCC 14-05(R)], "LANL summarized its efforts to regularly evaluate the appropriateness of the secondary contact and limited aquatic life uses" for classified waters in 20.6.4.128 NMAC. Dr. Meyerhoff references rebuttal testimony provided by Michael T. Saladen on February 12, 2015, where Mr. Saladen states that stream segments are assessed on a continuous basis and evaluated for flow, benthic macroinvertebrates, and vegetative cover. Mr. Saladen continues to state that there was no evidence that there have been any changes warranting a different designated aquatic life use for the non-perennial waters in 20.6.4.128 NMAC.

*The reference and the summary presented by Dr. Meyerhoff, does not demonstrate compliance with 40 C.F.R. § 131.20 (**NMED Exhibit 21**). Although Mr. Saladen provided testimony stating that there was no evidence warranting aquatic life use amendments for non-perennial waters, this statement alone does not demonstrate that uses under Section 101(a)(2) of the CWA (33 U.S. Code § 1251) (**NMED Exhibit 10**) are not existing or attainable. There does not appear to have been any evidence presented at either of the Triennial Reviews referenced by Dr. Meyerhoff that LANL conducted an evaluation of existing uses for the classified non-perennial waters in 20.6.4.128 NMAC. The absence of an amendment or evidence does not conclude an*

[4] https://www.env.nm.gov/surface-water-quality/wp-content/uploads/sites/25/2018/03/2020-2022-IR-Appendix-A-Integrated-List_012221.pdf

aquatic life use amendment was not warranted. Therefore, the evidence presented by Dr. Meyerhoff to be unsupported.

On page 19 of Dr. Meyerhoff's testimony (**LANL Exhibit 2, 2020 TR LANL-00041**), he states that "[t]he WQCC-approved revisions to the water quality standards during the 2009 and 2013 Triennial Reviews did not include any amendments to Sections 126 or 128 because there was no information in the record supporting changes to the water quality standards in these Sections."

*The Department disagrees with Dr. Meyerhoff's statement based on evidence presented by Amigos Bravos in the 2013 Triennial Review [WQCC 14-05(R)] demonstrating that an existing use included the presence of benthic macroinvertebrates in intermittent waters as demonstrated in the "U.S. Fish & Wildlife Service – A Water Quality Assessment of Four Intermittent Streams in Los Alamos County, New Mexico (July 2002)" ("U.S. Fish & Wildlife Study")(**NMED Exhibit 135**). This argument was redacted by Amigos Bravos only because the parties entered into the 2015 Joint Stipulation (**NMED Exhibit 72**) to evaluate the appropriate designated uses for non-perennial waters within LANL classified in 20.6.4.128 NMAC. Therefore, Dr. Meyerhoff's assertion that the designated uses in 20.6.4.128 NMAC have not been amended due to the absence of information is incorrect. Where in fact, the 2015 Joint Stipulation (**NMED Exhibit 72**) identifies that all three parties recognize the designated uses for some of these non-perennial waters may not be appropriate.*

On page 19 of Dr. Meyerhoff's testimony (**LANL Exhibit 2, 2020 TR LANL-00041**), he states that EPA's Record of Decision on the 2009 Triennial Review [WQCC 08-13(R)] reaffirmed its previous approval of the designated uses for 20.6.4.126 and 20.6.4.128 NMAC by stating these waters do not have an aquatic life use as required in Section 101(a)(2) of the CWA (33 U.S. Code § 1251) (**NMED Exhibit 10**) and must therefore be re-examined every three years.

The Department does not rebut the statement but does disagree with the assumption that conclusive re-evaluations were conducted. In fact, this argument was brought up by Amigos Bravos as part of the 2009 Triennial Review [WQCC 08-13(R)] and was reiterated in the WQCC's 2010 Statement of Reasons for the 2009 Triennial Review where the WQCC stated that no new information was brought forward. It is inappropriate to assert that the lack of information indicates that attainable or existing uses were evaluated, as stated in EPA's Record of Decision.

Therefore, Triad and DOE-NNSA's statement that the designated uses were evaluated because EPA stated they required a re-examination every three years is inaccurate.

On page 19 of Dr. Meyerhoff's testimony (**LANL Exhibit 2, 2020 TR LANL-00041**), he states that "EPA did not indicate any concerns with the previously approved Section 126 and 128 designated uses."

As stated in the WQCC's Statement of Reasons for the 2009 Triennial Review [WQCC 08-13(R)]*, no new information was brought forward for EPA to consider. A lack of information does not mean the designated uses are appropriate.*

On page 31 of Dr. Meyerhoff's testimony (**LANL Exhibit 2, 2020 TR LANL-00053**) regarding the EUA amending the designated use for three intermittent waters within LANL, he states that the "WQCC and EPA have already approved the classification of waters into Section 128…." Mr. Goering reiterates this statement on page 28 of his testimony (**LANL Exhibit 4, 2020 TR LANL-00131**), where he states, "There is no new information that would suggest further changes to these waters are appropriate."

First, designated uses, although adopted with the best available information at the time, are not static. All waters are subject to designated use amendments, as provided for in the federal regulations. Specifically, there are three conditions that would trigger a designated use *amendment; first, if new information is available that gives reason for an amendment (40 C.F.R. § 131.20) (**NMED Exhibit 21**); second, if the existing use has more stringent criteria than the designated use (40 C.F.R. § 131.10(i) (**NMED Exhibit 22**); or third, if the designated use in unattainable due to one of the factors in 40 C.F.R. § 131.10(g) (**NMED Exhibit 22**). New information from the Level 1 Hydrology Protocol surveys conducted in 2016 – 2019, indicate additional amendments may be warranted for other non-perennial waters within LANL.*

The Department does not disagree with Triad and DOE-NNSA's assertion that the Commission adopted designated uses for non-perennial waters within LANL, but these uses are not subject to amendments based on one of the three conditions listed above.

On page 21 of Dr. Meyerhoff's testimony (**LANL Exhibit 2, 2020 TR LANL-00043**) and page 4 of Mr. Gallegos' testimony (**LANL Exhibit 3, 2020 TR LANL-00063**) Triad and DOE-NNSA reference a chronology (**LANL Exhibit 36)** of collaboration that took place as part of the 2015 Joint Stipulation (**NMED Exhibit 72**).

*The chronology contained in LANL Exhibit 36 is incomplete and misleading. The Department initiated and followed up with the parties, specifically with LANL through letter, email, and meetings throughout 2017 and 2018 to coordinate data collection pertinent to determining the appropriate designated uses for non-perennial waters within LANL. As such, the Department has produced a supplemental chronology (**NMED Exhibit 126**) of the collaborative efforts undertaken as part of the 2015 Joint Stipulation (**NMED Exhibit 72**).*

On page 30 of Dr. Meyerhoff's testimony (**LANL Exhibit 2, 2020 TR LANL-00052**), he states that the draft EUA work plan was not provided until October 27, 2020, well after the Department's petitioning the Commission for proposed amendments to 20.6.4 NMAC.

*Providing the overlapping timelines for the Triennial Review and the work completed under the 2015 Joint Stipulation (**NMED Exhibit 72**) is vital to understanding Triad and DOE-NNSA's assertion that the Department did not provide a timely demonstration.*

*In accordance with 40 C.F.R. § 131.20 (**NMED Exhibit 21**) and 20.6.4.10 NMAC, the State is obligated to review and amend water quality standards in a public hearing at least once every three years. This is generally referred to as the "Triennial Review." Given the lengthy and unpredictable hearing process, the Department initiates the Triennial Review three years from the date of EPA's last approval and Technical Support Document ("TSD"). Based on the approval of the last Triennial Review by the EPA Region 6 Administrator in August 2017, the Department was obligated, pursuant to 40 C.F.R. § 131.20 (**NMED Exhibit 21**), to file any proposed amendments in a petition for a hearing on or before August 2020.*

*In conjunction with the Triennial Review, the 2015 Joint Stipulation (**NMED Exhibit 72**) also had a defined timeline. In accordance with the 2015 Joint Stipulation (**NMED Exhibit 72**), the Department was required to petition the Commission on any of the agreed-upon designated use amendments no later than the next Triennial Review. Given the next Triennial Review required a petition by August 2020, the Department was required to petition for amendments in accordance with the 2015 Joint Stipulation by August 2020 (**NMED Exhibit 72**).*

*As part of the 2015 Joint Stipulation (**NMED Exhibit 72**), the parties agreed that the determination of the hydrologic regime would provide the strongest evidence for determining appropriate designated uses for non-perennial waters within LANL. Due to various factors, some of which the Department outlines in the supplemental chronology provided as **NMED Exhibit 126**, 90% of the Hydrology Protocol surveys conducted as part of this effort occurred in the late summer/early fall of 2019. Although, the Department kept notes during the surveys to compare* *for quality assurance purposes, the "official" Hydrology Protocol surveys conducted in 2019 were retained by Triad and DOE-NNSA for internal review and clearance before being provided to the Department on January 30, 2020.*

*Given the filing for the Triennial Review, including the proposed amendments, was required to be completed by August 2020, the Department took an approach that consensus on at least some waterbodies could be reached prior to the Triennial Review hearing. Although the parties to the Stipulated Agreement did not reach consensus before the Triennial Review petition in August 2020, the Department proposed a broadly worded petition for amendments to 20.6.4.128 and 20.6.4.140 NMAC, to make progress towards fulfilling the obligations in the 2015 Joint Stipulation (**NMED Exhibit 72**). The Department expected that at least some portion would be agreeable and be ready by the Triennial Review hearing.*

While preparing the petition for the Triennial Review hearing, the Department prepared a work plan to determine what regulatory basis and defensible evidence was available for amending the designated aquatic life and recreational uses for the non-perennial waters within LANL. The intent of the work plan, although not required, was to facilitate a discussion with the parties on reaching consensus.

The Department began efforts to discuss the draft work plan with the parties beginning in September 2020. The Department then provided the draft work plan, for discussion purposes only, in October 2020. However, due to scheduling conflicts, the Stipulated Agreement parties next met to discuss the path forward and the draft work plan on November 19, 2020. The parties met for a follow-up technical discussion on December 16, 2020. The goal of the technical discussion was to form a final consensus on waterbodies in satisfaction of the Stipulated Agreement. Based on the discussion, Amigos Bravos, for the most part, supported the initial reasoning as presented in *the draft work plan proposed by the Department, which proposed to amend designated uses for all waters, other than those demonstrated to be ephemeral. Triad and DOE-NNSA contested that although there was the probability that other intermittent waters within LANL likely warrant a designated use with more stringent criteria, there was only sufficient evidence at the time to proceed with amending the designated uses for Effluent Canyon, and portions of Twomile Canyon and S-Site Canyon.*

*All parties agree that there is evidence available to warrant amendments to other non-perennial waters within LANL, but as it pertained to the conditions of the 2015 Joint Stipulation (**NMED Exhibit 72**) and the timeline to petition for the next Triennial Review, the parties agreed to narrow the focus of this proposed amendment to the three portions of tributaries noted above, which was limited by Triad and DOE-NNSA's input.*

*Therefore, in accordance with the 2015 Joint Stipulation (**NMED Exhibit 72)**, it was agreed that the Department would proceed with designated use amendments for Effluent Canyon, upper S-Site Canyon, and a portion of Twomile Canyon. In order to propose these designated use amendments, the Department prepared a demonstration for the three tributaries agreed upon by the parties for inclusion as part of the Department's Notice of Intent to Present Technical Testimony. Given the procedural order issued by the Hearing Officer on November 9, 2020, provided the deadline for filing the NOI by April 12, 2021, and a revised procedural order issued on April 1, 2021, to extend the NOI filing to May 3, 2021, the Department had slightly over four months after reaching consensus on the water bodies to develop the demonstration for the proposed amendments agreed upon by the parties. The Department completed the demonstration (**NMED Exhibit 73 and amended NMED Exhibit 124)** and filed it with the Commission, in accordance with the 2015 Joint Stipulation (**NMED Exhibit 72**) as part of this Triennial Review.*

*In accordance with the 2015 Joint Stipulation (**NMED Exhibit 72**), each of the parties still retain the right to petition independently, as they find appropriate. As such, the Department has identified additional tributaries within LANL, both perennial and non-perennial, for potential designated use amendments. However, given the extraordinarily limited resources and tight timelines to develop the demonstration for amending the aquatic life use for these non-perennial waters within LANL, as part of the 2015 Joint Stipulation (**NMED Exhibit 72**), the Department will investigate these waterbodies sometime after this Triennial Review. Triad and DOE-NNSA's statement lacks the necessary context given the challenges posed with coordination of data and the parties to the 2015 Joint Stipulation (**NMED Exhibit 72**) along with regulatory time constraints and the level of effort necessary to fulfill the obligations for the Triennial Review and the 2015 Joint Stipulation (**NMED Exhibit 72**), and is therefore misleading.*

TESTIMONY FROM TRIAD AND DOE-NNSA REGARDING EXISTING USE ANALYSIS FOR THREE INTERMITTENT WATERS WITHIN LANL

On page 31 of Dr. Meyerhoff's testimony (**LANL Exhibit 2, 2020 TR LANL-00053**) regarding the EUA amending the designated use for three intermittent waters within LANL, he states that the "WQCC and EPA have already approved the classification of waters into Section 128… [and] reclassification by NMED staff in this manner would disregard the work already being conducted under the 2015 Joint Stipulation."

As stated earlier in this rebuttal, designated uses, although adopted with the best available information at the time, are not static. They are subject to amendment, as provided in the federal regulations. The Department does not disagree that the Commission adopted designated uses for non-perennial waters within LANL, but that does not mean that these uses are not subject to being amended.

*Secondly, the Department disagrees that the EUA disregards the work already conducted under the 2015 Joint Stipulation (**NMED Exhibit 72**). In order to amend any water quality standard, a demonstration is required for the Commission and EPA to base their decision. The EUA is simply the resulting demonstration for the waters agreed to by the parties in satisfaction of the 2015 Joint Stipulation (**NMED Exhibit 72**).*

On page 3 of Mr. Gallegos' testimony (**LANL Exhibit 3, 2020 TR LANL-00062**), he states that LANL invited the Department to participate in all hydrology protocol surveys conducted by LANL, but the Department did not have staff available to participate.

*Triad and DOE-NNSA's statement that the only reason participation was limited was due to Department staff and availability is inaccurate. The Department made numerous attempts over a three-year period to coordinate field work with all three parties (see **NMED Exhibit 126**). However, due to the restrictive nature of accessing many of the sites, there was little ability to negotiate sites or availability to participate in field work without Triad and DOE-NNSA's consent and coordination.*

Overall, the Department participated in 52 hydrology protocol surveys between November 2016 and October 2019; 47 of which it conducted within a 10-weeks period from August 8, 2019 to October 17, 2019. Triad and DOE-NNSA coordinated and scheduled these surveys independently, without coordination with the Department or Amigos Bravos, although they did invite the Department on some, but not all surveys.

As such, the Department disagrees that LANL accommodated all parties for the hydrology protocol surveys and that lack of participation was due entirely to the Department's availability.

On page 21 of Dr. Meyerhoff's testimony (**LANL Exhibit 2, 2020 TR LANL-00043**) and on page 3 of Mr. Gallegos' testimony (**LANL Exhibit 3, 2020 TR LANL-00062**), Triad and DOE-NNSA state they provided all data to the Department and Amigos Bravos.

*While Triad and DOE-NNSA transmitted the data collected from 47 Level 1 Hydrology Protocol surveys to the Department on January 30, 2020 (**NMED Exhibit 127),** LANL did not transmit gage data and LANL's Hydrology Protocol Level 2 surveys to the Department until April 8, 2020 (**NMED Exhibit 128**), approximately six months following the conclusion of the field surveys in 2019. The transmittal cover letter addressed to the Department has no evidence that Triad provided the data to Amigos Bravos.*

Testimony provided by Triad and DOE-NNSA, reference to "Twomile Canyon" whereas the Department references "Two-Mile Canyon."

*The Department has been referring to this tributary as "Two-Mile Canyon." The Department investigated the reference though 7.5-minute quadrangle maps from the USGS to which the canyon is referenced as "Twomile." As a result, the Department has revised the proposed language in 20.6.4.140 NMAC (**NMED Exhibit 110**) and references to this tributary in the EUA.*

*As a subsequent finding, the Department also identified a typographical error in the title for the EUA as originally filed with the Commission. In addition to amending the reference to Twomile, the Department also corrected the title to reference the confluence of Twomile to Pajarito Canyon, not Water Canyon. As a result of these corrections, the Department filed the amended EUA as a new exhibit (**NMED Exhibit 124**).*

On page 24 of Dr. Meyerhoff's testimony (**LANL Exhibit 2, 2020 TR LANL-00046**) and page 34 of Mr. Goering's testimony (**LANL Exhibit 4, 2020 TR LANL-00137**), Triad and DOE-

NNSA disagree with the Department's proposed downstream extent for Twomile Canyon. The Department proposes the downstream extent to be at the confluence with Pajarito Canyon, while Triad and DOE-NNSA assert the downstream terminus is "approximately 0.2 miles more than LANL proposes."

The Department disagrees with Triad and DOE-NNSA's estimated distance. As determined through known latitude and longitude of E244 obtained through LANL's Intellus database (35°51'20.43"N, 106°17'45.64"W) and GPS coordinates obtained from the Hydrology Protocol survey (35°52'4.00"N, 106°19'25.00"W), the distance between E244 and the confluence with Pajarito Canyon is approximately 0.11 miles, or 165 meters.

On page 31 of Mr. Gallegos' testimony (**LANL Exhibit 3, 2020 TR LANL-00090**), he states the terminus for Twomile Canyon was based on the findings that the hydrology protocol "Level 1 score falls in the gray zone between ephemeral and intermittent, as it does here with a score of 10.5, a HP Level 2 assessment is needed."

*Triad and DOE-NNSA's statements are inaccurate. The Hydrology Protocol methodology (**NMED Exhibit 63**) states that a score of 10.5 is intermittent until further analysis indicates that the stream is ephemeral. On page 37 of Appendix C – Hydrology Protocol (**NMED Exhibit 63**), a minimum total score of 9.0 is set as a guideline to distinguish ephemeral from non-ephemeral tributaries. A score of 10.5 indicates intermittent conditions. A Level 2 survey would only reaffirm the intermittent hydrology, but lack of water and aquatic life would not, in and of itself, be sufficient to characterize the water as ephemeral given the seasonal behavior of intermittent waters. Triad and DOE-NNSA's assertion that a Level 2 Hydrology Protocol survey was needed to reaffirm intermittency, given other available data confirming the findings of the Level 1 survey, is therefore inaccurate.*

On page 31 of Mr. Gallegos' testimony (**LANL Exhibit 3, 2020 TR LANL-00090**), he states that the terminus for Twomile Canyon would be to the LANL gage station E244. Similarly, on page 34 of Mr. Goering's testimony (**LANL Exhibit 4, 2020 TR LANL-00137**), Triad and DOE-NNSA assert that because the Hydrology Protocol survey, conducted on September 12, 2019, exhibited no water in the channel at E244 and that no bivalves, amphibians and benthic macroinvertebrates were present, the terminus does not extend to the confluence with Pajarito Canyon.

Mr. Gallegos' assertion that the terminus for Twomile Canyon is at the LANL gage station E244 is not correct. The Department and LANL, in accordance with the Hydrology Protocol methodology, chose the location to be representative of the reach which extended downstream to the confluence with Pajarito Canyon. There are no natural or anthropogenic conditions within the approximately 165-meter reach between E244 and the confluence with Pajarito Canyon that would cause a change or break in hydrologic conditions to justify the terminus at E244. The Department stands by the findings in the EUA, which places the terminus at the confluence with Pajarito Canyon.

*Further, as discussed in some detail on page 34 of Mr. Goering's testimony (**LANL Exhibit 4**,* **2020 TR LANL-00137***), Twomile Canyon appears to be strongly influenced by seasonal winter precipitation, consistent with intermittent waters. The fact that the field staff did not observe water or aquatic life observed during mid-September is not sufficient to assert flow does not extend beyond the E244 gage. On the contrary, if there is intermittent flow at the gage 34% of the time, it can be assumed that the flow extends beyond the gage given there are no other contributing factors. Triad and DOE-NNSA's assertion that the terminus for intermittent flow ends at E244 is therefore inaccurate.*

On page 32 of Mr. Goering's testimony (**LANL Exhibit 4, 2020 TR LANL-00135**), he states no surface water data are available for Twomile Canyon.

*The Department, as part of the evidence collected for the EUA (**NMED Exhibit 73** and revised **NMED Exhibit 124**), found data associated with Twomile Canyon through Intellus. To the extent the Department was able to vet this data, they appear to be useable as supportive evidence for the determinations of the Hydrology Protocol surveys. Triad and DOE-NNSA's statement regarding available data for Twomile Canyon is therefore inaccurate.*

TESTIMONY FROM TRIAD AND DOE-NNSA REGARDING UNCLASSIFIED PERENNIALS IN LANL

Beginning on page 8 of Dr. Meyerhoff's testimony (**LANL Exhibit 2, 2020 TR LANL-00030**), Triad and DOE-NNSA assert that all waters within lands managed by DOE within LANL were classified in 20.6.4.126 NMAC and 20.6.4.128 NMAC. Dr. Meyerhoff reiterates this sentiment on page 9 (**LANL Exhibit 2, 2020 TR LANL-00031)** when he states that "[f]ollowing receipt of the UAA, EPA approved the classification of all surface waters on LANL property into Sections 126 and 128."

The Department disagrees that all waters within lands managed by DOE within LANL are classified. The description of portions of four identified perennial waters are classified in 20.6.4.126 NMAC and non-perennial waters are identified, more generally, in 20.6.4.128 NMAC. However, there are no provisions for unspecified perennial waters within lands managed by DOE within LANL, which, in accordance with 20.6.4.11(H) NMAC [currently being proposed to be moved to 20.6.4.7(U)(1) NMAC], are waters not identified in 20.6.4.101 through 206.4.899 NMAC and are subject to the designated uses in 20.6.4.99 NMAC.

This statement asserting all waters were intended to be classified is not supported by the evidence presented during the 2005 Triennial Review [WQCC 03-05(R)], which clearly identifies only four portions of tributaries identified to be perennial and provides no discussion or provision for other perennial waters within LANL. There is no indication that 20.6.4.126 NMAC was intended to establish designated uses for all perennial waters within LANL. Therefore, only non-perennial and specifically identified perennial waters within lands managed by DOE within LANL are classified waters of the state.

On page 11 of Dr. Meyerhoff's testimony (**LANL Exhibit 2, 2020 TR LANL-00033**), he states that LANL proposed amending 20.6.4 NMAC in 2003 to classify non-perennial waters within LANL. Further, he asserts LANL's proposal included all waters on LANL property.

*Again, the Department does not find supporting evidence that all waters within LANL were classified. In the 2003 Triennial Review's [WQCC 03-05(R)], Proposed Amendments and Statement of Basis dated August 15, 2003, the Department initially proposed amending designated uses for perennial portions of Los Alamos Canyon below Los Alamos Reservoir and perennial portions of Canon de Valle, Sandia, and Pajarito Canyons (**NMED Exhibit 74**). Although, page 10 of Dr. Fisher's direct testimony to the 2003 Triennial Review (**LANL Exhibit 23**) states the intent was to include all watercourses, Dr. Fisher describes on page 19, of his direct testimony that all other waters, not described as perennial had data indicating they were either intermittent or ephemeral. One may presume that there was no reason to believe that there were additional perennial waters within LANL; however, as adopted, only those identified perennial waters were classified. However, there is no evidence of an intent that 20.6.4.128 NMAC (or the equivalent proposed by LANL) intended to include perennial waters. This is further evidenced by the conclusions beginning on page 106 of the U.S. Fish & Wildlife Study (**NMED Exhibit 135**), which* *identified perennial waters were attaining a water quality sufficient enough to support coldwater aquatic life. Dr. Meyerhoff's assertion that all waters within LANL were classified as a result of this action is therefore incorrect.*

On page 12 of Dr. Meyerhoff's testimony (**LANL Exhibit 2, 2020 TR LANL-00034**), he states that during the Triennial Review [WQCC 03-05(R)], Dr. Fisher provided testimony indicating all waters within LANL were proposed to be classified.

The Department concurs that the statement is accurate to Dr. Fisher's testimony. However, Dr. Fisher's testimony continues with a description of the specific perennial waterbodies adopted in 20.6.4.126 NMAC. Dr. Fisher's testimony does not name other perennial waterbodies or describe them in general. Therefore, Dr. Meyerhoff's use of Dr. Fisher's statement as a demonstration that all waters within LANL are classified waters of the State is misleading.

On page 21 of Dr. Meyerhoff's testimony (**LANL Exhibit 2, 2020 TR LANL-00043**) and on page 14 of Mr. Goering's testimony (**LANL Exhibit 4, 2020 TR LANL-00117)**, Triad and DOE-NNSA support the Department's proposed designated use amendments for three identified perennial waters not already classified in 20.6.4.126 NMAC.

The Department had initially proposed an amendment to identify three new perennial waters in 20.6.4.126 NMAC, but given these waters are currently unclassified, this action would require a UAA to amend the designated recreational primary contact use in 20.6.4.99 NMAC to secondary contact as found in 20.6.4.126 NMAC. The Department is not opposed to evaluating the recreational use to determine if 20.6.4.126 NMAC is the appropriate classification for these waters, but that does not circumvent 40 C.F.R. § 131.10(g), which requires a UAA for such an amendment.

*This amendment was outside the scope of the 2015 Joint Stipulation (**NMED Exhibit 72**), which was limited to evaluating and proposing amended designated uses for non-perennial waters within LANL before the next Triennial Review. Therefore, given the need to conclude the obligations under the 2015 Joint Stipulation (**NMED Exhibit 72**) and the limited resources for Department staff to provide the necessary support for other amendments being brought forth under this Triennial Review, the Department postponed the development of this UAA to a later date. The Department is also taking this approach for additional non-perennial waters within LANL that may have an existing aquatic life with more stringent criteria than the current limited aquatic life use in 20.6.4.128 NMAC, but where consensus could not be reached between the parties to the 2015 Joint Stipulation about including these non-perennial waters in the proposed amendments for this Triennial Review.*

Given water quality standard amendments such as this can be petitioned at any time, not only during a Triennial Review, a phased approach to evaluating the multitude of waters within LANL is more appropriate and effective for all parties involved. This approach will also allow for more targeted opportunities for public participation in the rulemaking process.

On page 32 of Dr. Meyerhoff's testimony (**LANL Exhibit 2, 2020 TR LANL-00054**), he states that "waters should be reclassified from Section 128 to 126 and provided a higher level of aquatic life protection…."

The Department disagrees with Triad and DOE-NNSA's assertion that 20.6.4.128 NMAC includes otherwise undescribed perennial waters within LANL. Language in 20.6.4.128 NMAC specifically states ephemeral and intermittent portions of watercourses within lands managed by DOE within LANL and does not identify or name perennial waters or portions of perennial waters.

*These unclassified, perennial waters have designated uses in 20.6.4.99 NMAC, consistent with the process detailed on page II-6 of the WQMP/CPP (**NMED Exhibit 64**).*

*Although the aquatic life use for named perennial waters in 20.6.4.126 NMAC has more stringent criteria than the aquatic life use in 20.6.4.99 NMAC, the recreational use has less stringent criteria. Therefore, in accordance with 40 C.F.R. § 131.10(g) (**NMED Exhibit 22**) for these perennial waters to be classified in 20.6.4.126 NMAC, as Triad and DOE-NNSA have proposed, a UAA must demonstrate the primary recreational use in 20.6.4.99 NMAC is unattainable.*

*This finding is also provided by EPA Region 6 in their comments to NMED's public comment draft of proposed amendments (**NMED Exhibit 88**). Therefore, at this time, the Department does not support amending the designated uses for unclassified perennial waters as proposed by Triad and DOE-NNSA.*

On page 11 of Mr. Goering's testimony (**LANL Exhibit 4, 2020 TR LANL-00114**), he states that the data presented in **LANL Exhibit 38** and **LANL Exhibit 39** "provide strong technical basis for the reclassification of the three Pajarito Canyon reaches from Section 128 to 126."

*Again, as demonstrated throughout this rebuttal testimony, the Department disagrees that any perennial waters not listed in 20.6.4.126 NMAC are classified in 20.6.4.128 NMAC or that the action is a "reclassification." The technical basis may be sufficient but, as stated before, in accordance with 40 C.F.R. § 131.10(g) (**NMED Exhibit 22**) and 20.6.4.15 NMAC, the state may not amend a designated use to one with less stringent criteria without a UAA. The unclassified perennial waters discussed by Mr. Goering require a UAA to amend the primary contact recreational use in 20.6.4.99 NMAC to a secondary contact recreational use in 20.6.4.126 NMAC.*

Any proposal to amend the designated use for these unclassified perennial waters within LANL without the required UAA is therefore premature.

On page 11 of Mr. Gallegos' testimony (**LANL Exhibit 3, 2020 TR LANL-00070**), he states that all surface waters within LANL are classified. In addition, on page 11, Mr. Gallegos reasserts that all waters as described are classified in the amendments brought forth as part of the 2003 Triennial Review [WQCC 03-05(R)], made effective for State purposes on May 23, 2005. Mr. Gallegos states that as part of the 2003 Triennial Review, the Department proposed the classification of perennial, intermittent and ephemeral waters at LANL and that on May 13, 2005, the department adopted 20.6.4.126 NMAC for perennial portions within LANL. Mr. Goering reiterates this on page 28 of his testimony (**LANL Exhibit 4, 2020 TR LANL-00131**), where he states that "what remains classified as Section 128 waters has already been determined by the WQCC to be ephemeral and intermittent and that determination has been approved by EPA, along with the appropriate designated uses."

The Department rebuts these statements, in part. The language in 20.6.4.128 NMAC states that, "[e]phemeral and intermittent portions of watercourses within lands managed by [D]epartment of [E]nergy (DOE) within LANL…not specifically identified in 20.6.4.126 NMAC…", however, the classification is limited to only ephemeral and intermittent waters and does not speak to perennial waters not specifically identified in 20.6.4.126 NMAC. Similarly, the language in 20.6.4.126 NMAC names each perennial water: "[p]erennial portions of Cañon de Valle from Los Alamos national laboratory (LANL) stream gage E256 upstream to Burning Ground spring, Sandia canyon from Sigma canyon upstream to LANL NPDES outfall 001, Pajarito canyon from Arroyo de La Delfe upstream into Starmers gulch and Starmers spring and Water canyon from Area-A canyon upstream to State Route 501" and does not reference perennial waters *in a general context to cover all perennial waters within LANL. This detail is critical for implementation since there would be no mechanism to assert the designated uses for these perennial waters, other than treatment as an unclassified perennial water in 20.6.4.99 NMAC. The Department's direct testimony from the 2003 Triennial Review,* [WQCC 03-05(R)] ***(NMED Exhibit 129****) clarifies that the proposed classified segments only included select perennial waters and all ephemeral and intermittent waters within LANL. There is no evidence of a proposal to classify all perennial waters not listed in 20.6.4.126 NMAC or 20.6.4.128 NMAC. Nor does it appear that at any time did LANL or the Department petition for classification of all perennial waters within LANL.*

It was likely that the Department and LANL assumed there were no additional perennial waters at the time of these classifications; however, that does not by default conclude that perennial waters not listed in 20.6.4.126 NMAC are classified. As proposed and adopted, non-perennial waters and specifically delineated perennial waters are the only classified waters within lands managed by DOE within LANL, as defined in 20.6.4.7(C)(3) NMAC, 20.6.4.128 NMAC and 20.6.4.126 NMAC, respectively. Therefore, there is no support for the statements that perennial waters not identified in 20.6.4.126 NMAC are classified waters.

As provided in Triad and DOE-NNSA's map in ***LANL Exhibit 37****, all waters, prior to the recent Hydrology Protocol surveys, were assumed to have been delineated in 20.6.4.126 NMAC or have been non-perennial. This assumption appears to be incorrect. In accordance with the WQMP/CPP, these waters are considered unclassified perennial waters with designated uses in 20.6.4.99 NMAC, which include warmwater aquatic life, livestock watering, wildlife habitat and primary contact. As such, Department has updated the appropriate classification in the Department's Surface Water Quality Information Database ("SQUID"), which is accessible* *through the Bureau's OpenEnviroMap*[5]*. This action, completed following the approved WQMP/CPP (**NMED Exhibit 64**), is not a "move" or change in designated use. Instead, it was an incorrect assumption that these waters were non-perennial and classified waters in 20.6.4.128 NMAC.*

Beginning on page 16 of Mr. Gallegos' testimony (**LANL Exhibit 3, 2020 TR LANL-00075**), he states that in the Department's supporting evidence petitioning for hearing it was noted that the Department identified additional perennial waters through the 2015 Joint Stipulation *(**NMED Exhibit 72**).*

*Although the Department did make such a statement regarding previously unidentified perennial waters within LANL, it is important to clarify. The Department, LANL, and Amigos Bravos conducted Hydrology Protocol surveys as part of the 2015 Joint Stipulation (**NMED Exhibit 72**) to obtain additional information to determine the appropriate designated uses for non-perennial waters within LANL. In addition, these parties suspected, based on information provided by LANL and personal knowledge, that there were additional perennial waters beyond those identified in 20.6.4.126 NMAC. Although the 2015 Joint Stipulation (**NMED Exhibit 72**) was limited to determining the appropriate designated uses for the non-perennial waters, the parties included these suspected perennial sites for Hydrology Protocol surveys to determine the appropriate hydrology. Although the parties initially included the work associated with unclassified perennial waters within the investigation conducted under the 2015 Joint Stipulation, prior to the Hydrology Protocol surveys, there was no evidence supporting a perennial finding. In accordance with 20.6.4.15 NMAC and 40 C.F.R. § 131.10(g) (**NMED Exhibit 22**), this type of amendment requires a UAA. The Department ultimately determined a UAA to be beyond the*

[5] https://gis.web.env.nm.gov/oem/?map=swqb

established scope of work for the 2015 Joint Stipulation. Due to resource constraints and lack of defensible data, the Department rescinded the proposed amendments for the unclassified perennial waters. Although rescinded as a proposed amendment for this rulemaking, the Department intends to evaluate the designated uses for waters with LANL, and bring forth demonstrations for amending the designated uses, as appropriate. This includes the designated uses for unclassified perennial waters within LANL. For these reasons, the Department does not support Triad and DOE-NNSA's recommendation to amend the designated uses for unclassified perennial waters within LANL.

Mr. Gallegos states on page 18 of testimony (**LANL Exhibit 3, 2020 TR LANL-00077**) that LANL proposes to add clarifying language to 20.6.4.126 NMAC that expands classification of waters in this section to all perennial waters within LANL.

While the Department does not oppose evaluating the appropriate designated uses for currently unclassified perennial waters within LANL, the language as proposed by Triad and DOE-NNSA would still require a UAA to amend the designated recreational use.

Although the coldwater aquatic life use in 20.6.4.126 NMAC has more stringent criteria than the warmwater aquatic life use in 20.6.4.99 NMAC, a change that does not require a UAA, the primary contact recreational use for unclassified perennial waters in 20.6.4.99 NMAC has criteria more stringent than the secondary contact recreational use in 20.6.4.126 NMAC, which requires a UAA to amend.

*In accordance with 40 C.F.R. § 131.20 (**NMED Exhibit 20**), EPA must approve the State's action to amend water quality standards and uses the supporting evidence, such as a UAA, to make that determination. The prior UAA used for establishing designated uses for the non-perennial waters within LANL (**LANL Exhibit 18**), based on the U.S. Fish & Wildlife Study (**NMED Exhibit***

***135)**, was not approved by EPA. EPA evaluated and made a final decision on the water quality standards proposal by considering the supporting evidence, including the UAA, pursuant to 40 C.F.R. § 131.10(g) (**NMED Exhibit 22**).*

Therefore, a prior UAA developed specifically in support of a particular action would not be applicable for a new action without additional supporting evidence.

*As such, and as presented by Triad and DOE-NNSA, the UAA would have to demonstrate all unclassified perennial waters within LANL are unable to attain the criteria associated with the primary contact recreational use due to one of the six factors identified in 40 C.F.R. § 131.10(g) (**NMED Exhibit 22**). Until such a time that a UAA can demonstrate the inability to attain primary contact, the Department does not support the language as proposed by Triad and DOE-NNSA.*

On page 18 of Mr. Gallegos' testimony (**LANL Exhibit 3, 2020 TR LANL-00077**), he states that "[w]ith respect to the segments we propose to be moved from Section 128 to Section 126, there is no new data to suggest that the non-primary contact recreational use has changed."

No waters are being "moved." The waters Mr. Gallegos refers to are perennial, are not described in 20.6.4.126 NMAC or in 20.6.4.128 NMAC, and therefore are unclassified. The statement that a prior UAA demonstrates that primary contact is unattainable for these waters is inaccurate, nor would that prior UAA be sufficient evidence without providing additional, confirmatory information related to this action.

Although demonstrated previously that low-flow and lack of physical access prevented recreation in and on the water where full immersion would occur, the CWA protects for the attainment of the water quality to support the use, wherever possible. Although it may be a consideration for attainment, there is no criterion for volume to preclude attainment of primary contact.

On page 19 of Mr. Gallegos testimony (**LANL Exhibit 3, 2020 TR LANL-00078**) regarding attainment of water quality sufficient to support coldwater aquatic life, Mr. Gallegos states that "data suggest that coldwater aquatic life use may be attainable."

*The Department does not dispute Triad and DOE-NNSA's statement because there is evidence suggesting the existing use may be coldwater for some of these unclassified perennial waters within LANL. However, the designated primary contact recreational use may not be amended to secondary contact without a UAA. In accordance with 20.6.4.15(D) NMAC, a party other than the Department seeking to conduct a UAA must submit notice and a work plan to the Department and EPA. It is not until the Department approves the work plan that the UAA may commence. Until a demonstration provides evidence that the existing aquatic life use has criteria more stringent than the designated aquatic life use and a UAA demonstrates that primary contact is not attainable based on one of the factors in 40 C.F.R. § 131.10(g) (**NMED Exhibit 22**), the Department does not support amending the designated uses for the unclassified perennial waters within LANL.*

On page 19 of Mr. Gallegos' testimony (**LANL Exhibit 3, 2020 TR LANL-00078**), he states that Hydrology Protocol surveys identified portions of two tributaries as perennial but not delineated in 20.6.4.126 NMAC. These include Pajarito Canyon from 0.5 miles below Arroyo de la Delfe upstream to Homestead Spring and Arroyo de la Delfe from Pajarito to Keiling Spring.

*The Department disagrees that there are only two additional sections (one of which has two subsections) of perennial waters within LANL not delineated in 20.6.4.126 NMAC. Based on findings from the Hydrology Protocol surveys conducted by the Department with LANL, portions of four tributaries, not described in 20.6.4.126 NMAC, were identified as perennial. These descriptions were provided to LANL, to which they concurred on the hydrologic regimes (**NMED***

Exhibit 113*). These include Ancho Canyon from the Rio Grande to Ancho Springs, Pajarito Canyon from Starmers Gulch to Homestead Spring, Pajarito Canyon from 500 meters downstream of Arroyo de la Delfe to Arroyo de la Delfe and DP Canyon from 100 meters downstream of the grade control to 400 meters upstream of the grade control. Although Triad and DOE-NNSA concurred these reaches are perennial, Mr. Gallegos does not identify Ancho Canyon and DP Canyon in his testimony. The Department identifies these tributaries as unclassified perennial waters with designated uses in 20.6.4.99 NMAC, according to 20.6.4.11(H) NMAC and the process outlined in the State's approved WQMP/CPP.*

As it pertains to Pajarito Canyon, Pajarito from Arroyo de La Delfe to Starmers Gulch is a classified perennial water in 20.6.4.126 NMAC; however, LANL delineates the perennial portion of Pajarito Canyon from 0.5 miles below Arroyo de la Delfe upstream (past Starmer's Gulch) to Homestead Spring. Based on available information, the Department does not have reason to dispute the downstream delineation of 0.50 miles below Arroyo de la Delfe.

*Similarly, the Department found the upstream terminus to be consistent with the findings from the surveys. The Department has provided a map (****NMED Exhibit 130)****, created by the Department for discussion amongst the parties in November 2020, delineating the current Sections for each of these reaches and the hydrology as determined through Hydrology Protocol surveys. Although these waters are considered perennial, their hydrology does not in and of itself determine the appropriate designated aquatic life and recreational uses. These are therefore unclassified perennial waters of the State and will be considered as such until an analysis can demonstrate, through appropriate regulatory mechanisms, the designated uses are different than those in 20.6.4.99 NMAC.*

On page 20 of Mr. Gallegos' testimony (**LANL Exhibit 3, 2020 TR LANL-00079**), he states that "flow, pH, dissolved oxygen ("DO"), and temperature data from gage E241 and pH, DO, and temperature data from Homestead Spring" provide evidence that a designated aquatic life use with more stringent criteria is appropriate for Pajarito Canyon from Starmer's Gulch to Homestead Spring. Mr. Gallegos also provides additional evidence that supports a designated aquatic life use with more stringent criteria for the lower portion of Pajarito Canyon.

*The Department does not contest that there are data available demonstrating Pajarito Canyon from approximately 0.5 miles downstream of Arroyo de la Delfe to Homestead Spring is perennial and may be supporting an aquatic life use with more stringent criteria than warmwater, as established in 20.6.4.99 NMAC. However, in order to classify these unclassified perennial waters a UAA is required to amend the recreational use from secondary contact to primary contact. In accordance with 40 C.F.R. § 131.10(g) (**NMED Exhibit 22**), without a UAA, a designated use may not be amended to one with less stringent criteria. Therefore, these waters may not be classified in 20.6.4.126 NMAC as proposed by Triad and DOE-NNSA until that UAA is complete.*

On page 22 of Mr. Gallegos' testimony (**LANL Exhibit 3, 2020 TR LANL-00081**), he states that there may be other perennial waters within LANL beyond Pajarito Canyon and Arroyo de la Delfe.

The Department identified, and Triad concurred, that Ancho Canyon from the Rio Grande to Ancho Spring and DP Canyon from 100 meters downstream of the grade control to 400 meters upstream of the grade control were also determined to be perennial. The Department agrees with Mr. Gallegos' testimony that other tributaries with perennial hydrology may warrant additional analysis to determine appropriate designated uses.

On page 22 of Mr. Gallegos' testimony (**LANL Exhibit 3, 2020 TR LANL-00081**), he states that all "reclassification" decisions should be based upon the science and the data and since all LANL waters are already classified, none of the waters within LANL should ever default to 20.6.4.99 NMAC, including any that are determined to be perennial.

There does not appear to be any credible evidence for Mr. Gallegos' statement that no waters within LANL should ever default to 20.6.4.99 NMAC. This statement is neither supported by 20.6.4 NMAC nor the State's approved WQMP/CPP. Given these perennial waters are not described or delineated in 20.6.4.126 NMAC, and there are no other classified sections that describe these perennial waters, the designated uses in 20.6.4.99 NMAC apply.

On page 23 of Mr. Gallegos' testimony (**LANL Exhibit 3, 2020 TR LANL-00082**), he states that "LANL recommends that the WQCC approve the addition of three geographically defined stream segments to Section 126, consistent with the agreement of the parties under the 2015 Joint Stipulation (**NMED Exhibit 72**).

*There are several issues with this statement. First, the evaluation of perennial tributaries was not within the scope of the 2015 Joint Stipulation (**NMED Exhibit 72**). Second, the amendment of designated recreational uses for the waters identified to be perennial requires a UAA in accordance with 40 C.F.R. § 131.10(g) (**NMED Exhibit 22**). Failure to provide a UAA as evidence demonstrating these waters are unable to attain primary contact will result in disapproval of the amendments by EPA Region 6, as provided in their comments to the public comment draft dated December 22, 2020 (**NMED Exhibit 88**).*

On page 26 of Mr. Gallegos' testimony (**LANL Exhibit 3, 2020 TR LANL-00085**), Triad and DOE-NNSA recommend the word "specifically" be eliminated from the language in 20.6.4.128 NMAC pending the adoption of Triad and DOE-NNSA's proposed language for

20.6.4.126 NMAC. The proposed language would broaden and include all perennial waters to be classified in 20.6.4.126 NMAC and the use of the term "specifically" would no longer be appropriate. Mr. Gallegos goes on to state that 20.6.4.128 NMAC should also retain all waters not classified in 20.6.4.126 or 20.6.4.140 NMAC.

First, the Department disagrees with Triad and DOE-NNSA's assertion that 20.6.4.128 NMAC classifies all LANL waters, including perennial waters not already identified in 20.6.4.126 NMAC. There is no language in 20.6.4.128 NMAC to support this, nor does the record associated with its adoption indicate the section was intended to include perennial waters within LANL. Further, Mr. Gallegos supports retaining the description of ephemeral/intermittent designations in 20.6.4.128 NMAC.

*Second, the Department finds no reasoning for Triad and NNSA's removal of the word "specifically." Therefore, the Department requests the amendment, as proposed by the Department (**NMED Exhibit 110**), be approved as written.*

TESTIMONY FROM TRIAD AND DOE-NNSA REGARDING PROCESS

On page 25 of Dr. Meyerhoff's testimony (**LANL Exhibit 2, 2020 TR LANL-00047**), he states that the Department's process and evidentiary requirements to "reclassify" a water to assign a more protective designated use are unclear. Further, Dr. Meyerhoff states that the "technical basis for the need to require a higher level of aquatic life use protection was not provided with the [o]riginal [p]etition" so the "appropriateness of the proposal could not be evaluated."

The Department has provided the technical basis and the supporting evidence for amending the designated uses for these waters, based on the existing use. The Department believes it has adequately addressed Triad and DOE-NNSA's concerns in the Department's NOI filed with the Commission on May 3, 2021.

On page 25 of Dr. Meyerhoff's testimony (**LANL Exhibit 2, 2020 TR LANL-00047**), he references a 2006 memorandum from EPA regarding the UAA process.

*The Department does not dispute that Water Quality Standard amendments must be based on defensible data and done in a manner that provides opportunity for public engagement, such as is outlined in the State's approved WQMP/CPP. However, it is unclear how the memorandum regarding UAAs, as required pursuant to 40 C.F.R. § 131.10(g) (**NMED Exhibit 22**), is relevant to the topic regarding amending designated uses based on existing uses, in accordance with 40 C.F.R. § 131.10(i) (**NMED Exhibit 22**).*

On page 26 of Mr. Meyer's testimony (**LANL Exhibit 2, 2020 TR LANL-00048)**, he states that the UAA process "should also apply to the process of modifying designated uses assigned to a waterbody – regardless if the purpose is to remove the use or upgrade to a more protective use, such as the 'highest attainable use' or an existing use."

*There does not appear to be any regulatory support for this assertion. The federal regulations apply "highest attainable use" to the application of a UAA, as provided in 40 C.F.R. § 131.10(g) (**NMED Exhibit 22**) and the definition in 40 C.F.R. § 131.3 (**NMED Exhibit 26**). This requirement of a "highest attainable use" is not equivalent to the requirement in 40 C.F.R. § 131.10(i) (**NMED Exhibit 22**), which requires a state to amend the designated use to one with criteria at least as stringent as the existing use. The amendment of a designated use based on an existing use is not required to demonstrate anything more than attainment of a use at any time since November 28, 1975. The Department therefore disagrees with Dr. Meyerhoff's assertion.*

On page 28 of Dr. Meyerhoff's testimony (**LANL Exhibit 2, 2020 TR LANL-00050**), Triad and DOE-NNSA assert that "proposals to reclassify a waterbody should be made only through a process that provides clarity and more 'transparent communication' among all parties involved in the decision-making process."

*In accordance with 40 C.F.R. § 131.10(i) (**NMED Exhibit 22**), the State is proposing to amend the designated use for the three portions of waterbodies to which all three parties concurred that they warranted amendments, as outlined in the 2015 Joint Stipulation (**NMED Exhibit 72**). Federal and state regulations, and the State's approved WQMP/CPP, outline the process for amending water quality standards. The Department took exceptional care to ensure "transparent communication," as demonstrated in the chronology of actions associated with this matter (**NMED Exhibit 126**). Therefore, Triad and DOE-NNSA's assertion that the Department did not follow a clear process or communicate transparently is unsupported and false.*

Beginning on page 29 of Dr. Meyerhoff's testimony (**LANL Exhibit 2, 2020 TR LANL-00051**), he references the letter from EPA Headquarters in Washington D.C. to Derek Smithee (the "Smithee Letter") with the State of Oklahoma Water Resources Board related to the determination of existing uses. Triad and DOE-NNSA emphasize the elements referring to evaluation of all available data to describe an existing use as "accurately and completely as possible." Triad and DOE-NNSA state that this evidence implies that there should be a "clear process for making findings regarding the reclassification of a waterbody."

*The Department does have a process for amending water quality standards, as outlined in the WQMP/CPP, as well as a clear directive in 40 C.F.R. § 131.10(i) (**NMED Exhibit 22**) which simply directs States to amend the designated uses to be no less than the existing use. The Department does not agree that the Smithee Letter (**NMED Exhibit 62** and **LANL Exhibit 32**) in any way requires or implies that a "process" specific to determining existing uses, like a UAA, is appropriate. In fact, based on the wide array of potential circumstances that the State must* *consider for each type of use and the localized conditions, it is the Department's interpretation that each existing use analysis is temporal in scale and unique to the conditions at the time of analysis, making a standardized one-size-fits-all process inadequate. Therefore, the Department disagrees with Triad and DOE-NNSA's findings regarding a prescriptive process for determining existing uses as it pertains to amending designated uses.*

On page 30 of Dr. Meyerhoff's testimony (**LANL Exhibit 2, 2020 TR LANL-00052**), Triad and DOE-NNSA attempt to connect the language in the draft work plan as a link to why a demonstration for a designated use amendment based on existing uses should follow the UAA process.

*Triad and DOE-NNSA's reference to the language in the draft work plan, that was provided for discussion purposes between the parties to the 2015 Joint Stipulation (**NMED Exhibit 72**), is without sufficient context. In order to facilitate progress on determining appropriate designated uses for non-perennial waters, the Department had to provide known reference points, one of which is the UAA process. The UAA process is similar because it is a designated use amendment and has to undergo a rulemaking process to become effective. It is similar, not the same. A designated use, being amended to have less stringent criteria is only permitted if the conditions in 40 C.F.R. § 131.10(g) (**NMED Exhibit 22**) are applicable; this is not the same for a designated use amendment to more stringent criteria, as required in accordance with 40 C.F.R. § 131.10(i) (**NMED Exhibit 22**). The Department disagrees with the assertion that providing similarity in one aspect constitutes conformity on all parts for the whole.*

On page 33 of Dr. Meyerhoff's testimony (**LANL Exhibit 2, 2020 TR LANL-00055**), he presents the process recommended by Triad and DOE-NNSA for the evaluation of existing uses.

As part of this, Dr. Meyerhoff states that the finalization of the work plan should be conducted collaboratively with all parties.

*Based on the restrictive timelines presented in both the filings for the Triennial Review and the 2015 Joint Stipulation (**NMED Exhibit 72**), the Department proceeded without a final work plan and written consensus by all parties. Communication continued with the parties, particularly Triad and DOE-NNSA, through monthly update meetings and ongoing correspondence via email (**NMED Exhibit 126**). There is no obligation or regulatory requirement for the Department to develop a work plan for a potential water quality standards amendment. The Department determined that, for this particular project, a work plan could help facilitate a discussion and consensus on the designated uses for non-perennial waters in 20.6.4.128 NMAC. The Department disagrees with Triad and DOE-NNSA's assertion regarding the work plan.*

Beginning on page 34 of Dr. Meyerhoff's testimony (**LANL Exhibit 2, 2020 TR LANL-00056**), he elaborates on what the process for a EUA should incorporate. As part of this, he includes references to EPA's guidance on Improving the Effectiveness of the UAA Process (**LANL Exhibit 33**).

*The Department disagrees that there is not a process for a water quality standards amendment such as those associated with designated uses based on existing uses. The process is outlined in both state and federal regulations as well as the State's approved WQMP/CPP. As it pertains to a UAA, the federal regulations only permit amending the designated use, that is not an existing use, if one of the factors in 40 C.F.R. § 131.10(g) (**NMED Exhibit 22**) are applicable. The requirements of 40 C.F.R. § 131.10(g) (**NMED Exhibit 22**) do not apply to an amendment to more stringent criteria based on existing use. A UAA sets the highest attainable use (goal), based on available information; while an existing use demonstration establishes the minimum water* *quality condition that must be protected (what is known to be attainable). A designated use amendment, based on the existing use, does not require evaluating the highest attainable use, which may have more stringent criteria than the existing use.*

On page 15 of Mr. Gallegos' testimony (**LANL Exhibit 3, 2020 TR LANL-00074**), he states that the 2015 Joint Stipulation (**NMED Exhibit 72**) "does not and was never intended to override prior WQCC and EPA decisions for Section 128 waters by defaulting these waters to certain categories."

*This statement is incorrect. As explained previously, perennial waters within LANL not described in 20.6.4.126 NMAC are unclassified waters subject to 20.6.4.99 NMAC. In addition, the intent of the 2015 Joint Stipulation (**NMED Exhibit 72**) was to evaluate available data and determine the appropriate designated uses for the non-perennial waters within LANL. The Department brought forth designated use amendments for consideration by the Commission to fulfill the obligations of the 2015 Joint Stipulation (**NMED Exhibit 72**), wherever consensus was achieved, and where the existing use was determined to be attaining a more stringent water quality. The Department asserts that the intent of the 2015 Joint Stipulation (**NMED Exhibit 72**), was in part, to amend the designated uses for non-perennial waters, based on data and available information and consensus by all three parties.*

Beginning on page 15 and again on page 41 of Mr. Gallegos' testimony (**LANL Exhibit 3, 2020 TR LANL-00074 and 2020 TR LANL-00100**), he states that the Department does not have a formal procedural framework to classify waters or amend a designated use based on existing use.

The Department's procedural framework for determination of a water's classification, pending confirmation of hydrology using the State's approved Hydrology Protocol, is provided in *the State's WQMP/CPP (**NMED Exhibit 63**). Federal and state regulations, specifically in 40 C.F.R. § 131.10(i) (**NMED Exhibit 22**) and 20.6.4.10 NMAC, respectively, provide the procedure for amending a designated use based on the existing use. The Department followed the formal "procedural framework" as provided in the Public Participation Section of the WQMP/CPP and the Water Quality Control Commission Rulemaking Procedures (20.1.6 NMAC) to propose these Water Quality Standard amendments. Many cases, such as most amendments being brought forth as part of this Triennial Review, are considered "Water Quality Standards amendments" in the WQMP/CPP. As with any amendment to 20.6.4 NMAC, these types of amendments must be sufficiently supported with defensible evidence for the Commission to grant a hearing and consider the amendment. See NMSA 1978, § 74-6-4(D) (providing that the Commission "shall adopt water quality standards for surface and ground waters of the state based on credible scientific data and other evidence appropriate under the Water Quality Act.")*

*Regarding Mr. Gallegos' statement about "moving" waters, the Department assumes Mr. Gallegos is referring to the unclassified perennial waters within LANL. Prior to the Hydrology Protocol surveys, these waters were assumed to be non-perennial and, as a result, were documented by the Department as classified waters in 20.6.4.128 NMAC. However, new information concluded that portions of these waters are perennial and therefore not subject to 20.6.4.128 NMAC. Since these waters are also not identified in any other standards segment in 20.6.4.101 through 20.6.4.899 NMAC, they are unclassified. There was no "moving" of a water's designation in this case. The WQMP/CPP describes the process for establishing or revising a designated use through the Hydrology Protocol. In addition, 40 C.F.R. § 131.10(i) (**NMED Exhibit 22**) requires states to amend a designated use to one with criteria no less stringent than the existing use. 40 C.F.R. § 131.20 (**NMED Exhibit 21**) requires states evaluate all waters that* *do not have a designated use in Section 101(a)(2) of the CWA (33 U.S. Code § 1251) (**NMED Exhibit 10**) and determine if new evidence demonstrates a use in Section 101(a)(2) of the CWA (33 U.S. Code § 1251) (**NMED Exhibit 10**) may be attainable. That is the regulatory framework. The Department has proposed these amendments to the Commission in accordance with 20.1.6 NMAC.*

On page 41 of Mr. Gallegos' testimony (**LANL Exhibit 3, 2020 TR LANL-00100**) regarding the proposed process for modifying uses for waters classified in 20.6.4.128 NMAC, Triad and DOE-NNSA state that the draft "EUA Work Plan attempted to describe how to conduct an investigation into whether there is sufficient evidence to initiate an analysis of attainable aquatic life use for waters classified under Section 128."

*The intent of the Work Plan was to evaluate available information and determine if sufficient evidence existed to proceed with an analysis. Although the 2015 Joint Stipulation (**NMED Exhibit 72**) stated the parties would agree to meet and confer regarding the appropriate level of water quality protections afforded to non-perennial waters within LANL, it did not prescribe a mechanism for agreement. In addition, the 2015 Joint Stipulation (**NMED Exhibit 72**) ordered the Department to petition the WQCC with amendments agreed upon by the parties no later than the next Triennial Review. NMSA 1978, § 74-6-4(D) requires that the Commission "shall adopt water quality standards for surface and ground waters of the state based on credible scientific data and other evidence appropriate under the Water Quality Act." The Department therefore needed credible scientific data and other appropriate evidence as required by statute in order to proceed with that petition process. Although neither federal nor state regulations required a work plan, the Department drafted one, based on sound evidence and reasoning, to advance the discussions between the parties with the intent to reach consensus on proposed* *amendments, describing the appropriate designated uses. The Department agrees that the functionality of the work plan was to establish the regulatory mechanisms supporting such a proposal, demonstrate that there were no regulatory barriers to proceeding with such an analysis, and to determine if there was sufficient defensible data to conduct an analysis to determine the existing use. The Department disagrees that the work plan was intended to describe how the investigation would be conducted.*

VII. REBUTTAL TESTIMONY REGARDING HARDENSS-BASED ALUMINUM CRITERIA [20.6.4.900(I) NMAC]

<u>Summary of Triad and DOE-NNSA's Testimony</u>

David DeForest, with Windward Environmental LLC, on behalf of Triad and DOE-NNSA states several times in his direct testimony (**LANL Exhibit 8**) that the Commission should reject the Department's proposed amendments regarding aluminum criteria. Triad and DOE-NNSA advocate rejecting the Department's proposed amendments based on several factors. The first is that the 1988 EPA aluminum criteria guidance (**NMED Exhibit 66**) applied to waters within a pH range of 6.5-9.0 standard units ("SU"), so the use of the State's former dissolved aluminum criteria for waters outside this range would not be appropriate. Also, the 1988 EPA recommended aluminum criteria guidance is outdated, given EPA's 2018 recommended aluminum criteria, and is no longer applicable. Mr. DeForest's testimony (**LANL Exhibit 8**) states that research has been ongoing on the subject matter regarding aluminum toxicity. As part of this work, EPA released new aluminum criteria guidance in 2018 developed using a biotic ligand model ("BLM") with multiple-linear regression ("MLR"), which EPA recommends for waters with a pH between 5.0 and 10.5.

Mr. DeForest recommends not applying any aluminum criteria to waters outside the pH range of 6.5-9.0 SU since the hardness-based criteria is limited in application and EPA's 1988 aluminum criteria guidance is outdated and is no longer appropriate, given new research regarding bioavailability based on other water quality parameters.

Triad and DOE-NNSA support EPA's recommendation that the Department consider adopting EPA's 2018 aluminum criteria and retain and apply the acute and chronic dissolved aluminum criteria for waters with a pH less than 5.0 SU (the lower limit for the new aluminum criteria). However, on page 8 of Mr. DeForest's testimony (**LANL Exhibit 8, 2020 TR LANL-00205**), he again advocates rejecting the aluminum water quality standards as proposed by the Department without proposing alternative language.

Mr. DeForest also argues that the Department has not provided reasoning for amending the range for applicability of acute and chronic dissolved aluminum criteria from 6.5 to 6.6 SU in 20.6.4.900(J)(2)(i) NMAC.

Department's Rebuttal Response

*The Department concurs that the EPA 1988 aluminum criteria guidance (**NMED Exhibit 66**) specifies a pH range of 6.5-9.0 SU; however, the acute and chronic dissolved aluminum criteria for New Mexico, as approved by the WQCC and EPA Region 6, did not specify a pH range. In accordance with 40 C.F.R. § 131.11 (**NMED Exhibit 25**), a State may adopt the criteria based on EPA's recommended guidance; a modified version of the guidance (as done in this case); or based on other scientifically based methods. So, although the guidance provided applicability within a specified pH range, the State adopted a modified version of the guidance without the specified pH range. The Commission and EPA found the criteria to be protective and approved their adoption in the State's Water Quality Standards. Therefore, the acute and chronic dissolved* *aluminum criteria are the criteria applied to all surface waters of the State, since at least 1991 (**NMED Exhibit 131**). The State may not remove these criteria without justification and replacement with other criteria that protect aquatic life. The Department recognizes the need for investigating the dissolved aluminum criteria to ensure it is appropriate and protective. However, until the Department (or another party) demonstrates alternative criteria protective of aquatic life, the acute and chronic dissolved aluminum criteria apply for purposes of the CWA to all waters of the State outside the pH range of 6.5-9.0 SU. The language proposed by the Department does not change the criteria currently recognized by EPA for purposes of the CWA. The amendment only clarifies the application of the criteria for consistency with implementation.*

The Department concurs that research regarding aluminum bioavailability and toxicity is ongoing and continues to stay apprised of work being done in this discipline as information becomes available. As part of this endeavor, the Department is evaluating the appropriateness of EPA's 2018 aluminum guidance which requires concurrent analysis of pH, dissolved organic carbon ("DOC") and hardness. Even if the State adopts EPA's 2018 aluminum criteria, it will not resolve the appropriate aluminum criteria for waters with a pH less than 5.0 SU, which, although very limited, are present in New Mexico. The acute and chronic dissolved aluminum criteria are appropriate and remain applicable until there are criteria that provide for adequate protections, particularly for low pH surface waters of the State.

The dissolved aluminum criteria are therefore appropriate, as these are the criteria currently implemented by EPA Region 6 since it never approved removing the dissolved criteria outside the pH range of 6.5 – 9.0 SU. Therefore, the acute and chronic dissolved aluminum criteria are appropriate until new, defensible acute and chronic aluminum criteria are developed for waters with exceptionally low or high pH.

*The Department disagrees with Mr. DeForest's conclusion to reject the aluminum water quality standards based on the reasoning they do not account for all the parameters that can affect bioavailability, and therefore toxicity, to aquatic organisms. This is based upon several facts. First, the State adopted and has implemented the dissolved aluminum criteria since at least 1991 for all waters of the State as required by 40 C.F.R. § 131.11 (**NMED Exhibit 25**)*

*Mr. DeForest's observation regarding the delineated lower pH range of "6.6" SU appears to be a typographical error. EPA's disapproval of the hardness-based total recoverable aluminum criteria applies to waters with a pH less than 6.5 SU, meaning the applicable range is from 6.5 to 9.0 SU. The applicable range for the dissolved aluminum criteria would then be for waters with a pH less than 6.5 SU or waters with a pH more than 9.0 SU. The Department recognizes the language as proposed in **NMED Exhibit 9** is incorrect and is proposing amended language to 20.6.4.900(J)(2)(i) NMAC to clarify the application for hardness-based total recoverable aluminum criteria and the numeric dissolved aluminum criteria (**NMED Exhibit 110**).*

VIII. CONCLUSIONS

This rebuttal testimony addressed the direct testimonies of Amigos Bravos, SJWC and Triad and DOE-NNSA regarding:

- 20.6.4.7 NMAC - definitions for aquatic life uses;
- 20.6.4.7(E) NMAC - definition for "existing use";
- 20.6.4.10 NMAC - Review of Standards; Need for Additional Studies;
- 20.6.4.15 NMAC - Use Attainability Analysis;
- 20.6.4.126 NMAC - specifically described classified perennial waters within LANL;
- 20.6.4.128 NMAC - classified non-perennial waters within LANL;

- 20.6.4.140 NMAC - newly proposed specifically described classified intermittent waters within LANL; and
- 20.6.4.900(I) - hardness-based criteria associated with aluminum.

Based on the testimony, the Department is proposing amended language in 20.6.4 NMAC for the following:

- 20.6.4.7(U) NMAC - moving the definition of “use attainability analysis” from 20.6.4.15 NMAC to be consistent;
- 20.6.4.10(B) NMAC, 20.6.4.15(A) NMAC, and 20.6.4.15(D)(2)(c) NMAC - amending language to reflect that criteria are the element with stringency, not the use;
- 20.6.4.15 NMAC - amending the headers for each subsection to accurately reflect the content;
- 20.6.4.15(A) NMAC - removing the definition of a UAA based on the addition of the definition to 20.6.4.7(U) NMAC;
- 20.6.4.15(C) NMAC - adding language to include the federal reference to the definition for “highest attainable use” for clarity;
- 20.6.4.15(E) NMAC - adding reference subsections A-D as being applicable for UAAs conducted by parties other than the Department;
- 20.6.4.900(I)(1) NMAC, 20.6.4.900(I)(2) NMAC, and 20.6.4.900(J)(2)(i) NMAC - amending the language to reflect the correct pH ranges to which hardness-based total recoverable aluminum criteria and the numeric dissolved aluminum criteria apply; and
- 20.6.4.140 NMAC - amending language to accurately reference “Twomile” Canyon.

IX. PROPOSED AMENDMENTS

In conclusion, the Department thereby requests the Commission approve the Department's proposed amendments to the State's *Standards for Interstate and Intrastate Surface Waters* (20.6.4 NMAC) as revised in NMED Exhibit 110 based on the testimony and supporting evidence submitted in this matter.

This concludes my rebuttal testimony.

TITLE 20 ENVIRONMENTAL PROTECTION
CHAPTER 6 WATER QUALITY
PART 4 STANDARDS FOR INTERSTATE AND INTRASTATE SURFACE WATERS

20.6.4.1 ISSUING AGENCY: Water Quality Control commission.
[20.6.4.1 NMAC - Rp 20 NMAC 6.1.1001, 10/12/2000]

20.6.4.2 SCOPE: Except as otherwise provided by statute or regulation of the water quality control commission, this part governs all surface waters of the state of New Mexico, which are subject to the New Mexico Water Quality Act, Sections 74-6-1 through 74-6-17 NMSA 1978.
[20.6.4.2 NMAC - Rp 20 NMAC 6.1.1002, 10/12/2000; A, 5/23/2005]

20.6.4.3 STATUTORY AUTHORITY: This part is adopted by the water quality control commission pursuant to Subsection C of Section 74-6-4 NMSA 1978.
[20.6.4.3 NMAC - Rp 20 NMAC 6.1.1003, 10/12/2000]

20.6.4.4 DURATION: Permanent.
[20.6.4.4 NMAC - Rp 20 NMAC 6.1.1004, 10/12/2000]

20.6.4.5 EFFECTIVE DATE: October 12, 2000, unless a later date is indicated in the history note at the end of a section.
[20.6.4.5 NMAC - Rp 20 NMAC 6.1.1005, 10/12/2000]

20.6.4.6 OBJECTIVE:

A. The purpose of this part is to establish water quality standards that consist of the designated use or uses of surface waters of the state, the water quality criteria necessary to protect the use or uses and an antidegradation policy.

B. The state of New Mexico is required under the New Mexico Water Quality Act (Subsection C of Section 74-6-4 NMSA 1978) and the federal Clean Water Act, as amended (33 U.S.C. Section 1251 *et seq.*) to adopt water quality standards that protect the public health or welfare, enhance the quality of water and are consistent with and serve the purposes of the New Mexico Water Quality Act and the federal Clean Water Act. It is the objective of the federal Clean Water Act to restore and maintain the chemical, physical and biological integrity of the nation's waters, including those in New Mexico. This part is consistent with Section 101(a)(2) of the federal Clean Water Act, which declares that it is the national goal that wherever attainable, an interim goal of water quality that provides for the protection and propagation of fish, shellfish and wildlife and provides for recreation in and on the water be achieved by July 1, 1983. Agricultural, municipal, domestic and industrial water supply are other essential uses of New Mexico's surface water; however, water contaminants resulting from these activities will not be permitted to lower the quality of surface waters of the state below that required for protection and propagation of fish, shellfish and wildlife and recreation in and on the water, where practicable.

C. Pursuant to Subsection A of Section 74-6-12 NMSA 1978, this part does not grant to the water quality control commission or to any other entity the power to take away or modify property rights in water.

<u>**D.** These surface water quality standards serve to respond to the inherent threats of climate change and provide resiliency for the continued protection and enhancement of water quality.</u>
[20.6.4.6 NMAC - Rp 20 NMAC 6.1.1006, 10/12/2000; A, 5/23/2005<u>; A, XX/XX/XXXX</u>]

20.6.4.7 DEFINITIONS: Terms defined in the New Mexico Water Quality Act, but not defined in this part will have the meaning given in the Water Quality Act.

A. Terms beginning with numerals or the letter "A," and abbreviations for units.

<u>**(1) "4Q3"** means the critical low flow as determined by the minimum average flow over four consecutive days that occurs with a frequency of once in three years.</u>

[~~(1)~~]<u>(2)</u> "4T3 temperature" means the temperature not to be exceeded for four or more consecutive hours in a 24-hour period on more than three consecutive days.

[~~(2)~~]<u>(3)</u> "6T3 temperature" means the temperature not to be exceeded for six or more consecutive hours in a 24-hour period on more than three consecutive days.

[~~(3)~~]<u>(4)</u> Abbreviations used to indicate units are defined as follows:

(a) **"cfu/100 mL"** means colony-forming units per 100 milliliters; the results for *E. coli* may be reported as either colony forming units (CFU) or the most probable number (MPN), depending on the analytical method used;

(b) **"cfs"** means cubic feet per second;

(c) **"µg/L"** means micrograms per liter, equivalent to parts per billion when the specific gravity of the solution equals 1.0;

(d) **"µS/cm"** means microsiemens per centimeter; one µS/cm is equal to one µmho/cm;

(e) **"mg/kg"** means milligrams per kilogram, equivalent to parts per million;

(f) **"mg/L"** means milligrams per liter, equivalent to parts per million when the specific gravity of the solution equals 1.0;

(g) **"MPN/100 mL"** means most probable number per 100 milliliters; the results for *E. coli* may be reported as either CFU or MPN, depending on the analytical method used;

(h) **"NTU"** means nephelometric turbidity unit;

(i) **"pCi/L"** means picocuries per liter;

(j) **"pH"** means the measure of the acidity or alkalinity and is expressed in standard units (su).

[~~(4)~~][(5)] **"Acute toxicity"** means toxicity involving a stimulus severe enough to induce a response in 96 hours of exposure or less. Acute toxicity is not always measured in terms of lethality, but may include other toxic effects that occur within a short time period.

[~~(5)~~][(6)] "**Adjusted gross alpha**" means the total radioactivity due to alpha particle emission as inferred from measurements on a dry sample, including radium-226, but excluding radon-222 and uranium. Also excluded are source, special nuclear and by-product material as defined by the Atomic Energy Act of 1954.

[~~(6)~~][(7)] **"Aquatic life"** means any plant or animal life that uses surface water as primary habitat for at least a portion of its life cycle, but does not include avian or mammalian species.

[~~(7)~~][(8)] "**Attainable Use**" means a use that is achievable by the imposition of effluent limits required under sections 301(b) and 306 of the federal Clean Water Act and implementation of cost-effective and reasonable best management practices for nonpoint source control. An attainable use may or may not be as stringent as the designated use.

B. **Terms beginning with the letter "B".**

(1) **"Baseflow"** refers to the sustained flow volume of a stream or river. In natural systems, baseflow is comprised from regional groundwater inflow and local shallow subsurface inflow that is temporarily stored in the watershed during snowmelt and rain events and slowly released to the stream or river over time. In effluent dominated systems, baseflow is comprised predominantly from effluent with limited subsurface contributions. Baseflow in both scenarios is critical for sustaining flow in streams and rivers over seasonal and longer timeframes.

[~~(1)~~][(2)] **"Best management practices" or "BMPs":**

(a) for national pollutant discharge elimination system (NPDES) permitting purposes means schedules of activities, prohibitions of practices, maintenance procedures and other management practices to prevent or reduce the pollution of "waters of the United States;" BMPs also include treatment requirements, operating procedures and practices to control plant site runoff, spillage or leaks, sludge or waste disposal or drainage from raw material storage; or

(b) for nonpoint source pollution control purposes means methods, measures or practices selected by an agency to meet its nonpoint source control needs; BMPs include but are not limited to structural and nonstructural controls and operation and maintenance procedures; BMPS can be applied before, during and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters; BMPs for nonpoint source pollution control purposes shall not be mandatory except as required by state or federal law.

[~~(2)~~][(3)] **"Bioaccumulation"** refers to the uptake and retention of a substance by an organism from its surrounding medium and food.

[~~(3)~~][(4)] **"Bioaccumulation factor"** is the ratio of a substance's concentration in tissue versus its concentration in ambient water, in situations where the organism and the food chain are exposed.

[~~(4)~~][(5)] **"Biomonitoring"** means the use of living organisms to test the suitability of effluents for discharge into receiving waters or to test the quality of surface waters of the state.

C. **Terms beginning with the letter "C".**

(1) "**CAS number**" means an assigned number by chemical abstract service (CAS) to identify a substance. CAS numbers index information published in chemical abstracts by the American chemical society.

(2) **"Chronic toxicity"** means toxicity involving a stimulus that lingers or continues for a relatively long period relative to the life span of an organism. Chronic effects include, but are not limited to, lethality, growth impairment, behavioral modifications, disease and reduced reproduction.

(3) **"Classified water of the state"** means a surface water of the state, or reach of a surface water of the state, for which the commission has adopted a segment description and has designated a use or uses and applicable water quality criteria in 20.6.4.101 through 20.6.4.899 NMAC.

(4) **"Climate change"** refers to any significant change in the measures of climate lasting for an extended period of time, typically decades or longer, and includes major changes in temperature, precipitation, wind patterns or other weather-related effects. Climate change may be due to natural processes or human-caused changes of the atmosphere, or a combination of the two.

[~~(4)~~](5) **"Closed basin"** is a basin where topography prevents the surface outflow of water and water escapes by evapotranspiration or percolation.

[~~(5)~~](6) **"Coldwater"** in reference to an aquatic life use means a surface water of the state where the water temperature and other characteristics are suitable for the support or propagation or both of coldwater aquatic life.

(7) **"Contaminants of emerging concern"** or "CECs" refer to water contaminants including, but not limited to, per- and polyfluoroalkyl substances, pharmaceuticals and personal care products that may cause significant ecological or human health effects at low concentrations. CECs are generally chemical compounds recognized as having deleterious effects at environmental concentrations whose negative impacts have not been fully quantified and may not have regulatory numeric criteria.

[~~(6)~~](8) **"Coolwater"** in reference to an aquatic life use means the water temperature and other characteristics are suitable for the support or propagation of aquatic life whose physiological tolerances are intermediate between and may overlap those of warm and coldwater aquatic life.

[~~(7)~~](9) **"Commission"** means the New Mexico water quality control commission.

[~~(8)~~](10) **"Criteria"** are elements of state water quality standards, expressed as constituent concentrations, levels or narrative statements, representing a quality of water that supports a use. When criteria are met, water quality will protect the designated use.

D. Terms beginning with the letter "D".

(1) "**DDT and derivatives**" means 4,4'-DDT (CAS number 50293), 4,4'-DDE (CAS number 72559) and 4,4'-DDD (CAS number 72548).

(2) **"Department"** means the New Mexico environment department.

(3) **"Designated use"** means a use specified in 20.6.4.97 through 20.6.4.899 NMAC for a surface water of the state whether or not it is being attained.

(4) **"Dissolved"** refers to the fraction of a constituent of a water sample that passes through a 0.45-micrometer pore-size filter. The "dissolved" fraction is also termed "filterable residue."

(5) **"Domestic water supply"** means a surface water of the state that could be used for drinking or culinary purposes after disinfection.

E. Terms beginning with the letter "E".

(1) **"E. coli"** means the bacteria Escherichia coli.

(2) **"Effluent dominated"** refers to a water that has, over a 12-month average, more than three-quarters of its baseflow attributed to discharges from a permitted effluent discharge. Waters that are effluent dominated are of significant value by providing aquatic life and wildlife habitat.

[~~(2)~~](3) **"Ephemeral"** when used to describe a surface water of the state means the water body contains water briefly only in direct response to precipitation; its bed is always above the water table of the adjacent region.

[~~(3)~~](4) **"Existing use"** means a use actually attained in a surface water of the state on or after November 28, 1975, whether or not it is a designated use.

F. Terms beginning with the letter "F".

(1) **"Fish culture"** means production of coldwater or warmwater fishes in a hatchery or rearing station.

(2) "**Fish early life stages**" means the egg and larval stages of development of fish ending when the fish has its full complement of fin rays and loses larval characteristics.

G. Terms beginning with the letter "G". [RESERVED]

H. Terms beginning with the letter "H".

(1) "Hardness" means the measure of dissolved calcium and magnesium salts in water expressed as dissolved calcium carbonate ($CaCO3$) unless otherwise noted.

(2) "Harmonic mean flow" is the number of daily flow measurements divided by the sum of the reciprocals of the flows; that is, it is the reciprocal of the arithmetic mean of reciprocal daily flow measurements consistent with the equations in Paragraph (1) of Subsection B of 20.6.4.11 NMAC.

[~~(1)~~](3) "High quality coldwater" in reference to an aquatic life use means a perennial surface water of the state in a minimally disturbed condition with considerable aesthetic value and superior coldwater aquatic life habitat. A surface water of the state to be so categorized must have water quality, stream bed characteristics and other attributes of habitat sufficient to protect and maintain a propagating coldwater aquatic life population.

[~~(2)~~](4) "Human health-organism only" means the health of humans who ingest fish or other aquatic organisms from waters that contain pollutants.

I. Terms beginning with the letter "I".

(1) "Industrial water supply" means the use or storage of water by a facility for process operations unless the water is supplied by a public water system. Industrial water supply does not include irrigation or other agricultural uses.

(2) "Intermittent" when used to describe a surface water of the state means the water body contains water for extended periods only at certain times of the year, such as when it receives seasonal flow from springs or melting snow.

(3) "Interstate waters" means all surface waters of the state that cross or form a part of the border between states.

(4) "Intrastate waters" means all surface waters of the state that are not interstate waters.

(5) "Irrigation" means application of water to land areas to supply the water needs of beneficial plants.

(6) "Irrigation storage" means storage of water to supply the needs of beneficial plants.

J. Terms beginning with the letter "J". [RESERVED]

K. Terms beginning with the letter "K". [RESERVED]

L. Terms beginning with the letter "L".

(1) "LC-50" means the concentration of a substance that is lethal to fifty percent of the test organisms within a defined time period. The length of the time period, which may vary from 24 hours to one week or more, depends on the test method selected to yield the information desired.

(2) "**Limited aquatic life**" as a designated use, means the surface water is capable of supporting only a limited community of aquatic life. This subcategory includes surface waters that support aquatic species selectively adapted to take advantage of naturally occurring rapid environmental changes, [~~ephemeral or intermittent water,~~]low-flow, high turbidity, fluctuating temperature, low dissolved oxygen content or unique chemical characteristics.

(3) "Livestock watering" means the use of a surface water of the state as a supply of water for consumption by livestock.

M. Terms beginning with the letter "M".

(1) "Marginal coldwater" in reference to an aquatic life use means that natural [~~intermittent or low flows, or other natural~~]habitat conditions severely limit maintenance of a coldwater aquatic life population during at least some portion of the year or historical data indicate that the temperature [~~in~~] of the surface water of the state may exceed that which could continually support aquatic life adapted to coldwater[~~25°C (77°F)~~].

(2) "Marginal warmwater" in reference to an aquatic life use means natural intermittent or low flow or other natural habitat conditions severely limit the ability of the surface water of the state to sustain a natural aquatic life population on a continuous annual basis; or historical data indicate that natural water temperature routinely exceeds 32.2°C (90°F).

(3) "Maximum temperature" means the instantaneous temperature not to be exceeded at any time.

(4) "Minimum quantification level" means the minimum quantification level for a constituent determined by official published documents of the United States environmental protection agency.

N. Terms beginning with the letter "N".

(1) "Natural background" means that portion of a pollutant load in a surface water resulting only from non-anthropogenic sources. Natural background does not include impacts resulting from historic or existing human activities.

(2) **"Natural causes"** means those causal agents that would affect water quality and the effect is not caused by human activity but is due to naturally occurring conditions.

(3) **"Nonpoint source"** means any source of pollutants not regulated as a point source that degrades the quality or adversely affects the biological, chemical or physical integrity of surface waters of the state.

O. Terms beginning with the letter "O".

(1) "**Organoleptic**" means the capability to produce a detectable sensory stimulus such as odor or taste.

(2) **"Oversight agency"** means a state or federal agency, such as the United States department of agriculture forest service, that is responsible for land use or water quality management decisions affecting nonpoint source discharges where an outstanding national resource water is located.

P. Terms beginning with the letter "P".

(1) "**Playa**" means a shallow closed basin lake typically found in the high plains and deserts.

(2) **"Perennial"** when used to describe a surface water of the state means the water body typically contains water throughout the year and rarely experiences dry periods.

(3) **"Persistent toxic pollutants"** means pollutants, generally organic, that are resistant to environmental degradation through chemical, biological and photolytic processes and can bioaccumulate in organisms, causing adverse impacts on human health and aquatic life.

[~~(3)~~](4) **"Point source"** means any discernible, confined and discrete conveyance from which pollutants are or may be discharged into a surface water of the state, but does not include return flows from irrigated agriculture.

[~~(4)~~](5) "**Practicable**" means that which may be done, practiced or accomplished; that which is performable, feasible, possible.

[~~(5)~~](6) **"Primary contact"** means any recreational or other water use in which there is prolonged and intimate human contact with the water, such as swimming and water skiing, involving considerable risk of ingesting water in quantities sufficient to pose a significant health hazard. Primary contact also means any use of surface waters of the state for cultural, religious or ceremonial purposes in which there is intimate human contact with the water, including but not limited to ingestion or immersion, that could pose a significant health hazard.

[~~(6)~~](7) **"Public water supply"** means the use or storage of water to supply a public water system as defined by New Mexico's Drinking Water Regulations, 20.7.10 NMAC. Water provided by a public water system may need to undergo treatment to achieve drinking water quality.

Q. Terms beginning with the letter "Q". [RESERVED]

R. Terms beginning with the letter "R". [RESERVED]

S. Terms beginning with the letter "S".

(1) **"Secondary contact"** means any recreational or other water use in which human contact with the water may occur and in which the probability of ingesting appreciable quantities of water is minimal, such as fishing, wading, commercial and recreational boating and any limited seasonal contact.

(2) **"Segment"** means a classified water of the state described in 20.6.4.101 through 20.6.4.899 NMAC. The water within a segment should have the same uses, similar hydrologic characteristics or flow regimes, and natural physical, chemical and biological characteristics and exhibit similar reactions to external stresses, such as the discharge of pollutants.

(3) "**Specific conductance**" is a measure of the ability of a water solution to conduct an electrical current.

(4) **"State"** means the state of New Mexico.

(5) **"Surface water(s) of the state"**

(i) means all surface waters situated wholly or partly within or bordering upon the state, including the following:

(1) lakes[~~,~~];
(2) rivers[~~,~~];
(3) streams (including intermittent and ephemeral streams) [~~,~~];
(4) mudflats[~~,~~];
(5) sandflats[~~,~~];
(6) wetlands[~~,~~];
(7) sloughs[~~,~~];
(8) prairie potholes [~~,~~];
(9) wet meadows[~~,~~];

(10) playa lakes[~~,~~];
(11) reservoirs[~~,~~]; [~~or~~]and
(12) natural ponds.

(ii) [~~Surface waters of the state~~]also means all tributaries of such waters, including adjacent wetlands, any manmade bodies of water that were originally created in surface waters of the state or resulted in the impoundment of surface waters of the state, and any "waters of the United States" as defined under the Clean Water Act that are not included in the preceding description.

(iii) [~~Surface waters of the state~~]does not include private waters that do not combine with other surface or subsurface water or any water under tribal regulatory jurisdiction pursuant to Section 518 of the Clean Water Act. Waste treatment systems, including treatment ponds or lagoons designed and actively used to meet requirements of the Clean Water Act (other than cooling ponds as defined in 40 CFR Part 423.11(m) that also meet the criteria of this definition), are not surface waters of the state, unless they were originally created in surface waters of the state or resulted in the impoundment of surface waters of the state.

T. Terms beginning with the letter "T".

(1) "TDS" means total dissolved solids, also termed "total filterable residue."

(2) "Toxic pollutant" means those pollutants, or combination of pollutants, including disease-causing agents, that after discharge and upon exposure, ingestion, inhalation or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will cause death, shortened life spans, disease, adverse behavioral changes, reproductive or physiological impairment or physical deformations in such organisms or their offspring.

(3) "**Tributary**" means a perennial, intermittent or ephemeral waterbody that flows into a larger waterbody, and includes a tributary of a tributary.

(4) "Turbidity" is an expression of the optical property in water that causes incident light to be scattered or absorbed rather than transmitted in straight lines.

U. Terms beginning with the letter "U". [~~RESERVED~~]

(1) "Unclassified waters of the state" means those surface waters of the state not identified in 20.6.4.101 through 20.6.4.899 NMAC.

(2) "Use attainability analysis" means a scientific study conducted for the purpose of assessing the factors affecting the attainment of a use.

V. Terms beginning with the letter "V". [RESERVED]

W. Terms beginning with the letter "W".

(1) "Warmwater" with reference to an aquatic life use means that water temperature and other characteristics are suitable for the support or propagation or both of warmwater aquatic life.

(2) "Water contaminant" means any substance that could alter if discharged or spilled the physical, chemical, biological or radiological qualities of water. "Water contaminant" does not mean source, special nuclear or by-product material as defined by the Atomic Energy Act of 1954, but may include all other radioactive materials, including but not limited to radium and accelerator-produced isotopes.

(3) "Water pollutant" means a water contaminant in such quantity and of such duration as may with reasonable probability injure human health, animal or plant life or property, or to unreasonably interfere with the public welfare or the use of property.

(4) "Wetlands" means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions in New Mexico. Wetlands that are constructed outside of a surface water of the state for the purpose of providing wastewater treatment and that do not impound a surface water of the state are not included in this definition.

(5) "Wildlife habitat" means a surface water of the state used by plants and animals not considered as pathogens, vectors for pathogens or intermediate hosts for pathogens for humans or domesticated livestock and plants.

X. Terms beginning with the letters "X" through "Z". [RESERVED]

[20.6.4.7 NMAC - Rp 20 NMAC 6.1.1007, 10/12/2000; A, 7/19/2001; A, 5/23/2005; A, 7/17/2005; A, 8/1/2007; A, 12/1/2010; A, 1/14/2011; A, 3/2/2017; A, XX/XX/XXXX]

20.6.4.8 ANTIDEGRADATION POLICY AND IMPLEMENTATION PLAN:

A. Antidegradation Policy: This antidegradation policy applies to all surface waters of the state.

(1) Existing [~~instream water~~]uses, as defined in Paragraph (4) of Subsection E of 20.6.4.7 NMAC, and the level of water quality necessary to protect the existing uses shall be maintained and protected in all surface waters of the state.

(2) Where the quality of a surface water of the state exceeds levels necessary to support the propagation of fish, shellfish, and wildlife, and recreation in and on the water, that quality shall be maintained and protected unless the commission finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the state's continuing planning process, that allowing lower water quality is necessary to accommodate important economic and social development in the area in which the water is located. In allowing such degradation or lower water quality, the state shall assure water quality adequate to protect existing uses fully. Further, the state shall assure that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable BMPs for nonpoint source control. Additionally, the state shall encourage the use of watershed planning as a further means to protect surface waters of the state.

(3) No degradation shall be allowed in waters designated by the commission as outstanding national resource waters (ONRWs), except as provided in Subparagraphs (a) through (e) of this paragraph and in Paragraph (4) of this Subsection A.

(a) After providing a minimum 30-day public review and comment period, the commission determines that allowing temporary and short-term degradation of water quality is necessary to accommodate public health or safety activities in the area in which the ONRW is located. Examples of public health or safety activities include but are not limited to replacement or repair of a water or sewer pipeline or a roadway bridge. In making its decision, the commission shall consider whether the activity will interfere with activities implemented to restore or maintain the chemical, physical or biological integrity of the water. In approving the activity, the commission shall require that:

(i) the degradation shall be limited to the shortest possible time and shall not exceed six months;

(ii) the degradation shall be minimized and controlled by best management practices or in accordance with permit requirements as appropriate; all practical means of minimizing the duration, magnitude, frequency and cumulative effects of such degradation shall be utilized;

(iii) the degradation shall not result in water quality lower than necessary to protect any existing use in the ONRW; and

(iv) the degradation shall not alter the essential character or special use that makes the water an [~~ORNW~~]ONRW.

(b) Prior to the commission making a determination, the department or appropriate oversight agency shall provide a written recommendation to the commission. If the commission approves the activity, the department or appropriate oversight agency shall oversee implementation of the activity.

(c) Where an emergency response action that may result in temporary and short-term degradation to an ONRW is necessary to mitigate an immediate threat to public health or safety, the emergency response action may proceed prior to providing notification required by Subparagraph (a) of this paragraph in accordance with the following:

(i) only actions that mitigate an immediate threat to public health or safety may be undertaken pursuant to this provision; non-emergency portions of the action shall comply with the requirements of Subparagraph (a) of this paragraph;

(ii) the discharger shall make best efforts to comply with requirements (i) through (iv) of Subparagraph (a) of this paragraph;

(iii) the discharger shall notify the department of the emergency response action in writing within seven days of initiation of the action;

(iv) within 30 days of initiation of the emergency response action, the discharger shall provide a summary of the action taken, including all actions taken to comply with requirements (i) through (iv) of Subparagraph (a) of this paragraph.

(d) Preexisting land-use activities, including grazing, allowed by federal or state law prior to designation as an ONRW, and controlled by best management practices (BMPs), shall be allowed to continue so long as there are no new or increased discharges resulting from the activity after designation of the ONRW.

(e) Acequia operation, maintenance, and repairs are not subject to new requirements because of ONRW designation. However, the use of BMPs to minimize or eliminate the introduction of pollutants into receiving waters is strongly encouraged.

(4) This antidegradation policy does not prohibit activities that may result in degradation in surface waters of the state when such activities will result in restoration or maintenance of the chemical, physical or biological integrity of the water.

(a) For ONRWs, the department or appropriate oversight agency shall review on a case-by-case basis discharges that may result in degradation from restoration or maintenance activities, and may approve such activities in accordance with the following:

(i) the degradation shall be limited to the shortest possible time;

(ii) the degradation shall be minimized and controlled by best management practices or in accordance with permit requirements as appropriate, and all practical means of minimizing the duration, magnitude, frequency and cumulative effects of such degradation shall be utilized;

(iii) the degradation shall not result in water quality lower than necessary to protect any existing use of the surface water; and

(iv) the degradation shall not alter the essential character or special use that makes the water an [~~ORNW~~]ONRW.

(b) For surface waters of the state other than ONRWs, the department shall review on a case-by-case basis discharges that may result in degradation from restoration or maintenance activities, and may approve such activities in accordance with the following:

(i) the degradation shall be limited to the shortest possible time;

(ii) the degradation shall be minimized and controlled by best management practices or in accordance with permit requirements as appropriate, and all practical means of minimizing the duration, magnitude, frequency and cumulative effects of such degradation shall be utilized; and

(iii) the degradation shall not result in water quality lower than necessary to protect any existing use of the surface water.

(5) In those cases where potential water quality impairment associated with a thermal discharge is involved, this antidegradation policy and implementing method shall be consistent with Section 316 of the federal Clean Water Act.

(6) In implementing this section, the commission through the appropriate regional offices of the United States environmental protection agency will keep the administrator advised and provided with such information concerning the surface waters of the state as he or she will need to discharge his or her responsibilities under the federal Clean Water Act.

B. Implementation Plan: The department, acting under authority delegated by the commission, implements the water quality standards, including the antidegradation policy, by describing specific methods and procedures in the continuing planning process and by establishing and maintaining controls on the discharge of pollutants to surface waters of the state. The steps summarized in the following paragraphs, which may not all be applicable in every water pollution control action, list the implementation activities of the department. These implementation activities are supplemented by detailed antidegradation review procedures developed under the state's continuing planning process. The department:

(1) obtains information pertinent to the impact of the effluent on the receiving water and advises the prospective discharger of requirements for obtaining a permit to discharge;

(2) reviews the adequacy of existing data and conducts a water quality survey of the receiving water in accordance with an annually reviewed, ranked priority list of surface waters of the state requiring total maximum daily loads pursuant to Section 303(d) of the federal Clean Water Act;

(3) assesses the probable impact of the effluent on the receiving water relative to its attainable or designated uses and numeric and narrative criteria;

(4) requires the highest and best degree of wastewater treatment practicable and commensurate with protecting and maintaining the designated uses and existing water quality of surface waters of the state;

(5) develops water quality based effluent limitations and comments on technology based effluent limitations, as appropriate, for inclusion in any federal permit issued to a discharger pursuant to Section 402 of the federal Clean Water Act;

(6) requires that these effluent limitations be included in any such permit as a condition for state certification pursuant to Section 401 of the federal Clean Water Act;

(7) coordinates its water pollution control activities with other constituent agencies of the commission, and with local, state and federal agencies, as appropriate;

(8) develops and pursues inspection and enforcement programs to ensure that dischargers comply with state regulations and standards, and complements EPA's enforcement of federal permits;

(9) ensures that the provisions for public participation required by the New Mexico Water Quality Act and the federal Clean Water Act are followed;

(10) provides continuing technical training for wastewater treatment facility operators through the utility operators training and certification programs;

(11) provides funds to assist the construction of publicly owned wastewater treatment facilities through the wastewater construction program authorized by Section 601 of the federal Clean Water Act, and through funds appropriated by the New Mexico legislature;

(12) conducts water quality surveillance of the surface waters of the state to assess the effectiveness of water pollution controls, determines whether water quality standards are being attained, and proposes amendments to improve water quality standards;

(13) encourages, in conjunction with other state agencies, implementation of the best management practices set forth in the New Mexico statewide water quality management plan and the nonpoint source management program, such implementation shall not be mandatory except as provided by federal or state law;

(14) evaluates the effectiveness of BMPs selected to prevent, reduce or abate sources of water pollutants;

(15) develops procedures for assessing use attainment as required by 20.6.4.15 NMAC and establishing site-specific standards; and

(16) develops list of surface waters of the state not attaining designated uses, pursuant to Sections 305(b) and 303(d) of the federal Clean Water Act.

[20.6.4.8 NMAC - Rp 20 NMAC 6.1.1101, 10/12/2000; A, 5/23/2005; A, 8/1/2007; A, 1/14/2011; A, XX/XX/XXXX]

20.6.4.9 OUTSTANDING NATIONAL RESOURCE WATERS:

A. Procedures for nominating an ONRW: Any person may nominate a surface water of the state for designation as an ONRW by filing a petition with the commission pursuant to [~~the guidelines for water quality control commission regulation hearings~~]20.1.6 NMAC, Rulemaking Procedures - Water Quality Control Commission. A petition to designate a surface water of the state as an ONRW shall include:

(1) a map of the surface water of the state, including the location and proposed upstream and downstream boundaries;

(2) a written statement and evidence based on scientific principles in support of the nomination, including specific reference to one or more of the applicable ONRW criteria listed in Subsection B of this section;

(3) water quality data including chemical, physical or biological parameters, if available, to establish a baseline condition for the proposed ONRW;

(4) a discussion of activities that might contribute to the reduction of water quality in the proposed ONRW;

(5) any additional evidence to substantiate such a designation, including a discussion of the economic impact of the designation on the local and regional economy within the state of New Mexico and the benefit to the state; and

(6) affidavit of publication of notice of the petition in a newspaper of general circulation in the affected counties and in a newspaper of general statewide circulation.

B. Criteria for ONRWs: A surface water of the state, or a portion of a surface water of the state, may be designated as an ONRW where the commission determines that the designation is beneficial to the state of New Mexico, and:

(1) the water is a significant attribute of a state special trout water, national or state park, national or state monument, national or state wildlife refuge or designated wilderness area, or is part of a designated wild river under the federal Wild and Scenic Rivers Act; or

(2) the water has exceptional recreational or ecological significance; or

(3) the existing water quality is equal to or better than the numeric criteria for protection of aquatic life and contact uses and the human health-organism only criteria, and the water has not been significantly modified by human activities in a manner that substantially detracts from its value as a natural resource.

C. Pursuant to a petition filed under Subsection A of this section, the commission may classify a surface water of the state or a portion of a surface water of the state as an ONRW if the criteria set out in Subsection B of this section are met.

D. Waters classified as ONRWs: The following waters are classified as ONRWs:

(1) Rio Santa Barbara, including the west, middle and east forks from their headwaters downstream to the boundary of the Pecos Wilderness; and

(2) the waters within the United States forest service Valle Vidal special management unit including:

(a) Rio Costilla, including Comanche, La Cueva, Fernandez, Chuckwagon, Little Costilla, Powderhouse, Holman, Gold, Grassy, LaBelle and Vidal creeks, from their headwaters downstream to the boundary of the United States forest service Valle Vidal special management unit;

(b) Middle Ponil creek, including the waters of Greenwood Canyon, from their headwaters downstream to the boundary of the Elliott S. Barker wildlife management area;

(c) Shuree lakes;

(d) North Ponil creek, including McCrystal and Seally Canyon creeks, from their headwaters downstream to the boundary of the United States forest service Valle Vidal special management unit; and

(e) Leandro creek from its headwaters downstream to the boundary of the United States forest service Valle Vidal special management unit.

(3) the named perennial surface waters of the state, identified in Subparagraph (a) below, located within United States department of agriculture forest service wilderness. Wilderness are those lands designated by the United States congress as wilderness pursuant to the Wilderness Act. Wilderness areas included in this designation are the Aldo Leopold wilderness, Apache Kid wilderness, Blue Range wilderness, Chama River Canyon wilderness, Cruces Basin wilderness, Dome wilderness, Gila wilderness, Latir Peak wilderness, Pecos wilderness, San Pedro Parks wilderness, Wheeler Peak wilderness, and White Mountain wilderness.

(a) The following waters are designated in the Rio Grande basin:

(i) in the Aldo Leopold wilderness: Byers Run, Circle Seven creek, Flower canyon, Holden Prong, Indian canyon, Las Animas creek, Mud Spring canyon, North Fork Palomas creek, North Seco creek, Pretty canyon, Sids Prong, South Animas canyon, Victorio Park canyon, Water canyon;

(ii) in the Apache Kid wilderness Indian creek and Smith canyon;

(iii) in the Chama River Canyon wilderness: Chavez canyon, Ojitos canyon, Rio Chama;

(iv) in the Cruces Basin wilderness: Beaver creek, Cruces creek, Diablo creek, Escondido creek, Lobo creek, Osha creek;

(v) in the Dome wilderness: Capulin creek, Medio creek, Sanchez canyon/creek;

(vi) in the Latir Peak wilderness: Bull creek, Bull Creek lake, Heart lake, Lagunitas Fork, Lake Fork creek, Rito del Medio, Rito Primero, West Latir creek;

(vii) in the Pecos wilderness: Agua Sarca, Hidden lake, Horseshoe lake (Alamitos), Jose Vigil lake, Nambe lake, Nat lake IV, No Fish lake, North Fork Rio Quemado, Rinconada, Rio Capulin, Rio de las Trampas (Trampas creek), Rio de Truchas, Rio Frijoles, Rio Medio, Rio Molino, Rio Nambe, Rio San Leonardo, Rito con Agua, Rito Gallina, Rito Jaroso, Rito Quemado, San Leonardo lake, Santa Fe lake, Santa Fe river, Serpent lake, South Fork Rio Quemado, Trampas lake (East), Trampas lake (West);

(viii) in the San Pedro Parks wilderness: Agua Sarca, Cañon Madera, Cave creek, Cecilia Canyon creek, Clear creek (North SPP), Clear creek (South SPP), Corralitos creek, Dove creek, Jose Miguel creek, La Jara creek, Oso creek, Rio Capulin, Rio de las Vacas, Rio Gallina, Rio Puerco de Chama, Rito Anastacio East, Rito Anastacio West, Rito de las Palomas, Rito de las Perchas, Rito de los Pinos, Rito de los Utes, Rito Leche, Rito Redondo, Rito Resumidero, San Gregorio lake;

(ix) in the Wheeler Peak wilderness: Black Copper canyon, East Fork Red river, Elk lake, Horseshoe lake, Lost lake, Sawmill creek, South Fork lake, South Fork Rio Hondo, Williams lake.

(b) The following waters are designated in the Pecos River basin:

(i) in the Pecos wilderness: Albright creek, Bear creek, Beatty creek, Beaver creek, Carpenter creek, Cascade canyon, Cave creek, El Porvenir creek, Hollinger creek, Holy Ghost creek, Horsethief creek, Jack's creek, Jarosa canyon/creek, Johnson lake, Lake Katherine, Lost Bear lake, Noisy brook, Panchuela creek, Pecos Baldy lake, Pecos river, Rio Mora, Rio Valdez, Rito Azul, Rito de los Chimayosos, Rito de los Esteros, Rito del Oso, Rito del Padre, Rito las Trampas, Rito Maestas, Rito Oscuro, Rito Perro, Rito Sebadilloses, South Fork Bear creek, South Fork Rito Azul, Spirit lake, Stewart lake, Truchas lake (North), Truchas lake (South), Winsor creek;

(ii) in the White Mountain wilderness: Argentina creek, Aspen creek, Bonito creek, Little Bonito creek, Mills canyon/creek, Rodamaker creek, South Fork Rio Bonito, Turkey canyon/creek.

(c) The following waters are designated in the Gila River basin:

(i) in the Aldo Leopold wilderness: Aspen canyon, Black Canyon creek, Bonner canyon, Burnt canyon, Diamond creek, Falls canyon, Fisherman canyon, Running Water canyon, South Diamond creek;

(ii) in the Gila wilderness: Apache creek, Black Canyon creek, Brush canyon, Canyon creek, Chicken Coop canyon, Clear creek, Cooper canyon, Cow creek, Cub creek, Diamond creek, East Fork Gila river, Gila river, Gilita creek, Indian creek, Iron creek, Langstroth canyon, Lilley canyon, Little creek, Little Turkey creek, Lookout canyon, McKenna creek, Middle Fork Gila river, Miller Spring canyon, Mogollon creek, Panther canyon, Prior creek, Rain creek, Raw Meat creek, Rocky canyon, Sacaton creek, Sapillo creek, Sheep Corral canyon, Skeleton canyon, Squaw creek, Sycamore canyon, Trail canyon, Trail creek, Trout creek, Turkey creek, Turkey Feather creek, Turnbo canyon, West Fork Gila river, West Fork Mogollon creek, White creek, Willow creek, Woodrow canyon.

(d) The following waters are designated in the Canadian River basin: in the Pecos wilderness Daily creek, Johns canyon, Middle Fork Lake of Rio de la Casa, Middle Fork Rio de la Casa, North Fork Lake of Rio de la Casa, Rito de Gascon, Rito San Jose, Sapello river, South Fork Rio de la Casa, Sparks creek (Manuelitas creek).

(e) The following waters are designated in the San Francisco River basin:

(i) in the Blue Range wilderness: Pueblo creek;

(ii) in the Gila wilderness: Big Dry creek, Lipsey canyon, Little Dry creek, Little Whitewater creek, South Fork Whitewater creek, Spider creek, Spruce creek, Whitewater creek.

(f) The following waters are designated in the Mimbres Closed basin: in the Aldo Leopold wilderness Corral canyon, Mimbres river, North Fork Mimbres river, South Fork Mimbres river.

(g) The following waters are designated in the Tularosa Closed basin: in the White Mountain wilderness Indian creek, Nogal Arroyo, Three Rivers.

(h) The wetlands designated are identified on the *Maps and List of Wetlands Within United States Forest Service Wilderness Areas Designated as Outstanding National Resource Waters* published at the New Mexico state library and available on the department's website.

[20.6.4.9 NMAC - Rn, Subsections B, C and D of 20.6.4.8 NMAC, 5/23/2005; A, 5/23/2005; A, 7/17/2005; A, 2/16/2006; A, 12/1/2010; A, 1/14/2011; A, XX/XX/XXXX]

20.6.4.10 REVIEW OF STANDARDS; NEED FOR ADDITIONAL STUDIES:

A. Section 303(c)(1) of the federal Clean Water Act requires that the state hold public hearings at least once every three years for the purpose of reviewing water quality standards and proposing, as appropriate, necessary revisions to water quality standards.

B. In accordance with 40 CFR 131.10(i), when an existing use, as defined under 20.6.4.7 NMAC, is higher quality water than prescribed by the designated use and supporting evidence demonstrates the presence of that use, the designated use shall be amended accordingly to have criteria no less stringent than the existing use.

[~~B.~~] C. It is recognized that, in some cases, numeric criteria [~~have been adopted that reflect use designations rather than existing conditions of surface waters of the state.~~]for a particular designated use may not adequately reflect the local conditions or the aquatic communities adapted to those localized conditions. In these cases, a water quality criterion may be modified to reflect the natural condition of a specific waterbody. The modification of the criterion does not change the designated use; the modification only changes the criterion for that specific waterbody. [~~Narrative criteria are required for many constituents because accurate data on background levels are lacking. More intensive water quality monitoring may identify surface waters of the state where existing quality is considerably better than the established criteria.~~]When justified by sufficient data and information, a numeric [~~the~~] water quality [~~criteria~~]criterion [~~will~~]may be adopted or modified in accordance with 20.6.4.10(F) and 20.6.4.10(G) NMAC, to protect the attainable uses of the waterbody.

D. The removal or amendment of a designated use to a designated use with less stringent criteria can only be done through a use attainability analysis in accordance with 20.6.4.15 NMAC.

[~~C.~~] E. It is also recognized that contributions of water contaminants by diffuse nonpoint sources of water pollution may make attainment of certain criteria difficult. Revision of these criteria may be necessary as new information is obtained on nonpoint sources and other problems unique to semi-arid regions.

[~~D.~~] F. **Site-specific criteria.**

(1) The commission may adopt site-specific numeric criteria applicable to all or part of a surface water of the state based on relevant site-specific conditions such as:

(a) actual species at a site are more or less sensitive than those used in the national criteria data set;

(b) physical or chemical characteristics at a site such as pH or hardness alter the biological availability and/or toxicity of the chemical;

(c) physical, biological or chemical factors alter the bioaccumulation potential of a chemical;

(d) the concentration resulting from natural background exceeds numeric criteria for aquatic life, wildlife habitat or other uses if consistent with Subsection [~~E~~]G of 20.6.4.10 NMAC; or

(e) other factors or combination of factors that upon review of the commission may warrant modification of the default criteria, subject to EPA review and approval.

