Exhibit 57

Case No. WQCC 20-51(R)

PROPOSED AMENDMENTS OF LOS ALAMOS NATIONAL LABORATORY (REVISED)

NMED's proposed changes to the current 20.6.4. NMAC are shown with additions underlined and deletions indicated by strikethrough. In some cases, for clarity, NMED's deletions are shown with strikethrough and brackets. LANL's proposed modifications to NMED's proposed changes as provided in the Amended Petition are noted in ***bold italics***, and its proposed deletions to NMED'S Amended Petition or existing regulatory language are noted in double strikethrough.

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.

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~~**D.** These surface water quality standards serve to address the inherent threats to water quality due to climate change.~~

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 the letter "A".

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(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.~~

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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.~~

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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, pharmaceuticals and personal care products that may cause significant ecological or human health effects at low concentrations. CECs are generally chemical compounds that, although suspected to potentially have impacts, may not have regulatory standards, and the concentrations to which negative impacts are observed have not been fully studied.~~

~~(6)~~(~~6~~7) "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)~~(~~7~~8) "Commission" means the New Mexico water quality control commission.

~~(8)~~(~~8~~9) "**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.

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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)~~(*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)~~(*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.

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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 ***ephemeral, intermittent, or perennial*** 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~~] ***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.

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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) "Sufficiently sensitive" means any method approved under 40 CFR part 136 for the analysis of pollutants or pollutant parameters for which (1) the method minimum level (ML) is at or below the level of the effluent limit established in the permit; or (2) the method has the lowest ML of the analytical methods approved under 40 CFR part 136 for the measured pollutant or pollutant parameter.

~~(5)~~(6) "Surface water(s) of the state" means all surface waters situated wholly or partly within or bordering upon the state, including lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, reservoirs or natural ponds. 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. 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~~ ***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***.

(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. 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 20.6.4.99 NMAC if perennial. The commission may include an ephemeral unclassified surface water of the state in 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.

(2) "Use Attainability Analysis" means a structured scientific assessment of the factors affecting the attainment of the use, which include physical, chemical, biological, and economic factors as described in 40 CFR 131.10(g).

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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 ***of a water***, as defined in 20.6.4.7 NMAC, ~~is higher quality water~~ ***requires a higher level of protection*** than ~~prescribed by~~ the ***current*** designated use and ***new*** supporting evidence demonstrates the presence of that use, the designated use shall be amended accordingly to ***protect*** ~~be no less stringent than~~ the existing use. ***This action can only be taken after the commission has established formal procedures, through the water quality management plan continuing planning process, to amend a designated use that is found to be less restrictive than an existing use. The process described in this section may not be used where the commission has already made a determination concerning the existing use of classified waters of the state.***

~~[B.]~~**~~C.~~** ~~It is recognized that, in some cases, numeric criteria have been adopted that reflect use designation 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 requited 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.**~~***C.*** 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.~~ ***D.*** 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.

~~[E.]~~ ~~F.~~ ***E.*** **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 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~~***F*** of 20.6.4.10 NMAC.

[~~E.~~]~~G~~ ***F.*** **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 ***unless it is demonstrated such uses would be protected at background***

concentrations or such uses are not attainable in accordance with 20.6.4.15 NMAC. 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.~~** ***G.*** **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~~***G*** 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~~***G*** 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~~***G*** 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~~***G*** 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~~***G*** 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~~***G*** 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~~***G*** 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.

20.6.4.11 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

Modified Harmonic Mean =

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~~ ***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.~~

~~**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.~~***I.*** **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.

20.6.4.12 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~~ ***lowest minimum level (ML) of the analytical methods approved by EPA under 40 CFR part 136 for the measured pollutant or pollutant parameter***. In such cases, the water quality standard is enforceable at the ~~minimum quantification level~~ ***ML of the sufficiently sensitive method approved by EPA under 40 CFR part 136.***

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~~ 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~~***G*** 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.

20.6.4.13 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.

* * *

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, concentrations, ~~or~~ ***duration, 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 ***or 401 certification*** 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.

* * *

20.6.4.14 SAMPLING AND ANALYSIS:

A. ***40 CFR Part 136 approved methods shall be used to determine compliance with these standards and in Section 401 certifications under the federal Clean Water Act. In all other cases, sampling*** ~~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.

20.6.4.15 USE ATTAINABILITY ANALYSIS:

A. ~~Authority to remove a designated use. 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 ***to a different use that requires***~~, based on a~~ more stringent ~~existing use~~ ***water quality criteria may be supported by a use attainability analysis, but***, does not ***necessarily*** require a use attainability analysis. ***A use attainability analysis must be conducted when designating uses do not include uses specified in Section 101(a)(2) of the federal Clean Water Act or when designating sub-categories of these uses require less restrictive criteria than previously applicable. When removing designated uses that are not Section 101(a)(2) uses, a use attainability analysis is not required.***

(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. ~~The mechanism to remove a designated use~~ ***Conducting 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 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~~ ***shall*** 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 existing uses of the water being investigated ~~are not~~ ***do not require numeric criteria*** 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. ***The department will review and approve work plans, or provide written basis for non-approval, within thirty days of submittal or, in the case of a previously non-approved work plan, re-submittal by a proponent.***

(2) Upon approval of the work plan by the department, the proponent shall conduct the use attainability analysis 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.

* * *

20.6.4.126 RIO GRANDE BASIN: - Perennial ***waters within lands managed by the U.S. Department of Energy (DOE) within Los Alamos National Laboratory (LANL), including but not limited to:*** ~~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 ***0.5 miles below*** Arroyo de La Delfe upstream ***to Homestead Spring, Arroyo de La Delfe from Pajarito canyon to Kieling Spring,*** ~~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.

20.6.4.128 RIO GRANDE BASIN: - Ephemeral and intermittent portions of ~~watercourses~~ waters within lands managed by U.S. ~~d~~***D***epartment of ~~e~~***E***nergy **(**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).

* * *

20.6.4.140 RIO GRANDE BASIN: ***Intermittent portions of*** ~~**Effluent canyon from Mortandad canyon** ***confluence upstream*** **to its headwaters,**~~ S-Site canyon from ***alluvial groundwater well*** MSC 16-06293 ***upstream*** to Martin Spring, and ~~**Two Mile**~~ ***Twomile*** canyon from ~~its confluence with Pajarito canyon to~~ ***LANL stream gage E244 upstream to its confluence with*** upper ~~Two Mile~~ ***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.

20.6.4.900 CRITERIA APPLICABLE TO EXISTING, DESIGNATED OR ATTAINABLE USES UNLESS OTHERWISE SPECIFIED IN 20.6.4.97 THROUGH 20.6.4.899 NMAC:

* * *

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.

(1) Acute aquatic life criteria for metals: The equation to calculate acute criteria in µg/L exp(mA[ln(hardness)] + bA)(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~~0.8473	~~0.9095~~0.884	0.978

(2) Chronic aquatic life criteria for metals: The equation to calculate chronic criteria in µg/L is exp(mC[ln(hardness)] + bC)(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~~0.8473	~~0.6235~~0.884	0.986

* * *

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**	**LW**	**WH**	**Aquatic Life**			**Type**
						Acute	Chronic	HH-OO	
Aluminum, dissolved	7429-90-5		5,000			~~750 i~~	~~87 i~~		

* * *

(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 6.6 or greater than 9.0 S.U. If the concurrent pH is between 6.6 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.~~

* * *

Exhibit 58

STATE OF NEW MEXICO
BEFORE THE WATER QUALITY CONTROL COMMISSION

IN THE MATTER OF:

THE PETITION TO AMEND
THE STANDARDS FOR INTERSTATE
AND INTRASTATE SURFACE WATERS,
20.6.4 NMAC **WQCC No. 20-51(R)**

REBUTTAL TESTIMONY OF RICHARD D. MEYERHOFF ON BEHALF OF TRIAD NATIONAL SECURITY, LLC AND THE U.S. DEPARTMENT OF ENERGY, NATIONAL NUCLEAR SECURITY ADMINISTRATION

June 22, 2021

Rebuttal Testimony of Richard D. Meyerhoff
Case No. WQCC 20-51 (R)

I. WITNESS BACKGROUND AND QUALIFICATIONS

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Richard D. Meyerhoff. My business address is 4601 DTC Boulevard, Suite 900, Denver, Colorado 80237.

Q. ON WHOSE BEHALF ARE YOU SUBMITTING REBUTTAL TESTIMONY?

A. I am submitting this rebuttal testimony on behalf of Triad National Security, LLC, ("Triad") and the U.S. Department of Energy, National Nuclear Security Administration ("DOE") (collectively "LANL").[1]

Q. HAVE YOU PROVIDED PREVIOUS TESTIMONY IN THIS CASE?

A. Yes, I provided direct testimony which includes: (i) a summary of my qualifications and experience; (ii) a discussion of LANL's evaluation of and proposed changes to the amendments proposed by the New Mexico Environment Department ("NMED") to the Standards for Interstate and Intrastate Surface Waters, 20.6.4 NMAC ("Standards"); and (iii) the technical bases for certain related modifications to the Standards proposed in LANL's Notice of Intent to Present Technical Testimony ("LANL's Notice of Intent"). My direct testimony was submitted with LANL's Notice of Intent, filed on May 3, 2021, as **LANL Exhibit 2**.

II. PURPOSE OF TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?

[1] DOE and predecessor and current operators of LANL are referred to in my testimony collectively as "LANL" to avoid unnecessary entity name complications.

A. The purpose of my rebuttal testimony is to respond to the direct testimony of NMED and other parties to this proceeding relating to the following proposed amendments to 20.6.4 NMAC:

- NMED proposal to reclassify selected Section 128 waters (20.6.4.128 NMAC) based on its Existing Use Analysis (NMED Exhibit 73).
- NMED proposal to establish primary contact recreation as the existing use in selected waters based on its Existing Use Analysis of Recreational Uses for Classified Waters 20.6.4.101-20.6.4.899 NMAC (NMED Exhibit 56).
- NMED proposal to adopt definitions of "baseflow" (20.6.4.7(B)(1) NMAC) and "effluent-dominated" (20.6.4.7(E)(2) NMAC) (NMED Exhibit 1, Lemon Direct).
- Amigos Bravos proposal to modify the existing use definition at 20.6.4.7(E)(3) NMAC (Amigos Bravos Exhibit 1).

Q. HAVE YOU REVIEWED THE PRE-FILED DIRECT TESTIMONY FILED BY NMED, THE NEW MEXICO MINING ASSOCIATION ("NMMA"), THE SAN JUAN WATER COMMISSION ("SJWC"), AND AMIGOS BRAVOS IN THIS MATTER?

A. Yes.

III. AMENDMENT 1 – PROCESS FOR CONDUCTING AN EXISTING USE ANALYSIS

Q. DID THE ANALYSIS IN PRE-FILED DIRECT TESTIMONY PROVIDED BY WITNESSES FOR NMED, NMMA, SJWC, AND AMIGOS BRAVOS, CAUSE YOU TO RECONSIDER THE STATEMENTS AND PROPOSED REVISIONS TO 20.6.4 NMAC CONTAINED IN YOUR DIRECT TESTIMONY?

A. No, the pre-filed direct testimony provided by other parties did not cause me to alter my pre-filed direct testimony or any of LANL's proposed revisions to 20.6.4 NMAC addressed in my testimony. However, based on the testimony from the following witnesses I am supplementing my pre-filed testimony regarding proposed revisions to 20.6.4 NMAC: NMED witnesses Shelly Lemon (NMED Exhibit 1), Diana Aranda (NMED Exhibit 3) and Jennifer Fullam (NMED Exhibit 4); Amigos Bravos witness Rachel Conn (Amigos Bravos Exhibit 3).

Q. HAVE YOU REVIEWED NMED'S PROPOSED AMENDMENT TO 20.6.4 NMAC?

A. Yes. I have reviewed the proposed language in NMED's August 18, 2020 Petition ("Original Petition"), and NMED's March 12, 2021 Notice of Amended Petition ("Amended Petition"), as well as NMED's Statement of Reasons for the proposed amendments. I have also reviewed the written direct testimony of NMED's witnesses, Ms. Diana Aranda and Ms. Jennifer Fullam, and their accompanying exhibits which describe their procedures for evaluating existing uses as related to recreational uses of water.

Q. CAN YOU PLEASE SUMMARIZE NMED'S PROPOSAL TO MODIFY THE RECREATIONAL USES IN CLASSIFIED WATERS?

A. Based on analyses of existing uses, NMED is proposing to modify the applicable recreational use from secondary contact to primary contact on selected waters based solely on a review of available water quality data for *Escherichia coli* ("*E. coli*"), pH or both in Section 103, 116, 204, 206 and 207 waters. This same approach was considered when evaluating the existing recreational use for waters on LANL property, but because no water quality data was available, no change in recreational use was proposed at this time.

Additionally, in NMED Exhibit 56, NMED's Existing Use Analysis of Recreational Use for Classified Waters – 20.6.4.101-20.6.4.899 NMAC ("Recreational EUA"), NMED does not address waters on LANL property. However, NMED states that "Sections 20.6.4.126 and 20.6.4.128, contain a secondary contact designation but they will be investigated under a separate UAA, as appropriate." NMED Exhibit 56 at 37. As I testified in my pre-filed direct testimony, **LANL Exhibit 2**, NMED has already conducted a Use Attainability Analysis ("UAA") in 2007 that the WQCC and EPA approved to classify all waters within LANL as either Section 126 or Section 128 waters—with secondary contact. **LANL Exhibit 18**.

Q. BASED ON YOUR REVIEW OF THE DIRECT TESTIMONY OFFERED BY MS. DIANA ARANDA AND MS. JENNIFER FULLAM IN SUPPORT OF NMED'S PROPOSAL, WHAT DO YOU UNDERSTAND TO BE THE BASIS FOR NMED'S PROPOSAL?

A. NMED contends that an Existing Use Analysis ("EUA") based solely on *E. coli* and pH water quality data is sufficient for making a finding regarding whether primary contact is an existing use in a waterbody. NMED Exhibit 3 at 10-14; NMED Exhibit 56.

Q. DID YOUR DIRECT TESTIMONY ADDRESS THE BASIS FOR NMED'S PROPOSAL?

A. Not entirely. My testimony discussed the need for clear, transparent procedures for making an existing use determination, but did not address the specific requirements to evaluate existing uses (consistent with EPA's expectation for protection of existing uses), including the need to define the minimum data requirements that should be incorporated into an EUA for making existing use decisions.

Q. WHAT IS YOUR ANALYSIS OF NMED'S BASIS FOR ITS POSITION?

A. NMED's testimony indicates that decisions regarding which recreational use (primary contact or secondary contact) is existing in a New Mexico water should be based almost solely on the evaluation of water quality data. NMED is proposing that considerations regarding the actual use of the water (e.g., swimming or wading) either need not be evaluated at all, or can be determined based on anecdotal information and not waterbody-specific data. NMED's proposed approach is contrary to the intent of the federal law. A review of EPA regulations and guidance clearly demonstrate that both the actual use of the water and the existing water quality should be evaluated when conducting an EUA. The following testimony summarizes LANL's concerns with this NMED proposal for determining the existing recreational use of a waterbody.