(2) Site-specific criteria must fully protect the designated use to which they apply. In the case of human health-organism only criteria, site-specific criteria must fully protect human health when organisms are consumed from waters containing pollutants.

(3) Any person may petition the commission to adopt site-specific criteria. A petition for the adoption of site-specific criteria shall:

(a) identify the specific waters to which the site-specific criteria would apply;

(b) explain the rationale for proposing the site-specific criteria;

(c) describe the methods used to notify and solicit input from potential stakeholders and from the general public in the affected area, and present and respond to the public input received;

(d) present and justify the derivation of the proposed criteria.

(4) A derivation of site-specific criteria shall rely on a scientifically defensible method, such as one of the following:

(a) the recalculation procedure, the water-effect ratio for metals procedure or the resident species procedure as described in the water quality standards handbook (EPA-823-B-94-005a, 2nd edition, August 1994);

(b) the streamlined water-effect ratio procedure for discharges of copper (EPA-822-R-01-005, March 2001);

(c) the biotic ligand model as described in aquatic life ambient freshwater quality criteria - copper (EPA-822-R-07-001, February 2007);

(d) the methodology for deriving ambient water quality criteria for the protection of human health (EPA-822-B-00-004, October 2000) and associated technical support documents; or

(e) a determination of the natural background of the water body as described in Subsection [~~E~~]G of 20.6.4.10 NMAC.

[~~E.~~]G. Site-specific criteria based on natural background. The commission may adopt site-specific criteria equal to the concentration resulting from natural background where that concentration protects the designated use. The concentration resulting from natural background supports the level of aquatic life and wildlife habitat expected to occur naturally at the site absent any interference by humans. Domestic water supply, primary or secondary contact, or human health-organism only criteria shall not be modified based on natural background. A determination of natural background shall:

(1) consider natural spatial and seasonal to interannual variability as appropriate;

(2) document the presence of natural sources of the pollutant;

(3) document the absence of human sources of the pollutant or quantify the human contribution; and

(4) rely on analytical, statistical or modeling methodologies to quantify the natural background.

[~~F.~~]H. Temporary standards[~~:~~].

(1) Any person may petition the commission to adopt a temporary standard applicable to all or part of a surface water of the state as provided for in this section and applicable sections in 40 CFR Part 131, Water Quality Standards; specifically, Section 131.14. The commission may adopt a proposed temporary standard if the petitioner demonstrates that:

(a) attainment of the associated designated use may not be feasible in the short term due to one or more of the factors listed in 40 CFR 131.10(g), or due to the implementation of actions necessary to facilitate restoration such as through dam removal or other significant wetland or water body reconfiguration activities as demonstrated by the petition and supporting work plan requirements in Paragraphs (4) and (5) of Subsection [~~F~~]H of 20.6.4.10 NMAC;

(b) the proposed temporary standard represents the highest degree of protection feasible in the short term, limits the degradation of water quality to the minimum necessary to achieve the original standard by the expiration date of the temporary standard, and adoption will not cause the further impairment or loss of an existing use;

(c) for point sources, existing or proposed discharge control technologies will comply with applicable technology-based limitations and feasible technological controls and other management alternatives, such as a pollution prevention program; and

(d) for restoration activities, nonpoint source or other control technologies shall limit downstream impacts, and if applicable, existing or proposed discharge control technologies shall be in place consistent with Subparagraph (c) of Paragraph (1) of Subsection [~~F~~]H of 20.6.4.10 NMAC.

(2) A temporary standard shall apply to specific designated use(s), pollutant(s), or permittee(s), and to specific water body segment(s). The adoption of a temporary standard does not exempt dischargers from complying with all other applicable water quality standards or control technologies.

(3) Designated use attainment as reported in the federal Clean Water Act, Section 305(b)/303(d) Integrated Report shall be based on the original standard and not on a temporary standard.

(4) A petition for a temporary standard shall:

(a) identify the currently applicable standard(s), the proposed temporary standard for the specific pollutant(s), the permittee(s), and the specific surface water body segment(s) of the state to which the temporary standard would apply;

(b) include the basis for any factor(s) specific to the applicability of the temporary standard (for example critical flow under Subsection B of 20.6.4.11 NMAC);

(c) demonstrate that the proposed temporary standard meets the requirements in this subsection;

(d) present a work plan with timetable of proposed actions for achieving compliance with the original standard in accordance with Paragraph (5) of Subsection [~~F~~]H of 20.6.4.10 NMAC;

(e) include any other information necessary to support the petition.

(5) As a condition of a petition for a temporary standard, in addition to meeting the requirements in this Subsection, the petitioner shall prepare a work plan in accordance with Paragraph (4) of Subsection [~~F~~]H of 20.6.4.10 NMAC and submit the work plan to the department for review and comment. The work plan shall identify the factor(s) listed in 40 CFR 131.10(g) or Subparagraph (a) of Paragraph (1) of Subsection [~~F~~]H of 20.6.4.10 NMAC affecting attainment of the standard that will be analyzed and the timeline for proposed actions to be taken to achieve the uses attainable over the term of the temporary standard, including baseline water quality, and any investigations, projects, facility modifications, monitoring, or other measures necessary to achieve compliance with the original standard. The work plan shall include provisions for review of progress in accordance with Paragraph (8) of Subsection [~~F~~]H of 20.6.4.10 NMAC, public notice and consultation with appropriate state, tribal, local and federal agencies.

(6) The commission may condition the approval of a temporary standard by requiring additional monitoring, relevant analyses, the completion of specified projects, submittal of information, or any other actions.

(7) Temporary standards may be implemented only after a public hearing before the commission, commission approval and adoption pursuant to Subsection [~~F~~]H of 20.6.4.10 NMAC for all state purposes, and the federal Clean Water Act Section 303 (c) approval for any federal action.

(8) All temporary standards are subject to a required review during each succeeding review of water quality standards conducted in accordance with Subsection A of 20.6.4.10 NMAC. The petitioner shall provide a written report to the commission documenting the progress of proposed actions, pursuant to a reporting schedule stipulated in the approved temporary standard. The purpose of the review is to determine progress consistent with the original conditions of the petition for the duration of the temporary standard. If the petitioner cannot demonstrate that sufficient progress has been made the commission may revoke approval of the temporary standard or provide additional conditions to the approval of the temporary standard.

(9) The commission may consider a petition to extend a temporary standard. The effective period of a temporary standard shall be extended only if demonstrated to the commission that the factors precluding attainment of the underlying standard still apply, that the petitioner is meeting the conditions required for approval of the temporary standard, and that reasonable progress towards meeting the underlying standard is being achieved.

(10) A temporary standard shall expire no later than the date specified in the approval of the temporary standard. Upon expiration of a temporary standard, the original standard becomes applicable.

(11) Temporary standards shall be identified in 20.6.4.97-899 NMAC as appropriate for the surface water affected.

(12) "Temporary standard" means a time-limited designated use and criterion for a specific pollutant(s) or water quality parameter(s) that reflect the highest attainable condition during the term of the temporary standard.

[20.6.4.10 NMAC - Rp 20 NMAC 6.1.1102, 10/12/2000; Rn, 20.6.4.9 NMAC, 5/23/2005; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017; A, XX/XX/XXXX]

20.6.4.11 APPLICABILITY OF WATER QUALITY STANDARDS:

A. [RESERVED]

B. Critical low flow: The critical low flow of a stream at a particular site shall be used in developing point source discharge permit requirements to meet numeric criteria set in 20.6.4.97 through 20.6.4.900 NMAC and Subsection F of 20.6.4.13 NMAC.

(1) For human health-organism only criteria, the critical low flow is the harmonic mean flow[~~; "harmonic mean flow" is the number of daily flow measurements divided by the sum of the reciprocals of the flows; that is, it is the reciprocal of the mean of reciprocals~~]. For ephemeral waters the calculation shall be based upon the nonzero flow intervals and modified by including a factor to adjust for the proportion of intervals with zero flow. The equations are as follows:

$$\text{Harmonic Mean} = \frac{n}{\sum 1/Q}$$

where n = number of flow values
and Q = flow value

$$\text{Modified Harmonic Mean} = \left[\frac{\sum_{i=1}^{Nt-N_0} \frac{1}{Qi}}{Nt - N_0}\right]^{-1} x \left[\frac{Nt - N_0}{Nt}\right]$$

where Qi = nonzero flow
Nt = total number of flow values
and N_0 = number of zero flow values

(2) For all other narrative and numeric criteria, the critical low flow is the minimum average four consecutive day flow that occurs with a frequency of once in three years (4Q3). The critical low flow may be determined on an annual, a seasonal or a monthly basis, as appropriate, after due consideration of site-specific conditions.

C. Guaranteed minimum flow: The commission may allow the use of a contractually guaranteed minimum streamflow in lieu of a critical low flow determined under Subsection B of this section on a case-by-case basis and upon consultation with the interstate stream commission. Should drought, litigation or any other reason interrupt or interfere with minimum flows under a guaranteed minimum flow contract for a period of at least 30 consecutive days, such permission, at the sole discretion of the commission, may then be revoked. Any minimum flow specified under such revoked permission shall be superseded by a critical low flow determined under Subsection B of this section. A public notice of the request for a guaranteed minimum flow shall be published in a newspaper of general circulation by the department at least 30 days prior to scheduled action by the commission. These water quality standards do not grant to the commission or any other entity the power to create, take away or modify property rights in water.

D. Mixing zones: A limited mixing zone, contiguous to a point source wastewater discharge, may be allowed in any stream receiving such a discharge. Mixing zones serve as regions of initial dilution that allow the application of a dilution factor in calculations of effluent limitations. Effluent limitations shall be developed that will protect the most sensitive existing, designated or attainable use of the receiving water.

E. **Mixing zone limitations:** Wastewater mixing zones, in which the numeric criteria set under Subsection F of 20.6.4.13 NMAC, 20.6.4.97 through 20.6.4.899 NMAC or 20.6.4.900 NMAC may be exceeded, shall be subject to the following limitations:

(1) Mixing zones are not allowed for discharges to lakes, reservoirs, or playas; these effluents shall meet all applicable criteria set under Subsection F of 20.6.4.13 NMAC, 20.6.4.97 through 20.6.4.899 NMAC and 20.6.4.900 NMAC at the point of discharge.

(2) The acute aquatic life criteria, as set out in Subsection I, Subsection J, and Subsection K of 20.6.4.900 NMAC, shall be attained at the point of discharge for any discharge to a surface water of the state with a designated aquatic life use.

(3) The general criteria set out in Subsections A, B, C, D, E, G, H and J of 20.6.4.13 NMAC, and the provision set out in Subsection D of 20.6.4.14 NMAC are applicable within mixing zones.

(4) The areal extent and concentration isopleths of a particular mixing zone will depend on site-specific conditions including, but not limited to, wastewater flow, receiving water critical low flow, outfall design, channel characteristics and climatic conditions and, if needed, shall be determined on a case-by-case basis. When the physical boundaries or other characteristics of a particular mixing zone must be known, the methods presented in Section 4.4.5, "Ambient-induced mixing," in "Technical support document for water quality-based toxics control" (March 1991, EPA/505/2-90-001) shall be used.

(5) All applicable water quality criteria set under Subsection F of 20.6.4.13 NMAC, 20.6.4.97 through 20.6.4.899 NMAC and 20.6.4.900 NMAC shall be attained at the boundaries of mixing zones. A continuous zone of passage through or around the mixing zone shall be maintained in which the water quality meets all applicable criteria and allows the migration of aquatic life presently common in surface waters of the state with no effect on their populations.

F. **Multiple uses:** When a surface water of the state has more than a single designated use, the applicable numeric criteria shall be the most stringent of those established for such water.

G. Human health-organism only criteria in Subsection J of 20.6.4.900 NMAC apply to those waters with a designated, existing or attainable aquatic life use. When limited aquatic life is a designated use, the human health-organism only criteria apply only if adopted on a segment-specific basis. The human health-organism only criteria for persistent toxic pollutants, as identified in Subsection J of 20.6.4.900 NMAC, also apply to all tributaries of waters with a designated, existing or attainable aquatic life use.

H. **Unclassified waters of the state:** [~~Unclassified waters of the state are those surface waters of the state not identified in 20.6.4.101 through 20.6.4.899 NMAC.~~]An unclassified surface water of the state is presumed to support the uses specified in Section 101(a)(2) of the federal Clean Water Act. As such, it is subject to 20.6.4.98 NMAC if nonperennial or subject to 20.6.4.99 NMAC if perennial. The commission may include an ephemeral unclassified surface water of the state under 20.6.4.97 NMAC only if a use attainability analysis demonstrates pursuant to 20.6.4.15 NMAC that attainment of Section 101(a)(2) uses is not feasible.

[~~**I.**~~]**H.** **Exceptions:** Numeric criteria for temperature, dissolved solids, dissolved oxygen, sediment or turbidity adopted under the Water Quality Act do not apply when changes in temperature, dissolved solids, dissolved oxygen, sediment or turbidity in a surface water of the state are attributable to:

(1) natural causes (discharges from municipal separate storm sewers are not covered by this exception.); or

(2) the reasonable operation of irrigation and flood control facilities that are not subject to federal or state water pollution control permitting; major reconstruction of storage dams or diversion dams except for emergency actions necessary to protect health and safety of the public are not covered by this exception.

[20.6.4.11 NMAC - Rp 20 NMAC 6.1.1103, 10/12/2000; A, 10/11/2002; Rn, 20.6.4.10 NMAC, 5/23/2005; A, 5/23/2005; A, 12/1/2010; A, XX/XX/XXXX]

20.6.4.12 **COMPLIANCE WITH WATER QUALITY STANDARDS:** The following provisions apply to determining compliance for enforcement purposes; they do not apply for purposes of determining attainment of uses. The department has developed assessment protocols for the purpose of determining attainment of uses that are available for review from the department's surface water quality bureau.

A. Compliance with acute water quality criteria shall be determined from the analytical results of a single grab sample. Acute criteria shall not be exceeded.

B. Compliance with chronic water quality criteria shall be determined from the arithmetic mean of the analytical results of samples collected using applicable protocols. Chronic criteria shall not be exceeded more than once every three years.

C. Compliance with water quality standards for total ammonia shall be determined by performing the biomonitoring procedures set out in Subsections D and E of 20.6.4.14 NMAC, or by attainment of applicable ammonia criteria set out in Subsections K, L and M of 20.6.4.900 NMAC.

D. Compliance with the human health-organism only criteria shall be determined from the analytical results of representative grab samples, as defined in the water quality management plan. Human health-organism only criteria shall not be exceeded.

E. The commission may establish a numeric water quality criterion at a concentration that is below the minimum quantification level. In such cases, the water quality standard is enforceable at the minimum quantification level.

F. For compliance with hardness-dependent numeric criteria, [~~dissolved~~]hardness (as mg $CaCO_3$/L) shall be determined from a sample taken at the same time that the sample for the contaminant is taken.

G. **Compliance schedules**: [~~It shall be the policy of the commission to allow on a case-by-case basis t~~]The commission may allow the inclusion of a schedule of compliance in a NPDES permit issued to an existing facility on a case-by-case basis. Such schedule of compliance will be for the purpose of providing a permittee with adequate time to make treatment facility modifications necessary to comply with water quality based permit limitations determined to be necessary to implement new or revised water quality standards or wasteload allocation. Compliance schedules may be included in NPDES permits at the time of permit renewal or modification and shall be written to require compliance at the earliest practicable time. Compliance schedules shall also specify milestone dates so as to measure progress towards final project completion (e.g., design completion, construction start, construction completion, date of compliance).

H. It is a policy of the commission to allow a temporary standard approved and adopted pursuant to Subsection [~~F~~]H of 20.6.4.10 NMAC to be included in the applicable federal Clean Water Act permit as enforceable limits and conditions. The temporary standard and any schedule of actions may be included at the earliest practicable time, and shall specify milestone dates so as to measure progress towards meeting the original standard.
[20.6.4.12 NMAC - Rp 20 NMAC 6.1.1104, 10/12/2000; A, 10/11/2002; Rn, 20.6.4.11 NMAC, 5/23/2005; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017; A, XX/XX/XXXX]

20.6.4.13 GENERAL CRITERIA: General criteria are established to sustain and protect existing or attainable uses of surface waters of the state. These general criteria apply to all surface waters of the state at all times, unless a specified criterion is provided elsewhere in this part. Surface waters of the state shall be free of any water contaminant in such quantity and of such duration as may with reasonable probability injure human health, animal or plant life or property, or unreasonably interfere with the public welfare or the use of property.

A. **Bottom deposits and suspended or settleable solids:**

(1) Surface waters of the state shall be free of water contaminants including fine sediment particles (less than two millimeters in diameter), precipitates or organic or inorganic solids from other than natural causes that have settled to form layers on or fill the interstices of the natural or dominant substrate in quantities that damage or impair the normal growth, function or reproduction of aquatic life or significantly alter the physical or chemical properties of the bottom.

(2) Suspended or settleable solids from other than natural causes shall not be present in surface waters of the state in quantities that damage or impair the normal growth, function or reproduction of aquatic life or adversely affect other designated uses.

B. **Floating solids, oil and grease:** Surface waters of the state shall be free of oils, scum, grease and other floating materials resulting from other than natural causes that would cause the formation of a visible sheen or visible deposits on the bottom or shoreline, or would damage or impair the normal growth, function or reproduction of human, animal, plant or aquatic life.

C. **Color:** Color-producing materials resulting from other than natural causes shall not create an aesthetically undesirable condition nor shall color impair the use of the water by desirable aquatic life presently common in surface waters of the state.

D. **Organoleptic quality:**

(1) **Flavor of fish:** Water contaminants from other than natural causes shall be limited to concentrations that will not impart unpalatable flavor to fish.

(2) **Odor and taste of water:** Water contaminants from other than natural causes shall be limited to concentrations that will not result in offensive odor or taste arising in a surface water of the state or otherwise interfere with the reasonable use of the water.

E. **Plant nutrients:** Plant nutrients from other than natural causes shall not be present in concentrations that will produce undesirable aquatic life or result in a dominance of nuisance species in surface waters of the state.

F. **Toxic pollutants:**

(1) Except as provided in 20.6.4.16 NMAC, surface waters of the state shall be free of toxic pollutants, including but not limited to contaminants of emerging concern and those toxic pollutants listed in 20.6.2 NMAC, from other than natural causes in amounts, duration, concentrations or combinations that affect the propagation of fish or that are toxic to humans, livestock or other animals, fish or other aquatic organisms, wildlife using aquatic environments for habitation or aquatic organisms for food, or that will or can reasonably be expected to bioaccumulate in tissues of fish, shellfish and other aquatic organisms to levels that will impair the health of aquatic organisms or wildlife or result in unacceptable tastes, odors or health risks to human consumers of aquatic organisms.

(2) Pursuant to this section, the human health-organism only criteria shall be as set out in 20.6.4.900 NMAC. When a human health-organism only criterion is not listed in 20.6.4.900 NMAC, the following provisions shall be applied in accordance with 20.6.4.11, 20.6.4.12 and 20.6.4.14 NMAC.

(a) The human health-organism only criterion shall be the recommended human health criterion for "consumption of organisms only" published by the U.S. environmental protection agency pursuant to Section 304(a) of the federal Clean Water Act. In determining such criterion for a cancer-causing toxic pollutant, a cancer risk of 10^{-5} (one cancer per 100,000 exposed persons) shall be used.

(b) When a numeric criterion for the protection of human health for the consumption of organism only has not been published by the U.S. environmental protection agency, a quantifiable criterion may be derived from data available in the U.S. environmental protection agency's Integrated Risk Information System (IRIS) using the appropriate formula specified in *Methodology For Deriving Ambient Water Quality Criteria For The Protection Of Human Health (2000)*, EPA-822-B-00-004.

(3) Pursuant to this section, the chronic aquatic life criteria shall be as set out in 20.6.4.900 NMAC. When a chronic aquatic life criterion is not listed in 20.6.4.900 NMAC, the following provisions shall be applied in sequential order in accordance with 20.6.4.11, 20.6.4.12 and 20.6.4.14 NMAC.

(a) The chronic aquatic life criterion shall be the "freshwater criterion continuous concentration" published by the U.S. environmental protection agency pursuant to Section 304(a) of the federal Clean Water Act;

(b) If the U.S. environmental protection agency has not published a chronic aquatic life criterion, a geometric mean LC-50 value shall be calculated for the particular species, genus or group that is representative of the form of life to be preserved, using the results of toxicological studies published in scientific journals.

(i) The chronic aquatic life criterion for a toxic pollutant that does not bioaccumulate shall be ten percent of the calculated geometric mean LC-50 value; and

(ii) The chronic aquatic life criterion for a toxic pollutant that does bioaccumulate shall be: the calculated geometric mean LC-50 adjusted by a bioaccumulation factor for the particular species, genus or group representative of the form of life to be preserved, but when such bioaccumulation factor has not been published, the criterion shall be one percent of the calculated geometric mean LC-50 value.

(4) Pursuant to this section, the acute aquatic life criteria shall be as set out in 20.6.4.900 NMAC. When an acute aquatic life criterion is not listed in 20.6.4.900 NMAC, the acute aquatic life criterion shall be the "freshwater criterion maximum concentration" published by the U.S. environmental protection agency pursuant to Section 304(a) of the federal Clean Water Act.

(5) Within 90 days of the issuance of a final NPDES permit containing a numeric criterion selected or calculated pursuant to Paragraph (2), Paragraph (3) or Paragraph (4) of Subsection F of this section, the department shall petition the commission to adopt such criterion into these standards.

G. **Radioactivity:** The radioactivity of surface waters of the state shall be maintained at the lowest practical level and shall in no case exceed the criteria set forth in the New Mexico Radiation Protection Regulations, 20.3.1 and 20.3.4 NMAC.

H. **Pathogens:** Surface waters of the state shall be free of pathogens from other than natural causes in sufficient quantity to impair public health or the designated, existing or attainable uses of a surface water of the state.

I. **Temperature:** Maximum temperatures for surface waters of the state have been specified in 20.6.4.97 through 20.6.4.900 NMAC. However, the introduction of heat by other than natural causes shall not increase the temperature, as measured from above the point of introduction, by more than 2.7°C (5°F) in a stream, or more than 1.7°C (3°F) in a lake or reservoir. In no case will the introduction of heat be permitted when the maximum temperature specified for the reach would thereby be exceeded. These temperature criteria shall not apply to impoundments constructed offstream for the purpose of heat disposal. High water temperatures caused by unusually high ambient air temperatures are not violations of these criteria.

J. **Turbidity:** Turbidity attributable to other than natural causes shall not reduce light transmission to the point that the normal growth, function or reproduction of aquatic life is impaired or that will cause substantial visible contrast with the natural appearance of the water. Activities or discharges shall not cause turbidity to increase more than 10 NTU over background turbidity when the background turbidity, measured at a point immediately upstream of the activity, is 50 NTU or less, nor to increase more than twenty percent when the background turbidity is more than 50 NTU. However, limited-duration turbidity increases caused by dredging, construction or other similar activities may be allowed provided all practicable turbidity control techniques have been applied and all appropriate permits, certifications and approvals have been obtained.

K. **Total dissolved solids (TDS):** TDS attributable to other than natural causes shall not damage or impair the normal growth, function or reproduction of animal, plant or aquatic life. TDS shall be measured by either the "calculation method" (sum of constituents) or the filterable residue method. Approved test procedures for these determinations are set forth in 20.6.4.14 NMAC.

L. **Dissolved gases:** Surface waters of the state shall be free of nitrogen and other dissolved gases at levels above one hundred ten percent saturation when this supersaturation is attributable to municipal, industrial or other discharges.

M. **Biological integrity:** Surface waters of the state shall support and maintain a balanced and integrated community of aquatic organisms with species composition, diversity and functional organization comparable to those of natural or minimally impacted water bodies of a similar type and region.

[20.6.4.13 NMAC - Rp 20 NMAC 6.1.1105, 10/12/2000; A, 10/11/2002; Rn, 20.6.4.12 NMAC, 5/23/2005; A, 5/23/2005; A, 12/1/2010; A, XX/XX/XXXX]

20.6.4.14 SAMPLING AND ANALYSIS:

A. Sampling and analytical techniques shall conform with methods described in the following references unless otherwise specified by the commission pursuant to a petition to amend these standards:

(1) "*Guidelines Establishing Test Procedures For The Analysis Of Pollutants Under The Clean Water Act*," 40 CFR Part 136 or any test procedure approved or accepted by EPA using procedures provided in 40 CFR Parts 136.3(d), 136.4, and 136.5;

(2) *Standard Methods For The Examination Of Water And Wastewater*, latest edition, American public health association;

(3) *Methods For Chemical Analysis Of Water And Waste*, and other methods published by EPA office of research and development or office of water;

(4) *Techniques Of Water Resource Investigations Of The U.S. Geological Survey*;

(5) *Annual Book Of ASTM Standards*: volumes 11.01 and 11.02, water (I) and (II), latest edition, ASTM international;

(6) *Federal Register*, latest methods published for monitoring pursuant to Resource Conservation and Recovery Act regulations;

(7) *National Handbook Of Recommended Methods For Water-Data Acquisition*, latest edition, prepared cooperatively by agencies of the United States government under the sponsorship of the U.S. geological survey; or

(8) *Federal Register*, latest methods published for monitoring pursuant to the Safe Drinking Water Act regulations.

B. **Bacteriological Surveys:** The monthly geometric mean shall be used in assessing attainment of criteria when a minimum of five samples is collected in a 30-day period.

C. **Sampling Procedures:**

(1) Streams: Stream monitoring stations below discharges shall be located a sufficient distance downstream to ensure adequate vertical and lateral mixing.

(2) Lakes: Sampling stations in lakes shall be located at least 250 feet from a discharge.

(3) Lakes: Except for the restriction specified in Paragraph (2) of this subsection, lake sampling stations shall be located at any site where the attainment of a water quality criterion is to be assessed. Water quality measurements taken at intervals in the entire water column at a sampling station shall be averaged for the epilimnion, or in the absence of an epilimnion, for the upper one-third of the water column of the lake to determine attainment of criteria, except that attainment of criteria for toxic pollutants shall be assessed during periods of complete vertical mixing, e.g., during spring or fall turnover, or by taking depth-integrated composite samples of the water column.

D. Acute toxicity of effluent to aquatic life shall be determined using the procedures specified in U.S. environmental protection agency "*Methods For Measuring The Acute Toxicity Of Effluents And Receiving Waters To Freshwater And Marine Organisms*" (5th Ed., 2002, EPA 821-R-02-012), or latest edition thereof if adopted by EPA at 40 CFR Part 136, which is incorporated herein by reference. Acute toxicities of substances shall be determined using at least two species tested in whole effluent and a series of effluent dilutions. Acute toxicity due to discharges shall not occur within the wastewater mixing zone in any surface water of the state with an existing or designated aquatic life use.

E. Chronic toxicity of effluent or ambient surface waters of the state to aquatic life shall be determined using the procedures specified in U.S. environmental protection agency "*Short-Term Methods For Estimating The Chronic Toxicity Of Effluents And Receiving Waters To Freshwater Organisms*" (4th Ed., 2002, EPA 821-R-02-013), or latest edition thereof if adopted by EPA at 40 CFR Part 136, which is incorporated herein by reference. Chronic toxicities of substances shall be determined using at least two species tested in ambient surface water or whole effluent and a series of effluent dilutions. Chronic toxicity due to discharges shall not occur at the critical low flow, or any flow greater than the critical low flow, in any surface water of the state with an existing or designated aquatic life use more than once every three years.

[20.6.4.14 NMAC - Rp 20 NMAC 6.1.1106, 10/12/2000; Rn, 20.6.4.13 NMAC, 5/23/2005 & A, 5/23/2005; A, 12/1/2010]

20.6.4.15 USE ATTAINABILITY ANALYSIS:

A. **Regulatory requirements for a use attainability analysis.** [~~A use attainability analysis is a scientific study conducted for the purpose of assessing the factors affecting the attainment of a use.~~] Whenever a use attainability analysis is conducted, it shall be subject to the requirements and limitations set forth in 40 CFR Part 131, Water Quality Standards; specifically, Subsections 131.3(g), 131.10(g), 131.10(h) and 131.10(j) shall be applicable. In accordance with 40 CFR 131.10(i), and 20.6.4.10 NMAC, the amendment of a designated use, based on an existing use with more stringent criteria, does not require a use attainability analysis.

(1) The commission may remove a designated use, that is not an existing use, specified in Section 101(a)(2) of the federal Clean Water Act or adopt subcategories of a use in Section 101(a)(2) of the federal Clean Water Act[~~ use~~] requiring less stringent criteria only if a use attainability analysis demonstrates that attaining the use is not feasible because of a factor listed in 40 CFR 131.10(g). Uses in Section 101(a)(2) of the federal Clean Water Act[~~ uses~~], which refer to the protection and propagation of fish, shellfish and wildlife and recreation in and on the water, are also specified in Subsection B of 20.6.4.6 NMAC.

(2) A designated use cannot be removed if it is an existing use unless a use requiring more stringent criteria is designated.

B. **Methods for developing a use attainability analysis.** A use attainability analysis shall assess the physical, chemical, biological, economic or other factors affecting the attainment of a use. The analysis shall rely on scientifically defensible methods such as the methods described in the following documents:

(1) *Technical Support Manual: Waterbody Surveys And Assessments For Conducting Use Attainability Analyses*, volume I (November 1983) and volume III (November 1984) or latest editions, United States environmental protection agency, office of water, regulations and standards, Washington, D.C., for the evaluation of aquatic life or wildlife uses;

(2) the department's *Hydrology Protocol*, latest edition, approved by the commission, for identifying ephemeral, [~~and~~] intermittent, and perennial waters; or

(3) *Interim Economic Guidance For Water Quality Standards - Workbook*, March 1995, United States environmental protection agency, office of water, Washington, D.C. for evaluating economic impacts.

C. **Determining the highest attainable use.** If the use attainability analysis determines that the designated use is not attainable based on one of the factors in 40 CFR 131.10(g), the use attainability analysis shall demonstrate the support for removing the designated use and then determine the highest attainable use, as defined in 40 CFR 131.3(m), for the protection and propagation of fish, shellfish and wildlife and recreation in and on the water based on methods described in Subsection B of this section.

D. **Process to amend a designated use through a use attainability analysis.**

(1) The process for developing a use attainability analysis and petitioning the commission for removing a designated use and establishing the highest attainable use shall be done in accordance with the State's current *Water Quality Management Plan/Continuing Planning Process*.

[~~C.~~](2) If the findings of a use attainability analysis, conducted by the department, [~~based on~~] in accordance with the department's *Hydrology Protocol* (latest edition)[~~, approved by the commission,~~] demonstrates [~~to the satisfaction of the department~~]that federal Clean Water Act Section 101(a)(2) uses, that are not existing uses, are not feasible in an ephemeral water body due to the factor in 40 CFR 131.10(g)(2), the department may consider proceeding with the expedited use attainability analysis process in accordance with the State's current *Water Quality Management Plan/Continuing Planning Process*. The following elements must be met for the expedited use attainability analysis process to be authorized and implemented:

(a) The department is the primary investigator of the use attainability analysis;

(b) The use attainability analysis determined, through the application of the *Hydrology Protocol*, that the water being investigated is ephemeral and has no effluent discharges of sufficient volume that could compensate for the low-flow;

(c) The use attainability analysis determined that the criteria associated with the existing uses of the water being investigated are not more stringent than those in 20.6.4.97 NMAC;

(d) The designated uses in 20.6.4.97 NMAC have been determined to be the highest attainable uses for the water being analyzed;

(e) The department [~~shall~~]posted the use attainability analysis on its water quality standards website and [~~notify~~] notified its interested parties list of a 30-day public comment period~~.~~;

(f) [~~After reviewing~~]The department reviewed and responded to any comments received during the 30-day public comment period~~,~~; and

(g) The department [~~may proceed by submitting~~]submitted the use attainability analysis and response to comments to region 6 EPA for technical approval.

If EPA approves the revision under section 303(c) of the Clean Water Act [~~technical approval is granted~~], the water shall be subject to 20.6.4.97 NMAC for federal Clean Water Act purposes. The use attainability analysis, the technical support document,[~~ approval,~~] and the applicability of 20.6.4.97 NMAC to the water shall be posted on the department's water quality standards website. The department shall periodically petition the commission to list ephemeral waters under Subsection C of 20.6.4.97 NMAC and to incorporate changes to classified segments as appropriate.

[~~D.~~]E. Use attainability analysis conducted by an entity other than the department. Any person may submit notice to the department stating their intent to conduct a use attainability analysis.

(1) The proponent shall provide such notice along with [~~develop~~]a work plan supporting [~~to conduct~~]the development of a use attainability analysis[~~, and shall submit the work plan~~] to the department and region 6 EPA for review and comment.

(2) Upon approval of the work plan by the department, the proponent shall conduct the use attainability analysis in accordance with the applicable portions of Subsections A through D of this Section and implement public noticing in accordance with the approved work plan.

(3) Work plan elements. The work plan shall identify, at a minimum:

(a) the waterbody of concern and the reasoning for conducting a use attainability analysis;

(b) the [~~scope~~]source and validity of data [~~currently available and the scope of data to be gathered~~]to be used to demonstrate whether the current designated use is not attainable;[~~,~~]

(c) the factors in 40 CFR 131.10(g) affecting [~~use~~]the attainment of that use;

(d) [~~that will be analyzed~~] a description of the data being proposed to be used to demonstrate the highest attainable use;

(e) [~~and~~]the provisions for consultation with appropriate state and federal agencies;

(f) a description of how stakeholders and potentially affected tribes will be identified and engaged;

(g) a description of the public notice mechanisms to be employed; and [~~consultation with appropriate state and federal agencies~~]

(h) the expected timelines outlining the administrative actions to be taken for a rulemaking petition, pending the outcome of the use attainability analysis.

(4) [~~Upon approval of the work plan by the department, the proponent shall conduct the use attainability analysis in accordance with the approved work plan. The cost of such analysis shall be the responsibility of the proponent.~~] Upon completion of the use attainability analysis, the proponent shall submit the data, findings and conclusions to the department, and provide public notice of the use attainability analysis in accordance with the approved work plan.

(5) Pending the conclusions of the use attainability analysis and as described in the approved work plan, [~~T~~]the department or the proponent may petition the commission to modify the designated use [~~if the conclusions of the analysis support such action~~]. The cost of such use attainability analysis shall be the responsibility of the proponent. Subsequent costs associated with the administrative rulemaking process shall be the responsibility of the petitioner.

[20.6.4.15 NMAC - Rp 20 NMAC 6.1.1107, 10/12/2000; Rn, 20.6.4.14 NMAC, 5/23/2005; A, 5/23/2005; A, 7/17/2005; A, 12/1/2010; A, XX/XX/XXXX]

20.6.4.16 PLANNED USE OF A PISCICIDE: The use of a piscicide registered under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), 7 U.S.C. Section 136 *et seq*., and under the New Mexico Pesticide Control Act (NMPCA), Section 76-4-1 *et seq*. NMSA 1978 (1973) in a surface water of the state, shall not be a violation of Subsection F of 20.6.4.13 NMAC when such use is covered by a federal national pollutant discharge elimination system (NPDES) permit or has been approved by the commission under procedures provided in this section. The use of a piscicide which is covered by a NPDES permit shall require no further review by the commission and the person whose application is covered by the NPDES permit shall meet the additional notification and monitoring requirements outlined in Subsection G of 20.6.4.16 NMAC. The commission may approve the reasonable use of a piscicide under this section if the proposed use is not covered by a NPDES permit to further a Clean Water Act objective to restore and maintain the physical or biological integrity of surface waters of the state, including restoration of native species.

A. Any person seeking commission approval of the use of a piscicide not covered by a NPDES permit shall file a written petition concurrently with the commission and the surface water bureau of the department. The petition shall contain, at a minimum, the following information:

(1) petitioner's name and address;

(2) identity of the piscicide and the period of time (not to exceed five years) or number of applications for which approval is requested;

(3) documentation of registration under FIFRA and NMPCA and certification that the petitioner intends to use the piscicide according to the label directions, for its intended function;

(4) target and potential non-target species in the treated waters and adjacent riparian area, including threatened or endangered species;

(5) potential environmental consequences to the treated waters and the adjacent riparian area, and protocols for limiting such impacts;

(6) surface water of the state proposed for treatment;

(7) results of pre-treatment survey;

(8) evaluation of available alternatives and justification for selecting piscicide use;

(9) documentation of notice requesting public comment on the proposed use within a 30-day period, including information as described in Paragraphs (1), (2) and (6) of Subsection A of 20.6.4.16 NMAC, provided to:

(a) local political subdivisions;

(b) local water planning entities;

(c) local conservancy and irrigation districts; and

(d) local media outlets, except that the petitioner shall only be required to publish notice in a newspaper of circulation in the locality affected by the proposed use.

(10) copies of public comments received in response to the publication of notice and the petitioner's responses to public comments received;

(11) post-treatment assessment monitoring protocol; and

(12) any other information required by the commission.

B. Within 30 days of receipt of the petition, the department shall review the petition and file a recommendation with the commission to grant, grant with conditions or deny the petition. The recommendation shall include reasons, and a copy shall be sent to the petitioner by certified mail.

C. The commission shall review the petition, the public comments received under Paragraphs (9) and (10) of Subsection A of 20.6.4.16 NMAC, the petitioner's responses to public comments and the department's technical recommendations for the petition. A public hearing shall be held if the commission determines there is substantial public interest. The commission shall notify the petitioner and those commenting on the petition of the decision whether to hold a hearing and the reasons therefore in writing.

D. If the commission determines there is substantial public interest a public hearing shall be held within 90 days of receipt of the department's recommendation in the locality affected by the proposed use in accordance with 20.1.3 NMAC, Adjudicatory Procedures - Water Quality Control Commission. Notice of the hearing shall be given in writing by the petitioner to individuals listed under Subsection A of 20.6.4.16 NMAC as well as to individuals who provided public comment under that subsection at least 30 days prior to the hearing.

E. In a hearing provided for in this section or, if no hearing is held, in a commission meeting, the registration of a piscicide under FIFRA and NMPCA shall provide a rebuttable presumption that the determinations of the EPA Administrator in registering the piscicide, as outlined in 7 U.S.C. Section 136a(c)(5), are valid. For purposes of this Section the rebuttable presumptions regarding the piscicide include:

(1) Its composition is such as to warrant the proposed claims for it;

(2) Its labeling and other material submitted for registration comply with the requirements of FIFRA and NMPCA;

(3) It will perform its intended function without unreasonable adverse effects on the environment; and

(4) When used in accordance with all FIFRA label requirements it will not generally cause unreasonable adverse effects on the environment.

(5) "Unreasonable adverse effects on the environment" has the meaning provided in FIFRA, 7 U.S.C. Section 136(bb): "any unreasonable risk to man or the environment, taking into account the economic, social, and environmental costs and benefits of the use of any pesticide."

F. After a public hearing, or commission meeting if no hearing is held, the commission may grant the petition in whole or in part, may grant the petition subject to conditions, or may deny the petition. In granting any petition in whole or part or subject to conditions, the commission shall require the petitioner to implement post-treatment assessment monitoring and provide notice to the public in the immediate and near downstream vicinity of the application prior to and during the application.

G. Any person whose application is covered by a NPDES permit shall provide written notice to local entities as described in Subsection A of 20.6.4.16 NMAC and implement post-treatment assessment monitoring within the application area as described in Subsection F of 20.6.4.16 NMAC.

[20.6.4.16 NMAC - Rn, Paragraph (6) of Subsection F of 20.6.4.12 NMAC, 5/23/2005; A, 5/23/2005; A, 3/2/2017]

20.6.4.17 - 20.6.4.49 [RESERVED]

20.6.4.50 BASINWIDE PROVISIONS - Special provisions arising from interstate compacts, international treaties or court decrees or that otherwise apply to a basin are contained in 20.6.4.51 through 20.6.4.59 NMAC.

[20.6.4.50 NMAC - N, 5/23/2005]

20.6.4.51 [RESERVED]

20.6.4.52 PECOS RIVER BASIN - In order to protect existing and designated uses, it is a goal of the state of New Mexico to prevent increases in TDS in the Pecos river above the following benchmark values, which are expressed as flow-weighted, annual average concentrations, at three USGS gaging stations: at Santa Rosa 500 mg/L; near Artesia 2,700 mg/L; and near Malaga 3,600 mg/L. The benchmark values serve to guide state action. They are adopted pursuant to the New Mexico Water Quality Act, not the Clean Water Act.

[20.6.4.52 NMAC - N, 12/1/2010]

20.6.4.53 [RESERVED]

20.6.4.54 COLORADO RIVER BASIN - For the tributaries of the Colorado river system, the state of New Mexico will cooperate with the Colorado river basin states and the federal government to support and implement the salinity policy and program outlined in the most current "review, water quality standards for salinity, Colorado river system" or equivalent report by the Colorado river salinity control forum.

A. Numeric criteria expressed as the flow-weighted annual average concentration for salinity are established at three points in the Colorado river basin as follows: below Hoover dam, 723 mg/L; below Parker dam, 747 mg/L; and at Imperial dam, 879 mg/L.

B. As a part of the program, objectives for New Mexico shall include the elimination of discharges of water containing solids in solution as a result of the use of water to control or convey fly ash from coal-fired electric generators, wherever practicable.

[20.6.4.54 NMAC - Rn, Paragraphs (1) through (3) of Subsection K of 20.6.4.12 NMAC, 5/23/2005; A, 5/23/2005]

20.6.4.55 - 20.6.4.96 [RESERVED]

20.6.4.97 EPHEMERAL WATERS: Ephemeral surface waters of the state as identified below and additional ephemeral waters as identified on the department's water quality standards website pursuant to Paragraph (2) of Subsection [~~C~~]D of 20.6.4.15 NMAC are subject to the designated uses and criteria as specified in this section. Ephemeral waters classified in 20.6.4.101-899 NMAC are subject to the designated uses and criteria as specified in those sections.

A. Designated uses: livestock watering, wildlife habitat, limited aquatic life and secondary contact.

B. Criteria: the use-specific criteria in 20.6.4.900 NMAC are applicable to the designated uses.

C. Waters:

(1) the following waters are designated in the Rio Grande basin:

(a) Cunningham gulch from Santa Fe county road 55 upstream 1.4 miles to a point upstream of the Lac minerals mine, identified as Ortiz mine on U.S. geological survey topographic maps;

(b) an unnamed tributary from Arroyo Hondo upstream 0.4 miles to the Village of Oshara water reclamation facility outfall;

(c) an unnamed tributary from San Pedro creek upstream 0.8 miles to the PAA-KO community sewer outfall;

(d) Inditos draw from the crossing of an unnamed road along a power line one-quarter mile west of McKinley county road 19 upstream to New Mexico highway 509;

(e) an unnamed tributary from the diversion channel connecting Blue canyon and Socorro canyon upstream 0.6 miles to the New Mexico firefighters academy treatment facility outfall;

(f) an unnamed tributary from the Albuquerque metropolitan arroyo flood control authority (AMAFCA) Rio Grande south channel upstream of the crossing of New Mexico highway 47 upstream to I-25;

(g) the south fork of Cañon del Piojo from [~~Canon~~]Cañon del Piojo upstream 1.2 miles to an unnamed tributary;

(h) an unnamed tributary from the south fork of Cañon del Piojo upstream 1 mile to the Resurrection mine outfall;

(i) Arroyo del Puerto from San Mateo creek upstream 6.8 miles to the Ambrosia Lake mine entrance road;

(j) an unnamed tributary from San Mateo creek upstream 1.5 miles to the Roca Honda mine facility outfall;

(k) San Isidro arroyo, including unnamed tributaries to San Isidro arroyo, from Arroyo Chico upstream to its headwaters;

(l) Arroyo Tinaja, including unnamed tributaries to Arroyo Tinaja, from San Isidro arroyo upstream to 2 miles northeast of the Cibola national forest boundary;

(m) Mulatto canyon from Arroyo Tinaja upstream to 1 mile northeast of the Cibola national forest boundary; and

(n) Doctor arroyo, including unnamed tributaries to Doctor arroyo, from San Isidro arroyo upstream to its headwaters, and excluding Doctor Spring and Doctor arroyo from the spring to its confluence with the unnamed tributary approximately one-half mile downstream of the spring.

(2) the following waters are designated in the Pecos river basin:

(a) an unnamed tributary from Hart canyon upstream 1 mile to South Union road;

(b) Aqua Chiquita from Rio Peñasco upstream to McEwan canyon; and

(c) Grindstone canyon upstream of Grindstone reservoir.

(3) the following waters are designated in the Canadian river basin:

(a) Bracket canyon upstream of the Vermejo river;

(b) an unnamed tributary from Bracket canyon upstream 2 miles to the Ancho mine; and

(c) Gachupin canyon from the Vermejo river upstream 2.9 miles to an unnamed west tributary near the Ancho mine outfall.

(4) in the San Juan river basin an unnamed tributary of Kim-me-ni-oli wash upstream of the mine outfall.

(5) the following waters are designated in the Little Colorado river basin:

(a) Defiance draw from County Road 1 to upstream of West Defiance Road; and

(b) an unnamed tributary of Defiance draw from McKinley county road 1 upstream to New Mexico highway 264.

(6) the following waters are designated in the closed basins:

(a) in the Tularosa river closed basin San Andres canyon downstream of South San Andres canyon; and

(b) in the Mimbres river closed basin San Vicente arroyo from the Mimbres river upstream to Maudes canyon.

[20.6.4.97 NMAC - N, 5/23/2005; A, 12/1/2010; A, 3/2/2017; A, 12/17/2019; A, XX/XX/XXXX]

20.6.4.98 INTERMITTENT WATERS: All non-perennial surface waters of the state, except those ephemeral waters included under section 20.6.4.97 NMAC or classified in 20.6.4.101-899 NMAC.

A. Designated uses: livestock watering, wildlife habitat, marginal warmwater aquatic life and primary contact.

B. Criteria: the use-specific criteria in 20.6.4.900 NMAC are applicable to the designated uses, except that the following site-specific criteria apply: the monthly geometric mean of E. coli bacteria 206 cfu/100 mL or less, single sample 940 cfu/100 mL or less.

[20.6.4.98 NMAC - N, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.99 PERENNIAL WATERS: All perennial surface waters of the state except those classified in 20.6.4.101-899 NMAC.

A. Designated uses: Warmwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. Criteria: The use-specific criteria in 20.6.4.900 NMAC are applicable to the designated uses, except that the following site-specific criteria apply: the monthly geometric mean of E. coli bacteria 206 cfu/100 mL or less, single sample 940 cfu/100 mL or less.

[20.6.4.99 NMAC - N, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.100 [RESERVED]

20.6.4.101 RIO GRANDE BASIN: The main stem of the Rio Grande from the international boundary with Mexico upstream to one mile downstream of Percha dam.

A. Designated uses: irrigation, marginal warmwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses except that the following segment-specific criterion applies: temperature 34°C (93.2°F) or less.

(2) At mean monthly flows above 350 cfs, the monthly average concentration for: TDS 2,000 mg/L or less, sulfate 500 mg/L or less and chloride 400 mg/L or less.

C. Remarks: sustained flow in the Rio Grande below Caballo reservoir is dependent on release from Caballo reservoir during the irrigation season; at other times of the year, there may be little or no flow.

[20.6.4.101 NMAC - Rp 20 NMAC 6.1.2101, 10/12/2010; A, 12/15/2001; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.102 RIO GRANDE BASIN: The main stem of the Rio Grande from one mile downstream of Percha dam upstream to Caballo dam.

A. Designated uses: irrigation, livestock watering, wildlife habitat, primary contact and warmwater aquatic life.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

C. Remarks: sustained flow in the Rio Grande downstream of Caballo reservoir is dependent on release from Caballo reservoir during the irrigation season; at other times of the year, there may be little or no flow.

[20.6.4.102 NMAC - Rp 20 NMAC 6.1.2102, 10/12/2010; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.103 RIO GRANDE BASIN: [-] [~~The main stem of the Rio Grande from the headwaters of Caballo reservoir upstream to Elephant Butte dam and p~~]Perennial reaches of tributaries to the Rio Grande

in Sierra and Socorro counties not specifically identified under other sections of 20.6.4 NMAC, excluding waters on tribal lands.

A. Designated uses: irrigation, livestock watering, wildlife habitat, marginal coldwater aquatic life, secondary contact and warmwater aquatic life.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[~~**C. Remarks:** flow in this reach of the Rio Grande main stem is dependent upon release from Elephant Butte dam.~~]

[20.6.4.103 NMAC - Rp 20 NMAC 6.1.2103, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, XX/XX/XXXX]

[NOTE: This segment was divided effective XX/XX/XXXX. The standards for the main stem of the Rio Grande from the headwaters of Caballo reservoir upstream to Elephant Butte dam, perennial reaches of Palomas creek, perennial reaches of Rio Salado, perennial reaches of Percha creek, perennial reaches of Alamosa creek, and perennial reaches of Abo arroyo are under 20.6.4.112 NMAC.]

20.6.4.104 RIO GRANDE BASIN: - Caballo and Elephant Butte reservoir.

A. Designated uses: irrigation storage, livestock watering, wildlife habitat, primary contact and warmwater aquatic life.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.104 NMAC - Rp 20 NMAC 6.1.2104, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.105 RIO GRANDE BASIN: [-] The main stem of the Rio Grande from the headwaters of Elephant Butte reservoir upstream to Alameda bridge (Corrales bridge), excluding waters on Isleta pueblo.

A. Designated uses: irrigation, marginal warmwater aquatic life, livestock watering, public water supply, wildlife habitat and primary contact.

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

(2) At mean monthly flows above 100 cfs, the monthly average concentration for: TDS l,500 mg/L or less, sulfate 500 mg/L or less and chloride 250 mg/L or less.

(3) Effluent conditions referenced in 20.6.2.2102 NMAC, Rio Grande basin-community sewerage systems, apply if the applicability conditions in 20.6.2.2100 NMAC are met.

[20.6.4.105 NMAC - Rp 20 NMAC 6.1.2105, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, XX/XX/XXXX]

20.6.4.106 RIO GRANDE BASIN: [-] The main stem of the Rio Grande from Alameda bridge (Corrales bridge) upstream to the Angostura diversion works, excluding waters on Santa Ana pueblo, and intermittent water in the Jemez river below the Jemez pueblo boundary, excluding waters on Santa Ana and Zia pueblos, that enters the main stem of the Rio Grande. Portions of the Rio Grande in this segment are under the joint jurisdiction of the state and Sandia pueblo.

A. Designated uses: irrigation, marginal warmwater aquatic life, livestock watering, wildlife habitat and primary contact; and public water supply on the Rio Grande.

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

(2) At mean monthly flows above 100 cfs, the monthly average concentration for: TDS 1,500 mg/L or less, sulfate 500 mg/L or less and chloride 250 mg/L or less.

(3) Effluent conditions referenced in 20.6.2.2102, NMAC Rio Grande basin-community sewerage systems, apply if the applicability conditions in 20.6.2.2100 NMAC are met.

[20.6.4.106 NMAC - Rp 20 NMAC 6.1.2105.1, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, XX/XX/XXXX]

20.6.4.107 RIO GRANDE BASIN: [-] The Jemez river from the Jemez pueblo boundary upstream to Soda dam near the town of Jemez Springs and perennial reaches of Vallecito creek.

A. Designated uses: coldwater aquatic life, primary contact, irrigation, livestock watering and wildlife habitat; and public water supply on Vallecito creek.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 25°C (77°F).
[20.6.4.107 NMAC - Rp 20 NMAC 6.1.2105.5, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.108 RIO GRANDE BASIN: [-] Perennial reaches of the Jemez river upstream of Soda dam near the town of Jemez Springs and [~~all its~~]perennial reaches of tributaries to the Jemez river except those not specifically identified under other sections of 20.6.4 NMAC [~~above Soda dam near the town of Jemez Springs, except San Gregorio lake and Sulphur creek above its confluence with Redondo creek~~], and perennial reaches of the Guadalupe river and perennial reaches of [~~all its~~] tributaries to the Guadalupe river, and Calaveras canyon.

A. Designated uses: domestic water supply, fish culture, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 400 µS/cm or less (800 µS/cm or less on Sulphur creek); the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less; and pH within the range of 2.0 to 8.8 on Sulphur creek.
[20.6.4.108 NMAC - Rp 20 NMAC 6.1.2106, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 7/10/2012; A, XX/XX/XXXX]
[**NOTE:** The segment covered by this section was divided effective 5/23/2005. The standards for the additional segment are under 20.6.4.124 NMAC. The standards for San Gregorio lake are in 20.6.4.134 NMAC, effective 7/10/2012]

20.6.4.109 RIO GRANDE BASIN: [-] Perennial reaches of Bluewater creek excluding Bluewater lake and waters on tribal lands, Rio Moquino upstream of Laguna pueblo, Seboyeta creek, Rio Paguate upstream of Laguna pueblo, the Rio Puerco upstream of the northern boundary of Cuba, and all other perennial reaches of tributaries to the Rio Puerco, including the Rio San Jose in Cibola county from the USGS gaging station at Correo upstream to Horace springs excluding waters on tribal lands.

A. Designated uses: coldwater aquatic life, domestic water supply, fish culture, irrigation, livestock watering, wildlife habitat and primary contact; and public water supply on La Jara creek.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: phosphorus (unfiltered sample) 0.1 mg/L or less; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.109 NMAC - Rp 20 NMAC 6.1.2107, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 7/10/2012]
[**NOTE:** The standards for Bluewater lake are in 20.6.4.135 NMAC, effective 7/10/2012]

20.6.4.110 RIO GRANDE BASIN: The main stem of the Rio Grande from Angostura diversion works upstream to Cochiti dam, excluding the reaches on San Felipe, Kewa and Cochiti pueblos.

A. Designated uses: irrigation, livestock watering, wildlife habitat, primary contact, coldwater aquatic life and warmwater aquatic life.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: pH within the range of 6.6 to 9.0 and temperature 25°C (77°F) or less.
[20.6.4.110 NMAC - Rp 20 NMAC 6.1.2108, 10/12/2010; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.111 RIO GRANDE BASIN: [-] Perennial reaches of Las Huertas creek from the San Felipe pueblo boundary to the headwaters.

A. Designated uses: high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 25°C (77°F) or less.
[20.6.4.111 NMAC - Rp 20 NMAC 6.1.2108.5, 10/12/2000; A, 7/25/2001; A, 5/23/2005; A-12/1/2010]
[**NOTE:** The segment covered by this section was divided effective 5/23/2005. The standards for the additional segment are under 20.6.4.125 NMAC.]

20.6.4.112 [~~[RESERVED]~~] RIO GRANDE BASIN: - The main stem of the Rio Grande from the headwaters of Caballo reservoir upstream to Elephant Butte dam, perennial reaches of Palomas creek, perennial reaches of Rio Salado, perennial reaches of Percha creek, perennial reaches of Alamosa creek, and perennial reaches of Abo arroyo.

A. Designated uses: irrigation, livestock watering, wildlife habitat, marginal coldwater aquatic life, primary contact and warmwater aquatic life.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

C. Remarks: flow in this reach of the Rio Grande main stem is dependent upon release from Elephant Butte dam.

[20.6.4.112 NMAC - Rp 20 NMAC 6.1.2109, 10/12/2000; A, 5/23/2005; Repealed, 12/1/2010; A, XX/XX/XXXX]

20.6.4.113 RIO GRANDE BASIN: [-] The Santa Fe river and perennial reaches of its tributaries from the Cochiti pueblo boundary upstream to the outfall of the Santa Fe wastewater treatment facility.

A. Designated uses: irrigation, livestock watering, wildlife habitat, primary contact and coolwater aquatic life.

B. Criteria: The use-specific criteria in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 30°C (86°F) or less.

[20.6.4.113 NMAC - Rp 20 NMAC 6.1.2110, 10/12/2000; A, 10/11/2002; A, 5/23/2005; A, 12/1/2010; A, 2/14/2013]

20.6.4.114 RIO GRANDE BASIN: [-] The main stem of the Rio Grande from the Cochiti pueblo boundary upstream to Rio Pueblo de Taos excluding waters on San Ildefonso, Santa Clara and Ohkay Owingeh pueblos, Embudo creek from its mouth on the Rio Grande upstream to the Picuris Pueblo boundary, the Santa Cruz river from the Santa Clara pueblo boundary upstream to the Santa Cruz dam, the Rio Tesuque except waters on the Tesuque and Pojoaque pueblos, and the Pojoaque river from the San Ildefonso pueblo boundary upstream to the Pojoaque pueblo boundary. Some Rio Grande waters in this segment are under the joint jurisdiction of the state and San Ildefonso pueblo.

A. Designated uses: irrigation, livestock watering, wildlife habitat, marginal coldwater aquatic life, primary contact and warmwater aquatic life; and public water supply on the main stem Rio Grande.

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: 6T3 temperature 22°C (71.6°F) and maximum temperature 25°C (78.8°F). In addition, the following criteria based on a 12-month rolling average are applicable to the public water supply use for monitoring and public disclosure purposes only:

Radionuclide	pCi/L
Americium-241	1.9
Cesium-137	6.4
Plutonium-238	1.5
Plutonium-239/240	1.5
Strontium-90	3.5
Tritium	4,000

(2) At mean monthly flows above 100 cfs, the monthly average concentration for: TDS 500 mg/L or less, sulfate 150 mg/L or less and chloride 25 mg/L or less.

[20.6.4.114 NMAC - Rp 20 NMAC 6.1.2111, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.115 RIO GRANDE BASIN: [-] The perennial reaches of Rio Vallecitos, [~~and its~~]perennial reaches of tributaries to Rio Vallecitos except Hopewell lake, and perennial reaches of Rio del Oso and perennial reaches of El Rito creek above the town of El Rito.

A. Designated uses: domestic water supply, irrigation, high quality coldwater aquatic life, livestock watering, wildlife habitat and primary contact; public water supply on the Rio Vallecitos and El Rito creek.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 300 µS/cm or less; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.115 NMAC - Rp 20 NMAC 6.1.2112, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 7/10/2012; A, XX/XX/XXXX]
[**NOTE:** The standards for Hopewell lake are in 20.6.4.134 NMAC, effective 7/10/2012]

20.6.4.116 RIO GRANDE BASIN: The Rio Chama from its mouth on the Rio Grande upstream to Abiquiu reservoir, perennial reaches of the Rio Tusas, perennial reaches of the Rio Ojo Caliente, perennial reaches of Abiquiu creek and perennial reaches of El Rito creek downstream of the town of El Rito.

A. Designated uses: irrigation, livestock watering, wildlife habitat, coldwater aquatic life, warmwater aquatic life and [~~secondary~~]primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 31°C (87.8°F) or less.
[20.6.4.116 NMAC - Rp 20 NMAC 6.1.2113, 10/12/2010; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017; A, XX/XX/XXXX]

20.6.4.117 RIO GRANDE BASIN: [-] Abiquiu reservoir.

A. Designated uses: irrigation storage, livestock watering, wildlife habitat, primary contact, coldwater aquatic life and warmwater aquatic life.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 25°C (77°F) or less.
[20.6.4.117 NMAC - Rp 20 NMAC 6.1.2114, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.118 RIO GRANDE BASIN: [-] The Rio Chama from the headwaters of Abiquiu reservoir upstream to El Vado reservoir and perennial reaches of the Rio Gallina and Rio Puerco de Chama north of state highway 96. Some Rio Chama waters in this segment are under the joint jurisdiction of the state and the Jicarilla Apache tribe.

A. Designated uses: irrigation, livestock watering, wildlife habitat, coldwater aquatic life, warmwater aquatic life and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 26°C (78.8°F) or less.
[20.6.4.118 NMAC - Rp 20 NMAC 6.1.2115, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.119 RIO GRANDE BASIN: [-] All perennial reaches of tributaries to the Rio Chama above Abiquiu dam, except Canjilon lakes a, c, e and f and the Rio Gallina and Rio Puerco de Chama north of state highway 96 and excluding waters on Jicarilla Apache reservation, and the main stem of the Rio Chama from the headwaters of El Vado reservoir upstream to the New Mexico-Colorado line. Some Cañones creek and Rio Chama waters in this segment are under the joint jurisdiction of the state and the Jicarilla Apache tribe.

A. Designated uses: domestic water supply, fish culture, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact; and public water supply on the Rio Brazos and Rio Chama.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 500 µS/cm or less (1,000 µS or less for Coyote creek); the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.119 NMAC - Rp 20 NMAC 6.1.2116, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 7/10/2012]
[**NOTE:** The standards for Canjilon lakes a, c, e and f are in 20.6.4.134 NMAC, effective 7/10/2012]

20.6.4.120 RIO GRANDE BASIN: [-] El Vado and Heron reservoirs.

A. Designated uses: irrigation storage, livestock watering, wildlife habitat, public water supply, primary contact and coldwater aquatic life.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.120 NMAC - Rp 20 NMAC 6.1.2117, 10/12/2000; A. 5/23/2005; A, 12/1/2010]

20.6.4.121 RIO GRANDE BASIN: [-] Perennial tributaries to the Rio Grande in Bandelier national monument and their headwaters in Sandoval county and all perennial reaches of tributaries to the Rio Grande in Santa Fe county unless included in other segments and excluding waters on tribal lands.

A. Designated uses: domestic water supply, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact; and public water supply on Little Tesuque creek, the Rio en Medio, and the Santa Fe river.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 300 µS/cm or less; the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.121 NMAC - Rp 20 NMAC 6.1.2118, 10/12/2000; A. 5/23/2005; A, 12/1/2010; A, 2/14/2013]

[NOTE: The segment covered by this section was divided effective 5/23/2005. The standards for the additional segments are under 20.6.4.126, 20.6.4.127 and 20.6.4.128 NMAC.]

20.6.4.122 RIO GRANDE BASIN: [-] The main stem of the Rio Grande from Rio Pueblo de Taos upstream to the New Mexico-Colorado line, the Red river from its mouth on the Rio Grande upstream to the mouth of Placer creek, and the Rio Pueblo de Taos from its mouth on the Rio Grande upstream to the mouth of the Rio Grande del Rancho. Some Rio Grande and Rio Pueblo de Taos waters in this segment are under the joint jurisdiction of the state and Taos pueblo.

A. Designated uses: coldwater aquatic life, fish culture, irrigation, livestock watering, wildlife habitat and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.122 NMAC - Rp 20 NMAC 6.1.2119, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.123 RIO GRANDE BASIN: [-] Perennial reaches of the Red river upstream of the mouth of Placer creek, all perennial reaches of tributaries to the Red river, and all other perennial reaches of tributaries to the Rio Grande in Taos and Rio Arriba counties unless included in other segments and excluding waters on Santa Clara, Ohkay Owingeh, Picuris and Taos pueblos.

A. Designated uses: domestic water supply, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact; and public water supply on the Rio Pueblo and Rio Fernando de Taos.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 400 µS/cm or less (500 µS/cm or less for the Rio Fernando de Taos); the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less; and phosphorus (unfiltered sample) less than 0.1 mg/L for the Red river.

[20.6.4.123 NMAC - Rp 20 NMAC 6.1.2120, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

[**NOTE:** The segment covered by this section was divided effective 5/23/2005. The standards for the additional segment are under 20.6.4.129 NMAC.]

20.6.4.124 RIO GRANDE BASIN: Perennial reaches of Sulphur creek from its confluence with Redondo creek upstream to its headwaters.

A. Designated uses: limited aquatic life, wildlife habitat, livestock watering and secondary contact.

B. Criteria: the use-specific criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: pH within the range of 2.0 to 9.0, maximum temperature 30ºC (86ºF), and the chronic aquatic life criteria of Subsections I and J of 20.6.4.900 NMAC.

[20.6.4.124 NMAC - N, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.125 RIO GRANDE BASIN: [-] Perennial reaches of San Pedro creek from the San Felipe pueblo boundary to the headwaters.

A. Designated uses: coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 25°C (77°F) or less.

[20.6.4.125 NMAC - N, 5/23/2005; A, 12/1/2010]

20.6.4.126 RIO GRANDE BASIN: [-] Perennial portions of Cañon de Valle from Los Alamos national laboratory (LANL) stream gage E256 upstream to Burning Ground spring, Sandia canyon from Sigma canyon upstream to LANL NPDES outfall 001, Pajarito canyon from Arroyo de La Delfe upstream into Starmers gulch and Starmers spring and Water canyon from Area-A canyon upstream to State Route 501.

A. Designated uses: coldwater aquatic life, livestock watering, wildlife habitat and secondary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.126 NMAC - N, 5/23/2005; A, 12/1/2010]

20.6.4.127 RIO GRANDE BASIN: [-] Perennial portions of Los Alamos canyon upstream from Los Alamos reservoir and Los Alamos reservoir.

A. Designated uses: coldwater aquatic life, livestock watering, wildlife habitat, irrigation and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.127 NMAC - N, 5/23/2005; A, 12/1/2010]

20.6.4.128 RIO GRANDE BASIN: [-] Ephemeral and intermittent [~~watercourses~~]waters within lands managed by U.S. department of energy (DOE) within LANL[-], including but not limited to: Mortandad canyon, Cañada del Buey, Ancho canyon, Chaquehui canyon, Indio canyon, Fence canyon, Potrillo canyon, and portions of Cañon de Valle, Los Alamos canyon, Sandia canyon, Pajarito canyon and Water canyon not specifically identified in 20.6.4.126 NMAC or 20.6.4.140 NMAC. (Surface waters within lands scheduled for transfer from DOE to tribal, state or local authorities are specifically excluded.)

A. Designated uses: livestock watering, wildlife habitat, limited aquatic life and secondary contact.

B. Criteria: the use-specific criteria in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the acute total ammonia criteria set forth in Subsection [~~K~~]L of 20.6.4.900 NMAC ([~~salmonids~~]*Oncorhynchus* spp. absent).

[20.6.4.128 NMAC - N, 5/23/2005; A, 12/1/2010; A, XX/XX/XXXX]

[**NOTE:** This section was divided effective XX/XX/XXXX. The standards for some intermittent waters within LANL are in 20.6.4.140 NMAC.]

20.6.4.129 RIO GRANDE BASIN: [-] Perennial reaches of the Rio Hondo.

A. Designated uses: domestic water supply, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact**.**

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 400 µS/cm or less and phosphorus (unfiltered sample) less than 0.1 mg/L.

[20.6.4.129 NMAC - N, 5/23/2005; A, 12/1/2010]

20.6.4.130 RIO GRANDE BASIN: [-] The Rio Puerco from the Rio Grande upstream to Arroyo Chijuilla, excluding the reaches on Isleta, Laguna and Cañoncito Navajo pueblos. Some waters in this segment are under the joint jurisdiction of the state and Isleta, Laguna or Cañoncito Navajo pueblos.

A. Designated uses: irrigation, warmwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

(2) At mean monthly flows above 100 cfs, the monthly average concentration for: TDS l,500 mg/L or less, sulfate 500 mg/L or less and chloride 250 mg/L or less.

[20.6.4.130 NMAC - N, 12/1/2010]

20.6.4.131 RIO GRANDE BASIN: [-] The Rio Puerco from the confluence of Arroyo Chijuilla upstream to the northern boundary of Cuba.

A. **Designated uses:** warmwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.131 NMAC - N, 12/1/2010]

20.6.4.132 RIO GRANDE BASIN: [-] Rio Grande (Klauer) spring

A. **Designated uses:** domestic water supply, wildlife habitat, livestock watering, coldwater aquatic life use and primary contact.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.132 NMAC - N, 12/1/2010]

20.6.4.133 RIO GRANDE BASIN: [-] Bull Creek lake, Cow lake, Elk lake, Goose lake, Heart lake, Hidden lake (Lake Hazel), Horseshoe lake, Horseshoe (Alamitos) lake, Jose Vigil lake, Lost lake, Middle Fork lake, Nambe lake, Nat II lake, Nat IV lake, No Fish lake, Pioneer lake, San Leonardo lake, Santa Fe lake, Serpent lake, South Fork lake, Trampas lakes (east and west) and Williams lake.

A. **Designated uses:** high quality coldwater aquatic life, irrigation, domestic water supply, primary contact, livestock watering and wildlife habitat.

B. **Criteria:** The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 300 µS/cm or less; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.133 NMAC - N, 7/10/2012]

20.6.4.134 RIO GRANDE BASIN: [-] Cabresto lake, Canjilon lakes a, c, e and f, Fawn lakes (east and west), Hopewell lake and San Gregorio lake.

A. **Designated uses:** high quality coldwater aquatic life, irrigation, domestic water supply, primary contact, livestock watering and wildlife habitat.

B. **Criteria:** The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 300 µS/cm or less; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.134 NMAC - N, 7/10/2012]

20.6.4.135 RIO GRANDE BASIN: [-] Bluewater lake.

A. **Designated uses:** coldwater aquatic life, irrigation, domestic water supply, primary contact, livestock watering and wildlife habitat.

B. **Criteria:** The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses except that the following segment-specific criteria apply: phosphorus (unfiltered sample) 0.1 mg/L or less; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.135 NMAC - N, 7/10/2012]

20.6.4.136 RIO GRANDE BASIN: [-] The Santa Fe river from the outfall of the Santa Fe wastewater treatment facility to Guadalupe street.

A. **Designated uses:** limited aquatic life, wildlife habitat, primary contact, livestock watering, and irrigation.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.136 NMAC - N, 2/14/2013]

20.6.4.137 RIO GRANDE BASIN: [-] The Santa Fe river from Guadalupe street to Nichols reservoir.

A. **Designated uses:** coolwater aquatic life, wildlife habitat, primary contact, livestock watering, and irrigation.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.137 NMAC - N, 2/14/2013]

20.6.4.138 RIO GRANDE BASIN: [-] Nichols and McClure reservoirs.

A. Designated uses: high quality coldwater aquatic life, wildlife habitat, primary contact, public water supply and irrigation.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 300 µS/cm or less; the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.138 NMAC - N, 2/14/2013]

20.6.4.139 RIO GRANDE BASIN: [-] Perennial reaches of Galisteo creek and perennial reaches of its tributaries from Kewa pueblo upstream to 2.2 miles upstream of Lamy.

A. Designated uses: coolwater aquatic life, primary contact, irrigation, livestock watering, domestic water supply and wildlife habitat; and public water supply on Cerrillos reservoir.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.139 NMAC - N, 2/14/2013]

20.6.4.140 RIO GRANDE BASIN: Effluent canyon from Mortandad canyon to its headwaters, intermittent portions of S-Site canyon from monitoring well MSC 16-06293 to Martin spring, and intermittent portions of Two-Mile canyon from its confluence with Pajarito canyon to Upper Twomile canyon. (Surface waters within lands scheduled for transfer from DOE to tribal, state or local authorities are specifically excluded.)

A. Designated uses: livestock watering, wildlife habitat, marginal warmwater aquatic life and secondary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.
[20.6.4.140 NMAC - N, XX/XX/XXXX]

20.6.4.[~~140~~]141- 20.6.4.200 [RESERVED]

20.6.4.201 PECOS RIVER BASIN: [-] The main stem of the Pecos river from the New Mexico-Texas line upstream to the mouth of the Black river (near Loving).

A. Designated uses: irrigation, livestock watering, wildlife habitat, primary contact and warmwater aquatic life.

B. Criteria:

(l) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: dissolved boron for irrigation use 2,000 µg/L or less.

(2) At all flows above 50 cfs: TDS 20,000 mg/L or less, sulfate 3,000 mg/L or less and chloride 10,000 mg/L or less.
[20.6.4.201 NMAC - Rp 20 NMAC 6.1.2201, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.202 PECOS RIVER BASIN: [-] The main stem of the Pecos river from the mouth of the Black river upstream to lower Tansil dam, including perennial reaches of the Black river, the Delaware river and Blue spring.

A. Designated uses: industrial water supply, irrigation, livestock watering, wildlife habitat, primary contact and warmwater aquatic life.

B. Criteria:

(l) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 34°C (93.2°F) or less.

(2) At all flows above 50 cfs: TDS 8,500 mg/L or less, sulfate 2,500 mg/L or less and chloride 3,500 mg/L or less.

C. Remarks: diversion for irrigation frequently limits summer flow in this reach of the main stem Pecos river to that contributed by springs along the watercourse.
[20.6.4.202 NMAC - Rp 20 NMAC 6.1.2202, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

[**NOTE:** The segment covered by this section was divided effective 5/23/2005. The standards for Lower Tansil Lake and Lake Carlsbad are under 20.6.4.218 NMAC.]

20.6.4.203 PECOS RIVER BASIN: [-] The main stem of the Pecos river from the headwaters of Lake Carlsbad upstream to Avalon dam.

A. Designated uses: industrial water supply, livestock watering, wildlife habitat, primary contact and warmwater aquatic life.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: temperature 34°C (93.2°F) or less; the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.203 NMAC - Rp 20 NMAC 6.1.2203, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

[**NOTE:** The segment covered by this section was divided effective 5/23/2005. The standards for Lower Tansil Lake and Lake Carlsbad are under 20.6.4.218 and for Avalon Reservoir are under 20.6.4.219 NMAC.]

20.6.4.204 PECOS RIVER BASIN: [-] The main stem of the Pecos river from the headwaters of Avalon reservoir upstream to Brantley dam.

A. Designated uses: irrigation, livestock watering, wildlife habitat, [~~secondary~~]primary contact and warmwater aquatic life.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.204 NMAC - Rp 20 NMAC 6.1.2204, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, XX/XX/XXXX]

[**NOTE:** The segment covered by this section was divided effective 5/23/2005. The standards for Avalon Reservoir are under 20.6.4.219 NMAC.]

20.6.4.205 PECOS RIVER BASIN: [-] Brantley reservoir.

A. Designated uses: irrigation storage, livestock watering, wildlife habitat, primary contact and warmwater aquatic life.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.205 NMAC - Rp 20 NMAC 6.1.2205, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.206 PECOS RIVER BASIN: [~~The main stem of the Pecos river from the headwaters of Brantley reservoir upstream to Salt creek (near Acme), perennial reaches of the Rio Peñasco downstream from state highway 24 near Dunken, perennial reaches of the Rio Hondo and its~~]Perennial reaches of the Rio Felix and perennial reaches of tributaries to the Rio Hondo downstream of Bonney canyon, excluding North Spring river[~~ and perennial reaches of the Rio Felix~~].

A. Designated uses: irrigation, livestock watering, wildlife habitat, secondary contact and warmwater aquatic life.

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

(2) At all flows above 50 cfs: TDS 14,000 mg/L or less, sulfate 3,000 mg/L or less and chloride 6,000 mg/L or less.

[20.6.4.206 NMAC - Rp 20 NMAC 6.1.2206, 10/12/2010; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017; A, XX/XX/XXXX]

[**NOTE:** This segment was divided effective XX/XX/XXXX. The standards for the main stem of the Pecos river from the headwaters of Brantley reservoir upstream to Salt creek (near Acme), perennial reaches of the Rio Peñasco downstream from state highway 24 near Dunken, and perennial reaches of the Rio Hondo are under 20.6.4.231 NMAC.]

20.6.4.207 PECOS RIVER BASIN: [-] The main stem of the Pecos river from Salt creek (near Acme) upstream to Sumner dam.

A. Designated uses: irrigation, marginal warmwater aquatic life, livestock watering, wildlife habitat and [~~secondary~~]primary contact.

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

(2) At all flows above 50 cfs: TDS 8,000 mg/L or less, sulfate 2,500 mg/L or less and chloride 4,000 mg/L or less.

[20.6.4.207 NMAC - Rp 20 NMAC 6.1.2207, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, XX/XX/XXXX]

20.6.4.208 PECOS RIVER BASIN: [-] Perennial reaches of the Rio Peñasco above state highway 24 near Dunken, [~~and its~~]perennial reaches of tributaries to the Rio Peñasco above state highway 24 near Dunken, perennial reaches of Cox canyon, perennial reaches of the Rio Bonito downstream from state highway 48 (near Angus), the Rio Ruidoso downstream of the U.S. highway 70 bridge near Seeping Springs lakes, perennial reaches of the Rio Hondo upstream from Bonney canyon and perennial reaches of Agua Chiquita.

A. Designated uses: fish culture, irrigation, livestock watering, wildlife habitat, coldwater aquatic life and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: temperature 30°C (86°F) or less, and phosphorus (unfiltered sample) less than 0.1 mg/L.

[20.6.4.208 NMAC - Rp 20 NMAC 6.1.2208, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, XX/XX/XXXX]

20.6.4.209 PECOS RIVER BASIN: [-] Perennial reaches of Eagle creek upstream of Alto dam to the Mescalero Apache boundary, perennial reaches of the Rio Bonito upstream of state highway 48 (near Angus) excluding Bonito lake, [~~and its~~]perennial reaches of tributaries to the Rio Bonito upstream of state highway 48 (near Angus)[-], [~~and~~] perennial reaches of the Rio Ruidoso upstream of the U.S. highway 70 bridge near Seeping Springs lakes[~~,~~] above and below the Mescalero Apache boundary and [~~its~~]perennial reaches of tributaries to the Rio Ruidoso upstream of the U.S. highway 70 bridge near Seeping Springs lakes[~~,~~] above and below the Mescalero Apache boundary.

A. Designated uses: domestic water supply, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat, public water supply and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 600 µS/cm or less in Eagle creek, 1,100 µS/cm or less in Bonito creek and 1,500 µS/cm or less in the Rio Ruidoso; phosphorus (unfiltered sample) less than 0.1 mg/L; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.209 NMAC - Rp 20 NMAC 6.1.2209, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 7/10/2012; A, XX/XX/XXXX]

[**NOTE:** The standards for Bonito lake are in 20.6.4.223 NMAC, effective 7/10/2012]

20.6.4.210 PECOS RIVER BASIN: [-] Sumner reservoir.

A. Designated uses: irrigation storage, livestock watering, wildlife habitat, primary contact and warmwater aquatic life.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.210 NMAC - Rp 20 NMAC 6.1.2210, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.211 PECOS RIVER BASIN: [-] The main stem of the Pecos river from the headwaters of Sumner reservoir upstream to Tecolote creek excluding Santa Rosa reservoir.

A. Designated uses: fish culture, irrigation, marginal warmwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

(2) At all flows above 50 cfs: TDS 3,000 mg/L or less, sulfate 2,000 mg/L or less and chloride 400 mg/L or less.

[20.6.4.211 NMAC - Rp 20 NMAC 6.1.2211, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 7/10/2012]

[**NOTE:** The standards for Santa Rosa reservoir are in 20.6.4.225 NMAC, effective 7/10/2012]

20.6.4.212 PECOS RIVER BASIN: [-] Perennial tributaries to the main stem of the Pecos river from the headwaters of Sumner reservoir upstream to Santa Rosa dam.

A. Designated uses: irrigation, coldwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 25°C (77°F) or less.

[20.6.4.212 NMAC - Rp 20 NMAC 6.1.2211.1, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.213 PECOS RIVER BASIN: [-] McAllister lake.

A. Designated uses: coldwater aquatic life, secondary contact, livestock watering and wildlife habitat.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 25°C (77°F) or less.

[20.6.4.213 NMAC - Rp 20 NMAC 6.1.2211.3, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.214 PECOS RIVER BASIN: [-] Storrie lake.

A. Designated uses: coldwater aquatic life, warmwater aquatic life, primary contact, livestock watering, wildlife habitat, public water supply and irrigation storage.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.214 NMAC - Rp 20 NMAC 6.1.2211.5, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.215 PECOS RIVER BASIN: [-] Perennial reaches of the Gallinas river upstream of the diversion for the Las Vegas municipal reservoir, [~~and all its~~]perennial reaches of tributaries to the Gallinas river upstream of the diversion for the Las Vegas municipal reservoir, perennial reaches of Tecolote creek upstream of Blue creek[~~,~~] and all perennial reaches of tributaries [~~of~~]to Tecolote creek upstream of Blue creek.

A. Designated uses: domestic water supply, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat, industrial water supply and primary contact; and public water supply on the Gallinas river.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 300 µS/cm or less (450 µS/cm or less in Wright Canyon creek); the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.215 NMAC - Rp 20 NMAC 6.1.2212, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 2/13/2018; A, XX/XX/XXXX]

[**NOTE:** This segment was divided effective 2/13/2018. The standards for Tecolote creek from I-25 to Blue creek are under 20.6.4.230 NMAC.]

20.6.4.216 PECOS RIVER BASIN: [-] The main stem of the Pecos river from Tecolote creek upstream to Cañon de Manzanita.

A. Designated uses: irrigation, livestock watering, wildlife habitat, marginal coldwater aquatic life and primary contact.

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 30°C (86°F) or less.

(2) At all flows above 10 cfs: TDS 250 mg/L or less, sulfate 25 mg/L or less and chloride 5 mg/L or less.

[20.6.4.216 NMAC - Rp 20 NMAC 6.1.2213, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.217 PECOS RIVER BASIN: [-] Perennial reaches of Cow creek and all perennial reaches of its tributaries and the main stem of the Pecos river from Cañon de Manzanita upstream to its headwaters, including perennial reaches of all tributaries thereto except lakes identified in 20.6.4.222 NMAC.

A. **Designated uses:** domestic water supply, fish culture, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact; and public water supply on the main stem of the Pecos river.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 300 µS/cm or less; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.217 NMAC - Rp 20 NMAC 6.1.2214, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 7/10/2012]
[**NOTE:** The segment covered by this section was divided effective 5/23/2005. The standards for the additional segments are under 20.6.4.220 and 20.6.4.221 NMAC.]

20.6.4.218 PECOS RIVER BASIN: [-] Lower Tansil lake and Lake Carlsbad.

A. **Designated uses:** industrial water supply, livestock watering, wildlife habitat, primary contact and warmwater aquatic life.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 34°C (93.2°F) or less.
[20.6.4.218 NMAC - N, 5/23/2005; A, 12/1/2010]

20.6.4.219 PECOS RIVER BASIN: [-] Avalon reservoir.

A. **Designated uses:** irrigation storage, livestock watering, wildlife habitat, secondary contact and warmwater aquatic life.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.
[20.6.4.219 NMAC - N, 5/23/2005; A, 12/1/2010]

20.6.4.220 PECOS RIVER BASIN: [-] Perennial reaches of the Gallinas river and [~~its~~]perennial reaches of tributaries to the Gallinas river from its mouth upstream to the diversion for the Las Vegas municipal reservoir, except Pecos Arroyo.

A. **Designated uses:** irrigation, livestock watering, wildlife habitat, marginal coldwater aquatic life and primary contact.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 30°C (86°F) or less.
[20.6.4.220 NMAC - N, 5/23/2005; A, 12/1/2010; A, XX/XX/XXXX]

20.6.4.221 PECOS RIVER BASIN: [-] Pecos Arroyo.

A. **Designated uses:** livestock watering, wildlife habitat, warmwater aquatic life and primary contact.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 206 cfu/100 mL, single sample 940 cfu/100 mL.
[20.6.4.221 NMAC - N, 5/23/2005; A, 12/1/2010]

20.6.4.222 PECOS RIVER BASIN: [-] Johnson lake, Katherine lake, Lost Bear lake, Pecos Baldy lake, Spirit lake, Stewart lake and Truchas lakes (north and south).

A. **Designated uses:** high quality coldwater aquatic life, irrigation, domestic water supply, primary contact, livestock watering and wildlife habitat.

B. **Criteria:** The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 300 µS/cm or less; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.222 NMAC - N, 7/10/2012]

20.6.4.223 PECOS RIVER BASIN: [-] Bonito lake.

A. **Designated uses:** high quality coldwater aquatic life, irrigation, domestic water supply, primary contact, livestock watering, wildlife habitat and public water supply.

B. **Criteria:** The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses except that the following segment-specific criteria apply: specific conductance 1100 µS/cm or less;

phosphorus (unfiltered sample) less than 0.1 mg/L; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.223 NMAC - N, 7/10/2012]

20.6.4.224 PECOS RIVER BASIN: [-] Monastery lake.

A. Designated uses: coolwater aquatic life, primary contact, livestock watering and wildlife habitat.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of *E. coli* bacteria 206 cfu/100 mL or less, single sample 940 cfu/100 mL or less.
[20.6.4.224 NMAC - N, 7/10/2012]

20.6.4.225 PECOS RIVER BASIN: [-] Santa Rosa reservoir.

A. Designated uses: coolwater aquatic life, irrigation, primary contact, livestock watering and wildlife habitat.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.
[20.6.4.225 NMAC - N, 7/10/2012]

20.6.4.226 PECOS RIVER BASIN: [-] Perch lake.

A. Designated uses: coolwater aquatic life, primary contact, livestock watering and wildlife habitat.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses except that the following segment-specific criteria apply: the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.226 NMAC - N, 7/10/2012]

20.6.4.227 PECOS RIVER BASIN: [-] Lea lake.

A. Designated uses: warmwater aquatic life, primary contact and wildlife habitat.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses except that the following segment-specific criteria apply: the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.227 NMAC - N, 7/10/2012]

20.6.4.228 PECOS RIVER BASIN: [-] Cottonwood lake and Devil's Inkwell.

A. Designated uses: coolwater aquatic life, primary contact and wildlife habitat.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of *E. coli* bacteria 206 cfu/100 mL or less, single sample 940 cfu/100 mL or less.
[20.6.4.228 NMAC - N, 7/10/2012]

20.6.4.229 PECOS RIVER BASIN: [-] Mirror lake.

A. Designated uses: warmwater aquatic life, primary contact and wildlife habitat.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of *E. coli* bacteria 206 cfu/100 mL or less, single sample 940 cfu/100 mL or less.
[20.6.4.229 NMAC - N, 7/10/2012]

20.6.4.230 PECOS RIVER BASIN: [-] Perennial reaches of Tecolote creek from I-25 to Blue creek.

A. Designated uses: domestic water supply, coolwater aquatic life, irrigation, livestock watering, wildlife habitat, and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.230 NMAC - N, 2/13/2018]

20.6.4.231 PECOS RIVER BASIN: The main stem of the Pecos river from the headwaters of Brantley reservoir upstream to Salt creek (near Acme), perennial reaches of the Rio Peñasco downstream from state

highway 24 near Dunken, perennial reaches of North Spring river and perennial reaches of the Rio Hondo downstream of Bonney canyon.

A. Designated uses: irrigation, livestock watering, wildlife habitat, primary contact and warmwater aquatic life.

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

(2) At all flows above 50 cfs: TDS 14,000 mg/L or less, sulfate 3,000 mg/L or less and chloride 6,000 mg/L or less.

[N, XX/XX/XXXX]

[~~20.6.4.231~~]20.6.4.232 - 20.6.4.300 [RESERVED]

20.6.4.301 CANADIAN RIVER BASIN: [-] The main stem of the Canadian river from the New Mexico-Texas line upstream to Ute dam, and any flow that enters the main stem from Revuelto creek.

A. Designated uses: irrigation, marginal warmwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

(2) TDS 6,500 mg/L or less at flows above 25 cfs.

[20.6.4.301 NMAC - Rp 20 NMAC 6.1.2301, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.302 CANADIAN RIVER BASIN: [-] Ute reservoir.

A. Designated uses: livestock watering, wildlife habitat, public water supply, industrial water supply, primary contact and warmwater aquatic life.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.302 NMAC - Rp 20 NMAC 6.1.2302, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.303 CANADIAN RIVER BASIN: [-] The main stem of the Canadian river from the headwaters of Ute reservoir upstream to Conchas dam, the perennial reaches of Pajarito and Ute creeks and their perennial tributaries.

A. Designated uses: irrigation, marginal warmwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.303 NMAC - Rp 20 NMAC 6.1.2303, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.304 CANADIAN RIVER BASIN: [-] Conchas reservoir.

A. Designated uses: irrigation storage, livestock watering, wildlife habitat, public water supply, primary contact and warmwater aquatic life.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.304 NMAC - Rp 20 NMAC 6.1.2304, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.305 CANADIAN RIVER BASIN: The main stem of the Canadian river from the headwaters of Conchas reservoir upstream to the New Mexico-Colorado line, perennial reaches of the Conchas river, the Mora river downstream from the USGS gaging station near Shoemaker, the Vermejo river downstream from Rail canyon and perennial reaches of Raton, Chicorica (except Lake Maloya and Lake Alice) and Uña de Gato creeks.

A. Designated uses: irrigation, marginal warmwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

(2) TDS 3,500 mg/L or less at flows above 10 cfs.

[20.6.4.305 NMAC - Rp 20 NMAC 6.1.2305, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017]
[**NOTE:** This segment was divided effective 12/1/2010. The standards for Lake Alice and Lake Maloya are under 20.6.4.311 and 20.6.4.312 NMAC, respectively.]

20.6.4.306 CANADIAN RIVER BASIN: [-] The Cimarron river downstream from state highway 21 in Cimarron to the Canadian river and all perennial reaches of tributaries to the Cimarron river downstream from state highway 21 in Cimarron.

A. Designated uses: irrigation, warmwater aquatic life, livestock watering, wildlife habitat and primary contact; and public water supply on Cimarroncito creek.

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

(2) TDS 3,500 mg/L or less at flows above 10 cfs.

[20.6.4.306 NMAC - Rp 20 NMAC 6.1.2305.1, 10/12/2000; A, 7/19/2001; A, 5/23/2005; A, 12/1/2010]

20.6.4.307 CANADIAN RIVER BASIN: [-] Perennial reaches of the Mora river from the USGS gaging station near Shoemaker upstream to the state highway 434 bridge in Mora, all perennial reaches of tributaries to the Mora river downstream from the USGS gaging station at La Cueva in San Miguel and Mora counties except lakes identified in 20.6.4.313 NMAC, perennial reaches of Ocate creek downstream of Ocate, [~~and its~~]perennial reaches of tributaries to Ocate creek downstream of Ocate, and perennial reaches of Rayado creek downstream of Miami lake diversion in Colfax county.

A. Designated uses: marginal coldwater aquatic life, warmwater aquatic life, primary contact, irrigation, livestock watering and wildlife habitat.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.307 NMAC - Rp 20 NMAC 6.1.2305.3, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 7/10/2012; A, XX/XX/XXXX]

20.6.4.308 CANADIAN RIVER BASIN: [-] Charette lakes.

A. Designated uses: coldwater aquatic life, warmwater aquatic life, secondary contact, livestock watering and wildlife habitat.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.308 NMAC - Rp 20 NMAC 6.1.2305.5, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.309 CANADIAN RIVER BASIN: [-] The Mora river and perennial reaches of its tributaries upstream from the state highway 434 bridge in Mora except lakes identified in 20.6.4.313 NMAC, all perennial reaches of tributaries to the Mora river upstream from the USGS gaging station at La Cueva, perennial reaches of Coyote creek, [~~and its~~]perennial reaches of tributaries to Coyote creek, the Cimarron river above state highway 21 in Cimarron, [~~and its~~]perennial reaches of tributaries to the Cimarron river above state highway 21 in Cimarron except Eagle Nest lake, all perennial reaches of tributaries to the Cimarron river north and northwest of highway 64 except north and south Shuree ponds, perennial reaches of Rayado creek above Miami lake diversion, [~~and its~~]perennial reaches of tributaries to Rayado creek above Miami lake diversion, Ocate creek and perennial reaches of its tributaries upstream of Ocate, perennial reaches of the Vermejo river upstream from Rail canyon and all other perennial reaches of tributaries to the Canadian river northwest and north of U.S. highway 64 in Colfax county unless included in other segments.

A. Designated uses: domestic water supply, irrigation, high quality coldwater aquatic life, livestock watering, wildlife habitat, and primary contact; and public water supply on the Cimarron river upstream from Cimarron, [~~and~~]on perennial reaches of Rayado creek and on perennial reaches of [~~its~~]tributaries to Rayado creek.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 500 µS/cm or less; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.309 NMAC - Rp 20 NMAC 6.1.2306, 10/12/2000; A, 7/19/2001; A, 5/23/2005; A, 12/1/2010; A, 7/10/2012; A, XX/XX/XXXX]
[**NOTE:** The segment covered by this section was divided effective 5/23/2005. The standards for the additional segment are under 20.6.4.310 NMAC. The standards for Shuree ponds are in 20.6.4.314 NMAC and the standards for Eagle Nest lake are in 20.6.4.315 NMAC, effective 7/10/2012]

20.6.4.310 CANADIAN RIVER BASIN: [-] Perennial reaches of Corrumpa creek.

A. Designated uses: livestock watering, wildlife habitat, irrigation, primary contact and coldwater aquatic life.

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: temperature 25°C (77°F) or less; the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

(2) TDS 1,200 mg/L or less, sulfate 600 mg/L or less, chloride 40 mg/L or less.

[20.6.4.310 NMAC - N, 5/23/2005; A, 12/1/2010]

20.6.4.311 CANADIAN RIVER BASIN: Lake Alice.

A. Designated uses: marginal coldwater aquatic life, irrigation, livestock watering, wildlife habitat, primary contact and public water supply.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.311 NMAC - N, 12/1/2010; A, XX/XX/XXXX]

20.6.4.312 CANADIAN RIVER BASIN: Lake Maloya.

A. Designated uses: coldwater aquatic life, irrigation, livestock watering, wildlife habitat, primary contact and public water supply.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.312 NMAC - N, 12/1/2010; A, XX/XX/XXXX]

20.6.4.313 CANADIAN RIVER BASIN: [-] Encantada lake, Maestas lake, Middle Fork lake of Rio de la Casa, North Fork lake of Rio de la Casa and Pacheco lake.

A. Designated uses: high quality coldwater aquatic life, irrigation, domestic water supply, primary contact, livestock watering and wildlife habitat.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 300 µS/cm or less; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.313 NMAC - N, 7/10/2012]

20.6.4.314 CANADIAN RIVER BASIN: [-] Shuree ponds (north and south).

A. Designated uses: high quality coldwater aquatic life, irrigation, domestic water supply, primary contact, livestock watering and wildlife habitat.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses except that the following segment-specific criteria apply: specific conductance 500 µS/cm or less; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.314 NMAC - N, 7/10/2012]

20.6.4.315 CANADIAN RIVER BASIN: [-] Eagle Nest lake.

A. Designated uses: high quality coldwater aquatic life, irrigation, domestic water supply, primary contact, livestock watering, wildlife habitat and public water supply.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses except that the following segment-specific criteria apply: specific conductance 500 µS/cm or less; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.315 NMAC - N, 7/10/2012]

20.6.4.316 CANADIAN RIVER BASIN: [-] Clayton lake.

A. **Designated uses:** coolwater aquatic life, primary contact, livestock watering and wildlife habitat.

B. **Criteria:** The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of *E. coli* bacteria 206 cfu/100 mL or less, single sample 940 cfu/100 mL or less.

[20.6.4.316 NMAC - N, 7/10/2012]

20.6.4.317 CANADIAN RIVER BASIN: Springer lake.

A. **Designated uses:** coolwater aquatic life, irrigation, primary contact, livestock watering, wildlife habitat, and public water supply.

B. **Criteria:** The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.317 NMAC - N, 07-10-2012; A, 3/2/2017]

20.6.4.318 CANADIAN RIVER BASIN: Doggett creek.

A. **Designated uses:** Warm water aquatic life, livestock watering, wildlife habitat and primary contact.

B. **Criteria:** The use-specific criteria in 20.6.4.900 NMAC are applicable to the designated uses, except that the following site-specific criteria apply: the monthly geometric mean of E. coli bacteria 206 cfu/100 mL or less, single sample 940 cfu/100 mL or less.

C. **Discharger-specific temporary standard:**

(1) **Discharger:** City of Raton wastewater treatment plant

(2) **NPDES permit number:** NM0020273, Outfall 001

(3) **Receiving waterbody:** Doggett creek, 20.6.4.318 NMAC

(4) **Discharge latitude/longitude:** 36° 52' 13.91" N / 104° 25' 39.18" W

(5) **Pollutant(s):** nutrients; total nitrogen and total phosphorus

(6) **Factor of issuance:** substantial and widespread economic and social impacts (40 CFR 131.10(g)(6))

(7) **Highest attainable condition:** interim effluent condition of 8.0 mg/L total nitrogen and 1.6 mg/L total phosphorus as 30-day averages. The highest attainable condition shall be either the highest attainable condition identified at the time of the adoption, or any higher attainable condition later identified during any reevaluation, whichever is more stringent (40 CFR 131.14(b)(1)(iii)).

(8) **Effective date of temporary standard:** This temporary standard becomes effective for Clean Water Act purposes on the date of EPA approval.

(9) **Expiration date of temporary standard:** no later than 20 years from the effective date.

(10) **Reevaluation period:** at each succeeding review of water quality standards and at least once every five years from the effective date of the temporary standard (Paragraph (8) of Subsection H of 20.6.4.10[~~.F (8)~~] NMAC, 40 CFR 131.14(b)(1)(v)). If the discharger cannot demonstrate that sufficient progress has been made the commission may revoke approval of the temporary standard or provide additional conditions to the approval of the temporary standard. If the reevaluation is not completed at the frequency specified or the Department does not submit the reevaluation to EPA within 30 days of completion, the underlying designated use and criterion will be the applicable water quality standard for Clean Water Act purposes until the Department completes and submits the reevaluation to EPA. Public input on the reevaluation will be invited during NPDES permit renewals or triennial reviews, as applicable, in accordance with the State's most current approved water quality management plan and continuing planning process.

(11) **Timeline for proposed actions.** Tasks and target completion dates are listed in the most recent, WQCC-approved version of the New Mexico Environment Department, Surface Water Quality Bureau's "Nutrient Temporary Standards for City of Raton Wastewater Treatment Plant, NPDES No. NM0020273 to Doggett Creek."

[20.6.4.318 NMAC - N, 05/22/2020; A, XX/XX/XXXX]

20.6.4.319 - 20.6.4.400 [RESERVED]

20.6.4.401 SAN JUAN RIVER BASIN: [-] The main stem of the San Juan river from the Navajo Nation boundary at the Hogback upstream to its confluence with the Animas river. Some waters in this segment are under the joint jurisdiction of the state and the Navajo Nation.

A. Designated uses: public water supply, industrial water supply, irrigation, livestock watering, wildlife habitat, primary contact, marginal coldwater aquatic life and warmwater aquatic life.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 32.2°C (90°F) or less.

[20.6.4.401 NMAC - Rp 20 NMAC 6.1.2401, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

[**NOTE:** The segment covered by this section was divided effective 5/23/2005. The standards for the additional segment are under 20.6.4.408 NMAC.]

20.6.4.402 SAN JUAN RIVER BASIN: [-] La Plata river from its confluence with the San Juan river upstream to the New Mexico-Colorado line.

A. Designated uses: irrigation, marginal warmwater aquatic life, marginal coldwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 32.2°C (90°F) or less.

[20.6.4.402 NMAC - Rp 20 NMAC 6.1.2402, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.403 SAN JUAN RIVER BASIN: The Animas river from its confluence with the San Juan river upstream to Estes arroyo.

A. Designated uses: Public water supply, industrial water supply, irrigation, livestock watering, wildlife habitat, coolwater aquatic life, and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 29°C (84.2°F) or less.

[20.6.4.403 NMAC - Rp 20 NMAC 6.1.2403, 10/12/2010; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.404 SAN JUAN RIVER BASIN: The Animas river from Estes arroyo upstream to the Southern Ute Indian tribal boundary.

A. Designated uses: Coolwater aquatic life, irrigation, livestock watering, wildlife habitat, public water supply, industrial water supply and primary contact.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: phosphorus (unfiltered sample) 0.1 mg/L or less.

[20.6.4.404 NMAC - Rp 20 NMAC 6.1.2404, 10/12/2010; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.405 SAN JUAN RIVER BASIN: [-] The main stem of the San Juan river from [~~Canyon~~]Cañon Largo upstream to the Navajo dam.

A. Designated uses: high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat, public water supply, industrial water supply and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 400 µS/cm or less; the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.405 NMAC - Rp 20 NMAC 6.1.2405, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, XX/XX/XXXX]

20.6.4.406 SAN JUAN RIVER BASIN: [-] Navajo reservoir in New Mexico.

A. Designated uses: coldwater aquatic life, warmwater aquatic life, irrigation storage, livestock watering, wildlife habitat, public water supply, industrial water supply and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: phosphorus (unfiltered sample) 0.1 mg/L or less; the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.406 NMAC - Rp 20 NMAC 6.1.2406, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.407 SAN JUAN RIVER BASIN: [-] Perennial reaches of the Navajo river from the Jicarilla Apache reservation boundary to the Colorado border and perennial reaches of Los Pinos river in New Mexico.

A. Designated uses: coldwater aquatic life, irrigation, livestock watering, public water supply, wildlife habitat and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: phosphorus (unfiltered sample) 0.1 mg/L or less; the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.407 NMAC - Rp 20 NMAC 6.1.2407, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.408 SAN JUAN RIVER BASIN: [-] The main stem of the San Juan river from its confluence with the Animas river upstream to its confluence with [~~Canyon~~]Cañon Largo.

A. Designated uses: public water supply, industrial water supply, irrigation, livestock watering, wildlife habitat, primary contact, marginal coldwater aquatic life and warmwater aquatic life.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 32.2°C (90°F) or less.

[20.6.4.408 NMAC - N, 5/23/2005; A, 12/1/2010; A, XX/XX/XXXX]

20.6.4.409 SAN JUAN RIVER BASIN: [-] Lake Farmington.

A. Designated uses: public water supply, wildlife habitat, livestock watering, primary contact, coldwater aquatic life and warmwater aquatic life.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 25°C (77°F) or less.

[20.6.4.409 NMAC - N, 12/1/2010]

20.6.4.410 SAN JUAN RIVER BASIN: [-] Jackson lake.

A. Designated uses: coolwater aquatic life, irrigation, primary contact, livestock watering and wildlife habitat.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of *E. coli* bacteria 206 cfu/100 mL or less, single sample 940 cfu/100 mL or less.

[20.6.4.410 NMAC - N, 7/10/2012]

20.6.4.411 - 20.6.4.450: [RESERVED]

20.6.4.451 LITTLE COLORADO RIVER BASIN: [-] The Rio Nutria upstream of the Zuni pueblo boundary, Tampico draw, Agua Remora, Tampico springs.

A. Designated uses: coolwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.451 NMAC - N, 12/1/2010]

20.6.4.452 LITTLE COLORADO RIVER BASIN: [-] Ramah lake.

A. Designated uses: coldwater aquatic life, warmwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 25°C (77°F) or less.

[20.6.4.452 NMAC - N, 12/1/2010]

20.6.4.453 LITTLE COLORADO RIVER BASIN: [-] Quemado lake.

A. Designated uses: coolwater aquatic life, primary contact, livestock watering and wildlife habitat.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.453 NMAC - N, 7/10/2012]

20.6.4.454 - 20.6.4.500 [RESERVED]

20.6.4.501 GILA RIVER BASIN: [-] The main stem of the Gila river from the New Mexico-Arizona line upstream to Redrock canyon and perennial reaches of streams in Hidalgo county.

A. Designated uses: irrigation, marginal warmwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.501 NMAC - Rp 20 NMAC 6.1.2501, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.502 GILA RIVER BASIN: The main stem of the Gila river from Redrock canyon upstream to the confluence of the West Fork Gila river and East Fork Gila river and perennial reaches of tributaries to the Gila river downstream of Mogollon creek.

A. Designated uses: industrial water supply, irrigation, livestock watering, wildlife habitat, marginal coldwater aquatic life, primary contact and warmwater aquatic life.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: 28°C (82.4°F) or less.

[20.6.4.502 NMAC - Rp 20 NMAC 6.1.2502, 10/12/2010; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.503 GILA RIVER BASIN: All perennial tributaries to the Gila river upstream of and including Mogollon creek.

A. Designated uses: domestic water supply, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance of 400 µS/cm or less for all perennial tributaries except West Fork Gila and tributaries thereto, specific conductance of 300 µS/cm or less; 32.2°C (90°F) or less in the east fork of the Gila river and Sapillo creek downstream of Lake Roberts; the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.503 NMAC - Rp 20 NMAC 6.1.2503, 10/12/2010; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.504 GILA RIVER BASIN: [-] Wall lake, Lake Roberts and Snow lake.

A. Designated uses: coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: specific conductance 300 µS/cm or less.

[20.6.4.504 NMAC - Rp 20 NMAC 6.1.2504, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

[**NOTE:** The segment covered by this section was divided effective 5/23/2005. The standards for the additional segment are under 20.6.4.806 NMAC.]

20.6.4.505 GILA RIVER BASIN: [-] Bill Evans lake.

A. Designated uses: coolwater aquatic life, primary contact, livestock watering and wildlife habitat.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.505 NMAC - N, 7/10/2012]

20.6.4.506 - 20.6.4.600 [RESERVED]

20.6.4.601 SAN FRANCISCO RIVER BASIN: [-] The main stem of the San Francisco river from the New Mexico-Arizona line upstream to state highway 12 at Reserve and perennial reaches of Mule creek.

A. Designated uses: irrigation, marginal warmwater and marginal coldwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.601 NMAC - Rp 20 NMAC 6.1.2601, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.602 SAN FRANCISCO RIVER BASIN: [-] The main stem of the San Francisco river from state highway 12 at Reserve upstream to the New Mexico-Arizona line.

A. Designated uses: coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 25°C (77°F) or less.
[20.6.4.602 NMAC - Rp 20 NMAC 6.1.2602, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.603 SAN FRANCISCO RIVER BASIN: [-] All perennial reaches of tributaries to the San Francisco river above the confluence of Whitewater creek and including Whitewater creek.

A. Designated uses: domestic water supply, fish culture, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 400 µS/cm or less; the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less; and temperature 25°C (77°F) or less in Tularosa creek.
[20.6.4.603 NMAC - Rp 20 NMAC 6.1.2603, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.604 - 20.6.4.700 [RESERVED]

20.6.4.701 DRY CIMARRON RIVER: [-] Perennial portions of the Dry Cimarron river above Oak creek and perennial reaches of Oak creek.

A. Designated uses: coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact.

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: temperature 25°C (77°F) or less, the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

(2) TDS 1,200 mg/L or less, sulfate 600 mg/L or less and chloride 40 mg/L or less.
[20.6.4.701 NMAC - Rp 20 NMAC 6.1.2701, 10/12/2000; A, 5/23/2005 A, 12/1/2010]
[**NOTE:** The segment covered by this section was divided effective 5/23/2005. The standards for the additional segment are under 20.6.4.702 NMAC.]

20.6.4.702 DRY CIMARRON RIVER: [-] Perennial portions of the Dry Cimarron river below Oak creek, and perennial portions of Long canyon and Carrizozo creeks.

A. Designated uses: coolwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact.

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

(2) TDS 1,200 mg/L or less, sulfate 600 mg/L or less and chloride 40 mg/L or less.
[20.6.4.702 NMAC - N, 5/23/2005; A, 12/1/2010; A, 7/10/2012]

20.6.4.703 - 20.6.4.800 [RESERVED]

20.6.4.801 CLOSED BASINS: [-] Rio Tularosa upstream of the old U.S. highway 70 bridge crossing east of Tularosa and all perennial tributaries to the Tularosa basin except Three Rivers and Dog Canyon creek, and excluding waters on the Mescalero tribal lands.

A. Designated uses: coldwater aquatic life, irrigation, livestock watering, wildlife habitat, public water supply and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.801 NMAC - Rp 20 NMAC 6.1.2801, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 2/13/2018]

[**NOTE:** This segment was divided effective 2/13/2018. The standards for Dog Canyon creek are under 20.6.4.810 NMAC.]

20.6.4.802 CLOSED BASINS: [-] Perennial reaches of Three Rivers.

A. Designated uses: irrigation, domestic water supply, high quality coldwater aquatic life, primary contact, livestock watering and wildlife habitat.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 500 µS/cm or less; the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.802 NMAC - Rp 20 NMAC 6.1.2802, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.803 CLOSED BASINS: Perennial reaches of the Mimbres river downstream of the confluence with Allie canyon and all perennial reaches of tributaries thereto.

A. Designated uses: Coolwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less and temperature of 30°C (86°F) or less.
[20.6.4.803 NMAC - Rp 20 NMAC 6.1.2803, 10/12/2010; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.804 CLOSED BASINS: Perennial reaches of the Mimbres river upstream of the confluence with Allie canyon to Cooney canyon, and all perennial reaches of East Fork Mimbres (McKnight canyon) downstream of the fish barrier, and all perennial reaches thereto.

A. Designated uses: Irrigation, domestic water supply, coldwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.804 NMAC - Rp 20 NMAC 6.1.2804, 10/12/2010; A, 5/23/2005; A, 12/1/2010; A, 02-28-2018; A, 3/2/2017]
[**NOTE:** The segment covered by this section was divided effective 3/2/2017. The standards for the additional segment are covered under 20.6.4.807 NMAC.]

20.6.4.805 CLOSED BASINS: [-] Perennial reaches of the Sacramento river (Sacramento-Salt Flat closed basin) and all perennial tributaries thereto.

A. Designated uses: domestic water supply, livestock watering, wildlife habitat, marginal coldwater aquatic life and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.
[20.6.4.805 NMAC - Rp 20 NMAC 6.1.2805, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.806 CLOSED BASINS: [-] Bear canyon reservoir.

A. Designated uses: coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: specific conductance 300 µS/cm or less.
[20.6.4.806 NMAC - N, 5/23/2005; A, 12/1/2010]

20.6.4.807 CLOSED BASINS: Perennial reaches of the Mimbres river upstream of Cooney canyon and all perennial reaches thereto, including perennial reaches of East Fork Mimbres river (McKnight canyon) upstream of the fish barrier.

A. Designated uses: Irrigation, domestic water supply, high quality coldwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 300 µS/cm or less; the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.807 NMAC - N, 3/2/2017]

20.6.4.808 CLOSED BASINS: Perennial and intermittent watercourses within Smelter Tailing Soils Investigation Unit lands at the Chino mines company, excluding those ephemeral waters listed in 20.6.4.809 NMAC and including, but not limited to[,] the mainstem of Lampbright draw, beginning at the confluence of Lampbright Draw with Rustler canyon, all tributaries that originate west of Lampbright draw to the intersection of Lampbright draw with U.S. 180, and all tributaries of Whitewater creek that originate east of Whitewater creek from the confluence of Whitewater creek with Bayard canyon downstream to the intersection of Whitewater creek with U.S. 180.

A. Designated uses: Warmwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the acute and chronic aquatic life criteria for copper set forth in Subsection I of 20.6.4.900 NMAC shall be determined by multiplying that criteria by the water effect ratio ("WER") adjustment expressed by the following equation:

$$\mathrm{WER} = \frac{[10^{0.588+(0.703\times\log \mathrm{DOC})+(0.395\times\log \mathrm{Alkalinity})}]\times\left(\frac{100}{\mathrm{Hardness}}\right)^{0.9422}}{19.31}$$

For purposes of this section, dissolved organic carbon (DOC) is expressed in units of milligrams carbon per liter or mg C/L; alkalinity is expressed in units of mg/L as $CaCO_3$, and hardness is expressed in units of mg/L as $CaCO_3$. In waters that contain alkalinity concentrations greater than 250 mg/L, a value of 250 mg/L shall be used in the equation. In waters that contain DOC concentrations greater than 16 mg C/L, a value of 16 mg C/L shall be used in the equation. In waters that contain hardness concentrations greater than 400 mg/L, a value of 400 mg/L shall be used in the equation. The alkalinity, hardness and DOC concentrations used to calculate the WER value are those measured in the subject water sample.
[20.6.4.808 NMAC - N, 3/2/2017]

20.6.4.809 CLOSED BASINS: Ephemeral watercourses within smelter tailing soils investigation unit lands at the Chino mines company, limited to Chino mines property subwatershed drainage A and tributaries thereof, Chino mines property subwatershed drainage B and tributaries thereof (excluding the northwest tributary containing Ash spring and the Chiricahua leopard frog critical habitat transect); Chino mines property subwatershed drainage C and tributaries thereof (excluding reaches containing Bolton spring, the Chiricahua leopard frog critical habitat transect and all reaches in subwatershed C that are upstream of the Chiricahua leopard frog critical habitat); subwatershed drainage D and tributaries thereof (drainages D-1, D-2 and D-3, excluding the southeast tributary in drainage D1 that contains Brown spring) and subwatershed drainage E and all tributaries thereof (drainages E-1, E-2 and E-3).

A. Designated uses: Limited aquatic life, livestock watering, wildlife habitat and secondary contact.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the acute aquatic life criteria for copper set forth in Subsection I of 20.6.4.900 NMAC shall be determined by multiplying that criteria by the water effect ratio ("WER") adjustment expressed by the following equation:

$$\mathrm{WER} = \frac{[10^{0.588+(0.703\times\log \mathrm{DOC})+(0.395\times\log \mathrm{Alkalinity})}]\times\left(\frac{100}{\mathrm{Hardness}}\right)^{0.9422}}{19.31}$$

For purposes of this section, dissolved organic carbon (DOC) is expressed in units of milligrams carbon per liter or mg C/L; alkalinity is expressed in units of mg/L as $CaCO_3$, and hardness is expressed in units of mg/L as $CaCO_3$. In waters that contain alkalinity concentrations greater than 250 mg/L, a value of 250 mg/L shall be used in the equation. In waters that contain DOC concentrations greater than 16 mg C/L, a value of 16 mg C/L shall be used in the equation. In waters that contain hardness concentrations greater than 400 mg/L, a value of 400 mg/L shall be used in the equation. The alkalinity, hardness and DOC concentrations used to calculate the WER value are those measured in the subject water sample.
[20.6.4.809 NMAC - N, 3/2/2017]

20.6.4.810 CLOSED BASINS: Perennial reaches of Dog Canyon creek.

A. Designated uses: coolwater aquatic life, irrigation, livestock watering, wildlife habitat, public water supply, and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.810 NMAC - N, 2/13/2018]

20.6.4.811 - 20.6.4.899 [RESERVED]

20.6.4.900 CRITERIA APPLICABLE TO EXISTING, DESIGNATED OR ATTAINABLE USES UNLESS OTHERWISE SPECIFIED IN 20.6.4.97 THROUGH 20.6.4.899 NMAC:

A. Fish culture and water supply: Fish culture, public water supply and industrial water supply are designated uses in particular classified waters of the state where these uses are actually being realized. However, no numeric criteria apply uniquely to these uses. Water quality adequate for these uses is ensured by the general criteria and numeric criteria for bacterial quality, pH and temperature.

B. Domestic water supply: Surface waters of the state designated for use as domestic water supplies shall not contain substances in concentrations that create a lifetime cancer risk of more than one cancer per 100,000 exposed persons. Those criteria listed under domestic water supply in Subsection J of this section apply to this use.

C. Irrigation and irrigation storage: the following numeric criteria and those criteria listed under irrigation in Subsection J of this section apply to this use:

(1) dissolved selenium 0.13 mg/L

(2) dissolved selenium in presence of >500 mg/L SO_4 0.25 mg/L.

D. Primary contact: The monthly geometric mean of E. coli bacteria of 126 cfu/100 mL or MPN/100 ml, [~~and~~]a single sample of E. coli bacteria of 410 cfu/100 mL or MPN/100 mL, a single sample of total microcystins of 8 µg/L with no more than three exceedances within a 12-month period and a single sample of cylindrospermopsin of 15 µg/L with no more than three exceedances within a 12-month period, and pH within the range of 6.6 to 9.0 apply to this use. The results for *E. coli* may be reported as either colony forming units (CFU) or the most probable number (MPN) depending on the analytical method used.

E. Secondary contact: The monthly geometric mean of E. coli bacteria of 548 cfu/100 mL or MPN/100 mL and single sample of 2507 cfu/100 mL or MPN/100 mL apply to this use. The results for *E. coli* may be reported as either colony forming units (CFU) or the most probable number (MPN), depending on the analytical method used.

F. Livestock watering: the criteria listed in Subsection J of this section for livestock watering apply to this use.

G. Wildlife habitat: Wildlife habitat shall be free from any substances at concentrations that are toxic to or will adversely affect plants and animals that use these environments for feeding, drinking, habitat or propagation; can bioaccumulate; or might impair the community of animals in a watershed or the ecological integrity of surface waters of the state. The numeric criteria listed in Subsection J for wildlife habitat apply to this use.

H. Aquatic life: Surface waters of the state with a designated, existing or attainable use of aquatic life shall be free from any substances at concentrations that can impair the community of plants and animals in or the ecological integrity of surface waters of the state. Except as provided in Paragraph (7) of this subsection, the acute and chronic aquatic life criteria set out in Subsections I, J, K and L of this section and the human health-organism only criteria set out in Subsection J of this section are applicable to all aquatic life use subcategories. In addition, the specific criteria for aquatic life subcategories in the following paragraphs apply to waters classified under the respective designations.

(1) High quality coldwater: dissolved oxygen 6.0 mg/L or more, 4T3 temperature 20°C (68°F), maximum temperature 23°C (73°F), pH within the range of 6.6 to 8.8 and specific conductance a segment-specific limit between 300 µS/cm and 1,500 µS/cm depending on the natural background in the particular surface water of the state (the intent of this criterion is to prevent excessive increases in dissolved solids which would result in changes in community structure). Where a single segment-specific temperature criterion is indicated in 20.6.4.101-899 NMAC, it is the maximum temperature and no 4T3 temperature applies.

(2) Coldwater: dissolved oxygen 6.0 mg/L or more, 6T3 temperature 20°C (68°F), maximum temperature 24°C (75°F) and pH within the range of 6.6 to 8.8. Where a single segment-specific temperature criterion is indicated in 20.6.4.101-899 NMAC, it is the maximum temperature and no 6T3 temperature applies.

(3) Marginal coldwater: dissolved oxygen 6 mg/L or more, 6T3 temperature 25°C (77°F), maximum temperature 29°C (84°F) and pH within the range from 6.6 to 9.0. Where a single segment-specific temperature criterion is indicated in 20.6.4.101-899 NMAC, it is the maximum temperature and no 6T3 temperature applies.

(4) Coolwater: dissolved oxygen 5.0 mg/L or more, maximum temperature 29°C (84°F) and pH within the range of 6.6 to 9.0.

(5) Warmwater: dissolved oxygen 5 mg/L or more, maximum temperature 32.2°C (90°F) and pH within the range of 6.6 to 9.0. Where a segment-specific temperature criterion is indicated in 20.6.4.101-899 NMAC, it is the maximum temperature.

(6) Marginal warmwater: dissolved oxygen 5 mg/L or more, pH within the range of 6.6 to 9.0 and [~~maximum~~]temperatures that may routinely exceed 32.2°C (90°F). Where a segment-specific temperature criterion is indicated in 20.6.4.101-899 NMAC, it is the maximum temperature.

(7) Limited aquatic life: The acute aquatic life criteria of Subsections I and J of this section apply to this subcategory. Chronic aquatic life criteria do not apply unless adopted on a segment-specific basis. Human health-organism only criteria apply only for persistent toxic pollutants unless adopted on a segment-specific basis.

I. Hardness-dependent acute and chronic aquatic life criteria for metals are calculated using the following equations. The criteria are expressed as a function of [~~dissolved~~]hardness (as mg CaCO$_3$/L). With the exception of aluminum, the equations are valid only for [~~dissolved~~]hardness concentrations of 0-400 mg/L. For [~~dissolved~~]hardness concentrations above 400 mg/L, the criteria for 400 mg/L apply. For aluminum the equations are valid only for [~~dissolved~~]hardness concentrations of 0-220 mg/L. For [~~dissolved~~]hardness concentrations above 220 mg/L, the aluminum criteria for 220 mg/L apply. Calculated criteria must adhere to the treatment of significant figures and rounding identified in *Standard Methods For The Examination Of Water And Wastewater*, latest edition, American public health association.

(1) Acute aquatic life criteria for metals: The equation to calculate acute criteria in µg/L is exp(m_A[ln(hardness)] + b_A)(CF). Except for aluminum, the criteria are based on analysis of dissolved metal. For aluminum, the criteria are based on analysis of total recoverable aluminum in a sample that has a pH between 6.5 and 9.0 and is filtered to minimize mineral phases as specified by the department. [~~The EPA has disapproved the hardness-based equation for total recoverable aluminum in waters where the pH is less than 6.5 in the receiving stream for federal purposes of the Clean Water Act.~~]The equation parameters are as follows:

Metal	m_A	b_A	Conversion factor (CF)
Aluminum (Al)	1.3695	1.8308	
Cadmium (Cd)	[~~0.8968~~]0.9789	[~~-3.5699~~]-3.866	1.136672-[(ln hardness)(0.041838)]
Chromium (Cr) III	0.8190	3.7256	0.316
Copper (Cu)	0.9422	-1.700	0.960
Lead (Pb)	1.273	-1.460	1.46203-[(ln hardness)(0.145712)]
Manganese (Mn)	0.3331	6.4676	
Nickel (Ni)	0.8460	2.255	0.998
Silver (Ag)	1.72	-6.59	0.85
Zinc (Zn)	0.9094	0.9095	0.978

(2) Chronic aquatic life criteria for metals: The equation to calculate chronic criteria in µg/L is exp(m_C[ln(hardness)] + b_C)(CF). Except for aluminum, the criteria are based on analysis of dissolved metal. For aluminum, the criteria are based on analysis of total recoverable aluminum in a sample that has a pH between 6.5 and 9.0 and is filtered to minimize mineral phases as specified by the department. [~~The EPA has disapproved the hardness-based equation for total recoverable aluminum in waters where the pH is less than 6.5 in the receiving stream for federal purposes of the Clean Water Act.~~]The equation parameters are as follows:

Metal	m_C	b_C	Conversion factor (CF)
Aluminum (Al)	1.3695	0.9161	
Cadmium (Cd)	[~~0.7647~~]0.7977	[~~-4.2180~~]-3.909	1.101672-[(ln hardness)(0.041838)]
Chromium (Cr) III	0.8190	0.6848	0.860
Copper (Cu)	0.8545	-1.702	0.960
Lead (Pb)	1.273	-4.705	1.46203-[(ln hardness)(0.145712)]
Manganese (Mn)	0.3331	5.8743	
Nickel (Ni)	0.8460	0.0584	0.997
Zinc (Zn)	0.9094	0.6235	0.986

(3) Selected values of calculated acute and chronic criteria (µg/L).

Hardness as $CaCO_3$, dissolved (mg/L)		Al	Cd	Cr III	Cu	Pb	Mn	Ni	Ag	Zn
[~~25~~]25.0	Acute	512	[~~0.51~~] 0.490	[~~180~~] 183	[~~4~~] 3.64	[~~14~~] 13.9	[~~1,881~~] 1,880	[~~140~~] 145	[~~0.3~~] 0.30	[~~45~~] 45.4
	Chronic	205	[~~0.17~~] 0.253	[~~24~~] 23.8	[~~3~~] 2.74	[~~1~~] 0.541	1,040	[~~16~~] 16.1		[~~34~~] 34.4
[~~30~~]30.0	Acute	658	[~~0.59~~] 0.581	[~~210~~] 212	[~~4~~] 4.32	[~~17~~] 17.0	[~~1,999~~] 2,000	[~~170~~] 169	[~~0.4~~] 0.40	[~~54~~] 53.5
	Chronic	263	[~~0.19~~] 0.290	[~~28~~] 27.6	[~~3~~] 3.20	[~~1~~] 0.664	[~~1,105~~] 1,100	[~~19~~] 18.8		[~~41~~] 40.5
[~~40~~]40.0	Acute	975	[~~0.76~~] 0.761	[~~270~~] 269	[~~6~~] 5.67	[~~24~~] 23.5	2,200	[~~220~~] 216	[~~0.7~~] 0.66	[~~70~~] 69.5
	Chronic	391	[~~0.23~~] 0.360	[~~35~~] 35.0	[~~4~~] 4.09	[~~1~~] 0.916	[~~1,216~~] 1,220	[~~24~~] 24.0		[~~53~~] 52.7
[~~50~~]50.0	Acute	[~~1,324~~] 1,320	[~~0.91~~] 0.938	[~~320~~] 323	[~~7~~] 6.99	[~~30~~] 30.1	2,370	260	[~~1.0~~] 0.98	[~~85~~] 85.2
	Chronic	530	[~~0.28~~] 0.426	[~~42~~] 42.0	[~~5~~] 4.95	[~~1~~] 1.17	[~~1,309~~] 1,310	[~~29~~] 28.9		[~~65~~] 64.5
[~~60~~]60.0	Acute	[~~1,699~~] 1,700	[~~1.07~~] 1.11	[~~370~~] 375	[~~8~~] 8.30	[~~37~~] 36.9	[~~2,519~~] 2,520	[~~300~~] 304	1.3	[~~101~~] 100
	Chronic	681	[~~0.31~~] 0.489	[~~49~~] 48.8	[~~6~~] 5.79	[~~1~~] 1.44	[~~1,391~~] 1,390	[~~34~~] 33.8		[~~76~~] 76.2
[~~70~~]70.0	Acute	[~~2,099~~] 2,100	[~~1.22~~] 1.28	[~~430~~] 425	[~~10~~] 9.60	[~~44~~] 43.7	[~~2,651~~] 2,650	[~~350~~] 346	1.7	116
	Chronic	841	[~~0.35~~] 0.549	[~~55~~] 55.3	[~~7~~] 6.60	[~~2~~] 1.70	[~~1,465~~] 1,460	[~~38~~] 38.5		[~~88~~] 87.6
[~~80~~]80.0	Acute	2,520	[~~1.37~~] 1.46	[~~470~~] 474	[~~11~~] 10.9	[~~51~~] 50.6	[~~2,772~~] 2,770	[~~390~~] 388	2.2	131
	Chronic	1,010	[~~0.39~~] 0.607	[~~62~~] 61.7	[~~7~~] 7.40	[~~2~~] 1.97	[~~1,531~~] 1,530	[~~43~~] 43.0		[~~99~~] 98.9
[~~90~~]90.0	Acute	[~~2,961~~] 2,960	[~~1.51~~] 1.62	[~~520~~] 523	[~~12~~] 12.2	[~~58~~] 57.6	[~~2,883~~] 2,880	[~~430~~] 428	2.7	145
	Chronic	[~~1,186~~] 1,190	[~~0.42~~] 0.664	[~~68~~] 68.0	[~~8~~] 8.18	[~~2~~] 2.24	[~~1,593~~] 1,590	[~~48~~] 47.6		110
100	Acute	[~~3,421~~] 3,420	[~~1.65~~] 1.79	570	[~~13~~] 13.4	[~~65~~] 64.6	[~~2,986~~] 2,980	[~~470~~] 468	3.2	160
	Chronic	1,370	[~~0.45~~] 0.718	[~~74~~] 74.1	[~~9~~] 8.96	[~~3~~] 2.52	1,650	[~~52~~] 52.0		121
200	Acute	[~~8,838~~] 8,840	[~~2.98~~] 3.43	[~~1,010~~] 1,000	[~~26~~] 25.8	[~~140~~] 136	[~~3,761~~] 3,760	[~~840~~] 842	[~~11~~] 10	[~~301~~] 300
	Chronic	[~~3,541~~] 3,540	[~~0.75~~] 1.21	[~~130~~] 131	[~~16~~] 16.2	[~~5~~] 5.30	[~~2,078~~] 2,080	[~~90~~] 93.5		228
220	Acute	[~~10,071~~] 10,100	[~~3.23~~] 3.74	[~~1,087~~] 1,090	[~~28~~] 28.2	151	[~~3,882~~] 3,880	912	[~~13~~] 12	328
	Chronic	[~~4,035~~] 4,030	[~~0.80~~] 1.30	141	[~~18~~] 17.6	[~~6~~] 5.87	[~~2,145~~] 2,140	101		248
300	Acute		[~~4.21~~] 5.00	1,400	[~~38~~] 37.8	[~~210~~] 208	[~~4,305~~] 4,300	[~~1190~~] 1,190	21	[~~435~~] 434

Hardness as $CaCO_3$, dissolved (mg/L)		Al	Cd	Cr III	Cu	Pb	Mn	Ni	Ag	Zn
	Chronic		[~~1.00~~] 1.64	[~~180~~] 182	[~~23~~] 22.9	[~~8~~] 8.13	[~~2,379~~] 2,380	[~~130~~] 132		329
400 and above	Acute		[~~5.38~~] 6.54	1,770	[~~50~~] 49.6	[~~280~~] 281	[~~4,738~~] 4,740	[~~1510~~] 1,510	35	564
	Chronic		[~~1.22~~] 2.03	[~~230~~] 231	[~~29~~] 29.3	[~~11~~] 10.9	[~~2,618~~] 2,620	[~~170~~] 168		428

J. Use-specific numeric criteria.

(1) Table of numeric criteria: The following table sets forth the numeric criteria applicable to existing, designated and attainable uses. For metals, criteria represent the total sample fraction unless otherwise specified in the table. Additional criteria that are not compatible with this table are found in Subsections A through I, K and L of this section.

Pollutant	CAS Number	DWS	Irr/Irr storage	LW	WH	Aquatic Life			Type
						Acute	Chronic	HH-OO	
Aluminum, dissolved	7429-90-5		5,000			750 i	87 i		
Aluminum, total recoverable	7429-90-5					a	a		
Antimony, dissolved	7440-36-0	6						640	P
Arsenic, dissolved	7440-38-2	10	100	200		340	150	9.0	C,P
Asbestos	1332-21-4	7,000,000 fibers/L							
Barium, dissolved	7440-39-3	2,000							
Beryllium, dissolved	7440-41-7	4							
Boron, dissolved	7440-42-8		750	5,000					
Cadmium, dissolved	7440-43-9	5	10	50		a	a		
Chloride	1688-70-06					860,000	230,000		
Chlorine residual	7782-50-5				11	19	11		
Chromium III, dissolved	16065-83-1					a	a		
Chromium VI, dissolved	18540-29-9					16	11		
Chromium, dissolved	7440-47-3	100	100	1,000					
Cobalt, dissolved	7440-48-4		50	1,000					
Copper, dissolved	7440-50-8	1300	200	500		a	a		
Cyanide, total recoverable	57-12-5	200			5.2	22.0	5.2	[~~140~~] 400	
Iron	7439-89-6						1,000		
Lead, dissolved	7439-92-1	15	5,000	100		a	a		
Manganese, dissolved	7439-96-5					a	a		
Mercury	7439-97-6	2		10	0.77				
Mercury, dissolved	7439-97-6					1.4	0.77		
Methylmercury	22967-92-6							0.3 mg/kg in fish tissue	P
Molybdenum, dissolved	7439-98-7		1,000						
Molybdenum, total recoverable	7439-98-7					7,920	1,895		
Nickel, dissolved	7440-02-0	700				a	a	4,600	P
Nitrate as N		10 mg/L							
Nitrite + Nitrate				132 mg/L					
Selenium, dissolved	7782-49-2	50	b	50				4,200	P

Pollutant	CAS Number	DWS	Irr/Irr storage	LW	WH	Aquatic Life			Type
						Acute	Chronic	HH-OO	
Selenium, total recoverable	7782-49-2				5.0	20.0	5.0		
Silver, dissolved	7440-22-4					a			
Thallium, dissolved	7440-28-0	2						0.47	P
Uranium, dissolved	7440-61-1	30							
Vanadium, dissolved	7440-62-2		100	100					
Zinc, dissolved	7440-66-6	10,500	2,000	25,000		a	a	26,000	P
Adjusted gross alpha		15 pCi/L		15 pCi/L					
Radium 226 + Radium 228		5 pCi/L		30.0 pCi/L					
Strontium 90		8 pCi/L							
Tritium		20,000 pCi/L		20,000 pCi/L					
Acenaphthene	83-32-9	2,100						[~~990~~] 90	
Acrolein	107-02-8	18				3.0	3.0	[~~9~~] 400	
Acrylonitrile	107-13-1	0.65						[~~2.5~~] 70	C
Aldrin	309-00-2	0.021				3.0		[~~0.00050~~] 0.0000077	C,P
Anthracene	120-12-7	10,500						[~~40,000~~] 400	
Benzene	71-43-2	5						[~~510~~] 160	C
Benzidine	92-87-5	0.0015						[~~0.0020~~] 0.11	C
Benzo(a)anthracene	56-55-3	0.048						[~~0.18~~] 0.013	C
Benzo(a)pyrene	50-32-8	0.2						[~~0.18~~] 0.0013	C,P
Benzo(b)fluoranthene	205-99-2	0.048						[~~0.18~~] 0.013	C
Benzo(k)fluoranthene	207-08-9	0.048						[~~0.18~~] 0.13	C
alpha-BHC	319-84-6	0.056						[~~0.049~~] 0.0039	C
beta-BHC	319-85-7	0.091						[~~0.17~~] 0.14	C
[~~G~~]gamma-BHC (Lindane)	58-89-9	0.20				0.95		[~~1.8~~] 4.4	
Bis(2-chloroethyl) ether	111-44-4	0.30						[~~5.3~~] 22	C
Bis([~~2-chloroisopropyl~~] 2-chloro-1-methylethyl) ether	108-60-1	1,400						[~~65,000~~] 4,000	
Bis(2-ethylhexyl) phthalate	117-81-7	6						[~~22~~] 3.7	C
Bis(chloromethyl) ether	542-88-1							0.17	C
Bromoform	75-25-2	44						[~~1,400~~] 1,200	C
Butylbenzyl phthalate	85-68-7	7,000						[~~1,900~~] 1	C
Carbaryl	63-25-2					2.1	2.1		
Carbon tetrachloride	56-23-5	5						[~~16~~] 50	C

Pollutant	CAS Number	DWS	Irr/Irr storage	LW	WH	Aquatic Life			Type
						Acute	Chronic	HH-OO	
Chlordane	57-74-9	2				2.4	0.0043	[~~0.0081~~] 0.0032	C,P
Chlorobenzene	108-90-7	100						[~~1,600~~] 800	
Chlorodibromomethane	124-48-1	4.2						[~~130~~] 210	C
Chloroform	67-66-3	57						[~~4,700~~] 2,000	[~~C~~]
Chlorpyrifos	2921-88-2					0.083	0.041		
2-Chloronaphthalene	91-58-7	2,800						[~~1,600~~] 1,000	
2-Chlorophenol	95-57-8	175						[~~150~~] 800	
Chrysene	218-01-9	0.048						[~~0.18~~] 1.3	C
Demeton	8065-48-3						0.1		
Diazinon	333-41-5					0.17	0.17		
2,4-Dichlorophenoxyacetic acid	94-75-7							12,000	
Dichlorodiphenyldichloroethane (DDD)	72-54-8							0.0012	C
Dichlorodiphenyldichloroethylene (DDE)	72-55-9							0.00018	C
Dichlorodiphenyltrichloroethane (DDT)	50-29-3							0.0003	C,P
4,4'-DDT and derivatives		1.0			0.001	1.1	0.001	[~~0.0022~~]	[~~C,P~~]
Dibenzo(a,h)anthracene	53-70-3	0.048						[~~0.18~~] 0.0013	C
Dibutyl phthalate	84-74-2	3,500						[~~4,500~~] 30	
1,2-Dichlorobenzene	95-50-1	600						[~~1,300~~] 3,000	
1,3-Dichlorobenzene	541-73-1	469						[~~960~~] 10	
1,4-Dichlorobenzene	106-46-7	75						[~~190~~] 900	
3,3'-Dichlorobenzidine	91-94-1	0.78						[~~0.28~~] 1.5	C
Dichlorobromomethane	75-27-4	5.6						[~~170~~] 270	C
1,2-Dichloroethane	107-06-2	5						[~~370~~] 6,500	C
1,1-Dichloroethylene	75-35-4	7						[~~7,100~~] 20,000	[~~C~~]
2,4-Dichlorophenol	120-83-2	105						[~~290~~] 60	
1,2-Dichloropropane	78-87-5	5.0						[~~150~~] 310	C
1,3-Dichloropropene	542-75-6	3.5						[~~210~~] 120	C
Dieldrin	60-57-1	0.022				0.24	0.056	[~~0.00054~~] 0.000012	C,P
Diethyl phthalate	84-66-2	28,000						[~~44,000~~] 600	
Dimethyl phthalate	131-11-3	350,000						[~~1,100,000~~] 2,000	
2,4-Dimethylphenol	105-67-9	700						[~~850~~] 3,000	
Dinitrophenols	25550-58-7							1,000	
2,4-Dinitrophenol	51-28-5	70						[~~5,300~~] 300	

Pollutant	CAS Number	DWS	Irr/Irr storage	LW	WH	Aquatic Life			Type
						Acute	Chronic	HH-OO	
2,4-Dinitrotoluene	121-14-2	1.1						[~~34~~] 17	C
Dioxin	1746-01-6	3.0E-05						5.1E-08	C,P
1,2-Diphenylhydrazine	122-66-7	0.44						2.0	C
alpha-Endosulfan	959-98-8	62				0.22	0.056	[~~89~~] 30	
beta-Endosulfan	33213-65-9	62				0.22	0.056	[~~89~~] 40	
Endosulfan sulfate	1031-07-8	62						[~~89~~] 40	
Endrin	72-20-8	2				0.086	0.036	[~~0.060~~] 0.03	
Endrin aldehyde	7421-93-4	10.5						[~~0.30~~] 1	
Ethylbenzene	100-41-4	700						[~~2,100~~] 130	
Fluoranthene	206-44-0	1,400						[~~140~~] 20	
Fluorene	86-73-7	1,400						[~~5,300~~] 70	
Guthion	86-50-0						0.01		
Heptachlor	76-44-8	0.40				0.52	0.0038	[~~0.00079~~] 0.000059	C
Heptachlor epoxide	1024-57-3	0.20				0.52	0.0038	[~~0.00039~~] 0.00032	C
Hexachlorobenzene	118-74-1	1						[~~0.0029~~] 0.00079	C,P
Hexachlorobutadiene	87-68-3	4.5						[~~180~~] 0.1	C
Hexachlorocyclohexane (HCH)-Technical	608-73-1							0.1	C
Hexachlorocyclopentadiene	77-47-4	50						[~~1,100~~] 4	
Hexachloroethane	67-72-1	25						[~~33~~] 1	C
Ideno(1,2,3-cd)pyrene	193-39-5	0.048						[~~0.18~~] 0.013	C
Isophorone	78-59-1	368						[~~9,600~~] 18,000	C
Malathion	121-75-5						0.1		
Methoxychlor	72-43-5						0.03	0.02	
Methyl bromide	74-83-9	49						[~~1,500~~] 10,000	
3-Methyl-4-chlorophenol	59-50-7							2,000	
2-Methyl-4,6-dinitrophenol	534-52-1	14						[~~280~~] 30	
Methylene chloride	75-09-2	5						[~~5,900~~] 10,000	C
Mirex	2385-85-5						0.001		
Nitrobenzene	98-95-3	18						[~~690~~] 600	
Nitrosamines	Various							12.4	C
Nitrosodibutylamine	924-16-3							2.2	C
Nitrosodiethylamine	55-18-5							12.4	C
N-Nitrosodimethylamine	62-75-9	0.0069						30	C
N-Nitrosodi-n-propylamine	621-64-7	0.050						5.1	C
N-Nitrosodiphenylamine	86-30-6	71						60	C
N-Nitrosopyrrolidine	930-55-2							340	C
Nonylphenol	84852-15-3					28	6.6		

Pollutant	CAS Number	DWS	Irr/Irr storage	LW	WH	Aquatic Life			Type
						Acute	Chronic	HH-OO	
Parathion	56-38-2					0.065	0.013		
[~~Polychlorinated Biphenyls (PCBs)~~]	[~~1336-36-3~~]	[~~0.50~~]			[~~0.014~~]	[~~2~~]	[~~0.014~~]	[~~0.00064~~]	[~~C,P~~]
Pentachlorobenzene	608-93-5							0.1	
Pentachlorophenol	87-86-5	1.0				19	15	[~~30~~] 0.4	C
Phenol	108-95-2	10,500						[~~860,000~~] 300,000	
Polychlorinated Biphenyls (PCBs)	1336-36-3	0.50			0.014	2	0.014	0.00064	C,P
Pyrene	129-00-0	1,050						[~~4,000~~] 30	
1,2,4,5-Tetrachlorobenzene	95-94-3							0.03	
1,1,2,2-Tetrachloroethane	79-34-5	1.8						[~~40~~] 30	C
Tetrachloroethylene	127-18-4	5						[~~33~~] 290	C,P
Toluene	108-88-3	1,000						[~~15,000~~] 520	
Toxaphene	8001-35-2	3				0.73	0.0002	[~~0.0028~~] 0.0071	C
1,2-Trans-dichloroethylene	156-60-5	100						[~~10,000~~] 4,000	
Tributyltin (TBT)	Various					0.46	0.072		
1,2,4-Trichlorobenzene	120-82-1	70						[~~70~~] 0.76	C
1,1,1-Trichloroethane	71-55-6	200						200,000	
1,1,2-Trichloroethane	79-00-5	5						[~~160~~] 89	C
Trichloroethylene	79-01-6	5						[~~300~~] 70	C
2,4,5-Trichlorophenol	95-95-4							600	
2,4,6-Trichlorophenol	88-06-2	32						[~~24~~] 28	C
2-(2,4,5-Trichlorophenoxy)propionic acid (Silvex)	93-72-1							400	
Vinyl chloride	75-01-4	2						[~~24~~] 16	C

(2) Notes applicable to the table of numeric criteria in Paragraph (1) of this subsection.

(a) Where the letter "a" is indicated in a cell, the criterion is hardness-based and can be referenced in Subsection I of 20.6.4.900 NMAC.

(b) Where the letter "b" is indicated in a cell, the criterion can be referenced in Subsection C of 20.6.4.900 NMAC.

(c) Criteria are in µg/L unless otherwise indicated.

(d) Abbreviations are as follows: CAS - chemical abstracts service (see definition for "CAS number" in 20.6.4.7 NMAC); DWS - domestic water supply; Irr/Irr storage- irrigation [~~or~~]and irrigation storage; LW - livestock watering; WH - wildlife habitat; HH-OO - human health-organism only; C – criteria based on cancer-causing endpoint; P - persistent toxic pollutant.

(e) The criteria are based on analysis of an unfiltered sample unless otherwise indicated. The acute and chronic aquatic life criteria for aluminum are based on analysis of total recoverable aluminum in a sample that is filtered to minimize mineral phases as specified by the department.

(f) The criteria listed under human health-organism only (HH-OO) are intended to protect human health when aquatic organisms are consumed from waters containing pollutants. These criteria do not protect the aquatic life itself; rather, they protect the health of humans who ingest fish or other aquatic organisms.

(g) The dioxin criteria apply to the sum of the dioxin toxicity equivalents expressed as 2,3,7,8-TCDD dioxin.

(h) The criteria for polychlorinated biphenyls (PCBs) apply to the sum of all congeners, to the sum of all homologs or to the sum of all aroclors.

(i) The acute and chronic aquatic life criteria for dissolved aluminum only apply when the concurrent pH is less than 6.5 or greater than 9.0 S.U. If the concurrent pH is between 6.5 and 9.0 S.U. then the hardness-dependent total recoverable aluminum criteria in Paragraphs (1) and (2) of Subsection I of 20.6.4.900 NMAC apply.

[~~**K.** Acute aquatic life criteria for total ammonia are dependent on pH and the presence or absence of salmonids. The criteria in mg/L as N based on analysis of unfiltered samples are as follows:~~

~~pH~~	~~Where Salmonids Present~~	~~Where Salmonids Absent~~
~~6.5 and below~~	~~32.6~~	~~48.8~~
~~6.6~~	~~31.3~~	~~46.8~~
~~6.7~~	~~29.8~~	~~44.6~~
~~6.8~~	~~28.1~~	~~42.0~~
~~6.9~~	~~26.2~~	~~39.1~~
~~7.0~~	~~24.1~~	~~36.1~~
~~7.1~~	~~22.0~~	~~32.8~~
~~7.2~~	~~19.7~~	~~29.5~~
~~7.3~~	~~17.5~~	~~26.2~~
~~7.4~~	~~15.4~~	~~23.0~~
~~7.5~~	~~13.3~~	~~19.9~~
~~7.6~~	~~11.4~~	~~17.0~~
~~7.7~~	~~9.65~~	~~14.4~~
~~7.8~~	~~8.11~~	~~12.1~~
~~7.9~~	~~6.77~~	~~10.1~~
~~8.0~~	~~5.62~~	~~8.40~~
~~8.1~~	~~4.64~~	~~6.95~~
~~8.2~~	~~3.83~~	~~5.72~~
~~8.3~~	~~3.15~~	~~4.71~~
~~8.4~~	~~2.59~~	~~3.88~~
~~8.5~~	~~2.14~~	~~3.20~~
~~8.6~~	~~1.77~~	~~2.65~~
~~8.7~~	~~1.47~~	~~2.20~~
~~8.8~~	~~1.23~~	~~1.84~~
~~8.9~~	~~1.04~~	~~1.56~~
~~9.0 and above~~	~~0.885~~	~~1.32~~

~~**L.** Chronic aquatic life criteria for total ammonia are dependent on pH, temperature and whether fish in early life stages are present or absent. The criteria are based on analysis of unfiltered samples and are calculated according to the equations in Paragraphs (1) and (2) of this subsection. For temperatures from below 0 to 14°C, the criteria for 14°C apply; for temperatures above 30°C, the criteria for 30°C apply. For pH values below 6.5, the criteria for 6.5 apply; for pH values above 9.0, the criteria for 9.0 apply.~~

~~**(1) Chronic aquatic life criteria for total ammonia when fish early life stages are present:**~~

~~**(a)** The equation to calculate chronic criteria in mg/L as N is:~~

$$\cancel{((0.0577/(1 + 10^{7.688-pH})) + (2.487/(1 + 10^{pH-7.688}))) \times \text{MIN}\,(2.85, 1.45 \times 10^{0.028 \times (25-T)})}$$

~~**(b)** Selected values of calculated chronic criteria in mg/L as N:~~

~~pH~~	~~Temperature (°C)~~									
	~~14 and below~~	~~15~~	~~16~~	~~18~~	~~20~~	~~22~~	~~24~~	~~26~~	~~28~~	~~30 and above~~
~~6.5 and below~~	~~6.67~~	~~6.46~~	~~6.06~~	~~5.33~~	~~4.68~~	~~4.12~~	~~3.62~~	~~3.18~~	~~2.80~~	~~2.46~~
~~6.6~~	~~6.57~~	~~6.36~~	~~5.97~~	~~5.25~~	~~4.61~~	~~4.05~~	~~3.56~~	~~3.13~~	~~2.75~~	~~2.42~~
~~6.7~~	~~6.44~~	~~6.25~~	~~5.86~~	~~5.15~~	~~4.52~~	~~3.98~~	~~3.50~~	~~3.07~~	~~2.70~~	~~2.37~~

pH	Temperature (°C)									
	14 and below	15	16	18	20	22	24	26	28	30 and above
6.8	6.29	6.10	5.72	5.03	4.42	3.89	3.42	3.00	2.64	2.32
6.9	6.12	5.93	5.56	4.89	4.30	3.78	3.32	2.92	2.57	2.25
7.0	5.91	5.73	5.37	4.72	4.15	3.65	3.21	2.82	2.48	2.18
7.1	5.67	5.49	5.15	4.53	3.98	3.50	3.08	2.70	2.38	2.09
7.2	5.39	5.22	4.90	4.31	3.78	3.33	2.92	2.57	2.26	1.99
7.3	5.08	4.92	4.61	4.06	3.57	3.13	2.76	2.42	2.13	1.87
7.4	4.73	4.59	4.30	3.78	3.32	2.92	2.57	2.26	1.98	1.74
7.5	4.36	4.23	3.97	3.49	3.06	2.69	2.37	2.08	1.83	1.61
7.6	3.98	3.85	3.61	3.18	2.79	2.45	2.16	1.90	1.67	1.47
7.7	3.58	3.47	3.25	2.86	2.51	2.21	1.94	1.71	1.50	1.32
7.8	3.18	3.09	2.89	2.54	2.23	1.96	1.73	1.52	1.33	1.17
7.9	2.80	2.71	2.54	2.24	1.96	1.73	1.52	1.33	1.17	1.03
8.0	2.43	2.36	2.21	1.94	1.71	1.50	1.32	1.16	1.02	0.897
8.1	2.10	2.03	1.91	1.68	1.47	1.29	1.14	1.00	0.879	0.773
8.2	1.79	1.74	1.63	1.43	1.26	1.11	0.973	0.855	0.752	0.661
8.3	1.52	1.48	1.39	1.22	1.07	0.941	0.827	0.727	0.639	0.562
8.4	1.29	1.25	1.17	1.03	0.906	0.796	0.700	0.615	0.541	0.475
8.5	1.09	1.06	0.990	0.870	0.765	0.672	0.591	0.520	0.457	0.401
8.6	0.920	0.892	0.836	0.735	0.646	0.568	0.499	0.439	0.386	0.339
8.7	0.778	0.754	0.707	0.622	0.547	0.480	0.422	0.371	0.326	0.287
8.8	0.661	0.641	0.601	0.528	0.464	0.408	0.359	0.315	0.277	0.244
8.9	0.565	0.548	0.513	0.451	0.397	0.349	0.306	0.269	0.237	0.208
9.0 and above	0.486	0.471	0.442	0.389	0.342	0.300	0.264	0.232	0.204	0.179

~~**(2) Chronic aquatic life criteria for total ammonia when fish early life stages are absent.**~~

~~**(a)** The equation to calculate chronic criteria in mg/L as N is:~~

$$\cancel{((0.0577/(1 + 10^{7.688\text{-pH}})) + (2.487/(1 + 10^{\text{pH-}7.688})) \times 1.45 \times 10^{0.028 \times (25\text{-MAX}(T,7))}}$$

~~**(b)** Selected values of calculated chronic criteria in mg/L as N:~~

pH	Temperature (°C)								
	7 and below	8	9	10	11	12	13	14	15 and above
6.5 and below	10.8	10.1	9.51	8.92	8.36	7.84	7.35	6.89	6.46
6.6	10.7	9.99	9.37	8.79	8.24	7.72	7.24	6.79	6.36
6.7	10.5	9.81	9.20	8.62	8.08	7.58	7.11	6.66	6.25
6.8	10.2	9.58	8.98	8.42	7.90	7.40	6.94	6.51	6.10
6.9	9.93	9.31	8.73	8.19	7.68	7.20	6.75	6.33	5.93
7.0	9.60	9.00	8.43	7.91	7.41	6.95	6.52	6.11	5.73
7.1	9.20	8.63	8.09	7.58	7.11	6.67	6.25	5.86	5.49
7.2	8.75	8.20	7.69	7.21	6.76	6.34	5.94	5.57	5.22
7.3	8.24	7.73	7.25	6.79	6.37	5.97	5.60	5.25	4.92
7.4	7.69	7.21	6.76	6.33	5.94	5.57	5.22	4.89	4.59
7.5	7.09	6.64	6.23	5.84	5.48	5.13	4.81	4.51	4.23
7.6	6.46	6.05	5.67	5.32	4.99	4.68	4.38	4.11	3.85
7.7	5.81	5.45	5.11	4.79	4.49	4.21	3.95	3.70	3.47
7.8	5.17	4.84	4.54	4.26	3.99	3.74	3.51	3.29	3.09
7.9	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89	2.71
8.0	3.95	3.70	3.47	3.26	3.05	2.86	2.68	2.52	2.36
8.1	3.41	3.19	2.99	2.81	2.63	2.47	2.31	2.17	2.03

~~pH~~	~~Temperature (°C)~~								
	~~7 and below~~	~~8~~	~~9~~	~~10~~	~~11~~	~~12~~	~~13~~	~~14~~	~~15 and above~~
~~8.2~~	~~2.91~~	~~2.73~~	~~2.56~~	~~2.40~~	~~2.25~~	~~2.11~~	~~1.98~~	~~1.85~~	~~1.74~~
~~8.3~~	~~2.47~~	~~2.32~~	~~2.18~~	~~2.04~~	~~1.91~~	~~1.79~~	~~1.68~~	~~1.58~~	~~1.48~~
~~8.4~~	~~2.09~~	~~1.96~~	~~1.84~~	~~1.73~~	~~1.62~~	~~1.52~~	~~1.42~~	~~1.33~~	~~1.25~~
~~8.5~~	~~1.77~~	~~1.66~~	~~1.55~~	~~1.46~~	~~1.37~~	~~1.28~~	~~1.20~~	~~1.13~~	~~1.06~~
~~8.6~~	~~1.49~~	~~1.40~~	~~1.31~~	~~1.23~~	~~1.15~~	~~1.08~~	~~1.01~~	~~0.951~~	~~0.892~~
~~8.7~~	~~1.26~~	~~1.18~~	~~1.11~~	~~1.04~~	~~0.976~~	~~0.915~~	~~0.858~~	~~0.805~~	~~0.754~~
~~8.8~~	~~1.07~~	~~1.01~~	~~0.944~~	~~0.855~~	~~0.829~~	~~0.778~~	~~0.729~~	~~0.684~~	~~0.641~~
~~8.9~~	~~0.917~~	~~0.860~~	~~0.806~~	~~0.756~~	~~0.709~~	~~0.664~~	~~0.623~~	~~0.584~~	~~0.548~~
~~9.0 and above~~	~~0.790~~	~~0.740~~	~~0.694~~	~~0.651~~	~~0.610~~	~~0.572~~	~~0.536~~	~~0.503~~	~~0.471~~
~~At 15ºC and above, the criterion for fish early life stages absent is the same as the criterion for fish early life stages present (refer to table in Paragraph (1) of this subsection).~~									

]

K. The criteria for total ammonia consider sensitive freshwater mussel species in the family Unionidae, freshwater non-pulmonate snails, and *Oncorhynchus* spp. (a genus of fish in the family Salmonidae), hence further protecting the aquatic community. The total ammonia criteria magnitude is measured as Total Ammonia Nitrogen (TAN) mg/L. TAN is the sum of NH_4^+ and NH_3. TAN mg/L magnitude is derived as a function of pH and temperature (EPA 2013).

L . The acute aquatic life criteria for TAN (mg/L) was derived by the EPA (2013) as the one-hour average concentration of TAN mg/L that shall not be exceeded more than once every three years on average. The EPA acute criterion magnitude was derived using the following equation:

Acute TAN Criterion Magnitude for 1-hour average=

$$\mathrm{MIN}\left(\begin{array}{c}\left(\frac{0.275}{1+10^{7.204-pH}}+\frac{39}{1+10^{pH-7.204}}\right),\\ \left(0.7249\mathrm{x}\left(\frac{0.0114}{1+10^{7.204-pH}}+\frac{1.6181}{1+10^{pH-7.204}}\right)\mathrm{x}\left(23.12\times 10^{0.036(20-T)}\right)\right)\end{array}\right)$$

T (temperature °C) and *pH* are defined as the paired values associated with the TAN sample.

	Temperature (°C)																				
pH	**0-10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
6.5	51	48	44	41	37	34	32	29	27	25	23	21	19	18	16	15	14	13	12	11	9.9
6.6	49	46	42	39	36	33	30	28	26	24	22	20	18	17	16	14	13	12	11	10	9.5
6.7	46	44	40	37	34	31	29	27	24	22	21	19	18	16	15	14	13	12	11	9.8	9
6.8	44	41	38	35	32	30	27	25	23	21	20	18	17	15	14	13	12	11	10	9.2	8.5
6.9	41	38	35	32	30	28	25	23	21	20	18	17	15	14	13	12	11	10	9.4	8.6	7.9
7.0	38	35	33	30	28	25	23	21	20	18	**17**	15	14	13	12	11	10	9.4	8.6	7.9	7.3
7.1	34	32	30	27	25	23	21	20	18	17	15	14	13	12	11	10	9.3	8.5	7.9	7.2	6.7
7.2	31	29	27	25	23	21	19	18	16	15	14	13	12	11	9.8	9.1	8.3	7.7	7.1	6.5	6
7.3	27	26	24	22	20	18	17	16	14	13	12	11	10	9.5	8.7	8	7.4	6.8	6.3	5.8	5.3
7.4	24	22	21	19	18	16	15	14	13	12	11	9.8	9	8.3	7.7	7	6.5	6	5.5	5.1	4.7
7.5	21	19	18	17	15	14	13	12	11	10	9.2	8.5	7.8	7.2	6.6	6.1	5.6	5.2	4.8	4.4	4
7.6	18	17	15	14	13	12	11	10	9.3	8.6	7.9	7.3	6.7	6.2	5.7	5.2	4.8	4.4	4.1	3.8	3.5
7.7	15	14	13	12	11	10	9.3	8.6	7.9	7.3	6.7	6.2	5.7	5.2	4.8	4.4	4.1	3.8	3.5	3.2	2.9
7.8	13	12	11	10	9.3	8.5	7.9	7.2	6.7	6.1	5.6	5.2	4.8	4.4	4	3.7	3.4	3.2	2.9	2.7	2.5
7.9	11	9.9	9.1	8.4	7.7	7.1	6.6	3	5.6	5.1	4.7	4.3	4	3.7	3.4	3.1	2.9	2.6	2.4	2.2	2.1
8.0	8.8	8.2	7.6	7	6.4	5.9	5.4	5	4.6	4.2	3.9	3.6	3.3	3	2.8	2.6	2.4	2.2	2	1.9	1.7
8.1	7.2	6.8	6.3	5.8	5.3	4.9	4.5	4.1	3.8	3.5	3.2	3	2.7	2.5	2.3	2.1	2	1.8	1.7	1.5	1.4
8.2	6	5.6	5.2	4.8	4.4	4	3.7	3.4	3.1	2.9	2.7	2.4	2.3	2.1	1.9	1.8	1.6	1.5	1.4	1.3	1.2
8.3	4.9	4.6	4.3	3.9	3.6	3.3	3.1	2.8	2.6	2.4	2.2	2	1.9	1.7	1.6	1.4	1.3	1.2	1.1	1	0.96

8.4	4.1	3.8	3.5	3.2	3	2.7	2.5	2.3	2.1	2	1.8	1.7	1.5	1.4	1.3	1.2	1.1	1	0.93	0.86	0.79
8.5	3.3	3.1	2.9	2.7	2.4	2.3	2.1	1.9	1.8	1.6	1.5	1.4	1.3	1.2	1.1	0.98	0.9	0.83	0.77	0.71	0.65
8.6	2.8	2.6	2.4	2.2	2	1.9	1.7	1.6	1.5	1.3	1.2	1.1	1	0.96	0.88	0.81	0.75	0.69	0.63	0.58	0.54
8.7	2.3	2.2	2	1.8	1.7	1.6	1.4	1.3	1.2	1.1	1	0.94	0.87	0.8	0.74	0.68	0.62	0.57	0.53	0.49	0.45
8.8	1.9	1.8	1.7	1.5	1.4	1.3	1.2	1.1	1	0.93	0.86	0.79	0.73	0.67	0.62	0.57	0.52	0.48	0.44	0.41	0.37
8.9	1.6	1.5	1.4	1.3	1.2	1.1	1	0.93	0.85	0.79	0.72	0.67	0.61	0.56	0.52	0.48	0.44	0.4	0.37	0.34	0.32
9.0	1.4	1.3	1.2	1.1	1	0.93	0.86	0.79	0.73	0.67	0.62	0.57	0.52	0.48	0.44	0.41	0.37	0.34	0.32	0.29	0.27

(1) Temperature and pH-dependent values of the acute TAN criterion magnitude -when *Oncorhynchus* spp. absent.

(2) Temperature and pH-dependent values for the acute TAN criterion magnitude-when *Oncorhynchus* spp. are present.

	Temperature (°C)																
pH	**0-14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
6.5	33	33	32	29	27	25	23	21	19	18	16	15	14	13	12	11	9.9
6.6	31	31	30	28	26	24	22	20	18	17	16	14	13	12	11	10	9.5
6.7	30	30	29	27	24	22	21	19	18	16	15	14	13	12	11	9.8	9
6.8	28	28	27	25	23	21	20	18	17	15	14	13	12	11	10	9.2	8.5
6.9	26	26	25	23	21	20	18	17	15	14	13	12	11	10	9.4	8.6	7.9
7.0	24	24	23	21	20	18	**17**	15	14	13	12	11	10	9.4	8.6	8	7.3
7.1	22	22	21	20	18	17	15	14	13	12	11	10	9.3	8.5	7.9	7.2	6.7
7.2	20	20	19	18	16	15	14	13	12	11	9.8	9.1	8.3	7.7	7.1	6.5	6
7.3	18	18	17	16	14	13	12	11	10	9.5	8.7	8	7.4	6.8	6.3	5.8	5.3
7.4	15	15	15	14	13	12	11	9.8	9	8.3	7.7	7	6.5	6	5.5	5.1	4.7
7.5	13	13	13	12	11	10	9.2	8.5	7.8	7.2	6.6	6.1	5.6	5.2	4.8	4.4	4
7.6	11	11	11	10	9.3	8.6	7.9	7.3	6.7	6.2	5.7	5.2	4.8	4.4	4.1	3.8	3.5
7.7	9.6	9.6	9.3	8.6	7.9	7.3	6.7	6.2	5.7	5.2	4.8	4.4	4.1	3.8	3.5	3.2	3
7.8	8.1	8.1	7.9	7.2	6.7	6.1	5.6	5.2	4.8	4.4	4	3.7	3.4	3.2	2.9	2.7	2.5
7.9	6.8	6.8	6.6	6	5.6	5.1	4.7	4.3	4	3.7	3.4	3.1	2.9	2.6	2.4	2.2	2.1
8.0	5.6	5.6	5.4	5	4.6	4.2	3.9	3.6	3.3	3	2.8	2.6	2.4	2.2	2	1.9	1.7
8.1	4.6	4.6	4.5	4.1	3.8	3.5	3.2	3	2.7	2.5	2.3	2.1	2	1.8	1.7	1.5	1.4
8.2	3.8	3.8	3.7	3.5	3.1	2.9	2.7	2.4	2.3	2.1	1.9	1.8	1.6	1.5	1.4	1.3	1.2
8.3	3.1	3.1	3.1	2.8	2.6	2.4	2.2	2	1.9	1.7	1.6	1.4	1.3	1.2	1.1	1	1
8.4	2.6	2.6	2.5	2.3	2.1	2	1.8	1.7	1.5	1.4	1.3	1.2	1.1	1	0.9	0.9	0.8
8.5	2.1	2.1	2.1	1.9	1.8	1.6	1.5	1.4	1.3	1.2	1.1	1	0.9	0.8	0.8	0.7	0.7
8.6	1.8	1.8	1.7	1.6	1.5	1.3	1.2	1.1	1	1	0.9	0.8	0.8	0.7	0.6	0.6	0.5
8.7	1.5	1.5	1.4	1.3	1.2	1.1	1	0.9	0.9	0.8	0.7	0.7	0.6	0.6	0.5	0.5	0.5
8.8	1.2	1.2	1.2	1.1	1	0.9	0.9	0.8	0.7	0.7	0.6	0.6	0.5	0.5	0.4	0.4	0.4
8.9	1	1	1	0.9	0.9	0.8	0.7	0.7	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.3	0.3
9.0	0.88	0.9	0.9	0.8	0.7	0.7	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.3

M. The chronic aquatic life criteria for TAN (mg/L) was derived by the EPA (2013) as a thirty-day rolling average concentration of TAN mg/L that shall not be exceeded more than once every three years on average. In addition, the highest four-day average within the 30-day averaging period should not be more than 2.5 times the

CCC (e.g., 2.5 x 1.9 mg TAN/L at pH 7 and 20°C, or 4.8 mg TAN/L) more than once in three years on average. The EPA chronic criterion magnitude was derived using the following equation:

Chronic TAN Criterion Magnitude for 30-day average=

$$0.8876 \times \left(\frac{0.0278}{1+10^{7.688-pH}} + \frac{1.1994}{1+10^{pH-7.688}}\right) \times \left(2.126 \times 10^{0.028\times(20-MAX(T,7))}\right)$$

T (temperature °C) and *pH* are defined as the paired values associated with the TAN sample.

(1) Temperature and pH-Dependent Values of the Chronic TAN Criterion Magnitude.

	Temperature (°C)																							
pH	**0-7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
6.5	4.9	4.6	4.3	4.1	3.8	3.6	3.3	3.1	2.9	2.8	2.6	2.4	2.3	2.1	2	1.9	1.8	1.6	1.5	1.5	1.4	1.3	1.2	1.1
6.6	4.8	4.5	4.3	4	3.8	3.5	3.3	3.1	2.9	2.7	2.5	2.4	2.2	2.1	2	1.8	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.1
6.7	4.8	4.5	4.2	3.9	3.7	3.5	3.2	3	2.8	2.7	2.5	2.3	2.2	2.1	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1
6.8	4.6	4.4	4.1	3.8	3.6	3.4	3.2	3	2.8	2.6	2.4	2.3	2.1	2	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1
6.9	4.5	4.2	4	3.7	3.5	3.3	3.1	2.9	2.7	2.5	2.4	2.2	2.1	2	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1	1
7.0	4.4	4.1	3.8	3.6	3.4	3.2	3	2.8	2.6	2.4	2.3	2.2	2	**1.9**	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1	1
7.1	4.2	3.9	3.7	3.5	3.2	3	2.8	2.7	2.5	2.3	2.2	2.1	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1	1	1
7.2	4	3.7	3.5	3.3	3.1	2.9	2.7	2.5	2.4	2.2	2.1	2	1.8	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.1	1	1	0.9
7.3	3.8	3.5	3.3	3.1	2.9	2.7	2.6	2.4	2.2	2.1	2	1.8	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.1	1	1	0.9	0.9
7.4	3.5	3.3	3.1	2.9	2.7	2.5	2.4	2.2	2.1	2	1.8	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.1	1	1	0.9	0.9	0.8
7.5	3.2	3	2.8	2.7	2.5	2.3	2.2	2.1	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1	1	1	0.9	0.8	0.8	0.7
7.6	2.9	2.8	2.6	2.4	2.3	2.1	2	1.9	1.8	1.6	1.5	1.4	1.4	1.3	1.2	1.1	1.1	1	0.9	0.9	0.8	0.8	0.7	0.7
7.7	2.6	2.4	2.3	2.2	2	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1	1	0.9	0.9	0.8	0.8	0.7	0.7	0.6	0.6
7.8	2.3	2.2	2.1	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1	1	1	0.9	0.8	0.8	0.7	0.7	0.7	0.6	0.6	0.5
7.9	2.1	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1	1	1	0.9	0.8	0.8	0.7	0.7	0.7	0.6	0.6	0.5	0.5	0.5
8.0	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1	1	0.9	0.9	0.8	0.8	0.7	0.7	0.6	0.6	0.6	0.5	0.5	0.4	0.4	0.4
8.1	1.5	1.5	1.4	1.3	1.2	1.1	1.1	1	0.9	0.9	0.8	0.8	0.7	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4
8.2	1.3	1.2	1.2	1.1	1	1	0.9	0.8	0.8	0.7	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3
8.3	1.1	1.1	1	0.9	0.9	0.8	0.8	0.7	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3
8.4	1	0.9	0.8	0.8	0.7	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2
8.5	0.8	0.8	0.7	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2
8.6	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
8.7	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1
8.8	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1
8.9	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
9.0	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

[20.6.4.900 NMAC - Rp 20 NMAC 6.1.3100, 10/12/2010; A, 10/11/2002; A, 5/23/2005; A, 7/17/2005; A, 12/1/2010; A, 3/2/2017; A, XX/XX/XXXX]

20.6.4.901 PUBLICATION REFERENCES: These documents are intended as guidance and are available for public review during regular business hours at the offices of the surface water quality bureau. Copies of these documents have also been filed with the New Mexico state records center in order to provide greater access to this information.

A. American public health association. 1992. *Standard Methods For The Examination Of Water And Wastewater, 18th Edition.* Washington, D.C. 1048 p.

B. American public health association. 1995. *Standard Methods For The Examination Of Water And Wastewater, 19th Edition.* Washington, D.C. 1090 p.

C. American public health association. 1998. *Standard Methods For The Examination Of Water And Wastewater, 20th Edition.* Washington, D.C. 1112 p.

D. American public health association. 2018. *Standard Methods For The Examination Of Water And Wastewater, 23rd Edition.* Washington, D.C. 1796 p.

[~~D~~]E. United States geological survey. [~~1987~~]1989. *Methods For Determination Of Inorganic Substances In Water And Fluvial Sediments, Techniques Of Water-Resource Investigations Of The United States Geological Survey.* Washington, D.C. [~~80~~]545 p.

[~~E~~]F. United States geological survey. 1987. *Methods [~~f~~]For [~~t~~]The [~~d~~]Determination [~~o~~]Of [~~o~~]Organic [~~s~~]Substances [~~i~~]In [~~w~~]Water [~~a~~]And [~~f~~]Fluvial [~~s~~]Sediments, [~~t~~]Techniques [~~o~~]Of [~~w~~]Water-[~~r~~]Resource [~~i~~]Investigations [~~o~~]Of [~~t~~]The [~~U.S.~~] United States Geological [~~s~~]Survey.* Washington, D.C. 80 p.

[~~F~~]G. United States environmental protection agency. [~~1974~~]1983. *Methods For Chemical Analysis Of Water And Wastes.* [~~National environmental research center, Cincinnati, Ohio~~]Office of research and development, Washington, DC]. ~~[(EPA-625-/6-74-003)~~](EPA/600/4-79/020). [~~298~~]491 p.

[~~G~~]H. New Mexico water quality control commission. [~~2003~~]2020. ~~*(208)*~~ *State Of New Mexico Water Quality Management Plan and Continuing Planning Process.* Santa Fe, New Mexico. [~~85~~]277 p.

[~~H~~]I. Colorado river basin salinity control forum. [~~2014~~]2020. *[~~2014~~]2020 Review, Water Quality Standards For Salinity, Colorado River System.* Phoenix, Arizona. [~~99~~]97 p.

[~~I~~]J. United States environmental protection agency. 2002. *Methods For Measuring The Acute Toxicity Of Effluents And Receiving Waters To Freshwater And Marine Organisms.* Office of research and development, Washington, D.C. (5th Ed., EPA 821-R-02-012). 293 p. [~~http://www.epa.gov/ostWET/disk2/atx.pdf~~]

[~~J~~]K. United States environmental protection agency. 2002. *Short-Term Methods For Estimating The Chronic Toxicity Of Effluents And Receiving Waters To Freshwater Organisms.* Environmental monitoring systems laboratory, Cincinnati, Ohio. ([4th Ed., EPA 821-R-02-013). 335 p.

[~~K~~]L. [~~Ambient-induced mixing, in~~]United States environmental protection agency. 1991. Ambient-induced mixing, in *Technical Support Document For Water Quality-Based Toxics Control.* Office of water, Washington, D.C. (EPA/505/2-90-001). [~~2~~]335 p.

[~~L~~]M. United States environmental protection agency. 1983. *Technical Support Manual: Waterbody Surveys And Assessments For Conducting Use Attainability Analyses, Volume I:.* Office of water, regulations and standards, Washington, D.C. [~~251~~]232 p. [~~http://www.epa.gov/OST/library/wqstandards/uaavol123.pdf~~]

[~~M~~]N. United States environmental protection agency. 1984. *Technical Support Manual: Waterbody Surveys And Assessments For Conducting Use Attainability Analyses, Volume [~~Iii~~]III: Lake Systems.* Office of water, regulations and standards, Washington, D.C. 208 p. [~~http://www.epa.gov/OST/library/wqstandards/uaavol123.pdf~~]

[20.6.4.901 NMAC - Rp 20 NMAC 6.1.4000, 10/12/2010; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017; A, XX/XX/XXXX]

HISTORY of 20.6.4 NMAC:

Pre-NMAC History:

Material in the part was derived from that previously filed with the commission of public records - state records center and archives:

WQC 67-1, Water Quality Standards, filed 7-17-67, effective 8-18-67
WQC 67-1, Amendment Nos. 1-6, filed 3-21-68, effective 4-22-68
WQC 67-1, Amendment No. 7, filed 2-27-69, effective 3-30-69
WQC 67-1, Amendment No. 8, filed 7-14-69, effective 8-15-69
WQC 70-1, Water Quality Standards for Intrastate Waters and Tributaries to Interstate Streams, filed July 17, 1970;
WQC 67-1, Amendment Nos. 9 and 10, filed 2-12-71, effective 3-15-71
WQC 67-1, Amendment No. 11, filed 3-4-71, effective 4-5-71
WQC 73-1, New Mexico Water Quality Standards, filed 9-17-73, effective 10-23-73
WQC 73-1, Amendment Nos. 1 and 2, filed 10-3-75, effective 11-4-75
WQC 73-1, Amendment No. 3, filed 1-19-76, effective 2-14-76
WQC 77-2, Amended Water Quality Standards for Interstate and Intrastate Streams in New Mexico, filed 2-24-77, effective 3-11-77
WQC 77-2, Amendment No. 1, filed 3-23-78, effective 4-24-78
WQC 77-2, Amendment No. 2, filed 6-12-79, effective 7-13-79

WQCC 80-1, Water Quality Standards for Interstate and Intrastate Streams in New Mexico, filed 8-28-80, effective 9-28-80
WQCC 81-1, Water Quality Standards for Interstate and Intrastate Streams in New Mexico, filed 5-5-81, effective 6-4-81
WQCC 81-1, Amendment No. 1, filed 5-19-82, effective 6-18-82
WQCC 81-1, Amendment No. 2, filed 6-24-82, effective 7-26-82
WQCC 85-1, Water Quality Standards for Interstate and Intrastate Streams in New Mexico, filed 1-16-85, effective 2-15-85
WQCC 85-1, Amendment No. 1, filed 8-28-87, effective 9-28-87
WQCC 88-1, Water Quality Standards for Interstate and Intrastate Streams in New Mexico, filed 3-24-88, effective 4-25-88
WQCC 91-1, Water Quality Standards for Interstate and Intrastate Streams in New Mexico, filed 5-29-91, effective 6-29-91
WQCC 91-1, Amendment No. 1, filed 10-11-91, effective 11-12-91

History of the Repealed Material:
WQC 67-1, Water Quality Standards, - Superseded, 10-23-73
WQC 73-1, New Mexico Water Quality Standards, - Superseded, 3-11-77
WQC 77-2, Amended Water Quality Standards for Interstate and Intrastate Streams in New Mexico, - Superseded, 9-28-80
WQCC 80-1, Water Quality Standards for Interstate and Intrastate Streams in New Mexico, - Superseded, 6-4-81
WQCC 81-1, Water Quality Standards for Interstate and Intrastate Streams in New Mexico, - Superseded, 2-15-85
WQCC 85-1, Water Quality Standards for Interstate and Intrastate Streams in New Mexico, - Superseded, 4-25-88
WQCC 88-1, Water Quality Standards for Interstate and Intrastate Streams in New Mexico, - Superseded, 6-29-91
WQCC 91-1, Water Quality Standards for Interstate and Intrastate Streams in New Mexico, - Superseded, 1-23-95
20 NMAC 6.1, Standards for Interstate and Intrastate Streams, - Repealed, 2-23-00
20 NMAC 6.1, Standards for Interstate and Intrastate Surface Waters, - Repealed, 10/12/2000

Electronic Code of Federal Regulations

e-CFR data is current as of June 9, 2021

Title 40: Protection of Environment

PART 136—GUIDELINES ESTABLISHING TEST PROCEDURES FOR THE ANALYSIS OF POLLUTANTS

Contents

AUTHORITY: Secs. 301, 304(h), 307 and 501(a), Pub. L. 95-217, 91 Stat. 1566, *et seq.* (33 U.S.C. 1251, *et seq.*) (the Federal Water Pollution Control Act Amendments of 1972 as amended by the Clean Water Act of 1977).

§136.1   Applicability.

(a) The procedures prescribed herein shall, except as noted in §§136.4, 136.5, and 136.6, be used to perform the measurements indicated whenever the waste constituent specified is required to be measured for:

(1) An application submitted to the Director and/or reports required to be submitted under NPDES permits or other requests for quantitative or qualitative effluent data under parts 122 through 125 of this chapter; and

(2) Reports required to be submitted by dischargers under the NPDES established by parts 124 and 125 of this chapter; and

(3) Certifications issued by States pursuant to section 401 of the Clean Water Act (CWA), as amended.

(b) The procedure prescribed herein and in part 503 of title 40 shall be used to perform the measurements required for an application submitted to the Administrator or to a State for a sewage sludge permit under section 405(f) of the Clean Water Act and for recordkeeping and reporting requirements under part 503 of title 40.

(c) For the purposes of the NPDES program, when more than one test procedure is approved under this part for the analysis of a pollutant or pollutant parameter, the test procedure must be sufficiently sensitive as defined at 40 CFR 122.21(e)(3) and 122.44(i)(1)(iv).

[72 FR 14224, Mar. 26, 2007, as amended at 77 FR 29771, May 18, 2012; 79 FR 49013, Aug. 19, 2014; 82 FR 40846, Aug. 28, 2017]

§136.2   Definitions.

As used in this part, the term:

(a) *Act* means the Clean Water Act of 1977, Pub. L. 95-217, 91 Stat. 1566, *et seq.* (33 U.S.C. 1251 *et seq.*) (The Federal Water Pollution Control Act Amendments of 1972 as amended by the Clean Water Act of 1977).

(b) *Administrator* means the Administrator of the U.S. Environmental Protection Agency.

(c) *Regional Administrator* means one of the EPA Regional Administrators.

(d) *Director* means the director as defined in 40 CFR 122.2.

(e) *National Pollutant Discharge Elimination System (NPDES)* means the national system for the issuance of permits under section 402 of the Act and includes any State or interstate program which has been approved by the Administrator, in whole or in part, pursuant to section 402 of the Act.

(f) *Detection limit* means the minimum concentration of an analyte (substance) that can be measured and reported with a 99% confidence that the analyte concentration is distinguishable from the method blank results as determined by the procedure set forth at appendix B of this part.

[38 FR 28758, Oct. 16, 1973, as amended at 49 FR 43250, Oct. 26, 1984; 82 FR 40846, Aug. 28, 2017]

§136.3 Identification of test procedures.

Link to an amendment published at 86 FR 27237, May 19, 2021.

(a) Parameters or pollutants, for which methods are approved, are listed together with test procedure descriptions and references in Tables IA, IB, IC, ID, IE, IF, IG, and IH of this section. The methods listed in Tables IA, IB, IC, ID, IE, IF, IG, and IH are incorporated by reference, see paragraph (b) of this section, with the exception of EPA Methods 200.7, 601-613, 624.1, 625.1, 1613, 1624, and 1625. The full texts of Methods 601-613, 624.1, 625.1, 1613, 1624, and 1625 are printed in appendix A of this part, and the full text of Method 200.7 is printed in appendix C of this part. The full text for determining the method detection limit when using the test procedures is given in appendix B of this part. In the event of a conflict between the reporting requirements of 40 CFR parts 122 and 125 and any reporting requirements associated with the methods listed in these tables, the provisions of 40 CFR parts 122 and 125 are controlling and will determine a permittee's reporting requirements. The full texts of the referenced test procedures are incorporated by reference into Tables IA, IB, IC, ID, IE, IF, IG, and IH. The year after the method number indicates the latest editorial change of the method. The discharge parameter values for which reports are required must be determined by one of the standard analytical test procedures incorporated by reference and described in Tables IA, IB, IC, ID, IE, IF, IG, and IH or by any alternate test procedure which has been approved by the Administrator under the provisions of paragraph (d) of this section and §§136.4 and 136.5. Under certain circumstances (paragraph (c) of this section, in §136.5(a) through (d) or 40 CFR 401.13) other additional or alternate test procedures may be used.

TABLE IA—LIST OF APPROVED BIOLOGICAL METHODS FOR WASTEWATER AND SEWAGE SLUDGE

Parameter and units	Method[1]	EPA	Standard methods	AOAC, ASTM, USGS	Other
Bacteria					

1. Coliform (fecal), number per 100 mL or number per gram dry weight	Most Probable Number (MPN), 5 tube, 3 dilution, or	p. 132,[3] 1680,[11 15] 1681[11 20]	9221 C E-2006		
	Multiple tube/multiple well, or				Colilert-18®[13 18 21 29].
	Membrane filter (MF)[2], single step	p. 124[3]	9222 D-2006[30]	B-0050-85[4]	
2. Coliform (fecal) in presence of chlorine, number per 100 mL	MPN, 5 tube, 3 dilution, or	p. 132[3]	9221 C E-2006		
	MF[2], single step[5]	p. 124[3]	9222 D-2006[30]		
3. Coliform (total), number per 100 mL	MPN, 5 tube, 3 dilution, or	p. 114[3]	9221 B-2006		
	MF[2], single step or two step	p. 108[3]	9222 B-2006	B-0025-85[4]	
4. Coliform (total), in presence of chlorine, number per 100 mL	MPN, 5 tube, 3 dilution, or	p. 114[3]	9221 B-2006		
	MF[2] with enrichment[5]	p. 111[3]	9222 B-2006		
5. *E. coli,* number per 100 mL[21]	MPN[6 8 16] multiple tube, or		9221B.2-2006/9221F-2006[12 14]		
	multiple tube/multiple well, or		9223 B-2004[13]	991.15[10]	Colilert® [13 18]. Colilert-18® [13 17 18]
	MF[2 6 7 8] single step	1603[22]			mColiBlue-24®[19].

6. Fecal streptococci, number per 100 mL	MPN, 5 tube, 3 dilution, or	p. 139[3]	9230 B-2007		
	MF[2], or	p. 136[3]	9230 C-2007	B-0055-85[4]	
	Plate count	p. 143[3]			
7. Enterococci, number per 100 mL[21]	MPN, 5 tube, 3 dilution, or	p. 139[3]	9230 B-2007		
	MPN[6 8], multiple tube/multiple well, or		9230 D-2007	D6503-99[9]	Enterolert® [13 24].
	MF[2 6 7 8] single step or	1600[25]	9230 C-2007		
	Plate count	p. 143[3]			
8.*Salmonella* number per gram dry weight[11]	MPN multiple tube	1682[23]			
Aquatic Toxicity					
9. Toxicity, acute, fresh water organisms, LC_{50}, percent effluent	*Ceriodaphnia dubia* acute	2002.0[26]			
	Daphnia puplex and *Daphnia magna* acute	2021.0[26]			
	Fathead Minnow, *Pimephales promelas,* and Bannerfin shiner, *Cyprinella leedsi,* acute	2000.0[26]			
	Rainbow Trout, *Oncorhynchus mykiss,* and brook trout, *Salvelinus fontinalis,* acute	2019.0[26]			

10. Toxicity, acute, estuarine and marine organisms of the Atlantic Ocean and Gulf of Mexico, LC_{50}, percent effluent	Mysid, *Mysidopsis bahia,* acute	2007.0[26]			
	Sheepshead Minnow, *Cyprinodon variegatus,* acute	2004.0[26]			
	Silverside, *Menidia beryllina, Menidia menidia,* and *Menidia peninsulae,* acute	2006.0[26]			
11. Toxicity, chronic, fresh water organisms, NOEC or IC_{25}, percent effluent	Fathead minnow, *Pimephales promelas,* larval survival and growth	1000.0[27]			
	Fathead minnow, *Pimephales promelas,* embryo-larval survival and teratogenicity	1001.0[27]			
	Daphnia, *Ceriodaphnia dubia,* survival and reproduction	1002.0[27]			
	Green alga, *Selenastrum capricornutum,* growth	1003.0[27]			
12. Toxicity, chronic, estuarine and marine organisms of the Atlantic Ocean and Gulf of Mexico, NOEC or IC_{25}, percent effluent	Sheepshead minnow, *Cyprinodon variegatus,* larval survival and growth	1004.0[28]			
	Sheepshead minnow, *Cyprinodon*	1005.0[28]			

	variegatus, embryo-larval survival and teratogenicity				
	Inland silverside, *Menidia beryllina,* larval survival and growth	1006.0[28]			
	Mysid, *Mysidopsis bahia,* survival, growth, and fecundity	1007.0[28]			
	Sea urchin, *Arbacia punctulata,* fertilization	1008.0[28]			

Table IA notes:

[1]The method must be specified when results are reported.

[2]A 0.45-μm membrane filter (MF) or other pore size certified by the manufacturer to fully retain organisms to be cultivated and to be free of extractables which could interfere with their growth.

[3]Microbiological Methods for Monitoring the Environment, Water, and Wastes, EPA/600/8-78/017. 1978. U.S. EPA.

[4]U.S. Geological Survey Techniques of Water-Resource Investigations, Book 5, Laboratory Analysis, Chapter A4, Methods for Collection and Analysis of Aquatic Biological and Microbiological Samples. 1989. USGS.

[5]Because the MF technique usually yields low and variable recovery from chlorinated wastewaters, the Most Probable Number method will be required to resolve any controversies.

[6]Tests must be conducted to provide organism enumeration (density). Select the appropriate configuration of tubes/filtrations and dilutions/volumes to account for the quality, character, consistency, and anticipated organism density of the water sample.

[7]When the MF method has been used previously to test waters with high turbidity, large numbers of noncoliform bacteria, or samples that may contain organisms stressed by chlorine, a parallel test should be conducted with a multiple-tube technique to demonstrate applicability and comparability of results.

[8]To assess the comparability of results obtained with individual methods, it is suggested that side-by-side tests be conducted across seasons of the year with the water samples

routinely tested in accordance with the most current Standard Methods for the Examination of Water and Wastewater or EPA alternate test procedure (ATP) guidelines.

[9]Annual Book of ASTM Standards-Water and Environmental Technology, Section 11.02. 2000, 1999, 1996. ASTM International.

[10]Official Methods of Analysis of AOAC International. 16th Edition, 4th Revision, 1998. AOAC International.

[11]Approved for enumeration of target organism in sewage sludge.

[12]The multiple-tube fermentation test is used in 9221B.2-2006. Lactose broth may be used in lieu of lauryl tryptose broth (LTB), if at least 25 parallel tests are conducted between this broth and LTB using the water samples normally tested, and this comparison demonstrates that the false-positive rate and false-negative rate for total coliform using lactose broth is less than 10 percent. No requirement exists to run the completed phase on 10 percent of all total coliform-positive tubes on a seasonal basis.

[13]These tests are collectively known as defined enzyme substrate tests, where, for example, a substrate is used to detect the enzyme β-glucuronidase produced by *E. coli.*

[14]After prior enrichment in a presumptive medium for total coliform using 9221B.2-2006, all presumptive tubes or bottles showing any amount of gas, growth or acidity within 48 h ± 3 h of incubation shall be submitted to 9221F-2006. Commercially available EC-MUG media or EC media supplemented in the laboratory with 50 μg/mL of MUG may be used.

[15]Method 1680: Fecal Coliforms in Sewage Sludge (Biosolids) by Multiple-Tube Fermentation Using Lauryl-Tryptose Broth (LTB) and EC Medium, EPA-821-R-14-009. September 2014. U.S. EPA.

[16]Samples shall be enumerated by the multiple-tube or multiple-well procedure. Using multiple-tube procedures, employ an appropriate tube and dilution configuration of the sample as needed and report the Most Probable Number (MPN). Samples tested with Colilert® may be enumerated with the multiple-well procedures, Quanti-Tray® and the MPN calculated from the table provided by the manufacturer.

[17]Colilert-18® is an optimized formulation of the Colilert® for the determination of total coliforms and *E. coli* that provides results within 18 h of incubation at 35 °C rather than the 24 h required for the Colilert® test and is recommended for marine water samples.

[18]Descriptions of the Colilert®, Colilert-18®, and Quanti-Tray® may be obtained from IDEXX Laboratories, Inc.

[19]A description of the mColiBlue24® test, is available from Hach Company.

[20]Method 1681: Fecal Coliforms in Sewage Sludge (Biosolids) by Multiple-Tube Fermentation using A-1 Medium, EPA-821-R-06-013. July 2006. U.S. EPA.

[21]Approved for enumeration of target organism in wastewater effluent.

[22]Method 1603: *Escherichia coli* (*E. coli*) in Water by Membrane Filtration Using Modified membrane-Thermotolerant *Escherichia coli* Agar (modified mTEC), EPA-821-R-14-010. September 2014. U.S. EPA.

[23]Method 1682: *Salmonella* in Sewage Sludge (Biosolids) by Modified Semisolid Rappaport-Vassiliadis (MSRV) Medium, EPA-821-R-14-012. September 2014. U.S. EPA.

[24]A description of the Enterolert® test may be obtained from IDEXX Laboratories Inc.

[25] Method 1600: Enterococci in Water by Membrane Filtration Using membrane-Enterococcus Indoxyl-β-D-Glucoside Agar (mEI), EPA-821-R-14-011. September 2014. U.S. EPA.

[26]Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, EPA-821-R-02-012. Fifth Edition, October 2002. U.S. EPA.

[27]Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA-821-R-02-013. Fourth Edition, October 2002. U.S. EPA.

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

[29]To use Colilert-18® to assay for fecal coliforms, the incubation temperature is 44.5 ± 0.2 °C, and a water bath incubator is used.

[30]On a monthly basis, at least ten blue colonies from the medium must be verified using Lauryl Tryptose Broth and EC broth, followed by count adjustment based on these results; and representative non-blue colonies should be verified using Lauryl Tryptose Broth. Where possible, verifications should be done from randomized sample sources.

TABLE IB—LIST OF APPROVED INORGANIC TEST PROCEDURES

Parameter	Methodology[58]	EPA[52]	Standard methods	ASTM	USGS/AOAC/other
1. Acidity, as $CaCO_3$, mg/L	Electrometric endpoint or phenolphthalein endpoint		2310 B-2011	D1067-11	I-1020-85.[2]

2. Alkalinity, as $CaCO_3$, mg/L	Electrometric or Colorimetric titration to pH 4.5, Manual		2320 B-2011	D1067-11	973.43,[3] I-1030-85.[2]
	Automatic	310.2 (Rev. 1974)[1]			I-2030-85.[2]
3. Aluminum—Total,[4] mg/L	Digestion,[4] followed by any of the following:				
	AA direct aspiration[36]		3111 D-2011 or 3111 E-2011		I-3051-85.[2]
	AA furnace		3113 B-2010.		
	STGFAA	200.9, Rev. 2.2 (1994)			
	ICP/AES[36]	200.5, Rev 4.2 (2003);[68] 200.7, Rev. 4.4 (1994)	3120 B-2011	D1976-12	I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2011	D5673-10	993.14,[3] I-4471-97.[50]
	Direct Current Plasma (DCP)[36]			D4190-08	See footnote.[34]
	Colorimetric (Eriochrome cyanine R)		3500-Al B-2011		
4. Ammonia (as N), mg/L	Manual distillation[6] or gas diffusion (pH > 11), followed by any of the following:	350.1, Rev. 2.0 (1993)	4500-NH_3 B-2011		973.49.[3]
	Nesslerization			D1426-08 (A)	973.49,[3] I-3520-85.[2]

	Titration		4500-NH_3 C-2011		
	Electrode		4500-NH_3 D-2011 or E-2011	D1426-08 (B)	
	Manual phenate, salicylate, or other substituted phenols in Berthelot reaction based methods		4500-NH_3 F-2011		See footnote.[60]
	Automated phenate, salicylate, or other substituted phenols in Berthelot reaction based methods	350.1,[30] Rev. 2.0 (1993)	4500-NH_3 G-2011, 4500-NH_3 H-2011		I-4523-85.[2]
	Automated electrode				See footnote.[7]
	Ion Chromatography			D6919-09	
	Automated gas diffusion, followed by conductivity cell analysis				Timberline Ammonia-001.[74]
5. Antimony—Total,[4] mg/L	Digestion,[4] followed by any of the following:				
	AA direct aspiration[36]		3111 B-2011		
	AA furnace		3113 B-2010		
	STGFAA	200.9, Rev. 2.2 (1994)			
	ICP/AES[36]	200.5, Rev 4.2 (2003);[68] 200.7, Rev. 4.4 (1994)	3120 B-2011	D1976-12	I-4471-97.[50]

	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2011	D5673-10	993.14,[3] I-4471-97.[50]
6. Arsenic-Total,[4] mg/L	Digestion,[4] followed by any of the following:	206.5 (Issued 1978)[1]			
	AA gaseous hydride		3114 B-2011 or 3114 C-2011	D2972-08 (B)	I-3062-85.[2]
	AA furnace		3113 B-2010	D2972-08 (C)	I-4063-98.[49]
	STGFAA	200.9, Rev. 2.2 (1994)			
	ICP/AES[36]	200.5, Rev 4.2 (2003);[68] 200.7, Rev. 4.4 (1994)	3120 B-2011	D1976-12	
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2011	D5673-10	993.14,[3] I-4020-05.[70]
	Colorimetric (SDDC)		3500-As B-2011	D2972-08 (A)	I-3060-85.[2]
7. Barium—Total,[4] mg/L	Digestion,[4] followed by any of the following:				
	AA direct aspiration[36]		3111 D-2011		I-3084-85.[2]
	AA furnace		3113 B-2010	D4382-12	
	ICP/AES[36]	200.5, Rev 4.2 (2003);[68] 200.7, Rev. 4.4 (1994)	3120 B-2011		I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2011	D5673-10	993.14,[3] I-4471-97.[50]

	DCP[36]				See footnote.[34]
8. Beryllium—Total,[4] mg/L	Digestion,[4] followed by any of the following:				
	AA direct aspiration		3111 D-2011 or 3111 E-2011	D3645-08 (A)	I-3095-85.[2]
	AA furnace		3113 B-2010	D3645-08 (B)	
	STGFAA	200.9, Rev. 2.2 (1994)			
	ICP/AES	200.5, Rev 4.2 (2003);[68] 200.7, Rev. 4.4 (1994)	3120 B-2011	D1976-12	I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2011	D5673-10	993.14,[3] I-4471-97.[50]
	DCP			D4190-08	See footnote.[34]
	Colorimetric (aluminon)		See footnote.[61]		
9. Biochemical oxygen demand (BOD_5), mg/L	Dissolved Oxygen Depletion		5210 B-2011		973.44,[3] p. 17,[9] I-1578-78,[8] See footnote.[10 63]
10. Boron—Total,[37] mg/L	Colorimetric (curcumin)		4500-B B-2011		I-3112-85.[2]
	ICP/AES	200.5, Rev 4.2 (2003);[68] 200.7, Rev. 4.4 (1994)	3120 B-2011	D1976-12	I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2011	D5673-10	993.14,[3] I-4471-97.[50]

	DCP			D4190-08	See footnote.[34]
11. Bromide, mg/L	Electrode			D1246-10	I-1125-85.[2]
	Ion Chromatography	300.0, Rev 2.1 (1993) and 300.1, Rev 1.0 (1997)	4110 B-2011, C-2011, D-2011	D4327-03	993.30.[3]
	CIE/UV		4140 B-2011	D6508-10	D6508, Rev. 2.[54]
12. Cadmium—Total,[4] mg/L	Digestion,[4] followed by any of the following:				
	AA direct aspiration[36]		3111 B-2011 or 3111 C-2011	D3557-12 (A or B)	974.27,[3] p. 37,[9] I-3135-85[2] or I-3136-85.[2]
	AA furnace		3113 B-2010	D3557-12 (D)	I-4138-89.[51]
	STGFAA	200.9, Rev. 2.2 (1994)			
	ICP/AES[36]	200.5, Rev 4.2 (2003);[68] 200.7, Rev. 4.4 (1994)	3120 B-2011	D1976-12	I-1472-85[2] or I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2011	D5673-10	993.14,[3] I-4471-97.[50]
	DCP[36]			D4190-08	See footnote.[34]
	Voltametry[11]			D3557-12 (C)	

	Colorimetric (Dithizone)		3500-Cd-D-1990		
13. Calcium—Total,[4] mg/L	Digestion,[4] followed by any of the following:				
	AA direct aspiration		3111 B-2011	D511-09(B)	I-3152-85.[2]
	ICP/AES	200.5, Rev 4.2 (2003);[68] 200.7, Rev. 4.4 (1994)	3120 B-2011		I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2011	D5673-10	993.14.[3]
	DCP				See footnote.[34]
	Titrimetric (EDTA)		3500-Ca B-2011	D511-09 (A)	
	Ion Chromatography			D6919-09	
14. Carbonaceous biochemical oxygen demand ($CBOD_5$), mg/L[12]	Dissolved Oxygen Depletion with nitrification inhibitor		5210 B-2011		See footnote.[35 63]
15. Chemical oxygen demand (COD), mg/L	Titrimetric	410.3 (Rev. 1978)[1]	5220 B-2011 or C-2011	D1252-06 (A)	973.46,[3] p. 17,[9] I-3560-85.[2]
	Spectrophotometric, manual or automatic	410.4, Rev. 2.0 (1993)	5220 D-2011	D1252-06 (B)	See footnotes.[13 14], I-3561-85.[2]
16. Chloride, mg/L	Titrimetric: (silver nitrate)		4500-Cl^- B-2011	D512-04 (B)	I-1183-85.[2]
	(Mercuric nitrate)		4500-Cl^- C-2011	D512-04 (A)	973.51,[3] I-1184-85.[2]

	Colorimetric: Manual				I-1187-85.[2]
	Automated (ferricyanide)		$4500\text{-}Cl^{-}$ E-2011		I-2187-85.[2]
	Potentiometric Titration		$4500\text{-}Cl^{-}$ D-2011		
	Ion Selective Electrode			D512-04 (C)	
	Ion Chromatography	300.0, Rev 2.1 (1993) and 300.1, Rev 1.0 (1997)	4110 B-2011 or 4110 C-2011	D4327-03	993.30,[3] I-2057-90.[51]
	CIE/UV		4140 B-2011	D6508-10	D6508, Rev. 2.[54]
17. Chlorine-Total residual, mg/L	Amperometric direct		4500-Cl D-2011	D1253-08	
	Amperometric direct (low level)		4500-Cl E-2011		
	Iodometric direct		4500-Cl B-2011		
	Back titration ether end-point[15]		4500-Cl C-2011		
	DPD-FAS		4500-Cl F-2011		
	Spectrophotometric, DPD		4500-Cl G-2011		
	Electrode				See footnote.[16]
17A. Chlorine-Free Available, mg/L	Amperometric direct		4500-Cl D-2011	D1253-08	

	Amperometric direct (low level)		4500-Cl E-2011		
	DPD-FAS		4500-Cl F-2011		
	Spectrophotometric, DPD		4500-Cl G-2011		
18. Chromium VI dissolved, mg/L	0.45-micron filtration followed by any of the following:				
	AA chelation-extraction		3111 C-2011		I-1232-85.[2]
	Ion Chromatography	218.6, Rev. 3.3 (1994)	3500-Cr C-2011	D5257-11	993.23.[3]
	Colorimetric (diphenyl-carbazide)		3500-Cr B-2011	D1687-12 (A)	I-1230-85.[2]
19. Chromium—Total,[4] mg/L	Digestion,[4] followed by any of the following:				
	AA direct aspiration[36]		3111 B-2011	D1687-12 (B)	974.27,[3] I-3236-85.[2]
	AA chelation-extraction		3111 C-2011		
	AA furnace		3113 B-2010	D1687-12 (C)	I-3233-93.[46]
	STGFAA	200.9, Rev. 2.2 (1994)			
	ICP/AES[36]	200.5, Rev 4.2 (2003),[68] 200.7, Rev. 4.4 (1994)	3120 B-2011	D1976-12	I-4471-97.[50]

	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2011	D5673-10	993.14,[3] I-4020-05.[70]
	DCP[36]			D4190-08	See footnote.[34]
	Colorimetric (diphenyl-carbazide)		3500-Cr B-2011		
20. Cobalt—Total,[4] mg/L	Digestion,[4] followed by any of the following:				
	AA direct aspiration		3111 B-2011 or 3111 C-2011	D3558-08 (A or B)	p. 37,[9] I-3239-85.[2]
	AA furnace		3113 B-2010	D3558-08 (C)	I-4243-89.[51]
	STGFAA	200.9, Rev. 2.2 (1994)			
	ICP/AES[36]	200.7, Rev. 4.4 (1994)	3120 B-2011	D1976-12	I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2011	D5673-10	993.14,[3] I-4020-05.[70]
	DCP			D4190-08	See footnote.[34]
21. Color, platinum cobalt units or dominant wavelength, hue, luminance purity	Colorimetric (ADMI)		2120 F-2011[78]		
	Platinum cobalt visual comparison		2120 B-2011		I-1250-85.[2]
	Spectrophotometric				See footnote.[18]

22. Copper—Total,[4] mg/L	Digestion,[4] followed by any of the following:				
	AA direct aspiration[36]		3111 B-2011 or 3111 C-2011	D1688-12 (A or B)	974.27,[3] p. 37,[9] I-3270-85[2] or I-3271-85.[2]
	AA furnace		3113 B-2010	D1688-12 (C)	I-4274-89.[51]
	STGFAA	200.9, Rev. 2.2 (1994)			
	ICP/AES[36]	200.5, Rev 4.2 (2003);[68] 200.7, Rev. 4.4 (1994)	3120 B-2011	D1976-12	I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2011	D5673-10	993.14,[3] I-4020-05.[70]
	DCP[36]			D4190-08	See footnote.[34]
	Colorimetric (Neocuproine)		3500-Cu B-2011		
	Colorimetric (Bathocuproine)		3500-Cu C-2011		See footnote.[19]
23. Cyanide—Total, mg/L	Automated UV digestion/distillation and Colorimetry				Kelada-01.[55]
	Segmented Flow Injection, In-Line Ultraviolet Digestion, followed by gas diffusion amperometry			D7511-12	
	Manual distillation with $MgCl_2$, followed by any of the following:	335.4, Rev. 1.0 (1993)[57]	4500-CN^- B-2011 and C-2011	D2036-09(A),	10-204-00-1-X.[56]

				D7284-13	
	Flow Injection, gas diffusion amperometry			D2036-09(A) D7284-13	
	Titrimetric		4500-CN^- D-2011	D2036-09(A)	p. 22.[9]
	Spectrophotometric, manual		4500-CN^- E-2011	D2036-09(A)	I-3300-85.[2]
	Semi-Automated[20]	335.4, Rev. 1.0 (1993)[57]			10-204-00-1-X,[56] I-4302-85.[2]
	Ion Chromatography			D2036-09(A)	
	Ion Selective Electrode		4500-CN^- F-2011	D2036-09(A)	
24. Cyanide—Available, mg/L	Cyanide Amenable to Chlorination (CATC); Manual distillation with $MgCl_2$, followed by Titrimetric or Spectrophotometric		4500-CN^- G-2011	D2036-09(B)	
	Flow injection and ligand exchange, followed by gas diffusion amperometry[59]			D6888-09	OIA-1677-09.[44]
	Automated Distillation and Colorimetry (no UV digestion)				Kelada-01.[55]
24.A Cyanide—Free, mg/L	Flow Injection, followed by gas diffusion amperometry			D7237-10	OIA-1677-09.[44]

	Manual micro-diffusion and colorimetry			D4282-02	
25. Fluoride—Total, mg/L	Manual distillation,[6] followed by any of the following:		4500-F^- B-2011		
	Electrode, manual		4500-F^- C-2011	D1179-10 (B)	
	Electrode, automated				I-4327-85.[2]
	Colorimetric, (SPADNS)		4500-F^- D-2011	D1179-10 (A)	
	Automated complexone		4500-F^- E-2011		
	Ion Chromatography	300.0, Rev 2.1 (1993) and 300.1, Rev 1.0 (1997)	4110 B-2011 or C-2011	D4327-03	993.30.[3]
	CIE/UV		4140 B-2011	D6508-10	D6508, Rev. 2.[54]
26. Gold—Total,[4] mg/L	Digestion,[4] followed by any of the following:				
	AA direct aspiration		3111 B-2011		
	AA furnace	231.2 (Issued 1978)[1]	3113 B-2010		
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2011	D5673-10	993.14.[3]
	DCP				See footnote.[34]

27. Hardness—Total, as $CaCO_3$, mg/L	Automated colorimetric	130.1 (Issued 1971)[1]			
	Titrimetric (EDTA)		2340 C-2011	D1126-12	973.52B,[3] I-1338-85.[2]
	Ca plus Mg as their carbonates, by any approved method for Ca and Mg (See Parameters 13 and 33), provided that the sum of the lowest point of quantitation for Ca and Mg is below the NPDES permit requirement for Hardness.		2340 B-2011		
28. Hydrogen ion (pH), pH units	Electrometric measurement		4500-H^+ B-2011	D1293-99 (A or B)	973.41,[3] I-1586-85.[2]
	Automated electrode	150.2 (Dec. 1982)[1]			See footnote,[21] I-2587-85.[2]
29. Iridium—Total,[4] mg/L	Digestion,[4] followed by any of the following:				
	AA direct aspiration		3111 B-2011		
	AA furnace	235.2 (Issued 1978)[1]			
	ICP/MS		3125 B-2011		
30. Iron—Total,[4] mg/L	Digestion,[4] followed by any of the following:				
	AA direct aspiration[36]		3111 B-2011 or	D1068-10 (A)	974.27,[3] I-3381-85.[2]

			3111 C-2011		
	AA furnace		3113 B-2010	D1068-10 (B)	
	STGFAA	200.9, Rev. 2.2 (1994)			
	ICP/AES[36]	200.5, Rev. 4.2 (2003);[68] 200.7, Rev. 4.4 (1994)	3120 B-2011	D1976-12	I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2011	D5673-10	993.14.[3]
	DCP[36]			D4190-08	See footnote.[34]
	Colorimetric (Phenanthroline)		3500-Fe B-2011	D1068-10 (C)	See footnote.[22]
31. Kjeldahl Nitrogen[5]—Total, (as N), mg/L	Manual digestion[20] and distillation or gas diffusion, followed by any of the following:		4500-N_{org} B-2011 or C-2011 and 4500-NH_3 B-2011	D3590-11 (A)	I-4515-91.[45]
	Titration		4500-NH_3 C-2011		973.48.[3]
	Nesslerization			D1426-08 (A)	
	Electrode		4500-NH_3 D-2011 or E-2011	D1426-08 (B)	
	Semi-automated phenate	350.1, Rev. 2.0 (1993)	4500-NH_3 G-2011 4500-NH_3 H-2011		

	Manual phenate, salicylate, or other substituted phenols in Berthelot reaction based methods		4500-NH_3 F-2011		See footnote.[60]
	Automated gas diffusion, followed by conductivity cell analysis				Timberline Ammonia-001.[74]
	Automated Methods for TKN that do not require manual distillation.				
	Automated phenate, salicylate, or other substituted phenols in Berthelot reaction based methods colorimetric (auto digestion and distillation)	351.1 (Rev. 1978)[1]			I-4551-78.[8]
	Semi-automated block digestor colorimetric (distillation not required)	351.2, Rev. 2.0 (1993)	4500-N_{org} D-2011	D3590-11 (B)	I-4515-91.[45]
	Block digester, followed by Auto distillation and Titration				See footnote.[39]
	Block digester, followed by Auto distillation and Nesslerization				See footnote.[40]
	Block Digester, followed by Flow injection gas diffusion (distillation not required)				See footnote.[41]
	Digestion with peroxdisulfate, followed by Spectrophotometric (2,6-dimethyl phenol)				Hach 10242.[76]
	Digestion with persulfate, followed by Colorimetric				NCASI TNTP W10900.[77]

32. Lead—Total,[4] mg/L	Digestion,[4] followed by any of the following:				
	AA direct aspiration[36]		3111 B-2011 or 3111 C-2011	D3559-08 (A or B)	974.27,[3] I-3399-85.[2]
	AA furnace		3113 B-2010	D3559-08 (D)	I-4403-89.[51]
	STGFAA	200.9, Rev. 2.2 (1994)			
	ICP/AES[36]	200.5, Rev. 4.2 (2003);[68] 200.7, Rev. 4.4 (1994)	3120 B-2011	D1976-12	I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2011	D5673-10	993.14,[3] I-4471-97.[50]
	DCP[36]			D4190-08	See footnote.[34]
	Voltametry[11]			D3559-08 (C)	
	Colorimetric (Dithizone)		3500-Pb B-2011		
33. Magnesium—Total,[4] mg/L	Digestion,[4] followed by any of the following:				
	AA direct aspiration		3111 B-2011	D511-09 (B)	974.27,[3] I-3447-85.[2]
	ICP/AES	200.5, Rev. 4.2 (2003);[68] 200.7, Rev. 4.4 (1994)	3120 B-2011	D1976-12	I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2011	D5673-10	993.14.[3]

	DCP				See footnote.[34]
	Ion Chromatography			D6919-09	
34. Manganese—Total,[4] mg/L	Digestion,[4] followed by any of the following:				
	AA direct aspiration[36]		3111 B-2011	D858-12 (A or B)	974.27,[3] I-3454-85.[2]
	AA furnace		3113 B-2010	D858-12 (C)	
	STGFAA	200.9, Rev. 2.2 (1994)			
	ICP/AES[36]	200.5, Rev. 4.2 (2003);[68] 200.7, Rev. 4.4 (1994)	3120 B-2011	D1976-12	I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2011	D5673-10	993.14,[3] I-4471-97.[50]
	DCP[36]			D4190-08	See footnote.[34]
	Colorimetric (Persulfate)		3500-Mn B-2011		920.203.[3]
	Colorimetric (Periodate)				See footnote.[23]
35. Mercury—Total,[4] mg/L	Cold vapor, Manual	245.1, Rev. 3.0 (1994)	3112 B-2011	D3223-12	977.22,[3] I-3462-85.[2]
	Cold vapor, Automated	245.2 (Issued 1974)[1]			
	Cold vapor atomic fluorescence spectrometry (CVAFS)	245.7 Rev. 2.0 (2005)[17]			I-4464-01.[71]

	Purge and Trap CVAFS	1631E[43]			
36. Molybdenum—Total,[4] mg/L	Digestion,[4] followed by any of the following:				
	AA direct aspiration		3111 D-2011		I-3490-85.[2]
	AA furnace		3113 B-2010		I-3492-96.[47]
	ICP/AES[36]	200.7, Rev. 4.4 (1994)	3120 B-2011	D1976-12	I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2011	D5673-10	993.14,[3] I-4471-97.[50]
	DCP				See footnote.[34]
37. Nickel—Total,[4] mg/L	Digestion,[4] followed by any of the following:				
	AA direct aspiration[36]		3111 B-2011 or 3111 C-2011	D1886-08 (A or B)	I-3499-85.[2]
	AA furnace		3113 B-2010	D1886-08 (C)	I-4503-89.[51]
	STGFAA	200.9, Rev. 2.2 (1994)			
	ICP/AES[36]	200.5, Rev. 4.2 (2003);[68] 200.7, Rev. 4.4 (1994)	3120 B-2011	D1976-12	I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2011	D5673-10	993.14,[3] I-4020-05.[70]

	DCP[36]			D4190-08	See footnote.[34]
38. Nitrate (as N), mg/L	Ion Chromatography	300.0, Rev. 2.1 (1993) and 300.1, Rev. 1.0 (1997)	4110 B-2011 or C-2011	D4327-03	993.30.[3]
	CIE/UV		4140 B-2011	D6508-10	D6508, Rev. 2.[54]
	Ion Selective Electrode		4500-NO_3^- D-2011		
	Colorimetric (Brucine sulfate)	352.1 (Issued 1971)[1]			973.50,[3] 419D[1 7] p. 28.[9]
	Spectrophotometric (2,6-dimethylphenol)				Hach 10206.[75]
	Nitrate-nitrite N minus Nitrite N (See parameters 39 and 40)				
39. Nitrate-nitrite (as N), mg/L	Cadmium reduction, Manual		4500-NO_3^- E-2011	D3867-04 (B)	
	Cadmium reduction, Automated	353.2, Rev. 2.0 (1993)	4500-NO_3^- F-2011	D3867-04 (A)	I-2545-90.[51]
	Automated hydrazine		4500-NO_3^- H-2011		
	Reduction/Colorimetric				See footnote.[62]
	Ion Chromatography	300.0, Rev. 2.1 (1993) and 300.1, Rev. 1.0 (1997)	4110 B-2011 or C-2011	D4327-03	993.30.[3]

	CIE/UV		4140 B-2011	D6508-10	D6508, Rev. 2.[54]
	Enzymatic reduction, followed by automated colorimetric determination				I-2547-11,[72] I-2548-11,[72] N07-0003.[73]
	Spectrophotometric (2,6-dimethylphenol)				Hach 10206.[75]
40. Nitrite (as N), mg/L	Spectrophotometric: Manual		4500-NO_2^- B-2011		See footnote.[25]
	Automated (Diazotization)				I-4540-85,[2] See footnote.[62]
	Automated (*bypass cadmium reduction)	353.2, Rev. 2.0 (1993)	4500-NO_3^- F-2011	D3867-04 (A)	I-4545-85.[2]
	Manual (*bypass cadmium reduction)		4500-NO_3^- E-2011	D3867-04 (B)	
	Ion Chromatography	300.0, Rev. 2.1 (1993) and 300.1, Rev. 1.0 (1997)	4110 B-2011 or C-2011	D4327-03	993.30.[3]
	CIE/UV		4140 B-2011	D6508-10	D6508, Rev. 2.[54]
	Automated (*bypass Enzymatic reduction)				I-2547-11,[72] I-2548-11,[72] N07-0003.[73]
41. Oil and grease—Total recoverable, mg/L	Hexane extractable material (HEM): n-Hexane extraction and gravimetry	1664 Rev. A; 1664 Rev. B[42]	5520 B-2011[38]		
	Silica gel treated HEM (SGT-HEM): Silica gel treatment and gravimetry	1664 Rev. A; 1664 Rev. B[42]	5520 B-2011[38] and 5520 F-2011[38]		

42. Organic carbon—Total (TOC), mg/L	Combustion		5310 B-2011	D7573-09	973.47,[3] p. 14.[24]
	Heated persulfate or UV persulfate oxidation		5310 C-2011, 5310 D-2011	D4839-03	973.47,[3] p. 14.[24]
43. Organic nitrogen (as N), mg/L	Total Kjeldahl N (Parameter 31) minus ammonia N (Parameter 4).				
44. Ortho-phosphate (as P), mg/L	Ascorbic acid method:				
	Automated	365.1, Rev. 2.0 (1993)	4500-P F-2011 or G-2011		973.56,[3] I-4601-85.[2]
	Manual single reagent		4500-P E-2011	D515-88 (A)	973.55.[3]
	Manual two reagent	365.3 (Issued 1978)[1]			
	Ion Chromatography	300.0, Rev. 2.1 (1993) and 300.1, Rev. 1.0 (1997)	4110 B-2011 or C-2011	D4327-03	993.30.[3]
	CIE/UV		4140 B-2011	D6508-10	D6508, Rev. 2.[54]
45. Osmium—Total,[4] mg/L	Digestion,[4] followed by any of the following:				
	AA direct aspiration		3111 D-2011		
	AA furnace	252.2 (Issued 1978)[1]			

46. Oxygen, dissolved, mg/L	Winkler (Azide modification)		4500-O (B-F)-2011	D888-09 (A)	973.45B,[3] I-1575-78.[8]
	Electrode		4500-O G-2011	D888-09 (B)	I-1576-78.[8]
	Luminescence Based Sensor			D888-09 (C)	See footnote.[63] See footnote.[64]
47. Palladium—Total,[4] mg/L	Digestion,[4] followed by any of the following:				
	AA direct aspiration		3111 B-2011		
	AA furnace	253.2 (Issued 1978)[1]			
	ICP/MS		3125 B-2011		
	DCP				See footnote.[34]
48. Phenols, mg/L	Manual distillation,[26] followed by any of the following:	420.1 (Rev. 1978)[1]	5530 B-2010	D1783-01	
	Colorimetric (4AAP) manual	420.1 (Rev. 1978)[1]	5530 D-2010[27]	D1783-01 (A or B)	
	Automated colorimetric (4AAP)	420.4 Rev. 1.0 (1993)			
49. Phosphorus (elemental), mg/L	Gas-liquid chromatography				See footnote.[28]
50. Phosphorus—Total, mg/L	Digestion,[20] followed by any of the following:		4500-P B(5)-2011		973.55.[3]
	Manual	365.3 (Issued 1978)[1]	4500-P E-2011	D515-88 (A)	

	Automated ascorbic acid reduction	365.1 Rev. 2.0 (1993)	4500-P (F-H)-2011		973.56,[3] I-4600-85.[2]
	ICP/AES[4 36]	200.7, Rev. 4.4 (1994)	3120 B-2011		I-4471-97.[50]
	Semi-automated block digestor (TKP digestion)	365.4 (Issued 1974)[1]		D515-88 (B)	I-4610-91.[48]
	Digestion with persulfate, followed by Colorimetric				NCASI TNTP W10900.[77]
51. Platinum—Total[4], mg/L	Digestion,[4] followed by any of the following:				
	AA direct aspiration		3111 B-2011		
	AA furnace	255.2 (Issued 1978)[1]			
	ICP/MS		3125 B-2011		
	DCP				See footnote.[34]
52. Potassium—Total[4], mg/L	Digestion,[4] followed by any of the following:				
	AA direct aspiration		3111 B-2011		973.53,[3] I-3630-85.[2]
	ICP/AES	200.7, Rev. 4.4 (1994)	3120 B-2011		
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2011	D5673-10	993.14.[3]
	Flame photometric		3500-K B-2011		

	Electrode		3500-K C-2011		
	Ion Chromatography			D6919-09	
53. Residue—Total, mg/L	Gravimetric, 103-105°		2540 B-2011		I-3750-85.[2]
54. Residue—filterable, mg/L	Gravimetric, 180°		2540 C-2011	D5907-13	I-1750-85.[2]
55. Residue—non-filterable (TSS), mg/L	Gravimetric, 103-105° post washing of residue		2540 D-2011	D5907-13	I-3765-85.[2]
56. Residue—settleable, mg/L	Volumetric, (Imhoff cone), or gravimetric		2540 F-2011		
57. Residue—Volatile, mg/L	Gravimetric, 550°	160.4 (Issued 1971)[1]	2540-E-2011		I-3753-85.[2]
58. Rhodium—Total[4], mg/L	Digestion,[4] followed by any of the following:				
	AA direct aspiration, or		3111 B-2011		
	AA furnace	265.2 (Issued 1978)[1]			
	ICP/MS		3125 B-2011		
59. Ruthenium—Total[4], mg/L	Digestion,[4] followed by any of the following:				
	AA direct aspiration, or		3111 B-2011		
	AA furnace	267.2[1]			

	ICP/MS		3125 B-2011		
60. Selenium—Total[4], mg/L	Digestion,[4] followed by any of the following:				
	AA furnace		3113 B-2010	D3859-08 (B)	I-4668-98.[49]
	STGFAA	200.9, Rev. 2.2 (1994)			
	ICP/AES[36]	200.5, Rev 4.2 (2003)[68]; 200.7, Rev. 4.4 (1994)	3120 B-2011	D1976-12	
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2011	D5673-10	993.14,[3] I-4020-05.[70]
	AA gaseous hydride		3114 B-2011, or 3114 C-2011	D3859-08 (A)	I-3667-85.[2]
61. Silica—Dissolved,[37] mg/L	0.45-micron filtration followed by any of the following:				
	Colorimetric, Manual		4500-SiO_2 C-2011	D859-10	I-1700-85.[2]
	Automated (Molybdosilicate)		4500-SiO_2 E-2011 or F-2011		I-2700-85.[2]
	ICP/AES	200.5, Rev. 4.2 (2003)[68]; 200.7, Rev. 4.4 (1994)	3120 B-2011		I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2011	D5673-10	993.14.[3]

62. Silver—Total,[4 31] mg/L	Digestion,[4 29] followed by any of the following:				
	AA direct aspiration		3111 B-2011 or 3111 C-2011		974.27,[3] p. 37,[9] I-3720-85.[2]
	AA furnace		3113 B-2010		I-4724-89.[51]
	STGFAA	200.9, Rev. 2.2 (1994)			
	ICP/AES	200.5, Rev. 4.2 (2003)[68]; 200.7, Rev. 4.4 (1994)	3120 B-2011	D1976-12	I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2011	D5673-10	993.14,[3] I-4471-97.[50]
	DCP				See footnote.[34]
63. Sodium—Total,[4] mg/L	Digestion,[4] followed by any of the following:				
	AA direct aspiration		3111 B-2011		973.54,[3] I-3735-85.[2]
	ICP/AES	200.5, Rev. 4.2 (2003)[68]; 200.7, Rev. 4.4 (1994)	3120 B-2011		I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2011	D5673-10	993.14.[3]
	DCP				See footnote.[34]
	Flame photometric		3500-Na B-2011		

	Ion Chromatography			D6919-09	
64. Specific conductance, micromhos/cm at 25 °C	Wheatstone bridge	120.1 (Rev. 1982)[1]	2510 B-2011	D1125-95(99) (A)	973.40,[3] I-2781-85.[2]
65. Sulfate (as SO_4), mg/L	Automated colorimetric	375.2, Rev. 2.0 (1993)	4500-SO_4^{2-} F-2011 or G-2011		
	Gravimetric		4500-SO_4^{2-} C-2011 or D-2011		925.54.[3]
	Turbidimetric		4500-SO_4^{2-} E-2011	D516-11	
	Ion Chromatography	300.0, Rev. 2.1 (1993) and 300.1, Rev. 1.0 (1997)	4110 B-2011 or C-2011	D4327-03	993.30,[3] I-4020-05.[70]
	CIE/UV		4140 B-2011	D6508-1010	D6508, Rev. 2.[54]
66. Sulfide (as S), mg/L	Sample Pretreatment		4500-S^{2-} B, C-2011		
	Titrimetric (iodine)		4500-S^{2-} F-2011		I-3840-85.[2]
	Colorimetric (methylene blue)		4500-S^{2-} D-2011		
	Ion Selective Electrode		4500-S^{2-} G-2011	D4658-09	

67. Sulfite (as SO_3), mg/L	Titrimetric (iodine-iodate)		4500-SO_3^{2-} B-2011		
68. Surfactants, mg/L	Colorimetric (methylene blue)		5540 C-2011	D2330-02	
69. Temperature, °C	Thermometric		2550 B-2010		See footnote.[32]
70. Thallium—Total,[4] mg/L	Digestion,[4] followed by any of the following:				
	AA direct aspiration		3111 B-2011		
	AA furnace	279.2 (Issued 1978)[1]	3113 B-2010		
	STGFAA	200.9, Rev. 2.2 (1994)			
	ICP/AES	200.7, Rev. 4.4 (1994)	3120 B-2011	D1976-12	
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2011	D5673-10	993.14,[3] I-4471-97.[50]
71. Tin—Total,[4] mg/L	Digestion,[4] followed by any of the following:				
	AA direct aspiration		3111 B-2011		I-3850-78.[8]
	AA furnace		3113 B-2010		
	STGFAA	200.9, Rev. 2.2 (1994)			

	ICP/AES	200.5, Rev. 4.2 (2003)[68]; 200.7, Rev. 4.4 (1994)			
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2011	D5673-10	993.14.[3]
72. Titanium—Total,[4] mg/L	Digestion,[4] followed by any of the following:				
	AA direct aspiration		3111 D-2011		
	AA furnace	283.2 (Issued 1978)[1]			
	ICP/AES	200.7, Rev. 4.4 (1994)			
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2011	D5673-10	993.14.[3]
	DCP				See footnote.[34]
73. Turbidity, NTU[53]	Nephelometric	180.1, Rev. 2.0 (1993)	2130 B-2011	D1889-00	I-3860-85.[2] See footnote.[65] See footnote.[66] See footnote.[67]
74. Vanadium—Total,[4] mg/L	Digestion,[4] followed by any of the following:				
	AA direct aspiration		3111 D-2011		
	AA furnace		3113 B-2010	D3373-12	
	ICP/AES	200.5, Rev. 4.2 (2003);[68] 200.7, Rev. 4.4 (1994)	3120 B-2011	D1976-12	I-4471-97.[50]

	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2011	D5673-10	993.14,[3] I-4020-05.[70]
	DCP			D4190-08	See footnote.[34]
	Colorimetric (Gallic Acid)		3500-V B-2011		
75. Zinc—Total,[4] mg/L	Digestion,[4] followed by any of the following:				
	AA direct aspiration[36]		3111 B-2011 or 3111 C-2011	D1691-12 (A or B)	974.27,[3] p. 37,[9] I-3900-85.[2]
	AA furnace	289.2 (Issued 1978)[1]			
	ICP/AES[36]	200.5, Rev. 4.2 (2003)[68]; 200.7, Rev. 4.4 (1994)	3120 B-2011	D1976-12	I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2011	D5673-10	993.14,[3] I-4020-05.[70]
	DCP[36]			D4190-08	See footnote.[34]
	Colorimetric (Zincon)		3500 Zn B-2011		See footnote.[33]
76. Acid Mine Drainage		1627[69]			

Table IB Notes:

[1]Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020. Revised March 1983 and 1979, where applicable. U.S. EPA.