Q. WHAT IS THE DEFINITION OF AN "EXISTING USE"?

A. The term "existing use" is defined in both federal and state regulations as follows:

- Federal regulation at 40 CFR § 131.3(c): 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.
- New Mexico regulations at 20.6.4.7(E)(4) NMAC: "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.

Common to both the federal and state regulatory definition is the phrase "use(s) actually attained." Of importance to these definitions is what is meant by the word "use" in this context. EPA Water Quality Standards Handbook ("WQS Handbook"), Chapter 2, states: "A water quality standard defines the water quality goals of a water body or portion thereof,

in part, by designating the use or uses to be made of the water." **LANL Exhibit 67** at 1. This statement emphasizes that a use relates to how a waterbody may be used by people (swimming, drinking water, industrial use, etc.), aquatic organisms (e.g., coldwater vs. warmwater oranisms) or wildlife.

Q. HAS EPA PROVIDED GUIDANCE ON HOW TO EVALUATE EXISTING USES?

A. Yes, EPA's most recent and comprehensive guidance on existing uses was included in an attachment to a 2008 letter from EPA to the State of Oklahoma. **LANL Exhibit 32**; NMED Exhibit 62. This guidance is included in the EPA's WQS Handbook as a reference in the discussion regarding making a determination of whether a use is existing. WQS Handbook, **LANL Exhibit 67** at 9. This attachment states (**LANL Exhibit 32**, Attachment at 1):

> EPA considers the phrase "existing uses are those uses actually attained" to mean the use and water quality necessary to support the use[s] (sic) that have been achieved in the waterbody on or after November 28, 1975. Waterbody uses relate to a distinct purpose (e.g., recreation, public water supply) or function (e.g., supporting an aquatic ecosystem). EPA's regulations, relating to the protection of existing uses, require states and tribes to maintain and protect these uses, not specific water quality parameters which may have achieved levels more protective than necessary to support these uses.

This EPA finding has three key components:

- An existing use evaluation includes both the use of the water and the water quality necessary to support the use;
- Uses relate to a purpose or function for a waterbody, e.g., recreation, drinking water, or habitat for specific type of aquatic ecosystem; and
- States are to maintain and protect the use – not specific water quality parameters.

The EPA further elaborates what it means regarding analysis of existing uses through the following statements (**LANL Exhibit 32**, Attachment 1 at 2-3):

> A waterbody may have multiple existing uses. When evaluating the uses actually achieved along a continuum, the existing uses of a waterbody are the 'highest degree of uses' and water quality necessary to support those uses, that have been achieved since November 28, 1975, independent of the designated use. 'Highest degree of uses' generally means the degree of use closest to those supported by minimally impacted conditions, which usually is associated with the highest level of water quality. (Emphasis added).
>
> * * * * *
>
> 3) How should a state or tribe determine the existing use for a waterbody? A state or tribe should determine existing uses on a site-specific basis to ensure it has identified the highest degree of uses and water quality necessary to support the uses that have been achieved since November 28, 1975. When describing existing uses, states and tribes should articulate not only the use(s) that has been achieved, but also the water quality supporting the specific use(s) that has been achieved. (Emphasis added).

In both examples above, the actual use of the water (purpose or function) is mentioned separately from the water quality necessary to support that use.

Q. DOES EPA REQUIRE THAT STATES ALWAYS CONSIDER BOTH COMPONENTS THAT DEFINE AN EXISTING USE?

A. EPA does give states and tribes the discretion to determine whether a use of a water is existing but it also recommends that these findings be based on reasonable evidence. This position is stated in 2008 guidance provided to the State of Oklahoma (**LANL Exhibit 32**, Attachment at 3):

> Although EPA interprets the definition of "existing use" to require consideration of the available data and information on both actual use and water quality, all the necessary data may not be available. In these circumstances, a state or tribe may choose, in implementing its water quality standards program, to determine an existing use based on the strength of evidence that a use has actually been achieved or the strength of evidence that water quality supporting a use has been achieved. In other words, where data may be limited or inconclusive, EPA expects states and tribes to consider the quantity, quality, and reliability of the different types of available data to describe the existing use as accurately and completely as possible and to resolve any apparent discrepancies based upon that evaluation.

EPA recognizes that not all data needed to evaluate all aspects of what constititutes an existing use may be available; regardless EPA states that it does expect the existing use to be described as accurately and completely as possible. This admonition was reiterated in EPA's 2015 revisions to the federal water quality standards regulation (**LANL Exhibit 31** at 51,027).

> The WQS regulation at §131.3(e) defines an existing use as ''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.'' EPA provided additional clarification on existing uses in the background section of the proposed preamble, as well as in a September 2008 letter from EPA to the State of Oklahoma. Specifically, EPA explained that existing uses are known to be ''actually attained'' when the use has actually occurred and the water quality necessary to support the use has been attained. EPA recognizes, however, that all the necessary data may not be available to determine whether the use actually occurred or the water quality to support the use has been attained. When determining an existing use, EPA provides substantial flexibility to states and authorized tribes to evaluate the strength of the available data and information where data may be limited, inconclusive, or insufficient regarding whether the use has occurred and the water quality necessary to support the use has been attained. In this instance, states and authorized tribes may decide that based on such information, the use is indeed existing.

EPA states it "provides substantial flexibility" for states and tribes to make existing use decisions. This flexibility is granted where "data may be limited, inconclusive, or insufficient whether the use has occurred and the water quality necessary to support the use has been attained." **LANL Exhibit 31** at 51,027.

Q. IF THE EPA ALLOWS FLEXIBILITY TO MAKE EXISTING USE DECISIONS, WHY IS LANL CONCERNED WITH THE EXERCISE OF SUCH AUTHORITY IN THE INSTANCE OF WATERS ON LANL PROPERTY AND OTHER WATERS OF THE STATE?

A. While there may be flexibility in making an existing use decision, it is reasonable to expect that a thorough effort will be made to collect the appropriate type and amount of data to

make regulatory decisions. As noted in **LANL Exhibit 32** at LANL-00569 and quoted above, EPA expects "available data to describe the existing use as accurately and completely as possible." This is also critical given EPA's admonition to states and tribes that an existing use decision needs to be made carefully, given how the findings from such a determination impact other water quality management decisions. (**LANL Exhibit 32** at LANL-00571, **LANL Exhibit 2** at 29):

> It is appropriate to describe the existing uses of a waterbody in terms of both actual use and water quality because doing so provides the most comprehensive means of describing the baseline conditions that must be protected. In identifying an existing use, it is important to have a high degree of confidence because a state or tribe may not remove an existing use when revising designated uses, regardless of whether the existing use remains attainable. This is also important because EPA's antidegradation provisions require any CWA authorization of a discharge or activity that may result in a discharge to protect the existing use.

EPA states that it is important to have a high degree of confidence when establishing a use as existing. LANL does not believe this high degree of confidence threshold has been reached where an EUA does not include an evaluation of the actual use of the water—yet this is the approach NMED proposes.

In its Statement of Reasons and Final Order for the 2013 Trienniel Review, the WQCC agreed with the importance of having sufficient technical information to upgrade a designated use to one with more stringent water quality criteria, e.g., upgrading the recreational use from secondary contact to primary contact (*see* excerpt of 2014 Triennial Review Statement of Reasons and Final Order, SJWC Exhibit 2-M at 36, 40-41):

> The Department has not presented sufficient technical information to support its proposal to upgrade the . . . segments to primary contact. . . . Adopting more stringent water quality standards absent information and data proving use is attainable is unadvised. Federal regulations require new and substantive information to upgrade a designated use, which the Department has failed to provide. Upgrading the . . . segments to primary

> contact would burden the State of New Mexico with unwarranted transactional costs.