[2]Methods for Analysis of Inorganic Substances in Water and Fluvial Sediments, Techniques of Water-Resource Investigations of the U.S. Geological Survey, Book 5, Chapter A1., unless otherwise stated. 1989. USGS.

[3]Official Methods of Analysis of the Association of Official Analytical Chemists, Methods Manual, Sixteenth Edition, 4th Revision, 1998. AOAC International.

[4]For the determination of total metals (which are equivalent to total recoverable metals) the sample is not filtered before processing. A digestion procedure is required to solubilize analytes in suspended material and to break down organic-metal complexes (to convert the analyte to a detectable form for colorimetric analysis). For non-platform graphite furnace atomic absorption determinations, a digestion using nitric acid (as specified in Section 4.1.3 of Methods for the Chemical Analysis of Water and Wastes) is required prior to analysis. The procedure used should subject the sample to gentle, acid refluxing and at no time should the sample be taken to dryness. For direct aspiration flame atomic absorption determinations (FLAA) a combination acid (nitric and hydrochloric acids) digestion is preferred prior to analysis. The approved total recoverable digestion is described as Method 200.2 in Supplement I of "Methods for the Determination of Metals in Environmental Samples" EPA/600R-94/111, May, 1994, and is reproduced in EPA Methods 200.7, 200.8, and 200.9 from the same Supplement. However, when using the gaseous hydride technique or for the determination of certain elements such as antimony, arsenic, selenium, silver, and tin by non-EPA graphite furnace atomic absorption methods, mercury by cold vapor atomic absorption, the noble metals and titanium by FLAA, a specific or modified sample digestion procedure may be required and in all cases the referenced method write-up should be consulted for specific instruction and/or cautions. For analyses using inductively coupled plasma-atomic emission spectrometry (ICP-AES), the direct current plasma (DCP) technique or EPA spectrochemical techniques (platform furnace AA, ICP-AES, and ICP-MS) use EPA Method 200.2 or an approved alternate procedure (e.g., CEM microwave digestion, which may be used with certain analytes as indicated in Table IB); the total recoverable digestion procedures in EPA Methods 200.7, 200.8, and 200.9 may be used for those respective methods. Regardless of the digestion procedure, the results of the analysis after digestion procedure are reported as "total" metals.

[5]Copper sulfate or other catalysts that have been found suitable may be used in place of mercuric sulfate.

[6]Manual distillation is not required if comparability data on representative effluent samples are on file to show that this preliminary distillation step is not necessary: However, manual distillation will be required to resolve any controversies. In general, the analytical method should be consulted regarding the need for distillation. If the method is not clear, the laboratory may compare a minimum of 9 different sample matrices to evaluate the need for distillation. For each matrix, a matrix spike and matrix spike duplicate are analyzed both with and without the distillation step. (A total of 36 samples, assuming 9 matrices). If results are comparable, the laboratory may dispense with the distillation step for future analysis. Comparable is defined as <20% RPD for all tested matrices). Alternatively the two populations of spike recovery percentages may be compared using a recognized statistical test.

[7]Industrial Method Number 379-75 WE Ammonia, Automated Electrode Method, Technicon Auto Analyzer II. February 19, 1976. Bran & Luebbe Analyzing Technologies Inc.

[8]The approved method is that cited in Methods for Determination of Inorganic Substances in Water and Fluvial Sediments, Techniques of Water-Resources Investigations of the U.S. Geological Survey, Book 5, Chapter A1. 1979. USGS.

[9]American National Standard on Photographic Processing Effluents. April 2, 1975. American National Standards Institute.

[10]In-Situ Method 1003-8-2009, Biochemical Oxygen Demand (BOD) Measurement by Optical Probe. 2009. In-Situ Incorporated.

[11]The use of normal and differential pulse voltage ramps to increase sensitivity and resolution is acceptable.

[12]Carbonaceous biochemical oxygen demand ($CBOD_5$) must not be confused with the traditional BOD_5 test method which measures “total 5-day BOD.” The addition of the nitrification inhibitor is not a procedural option, but must be included to report the $CBOD_5$ parameter. A discharger whose permit requires reporting the traditional BOD_5 may not use a nitrification inhibitor in the procedure for reporting the results. Only when a discharger's permit specifically states $CBOD_5$ is required can the permittee report data using a nitrification inhibitor.

[13]OIC Chemical Oxygen Demand Method. 1978. Oceanography International Corporation.

[14]Method 8000, Chemical Oxygen Demand, Hach Handbook of Water Analysis, 1979. Hach Company.

[15]The back titration method will be used to resolve controversy.

[16]Orion Research Instruction Manual, Residual Chlorine Electrode Model 97-70. 1977. Orion Research Incorporated. The calibration graph for the Orion residual chlorine method must be derived using a reagent blank and three standard solutions, containing 0.2, 1.0, and 5.0 mL 0.00281 N potassium iodate/100 mL solution, respectively.

[17]Method 245.7, Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, EPA-821-R-05-001. Revision 2.0, February 2005. US EPA.

[18]National Council of the Paper Industry for Air and Stream Improvement (NCASI) Technical Bulletin 253 (1971) and Technical Bulletin 803, May 2000.

[19]Method 8506, Bicinchoninate Method for Copper, Hach Handbook of Water Analysis. 1979. Hach Company.

[20]When using a method with block digestion, this treatment is not required.

[21]Industrial Method Number 378-75WA, Hydrogen ion (pH) Automated Electrode Method, Bran & Luebbe (Technicon) Autoanalyzer II. October 1976. Bran & Luebbe Analyzing Technologies.

[22]Method 8008, 1,10-Phenanthroline Method using FerroVer Iron Reagent for Water. 1980. Hach Company.

[23]Method 8034, Periodate Oxidation Method for Manganese, Hach Handbook of Wastewater Analysis. 1979. Hach Company.

[24]Methods for Analysis of Organic Substances in Water and Fluvial Sediments, Techniques of Water-Resources Investigations of the U.S. Geological Survey, Book 5, Chapter A3, (1972 Revised 1987). 1987. USGS.

[25]Method 8507, Nitrogen, Nitrite-Low Range, Diazotization Method for Water and Wastewater. 1979. Hach Company.

[26]Just prior to distillation, adjust the sulfuric-acid-preserved sample to pH 4 with 1 + 9 NaOH.

[27]The colorimetric reaction must be conducted at a pH of 10.0 ± 0.2.

[28]Addison, R.F., and R.G. Ackman. 1970. Direct Determination of Elemental Phosphorus by Gas-Liquid Chromatography, *Journal of Chromatograph*y, 47(3):421-426.

[29]Approved methods for the analysis of silver in industrial wastewaters at concentrations of 1 mg/L and above are inadequate where silver exists as an inorganic halide. Silver halides such as the bromide and chloride are relatively insoluble in reagents such as nitric acid but are readily soluble in an aqueous buffer of sodium thiosulfate and sodium hydroxide to pH of 12. Therefore, for levels of silver above 1 mg/L, 20 mL of sample should be diluted to 100 mL by adding 40 mL each of 2 M $Na_2S_2O_3$and NaOH. Standards should be prepared in the same manner. For levels of silver below 1 mg/L the approved method is satisfactory.

[30]The use of EDTA decreases method sensitivity. Analysts may omit EDTA or replace with another suitable complexing reagent provided that all method specified quality control acceptance criteria are met.

[31]For samples known or suspected to contain high levels of silver (e.g., in excess of 4 mg/L), cyanogen iodide should be used to keep the silver in solution for analysis. Prepare a cyanogen iodide solution by adding 4.0 mL of concentrated NH_4OH, 6.5 g of KCN, and 5.0 mL of a 1.0 N solution of I_2 to 50 mL of reagent water in a volumetric flask and dilute to 100.0 mL. After digestion of the sample, adjust the pH of the digestate to >7 to prevent the formation of HCN under acidic conditions. Add 1 mL of the cyanogen iodide solution to the sample digestate and adjust the volume to 100 mL with reagent water (NOT acid). If cyanogen iodide is added to sample digestates, then silver standards must be prepared that contain cyanogen iodide as

well. Prepare working standards by diluting a small volume of a silver stock solution with water and adjusting the pH>7 with NH_4OH. Add 1 mL of the cyanogen iodide solution and let stand 1 hour. Transfer to a 100-mL volumetric flask and dilute to volume with water.

[32]"Water Temperature-Influential Factors, Field Measurement and Data Presentation," Techniques of Water-Resources Investigations of the U.S. Geological Survey, Book 1, Chapter D1. 1975. USGS.

[33]Method 8009, Zincon Method for Zinc, Hach Handbook of Water Analysis, 1979. Hach Company.

[34]Method AES0029, Direct Current Plasma (DCP) Optical Emission Spectrometric Method for Trace Elemental Analysis of Water and Wastes. 1986-Revised 1991. Thermo Jarrell Ash Corporation.

[35]In-Situ Method 1004-8-2009, Carbonaceous Biochemical Oxygen Demand (CBOD) Measurement by Optical Probe. 2009. In-Situ Incorporated.

[36]Microwave-assisted digestion may be employed for this metal, when analyzed by this methodology. Closed Vessel Microwave Digestion of Wastewater Samples for Determination of Metals. April 16, 1992. CEM Corporation.

[37]When determining boron and silica, only plastic, PTFE, or quartz laboratory ware may be used from start until completion of analysis.

[38]Only use n-hexane (n-Hexane—85% minimum purity, 99.0% min. saturated C6 isomers, residue less than 1 mg/L) extraction solvent when determining Oil and Grease parameters—Hexane Extractable Material (HEM), or Silica Gel Treated HEM (analogous to EPA Methods 1664 Rev. A and 1664 Rev. B). Use of other extraction solvents is prohibited.

[39]Method PAI-DK01, Nitrogen, Total Kjeldahl, Block Digestion, Steam Distillation, Titrimetric Detection. Revised December 22, 1994. OI Analytical.

[40]Method PAI-DK02, Nitrogen, Total Kjeldahl, Block Digestion, Steam Distillation, Colorimetric Detection. Revised December 22, 1994. OI Analytical.

[41]Method PAI-DK03, Nitrogen, Total Kjeldahl, Block Digestion, Automated FIA Gas Diffusion. Revised December 22, 1994. OI Analytical.

[42]Method 1664 Rev. B is the revised version of EPA Method 1664 Rev. A. U.S. EPA. February 1999, Revision A. Method 1664, n-Hexane Extractable Material (HEM; Oil and Grease) and Silica Gel Treated n-Hexane Extractable Material (SGT-HEM; Non-polar Material) by Extraction and Gravimetry. EPA-821-R-98-002. U.S. EPA. February 2010, Revision B. Method 1664, n-Hexane Extractable Material (HEM; Oil and Grease) and Silica Gel Treated n-Hexane Extractable Material (SGT-HEM; Non-polar Material) by Extraction and Gravimetry. EPA-821-R-10-001.

[43]Method 1631, Revision E, Mercury in Water by Oxidation, Purge and Trap, and Cold Vapor Atomic Fluorescence Spectrometry, EPA-821-R-02-019. Revision E. August 2002, U.S. EPA. The application of clean techniques described in EPA's Method 1669: *Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels,* EPA-821-R-96-011, are recommended to preclude contamination at low-level, trace metal determinations.

[44]Method OIA-1677-09, Available Cyanide by Ligand Exchange and Flow Injection Analysis (FIA). 2010. OI Analytical.

[45]Open File Report 00-170, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Ammonium Plus Organic Nitrogen by a Kjeldahl Digestion Method and an Automated Photometric Finish that Includes Digest Cleanup by Gas Diffusion. 2000. USGS.

[46]Open File Report 93-449, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Chromium in Water by Graphite Furnace Atomic Absorption Spectrophotometry. 1993. USGS.

[47]Open File Report 97-198, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Molybdenum by Graphite Furnace Atomic Absorption Spectrophotometry. 1997. USGS.

[48]Open File Report 92-146, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Total Phosphorus by Kjeldahl Digestion Method and an Automated Colorimetric Finish That Includes Dialysis. 1992. USGS.

[49]Open File Report 98-639, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Arsenic and Selenium in Water and Sediment by Graphite Furnace-Atomic Absorption Spectrometry. 1999. USGS.

[50]Open File Report 98-165, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Elements in Whole-water Digests Using Inductively Coupled Plasma-Optical Emission Spectrometry and Inductively Coupled Plasma-Mass Spectrometry. 1998. USGS.

[51]Open File Report 93-125, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Inorganic and Organic Constituents in Water and Fluvial Sediments. 1993. USGS.

[52]Unless otherwise indicated, all EPA methods, excluding EPA Method 300.1, are published in U.S. EPA. May 1994. Methods for the Determination of Metals in Environmental Samples, Supplement I, EPA/600/R-94/111; or U.S. EPA. August 1993. Methods for the Determination of Inorganic Substances in Environmental Samples, EPA/600/R-93/100. EPA Method 300.1 is US EPA. Revision 1.0, 1997, including errata cover sheet April 27, 1999. Determination of Inorganic Ions in Drinking Water by Ion Chromatography.

[53]Styrene divinyl benzene beads (e.g., AMCO-AEPA-1 or equivalent) and stabilized formazin (e.g., Hach StablCal™or equivalent) are acceptable substitutes for formazin.

[54]Method D6508-10, Test Method for Determination of Dissolved Inorganic Anions in Aqueous Matrices Using Capillary Ion Electrophoresis and Chromate Electrolyte. 2010. ASTM.

[55]Kelada-01, Kelada Automated Test Methods for Total Cyanide, Acid Dissociable Cyanide, and Thiocyanate, EPA 821-B-01-009, Revision 1.2, August 2001. US EPA. Note: A 450-W UV lamp may be used in this method instead of the 550-W lamp specified if it provides performance within the quality control (QC) acceptance criteria of the method in a given instrument. Similarly, modified flow cell configurations and flow conditions may be used in the method, provided that the QC acceptance criteria are met.

[56]QuikChem Method 10-204-00-1-X, Digestion and Distillation of Total Cyanide in Drinking and Wastewaters using MICRO DIST and Determination of Cyanide by Flow Injection Analysis. Revision 2.2, March 2005. Lachat Instruments.

[57]When using sulfide removal test procedures described in EPA Method 335.4-1, reconstitute particulate that is filtered with the sample prior to distillation.

[58]Unless otherwise stated, if the language of this table specifies a sample digestion and/or distillation "followed by" analysis with a method, approved digestion and/or distillation are required prior to analysis.

[59]Samples analyzed for available cyanide using OI Analytical method OIA-1677-09 or ASTM method D6888-09 that contain particulate matter may be filtered only after the ligand exchange reagents have been added to the samples, because the ligand exchange process converts complexes containing available cyanide to free cyanide, which is not removed by filtration. Analysts are further cautioned to limit the time between the addition of the ligand exchange reagents and sample filtration to no more than 30 minutes to preclude settling of materials in samples.

[60]Analysts should be aware that pH optima and chromophore absorption maxima might differ when phenol is replaced by a substituted phenol as the color reagent in Berthelot Reaction ("phenol-hypochlorite reaction") colorimetric ammonium determination methods. For example when phenol is used as the color reagent, pH optimum and wavelength of maximum absorbance are about 11.5 and 635 nm, respectively—see, Patton, C.J. and S.R. Crouch. March 1977. Anal. Chem. 49:464-469. These reaction parameters increase to pH > 12.6 and 665 nm when salicylate is used as the color reagent—see, Krom, M.D. April 1980. The Analyst 105:305-316.

[61]If atomic absorption or ICP instrumentation is not available, the aluminon colorimetric method detailed in the 19th Edition of *Standard Methods* may be used. This method has poorer precision and bias than the methods of choice.

[62]Easy (1-Reagent) Nitrate Method, Revision November 12, 2011. Craig Chinchilla.

[63]Hach Method 10360, Luminescence Measurement of Dissolved Oxygen in Water and Wastewater and for Use in the Determination of BOD_5 and $cBOD_5$. Revision 1.2, October 2011. Hach Company. This method may be used to measure dissolved oxygen when performing the methods approved in Table IB for measurement of biochemical oxygen demand (BOD) and carbonaceous biochemical oxygen demand (CBOD).

[64]In-Situ Method 1002-8-2009, Dissolved Oxygen (DO) Measurement by Optical Probe. 2009. In-Situ Incorporated.

[65]Mitchell Method M5331, Determination of Turbidity by Nephelometry. Revision 1.0, July 31, 2008. Leck Mitchell.

[66]Mitchell Method M5271, Determination of Turbidity by Nephelometry. Revision 1.0, July 31, 2008. Leck Mitchell.

[67]Orion Method AQ4500, Determination of Turbidity by Nephelometry. Revision 5, March 12, 2009. Thermo Scientific.

[68]EPA Method 200.5, Determination of Trace Elements in Drinking Water by Axially Viewed Inductively Coupled Plasma-Atomic Emission Spectrometry, EPA/600/R-06/115. Revision 4.2, October 2003. US EPA.

[69]Method 1627, Kinetic Test Method for the Prediction of Mine Drainage Quality, EPA-821-R-09-002. December 2011. US EPA.

[70]Techniques and Methods Book 5-B1, Determination of Elements in Natural-Water, Biota, Sediment and Soil Samples Using Collision/Reaction Cell Inductively Coupled Plasma-Mass Spectrometry, Chapter 1, Section B, Methods of the National Water Quality Laboratory, Book 5, Laboratory Analysis, 2006. USGS.

[71]Water-Resources Investigations Report 01-4132, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Organic Plus Inorganic Mercury in Filtered and Unfiltered Natural Water with Cold Vapor-Atomic Fluorescence Spectrometry, 2001. USGS.

[72]USGS Techniques and Methods 5-B8, Chapter 8, Section B, Methods of the National Water Quality Laboratory Book 5, Laboratory Analysis, 2011 USGS.

[73]NECi Method N07-0003, "Nitrate Reductase Nitrate-Nitrogen Analysis," Revision 9.0, March 2014, The Nitrate Elimination Co., Inc.

[74]Timberline Instruments, LLC Method Ammonia-001, "Determination of Inorganic Ammonia by Continuous Flow Gas Diffusion and Conductivity Cell Analysis," June 2011, Timberline Instruments, LLC.

[75]Hach Company Method 10206, "Spectrophotometric Measurement of Nitrate in Water and Wastewater," Revision 2.1, January 2013, Hach Company.

[76]Hach Company Method 10242, "Simplified Spectrophotometric Measurement of Total Kjeldahl Nitrogen in Water and Wastewater," Revision 1.1, January 2013, Hach Company.

[77]National Council for Air and Stream Improvement (NCASI) Method TNTP-W10900, "Total (Kjeldahl) Nitrogen and Total Phosphorus in Pulp and Paper Biologically Treated Effluent by Alkaline Persulfate Digestion," June 2011, National Council for Air and Stream Improvement, Inc.

[78]The pH adjusted sample is to be adjusted to 7.6 for NPDES reporting purposes.

TABLE IC—LIST OF APPROVED TEST PROCEDURES FOR NON-PESTICIDE ORGANIC COMPOUNDS

Parameter[1]	Method	EPA[2 7]	Standard methods	ASTM	Other
1. Acenaphthene	GC	610			
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
	HPLC	610	6440 B-2005	D4657-92 (98)	
2. Acenaphthylene	GC	610			
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
	HPLC	610	6440 B-2005	D4657-92 (98)	
3. Acrolein	GC	603			
	GC/MS	624.1,[4] 1624B			
4. Acrylonitrile	GC	603			

	GC/MS	624.1,[4] 1624B			
5. Anthracene	GC	610			
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
	HPLC	610	6440 B-2005	D4657-92 (98)	
6. Benzene	GC	602	6200 C-2011		
	GC/MS	624.1, 1624B	6200 B-2011		
7. Benzidine	Spectro-photometric				See footnote,[3] p.1.
	GC/MS	625.1[5], 1625B	6410 B-2000		
	HPLC	605			
8. Benzo(a)anthracene	GC	610			
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
	HPLC	610	6440 B-2005	D4657-92 (98)	
9. Benzo(a)pyrene	GC	610			
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
	HPLC	610	6440 B-2005	D4657-92 (98)	
10. Benzo(b)fluoranthene	GC	610			

	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
	HPLC	610	6440 B-2005	D4657-92 (98)	
11. Benzo(g,h,i)perylene	GC	610			
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
	HPLC	610	6440 B-2005	D4657-92 (98)	
12. Benzo(k)fluoranthene	GC	610			
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
	HPLC	610	6440 B-2005	D4657-92 (98)	
13. Benzyl chloride	GC				See footnote,[3] p. 130.
	GC/MS				See footnote,[6] p. S102.
14. Butyl benzyl phthalate	GC	606			
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
15. bis(2-Chloroethoxy) methane	GC	611			
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
16. bis(2-Chloroethyl) ether	GC	611			
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.

17. bis(2-Ethylhexyl) phthalate	GC	606			
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
18. Bromodichloromethane	GC	601	6200 C-2011		
	GC/MS	624.1, 1624B	6200 B-2011		
19. Bromoform	GC	601	6200 C-2011		
	GC/MS	624.1, 1624B	6200 B-2011		
20. Bromomethane	GC	601	6200 C-2011		
	GC/MS	624.1, 1624B	6200 B-2011		
21. 4-Bromophenyl phenyl ether	GC	611			
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
22. Carbon tetrachloride	GC	601	6200 C-2011		See footnote,[3] p. 130.
	GC/MS	624.1, 1624B	6200 B-2011		
23. 4-Chloro-3-methyl phenol	GC	604	6420 B-2000		
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
24. Chlorobenzene	GC	601, 602	6200 C-2011		See footnote,[3] p. 130.

	GC/MS	624.1, 1624B	6200 B-2011		
25. Chloroethane	GC	601	6200 C-2011		
	GC/MS	624.1, 1624B	6200 B-2011		
26. 2-Chloroethylvinyl ether	GC	601			
	GC/MS	624.1, 1624B			
27. Chloroform	GC	601	6200 C-2011		See footnote,[3] p. 130.
	GC/MS	624.1, 1624B	6200 B-2011		
28. Chloromethane	GC	601	6200 C-2011		
	GC/MS	624.1, 1624B	6200 B-2011		
29. 2-Chloronaphthalene	GC	612			
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
30. 2-Chlorophenol	GC	604	6420 B-2000		
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
31. 4-Chlorophenyl phenyl ether	GC	611			
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
32. Chrysene	GC	610			

	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
	HPLC	610	6440 B-2005	D4657-92 (98)	
33. Dibenzo(a,h)anthracene	GC	610			
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
	HPLC	610	6440 B-2005	D4657-92 (98)	
34. Dibromochloromethane	GC	601	6200 C-2011		
	GC/MS	624.1, 1624B	6200 B-2011		
35. 1,2-Dichlorobenzene	GC	601, 602	6200 C-2011		
	GC/MS	624.1, 1625B	6200 B-2011		See footnote,[9] p. 27.
36. 1,3-Dichlorobenzene	GC	601, 602	6200 C-2011		
	GC/MS	624.1, 1625B	6200 B-2011		See footnote,[9] p. 27.
37. 1,4-Dichlorobenzene	GC	601, 602	6200 C-2011		
	GC/MS	624.1, 1625B	6200 B-2011		See footnote,[9] p. 27.
38. 3,3'-Dichlorobenzidine	GC/MS	625.1, 1625B	6410 B-2000		
	HPLC	605			

39. Dichlorodifluoromethane	GC	601			
	GC/MS		6200 C-2011		
40. 1,1-Dichloroethane	GC	601	6200 C-2011		
	GC/MS	624.1, 1624B	6200 B-2011		
41. 1,2-Dichloroethane	GC	601	6200 C-2011		
	GC/MS	624.1, 1624B	6200 B-2011		
42. 1,1-Dichloroethene	GC	601	6200 C-2011		
	GC/MS	624.1, 1624B	6200 B-2011		
43. trans-1,2-Dichloroethene	GC	601	6200 C-2011		
	GC/MS	624.1, 1624B	6200 B-2011		
44. 2,4-Dichlorophenol	GC	604	6420 B-2000		
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
45. 1,2-Dichloropropane	GC	601	6200 C-2011		
	GC/MS	624.1, 1624B	6200 B-2011		

46. *cis*-1,3-Dichloropropene	GC	601	6200 C-2011		
	GC/MS	624.1, 1624B	6200 B-2011		
47. *trans*-1,3-Dichloropropene	GC	601	6200 C-2011		
	GC/MS	624.1, 1624B	6200 B-2011		
48. Diethyl phthalate	GC	606			
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
49. 2,4-Dimethylphenol	GC	604	6420 B-2000		
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
50. Dimethyl phthalate	GC	606			
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
51. Di-n-butyl phthalate	GC	606			
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
52. Di-n-octyl phthalate	GC	606			
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
53. 2, 4-Dinitrophenol	GC	604	6420 B-2000		See footnote,[9] p. 27.

	GC/MS	625.1, 1625B	6410 B-2000		
54. 2,4-Dinitrotoluene	GC	609			
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
55. 2,6-Dinitrotoluene	GC	609			
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
56. Epichlorohydrin	GC				See footnote,[3] p. 130.
	GC/MS				See footnote,[6] p. S102.
57. Ethylbenzene	GC	602	6200 C-2011		
	GC/MS	624.1, 1624B	6200 B-2011		
58. Fluoranthene	GC	610			
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
	HPLC	610	6440 B-2005	D4657-92 (98)	
59. Fluorene	GC	610			
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
	HPLC	610	6440 B-2005	D4657-92 (98)	

60. 1,2,3,4,6,7,8-Heptachloro-dibenzofuran	GC/MS	1613B			
61. 1,2,3,4,7,8,9-Heptachloro-dibenzofuran	GC/MS	1613B			
62. 1,2,3,4,6,7,8- Heptachloro-dibenzo-*p*-dioxin	GC/MS	1613B			
63. Hexachlorobenzene	GC	612			
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
64. Hexachlorobutadiene	GC	612			
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
65. Hexachlorocyclopentadiene	GC	612			
	GC/MS	625.1,[5] 1625B	6410 B-2000		See footnote,[9] p. 27.
66. 1,2,3,4,7,8-Hexachloro-dibenzofuran	GC/MS	1613B			
67. 1,2,3,6,7,8-Hexachloro-dibenzofuran	GC/MS	1613B			
68. 1,2,3,7,8,9-Hexachloro-dibenzofuran	GC/MS	1613B			
69. 2,3,4,6,7,8-Hexachloro-dibenzofuran	GC/MS	1613B			
70. 1,2,3,4,7,8-Hexachloro-dibenzo-*p*-dioxin	GC/MS	1613B			
71. 1,2,3,6,7,8-Hexachloro-dibenzo-*p*-dioxin	GC/MS	1613B			

72. 1,2,3,7,8,9-Hexachloro-dibenzo-*p*-dioxin	GC/MS	1613B			
73. Hexachloroethane	GC	612			
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
74. Indeno(1,2,3-c,d) pyrene	GC	610			
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
	HPLC	610	6440 B-2005	D4657-92 (98)	
75. Isophorone	GC	609			
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
76. Methylene chloride	GC	601	6200 C-2011		See footnote,[3] p. 130.
	GC/MS	624.1, 1624B	6200 B-2011		
77. 2-Methyl-4,6-dinitrophenol	GC	604	6420 B-2000		
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
78. Naphthalene	GC	610			
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
	HPLC	610	6440 B-2005		
79. Nitrobenzene	GC	609			

	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
	HPLC			D4657-92 (98)	
80. 2-Nitrophenol	GC	604	6420 B-2000		
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
81. 4-Nitrophenol	GC	604	6420 B-2000		
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
82. N-Nitrosodimethylamine	GC	607			
	GC/MS	625.1,[5] 1625B	6410 B-2000		See footnote,[9] p. 27.
83. N-Nitrosodi-n-propylamine	GC	607			
	GC/MS	625.1,[5] 1625B	6410 B-2000		See footnote,[9] p. 27.
84. N-Nitrosodiphenylamine	GC	607			
	GC/MS	625.1,[5] 1625B	6410 B-2000		See footnote,[9] p. 27.
85. Octachlorodibenzofuran	GC/MS	1613B[10]			
86. Octachlorodibenzo-*p*-dioxin	GC/MS	1613B[10]			
87. 2,2'-oxybis(1-chloropropane)[12] [also known as bis(2-Chloro-1-methylethyl) ether]	GC	611			

	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
88. PCB-1016	GC	608.3			See footnote,[3] p. 43; See footnote.[8]
	GC/MS	625.1	6410 B-2000		
89. PCB-1221	GC	608.3			See footnote,[3] p. 43; See footnote.[8]
	GC/MS	625.1	6410 B-2000		
90. PCB-1232	GC	608.3			See footnote,[3] p. 43; See footnote.[8]
	GC/MS	625.1	6410 B-2000		
91. PCB-1242	GC	608.3			See footnote,[3] p. 43; See footnote.[8]
	GC/MS	625.1	6410 B-2000		
92. PCB-1248	GC	608.3			See footnote,[3] p. 43; See footnote.[8]
	GC/MS	625.1	6410 B-2000		
93. PCB-1254	GC	608.3			See footnote,[3] p. 43; See footnote.[8]

	GC/MS	625.1	6410 B-2000		
94. PCB-1260	GC	608.3			See footnote,[3] p. 43; See footnote.[8]
	GC/MS	625.1	6410 B-2000		
95. 1,2,3,7,8-Pentachloro-dibenzofuran	GC/MS	1613B			
96. 2,3,4,7,8-Pentachloro-dibenzofuran	GC/MS	1613B			
97. 1,2,3,7,8,-Pentachloro-dibenzo-*p*-dioxin	GC/MS	1613B			
98. Pentachlorophenol	GC	604	6420 B-2000		See footnote,[3] p. 140.
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
99. Phenanthrene	GC	610			
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
	HPLC	610	6440 B-2005	D4657-92 (98)	
100. Phenol	GC	604	6420 B-2000		
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
101. Pyrene	GC	610			

	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
	HPLC	610	6440 B-2005	D4657-92 (98)	
102. 2,3,7,8-Tetrachloro-dibenzofuran	GC/MS	1613B[10]			
103. 2,3,7,8-Tetrachloro-dibenzo-*p*-dioxin	GC/MS	613, 625.1,[5a] 1613B			
104. 1,1,2,2-Tetrachloroethane	GC	601	6200 C-2011		See footnote,[3] p. 130.
	GC/MS	624.1, 1624B	6200 B-2011		
105. Tetrachloroethene	GC	601	6200 C-2011		See footnote,[3] p. 130.
	GC/MS	624.1, 1624B	6200 B-2011		
106. Toluene	GC	602	6200 C-2011		
	GC/MS	624.1, 1624B	6200 B-2011		
107. 1,2,4-Trichlorobenzene	GC	612			See footnote,[3] p. 130.
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
108. 1,1,1-Trichloroethane	GC	601	6200 C-2011		
	GC/MS	624.1, 1624B	6200 B-2011		

109. 1,1,2-Trichloroethane	GC	601	6200 C-2011		See footnote,[3] p. 130.
	GC/MS	624.1, 1624B	6200 B-2011		
110. Trichloroethene	GC	601	6200 C-2011		
	GC/MS	624.1, 1624B	6200 B-2011		
111. Trichlorofluoromethane	GC	601	6200 C-2011		
	GC/MS	624.1	6200 B-2011		
112. 2,4,6-Trichlorophenol	GC	604	6420 B-2000		
	GC/MS	625.1, 1625B	6410 B-2000		See footnote,[9] p. 27.
113. Vinyl chloride	GC	601	6200 C-2011		
	GC/MS	624.1, 1624B	6200 B-2011		
114. Nonylphenol	GC/MS			D7065-11	
115. Bisphenol A (BPA)	GC/MS			D7065-11	
116. *p-tert*-Octylphenol (OP)	GC/MS			D7065-11	
117. Nonylphenol Monoethoxylate (NP1EO)	GC/MS			D7065-11	

118. Nonylphenol Diethoxylate (NP2EO)	GC/MS			D7065-11	
119. Adsorbable Organic Halides (AOX)	Adsorption and Coulometric Titration	1650[11]			
120. Chlorinated Phenolics	In Situ Acetylation and GC/MS	1653[11]			

Table IC notes:

[1] All parameters are expressed in micrograms per liter (µg/L) except for Method 1613B, in which the parameters are expressed in picograms per liter (pg/L).

[2] The full text of Methods 601-613, 1613B, 1624B, and 1625B are provided at appendix A, Test Procedures for Analysis of Organic Pollutants. The standardized test procedure to be used to determine the method detection limit (MDL) for these test procedures is given at appendix B of this part, Definition and Procedure for the Determination of the Method Detection Limit. These methods are available at: *https://www.epa.gov/cwa-methods* as individual PDF files.

[3] Methods for Benzidine: Chlorinated Organic Compounds, Pentachlorophenol and Pesticides in Water and Wastewater. September 1978. U.S. EPA.

[4] Method 624.1 may be used for quantitative determination of acrolein and acrylonitrile, provided that the laboratory has documentation to substantiate the ability to detect and quantify these analytes at levels necessary to comply with any associated regulations. In addition, the use of sample introduction techniques other than simple purge-and-trap may be required. QC acceptance criteria from Method 603 should be used when analyzing samples for acrolein and acrylonitrile in the absence of such criteria in Method 624.1.

[5] Method 625.1 may be extended to include benzidine, hexachlorocyclopentadiene, N-nitrosodimethylamine, N-nitrosodi-n-propylamine, and N-nitrosodiphenylamine. However, when they are known to be present, Methods 605, 607, and 612, or Method 1625B, are preferred methods for these compounds.

[5a] Method 625.1 screening only.

[6] Selected Analytical Methods Approved and Cited by the United States Environmental Protection Agency, Supplement to the 15th Edition of *Standard Methods for the Examination of Water and Wastewater.* 1981. American Public Health Association (APHA).

[7] Each analyst must make an initial, one-time demonstration of their ability to generate acceptable precision and accuracy with Methods 601-603, 1624B, and 1625B in accordance with procedures each in Section 8.2 of each of these Methods. Additionally, each laboratory, on an on-going basis must spike and analyze 10% (5% for Methods 624.1 and 625.1 and 100% for methods 1624B and 1625B) of all samples to monitor and evaluate laboratory data quality in accordance with Sections 8.3 and 8.4 of these methods. When the recovery of any parameter falls outside the quality control (QC) acceptance criteria in the pertinent method, analytical results for that parameter in the unspiked sample are suspect. The results should be reported but cannot be used to demonstrate regulatory compliance. If the method does not contain QC acceptance criteria, control limits of ± three standard deviations around the mean of a minimum of five replicate measurements must be used. These quality control requirements also apply to the Standard Methods, ASTM Methods, and other methods cited.

[8] Organochlorine Pesticides and PCBs in Wastewater Using Empore™ Disk. Revised October 28, 1994. 3M Corporation.

[9] Method O-3116-87 is in Open File Report 93-125, Methods of Analysis by U.S. Geological Survey National Water Quality Laboratory—Determination of Inorganic and Organic Constituents in Water and Fluvial Sediments. 1993. USGS.

[10] Analysts may use Fluid Management Systems, Inc. Power-Prep system in place of manual cleanup provided the analyst meets the requirements of Method 1613B (as specified in Section 9 of the method) and permitting authorities. Method 1613, Revision B, Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution HRGC/HRMS. Revision B, 1994. U.S. EPA. The full text of this method is provided in appendix A to this part and at *https://www.epa.gov/cwa-methods/approved-cwa-methods-organic-compounds*.

[11] Method 1650, Adsorbable Organic Halides by Adsorption and Coulometric Titration. Revision C, 1997 U.S. EPA. Method 1653, Chlorinated Phenolics in Wastewater by In Situ Acetylation and GCMS. Revision A, 1997 U.S. EPA. The full text for both of these methods is provided at appendix A in part 430 of this chapter, The Pulp, Paper, and Paperboard Point Source Category.

[12] The compound was formerly inaccurately labeled as 2,2'-oxybis(2-chloropropane) and bis(2-chloroisopropyl) ether. Some versions of Methods 611, and 1625 inaccurately list the analyte as "bis(2-chloroisopropyl)ether," but use the correct CAS number of 108-60-1.

TABLE ID—LIST OF APPROVED TEST PROCEDURES FOR PESTICIDES[1]

Parameter	Method	EPA[2 7 10]	Standard methods	ASTM	Other

1. Aldrin	GC	617, 608.3	6630 B-2007 & C-2007	D3086-90, D5812-96 (02)	See footnote,[3] p. 7; See footnote,[4] O-3104-83; See footnote,[8] 3M0222.
	GC/MS	625.1	6410 B-2000		
2. Ametryn	GC	507, 619			See footnote,[3] p. 83; See footnote,[9] O-3106-93; See footnote,[6] p. S68.
	GC/MS	525.2, 625.1			See footnote,[14] O-1121-91.
3. Aminocarb	TLC				See footnote,[3] p. 94; See footnote,[6] p. S60.
	HPLC	632			
4. Atraton	GC	619			See footnote,[3] p. 83; See footnote,[6] p. S68.
	GC/MS	625.1			
5. Atrazine	GC	507, 619, 608.3			See footnote,[3] p. 83; See footnote,[6] p. S68; See footnote,[9] O-3106-93.
	HPLC/MS				See footnote,[12] O-2060-01.
	GC/MS	525.1, 525.2, 625.1			See footnote,[11] O-1126-95.
6. Azinphos methyl	GC	614, 622, 1657			See footnote,[3] p. 25; See footnote,[6] p. S51.
	GC/MS	625.1			See footnote,[11] O-1126-95.
7. Barban	TLC				See footnote,[3] p. 104; See footnote,[6] p. S64.
	HPLC	632			

	GC/MS	625.1			
8. α-BHC	GC	617, 608.3	6630 B-2007 & C-2007	D3086-90, D5812-96(02)	See footnote,[3] p. 7; See footnote,[8] 3M0222.
	GC/MS	625.1[5]	6410 B-2000		See footnote,[11] O-1126-95.
9. β-BHC	GC	617, 608.3	6630 B-2007 & C-2007	D3086-90, D5812-96(02)	See footnote,[8] 3M0222.
	GC/MS	625.1	6410 B-2000		
10. δ-BHC	GC	617, 608.3	6630 B-2007 & C-2007	D3086-90, D5812-96(02)	See footnote,[8] 3M0222.
	GC/MS	625.1	6410 B-2000		
11. γ-BHC (Lindane)	GC	617, 608.3	6630 B-2007 & C-2007	D3086-90, D5812-96(02)	See footnote,[3] p. 7; See footnote,[4] O-3104-83; See footnote,[8] 3M0222.
	GC/MS	625.1[5]	6410 B-2000		See footnote,[11] O-1126-95.
12. Captan	GC	617, 608.3	6630 B-2007	D3086-90, D5812-96(02)	See footnote,[3] p. 7.
13. Carbaryl	TLC				See footnote,[3] p. 94, See footnote,[6] p. S60.
	HPLC	531.1, 632			
	HPLC/MS	553			See footnote,[12] O-2060-01.
	GC/MS	625.1			See footnote,[11] O-1126-95.

14. Carbophenothion	GC	617, 608.3	6630 B-2007		See footnote,[4] page 27; See footnote,[6] p. S73.
	GC/MS	625.1			
15. Chlordane	GC	617, 608.3	6630 B-2007 & C-2007	D3086-90, D5812-96(02)	See footnote,[3] p. 7; See footnote,[4] O-3104-83; See footnote,[8] 3M0222.
	GC/MS	625.1	6410 B-2000		
16. Chloropropham	TLC				See footnote,[3] p. 104; See footnote,[6] p. S64.
	HPLC	632			
	GC/MS	625.1			
17. 2,4-D	GC	615	6640 B-2006		See footnote,[3] p. 115; See footnote,[4] O-3105-83.
	HPLC/MS				See footnote,[12] O-2060-01.
18. 4,4′-DDD	GC	617, 608.3	6630 B-2007 & C-2007	D3086-90, D5812-96(02)	See footnote,[3] p. 7; See footnote,[4] O-3105-83; See footnote,[8] 3M0222.
	GC/MS	625.1	6410 B-2000		
19. 4,4′-DDE	GC	617, 608.3	6630 B-2007 & C-2007	D3086-90, D5812-96(02)	See footnote,[3] p. 7; See footnote,[4] O-3104-83; See footnote,[8] 3M0222.
	GC/MS	625.1	6410 B-2000		See footnote,[11] O-1126-95.
20. 4,4′-DDT	GC	617, 608.3	6630 B-2007 & C-2007	D3086-90, D5812-96(02)	See footnote,[3] p. 7; See footnote,[4] O-3104-83; See footnote,[8] 3M0222.

	GC/MS	625.1	6410 B-2000		
21. Demeton-O	GC	614, 622			See footnote,[3] p. 25; See footnote,[6] p. S51.
	GC/MS	625.1			
22. Demeton-S	GC	614, 622			See footnote,[3] p. 25; See footnote,[6] p. S51.
	GC/MS	625.1			
23. Diazinon	GC	507, 614, 622, 1657			See footnote,[3] p. 25; See footnote,[4] O-3104-83; See footnote,[6] p. S51.
	GC/MS	525.2, 625.1			See footnote,[11] O-1126-95.
24. Dicamba	GC	615			See footnote,[3] p. 115.
	HPLC/MS				See footnote,[12] O-2060-01.
25. Dichlofenthion	GC	622.1			See footnote,[4] page 27; See footnote,[6] p. S73.
26. Dichloran	GC	608.2, 617, 608.3	6630 B-2007		See footnote,[3] p. 7.
27. Dicofol	GC	617, 608.3			See footnote,[4] O-3104-83.
28. Dieldrin	GC	617, 608.3	6630 B-2007 & C-2007	D3086-90, D5812-96(02)	See footnote,[3] p. 7; See footnote,[4] O-3104-83; See footnote,[8] 3M0222.
	GC/MS	625.1	6410 B-2000		See footnote,[11] O-1126-95.
29. Dioxathion	GC	614.1, 1657			See footnote,[4] page 27; See footnote,[6] p. S73.

30. Disulfoton	GC	507, 614, 622, 1657			See footnote,[3] p. 25; See footnote,[6] p. S51.
	GC/MS	525.2, 625.1			See footnote,[11] O-1126-95.
31. Diuron	TLC				See footnote,[3] p. 104; See footnote,[6] p. S64.
	HPLC	632			
	HPLC/MS	553			See footnote,[12] O-2060-01.
32. Endosulfan I	GC	617, 608.3	6630 B-2007 & C-2007	D3086-90, D5812-96(02)	See footnote,[3] p. 7; See footnote,[4] O-3104-83; See footnote,[8] 3M0222).
	GC/MS	625.1[5]	6410 B-2000		See footnote,[13] O-2002-01.
33. Endosulfan II	GC	617, 608.3	6630 B-2007 & C-2007	D3086-90, D5812-96(02)	See footnote,[3] p. 7; See footnote,[8] 3M0222.
	GC/MS	625.1[5]	6410 B-2000		See footnote,[13] O-2002-01.
34. Endosulfan Sulfate	GC	617, 608.3	6630 C-2007		See footnote,[8] 3M0222.
	GC/MS	625.1	6410 B-2000		
35. Endrin	GC	505, 508, 617, 1656, 608.3	6630 B-2007 & C-2007	D3086-90, D5812-96(02)	See footnote,[3] p. 7; See footnote,[4] O-3104-83; See footnote,[8] 3M0222.
	GC/MS	525.1, 525.2, 625.1[5]	6410 B-2000		
36. Endrin aldehyde	GC	617, 608.3	6630 C-2007		See footnote,[8] 3M0222.

	GC/MS	625.1			
37. Ethion	GC	614, 614.1, 1657			See footnote,[4] page 27; See footnote,[6] p. S73.
	GC/MS	625.1			See footnote,[13] O-2002-01.
38. Fenuron	TLC				See footnote,[3] p. 104; See footnote,[6] p. S64.
	HPLC	632			
	HPLC/MS				See footnote,[12] O-2060-01.
39. Fenuron-TCA	TLC				See footnote,[3] p. 104; See footnote,[6] p. S64.
	HPLC	632			
40. Heptachlor	GC	505, 508, 617, 1656, 608.3	6630 B-2007 & C-2007	D3086-90, D5812-96(02)	See footnote,[3] p. 7; See footnote,[4] O-3104-83; See footnote,[8] 3M0222.
	GC/MS	525.1, 525.2, 625.1	6410 B-2000		
41. Heptachlor epoxide	GC	617, 608.3	6630 B-2007 & C-2007	D3086-90, D5812-96(02)	See footnote,[3] p. 7; See footnote,[4] O-3104-83; See footnote,[6] p. S73; See footnote,[8] 3M0222.
	GC/MS	625.1	6410 B-2000		
42. Isodrin	GC	617, 608.3	6630 B-2007 & C-2007		See footnote,[4] O-3104-83; See footnote,[6] p. S73.
	GC/MS	625.1			
43. Linuron	GC				See footnote,[3] p. 104; See footnote,[6] p. S64.

	HPLC	632			
	HPLC/MS	553			See footnote,[12] O-2060-01.
	GC/MS				See footnote,[11] O-1126-95.
44. Malathion	GC	614, 1657	6630 B-2007		See footnote,[3] p. 25; See footnote,[6] p. S51.
	GC/MS	625.1			See footnote,[11] O-1126-95.
45. Methiocarb	TLC				See footnote,[3] p. 94; See footnote,[6] p. S60.
	HPLC	632			
	HPLC/MS				See footnote,[12] O-2060-01.
46. Methoxychlor	GC	505, 508, 608.2, 617, 1656, 608.3	6630 B-2007 & C-2007	D3086-90, D5812-96(02)	See footnote,[3] p. 7; See footnote,[4] O-3104-83; See footnote,[8] 3M0222.
	GC/MS	525.1, 525.2, 625.1			See footnote,[11] O-1126-95.
47. Mexacarbate	TLC				See footnote,[3] p. 94; See footnote,[6] p. S60.
	HPLC	632			
	GC/MS	625.1			
48. Mirex	GC	617, 608.3	6630 B-2007 & C-2007	D3086-90, D5812-96(02)	See footnote,[3] p. 7; See footnote,[4] O-3104-83.
	GC/MS	625.1			
49. Monuron	TLC				See footnote,[3] p. 104; See footnote,[6] p. S64.
	HPLC	632			

50. Monuron-TCA	TLC				See footnote,[3] p. 104; See footnote,[6] p. S64.
	HPLC	632			
51. Neburon	TLC				See footnote,[3] p. 104; See footnote,[6] p. S64.
	HPLC	632			
	HPLC/MS				See footnote,[12] O-2060-01.
52. Parathion methyl	GC	614, 622, 1657	6630 B-2007		See footnote,[4] page 27; See footnote,[3] p. 25.
	GC/MS	625.1			See footnote,[11] O-1126-95.
53. Parathion ethyl	GC	614	6630 B-2007		See footnote,[4] page 27; See footnote,[3] p. 25.
	GC/MS				See footnote,[11] O-1126-95.
54. PCNB	GC	608.1, 617, 608.3	6630 B-2007 & C-2007	D3086-90, D5812-96(02)	See footnote,[3] p. 7.
55. Perthane	GC	617, 608.3		D3086-90, D5812-96(02)	See footnote,[4] O-3104-83.
56. Prometon	GC	507, 619			See footnote,[3] p. 83; See footnote,[6] p. S68; See footnote,[9] O-3106-93.
	GC/MS	525.2, 625.1			See footnote,[11] O-1126-95.
57. Prometryn	GC	507, 619			See footnote,[3] p. 83; See footnote,[6] p. S68; See footnote,[9] O-3106-93.
	GC/MS	525.1, 525.2, 625.1			See footnote,[13] O-2002-01.

58. Propazine	GC	507, 619, 1656, 608.3			See footnote,[3] p. 83; See footnote,[6] p. S68; See footnote,[9] O-3106-93.
	GC/MS	525.1, 525.2, 625.1			
59. Propham	TLC				See footnote,[3] p. 104; See footnote,[6] p. S64.
	HPLC	632			
	HPLC/MS				See footnote,[12] O-2060-01.
60. Propoxur	TLC				See footnote,[3] p. 94; See footnote,[6] p. S60.
	HPLC	632			
61. Secbumeton	TLC				See footnote,[3] p. 83; See footnote,[6] p. S68.
	GC	619			
62. Siduron	TLC				See footnote,[3] p. 104; See footnote,[6] p. S64.
	HPLC	632			
	HPLC/MS				See footnote,[12] O-2060-01.
63. Simazine	GC	505, 507, 619, 1656, 608.3			See footnote,[3] p. 83; See footnote,[6] p. S68; See footnote,[9] O-3106-93.
	GC/MS	525.1, 525.2, 625.1			See footnote,[11] O-1126-95.
64. Strobane	GC	617, 608.3	6630 B-2007 & C-2007		See footnote,[3] p. 7.

65. Swep	TLC				See footnote,[3] p. 104; See footnote,[6] p. S64.
	HPLC	632			
66. 2,4,5-T	GC	615	6640 B-2006		See footnote,[3] p. 115; See footnote,[4] O-3105-83.
67. 2,4,5-TP (Silvex)	GC	615	6640 B-2006		See footnote,[3] p. 115; See footnote,[4] O-3105-83.
68. Terbuthylazine	GC	619, 1656, 608.3			See footnote,[3] p. 83; See footnote,[6] p. S68.
	GC/MS				See footnote,[13] O-2002-01.
69. Toxaphene	GC	505, 508, 617, 1656, 608.3	6630 B-2007 & C-2007	D3086-90, D5812-96(02)	See footnote,[3] p. 7; See footnote;[8] See footnote,[4] O-3105-83.
	GC/MS	525.1, 525.2, 625.1	6410 B-2000		
70. Trifluralin	GC	508, 617, 627, 1656, 608.3	6630 B-2007		See footnote,[3] p. 7; See footnote,[9] O-3106-93.
	GC/MS	525.2, 625.1			See footnote,[11] O-1126-95.

Table ID notes:

[1]Pesticides are listed in this table by common name for the convenience of the reader. Additional pesticides may be found under Table IC of this section, where entries are listed by chemical name.

[2]The standardized test procedure to be used to determine the method detection limit (MDL) for these test procedures is given at appendix B of this part, Definition and Procedure for the Determination of the Method Detection Limit.

[3]Methods for Benzidine, Chlorinated Organic Compounds, Pentachlorophenol and Pesticides in Water and Wastewater. September 1978. U.S. EPA. This EPA publication includes thin-layer chromatography (TLC) methods.

[4]Methods for the Determination of Organic Substances in Water and Fluvial Sediments, Techniques of Water-Resources Investigations of the U.S. Geological Survey, Book 5, Chapter A3. 1987. USGS.

[5]The method may be extended to include α-BHC, γ-BHC, endosulfan I, endosulfan II, and endrin. However, when they are known to exist, Method 608.3 is the preferred method.

[6]Selected Analytical Methods Approved and Cited by the United States Environmental Protection Agency, Supplement to the 15th Edition of *Standard Methods for the Examination of Water and Wastewater.* 1981. American Public Health Association (APHA).

[7]Each analyst must make an initial, one-time, demonstration of their ability to generate acceptable precision and accuracy with Methods 608.3 and 625.1 in accordance with procedures given in Section 8.2 of each of these methods. Additionally, each laboratory, on an on-going basis, must spike and analyze 5% of all samples analyzed with Method 608.3 or 5% of all samples analyzed with Method 625.1 to monitor and evaluate laboratory data quality in accordance with Sections 8.3 and 8.4 of these methods. When the recovery of any parameter falls outside the warning limits, the analytical results for that parameter in the unspiked sample are suspect. The results should be reported, but cannot be used to demonstrate regulatory compliance. These quality control requirements also apply to the Standard Methods, ASTM Methods, and other methods cited.

[8]Organochlorine Pesticides and PCBs in Wastewater Using Empore™ Disk. Revised October 28, 1994. 3M Corporation.

[9]Method O-3106-93 is in Open File Report 94-37, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Triazine and Other Nitrogen-Containing Compounds by Gas Chromatography With Nitrogen Phosphorus Detectors. 1994. USGS.

[10]EPA Methods 608.1, 608.2, 614, 614.1, 615, 617, 619, 622, 622.1, 627, and 632 are found in Methods for the Determination of Nonconventional Pesticides in Municipal and Industrial Wastewater, EPA 821-R-92-002, April 1992, U.S. EPA. EPA Methods 505, 507, 508, 525.1, 531.1 and 553 are in Methods for the Determination of Nonconventional Pesticides in Municipal and Industrial Wastewater, Volume II, EPA 821-R-93-010B, 1993, U.S. EPA. EPA Method 525.2 is in Determination of Organic Compounds in Drinking Water by Liquid-Solid Extraction and Capillary Column Gas Chromatography/Mass Spectrometry, Revision 2.0, 1995, U.S. EPA. EPA methods 1656 and 1657 are in Methods for the Determination of Nonconventional Pesticides in Municipal and Industrial Wastewater, Volume I, EPA 821-R-93-010A, 1993, U.S. EPA. Methods 608.3 and 625.1 are available at *https://www.epa.gov/cwa-methods/approved-cwa-test-methods-organic-compounds*.

[11]Method O-1126-95 is in Open-File Report 95-181, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of pesticides in water by

C-18 solid-phase extraction and capillary-column gas chromatography/mass spectrometry with selected-ion monitoring. 1995. USGS.

[12]Method O-2060-01 is in Water-Resources Investigations Report 01-4134, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Pesticides in Water by Graphitized Carbon-Based Solid-Phase Extraction and High-Performance Liquid Chromatography/Mass Spectrometry. 2001. USGS.

[13]Method O-2002-01 is in Water-Resources Investigations Report 01-4098, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of moderate-use pesticides in water by C-18 solid-phase extraction and capillary-column gas chromatography/mass spectrometry. 2001. USGS.

[14]Method O-1121-91 is in Open-File Report 91-519, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of organonitrogen herbicides in water by solid-phase extraction and capillary-column gas chromatography/mass spectrometry with selected-ion monitoring. 1992. USGS.

TABLE IE—LIST OF APPROVED RADIOLOGIC TEST TEST PROCEDURES

Parameter and units	Method	Reference (method number or page)				
		EPA[1]	Standard Methods 18th, 19th, 20th Ed.	Standard Methods Online	ASTM	USGS[2]
1. Alpha-Total, pCi per liter	Proportional or scintillation counter	900.0	7110 B	7110 B-00	D1943-90, 96	pp. 75 and 78[3]
2. Alpha-Counting error, pCi per liter	Proportional or scintillation counter	Appendix B	7110 B	7110 B-00	D1943-90, 96	p. 79
3. Beta-Total, pCi per liter	Proportional counter	900.0	7110 B	7110 B-00	D1890-90, 96	pp. 75 and 78[3]
4. Beta-Counting error, pCi	Proportional counter	Appendix B	7110 B	7110 B-00	D1890-90, 96	p. 79
5. (a) Radium Total pCi per liter (b) Ra, pCi per liter	Proportional counter	903.0	7500-Ra B	7500-Ra B-01	D2460-90, 97	

	Scintillation counter	903.1	7500-Ra C	7500-Ra C-01	D3454-91, 97	p. 81

[1]Prescribed Procedures for Measurement of Radioactivity in Drinking Water, EPA-600/4-80-032 (1980), U.S. Environmental Protection Agency, August 1980.

[2]Fishman, M. J. and Brown, Eugene, "Selected Methods of the U.S. Geological Survey of Analysis of Wastewaters," U.S. Geological Survey, Open-File Report 76-177 (1976).

[3]The method found on p. 75 measures only the dissolved portion while the method on p. 78 measures only the suspended portion. Therefore, the two results must be added to obtain the "total."

TABLE IF—LIST OF APPROVED METHODS FOR PHARMACEUTICAL POLLUTANTS

Pharmaceuticals pollutants	CAS registry No.	Analytical method number
Acetonitrile	75-05-8	1666/1671/D3371/D3695/624.1
n-Amyl acetate	628-63-7	1666/D3695
n-Amyl alcohol	71-41-0	1666/D3695
Benzene	71-43-2	D4763/D3695/502.2/524.2/624.1
n-Butyl-acetate	123-86-4	1666/D3695
tert-Butyl alcohol	75-65-0	1666/624.1
Chlorobenzene	108-90-7	502.2/524.2/624.1
Chloroform	67-66-3	502.2/524.2/551/624.1
o-Dichlorobenzene	95-50-1	1625C/502.2/524.2/624.1
1,2-Dichloroethane	107-06-2	D3695/502.2/524.2/624.1
Diethylamine	109-89-7	1666/1671
Dimethyl sulfoxide	67-68-5	1666/1671

Ethanol	64-17-5	1666/1671/D3695/624.1
Ethyl acetate	141-78-6	1666/D3695/624.1
n-Heptane	142-82-5	1666/D3695
n-Hexane	110-54-3	1666/D3695
Isobutyraldehyde	78-84-2	1666/1667
Isopropanol	67-63-0	1666/D3695
Isopropyl acetate	108-21-4	1666/D3695
Isopropyl ether	108-20-3	1666/D3695
Methanol	67-56-1	1666/1671/D3695/624.1
Methyl Cellosolve® (2-Methoxy ethanol)	109-86-4	1666/1671
Methylene chloride	75-09-2	502.2/524.2/624.1
Methyl formate	107-31-3	1666
4-Methyl-2-pentanone (MIBK)	108-10-1	1624C/1666/D3695/D4763/524.2/624.1
Phenol	108-95-2	D4763
n-Propanol	71-23-8	1666/1671/D3695/624.1
2-Propanone (Acetone)	67-64-1	D3695/D4763/524.2/624.1
Tetrahydrofuran	109-99-9	1666/524.2/624.1
Toluene	108-88-3	D3695/D4763/502.2/524.2/624.1
Triethlyamine	121-44-8	1666/1671
Xylenes	(Note 1)	1624C/1666/624.1

Table IF note:

[1]1624C: *m*-xylene 108-38-3, *o,p*-xylene, E-14095 (Not a CAS number; this is the number provided in the Environmental Monitoring Methods Index [EMMI] database.); 1666: m,p-xylene 136777-61-2, *o*-xylene 95-47-6.

TABLE IG—TEST METHODS FOR PESTICIDE ACTIVE INGREDIENTS

[40 CFR part 455]

EPA survey code	Pesticide name	CAS No.	EPA analytical method No.(s)[3]
8	Triadimefon	43121-43-3	507/633/525.1/525.2/1656/625.1.
12	Dichlorvos	62-73-7	1657/507/622/525.1/525.2/625.1.
16	2,4-D; 2,4-D Salts and Esters [2,4-Dichloro-phenoxyacetic acid]	94-75-7	1658/515.1/615/515.2/555.
17	2,4-DB; 2,4-DB Salts and Esters [2,4-Dichlorophenoxybutyric acid]	94-82-6	1658/515.1/615/515.2/555.
22	Mevinphos	7786-34-7	1657/507/622/525.1/525.2/625.1.
25	Cyanazine	21725-46-2	629/507/608.3/625.1.
26	Propachlor	1918-16-7	1656/508/608.1/525.1/525.2/608.3/625.1.
27	MCPA; MCPA Salts and Esters [2-Methyl-4-chlorophenoxyacetic acid]	94-74-6	1658/615/555.
30	Dichlorprop; Dichlorprop Salts and Esters [2-(2,4-Dichlorophenoxy) propionic acid]	120-36-5	1658/515.1/615/515.2/555.

31	MCPP; MCPP Salts and Esters [2-(2-Methyl-4-chlorophenoxy) propionic acid]	93-65-2	1658/615/555.
35	TCMTB [2-(Thiocyanomethylthio) benzo-thiazole]	21564-17-0	637.
39	Pronamide	23950-58-5	525.1/525.2/507/633.1/625.1.
41	Propanil	709-98-8	632.1/1656/608.3.
45	Metribuzin	21087-64-9	507/633/525.1/525.2/1656/608.3/625.1.
52	Acephate	30560-19-1	1656/1657/608.3.
53	Acifluorfen	50594-66-6	515.1/515.2/555.
54	Alachlor	15972-60-8	505/507/645/525.1/525.2/1656/608.3/625.1.
55	Aldicarb	116-06-3	531.1.
58	Ametryn	834-12-8	507/619/525.2/625.1.
60	Atrazine	1912-24-9	505/507/619/525.1/525.2/1656/ 608.3/625.1.
62	Benomyl	17804-35-2	631.
68	Bromacil; Bromacil Salts and Esters	314-40-9	507/633/525.1/525.2/1656/608.3/625.1.

69	Bromoxynil	1689-84-5	1625/1661/625.1.
69	Bromoxynil Octanoate	1689-99-2	1656/608.3.
70	Butachlor	23184-66-9	507/645/525.1/525.2/1656/608.3/625.1.
73	Captafol	2425-06-1	1656/608.3/625.1.
75	Carbaryl [Sevin]	63-25-2	531.1/632/553/625.1.
76	Carbofuran	1563-66-2	531.1/632/625.1.
80	Chloroneb	2675-77-6	1656/508/608.1/525.1/525.2/608.3/625.1.
82	Chlorothalonil	1897-45-6	508/608.2/525.1/525.2/1656/608.3/625.1.
84	Stirofos	961-11-5	1657/507/622/525.1/525.2/625.1.
86	Chlorpyrifos	2921-88-2	1657/508/622/625.1.
90	Fenvalerate	51630-58-1	1660.
103	Diazinon	333-41-5	1657/507/614/622/525.2/625.1.
107	Parathion methyl	298-00-0	1657/614/622/625.1.
110	DCPA [Dimethyl 2,3,5,6-tetrachloro-terephthalate]	1861-32-1	508/608.2/525.1/525.2/515.1[2]/515.2[2]/1656/608.3/625.1.

112	Dinoseb	88-85-7	1658/515.1/615/515.2/555/625.1.
113	Dioxathion	78-34-2	1657/614.1.
118	Nabonate [Disodium cyanodithio-imidocarbonate]	138-93-2	630.1.
119	Diuron	330-54-1	632/553.
123	Endothall	145-73-3	548/548.1.
124	Endrin	72-20-8	1656/505/508/617/525.1/525.2/608.3/625.1.
125	Ethalfluralin	55283-68-6	1656/627/608.3 See footnote 1.
126	Ethion	563-12-2	1657/614/614.1/625.1.
127	Ethoprop	13194-48-4	1657/507/622/525.1/525.2/625.1.
132	Fenarimol	60168-88-9	507/633.1/525.1/525.2/1656/608.3/625.1.
133	Fenthion	55-38-9	1657/622/625.1.
138	Glyphosate [N-(Phosphonomethyl) glycine]	1071-83-6	547.
140	Heptachlor	76-44-8	1656/505/508/617/525.1/525.2/608.3/625.1.
144	Isopropalin	33820-53-0	1656/627/608.3.

148	Linuron	330-55-2	553/632.
150	Malathion	121-75-5	1657/614/625.1.
154	Methamidophos	10265-92-6	1657.
156	Methomyl	16752-77-5	531.1/632.
158	Methoxychlor	72-43-5	1656/505/508/608.2/617/525.1/525.2/608.3/625.1.
172	Nabam	142-59-6	630/630.1.
173	Naled	300-76-5	1657/622/625.1.
175	Norflurazon	27314-13-2	507/645/525.1/525.2/1656/608.3/625.1.
178	Benfluralin	1861-40-1	1656/627/608.3 See footnote 1.
182	Fensulfothion	115-90-2	1657/622/625.1.
183	Disulfoton	298-04-4	1657/507/614/622/525.2/625.1.
185	Phosmet	732-11-6	1657/622.1/625.1.
186	Azinphos Methyl	86-50-0	1657/614/622/625.1.
192	Organo-tin pesticides	12379-54-3	Ind-01/200.7/200.9.

197	Bolstar	35400-43-2	1657/622.
203	Parathion	56-38-2	1657/614/625.1.
204	Pendimethalin	40487-42-1	1656.
205	Pentachloronitrobenzene	82-68-8	1656/608.1/617/608.3/625.1.
206	Pentachlorophenol	87-86-5	1625/515.2/555/515.1/525.1/525.2/625.1.
208	Permethrin	52645-53-1	608.2/508/525.1/525.2/1656/1660/608.3[4]/625.1[4].
212	Phorate	298-02-2	1657/622/625.1.
218	Busan 85 [Potassium dimethyldithiocarbamate]	128-03-0	630/630.1.
219	Busan 40 [Potassium N-hydroxymethyl-N-methyldithiocarbamate]	51026-28-9	630/630.1.
220	KN Methyl [Potassium N-methyl-dithiocarbamate]	137-41-7	630/630.1.
223	Prometon	1610-18-0	507/619/525.2/625.1.
224	Prometryn	7287-19-6	507/619/525.1/525.2/625.1.
226	Propazine	139-40-2	507/619/525.1/525.2/1656/608.3/625.1.
230	Pyrethrin I	121-21-1	1660.

232	Pyrethrin II	121-29-9	1660.
236	DEF [S,S,S-Tributyl phosphorotrithioate]	78-48-8	1657.
239	Simazine	122-34-9	505/507/619/525.1/525.2/1656/608.3/625.1.
241	Carbam-S [Sodium dimethyldithio-carbamate]	128-04-1	630/630.1.
243	Vapam [Sodium methyldithiocarbamate]	137-42-8	630/630.1.
252	Tebuthiuron	34014-18-1	507/525.1/525.2/625.1.
254	Terbacil	5902-51-2	507/633/525.1/525.2/1656/608.3/625.1.
255	Terbufos	13071-79-9	1657/507/614.1/525.1/525.2/625.1.
256	Terbuthylazine	5915-41-3	619/1656/608.3.
257	Terbutryn	886-50-0	507/619/525.1/525.2/625.1.
259	Dazomet	533-74-4	630/630.1/1659.
262	Toxaphene	8001-35-2	1656/505/508/617/525.1/525.2/608.3/625.1.
263	Merphos [Tributyl phosphorotrithioate]	150-50-5	1657/507/525.1/525.2/622/625.1.
264	Trifluralin[1]	1582-09-8	1656/508/617/627/525.2/608.3/625.1.

268	Ziram [Zinc dimethyldithiocarbamate]	137-30-4	630/630.1.

Table IG notes:

[1]Monitor and report as total Trifluralin.

[2]Applicable to the analysis of DCPA degradates.

[3]EPA Methods 608.1 through 645, 1645 through 1661, and Ind-01 are available in Methods for the Determination of Nonconventional Pesticides in Municipal and Industrial Wastewater, Volume I, EPA 821-R-93-010A, Revision I, August 1993, U.S. EPA. EPA Methods 200.9 and 505 through 555 are available in Methods for the Determination of Nonconventional Pesticides in Municipal and Industrial Wastewater, Volume II, EPA 821-R-93-010B, August 1993, U.S. EPA. The full text of Methods 608.3, 625.1, and 1625 are provided at appendix A of this part. The full text of Method 200.7 is provided at appendix C of this part. Methods 608.3 and 625.1 are available at *https://www.epa.gov/cwa-methods/approved-cwa-test-methods-organic-compounds*.

[4]Permethrin is not listed within methods 608.3 and 625.1; however, *cis*-permethrin and *trans*-permethrin are listed. Permethrin can be calculated by adding the results of *cis*- and *trans*-permethrin.

TABLE IH—LIST OF APPROVED MICROBIOLOGICAL METHODS FOR AMBIENT WATER

Parameter and units	Method[1]	EPA	Standard methods	AOAC, ASTM, USGS	Other
Bacteria					
1. Coliform (fecal), number per 100 mL or number per gram dry weight	Most Probable Number (MPN), 5 tube, 3 dilution, or	p. 132[3]	9221 C E-2006.		
	Membrane filter (MF),[2] single step	p. 124[3]	9222 D-2006[27]	B-0050-85.[4]	
2. Coliform (fecal) in presence of chlorine, number per 100 mL	MPN, 5 tube, 3 dilution, or	p. 132[3]	9221 C E-2006.		

	MF,[2] single step[5]	p. 124[3]	9222 D-2006.[27]		
3. Coliform (total), number per 100 mL	MPN, 5 tube, 3 dilution, or	p. 114[3]	9221 B-2006.		
	MF,[2] single step or two step	p. 108[3]	9222 B-2006	B-0025-85.[4]	
4. Coliform (total), in presence of chlorine, number per 100 mL	MPN, 5 tube, 3 dilution, or	p. 114[3]	9221 B-2006.		
	MF[2] with enrichment	p. 111[3]	9222 B-2006.		
5. *E. coli,* number per 100 mL	MPN,[6 8 14] multiple tube, or		9221 B.2-2006/9221 F-2006[11 13]		
	Multiple tube/multiple well, or		9223 B-2004[12]	991.15[10]	Colilert®,[12 16] Colilert-18®.[12 15 16]
	MF,[2 5 6 7 8] two step, or	1103.1[19]	9222 B-2006/9222 G-2006,[18] 9213 D-2007	D-5392-93.[9]	
	Single step	1603,[20] 1604[21]			mColiBlue-24®.[17]
6. Fecal streptococci, number per 100 mL	MPN, 5 tube, 3 dilution, or	p. 139[3]	9230 B-2007.		
	MF[2], or	p. 136[3]	9230 C-2007	B-0055-85[4]	
	Plate count	p. 143.[3]			
7. Enterococci, number per 100 mL	MPN,[6 8] multiple tube/multiple well, or		9230 D-2007	D6503-99[9]	Enterolert®.[12 22]

	MF[2 5 6 7 8] two step, or	1106.1[23]	9230 C-2007	D5259-92.[9]	
	Single step, or	1600[24]	9230 C-2007.		
	Plate count	p. 143.[3]			
Protozoa					
8. *Cryptosporidium*	Filtration/IMS/FA	1622,[25] 1623.[26]			
9. *Giardia*	Filtration/IMS/FA	1623.[26]			

Table IH notes:

[1]The method must be specified when results are reported.

[2]A 0.45-μm membrane filter (MF) or other pore size certified by the manufacturer to fully retain organisms to be cultivated and to be free of extractables which could interfere with their growth.

[3]Microbiological Methods for Monitoring the Environment, Water, and Wastes. EPA/600/8-78/017. 1978. U.S. EPA.

[4]U.S. Geological Survey Techniques of Water-Resource Investigations, Book 5, Laboratory Analysis, Chapter A4, Methods for Collection and Analysis of Aquatic Biological and Microbiological Samples. 1989. USGS.

[5]Because the MF technique usually yields low and variable recovery from chlorinated wastewaters, the Most Probable Number method will be required to resolve any controversies.

[6]Tests must be conducted to provide organism enumeration (density). Select the appropriate configuration of tubes/filtrations and dilutions/volumes to account for the quality, character, consistency, and anticipated organism density of the water sample.

[7]When the MF method has not been used previously to test waters with high turbidity, large numbers of noncoliform bacteria, or samples that may contain organisms stressed by chlorine, a parallel test should be conducted with a multiple-tube technique to demonstrate applicability and comparability of results.

[8]To assess the comparability of results obtained with individual methods, it is suggested that side-by-side tests be conducted across seasons of the year with the water samples

routinely tested in accordance with the most current Standard Methods for the Examination of Water and Wastewater or EPA alternate test procedure (ATP) guidelines.

[9]Annual Book of ASTM Standards—Water and Environmental Technology. Section 11.02. 2000, 1999, 1996. ASTM International.

[10]Official Methods of Analysis of AOAC International, 16th Edition, Volume I, Chapter 17. 1995. AOAC International.

[11]The multiple-tube fermentation test is used in 9221B.2-2006. Lactose broth may be used in lieu of lauryl tryptose broth (LTB), if at least 25 parallel tests are conducted between this broth and LTB using the water samples normally tested, and this comparison demonstrates that the false-positive rate and false-negative rate for total coliform using lactose broth is less than 10 percent. No requirement exists to run the completed phase on 10 percent of all total coliform-positive tubes on a seasonal basis.

[12]These tests are collectively known as defined enzyme substrate tests, where, for example, a substrate is used to detect the enzyme β-glucuronidase produced by*E. coli.*

[13]After prior enrichment in a presumptive medium for total coliform using 9221B.2-2006, all presumptive tubes or bottles showing any amount of gas, growth or acidity within 48 h ± 3 h of incubation shall be submitted to 9221F-2006. Commercially available EC-MUG media or EC media supplemented in the laboratory with 50 μg/mL of MUG may be used.

[14]Samples shall be enumerated by the multiple-tube or multiple-well procedure. Using multiple-tube procedures, employ an appropriate tube and dilution configuration of the sample as needed and report the Most Probable Number (MPN). Samples tested with Colilert® may be enumerated with the multiple-well procedures, Quanti-Tray® or Quanti-Tray®/2000, and the MPN calculated from the table provided by the manufacturer.

[15]Colilert-18® is an optimized formulation of the Colilert® for the determination of total coliforms and*E. coli* that provides results within 18 h of incubation at 35 °C, rather than the 24 h required for the Colilert® test, and is recommended for marine water samples.

[16]Descriptions of the Colilert®, Colilert-18®, and Quanti-Tray® may be obtained from IDEXX Laboratories Inc.

[17]A description of the mColiBlue24® test may be obtained from Hach Company.

[18]Subject total coliform positive samples determined by 9222B-2006 or other membrane filter procedure to 9222G-2006 using NA-MUG media.

[19]Method 1103.1:*Escherichia coli* (*E. coli*) in Water by Membrane Filtration Using membrane-Thermotolerant*Escherichia coli* Agar (mTEC), EPA-821-R-10-002. March 2010. U.S. EPA.

[20]Method 1603:*Escherichia coli* (*E. coli*) in Water by Membrane Filtration Using Modified membrane-Thermotolerant*Escherichia coli* Agar (Modified mTEC), EPA-821-R-14-010. September 2014. U.S. EPA.

[21]Preparation and use of MI agar with a standard membrane filter procedure is set forth in the article, Brenner et al. 1993. New Medium for the Simultaneous Detection of Total Coliform and*Escherichia coli* in Water. Appl. Environ. Microbiol. 59:3534-3544 and in Method 1604: Total Coliforms and*Escherichia coli* (*E. coli*) in Water by Membrane Filtration by Using a Simultaneous Detection Technique (MI Medium), EPA 821-R-02-024, September 2002, U.S. EPA.

[22]A description of the Enterolert® test may be obtained from IDEXX Laboratories Inc.

[23]Method 1106.1: Enterococci in Water by Membrane Filtration Using membrane-Enterococcus-Esculin Iron Agar (mE-EIA), EPA-821-R-09-015. December 2009. U.S. EPA.

[24]Method 1600: Enterococci in Water by Membrane Filtration Using membrane-Enterococcus Indoxyl-β-D-Glucoside Agar (mEI), EPA-821-R-14-011. September 2014. U.S. EPA.

[25]Method 1622 uses a filtration, concentration, immunomagnetic separation of oocysts from captured material, immunofluorescence assay to determine concentrations, and confirmation through vital dye staining and differential interference contrast microscopy for the detection of*Cryptosporidium.* Method 1622:*Cryptosporidium* in Water by Filtration/IMS/FA, EPA-821-R-05-001. December 2005. U.S. EPA.

[26]Method 1623 uses a filtration, concentration, immunomagnetic separation of oocysts and cysts from captured material, immunofluorescence assay to determine concentrations, and confirmation through vital dye staining and differential interference contrast microscopy for the simultaneous detection of*Cryptosporidium* and*Giardia* oocysts and cysts. Method 1623:*Cryptosporidium* and*Giardia* in Water by Filtration/IMS/FA. EPA-821-R-05-002. December 2005. U.S. EPA.

[27]On a monthly basis, at least ten blue colonies from the medium must be verified using Lauryl Tryptose Broth and EC broth, followed by count adjustment based on these results; and representative non-blue colonies should be verified using Lauryl Tryptose Broth. Where possible, verifications should be done from randomized sample sources.

(b) Certain material is incorporated by reference into this part with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. All approved material is available for inspection at EPA's Water Docket, EPA West, 1301 Constitution Avenue NW., Room 3334, Washington, DC 20004, Telephone: 202-566-2426, and is available from the sources listed below. It is also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: *https://www.archives.gov/federal-register/cfr/ibr-locations.html*.

(1) Environmental Monitoring and Support Laboratory, U.S. Environmental Protection Agency, Cincinnati OH (US EPA). Available at *http://water.epa.gov/scitech/methods/cwa/index.cfm* or from: National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161

(i) Microbiological Methods for Monitoring the Environment, Water, and Wastes. 1978. EPA/600/8-78/017, Pub. No. PB-290329/A.S.

(A) Part III Analytical Methodology, Section B Total Coliform Methods, page 108. Table IA, Note 3; Table IH, Note 3.

(B) Part III Analytical Methodology, Section B Total Coliform Methods, 2.6.2 Two-Step Enrichment Procedure, page 111. Table IA, Note 3; Table IH, Note 3.

(C) Part III Analytical Methodology, Section B Total Coliform Methods, 4 Most Probable Number (MPN) Method, page 114. Table IA, Note 3; Table IH, Note 3.

(D) Part III Analytical Methodology, Section C Fecal Coliform Methods, 2 Direct Membrane Filter (MF) Method, page 124. Table IA, Note 3; Table IH, Note 3.

(E) Part III, Analytical Methodology, Section C Fecal Coliform Methods, 5 Most Probable Number (MPN) Method, page 132. Table IA, Note 3; Table IH, Note 3.

(F) Part III Analytical Methodology, Section D Fecal Streptococci, 2 Membrane Filter (MF) Method, page 136. Table IA, Note 3; Table IH, Note 3.

(G) Part III Analytical Methodology, Section D Fecal Streptococci, 4 Most Probable Number Method, page 139. Table IA, Note 3; Table IH, Note 3.

(H) Part III Analytical Methodology, Section D Fecal Streptococci, 5 Pour Plate Method, page 143. Table IA, Note 3; Table IH, Note 3.

(ii) [Reserved]

(2) Environmental Monitoring and Support Laboratory, U.S. Environmental Protection Agency, Cincinnati OH (US EPA). Available at *http://water.epa.gov/scitech/methods/cwa/index.cfm.*

(i) Method 300.1 (including Errata Cover Sheet, April 27, 1999), Determination of Inorganic Ions in Drinking Water by Ion Chromatography, Revision 1.0, 1997. Table IB, Note 52.

(ii) Method 551, Determination of Chlorination Disinfection Byproducts and Chlorinated Solvents in Drinking Water by Liquid-Liquid Extraction and Gas Chromatography With Electron-Capture Detection. 1990. Table IF.

(3) National Exposure Risk Laboratory-Cincinnati, U.S. Environmental Protection Agency, Cincinnati OH (US EPA). Available from *http://water.epa.gov/scitech/methods/cwa/index.cfm* or from the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161. Telephone: 800-553-6847.

(i) Methods for the Determination of Inorganic Substances in Environmental Samples. August 1993. EPA/600/R-93/100, Pub. No. PB 94120821. Table IB, Note 52.

(A) Method 180.1, Determination of Turbidity by Nephelometry. Revision 2.0. Table IB, Note 52.

(B) Method 300.0, Determination of Inorganic Anions by Ion Chromatography. Revision 2.1. Table IB, Note 52.

(C) Method 335.4, Determination of Total Cyanide by Semi-Automated Colorimetry. Revision 1.0. Table IB, Notes 52 and 57.

(D) Method 350.1, Determination of Ammonium Nitrogen by Semi-Automated Colorimetry. Revision 2.0. Table IB, Notes 30 and 52.

(E) Method 351.2, Determination of Total Kjeldahl Nitrogen by Semi-Automated Colorimetry. Revision 2.0. Table IB, Note 52.

(F) Method 353.2, Determination of Nitrate-Nitrite Automated Colorimetry. Revision 2.0. Table IB, Note 52.

(G) Method 365.1, Determination of Phosphorus by Automated Colorimetry. Revision 2.0. Table IB, Note 52.

(H) Method 375.2, Determination of Sulfate by Automated Colorimetry. Revision 2.0. Table IB, Note 52.

(I) Method 410.4, Determination of Chemical Oxygen Demand by Semi-Automated Colorimetry. Revision 2.0. Table IB, Note 52.

(ii) Methods for the Determination of Metals in Environmental Samples, Supplement I. May 1994. EPA/600/R-94/111, Pub. No. PB 95125472. Table IB, Note 52.

(A) Method 200.7, Determination of Metals and Trace Elements in Water and Wastes by Inductively Coupled Plasma-Atomic Emission Spectrometry. Revision 4.4. Table IB, Note 52.

(B) Method 200.8, Determination of Trace Elements in Water and Wastes by Inductively Coupled Plasma Mass Spectrometry. Revision 5.3. Table IB, Note 52.

(C) Method 200.9, Determination of Trace Elements by Stabilized Temperature Graphite Furnace Atomic Absorption Spectrometry. Revision 2.2. Table IB, Note 52.

(D) Method 218.6, Determination of Dissolved Hexavalent Chromium in Drinking Water, Groundwater, and Industrial Wastewater Effluents by Ion Chromatography. Revision 3.3. Table IB, Note 52.

(E) Method 245.1, Determination of Mercury in Water by Cold Vapor Atomic Absorption Spectrometry. Revision 3.0. Table IB, Note 52.

(4) National Exposure Risk Laboratory-Cincinnati, U.S. Environmental Protection Agency, Cincinnati OH (US EPA). Available at *http://water.epa.gov/scitech/methods/cwa/index.cfm.*

(i) EPA Method 200.5, Determination of Trace Elements in Drinking Water by Axially Viewed Inductively Coupled Plasma-Atomic Emission Spectrometry. Revision 4.2, October 2003. EPA/600/R-06/115. Table IB, Note 68.

(ii) EPA Method 525.2, Determination of Organic Compounds in Drinking Water by Liquid-Solid Extraction and Capillary Column Gas Chromatography/Mass Spectrometry. Revision 2.0, 1995. Table ID, Note 10.

(5) Office of Research and Development, Cincinnati OH. U.S. Environmental Protection Agency, Cincinnati OH (US EPA). Available at *http://water.epa.gov/scitech/methods/cwa/index.cfm* or from ORD Publications, CERI, U.S. Environmental Protection Agency, Cincinnati OH 45268.

(i) Methods for Benzidine, Chlorinated Organic Compounds, Pentachlorophenol, and Pesticides in Water and Wastewater. 1978. Table IC, Note 3; Table ID, Note 3.

(ii) Methods for Chemical Analysis of Water and Wastes. March 1979. EPA-600/4-79-020. Table IB, Note 1.

(iii) Methods for Chemical Analysis of Water and Wastes. Revised March 1983. EPA-600/4-79-020. Table IB, Note 1.

(A) Method 120.1, Conductance, Specific Conductance, μmhos at 25 °C. Revision 1982. Table IB, Note 1.

(B) Method 130.1, Hardness, Total (mg/L as $CaCO_3$), Colorimetric, Automated EDTA. Issued 1971. Table IB, Note 1.

(C) Method 150.2, pH, Continuous Monitoring (Electrometric). December 1982. Table IB, Note 1.

(D) Method 160.4, Residue, Volatile, Gravimetric, Ignition at 550 °C. Issued 1971. Table IB, Note 1.

(E) Method 206.5, Arsenic, Sample Digestion Prior to Total Arsenic Analysis by Silver Diethyldithiocarbamate or Hydride Procedures. Issued 1978. Table IB, Note 1.

(F) Method 231.2, Gold, Atomic Absorption, Furnace Technique. Issued 1978. Table IB, Note 1.

(G) Method 245.2, Mercury, Automated Cold Vapor Technique. Issued 1974. Table IB, Note 1.

(H) Method 252.2, Osmium, Atomic Absorption, Furnace Technique. Issued 1978. Table IB, Note 1.

(I) Method 253.2, Palladium, Atomic Absorption, Furnace Technique. Issued 1978. Table IB, Note 1.

(J) Method 255.2, Platinum, Atomic Absorption, Furnace Technique. Issued 1978. Table IB, Note 1.

(K) Method 265.2, Rhodium, Atomic Absorption, Furnace Technique. Issued 1978. Table IB, Note 1.

(L) Method 279.2, Thallium, Atomic Absorption, Furnace Technique. Issued 1978. Table IB, Note 1.

(M) Method 283.2, Titanium, Atomic Absorption, Furnace Technique. Issued 1978. Table IB, Note 1.

(N) Method 289.2, Zinc, Atomic Absorption, Furnace Technique. Issued 1978. Table IB, Note 1.

(O) Method 310.2, Alkalinity, Colorimetric, Automated, Methyl Orange. Revision 1974. Table IB, Note 1.

(P) Method 351.1, Nitrogen, Kjeldahl, Total, Colorimetric, Automated Phenate. Revision 1978. Table IB, Note 1.

(Q) Method 352.1, Nitrogen, Nitrate, Colorimetric, Brucine. Issued 1971. Table IB, Note 1.

(R) Method 365.3, Phosphorus, All Forms, Colorimetric, Ascorbic Acid, Two Reagent. Issued 1978. Table IB, Note 1.

(S) Method 365.4, Phosphorus, Total, Colorimetric, Automated, Block Digestor AA II. Issued 1974. Table IB, Note 1.

(T) Method 410.3, Chemical Oxygen Demand, Titrimetric, High Level for Saline Waters. Revision 1978. Table IB, Note 1.

(U) Method 420.1, Phenolics, Total Recoverable, Spectrophotometric, Manual 4-AAP With Distillation. Revision 1978. Table IB, Note 1.

(iv) Prescribed Procedures for Measurement of Radioactivity in Drinking Water. 1980. EPA-600/4-80-032. Table IE.

(A) Method 900.0, Gross Alpha and Gross Beta Radioactivity. Table IE.

(B) Method 903.0, Alpha-Emitting iRadio Isotopes. Table IE.

(C) Method 903.1, Radium-226, Radon Emanation Technique. Table IE.

(D) Appendix B, Error and Statistical Calculations. Table IE.

(6) Office of Science and Technology, U.S. Environmental Protection Agency, Washington DC (US EPA). Available at *http://water.epa.gov/scitech/methods/cwa/index.cfm.*

(i) Method 1625C, Semivolatile Organic Compounds by Isotope Dilution GCMS. 1989. Table IF.

(ii) [Reserved]

(7) Office of Water, U.S. Environmental Protection Agency, Washington DC (US EPA). Available at *http://water.epa.gov/scitech/methods/cwa/index.cfm* or from National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161.

(i) Method 1631, Mercury in Water by Oxidation, Purge and Trap, and Cold Vapor Atomic Fluorescence Spectrometry. Revision E, August 2002. EPA-821-R-02-019, Pub. No. PB2002-108220. Table IB, Note 43.

(ii) Kelada-01, Kelada Automated Test Methods for Total Cyanide, Acid Dissociable Cyanide, and Thiocyanate. Revision 1.2, August 2001. EPA 821-B-01-009, Pub. No. PB 2001-108275. Table IB, Note 55.

(iii) In the compendium *Analytical Methods for the Determination of Pollutants in Pharmaceutical Manufacturing Industry Wastewaters.* July 1998. EPA 821-B-98-016, Pub. No. PB95201679. Table IF, Note 1.

(A) EPA Method 1666, Volatile Organic Compounds Specific to the Pharmaceutical Industry by Isotope Dilution GC/MS. Table IF, Note 1.

(B) EPA Method 1667, Formaldehyde, Isobutyraldehyde, and Furfural by Derivatization Followed by High Performance Liquid Chromatography. Table IF.

(C) Method 1671, Volatile Organic Compounds Specific to the Pharmaceutical Manufacturing Industry by GC/FID. Table IF.

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(lxv) ASTM. D7237-10, Standard Test Method for Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection. June 2010. Table IB.

(lxvi) ASTM. D7284-13, Standard Test Method for Total Cyanide in Water by Micro Distillation followed by Flow Injection Analysis with Gas Diffusion Separation and Amperometric Detection. July 2013. Table IB.

(lxvii) ASTM. D7365-09a, Standard Practice for Sampling, Preservation, and Mitigating Interferences in Water Samples for Analysis of Cyanide. October 2009. Table II, Notes 5 and 6.

(lxviii) ASTM. D7511-12, Standard Test Method for Total Cyanide by Segmented Flow Injection Analysis, In-Line Ultraviolet Digestion and Amperometric Detection. January 2012. Table IB.

(lxix) ASTM. D7573-09, Standard Test Method for Total Carbon and Organic Carbon in Water by High Temperature Catalytic Combustion and Infrared Detection. November 2009. Table IB.

(16) Bran & Luebbe Analyzing Technologies, Inc., Elmsford NY 10523.

(i) Industrial Method Number 378-75WA, Hydrogen Ion (pH) Automated Electrode Method, Bran & Luebbe (Technicon) Auto Analyzer II. October 1976. Table IB, Note 21.

(ii) [Reserved]

(17) CEM Corporation, P.O. Box 200, Matthews NC 28106-0200.

(i) Closed Vessel Microwave Digestion of Wastewater Samples for Determination of Metals. April 16, 1992. Table IB, Note 36.

(ii) [Reserved]

(18) Craig R. Chinchilla, 900 Jorie Blvd., Suite 35, Oak Brook IL 60523. Telephone: 630-645-0600.

(i) Nitrate by Discrete Analysis Easy (1-Reagent) Nitrate Method, (Colorimetric, Automated, 1 Reagent). Revision 1, November 12, 2011. Table IB, Note 62.

(ii) [Reserved]

(19) Hach Company, P.O. Box 389, Loveland CO 80537.

(i) Method 8000, Chemical Oxygen Demand. Hach Handbook of Water Analysis. 1979. Table IB, Note 14.

(ii) Method 8008, 1,10-Phenanthroline Method using FerroVer Iron Reagent for Water. 1980. Table IB, Note 22.

(iii) Method 8009, Zincon Method for Zinc. Hach Handbook for Water Analysis. 1979. Table IB, Note 33.

(iv) Method 8034, Periodate Oxidation Method for Manganese. Hach Handbook for Water Analysis. 1979. Table IB, Note 23.

(v) Method 8506, Bicinchoninate Method for Copper. Hach Handbook of Water Analysis. 1979. Table IB, Note 19.

(vi) Method 8507, Nitrogen, Nitrite—Low Range, Diazotization Method for Water and Wastewater. 1979. Table IB, Note 25.

(vii) Method 10206, Hach Company TNTplus 835/836 Nitrate Method 10206, Spectrophotometric Measurement of Nitrate in Water and Wastewater. Revision 2.1, January 10, 2013. Table IB, Note 75.

(viii) Method 10242, Hach Company TNTplus 880 Total Kjeldahl Nitrogen Method 10242, Simplified Spectrophotometric Measurement of Total Kjeldahl Nitrogen in Water and Wastewater. Revision 1.1, January 10, 2013. Table IB, Note 76.

(ix) Hach Method 10360, Luminescence Measurement of Dissolved Oxygen in Water and Wastewater and for Use in the Determination of BOD_5 and $cBOD_5$. Revision 1.2, October 2011. Table IB, Note 63.

(x) m-ColiBlue24® Method, for total Coliforms and *E. coli.* Revision 2, 1999. Table IA, Note 18; Table IH, Note 17.

(20) IDEXX Laboratories Inc., One Idexx Drive, Westbrook ME 04092.

(i) Colilert. 2013. Table IA, Notes 17 and 18; Table IH, Notes 14, 15 and 16.

(ii) Colilert-18. 2013. Table IA, Notes 17 and 18; Table IH, Notes 14, 15 and 16.

(iii) Enterolert. 2013. Table IA, Note 24; Table IH, Note 12.

(iv) Quanti-Tray Insert and Most Probable Number (MPN) Table. 2013. Table IA, Note 18; Table IH, Notes 14 and 16.

(21) In-Situ Incorporated, 221 E. Lincoln Ave., Ft. Collins CO 80524. Telephone: 970-498-1500.

(i) In-Situ Inc. Method 1002-8-2009, Dissolved Oxygen Measurement by Optical Probe. 2009. Table IB, Note 64.

(ii) In-Situ Inc. Method 1003-8-2009, Biochemical Oxygen Demand (BOD) Measurement by Optical Probe. 2009. Table IB, Note 10.

(iii) In-Situ Inc. Method 1004-8-2009, Carbonaceous Biochemical Oxygen Demand (CBOD) Measurement by Optical Probe. 2009. Table IB, Note 35.

(22) Journal of Chromatography, Elsevier/North-Holland, Inc., Journal Information Centre, 52 Vanderbilt Avenue, New York NY 10164. (Also available from most public libraries.

(i) Direct Determination of Elemental Phosphorus by Gas-Liquid Chromatography. Addison, R.F. and R.G. Ackman. 47(3): 421-426, 1970. Table IB, Note 28.

(ii) [Reserved]

(23) Lachat Instruments, 6645 W. Mill Road, Milwaukee WI 53218, Telephone: 414-358-4200.

(i) QuikChem Method 10-204-00-1-X, Digestion and Distillation of Total Cyanide in Drinking and Wastewaters using MICRO DIST and Determination of Cyanide by Flow Injection Analysis. Revision 2.2, March 2005. Table IB, Note 56.

(ii) [Reserved]

(24) Leck Mitchell, Ph.D., P.E., 656 Independence Valley Dr., Grand Junction CO 81507. Telephone: 970-244-8661.

(i) Mitchell Method M5271, Determination of Turbidity by Nephelometry. Revision 1.0, July 31, 2008. Table IB, Note 66.

(ii) Mitchell Method M5331, Determination of Turbidity by Nephelometry. Revision 1.0, July 31, 2008. Table IB, Note 65.

(25) National Council of the Paper Industry for Air and Stream Improvements, Inc. (NCASI), 260 Madison Avenue, New York NY 10016.

(i) NCASI Method TNTP-W10900, Total Nitrogen and Total Phophorus in Pulp and Paper Biologically Treated Effluent by Alkaline Persulfate Digestion. June 2011. Table IB, Note 77.

(ii) NCASI Technical Bulletin No. 253, An Investigation of Improved Procedures for Measurement of Mill Effluent and Receiving Water Color. December 1971. Table IB, Note 18.

(iii) NCASI Technical Bulletin No. 803, An Update of Procedures for the Measurement of Color in Pulp Mill Wastewaters. May 2000. Table IB, Note 18.

(26) The Nitrate Elimination Co., Inc. (NECi), 334 Hecla St., Lake Linden NI 49945.

(i) NECi Method N07-0003, Method for Nitrate Reductase Nitrate-Nitrogen Analysis. Revision 9.0. March 2014. Table IB, Note 73.

(ii) [Reserved]

(27) Oceanography International Corporation, 512 West Loop, P.O. Box 2980, College Station TX 77840.

(i) OIC Chemical Oxygen Demand Method. 1978. Table IB, Note 13.

(ii) [Reserved]

(28) OI Analytical, Box 9010, College Station TX 77820-9010.

(i) Method OIA-1677-09, Available Cyanide by Ligand Exchange and Flow Injection Analysis (FIA). Copyright 2010. Table IB, Note 59.

(ii) Method PAI-DK01, Nitrogen, Total Kjeldahl, Block Digestion, Steam Distillation, Titrimetric Detection. Revised December 22, 1994. Table IB, Note 39.

(iii) Method PAI-DK02, Nitrogen, Total Kjeldahl, Block Digestion, Steam Distillation, Colorimetric Detection. Revised December 22, 1994. Table IB, Note 40.

(iv) Method PAI-DK03, Nitrogen, Total Kjeldahl, Block Digestion, Automated FIA Gas Diffusion. Revised December 22, 1994. Table IB, Note 41.

(29) ORION Research Corporation, 840 Memorial Drive, Cambridge, Massachusetts 02138.

(i) ORION Research Instruction Manual, Residual Chlorine Electrode Model 97-70. 1977. Table IB, Note 16.

(ii) [Reserved]

(30) Technicon Industrial Systems, Tarrytown NY 10591.

(i) Industrial Method Number 379-75WE Ammonia, Automated Electrode Method, Technicon Auto Analyzer II. February 19, 1976. Table IB, Note 7.

(ii) [Reserved]

(31) Thermo Jarrell Ash Corporation, 27 Forge Parkway, Franklin MA 02038.

(i) Method AES0029. Direct Current Plasma (DCP) Optical Emission Spectrometric Method for Trace Elemental Analysis of Water and Wastes. 1986, Revised 1991. Table IB, Note 34.

(ii) [Reserved]

(32) Thermo Scientific, 166 Cummings Center, Beverly MA 01915. Telephone: 1-800-225-1480. *www.thermoscientific.com.*

(i) Thermo Scientific Orion Method AQ4500, Determination of Turbidity by Nephelometry. Revision 5, March 12, 2009. Table IB, Note 67.

(ii) [Reserved]

(33) 3M Corporation, 3M Center Building 220-9E-10, St. Paul MN 55144-1000.

(i) Organochlorine Pesticides and PCBs in Wastewater Using Empore™ Disk" Test Method 3M 0222. Revised October 28, 1994. Table IC, Note 8; Table ID, Note 8.

(ii) [Reserved]

(34) Timberline Instruments, LLC, 1880 South Flatiron Ct., Unit I, Boulder CO 80301.

(i) Timberline Amonia-001, Determination of Inorganic Ammonia by Continuous Flow Gas Diffusion and Conductivity Cell Analysis. June 24, 2011. Table IB, Note 74.

(ii) [Reserved]

(35) U.S. Geological Survey (USGS), U.S. Department of the Interior, Reston, Virginia. Available from USGS Books and Open-File Reports (OFR) Section, Federal Center, Box 25425, Denver, CO 80225.

(i) Colorimetric determination of nitrate plus nitrite in water by enzymatic reduction, automated discrete analyzer methods. U.S. Geological Survey Techniques and Methods, Book 5—Laboratory Analysis, Section B—Methods of the National Water Quality Laboratory, Chapter 8. 2011. Table IB, Note 72.

(ii) Methods for Determination of Inorganic Substances in Water and Fluvial Sediments, editors, Techniques of Water-Resources Investigations of the U.S. Geological Survey, Book 5, Chapter A1. 1979. Table IB, Note 8.

(iii) Methods for Determination of Inorganic Substances in Water and Fluvial Sediments, Techniques of Water-Resources Investigations of the U.S. Geological Survey, Book 5, Chapter A1. 1989. Table IB, Note 2.

(iv) Methods for the Determination of Organic Substances in Water and Fluvial Sediments. Techniques of Water-Resources Investigations of the U.S. Geological Survey, Book 5, Chapter A3. 1987. Table IB, Note 24; Table ID, Note 4.

(v) OFR 76-177, Selected Methods of the U.S. Geological Survey of Analysis of Wastewaters. 1976. Table IE, Note 2.

(vi) OFR 91-519, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Organonitrogen Herbicides in Water by Solid-Phase Extraction and Capillary-Column Gas Chromatography/Mass Spectrometry With Selected-Ion Monitoring. 1992. Table ID, Note 14.

(vii) OFR 92-146, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Total Phosphorus by a Kjeldahl Digestion Method and an Automated Colorimetric Finish That Includes Dialysis. 1992. Table IB, Note 48.

(viii) OFR 93-125, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Inorganic and Organic Constituents in Water and Fluvial Sediments. 1993. Table IB, Note 51; Table IC, Note 9.

(ix) OFR 93-449, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Chromium in Water by Graphite Furnace Atomic Absorption Spectrophotometry. 1993. Table IB, Note 46.

(x) OFR 94-37, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Triazine and Other Nitrogen-containing Compounds by Gas Chromatography With Nitrogen Phosphorus Detectors. 1994. Table ID, Note 9.

(xi) OFR 95-181, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Pesticides in Water by C-18 Solid-Phase Extraction and Capillary-Column Gas Chromatography/Mass Spectrometry With Selected-Ion Monitoring. 1995. Table ID, Note 11.

(xii) OFR 97-198, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Molybdenum in Water by Graphite Furnace Atomic Absorption Spectrophotometry. 1997. Table IB, Note 47.

(xiii) OFR 98-165, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Elements in Whole-Water Digests Using Inductively Coupled Plasma-Optical Emission Spectrometry and Inductively Coupled Plasma-Mass Spectrometry. 1998. Table IB, Note 50.

(xiv) OFR 98-639, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Arsenic and Selenium in Water and Sediment by Graphite Furnace—Atomic Absorption Spectrometry. 1999. Table IB, Note 49.

(xv) OFR 00-170, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Ammonium Plus Organic Nitrogen by a Kjeldahl Digestion Method and an Automated Photometric Finish that Includes Digest Cleanup by Gas Diffusion. 2000. Table IB, Note 45.

(xvi) Techniques and Methods Book 5-B1, Determination of Elements in Natural-Water, Biota, Sediment and Soil Samples Using Collision/Reaction Cell Inductively Coupled Plasma-Mass Spectrometry. Chapter 1, Section B, Methods of the National Water Quality Laboratory, Book 5, Laboratory Analysis. 2006. Table IB, Note 70.

(xvii) U.S. Geological Survey Techniques of Water-Resources Investigations, Book 5, Laboratory Analysis, Chapter A4, Methods for Collection and Analysis of Aquatic Biological and Microbiological Samples. 1989. Table IA, Note 4; Table IH, Note 4.

(xviii) Water-Resources Investigation Report 01-4098, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Moderate-Use Pesticides and Selected Degradates in Water by C-18 Solid-Phase Extraction and Gas Chromatography/Mass Spectrometry. 2001. Table ID, Note 13.

(xix) Water-Resources Investigations Report 01-4132, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Organic Plus Inorganic Mercury in Filtered and Unfiltered Natural Water With Cold Vapor-Atomic Fluorescence Spectrometry. 2001. Table IB, Note 71.

(xx) Water-Resources Investigation Report 01-4134, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Pesticides in Water by Graphitized Carbon-Based Solid-Phase Extraction and High-Performance Liquid Chormatography/Mass Spectrometry. 2001. Table ID, Note 12.

(xxi) Water Temperature—Influential Factors, Field Measurement and Data Presentation, Techniques of Water-Resources Investigations of the U.S. Geological Survey, Book 1, Chapter D1. 1975. Table IB, Note 32.

(36) Waters Corporation, 34 Maple Street, Milford MA 01757, Telephone: 508-482-2131, Fax: 508-482-3625.

(i) Method D6508, Test Method for Determination of Dissolved Inorganic Anions in Aqueous Matrices Using Capillary Ion Electrophoresis and Chromate Electrolyte. Revision 2, December 2000. Table IB, Note 54.

(ii) [Reserved]

(c) Under certain circumstances, the Director may establish limitations on the discharge of a parameter for which there is no test procedure in this part or in 40 CFR parts 405 through 499. In these instances the test procedure shall be specified by the Director.

(d) Under certain circumstances, the Administrator may approve additional alternate test procedures for nationwide use, upon recommendation by the Alternate Test Procedure Program Coordinator, Washington, DC.

(e) Sample preservation procedures, container materials, and maximum allowable holding times for parameters are cited in Tables IA, IB, IC, ID, IE, IF, IG, and IH are prescribed in Table II. Information in the table takes precedence over information in specific methods or elsewhere. Any person may apply for a change from the prescribed preservation techniques, container materials, and maximum holding times applicable to samples taken from a specific discharge. Applications for such limited use changes may be made by letters to the Regional Alternative Test Procedure (ATP) Program Coordinator or the permitting authority in the Region in which the discharge will occur. Sufficient data should be provided to assure such changes in sample preservation, containers or holding times do not adversely affect the integrity of the sample. The Regional ATP Coordinator or permitting authority will review the application and then notify the applicant and the appropriate State agency of approval or rejection of the use of the alternate test procedure. A decision to approve or deny any request on deviations from the prescribed Table II requirements will be made within 90 days of receipt of the application by the Regional Administrator. An analyst may not modify any sample preservation and/or holding time requirements of an approved method unless the requirements of this section are met.

TABLE II—REQUIRED CONTAINERS, PRESERVATION TECHNIQUES, AND HOLDING TIMES

Parameter number/name	Container[1]	Preservation[2 3]	Maximum holding time[4]
Table IA—Bacterial Tests			
1-5. Coliform, total, fecal, and *E. coli*	PA, G	Cool, <10 °C, 0.008% $Na_2S_2O_3$[5]	8 hours.[22 23]

6. Fecal streptococci	PA, G	Cool, <10 °C, 0.008% $Na_2S_2O_3$[5]	8 hours.[22]
7. Enterococci	PA, G	Cool, <10 °C, 0.008% $Na_2S_2O_3$[5]	8 hours.[22]
8. *Salmonella*	PA, G	Cool, <10 °C, 0.008% $Na_2S_2O_3$[5]	8 hours.[22]
Table IA—Aquatic Toxicity Tests			
9-12. Toxicity, acute and chronic	P, FP, G	Cool, ≤6 °C[16]	36 hours.
Table IB—Inorganic Tests			
1. Acidity	P, FP, G	Cool, ≤6 °C[18]	14 days.
2. Alkalinity	P, FP, G	Cool, ≤6 °C[18]	14 days.
4. Ammonia	P, FP, G	Cool, ≤6 °C,[18] H_2SO_4 to pH <2	28 days.
9. Biochemical oxygen demand	P, FP, G	Cool, ≤6 °C[18]	48 hours.
10. Boron	P, FP, or Quartz	HNO_3 to pH <2	6 months.
11. Bromide	P, FP, G	None required	28 days.
14. Biochemical oxygen demand, carbonaceous	P, FP G	Cool, ≤6 °C[18]	48 hours.
15. Chemical oxygen demand	P, FP, G	Cool, ≤6 °C,[18] H_2SO_4 to pH <2	28 days.
16. Chloride	P, FP, G	None required	28 days.
17. Chlorine, total residual	P, G	None required	Analyze within 15 minutes.
21. Color	P, FP, G	Cool, ≤6 °C[18]	48 hours.

23-24. Cyanide, total or available (or CATC) and free	P, FP, G	Cool, ≤6 °C,[18] NaOH to pH >10,[5 6] reducing agent if oxidizer present	14 days.
25. Fluoride	P	None required	28 days.
27. Hardness	P, FP, G	HNO_3 or H_2SO_4 to pH <2	6 months.
28. Hydrogen ion (pH)	P, FP, G	None required	Analyze within 15 minutes.
31, 43. Kjeldahl and organic N	P, FP, G	Cool, ≤6 °C,[18] H_2SO_4 to pH <2	28 days.
Table IB—Metals[7]			
18. Chromium VI	P, FP, G	Cool, ≤6 °C,[18] pH = 9.3-9.7[20]	28 days.
35. Mercury (CVAA)	P, FP, G	HNO_3 to pH <2	28 days.
35. Mercury (CVAFS)	FP, G; and FP-lined cap[17]	5 mL/L 12N HCl or 5 mL/L BrCl[17]	90 days.[17]
3, 5-8, 12, 13, 19, 20, 22, 26, 29, 30, 32-34, 36, 37, 45, 47, 51, 52, 58-60, 62, 63, 70-72, 74, 75. Metals, except boron, chromium VI, and mercury	P, FP, G	HNO_3 to pH <2, or at least 24 hours prior to analysis[19]	6 months.
38. Nitrate	P, FP, G	Cool, ≤6 °C[18]	48 hours.
39. Nitrate-nitrite	P, FP, G	Cool, ≤6 °C,[18]H_2SO_4 to pH <2	28 days.
40. Nitrite	P, FP, G	Cool, ≤6 °C[18]	48 hours.
41. Oil and grease	G	Cool to ≤6 °C,[18] HCl or H_2SO_4 to pH <2	28 days.
42. Organic Carbon	P, FP, G	Cool to ≤6 °C,[18] HCl, H_2SO_4, or H_3PO_4 to pH <2	28 days.

44. Orthophosphate	P, FP, G	Cool, to ≤6 °C[18 24]	Filter within 15 minutes; Analyze within 48 hours.
46. Oxygen, Dissolved Probe	G, Bottle and top	None required	Analyze within 15 minutes.
47. Winkler	G, Bottle and top	Fix on site and store in dark	8 hours.
48. Phenols	G	Cool, ≤6 °C,[18] H_2SO_4 to pH <2	28 days.
49. Phosphorous (elemental)	G	Cool, ≤6 °C[18]	48 hours.
50. Phosphorous, total	P, FP, G	Cool, ≤6 °C,[18] H_2SO_4 to pH <2	28 days.
53. Residue, total	P, FP, G	Cool, ≤6 °C[18]	7 days.
54. Residue, Filterable	P, FP, G	Cool, ≤6 °C[18]	7 days.
55. Residue, Nonfilterable (TSS)	P, FP, G	Cool, ≤6 °C[18]	7 days.
56. Residue, Settleable	P, FP, G	Cool, ≤6 °C[18]	48 hours.
57. Residue, Volatile	P, FP, G	Cool, ≤6 °C[18]	7 days.
61. Silica	P or Quartz	Cool, ≤6 °C[18]	28 days.
64. Specific conductance	P, FP, G	Cool, ≤6 °C[18]	28 days.
65. Sulfate	P, FP, G	Cool, ≤6 °C[18]	28 days.
66. Sulfide	P, FP, G	Cool, ≤6 °C,[18] add zinc acetate plus sodium hydroxide to pH >9	7 days.
67. Sulfite	P, FP, G	None required	Analyze within 15 minutes.
68. Surfactants	P, FP, G	Cool, ≤6 °C[18]	48 hours.

69. Temperature	P, FP, G	None required	Analyze within 15 minutes.
73. Turbidity	P, FP, G	Cool, ≤6 °C[18]	48 hours.
Table IC—Organic Tests[8]			
13, 18-20, 22, 24, 25, 27,28, 34-37, 39-43, 45-47, 56, 76, 104, 105, 108-111, 113. Purgeable Halocarbons	G, FP-lined septum	Cool, ≤6 °C,[18] 0.008% $Na_2S_2O_3$,[5] HCl to pH 2	14 days.
26. 2-Chloroethylvinyl ether	G, FP-lined septum	Cool, ≤6 °C,[18] 0.008% $Na_2S_2O_3$[5]	14 days.
6, 57, 106. Purgeable aromatic hydrocarbons	G, FP-lined septum	Cool, ≤6 °C,[18] 0.008% $Na_2S_2O_3$,[5] HCl to pH 2[9]	14 days.[9]
3, 4. Acrolein and acrylonitrile	G, FP-lined septum	Cool, ≤6 °C,[18] 0.008% $Na_2S_2O_3$, pH to 4-5[10]	14 days.[10]
23, 30, 44, 49, 53, 77, 80, 81, 98, 100, 112. Phenols[11]	G, FP-lined cap	Cool, ≤6 °C,[18] 0.008% $Na_2S_2O_3$	7 days until extraction, 40 days after extraction.
7, 38. Benzidines[11] [12]	G, FP-lined cap	Cool, ≤6 °C,[18] 0.008% $Na_2S_2O_3$[5]	7 days until extraction.[13]
14, 17, 48, 50-52. Phthalate esters[11]	G, FP-lined cap	Cool, ≤6 °C[18]	7 days until extraction, 40 days after extraction.
82-84. Nitrosamines[11] [14]	G, FP-lined cap	Cool, ≤6 °C,[18] store in dark, 0.008% $Na_2S_2O_3$[5]	7 days until extraction, 40 days after extraction.
88-94. PCBs[11]	G, FP-lined cap	Cool, ≤6 °C[18]	1 year until extraction, 1 year after extraction.
54, 55, 75, 79. Nitroaromatics and isophorone[11]	G, FP-lined cap	Cool, ≤6 °C,[18] store in dark, 0.008% $Na_2S_2O_3$[5]	7 days until extraction, 40 days after extraction.

1, 2, 5, 8-12, 32, 33, 58, 59, 74, 78, 99, 101. Polynuclear aromatic hydrocarbons[11]	G, FP-lined cap	Cool, ≤6 °C,[18] store in dark, 0.008% $Na_2S_2O_3$[5]	7 days until extraction, 40 days after extraction.
15, 16, 21, 31, 87. Haloethers[11]	G, FP-lined cap	Cool, ≤6 °C,[18] 0.008% $Na_2S_2O_3$[5]	7 days until extraction, 40 days after extraction.
29, 35-37, 63-65, 107. Chlorinated hydrocarbons[11]	G, FP-lined cap	Cool, ≤6 °C[18]	7 days until extraction, 40 days after extraction.
60-62, 66-72, 85, 86, 95-97, 102, 103. CDDs/CDFs[11]	G	See footnote 11	See footnote 11.
Aqueous Samples: Field and Lab Preservation	G	Cool, ≤6 °C,[18] 0.008% $Na_2S_2O_3$,[5] pH <9	1 year.
Solids and Mixed-Phase Samples: Field Preservation	G	Cool, ≤6 °C[18]	7 days.
Tissue Samples: Field Preservation	G	Cool, ≤6 °C[18]	24 hours.
Solids, Mixed-Phase, and Tissue Samples: Lab Preservation	G	Freeze, ≤−10 °C	1 year.
114-118. Alkylated phenols	G	Cool, <6 °C, H_2SO_4 to pH <2	28 days until extraction, 40 days after extraction.
119. Adsorbable Organic Halides (AOX)	G	Cool, <6 °C, 0.008% $Na_2S_2O_3$, HNO_3 to pH <2	Hold *at least* 3 days, but not more than 6 months.
120. Chlorinated Phenolics	G, FP-lined cap	Cool, <6 °C, 0.008% $Na_2S_2O_3$, H_2SO_4 to pH <2	30 days until acetylation, 30 days after acetylation.
Table ID—Pesticides Tests			

1-70. Pesticides[11]	G, FP-lined cap	Cool, ≤6 °C,[18] pH 5-9[15]	7 days until extraction, 40 days after extraction.
Table IE—Radiological Tests			
1-5. Alpha, beta, and radium	P, FP, G	HNO_3 to pH <2	6 months.
Table IH—Bacterial Tests			
1-4. Coliform, total, fecal	PA, G	Cool, <10 °C, 0.008% $Na_2S_2O_3$[5]	8 hours.[22 23]
5. *E. coli*	PA, G	Cool, <10 °C, 0. 008% $Na_2S_2O_3$[5]	8 hours.[22]
6. Fecal streptococci	PA, G	Cool, <10 °C, 0.008% $Na_2S_2O_3$[5]	8 hours.[22]
7. Enterococci	PA, G	Cool, <10 °C, 0. 008% $Na_2S_2O_3$[5]	8 hours.[22]
Table IH—Protozoan Tests			
8. *Cryptosporidium*	LDPE; field filtration	1-10 °C	96 hours.[21]
9. *Giardia*	LDPE; field filtration	1-10 °C	96 hours.[21]

[1]"P" is for polyethylene; "FP" is fluoropolymer (polytetrafluoroethylene (PTFE); Teflon®), or other fluoropolymer, unless stated otherwise in this Table II; "G" is glass; "PA" is any plastic that is made of a sterilizable material (polypropylene or other autoclavable plastic); "LDPE" is low density polyethylene.

[2]Except where noted in this Table II and the method for the parameter, preserve each grab sample within 15 minutes of collection. For a composite sample collected with an automated sample (e.g., using a 24-hour composite sample; see 40 CFR 122.21(g)(7)(i) or 40 CFR part 403, appendix E), refrigerate the sample at ≤6 °C during collection unless specified otherwise in this Table II or in the method(s). For a composite sample to be split into separate aliquots for preservation and/or analysis, maintain the sample at ≤6 °C, unless specified otherwise in this Table II or in the method(s), until collection, splitting, and preservation is completed. Add the preservative to the sample container prior to sample collection when the preservative will not

compromise the integrity of a grab sample, a composite sample, or aliquot split from a composite sample within 15 minutes of collection. If a composite measurement is required but a composite sample would compromise sample integrity, individual grab samples must be collected at prescribed time intervals (e.g., 4 samples over the course of a day, at 6-hour intervals). Grab samples must be analyzed separately and the concentrations averaged. Alternatively, grab samples may be collected in the field and composited in the laboratory if the compositing procedure produces results equivalent to results produced by arithmetic averaging of results of analysis of individual grab samples. For examples of laboratory compositing procedures, see EPA Method 1664 Rev. A (oil and grease) and the procedures at 40 CFR 141.24(f)(14)(iv) and (v) (volatile organics).

[3]When any sample is to be shipped by common carrier or sent via the U.S. Postal Service, it must comply with the Department of Transportation Hazardous Materials Regulations (49 CFR part 172). The person offering such material for transportation is responsible for ensuring such compliance. For the preservation requirement of Table II, the Office of Hazardous Materials, Materials Transportation Bureau, Department of Transportation has determined that the Hazardous Materials Regulations do not apply to the following materials: Hydrochloric acid (HCl) in water solutions at concentrations of 0.04% by weight or less (pH about 1.96 or greater; Nitric acid (HNO_3) in water solutions at concentrations of 0.15% by weight or less (pH about 1.62 or greater); Sulfuric acid (H_2SO_4) in water solutions at concentrations of 0.35% by weight or less (pH about 1.15 or greater); and Sodium hydroxide (NaOH) in water solutions at concentrations of 0.080% by weight or less (pH about 12.30 or less).

[4]Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before the start of analysis and still be considered valid. Samples may be held for longer periods only if the permittee or monitoring laboratory have data on file to show that, for the specific types of samples under study, the analytes are stable for the longer time, and has received a variance from the Regional ATP Coordinator under §136.3(e). For a grab sample, the holding time begins at the time of collection. For a composite sample collected with an automated sampler (e.g., using a 24-hour composite sampler; see 40 CFR 122.21(g)(7)(i) or 40 CFR part 403, appendix E), the holding time begins at the time of the end of collection of the composite sample. For a set of grab samples composited in the field or laboratory, the holding time begins at the time of collection of the last grab sample in the set. Some samples may not be stable for the maximum time period given in the table. A permittee or monitoring laboratory is obligated to hold the sample for a shorter time if it knows that a shorter time is necessary to maintain sample stability. See §136.3(e) for details. The date and time of collection of an individual grab sample is the date and time at which the sample is collected. For a set of grab samples to be composited, and that are all collected on the same calendar date, the date of collection is the date on which the samples are collected. For a set of grab samples to be composited, and that are collected across two calendar dates, the date of collection is the dates of the two days; e.g., November 14-15. For a composite sample collected automatically on a given date, the date of collection is the date on which the sample is collected. For a composite sample collected automatically, and that is collected across two calendar dates, the date of collection is the dates of the two days; e.g., November 14-15. For static-renewal toxicity tests, each grab or composite sample may also be

used to prepare test solutions for renewal at 24 h, 48 h, and/or 72 h after first use, if stored at 0-6 °C, with minimum head space.

[5]ASTM D7365-09a specifies treatment options for samples containing oxidants (e.g., chlorine) for cyanide analyses. Also, Section 9060A of Standard Methods for the Examination of Water and Wastewater (20th and 21st editions) addresses dechlorination procedures for microbiological analyses.

[6]Sampling, preservation and mitigating interferences in water samples for analysis of cyanide are described in ASTM D7365-09a. There may be interferences that are not mitigated by the analytical test methods or D7365-09a. Any technique for removal or suppression of interference may be employed, provided the laboratory demonstrates that it more accurately measures cyanide through quality control measures described in the analytical test method. Any removal or suppression technique not described in D7365-09a or the analytical test method must be documented along with supporting data.

[7]For dissolved metals, filter grab samples within 15 minutes of collection and before adding preservatives. For a composite sample collected with an automated sampler (e.g., using a 24-hour composite sampler; see 40 CFR 122.21(g)(7)(i) or 40 CFR part 403, appendix E), filter the sample within 15 minutes after completion of collection and before adding preservatives. If it is known or suspected that dissolved sample integrity will be compromised during collection of a composite sample collected automatically over time (e.g., by interchange of a metal between dissolved and suspended forms), collect and filter grab samples to be composited (footnote 2) in place of a composite sample collected automatically.

[8]Guidance applies to samples to be analyzed by GC, LC, or GC/MS for specific compounds.

[9]If the sample is not adjusted to pH 2, then the sample must be analyzed within seven days of sampling.

[10]The pH adjustment is not required if acrolein will not be measured. Samples for acrolein receiving no pH adjustment must be analyzed within 3 days of sampling.

[11]When the extractable analytes of concern fall within a single chemical category, the specified preservative and maximum holding times should be observed for optimum safeguard of sample integrity (*i.e.,* use all necessary preservatives and hold for the shortest time listed). When the analytes of concern fall within two or more chemical categories, the sample may be preserved by cooling to ≤6 °C, reducing residual chlorine with 0.008% sodium thiosulfate, storing in the dark, and adjusting the pH to 6-9; samples preserved in this manner may be held for seven days before extraction and for forty days after extraction. Exceptions to this optional preservation and holding time procedure are noted in footnote 5 (regarding the requirement for thiosulfate reduction), and footnotes 12, 13 (regarding the analysis of benzidine).

[12]If 1,2-diphenylhydrazine is likely to be present, adjust the pH of the sample to 4.0 ± 0.2 to prevent rearrangement to benzidine.

[13]Extracts may be stored up to 30 days at <0 °C.

[14]For the analysis of diphenylnitrosamine, add 0.008% $Na_2S_2O_3$ and adjust pH to 7-10 with NaOH within 24 hours of sampling.

[15]The pH adjustment may be performed upon receipt at the laboratory and may be omitted if the samples are extracted within 72 hours of collection. For the analysis of aldrin, add 0.008% $Na_2S_2O_3$.

[16]Place sufficient ice with the samples in the shipping container to ensure that ice is still present when the samples arrive at the laboratory. However, even if ice is present when the samples arrive, immediately measure the temperature of the samples and confirm that the preservation temperature maximum has not been exceeded. In the isolated cases where it can be documented that this holding temperature cannot be met, the permittee can be given the option of on-site testing or can request a variance. The request for a variance should include supportive data which show that the toxicity of the effluent samples is not reduced because of the increased holding temperature. Aqueous samples must not be frozen. Hand-delivered samples used on the day of collection do not need to be cooled to 0 to 6 °C prior to test initiation.

[17]Samples collected for the determination of trace level mercury (<100 ng/L) using EPA Method 1631 must be collected in tightly-capped fluoropolymer or glass bottles and preserved with BrCl or HCl solution within 48 hours of sample collection. The time to preservation may be extended to 28 days if a sample is oxidized in the sample bottle. A sample collected for dissolved trace level mercury should be filtered in the laboratory within 24 hours of the time of collection. However, if circumstances preclude overnight shipment, the sample should be filtered in a designated clean area in the field in accordance with procedures given in Method 1669. If sample integrity will not be maintained by shipment to and filtration in the laboratory, the sample must be filtered in a designated clean area in the field within the time period necessary to maintain sample integrity. A sample that has been collected for determination of total or dissolved trace level mercury must be analyzed within 90 days of sample collection.

[18]Aqueous samples must be preserved at ≤6 °C, and should not be frozen unless data demonstrating that sample freezing does not adversely impact sample integrity is maintained on file and accepted as valid by the regulatory authority. Also, for purposes of NPDES monitoring, the specification of "≤ °C" is used in place of the "4 °C" and "<4 °C" sample temperature requirements listed in some methods. It is not necessary to measure the sample temperature to three significant figures (1/100th of 1 degree); rather, three significant figures are specified so that rounding down to 6 °C may not be used to meet the ≤6 °C requirement. The preservation temperature does not apply to samples that are analyzed immediately (less than 15 minutes).

[19]An aqueous sample may be collected and shipped without acid preservation. However, acid must be added at least 24 hours before analysis to dissolve any metals that adsorb to the container walls. If the sample must be analyzed within 24 hours of collection, add the acid

immediately (see footnote 2). Soil and sediment samples do not need to be preserved with acid. The allowances in this footnote supersede the preservation and holding time requirements in the approved metals methods.

[20]To achieve the 28-day holding time, use the ammonium sulfate buffer solution specified in EPA Method 218.6. The allowance in this footnote supersedes preservation and holding time requirements in the approved hexavalent chromium methods, unless this supersession would compromise the measurement, in which case requirements in the method must be followed.

[21]Holding time is calculated from time of sample collection to elution for samples shipped to the laboratory in bulk and calculated from the time of sample filtration to elution for samples filtered in the field.

[22]Sample analysis should begin as soon as possible after receipt; sample incubation must be started no later than 8 hours from time of collection.

[23]For fecal coliform samples for sewage sludge (biosolids) only, the holding time is extended to 24 hours for the following sample types using either EPA Method 1680 (LTB-EC) or 1681 (A-1): Class A composted, Class B aerobically digested, and Class B anaerobically digested.

[24]The immediate filtration requirement in orthophosphate measurement is to assess the dissolved or bio-available form of orthophosphorus (*i.e.,* that which passes through a 0.45-micron filter), hence the requirement to filter the sample immediately upon collection (*i.e.,* within 15 minutes of collection).

[38 FR 28758, Oct. 16, 1973]

EDITORIAL NOTE: For FEDERAL REGISTER citations affecting §136.3, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and at *www.govinfo.gov.*

§136.4 Application for and approval of alternate test procedures for nationwide use.

(a) A written application for review of an alternate test procedure (alternate method) for nationwide use may be made by letter via email or by hard copy in triplicate to the National Alternate Test Procedure (ATP) Program Coordinator (National Coordinator), Office of Science and Technology (4303T), Office of Water, U.S. Environmental Protection Agency, 1200 Pennsylvania Ave. NW., Washington, DC 20460. Any application for an ATP under this paragraph (a) shall:

(1) Provide the name and address of the responsible person or firm making the application.

(2) Identify the pollutant(s) or parameter(s) for which nationwide approval of an alternate test procedure is being requested.

(3) Provide a detailed description of the proposed alternate test procedure, together with references to published or other studies confirming the general applicability of the alternate test procedure for the analysis of the pollutant(s) or parameter(s) in wastewater discharges from representative and specified industrial or other categories.

(4) Provide comparability data for the performance of the proposed alternative test procedure compared to the performance of the reference method.

(b) The National Coordinator may request additional information and analyses from the applicant in order to evaluate whether the alternate test procedure satisfies the applicable requirements of this part.

(c) *Approval for nationwide use.* (1) After a review of the application and any additional analyses requested from the applicant, the National Coordinator will notify the applicant, in writing, of whether the National Coordinator will recommend approval or disapproval of the alternate test procedure for nationwide use in CWA programs. If the application is not recommended for approval, the National Coordinator may specify what additional information might lead to a reconsideration of the application and notify the Regional Alternate Test Procedure Coordinators of the disapproval recommendation. Based on the National Coordinator's recommended disapproval of a proposed alternate test procedure and an assessment of any current approvals for limited uses for the unapproved method, the Regional ATP Coordinator may decide to withdraw approval of the method for limited use in the Region.

(2) Where the National Coordinator has recommended approval of an applicant's request for nationwide use of an alternate test procedure, the National Coordinator will notify the applicant. The National Coordinator will also notify the Regional ATP Coordinators that they may consider approval of this alternate test procedure for limited use in their Regions based on the information and data provided in the application until the alternate test procedure is approved by publication in a final rule in the FEDERAL REGISTER.

(3) EPA will propose to amend this part to include the alternate test procedure in §136.3. EPA shall make available for review all the factual bases for its proposal, including the method, any performance data submitted by the applicant and any available EPA analysis of those data.

(4) Following public comment, EPA shall publish in the FEDERAL REGISTER a final decision on whether to amend this part to include the alternate test procedure as an approved analytical method for nationwide use.

(5) Whenever the National Coordinator has recommended approval of an applicant's ATP request for nationwide use, any person may request an approval of the method for limited use under §136.5 from the EPA Region.

[77 FR 29809, May 18, 2012, as amended at 82 FR 40874, Aug. 28, 2017]

§136.5 Approval of alternate test procedures for limited use.

(a) Any person may request the Regional ATP Coordinator to approve the use of an alternate test procedure in the Region.

(b) When the request for the use of an alternate test procedure concerns use in a State with an NPDES permit program approved pursuant to section 402 of the Act, the requestor shall first submit an application for limited use to the Director of the State agency having responsibility for issuance of NPDES permits within such State (*i.e.,* permitting authority). The Director will forward the application to the Regional ATP Coordinator with a recommendation for or against approval.

(c) Any application for approval of an alternate test procedure for limited use may be made by letter, email or by hard copy. The application shall include the following:

(1) Provide the name and address of the applicant and the applicable ID number of the existing or pending permit(s) and issuing agency for which use of the alternate test procedure is requested, and the discharge serial number.

(2) Identify the pollutant or parameter for which approval of an alternate test procedure is being requested.

(3) Provide justification for using testing procedures other than those specified in Tables IA through IH of §136.3, or in the NPDES permit.

(4) Provide a detailed description of the proposed alternate test procedure, together with references to published studies of the applicability of the alternate test procedure to the effluents in question.

(5) Provide comparability data for the performance of the proposed alternate test procedure compared to the performance of the reference method.

(d) *Approval for limited use.* (1) The Regional ATP Coordinator will review the application and notify the applicant and the appropriate State agency of approval or rejection of the use of the alternate test procedure. The approval may be restricted to use only with respect to a specific discharge or facility (and its laboratory) or, at the discretion of the Regional ATP Coordinator, to all dischargers or facilities (and their associated laboratories) specified in the approval for the Region. If the application is not approved, the Regional ATP Coordinator shall specify what additional information might lead to a reconsideration of the application.

(2) The Regional ATP Coordinator will forward a copy of every approval and rejection notification to the National Alternate Test Procedure Coordinator.

[77 FR 29809, May 18, 2012, as amended at 82 FR 40875, Aug. 28, 2017]

§136.6 Method modifications and analytical requirements.

Link to an amendment published at 86 FR 27260, May 19, 2021.

(a) *Definitions of terms used in this section*—(1) *Analyst* means the person or laboratory using a test procedure (analytical method) in this part.

(2) *Chemistry of the method* means the reagents and reactions used in a test procedure that allow determination of the analyte(s) of interest in an environmental sample.

(3) *Determinative technique* means the way in which an analyte is identified and quantified (e.g., colorimetry, mass spectrometry).

(4) *Equivalent performance* means that the modified method produces results that meet or exceed the QC acceptance criteria of the approved method.

(5) *Method-defined analyte* means an analyte defined solely by the method used to determine the analyte. Such an analyte may be a physical parameter, a parameter that is not a specific chemical, or a parameter that may be comprised of a number of substances. Examples of such analytes include temperature, oil and grease, total suspended solids, total phenolics, turbidity, chemical oxygen demand, and biochemical oxygen demand.

(6) *QC* means "quality control."

(b) *Method modifications.* (1) If the underlying chemistry and determinative technique in a modified method are essentially the same as an approved Part 136 method, then the modified method is an equivalent and acceptable alternative to the approved method provided the requirements of this section are met. However, those who develop or use a modification to an approved (Part 136) method must document that the performance of the modified method, in the matrix to which the modified method will be applied, is equivalent to the performance of the approved method. If such a demonstration cannot be made and documented, then the modified method is not an acceptable alternative to the approved method. Supporting documentation must, if applicable, include the routine initial demonstration of capability and ongoing QC including determination of precision and accuracy, detection limits, and matrix spike recoveries. Initial demonstration of capability typically includes analysis of four replicates of a mid-level standard and a method detection limit study. Ongoing quality control typically includes method blanks, mid-level laboratory control samples, and matrix spikes (QC is as specified in the method). The method is considered equivalent if the quality control requirements in the reference method are achieved. Where the laboratory is using a vendor-supplied method, it is the QC criteria in the reference method, not the vendor's method, that must be met to show equivalency. Where a sample preparation step is required (*i.e.,* digestion, distillation), QC tests are to be run using standards treated in the same way as the samples. The method user's Standard Operating Procedure (SOP) must clearly document the modifications made to the reference method. Examples of allowed method modifications are listed in this section. If the method user is uncertain whether a method modification is allowed, the Regional ATP Coordinator or Director should be contacted for approval *prior* to implementing the modification. The method user should also complete necessary performance checks to verify that acceptable performance is achieved with the method modification *prior* to analyses of compliance samples.

(2) *Requirements.* The modified method must meet or exceed performance of the approved method(s) for the analyte(s) of interest, as documented by meeting the initial and ongoing quality control requirements in the method.

(i) *Requirements for establishing equivalent performance.* If the approved method contains QC tests and QC acceptance criteria, the modified method must use these QC tests and the modified method must meet the QC acceptance criteria with the following conditions:

(A) The analyst may only rely on QC tests and QC acceptance criteria in a method if it includes wastewater matrix QC tests and QC acceptance criteria (e.g., matrix spikes) and both initial (start-up) and ongoing QC tests and QC acceptance criteria.

(B) If the approved method does not contain QC tests and QC acceptance criteria or if the QC tests and QC acceptance criteria in the method do not meet the requirements of this section, then the analyst must employ QC tests published in the “equivalent” of a Part 136 method that has such QC, or the essential QC requirements specified at 136.7, as applicable. If the approved method is from a compendium or VCSB and the QA/QC requirements are published in other parts of that organization's compendium rather than within the Part 136 method then that part of the organization's compendium must be used for the QC tests.

(C) In addition, the analyst must perform ongoing QC tests, including assessment of performance of the modified method on the sample matrix (e.g., analysis of a matrix spike/matrix spike duplicate pair for every twenty samples), and analysis of an ongoing precision and recovery sample (e.g., laboratory fortified blank or blank spike) and a blank with each batch of 20 or fewer samples.

(D) If the performance of the modified method in the wastewater matrix or reagent water does not meet or exceed the QC acceptance criteria, the method modification may not be used.

(ii) *Requirements for documentation.* The modified method must be documented in a method write-up or an addendum that describes the modification(s) to the approved method prior to the use of the method for compliance purposes. The write-up or addendum must include a reference number (e.g., method number), revision number, and revision date so that it may be referenced accurately. In addition, the organization that uses the modified method must document the results of QC tests and keep these records, along with a copy of the method write-up or addendum, for review by an auditor.

(3) *Restrictions.* An analyst may not modify an approved Clean Water Act analytical method for a method-defined analyte. In addition, an analyst may not modify an approved method if the modification would result in measurement of a different form or species of an analyte. Changes in method procedures are not allowed if such changes would alter the defined chemistry (*i.e.,* method principle) of the unmodified method. For example, phenol method 420.1

or 420.4 defines phenolics as ferric iron oxidized compounds that react with 4-aminoantipyrine (4-AAP) at pH 10 after being distilled from acid solution. Because total phenolics represents a group of compounds that all react at different efficiencies with 4-AAP, changing test conditions likely would change the behavior of these different phenolic compounds. An analyst may not modify any sample collection, preservation, or holding time requirements of an approved method. Such modifications to sample collection, preservation, and holding time requirements do not fall within the scope of the flexibility allowed at §136.6. Method flexibility refers to modifications of the analytical procedures used for identification and measurement of the analyte only and does not apply to sample collection, preservation, or holding time procedures, which may only be modified as specified in §136.3(e).

(4) *Allowable changes.* Except as noted under paragraph (b)(3) of this section, an analyst may modify an approved test procedure (analytical method) provided that the underlying reactions and principles used in the approved method remain essentially the same, and provided that the requirements of this section are met. If equal or better performance can be obtained with an alternative reagent, then it is allowed. A laboratory wishing to use these modifications must demonstrate acceptable method performance by performing and documenting all applicable initial demonstration of capability and ongoing QC tests and meeting all applicable QC acceptance criteria as described in §136.7. Some examples of the allowed types of changes, provided the requirements of this section are met include:

(i) Changes between manual method, flow analyzer, and discrete instrumentation.

(ii) Changes in chromatographic columns or temperature programs.

(iii) Changes between automated and manual sample preparation, such as digestions, distillations, and extractions; in-line sample preparation is an acceptable form of automated sample preparation for CWA methods.

(iv) In general, ICP-MS is a sensitive and selective detector for metal analysis; however isobaric interference can cause problems for quantitative determination, as well as identification based on the isotope pattern. Interference reduction technologies, such as collision cells or reaction cells, are designed to reduce the effect of spectroscopic interferences that may bias results for the element of interest. The use of interference reduction technologies is allowed, provided the method performance specifications relevant to ICP-MS measurements are met.

(v) The use of EPA Method 200.2 or the sample preparation steps from EPA Method 1638, including the use of closed-vessel digestion, is allowed for EPA Method 200.8, provided the method performance specifications relevant to the ICP-MS are met.

(vi) Changes in pH adjustment reagents. Changes in compounds used to adjust pH are acceptable as long as they do not produce interference. For example, using a different acid to adjust pH in colorimetric methods.

(vii) Changes in buffer reagents are acceptable provided that the changes do not produce interferences.

(viii) Changes in the order of reagent addition are acceptable provided that the change does not alter the chemistry and does not produce an interference. For example, using the same reagents, but adding them in different order, or preparing them in combined or separate solutions (so they can be added separately), is allowed, provided reagent stability or method performance is equivalent or improved.

(ix) Changes in calibration range (provided that the modified range covers any relevant regulatory limit and the method performance specifications for calibration are met).

(x) Changes in calibration model. (A) Linear calibration models do not adequately fit calibration data with one or two inflection points. For example, vendor-supplied data acquisition and processing software on some instruments may provide quadratic fitting functions to handle such situations. If the calibration data for a particular analytical method routinely display quadratic character, using quadratic fitting functions may be acceptable. In such cases, the minimum number of calibrators for second order fits should be six, and in no case should concentrations be extrapolated for instrument responses that exceed that of the most concentrated calibrator. Examples of methods with nonlinear calibration functions include chloride by SM4500-Cl-E-1997, hardness by EPA Method 130.1, cyanide by ASTM D6888 or OIA1677, Kjeldahl nitrogen by PAI-DK03, and anions by EPA Method 300.0.

(B) As an alternative to using the average response factor, the quality of the calibration may be evaluated using the Relative Standard Error (RSE). The acceptance criterion for the RSE is the same as the acceptance criterion for Relative Standard Deviation (RSD), in the method. RSE is calculated as:

$$\%\,RSE = 100x\sqrt{\frac{\sum_{i=1}^{n}\left[\frac{x_i' - x_i}{x_i}\right]^2}{(n-p)}}$$

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Where:

x'_i = Calculated concentration at level i

x_i = Actual concentration of the calibration level i

n = Number of calibration points

p = Number of terms in the fitting equation (average = 1, linear = 2, quadratic = 3)

(C) Using the RSE as a metric has the added advantage of allowing the same numerical standard to be applied to the calibration model, regardless of the form of the model. Thus, if a method states that the RSD should be ≤20% for the traditional linear model through the origin, then the RSE acceptance limit can remain ≤20% as well. Similarly, if a method provides an RSD acceptance limit of ≤15%, then that same figure can be used as the acceptance limit for the RSE. The RSE may be used as an alternative to correlation coefficients and coefficients of determination for evaluating calibration curves for any of the methods at part 136. If the method includes a numerical criterion for the RSD, then the same numerical value is used for the RSE. Some older methods do not include any criterion for the calibration curve—for these methods, if RSE is used the value should be ≤20%. Note that the use of the RSE is included as an alternative to the use of the correlation coefficient as a measure of the suitability of a calibration curve. It is not necessary to evaluate both the RSE and the correlation coefficient.

(xi) Changes in equipment such as equipment from a vendor different from the one specified in the method.

(xii) The use of micro or midi distillation apparatus in place of macro distillation apparatus.

(xiii) The use of prepackaged reagents.

(xiv) The use of digital titrators and methods where the underlying chemistry used for the determination is similar to that used in the approved method.

(xv) Use of selected ion monitoring (SIM) mode for analytes that cannot be effectively analyzed in full-scan mode and reach the required sensitivity. False positives are more of a concern when using SIM analysis, so at a minimum, one quantitation and two qualifying ions must be monitored for each analyte (unless fewer than three ions with intensity greater than 15% of the base peak are available). The ratio of each of the two qualifying ions to the quantitation ion must be evaluated and should agree with the ratio observed in an authentic standard within ±20 percent. Analyst judgment must be applied to the evaluation of ion ratios because the ratios can be affected by co-eluting compounds present in the sample matrix. The signal-to-noise ratio of the least sensitive ion should be at least 3:1. Retention time in the sample should match within 0.05 minute of an authentic standard analyzed under identical conditions. Matrix interferences can cause minor shifts in retention time and may be evident as shifts in the retention times of the internal standards. The total scan time should be such that a minimum of eight scans are obtained per chromatographic peak.

(xvi) Changes are allowed in purge-and-trap sample volumes or operating conditions. Some examples are:

(A) Changes in purge time and purge-gas flow rate. A change in purge time and purge-gas flow rate is allowed provided that sufficient total purge volume is used to achieve the required minimum detectible concentration and calibration range for all compounds. In general, a purge rate in the range 20-200 mL/min and a total purge volume in the range 240-880 mL are recommended.

(B) Use of nitrogen or helium as a purge gas, provided that the required sensitivities for all compounds are met.

(C) Sample temperature during the purge state. Gentle heating of the sample during purging (e.g., 40 °C) increases purging efficiency of hydrophilic compounds and may improve sample-to-sample repeatability because all samples are purged under precisely the same conditions.

(D) Trap sorbent. Any trap design is acceptable, provided that the data acquired meet all QC criteria.

(E) Changes to the desorb time. Shortening the desorb time (e.g., from4 minutes to 1 minute) may not affect compound recoveries, and can shorten overall cycle time and significantly reduce the amount of water introduced to the analytical system, thus improving the precision of analysis, especially for water-soluble analytes. A desorb time of four minutes is recommended, however a shorter desorb time may be used, provided that all QC specifications in the method are met.

(F) Use of water management techniques is allowed. Water is always collected on the trap along with the analytes and is a significant interference for analytical systems (GC and GC/MS). Modern water management techniques (e.g., dry purge or condensation points) can remove moisture from the sample stream and improve analytical performance.

(xvii) If the characteristics of a wastewater matrix prevent efficient recovery of organic pollutants and prevent the method from meeting QC requirements, the analyst may attempt to resolve the issue by adding salts to the sample, provided that such salts do not react with or introduce the target pollutant into the sample (as evidenced by the analysis of method blanks, laboratory control samples, and spiked samples that also contain such salts), and that all requirements of paragraph (b)(2) of this section are met. Samples having residual chlorine or other halogen must be dechlorinated prior to the addition of such salts.

(xviii) If the characteristics of a wastewater matrix result in poor sample dispersion or reagent deposition on equipment and prevent the analyst from meeting QC requirements, the analyst may attempt to resolve the issue by adding a inert surfactant that does not affect the chemistry of the method, such as Brij-35 or sodium dodecyl sulfate (SDS), provided that such surfactant does not react with or introduce the target pollutant into the sample (as evidenced by the analysis of method blanks, laboratory control samples, and spiked samples that also contain such surfactant) and that all requirements of paragraph (b)(1) and (b)(2) of this section are met. Samples having residual chlorine or other halogen must be dechlorinated prior to the addition of such surfactant.

(xix) The use of gas diffusion (using pH change to convert the analyte to gaseous form and/or heat to separate an analyte contained in steam from the sample matrix) across a hydrophobic semi-permeable membrane to separate the analyte of interest from the sample matrix may be used in place of manual or automated distillation in methods for analysis such as ammonia, total cyanide, total Kjeldahl nitrogen, and total phenols. These procedures do not replace the digestion procedures specified in the approved methods and must be used in conjunction with those procedures.

(xx) Changes in equipment operating parameters such as the monitoring wavelength of a colorimeter or the reaction time and temperature as needed to achieve the chemical reactions defined in the unmodified CWA method. For example, molybdenum blue phosphate methods have two absorbance maxima, one at about 660 nm and another at about 880 nm. The former is about 2.5 times less sensitive than the latter. Wavelength choice provides a cost-effective, dilution-free means to increase sensitivity of molybdenum blue phosphate methods.

(xxi) Interchange of oxidants, such as the use of titanium oxide in UV-assisted automated digestion of TOC and total phosphorus, as long as complete oxidation can be demonstrated.

(xxii) Use of an axially viewed torch with Method 200.7.

(c) The permittee must notify their permitting authority of the intent to use a modified method. Such notification should be of the form “Method xxx has been modified within the flexibility allowed in 40 CFR 136.6.” The permittee may indicate the specific paragraph of §136.6 allowing the method modification. Specific details of the modification need not be provided, but must be documented in the Standard Operating Procedure (SOP) and maintained by the analytical laboratory that performs the analysis.

[77 FR 29810, May 18, 2012, as amended at 82 FR 40875, Aug. 28, 2017]

§136.7 Quality assurance and quality control.

The permittee/laboratory shall use suitable QA/QC procedures when conducting compliance analyses with any part 136 chemical method or an alternative method specified by the permitting authority. These QA/QC procedures are generally included in the analytical method or may be part of the methods compendium for approved Part 136 methods from a consensus organization. For example, Standard Methods contains QA/QC procedures in the Part 1000 section of the Standard Methods Compendium. The permittee/laboratory shall follow these QA/QC procedures, as described in the method or methods compendium. If the method lacks QA/QC procedures, the permittee/laboratory has the following options to comply with the QA/QC requirements:

(a) Refer to and follow the QA/QC published in the “equivalent” EPA method for that parameter that has such QA/QC procedures;

(b) Refer to the appropriate QA/QC section(s) of an approved part 136 method from a consensus organization compendium;

(c)(1) Incorporate the following twelve quality control elements, where applicable, into the laboratory's documented standard operating procedure (SOP) for performing compliance analyses when using an approved part 136 method when the method lacks such QA/QC procedures. One or more of the twelve QC elements may not apply to a given method and may be omitted if a written rationale is provided indicating why the element(s) is/are inappropriate for a specific method.

(i) Demonstration of Capability (DOC);

(ii) Method Detection Limit (MDL);

(iii) Laboratory reagent blank (LRB), also referred to as method blank (MB);

(iv) Laboratory fortified blank (LFB), also referred to as a spiked blank, or laboratory control sample (LCS);

(v) Matrix spike (MS) and matrix spike duplicate (MSD), or laboratory fortified matrix (LFM) and LFM duplicate, may be used for suspected matrix interference problems to assess precision;

(vi) Internal standards (for GC/MS analyses), surrogate standards (for organic analysis) or tracers (for radiochemistry);

(vii) Calibration (initial and continuing), also referred to as initial calibration verification (ICV) and continuing calibration verification (CCV);

(viii) Control charts (or other trend analyses of quality control results);

(ix) Corrective action (root cause analysis);

(x) QC acceptance criteria;

(xi) Definitions of preparation and analytical batches that may drive QC frequencies; and

(xii) Minimum frequency for conducting all QC elements.

(2) These twelve quality control elements must be clearly documented in the written standard operating procedure for each analytical method not containing QA/QC procedures, where applicable.

[77 FR 29813, May 18, 2012]

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Title 40: Protection of Environment

PART 122—EPA ADMINISTERED PERMIT PROGRAMS: THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

§122.44 Establishing limitations, standards, and other permit conditions (applicable to State NPDES programs, see §123.25).

In addition to the conditions established under §122.43(a), each NPDES permit shall include conditions meeting the following requirements when applicable.

(a)(1) *Technology-based effluent limitations and standards* based on: effluent limitations and standards promulgated under section 301 of the CWA, or new source performance standards promulgated under section 306 of CWA, on case-by-case effluent limitations determined under section 402(a)(1) of CWA, or a combination of the three, in accordance with §125.3 of this chapter. For new sources or new dischargers, these technology based limitations and standards are subject to the provisions of §122.29(d) (protection period).

(2) *Monitoring waivers for certain guideline-listed pollutants.* (i) The Director may authorize a discharger subject to technology-based effluent limitations guidelines and standards in an NPDES permit to forego sampling of a pollutant found at 40 CFR Subchapter N of this chapter if the discharger has demonstrated through sampling and other technical factors that the pollutant is not present in the discharge or is present only at background levels from intake water and without any increase in the pollutant due to activities of the discharger.

(ii) This waiver is good only for the term of the permit and is not available during the term of the first permit issued to a discharger.

(iii) Any request for this waiver must be submitted when applying for a reissued permit or modification of a reissued permit. The request must demonstrate through sampling or other technical information, including information generated during an earlier permit term that the pollutant is not present in the discharge or is present only at background levels from intake water and without any increase in the pollutant due to activities of the discharger.

(iv) Any grant of the monitoring waiver must be included in the permit as an express permit condition and the reasons supporting the grant must be documented in the permit's fact sheet or statement of basis.

(v) This provision does not supersede certification processes and requirements already established in existing effluent limitations guidelines and standards.

(b)(1) *Other effluent limitations and standards* under sections 301, 302, 303, 307, 318 and 405 of CWA. If any applicable toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is promulgated under section 307(a) of CWA for a toxic pollutant and that standard or prohibition is more stringent than any limitation on the pollutant in the permit, the Director shall institute proceedings under these regulations to modify or revoke and reissue the permit to conform to the toxic effluent standard or prohibition. See also §122.41(a).

(2) *Standards for sewage sludge use or disposal* under section 405(d) of the CWA unless those standards have been included in a permit issued under the appropriate provisions of subtitle C of the Solid Waste Disposal Act, Part C of Safe Drinking Water Act, the Marine Protection, Research, and Sanctuaries Act of 1972, or the Clean Air Act, or under State permit programs approved by the Administrator. When there are no applicable standards for sewage sludge use or disposal, the permit may include requirements developed on a case-by-case basis to protect public health and the environment from any adverse effects which may occur from toxic pollutants in sewage sludge. If any applicable standard for sewage sludge use or disposal is promulgated under section 405(d) of the CWA and that standard is more stringent than any limitation on the pollutant or practice in the permit, the Director may initiate proceedings under these regulations to modify or revoke and reissue the permit to conform to the standard for sewage sludge use or disposal.

(3) Requirements applicable to cooling water intake structures under section 316(b) of the CWA, in accordance with part 125, subparts I, J, and N of this chapter.

(c) *Reopener clause:* For any permit issued to a treatment works treating domestic sewage (including “sludge-only facilities”), the Director shall include a reopener clause to incorporate any applicable standard for sewage sludge use or disposal promulgated under section 405(d) of the CWA. The Director may promptly modify or revoke and reissue any permit containing the reopener clause required by this paragraph if the standard for sewage sludge use or disposal is more stringent than any requirements for sludge use or disposal in the permit, or controls a pollutant or practice not limited in the permit.

(d) *Water quality standards and State requirements:* any requirements in addition to or more stringent than promulgated effluent limitations guidelines or standards under sections 301, 304, 306, 307, 318 and 405 of CWA necessary to:

(1) Achieve water quality standards established under section 303 of the CWA, including State narrative criteria for water quality.

(i) Limitations must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality.

(ii) When determining whether a discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above a narrative or numeric criteria within a State water quality standard, the permitting authority shall use procedures which account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant or pollutant parameter in the effluent, the sensitivity of the species to toxicity testing (when evaluating whole effluent toxicity), and where appropriate, the dilution of the effluent in the receiving water.

(iii) When the permitting authority determines, using the procedures in paragraph (d)(1)(ii) of this section, that a discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above the allowable ambient concentration of a State numeric criteria within a State water quality standard for an individual pollutant, the permit must contain effluent limits for that pollutant.

(iv) When the permitting authority determines, using the procedures in paragraph (d)(1)(ii) of this section, that a discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above the numeric criterion for whole effluent toxicity, the permit must contain effluent limits for whole effluent toxicity.

(v) Except as provided in this subparagraph, when the permitting authority determines, using the procedures in paragraph (d)(1)(ii) of this section, toxicity testing data, or other information, that a discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above a narrative criterion within an applicable State water quality standard, the permit must contain effluent limits for whole effluent toxicity. Limits on whole effluent toxicity are not necessary where the permitting authority demonstrates in the fact sheet or statement of basis of the NPDES permit, using the procedures in paragraph (d)(1)(ii) of this section, that chemical-specific limits for the effluent are sufficient to attain and maintain applicable numeric and narrative State water quality standards.

(vi) Where a State has not established a water quality criterion for a specific chemical pollutant that is present in an effluent at a concentration that causes, has the reasonable potential to cause, or contributes to an excursion above a narrative criterion within an applicable State water quality standard, the permitting authority must establish effluent limits using one or more of the following options:

(A) Establish effluent limits using a calculated numeric water quality criterion for the pollutant which the permitting authority demonstrates will attain and maintain applicable narrative water quality criteria and will fully protect the designated use. Such a criterion may be derived using a proposed State criterion, or an explicit State policy or regulation interpreting its narrative water quality criterion, supplemented with other relevant information which may include: EPA's Water Quality Standards Handbook, October 1983, risk assessment data, exposure data, information about the pollutant from the Food and Drug Administration, and current EPA criteria documents; or

(B) Establish effluent limits on a case-by-case basis, using EPA's water quality criteria, published under section 304(a) of the CWA, supplemented where necessary by other relevant information; or

(C) Establish effluent limitations on an indicator parameter for the pollutant of concern, provided:

(*1*) The permit identifies which pollutants are intended to be controlled by the use of the effluent limitation;

(*2*) The fact sheet required by §124.56 sets forth the basis for the limit, including a finding that compliance with the effluent limit on the indicator parameter will result in controls on the pollutant of concern which are sufficient to attain and maintain applicable water quality standards;

(*3*) The permit requires all effluent and ambient monitoring necessary to show that during the term of the permit the limit on the indicator parameter continues to attain and maintain applicable water quality standards; and

(*4*) The permit contains a reopener clause allowing the permitting authority to modify or revoke and reissue the permit if the limits on the indicator parameter no longer attain and maintain applicable water quality standards.

(vii) When developing water quality-based effluent limits under this paragraph the permitting authority shall ensure that:

(A) The level of water quality to be achieved by limits on point sources established under this paragraph is derived from, and complies with all applicable water quality standards; and

(B) Effluent limits developed to protect a narrative water quality criterion, a numeric water quality criterion, or both, are consistent with the assumptions and requirements of any available wasteload allocation for the discharge prepared by the State and approved by EPA pursuant to 40 CFR 130.7.

(2) Attain or maintain a specified water quality through water quality related effluent limits established under section 302 of CWA;

(3) Conform to the conditions to a State certification under section 401 of the CWA that meets the requirements of §124.53 when EPA is the permitting authority. If a State certification is stayed by a court of competent jurisdiction or an appropriate State board or agency, EPA shall notify the State that the Agency will deem certification waived unless a finally effective State certification is received within sixty days from the date of the notice. If the State does not forward a finally effective certification within the sixty day period, EPA shall include conditions in the permit that may be necessary to meet EPA's obligation under section 301(b)(1)(C) of the CWA;

(4) Conform to applicable water quality requirements under section 401(a)(2) of CWA when the discharge affects a State other than the certifying State;

(5) Incorporate any more stringent limitations, treatment standards, or schedule of compliance requirements established under Federal or State law or regulations in accordance with section 301(b)(1)(C) of CWA;

(6) Ensure consistency with the requirements of a Water Quality Management plan approved by EPA under section 208(b) of CWA;

(7) Incorporate section 403(c) criteria under part 125, subpart M, for ocean discharges;

(8) Incorporate alternative effluent limitations or standards where warranted by "fundamentally different factors," under 40 CFR part 125, subpart D;

(9) Incorporate any other appropriate requirements, conditions, or limitations (other than effluent limitations) into a new source permit to the extent allowed by the National Environmental Policy Act, 42 U.S.C. 4321 *et seq.* and section 511 of the CWA, when EPA is the permit issuing authority. (See §122.29(c)).

(e) *Technology-based controls for toxic pollutants.* Limitations established under paragraphs (a), (b), or (d) of this section, to control pollutants meeting the criteria listed in paragraph (e)(1) of this section. Limitations will be established in accordance with paragraph (e)(2) of this section. An explanation of the development of these limitations shall be included in the fact sheet under §124.56(b)(1)(i).

(1) Limitations must control all toxic pollutants which the Director determines (based on information reported in a permit application under §122.21(g)(7) or in a notification under §122.42(a)(1) or on other information) are or may be discharged at a level greater than the level which can be achieved by the technology-based treatment requirements appropriate to the permittee under §125.3(c) of this chapter; or

(2) The requirement that the limitations control the pollutants meeting the criteria of paragraph (e)(1) of this section will be satisfied by:

(i) Limitations on those pollutants; or

(ii) Limitations on other pollutants which, in the judgment of the Director, will provide treatment of the pollutants under paragraph (e)(1) of this section to the levels required by §125.3(c).

(f) *Notification level.* A "notification level" which exceeds the notification level of §122.42(a)(1)(i), (ii) or (iii), upon a petition from the permittee or on the Director's initiative. This new notification level may not exceed the level which can be achieved by the technology-based treatment requirements appropriate to the permittee under §125.3(c)

(g) *Twenty-four hour reporting.* Pollutants for which the permittee must report violations of maximum daily discharge limitations under §122.41(1)(6)(ii)(C) (24-hour reporting) shall be listed in the permit. This list shall include any toxic pollutant or hazardous substance, or any pollutant specifically identified as the method to control a toxic pollutant or hazardous substance.

(h) *Durations* for permits, as set forth in §122.46.

(i) *Monitoring requirements.* In addition to §122.48, the following monitoring requirements:

(1) To assure compliance with permit limitations, requirements to monitor:

(i) The mass (or other measurement specified in the permit) for each pollutant limited in the permit;

(ii) The volume of effluent discharged from each outfall;

(iii) Other measurements as appropriate including pollutants in internal waste streams under §122.45(i); pollutants in intake water for net limitations under §122.45(f); frequency, rate of discharge, etc., for noncontinuous discharges under §122.45(e); pollutants subject to notification requirements under §122.42(a); and pollutants in sewage sludge or other monitoring as specified in 40 CFR part 503; or as determined to be necessary on a case-by-case basis pursuant to section 405(d)(4) of the CWA.

(iv) According to sufficiently sensitive test procedures (i.e., methods) approved under 40 CFR part 136 for the analysis of pollutants or pollutant parameters or required under 40 CFR chapter I, subchapter N or O.

(A) For the purposes of this paragraph, a method is "sufficiently sensitive" when:

(*1*) The method minimum level (ML) is at or below the level of the effluent limit established in the permit for the measured pollutant or pollutant parameter; or

(*2*) The method has the lowest ML of the analytical methods approved under 40 CFR part 136 or required under 40 CFR chapter I, subchapter N or O for the measured pollutant or pollutant parameter.

NOTE TO PARAGRAPH (i)(1)(iv)(A): Consistent with 40 CFR part 136, applicants or permittees have the option of providing matrix or sample specific minimum levels rather than the published levels. Further, where an applicant or permittee can demonstrate that, despite a good faith effort to use a method that would otherwise meet the definition of “sufficiently sensitive”, the analytical results are not consistent with the QA/QC specifications for that method, then the Director may determine that the method is not performing adequately and the Director should select a different method from the remaining EPA-approved methods that is sufficiently sensitive consistent with 40 CFR 122.44(i)(1)(iv)(A). Where no other EPA-approved methods exist, the Director should select a method consistent with 40 CFR 122.44(i)(1)(iv)(B).

(B) In the case of pollutants or pollutant parameters for which there are no approved methods under 40 CFR part 136 or methods are not otherwise required under 40 CFR chapter I, subchapter N or O, monitoring shall be conducted according to a test procedure specified in the permit for such pollutants or pollutant parameters.

(2) Except as provided in paragraphs (i)(4) and (5) of this section, requirements to report monitoring results shall be established on a case-by-case basis with a frequency dependent on the nature and effect of the discharge, but in no case less than once a year. For sewage sludge use or disposal practices, requirements to monitor and report results shall be established on a case-by-case basis with a frequency dependent on the nature and effect of the sewage sludge use or disposal practice; minimally this shall be as specified in 40 CFR part 503 (where applicable), but in no case less than once a year. All results must be electronically reported in compliance with 40 CFR part 3 (including, in all cases, subpart D to part 3), §122.22, and 40 CFR part 127.

(3) Requirements to report monitoring results for storm water discharges associated with industrial activity which are subject to an effluent limitation guideline shall be established on a case-by-case basis with a frequency dependent on the nature and effect of the discharge, but in no case less than once a year.

(4) Requirements to report monitoring results for storm water discharges associated with industrial activity (other than those addressed in paragraph (i)(3) of this section) shall be established on a case-by-case basis with a frequency dependent on the nature and effect of the discharge. At a minimum, a permit for such a discharge must require:

(i) The discharger to conduct an annual inspection of the facility site to identify areas contributing to a storm water discharge associated with industrial activity and evaluate whether measures to reduce pollutant loadings identified in a storm water pollution prevention plan are adequate and properly implemented in accordance with the terms of the permit or whether additional control measures are needed;

(ii) The discharger to maintain for a period of three years a record summarizing the results of the inspection and a certification that the facility is in compliance with the plan and the permit, and identifying any incidents of non-compliance;

(iii) Such report and certification be signed in accordance with §122.22; and

(iv) Permits for storm water discharges associated with industrial activity from inactive mining operations may, where annual inspections are impracticable, require certification once every three years by a Registered Professional Engineer that the facility is in compliance with the permit, or alternative requirements.

(5) Permits which do not require the submittal of monitoring result reports at least annually shall require that the permittee report all instances of noncompliance not reported under §122.41(l) (1), (4), (5), and (6) at least annually.

(j) *Pretreatment program for POTWs.* Requirements for POTWs to:

(1) Identify, in terms of character and volume of pollutants, any Significant Industrial Users discharging into the POTW subject to Pretreatment Standards under section 307(b) of CWA and 40 CFR part 403.

(2)(i) Submit a local program when required by and in accordance with 40 CFR part 403 to assure compliance with pretreatment standards to the extent applicable under section 307(b). The local program shall be incorporated into the permit as described in 40 CFR part 403. The program must require all indirect dischargers to the POTW to comply with the reporting requirements of 40 CFR part 403.

(ii) Provide a written technical evaluation of the need to revise local limits under 40 CFR 403.5(c)(1), following permit issuance or reissuance.

(3) For POTWs which are “sludge-only facilities,” a requirement to develop a pretreatment program under 40 CFR part 403 when the Director determines that a pretreatment program is necessary to assure compliance with Section 405(d) of the CWA.

(k) *Best management practices (BMPs)* to control or abate the discharge of pollutants when:

(1) Authorized under section 304(e) of the CWA for the control of toxic pollutants and hazardous substances from ancillary industrial activities;

(2) Authorized under section 402(p) of the CWA for the control of storm water discharges;

(3) Numeric effluent limitations are infeasible; or

(4) The practices are reasonably necessary to achieve effluent limitations and standards or to carry out the purposes and intent of the CWA.

NOTE TO PARAGRAPH (k)(4): Additional technical information on BMPs and the elements of BMPs is contained in the following documents: Guidance Manual for Developing Best Management Practices (BMPs), October 1993, EPA No. 833/B-93-004, NTIS No. PB 94-178324, ERIC No. W498); Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices, September 1992, EPA No. 832/R-92-005, NTIS No. PB 92-235951, ERIC No. N482); Storm Water Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices: Summary Guidance, EPA No. 833/R-92-001, NTIS No. PB 93-223550; ERIC No. W139; Storm Water Management for Industrial Activities, Developing Pollution Prevention Plans and Best Management Practices, September 1992; EPA 832/R-92-006, NTIS No. PB 92-235969, ERIC No. N477; Storm Water Management for Industrial Activities, Developing Pollution Prevention Plans and Best Management Practices: Summary Guidance, EPA 833/R-92-002, NTIS No. PB 94-133782; ERIC No. W492. These and other EPA guidance documents can be obtained through the National Service Center for Environmental Publications (NSCEP) at *http://www.epa.gov/nscep*. In addition, States may have BMP guidance documents. These EPA guidance documents are listed here only for informational purposes; they are not binding and EPA does not intend that these guidance documents have any mandatory, regulatory effect by virtue of their listing in this note.

(l) *Reissued permits.* (1) Except as provided in paragraph (l)(2) of this section when a permit is renewed or reissued, interim effluent limitations, standards or conditions must be at least as stringent as the final effluent limitations, standards, or conditions in the previous permit (unless the circumstances on which the previous permit was based have materially and substantially changed since the time the permit was issued and would constitute cause for permit modification or revocation and reissuance under §122.62.)

(2) In the case of effluent limitations established on the basis of Section 402(a)(1)(B) of the CWA, a permit may not be renewed, reissued, or modified on the basis of effluent guidelines promulgated under section 304(b) subsequent to the original issuance of such permit, to contain effluent limitations which are less stringent than the comparable effluent limitations in the previous permit.

(i) Exceptions—A permit with respect to which paragraph (l)(2) of this section applies may be renewed, reissued, or modified to contain a less stringent effluent limitation applicable to a pollutant, if—

(A) Material and substantial alterations or additions to the permitted facility occurred after permit issuance which justify the application of a less stringent effluent limitation;

(B)(*1*) Information is available which was not available at the time of permit issuance (other than revised regulations, guidance, or test methods) and which would have justified the application of a less stringent effluent limitation at the time of permit issuance; or

(*2*) The Administrator determines that technical mistakes or mistaken interpretations of law were made in issuing the permit under section 402(a)(1)(b);

(C) A less stringent effluent limitation is necessary because of events over which the permittee has no control and for which there is no reasonably available remedy;

(D) The permittee has received a permit modification under section 301(c), 301(g), 301(h), 301(i), 301(k), 301(n), or 316(a); or

(E) The permittee has installed the treatment facilities required to meet the effluent limitations in the previous permit and has properly operated and maintained the facilities but has nevertheless been unable to achieve the previous effluent limitations, in which case the limitations in the reviewed, reissued, or modified permit may reflect the level of pollutant control actually achieved (but shall not be less stringent than required by effluent guidelines in effect at the time of permit renewal, reissuance, or modification).

(ii) *Limitations.* In no event may a permit with respect to which paragraph (l)(2) of this section applies be renewed, reissued, or modified to contain an effluent limitation which is less stringent than required by effluent guidelines in effect at the time the permit is renewed, reissued, or modified. In no event may such a permit to discharge into waters be renewed, issued, or modified to contain a less stringent effluent limitation if the implementation of such limitation would result in a violation of a water quality standard under section 303 applicable to such waters.

(m) *Privately owned treatment works.* For a privately owned treatment works, any conditions expressly applicable to any user, as a limited co-permittee, that may be necessary in the permit issued to the treatment works to ensure compliance with applicable requirements under this part. Alternatively, the Director may issue separate permits to the treatment works and to its users, or may require a separate permit application from any user. The Director's decision to issue a permit with no conditions applicable to any user, to impose conditions on one or more users, to issue separate permits, or to require separate applications, and the basis for that decision, shall be stated in the fact sheet for the draft permit for the treatment works.

(n) *Grants.* Any conditions imposed in grants made by the Administrator to POTWs under sections 201 and 204 of CWA which are reasonably necessary for the achievement of effluent limitations under section 301 of CWA.

(o) *Sewage sludge.* Requirements under section 405 of CWA governing the disposal of sewage sludge from publicly owned treatment works or any other treatment works treating domestic sewage for any use for which regulations have been established, in accordance with any applicable regulations.

(p) *Coast Guard.* When a permit is issued to a facility that may operate at certain times as a means of transportation over water, a condition that the discharge shall comply with any applicable regulations promulgated by the Secretary of the department in which the Coast Guard is operating, that establish specifications for safe transportation, handling, carriage, and storage of pollutants.

(q) *Navigation.* Any conditions that the Secretary of the Army considers necessary to ensure that navigation and anchorage will not be substantially impaired, in accordance with §124.59 of this chapter.

(r) *Great Lakes.* When a permit is issued to a facility that discharges into the Great Lakes System (as defined in 40 CFR 132.2), conditions promulgated by the State, Tribe, or EPA pursuant to 40 CFR part 132.

(s) *Qualifying State, Tribal, or local programs.* (1) For storm water discharges associated with small construction activity identified in §122.26(b)(15), the Director may include permit conditions that incorporate qualifying State, Tribal, or local erosion and sediment control program requirements by reference. Where a qualifying State, Tribal, or local program does not include one or more of the elements in this paragraph (s)(1), then the Director must include those elements as conditions in the permit. A qualifying State, Tribal, or local erosion and sediment control program is one that includes:

(i) Requirements for construction site operators to implement appropriate erosion and sediment control best management practices;

(ii) Requirements for construction site operators to control waste such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site that may cause adverse impacts to water quality;

(iii) Requirements for construction site operators to develop and implement a storm water pollution prevention plan. (A storm water pollution prevention plan includes site descriptions, descriptions of appropriate control measures, copies of approved State, Tribal or local requirements, maintenance procedures, inspection procedures, and identification of non-storm water discharges); and

(iv) Requirements to submit a site plan for review that incorporates consideration of potential water quality impacts.

(2) For storm water discharges from construction activity identified in §122.26(b)(14)(x), the Director may include permit conditions that incorporate qualifying State, Tribal, or local erosion and sediment control program requirements by reference. A qualifying State, Tribal or local erosion and sediment control program is one that includes the elements listed in paragraph (s)(1) of this section and any additional requirements necessary to achieve the applicable technology-based standards of “best available technology” and “best conventional technology” based on the best professional judgment of the permit writer.

[48 FR 14153, Apr. 1, 1983]

From:	Gallegos, Robert M
To:	Barrios, Kristopher, NMENV
Cc:	Iacona, Brian M; Foley, William
Subject:	[EXT] Follow-Up to Los Alamos National Laboratory Assessment Unit Discussion
Date:	Wednesday, March 3, 2021 12:38:46 PM

Kris,

This follows our discussion yesterday concerning Assessment Unit boundaries for certain perennial waters at LANL. The map is going to take longer. Our GIS colleagues are pretty backed up.

Hope this gets to the outstanding questions:

- DP Canyon – from 0.1 kilometer below the DP Grade Control Structure to 0.4 kilometers above the DP Grade Control Structure
- Pajarito (blw Arroyo de la Delfe) – to a distance of 0.5 kilometers below Arroyo de la Delfe to (confluence with Arroyo de la Delfe)
- Kieling Spring coordinates – 35.8569965 -106.3374554

Let me know if you need anything.

Thanks,

rg

1101E.13: The Commission adopts NMED's proposal because it best captures the intent of applicable federal regulations and is more concise than the Attorney General/AB proposal.

1101E New Paragraphs: The Commission rejects the new paragraphs proposed by AB and NMEQA as unnecessary.

1103A.1: The Commission elects to delete the original term "point or nonpoint source," acknowledging that federal law refers to only point source discharges. However, the Act confers jurisdiction over discharges, not sources, so the Commission elects to retain the term "discharge" for the purposes of this standard to avoid including sources in the scope of this section. The Commission rejects LANL's proposal to separately include "intermittent" surface waters as unnecessary in light of the existing inclusion of ephemeral surface waters.

1103A.2: The Commission adopts NMED's proposal to increase clarity.

1103A.3: The Commission deletes "surface" where indicated to reflect the definition of "water" elsewhere in the Standards. The Commission inserts "surface" to better reflect the definition of "surface waters of the state" elsewhere in the Standards. The Commission adopts LANL's proposal instead of NMED's proposal because the former's focus on discharge, and not the source of discharge, comports more consistently with the jurisdiction conferred by the Act.

1103E: The Commission adopts AB's proposals for 1103E.2 to improve enforcement of the Standards, and adopts NMED's proposals for the remainder of 1103E to achieve consistency with federal standards and to balance the costs and benefits of implementation.

Proposed new 1103G: Due to the lack of evidence in the record supporting SJWC's proposal for wildlife habitat use designation, the Commission declines to adopt its proposal.

Proposed new 1104A: The Commission does not adopt the LANL proposal as unnecessary.

Proposed new 1104B: The Commission declines LANL's proposal to insert language reflecting the new statutory exception of Section 74-6-12(H) because it does so in 1105. The Commission adopts the NMED proposal, as amended, to balance the costs versus the reliability of testing.

1104D: The Commission adopts the LANL proposal, and amends "practical" with "minimum" to comport with federal regulations and both NMED and EPA policy.

1104F: The Commission adopts the hearing officer's proposal listed as 1104.E on p. 61 of the Comments to best balance flexibility with reliability of testing.

1104G: The Commission adopts NMED's proposal to achieve consistency with national standards and as a reasonably protective standard.

Proposed new 1104H: The Commission rejects NMED and AB's respective proposals as overprotective and not supported by sufficient evidence.

1105: The Commission includes the statutory exception of Section 74-6-12(H) to avoid repetition in all relevant subsections.

1105A: The Commission adopts the SWEC proposal for consistency with federal law, although the Commission retains the term "will settle" to avoid an overprotective and uncertain standard.

TITLE IV—PERMITS AND LICENSES

CERTIFICATION

SEC. 401. (a)(1) Any applicant for a Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters, shall provide the licensing or permitting agency a certification from the State in which the discharge originates or will originate, or, if appropriate, from the interstate water pollution control agency having jurisdiction over the navigable waters at the point where the discharge originates or will originate, that any such discharge will comply with the applicable provisions of sections 301, 302, 303, 306, and 307 of this Act. In the case of any such activity for which there is not an applicable effluent limitation or other limitation under sections 301(b) and 302, and there is not an applicable standard under sections 306 and 307, the State shall so certify, except that any such certification shall not be deemed to satisfy section 511(c) of this Act. Such State or interstate agency shall establish procedures for public notice in the case of all applications for certification by it and, to the extent it deems appropriate, procedures for public hearings in connection with specific applications. In any case where a State or interstate agency has no authority to give such a certification, such certification shall be from the Administrator. If the State, interstate agency, or Administrator, as the case may be, fails or refuses to act on a request for certification, within a reasonable period of time (which shall not exceed one year) after receipt of such request, the certification requirements of this subsection shall be waived with respect to such Federal application. No license or permit shall be granted until the certification required by this section has been obtained or has been waived as provided in the preceding sentence. No license or permit shall be granted if certification has been denied by the State, interstate agency, or the Administrator, as the case may be.

(2) Upon receipt of such application and certification the licensing or permitting agency shall immediately notify the Administrator of such application and certification. Whenever such a discharge may affect, as determined by the Administrator, the quality of the waters of any other State, the Administrator within thirty days of the date of notice of application for such Federal license or permit shall so notify such other State, the licensing or permitting agency, and the applicant. If, within sixty days after receipt of such notification, such other State determines that such discharge will affect the quality of its waters so as to violate any water quality requirement in such State, and within such sixty-day period notifies the Administrator and the licensing or permitting agency in writing of its objection to the issuance of such license or permit and requests a public hearing on such objection, the licensing or permitting agency shall hold such a hearing. The Administrator shall at such hearing submit his evaluation and recommendations with respect to any such objection to the licensing or permitting agency. Such agency, based upon the recommendations of such State, the Administrator, and upon any additional evidence, if any, presented to the agency at the hearing, shall condition such license or permit in such manner as may be necessary to insure compliance with ap-

plicable water quality requirements. If the imposition of conditions cannot insure such compliance such agency shall not issue such license or permit.

(3) The certification obtained pursuant to paragraph (1) of this subsection with respect to the construction of any facility shall fulfill the requirements of this subsection with respect to certification in connection with any other Federal license or permit required for the operation of such facility unless, after notice to the certifying State, agency, or Administrator, as the case may be, which shall be given by the Federal agency to whom application is made for such operating license or permit, the State, or if appropriate, the interstate agency or the Administrator, notifies such agency within sixty days after receipt of such notice that there is no longer reasonable assurance that there will be compliance with the applicable provisions of sections 301, 302, 303, 306, and 307 of this Act because of changes since the construction license or permit certification was issued in (A) the construction or operation of the facility, (B) the characteristics of the waters into which such discharge is made, (C) the water quality criteria applicable to such waters or (D) applicable effluent limitations or other requirements. This paragraph shall be inapplicable in any case where the applicant for such operating license or permit has failed to provide the certifying State, or, if appropriate, the interstate agency or the Administrator, with notice of any proposed changes in the construction or operation of the facility with respect to which a construction license or permit has been granted, which changes may result in violation of section 301, 302, 303, 306, or 307 of this Act.

(4) Prior to the initial operation of any federally licensed or permitted facility or activity which may result in any discharge into the navigable waters and with respect to which a certification has been obtained pursuant to paragraph (1) of this subsection, which facility or activity is not subject to a Federal operating license or permit, the licensee or permittee shall provide an opportunity for such certifying State, or, if appropriate, the interstate agency or the Administrator to review the manner in which the facility or activity shall be operated or conducted for the purposes of assuring that applicable effluent limitations or other limitations or other applicable water quality requirements will not be violated. Upon notification by the certifying State, or if appropriate, the interstate agency or the Administrator that the operation of any such federally licensed or permitted facility or activity will violate applicable effluent limitations or other limitations or other water quality requirements such Federal agency may, after public hearing, suspend such license or permit. If such license or permit is suspended, it shall remain suspended until notification is received from the certifying State, agency, or Administrator, as the case may be, that there is reasonable assurance that such facility or activity will not violate the applicable provisions of section 301, 302, 303, 306, or 307 of this Act.

(5) Any Federal license or permit with respect to which a certification has been obtained under paragraph (1) of this subsection may be suspended or revoked by the Federal agency issuing such license or permit upon the entering of a judgment under this Act that such facility or activity has been operated in violation of the

applicable provisions of section 301, 302, 303, 306, or 307 of this Act.

(6) Except with respect to a permit issued under section 402 of this Act, in any case where actual construction of a facility has been lawfully commenced prior to April 3, 1970, no certification shall be required under this subsection for a license or permit issued after April 3, 1970, to operate such facility, except that any such license or permit issued without certification shall terminate April 3, 1973, unless prior to such termination date the person having such license or permit submits to the Federal agency which issued such license or permit a certification and otherwise meets the requirements of this section.

(b) Nothing in this section shall be construed to limit the authority of any department or agency pursuant to any other provision of law to require compliance with any applicable water quality requirements. The Administrator shall, upon the request of any Federal department or agency, or State or interstate agency, or applicant, provide, for the purpose of this section, any relevant information on applicable effluent limitations, or other limitations, standards, regulations, or requirements, or water quality criteria, and shall, when requested by any such department or agency or State or interstate agency, or applicant, comment on any methods to comply with such limitations, standards, regulations, requirements, or criteria.

(c) In order to implement the provisions of this section, the Secretary of the Army, acting throught the Chief of Engineers, is authorized, if he deems it to be in the public interest, to permit the use of spoil disposal areas under his jurisdiction by Federal licenses or permittees, and to make an appropriate charge for such use. Moneys received from such licensees or permittees shall be deposited in the Treasury as miscellaneous receipts.

(d) Any certification provided under this section shall set forth any effluent limitations and other limitations, and monitoring requirements necessary to assure that any applicant for a Federal license or permit will comply with any applicable effluent limitations and other limitations, under section 301 or 302 of this Act, standard of performance under section 306 of this Act, or prohibition, effluent standard, or pretreatment standard under section 307 of this Act, and with any other appropriate requirement of State law set forth in such certification, and shall become a condition on any Federal license or permit subject to the provisions of this section.

(33 U.S.C. 1341)

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

SEC. 402. (a)(1) Except as provided in sections 318 and 404 of this Act, the Administrator may, after opportunity for public hearing, issue a permit for the discharge of any pollutant, or combination of pollutants, notwithstanding section 301(a), upon condition that such discharge will meet either (A) all applicable requirements under sections 301, 302, 306, 307, 308, and 403 of this Act, or (B) prior to the taking of necessary implementing actions relating to all such requirements, such conditions as the Administrator determines are necessary to carry out the provisions of this Act.

(2) The Administrator shall award a certificate or plaque of suitable design to each industrial organization or political subdivision which qualifies for such recognition under regulations established under this subsection.

(3) The President of the United States, the Governor of the appropriate State, the Speaker of the House of Representatives, and the President pro tempore of the Senate shall be notified of the award by the Administrator and the awarding of such recognition shall be published in the Federal Register.

(f) Upon the request of a State water pollution control agency, personnel of the Environmental Protection Agency may be detailed to such agency for the purpose of carrying out the provisions of this Act.

(33 U.S.C. 1361)

GENERAL DEFINITIONS

SEC. 502. Except as otherwise specifically provided, when used in this Act:

(1) The term “State water pollution control agency” means the State agency designated by the Governor having responsibility for enforcing State laws relating to the abatement of pollution.

(2) The term “interstate agency” means an agency of two or more States established by or pursuant to an agreement or compact approved by the Congress, or any other agency of two or more States, having substantial powers or duties pertaining to the control of pollution as determined and approved by the Adminstrator.

(3) The term “State” means a State, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, and the Trust Territory of the Pacific Islands.

(4) The term “municipality” means a city, town, borough, county, parish, district, association, or other public body created by or pursuant to State law and having jurisdiction over disposal of sewage, industrial wastes, or other wastes, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of this Act.

(5) The term “person” means an individual, corporation, partnership, association, State, municipality, commission, or political subdivision of a State, or any interstate body.

(6) The term “pollutant” means dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water. This term does not mean (A) “sewage from vessels or a discharge incidental to the normal operation of a vessel of the Armed Forces” within the meaning of section 312 of this Act; or (B) water, gas, or other material which is injected into a well to facilitate production of oil or gas, or water derived in association with oil or gas production and disposed of in a well, if the well used either to facilitate production or for disposal purpose is approved by authority of the State in which the well is located, and if such State determines

that such injection or disposal will not result in the degradation of ground or surface water resources.

(7) The term "navigable waters" means the waters of the United States, including the territorial seas.

(8) The term "territorial seas" means the belt of the seas measured from the line of ordinary low water along that portion of the coast which is in direct contact with the open sea and the line marking the seaward limit of inland waters, and extending seaward a distance of three miles.

(9) The term "contiguous zone" means the entire zone established or to be established by the United States under article 24 of the Convention of the Territorial Sea and the Contiguous Zone.

(10) The term "ocean" means any portion of the high seas beyond the contiguous zone.

(11) The term "effluent limitation" means any restriction established by a State or the Administrator on quantities, rates, and concentrations of chemical, physical, biological, and other constituents which are discharged from point sources into navigable waters, the waters of the contiguous zone, or the ocean, including schedules of compliance.

(12) The term "discharge of a pollutant" and the term "discharge of pollutants" each means (A) any addition of any pollutant to navigable waters from any point source, (B) any addition of any pollutant to the waters of the contiguous zone or the ocean from any point source other than a vessel or other floating craft.

(13) The term "toxic pollutant" means those pollutants, or combinations of pollutants, including disease-causing agents, which after discharge and upon exposure, ingestion, inhalation or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will, on the basis of information available to the Administrator, cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunctions in reproduction) or physical deformations, in such organisms or their offspring.

(14) The term "point source" means any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged. This term does not include agricultural stormwater discharges and return flows from irrigated agriculture.

(15) The term "biological monitoring" shall mean the determination of the effects on aquatic life, including accumulation of pollutants in tissue, in receiving waters due to the discharge of pollutants (A) by techniques and procedures, including sampling of organisms representative of appropriate levels of the food chain appropriate to the volume and the physical, chemical, and biological characteristics of the effluent, and (B) at appropriate frequencies and locations.

(16) The term "discharge" when used without qualification includes a discharge of a pollutant, and a discharge of pollutants.

(17) The term "schedule of compliance" means a schedule of remedial measures including an enforceable sequence of actions or

operations leading to compliance with an effluent limitation, other limitation, prohibition, or standard.

(18) The term "industrial user" means those industries identified in the Standard Industrial Classification Manual, Bureau of the Budget, 1967, as amended and supplemented, under the category "Division D—Manufacturing" and such other classes of significant waste producers as, by regulation, the Administrator deems appropriate.

(19) The term "pollution" means the man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water.

(20) The term "medical waste" means isolation wastes; infectious agents; human blood and blood products; pathological wastes; sharps; body parts; contaminated bedding; surgical wastes and potentially contaminated laboratory wastes; dialysis wastes; and such additional medical items as the Administrator shall prescribe by regulation.

(21) COASTAL RECREATION WATERS.—

(A) IN GENERAL.—The term "coastal recreation waters" means—

(i) the Great Lakes; and

(ii) marine coastal waters (including coastal estuaries) that are designated under section 303(c) by a State for use for swimming, bathing, surfing, or similar water contact activities.

(B) EXCLUSIONS.—The term "coastal recreation waters" does not include—

(i) inland waters; or

(ii) waters upstream of the mouth of a river or stream having an unimpaired natural connection with the open sea.

(22) FLOATABLE MATERIAL.—

(A) IN GENERAL.—The term "floatable material" means any foreign matter that may float or remain suspended in the water column.

(B) INCLUSIONS.—The term "floatable material" includes—

(i) plastic;

(ii) aluminum cans;

(iii) wood products;

(iv) bottles; and

(v) paper products.

(23) PATHOGEN INDICATOR.—The term "pathogen indicator" means a substance that indicates the potential for human infectious disease.

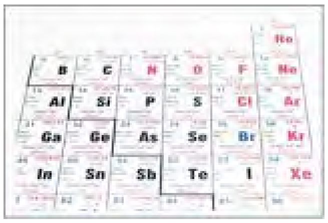
(33 U.S.C. 1362)

WATER POLLUTION CONTROL ADVISORY BOARD

SEC. 503. (a)(1) There is hereby established in the Environmental Protection Agency a Water Pollution Control Advisory Board, composed of the Administrator or his designee, who shall be Chairman, and nine members appointed by the President, none of whom shall be Federal officers or employees. The appointed mem-

EPA United States Environmental Protection Agency

Toxic and Priority Pollutants Under the Clean Water Act



The **Toxic Pollutant List** was developed in 1976 and subsequently added to the Clean Water Act by Congress in 1977. The list was intended to be used by EPA and states as a starting point to ensure that Effluent Guidelines regulations, water quality criteria and standards, and NPDES (National Pollutant Discharge Elimination System) permit requirements addressed the problems of toxics in waterways. However, this list consisted of broad categories of pollutants rather than specific, individual pollutants. Therefore, EPA developed the **Priority Pollutant List** in 1977 to make implementation of the Toxic Pollutant List more practical for water testing and regulatory purposes.

Portions of both lists are outdated. For example, they contain some pesticides that have not been manufactured in the United States for many years and are therefore unlikely to be discharged into surface waters. As such, the pollutants on these lists are not the only ones regulated under the CWA programs. EPA considers a wider range of pollutants—toxic, conventional and nonconventional—when developing Effluent Guidelines. (*See* Learn about Effluent Guidelines.) Neither Congress nor EPA have updated either list, but EPA is providing them here as a reference because EPA, states, and authorized tribes continue to consult the lists when developing ambient water quality criteria pursuant to CWA sections 303(c)(2)(B) and 304(a). (*See* Water Quality Standards: Regulations and Resources)

Related Information

- National Water Quality Criteria Tables

On this page:

Toxic Pollutant List

Key Features

- The Clean Water Act references the Toxic Pollutant List at section 307(a)(1); 33 U.S.C. 1317(a)(1).
- The list appears in the Code of Federal Regulations at 40 CFR 401.15.
- The list contains 65 entries. Many of the entries, such as "haloethers," are for groups of pollutants.

Relationship between CWA Section 307(a)(1) and the Toxic Pollutant List

- Section 307(a)(1) says:

> ...the list of toxic pollutants or combination of pollutants subject to this Act shall consist of those toxic pollutants listed in table 1 of Committee Print Numbered 95-30 of the Committee on Public Works of the House of Representatives…

- Committee Print 95-30 (November 1977) is titled "Data Relating to H.R. 3199 (Clean Water Act of 1977)."
- Table 1 is titled "Section 307—Toxic Pollutants." EPA codified Table 1 at 40 CFR 401.15.

History of the Toxic Pollutant List

- Source of the list: The list was negotiated among parties to a settlement agreement (*NRDC et al. vs Train,* 6 ELR 20588 EXIT , D.D.C. June 9, 1976). This agreement is sometimes referred to as the "Toxics Consent Decree" or the "Flannery Decision" (for presiding U.S. District Court Judge Thomas A. Flannery).
- Congress subsequently ratified the Settlement Agreement and the Toxic Pollutant List when it amended the CWA in 1977 (Pub. L. 95-217, December 27, 1977 (PDF)). (46 pp, 7.7 MB, About PDF)
- Background document:
  Copeland, Claudia. Congressional Research Service (1993). "Toxic Pollutants and the Clean Water Act: Current Issues." Report No. 93-849. EXIT
- The list was first published on January 31, 1978 in the Federal Register (43 FR 4108).
- On July 31, 1979 (44 FR 44501), EPA published the list again and added the list to the CFR at 40 CFR 401.15.
- On November 8, 1983 (48 FR 51405), EPA added regulations at 40 CFR 131.11 that require states and authorized tribes to adopt water quality criteria, sufficient enough to protect the designated use, for section 307(a) toxic pollutants.

- On February 4, 1987, Congress amended CWA section 303(c)(2) by adding subparagraph (B) which requires that a state, whenever reviewing, revising, or adopting new water quality standards, must adopt numeric criteria for all toxic pollutants listed pursuant to section 307(a)(1) for which criteria have been published under section 304(a).
- For the 14 states that did not timely adopt such numeric criteria, EPA promulgated the National Toxics Rule (NTR) on December 22, 1992 (57 FR 60848). The NTR uses the criteria listed in section 304(a) to promulgate numeric criteria for states that had not yet adopted numeric criteria for those toxic pollutants.

Modifications

- EPA removed three pollutants from the list in 1981, after determining that their chemical properties did not justify their inclusion:
  - *Dichlorodifluoromethane* and *trichlorofluoromethane* were de-listed on January 8, 1981 (46 FR 2266) at the request of E.I. duPont de Nemours and Co. because of low solubility in water and high volatility combined with low human and mammalian toxicity. *Bis(chloromethyl) ether* was de-listed on February 4, 1981 (46 FR 10723) based on data that indicated a half-life in water of 38 seconds at 20°C.
- De-listing the three pollutants did not change the 65 entries because the three de-listed pollutants were specific compounds within entries for the groups Halomethanes (list entry 38) and Haloethers (list entry 37).

Priority Pollutant List

Overview

Key features of the Priority Pollutant List and its relationship to the Toxic Pollutant List:

- The Priority Pollutants are a set of chemical pollutants EPA regulates, and for which EPA has published analytical test methods.
- The Priority Pollutant List makes the list of toxic pollutants more usable, in a practical way, for the purposes assigned to EPA by the Clean Water Act. For example, the Priority Pollutant list is more practical for testing and for regulation in that chemicals are described by their individual chemical names. The list of toxic pollutants, in contrast, contains open-ended groups of pollutants, such as "chlorinated benzenes." That group contains hundreds of compounds; there is no test for the group as a whole, nor is it practical to regulate or test for all of these compounds.

Derivation

Starting with the list of toxic pollutants, EPA used four criteria to select and prioritize specific pollutants:

- We included all pollutants specifically named on the list of toxic pollutants;

- There had to be a chemical standard available for the pollutant, so that testing for the pollutant could be performed;
- The pollutant had to have been reported as found in water with a frequency of occurrence of at least 2.5 percent, and
- The pollutant had to have been produced in significant quantities, as reported in Stanford Research Institute's "1976 Directory of Chemical Producers, USA."

Number of Entries

Originally, there were 129. When three pollutants were removed from the list of toxic pollutants in 1981 (see "Modifications" above), they were also removed from the Priority Pollutant List.

- Entry numbers 17, 49, and 50 were removed.
- The last number on the list is still 129, although there are 126 entries.

Publication

Q: Why is the Priority Pollutant List published at 40 CFR Part 423, Appendix A, rather than at Part 401, or some other, more general section?

- One of the first industrial categories for which EPA developed Effluent Guidelines was the Steam Electric Power Generating Category (40 CFR Part 423). The Priority Pollutant List was included to support regulations for that category.
- Although the other sections within Part 423 apply only to the Steam Electric Power Generating Category, the Priority Pollutant List in Appendix A is not limited in terms of its relevance to that one industrial category.
- Some users find it helpful to think of Appendix A to Part 423 as a convenient storage place for the list, or as a matter of convenience for citation.

You may need a PDF reader to view some of the files on this page. See EPA's About PDF page to learn more.

- Priority Pollutant List (PDF) (2 pp, 47 K, 2014)

LAST UPDATED ON AUGUST 24, 2020

Emerging Contaminants and Federal Facility Contaminants of Concern

- Technical Fact Sheets
- Additional Information

Technical and Emerging Contaminant Fact Sheets

EPA published the following technical fact sheets, which provide brief summaries of contaminants of concern that present unique issues and challenges to the environmental community and EPA at contaminated federal facility sites. Each fact sheet provides a brief summary of the contaminant, including physical and chemical properties, environmental and health impacts, existing federal and state guidelines, and detection and treatment methods. These fact sheets are intended for project managers and field personnel to use when addressing specific contaminants at cleanup sites and are updated annually to include timely information.

1,2,3-Trichloropropane (TCP)
EPA Publication Number: EPA 505-F-17-007
This fact sheet provides a brief summary of 1,2,3-trichloropropane (TCP including physical and chemical properties; environmental and health impacts; existing federal and state guidelines; detection and treatment methods; and additional sources of information.

1,4-Dioxane
EPA Publication Number: EPA 505-F-17-011
This fact sheet provides a brief summary of 1,4-dioxane, including physical and chemical properties; environmental and health impacts; existing federal and state guidelines; detection and treatment methods; and additional sources of information.

2,4,6-Trinitrotoluene (TNT)
EPA Publication Number: EPA 505-F-17-009
This fact sheet provides a brief summary of 2,4,6-trinitrotoluene (TNT), including physical and chemical properties; environmental and health impacts; existing federal and state guidelines; detection and treatment methods; and additional sources of information.

Dinitrotoluene (DNT)
EPA Publication number: EPA 505-F-17-010
This fact sheet provides a brief summary of dinitrotoluene (DNT), including

physical and chemical properties; environmental and health impacts; existing federal and state guidelines; detection and treatment methods; and additional sources of information.

Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)
EPA Publication Number: EPA 505-F-17-008
This fact sheet provides a brief summary of hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX), also known as royal demolition explosive, including physical and chemical properties; environmental and health impacts; existing federal and state guidelines; detection and treatment methods; and additional sources of information.

Nanomaterials
EPA Publication Number: EPA 505-F-17-002
This fact sheet provides a brief summary of the emerging contaminant nanomaterials (NM), including physical and chemical properties; environmental and health impacts; existing federal and state guidelines; detection and treatment methods; and additional sources of information.

N-Nitroso-dimethylamine (NDMA)
EPA Publication Number: EPA 505-F-17-005
This fact sheet provides a brief summary of N-Nitroso-dimethylamine (NDMA), including physical and chemical properties; environmental and health impacts; existing federal and state guidelines; detection and treatment methods; and additional sources of information.

Perchlorate
EPA Publication Number: EPA 505-F-17-003
This fact sheet provides a brief summary of perchlorate, including physical and chemical properties; environmental and health impacts; existing federal and state guidelines; detection and treatment methods; and additional sources of information.

Perfluorooctane Sulfonate (PFOS) and Perfluorooctanoic Acid (PFOA)
EPA Publication Number: EPA 505-F-17-001
This fact sheet provides a summary of two contaminants of emerging concern, perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA), including physical and chemical properties; environmental and health impacts; existing federal and state guidelines; detection and treatment methods; and additional sources of information.

Polybrominated biphenyls (PBBs)
EPA Publication Number: EPA 505-F-17-016
This fact sheet provides a brief summary of polybrominated biphenyls (PBB), including physical and chemical properties; environmental and health impacts; existing federal and state guidelines; detection and treatment methods; and additional sources of information.

Polybrominated diphenyl ethers (PBDEs)
EPA Publication Number: EPA 505-F-17-015
This fact sheet provides a brief summary of polybrominated diphenyl ethers (PBDE), including physical and chemical properties; environmental and health impacts; existing federal and state guidelines; detection and treatment methods; and additional sources of information.

Tungsten
EPA Publication Number: EPA 505-F-17-004
This fact sheet provides a brief summary of tungsten, including physical and chemical properties; environmental and health impacts; existing federal and state guidelines; detection and treatment methods; and additional sources of information.

Additional Information

Perchlorate Resources

Perchlorate is used in a wide range of applications, including military munitions (mortars, flares, grenades), solid rocket fuel, pyrotechnics and fireworks, blasting agents, matches, air bags, and certain types of fertilizers. It has been detected in the ground water at 54 federal facilities and 29 private (Superfund or RCRA) sites in 26 states. EPA and states are addressing the contamination at many of the sites through investigations and response actions (e.g., blending, providing alternative water supplies, remediating ground water contamination) or through enforcement actions against potentially responsible parties (PRPs). For additional perchlorate information, visit the following:

- US EPA: Perchlorate
- US EPA: Revised Assessment Guidance for Perchlorate - January 2009

Vapor Intrusion

Vapor intrusion (VI) also is being examined as an emerging contaminant because of concerns about the VI pathway. Vapor intrusion generally occurs when there is a migration of volatile chemicals from contaminated ground water or soil into indoor air spaces of overlying buildings.

For additional information on vapor intrusion, visit EPA's Vapor Intrusion Web site.

LAST UPDATED ON OCTOBER 7, 2020

1,4-Dioxane; CASRN 123-91-1

Human health assessment information on a chemical substance is included in the IRIS database only after a comprehensive review of toxicity data, as outlined in the IRIS assessment development process. Sections I (Health Hazard Assessments for Noncarcinogenic Effects) and II (Carcinogenicity Assessment for Lifetime Exposure) present the conclusions that were reached during the assessment development process. Supporting information and explanations of the methods used to derive the values given in IRIS are provided in the guidance documents located on the IRIS website.

STATUS OF DATA FOR 1,4-Dioxane

File First On-Line 08/22/1988

Category (section)	Assessment Available?	Last Revised
Oral RfD (I.A.)	yes	08/11/2010
Inhalation RfC (I.B.)	yes	09/20/2013
Carcinogenicity Assessment (II.)	yes	09/20/2013

I. HEALTH HAZARD ASSESSMENTS FOR NONCARCINOGENIC EFFECTS

I.A. REFERENCE DOSE (RfD) FOR CHRONIC ORAL EXPOSURE

Substance Name – 1,4-Dioxane
CASRN – 123-91-1
Section I.A. Last Revised – 08/11/2010

The RfD is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily oral exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. The RfD is intended for use in risk assessments for health effects known or assumed to be produced through a nonlinear (presumed threshold) mode of action. It is expressed in units of mg/kg-day. Please refer to the guidance documents at http://www.epa.gov/iris/backgrd.html for an elaboration of these concepts. Because RfD values can be derived for the noncarcinogenic health effects of substances that are also carcinogens, it is essential to refer to other sources of information concerning the carcinogenicity of this chemical substance. If the U.S. EPA has evaluated this substance for potential human carcinogenicity, a summary of that evaluation will be contained in Section II of this file.

There was no previous oral RfD for 1,4-dioxane on IRIS.

I.A.1. CHRONIC ORAL RfD SUMMARY

Critical Effect	Point of Departure	UF	Chronic RfD
Liver and kidney toxicity **Chronic oral male rat study** **Kociba et al. (1974)**	NOAEL: 9.6 mg/kg-day	300	0.03 mg/kg-day

I.A.2. PRINCIPAL AND SUPPORTING STUDIES (ORAL RfD)

Liver and kidney toxicity were the primary noncancer health effects associated with exposure to 1,4-dioxane in humans and laboratory animals. Occupational exposure to 1,4-dioxane has resulted in hemorrhagic nephritis and centrilobular necrosis of the liver (Johnstone, 1959; Barber, 1934). In animals, liver and kidney degeneration and necrosis were observed frequently in acute oral and inhalation studies (JBRC, 1998a; Drew et al., 1978; David, 1964; Kesten et al., 1939; Laug et al., 1939; Schrenk and Yant, 1936; de Navasquez, 1935; Fairley et al., 1934). Liver and kidney effects were also observed following chronic oral exposure to 1,4-dioxane in animals (Kano et al., 2009; JBRC, 1998b; Yamazaki et al., 1994; NCI, 1978; Kociba et al., 1974; Argus et al., 1973; Argus et al., 1965) [see summary Table 4-25 in the *Toxicological Review of 1,4-Dioxane* (U.S. EPA, 2013)].

In the available chronic studies, (Kociba et al., 1974) reported the most sensitive effects in the liver and kidney based on a NOAEL of 9.6 mg/kg-day and a LOAEL of 94 mg/kg-day in male Sherman rats. Kociba et al. (1974) reported toxic effects of hepatocellular degeneration and necrosis in the liver, while liver lesions reported in other studies (JBRC, 1998b; Argus et al., 1973) appeared to be related to the carcinogenic process. Kociba et al. (1974) also reported renal tubule epithelial cell degenerative changes and necrosis in the kidney which was supported by data in NCI (1978) and Argus et al. (1973); however, kidney toxicity was observed in these studies at higher doses. For degenerative liver effects resulting from 1,4-dioxane exposure, the Kociba et al. (1974) study represents the most sensitive effect and dataset observed in a chronic bioassay. As a result, Kociba et al. (1974) was chosen as the principal study for the derivation of the RfD.

Kociba et al. (1974) conducted a 2-year study in which four groups of 6-8-week-old Sherman rats (60/sex/dose level) were administered 1,4-dioxane in drinking water at levels of 0 (controls), 0.01, 0.1, or 1.0% for up to 716 days. Based on water consumption and BW data for specific exposure groups, Kociba et al. (1974) calculated mean daily doses of 9.6, 94, and 1,015 mg/kg-day for male rats and 19, 148, and 1,599 mg/kg-day for female rats during days 114-198 for the 0.01, 0.1, and 1.0% concentration levels, respectively. Rats were observed daily for clinical signs of toxicity, and BWs were measured twice weekly during the first month, weekly during months 2-7, and biweekly thereafter. Water consumption was recorded at three different time periods during the study: days 1-113, 114-198, and 446-460. Blood samples were collected from a minimum of five male and five female control and high-dose rats during the 4th, 6th, 12th, and 18th months of the study and at termination. Each blood sample was analyzed for packed cell volume, total erythrocyte count, hemoglobin, and total and differential WBC counts. Additional endpoints evaluated included organ weights (brain, liver, kidney, testes, spleen, and heart) and gross and microscopic examination of major tissues and organs (brain, bone and bone marrow, ovaries, pituitary, uterus, mesenteric lymph nodes, heart, liver, pancreas, spleen, stomach, prostate, colon, trachea, duodenum, kidneys, esophagus, jejunum, testes, lungs, spinal cord, adrenals, thyroid, parathyroid, nasal turbinates, and urinary bladder).

Histopathological lesions were restricted to the liver and kidney from the mid- and high-dose groups and consisted of variable degrees of renal tubular epithelial and hepatocellular degeneration and necrosis (no quantitative incidence data were provided). Rats from these groups also showed evidence of hepatic regeneration, as indicated by hepatocellular hyperplastic nodule formation and evidence of renal tubular epithelial regenerative activity (observed after 2 years of exposure). These changes were not seen in controls or in low-dose rats. The authors determined a NOAEL of 9.6 mg/kg-day and a LOAEL of 94 mg/kg-day for 1,4-dioxane based on the liver and kidney effects in male rats.