Q. BASED ON EPA AND NMED REGULATIONS, CAN YOU SUMMARIZE YOUR TESTIMONY SO FAR REGARDING HOW AN EXISTING USE SHOULD BE EVALUATED?

A. First, consistent with the definitions of an existing use and EPA guidance regarding how to evaluate an existing use, states and tribes should consider two components when conducting an EUA:

- The actual use of the water which may consider its purpose (e.g., a waterbody used for swimming recreational activities or as a drinking water source), or its function (e.g., as habitat for coldwater or warmwater aquatic organisms).
- Existing water quality (i.e., is the quality of the water sufficient to support the attainment of the use of the water?).

Second, data gathering efforts should be sufficiently thorough to fully understand the baseline conditions of the waterbody and ensure a high degree of confidence that in fact a use is indeed existing.

Q. BASED ON NMED DIRECT TESTIMONY AND EXHIBITS, WHAT ARE NMED'S FINDINGS WITH REGARDS TO RECREATIONAL EXISTING USES IN SECTION 128 WATERS?

A. NMED's Jennifer Fullam testified that a recreational use determination could not be made at this time for waters included in the EUA for Section 128 waters because no *E. coli* data were available (NMED Exhibit 4 at 34; NMED Exhibit 73 at 20):

> However, no *E. coli* data were found for purposes of this analysis for Effluent Canyon, S-Site Canyon, and Two-Mile Canyon. Therefore, the existing recreational use, based on *E. coli*, was found to be indeterminate at

> this time based on insufficient evidence and no further analysis of recreational use was conducted. Until further data are available, the existing recreational use is assumed to be at least secondary contact.

Q. WHY IS THIS NMED FINDING A CONCERN TO LANL?

A. As discussed above, EPA guidance states that an Existing Use evaluation includes two parts – the actual use and the water quality to attain that use. NMED is testifying that they are unable to make an existing use determination at this time because of a lack of water quality data. However, they fail to mention that NMED completed a UAA on these waterbodies in 2007 (**LANL Exhibit 2** at 16; **LANL Exhibit 18**). That UAA, which was approved by the WQCC and EPA (**LANL Exhibit 2** at 9-17; **LANL Exhibit 18**), showed that primary contact recreation was not an attainable use based on low flow conditions (**LANL Exhibit 2** at 16; **LANL Exhibit 18** at 4):

> In conclusion, secondary contact recreation is an existing and attainable use for the stream reaches in Segments 126 and 128. Hydrologic modifications do not currently affect recreational opportunities, and water quality likely supports both secondary and primary contact activities. Nevertheless, primary contact is not an attainable use because flows and water levels are generally too low for full body immersion or prolonged and intimate contact with the water. This is the factor identified in 40 CFR 131.10(g)(2): "Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use…" Hazardous high-flow conditions and restricted access also limit the feasibility of primary contact recreation.

NMED's 2007 UAA conclusion demonstrates that both components – actual use and water quality – were considered in 2007. The UAA states that water quality likely supports both secondary and primary contact uses, but very importantly the determination that secondary contact recreation was the appropriate use designation for Section 128 (and Section 126) waters was based on the use definitions, i.e., primary contact is not attainable "because flows and water levels are generally too low for full body immersion or prolonged and intimate contact with the water." (**LANL Exhibit 18** at 4).

20.6.4.7(P)(6) and 20.6.4.7(S)(1) NMAC, respectively, define primary contact and secondary contact recreation as follows:

> "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.
>
> "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.

Each of these definitions emphasizes the nature of the actual use of the waterbody. For primary contact, actual use means "prolonged and intimate human contact with the water" and "considerable risk of ingesting water in quantities sufficient to pose a significant health hazard." For secondary contact the actual use includes activities where there is minimal risk of ingesting appreciable quantities of water, e.g. fishing, wading and boating. The key distinction between the secondary and primary contact recreation uses is the risk of ingestion of water. 20.6.4.ZZ NMAC establishes pathogen indicator criteria (*Escherichia coli*, or "*E. coli*") to protect recreational activity. These criteria, which rely on EPA federal recommendations, are based on risk of exposure or ingestion of water (NMED Exhibit 3 at 10). While an evaluation of *E. coli* concentrations is an important element in the evaluation of the attainment of the recreational use, the allowable *E. coli* concentrations to protect the use are explicitly tied to the actual use of the water, that is the risk of exposure to pathogens through prolonged immersion and ingestion of water.

Neither NMED's direct testimony nor its key exhibit to support its evaluation of existing uses in Section 128 waters (NMED Exhibit 4; NMED Exhibit 73) acknowledge NMED's secondary contact existing and attainable use findings for all LANL waters from the NMED 2007 UAA. **LANL Exhibit 18** at LANL-00365 – LANL-00386. These same sources also do not acknowledge that the WQCC and EPA approved the UAA. **LANL Exhibit 19**. Finally, NMED's EUA does not present any new information in the record regarding whether the flow and water level conditions that were found to prevent attainment of primary contact recreation in 2007 still exist today. Accordingly, the WQCC should reject any recommendation from NMED to include primary contact as an existing use for LANL waters.

Q. IS NMED'S APPROACH TO EVALUATING EXISTING USES FOR RECREATION PROTECTION BASED SOLELY ON WATER QUALITY UNIQUE TO SECTION 128 WATERS ON LANL PROPERTY?

A. No, it is not unique. NMED conducted an EUA of recreational uses for other classified waters in the state within the Rio Grande Basin (Section 103 and 116 waters) and the Pecos River Basin (Sections 204, 206 and 207). NMED Exhibit 56. This document states (NMED Exhibit 56 at 22):

> Available *E. coli* data for waterbodies with a secondary contact designation were evaluated to determine the waterbodies' existing uses and whether a change to the designated use is warranted.

The EUA limited its analysis of actual use of the water in each evaluated waterbody within these Sections to the following general statement (NMED Exhibit 56 at 23):

> SWQB [Surface Water Quality Bureau] does not monitor or gather information on recreational use demonstrating full immersion, such as swimming and wading. However, visitor brochures and recreational websites encourage popular recreational activities, such as swimming,

> kayaking and wading, in waters related to the five classified segments evaluated as part of this EUA. Several sections, including the Rio Grande between Elephant Butte and Caballo Reservoirs, the Rio Chama between Abiquiu Reservoir and the Rio Grande, and the Rio Ojo Caliente, are noted in guides to river rafting in New Mexico. Furthermore, as stated in direct written testimony of SWQB, entered into the pleadings log as part of the last triennial review (WQCC Docket 14-05(R)), evidence of these uses has not only been encouraged, but has also been recorded.

This analysis of "actual use" does not provide waterbody-specific information and conflates the definitions of primary and secondary contact recreation in the following ways:

- Full immersion is defined above to include "swimming and wading," yet 20.6.4.7.P(6) NMAC defines primary contact recreation to include swimming; wading as a recreational activity is included as an example of secondary contact recreation (see 20.6.4.7.S(1) NMAC);
- The reference to "popular recreational activities, such as swimming, kayaking and wading" include both primary contact (swimming) and secondary contact activities (wading); and
- The reference to river rafting would be more consistent with secondary contact than primary contact given that the former includes "recreational boating" in its definition (see 20.6.4.7.S(1) NMAC).

While primary contact recreation may be the existing recreational use of at least some of the waters evaluated under NMED's EUA of recreational uses (NMED Exhibit 56), broad generalizations about the actual uses attained should be based on the collection of waterbody-specific data and not on outside websites or marketing materials. Moreover, care should be made to distinguish between swimming and wading since by definition these are activities associated with different recreational uses.