Methods of Analysis. Kociba et al. (1974) did not provide quantitative incidence or severity data for liver and kidney degeneration and necrosis. Benchmark dose (BMD) modeling could not be performed for this study, and the NOAEL for liver and kidney degeneration (9.6 mg/kg-day in male rats) was used as the point of departure (POD) in deriving the RfD for 1,4-dioxane.

Other datasets and alternative POD values were also considered as the basis for the 1,4-dioxane RfD, including incidence data reported for cortical tubule degeneration in male and female rats (NCI, 1978) and liver hyperplasia (JBRC, 1998b). The $BMDL_{10}$ values of 22.3

mg/kg-day and 23.8 mg/kg-day from the (NCI, 1978) and (JBRC, 1998b) studies, respectively, are about double the NOAEL (9.6 mg/kg-day) observed by Kociba et al. (1974).

I.A.3. UNCERTAINTY FACTORS

UF = 300
= 10 (UF_A) × 10 (UF_H) × 1 (UF_S) × 1 (UF_L) × 3 (UF_D)

A default interspecies UF of 10 (UF_A) was used to account for pharmacokinetic and pharmacodynamic differences between rats and humans. Existing PBPK models could not be used to derive an oral RfD for 1,4-dioxane.

A default interindividual variability UF of 10 (UF_H) was used to account for variation in sensitivity within human populations because there is limited information on the degree to which humans of varying gender, age, health status, or genetic makeup might vary in the disposition of, or response to, 1,4-dioxane.

An UF to extrapolate from a subchronic to a chronic (UF_S) exposure duration was not necessary (e.g., UF_S = 1) because the RfD was derived from a study using a chronic exposure protocol.

An UF to extrapolate from a LOAEL to a NOAEL (UF_L) was not necessary (e.g., UF_L = 1) because the RfD was based on a NOAEL. Kociba et al. (1974) was a well-conducted, chronic drinking water study with an adequate number of animals. Histopathological examination was performed for many organs and tissues, but clinical chemistry analysis was not performed. NOAEL and LOAEL values were derived from the study based on liver and kidney toxicity.

An UF of 3 for database deficiencies (UF_D) was applied due to the lack of a multigeneration reproductive toxicity study.

I.A.4. ADDITIONAL STUDIES/COMMENTS

The predominant noncancer effect of chronic oral exposure to 1,4-dioxane is degenerative effects in the liver and kidney. For degenerative liver effects resulting from 1,4-dioxane exposure, the Kociba et al. (1974) study represents the most sensitive effect and dataset observed in a chronic bioassay.

Kidney toxicity as evidenced by glomerulonephritis (Argus et al., 1965; Argus et al., 1973) and degeneration of the cortical tubule (CAA, 1990; NCI, 1978; Kociba et al., 1974) has also been observed in response to chronic exposure to 1,4-dioxane. Degenerative effects were observed in the kidney at the same dose level as effects in the liver (Kociba et al., 1974).

Rhinitis and inflammation of the nasal cavity were reported in both the NCI (1978) (mice only, dose ≥ 380 mg/kg-day) and JBRC (1998a) studies (≥ 274 mg/kg-day in rats, >278 mg/kg-day in mice). JBRC (1998a)reported nasal inflammation in rats (NOAEL 55 mg/kg-day, LOAEL 274 mg/kg-day) and mice (NOAEL 66 mg/kg-day, LOAEL 278 mg/kg-day).

Studies in experimental animals have also found that relatively high doses of 1,4-dioxane (1,000 mg/kg-day) during gestation can produce delayed ossification of the sternebrae and reduced fetal BWs (Giavini et al., 1985).

For more detail on Susceptible Populations, exit to the toxicological review, Section 4.8 (PDF)

I.A.5. CONFIDENCE IN THE CHRONIC ORAL RfD

Study - Medium
Data Base - Medium
RfD - Medium

The overall confidence in the RfD is medium. Confidence in the principal study (Kociba et al., 1974) is medium. The 2-year drinking water study is a well-conducted, peer-reviewed study that used 3 dose groups plus a control. The study had adequate group sizes (60 rats/sex/dose group) and investigated multiple target organs.

Confidence in the oral database is medium due to the lack of a multigeneration reproductive toxicity study.

Reflecting medium confidence in the principal study and medium confidence in the database, confidence in the RfD is medium.

For more detail on Characterization of Hazard and Dose Response, exit to the toxicological review, Section 6 (PDF).

I.A.6. EPA DOCUMENTATION AND REVIEW OF THE CHRONIC ORAL RfD

Source Document – *Toxicological Review of 1,4-Dioxane* (U.S. EPA, 2013)

This document has been provided for review to EPA scientists, interagency reviewers from other federal agencies and the Executive Office of the President, and the public, and peer reviewed by independent scientists external to EPA. A summary and EPA's disposition of the comments received from the independent external peer reviewers and from the public is included in Appendix A of the *Toxicological Review of 1,4-Dioxane* (U.S. EPA, 2013). **To**

review this appendix, exit to the Toxicological Review, Appendix A, Summary of External Peer Review and Public Comments and Disposition (PDF).

I.A.7. EPA CONTACTS

Please contact the IRIS Hotline for all questions concerning this assessment or IRIS, in general, at (202) 566-1676 (phone), (202) 566-1749 (fax), or hotline.iris@epa.gov (email address).

I.B. REFERENCE CONCENTRATION (RfC) FOR CHRONIC INHALATION EXPOSURE

Substance Name — 1,4-Dioxane
CASRN — 123-91-1
Section I.B. Last Revised — 09/20/2013

The RfC is an estimate (with uncertainty spanning perhaps an order of magnitude) of a continuous inhalation exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. The RfC considers toxic effects for both the respiratory system (portal of entry) and for effects peripheral to the respiratory system (extrarespiratory effects). The inhalation RfC (generally expressed in units of mg/m^3) is analogous to the oral RfD and is similarly intended for use in risk assessments for health effects known or assumed to be produced through a nonlinear (presumed threshold) mode of action.

Inhalation RfCs are derived according to *Methods for Derivation of Inhalation Reference Concentrations and Application of Inhalation Dosimetry* (U.S. EPA, 1994). Because RfCs can also be derived for the noncarcinogenic health effects of substances that are carcinogens, it is essential to refer to other sources of information concerning the carcinogenicity of this chemical substance. The U.S. EPA has evaluated this substance for potential human carcinogenicity, a summary of that evaluation is contained in Section II of this file.

I.B.1. CHRONIC INHALATION RfC SUMMARY

Critical Effect	Point of Departure*	UF	Chronic RfC
Atrophy and respiratory metaplasia of the olfactory epithelium **Chronic inhalation male rat study** **Kasai et al. (2009)**	LOAEL: 50 ppm LOAEL POD_{ADJ}: 8.9 ppm LOAEL POD_{HEC}: 32.2 mg/m^3	1,000	3×10^{-2} mg/m^3

*Conversion Factors and Assumptions - Rats in the principal study were exposed for 6 hours/day, 5 days/week, for 104 weeks. The POD associated with intermittent exposure was adjusted to continuous exposure by multiplying the POD by 6/24 hours and 5/7 days resulting in the POD_{ADJ} of 8.9 ppm. This ppm value was converted to mg/m^3 using the chemical-specific conversion factor of 1 ppm = 3.6 mg/m^3. Additionally, the POD was adjusted to reflect the human equivalent concentration (HEC) by application of a chemical-specific dosimetric adjustment factor (DAF) of 1.12 resulting in the POD_{HEC} of 32.2 mg/m^3

I.B.2. PRINCIPAL AND SUPPORTING STUDIES

Four inhalation studies in animals were identified in the literature; two, 13 week subchronic studies in laboratory animals (Kasai et al., 2008; Fairley et al., 1934) and two, 2 year chronic studies in rats (Kasai et al., 2009; Torkelson et al., 1974). Nasal, liver, and kidney toxicity were the primary noncancer health effects of inhalation exposure to 1,4-dioxane in rodents (see summary Table 4-26 in the *Toxicological Review of 1,4-Dioxane* (U.S. EPA, 2013).

The chronic Kasai et al. (2009) study was selected as the principal study for the derivation of the RfC. Groups of male 6 week old F344/DuCrj rats (50/group) were exposed via inhalation to nominal concentrations of 0 (clean air), 50, 250, and 1,250 ppm (0, 180, 900, and 4,500 mg/m^3, respectively) of vaporized 1,4-dioxane (>99% pure) for 6 hours/day, 5 days/week, for 104 weeks (2 years) in whole body inhalation chambers (Kasai et al., 2009). At the time of death or at the end of the 2-years of exposure the authors examined multiple organ systems. Based on the noncancer database for 1,4-dioxane, this study demonstrated exposure concentration related effects for histopathological lesions at a lower concentration (50 ppm) compared to the subchronic Kasai et al. study (2008). The 2 year bioassay (Kasai et al., 2009) did not observe effects in both sexes, but the use of only male rats was proposed by the study authors as justified by data illustrating the absence of induced mesotheliomas in female rats following exposure to 1,4-dioxane in drinking water (Yamazaki et al., 1994). Additionally, a similar pattern of effects was observed after oral exposure to 1,4-dioxane (Kano et al., 2009; JBRC, 1998b) as observed in the Kasai et al. (2009) 2 year inhalation study.

Nonneoplastic lesions from the Kasai et al. (2009) study that were statistically increased as compared to control were considered candidates for the critical effect. The candidate endpoints included centrilobular necrosis of the liver, squamous cell metaplasia of nasal respiratory epithelium, squamous cell hyperplasia of nasal respiratory epithelium, respiratory metaplasia of nasal olfactory epithelium, sclerosis in lamina propria of nasal cavity, and two degenerative nasal lesions, that is, atrophy of nasal olfactory epithelium and hydropic change in the lamina propria. Despite statistical increases at the low and mid exposure concentrations (50 and 250 ppm, respectively), incidences of nuclear enlargement of respiratory epithelium (nasal cavity), olfactory epithelium (nasal cavity), and proximal tubule (kidney) were not considered candidates for the critical effect, since nuclear enlargement as a specific morphologic diagnosis is not considered by EPA to be an adverse effect of exposure to 1,4-dioxane.

Methods of Analysis. Benchmark dose (BMD) modeling methodology (U.S. EPA, 2012) was used to analyze the candidate endpoints identified for 1,4-dioxane. BMDs and BMDLs were able to be determined for centrilobular necrosis, squamous cell metaplasia and hyperplasia of the respiratory epithelium, and hydropic change of lamina propria. Due to poor fit or substantial model uncertainty, BMD model results were inadequate for the following nasal lesions: atrophy (olfactory epithelium), respiratory metaplasia (olfactory epithelium), and sclerosis (lamina propria). Consequently, the NOAEL/LOAEL approach was used to determine potential PODs for these endpoints.

Other endpoints in Kasai et al. (2009) were considered as alternative POD values in the derivation of the RfC, including incidence data reported for centrilobular necrosis in the liver and other respiratory effects. Alternative PODs are shown in Table 5-4 and Figure 5-5 of the *Toxicological Review for 1,4-Dioxane* (U.S. EPA, 2013).

I.B.3. UNCERTAINTY FACTORS

UF = 1,000

$$= 3\ (UF_A) \times 10\ (UF_H) \times 1\ (UF_S) \times 10\ (UF_L) \times 3\ (UF_D)$$

An interspecies UF of 3 (UF_A) was used for animal to human extrapolation to account for pharmacodynamic differences between species. This uncertainty factor is comprised of two separate areas of uncertainty to account for differences in the toxicokinetics and toxicodynamics of animals and humans. In this assessment, the toxicokinetic uncertainty was accounted for by the calculation of a HEC and application of a dosimetric adjustment factor as outlined in the RfC methodology (U.S. EPA, 1994). As the toxicokinetic differences are thus accounted for, only the toxicodynamic uncertainties remain, and an UFA of 3 is retained to account for this uncertainty.

A default interindividual variability UF of 10 (UF_H) was used to account for variation in sensitivity within human populations because there is limited information on the degree to which humans of varying gender, age, health status, or genetic makeup might vary in the disposition of, or response to, 1,4-dioxane. A recent modeling study by Valcke and Krishnan (2011) assessed the impact of exposure duration and concentration on the human kinetic adjustment factor and estimated the neonate to adult 1,4-dioxane blood concentration ratio to be 3.2. Thus, a full factor of 10 was used to account for differences between adults and neonates, as well as other differences in gender, age, health status, or genetics that might result in a different disposition of, or response to, 1,4-dioxane.

An UF to extrapolate from a subchronic to a chronic (UF_S) exposure duration was not necessary (e.g., UF_S = 1) because the RfC was derived from a study using a chronic exposure protocol.

An UF of 10 (UF_L) was used to extrapolate from a LOAEL to a NOAEL because a LOAEL was used as the POD. A NOAEL for atrophy and respiratory metaplasia of the olfactory epithelium was not identified in the study by Kasai et al. (2009).

An UF of 3 for database deficiencies (UF_D) was applied due to the lack of a multigeneration reproductive toxicity study.

I.B.4. ADDITIONAL STUDIES/COMMENTS

Prior to the Kasai et al. (Kasai et al., 2009; Kasai et al., 2008) studies, two other studies were available for consideration in the derivation of inhalation toxicity values: one subchronic study (Fairley et al., 1934) and one chronic inhalation study (Torkelson et al., 1974). In the subchronic study, rabbits, guinea pigs, rats, and mice (3-6/species/group) were exposed to 1,000, 2,000, 5,000, or 10,000 ppm of 1,4-dioxane vapor for 1.5 hours two times a day for 5 days, 1.5 hours for one day, and no exposure on the seventh day. Animals were exposed until death occurred or were sacrificed after various durations of exposure (3-202.5 hours). Detailed dose-response information was not provided; however, severe liver and kidney damage and acute vascular congestion of the lungs were observed at concentrations ≥ 1,000 ppm. Kidney damage was described as patchy degeneration of cortical tubules with vascular congestion and hemorrhage. Liver lesions varied from cloudy hepatocyte swelling to large areas of necrosis.

Torkelson et al. (1974) performed a chronic inhalation study in which male and female Wistar rats (288/sex) were exposed to 111 ppm 1,4-dioxane vapor for 7 hours/day, 5 days/week for 2 years. Control rats (192/sex) were exposed to filtered air. No significant effects were observed on BWs, survival, organ weights, hematology, clinical chemistry, or histopathology. Because Fairley et al. (1934) identified a free-standing LOAEL only, and Torkelson et al. (1974) identified a free-standing NOAEL only, neither study was sufficient to characterize the inhalation risks of 1,4-dioxane.

For more detail on Susceptible Populations, exit to the toxicological review, Section 4.7 (PDF).

I.B.5. CONFIDENCE IN THE CHRONIC INHALATION RfC

Study—Medium
Database—Medium
RfC—Medium

The overall confidence in the RfC is medium. Confidence in the principal study (Kasai et al., 2009) is medium. The 2-year inhalation study is a well-conducted, peer-reviewed study that used 3 dose groups plus a control. The study had adequate group sizes (50 rats/dose group) and investigated multiple target organs; however, the study did only used male rats and did not investigate chronic effects in females.

Confidence in the database is medium due to the lack of supporting studies and a multigeneration reproductive toxicity study.

Reflecting medium confidence in the principal study and medium confidence in the database, confidence in the RfC is medium.

For more detail on Characterization of Hazard and Dose Response, exit to the toxicological review, Section 6 (PDF).

I.B.6. EPA DOCUMENTATION AND REVIEW OF THE CHRONIC INHALATION RfC

Source Document—*Toxicological Review of 1,4-Dioxane* (U.S. EPA, 2013).

This document has been provided for review to EPA scientists, interagency reviewers from other federal agencies and the Executive Office of the President, and the public, and peer reviewed by independent scientists external to EPA. A summary and EPA's disposition of the comments received from the independent external peer reviewers and from the public is included in Appendix A of the *Toxicological Review of 1,4-Dioxane* (U.S. EPA, 2013). ***To review this appendix, exit to the toxicological review, Appendix A, EPA Response to Major External Peer Review and Public Comments (PDF).***

Agency Completion Date—09/20/2013

___I.B.7. EPA CONTACTS

Please contact the IRIS Hotline for all questions concerning this assessment or IRIS, in general, at (202) 566-1676 (phone), (202) 566-1749 (fax), or hotline.iris@epa.gov (email address).

II. CARCINOGENICITY ASSESSMENT FOR LIFETIME EXPOSURE

Substance Name — 1,4-Dioxane
CASRN — 123-91-1
Last Revised — 09/20/2013

This section provides information on three aspects of the carcinogenic assessment for the substance in question: the weight-of-evidence judgment of the likelihood that the substance is a human carcinogen, and quantitative estimates of risk from oral and inhalation exposure. Users are referred to Section I of this file for information on long-term toxic effects other than carcinogenicity.

The rationale and methods used to develop the carcinogenicity information in IRIS are described in the *Guidelines for Carcinogen Risk Assessment* (U.S. EPA, 2005a) and the *Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens* (U.S. EPA, 2005b). The quantitative risk estimates are derived from the application of a low-dose extrapolation procedure, and are presented in two ways to better facilitate their use. First, route-specific risk values are presented. The "oral slope factor" is a plausible upper bound on the estimate of risk per mg/kg-day of oral exposure. Similarly, a "unit risk" is a plausible upper bound on the estimate of risk per unit of concentration, either per µg/L drinking water (see Section II.B.1.) or per µg/m^3 air breathed (see Section II.C.1.). Second, the estimated concentration of the chemical substance in drinking water when associated with cancer risks of 1 in 10,000, 1 in 100,000, or 1 in 1,000,000 is also provided.

A cancer assessment for 1,4-dioxane via the oral route of exposure was posted on the IRIS databse in 2010. At that time, 1,4-dioxane was classified as a likely human carcinogen, based on the *Guidelines for Carcinogen Risk Assessment* (U.S. EPA, 2005a). This update adds an inhalation unit risk (IUR) to that assessment, and the weight-of-evidence cancer classification remains the same.

A previous cancer assessment for 1,4-dioxane was posted on the IRIS database in 1988. At that time, 1,4-dioxane was classified as a B2 carcinogen (probable human carcinogen), based on inadequate human data and sufficient evidence of carcinogenicity in animals (induction of nasal cavity and liver carcinomas in multiple strains of rats, liver carcinomas in mice, and gall bladder carcinomas in guinea pigs). An oral cancer slope factor (CSF) of 1.1×10^{-2} $(mg/kg\text{-}day)^{-1}$ was derived from the tumor incidence data for nasal squamous cell carcinoma in male rats exposed to 1,4-dioxane in drinking water for 2 years (NCI, 1978). The linearized multistage extra risk procedure was used for linear low dose extrapolation. An inhalation unit risk (IUR) was not previously derived.

II.A. EVIDENCE FOR HUMAN CARCINOGENICITY

II.A.1. WEIGHT-OF-EVIDENCE CHARACTERIZATION

In accordance with the *Guidelines for Carcinogen Risk Assessment* (U.S. EPA, 2005a), 1,4-dioxane is characterized as "likely to be carcinogenic to humans." This characterization is based on the following findings: (1) inadequate evidence of carcinogenicity in humans, and (2) sufficient evidence in animals (i.e., hepatic tumors in multiple species [three strains of rats, two strains of mouse, and in guinea pigs]; mesotheliomas of the peritoneum, mammary, and nasal tumors have also been observed in rats following 2 years of oral exposure to 1,4-dioxane).

There is adequate evidence of liver carcinogenicity in several 2-year bioassays conducted in three strains of rats, two strains of mice, and in guinea pigs (Kano et al., 2009; Kasai et al., 2009; JBRC, 1998b; Yamazaki et al., 1994; NCI, 1978; Kociba et al., 1974; Argus et al., 1973; Hoch-Ligeti and Argus, 1970; Hoch-Ligeti et al., 1970; Argus et al., 1965). Additionally, tumors of the peritoneum (Kano et al., 2009; Kasai et al., 2009; JBRC, 1998b; Yamazaki et al., 1994), mammary (Kano et al., 2009; Kasai et al., 2009; JBRC, 1998b; Yamazaki et al., 1994), and nasal cavitiy (Kano et al., 2009; Kasai et al., 2009; JBRC, 1998b; Yamazaki et al., 1994; NCI, 1978; Kociba et al., 1974; Argus et al., 1973; Hoch-Ligeti et al., 1970), as well as kidney, Zymbal gland, and subcutaneous tissue (Kasai et al., 2009) have been observed in rats due to exposure to 1,4-dioxane. Studies in humans are inconclusive regarding evidence for a causal link between occupational exposure to 1,4-dioxane and increased risk for cancer; however, only two studies were available and these were limited by small cohort size and a small number of reported cancer cases (Buffler et al., 1978; Thiess et al., 1976).

U.S. EPA's *Guidelines for Carcinogen Risk Assessment* (U.S. EPA, 2005a) indicate that for tumors occurring at a site other than the initial point of contact, the weight of evidence for carcinogenic potential may apply to all routes of exposure that have not been adequately tested at sufficient doses. An exception occurs when there is convincing information (e.g., toxicokinetic data) that absorption does not occur by other routes. Information available on the carcinogenic effects of 1,4-dioxane via the oral route demonstrates that tumors occur in tissues remote from the site of absorption. Information on the carcinogenic effects of 1,4-dioxane via the dermal route in humans and animals is absent. Based on the observance of systemic tumors following oral and inhalation exposure, and in the absence of information to indicate otherwise, it is assumed that an internal dose will be achieved regardless of the route of exposure. Therefore, 1,4-dioxane is "likely to be carcinogenic to humans" by all routes of exposure.

A MOA hypothesis involving sustained proliferation of spontaneously transformed liver cells has some support from data indicating that 1,4-dioxane acts as a tumor promoter in mouse skin and rat liver bioassays (Lundberg et al., 1987; King et al., 1973). Dose-response and temporal data support the occurrence of cell proliferation and hyperplasia prior to the development of liver tumors (JBRC, 1998b; Kociba et al., 1974) in the rat model. However, the dose-response relationship for induction of hepatic cell proliferation has not been characterized, and it is unknown if it would reflect the dose-response relationship for liver tumors in the 2-year rat and mouse studies. Conflicting data from rat and mouse bioassays (JBRC, 1998b; Kociba et al., 1974) suggest that cytotoxicity may not be a required precursor event for 1,4-dioxane-induced cell proliferation. Liver tumors were observed in female rats and female mice in the absence of lesions indicative of cytotoxicity (Kano et al., 2009; JBRC, 1998b; NCI, 1978). Thus, data regarding a plausible dose response and temporal progression from cytotoxicity and cell proliferation to eventual liver tumor formation are not available. The MOA by which 1,4 dioxane produces liver, nasal, peritoneal (mesotheliomas), and mammary gland tumors is not conclusive, and the available data do not support any hypothesized carcinogenic MOA for 1,4 dioxane.

For more detail on Characterization of Hazard and Dose Response, exit to the toxicological review, Section 6 (PDF).

For more detail on Susceptible Populations, exit to the toxicological review, Section 4.8 (PDF)

II.A.2. HUMAN CARCINOGENICITY DATA

Human studies of occupational exposure to 1,4-dioxane were inconclusive to assess the evidence of carcinogenicity of 1,4-dioxane (see Section 4.1 in the *Toxicological Review of 1,4-Dioxane* (U.S. EPA, 2013). In each case, the cohort size and number of reported cases were of limited size (Buffler et al., 1978; Thiess et al., 1976).

II.A.3. ANIMAL CARCINOGENICITY DATA

Three chronic drinking water bioassays provided incidence data for liver tumors in rats and mice, and nasal cavity, peritoneal, and mammary gland tumors in rats only (Kano et al., 2009; JBRC, 1998b; Yamazaki et al., 1994; NCI, 1978; Kociba et al., 1974). With the exception of the NCI (1978) study, the incidence of nasal cavity tumors was generally lower than the incidence of liver tumors in exposed rats. The Kano et al. (2009) drinking water study was chosen as the principal study for derivation of an oral cancer slope factor (CSF) for 1,4-dioxane. This study used three dose groups in addition to controls and characterized the dose-response relationship at lower exposure levels, as compared to the high doses employed in the NCI (1978) bioassay. The Kociba et al. (1974) study also used three low dose exposure groups; however, the study authors only reported the incidence of hepatocellular carcinoma, which may underestimate the combined incidence of rats with adenoma or carcinoma. In addition to increased incidence of liver tumors, chosen as the most sensitive target organ for tumor formation, the Kano et al. (2009) study also noted increased incidence of peritoneal and mammary gland tumors. Nasal cavity tumors were also seen in high-dose male and female rats; however, the incidence of nasal tumors was much lower than the incidence of liver tumors in both rats and mice.

As described in detail in Section 4.2.1.2.6 and Appendix E of the *Toxicological Review of 1,4-Dioxane* (U.S. EPA, 2013), the Japanese Bioassay Research Center conducted a 2-year drinking water study on the effects of 1,4-dioxane in both sexes of rats and mice. The results from that study were reported several times, once as conference proceedings (Yamazaki et al., 1994), once as a detailed laboratory report (JBRC, 1998b), and once as a published manuscript (Kano et al., 2009). As a result of the most recent publication (Kano et al., 2009), the *Toxicological Review of 1,4-Dioxane* (U.S. EPA, 2010) was updated and the data in the new publication was considered. Although the data contained in the reports varied, the differences were minor and did not affect the conclusions of this assessment. The variations included: (1) the level of detail on dose information reported; (2) categories for incidence data reported (e.g., all animals or sacrificed animals); and (3) analysis of non- and neoplastic lesions.

A chronic bioassay of 1,4-dioxane by the inhalation route reported by Kasai et al. (2009) provides data adequate for dose response modeling and was subsequently chosen as the study for the derivation of an IUR for 1,4-dioxane. In this bioassay, groups of 50 male F344 rats were exposed to either 0, 50, 250 or 1,250 ppm 1,4-dioxane, 6 hours/day, 5 days/week, for 2 years (104 weeks). In male F344 rats, 1,4-dioxane produced a statistically significant increase in incidence and/or a statistically significant dose response trend for the following tumor types: hepatomas, nasal squamous cell carcinomas, renal cell carcinomas, peritoneal mesotheliomas, mammary gland fibroadenomas, Zymbal gland adenomas, and subcutis fibromas (Kasai et al., 2009).

II.A.4. SUPPORTING DATA FOR CARCINOGENICITY

Several carcinogenicity bioassays have been conducted for 1,4-dioxane in mice, rats, and guinea pigs (Kano et al., 2009; Kasai et al., 2009; JBRC, 1998b; Yamazaki et al., 1994; NCI, 1978; Kociba et al., 1974; Torkelson et al., 1974; Argus et al., 1973; Hoch-Ligeti and Argus, 1970; Hoch-Ligeti et al., 1970; Argus et al., 1965). Liver tumors have been observed following drinking water exposure in male Wistar rats (Argus et al., 1965), male guinea pigs (Hoch-Ligeti and Argus, 1970), male Sprague Dawley rats (Argus et al., 1973; Hoch-Ligeti et al., 1970), male and female Sherman rats (Kociba et al., 1974), female Osborne-Mendel rats (NCI, 1978), male and female F344/DuCrj rats (Kano et al., 2009; Kasai et al., 2009; JBRC, 1998b; Yamazaki et al., 1994), male and female $B6C3F_1$ mice (NCI, 1978), and male and female Crj:BDF_1 mice (Kano et al., 2009; JBRC, 1998b; Yamazaki et al., 1994). In the earliest cancer bioassays, the liver tumors were described as hepatomas (Argus et al., 1973; Hoch-Ligeti and Argus, 1970; Hoch-Ligeti et al., 1970; Argus et al., 1965); however, later studies made a distinction between hepatocellular carcinoma and hepatocellular adenoma (Kano et al., 2009; Kasai et al., 2009; JBRC, 1998b; Yamazaki et al., 1994; NCI, 1978). Both tumor types have been seen in rats and mice exposed to 1,4-dioxane. Kociba et al. (1974) noted evidence of liver toxicity at or below the dose levels that produced liver tumors but did not report incidence data for these effects. Hepatocellular degeneration and necrosis were observed in the mid- and high-dose groups of male and female Sherman rats exposed to 1,4-dioxane, while tumors were only observed at the highest dose. Hepatic regeneration was indicated in the mid- and high-dose groups by the formation of hepatocellular hyperplastic nodules. Findings from JBRC (1998b) also provided evidence of liver hyperplasia in male F344/DuCrj rats at a dose level below the dose that induced a statistically significant increase in tumor formation.

Nasal cavity tumors were also observed in Sprague Dawley rats (Argus et al., 1973; Hoch-Ligeti et al., 1970), Osborne-Mendel rats (NCI, 1978), Sherman rats (Kociba et al., 1974), and F344/DuCrj rats (Kano et al., 2009; Kasai et al., 2009; JBRC, 1998b; Yamazaki et al., 1994). Most tumors were characterized as squamous cell carcinomas. Nasal tumors were not elevated in $B6C3F_1$ or Crj:BDF_1 mice. JBRC (1998b) was the only study that evaluated nonneoplastic changes in nasal cavity tissue following prolonged exposure to 1,4-dioxane in the drinking water. Histopathological lesions in female F344/DuCrj rats were suggestive of toxicity and regeneration in this tissue (i.e., atrophy, adhesion, inflammation, nuclear enlargement, and hyperplasia and metaplasia of respiratory and olfactory epithelium). Some of these effects occurred at a lower dose (83 mg/kg-day) than that shown to produce nasal cavity tumors (429 mg/kg-day) in female rats. Reexamination of tissue sections from the NCI (1978) bioassay suggested that the majority of nasal tumors were located in the dorsal nasal septum or the nasoturbinate of the anterior portion of the dorsal meatus. Nasal tumors were not observed in an inhalation study in Wistar rats exposed to 111 ppm for 5 days/week for 2 years (Torkelson et al., 1974).

Tumor initiation and promotion studies in mouse skin and rat liver suggested that 1,4-dioxane does not initiate the carcinogenic process, but instead acts as a tumor promoter (Lundberg et al., 1987; Bull et al., 1986; King et al., 1973) [see Section 4.2.3 in the *Toxicological Review of 1,4-Dioxane* (U.S. EPA, 2013)].

In addition to the liver and nasal tumors observed in several studies, a statistically significant increase in mesotheliomas of the peritoneum was seen in male rats from the Kano et al. (2009) (also (JBRC, 1998b; Yamazaki et al., 1994) and Kasai et al. (2009). Female rats dosed with 429 mg/kg-day in drinking water for 2 years also showed a statistically significant increase in mammary gland adenomas (Kano et al., 2009; JBRC, 1998b; Yamazaki et al., 1994) A significant increase in the incidence of these tumors was not observed in other chronic oral bioassays of 1,4-dioxane (NCI, 1978; Kociba et al., 1974). Additional statistically significant increases in other tumor types were observed in male F344 rats exposed to 0, 50, 250 or 1,250 ppm 1,4-dioxane, 6 hours/day, 5 days/week, for 2 years (104 weeks) including renal cell carcinomas, peritoneal mesotheliomas, mammary gland fibroadenomas, Zymbal gland adenomas, and subcutis fibromas (Kasai et al., 2009).

II.B. QUANTITATIVE ESTIMATE OF CARCINOGENIC RISK FROM ORAL EXPOSURE

II.B.1. SUMMARY OF RISK ESTIMATES

II.B.1.1. Oral Slope Factor: 1×10^{-1} per mg/kg-day

The derivation of the oral slope factor 1×10^{-1} per mg/kg-day is based on the incidence of hepatocellular adenomas and carcinomas in female mice exposed to 1,4-dioxane in drinking water for 2 years (Kano et al., 2009). The dose metric used in the current estimate of the human equivalent dose (HED) is the applied or external dose because a PBPK model was determined not to be suitable for species extrapolation (see Appendix B of the *Toxicological Review of 1,4-Dioxane* (U.S. EPA, 2013). The rat $BMDL_{50}$ of 32.93 mg/kg-day represents the POD used to calculate the $BMDL_{50HED}$ of 4.95 mg/kg-day.

The oral slope factor is derived from the $BMDL_{50HED}$, the 95% lower bound on the exposure associated with a 50% extra cancer risk, by dividing the risk (as a fraction) by the $BMDL_{50HED}$, and represents an upper bound, continuous lifetime exposure risk estimate:

$BMDL_{50HED}$, lower 95% bound on exposure at 50% extra risk – 4.95 mg/kg-day

BMD_{50HED}, central estimate of exposure at 50% extra risk – 7.51 mg/kg-day

The slope of the linear extrapolation from the central estimate is 0.5/ (7.51 mg/kg-day) = 7×10^{-2} per mg/kg-day

The slope factor for 1,4-dioxane should not be used with exposures exceeding the point of departure ($BMDL_{50HED}$ = 4.95 mg/kg-day), because above this level the fitted dose-response model better characterizes what is known about the carcinogenicity of 1,4-dioxane.

II.B.1.2. Drinking Water Unit Risk*: 2.9×10^{-6} per µg/L

Drinking Water Concentrations at Specified Risk Levels

Risk Level	Lower Bound on Concentration Estimate*
E-4 (1 in 10,000)	35 µg/L
E-5 (1 in 100,000)	3.5 µg/L
E-6 (1 in 1,000,000)	0.35 µg/L

*The unit risk and concentration estimates assume water consumption of 2 L/day by a 70 kg human.

II.B.1.3. Extrapolation Method

Log-logistic model with linear extrapolation from the POD ($BMDL_{50HED}$) associated with 50% extra cancer risk.

The log-logistic model provided the best-fit to the female mouse liver tumor data Kano et al. (2009) female data as indicated by the AIC and *p*-value as was chosen as the best-fitting model to carry forward in the analysis; however, this model resulted in a $BMDL_{10}$ much lower than the response level at the lowest dose in the study (Kano et al., 2009). Thus, the log-logistic model was also run for BMR values of 30 and 50%. Using a higher BMR value resulted in BMDL values closer to the lowest observed response data, and a BMR of 50% was chosen to carry forward in the analysis.

II.B.2. DOSE-RESPONSE DATA

Tumor Type – hepatocellular adenoma and carcinoma
Test Species – female BDF1 mouse
Route – Oral, drinking water
References – Kano et al. (2009)

Incidence of liver tumors in female BDF1 female mice exposed to 1,4-dioxane in drinking water for 2 years

Tumor	Dose (mg/kg-day)			
	0	66	278	964
Hepatocellular adenoma or carcinoma	5/50	35/50[a]	41/50[a]	46/50[a,b]

[a]Significantly different from control by Fisher's exact test ($p < 0.01$.)

[b]Statistically significant trend for increased tumor incidence by Peto's test ($p < 0.01$).

Source: Kano et al. (2009)

Oral Cancer Slope Factor (CSF) using linear low-dose extrapolation approach and interspecies extrapolation

Tumor	Dose groups modeled	BMD_{50} mg/kg-day	$BMDL_{50}$ mg/kg-day	BMD_{HED} mg/kg-day	$BMDL_{HED}$ mg/kg-day	Oral SF $(mg/kg\text{-}day)^{-1}$
Female mouse hepatocellular adenoma or	0, 66, 278, 964	49.88	32.93	7.51	4.95	0.10

Oral Cancer Slope Factor (CSF) using linear low-dose extrapolation approach and interspecies extrapolation	
carcinoma	mg/kg-day

II.B.3. ADDITIONAL COMMENTS

Supplementary information not required.

II.B.4. DISCUSSION OF CONFIDENCE

Relevance to humans. The oral CSF was derived using the tumor incidence in the liver of female mice. A thorough review of the available toxicological data available for 1,4-dioxane provides no scientific justification to propose that the liver adenomas and carcinomas observed in animal models following exposure to 1,4-dioxane are not plausible in humans. Liver adenomas and carcinomas were considered plausible outcomes in humans due to exposure to 1,4-dioxane.

Choice of low-dose extrapolation approach. The possibilities for the low-dose extrapolation of tumor risk from exposure to 1,4-dioxane, or any chemical, are linear or nonlinear, but is dependent upon a plausible MOA(s) for the observed tumors. The MOA is a key consideration in clarifying how risks should be estimated for low-dose exposure. Exposure to 1,4-dioxane has been observed in animal models to induce multiple tumor types, including liver adenomas and carcinomas, nasal carcinomas, mammary adenomas and fibroadenomas, and mesotheliomas of the peritoneal cavity (Kano et al., 2009). MOA information that is available for the carcinogenicity of 1,4-dioxane has largely focused on liver adenomas and carcinomas, with little or no MOA information available for the remaining tumor types. In Section 4.7.3 of the *Toxicological Review of 1,4-Dioxane* (U.S. EPA, 2013), hypothesized MOAs, other than a mutagenic MOA, were explored due to the lack of mutagenicity observed in genetic toxicology tests performed for 1,4-dioxane. The available evidence in support of the hypothesized MOAs for 1,4-dioxane is not conclusive. In the absence of a MOA(s) for the observed tumor types associated with exposure to 1,4-dioxane, a linear low-dose extrapolation approach was used to estimate human carcinogenic risk associated with 1,4-dioxane exposure.

In the studies evaluated (Kano et al., 2009; NCI, 1978; Kociba et al., 1974), the multistage model provided good descriptions of the incidence of a few tumor types in male (nasal cavity) and female (hepatocellular and nasal cavity) rats and in male mice (hepatocellular) exposed to

1,4-dioxane via ingestion (see Appendix D of the *Toxicological Review of 1,4-Dioxane* (U.S. EPA, 2013) for additional details). However, the multistage model did not provide an adequate fit for female mouse liver tumor dataset based upon the following (U.S. EPA, 2012):

Goodness-of-fit *p*-value was less than 0.10 indicating statistically significant lack of fit;

AIC was larger than other acceptable models;

Observed data deviated substantially from the fitted model, as measured by their standardized χ^2 residuals (i.e., residuals with values greater than an absolute value of one).

By default, the BMDS software imposes constraints on the values of certain parameters of the models. When these constraints were imposed, the multistage model and most other models did not fit the incidence data for female mouse liver adenomas or carcinomas, even after dropping the highest dose group.

The log-logistic model was selected because it was the only model that provided an adequate fit to the female mouse liver tumor data (Kano et al., 2009). A BMR of 50% was used because it is proximate to the response at the lowest dose tested and the $BMDL_{50}$ was estimated by applying appropriate parameter constraints to the selected model, consistent with the BMD Technical Guidance Document (U.S. EPA, 2012).

The human equivalent oral CSF estimated from liver tumor datasets with statistically significant increases ranged from 4.2×10^{-4} to 1.0×10^{-1} per mg/kg-day, a range of about three orders of magnitude, with the upper and lower extremes coming from the combined male and female data for hepatocellular carcinomas (Kociba et al., 1974) and the female mouse liver adenoma and carcinoma dataset (Kano et al., 2009).

Dose metric. 1,4-Dioxane is known to be metabolized in vivo. However, it is unknown whether a metabolite or the parent compound, or some combination of parent compound and metabolites, is responsible for the observed carcinogenicity. If the actual carcinogenic moiety is proportional to administered exposure, then use of administered exposure as the dose metric is the least biased choice. On the other hand, if this is not the correct dose metric, then the impact on the CSF and IUR is unknown.

Interspecies extrapolation. An adjustment for cross-species scaling ($BW^{0.75}$) was applied to address toxicological equivalence of internal doses between each rodent species and humans, consistent with the U.S. EPA's 2005 *Guidelines for Carcinogen Risk Assessment* (U.S. EPA, 2005a). It is assumed that equal risks result from equivalent constant lifetime exposures.

Statistical uncertainty at the POD. Parameter uncertainty can be assessed through confidence intervals. Each description of parameter uncertainty assumes that the underlying model and associated assumptions are valid. For the log-logistic model applied to the female mouse data, there is a reasonably small degree of uncertainty at the 50% excess incidence level (the POD for linear low-dose extrapolation), as indicated by the proximity of the $BMDL_{HED}$ (4.95 mg/kg-day) to the BMD_{HED} (7.51 mg/kg-day).

Bioassay selection. The study by Kano et al. (2009) was used for development of an oral CSF. This was a well-designed study, conducted in both sexes in two species with a sufficient number of animals per dose group. The number of test animals allocated among three dose levels and an untreated control group was adequate, with examination of appropriate toxicological endpoints in both sexes of rats and mice. Alternative bioassays (Kociba et al., 1974) are available and were fully considered for the derivation of the oral CSF.

Choice of species/gender. The oral CSF for 1,4-dioxane was derived using the tumor incidence data for the female mouse, which was thought to be more sensitive than male mice or either sex of rats to the carcinogenicity of 1,4-dioxane. While all data, from both species and sexes reported from the Kano et al. (2009) study, were suitable for deriving an oral CSF, the female mouse data represented the most sensitive indicator of carcinogenicity in the rodent model. The lowest exposure level (66 mg/kg-day [animal dose] or 10 mg/kg-day [HED]) observed a considerable and significant increase in combined liver adenomas and carcinomas. Additional testing of doses within the range of control and the lowest dose (66 mg/kg-day [animal dose] or 10 mg/kg-day [HED]) could refine and reduce uncertainty for the oral CSF.

Human population variability. The extent of inter-individual variability in 1,4-dioxane metabolism has not been characterized. A separate issue is that the human variability in response to 1,4-dioxane is also unknown. Data exploring whether there is differential sensitivity to 1,4-dioxane carcinogenicity across life stages is unavailable. This lack of understanding about potential differences in metabolism and susceptibility across exposed human populations thus represents a source of uncertainty. Also, the lack of information linking a MOA for 1,4-dioxane to the observed carcinogenicity is a source of uncertainty.

II.C. QUANTITATIVE ESTIMATE OF CARCINOGENIC RISK FROM INHALATION EXPOSURE

II.C.1. SUMMARY OF RISK ESTIMATES

II.C.1.1. Inhalation Unit Risk: 5×10^{-6} $(\mu g/m^3)^{-1}$

The derivation of the inhalation unit risk 5×10^{-6} per $\mu g/m^3$ is based on combined tumor incidence in male rats exposed to 1,4-dioxane in via inhalation for 2 years (Kasai et al., 2009). The dose metric used in the current estimate of the human equivalent concentration (HEC) is the applied or inhaled concentration because a PBPK model was determined not to be suitable for species extrapolation (see Appendix B of the *Toxicological Review of 1,4-Dioxane* (U.S. EPA, 2013). The rat multitumor $BMCL_{10}$ of 30.3 ppm represents the POD used to calculate the $BMCL_{HEC}$ of 19.5 mg/m^3.

The inhalation unit risk is derived from the $BMCL_{HEC}$, the 95% lower bound on the exposure associated with a 10% extra cancer risk, by dividing the risk (as a fraction) by the $BMCL_{HEC}$, and represents an upper bound, continuous lifetime exposure risk estimate:

$BMCL_{10HEC}$, lower 95% bound on exposure at 10% extra risk — 19.5 mg/m^3

BMC_{10HEC}, central estimate of exposure at 10% extra risk — 26.0 mg/m^3

The slope of the linear extrapolation from the central estimate is 0.1/ (26.0 mg/m^3) = 4×10^{-6} per µg/m^3

The inhalation unit risk for 1,4-dioxane should not be used with exposures exceeding the point of departure ($BMCL_{10HEC}$ = 19.5 mg/m^3), because above this level the fitted dose-response model better characterizes what is known about the carcinogenicity of 1,4-dioxane.

II.C.1.2. Extrapolation Method

Multi-tumor dose-response model with linear extrapolation from the POD ($BMCL_{10HEC}$) associated with 10% extra cancer risk. Statistically significant dose response trends for the increase in tumors with increasing dose was observed for the nasal cavity squamous cell carcinomas, hepatomas, renal cell carcinomas, peritoneal mesotheliomas, mammary gland fibroadenomas, and Zymbal gland adenomas. All of these tumors were considered to be of independent origin and included in the multi-tumor analysis.

II.C.2. DOSE-RESPONSE DATA

Tumor Types — multiple (nasal, liver, kidney, peritoneal, mammary gland, and Zymbal gland)
Test species — male F344 rats
Route — Inhalation
Reference — Kasai et al. (2009)

Incidence of tumors in F344 male rats exposed to 1,4-dioxane for 104 weeks (6 hours/day, 5 days/week)

Tumor Type	Animal Exposure (ppm)			
	0	50	250	1,250

Nasal cavity squamous cell carcinoma	0/50	0/50	1/50	6/50[a,b]
Hepatocellular adenoma or carcinoma[e]	1/50	2/50	4/50	22/50[a,c]
Renal cell carcinoma	0/50	0/50	0/50	4/50[a]
Peritoneal mesothelioma	2/50	4/50	14/50[c]	41/50[a,c]
Mammary gland fibroadenoma	1/50	2/50	3/50	5/50[d]
Mammary gland adenoma	0/50	0/50	0/50	1/50
Zymbal gland adenoma	0/50	0/50	0/50	4/50[a]
Subcutis fibroma	1/50	4/50	9/50[c]	5/50

[a]Statistically significant trend for increased tumor incidence by Peto's test ($p \leq 0.01$).

[b]Tumor incidence significantly elevated compared with that in controls by Fisher's exact test ($p \leq 0.05$).

[c]Tumor incidence significantly elevated compared with that in controls by Fisher's exact test ($p \leq 0.01$).

[d]Statistically significant trend for increased tumor incidence by Peto's test ($p \leq 0.05$).

[e]Provided via email from Dr. Tatsuya Kasai (JBRC) to Dr. Reeder Sams (U.S. EPA) on 12/23/2008 (2008). Statistics were not reported for these data by study authors, so statistical analyses were conducted by EPA.

Source: Kasai et al. (2009) and Kasai (2008)

Inhalation Unit Risk (IUR) using linear low-dose extrapolation approach and interspecies extrapolation

Tumor	Dose groups modeled	BMC_{10} mg/m^3	$BMCL_{10}$ mg/m^3	BMC_{HEC} mg/m^3	$BMCL_{HEC}$ mg/m^3	Inhalation Unit Risk (µg/m^3)$^{-1}$
Multiple – F344 male rats	0, 50, 250, 1,250 ppm (0, 180, 900, or 4,500 mg/m^3)	40.4	30.3	26.0	19.5	5.0×10^{-6}

II.C.3. ADDITIONAL COMMENTS

Supplementary information not required.

II.C.4. DISCUSSION OF CONFIDENCE

Relevance to humans. The derivation of the inhalation unit risk is based on the tumor incidence at multiple sites in male rats. There is no information on 1,4-dioxane to indicate that the observed rodent tumors are irrelevant to humans. Further, no data exist to guide quantitative adjustment for differences in sensitivity among rodents and humans. In the absence of information to indicate otherwise and considering similar cell types are prevalent throughout the respiratory tract of rats and humans, the nasal, liver, renal, peritoneal, mammary gland, Zymbal gland and subcutis tumors were considered relevant to humans.

Choice of low-dose extrapolation approach. The possibilities for the low-dose extrapolation of tumor risk from exposure to 1,4-dioxane, or any chemical, are linear or nonlinear, but is dependent upon a plausible MOA(s) for the observed tumors. The MOA is a key consideration in clarifying how risks should be estimated for low-dose exposure. Exposure to 1,4-dioxane has been observed in animal models to induce multiple tumor types, including liver adenomas and carcinomas, nasal carcinomas, mammary adenomas and fibroadenomas, and mesotheliomas of the peritoneal cavity (Kano et al., 2009). MOA information that is available for the carcinogenicity of 1,4-dioxane has largely focused on liver adenomas and carcinomas, with little or no MOA information available for the remaining tumor types. In Section 4.7.3 of the *Toxicological Review of 1,4-Dioxane* (U.S. EPA, 2013), hypothesized MOAs, other than a mutagenic MOA, were explored due to the lack of mutagenicity observed in genetic toxicology tests performed for 1,4-dioxane. The available evidence in support of the hypothesized MOAs for 1,4-dioxane is not conclusive. In the absence of sufficient information to support a MOA(s) for the observed tumor types associated with exposure to 1,4-dioxane, a linear low-dose extrapolation approach was used to estimate human carcinogenic risk associated with 1,4-dioxane exposure.

The BMDS multistage cancer model provided adequate fits for the tumor incidence data following a 2 year inhalation exposure to 1,4-dioxane by male rats (Kasai et al., 2009), thus the BMDS MS_Combo multi-tumor model was used to determine a $BMCL_{10}$.

Interspecies extrapolation. Differences in the anatomy of the upper respiratory tract and resulting differences in absorption or in local respiratory system effects are sources of uncertainty in the inhalation cancer assessment. However, since similar cell types are prevalent throughout the respiratory tract of both rats and humans, the tumors are considered biologically plausible and relevant to humans.

Statistical uncertainty at the POD. Parameter uncertainty can be assessed through confidence intervals. Each description of parameter uncertainty assumes that the underlying model and associated assumptions are valid. For the multistage, multi-tumor model applied for the male rat inhalation dataset, there is a reasonably small degree of uncertainty at the 10% extra risk level (the POD for linear low dose extrapolation).

Bioassay selection. The study by Kasai et al. (2009) was used for derivation of an inhalation unit risk. This was a well designed study, conducted in male rats with a sufficient number (N=50) of animals per dose group. Three dose levels plus an untreated control group were examined following exposure to 1,4-dioxane via inhalation for 2 years.

Choice of species/gender. Male F344 rat data were used to estimate risk following inhalation of 1,4-dioxane. Kano et al. (2009) showed that male rats were more sensitive than female rats to the effects of 1,4-dioxane following oral administration; therefore, male rats were chosen to be studies in the 2 year bioassay conducted by the same laboratory (Kasai et al., 2009). The sensitivity and tumorigenic response of female rats or male or female mice following inhalation of 1,4-dioxane is unknown. Since female mice were the most sensitive gender and species examined in the Kano et al. (2009) oral study, female mice may also be more sensitive to the inhalation of 1,4-dioxane which would result in a greater risk.

Human population variability. The extent of inter-individual variability in 1,4-dioxane metabolism has not been characterized. A separate issue is that the human variability in response to 1,4-dioxane is also unknown. Data exploring whether there is differential sensitivity to 1,4-dioxane carcinogenicity across life stages is unavailable. This lack of understanding about potential differences in metabolism and susceptibility across exposed human populations thus represents a source of uncertainty. Also, the lack of information linking a MOA for 1,4-dioxane to the observed carcinogenicity is a source of uncertainty.

II.D. EPA DOCUMENTATION, REVIEW, AND CONTACTS (CARCINOGENICITY ASSESSMENT)

II.D.1. EPA DOCUMENTATION

Source Document — *Toxicological Review of 1,4-Dioxane* (U.S. EPA, 2013)

This document has been provided for review to EPA scientists, interagency reviewers from other federal agencies and the Executive Office of the President, and the public, and peer reviewed by independent scientists external to EPA. A summary and EPA's disposition of the comments received from the independent external peer reviewers and from the public is included in Appendix A of the *Toxicological Review of 1,4-Dioxane* (U.S. EPA, 2013). **To review this appendix, exit to the Toxicological Review, Appendix A, Summary of External Peer Review and Public Comments and Disposition (PDF).**

II.D.2. EPA REVIEW

Agency Completion Date Oral – **08/11/2010**

Agency Completion Date Inhalation – **09/20/2013**

II.D.3. EPA CONTACTS

Please contact the IRIS Hotline for all questions concerning this assessment or IRIS, in general, at (202) 566-1676 (phone), (202) 566-1749 (fax), or hotline.iris@epa.gov (email address).

III. [reserved]
IV. [reserved]
V. [reserved]

VI. Bibliography

Substance Name — 1,4-Dioxane
CASRN — 123-91-1

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VII. Revision History

Substance Name — 1,4-Dioxane
CASRN — 123-91-1
File First On-Line — 08/22/1998

Date	Section	Description
08/22/1988	II.	Carcinogen summary on-line
08/11/2010	I., II., VI.	RfD and cancer assessment updated; RfC discussion added.
09/20/2013		Added RfC and inhalation cancer assessment.

VIII. Synonyms

Substance Name — 1,4-Dioxane
CASRN — 123-91-1
Section VIII. Last Revised — 09/20/2013

- 123-91-1
- diethylene dioxide
- diethylene oxide
- dioxane, 1,4-
- p-dioxane
- dioxane
- dioxyethylene ether
- diethylene ether
- 1,4-diethylene dioxide

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1050 B. Significant Figures

1. Reporting Requirements

To avoid ambiguity in reporting results or in presenting directions for a procedure, it is customary to use "significant figures." All digits in a reported result are expected to be known definitely, except for the last digit, which may be in doubt. Such a number is said to contain only significant figures. If more than a single doubtful digit is reported, the extra digit or digits are not significant. This is an important distinction. Extra digits should be carried in calculation (see 1050B.2). If an analytical result is reported as "75.6 mg/L," the analyst should be quite certain of the "75," but may be uncertain as to whether the ".6" should be .5 or .7, or even .4 or .8, because of unavoidable uncertainty in the analytical procedure. If the standard deviation were known from previous work to be 2 mg/L , the analyst would have, or should have, rounded off the result to "76 mg/L" before reporting it. On the other hand, if the method was so good that a result of "75.64 mg/L" could have been conscientiously reported, then the analyst should not have rounded it off to 75.6 mg/L.

Report only such figures as are justified by the accuracy of the work. Do not follow the common practice of requiring that quantities listed in a column have the same number of figures to the right of the decimal point.

2. Rounding Off

Round off by dropping digits that are not significant. If the digit 6, 7, 8, or 9 is dropped, increase preceding digit by one unit; if the digit 0, 1, 2, 3, or 4 is dropped, do not alter preceding digit. If the digit 5 is dropped, round off preceding digit to the nearest even number: thus 2.25 becomes 2.2 and 2.35 becomes 2.4.

When making calculations, perform all computations before rounding off results. Repeated rounding off can result in changing the value of a reported result. For example, taking the measured value of 77.46 and rounding off to three significant figures yields 77.5. If the latter number were rounded a second time to two significant figures, the result would be 78. This is clearly a different result from a rounding of the original value of 77.46 to two significant figures (77).

3. Ambiguous Zeros

The digit 0 may record a measured value of zero or it may serve merely as a spacer to locate the decimal point. If the result of a sulfate determination is reported as 420 mg/L, the report recipient may be in doubt whether the zero is significant or not, because the zero cannot be deleted. If an analyst calculates a total residue of 1146 mg/L, but realizes that the 4 is somewhat doubtful and that therefore the 6 has no significance, the answer should be rounded off to 1150 mg/L and so reported but here, too, the report recipient will not know whether the zero is significant. Although the number could be expressed as a power of 10 (e.g., 11.5×10^2 or 1.15×10^3), this form is not used generally because it would not be consistent with the normal expression of results and might be confusing. In most other cases, there will be no doubt as to the sense in which the digit 0 is used. It is obvious that the zeros are significant in such numbers as 104 and 40.08. In a number written as 5.000, it is understood that all the zeros are significant, or else the number could have been rounded off to 5.00, 5.0, or 5, whichever was appropriate. Whenever zero is ambiguous, it is advisable to accompany the result with an estimate of its uncertainty.

Sometimes, significant zeros are dropped without good cause. If a buret is read as "23.60 mL," it should be so recorded, and not as "23.6 mL." The first number indicates that the analyst took the trouble to estimate the second decimal place; "23.6 mL" would indicate an imprecise reading of the buret.

4. Standard Deviation

Suppose that a set of potential results is normally distributed with a standard deviation of 100 mg/L and that a calculated value turns out to be 1450 mg/L. Then that 1450 is the best estimate available of this particular value, and from a Bayesian point of view, there would only be about a 31% chance that the true value was 1400 or lower or that the true value was 1500 or higher. It does not make sense to round the 1450 value to 1400. The arbitrary subtracting of half a standard deviation leaves us with a value that does not represent our best estimate well. The standard deviation should influence the last significant figures of a calculation only by $\pm$ 0.5[1] and if more, the number of significant figures cannot be justified.

When reporting numbers in the form $x \pm y$, always state whether y represents standard deviation, standard error, confidence limit, or an estimate of maximum bias. Standard deviations and standard errors often should be reported with extra digits (compared with single measurements) because they are calculated from variances and because they are square roots (see 1050B.5). When interpreting a quantity such as 1480 $\pm$ 40, be aware that this notation seldom indicates a belief that the true value lies anywhere in the range from 1440 to 1520 with equal probability; instead, the probability is concentrated near the central value (1480).

5. Calculations

As a starting point, round off the results of any calculation in which several numbers are multiplied and divided to as few significant figures as are present in the factor with the fewest significant figures.[2] However, several potential reasons to modify that guideline are noted below.

Example: Assume that the following calculation must be made to obtain the results of an analysis:

$$\frac{56 \times 0.003\ 462 \times 43.22}{1.684}$$

A ten-place calculator yields an answer of "4.975 740 998." If the number 56 is an exact number (a count or a mathematical constant such as π), it has no error associated with it and is considered to have unlimited significant figures. In that case, round off the result of the calculation to "4.976" because other numbers have only four significant figures. However, if 56 is an approximate measurement with uncertainly associated beyond the second figure, round off the result to "5.0" because 56 has only two significant figures.

When numbers are added or subtracted, the number that has the least precision in its last significant digit limits the number of places that can justifiably be carried in the sum or difference. It is acceptable practice to carry one more digit beyond the least precise significant digit.

Example:

The following numbers are to be added:

0.0072
12.02
4.0078
25.9
4886

The number "4886" is the least precise number (decimal place). Round each number in the sum to one or more digits beyond the least precise number and compute the sum.

0.0
12.0
4.0
25.9
4886.
4927.9

Round the result to the precision of the least precise number in the sum, 4928.

Some calculators or computers round off numbers by a different rule that tends to bias results toward the larger digit in the last significant figure. Before using such a device, determine which rounding techniques are programmed and if an incorrect rounding method is being used, reprogram to follow the correct rounding method. If it is not possible to reprogram, take unrounded number and manually round off using the correct scientific roundoff method.

Interpret the foregoing guidelines flexibly. For example, consider a series of measurements of variable u, v, and w, and a derived variable $y = uv/w$ that is calculated for each case. Suppose measurements give $y = 9.90972$ and $y = 10.11389$ for two cases with similar measured values. According to the guidelines, the first y should be rounded to 9.91; the final digit here is about 0.1% of the overall result. For comparable precision, round the y value for the second case to 10.11 (not 10.1) because the fourth digit is also about 0.1% of the number. To generalize, more significant digits should at times be provided for quantities having 1, 2, or 3 (say) as leading digits than for quantities beginning with 7, 8, or 9.

Flexibility is also needed for the average of several numbers. The standard deviation (standard error) of a mean of N numbers is only $1/\sqrt{N}$ as large as the standard deviation of the individual numbers. Thus a mean of 100 numbers like d.dd is known to a precision of d.ddd. Even if fewer values than 100 are averaged, showing an extra digit may be justifiable. Because variances are averages of squared deviations, they too are more precise than individual deviations. Therefore, reporting variances with an extra digit or two is often justifiable.

These guidelines refer only to final reported values. When performing any series of mathematical or statistical calculations, do not round measurements or other numbers until the very end of the analysis. Keep two or three extra digits for all intermediate calculations, to reduce round-off errors, which can be substantial.

6. General Arithmetic Functions

In analytical calculations, it may be necessary to use functions other than simple arithmetic, such as logarithmic, exponential, or trigonometric functions. A detailed treatment of significant figures in such cases is available.[3]

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Title 40: Protection of Environment

PART 131—WATER QUALITY STANDARDS

§131.5 EPA authority.

(a) Under section 303(c) of the Act, EPA is to review and to approve or disapprove State-adopted water quality standards. The review involves a determination of:

(1) Whether the State has adopted designated water uses that are consistent with the requirements of the Clean Water Act;

(2) Whether the State has adopted criteria that protect the designated water uses based on sound scientific rationale consistent with §131.11;

(3) Whether the State has adopted an antidegradation policy that is consistent with §131.12, and whether any State adopted antidegradation implementation methods are consistent with §131.12;

(4) Whether any State adopted WQS variance is consistent with §131.14;

(5) Whether any State adopted provision authorizing the use of schedules of compliance for water quality-based effluent limits in NPDES permits is consistent with §131.15;

(6) Whether the State has followed applicable legal procedures for revising or adopting standards;

(7) Whether the State standards which do not include the uses specified in section 101(a)(2) of the Act are based upon appropriate technical and scientific data and analyses, and

(8) Whether the State submission meets the requirements included in §131.6 of this part and, for Great Lakes States or Great Lakes Tribes (as defined in 40 CFR 132.2) to conform to section 118 of the Act, the requirements of 40 CFR part 132.

(b) If EPA determines that the State's or Tribe's water quality standards are consistent with the factors listed in paragraphs (a)(1) through (8) of this section, EPA approves the standards. EPA must disapprove the State's or Tribe's water quality standards and promulgate Federal standards under section 303(c)(4), and for Great Lakes States or Great Lakes Tribes under section 118(c)(2)(C) of the Act, if State or Tribal adopted standards are not consistent with the factors listed in paragraphs (a)(1) through (8) of this section. EPA may also promulgate a new or revised standard when necessary to meet the requirements of the Act.

(c) Section 401 of the Clean Water Act authorizes EPA to issue certifications pursuant to the requirements of section 401 in any case where a State or interstate agency has no authority for issuing such certifications.

[48 FR 51405, Nov. 8, 1983, as amended at 56 FR 64894, Dec. 12, 1991; 60 FR 15387, Mar. 23, 1995; 80 FR 51047, Aug. 21, 2015]

New Mexico Environment Department

Stakeholder Discussions for the 2020 Triennial Review of Water Quality Standards

Jennifer Fullam,
Standards, Planning and Reporting Team Leader Surface
Water Quality Bureau
July 2020

SWQB Invites Stakeholder Input for the Triennial Review of Water Quality Standards

The Bureau would like to thank you for expressing interest in the Triennial Review of *Standards for Interstate and Intrastate Surface Waters* (20.6.4 NMAC).

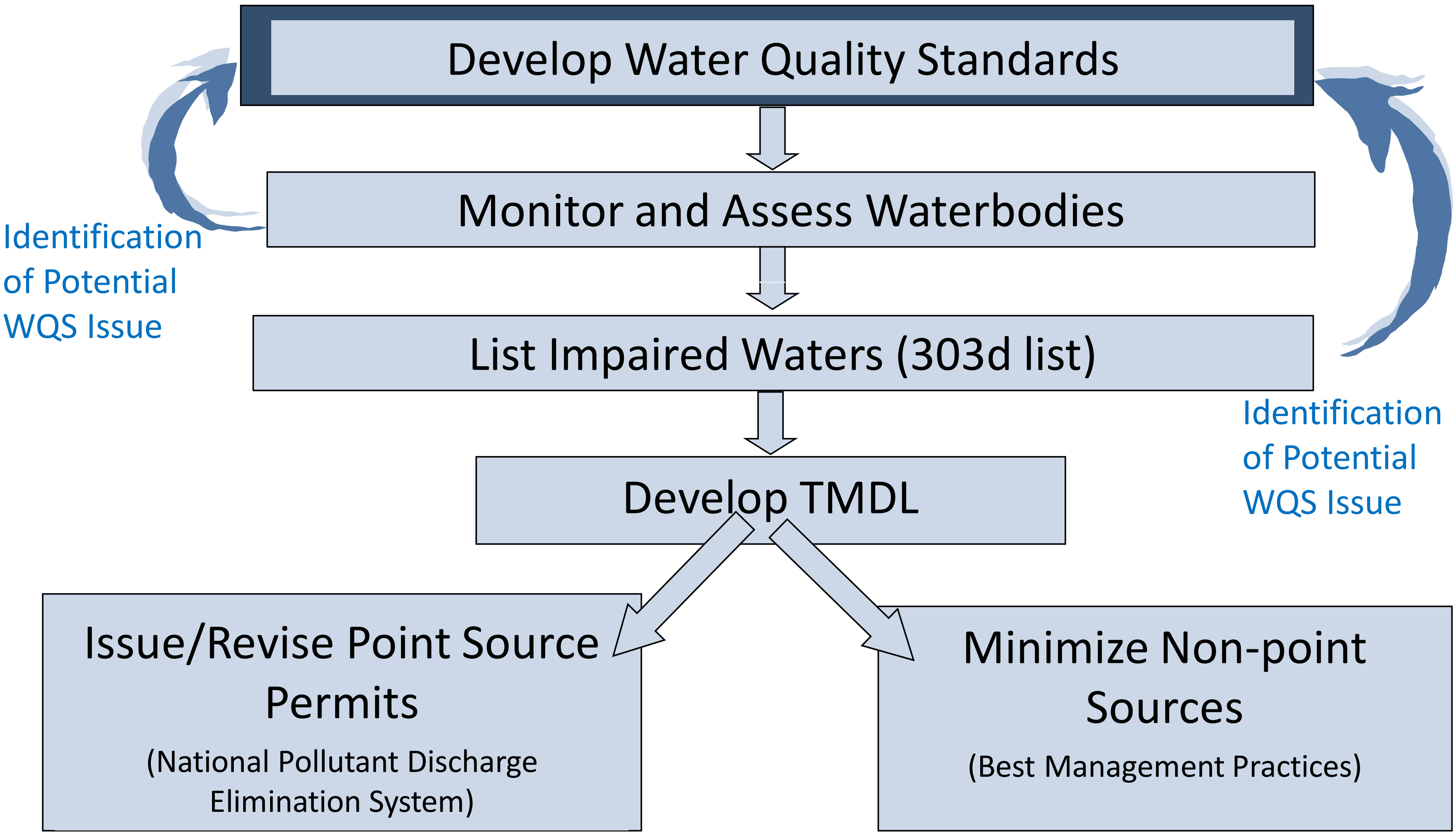
General Outline of Todays Discussion

I. **Regulatory Framework for Triennial Reviews**
II. **Amendments under consideration for this Triennial**
III. **The Triennial Review Process and Tentative Timelines**
IV. **Listening Session with Stakeholders**

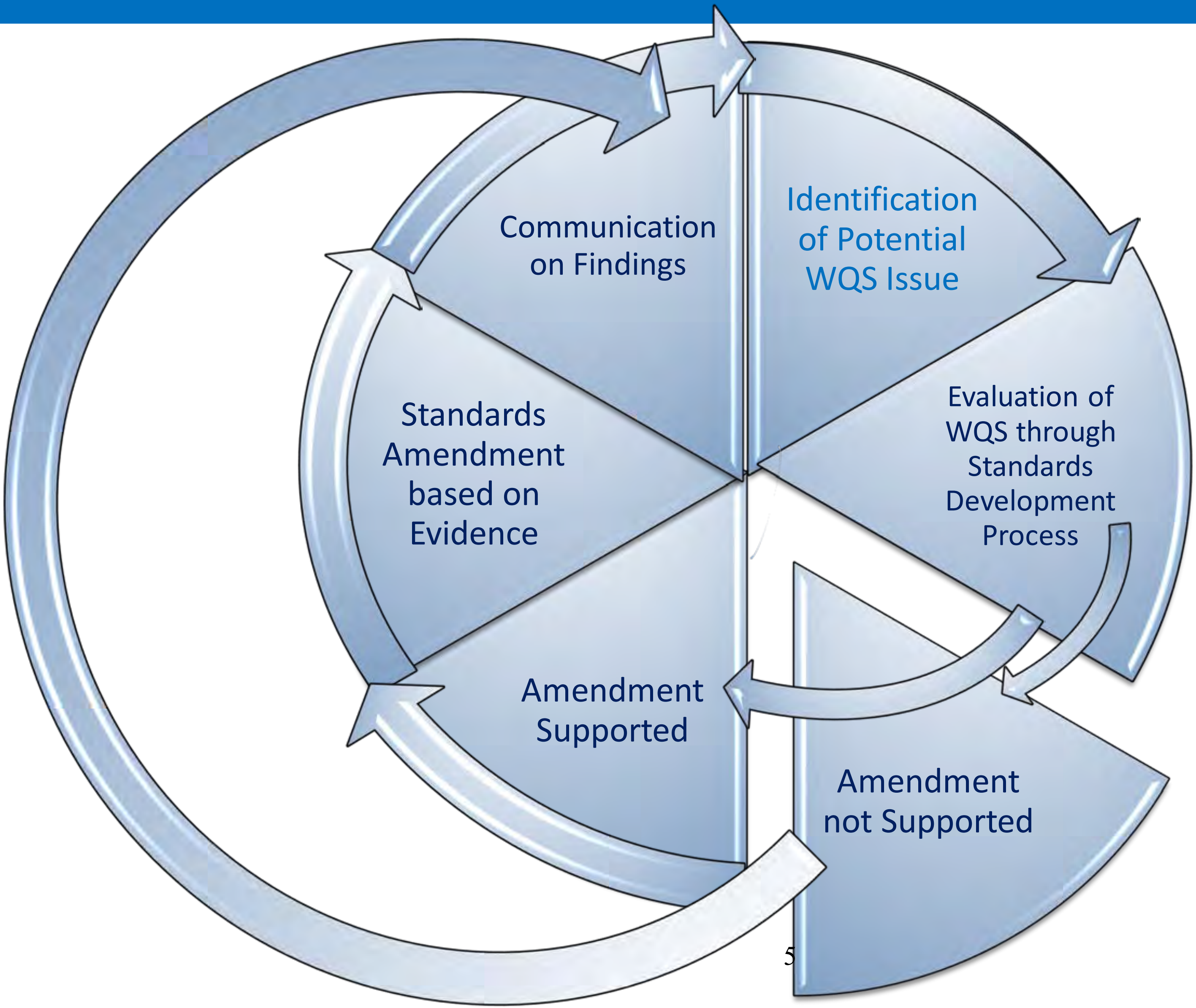
NMED Exhibit 122

I. Regulatory Framework

Clean Water Act Framework



WQS Amendments



Stakeholder's Participation

- 40 CFR 25.4 provides for meaningful engagement
- New Mexico's State Rules Act (NMSA 1978 § 14-4-2) requires distribution of information regarding the proposed rule to the public as provided under the definition for "provide to the public"
- Public Outreach, including Stakeholder Engagement is outlined in the State's Water Quality Management Plan/Continuing Planning Process
  - Central location of reports, studies, plans and other documents
  - Notify stakeholders in a timely fashion prior to consideration of major decisions

State of New Mexico Water Quality Standards

Federal Water Pollution Control Act (Clean Water Act or "CWA")

Per Section 303 of the CWA, each agency is required to adopt Water Quality Standards	Per Section 101(a) of CWA, the objective of the Act is to restore and maintain the chemical, physical and biological integrity of the Nations waters

40 Code of Federal Regulations ("CFR")

Per 40 CFR 131.20, from time to time, but at least once every 3 years, **hold public hearings for the purpose of reviewing applicable water quality standards** adopted pursuant to §§ 131.10 through 131.15 and Federally promulgated water quality standards and, as appropriate, modifying and adopting standards. The State shall also **re-examine any waterbody segment with water quality standards that do not include the uses specified in section 101(a)(2)** of the Act every 3 years to determine if any new information has become available. If such new information indicates that the uses specified in section 101(a)(2) of the Act are attainable, the State shall revise its standards accordingly.

The State of New Mexico's Water Quality Act ("WQA") NMSA 1978, §§ 74-6-1 to -17

Is the mechanism via which the Legislature has provided authority to adopt Water Quality Standards in accordance with the CWA

Water Quality Control Commission ("WQCC")

The WQCC, having no administrative staff of its own, has delegated the responsibilities for water quality management and CWA activities involving surface waters to the New Mexico Environment Department ("NMED")

20.6.4 New Mexico Administrative Code ("NMAC")

The WQCC has codified its water quality standards for interstate and intrastate surface waters

2020 Triennial Review of Water Quality Standards

- Federal CWA § 303(c)(1)
- 40 CFR § 131.20
  - Requires the State hold a public hearing for the purpose of reviewing applicable water quality standards at least once every three years
  - As appropriate, modify and adopt standards through the rulemaking process which requires a hearing
    - re-examine any waterbody segment with water quality standards
    - if any new information has become available
- 20.6.4.10(A) NMAC requires the state hold public hearings at least once every three years to review and propose necessary revisions to the water quality standards

Review Process

- Evaluation of needs
- Ranking of proposed amendments
  - **Tier I**- Required to be reviewed for Triennial
  - **Tier II**-Can only be updated during a Triennial and implications for implementing WQS if change not made at this time
  - **Tier III**-Can only be updated during a Triennial but no direct implications for implementing WQS if change not made at this time
  - **Tier IV**-Can be made outside the Triennial
- Prioritization
- Verification of information in sections
- Evaluation of history and supporting evidence for amendment
- Final identification of actions for this Triennial

II. Amendments under consideration

Summary of Amendments Being Considered

- Updating definitions (20.6.4.7 NMAC)
- Clarification of language under Review of Standards (20.6.4.10 NMAC)
- Clarification of language under Use Attainability Analysis (20.6.4.15 NMAC)
- Several designated use amendments
- Updates to the aquatic life and human health criteria (20.6.4.900 NMAC)
- Updates to ammonia criteria (20.6.4.900 NMAC)

Designated Uses Amendments Being Considered

- Classified non-perennial tributaries currently classified with a non-attainable designated use intended for perennial waters
- Review classified perennial waters designated with secondary contact to determine if existing uses are more stringent
- Waters within Los Alamos National Laboratory
  - Pursuant to the Stipulated Agreement between NMED, Los Alamos National Laboratory, and Amigos Bravos
  - Reviewing aquatic life uses

General Updates

- General updates
  - ensure consistency of language across the standards
  - correct grammatical errors
  - update references.

III. Process and Tentative Timelines

Standards Amendments-What to Propose

Criteria Amendments can be made if Section 304(a) guidance is updated, the State determines another criteria is protective of a use

Antidegradation Policy amendments can be made, as needed to meet the federal requirements by submitting demonstration of amendment under the processes for rulemaking

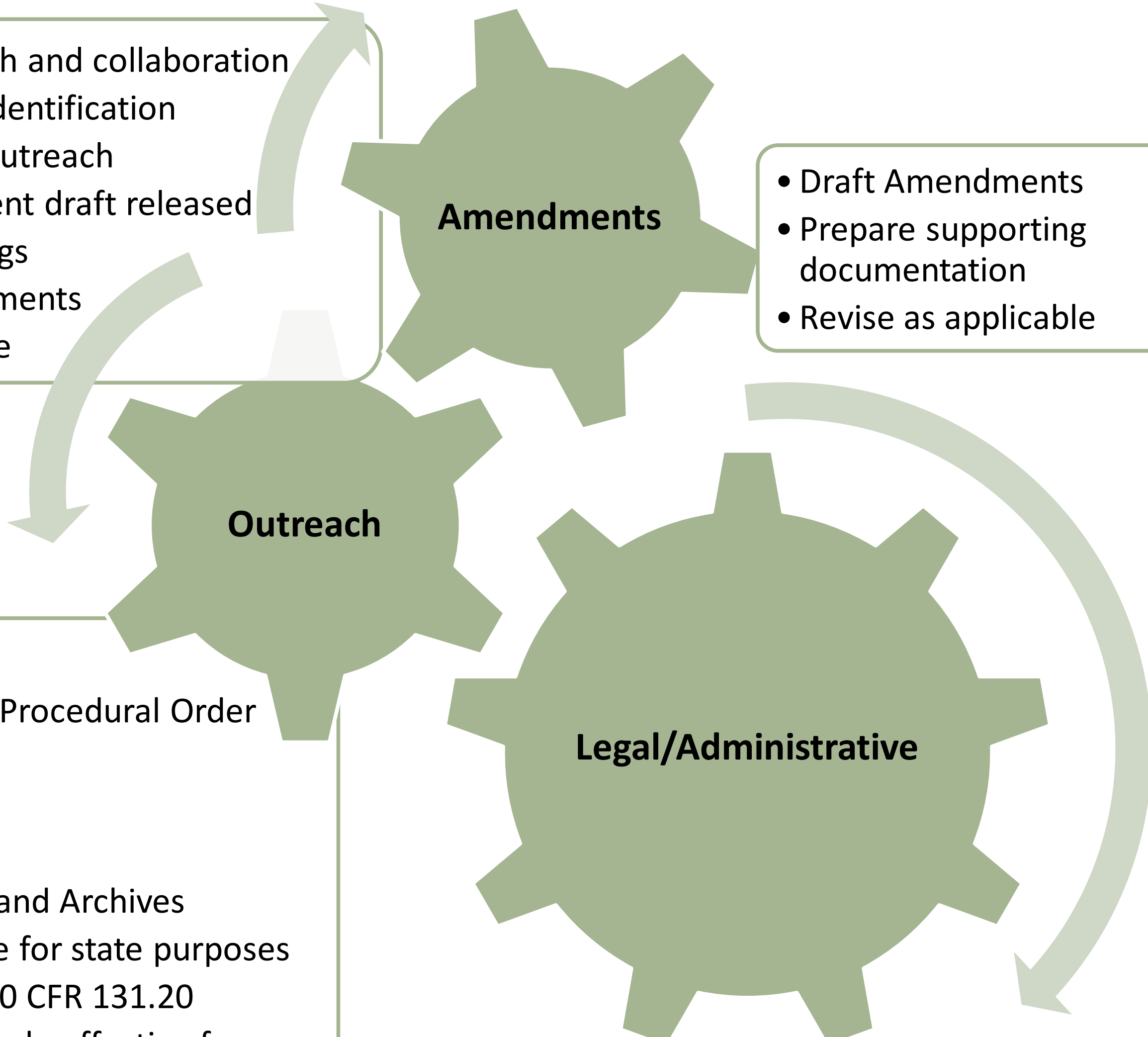
Designated Uses based on Water Quality

- **Meets Criteria**
  - Existing Use **<u>is</u>** more Stringent than Designated Use
    - Develop work plan (or equivalent) to propose **amendment** to make designated use at least as stringent as the existing use
  - Existing Use is **<u>equal to</u>** designated use
    - Evaluate potential for petitioning for **ONRW** status

      Outstanding National Resource Waters Petitions can also be considered if a particular waterbody has exceptional recreational or ecological significance or is a water in a specially designated area (see 20.6.4.9 NMAC)
- **Does Not Meet Criteria**
  - Use is **not** being supported
    - Non-support due to **temporary** conditions
      - Develop work plan to evaluate if **temporary standard** is supported
    - Non-support due to **permanent** conditions
      - Develop work plan to evaluate if **UAA** is supported
  - Use **is** supported
    - Develop work plan (or equivalent) to evaluate if **Site-Specific Criteria** is Supported

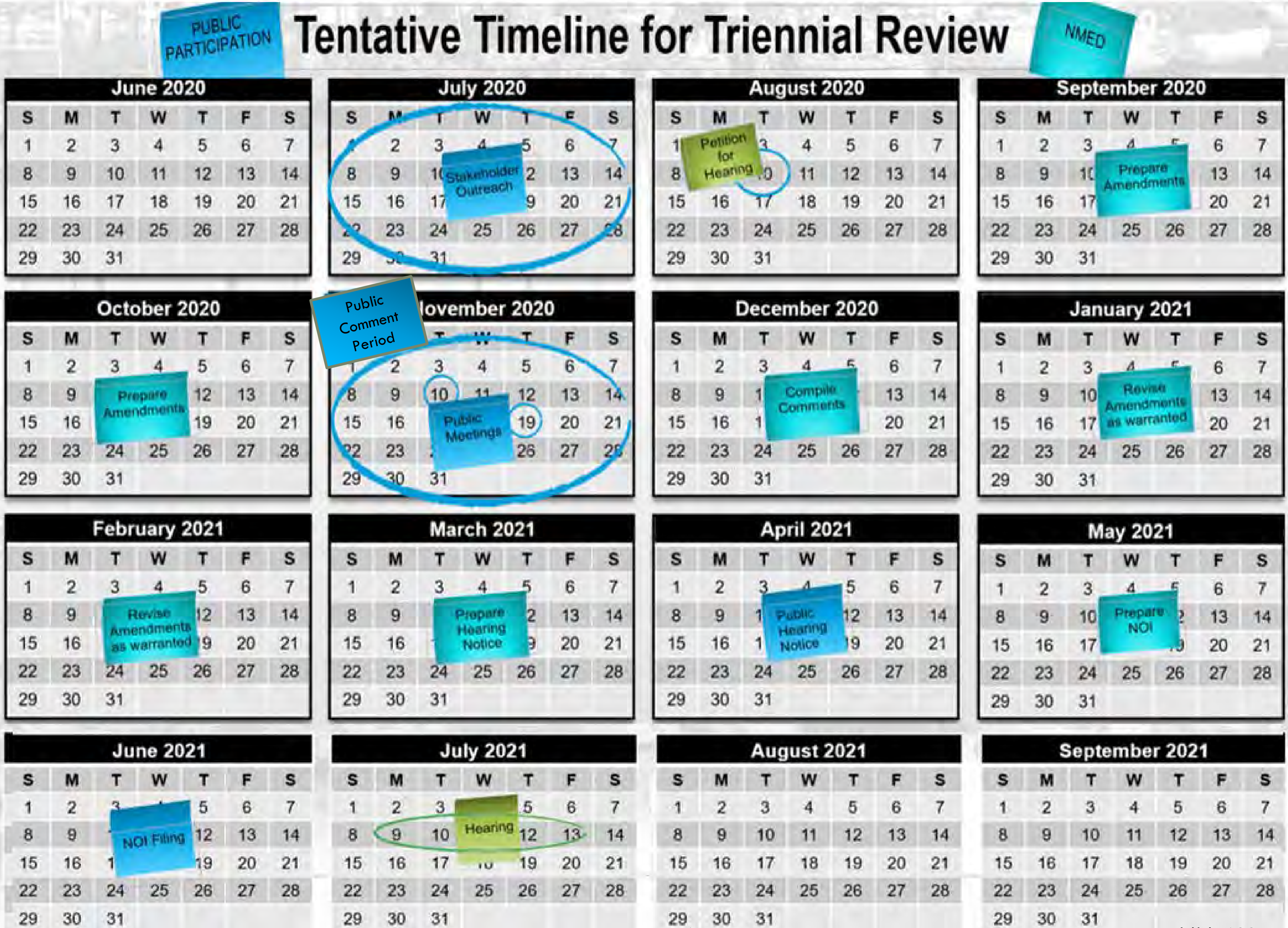
Public Hearing Process

- Tribal outreach and collaboration
- Stakeholder identification
- Stakeholder outreach
- Public comment draft released
- Public meetings
- Compile comments
- Hearing notice



- Draft Amendments
- Prepare supporting documentation
- Revise as applicable

- Petition the WQCC
- Hearing Schedule and Procedural Order
- File Notice of Intent
- Hearing
- WQCC deliberation
- File rule with Records and Archives
- Rule becomes effective for state purposes
- Submit to EPA under 40 CFR 131.20
- EPA Approval renders rule effective for Clean Water Act Purposes


PUBLIC PARTICIPATION
Tentative Timeline for Triennial Review
NMED
June 2020
July 2020
Stakeholder Outreach
August 2020
Petition for Hearing
September 2020
Prepare Amendments
October 2020
Prepare Amendments
Public Comment Period
November 2020
Public Meetings
December 2020
Compile Comments
January 2021
Revise Amendments as warranted
February 2021
Revise Amendments as warranted
March 2021
Prepare Hearing Notice
April 2021
Public Hearing Notice
May 2021
Prepare NOI
June 2021
NOI Filing
July 2021
Hearing
August 2021
September 2021

Listening Session

IV

General Format for Session

Raise Hand

When called on by Moderator, please provide a brief (1-2 minute) statement

- Looking for input on some of the areas NMED is considering amending
- Input on the tentative timeline
- Input on other areas of need of review under 20.6.4 NMAC

Once everyone has had opportunity to speak you may be called on again to expand further on your ideas if needed

SWQB Stakeholder Input for the Triennial Review of WQS

Thank You

Contact:

Jennifer Fullam,

Water Quality Standards Coordinator

Surface Water Quality Bureau

Email: jennifer.fullam@state.nm.us

Written Stakeholder Input Encouraged to be Submitted by

Monday, August 17, 2020

Information about New Mexico's water quality standards can be found at:

https://www.env.nm.gov/surface-water-quality/wqs/.

Additional information about water quality in general is available on the Surface Water Quality Bureau's website:

https://www.env.nm.gov/surface-water-quality/.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

NOV 5 1997

OFFICE OF WATER

MEMORANDUM

SUBJECT: Establishing Site Specific Aquatic Life Criteria Equal to Natural Background

FROM: Tudor T. Davies, Director
Office of Science and Technology

TO: Water Management Division Directors, Regions 1-10
State and Tribal Water Quality Management Program Directors

In the course of reviewing State and Tribal water quality standards (WQS), EPA has identified several issues pertaining to the establishment of site specific numeric criteria on the basis of natural background conditions. EPA is issuing this policy to provide greater clarity and direction for States and Tribes who are considering establishing site specific criteria equal to natural background conditions, and for EPA Regional Offices reviewing State and Tribal water quality management programs.

Background

Site specific criteria are allowed by regulation and are subject to EPA review and approval. The Federal water quality standards regulation at 40 CFR 131.11(b)(1) requires States and authorized Tribes to adopt numeric water quality criteria that are based on section 304(a) criteria, section 304(a) criteria modified to reflect site-specific conditions, or other scientifically defensible methods. Under 40 CFR 131.5(a)(2), EPA reviews State WQS to determine whether a State has adopted criteria to protect the designated uses. Existing guidance and practice are that EPA will approve site specific criteria developed on the basis of sound scientific rationales.

Currently, EPA guidance has specified three procedures for States and Tribes to follow in deriving site specific criteria. These are the Recalculation Procedure, the Water-Effect Ratio Procedure and the Resident Species Procedure. These procedures can be found in the *Water Quality Standards Handbook* (EPA-823-B940005a, 1994). EPA also recognizes there may be naturally occurring concentrations of pollutants which may exceed the national criteria published under section 304(a) of the Clean Water Act.

Policy

This policy applies only to site specific numeric aquatic life criteria based on natural background. States and Tribes may establish site specific numeric aquatic life water quality criteria by setting the criteria value equal to *natural* background. Natural background is defined as background concentration due *only* to non-anthropogenic sources, i.e., non-manmade sources. In setting criteria equal to natural background the State or Tribe should, at a minimum, include in their water quality standards:

(1) a definition of natural background consistent with the above;
(2) a provision that site specific criteria may be set equal to natural background;
(3) a procedure for determining natural background, or alternatively, a reference in their water quality standards to another document describing the binding procedure that will be used.

Discussion

A State or Tribal procedure for determining natural background will need to be specific enough to establish natural background concentration accurately and reproducibly. States and Tribes should also provide for public notice and comment on the definition, the provision, the procedure and the site specific numeric criteria derived from the procedure. The State or Tribe will need to document the resulting site specific numeric criteria in the State or Tribal water quality standards, including specifying the water body segment to which the site specific criteria apply. This can be accomplished through adopting the site specific criteria into the State or Tribal WQS, or, alternatively, by appending the site specific criteria to the WQS. In either case, the State or Tribe must comply with the public participation requirements of 40 CFR 131.20 and 40 CFR Part 25, and State and Tribal citizens should be able to readily determine the water quality criteria applicable to specific water bodies.

For aquatic life uses, where the natural background concentration for a specific parameter is documented, by definition that concentration is sufficient to support the level of aquatic life expected to occur naturally at the site absent any interference by humans. The State or Tribe should consider refining the designated use for the water body to more precisely define the existing aquatic life use.

This policy does not apply to human health uses. For human health uses, where the natural background concentration is documented, this new information should result in, at a minimum, a re-evaluation of the human health use designation. Where the new background information documents that the natural background concentration does not support a human health use previously believed attained, it may be prudent for the State or Tribe to change the human health use to one the natural background concentration will support (e.g., from drinking water supply to drinking water supply only after treatment).

Conclusion

This policy explains and clarifies the use of natural background conditions in establishing site specific criteria for protection of aquatic life uses. In addition to the three procedures listed above for deriving site specific criteria as discussed above, States and Tribes can address natural background conditions through refining the designated use to more accurately reflect the aquatic community present within the stream segment. EPA recognizes that there are other options available to States/Tribes to account for other ambient conditions (e.g., concentrations due to non-natural, man-made conditions) which exceed the national criteria. One such option is for a State or Tribe to conduct a Use Attainability Analysis, consistent with the requirements of 40 CFR 131.10, and adopt a use which is less than the 101(a) goal uses of the Clean Water Act, e.g., less than "fishable/swimmable", or modify a 101(a) goal use such that less stringent criteria are required. In any case, the existing uses of the water body segment must be maintained and protected.

If you have any questions or concerns regarding this policy, please contact me or have your staff contact Elizabeth Southerland, Acting Director, Standards and Applied Science Division, at 202-260-3966.

cc: Lepow, OGC
Wayland, OWOW
Cook, OWM
Dougherty, OGWDW

Existing Use Analysis
for
Effluent Canyon, Upper S-Site Canyon and Twomile Canyon from Pajarito Canyon upstream to its confluence with Upper Twomile Canyon

Prepared by:
Surface Water Quality Bureau

Original: May 3, 2021
Corrected: June 22, 2021

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Table of Contents

I. Introduction

The objective of the Clean Water Act ("CWA") is to restore and maintain the chemical, physical and biological integrity of the Nation's waters. One of the goals established under the CWA to achieve this objective, is to ensure, wherever attainable water quality provides for the protection and propagation of fish, shellfish and wildlife (aquatic life) and provides for the ability to recreate in and on the water. The CWA implements the measures necessary to achieve this goal through 40 Code of Federal Regulations ("C.F.R."), which, in part, requires states to uphold these goals through the adoption of surface Water Quality Standards ("WQS"). In accordance with 40 C.F.R. § 131.6, these WQS contain, at a minimum, the designated uses for waterbodies, the surface water quality criteria to protect those uses, and an antidegradation policy to ensure the water quality is maintained. The State of New Mexico has codified its WQS under *Standards for Interstate and Intrastate Surface Waters* (20.6.4 NMAC) but recognizes that water quality protection is ongoing and protections for waters may change over time. The most common type of amendments to water quality protections are those associated with the established designated uses.

There are three general conditions to which a designated use may be amended:

1. In accordance with 40 C.F.R. § 131.10(g) and 20.6.4.15 NMAC, if a designated use, that is not an existing use, is not attainable due to one of the six factors identified under 40 C.F.R. § 131.10(g) it may be removed through a Use Attainability Analysis ("UAA"). The UAA must be conducted to demonstrate that the proposed designated use is not less stringent than the existing use, determine the factor preventing the attainment of the current use, and provide evidence supporting the highest attainable use; or
2. In accordance with 40 C.F.R. § 131.10(i), the state reviews and revises applicable WQS to reflect the uses actually attained should those be more stringent than the current designated uses; or
3. In accordance with 40 C.F.R. § 131.20, the state reviews applicable WQS to which there is new (not considered before) information that has become available. If such new information indicates that more stringent uses specified in Section 101(a)(2) of the CWA are attainable, the state revises its standards accordingly during the Triennial Review.

As discussed in this Existing Use Analysis ("EUA"), there is reasonable evidence that existing uses may be more stringent than the current designated use. Therefore, in accordance with 40 C.F.R. § 131.10(i), this EUA will assess the appropriate designated uses and associated criteria based on the existing uses for three non-perennial waters within lands managed by Los Alamos National Laboratory ("LANL") on the Pajarito Plateau in Los Alamos, New Mexico as described in 20.6.4.128 NMAC. In order to do so, this analysis includes the State's regulatory authority and procedures to amend a WQS, an evaluation of the proposed changes as it pertains to the State's antidegradation policy, the waters and designated uses being evaluated under this analysis, an evaluation of threatened and endangered species that may be impacted by amending the designated use, general site conditions, data that were used to establish the existing uses and whether more stringent designated uses are supported based on existing uses.

Throughout the document, some of the referenced regulatory citations have been provided in boxed text to aid with referencing.

II. Regulatory Authority and Framework

A. Authority

The goals and objectives of the CWA, as established in Section 101(a), are to restore and maintain the chemical, physical and biological integrity of the Nations waters; and wherever attainable, to protect for the propagation of fish, shellfish and wildlife, and provide for recreation in and on the water. The CWA requires states to adopt WQS under 40 C.F.R. § 131.4 to achieve these goals and objectives.

CWA § 101(a)

The objective of this Act is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. In order to achieve this objective, it is hereby declared that, consistent with the provisions of this Act—

> *(2) it is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water be achieved by July 1, 1983;*

40 C.F.R. § 131.4

(a) *States (as defined in § 131.3) are responsible for reviewing, establishing, and revising water quality standards. As recognized by section 510 of the Clean Water Act, States may develop water quality standards more stringent than required by this regulation. Consistent with section 101(g) and 518(a) of the Clean Water Act, water quality standards shall not be construed to supersede or abrogate rights to quantities of water.*

The basic authority for water quality management in New Mexico is provided through the Water Quality Act (NMSA 1978, §§ 74-6-1 to 74-6-17). This law establishes the Water Quality Control Commission ("WQCC") and specifies its duties and powers. The WQCC is the state water pollution control agency for all purposes of the federal Clean Water Act (NMSA 1978, § 74-6-3(E)). Under Section 74-6-4(D), the Water Quality Act requires the WQCC to adopt WQS based on credible scientific data and reliable evidence. New Mexico's *Standards for Interstate and Intrastate Surface Waters* (20.6.4 NMAC) establish surface WQS that consist of designated uses for surface waters of the State, the water quality criteria necessary to protect the designated uses, and an antidegradation policy.

74-6-4 NMSA 1978 Duties and powers of commission.

The commission:

D. shall adopt water quality standards for surface and ground waters of the state based on credible scientific data and other evidence appropriate under the Water Quality Act. The standards shall include narrative standards and, as appropriate, the designated uses of the waters and the water quality criteria necessary to protect such uses. The standards shall at a minimum protect the public health or welfare, enhance the quality of water and serve the purposes of the Water Quality Act. In making standards, the commission shall give weight it deems appropriate to all facts and circumstances, including the use and value of the water for water supplies, propagation of fish and wildlife, recreational purposes and agricultural, industrial and other purposes;

The WQCC has the authority to delegate responsibility for administering its regulations to constituent agencies to assure adequate coverage and prevent duplication of effort (NMSA 1978, § 74-6-3(F)). As such, the New Mexico Environment Department ("NMED") is the primary constituent agency responsible for administering and enforcing all programs implemented by the state under the CWA. The WQCC must approve and adopt amendments to the State's WQS prior to NMED filing the amendments with State Records Center and Archives. Amendments become effective for State purposes under the Water Quality Act thirty days after filing with State Records (NMSA 1978, § 74-6-6(E)) or after publication in the New Mexico Register (NMSA 1978, § 14-4-5)), whichever comes later. In accordance with 40 C.F.R. 131.20, within thirty days of the final state action to adopt and certify the revised WQS, the State must submit the amendments and any supporting documentation to the U.S. Environmental Protection Agency ("EPA") for review and approval under the CWA.

40 C.F.R. § 131.20 *State review and revision of water quality standards.*
(c) Submittal to EPA. *The State shall submit the results of the review, any supporting analysis for the use attainability analysis, the methodologies used for site-specific criteria development, any general policies applicable to water quality standards and any revisions of the standards to the Regional Administrator for review and approval, within 30 days of the final State action to adopt and certify the revised standard, or if no revisions are made as a result of the review, within 30 days of the completion of the review.*

B. Background for an Existing Use Analysis

Water quality standards must contain three key elements that dictate their regulatory function. These include establishing designated uses, criteria to protect for those uses and an antidegradation policy. These requirements uphold the objective of the CWA (Section 101 of the CWA) to "restore and maintain the chemical, physical and biological integrity of the Nation's waters".

40 C.F.R. § 131.3 Definitions
(b) Criteria *are elements of State water quality standards, expressed as constituent concentrations, levels, or narrative statements, representing a quality of water that supports a particular use. When criteria are met, water quality will generally protect the designated use.*
(f) Designated uses *are those uses specified in water quality standards for each water body or segment whether or not they are being attained.*
40 C.F.R. § 131.12 Antidegradation policy and implementation methods.
(a) The State shall develop and adopt a statewide antidegradation policy…

According to 40 C.F.R. § 131.3(e), the definition of existing uses "are those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards". A designated use may not be less stringent than an existing use.

40 C.F.R. § 131.3 Definitions
(e) Existing uses *are those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards.*

40 C.F.R. § 131.10 Designation of uses
(i) *Where existing water quality standards specify designated uses less than those which are presently being attained, the State shall revise its standards to reflect the uses actually being attained.*

> ***40 C.F.R. § 131.20 State review and revision of water quality standards.***
> ***(a) State review.*** *The State shall from time to time, but at least once every 3 years, hold public hearings for the purpose of reviewing applicable water quality standards... The State shall also re-examine any waterbody segment with water quality standards that do not include the uses specified in section 101(a)(2) of the Act every 3 years to determine if any new information has become available. If such new information indicates that the uses specified in section 101(a)(2) of the Act are attainable, the State shall revise its standards accordingly…*

If the designated use has criteria less stringent than the existing use, the State must amend the WQS to reflect the use actually attained. Unlike the requirements for removing or amending a designated use to one with less stringent criteria under 40 C.F.R. § 131.10(g), a Use Attainability Analysis ("UAA") is not required for revising standards to reflect an existing use. However, in the State of New Mexico designated uses are codified under rule (20.6.4 NMAC) and the State must undertake a rulemaking process to amend the WQS. NMED must provide supporting evidence that demonstrates compliance with regulatory elements to petition the Commission and provide EPA the reasoning to establish a more stringent designated use. An EUA standardizes the elements necessary for a WQS designated use amendment. Although neither federal nor State law or rule define the term "EUA", 40 C.F.R. § 131.10(i) and 20.6.4.10(B) NMAC establish the requirement to amend uses to be at least as stringent as existing uses.

> ***40 C.F.R. § 131.10 Designation of uses***
> ***(g)*** *States may designate a use, or remove a use that is not an existing use, if the State conducts a use attainability analysis as specified in paragraph (j) of this section that demonstrates attaining the use is not feasible because of one of the six factors in this paragraph. If a State adopts a new or revised water quality standard based on a required use attainability analysis, the State shall also adopt the highest attainable use, as defined in § 131.3(m).*

> ***40 C.F.R. § 131.3 Definitions***
> ***(m)*** *Highest attainable use is the modified aquatic life, wildlife, or recreation use that is both closest to the uses specified in section 101(a)(2) of the Act and attainable, based on the evaluation of the factor(s) in 40 C.F.R. § 131.10(g) that preclude(s) attainment of the use and any other information or analyses that were used to evaluate attainability. There is no required highest attainable use where the State demonstrates the relevant use specified in section 101(a)(2) of the Act and sub-categories of such a use are not attainable.*

Therefore, this analysis intends to provide the supporting evidence needed to determine if a designated use change is warranted based on existing uses.

III. Analysis Framework

A. Reasoning for Analysis

As part of the efforts made to determine the appropriate designated uses for classified ephemeral and intermittent waters within lands managed by U.S. Department of Energy ("DOE") within LANL as identified in 20.6.4.128 NMAC, Amigos Bravos, the U.S. DOE, Los Alamos National Security LLC, and NMED entered into a joint stipulation (WQCCb, 2015) on October 9, 2015. This agreement required the parties meet, share available data, and confer regarding the appropriate level of water quality protections for ephemeral and intermittent waters classified under 20.6.4.128 NMAC. The stipulation requires NMED petition the WQCC on or before the next Triennial Review for amendments to which all parties concur. The lack of concurrence on these tributaries would not preclude any of the parties from filing independent petitions for amending the designated uses, as they saw appropriate, given the demonstration was prepared in accordance with 20.6.4.15 NMAC and filed with the Commission in accordance with 20.1.6 NMAC.

Following several years of discussions and data gathering, the three parties reached concurrence in December 2020 for increased aquatic life protections based predominately on hydrology. Therefore, this EUA only evaluates those tributaries in which the three parties concurred. These include Effluent Canyon, Twomile Canyon from its confluence with Pajarito Canyon to its confluence with Upper Twomile Canyon, and S-Site Canyon from alluvial monitoring well MSC 16-06293 to Martin Spring. Based on the stipulated agreement restrictions, this analysis does not evaluate the appropriate designated uses for the other ephemeral and intermittent waters within LANL. These other waters, which also warrant evaluation, will be considered independently of this analysis.

B. Waterbodies Evaluated

For purposes of this analysis, and as part of the joint stipulation, there was only concurrence by all parties to proceed with a full designated use analysis based on existing uses for three tributaries within LANL. They include Effluent Canyon, the upper portion of S-site Canyon from alluvial monitoring well MSC 16-06293 to Martin Spring, and Twomile Canyon from Pajarito Canyon upstream to its confluence with Upper Twomile Canyon. All three of these tributaries are classified waters in 20.6.4.128 NMAC.

20.6.4.128 RIO GRANDE BASIN

Ephemeral and intermittent portions of watercourses within lands managed by U.S. department of energy (DOE) within LANL, including but not limited to: Mortandad Canyon, Cañada del Buey, Ancho Canyon, Chaquehui Canyon, Indio Canyon, Fence Canyon, Potrillo Canyon and portions of Cañon de Valle, Los Alamos Canyon, Sandia Canyon, Pajarito Canyon and Water Canyon not specifically identified in 20.6.4.126 NMAC. (Surface waters within lands scheduled for transfer from DOE to tribal, state or local authorities are specifically excluded.)

> ***A. Designated Uses:*** *livestock watering, wildlife habitat, limited aquatic life and secondary contact.*
>
> ***B. Criteria:*** *the use-specific criteria in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the acute total ammonia criteria set forth in Subsection K of 20.6.4.900 NMAC (salmonids absent).*

[20.6.4.128 NMAC - N, 05-23-05; A, 12-01-10]

C. Designated Uses Evaluated

Designated uses for livestock watering and wildlife habitat are not being evaluated under this analysis since they are designated uses for all waters of the state and are established as attainable for these waters. Therefore, NMED is only evaluating aquatic life and recreational uses under this analysis.

The current designated aquatic life use for Effluent Canyon, S-Site Canyon and Twomile Canyon is limited aquatic life, which has acute numeric criteria but does not have criteria for pH, dissolved oxygen, temperature, or chronic numeric criteria, with a segment-specific acute ammonia criterion.

The current designated recreational use for Effluent Canyon, S-Site Canyon and Twomile Canyon is secondary contact which has an *Escherichia coli* ("*E. coli*") bacteria monthly geometric mean criterion of 548 colony forming units ("cfu") per 100 milliliters ("mL") or most probable number ("MPN") per 100 mL, and a single sample criterion of 2,507 cfu per 100 mL or MPN per 100 mL.

Table III-1. *Tributaries located within the study area and their current designated uses with a notation on those evaluated under this analysis*.

WQS	Waterbody Description	Contact Use	Aquatic Life Use	Domestic Water Supply	Fish Culture, Public Water Supply, Industrial Water Supply	Irrigation and Irrigation Storage	Livestock watering	Wildlife habitat
20.6.4.128	Effluent Canyon	SC*	LAL*	-	-	-	Y	Y
20.6.4.128	S-Site Canyon	SC*	LAL*	-	-	-	Y	Y
20.6.4.128	Twomile Canyon	SC*	LAL*	-	-	-	Y	Y

"*" denotes that this designated use is evaluated under this analysis
"SC" denotes Secondary Contact designated recreational use for the listed waterbody
"LAL" denotes Limited Aquatic Life designated aquatic life use for the listed waterbody
"-" denotes not a designated use for the listed waterbody
"Y" denotes this as a designated use for the listed waterbody

D. Protection of Downstream Water Quality Standards

In accordance with 40 C.F.R. § 131.10(b), when states consider a designated use amendment, they must provide for the attainment and maintenance of the WQS of downstream waters.

Effluent Canyon is a tributary of Mortandad Canyon. Mortandad Canyon is presumed to be a non-perennial water within LANL and therefore classified under 20.6.4.128 NMAC. As already stated, the designated aquatic and recreational uses in 20.6.4.128 NMAC include limited aquatic life use and secondary contact recreational use. Mortandad Canyon traverses off lands managed by the DOE within LANL before it transitions to Pueblo de San Ildefonso waters. The Pueblo de San Ildefonso does not have "Treatment in a similar manner As a State" ("TAS") through EPA but has a water quality monitoring program that assesses against the state's defined designated uses under 20.6.4 NMAC. For Mortandad Canyon not within LANL, the designated aquatic and recreational uses in 20.6.4.98 NMAC include marginal warmwater aquatic life use and primary contact recreational use. Mortandad Canyon then terminates at the confluence with the Rio Grande in Santa Fe county. The Rio Grande, at this location is classified in 20.6.4.114 NMAC and has both warmwater and marginal coldwater aquatic life designated uses and a primary contact recreational use.

S-Site Canyon is a tributary to Water Canyon. Water Canyon, at its confluence with S-Site Canyon, is currently presumed to be a non-perennial water within LANL and therefore classified under 20.6.4.128 NMAC. Water Canyon traverses across lands managed by the DOE within LANL until just before its termination at its confluence with the Rio Grande in Santa Fe county. The portion of Water Canyon not within LANL is currently presumed to be an unclassified non-perennial water under 20.6.4.98 NMAC, which has a marginal warmwater aquatic life use and a primary contact recreational use. The Rio Grande at this location is classified under 20.6.4.114 NMAC, which has both warmwater and marginal coldwater aquatic life designated uses and a primary contact recreational use.

Twomile Canyon is a tributary to Pajarito Canyon. Pajarito Canyon, at its confluence with Twomile Canyon, is currently presumed to be a non-perennial water within LANL and therefore classified under 20.6.4.128 NMAC. Pajarito Canyon then traverses out of lands managed by the DOE within LANL as it bisects the town of White Rock. Outside of LANL, Pajarito Canyon has protections for unclassified non-perennial waters under 20.6.4.98 NMAC with a marginal warmwater aquatic life use and a primary contact recreational use. Pajarito Canyon then terminates at its confluence with the Rio Grande, in Los Alamos County. The Rio Grande, at this location, is classified under 20.6.4.114 NMAC, which has both warmwater and marginal coldwater aquatic life designated uses and a primary contact recreational use.

Based on the evidence presented in this review, a more stringent aquatic life designated use, as evaluated in this EUA, would not cause water quality degradation in downstream waters.

IV. Antidegradation Evaluation

A. Regulatory Background

In accordance with 40 C.F.R. § 131.12, states must develop and adopt a statewide antidegradation policy, which shall include protection for various levels of water quality. In addition, states must develop methods for implementing the antidegradation policy. New Mexico's antidegradation policy, codified under 20.6.4.8 NMAC, defines three tiers of protection against degradation. These tiers include protections for existing uses ("Tier 1"), protections for high quality waters that exceed levels necessary to support aquatic life, wildlife and recreational uses ("Tier 2"), and protections for waters designated as Outstanding National Resource Waters ("Tier 3"). The implementation procedure for the State's antidegradation policy is integrated as a part of the state's Water Quality Management Plan/Continuing Planning Process (WQMP/CPP), which is approved by both the WQCC and EPA.