Notwithstanding how NMED evaluated the actual use of waterbodies for primary contact recreation (NMED Exhibit 56 at 23), the EUA ultimately relies on water quality data to make findings regarding whether or not primary contact recreation is an existing use (NMED Exhibit 3 at 11-12):

> Finally, the Department analyzed the *E. coli* data. For this analysis, the single grab criterion was utilized since the number of samples necessary to calculate a monthly geometric mean were not available. The analysis utilized the primary contact single grab *E. coli* criterion of 410 cfu/100 mL for the recreational designated existing use determination. If the waterbody segment contained at least one *E. coli* sample result equal to or less than 410 cfu/100 mL, then the existing use was determined to be at least primary contact. This single sample determination comes from the existing use definition in 20.6.4.7(E)(3) NMAC and 40 C.F.R. § 131.3 (NMED Exhibit 26); where an existing use equals the actual use that has been attained by a surface water. Meaning, even though the water could contain samples above 410 cfu/100 mL, if the water contains at least a single sample that was at or less than 410 cfu/100 mL, then it demonstrates that the water can actually attain that criterion. Therefore, if a segment under review achieves primary contact use designation once, then that is the appropriate designated use. However, if the waterbody segment single sample results for *E. coli* are all greater than 410 cfu/100 mL, then that waterbody segment's existing use was determined to be appropriately designated under secondary contact (Emphasis added).

As emphasized above, NMED states that the "existing use equals the actual use," that this use can be determined from a single sample, and that this approach is consistent with state and federal definitions of "existing use." These definitions state:

- "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 (20.6.4.7(E)(3) NMAC).
- 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 CFR § 131.3(e)).

Neither of these definitions equate a single sample determination with making a finding that a use is attainable. However, both definitions do include the phrase, "use (or uses) actually attained." As noted in my testimony above, EPA has clearly stated through its guidance that "uses actually attained" include two components – the actual use of the water and the necessary water quality to support that use (**LANL Exhibit 32**; **LANL Exhibit 31**). Regardless of this clear guidance, NMED summarizes its existing use findings for various classified waters (20.6.4.103 to 20.6.4.207 NMAC) as follows (NMED Exhibit 3 at 13):

> Of the waterbodies with available data, all were within a pH range of 6.6 to 9.0 and at least one *E. coli* sample result less than or equal to 410 cfu/100 mL. These findings assert that the select listed waterbodies attain the criteria for primary contact recreational use. Therefore, in accordance with 40 C.F.R. § 131.10(i) (NMED Exhibit 22), the Department proposes amending, with some exceptions, the designated recreational use for classified waters in 20.6.4.103, 20.6.4.116,20.6.4.204, 20.6.4.206, and 20.6.4.207 NMAC.

Q. DO YOU HAVE ANY ADDITIONAL CONCERNS REGARDING NMED'S FOCUS ON WATER QUALITY ONLY AND NOT CONSIDERING THE ACTUAL USE OF THE WATER FOR AN EXISTING USE DETERMINATION?

A. Yes. NMED has stated that it is making existing use decisions based on water quality with as few as a single sample result (NMED Exhibit 3 at 12):

> If the waterbody segment contained at least one *E. coli* sample result equal to or less than 410 cfu/100 mL, then the existing use was determined to be at least primary contact.

NMED direct testimony states that the *E. coli* criteria used to evaluate attainment of the primary contact use are based on the EPA's 2012 recommended *E. coli* single grab numeric criteria. NMED Exhibit 3 at 10. Through its authority under CWA Section 304(a)(1), the EPA periodically develops and publishes recommended water quality criteria based on the

latest scientific knowledge for consideration by states and tribes. When developing these criteria, the EPA considers three components: magnitude, duration and frequency. EPA's recommended 2012 *E. coli* criteria to protect recreational uses of water include all three components **(LANL Exhibit 68** at 40):

> EPA recommends that RWQC [Recreational Water Quality Criteria] consist of a magnitude, duration and frequency. Magnitude is the numeric expression of the maximum amount of the pollutant that may be present in a waterbody that supports the designated use. Duration is the period of time over which the magnitude is calculated. Frequency of excursion describes the maximum number of times the pollutant may be present above the magnitude over the specified time period (duration). A criterion is set in a WQS such that the combination of magnitude, duration and frequency protect the designated use (such as primary contact recreation).

EPA's 2012 *E. coli* recommendations to protect primary contact recreation are as follows (**LANL Exhibit 68** at 41):

> **Magnitude**: GM [Geometric Mean] and the STV (Single Threshold Value) (regardless of the sample size).
>
> **Duration and Frequency**: The waterbody GM should not be greater than the selected GM magnitude in any 30-day interval. There should not be greater than a ten percent excursion frequency of the selected STV magnitude in the same 30-day interval.

EPA's 304(a) recommended *E. coli* recreational water quality criteria for freshwaters are as follows (**LANL Exhibit 68** at 6):

- **Magnitude**: Geometric mean of 126 cfu/100 mL and a single threshold value of 410 cfu/100 mL.

- **Duration and Frequency**: The geometric mean should not be greater than the geometric mean magnitude of 126 cfu/100 mL in any 30-day interval; there should not be a greater than ten percent excursion frequency of the STV magnitude in the same 30-day interval.

20.6.4.900 NMAC establishes the criteria applicable to the protection of the primary contact use in state waters. With regards to *E. coli*, the existing criteria are: "The

monthly geometric mean of *E. coli* bacteria of 126 cfu/100 mL or MPN/100 ml, and single sample of 410 cfu/100 mL or MPN/100 mL…" Section 20.6.4.14(B) NMAC states that the monthly geometric mean shall be used in assessing attainment of criteria when a minimum of five samples are collected in a 30-day period. The Standards provide no guidance regarding evaluation of the single sample criterion. However, NMED has established procedures for assessing water quality standards attainment for state waters to fullfill its reporting obligations when preparing the CWA Section §303(d)/§305(b) Integrated Report (Comprehensive Assessment and Listing Methodology or "CALM"). CALM Table 3.9 ("Interpreting bacteriological data to assess Contact Use Support") establishes the following requirements for assessing attainment with the primary contact use (**LANL Exhibit 69** at 31):

- A minimum of four sample results is needed to assess use support - if there are less than four sample results, then the waterbody is not assessed.
- If 4 to 10 sample results are available – no more than one exceedance of the single sample criterion is allowed for the waterbody to be assessed as fully supporting its recreational use. If more than one exceedance of the single sample criterion is found then the waterbody does not support the use.
- If > 10 sample results are available – the waterbody fully supports its uses if the single sample criterion is exceeded in < 10% of the samples or the geometric mean criterion is met. Otherwise, the waterbody is not supporting its contact use.

NMED's CALM procedures also state the following with regards to application of data for making use attainment decisions (**LANL Exhibit 69** at 15):

> A determination of **Fully Supporting** or **Not Supporting** should not be made in the absence of data. It is understood that any assessment may

> involve some level of best professional judgment (BPJ). However, evaluations based on BPJ, literature statements, or public comments without data to support the decision shall not be the only basis for a listing or de-listing. To those AUs [Assessment Units] for which there are no available data that meet the QA/QC requirements for any criteria within an applicable designated or existing use, a designation of **Not Assessed** will be assigned that use. (Emphasis in the original.)

Given that the purpose of the CALM procedures is to evaluate the attainment of uses based on water quality, it is reasonable to expect that the same water quality data thresholds used for determining whether a primary contact use is being attained for the purposes of the §303(d)/§305(b) Integrated Report would also be used for evaluating an existing use. Accordingly, stating that an existing use decision can be made on a single sample result is not only inconsistent with the state's CALM procedures but inconsistent with EPA's recommendations for consideration of magnitude, duration and frequency when applying its 304(a) criteria for *E. coli*. The WQCC should not adopt the approach nor rely on staff analysis based on this approach.