40 C.F.R. § 131.12 Antidegradation policy and implementation methods.
(a) *The State shall develop and adopt a statewide antidegradation policy.*

20.6.4.8 NMAC – Antidegradation Policy and Implementation Plan
A. Antidegradation Policy: *This antidegradation policy applies to all surface waters of the state.*
(1) *Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected in all surface waters of the state.*
(2) *Where the quality of a surface water of the state exceeds levels necessary to support the propagation of fish, shellfish, and wildlife, and recreation in and on the water, that quality shall be maintained and protected unless the commission finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the state's continuing planning process, that allowing lower water quality is necessary to accommodate important economic and social development in the area in which the water is located. In allowing such degradation or lower water quality, the state shall assure water quality adequate to protect existing uses fully. Further, the state shall assure that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable BMPs for nonpoint source control. Additionally, the state shall encourage the use of watershed planning as a further means to protect surface waters of the state.*
(3) *No degradation shall be allowed in waters designated by the commission as outstanding national resource waters (ONRWs), except as provided in Subparagraphs (a) through (e) of this paragraph and in Paragraph (4) of this Subsection A.*

20.6.4.8 NMAC – Antidegradation Policy and Implementation Plan
B. Implementation Plan: *The department, acting under authority delegated by the commission, implements the water quality standards, including the antidegradation policy, by describing specific methods and procedures in the continuing planning process and by establishing and maintaining controls on the discharge of pollutants to surface waters of the state. The steps summarized in the following paragraphs, which may not all be applicable in every water pollution control action, list the implementation activities of the department. These implementation activities are supplemented by detailed antidegradation review procedures developed under the state's continuing planning process.*

NMED evaluated information regarding designated Outstanding National Resource Water ("ONRWs") and existing uses for Effluent Canyon, the upper portion of S-site Canyon, and Twomile Canyon from Pajarito Canyon upstream to the confluence with Upper Twomile Canyon to determine if any proposed amendments would conflict with the state's antidegradation policy, as discussed below.

B. Outstanding National Resource Waters

An ONRW is a designation granted by the WQCC for waters that have a particular benefit to the State. These designated waters are listed under 20.6.4.9(D) NMAC and are protected from degradation in accordance with 20.6.4.8(3) NMAC.

In order to evaluate changes to a designated use, NMED must determine whether the waterbody is designated as an ONRW. The Surface Water Quality Bureau ("SWQB") conducted a review of ONRWs identified under 20.6.4.9(D) NMAC and compared these with the waters evaluated under this analysis. The evaluation determined that none of the waters considered under this analysis are listed as an ONRW. Therefore, no degradation of an ONRW will occur as a result of a more stringent designated use.

C. Existing use

An "Existing Use" is defined equally across NMAC, 40 C.F.R. § 131.3, and the CWA as a use that is actually attained in a surface water on or after November 28, 1975, whether or not it is a designated use and whether or not it is currently being attained. An existing use represents the highest quality of water attained and therefore provides the data required to evaluate both existing instream uses and determination of water quality that exceeds levels necessary to support aquatic life, wildlife, and recreational uses as required under the antidegradation policy.

Since the goal of this EUA is to evaluate and amend, as appropriate, the aquatic life designated use to reflect a more stringent existing use, no degradation of a waterbody will occur as a result of the WQS amendment to a more stringent use. The findings of the existing uses for waters evaluated under this EUA can be found in detail under Section VII. Note that this EUA is limited in scope and only evaluates the existing uses, based on available information, for Effluent Canyon, S-Site Canyon from alluvial monitoring well MSC 16-06293 to Martin Spring, and Twomile Canyon from its confluence with Pajarito Canyon to Upper Twomile Canyon because the three parties only reached concurrence for these three waterbodies, as described.

V. Threatened and Endangered Species Review

A. Regulatory background

In accordance with Section 7(a)(2) of the Endangered Species Act ("ESA"), EPA shall consult with the U.S. Fish and Wildlife Service to ensure that any action authorized by the EPA is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of habitat of such species. If EPA believes that a threatened or endangered species may be affected or jeopardized by implementing a WQS change, then the Federal agencies, through ESA consultation, shall ensure that the appropriate actions are implemented (ESA 2019). In order to assist EPA with evaluation, this EUA includes a preliminary screening of listed threatened and endangered species within the larger LANL area.

Section 7(a) of the ESA ***FEDERAL AGENCY ACTIONS AND CONSULTATIONS*** *(1) The Secretary shall review other programs administered by him and utilize such programs in furtherance of the purposes of this Act. All other Federal agencies shall, in consultation with and with the assistance of the Secretary, utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species and threatened species listed pursuant to section 4 of this Act.* *(2) Each Federal agency shall, in consultation with and with the assistance of the Secretary, insure that any action authorized, funded, or carried out by such agency (hereinafter in this section referred to as an agency action) is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined by the Secretary, after consultation as appropriate with affected States, to be critical, unless such agency has been granted an exemption for such action by the Committee pursuant to subsection (h) of this section. In fulfilling the requirements of this paragraph each agency shall use the best scientific and commercial data available.*

B. Evaluation of Threatened and Endangered Species

This EUA includes a review of U.S. Fish and Wildlife Service's Information for Planning and Consultation (IPaC) project planning tool (https://ecos.fws.gov/ipac/) to determine if the listed waterbodies in this EUA overlap with listed species or critical habitat (when applicable). According to the IPaC planning tool, threatened and endangered species for the geographical area comprising LANL include:

1. Federally listed threatened species:
    a. Mexican Spotted Owl (*Stix occidentalis lucida*)
    b. Yellow-billed Cuckoo (*Cozzyzus americanus*)
2. Federally listed endangered species:
    a. New Mexico Meadow Jumping Mouse *(Zapus hudsonius luteus)*
    b. Southwestern Willow Flycatcher (*Empidonax traillii extimus*)
    c. Jemez Mountain Salamander (*Plethodon neomexicanus*)
    d. Rio Grande Silvery Minnow (*Hybognathus amarus*)
3. Area federally delineated as critical habitat for the following species:
    a. Jemez Mountain Salamander (*Plethodon neomexicanus*)
    b. Mexican Spotted Owl (*Stix occidentalis lucida*)

Appendix B of this document contains a figure depicting the area evaluated under IPaC and describes the defined area.

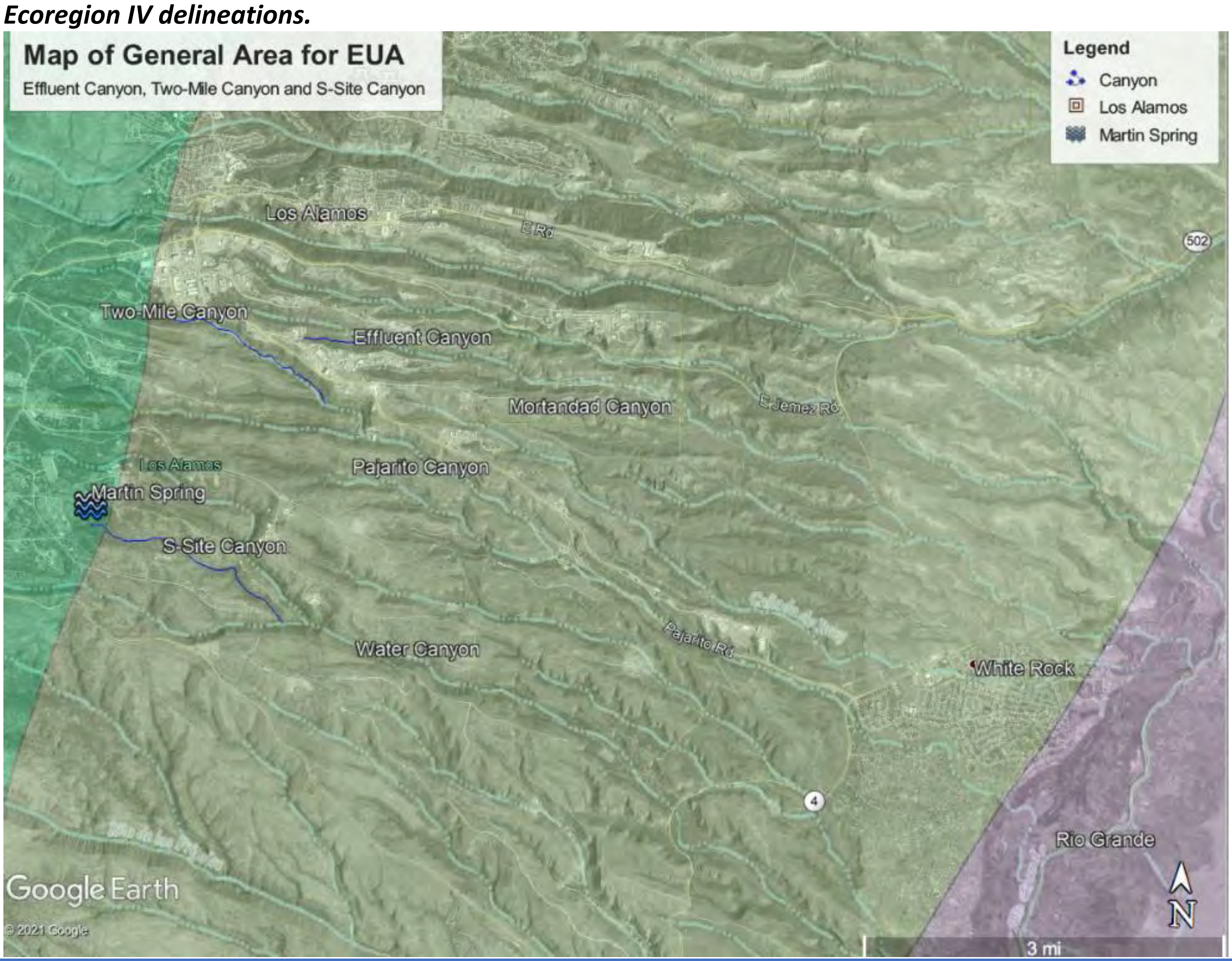
The proposed change in WQS would not jeopardize any threatened and endangered species' continued existence nor result in the destruction or adverse modification of critical habitat because this evaluation is considering designated uses that would be more stringent for intermittent waters currently classified under 20.6.4.128 NMAC. This increased protection would not negatively affect or degrade habitat but would provide enhanced protections to the waterbodies and those species dependent on them. This threatened and endangered species evaluation is limited to the existing use analysis for Effluent Canyon, S-Site Canyon from alluvial monitoring well MSC 16-06293 to Martin Spring, and Twomile Canyon from its confluence with Pajarito Canyon to Upper Twomile Canyon. Existing use analyses for other waterbodies within LANL must reevaluate impacts to threatened and endangered species.

VI. Site Conditions

A. Geographical location

The Pajarito Plateau, which in part, includes Effluent Canyon, S-site Canyon and Twomile Canyon from Pajarito Canyon upstream to the confluence with Upper Twomile Canyon, refers to the area east of the Valle Caldera and west of the Rio Grande in Los Alamos County, New Mexico, approximately 35 miles northwest of Santa Fe. Figure VI-1 provides the geospatial locations of the waterbodies evaluated in this EUA.

Figure VI-1. ***Map of general area depicting the tributaries being evaluated under this EUA and EPA's Ecoregion IV delineations.***



B. Physiographic and Ecological Conditions

The Pajarito Plateau was formed through volcanic flows and erosion. Characteristic of a plateau, it consists of steep fingerlike canyons that have an elevational profile of over 1,000 feet that lead up to a relatively flat elevational surface of approximately 7,320 feet. The waters evaluated under this work plan drain in a dendritic pattern from the east rim of the Valle Caldera southeast towards the Rio Grande. Effluent canyon is approximately 0.50 miles long from its confluence with Mortandad canyon to is origin at TA-16. S-site canyon is approximately 2 miles long from its confluence with Water canyon to its origin at Martin spring in TA-33. Twomile canyon is approximately 2 miles long from its confluence with Pajarito canyon to Upper Twomile canyon. The waters within LANL are located in the upper reaches of the Rio Grande-Santa Fe Sub-basin 8-digit Hydrologic Unit Code ("HUC"), which encompasses 4,847 Square kilometers (1,197,826 acres) and includes the Canada Ancha-Rio Grande watershed (10-digit HUC). The elevation, aspect, and slope of these physiographic features influence the hydrology of the area, which in turn has a direct effect on aquatic life.

The Pajarito Plateau is within the level IV ecological regions 21d, 21g, 21h and transitions to ecological regions 22g and 22h where tributaries from the Pajarito Plateau converge with the Rio Grande (Griffin et al, 2006). Ecological regions (otherwise referred to as "Ecoregions") denote areas of general similarity in the type, quality, and quantity of environmental resources. Ecoregions serve as a spatial framework for the research, assessment, management, and monitoring of ecosystems and ecosystem components. In recognizing the spatial differences in the capacities and potentials of ecosystems, ecoregions stratify the environment by its probable response to disturbance (Omernik, 1995). For purposes of this EUA, the physiographic and ecological conditions of the Pajarito Plateau influence but do not determine attainable uses and may only be used as supporting evidence to determine the existing use.

C. Land Use and Anthropogenic History

Historically, the Pajarito Plateau area was inhabited and utilized by local indigenous tribes, as noted in the abundant archaeological evidence throughout the region. Other than a few noted homesteaders and a boys' school founded by Ashley Pond in 1917, the area remained relatively undeveloped until the establishment of LANL in 1942 (Machen, McGehee and Hoard, 2013). As provided on their website (https://www.lanl.gov/about/facts-figures/index.php), LANL is a DOE facility that operates on approximately 40 square miles of DOE-owned property on the Pajarito Plateau, with more than 1,000 buildings, 13 nuclear facilities, and a power plant in 47 technical areas, connected by 268 miles of roads, 100 miles of which are paved. Similar to the physiographic and ecological conditions, the land use and anthropogenic history influences the attainable uses of a tributary; however, the land use and anthropogenic history do not alter the existing uses. For purposes of this EUA, the land use and anthropogenic history are mentioned for informational purposes only and will not be used in the determination of the aquatic life existing use.

D. Urban Areas

Anthropogenic activities can affect water quality due to a variety of factors including, but not limited to, increased velocity as a result of sheet-flow run-off from impervious surfaces, increased erosion in some areas and desertification in others due to altered flow patterns (Levick et al. 2008), increased volumes from storm water systems that alter flow regimes, and decreased permeability and increased mobilization of pollutants. Therefore, an evaluation of water quality changes must consider anthropogenic activities.

SWQB reviewed the U.S. Census Bureau's Master Address File / Topologically Integrated Geographic Encoding and Referencing ("MAF/TIGER") Database ("MTDB") TIGER/Line shapefile to determine if any non-perennial waters under analysis run through or are adjacent to an Urban Area designation.

Table VI-1 identifies the presumed non-perennial tributaries located on the Pajarito Plateau that flow, at least partially, through a designated Urban Area.

Table VI-1. *Summary of presumed non-perennial tributaries that run through an urban area.*

WQS	Urban Area	Waterbodies
20.6.4.128	Los Alamos, NM	Los Alamos Canyon, DP Canyon
20.6.4.128	White Rock, NM	Mortandad Canyon

Although all three tributaries being evaluated under this analysis transect through LANL, none transect the adjacent urban areas of Los Alamos or White Rock. According to the U.S. Census Bureau, the town of Los Alamos, the county seat for Los Alamos County, has a population of 12,019 (U.S. Census Bureau, 2010), while White Rock has a population of 5,725 (U.S. Census Bureau, 2010b). Although not an urban area, as reported on their website (https://www.lanl.gov/about/facts-figures/index.php), LANL is northern New Mexico's largest employer, second only to the State of New Mexico with 12,752 employees, including its contractors, students and post-doctoral researchers. Most employees reside outside of Los Alamos.

Since the waterbodies studied in this EUA analysis are not located within or flow through designated Urban Areas, the effects of urban areas are not relevant to this analysis. Thus, this EAU will not consider urban areas as supporting evidence for existing uses.

The CWA requires states establish the highest attainable use for a water, which may not be less stringent than the existing use. This EUA evaluates the existing uses; therefore, the potential anthropogenic impacts on water quality are not being evaluated in any depth as they would not alter the determination of an existing use or the amendment of a designated use to be at least as stringent as the existing use.

E. National Pollutant Discharge Elimination System and Stormwater General Permits

The Pajarito Plateau, and LANL in particular, has two NPDES permits with outfalls discharging to several of the tributaries being evaluated under this EUA (Table VII-2). Since consistent discharges from a permitted facility could provide more permanence of stream flow, this condition could support more sensitive populations of aquatic life. For those waterbodies to which consistent discharges under an NPDES permit occur, the hydrologic conditions must be considered in determining the hydrologic regime.

Table VI-2. *Summary of NPDES permits discharging to non-perennial tributaries.*

WQS	FACILITY NAME	PERMIT NUMBER	Waterbody
20.6.4.126	Los Alamos National Laboratory (Industrial Outfalls)	NM0028355	Perennial portions of Sandia in 20.6.4.126 NMAC
20.6.4.128			Mortandad canyon, Canada del Buey, Los Alamos canyon, Ephemeral portion of Sandia canyon, Ten Site canyon and Canon de Valle

WQS	FACILITY NAME	PERMIT NUMBER	Waterbody
20.6.4.98	Los Alamos National Laboratory/Storm water	NM0030759	Rendija canyon, Bayo canyon,
20.6.4.128			Mortandad canyon, Canada del Buey, Los Alamos canyon, DP canyon, Sandia canyon, Ten Site canyon, Canyon de Valle, Water canyon, Ancho canyon, Chaquehui canyon, Fence canyon, Pajarito canyon, Twomile canyon, Three-Mile canyon, Potrillo canyon and Pueblo canyon

Both permits NM0028355 and NM0030759 discharge to the waters under review for this EUA.

Permit number NM030759 authorizes stormwater discharge from areas within LANL to various tributaries including **Mortandad** (Effluent canyon) and **Twomile canyon**. Due to the episodic nature of this discharge, it will not be evaluated as part of the EUA.

There are two outfalls associated with discharges to **Effluent Canyon** (identified as Mortandad canyon in NPDES Permit No. NM0028355). These include treated effluent discharges from LANL's Radioactive Liquid Waste Treatment Facility from Technical Area ("TA") 50 to Outfall 051, physically located in Effluent canyon in TA-26; and storm water, cooling tower blowdown, and "other" wastewater from Outfall 03A181, physically located in TA-11. Hydrology protocol surveys and streamfow gaging data would provide evidence of any sustained discharges from these outfalls.

There is one outfall associated with discharges to **Twomile canyon**. This outfall includes discharge from TA-45 to Outfall 03A025, which is not identified under LANL's current permit (EPA, 2015) and may no longer be active. Hydrology protocol surveys and gaging station data would capture evidence of sustained discharges from this outfall.

There are two outfalls associated with discharges to **S-Site canyon**. These discharges include TA-33 to Outfalls 03A130 and 05A097, which are not identified under LANL's current permit (EPA, 2015) and may no longer be active. Hydrology protocol surveys and gaging station data would capture evidence of sustained discharges from this outfall.

F. Diversions and Impoundments

Impoundments can create low-flow conditions, disrupt natural surface flow and sediment transport, interfere with natural geomorphic processes, alter water temperatures, and fragment the natural stream systems (Levick et al. 2008). The impoundments within the study area were limited to gradient control structures which do not retain significant flows, road crossing culverts, sediment catchment basins to reduce sediment and pollutant transport while allowing for flow of water within the channel and a single large scale water retainment structure across Pajarito Canyon just below its confluence with Twomile Canyon to minimize sediment and contaminant transport. Surveys determined that with the exception of the large structure across Pajarito Canyon, none of the structures prevented flow of water and therefore are not of reasonable concern to evaluating the existing uses for Effluent Canyon, the upper portion of S-site Canyon and Twomile Canyon from Pajarito Canyon upstream to its confluence with Upper Twomile Canyon.

An evaluation of surface water diversions was conducted to determine if hydrologic conditions were a result of anthropogenic activities that would prevent attainment of a more stringent designated use. According to the Office of the State Engineer (“OSE”) Water Rights Reporting System Points of Diversion, the areas in and around Effluent canyon, S-Site canyon and Twomile canyon have several points of diversion. These are predominately ground water diversions and have been determined to be insignificant for the establishment of more stringent designated uses. Thus, specifics concerning diversions and impoundments were not expanded upon for use as supporting evidence in consideration of an EUA.

Table VI-3. List of points of diversion as identified through the New Mexico Office of the State Engineer’s Water Rights Reporting System.

POD ID	Associated Canyon	*Type-Depth	Use	**Status	Diversion	Owner
RG 95966	Twomile (Upper)	GW-500’	Exploration	Active	0	Pojoaque Valley School District
RG 91700	Twomile (Upper)	GW-31’	Monitoring	Inactive	0	US DOE LANL
RG 91698	Twomile (Upper)	GW-32’	Monitoring	Inactive	0	US DOE LANL
RG 92969	Twomile	SW-0’	Monitoring	Inactive	0	US DOE LANL
RG 92230	Twomile	GW-1,418’	Monitoring	Active	0	US DOE LANL
RG 95504	S-Site	GW-N/A	Monitoring	Pending	0	US DOE LANL
RG 92969	Effluent	SW-0’	Monitoring	Inactive	0	US DOE LANL
RG 95365	Effluent	GW-825’	Plugging Plan	-	0	US DOE LANL

*Groundwater “GW”, Surface Water “SW”; depth in feet (or 0’ for a surface water diversion)
** Identified as “Plugged” or “PLG” on the OSE Water Rights Summary

VII. Existing Use Evaluation

Since existing uses are based on the highest quality of water needed to support a use, this EUA evaluates water quality data to determine the existing use. Water quality data used to determine the existing aquatic life uses were collected under ambient, baseflow conditions and not the result of a direct and immediate result of precipitation. Based on the findings from discussions between the three parties to the Joint Stipulation concluding in December 2020, this analysis is limited in scope and only evaluates the existing uses, based on available information at the time, for:

- Effluent Canyon,
- S-Site Canyon from alluvial monitoring well MSC 16-06293 to Martin Spring and
- Twomile Canyon from its confluence with Pajarito Canyon to Upper Twomile Canyon.

Data used to determine the existing recreational and aquatic life uses are provided in **Appendix A** of this analysis.

This EUA evaluates the following water quality data to establish existing uses:

Criteria I. The hydrologic condition establishes the minimum level of protection for aquatic life. Should there be evidence of intermittent conditions or persistent flow (spanning more than 96 hours), the existing use is, at a minimum, that in which aquatic life are protected against chronic exposure to pollutants.

Criteria II. The maximum water temperatures recorded during summer months demonstrate uses that cannot be supported.

Criteria III. The pH range provides evidence of ambient water quality conditions for a particular waterbody section to establish both recreational and aquatic life existing uses.

Criteria IV. Dissolved Oxygen ("DO") provides evidence of ambient water quality conditions for a particular section of a waterbody to support the establishment of existing uses.

Criteria V. Benthic macroinvertebrates are, in part, an indicator of the hydrologic, biologic, and chemical conditions of a tributary. For purposes of this analysis, the presence or absence of benthic macroinvertebrate data will be used in a unilateral fashion. The presence of benthic macroinvertebrates indicates the persistence of water over periods long enough to support lifecycles of aquatic life. However, the absence of benthic macroinvertebrates does not assert, in and of itself, that water is not present for periods long enough to support aquatic life. Other conditions may cause a lack of benthic macroinvertebrates beyond just the absence of water.

Criteria VI. Other numeric aquatic life criteria, as listed in 20.6.4.900(I) through (M), are assumed to be attainable for establishing the existing use unless determined that natural sources are preventing attainment, which is beyond the scope and resources for this analysis. No further analysis of numeric criteria beyond pH, DO, and temperature was conducted for existing aquatic life uses.

Criteria VII. *Escherichia coli* (*E. coli*) is the predominant criteria for recreational uses. However, no *E. coli* data were found for purposes of this analysis. Therefore, the existing recreational use, based on *E. coli* was found to be indeterminate at this time. No further analysis of *E. coli* was conducted as it pertained to existing recreational uses. Until further data are available, the existing recreational use is assumed to be at least secondary contact.

A. Hydrologic Condition

The hydrologic condition was determined through Hydrology Protocol surveys, conducted within normal meteorological conditions. This analysis uses available stream and alluvial well hydrographs, confirmed with climatological data, to supplement the Hydrology Protocol determination of hydrologic condition.

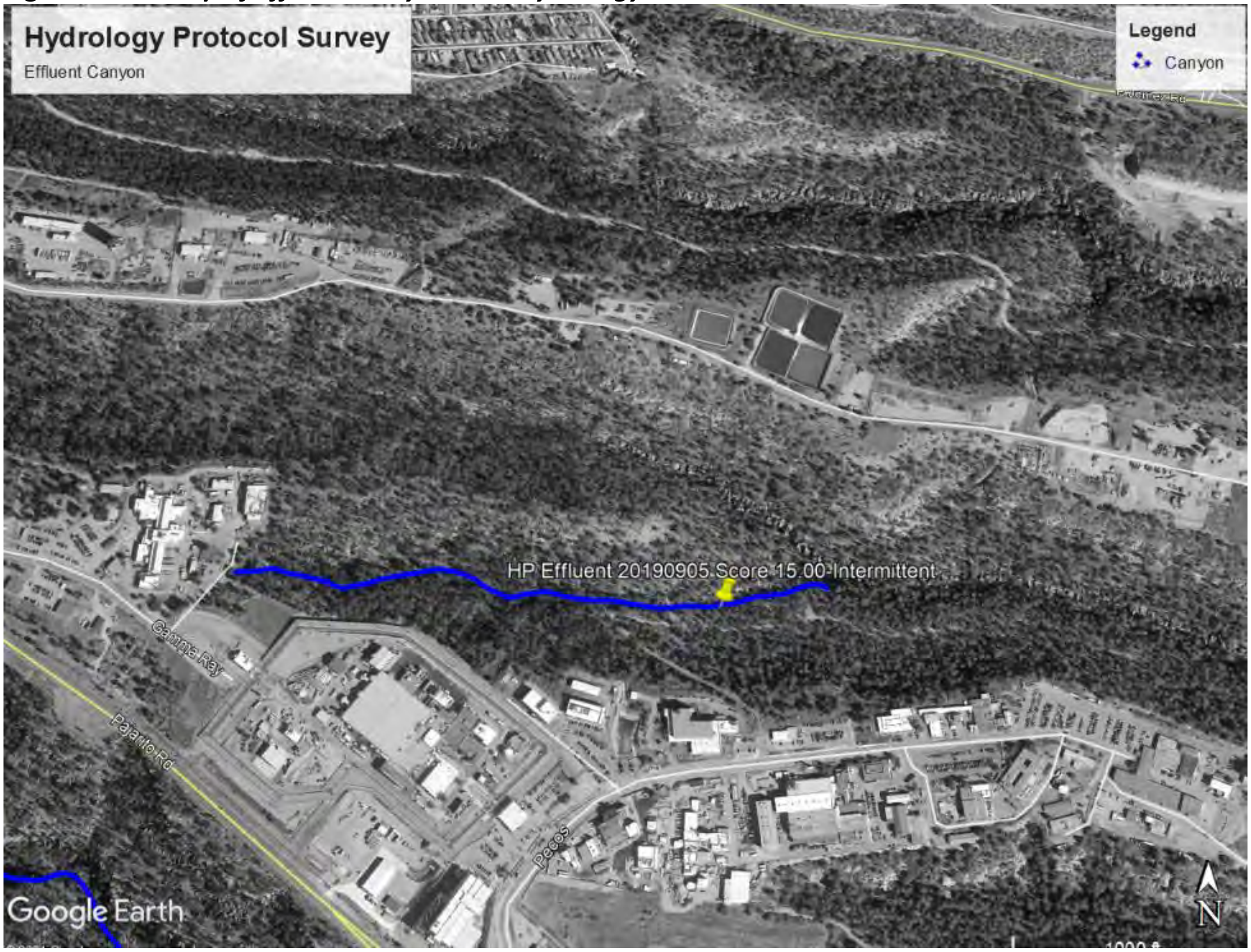
Representatives from both LANL and NMED conducted Hydrology Protocol surveys of the referenced waterbodies in 2019. The surveys were conducted when the standardized precipitation index was within a range of -1.5 to 1.5, indicating normal or near-normal meteorological conditions, ideal for validation of survey findings. SWQB validated the survey results with field notes recorded at the time of the Hydrology Protocol surveys.

SWQB extracted streamflow data from LANL's Intellus database for use as supporting information for the presence and permanence of water. This data was collected by LANL through instantaneous measurements (usually with water quality data collection activities) or through continuous monitoring in both automated stream and alluvial well samplers, using LANL's Interim Facility-Wide Groundwater Monitoring Plans ("IFGMPs"). This data was compared with historical weather data, collected by the National Oceanic Atmospheric Administration ("NOAA") for Los Alamos County between September 1, 2005 and July 1, 2007, to confirm that streamflow was not in direct response to significant precipitation events. In addition to streamflow data, LANL provided hydrographs for several gage stations within S-Site Canyon (Martin Spring). It should be noted that although the presence of streamflow data supports the persistence of water, the lack of streamflow data does not demonstrate, in and of itself, conditions are not sufficient to support aquatic life.

Effluent Canyon was surveyed using the Hydrology Protocol method below outfall 051 and below the grade control (Figure VII-1) on September 5, 2019 when the 12-month standardized precipitation index for Los Alamos County from October 1, 2018 through September 30, 2019, was between 0 and 1; indicating normal to slightly above normal precipitation, ideal for the use of the survey methodology. The Hydrology Protocol survey for Effluent Canyon scored 15.00, indicating intermittent conditions.

Streamflow data, as captured by automated stream gages (E1-W and E1-E), were limited but provide some data demonstrating measurable seasonal flow in the fall and spring not directly in response to precipitation events; thus, supporting the finding of the Hydrology Protocol survey that Effluent Canyon has an intermittent hydrologic regime. Due to sustained periods of water, the existing use is, at a minimum, that which protects aquatic life from chronic exposure to pollutants. **This intermittent hydrologic regime establishes that Effluent Canyon, from its confluence with Mortandad Canyon to its headwaters, has an existing aquatic life use of at least marginal warmwater.**

Figure VII-1. ***Map of Effluent Canyon with Hydrology Protocol scores.***



S-Site Canyon (Martin Spring) was surveyed three times (Figure VII-2) using the Hydrology Protocol method. Two surveys were conducted on August 29, 2019, one at the monitoring well MSC-16-06293, which scored 8.00 (ephemeral) and one above the monitoring well, which scored 16.00 (intermittent). The standardized precipitation index for Los Alamos County from September 1, 2018 through August 31, 2019 was between 0 and 1; indicating normal to slightly above normal precipitation, ideal for the use of the survey methodology. These two survey points are within 300 meters of each other. The third survey, conducted on October 17, 2019 in S-site Canyon just before its confluence with Water Canyon, scored 9.00 (intermittent). The standardized precipitation index for Los Alamos County from November 1, 2018 through October 31, 2019 was between 0 and -1; indicating normal to slightly below normal precipitation, ideal for using the survey methodology.

The presence of surface water was demonstrated from hydrographs in three alluvial well gages along S-Site Canyon. The alluvial well gages, MSC-16-06293, MSC-16-06294 and MSC-16-06295 are located approximately 340 meters (m), 1,000 m and 1,300 m downstream of Martin Spring, respectively. For MSC-16-06295, the alluvial well furthest downstream from Martin Spring, the groundwater hydrograph, provided by LANL, shows groundwater elevation changes consistent with seasonal variation from approximately 2005 to approximately 2014. Elevation of groundwater regularly rises to an elevation above ground level several times a year, likely resulting in intermittent flow in the lower elevation channel.

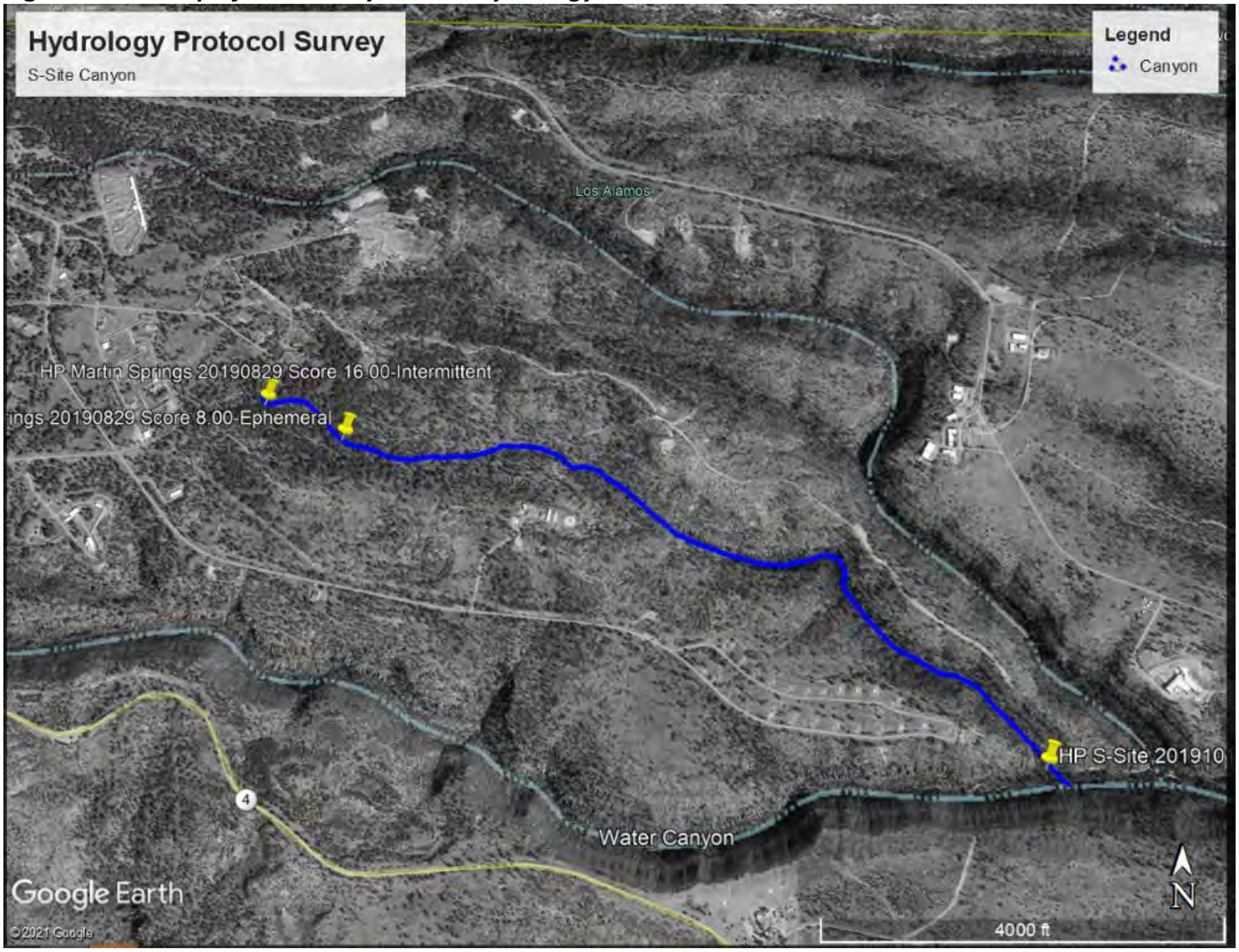
MSC-16-06294 also shows seasonal fluctuation in groundwater depth to levels just around a foot below ground elevation, which would likely result in surface water useable by aquatic life. However, based on the limited scope of this EUA, data for S-Site Canyon was only evaluated from alluvial monitoring well MSC 16-06293 upstream to Martin Spring. It should be noted that the alluvial well data for S-Site Canyon downstream of monitoring well MSC 16-06293 may be evaluated as part of a separate analysis for the lower reach of this tributary.

The data from alluvial monitoring well MSC-16-06293 indicate seasonal fluctuation in groundwater depth to levels just around a foot below ground elevation. The monitoring well, located above and outside the stream channel, indicates that seasonal surface water flows may be likely in the channel at this location, supporting the findings from the Hydrology Protocol surveys. Since groundwater is generally less responsive to direct precipitation, water levels shown in hydrographs are likely not due to a specific precipitation event.

Although the data from the hydrographs were qualitative, they illustrate general surface/subsurface interactions occurring within S-Site Canyon. Information indicates that seasonal levels in groundwater fluctuate regularly throughout S-Site Canyon to elevations at or above ground surface, likely resulting in surface water sufficient enough to support aquatic life at least from alluvial monitoring well MSC 16-06293 to Martin Spring. Therefore, S-Site Canyon from alluvial monitoring well MSC 16-06293 to Martin Spring has an intermittent hydrologic regime. Due to sustained periods of water, the existing use is, at a minimum, that which protects aquatic life from chronic exposure to pollutants. **This intermittent hydrologic regime establishes that S-Site Canyon from alluvial monitoring well MSC 16-06293 to Martin Spring has an existing aquatic life use of at least marginal warmwater.**

Although evidence was available at the time of this analysis, the hydrologic regime and existing use for S-Site Canyon from its confluence with Water Canyon to MSC 16-06293 was not evaluated as part of this EUA, based on lack of consensus as required under the stipulated agreement. Further analysis of the existing use for S-Site Canyon is warranted as part of a future investigation.

Figure VII-2. ***Map of S-Site Canyon with Hydrology Protocol scores.***



Twomile Canyon was surveyed in four locations using the Hydrology Protocol on September 12, 2019. These surveys occurred along the approximately Twomile stretch from the confluence of Twomile Canyon with Pajarito Canyon to the convergence of Upper Twomile Canyon and Twomile Canyon (Figure VII-3). The 12-month standardized precipitation index for Los Alamos County from October 1, 2018 through September 30, 2019, was between 0 and 1; indicating normal to slightly above normal precipitation, ideal for using the survey methodology. Three of the surveys along this section of Twomile Canyon scored intermittent (18.00, 19.00 and 10.50), and one (identified as below TA-59) scored perennial (20.50).

The survey that scored 20.50 was conducted approximately 400 m upstream from "Twomile below TA-59" and approximately 500 m downstream from Twomile Canyon's confluence with Upper Twomile Canyon and, in accordance with the Hydrology Protocol survey methodology, is considered perennial until there is supporting evidence demonstrating it to be intermittent.

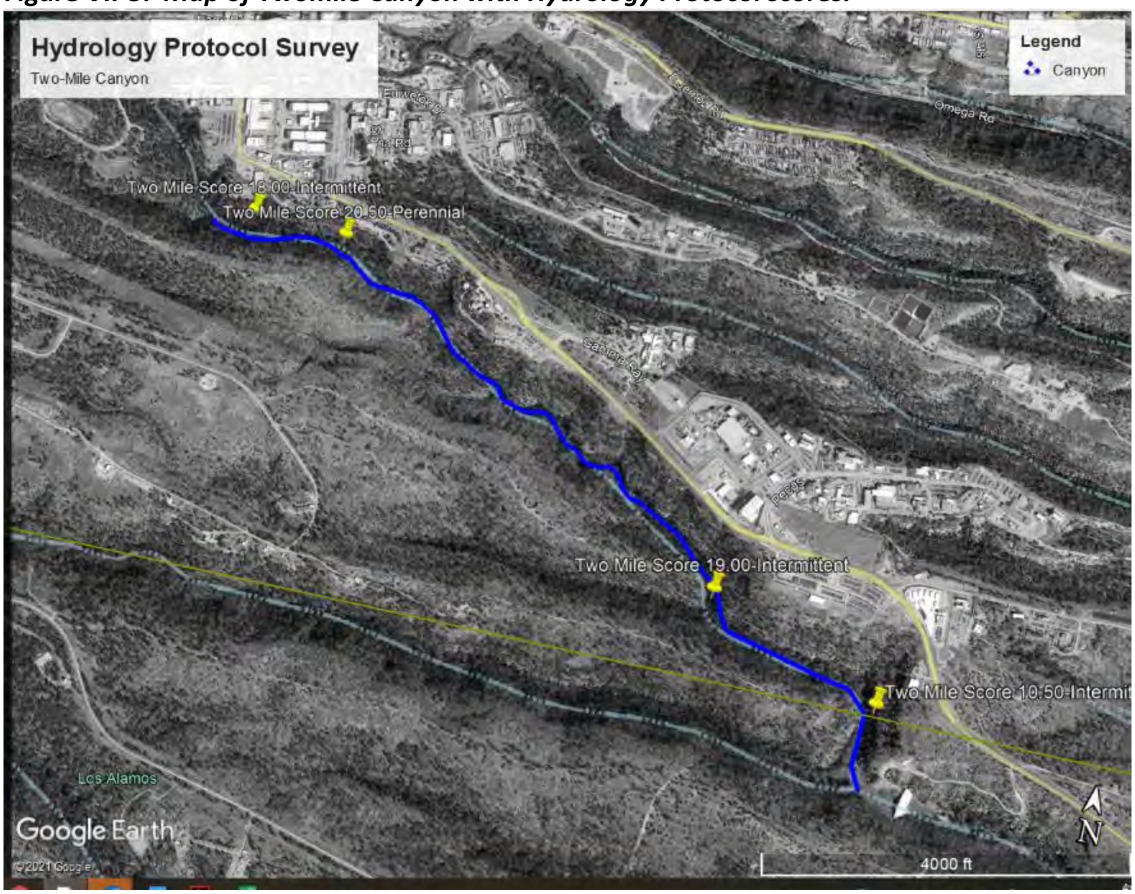
The survey that was conducted near E244, was the lowest score within Twomile Canyon but still scored within the intermittent range. This survey site was approximately 160 m from Twomile Canyon's confluence with Pajarito and is believed to be representative of the reach down to the confluence with Pajarito Canyon.

Although there is some fluctuation throughout Twomile Canyon from its confluence with Pajarito Canyon to its confluence with Upper Twomile Canyon, overall, the entire reach is consistently intermittent.

Stream flow data was limited to two instantaneous measurements in April 2016 in Twomile Canyon (below TA-59). No hydrograph data was provided by LANL. Although streamflow data would have been supportive for determination, it is not required and does not influence the determination that Twomile Canyon from its confluence with Pajarito Canyon to its confluence with Upper Twomile Canyon has an intermittent hydrologic regime. Due to sustained periods of water, the existing use is, at a minimum that which protects aquatic life from chronic exposure to pollutants. **This intermittent hydrologic regime establishes that Twomile Canyon from its confluence with Pajarito Canyon to its confluence with Upper Two Canyon has an existing aquatic life use of at least marginal warmwater.**

Although evidence was available at the time of this analysis, the hydrologic regime and existing use for Twomile Canyon from its confluence with Upper Twomile Canyon to its headwaters was not evaluated as part of this EUA, based on lack of consensus as required under the stipulated agreement. Further analysis of the existing use for Twomile Canyon is warranted as part of a future investigation.

Figure VII-3. ***Map of Twomile Canyon with Hydrology Protocol scores.***



B. Temperature

Ambient water temperature is one of the criteria necessary to support aquatic life and can be a limiting factor given species temperature tolerance ranges. Most of the state's criteria for designated aquatic life uses include both a maximum temperature (Tmax) criterion, which is an acute exposure, as well as longer sustained temperature (4T3 or 6T3), which represents a chronic exposure. In order to accurately capture a "Tmax", "4T3" or "6T3", as defined under 20.6.4 NMAC, long-term deployment of a temperature data logger is required. However, instantaneous measurements can provide information on what temperatures are not attainable. Water temperature data was obtained from a query through Intellus from 1975-2021 for the temperature at all sites. Data is collected by LANL using LANL's IFGMPs.

Effluent Canyon did not have any direct water temperature measurements, but data collected from Mortandad Canyon below Effluent Canyon from 1997 to 2002 provided general information on stream temperature attainability for the microclimate affiliated with Effluent Canyon. The temperature data for Mortandad Canyon below Effluent Canyon (or E200) included 15 data points with a range from 1^{o}C on March 2, 2007 at 11:07 am to 22.8^{o}C on August 22, 2007 at 1:35 pm.

Since it is generally the maximum summer temperature that is of most concern for determining an existing use, and ambient air temperature is a driver of ambient water temperature, where groundwater inputs are minimal, a subset of ambient water temperature data for June, July and August was extracted from the dataset. This summertime subset included seven data points with a range of 12.3^{o}C on June 3, 1997 at 9:00 am to 22.8^{o}C on August 22, 2007. The median temperature was 16.3 ^{o}C with a standard deviation of 3.39 ^{o}C.

SWQB did not use the Bureau's Air-Water Temperature Correlation Model to model ambient maximum water temperatures because the model is not designed to evaluate this type of waterbody (i.e., non-perennial, known ground water influences, high gradient/steep canyon).

Since temperature grab data cannot be demonstrated to cover the warmest water temperatures of the year or particular day, it cannot be used to determine the maximum temperatures supporting an existing use. However, none of the reported temperatures exceed the temperature criteria for a marginal warmwater aquatic life use; therefore, **Effluent Canyon, based on an evaluation of temperature data from Mortandad Canyon, has an existing aquatic life use of at least marginal warmwater.**

S-Site Canyon (Martin Spring) had 53 sampling events with associated water temperature measurements. There were three identified sampling locations within the dataset; "Martin Lower SW filt samp port", "Martin Spring" and "Martin Upper SW Filt Samp Port." The latitude and longitude for all three sampling locations is at or near Martin Spring, and likely not equilibrated with the ambient air. However, the temperature data can provide information regarding water quality at or near Martin Spring.

The dataset, as extracted from Intellus, spanned from 1995 to 2020 with water temperature ranges from 5.5 ^{o}C on March 29, 2006 at 11:15 am to 18.7 ^{o}C on August 29, 2017 at 1:10 pm.

As described for Effluent Canyon, the dataset was filtered to assess water temperature for the summer months of June, July and August. The extracted dataset included 18 data points with a range of 10.4 ^{o}C on July 21, 1995 to 18.7 ^{o}C on August 29, 2017 at 1:10 pm. The median temperature was 12.8 ^{o}C with a standard deviation of 2.4 ^{o}C.

SWQB did not use the Bureau's Air-Water Temperature Correlation Model to model ambient maximum water temperatures because the model is not designed to evaluate this type of waterbody (i.e., non-perennial, known ground water influences, high gradient/steep canyon).

Since temperature grab data cannot be demonstrated to cover the warmest water temperatures of the year or particular day, it cannot be used to determine the maximum temperatures supporting an existing use. However, none of the reported temperatures exceed the temperature criteria for a marginal warmwater aquatic life use; therefore, **S-Site Canyon from alluvial monitoring well MSC 16-06293 to Martin Spring, based on an evaluation of water temperatures from S-Site Canyon, has an existing aquatic life use of at least marginal warmwater.**

In addition, data collection activities support evidence found in the hydrology protocol surveys that the presence of water extends beyond periods of precipitation, further supporting the finding that intermittent hydrology exists.

Twomile Canyon had 23 data sampling events with associated water temperature measurement. There were three identified sampling locations within the dataset; "Twomile Canyon below TA-59", "Twomile above Pajarito" and "Twomile above Pajarito E244"; the latter two having the same longitude and latitude described for Twomile Canyon above Pajarito at E244. The overall range for the dataset spanned from 0.29 ^{o}C on December 19, 2008 at 11:00 am to 19.2 ^{o}C on June 27, 2007 at 2:52 pm. Because there is almost a 1.5 mile distance between the two sampling locations they were analyzed independently.

For Twomile below TA-59, there are 14 data points with a range between 0.29 ^{o}C on December 19, 2008 at 11:00 am to 19.2 ^{o}C on June 27, 2007 at 2:52 pm. As described for S-Site Canyon and Effluent Canyon, the dataset was filtered and evaluated for just the summer months of June, July and August, to which there were four data points between 2006 and 2010. The range spanned from 13.7 ^{o}C on August 25, 2006 at 9:30 am to 19.2 ^{o}C on June 27, 2007 at 2:52 pm with a median of 17.1 ^{o}C and a standard deviation of 2.3 ^{o}C.

For Twomile above Pajarito at E244, there are 9 data points with a range between 2 ^{o}C on December 17, 2007 at 11:40 am to 17.2 ^{o}C on June 27, 2007 at 11:45 am. As described for S-Site Canyon and Effluent Canyon, the dataset was filtered and evaluated for just the summer months of June, July and August, to which there were four data points between 1998 and 2010. The range spanned from 14.1 ^{o}C on August 29, 2006 at 8:40 am to 17.2 ^{o}C on June 27, 2007 at 11:45 am with a median of 15.38 ^{o}C and a standard deviation of 1.51 ^{o}C.

SWQB did not use the Bureau's Air-Water Temperature Correlation Model to model ambient maximum water temperatures because the model is not designed to evaluate this type of waterbody (i.e., non-perennial, known ground water influences, high gradient/steep canyon).

Since temperature grab data cannot be demonstrated to cover the warmest water temperatures of the year or particular day, it cannot be used to determine the maximum temperatures supporting an existing use. However, none of the reported temperatures exceed the temperature criteria for a marginal warmwater aquatic life use; therefore, **Twomile Canyon from Pajarito Canyon to Upper Twomile Canyon, based on an evaluation of water temperatures from Twomile Canyon, has an existing aquatic life use of at least marginal warmwater.**

In addition, data collection provides indication that water is present, further supporting the finding that intermittent hydrology exists

C. pH

For data associated with Effluent Canyon, S-Site Canyon and Twomile Canyon, the circumneutral range for pH will be used to determine the existing use for each of the Canyons.

Effluent Canyon did not have any direct pH measurements, but data collected from Mortandad Canyon below Effluent Canyon from 1997 to 2002 provided general information on stream pH range attainable for Effluent Canyon. It was verified with the provided latitude and longitude that "Mortandad below Effluent Canyon" and "Mortandad below Effluent E200" are in the same geographic location and were therefore analyzed as one dataset.

There were 26 data points between 1997 and 2009 with a pH range from 5.63 Standard Units ("SU") to 8.79 SU, a median of 7.15 SU and a standard deviation of 0.62 SU. Twenty-four out of the 26 measurements (92%) were within the pH range criterion for designated aquatic life uses, with the exception of limited aquatic life, which has no pH range. This range indicates Mortandad Canyon has an existing aquatic life use of at least marginal warmwater. Given flow to Mortandad Canyon is in part from Effluent Canyon, **Effluent Canyon, based on an evaluation of pH data from Mortandad Canyon, has an existing aquatic life use of at least marginal warmwater and an existing primary contact recreational use.**

S-Site Canyon (Martin Spring) had 53 sampling events between 1995 and 2020 associated water pH measurements. There were three identified sampling locations within the dataset; "Martin Lower SW filt samp port", "Martin Spring" and "Martin Upper SW Filt Samp Port." The latitude and longitude for all three sampling locations is at or near Martin Spring, therefore the data were analyzed as one dataset.

The dataset had a pH range between 5.69 SU and 7.79 SU with a median of 6.95 SU and a standard deviation of 0.39 SU. Fourty-seven out of the 53 measurements (89%) were within the pH range criterion for designated aquatic life uses, with the exception of limited aquatic life, which has no pH range. **This range indicates that S-Site Canyon from alluvial monitoring well MSC 16-06293 to Martin Spring, based on an evaluation of pH data, has an existing aquatic life use of at least marginal warmwater and an existing primary contact recreational use.**

Twomile Canyon There were three identified sampling locations within the dataset; "Twomile Canyon below TA-59", Twomile above Pajarito" and "Twomile above Pajarito E244"; the latter two having the same longitude and latitude and being described here as Twomile Canyon above Pajarito at E244. Because there is almost a 1.5 mile distance between the two sampling locations, they were analyzed independently.

Twomile above Pajarito at E244 had 26 data points between 1998 and 2010 with a pH range between 6.11 SU and 7.7 SU, a median of 7.01 SU and a standard deviation of 0.35 SU. Twenty-three out of the 26 measurements (88%) were within the pH range criterion for designated aquatic life uses, with the exception of limited aquatic life which has no pH range. This range indicates Twomile Canyon above Pajarito has an existing aquatic life use of at least marginal warmwater.

Twomile below TA-59 had 14 data points between 2006 and 2019 with a pH range between 6.07 SU and 7.84 SU with a median of 7.15 SU and a standard deviation of 0.42 SU. Thirteen out of the 14 measurements (93%) were within the pH range criterion for designated aquatic life uses, with the exception of limited aquatic life, which has no pH range. This range indicates Twomile Canyon below TA-59 has an existing aquatic life use of at least marginal warmwater.

Since findings from both Twomile Canyon above Pajarito Canyon at E244 and Twomile Canyon below TA-59 are consistent, it can be asserted that **Twomile Canyon from Pajarito Canyon to Upper Twomile Canyon has an existing aquatic life use, based on an evaluation of pH data, of at least marginal warmwater and an existing primary contact recreational use**.

D. Dissolved Oxygen

For data associated with Effluent Canyon, S-Site Canyon and Twomile Canyon, the range and highest concentration of DO will be evaluated to demonstrate the highest concentration each tributary has been able to attain.

Effluent Canyon did not have any direct DO measurements. Still, data collected from Mortandad Canyon below Effluent Canyon provided general information on DO that would be expected to be attainable for Effluent Canyon as well, given there are no identifiable conditions to make Effluent Canyon significantly different from Mortandad Canyon. It was verified with the provided latitude and longitude that "Mortandad below Effluent Canyon" and Mortandad below Effluent E200" are at the same geographic location and were therefore analyzed as one dataset.

There were 10 data points between 1997 and 2009 with a DO ranging from 2.08 miligrams per liter ("mg/L") to 175.7 mg/L.

There were several measurements, that although marked to be useable by LANL appear to be erroneous given that 100% saturation of oxygen in water at 7,320 feet above sea level and 25°C (75°F) would be just over 6 mg/L, as determined through the use of a DO conversion calculator (https://www.waterontheweb.org/). SWQB evaluated the validity of all DO values, as described below.

The sample taken on October 27, 2006 had a DO concentration of 175.7 mg/L, which is equivalent to 100% saturation when ambient air temperatures are below -40.4°C (-40.5°F). This is highly unlikely given the average low for October in Los Alamos County according to Climate-Data.org is 1.8°C (35.2°F) and it is highly unlikey a water temperature significantly less than 0 °C would be measured (it would be ice) Therefore, SWQB considered this data point an outlier and removed it from the dataset used for this analysis. The other nine data points represented values within expected ranges and were considered useable for this analysis.

Of the data points not considered outliers, the range was between 2.08 mg/L to 11.93 mg/L with a median of 5.98 mg/L and standard deviation of 3.19 mg/L, indicating high variability for DO. It is acknowledged that measurements for DO can fluctuate greatly based on calibration techniques, sensor function and barometric pressure. Even with the high variability, five out of the nine measurements (56%) had a DO concentration greater than 5 mg/L; however, these data points are not indicative of the naturally occurring diel DO cycle. Given flow to Mortandad Canyon is in part from Effluent Canyon, **Effluent Canyon, based on DO, has an existing aquatic life use of at least marginal warmwater.**

S-Site Canyon (Martin Spring) had 45 sampling events between 2005 and 2020 associated water DO measurements. There were three identified sampling locations within the dataset; "Martin Lower SW filt samp port", "Martin Spring" and "Martin Upper SW Filt Samp Port." The latitude and longitude for all three sampling locations is at or near Martin Spring, therefore the data were analyzed as one dataset.

The dataset had a DO range between 2.9 mg/L to 69.51 mg/L. There were several measurements, that although marked to be useable by LANL appear to be erroneous given that 100% saturation of oxygen in water at 7,320' and 25°C (75°F) would be just over 6 mg/L, as determined through the use of a DO conversion calculator (https://www.waterontheweb.org/). SWQB evaluated the validity of all DO values, as described below.

For July, the average temperature, according to Climate-Data.org, is 19.5°C (67.2°F), which corresponds to an estimated DO concentration of 6.94 mg/L at 100% saturation and 7,320 feet above sea level. Data collected on July 28, 2006 are all an order of magnitude greater than the estimated maximum concentration and were considered outliers and not used for the analysis.

Given the average temperature for March is 2.2°C (36°F) for Los Alamos County, as obtained from Climate-Data.org, the corresponding DO concentration at 100% saturation is 10.46 mg/L. In addition, given an average low of -4.5°C (23.9°F), the corresponding DO concentration at 100% saturation is 12.75 mg/L. The sample taken on March 24, 2009 had a measured DO concentration of 14 mg/L, which would be the estimated DO concentration at 100% saturation when the temperature is approximately -7.8°C (18°F). Although possible, a water temperature of -7.8°C (18°F) is highly improbable; therefore, this data point was considered an outlier and not used for the analysis.

Of the 41 useable data points, the range was between 2.9 mg/L and 9.62 mg/L with a median of 7.47 mg/L and a standard deviation of 1.55 mg/L. Thirty-six out of the 41 useable measurements (90%) had a DO concentration greater than 6.0; however, these data points are not indicative of the naturally occurring diel DO cycle. The data indicate that **S-Site Canyon from alluvial monitoring well MSC 16-06293 to Martin Spring**, **based on DO**, **has an existing aquatic life use of at least marginal warmwater**.

Twomile Canyon had 22 data sampling events between 2006 and 2019 with water DO measurements. There were two identified sampling locations within the dataset; "Two Mile Canyon below TA-59" and "Twomile above Pajarito." Because there is almost a 1.5 mile distance between the two data points they were analyzed independently.

Twomile above Pajarito at E244 had 10 data points between 2006 and 2010 with a DO range between 6.6 mg/L and 140 mg/L. The validity of the DO measurement taken August 29, 2006 was estimated using average elevation of 7,320' and average temperature of 17.8°C (64.1°F) as obtained from Climate-Data.org. The DO measurement of 140 mg/L is approximately 20 times the estimated 100% saturation concentration of 7.21 mg/L. Therefore, this data point was determined to be an outlier and not used for his analysis. The other 9 data points were considered useable for this analysis.

The nine useable data points for DO at Twomile above Pajarito at E244 ranged from 6.6 mg/L to 11.5 mg/L with a median of 8.64 mg/L and a standard deviation of 1.65 mg/L. All nine measurements (100%) had a DO concentration of 6 mg/L or greater, however these data points are not indicative of the diel DO cycle necessary for support of aquatic life. The data, at best, indicate that **Twomile Canyon above Pajarito at E244, based on DO, has an existing aquatic life use of at least marginal warmwater.**

Twomile below TA-59 had 14 data points between 2006 and 2019 with a DO range between 16.85 mg/L and 3.74 mg/L. The validity of the DO measurement taken December 19, 2008 was estimated using average elevation of 7,320 feet above sea level and average temperature of -3.7°C (25.4°F) as obtained from Climate-Data.org. The DO measurement of 16.85 mg/L was well above an estimated 100% saturation concentration of 12.44 mg/L. Therefore, this data point was determined to be an outlier and not used for his analysis. The other 13 data points were considered useable for this analysis.

The 13 useable data points for DO at Twomile below TA-59 ranged from 3.74 mg/L to 10.12 mg/L with a median of 7.62 mg/L and a standard deviation of 2.07 mg/L. Ten out of the 13 measurements (77%) had a DO concentration of 6 mg/L or greater; however, these data points are not indicative of the naturally occurring diel DO cycle. The data indicate that **Twomile Canyon below TA-59, based on DO, has an existing aquatic life use of at least marginal warmwater.**

E. Aquatic Life

The presence/absence of benthic macroinvertebrates extrapolated from the Level 1 and Level 2 Hydrology Protocol surveys was used to support the determination for existing uses of at least marginal warmwater aquatic life. The absence of benthic macroinvertebrates is indeterminate for establishing an existing use given various factors affecting the presence and bias in observational findings.

Effluent Canyon

One Level 1 Hydrology Protocol survey was conducted by representatives from both LANL and SWQB on September 5, 2019 in Effluent Canyon "below 051 Outfall." Benthic macroinvertebrates (hairworms and water mites) were observed but only through extensive searching in a predominately dry channel with standing pools and saturated substrate.

One Level 2 Hydrology Protocol survey conducted by representatives from LANL on October 22, 2019 in Effluent Canyon "below 051 Outfall" indicates presence of benthic macroinvertebrates, supporting the findings from the Level 1 survey.

Effluent Canyon, based on the presence of benthic macroinvertebrates, has an existing aquatic life use of at least marginal warmwater.

S-Site Canyon

Two Level 1 Hydrology Protocol surveys were conducted by representatives from both LANL and SWQB on August 29, 2019 in S-Site Canyon "at MSC 16-06293" and "below Martin Springs." At the time of the survey for "Martin Spring at MSC 16-06293", the channel had no standing water and no macroinvertebrates were observed. However, at the location "below Martin Spring" benthic macroinvertebrates (mayfly, mosquito larvae and water beetle) were observed with little difficulty but not throughout the reach, which consisted of standing pools and saturated substrate.

One Level 2 Hydrology Protocol survey "below Martin Spring" conducted by representatives from LANL on October 17, 2019 indicates the presence of benthic macroinvertebrates (Order: Trichoptera), supporting the findings from the Level 1 survey.

Another Level 1 Hydrology Protocol survey was conducted in S-Site Canyon by representatives from both LANL and SWQB on October 17, 2019, near the confluence with Water Canyon, upstream of E261. At the time of the survey the channel had no standing water and no macroinvertebrates were observed.

S-Site Canyon from monitoring well MSC 16-06293 upstream to Martin Spring, based on the presence of benthic macroinvertebrates, has an existing aquatic life use of at least marginal warmwater.

__Twomile Canyon__

Four Level 1 Hydrology Protocol surveys were conducted by representatives from both LANL and SWQB on September 12, 2019 along Twomile Canyon from its confluence with Pajarito Canyon to the confluence with Upper Twomile Canyon. Benthic macroinvertebrates were observed in three of the four survey sites. Only the survey site just above Pajarito Canyon at E244, which was dry at the time of the survey, resulted in no observed benthic macroinvertebrates. **Twomile Canyon, based on the presence of benthic macroinvertebrates, has an existing aquatic life use of at least marginal warmwater.**

Table. VII-1. *Summary of existing uses for Effluent Canyon, S-Site Canyon from monitoring well MSC 16-06293 upstream to Martin Spring and Twomile Canyon from its confluence with Pajarito to Upper Twomile Canyon.*

Parameter	**Effluent Canyon**	**S-Site Canyon (Martin Spring)**	**Twomile Canyon**
Hydrology	≥ Marginal Warmwater	≥ Marginal Warmwater	≥ Marginal Warmwater
Temperature	≥ Marginal Warmwater	≥ Marginal Warmwater	≥ Marginal Warmwater
pH	≥ Marginal Warmwater	≥ Marginal Warmwater	≥ Marginal Warmwater
Dissolved Oxygen	≥ Marginal Warmwater	≥ Marginal Warmwater	≥ Marginal Warmwater
Aquatic Life	≥ Marginal Warmwater	≥ Marginal Warmwater	≥ Marginal Warmwater
Other Numeric Criteria	Not assessed	Not assessed	Not assessed
E. coli	Not assessed	Not assessed	Not assessed

F. Findings

A EUA is conducted to analyze the appropriate designated use based on the existing use. For this analysis, NMED evaluated the existing uses for Effluent Canyon, S-Site Canyon and Twomile Canyon, within LANL.

- There is regulatory authority under 40 C.F.R. § 131.10(i) to conduct an analysis and amend the designated uses to be at least the existing uses.
- There is regulatory authority under 40 C.F.R. § 131.20 to conduct a review and analysis, and amend the designated uses if more stringent uses specified in CWA § 101(a)(2) are attainable.
- Based on the findings from discussions concluding in December 2020, which were conducted as part of a Joint Stipulation between LANL, Amigos Bravos and NMED, this analysis was limited in scope to Effluent Canyon, S-Site Canyon from alluvial monitoring well MSC 16-06293 to Martin Spring, and Twomile Canyon from its confluence with Pajarito Canyon to Upper Twomile Canyon.

- Effluent Canyon, S-Site Canyon and Twomile Canyon currently have a designated limited aquatic life use and a secondary contact recreational use along with designated uses for livestock watering and wildlife habitat.
- Since livestock watering and wildlife habitat uses are designated uses for all waters of the state, these uses were not evaluated as part of this analysis.
- There was reasonable evidence that the existing aquatic life and recreational uses for these waters may be more stringent than the current designated uses.
- The analysis found that the waters in this analysis are not Outstanding National Resource Waters and amending the designated uses to be more stringent would not violate the State's antidegradation policy.
- The analysis determined that amending the designated use to a more stringent existing use will not violate the State's antidegradation policy.
- Amending the designated use to a more stringent existing use will not impact or degrade downstream waters.
- Amending the designated use to a more stringent existing use will not impose harm to threatened and endangered species documented within the area of Effluent Canyon, S-Site Canyon, and Twomile Canyon.
- There are no specific site conditions that would impact an existing use.
- Available *E. coli* data for Effluent Canyon, S-Site Canyon and Twomile Canyon is insufficient to demonstrate whether primary contact is the existing recreational use.
- Until such a time when additional information indicates that primary contact is the existing use, secondary contact will remain the recreational use for Effluent Canyon, S-Site Canyon and Twomile Canyon.
- Effluent, S-Site Canyon from MSC 16-06293 to Martin Spring, and Twomile Canyon from its confluence with Pajarito Canyon to Upper Twomile Canyon have intermittent hydrological regimes.
- The presence of water within these tributaries establishes that the existing aquatic life use is no less stringent than one that can protect for chronic exposure to pollutants.
- The current designated limited aquatic life use does not provide protection for chronic exposure; therefore, the existing aquatic life use is more stringent than the designated aquatic life use.
- The available temperature, pH, and DO data and the presence of benthic macroinvertebrates support the determination that Effluent Canyon has an existing aquatic life use of at least marginal warmwater.
- The available temperature, pH, and DO data and the presence of benthic macroinvertebrates support the deteremination that S-Site Canyon from monitoring well, MSC 16-06293 to Martin Spring has an existing aquatic life use of at least marginal warmwater.
- The available temperature, pH, an DO data and the presence of benthic macroinvertebrates support the determination that Twomile Canyon from its confluence with Pajarito Canyon to Upper Twomile Canyon has an existing aquatic life use of at least marginal warmwater.
- In accordance with 40 C.F.R. § 131.10(i), the existing use may not be less than the designated use. Therefore, the findings of this EUA support amending the designated aquatic life uses for Effluent Canyon, S-Site Canyon and Twomile Canyon to at least marginal warmwater.
- In accordance with 40 C.F.R. 131.20, through this EUA it has been demonstrated that more stringent (aquatic life) uses specified in CWA § 101(a)(2) are attainable. Therefore, the findings of this EUA support amending the designated aquatic life uses for Effluent Canyon, S-Site Canyon and Twomile Canyon to at least marginal warmwater.

- The findings of this analysis were based on available data at the time of analysis and do not preclude future analyses of existing uses.

This EUA demonstrates the existing aquatic life use for Effluent Canyon is at least marginal warmwater and the designated aquatic life use for this waterbody under 20.6.4 NMAC should be amended to be reflective of the existing use. The recreational use did not have sufficient evidence at this time to determine an existing use with more stringent criteria than secondary contact.

This EUA demonstrates the existing aquatic life use for S-Site Canyon from MSC-16-06293 upstream to Martin Spring is at least marginal warmwater and the designated aquatic life use for this waterbody under 20.6.4 NMAC should be amended to be reflective of the existing use. The recreational use did not have sufficient evidence at this time to determine an existing use with more stringent criteria than secondary contact.

This EUA demonstrates the existing aquatic life use for Twomile Canyon from Pajarito Canyon upstream to Upper Twomile Canyon is at least marginal warmwater and the designated aquatic life use for this waterbody under 20.6.4 NMAC should be amended to be reflective of the existing use. The recreational use did not have sufficient evidence at this time to determine an existing use with more stringent criteria than secondary contact.

Table VIII-1. *Selected sections non-perennial portions and highest attainable designated uses.*

Current WQS	Proposed WQS	Waterbody Description	Designated RU	Existing RU	Designated ALU	Existing ALU	LW	WH
20.6.4.128	20.6.4.140	Effluent Canyon from its confluence with Mortandad Canyon to its headwaters	SC	ID	LAL	MWW*	Y	Y
20.6.4.128	20.6.4.140	S-Site Canyon from monitoring well MSC 16-06293 upstream to Martin Spring	SC	ID	LAL	MWW*	Y	Y
20.6.4.128	20.6.4.140	Twomile Canyon from its confluence with Pajarito Canyon upstream to Upper Twomile Canyon	SC	ID	LAL	MWW*	Y	Y

"*" denotes a proposed amendment based on existing use
"RU" denotes designated recreational use
"SC" denotes secondary contact recreational use
"ID" denotes indeterminate
"LAL" denotes Limited aquatic life designated aquatic life use
"MWW*" denotes marginal warmwater designated aquatic life use
"LW" denotes livestock watering
"WH" denotes wildlife habitat
"Y" denotes this is proposed to remain as a designated use for the listed waterbody

VIII. Proposed Amendments to Standards for Interstate and Intrastate Surface Waters (20.6.4 NMAC)

The evidence presented in this EUA supports the designation of marginal warmwater aquatic life for Effluent Canyon, the upper reaches of S-Site Canyon and Twomile Canyon from its confluence with

Pajarito to Upper Twomile Canyon. The designated uses for unclassified non-perennial waters are livestock watering, wildlife habitat, marginal warmwater aquatic life and primary contact, as listed under 20.6.4.98 NMAC. NMED recommends that the following referenced classified waters 20.6.4.101-20.6.4.899 NMAC be amended as follows:

20.6.4.128 RIO GRANDE BASIN: [-] Ephemeral and intermittent ~~watercourses~~waters within lands managed by U.S. department of energy (DOE) within LANL , including but not limited to: Mortandad canyon, Cañada del Buey, Ancho canyon, Chaquehui canyon, Indio canyon, Fence canyon, Potrillo canyon, and portions of Cañon de Valle, Los Alamos canyon, Sandia canyon, Pajarito canyon and Water canyon not specifically identified in 20.6.4.126 NMAC or 20.6.4.140 NMAC. (Surface waters within lands scheduled for transfer from DOE to tribal, state or local authorities are specifically excluded.)

A. Designated uses: livestock watering, wildlife habitat, limited aquatic life and secondary contact.

B. Criteria: the use-specific criteria in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the acute total ammonia criteria set forth in Subsection [~~K~~]L of 20.6.4.900 NMAC ([~~salmonids~~]*Oncorhynchus* spp. absent).

[20.6.4.128 NMAC - N, 5/23/2005; A, 12/1/2010; A, XX/XX/XXXX]

[**NOTE:** This section was divided effective XX/XX/XXXX. The standards for some intermittent waters within LANL are in 20.6.4.140 NMAC.]

20.6.4.140 RIO GRANDE BASIN: Effluent canyon from Mortandad canyon to its headwaters, intermittent portions of S-Site canyon from monitoring well MSC 16-06293 to Martin spring, and intermittent portions of Twomile canyon from its confluence with Pajarito canyon to Upper Twomile canyon. (Surface waters within lands scheduled for transfer from DOE to tribal, state or local authorities are specifically excluded.)

A. Designated uses: livestock watering, wildlife habitat, marginal warmwater aquatic life and secondary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.140 NMAC - N, XX/XX/XXXX]

IX. References

A. Federal and State Acts

- Federal Clean Water Act (CWA), 33 U.S.C. § 1251 *et seq*. https://www.epa.gov/sites/production/files/2017-08/documents/federal-water-pollution-control-act-508full.pdf. (accessed March 3, 2021).

- Federal Endangered Species Act (ESA), 16 U.S.C. Code § 1531 *et seq*.

- New Mexico Water Quality Act, NMSA 1978, §§ 74-6-1 through 74-6-17 (2009). https://nmonesource.com/nmos/nmsa/en/item/4415/index.do#!fragment/zoupio-_Toc40794247/BQCwhgziBcwMYgK4DsDWszIQewE4BUBTADwBdoAvbRABwEtsBaAfX2zgBYAGAdgE4OAJg48AlABpk2UoQgBFRIVwBPaAHI14iHFzYANnoDCSNNACEyLYTC4ECpao1WbCAMp5SAIVUAlAKIAMn4AagCCAHKGfuKkYABG0KTsoqJAA. (accessed March 3, 2021).

B. Federal and State Regulations

- United States of America Code of Federal Regulations, Title 40-Protection of the Environment, Chapter I-Environmental Protection Agency, Subchapter D-Water Programs, Part 131-Water Quality Standards. 40 C.F.R. § 131, (2019). https://www.ecfr.gov/cgi-bin/text-idx?SID=1ad232e82435ddd65675d84e8dd604dd&mc=true&node=pt40.24.131&rgn=div5. (accessed March 3, 2021).

- New Mexico Standards for Interstate and Intrastate Surface Waters, 20.6.4 NMAC. May 22, 2020. http://164.64.110.134/parts/title20/20.006.0004.html. (accessed March 3, 2021).

C. Other References

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Appendix A
Available Data Extracted for Determination of Existing Uses

A. Effluent canyon

1. Hydrology Protocol surveys (Level 1)

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Elevation: 7,110 ft.

Date: 9/5/2019	Stream Name: Effluent Canyon	Latitude: 35° 51' 54" N
Evaluator(s): * See Notes	Site ID: Below outfall, SEP GC	Longitude: 106° 17' 52" W
TOTAL POINTS: 15 (Stream is at least intermittent if ≥ 15)	Assessment Unit: N/A	Drought Index (12-mo. SPI Value): 0-1

WEATHER CONDITIONS	NOW:	PAST 48 HOURS:	Has there been a heavy rain in the last 48 hours?
	___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover X clear/sunny	___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover X clear/sunny	___ YES X NO **Field evaluations should be performed at least 48 hours after the last known major rainfall event OTHER: Stream Modifications X YES ___ NO Diversions ___ YES X NO Discharges X YES ___ NO **Explain in further detail in NOTES section

LEVEL 1 INDICATORS	STREAM CONDITION: Strong	Moderate	Weak	Poor
1.1. Water in Channel	Flow is evident throughout the reach. Moving water is seen in riffle areas but may not be as evident throughout the runs.	Water is present in the channel but flow is barely discernable in areas of greatest gradient change (i.e. riffles) or floating object is necessary to observe flow.	Dry channel with standing pools. There is some evidence of base flows (i.e. riparian vegetation growing along channel, saturated or moist sediment under rocks, etc.)	Dry channel. No evidence of base flows was found.
	6	4	2	0
1.2. Fish	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Fish are not present.
	3	2	1	0
1.3. Benthic Macroinvertebrates	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Macroinvertebrates are not present.
	3	2	1	0
1.4. Filamentous Algae/Periphyton	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Filamentous algae and/or periphyton are not present.
	3	2	1	0
Veg found: barberry, chokecherry, Virginia Creeper, gamble oak, rushy, docks, fir, orchard grass 1.5. Differences in Vegetation Riparian Vegetation in patches – Uneven distribution	Dramatic compositional differences in vegetation are present between the stream banks and the adjacent uplands. A distict riparian vegetation corridor exists along the entire reach – riparian, aquatic, or wetland species dominate the length of the reach.	A distinct riparian vegetation corridor exists along part of the reach. Riparian vegetation is interspersed with upland vegetation along the length of the reach.	Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.	No compositional or density differences in vegetation are present between the streambanks and the adjacent uplands.
	3	2	1.5 1	0
1.6. Absence of Rooted Upland Plants in Streambed	Rooted upland plants are absent within the streambed/thalweg.	There are a few rooted upland plants present within the streambed/thalweg.	Rooted upland plants are consistently dispersed throughout the streambed/thalweg.	Rooted upland plants are prevalent within the streambed/thalweg.
	3	2	1	0
			SUBTOTAL (#1.1 – #1.6)	6.5

If the stream being evaluated has a subtotal ≤ 2 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 18 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 2 and 18 continue the Level 1 Evaluation.

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LEVEL 1 INDICATORS	STREAM CONDITION: Strong	Moderate	Weak	Poor
1.7. Sinuosity	Ratio > 1.4. Stream has numerous, closely-spaced bends, few straight sections.	Ratio < 1.4. Stream has good sinuosity with some straight sections.	Ratio < 1.2. Stream has very few bends and mostly straight sections.	Ratio = 1.0. Stream is completely straight with no bends.
	3	2	1	0
1.8. Floodplain and Channel Dimensions	Ratio > 2.5. Stream is minimally confined with a wide, active floodplain.	Ratio between 1.2 and 2.5. 1.26 Stream is moderately confined. Floodplain is present, but may only be active during larger floods.	Ratio < 1.2. Stream is incised with a noticeably confined channel. Floodplain is narrow or absent and typically disconnected from the channel.	
	3	1.5	0	
1.9. In-Channel Structure: Riffle-Pool Sequence	Demonstrated by a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.	Represented by a less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.	Stream shows some flow but mostly has areas of pools or of riffles.	There is no sequence exhibited.
	3	2	1	0
			SUBTOTAL (#1.1 – #1.9)	13

If the stream being evaluated has a subtotal ≤ 5 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 21 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 5 and 21 continue the Level 1 Evaluation.

1.10. Particle Size or Stream Substrate Sorting	Particle sizes in the channel are noticeably different from particle sizes in areas close to but not in the channel. There is a clear distribution of various sized substrates in the stream channel with finer particles accumulating in the pools, and larger particles accumulating in the riffles/runs.	Particle sizes in the channel are moderately similar to particle sizes in areas close to but not in the channel. Various sized substrates are present in the stream channel and are represented by a higher ratio of larger particles (gravel/cobble).	Particle sizes in the channel are similar or comparable to particle sizes in areas close to but not in the channel. Substrate sorting is not readily observed in the stream channel.	
	3	1.5	0	
1.11. Hydric Soils	Hydric soils are found within the study reach.		Hydric soils are not found within the study reach.	
	Present = 3		Absent = 0	
1.12. Sediment on Plants and Debris	Sediment found readily on plants and debris within the stream channel, on the streambank, and within the floodplain throughout the length of the stream.	Sediment found on plants or debris within the stream channel although it is not prevalent along the stream. Mostly accumulating in pools.	Sediment is isolated in small amounts along the stream.	No sediment is present on plants or debris.
	1.5	1	0.5	0
			TOTAL POINTS (#1.1 – #1.12)	15

SUPPLEMENTAL INDICATORS: The following indicators do not occur consistently throughout New Mexico but may be useful in the determination of perenniality. If the indicator is present record score below and tally with previous score to compute TOTAL.		
1.13. Seeps and Springs SEP GCS returns water	Seeps and springs are found within the study reach.	Seeps and springs are not found within the study reach.
	Present = 1.5	Absent = 0
1.14. Iron Oxidizing Bacteria/Fungi	Iron-oxidizing bacteria and/or fungi are found within the study reach.	Iron-oxidizing bacteria and/or fungi are not found within the study reach.
	Present = 1.5	Absent = 0
	TOTAL plus SUPPLEMENTAL POINTS (#1.1 – #1.14)	15

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NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Photo Descriptions and NOTES

Photo #	Description (US, DS, LB, RB, etc.)	Notes
1	Upstream	
2	Downstream	
3	Right Bank	
4	Left Bank	
5	Overall Channel - Downstream	
6	Macroinvertebrate - Worm	

NOTES:

Evaluators: Marcela Shando, Sam Loftin, Brad Schilling, Jennifer Fullam, Cesar Dominguez

Stream modification: SEP Grade Control Structure

Discharges - Downstream of outfall 051 - not currently discharging
* 21,345 gallons of effluent discharge from outfall on a single day in June 2019

LEVEL 1 Field Measurements

Pebble Count Tally Sheet

Site Name: ______ **Storet ID:** ______
Date: ______ **Crew:** ______

Substrate Type	Diameter Range	In-Channel COUNT	In-Channel % Composition	Out of Channel COUNT	Out of Channel % Composition
Silt/Clay	< 0.06 mm				
Sand	0.06 – 2.0 mm (gritty)				
Gravel	2.0 – 64 mm	N/A [illegible]			
Cobble	64 – 256	9/9/19			
Boulder	> 256 mm				
Bedrock	—				

****Please be sure to measure at least 50 pebbles (10 in 5 transects or 5 in 10 transects- depending on stream size) for accurate distributional representation****

INDICATOR #1.8 (*Floodplain and Channel Dimensions*) – MEASUREMENTS & CALCULATIONS**							
Max Depth (#1)	Bankfull Stage (#2)	Maximum Depth Value (#3)	2x Maximum Depth Value (#3)	Flood-Prone Area Location (#4)	Flood-Prone Area Width (#5)	Bankfull Width (#6)	Floodplain to Active Channel Ratio (FPA Width / Bankfull Width)
9.23'	8.50'	.73'	1.46'	7.77'	6.4'	5.0'	1.28

****REFER to Figure 3 on page 19 for clarification**

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Data is for tower ta6.
This file was obtained from the LANL Weather Machine, http://weather.lanl.gov.
Request made on Thu Sep 05 13:41:36 2019 MST.
All data times are MST.

month	day	year	doy	tprecip
mm	dd	yyyy	ddd	in
9	1	2019	244	0.25
9	2	2019	245	0
9	3	2019	246	0
9	4	2019	247	0

Data is for tower ta49.
This file was obtained from the LANL Weather Machine, http://weather.lanl.gov.
Request made on Thu Sep 05 13:42:11 2019 MST.
All data times are MST.

month	day	year	doy	tprecip
mm	dd	yyyy	ddd	in
9	1	2019	244	0.16
9	2	2019	245	0
9	3	2019	246	0
9	4	2019	247	0

Data is for tower ta53.
This file was obtained from the LANL Weather Machine, http://weather.lanl.gov.
Request made on Thu Sep 05 13:42:59 2019 MST.
All data times are MST.

month	day	year	doy	tprecip
mm	dd	yyyy	ddd	in
9	1	2019	244	0.04
9	2	2019	245	0
9	3	2019	246	0
9	4	2019	247	0

Data is for tower ta54.
This file was obtained from the LANL Weather Machine, http://weather.lanl.gov.
Request made on Thu Sep 05 13:43:28 2019 MST.
All data times are MST.

month	day	year	doy	tprecip
mm	dd	yyyy	ddd	in
9	1	2019	244	0
9	2	2019	245	0.19
9	3	2019	246	0
9	4	2019	247	0


September 5, 2019
Effluent below outfall
0 51 + SEP Grade Control
Photo 1: Upstream


September 5, 2019


September 5, 2019
Effluent below outfall
SEP Grade Control

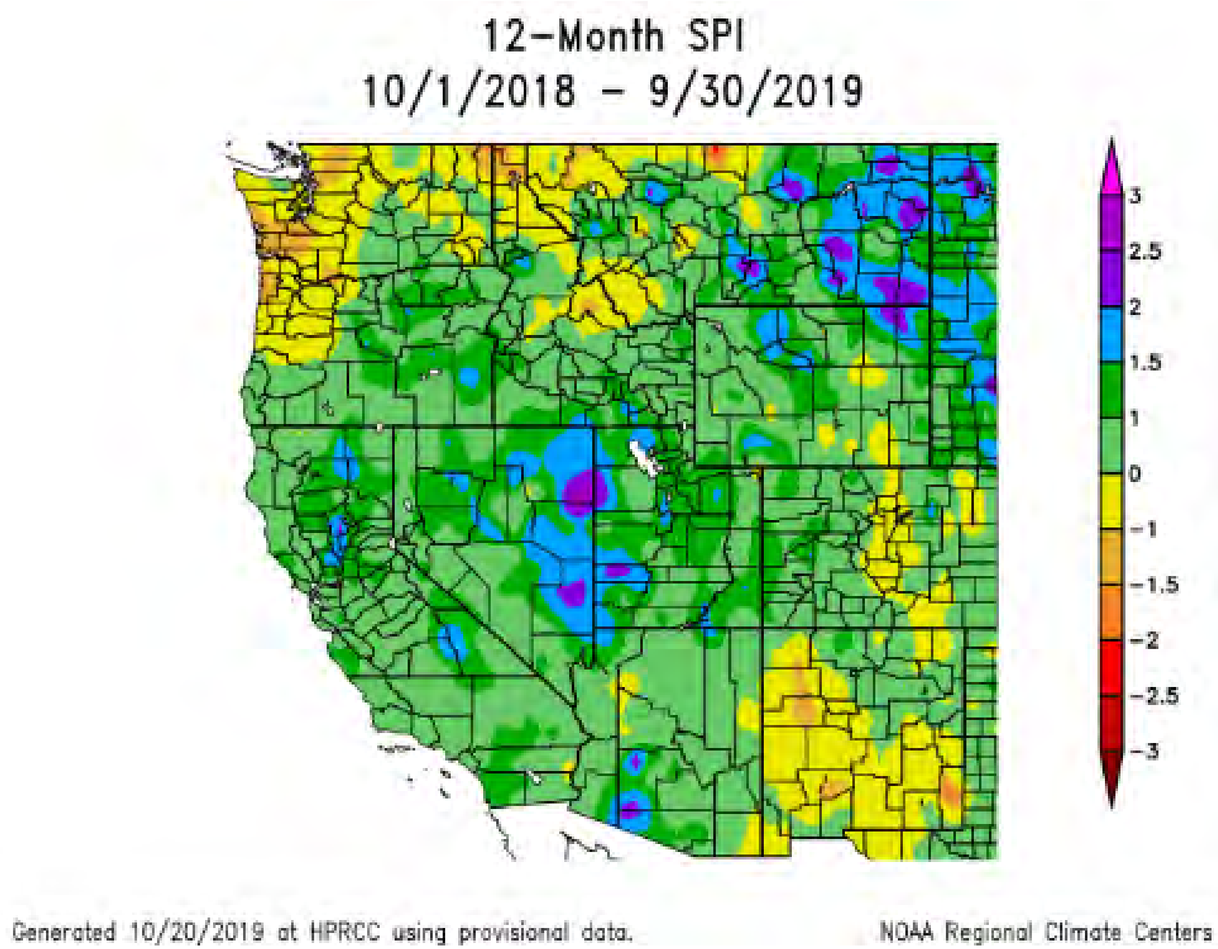

September 5, 2019
Effluent below outfall
SEP Grade Control
Left Bank


September 5, 2019
Effluent below outfall
051 + SEP Grade Control
Photo 5 - Downstream

2. 12- month SPI

High Plains Regional Climate Center - https://hprcc.unl.edu/maps.php?map=ACISClimateMaps

October 1, 2018 through September 30, 2019



3. Stream gage stations from Intellus

Site ID	Location ID	Field Parameter	Measurement Date	Measurement Time	Field Measurement	Measurement Units	Latitude (Decimal)	Longitude (Decimal)
N3B	E-1W	Flow (in cfs)	09-07-2005	09:30	0.007	CFS	35.8650326	-106.2988345
N3B	E-1W	Flow (in cfs)	06-27-2006	09:00	0.01	CFS	35.8650326	-106.2988345
N3B	E-1W	Flow (in cfs)	10-19-2006	08:15	0.0008	CFS	35.8650326	-106.2988345
N3B	E-1W	Flow (in cfs)	03-01-2007	11:35	0.01	CFS	35.8650326	-106.2988345
N3B	E-1W	Flow (in cfs)	06-18-2007	12:40	0.01	CFS	35.8650326	-106.2988345

4. Stream hydrograph from LANL

No stream hydrographs were provided

5. Precipitation from NOAA

https://www.ncdc.noaa.gov/cdo-web/search

6. Alluvial hydrographs from LANL

No alluvial hydrographs were provided

7. Water temperature from Intellus

Site ID	Location ID	Field Parameter	Measurement Date	Month	Measurement Time	Field Measurement	Measurement Units	Latitude (Decimal)	Longitude (Decimal)	Usable
N3B	Mortandad below Effluent Canon	Temperature	08-22-2007	8	13:35	22.8	deg C	35.8654418	-106.2961255	Y
N3B	Mortandad below Effluent Canon	Temperature	07-30-2003	7	09:20	17.4	deg C	35.8654418	-106.2961255	Y
N3B	Mortandad below Effluent Canon	Temperature	08-20-2008	8	12:35	16.9	deg C	35.8654418	-106.2961255	Y
N3B	Mortandad below Effluent Canon	Temperature	06-09-2004	6	09:30	16.3	deg C	35.8654418	-106.2961255	Y
N3B	Mortandad below Effluent Canon	Temperature	08-18-2009	8	11:00	15.2	deg C	35.8654418	-106.2961255	Y
N3B	Mortandad below Effluent Canon	Temperature	06-28-2006	6	09:40	13.5	deg C	35.8654418	-106.2961255	Y
NMED	Mortandad below Effluent E200	Temperature	06-03-1997	6	09:00	12.3	C	35.865442	-106.296126	Y
					Median	16.30	deg C			

					Standard Deviation	3.39	deg C			

8. Water pH from Intellus

Site ID	Location ID	Field Parameter	Measurement Date	Measurement Time	Field Measurement	Measurement Units	Latitude (Decimal)	Longitude (Decimal)	Usable
N3B	Mortandad below Effluent Canon	pH	06-22-2006	15:00	5.63	SU	35.8654418	-106.2961255	Y
N3B	Mortandad below Effluent Canon	pH	02-21-2008	13:10	6.5	SU	35.8654418	-106.2961255	Y
N3B	Mortandad below Effluent Canon	pH	03-02-2007	11:07	6.63	SU	35.8654418	-106.2961255	Y
N3B	Mortandad below Effluent Canon	pH	06-29-2006	16:10	6.68	SU	35.8654418	-106.2961255	Y
N3B	Mortandad below Effluent Canon	pH	06-11-2007	21:38	6.73	SU	35.8654418	-106.2961255	Y
N3B	Mortandad below Effluent Canon	pH	06-16-2007	15:13	6.89	SU	35.8654418	-106.2961255	Y
N3B	Mortandad below Effluent Canon	pH	08-25-2006	11:43	6.91	SU	35.8654418	-106.2961255	Y
N3B	Mortandad below Effluent Canon	pH	08-18-2009	11:00	6.92	SU	35.8654418	-106.2961255	Y
N3B	Mortandad below Effluent Canon	pH	08-19-2006	14:48	6.95	SU	35.8654418	-106.2961255	Y
N3B	Mortandad below Effluent Canon	pH	07-15-2005	15:20	6.97	SU	35.8654418	-106.2961255	Y
N3B	Mortandad below Effluent Canon	pH	08-20-2008	12:35	7.1	SU	35.8654418	-106.2961255	Y
N3B	Mortandad below Effluent Canon	pH	11-18-2008	14:07	7.1	SU	35.8654418	-106.2961255	Y
N3B	Mortandad below Effluent Canon	pH	03-23-2007	09:10	7.14	SU	35.8654418	-106.2961255	Y
N3B	Mortandad below Effluent Canon	pH	07-20-2005	15:01	7.16	SU	35.8654418	-106.2961255	Y
N3B	Mortandad below Effluent Canon	pH	05-03-2005	15:07	7.17	SU	35.8654418	-106.2961255	Y
N3B	Mortandad below Effluent Canon	pH	10-27-2006	09:10	7.22	SU	35.8654418	-106.2961255	Y
N3B	Mortandad below Effluent Canon	pH	06-28-2006	09:40	7.38	SU	35.8654418	-106.2961255	Y
N3B	Mortandad below Effluent Canon	pH	05-02-2007	00:48	7.4	SU	35.8654418	-106.2961255	Y
NMED	Mortandad below Effluent E200	pH	06-03-1997	09:00	7.52	SU	35.865442	-106.296126	Y
N3B	Mortandad below Effluent Canon	pH	08-22-2007	13:35	7.62	SU	35.8654418	-106.2961255	Y
N3B	Mortandad below Effluent Canon	pH	02-12-2009	15:00	7.78	SU	35.8654418	-106.2961255	Y
N3B	Mortandad below Effluent Canon	pH	06-09-2004	09:30	7.86	SU	35.8654418	-106.2961255	Y
NMED	Mortandad below Effluent E200	pH	04-18-2001	09:30	7.87	SU	35.865442	-106.296126	Y
N3B	Mortandad below Effluent Canon	pH	05-28-2002	16:00	7.98	SU	35.8654418	-106.2961255	Y

N3B	Mortandad below Effluent Canon	pH	07-30-2003	09:20	8.1	SU	35.8654418	-106.2961255	Y
N3B	Mortandad below Effluent Canon	pH	04-24-2005	07:47	8.79	SU	35.8654418	-106.2961255	Y
				Median	7.15	SU			
				Standard Deviation	0.62	SU			

9. Water Dissolved oxygen from Intellus

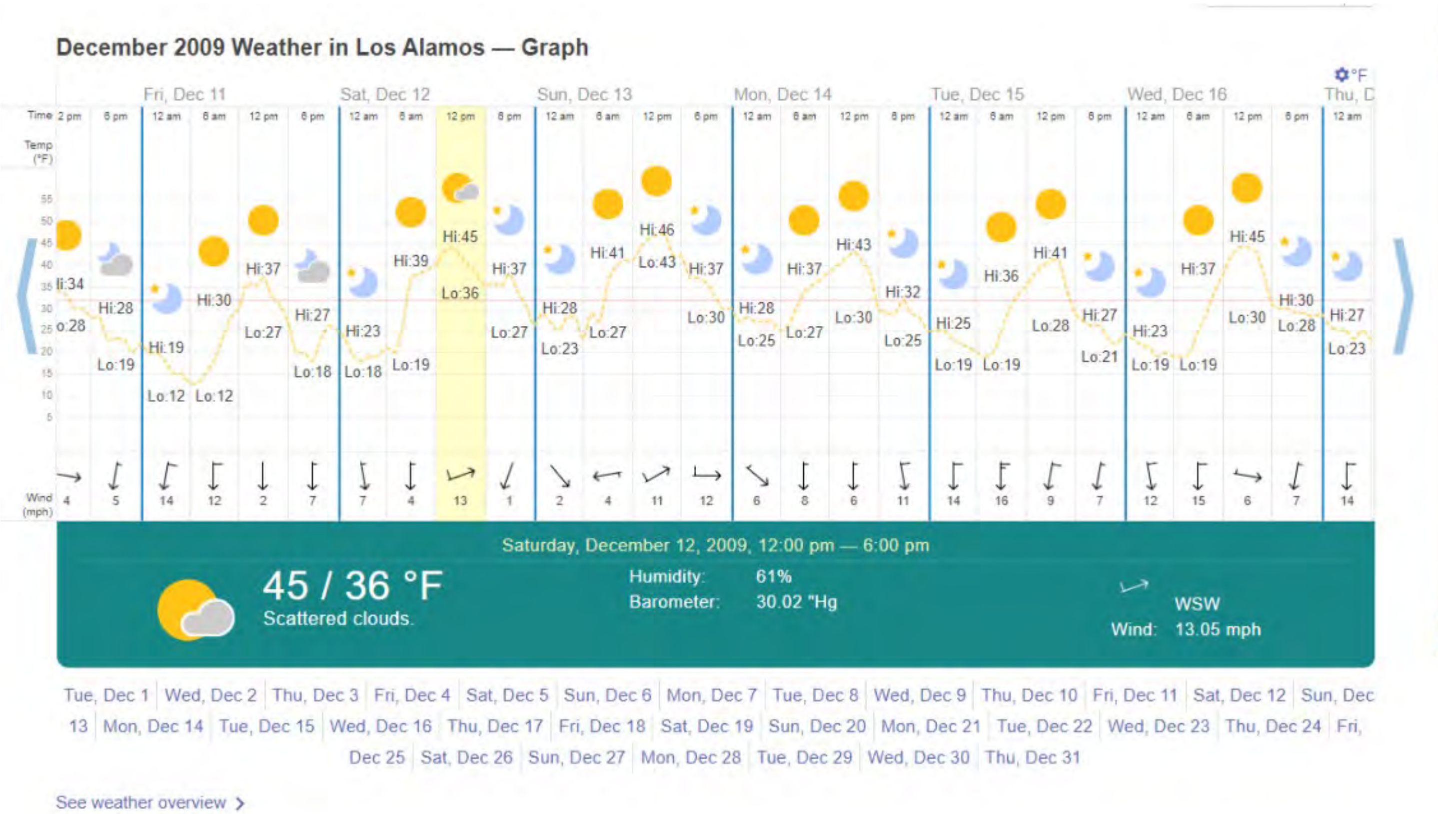
Site ID	Location ID	Field Parameter	Measurement Date	Measurement Time	Field Measurement	Measurement Units	Latitude (Decimal)	Longitude (Decimal)	Usable	
N3B	Mortandad below Effluent Canon	Dissolved Oxygen	10-27-2006	09:10	175.7	mg/L	35.8654418	-106.2961255	Y	Not used
N3B	Mortandad below Effluent Canon	Dissolved Oxygen	02-12-2009	15:00	11.93	mg/L	35.8654418	-106.2961255	Y	
N3B	Mortandad below Effluent Canon	Dissolved Oxygen	02-21-2008	13:10	8.84	mg/L	35.8654418	-106.2961255	Y	
N3B	Mortandad below Effluent Canon	Dissolved Oxygen	11-18-2008	14:07	7.66	mg/L	35.8654418	-106.2961255	Y	
NMED	Mortandad below Effluent E200	Dissolved Oxygen	06-03-1997	09:00	7	mg/L	35.865442	-106.296126	Y	
N3B	Mortandad below Effluent Canon	Dissolved Oxygen	03-02-2007	11:07	5.16	mg/L	35.8654418	-106.2961255	Y	
N3B	Mortandad below Effluent Canon	Dissolved Oxygen	08-22-2007	13:35	4.87	mg/L	35.8654418	-106.2961255	Y	
N3B	Mortandad below Effluent Canon	Dissolved Oxygen	08-20-2008	12:35	3.9	mg/L	35.8654418	-106.2961255	Y	
N3B	Mortandad below Effluent Canon	Dissolved Oxygen	06-28-2006	09:40	2.43	mg/L	35.8654418	-106.2961255	Y	
N3B	Mortandad below Effluent Canon	Dissolved Oxygen	08-18-2009	11:00	2.08	mg/L	35.8654418	-106.2961255	Y	
				Median	5.98	mg/L				
				Standard Deviation	3.19	mg/L				

10. Weather data

December 12, 2009

Time and date

https://www.timeanddate.com/weather/@5476825/historic?month=08&year=2009



Average weather for Los Alamos

Climate-Data.org

https://en.climate-data.org/north-america/united-states-of-america/new-mexico/los-alamos-871784/

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature °C (°F)	-4 °C (24.8) °F	-2.3 °C (27.8) °F	2.2 °C (35.9) °F	6.9 °C (44.4) °F	11.9 °C (53.5) °F	18.2 °C (64.7) °F	19.5 °C (67.2) °F	17.8 °C (64.1) °F	14.4 °C (57.9) °F	8.2 °C (46.7) °F	1.9 °C (35.4) °F	-3.7 °C (25.4) °F
Min. Temperature °C (°F)	-9.3 °C (15.2) °F	-8.1 °C (17.5) °F	-4.5 °C (23.9) °F	-0.8 °C (30.6) °F	3.6 °C (38.4) °F	9.2 °C (48.6) °F	12.4 °C (54.3) °F	11 °C (51.8) °F	7.4 °C (45.4) °F	1.8 °C (35.2) °F	-3.6 °C (25.6) °F	-8.5 °C (16.7) °F
Max. Temperature °C (°F)	3.9 °C (39) °F	5.5 °C (41.9) °F	10.4 °C (50.7) °F	15.2 °C (59.4) °F	20 °C (67.9) °F	26.1 °C (79) °F	26.4 °C (79.5) °F	24.6 °C (76.3) °F	21.6 °C (70.9) °F	15.9 °C (60.6) °F	9.6 °C (49.2) °F	3.7 °C (38.7) °F
Precipitation / Rainfall mm (in)	30 (1.2)	30 (1.2)	36 (1.4)	38 (1.5)	44 (1.7)	32 (1.3)	77 (3)	98 (3.9)	67 (2.6)	52 (2)	31 (1.2)	32 (1.3)
Humidity(%)	58%	54%	46%	36%	32%	28%	44%	51%	50%	50%	50%	58%
Rainy days (d)	4	5	5	6	6	5	10	12	7	5	4	4

11. ***E. coli* in water from Intellus**

No *E. coli* data found

B. S-Site canyon (Martin Spring)

1. Hydrology Protocol surveys (Level 1)

start: 2:00pm
end: 2:18pm

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Date: 29Aug2019	Stream Name: CdV @ Martin Spring Canyon 3 (Martin Spring 3mi 9-3-19)	Latitude: 35° 50' 31" N
Evaluator(s): Loftin, Schilling, Schendo, Armijo, Fullam	Site ID: ~~abv~~ below Martin Springs	Longitude: 106° 20' 10' W
TOTAL POINTS: Stream is at least intermittent if ≥ 12 — 16.0	Assessment Unit: N/A	Drought Index (12-mo. SPI Value): 0 – 1 9-3-19

WEATHER CONDITIONS	NOW: ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) 90 %cloud cover ___ clear/sunny	PAST 48 HOURS: ___ storm (heavy rain) ___ rain (steady rain) X showers (intermittent) ___ %cloud cover ___ clear/sunny 8/27 0.14" @TA-06	Has there been a heavy rain in the last 48 hours? ___ YES X NO **Field evaluations should be performed at least 48 hours after the last known major rainfall event. OTHER: Stream Modifications ___ YES X NO; Diversions ___ YES X NO; Discharges ___ YES X NO **Explain in further detail in NOTES section

LEVEL 1 INDICATORS	STREAM CONDITION Strong	Moderate	Weak	Poor
1.1. Water in Channel	Flow is evident throughout the reach. Moving water is seen in riffle areas but may not be as evident throughout the runs.	Water is present in the channel but flow is barely discernable in areas of greatest gradient change (i.e. riffles) or floating object is necessary to observe flow.	Dry channel with standing pools. There is some evidence of base flows (i.e. riparian vegetation growing along channel, saturated or moist sediment under rocks, etc)	Dry channel. No evidence of base flows was found.
	6	4	2 (circled)	0
1.2. Fish	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Fish are not present.
	3	2	1	0 (circled)
1.3. Benthic Macroinvertebrates (mayfly, mosquito, water beetle)	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Macroinvertebrates are not present.
	3	2 (circled)	1	0
1.4. Filamentous Algae/Periphyton	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Filamentous algae and/or periphyton are not present.
	3	2 (circled)	1	0
1.5. Differences in Vegetation (rushes, grasses, roses, Ponderosa, gambel oak, thistle — differ between reach + uplands)	Dramatic compositional differences in vegetation are present between the stream banks and the adjacent uplands. A distinct riparian vegetation corridor exists along the entire reach – riparian, aquatic, or wetland species dominate the length of the reach.	A distinct riparian vegetation corridor exists along part of the reach. Riparian vegetation is interspersed with upland vegetation along the length of the reach.	Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.	No compositional or density differences in vegetation are present between the streambanks and the adjacent uplands.
	3	2 — 1.5 (circled)	1	0
1.6. Absence of Rooted Upland Plants in Streambed	Rooted upland plants are absent within the streambed/thalweg.	There are a few rooted upland plants present within the streambed/thalweg.	Rooted upland plants are consistently dispersed throughout the streambed/thalweg.	Rooted upland plants are prevalent within the streambed/thalweg.
	3	2 (circled)	1	0
			SUBTOTAL (#1.1 – #1.6)	9.5

If the stream being evaluated has a subtotal ≤ 2 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 18 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 2 and 18 continue the Level 1 Evaluation.

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CdV @ Martin Spring Canyon 3 below

LEVEL 1 INDICATORS	STREAM CONDITION (Martin Springs) Strong	Moderate	Weak	Poor
1.7. Sinuosity	Ratio > 1.4. Stream has numerous, closely-spaced bends, few straight sections.	Ratio < 1.4. Stream has good sinuosity with some straight sections.	Ratio < 1.2. Stream has very few bends and mostly straight sections.	Ratio = 1.0. Stream is completely straight with no bends.
	3	2	1 (circled)	0
1.8. Floodplain and Channel Dimensions	Ratio > 2.5. Stream is minimally confined with a wide, active floodplain.	Ratio between 1.2 and 2.5. Stream is moderately confined. Floodplain is present, but may only be active during larger floods. (2.22)	Ratio < 1.2. Stream is incised with a noticeably confined channel. Floodplain is narrow or absent and typically disconnected from the channel.	
	3	1.5 (circled)	0	
1.9. In-Channel Structure: Riffle-Pool Sequence	Demonstrated by a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.	Represented by a less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.	Stream shows some flow but mostly has areas of pools or of riffles.	There is no sequence exhibited.
	3	2	1 (circled)	0
			SUBTOTAL (#1.1 – #1.9)	13.0

If the stream being evaluated has a subtotal ≤ 5 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 21 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 5 and 21 continue the Level 1 Evaluation.

LEVEL 1 INDICATORS	Strong	Moderate	Poor
1.10. Particle Size or Stream Substrate Sorting	Particle sizes in the channel are noticeably different from particle sizes in areas close to but not in the channel. There is a clear distribution of various sized substrates in the stream channel with finer particles accumulating in the pools, and larger particles accumulating in the riffles/runs.	Particle sizes in the channel are moderately similar to particle sizes in areas close to but not in the channel. Various sized substrates are present in the stream channel and are represented by a higher ratio of larger particles (gravel/cobble).	Particle sizes in the channel are similar or comparable to particle sizes in areas close to but not in the channel. Substrate sorting is not readily observed in the stream channel. no sorting
	3	1.5	0 (circled)

LEVEL 1 INDICATORS		
1.11. Hydric Soils	Hydric soils are found within the study reach.	Hydric soils are not found within the study reach.
	Present = 3	Absent = 0 (circled)

LEVEL 1 INDICATORS	Strong	Moderate	Weak	Poor
1.12. Sediment on Plants and Debris	Sediment found readily on plants and debris within the stream channel, on the streambank, and within the floodplain throughout the length of the stream.	Sediment found on plants or debris within the stream channel although it is not prevalent along the stream. Mostly accumulating in pools.	Sediment is isolated in small amounts along the stream.	No sediment is present on plants or debris.
	1.5 (circled)	1	0.5	0
			TOTAL POINTS (#1.1 – #1.12)	14.5

SUPPLEMENTAL INDICATORS: The following indicators do not occur consistently throughout New Mexico but may be useful in the determination of perenniality. If the indicator is present record score below and tally with previous score to compute TOTAL.

SUPPLEMENTAL INDICATORS		
1.13. Seeps and Springs	Seeps and springs are found within the study reach.	Seeps and springs are not found within the study reach.
	Present = 1.5 (circled)	Absent = 0
1.14. Iron Oxidizing Bacteria/Fungi	Iron-oxidizing bacteria and/or fungi are found within the study reach.	Iron-oxidizing bacteria and/or fungi are not found within the study reach.
	Present = 1.5	Absent = 0 (circled)
TOTAL plus SUPPLEMENTAL POINTS (#1.1 – #1.14)		16.0

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NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Photo Descriptions and NOTES

Photo #	Description (US, DS, LB, RB, etc.)	Notes
1	upstream	Photos by S. Loftin
2	~~left bank~~ downstream	"
3	~~right bank~~ left bank	"
4	right bank	"
5	upstream	"
6	Benthics	

NOTES:

Flagging noted w/ purple gloves

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CdV @ Martin Springs Cnyn 3
below Martin Springs

LEVEL 1 Field Measurements

Pebble Count Tally Sheet

Site Name: ______ **Storet ID:** ______
Date: ______ **Crew:** ______

Substrate Type	Diameter Range	In-Channel COUNT	In-Channel % Composition	Out of Channel COUNT	Out of Channel % Composition
Silt/Clay	< 0.06 mm				
Sand	0.06 – 2.0 mm (gritty)				
Gravel	2.0 – 64 mm				
Cobble	64 – 256				
Boulder	> 256 mm				
Bedrock	----				

****Please be sure to measure at least 50 pebbles (10 in 5 transects or 5 in 10 transects-depending on stream size) for accurate distributional representation****

INDICATOR #1.8 (*Floodplain and Channel Dimensions*) – MEASUREMENTS & CALCULATIONS**							
Max Depth (#1)	Bankfull Stage (#2)	Maximum Depth Value (#3)	2x Maximum Depth Value (#3)	Flood-Prone Area Location (#4)	Flood-Prone Area Width (#5)	Bankfull Width (#6)	Floodplain to Active Channel Ratio (FPA Width / Bankfull Width)
8.8 ft.	8.56ft	0.24ft	0.48ft	8.32ft	2.45m	1.1m	2.22 m

****REFER to Figure 3 on page 19 for clarification**

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Data is for tower ta6.
This file was obtained from the LANL Weather Machine, http://weather.lanl.gov.
Request made on Thu Aug 29 06:37:40 2019 MST.
All data times are MST.

month	day	year	doy	tprecip
mm	dd	yyyy	ddd	in
8	24	2019	236	0
8	25	2019	237	0
8	26	2019	238	0
8	27	2019	239	0.14
8	28	2019	240	0

Data is for tower ta49.
This file was obtained from the LANL Weather Machine, http://weather.lanl.gov.
Request made on Thu Aug 29 06:38:14 2019 MST.
All data times are MST.

month	day	year	doy	tprecip
mm	dd	yyyy	ddd	in
8	24	2019	236	0
8	25	2019	237	0
8	26	2019	238	0
8	27	2019	239	0.05
8	28	2019	240	0

Data is for tower ta53.
This file was obtained from the LANL Weather Machine, http://weather.lanl.gov.
Request made on Thu Aug 29 06:38:57 2019 MST.
All data times are MST.

month	day	year	doy	tprecip
mm	dd	yyyy	ddd	in
8	24	2019	236	0
8	25	2019	237	0
8	26	2019	238	0
8	27	2019	239	0.02
8	28	2019	240	0

Data is for tower ncom.
This file was obtained from the LANL Weather Machine, http://weather.lanl.gov.
Request made on Thu Aug 29 06:41:29 2019 MST.
All data times are MST.

month	day	year	doy	tprecip
mm	dd	yyyy	ddd	in
8	24	2019	236	0

8	25	2019	237	0
8	26	2019	238	0
8	27	2019	239	0.01
8	28	2019	240	0


29 AUG 2019
Martin Spgs Cyn
Below MARTIN SPRINGS
Photo1 : Upstream


29 AUG 2019
Martin Spgs Cyn
Below MARTIN SPRINGS
Photo 2: Downstream


29 AUG 2019
Martin Spgs Cyn
Below MARTIN SPRINGS
Photo 4 : Right Bank


29 AUG 2019
Martin Spgs Cyn
Below MARTIN SPRINGS
Photo 3: Left Bank


29 AUG 2019
Martin Spgs Cyn
Below MARTIN SPRINGS
Photo 5: Upstream

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Date: 8-29-2019	Stream Name: Martin Spring	Latitude: 35° 50' ~~29.7~~ 26.952" N
Evaluator(s): * See Notes	Site ID: At MSC 16-06293	Longitude: 106° ~~20~~ 19' ~~8~~ 59.016" W
TOTAL POINTS: 8 Stream is at least intermittent if ≥ 12	Assessment Unit: N/A	Drought Index (12-mo. SPI Value): 0-1

WEATHER CONDITIONS	**NOW:** __ storm (heavy rain) __ rain (steady rain) __ showers (intermittent) 70 %cloud cover __ clear/sunny	**PAST 48 HOURS:** __ storm (heavy rain) __ rain (steady rain) X showers (intermittent) __ %cloud cover __ clear/sunny TA-6 Rain Gage - .14" on 8/27/2019	**Has there been a heavy rain in the last 48 hours?** __ YES X NO *Field evaluations should be performed at least 48 hours after the last known major rainfall event. **OTHER:** Stream Modifications __ YES X NO Diversions __ YES X NO Discharges __ YES X NO **Explain in further detail in NOTES section

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	Moderate	Weak	Poor
1.1. Water in Channel	Flow is evident throughout the reach. Moving water is seen in riffle areas but may not be as evident throughout the runs.	Water is present in the channel but flow is barely discernable in areas of greatest gradient change (i.e. riffles) or floating object is necessary to observe flow.	Dry channel with standing pools. There is some evidence of base flows (i.e. riparian vegetation growing along channel, saturated or moist sediment under rocks, etc).	Dry channel. No evidence of base flows was found. No standing water
	6	4	2	1 0
1.2. Fish	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Fish are not present.
	3	2	1	0
1.3. Benthic Macroinvertebrates	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Macroinvertebrates are not present.
	3	2	1	0
1.4. Filamentous Algae/Periphyton	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Filamentous algae and/or periphyton are not present.
	3	2	1	0
1.5. Differences in Vegetation No distinct riparian Corridor (patchy)	Dramatic compositional differences in vegetation are present between the stream banks and the adjacent uplands. A distinct riparian vegetation corridor exists along the entire reach – riparian, aquatic, or wetland species dominate the length of the reach.	A distinct riparian vegetation corridor exists along part of the reach. Riparian vegetation is interspersed with upland vegetation along the length of the reach.	Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.	No compositional or density differences in vegetation are present between the streambanks and the adjacent uplands.
	3	2	1 1.5	0
1.6. Absence of Rooted Upland Plants in Streambed	Rooted upland plants are absent within the streambed/thalweg.	There are a few rooted upland plants present within the streambed/thalweg.	Rooted upland plants are consistently dispersed throughout the streambed/thalweg.	Rooted upland plants are prevalent within the streambed/thalweg.
	3	2	1	0
			SUBTOTAL (#1.1 – #1.6)	3.5

If the stream being evaluated has a subtotal ≤ 2 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 18 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 2 and 18 continue the Level 1 Evaluation.

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	Moderate	Weak	Poor
1.7. Sinuosity	Ratio > 1.4. Stream has numerous, closely-spaced bends, few straight sections.	Ratio ≤ 1.4. Stream has good sinuosity with some straight sections.	Ratio < 1.2. Stream has very few bends and mostly straight sections.	Ratio = 1.0. Stream is completely straight with no bends.
	3	2	1	0
1.8. Floodplain and Channel Dimensions	Ratio > 2.5. Stream is minimally confined with a wide, active floodplain.	Ratio between 1.2 and 2.5. 1.83 Stream is moderately confined. Floodplain is present, but may only be active during larger floods.		Ratio < 1.2. Stream is incised with a noticeably confined channel. Floodplain is narrow or absent and typically disconnected from the channel.
	3	1.5		0
1.9. In-Channel Structure: Riffle-Pool Sequence	Demonstrated by a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.	Represented by a less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.	Stream shows some flow but mostly has areas of pools or of riffles.	There is no sequence exhibited.
	3	2	1	0
			SUBTOTAL (#1.1 – #1.9)	7

If the stream being evaluated has a subtotal ≤ 5 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 21 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 5 and 21 continue the Level 1 Evaluation.

Some sorting in channel - not a lot of large particles 1.10. Particle Size or Stream Substrate Sorting	Particle sizes in the channel are noticeably different from particle sizes in areas close to but not in the channel. There is a clear distribution of various sized substrates in the stream channel with finer particles accumulating in the pools, and larger particles accumulating in the riffles/runs.	Particle sizes in the channel are moderately similar to particle sizes in areas close to but not in the channel. Various sized substrates are present in the stream channel and are represented by a higher ratio of larger particles (gravel/cobble).		Particle sizes in the channel are similar or comparable to particle sizes in areas close to but not in the channel. Substrate sorting is not readily observed in the stream channel.
	3	1.5	1	0
1.11. Hydric Soils	Hydric soils are found within the study reach.		Hydric soils are not found within the study reach.	
	Present = 3		Absent = 0	
1.12. Sediment on Plants and Debris	Sediment found readily on plants and debris within the stream channel, on the streambank, and within the floodplain throughout the length of the stream.	Sediment found on plants or debris within the stream channel although it is not prevalent along the stream. Mostly accumulating in pools.	Sediment is isolated in small amounts along the stream.	No sediment is present on plants or debris.
	1.5	1	0.5	0
			TOTAL POINTS (#1.1 – #1.12)	8

SUPPLEMENTAL INDICATORS: The following indicators do not occur consistently throughout New Mexico but may be useful in the determination of perenniality. If the indicator is present record score below and tally with previous score to compute TOTAL.		
1.13. Seeps and Springs	Seeps and springs are found within the study reach.	Seeps and springs are not found within the study reach.
	Present = 1.5	Absent = 0
1.14. Iron Oxidizing Bacteria/Fungi	Iron-oxidizing bacteria and/or fungi are found within the study reach.	Iron-oxidizing bacteria and/or fungi are not found within the study reach.
	Present = 1.5	Absent = 0
	TOTAL *plus* SUPPLEMENTAL POINTS (#1.1 – #1.14)	8

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Photo Descriptions and NOTES

Photo #	Description (US, DS, LB, RB, etc.)	Notes
1	Upstream	
2	Downstream	
3	Left Bank	
4	Right Bank	
5	Channel Upstream towards well	

NOTES:

Evaluators. Sam Loftin, Marcus Shendo, Brad Schilling, Karen Armijo, Jennifer Fullam

GPS coordinates are approximate.

LEVEL 1 Field Measurements

Pebble Count Tally Sheet

Site Name: ______ Storet ID: ______
Date: ______ Crew: ______

Substrate Type	Diameter Range	In-Channel COUNT	In-Channel % Composition	Out of Channel COUNT	Out of Channel % Composition
Silt/Clay	< 0.06 mm				
Sand	0.06 – 2.0 mm (gritty)				
Gravel	2.0 – 64 mm	N/A BmI			
Cobble	64 – 256	9-3-19			
Boulder	> 256 mm				
Bedrock	---				

Please be sure to measure at least 50 pebbles (10 in 5 transects or 5 in 10 transects-depending on stream size) for accurate distributional representation

INDICATOR #1.8 (*Floodplain and Channel Dimensions*) – MEASUREMENTS & CALCULATIONS**							
Max Depth (#1)	Bankfull Stage (#2)	Maximum Depth Value (#3)	2x Maximum Depth Value (#3)	Flood-Prone Area Location (#4)	Flood-Prone Area Width (#5)	Bankfull Width (#6)	Floodplain to Active Channel Ratio (FPA Width / Bankfull Width)
8.15'	7.67'	.48'	.96'	7.19'	3.51 m	1.92 m	1.83

**REFER to Figure 3 on page 19 for clarification

Data is for tower ta6.
This file was obtained from the LANL Weather Machine. http://weather.lanl.gov.
Request made on Thu Aug 29 06:37:40 2019 MST
All data times are MST.

month	day	year	doy	tprecip
mm	dd	yyyy	ddd	in
8	24	2019	236	0
8	25	2019	237	0
8	26	2019	238	0
8	27	2019	239	0.14
8	28	2019	240	0

Data is for tower ta49.
This file was obtained from the LANL Weather Machine, http://weather.lanl.gov.
Request made on Thu Aug 29 06:38:14 2019 MST.
All data times are MST.

month	day	year	doy	tprecip
mm	dd	yyyy	ddd	in
8	24	2019	236	0
8	25	2019	237	0
8	26	2019	238	0
8	27	2019	239	0.05
8	28	2019	240	0

Data is for tower ta53.
This file was obtained from the LANL Weather Machine, http://weather.lanl.gov.
Request made on Thu Aug 29 06:38:57 2019 MST.
All data times are MST.

month	day	year	doy	tprecip
mm	dd	yyyy	ddd	in
8	24	2019	236	0
8	25	2019	237	0
8	26	2019	238	0
8	27	2019	239	0.02
8	28	2019	240	0

Data is for tower ncom.
This file was obtained from the LANL Weather Machine, http://weather.lanl.gov.
Request made on Thu Aug 29 06:41:29 2019 MST.
All data times are MST.

month	day	year	doy	tprecip
mm	dd	yyyy	ddd	in
8	24	2019	236	0
8	25	2019	237	0
8	26	2019	238	0
8	27	2019	239	0.01
8	28	2019	240	0


29 AUG 2019
Martin Spgs Cyn 3
at MSC16-06293
Photo 1: Upstream


29 AUG 2018
Martin Spgs Cyn 3
at MSC16-0629
Photo2: Downstream

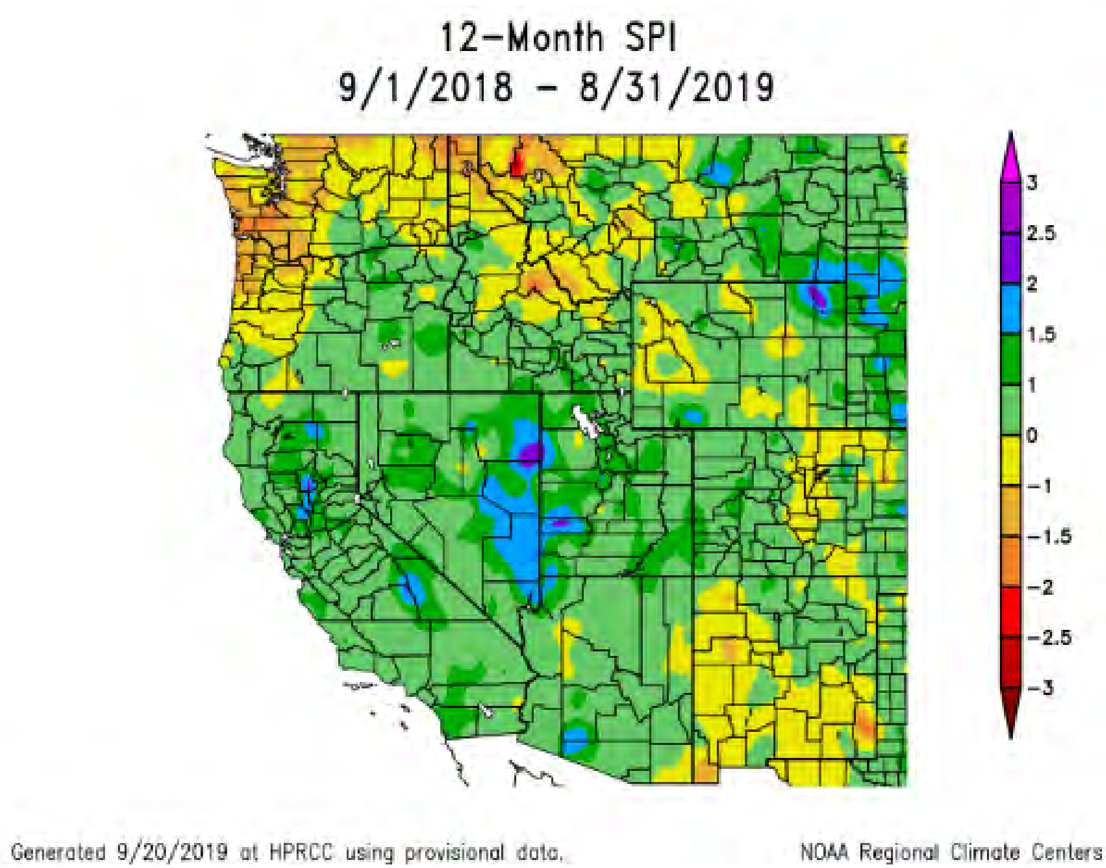

29 AUG 2019
Martin Spgs Cyn 3
at MSC16-06293
Photo 4: Right Bank


24 AUG 2019
Martin Spgs Cyn 3
at MSC16-06293
Photo3: Left Bank

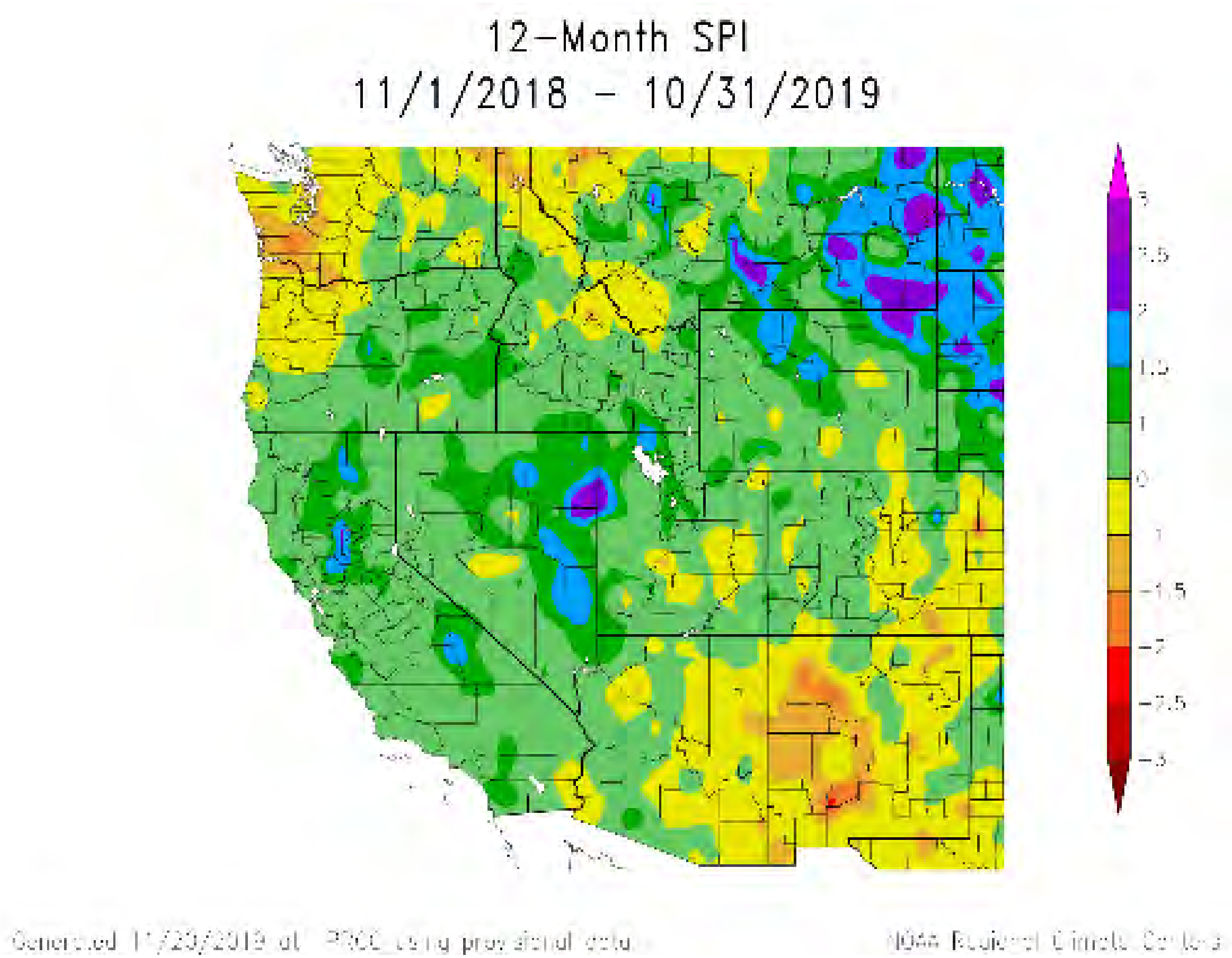

29 AUG 2019
Martin Spgs Cyn 3
at MSC16-06293
Photo5: Upstream

2. 12-month SPI

High Plains Regional Climate Center https://hprcc.unl.edu/maps.php?map=ACISClimateMaps September 1, 2018 through August 31, 2019



12- month SPI High Plains Regional Climate Center - https://hprcc.unl.edu/maps.php?map=ACISClimateMaps October 1, 2018 through September 30, 2019



3. Stream gage stations from Intellus

Site ID	Location ID	Field Parameter	Measurement Date	Measurement Time	Field Measurement	Measurement Units	Latitude (Decimal)	Longitude (Decimal)
N3B	Martin Spring	Flow (in gpm)	03-28-2016	11:10	1.11	GPM	35.8425518	-106.3363104
N3B	Martin Spring	Flow (in gpm)	06-22-2016	11:04	0.79	GPM	35.8425518	-106.3363104
N3B	Martin Spring	Flow (in gpm)	09-15-2016	12:05	0.95	GPM	35.8425518	-106.3363104
N3B	Martin Spring	Flow (in gpm)	12-15-2016	12:10	0.79	GPM	35.8425518	-106.3363104
N3B	Martin Spring	Flow (in gpm)	03-09-2017	13:50	1.45	GPM	35.8425518	-106.3363104
N3B	Martin Spring	Flow (in gpm)	06-01-2017	13:37	0.83	GPM	35.8425518	-106.3363104
N3B	Martin Spring	Flow (in gpm)	08-29-2017	13:10	0.71	GPM	35.8425518	-106.3363104
N3B	Martin Spring	Discharge Rate	02-23-2018	10:05	0.82	gal/min	35.8425518	-106.3363104
N3B	Martin Spring	Discharge Rate	08-22-2018	11:00	0.44	gal/min	35.8425518	-106.3363104
N3B	Martin Spring	Discharge Rate	03-06-2019	12:25	8.90	gal/min	35.8425518	-106.3363104
N3B	Martin Spring	Discharge Rate	08-10-2019	09:15	0.83	gal/min	35.8425518	-106.3363104
N3B	Martin Spring	Discharge Rate	07-23-2020	12:40	0.72	gal/min	35.8425518	-106.3363104

4. Stream hydrograph from LANL

No stream hydrographs were provided.

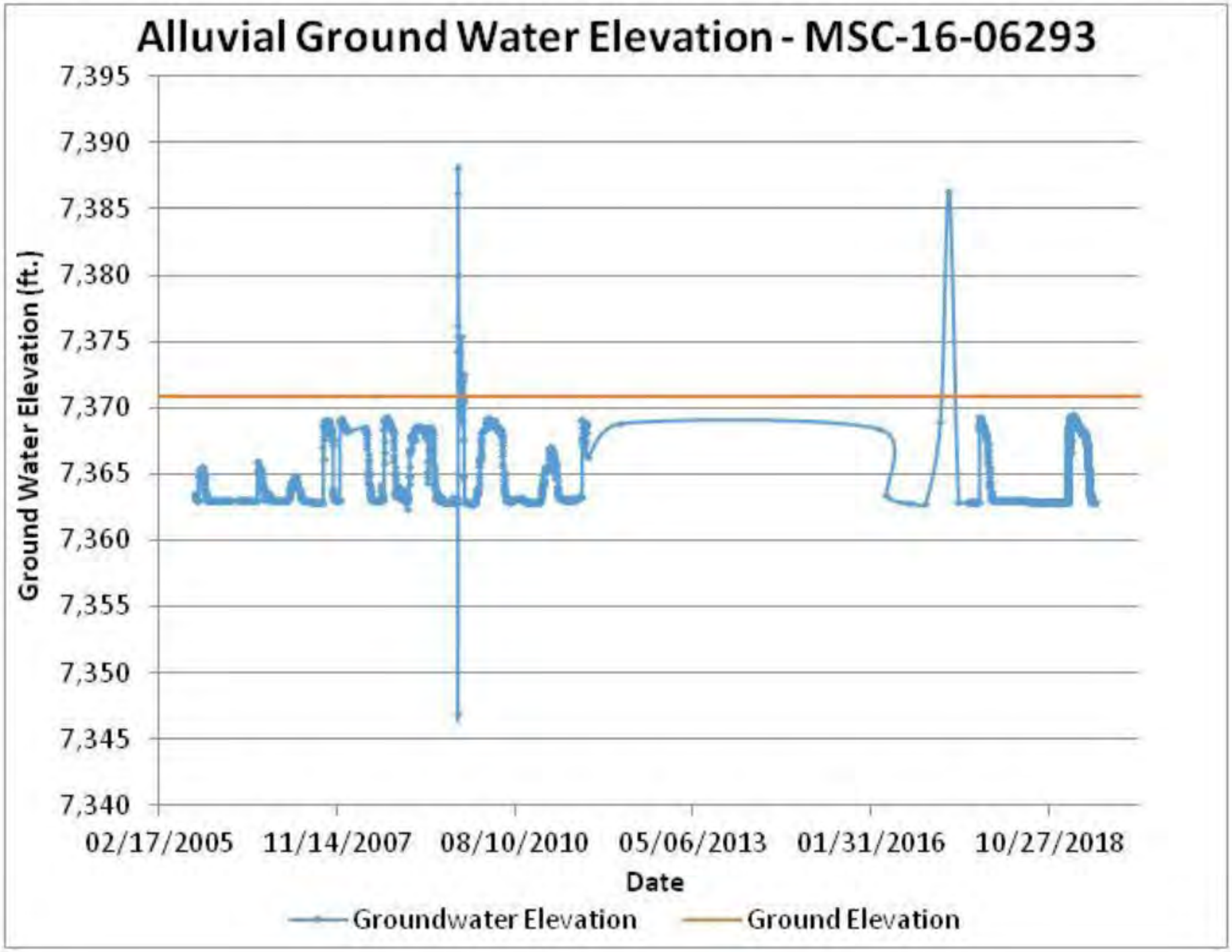
5. Precipitation from NOAA

https://www.ncdc.noaa.gov/cdo-web/search

6. **Alluvial hydrographs from LANL**

MSC-16-06293 2005 through 2018

EPC-DO: 20-113 Attachment 3 LA-UR-20-22687



7. Water temperature from Intellus

Site ID	Location ID	Field Parameter	Measurement Date	Month	Measurement Time	Field Measurement	Measurement Units	Latitude (Decimal)	Longitude (Decimal)	Usable
N3B	Martin Spring	Temperature	08-29-2017	8	13:10	18.7	deg C	35.8425518	-106.3363104	
N3B	Martin Spring	Temperature	08-13-2014	8	12:16	16.97	deg C	35.8425518	-106.3363104	
N3B	Martin Spring	Temperature	07-23-2015	7	11:05	16.92	deg C	35.8425518	-106.3363104	
N3B	Martin Lower SW filt samp port	Temperature	07-28-2006	7	10:10	15.58	deg C	35.8423181	-106.3364896	Y
N3B	Martin Spring	Temperature	07-23-2020	7	12:40	15.4	deg C	35.8425518	-106.3363104	Y
N3B	Martin Upper SW Filt Samp Port	Temperature	07-28-2006	7	10:10	14.35	deg C	35.8424173	-106.3365398	Y
N3B	Martin Spring	Temperature	06-01-2017	6	13:37	14.1	deg C	35.8425518	-106.3363104	
N3B	Martin Spring	Temperature	07-20-2012	7	11:51	13.67	deg C	35.8425518	-106.3363104	
N3B	Martin Lower SW filt samp port	Temperature	08-25-2005	8	09:55	12.9	deg C	35.8423181	-106.3364896	Y
N3B	Martin Spring	Temperature	08-10-2019	8	09:15	12.7	deg C	35.8425518	-106.3363104	Y
N3B	Martin Spring	Temperature	06-22-2016	6	11:04	12.61	deg C	35.8425518	-106.3363104	
N3B	Martin Spring	Temperature	08-22-2018	8	11:00	12.6	deg C	35.8425518	-106.3363104	Y
N3B	Martin Spring	Temperature	08-25-2005	8	09:35	11.9	deg C	35.8425518	-106.3363104	Y
N3B	Martin Spring	Temperature	07-28-2006	7	10:10	11.83	deg C	35.8425518	-106.3363104	Y
N3B	Martin Upper SW Filt Samp Port	Temperature	08-25-2005	8	09:45	11.49	deg C	35.8424173	-106.3365398	Y
NMED	Martin Spring	Temperature	06-04-1996	6	00:00	10.9	C	35.842552	-106.33631	Y
NMED	Martin Spring	Temperature	08-27-2008	8	10:39	10.7	C	35.842552	-106.33631	Y
NMED	Martin Spring	Temperature	07-21-1995	7	00:00	10.4	C	35.842552	-106.33631	Y
					Median	12.80	deg C			
					Standard Deviation	2.38	deg C			

8. Water pH from Intellus

Site ID	Location ID	Field Parameter	Measurement Date	Measurement Time	Field Measure ment	Measurement Units	Latitude (Decimal)	Longitude (Decimal)	Usable
N3B	Martin Spring	pH	08-10-2019	09:15	7.79	SU	35.8425518	-106.3363104	Y
N3B	Martin Lower SW filt samp port	pH	07-28-2006	10:10	7.7	SU	35.8423181	-106.3364896	Y
N3B	Martin Spring	pH	03-09-2017	13:50	7.49	SU	35.8425518	-106.3363104	
N3B	Martin Spring	pH	06-01-2017	13:37	7.47	SU	35.8425518	-106.3363104	
N3B	Martin Spring	pH	08-29-2017	13:10	7.40	SU	35.8425518	-106.3363104	
N3B	Martin Spring	pH	08-22-2018	11:00	7.40	SU	35.8425518	-106.3363104	Y
N3B	Martin Upper SW Filt Samp Port	pH	03-29-2006	11:22	7.31	SU	35.8424173	-106.3365398	Y
N3B	Martin Spring	pH	01-18-2012	10:22	7.3	SU	35.8425518	-106.3363104	Y
N3B	Martin Lower SW filt samp port	pH	03-29-2006	11:15	7.29	SU	35.8423181	-106.3364896	Y
N3B	Martin Spring	pH	03-29-2006	11:10	7.28	SU	35.8425518	-106.3363104	Y
N3B	Martin Spring	pH	07-23-2015	11:05	7.28	SU	35.8425518	-106.3363104	
N3B	Martin Spring	pH	09-15-2011	12:02	7.27	SU	35.8425518	-106.3363104	Y
N3B	Martin Spring	pH	03-28-2016	11:10	7.27	SU	35.8425518	-106.3363104	
N3B	Martin Spring	pH	04-06-2005	12:00	7.24	SU	35.8425518	-106.3363104	Y
N3B	Martin Spring	pH	12-01-2015	11:03	7.20	SU	35.8425518	-106.3363104	
N3B	Martin Spring	pH	03-06-2019	12:25	7.18	SU	35.8425518	-106.3363104	Y
N3B	Martin Spring	pH	09-15-2011	12:07	7.17	SU	35.8425518	-106.3363104	Y
N3B	Martin Spring	pH	07-20-2012	11:51	7.17	SU	35.8425518	-106.3363104	
N3B	Martin Spring	pH	07-23-2020	12:40	7.13	SU	35.8425518	-106.3363104	Y
N3B	Martin Spring	pH	01-27-2015	11:28	7.08	SU	35.8425518	-106.3363104	
N3B	Martin Spring	pH	06-22-2016	11:04	7.08	SU	35.8425518	-106.3363104	
N3B	Martin Spring	pH	05-09-2005	14:57	7.07	SU	35.8425518	-106.3363104	Y
N3B	Martin Upper SW Filt Samp Port	pH	07-28-2006	10:10	7.07	SU	35.8424173	-106.3365398	Y
NMED	Martin Spring	pH	07-21-1995	00:00	7.04	SU	35.842552	-106.33631	Y
N3B	Martin Spring	pH	03-27-2013	11:45	7.02	SU	35.8425518	-106.3363104	

NMED	Martin Spring	pH	05-12-1995	00:00	6.99	SU	35.842552	-106.33631	Y
N3B	Martin Spring	pH	12-15-2016	12:10	6.95	SU	35.8425518	-106.3363104	
N3B	Martin Spring	pH	09-15-2016	12:05	6.91	SU	35.8425518	-106.3363104	
N3B	Martin Lower SW filt samp port	pH	11-14-2005	10:05	6.9	SU	35.8423181	-106.3364896	Y
N3B	Martin Spring	pH	07-28-2006	10:10	6.9	SU	35.8425518	-106.3363104	Y
N3B	Martin Spring	pH	03-06-2014	12:27	6.90	SU	35.8425518	-106.3363104	
N3B	Martin Upper SW Filt Samp Port	pH	11-14-2005	09:40	6.86	SU	35.8424173	-106.3365398	Y
N3B	Martin Spring	pH	09-17-2013	11:33	6.85	SU	35.8425518	-106.3363104	
N3B	Martin Spring	pH	02-23-2018	10:05	6.85	SU	35.8425518	-106.3363104	Y
N3B	Martin Lower SW filt samp port	pH	08-25-2005	09:55	6.84	SU	35.8423181	-106.3364896	Y
NMED	Martin Spring	pH	12-15-1997	00:00	6.77	SU	35.842552	-106.33631	Y
N3B	Martin Spring	pH	05-09-2007	10:35	6.77	SU	35.8425518	-106.3363104	Y
N3B	Martin Spring	pH	04-05-2011	10:55	6.75	SU	35.8425518	-106.3363104	Y
N3B	Martin Spring	pH	08-13-2014	12:16	6.74	SU	35.8425518	-106.3363104	
N3B	Martin Spring	pH	11-14-2005	09:55	6.71	SU	35.8425518	-106.3363104	Y
N3B	Martin Upper SW Filt Samp Port	pH	08-25-2005	09:45	6.67	SU	35.8424173	-106.3365398	Y
N3B	Martin Spring	pH	03-24-2009	10:45	6.65	SU	35.8425518	-106.3363104	Y
N3B	Martin Spring	pH	10-16-2009	10:15	6.65	SU	35.8425518	-106.3363104	Y
N3B	Martin Spring	pH	08-25-2005	09:35	6.63	SU	35.8425518	-106.3363104	Y
N3B	Martin Spring	pH	09-14-2010	13:58	6.61	SU	35.8425518	-106.3363104	Y
N3B	Martin Spring	pH	04-02-2008	10:35	6.6	SU	35.8425518	-106.3363104	Y
N3B	Martin Spring	pH	10-08-2008	13:25	6.6	SU	35.8425518	-106.3363104	Y
N3B	Martin Spring	pH	04-13-2010	13:52	6.55	SU	35.8425518	-106.3363104	Y
N3B	Martin Spring	pH	10-19-2007	14:45	6.5	SU	35.8425518	-106.3363104	Y
NMED	Martin Spring	pH	06-04-1996	00:00	6.29	SU	35.842552	-106.33631	Y
NMED	Martin Spring	pH	08-27-2008	10:39	6.27	SU	35.842552	-106.33631	Y
NMED	Martin Spring	pH	05-24-1996	00:00	6.25	SU	35.842552	-106.33631	Y
N3B	Martin Spring	pH	12-18-2008	13:17	5.69	SU	35.8425518	-106.3363104	Y

				Median	6.95	SU			
				Standard Deviation	0.39	SU			

9. Water Dissolved oxygen from Intellus

Site ID	Location ID	Field Parameter	Measurement Date	Measurement Time	Field Measurement	Measurement Units	Latitude (Decimal)	Longitude (Decimal)	Usable	
N3B	Martin Upper SW Filt Samp Port	Dissolved Oxygen	07-28-2006	10:10	69.51	mg/L	35.8424173	-106.3365398	Y	Not used
N3B	Martin Lower SW filt samp port	Dissolved Oxygen	07-28-2006	10:10	59.16	mg/L	35.8423181	-106.3364896	Y	Not used
N3B	Martin Spring	Dissolved Oxygen	07-28-2006	10:10	53.4	mg/L	35.8425518	-106.3363104	Y	Not used
N3B	Martin Spring	Dissolved Oxygen	03-24-2009	10:45	14	mg/L	35.8425518	-106.3363104	Y	Not used
N3B	Martin Lower SW filt samp port	Dissolved Oxygen	03-29-2006	11:15	9.62	mg/L	35.8423181	-106.3364896	Y	
N3B	Martin Spring	Dissolved Oxygen	03-29-2006	11:10	9.43	mg/L	35.8425518	-106.3363104	Y	
N3B	Martin Spring	Dissolved Oxygen	12-18-2008	13:17	9.34	mg/L	35.8425518	-106.3363104	Y	
N3B	Martin Spring	Dissolved Oxygen	05-09-2007	10:35	9.05	mg/L	35.8425518	-106.3363104	Y	
N3B	Martin Upper SW Filt Samp Port	Dissolved Oxygen	03-29-2006	11:22	8.84	mg/L	35.8424173	-106.3365398	Y	
N3B	Martin Spring	Dissolved Oxygen	09-15-2011	12:07	8.31	mg/L	35.8425518	-106.3363104	Y	
N3B	Martin Spring	Dissolved Oxygen	04-02-2008	10:35	8.28	mg/L	35.8425518	-106.3363104	Y	
N3B	Martin Spring	Dissolved Oxygen	02-23-2018	10:05	7.91	mg/L	35.8425518	-106.3363104	Y	
N3B	Martin Spring	Dissolved Oxygen	03-28-2016	11:10	7.88	mg/L	35.8425518	-106.3363104		
N3B	Martin Spring	Dissolved Oxygen	12-01-2015	11:03	7.84	mg/L	35.8425518	-106.3363104		
N3B	Martin Spring	Dissolved Oxygen	01-18-2012	10:22	7.82	mg/L	35.8425518	-106.3363104	Y	
N3B	Martin Spring	Dissolved Oxygen	12-15-2016	12:10	7.72	mg/L	35.8425518	-106.3363104		
N3B	Martin Spring	Dissolved Oxygen	10-16-2009	10:15	7.67	mg/L	35.8425518	-106.3363104	Y	
N3B	Martin Spring	Dissolved Oxygen	06-22-2016	11:04	7.63	mg/L	35.8425518	-106.3363104		
N3B	Martin Spring	Dissolved Oxygen	01-27-2015	11:28	7.62	mg/L	35.8425518	-106.3363104		
N3B	Martin Spring	Dissolved Oxygen	10-08-2008	13:25	7.58	mg/L	35.8425518	-106.3363104	Y	
N3B	Martin Spring	Dissolved Oxygen	07-23-2020	12:40	7.58	mg/L	35.8425518	-106.3363104	Y	
N3B	Martin Spring	Dissolved Oxygen	03-27-2013	11:45	7.55	mg/L	35.8425518	-106.3363104		

N3B	Martin Spring	Dissolved Oxygen	07-20-2012	11:51	7.52	mg/L	35.8425518	-106.3363104		
N3B	Martin Spring	Dissolved Oxygen	04-05-2011	10:55	7.51	mg/L	35.8425518	-106.3363104	Y	
N3B	Martin Spring	Dissolved Oxygen	09-15-2016	12:05	7.47	mg/L	35.8425518	-106.3363104		
N3B	Martin Spring	Dissolved Oxygen	06-01-2017	13:37	7.47	mg/L	35.8425518	-106.3363104		
N3B	Martin Spring	Dissolved Oxygen	08-22-2018	11:00	7.42	mg/L	35.8425518	-106.3363104	Y	
N3B	Martin Spring	Dissolved Oxygen	03-06-2014	12:27	7.38	mg/L	35.8425518	-106.3363104		
N3B	Martin Spring	Dissolved Oxygen	08-10-2019	09:15	7.38	mg/L	35.8425518	-106.3363104	Y	
N3B	Martin Spring	Dissolved Oxygen	08-29-2017	13:10	7.34	mg/L	35.8425518	-106.3363104		
N3B	Martin Spring	Dissolved Oxygen	03-06-2019	12:25	7.31	mg/L	35.8425518	-106.3363104	Y	
N3B	Martin Spring	Dissolved Oxygen	03-09-2017	13:50	7.14	mg/L	35.8425518	-106.3363104		
N3B	Martin Spring	Dissolved Oxygen	05-09-2005	14:57	6.98	mg/L	35.8425518	-106.3363104	Y	
N3B	Martin Spring	Dissolved Oxygen	09-15-2011	12:02	6.91	mg/L	35.8425518	-106.3363104	Y	
N3B	Martin Spring	Dissolved Oxygen	04-13-2010	13:52	6.72	mg/L	35.8425518	-106.3363104	Y	
N3B	Martin Spring	Dissolved Oxygen	07-23-2015	11:05	6.50	mg/L	35.8425518	-106.3363104		
N3B	Martin Spring	Dissolved Oxygen	04-06-2005	12:00	6.2	mg/L	35.8425518	-106.3363104	Y	
N3B	Martin Spring	Dissolved Oxygen	09-14-2010	13:58	6.17	mg/L	35.8425518	-106.3363104	Y	
N3B	Martin Spring	Dissolved Oxygen	09-17-2013	11:33	6.10	mg/L	35.8425518	-106.3363104		
N3B	Martin Spring	Dissolved Oxygen	08-13-2014	12:16	6.00	mg/L	35.8425518	-106.3363104		
NMED	Martin Spring	Dissolved Oxygen	08-27-2008	10:39	5.86	mg/L	35.842552	-106.33631	Y	
N3B	Martin Spring	Dissolved Oxygen	10-19-2007	14:45	3.7	mg/L	35.8425518	-106.3363104	Y	
N3B	Martin Lower SW filt samp port	Dissolved Oxygen	08-25-2005	09:55	3.3	mg/L	35.8423181	-106.3364896	Y	
N3B	Martin Upper SW Filt Samp Port	Dissolved Oxygen	08-25-2005	09:45	3.2	mg/L	35.8424173	-106.3365398	Y	
N3B	Martin Spring	Dissolved Oxygen	08-25-2005	09:35	2.9	mg/L	35.8425518	-106.3363104	Y	
				Median	7.47	mg/L				
				Standard Deviation	1.55	mg/L				

10. Weather data

Average weather for Los Alamos

Climate-Data.org

https://en.climate-data.org/north-america/united-states-of-america/new-mexico/los-alamos-871784/

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature °C (°F)	-4 °C (24.8) °F	-2.3 °C (27.8) °F	2.2 °C (35.9) °F	6.9 °C (44.4) °F	11.9 °C (53.5) °F	18.2 °C (64.7) °F	19.5 °C (67.2) °F	17.8 °C (64.1) °F	14.4 °C (57.9) °F	8.2 °C (46.7) °F	1.9 °C (35.4) °F	-3.7 °C (25.4) °F
Min. Temperature °C (°F)	-9.3 °C (15.2) °F	-8.1 °C (17.5) °F	-4.5 °C (23.9) °F	-0.8 °C (30.6) °F	3.6 °C (38.4) °F	9.2 °C (48.6) °F	12.4 °C (54.3) °F	11 °C (51.8) °F	7.4 °C (45.4) °F	1.8 °C (35.2) °F	-3.6 °C (25.6) °F	-8.5 °C (16.7) °F
Max. Temperature °C (°F)	3.9 °C (39) °F	5.5 °C (41.9) °F	10.4 °C (50.7) °F	15.2 °C (59.4) °F	20 °C (67.9) °F	26.1 °C (79) °F	26.4 °C (79.5) °F	24.6 °C (76.3) °F	21.6 °C (70.9) °F	15.9 °C (60.6) °F	9.6 °C (49.2) °F	3.7 °C (38.7) °F
Precipitation / Rainfall mm (in)	30 (1.2)	30 (1.2)	36 (1.4)	38 (1.5)	44 (1.7)	32 (1.3)	77 (3)	98 (3.9)	67 (2.6)	52 (2)	31 (1.2)	32 (1.3)
Humidity(%)	58%	54%	46%	36%	32%	28%	44%	51%	50%	50%	50%	58%
Rainy days (d)	4	5	5	6	6	5	10	12	7	5	4	4

11. *E. coli* in water from Intellus

No *E. coli* data found

C. **Twomile canyon**

1. **Hydrology Protocol surveys (Level 1)**

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Elevation 7040

Date: 9-12-2019	Stream Name: Twomile Canyon	Latitude: 35° 51' 30" N
Evaluator(s): * See Notes	Site ID: TA-55 Confluence	Longitude: 106° 18' 9" W
TOTAL POINTS: 19 Stream is at least intermittent if ≥ 12	Assessment Unit: NM-128. A-15	Drought Index (12-mo. SPI Value): 0-1

WEATHER CONDITIONS	NOW:	PAST 48 HOURS:	
	__ storm (heavy rain) __ rain (steady rain) __ showers (intermittent) __ %cloud cover X clear/sunny	__ storm (heavy rain) __ rain (steady rain) X showers (intermittent) __ %cloud cover __ clear/sunny	Has there been a heavy rain in the last 48 hours? __ YES X NO **Field evaluations should be performed at least 48 hours after the last known major rainfall event. OTHER: Stream Modifications __ YES X NO Diversions __ YES X NO Discharges __ YES X NO **Explain in further detail in NOTES section

LEVEL 1 INDICATORS	STREAM CONDITION: Strong	Moderate	Weak	Poor
1.1. Water in Channel	Flow is evident throughout the reach. Moving water is seen in riffle areas but may not be as evident throughout the runs.	Water is present in the channel but flow is barely discernable in areas of greatest gradient change (i.e. riffles) or floating object is necessary to observe flow.	Dry channel with standing pools. There is some evidence of base flows (i.e. riparian vegetation growing along channel, saturated or moist sediment under rocks, etc)	Dry channel. No evidence of base flows was found.
	6	4	2	0
1.2. Fish	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Fish are not present
	3	2	1	0
1.3. Benthic Macroinvertebrates	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Macroinvertebrates are not present
	3	2	1	0
1.4. Filamentous Algae/Periphyton	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Filamentous algae and/or periphyton are not present.
	3	2	1	0
1.5. Differences in Vegetation	Dramatic compositional differences in vegetation are present between the stream banks and the adjacent uplands. A distict riparian vegetation corridor exists along the entire reach – riparian, aquatic, or wetland species dominate the length of the reach.	A distinct riparian vegetation corridor exists along part of the reach. Riparian vegetation is interspersed with upland vegetation along the length of the reach.	Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.	No compositional or density differences in vegetation are present between the streambanks and the adjacent uplands.
	3	2	1	0
1.6. Absence of Rooted Upland Plants in Streambed	Rooted upland plants are absent within the streambed/thalweg.	There are a few rooted upland plants present within the streambed/thalweg.	Rooted upland plants are consistently dispersed throughout the streambed/thalweg.	Rooted upland plants are prevalent within the streambed/thalweg.
	3	2	1	0
			SUBTOTAL (#1.1 – #1.6)	12

If the stream being evaluated has a subtotal ≤ 2 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 18 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 2 and 18 continue the Level 1 Evaluation.

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LEVEL 1 INDICATORS	STREAM CONDITION: Strong	Moderate	Weak	Poor
1.7. Sinuosity	**Ratio > 1.4.** Stream has numerous, closely-spaced bends, few straight sections.	**Ratio < 1.4.** Stream has good sinuosity with some straight sections.	**Ratio < 1.2.** Stream has very few bends and mostly straight sections.	**Ratio = 1.0.** Stream is completely straight with no bends.
	3	2	1	0
1.8. Floodplain and Channel Dimensions	**Ratio > 2.5.** Stream is minimally confined with a wide, active floodplain.	**Ratio between 1.2 and 2.5.** Stream is moderately confined. Floodplain is present, but may only be active during larger floods.	**Ratio < 1.2.** Stream is incised with a noticeably confined channel. Floodplain is narrow or absent and typically disconnected from the channel.	
	3	1.5	0	
1.9. In-Channel Structure: Riffle-Pool Sequence	Demonstrated by a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.	Represented by a less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.	Stream shows some flow but mostly has areas of pools or of riffles.	There is no sequence exhibited.
	3	2	1	0
			SUBTOTAL (#1.1 – #1.9)	17.5

If the stream being evaluated has a subtotal ≤ 5 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 21 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 5 and 21 continue the Level 1 Evaluation.

LEVEL 1 INDICATORS	Strong	Moderate	Weak	Poor
Limited sorting 1.10. Particle Size or Stream Substrate Sorting	Particle sizes in the channel are noticeably different from particle sizes in areas close to but not in the channel. There is a clear distribution of various sized substrates in the stream channel with finer particles accumulating in the pools, and larger particles accumulating in the riffles/runs.	Particle sizes in the channel are moderately similar to particle sizes in areas close to but not in the channel. Various sized substrates are present in the stream channel and are represented by a higher ratio of larger particles (gravel/cobble).	Particle sizes in the channel are similar or comparable to particle sizes in areas close to but not in the channel. Substrate sorting is not readily observed in the stream channel.	
	3	1.5 1	0	
1.11. Hydric Soils	Hydric soils are found within the study reach.	Hydric soils are not found within the study reach.		
	Present = 3	Absent = 0		
1.12. Sediment on Plants and Debris	Sediment found readily on plants and debris within the stream channel, on the streambank, and within the floodplain throughout the length of the stream.	Sediment found on plants or debris within the stream channel although it is not prevalent along the stream. Mostly accumulating in pools.	Sediment is isolated in small amounts along the stream.	No sediment is present on plants or debris.
	1.5	1	0.5	0
			TOTAL POINTS (#1.1 – #1.12)	19

SUPPLEMENTAL INDICATORS: The following indicators do not occur consistently throughout New Mexico but may be useful in the determination of perenniality. If the indicator is present record score below and tally with previous score to compute TOTAL.		
1.13. Seeps and Springs	Seeps and springs are found within the study reach	Seeps and springs are not found within the study reach
	Present = 1.5	Absent = 0
1.14. Iron Oxidizing Bacteria/Fungi	Iron-oxidizing bacteria and/or fungi are found within the study reach.	Iron-oxidizing bacteria and/or fungi are not found within the study reach.
	Present = 1.5	Absent = 0
	TOTAL *plus* SUPPLEMENTAL POINTS (#1.1 – #1.14)	19

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NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Photo Descriptions and NOTES

Photo #	Description (US, DS, LB, RB, etc.)	Notes
1	Upstream	
2	Downstream	
3	Right Bank	
4	Left Bank	
5	Overall Channel - Downstream	
6	Benthic Macroinvertebrates	
7	Benthic Macroinvertebrates-2	

NOTES:

Evaluators: Sam Loftin, Robert Gallegos, Jennifer Fullam

TA-54 Rain Gage recorded .06" on 9-10-19

1.3- Caddisfly casing, Worm, mayfly

1.5- oak, Clover, red top, daisy, box elder, rose, poison ivy, thistle

1.10- Limited Sorting

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LEVEL 1 Field Measurements

Pebble Count Tally Sheet

Site Name: ______ **Storet ID:** ______

Date: ______ **Crew:** ______

Substrate Type	Diameter Range	In-Channel COUNT	In-Channel % Composition	Out of Channel COUNT	Out of Channel % Composition
Silt/Clay	< 0.06 mm		N/A RMG		
Sand	0.06 – 2.0 mm (gritty)		9-17-19		
Gravel	2.0 – 64 mm				
Cobble	64 – 256				
Boulder	> 256 mm				
Bedrock	—				

Please be sure to measure at least 50 pebbles (10 in 5 transects or 5 in 10 transects- depending on stream size) for accurate distributional representation

Max Depth (#1)	Bankfull Stage (#2)	Maximum Depth Value (#3)	2x Maximum Depth Value (#3)	Flood-Prone Area Location (#4)	Flood-Prone Area Width (#5)	Bankfull Width (#6)	Floodplain to Active Channel Ratio (FPA Width / Bankfull Width)
7.64'	7.25'	.39'	.78'	6.86'	10.65'	4.34'	2.45

Table title: **INDICATOR #1.8 (*Floodplain and Channel Dimensions*) – MEASUREMENTS & CALCULATIONS****

**REFER to Figure 3 on page 19 for clarification

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Data is for tower ta6.
This file was obtained from the LANL Weather Machine, http://weather.lanl.gov.
Request made on Thu Sep 12 06:53:26 2019 MST.
All data times are MST.

month	day	year	doy	tprecip
mm	dd	yyyy	ddd	in
9	9	2019	252	0
9	10	2019	253	0.06
9	11	2019	254	0.03

Data is for tower ta49.
This file was obtained from the LANL Weather Machine, http://weather.lanl.gov.
Request made on Thu Sep 12 06:55:52 2019 MST.
All data times are MST.

month	day	year	doy	tprecip
mm	dd	yyyy	ddd	in
9	9	2019	252	0
9	10	2019	253	0
9	11	2019	254	0

Data is for tower ta53.
This file was obtained from the LANL Weather Machine, http://weather.lanl.gov.
Request made on Thu Sep 12 06:56:32 2019 MST.
All data times are MST.

month	day	year	doy	tprecip
mm	dd	yyyy	ddd	in
9	9	2019	252	0
9	10	2019	253	0
9	11	2019	254	0.1

Data is for tower ta54.
This file was obtained from the LANL Weather Machine, http://weather.lanl.gov.
Request made on Thu Sep 12 06:57:11 2019 MST.
All data times are MST.

month	day	year	doy	tprecip
mm	dd	yyyy	ddd	in
9	9	2019	252	0
9	10	2019	253	0.06
9	11	2019	254	0


September 12, 2019
Two Mile Canyon TA55
Confluence
NM-128 A_15
Photo 1 Upstream


September 12, 2019
Two Mile Canyon TA55
Confluence
NM-128 A_15
Photo 2: Downstream


September 12, 2019
Two Mile Canyon TA55
Confluence
NM-128 A_15
Photo 3: Right Bank


September 12, 2019
Two Mile Canyon TA55
Confluence
NM-128 A_15
Photo 3 Left Bank


September 12, 2019
Two Mile Canyon TA55
Confluence
NM-128 A_15
Photo 5: Downstream


September 12, 2019
Two Mile Canyon TA 55 Confluence
NM-128. A_15
Benthics

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Elevation: 7,270

Date: 9-12-2019	Stream Name: Twomile Canyon	Latitude: 35° 52' 3" N
Evaluator(s): *See Notes	Site ID: Below TA-59	Longitude: 106° 19' 11" W
TOTAL POINTS: 20.5 Stream is at least intermittent if ≥ 12	Assessment Unit: NM-128.A-15	Drought Index (12-mo. SPI Value): 0-1

WEATHER CONDITIONS	NOW:	PAST 48 HOURS:	
	___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover X clear/sunny	___ storm (heavy rain) ___ rain (steady rain) X showers (intermittent) ___ %cloud cover ___ clear/sunny	Has there been a heavy rain in the last 48 hours? ___ YES X NO **Field evaluations should be performed at least 48 hours after the last known major rainfall event OTHER: Stream Modifications ___ YES X NO Diversions ___ YES X NO Discharges ___ YES X NO **Explain in further detail in NOTES section

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	Moderate	Weak	Poor
1.1. Water in Channel	Flow is evident throughout the reach. Moving water is seen in riffle areas but may not be as evident throughout the runs.	Water is present in the channel but flow is barely discernable in areas of greatest gradient change (i.e. riffles) or floating object is necessary to observe flow.	Dry channel with standing pools. There is some evidence of base flows (i.e. riparian vegetation growing along channel, saturated or moist sediment under rocks, etc)	Dry channel. No evidence of base flows was found.
	6	4	2	0
1.2. Fish	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Fish are not present.
	3	2	1	0
1.3. Benthic Macroinvertebrates	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Macroinvertebrates are not present.
	3	2	1	0
1.4. Filamentous Algae/Periphyton	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Filamentous algae and/or periphyton are not present.
	3	2	1	0
1.5. Differences in Vegetation	Dramatic compositional differences in vegetation are present between the stream banks and the adjacent uplands. A distinct riparian vegetation corridor exists along the entire reach – riparian, aquatic, or wetland species dominate the length of the reach.	A distinct riparian vegetation corridor exists along part of the reach. Riparian vegetation is interspersed with upland vegetation along the length of the reach.	Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.	No compositional or density differences in vegetation are present between the streambanks and the adjacent uplands.
	3	2	1	0
1.6. Absence of Rooted Upland Plants in Streambed	Rooted upland plants are absent within the streambed/thalweg.	There are a few rooted upland plants present within the streambed/thalweg.	Rooted upland plants are consistently dispersed throughout the streambed/thalweg.	Rooted upland plants are prevalent within the streambed/thalweg.
	3	2	1	0
			SUBTOTAL (#1.1 – #1.6)	13

If the stream being evaluated has a subtotal ≤ 2 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 18 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 2 and 18 continue the Level 1 Evaluation.

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LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	Moderate	Weak	Poor
1.7. Sinuosity	Ratio > 1.4. Stream has numerous, closely-spaced bends, few straight sections.	Ratio < 1.4. Stream has good sinuosity with some straight sections.	Ratio < 1.2. Stream has very few bends and mostly straight sections.	Ratio = 1.0. Stream is completely straight with no bends.
	3	2	1	0
1.8. Floodplain and Channel Dimensions 1.54	Ratio > 2.5. Stream is minimally confined with a wide, active floodplain.	Ratio between 1.2 and 2.5. Stream is moderately confined. Floodplain is present, but may only be active during larger floods.	Ratio < 1.2. Stream is incised with a noticeably confined channel. Floodplain is narrow or absent and typically disconnected from the channel.	
	3	1.5	0	
1.9. In-Channel Structure: Riffle-Pool Sequence	Demonstrated by a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.	Represented by a less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.	Stream shows some flow but mostly has areas of pools or of riffles.	There is no sequence exhibited.
	3	2	1	0
			SUBTOTAL (#1.1 – #1.9)	18.5

If the stream being evaluated has a subtotal ≤ 5 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 21 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 5 and 21 continue the Level 1 Evaluation.

1.10. Particle Size or Stream Substrate Sorting	Particle sizes in the channel are noticeably different from particle sizes in areas close to but not in the channel. There is a clear distribution of various sized substrates in the stream channel with finer particles accumulating in the pools, and larger particles accumulating in the riffles/runs.	Particle sizes in the channel are moderately similar to particle sizes in areas close to but not in the channel. Various sized substrates are present in the stream channel and are represented by a higher ratio of larger particles (gravel/cobble).	Particle sizes in the channel are similar or comparable to particle sizes in areas close to but not in the channel. Substrate sorting is not readily observed in the stream channel.	
	3	1.5	0	
1.11. Hydric Soils	Hydric soils are found within the study reach.	Hydric soils are not found within the study reach.		
	Present = 3	Absent = 0		
1.12. Sediment on Plants and Debris	Sediment found readily on plants and debris within the stream channel, on the streambank, and within the floodplain throughout the length of the stream.	Sediment found on plants or debris within the stream channel although it is not prevalent along the stream. Mostly accumulating in pools.	Sediment is isolated in small amounts along the stream.	No sediment is present on plants or debris.
	1.5	1	0.5	0
			TOTAL POINTS (#1.1 – #1.12)	20.5

SUPPLEMENTAL INDICATORS: The following indicators do not occur consistently throughout New Mexico but may be useful in the determination of perenniality. If the indicator is present record score below and tally with previous score to compute TOTAL.

1.13. Seeps and Springs	Seeps and springs are found within the study reach	Seeps and springs are not found within the study reach
	Present = 1.5	Absent = 0
1.14. Iron Oxidizing Bacteria/Fungi	Iron-oxidizing bacteria and/or fungi are found within the study reach	Iron-oxidizing bacteria and/or fungi are not found within the study reach
	Present = 1.5	Absent = 0
TOTAL plus SUPPLEMENTAL POINTS (#1.1 – #1.14)		20.5

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NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Photo Descriptions and NOTES

Photo #	Description (US, DS, LB, RB, etc.)	Notes
1	Upstream	
2	Downstream	
3	Right Bank	
4	Left Bank	
5	Overall Channel Upstream	

NOTES:

Evaluators: Jennifer Fullam, Sam Loftin, Robert Gallegos

TA-6 Rain gage recorded .06" on 9/10 and .03" on 9/11.

1.3 - Macros - Beetles, mayfly, redworm

LEVEL 1 Field Measurements

Pebble Count Tally Sheet

Site Name: ____________ **Storet ID:** ____________

Date: ____________ **Crew:** ____________

Substrate Type	Diameter Range	In-Channel COUNT	In-Channel % Composition	Out of Channel COUNT	Out of Channel % Composition
Silt/Clay	< 0.06 mm		N/A BMI		
Sand	0.06 – 2.0 mm (gritty)		9-17-11		
Gravel	2.0 – 64 mm				
Cobble	64 – 256				
Boulder	> 256 mm				
Bedrock	—				

****Please be sure to measure at least 50 pebbles (10 in 5 transects or 5 in 10 transects- depending on stream size) for accurate distributional representation****

INDICATOR #1.8 (*Floodplain and Channel Dimensions*) – MEASUREMENTS & CALCULATIONS**							
Max Depth (#1)	Bankfull Stage (#2)	Maximum Depth Value (#3)	2x Maximum Depth Value (#3)	Flood-Prone Area Location (#4)	Flood-Prone Area Width (#5)	Bankfull Width (#6)	Floodplain to Active Channel Ratio (FPA Width / Bankfull Width)
8.2'	7.65'	.55'	1.1'	7.1'	9.39'	6.1'	1.54

****REFER to Figure 3 on page 19 for clarification**

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Data is for tower ta6.
This file was obtained from the LANL Weather Machine, http://weather.lanl.gov.
Request made on Thu Sep 12 06:53:26 2019 MST.
All data times are MST.

month	day	year	doy	tprecip
mm	dd	yyyy	ddd	in
9	9	2019	252	0
9	10	2019	253	0.06
9	11	2019	254	0.03

Data is for tower ta49.
This file was obtained from the LANL Weather Machine, http://weather.lanl.gov.
Request made on Thu Sep 12 06:55:52 2019 MST.
All data times are MST.

month	day	year	doy	tprecip
mm	dd	yyyy	ddd	in
9	9	2019	252	0
9	10	2019	253	0
9	11	2019	254	0

Data is for tower ta53.
This file was obtained from the LANL Weather Machine, http://weather.lanl.gov.
Request made on Thu Sep 12 06:56:32 2019 MST.
All data times are MST.

month	day	year	doy	tprecip
mm	dd	yyyy	ddd	in
9	9	2019	252	0
9	10	2019	253	0
9	11	2019	254	0.1

Data is for tower ta54.
This file was obtained from the LANL Weather Machine, http://weather.lanl.gov.
Request made on Thu Sep 12 06:57:11 2019 MST.
All data times are MST.

month	day	year	doy	tprecip
mm	dd	yyyy	ddd	in
9	9	2019	252	0
9	10	2019	253	0.06
9	11	2019	254	0


September 12, 2019
Two Mile Canyon blw TA 59
NM-128 A_15
Photo 1 : Upstream


September 12, 2019
Two Mile Canyon blw TA 59
NM-128.A_15
Photo 2: DownStream


September 12, 2019
Two Mile Canyon blw TA 59
NM-128 A_15
Photo 3: R bank


September 12, 2019
Two Mile Canyon blw. TA 59
NM-128 A_15
Photo 4: L bank


September 12, 2019
Two Mile Canyon blw TA 59
Mnm-128 A_15
Photo 5 Upstream

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Elevation: 6,450 ft

Date: 9-12-2019	Stream Name: Two Mile Canyon	Latitude: 35° 51' 21" N
Evaluator(s): *See Notes	Site ID: Above E244	Longitude: 106° 17' 45" W
TOTAL POINTS: 10.5 Stream is at least intermittent if ≥ 15	Assessment Unit: NM-128.A-15	Drought Index (12-mo. SPI Value): 0-1

WEATHER CONDITIONS	NOW:	PAST 48 HOURS:	
	__ storm (heavy rain) __ rain (steady rain) __ showers (intermittent) __ %cloud cover X clear/sunny	__ storm (heavy rain) __ rain (steady rain) X showers (intermittent) __ %cloud cover __ clear/sunny	Has there been a heavy rain in the last 48 hours? __ YES X NO **Field evaluations should be performed at least 48 hours after the last known major rainfall event OTHER: Stream Modifications __ YES X NO Diversions __ YES X NO Discharges __ YES X NO **Explain in further detail in NOTES section

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	Moderate	Weak	Poor
1.1. Water in Channel	Flow is evident throughout the reach. Moving water is seen in riffle areas but may not be as evident throughout the runs.	Water is present in the channel but flow is barely discernable in areas of greatest gradient change (i.e. riffles) or floating object is necessary to observe flow.	Dry channel with standing pools. There is some evidence of base flows (i.e. riparian vegetation growing along channel, saturated or moist sediment under rocks, etc).	Dry channel. No evidence of base flows was found.
	6	4	2	0
1.2. Fish	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Fish are not present.
	3	2	1	0
1.3. Benthic Macroinvertebrates	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Macroinvertebrates are not present.
	3	2	1	0
1.4. Filamentous Algae/Periphyton	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Filamentous algae and/or periphyton are not present.
	3	2	1	0
1.5. Differences in Vegetation	Dramatic compositional differences in vegetation are present between the stream banks and the adjacent uplands. A distinct riparian vegetation corridor exists along the entire reach – riparian, aquatic, or wetland species dominate the length of the reach.	A distinct riparian vegetation corridor exists along part of the reach. Riparian vegetation is interspersed with upland vegetation along the length of the reach.	Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.	No compositional or density differences in vegetation are present between the streambanks and the adjacent uplands.
	3	2	1	0
1.6. Absence of Rooted Upland Plants in Streambed	Rooted upland plants are absent within the streambed/thalweg.	There are a few rooted upland plants present within the streambed/thalweg.	Rooted upland plants are consistently dispersed throughout the streambed/thalweg.	Rooted upland plants are prevalent within the streambed/thalweg.
	3	2	1	0
				SUBTOTAL (#1.1 – #1.6): 5

If the stream being evaluated has a subtotal ≤ 2 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 18 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 2 and 18 continue the Level 1 Evaluation.

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	Moderate	Weak	Poor
1.7. Sinuosity	**Ratio > 1.4.** Stream has numerous, closely-spaced bends, few straight sections.	**Ratio < 1.4.** Stream has good sinuosity with some straight sections.	**Ratio < 1.2.** Stream has very few bends and mostly straight sections.	**Ratio = 1.0.** Stream is completely straight with no bends.
	3	2	1	0
1.8. Floodplain and Channel Dimensions	**Ratio > 2.5.** Stream is minimally confined with a wide, active floodplain.	**Ratio between 1.2 and 2.5.** Stream is moderately confined. Floodplain is present, but may only be active during larger floods.		**Ratio < 1.2.** Stream is incised with a noticeably confined channel. Floodplain is narrow or absent and typically disconnected from the channel.
	3	1.5		0
1.9. In-Channel Structure: Riffle-Pool Sequence	Demonstrated by a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.	Represented by a less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.	Stream shows some flow but mostly has areas of pools or of riffles.	There is no sequence exhibited.
	3	2	1	0
				SUBTOTAL (#1.1 – #1.9): 8.5

If the stream being evaluated has a subtotal ≤ 5 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 21 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 5 and 21 continue the Level 1 Evaluation.

LEVEL 1 INDICATORS	Strong	Moderate	Weak	Poor
1.10. Particle Size or Stream Substrate Sorting	Particle sizes in the channel are noticeably different from particle sizes in areas close to but not in the channel. There is a clear distribution of various sized substrates in the stream channel with finer particles accumulating in the pools, and larger particles accumulating in the riffles/runs.	Particle sizes in the channel are moderately similar to particle sizes in areas close to but not in the channel. Various sized substrates are present in the stream channel and are represented by a higher ratio of larger particles (gravel/cobble).		Particle sizes in the channel are similar or comparable to particle sizes in areas close to but not in the channel. Substrate sorting is not readily observed in the stream channel.
	3	1.5		0
1.11. Hydric Soils	Hydric soils are found within the study reach.		Hydric soils are not found within the study reach.	
	Present = 3		Absent = 0	
1.12. Sediment on Plants and Debris	Sediment found readily on plants and debris within the stream channel, on the streambank, and within the floodplain throughout the length of the stream.	Sediment found on plants or debris within the stream channel although it is not prevalent along the stream. Mostly accumulating in pools.	Sediment is isolated in small amounts along the stream.	No sediment is present on plants or debris.
	1.5	1	0.5	0
				TOTAL POINTS (#1.1 – #1.12): 10.5

SUPPLEMENTAL INDICATORS: The following indicators do not occur consistently throughout New Mexico but may be useful in the determination of perenniality. If the indicator is present record score below and tally with previous score to compute TOTAL.

1.13. Seeps and Springs	Seeps and springs are found within the study reach.	Seeps and springs are not found within the study reach.
	Present = 1.5	Absent = 0
1.14. Iron Oxidizing Bacteria/Fungi	Iron-oxidizing bacteria and/or fungi are found within the study reach.	Iron-oxidizing bacteria and/or fungi are not found within the study reach.
	Present = 1.5	Absent = 0
	TOTAL plus SUPPLEMENTAL POINTS (#1.1 – #1.14)	10.5

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Photo Descriptions and NOTES

Photo #	Description (US, DS, LB, RB, etc.)	Notes
1	Upstream	
2	Downstream	
3	Right Bank	
4	Left Bank	
5	Overall Channel - Downstream	

NOTES:

Evaluators: Jim Loftin, Jennifer Fullam, Robert Gallegos

TA-54 Rain Gage recorded .06" on 9/10/19.

Vegetation present: evening primrose, orchard grass, ponderosa pine, box elder, mullein, red top, thistle, yarrow, New Mexico locust

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LEVEL 1 Field Measurements

Pebble Count Tally Sheet

Site Name: ________ **Storet ID:** ________

Date: ________ **Crew:** ________

Substrate Type	Diameter Range	In-Channel COUNT	In-Channel % Composition	Out of Channel COUNT	Out of Channel % Composition
Silt/Clay	< 0.06 mm		N/A BMI		
Sand	0.06 – 2.0 mm (gritty)		9-17-19		
Gravel	2.0 – 64 mm				
Cobble	64 – 256				
Boulder	> 256 mm				
Bedrock	—				

Please be sure to measure at least 50 pebbles (10 in 5 transects or 5 in 10 transects- depending on stream size) for accurate distributional representation

INDICATOR #1.8 (*Floodplain and Channel Dimensions*) – MEASUREMENTS & CALCULATIONS**							
Max Depth (#1)	Bankfull Stage (#2)	Maximum Depth Value (#3)	2x Maximum Depth Value (#3)	Flood-Prone Area Location (#4)	Flood-Prone Area Width (#5)	Bankfull Width (#6)	Floodplain to Active Channel Ratio (FPA Width / Bankfull Width)
7.70'	7.03'	.67'	1.34'	6.36'	18.72'	12.45'	1.5

**REFER to Figure 3 on page 19 for clarification

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Data is for tower ta6.
This file was obtained from the LANL Weather Machine, http://weather.lanl.gov
Request made on Thu Sep 12 06:53:26 2019 MST.
All data times are MST.

month	day	year	doy	tprecip
mm	dd	yyyy	ddd	in
9	9	2019	252	0
9	10	2019	253	0.06
9	11	2019	254	0.03

Data is for tower ta49.
This file was obtained from the LANL Weather Machine, http://weather.lanl.gov.
Request made on Thu Sep 12 06:55:52 2019 MST.
All data times are MST.

month	day	year	doy	tprecip
mm	dd	yyyy	ddd	in
9	9	2019	252	0
9	10	2019	253	0
9	11	2019	254	0

Data is for tower ta53.
This file was obtained from the LANL Weather Machine, http://weather.lanl.gov.
Request made on Thu Sep 12 06:56:32 2019 MST.
All data times are MST.

month	day	year	doy	tprecip
mm	dd	yyyy	ddd	in
9	9	2019	252	0
9	10	2019	253	0
9	11	2019	254	0.1

Data is for tower ta54.
This file was obtained from the LANL Weather Machine, http://weather.lanl.gov.
Request made on Thu Sep 12 06:57:11 2019 MST.
All data times are MST.

month	day	year	doy	tprecip
mm	dd	yyyy	ddd	in
9	9	2019	252	0
9	10	2019	253	0.06
9	11	2019	254	0


September 12, 2019
Two Mile Canyon Above E244
NM-128 A_15
Photo 1 : Upstream


September 12, 2019
Two Mile Canyon Above E244
NM-128 A_15
Photo 2: Downstream


September 12, 2019
Two Mile Canyon Above E244
NM-128 A_15
Photo 3 : Right Bank


September 12, 2019
Two Mile Canyon Above E244
NM-128 A_15
Photo 4: Left Bank


September 12, 2019
Two Mile Canyon Above E244
NM-128 A_15
Photo 5: Down Stream

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Elevation: 7310

Date: 9-12-2019	**Stream Name:** Thu Mile Cnyn	**Latitude:** 35° 52' 4" N
Evaluator(s): x See Notes	**Site ID:** Bdow Confluence	**Longitude:** 106° 19' 25" W
TOTAL POINTS: Stream is at least intermittent if ≥ 12 — 18	**Assessment Unit:** NM-128. A-15	**Drought Index (12-mo. SPI Value):** 0-1

WEATHER CONDITIONS	**NOW:** __ storm (heavy rain) __ rain (steady rain) __ showers (intermittent) __ %cloud cover X clear/sunny	**PAST 48 HOURS:** __ storm (heavy rain) __ rain (steady rain) X showers (intermittent) __ %cloud cover __ clear/sunny	**Has there been a heavy rain in the last 48 hours?** __ YES X NO **Field evaluations should be performed at least 48 hours after the last known major rainfall event. **OTHER:** **Stream Modifications** __ YES X NO **Diversions** __ YES X NO **Discharges** __ YES X NO **Explain in further detail in NOTES section

LEVEL 1 INDICATORS	STREAM CONDITION: Strong	Moderate	Weak	Poor
1.1. Water in Channel	Flow is evident throughout the reach. Moving water is seen in riffle areas but may not be as evident throughout the runs.	Water is present in the channel but flow is barely discernable in areas of greatest gradient change (i.e. riffles) or floating object is necessary to observe flow.	Dry channel with standing pools. There is some evidence of base flows (i.e. riparian vegetation growing along channel, saturated or moist sediment under rocks, etc)	Dry channel. No evidence of base flows was found
	6	4	2	0
1.2. Fish	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find	Fish are not present.
	3	2	1	0
1.3. Benthic Macroinvertebrates	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find	Macroinvertebrates are not present.
	3	2	1	0
1.4. Filamentous Algae/Periphyton	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find	Filamentous algae and/or periphyton are not present.
	3	2	1	0
1.5. Differences in Vegetation	Dramatic compositional differences in vegetation are present between the stream banks and the adjacent uplands. A distict riparian vegetation corridor exists along the entire reach – riparian, aquatic, or wetland species dominate the length of the reach.	A distinct riparian vegetation corridor exists along part of the reach. Riparian vegetation is interspersed with upland vegetation along the length of the reach.	Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.	No compositional or density differences in vegetation are present between the streambanks and the adjacent uplands.
	3	2	1	0
1.6. Absence of Rooted Upland Plants in Streambed	Rooted upland plants are absent within the streambed/thalweg	There are a few rooted upland plants present within the streambed/thalweg	Rooted upland plants are consistently dispersed throughout the streambed/thalweg	Rooted upland plants are prevalent within the streambed/thalweg
	3	2	1	0
			SUBTOTAL (#1.1 – #1.6)	11

If the stream being evaluated has a subtotal ≤ 2 at this juncture, the stream is determined to be EPHEMERAL. If the stream being evaluated has a subtotal ≥ 18 at this point, the stream is determined to be PERENNIAL. YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 2 and 18 continue the Level 1 Evaluation.

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LEVEL 1 INDICATORS	STREAM CONDITION: Strong	Moderate	Weak	Poor
1.7. Sinuosity	**Ratio > 1.4.** Stream has numerous, closely-spaced bends, few straight sections.	**Ratio < 1.4.** Stream has good sinuosity with some straight sections.	**Ratio < 1.2.** Stream has very few bends and mostly straight sections.	**Ratio = 1.0.** Stream is completely straight with no bends.
	3	2	1	0
1.8. Floodplain and Channel Dimensions 1.07	**Ratio > 2.5.** Stream is minimally confined with a wide, active floodplain.	**Ratio between 1.2 and 2.5.** Stream is moderately confined. Floodplain is present, but may only be active during larger floods.		**Ratio < 1.2.** Stream is incised with a noticeably confined channel. Floodplain is narrow or absent and typically disconnected from the channel.
	3	1.5		0
1.9. In-Channel Structure: Riffle-Pool Sequence	Demonstrated by a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.	Represented by a less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.	Stream shows some flow but mostly has areas of pools or of riffles.	There is no sequence exhibited.
	3	2	1	0
			SUBTOTAL (#1.1 – #1.9)	~~12~~ 15

If the stream being evaluated has a subtotal ≤ 5 at this juncture, the stream is determined to be EPHEMERAL. If the stream being evaluated has a subtotal ≥ 21 at this point, the stream is determined to be PERENNIAL. YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 5 and 21 continue the Level 1 Evaluation.

LEVEL 1 INDICATORS	Strong	Moderate	Weak	Poor
1.10. Particle Size or Stream Substrate Sorting	Particle sizes in the channel are noticeably different from particle sizes in areas close to but not in the channel. There is a clear distribution of various sized substrates in the stream channel with finer particles accumulating in the pools, and larger particles accumulating in the riffles/runs.	Particle sizes in the channel are moderately similar to particle sizes in areas close to but not in the channel. Various sized substrates are present in the stream channel and are represented by a higher ratio of larger particles (gravel/cobble).		Particle sizes in the channel are similar or comparable to particle sizes in areas close to but not in the channel. Substrate sorting is not readily observed in the stream channel.
	3	1.5		0
1.11. Hydric Soils	Hydric soils are found within the study reach.		Hydric soils are not found within the study reach.	
	Present = 3		**Absent = 0**	
1.12. Sediment on Plants and Debris	Sediment found readily on plants and debris within the stream channel, on the streambank, and within the floodplain throughout the length of the stream.	Sediment found on plants or debris within the stream channel although it is not prevalent along the stream. Mostly accumulating in pools.	Sediment is isolated in small amounts along the stream.	No sediment is present on plants or debris.
	1.5	1	0.5	0
			TOTAL POINTS (#1.1 – #1.12)	~~13.5~~ 16.5

SUPPLEMENTAL INDICATORS: The following indicators do not occur consistently throughout New Mexico but may be useful in the determination of perenniality. If the indicator is present record score below and tally with previous score to compute TOTAL.		
1.13. Seeps and Springs	Seeps and springs are found within the study reach.	Seeps and springs are not found within the study reach.
	Present = 1.5	**Absent = 0**
1.14. Iron Oxidizing Bacteria/Fungi	Iron-oxidizing bacteria and/or fungi are found within the study reach.	Iron-oxidizing bacteria and/or fungi are not found within the study reach.
	Present = 1.5	**Absent = 0**
	TOTAL *plus* SUPPLEMENTAL POINTS (#1.1 – #1.14)	18

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Photo Descriptions and NOTES

Photo #	Description (US, DS, LB, RB, etc.)	Notes
1	Upstream	
2	Downstream	
3	Right Bank	
4	Left Bank	
5	Overall Channel	Downstream
6	Benthic Macroinvertebrates	

NOTES:

Evaluators: Jennifer Fullam, Sam Loftin, Robert Gallegos

TA-6 Rain Gage recorded .06" on 9/10 and .03" on 9/11

1.7- Sinuosity is inhibited by narrow canyon

1.10- incised channel - no difference between channel / Flood plain

Vegetation present- Chokecherry, grasses, fescue, red top

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LEVEL 1 Field Measurements

Pebble Count Tally Sheet

Site Name: ______ **Storet ID:** ______

Date: ______ **Crew:** ______

Substrate Type	Diameter Range	In-Channel COUNT	In-Channel % Composition	Out of Channel COUNT	Out of Channel % Composition
Silt/Clay	< 0.06 mm		N/A BMZ		
Sand	0.06 – 2.0 mm (gritty)		9/17/19		
Gravel	2.0 – 64 mm				
Cobble	64 – 256				
Boulder	> 256 mm				
Bedrock	—				

Please be sure to measure at least 50 pebbles (10 in 5 transects or 5 in 10 transects-depending on stream size) for accurate distributional representation

INDICATOR #1.8 (*Floodplain and Channel Dimensions*) – MEASUREMENTS & CALCULATIONS**							
Max Depth (#1)	Bankfull Stage (#2)	Maximum Depth Value (#3)	2x Maximum Depth Value (#3)	Flood-Prone Area Location (#4)	Flood-Prone Area Width (#5)	Bankfull Width (#6)	Floodplain to Active Channel Ratio (FPA Width / Bankfull Width)
23.87'	23.80'	.07'	.14'	23.73'	9.10'	8.45'	1.07

**REFER to Figure 3 on page 19 for clarification

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Data is for tower ta6.
This file was obtained from the LANL Weather Machine, http://weather.lanl.gov.
Request made on Thu Sep 12 06:53:26 2019 MST.
All data times are MST.

month	day	year	doy	tprecip
mm	dd	yyyy	ddd	in
9	9	2019	252	0
9	10	2019	253	0.06
9	11	2019	254	0.03

Data is for tower ta49.
This file was obtained from the LANL Weather Machine, http://weather.lanl.gov.
Request made on Thu Sep 12 06:55:52 2019 MST.
All data times are MST.

month	day	year	doy	tprecip
mm	dd	yyyy	ddd	in
9	9	2019	252	0
9	10	2019	253	0
9	11	2019	254	0

Data is for tower ta53.
This file was obtained from the LANL Weather Machine, http://weather.lanl.gov.
Request made on Thu Sep 12 06:56:32 2019 MST.
All data times are MST.

month	day	year	doy	tprecip
mm	dd	yyyy	ddd	in
9	9	2019	252	0
9	10	2019	253	0
9	11	2019	254	0.1

Data is for tower ta54.
This file was obtained from the LANL Weather Machine, http://weather.lanl.gov.
Request made on Thu Sep 12 06:57:11 2019 MST.
All data times are MST.

month	day	year	doy	tprecip
mm	dd	yyyy	ddd	in
9	9	2019	252	0
9	10	2019	253	0.06
9	11	2019	254	0


September 12, 2019
Two Mile Canyon blw Cont.
NM-128. A_15
Photo 1: Upstream


September 12, 2019
Two Mile Canyon blw Conf.
NM-128. A_15
Photo 2: Downstream


September 12, 2019
Two Mile Canyon blw Conf.
NM-128. A_15
Photo 3 R. Bank


September 12, 2019
Two Mile Canyon blw Conf.
NM-128. A_15
Photo 4 : L. Bank

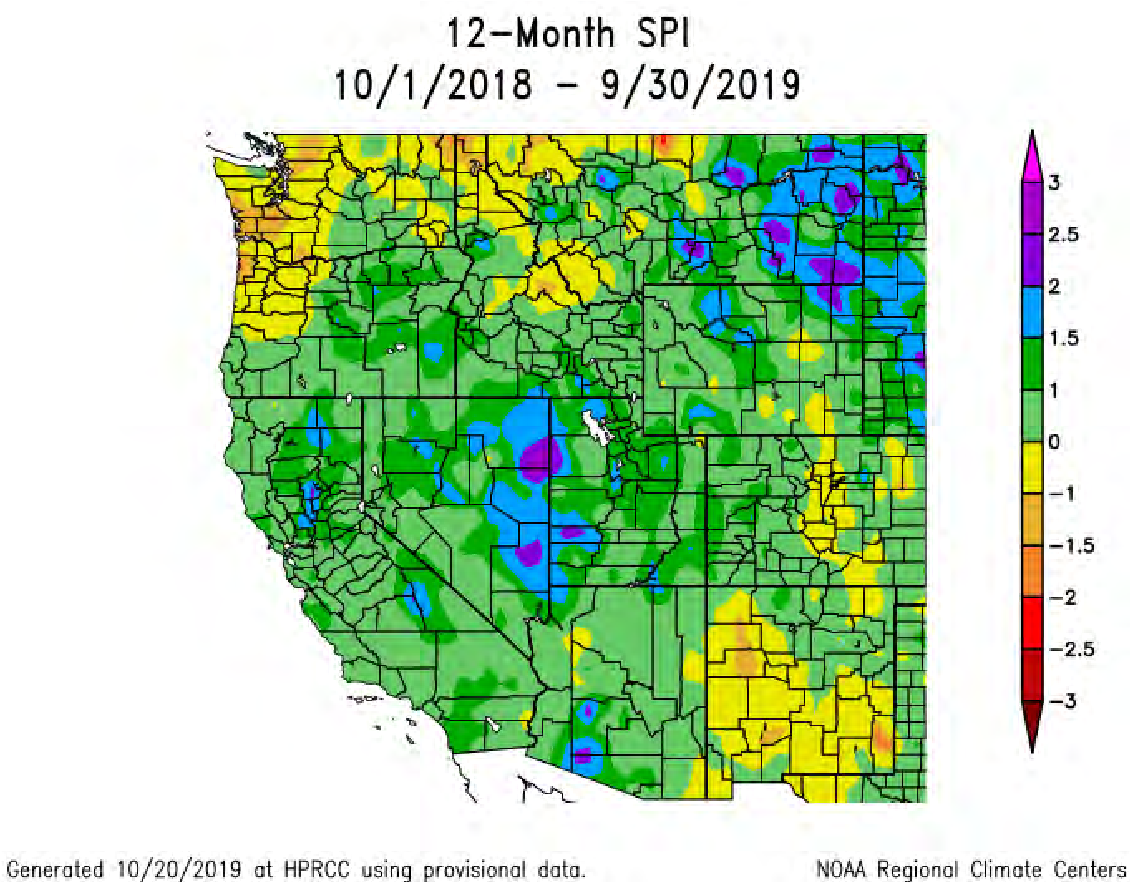

September 12, 2019
Two Mile Canyon blw Conf.
NM-128. A_15
Photo 5 : Downstream


September 12, 2019
Two Mile Canyon blw Conf.
NM-128. A_15
Photo 6 Benthics

2. 12-month SPI

High Plains Regional Climate Center https://hprcc.unl.edu/maps.php?map=ACISClimateMaps

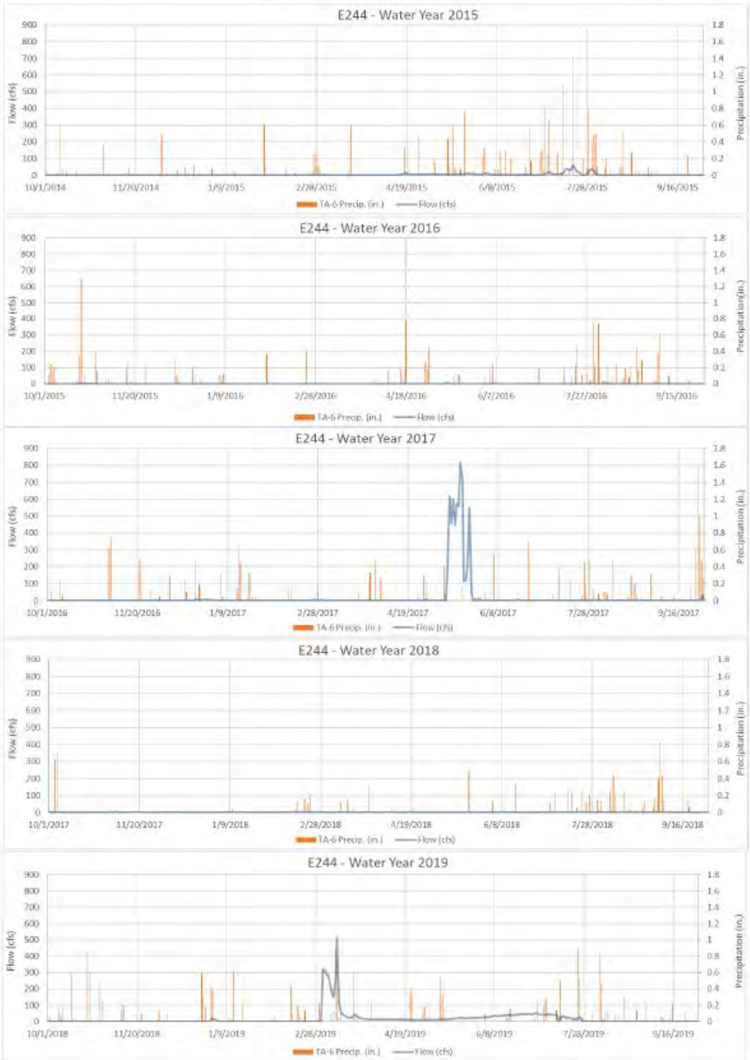
October 1, 2018 through September 30, 2019



3. Streamflow from hydrograph from LANL

EPC-DO: 20-113 | Attachment 2 | LA-UR-20-22687

Surface Water Gage Station E244



4. Stream gage stations from Intellus

Site ID	Location ID	Field Parameter	Measurement Date	Measurement Time	Field Measurement	Measurement Units	Latitude (Decimal)	Longitude (Decimal)
N3B	Two Mile Canyon below TA-59	Flow (in gpm)	04-20-2016	11:10	22.9	GPM	35.865972	-106.3155681
N3B	Two Mile Canyon below TA-59	Discharge Rate	04-15-2019	09:30	9.43	gal/min	35.865972	-106.3155681

5. Precipitation from NOAA

https://www.ncdc.noaa.gov/cdo-web/search

6. Alluvial hydrographs from LANL

No alluvial hydrographs were provided

7. Water temperature from Intellus

Site ID	Location ID	Field Parameter	Measurement Date	Month	Measurement Time	Field Measurement	Measurement Units	Latitude (Decimal)	Longitude (Decimal)	Usable
N3B	Two Mile Canyon below TA-59	Temperature	06-27-2007	6	14:52	19.2	deg C	35.865972	-106.3155681	Y
N3B	Two Mile Canyon below TA-59	Temperature	08-06-2010	8	13:04	17.88	deg C	35.865972	-106.3155681	Y
N3B	Two Mile Canyon below TA-59	Temperature	06-12-2008	6	14:00	16.4	deg C	35.865972	-106.3155681	Y
N3B	Two Mile Canyon below TA-59	Temperature	08-25-2006	8	09:30	13.7	deg C	35.865972	-106.3155681	Y
					Median	17.14	deg C			
					Standard Deviation	2.36	deg C			
Site ID	Location ID	Field Parameter	Measurement Date	Month	Measurement Time	Field Measurement	Measurement Units	Latitude (Decimal)	Longitude (Decimal)	Usable
N3B	Twomile above Pajarito	Temperature	06-27-2007	6	11:45	17.2	deg C	35.8556751	-106.2960122	Y
N3B	Twomile above Pajarito	Temperature	08-11-2010	8	11:10	16.36	deg C	35.8556751	-106.2960122	Y
NMED	Two Mile above Pajarito E244	Temperature	08-05-1998	8	10:10	14.4	C	35.855675	-106.296012	Y
N3B	Twomile above Pajarito	Temperature	08-29-2006	8	08:40	14.1	deg C	35.8556751	-106.2960122	Y
					Median	15.38	deg C			
					Standard Deviation	1.51	deg C			

8. Water pH from Intellus

Site ID	Location ID	Field Parameter	Measurement Date	Measurement Time	Field Measurement	Measurement Units	Latitude (Decimal)	Longitude (Decimal)	Usable
N3B	Twomile above Pajarito	pH	08-22-2005	12:00	7.7	SU	35.8556751	-106.2960122	Y
N3B	Twomile above Pajarito	pH	08-24-2005	13:26	7.6	SU	35.8556751	-106.2960122	Y
N3B	Twomile above Pajarito	pH	08-11-2010	11:10	7.39	SU	35.8556751	-106.2960122	Y
N3B	Twomile above Pajarito	pH	09-10-2008	13:20	7.37	SU	35.8556751	-106.2960122	Y
N3B	Twomile above Pajarito	pH	09-28-2005	16:43	7.34	SU	35.8556751	-106.2960122	Y
N3B	Twomile above Pajarito	pH	03-22-2005	10:56	7.23	SU	35.8556751	-106.2960122	Y
N3B	Twomile above Pajarito	pH	08-19-2006	17:11	7.11	SU	35.8556751	-106.2960122	Y
N3B	Twomile above Pajarito	pH	12-17-2007	11:40	7.1	SU	35.8556751	-106.2960122	Y
N3B	Twomile above Pajarito	pH	08-01-2006	12:32	7.08	SU	35.8556751	-106.2960122	Y
N3B	Twomile above Pajarito	pH	08-29-2006	08:40	7.08	SU	35.8556751	-106.2960122	Y
NMED	Two Mile above Pajarito E244	pH	08-05-1998	10:10	7.06	SU	35.855675	-106.296012	Y
N3B	Twomile above Pajarito	pH	01-29-2008	11:10	7.03	SU	35.8556751	-106.2960122	Y
N3B	Twomile above Pajarito	pH	06-16-2007	15:54	7.02	SU	35.8556751	-106.2960122	Y
N3B	Twomile above Pajarito	pH	04-03-2007	10:40	7	SU	35.8556751	-106.2960122	Y
N3B	Twomile above Pajarito	pH	08-07-2006	13:04	6.97	SU	35.8556751	-106.2960122	Y
N3B	Twomile above Pajarito	pH	07-15-2005	15:46	6.95	SU	35.8556751	-106.2960122	Y
N3B	Twomile above Pajarito	pH	03-23-2007	14:00	6.89	SU	35.8556751	-106.2960122	Y
N3B	Twomile above Pajarito	pH	06-27-2007	11:45	6.86	SU	35.8556751	-106.2960122	Y
N3B	Twomile above Pajarito	pH	09-12-2007	09:30	6.84	SU	35.8556751	-106.2960122	Y
N3B	Twomile above Pajarito	pH	09-01-2006	14:00	6.83	SU	35.8556751	-106.2960122	Y
N3B	Twomile above Pajarito	pH	03-05-2008	11:00	6.8	SU	35.8556751	-106.2960122	Y
N3B	Twomile above Pajarito	pH	08-25-2006	12:13	6.65	SU	35.8556751	-106.2960122	Y
N3B	Twomile above Pajarito	pH	10-09-2006	18:08	6.65	SU	35.8556751	-106.2960122	Y
N3B	Twomile above Pajarito	pH	07-14-2007	17:25	6.52	SU	35.8556751	-106.2960122	Y

N3B	Twomile above Pajarito	pH	06-29-2006	16:25	6.46	SU	35.8556751	-106.2960122	Y
N3B	Twomile above Pajarito	pH	07-26-2007	14:28	6.11	SU	35.8556751	-106.2960122	Y
				Median	7.01	SU			
				Standard Deviation	0.35	SU			

Site ID	Location ID	Field Parameter	Measurement Date	Measurement Time	Field Measurement	Measurement Units	Latitude (Decimal)	Longitude (Decimal)	Usable
N3B	Two Mile Canyon below TA-59	pH	04-20-2016	11:10	7.84	SU	35.865972	-106.3155681	
N3B	Two Mile Canyon below TA-59	pH	04-15-2019	09:30	7.58	SU	35.865972	-106.3155681	Y
N3B	Two Mile Canyon below TA-59	pH	09-17-2009	08:10	7.26	SU	35.865972	-106.3155681	Y
N3B	Two Mile Canyon below TA-59	pH	04-02-2007	11:50	7.2	SU	35.865972	-106.3155681	Y
N3B	Two Mile Canyon below TA-59	pH	08-06-2010	13:04	7.2	SU	35.865972	-106.3155681	Y
N3B	Two Mile Canyon below TA-59	pH	03-07-2008	14:10	7.19	SU	35.865972	-106.3155681	Y
N3B	Two Mile Canyon below TA-59	pH	06-27-2007	14:52	7.16	SU	35.865972	-106.3155681	Y
N3B	Two Mile Canyon below TA-59	pH	09-15-2008	16:10	7.13	SU	35.865972	-106.3155681	Y
N3B	Two Mile Canyon below TA-59	pH	12-19-2007	08:02	6.97	SU	35.865972	-106.3155681	Y
N3B	Two Mile Canyon below TA-59	pH	09-11-2007	08:50	6.94	SU	35.865972	-106.3155681	Y
N3B	Two Mile Canyon below TA-59	pH	08-25-2006	09:30	6.89	SU	35.865972	-106.3155681	Y
N3B	Two Mile Canyon below TA-59	pH	06-12-2008	14:00	6.8	SU	35.865972	-106.3155681	Y
N3B	Two Mile Canyon below TA-59	pH	02-27-2009	11:45	6.6	SU	35.865972	-106.3155681	Y
N3B	Two Mile Canyon below TA-59	pH	12-19-2008	11:00	6.07	SU	35.865972	-106.3155681	Y
				Median	7.15	SU			
				Standard Deviation	0.42	SU			

9. Weather data

Average weather for Los Alamos

Climate-Data.org

https://en.climate-data.org/north-america/united-states-of-america/new-mexico/los-alamos-871784/

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature °C (°F)	-4 °C (24.8) °F	-2.3 °C (27.8) °F	2.2 °C (35.9) °F	6.9 °C (44.4) °F	11.9 °C (53.5) °F	18.2 °C (64.7) °F	19.5 °C (67.2) °F	17.8 °C (64.1) °F	14.4 °C (57.9) °F	8.2 °C (46.7) °F	1.9 °C (35.4) °F	-3.7 °C (25.4) °F
Min. Temperature °C (°F)	-9.3 °C (15.2) °F	-8.1 °C (17.5) °F	-4.5 °C (23.9) °F	-0.8 °C (30.6) °F	3.6 °C (38.4) °F	9.2 °C (48.6) °F	12.4 °C (54.3) °F	11 °C (51.8) °F	7.4 °C (45.4) °F	1.8 °C (35.2) °F	-3.6 °C (25.6) °F	-8.5 °C (16.7) °F
Max. Temperature °C (°F)	3.9 °C (39) °F	5.5 °C (41.9) °F	10.4 °C (50.7) °F	15.2 °C (59.4) °F	20 °C (67.9) °F	26.1 °C (79) °F	26.4 °C (79.5) °F	24.6 °C (76.3) °F	21.6 °C (70.9) °F	15.9 °C (60.6) °F	9.6 °C (49.2) °F	3.7 °C (38.7) °F
Precipitation / Rainfall mm (in)	30 (1.2)	30 (1.2)	36 (1.4)	38 (1.5)	44 (1.7)	32 (1.3)	77 (3)	98 (3.9)	67 (2.6)	52 (2)	31 (1.2)	32 (1.3)
Humidity(%)	58%	54%	46%	36%	32%	28%	44%	51%	50%	50%	50%	58%
Rainy days (d)	4	5	5	6	6	5	10	12	7	5	4	4

10. Water Dissolved oxygen from Intellus

Site ID	Location ID	Field Parameter	Measurement Date	Measure ment Time	Field Measure ment	Measure ment Units	Latitude (Decimal)	Longitude (Decimal)	Usable	Average Temp	max DO	Exceeds max
N3B	Two Mile Canyon below TA-59	Dissolved Oxygen	12-19-2008	11:00	16.85	mg/L	35.865972	-106.3155681	Y	25.4	12.44	Not used
N3B	Two Mile Canyon below TA-59	Dissolved Oxygen	02-27-2009	11:45	10.12	mg/L	35.865972	-106.3155681	Y	27.8	11.91	

N3B	Two Mile Canyon below TA-59	Dissolved Oxygen	03-07-2008	14:10	9.36	mg/L	35.865972	-106.3155681	Y	35.9	10.46	
N3B	Two Mile Canyon below TA-59	Dissolved Oxygen	04-02-2007	11:50	9.34	mg/L	35.865972	-106.3155681	Y	44.4	9.25	
N3B	Two Mile Canyon below TA-59	Dissolved Oxygen	04-20-2016	11:10	8.96	mg/L	35.865972	-106.3155681		44.4	9.25	
N3B	Two Mile Canyon below TA-59	Dissolved Oxygen	04-15-2019	09:30	8.57	mg/L	35.865972	-106.3155681	Y	44.4	9.25	
N3B	Two Mile Canyon below TA-59	Dissolved Oxygen	12-19-2007	08:02	8.28	mg/L	35.865972	-106.3155681	Y	25.4	12.44	
N3B	Two Mile Canyon below TA-59	Dissolved Oxygen	09-17-2009	08:10	7.62	mg/L	35.865972	-106.3155681	Y	57.9	7.75	
N3B	Two Mile Canyon below TA-59	Dissolved Oxygen	09-15-2008	16:10	7.28	mg/L	35.865972	-106.3155681	Y	57.9	7.75	
N3B	Two Mile Canyon below TA-59	Dissolved Oxygen	09-11-2007	08:50	7.1	mg/L	35.865972	-106.3155681	Y	57.9	7.75	
N3B	Two Mile Canyon below TA-59	Dissolved Oxygen	08-06-2010	13:04	6.75	mg/L	35.865972	-106.3155681	Y	64.1	7.21	
N3B	Two Mile Canyon below TA-59	Dissolved Oxygen	06-12-2008	14:00	4.74	mg/L	35.865972	-106.3155681	Y	64.7	7.15	
N3B	Two Mile Canyon below TA-59	Dissolved Oxygen	06-27-2007	14:52	4.1	mg/L	35.865972	-106.3155681	Y	64.7	7.15	
N3B	Two Mile Canyon below TA-59	Dissolved Oxygen	08-25-2006	09:30	3.74	mg/L	35.865972	-106.3155681	Y	64.1	7.21	
				Median	7.62	mg/L						
				Standard Deviation	2.07	mg/L						

11. *E. coli* in water from Intellus

No *E. coli* data found

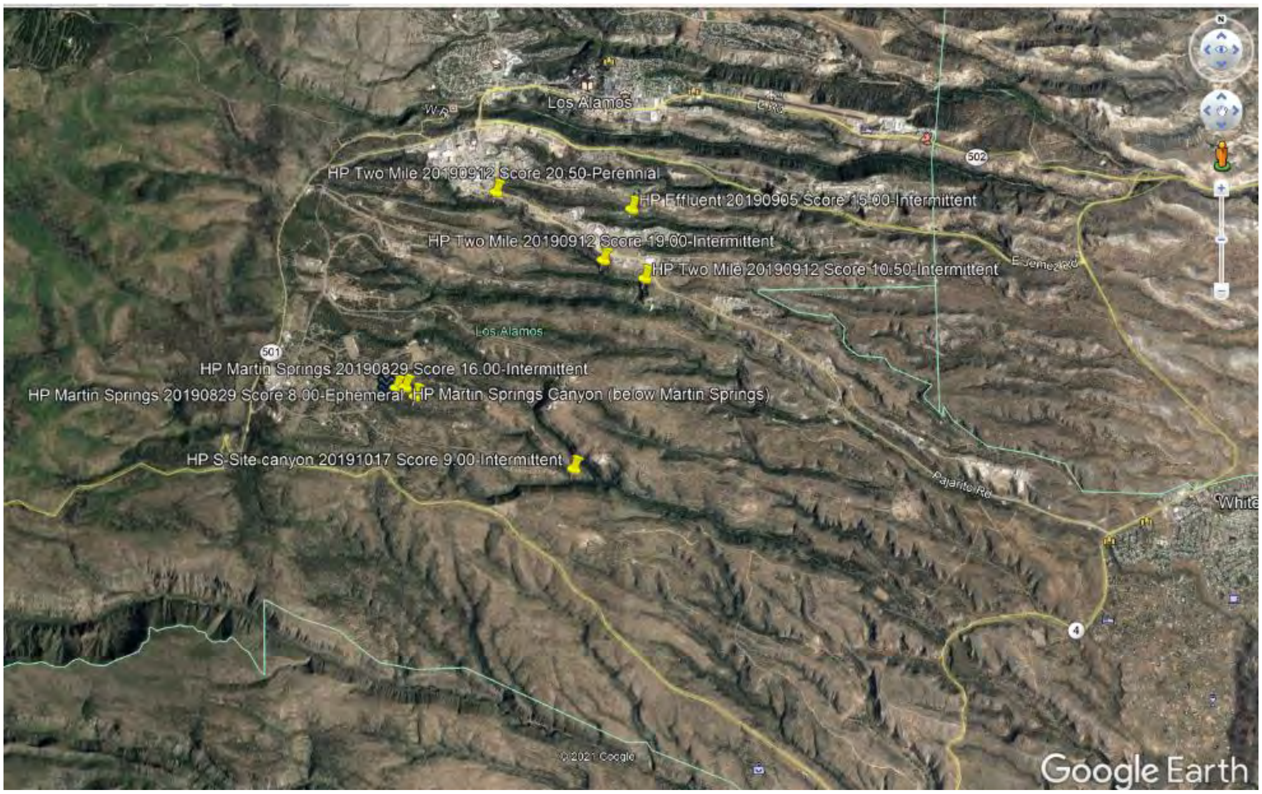
Appendix B
US Fish and Wildlife Service Environmental Conservation Online System Information for Planning and Consultation (IPaC) geographical area delineations for species evaluation.

The following map was created by the SWQB as part of this EUA. The map created in IPaC was used to determine potential threatened and endangered species within the study area. The IPaC map online tool does not provide a distance scale when running its evaluation.

Coverage:

20.6.4.128 RIO GRANDE BASIN. Ephemeral and intermittent portions of watercourses within lands managed by U.S. department of energy (DOE) within LANL

The area being evaluated is located in Los Alamos County, New Mexico and contains the lands managed by DOE within LANL. For more detailed site conditions refer to section VI of this analysis.



Metadata:

The delineation for determining threatened and endangered species that may be impacted by changes in WQS for the tributaries listed above was performed in IPaC and is illustrated in Figure B-1B. The delineation was conducted by manually defining a 41.92 square mile polygon with a 100 foot buffer; originating from the confluence of Ancho Canyon and the Rio Grande, upstream along the Rio Grande to the northeastern boundary of LANL; northwest to State Road 4; north along State Road 4 to Grand Canyon Dr in White Rock; northwest along Canada de Buey to a peak denoted only with an elevation of 6,847 feet; north to BIA-413; east to State Road 4; along State Road 4 until its merge with State Road 502; north to Barrancas Canyon; West to Pueblo Canyon Road; south to East Road, West along Los Alamos Canyon and Omega Road to Diamond Drive; southwest along west Road until it turns to Camp May Road which then merges to W. Jemez Road; along West Jemez Road until its termination with State Road 4; east along State

Road 4 until Entrance Road; south/southeast along Entrance Road until Entrance Road turns northwest; south from the turn on Entrance road to the Rio Grande.

Figure B-1B. Delineation used for identifying potential threatened and endangered species through IPaC.