Q. HAS NMED'S DIRECT TESTIMONY CHANGED LANL'S PROPOSAL?

A. Yes, my direct testimony included a recommendation for the establishment of a clear process to evaluate existing uses. In general, I testified that the process should include five key steps. Based on my review of NMED's direct testimony and relevant exhibits I am proposing modifications to these steps.

Q. PLEASE EXPLAIN YOUR PROPOSED MODIFICATION.

A. My direct testimony included the following five recommended steps for conducting an EUA (**LANL Exhibit 2** at 33):

- Step 1 – Finalize the EUA Work Plan;

- Step 2 – Implement the existing use investigation by compiling existing data, as required by the Work Plan, and collecting additional data, where necessary, to fill critical data gaps;
- Step 3 – Conduct the existing use analysis, i.e., determining if a higher attainable use is applicable to the waterbody;
- Step 4 – Prepare and submit a petition to the WQCC to modify the designated use or uses for the studied waters, if warranted by the analysis; and
- Step 5 – would be dependent on the findings of the WQCC. If the WQCC adopts revisions to 20.6.4 NMAC as a result of the EUA completed as part of this stepwise process, then under this step, the revised water quality standards and all supporting evidence would be submitted to the EPA Regional Administrator for review and approval. If the WQCC rejects the petition, then the proponents would need to determine whether to revise the petition for submittal again at a later date.

Based on my review of NMED's direct testimony, relevant exhibits, and the testimony provided above and given NMED's almost sole focus on water quality to evaluate existing uses and reliance on limited water quality data, I recommend the following modifications to Steps 2 and 3 above as originally recommended in my direct testimony:

- Step 2 – Implement the existing use investigation by compiling existing data, as required by the Work Plan, and collecting additional data, where necessary, to fill critical data gaps. This step shall include collection of (a) water quality data to assess attainment of the relevant water quality criteria (e.g., *E. coli* and pH criteria as they pertain to recreational uses); and (b) data regarding actual attainment of the use of the

water (e.g., flow/depth data) to evaluate whether activities consistent with the proposed use, such as swimming for a primary contact use, are possible such that there is considerable risk of ingesting water in quantities sufficient to pose a significant health hazard.

- Step 3 – Conduct the existing use analysis, i.e., determining if a higher attainable use is applicable to the waterbody. When evaluating water quality data, the thresholds for evaluating use attainment should be consistent with the State's approved CALM procedures for assessing use attainment for the purposes of preparing the biannual CWA §303(d)/§305(b) Integrated Report to EPA.

Consistent with our recommendations for Steps 2 and 3, as described above, LANL agrees with SJWC's direct testimony regarding the need to define what is acceptable evidence when conducting an EUA. More specifically, SJWC recommends: "The amount and type of data required for an EUA should be defined, either in the WQS or in the State of New Mexico Statewide Water Quality Management Plan and Continuing Planning Process…" SJWC Exhibit 2 at 13-14. LANL's proposed steps for completing an EUA supports this position.

IV. AMENDMENT 2 – PROPOSED DEFINITIONS FOR "BASEFLOW" AND "EFFLUENT-DOMINATED"

Q. HAVE YOU REVIEWED NMED'S PROPOSED AMENDMENTS TO 20.6.4.7(B)(1) AND 20.6.4.7(E)(2) NMAC, AND THE DIRECT TESTIMONY OF SHELLY LEMON FILED ON BEHALF OF NMED IN NMED EXHIBIT 1?

A. Yes.

Q. PLEASE SUMMARIZE YOUR UNDERSTANDING OF THE PROPOSED AMENDMENT TO 20.6.4.7(B)(1) AND 20.6.4.7(E)(2) NMAC.

A. NMED has proposed to add a definition for "baseflow" to be used in another new proposed definition for "effluent-dominated." These definitions as stated in NMED's proposed amendments are as follows (NMED Exhibit 9 at 2, 3):

> "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."
>
> "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.

According to the direct testimony of Ms. Lemon, adding the definition for "baseflow" will "provide reference to the term as it applies to flow condition and to clarify the word in the proposed definition of 'effluent dominated'" and "adding the definition will provide clear guidance in the implementation of water quality standards." NMED Exhibit 1 at 13.

Q. WHAT IS LANL'S POSITION ON THE PROPOSED AMENDMENTS TO ADD 20.6.4.7(B)(1) AND 20.6.4.7(E)(2) NMAC?

A. LANL disagrees with the addition of these two new definitions.

Q. PLEASE EXPLAIN THE BASIS FOR LANL'S RECOMMENDATION THAT THE WQCC NOT ADOPT THESE DEFINITIONS.

A. There are several reasons why LANL recommends that the WQCC not adopt these proposed definitions:

- The purpose of 20.6.4.7 NMAC is to provide definitions to terms used in this part of the New Mexico Administrative Code. Currently, neither the term "baseflow" nor the

term "effluent dominated" is used in 20.6.4 NMAC, and based on NMED's proposed changes to 20.6.4 NMAC during this Triennial Review (NMED Exhibit 9), these terms are not included in any proposed language in 20.6.4 NMAC, except as new proposed definitions.

- NMED states that: "baseflow" is needed "to provide reference to the term as it applies to flow condition and to clarify the word in the proposed definition of 'effluent dominated'." NMED Exhibit 1 at 13. In other words, "baseflow" is only needed because the term is used in the proposed "effluent dominated" definition. If "baseflow" requires definition only because it is used in the proposed "effluent dominated", but "effluent dominated" is not used anywhere else in 20.6.4 NMAC, then as stated above, the term is not needed.
- NMED states that the "effluent dominated" definition should be added because it is used in "several procedural documents" with two examples provided: "…state's WQMP/CPP (Water Quality Management Plan and Continuing Planning Process) and EPA's Technical Support Document for Water Quality Based Toxics Control ("TSD") regarding NPDES permits." NMED Exhibit 1 at 13-14. First, if these terms are being used in other procedural documents, then the appropriate place to define these terms is in those documents. Second, with regards to the two examples provided, I did not find the term "effluent dominated" used anywhere in the WQMP/CPP (**LANL Exhibit 70**). In the TSD, the term is used infrequently, only six times in the 145 page main body of the document (**LANL Exhibit 71**). All instances of use of the term are in the context of the development of National Pollutant Discharge Elimination System ("NPDES") permit requirements. Not only are these requirements not a component of 20.6.4

NMAC, but EPA is responsible for authorizing NPDES permits for wastewater discharges in the State of New Mexico. Adding an "effluent dominated" definition in 20.6.4 NMAC will not likely influence that process.

- NMED also provides this reason for proposing an "effluent dominated" definition (NMED Exhibit 1 at 14):

> adding a definition for the term "effluent dominated" will be applicable should the State adopt a designated aquatic life use for "effluent dominated" waters. These waters may not be able to attain all the current applicable criteria (e.g., nutrients) and more environmental harm may be caused if the discharge ceases, which would eliminate a reliable source of baseflow for aquatic life and wildlife. (Emphasis added).

Given that NMED is not actually proposing to adopt a designated aquatic life use for "effluent dominated" waters in this Triennial Review (NMED Exhibit 9), proposing to adopt a definition for this purpose is premature. If NMED makes such a proposal in a future Triennial Review, LANL agrees it may be be appropriate to propose a definition for "effluent dominated" at that time. This approach would be consistent with other states that have adopted a definition for "effluent dominated." For example, Colorado defines "effluent-dominated" in its water quality standards (5 Code of Colorado Regulations ["CCR"] 1002-31.5(18)), because the term is specifically used in relation to Tier 1 waters under its antidegradation regulations at 5 CCR 1002-31.8(2)(b) (**LANL Exhibit 72**). Other states have defined a similar term, "effluent-dependent," in their respective water quality standards because each state has established use classifications and numeric water quality criteria specific to these types of waterbodies:

- Arizona: The term "effluent-dependent water" is defined at Arizona Administrative Code ("AAC") Section R18-11-101.17. The term is used to

classify specific waters that meet the "effluent-dependent water" definition under AAC R18-11-113. The state applies specific numeric aquatic and wildlife criteria to these waters ("$A\&W_{edw}$") in AAC R18-11-Appendix A (**LANL Exhibit 73**) .

- Wyoming: The term "effluent dependent water" is defined in Wyoming's surface water quality standards (Wyoming Administrative Code 020-0011 Chapter 1, Section 2(b)(xiii)) for the purpose of supporting the definitions of three types of classified waters: Class 2D (effluent dependent waters known to have resident fish populations); Class 3D (effluent dependent waters that support aquatic communities other than fish); and Class 4C (isolated waters including off channel effluent dependent ponds). Section 36 of the Wyoming surface water quality standards establish numeric criteria applicable to these classes of waters (**LANL Exhibit 74**).

Finally in addition to the reasons stated above for not supporting the adoption of the proposed definitions, LANL disagrees with the insertion of the "value" statement at the end of the proposed definition of an "effluent dominated" water (NMED Exhibit 9 at 3):

> "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. (Emphasis added).

The primary portion of this definition is hydrology-based, as is the proposed "baseflow" definition. The non-hydrology related statement at the end of the definition does not provide any information regarding the hydrologic characteristics of the waterbody that make it "effluent dominated." Colorado's regulatory definition of an "effluent dominated" water is hydrology-based (**LANL Exhibit 72**) and the "effluent dependent" definitions

established by Arizona and Wyoming also focus on the flow characteristics of the water as it pertains to treated effluent (**LANL Exhibit 73**; **LANL Exhibit 75**). Similarly, when "effluent dominated" is used by EPA, the context is the source of the water, i.e., treated wastewater effluent (**LANL Exhibit 71**).

Q. DO YOU RECOMMEND THAT THE WQCC ADOPT THE PROPOSED AMENDMENT?

A. No, these proposed new definitions should not be adopted by the WQCC.

Q. HAVE OTHER PARTIES TO THIS PROCEEDING MADE RECOMMENDATIONS RELATED TO NMED'S PROPOSED AMENDMENTS TO ADD 20.6.4.7(B)(1) AND 20.6.4.7(E)(2) NMAC?

A. Yes.

Q. PLEASE SUMMARIZE THOSE RECOMMENDATIONS?

A. The SJWC does not support the adoption of either the "baseflow" or "effluent dominated" proposed definitions. The reasons presented in their direct testimony are similar to the reasons I have presented above (SJWC Exhibit 2 at 7):

> …neither term is used elsewhere in the WQS. The definitions are therefore not needed and could create confusion concerning their applicability to other WQS. The appropriate time to adopt these new definitions is when another WQS is adopted that incorporates the terms "baseflow" and/or "effluent dominated." Further, it is not possible to determine whether the proposed definitions are appropriate without knowing the context in which they may be used, if ever, in future WQS.

Similarly, Amigos Bravos notes that neither "baseflow" nor "effluent dominated" are referred to in 20.6.4 NMAC. Accordingly, they serve no regulatory purpose. Amigos Bravos Exhibit 3 at 11-12. Amigos Bravos also stated its significant concerns regarding the concept of explicitly defining "effluent dominated" waters as it "could represent the

first step in setting up a framework in which some waters may be considered less important or less worthy of protection than other waters." *Id*. at 12. For these reasons. Amigos Bravos's first recommendation is that both definitions should be deleted from the proposed changes to 20.6.4.7 NMAC. However, Amigos Bravos does offer an alternative to NMED's proposal. Specifically, they would delete the "effluent dominated" definition but modify the proposed "baseflow" definition by revising it to remove any use of the term "effluent dominated" in the definition. *Id*. at 13.

Q. DOES THAT TESTIMONY CHANGE LANL'S POSITION?

A. No. SJWC and Amigos Bravos also recommend that the WQCC not adopt NMED's proposed amendments to add 20.6.4.7(B)(1) and 20.6.4.7(E)(2) NMAC.

IV. ADDITIONAL CHANGES PROPOSED BY OTHER INTERESTED PARTIES

Q. DOES YOUR REBUTTAL TESTIMONY ADDRESS PROPOSALS PREPARED BY OTHER INTERESTED PARTIES?

A. Yes. LANL will provide rebuttal testimony on the following: Amigos Bravos's proposal to amend the "existing use" definition at 20.6.4.7(E)(3) NMAC.

Q. HAVE YOU REVIEWED AMIGOS BRAVOS'S PROPOSED AMENDMENT TO NMAC 20.6.4.7.E(3) AND THE DIRECT TESTIMONY OF RACHEL CONN FILED ON BEHALF OF AMIGOS BRAVOS?

A. Yes.

Q. PLEASE SUMMARIZE YOUR UNDERSTANDING OF THE AMIGOS BRAVOS PROPOSED AMENDMENT TO 20.6.4.7(E)(3) NMAC.

A. Amigos Bravos's direct testimony includes a proposal to modify the definition of "existing use" (Amigos Bravos Exhibit 1 at 4, underlined text indicates new language proposed by Amigos Bravos):

> (3) "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. An existing use can be established by demonstrating that fishing, swimming, or other uses have actually occurred since November 28, 1975; or that the water quality is suitable to allow the use to be attained.

Amigos Bravos provided the following reason for its proposal to revise the "existing use" definition (Amigos Bravos Exhibit 3 at 13-14):

> In its Water Quality Standards Handbook, EPA more clearly explains 'existing use.' According to EPA: An 'existing use' can be established by demonstrating that:
> - fishing, swimming, or other uses have actually occurred since November 28, 1975; or
> - that the water quality is suitable to allow the use to be attained—unless there are physical problems, such as substrate or flow, that prevent the use from being attained.
>
> EPA underlined the "or" in its Handbook, stressing that an existing use can be determined either by showing that fishing or swimming has occurred in the water body or that the water quality is suitable for the use.

Amigos Bravos's testimony continues on, stating that their proposal relies "on EPA's more precise language" and that the proposed modification to 20.6.4.7.E(3) NMAC "mirrors EPA's language." *Id.* at 14.

Q. WHAT IS LANL'S POSITION ON THE AMIGOS BRAVOS PROPOSED AMENDMENT TO 20.6.4.7(E)(3) NMAC?

A. LANL opposes the proposed modification to the "existing use" definition suggested by Amigos Bravos and recommends that the WQCC not adopt this amended definition.

Q. PLEASE EXPLAIN THE BASIS FOR LANL'S RECOMMENDATION THAT THE WQCC NOT ADOPT AMIGOS BRAVOS'S PROPOSED AMENDMENT TO 20.6.4.7(E)(3) NMAC.

A. First, Amigos Bravos indicates that the proposed modification to the "existing use" definition relies on EPA's "more precise language". While the proposed modification is closer to EPA's language, it leaves out a critical qualifier relevant to the water quality language: "unless there are physical problems, such as substrate or flow, that prevent the use from being attained." (Amigos Bravos Exhibit 3 at 13; **LANL Exhibit 75** at 4). The EPA's clarifying text is critical since it makes clear that an evaluation of an "existing use" has two key components – the actual use of the water itself (e.g., swimming) and the water quality to protect that actual use. With regards to the latter, EPA recognizes that you can have excellent water quality and still not be able to actually use the waterbody in certain ways, e.g., you cannot physically swim where there is insufficient water.

As Amigos Bravos notes, the source of the existing use language is the WQS Handbook, specifically in Chapter 4: Antidegradation (Amigos Bravos Exhibit 3 at 13). A review of the antidegradation regulations sheds light on why the qualifier regarding "physical problems" preventing the use from being attained is a key part of the definition.

The original federal water quality standards regulation promulgated in 1983, which was codified at 40 CFR § 131.12 (Antidegradation Policy and Implementation Recommendations) states the following regarding protection of existing uses under the Antidegradation Policy (**LANL Exhibit 76** at 51,407):

> (a) The State shall develop and adopt a statewide antidegradation policy. The antidegradation policy shall, at a minimum, be consistent with the following: (1) Existing instream water uses and the level of water quality

> necessary to protect the existing uses shall be maintained and protected (Emphasis added).

The original regulation uses an "and" which creates a relationship between the actual instream water use and the level of water quality needed to protect the use. This regulation at 40 CFR § 131.12(a)(1) remains the same today (NMED Exhibit 27).

After adoption of the 1983 water quality standards regulation, questions arose regarding how the Antidegradation Policy at 40 CFR § 131.12 should be implemented by states and tribes. EPA published "Question and Answers on Antidegradation" in 1985 to address these questions.[2] Question #7 in this guidance asks: "7) What is the proper interpretation of the term 'An Existing Use'?" EPA states the following (**LANL Exhibit 77** at 2):

> An existing use can be established by demonstrating that fishing, swimming, or other uses have actually occurred since November 28, 1975, or that the water quality is suitable to allow such uses to occur (unless there are physical problems which prevent the use regardless of water quality).

EPA's answer includes the "or" language between the reference to the actual use occurring and having suitable water quality; however, EPA qualified the water quality component, recognizing that there may still be "physical problems" preventing the use from being attained. As Amigos Bravos notes in its testimony (Amigos Bravos Exhibit 3 at 13), this same recognition is found in the WQS Handbook, Chapter 4 (**LANL Exhibit 75**).

Since 1985, EPA has continued to update its guidance on how to evaluate whether a use is existing. In its response to questions raised by the State of Oklahoma in 2008 the EPA prepared a new question and answer document regarding existing uses (**LANL Exhibit 32**; **LANL Exhibit 2**; NMED Exhibit 62). EPA's online version of the WQS

[2] Today, EPA includes this document as Appendix G of its WQS Handbook.

Handbook, Chapter 4, Section 4.4 provides a link to this 2008 document (*Id*. at 4) which includes the following question: "3) How should a state or tribe determine the existing use for a waterbody?" EPA provides a lengthy response that includes the following excerpts (**LANL Exhibit 32**):

> A state or tribe should determine existing uses on a site-specific basis to ensure it has identified the highest degree of uses and water quality necessary to support the uses that have been achieved since November 2, 1975. When describing existing uses, states and tribes should articulate not only the use(s) that has been achieved, but also the water quality supporting the specific use(s) that has been achieved….(Emphasis added).
>
> In a 1985 Antidegradation Questions and Answers document, EPA said "An existing use can be established by demonstrating that fishing, swimming, or other uses have actually occurred since November 28, 1975 or that the water quality is suitable to allow such uses to occur (unless there are physical problems which prevent the use regardless of water quality.)" While this approach allows states to make an existing use determination where it only has information on one or the other type of information, some have interpreted this statement as obligating states to ignore one set of information where both types are available. EPA has found that, in practice, taking into account all the available information results in a more accurate articulation of the existing uses. In addition, the 1985 policy was stated under the assumption that states and tribes would likely describe existing uses in the same terms or categories employed for designated uses. However, during the time since issuing those Qs and As, EPA has seen increasingly complex issues arise regarding the implementation of the existing use provisions of the Federal water quality standards regulations. It has become apparent that using the same designated use categories to describe existing uses may be insufficiently detailed to accurately describe the existing use.
>
> Under the clarification that states and tribes are not bound to describing their existing uses with the same categories employed for designated uses, the following summarizes how states and tribes should determine existing uses.
>
> 1. Where a use (i.e., some degree of use related to aquatic life, wildlife, and human activity) has actually been achieved on or after November 28, 1975, the existing use is the highest degree of use and the water quality that has been achieved and is necessary to support the use…; and (emphasis in the original)

> 2. Where the water quality achieved was sufficient to support a use on or after November 28, 1975, but the use (i.e., some degree of use related to aquatic life, wildlife, and human activity) has not occurred, the federal regulations provide states and tribes the discretion to determining whether or not this is an existing use. In this case, however, it would be reasonable to presume the use is attainable and that a state or tribe would need to explain the factors unrelated to water quality (e.g. human caused conditions that cannot be remedied, hydrologic modifications) that are limiting the attainment of the use before it can be removed….
>
> It is appropriate to describe the existing uses of a waterbody in terms of both actual use and water quality because doing so provides the most comprehensive means of describing the baseline conditions that must be protected. In identifying an existing use, it is important to have a high degree of confidence because a state or tribe may not remove an existing use when revising designated uses, regardless of whether the existing use remains attainable. This is also important because EPA's antidegradation provisions require any CWA authorization of a discharge or activity that may result in a discharge to protect the existing use… (Emphasis added).

Based on this recent EPA guidance regarding how to determine if a use is existing, coupled with EPA's WQS Handbook that recognizes that physical limitations may limit the attainability of a use regardless of the water quality, LANL opposes Amigos Bravos's proposed modification to the "existing use" definition.

Q. DO YOU RECOMMEND THAT THE WQCC ADOPT THE PROPOSED AMENDMENT?

A. No.

Q. PLEASE EXPLAIN THE BASIS FOR YOUR RECOMMENDATION.

A. For the reasons I have stated above, fundamentally Amigos Bravos's proposed amendment to the definition of "existing use" fails to consider that an evaluation of an "existing use" has two key components – the actual use of the water itself (e.g., swimming) and the water quality to protect that actual use. LANL recommends that the WQCC reject Amigos Bravos's proposed "existing use" definition amendment.

V. CONCLUSION

Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A. Yes.

Exhibit 59

STATE OF NEW MEXICO
BEFORE THE WATER QUALITY CONTROL COMMISSION

IN THE MATTER OF:

THE PETITION TO AMEND
THE STANDARDS FOR INTERSTATE
AND INTRASTATE SURFACE WATERS,
20.6.4 NMAC **WQCC No. 20-51(R)**

REBUTTAL TESTIMONY OF ROBERT M. GALLEGOS ON BEHALF OF TRIAD NATIONAL SECURITY, LLC AND THE U.S. DEPARTMENT OF ENERGY, NATIONAL NUCLEAR SECURITY ADMINISTRATION

June 22, 2021

I. INTRODUCTION

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Robert M. Gallegos. My office is located in Technical Area 59, Building 96 at Los Alamos National Laboratory.

Q. ON WHOSE BEHALF ARE YOU SUBMITTING REBUTTAL TESTIMONY?

A. I am submitting this rebuttal testimony on behalf of Triad National Security, LLC, ("Triad") and the U.S. Department of Energy, National Nuclear Security Administration ("DOE") (collectively "LANL").[1]

Q. HAVE YOU PROVIDED PREVIOUS TESTIMONY IN THIS CASE?

A. Yes, I provided direct testimony which includes: (i) a summary of my qualifications and experience; (ii) a discussion of LANL's evaluation of and proposed changes to the amendments proposed by New Mexico Environment Department ("NMED") to the Standards for Interstate and Intrastate Surface Waters, 20.6.4 NMAC ("Standards") set forth in NMED's August 18, 2020 Petition ("Original Petition") and NMED's March 12, 2021 Notice of Amended Petition ("Amended Petition"); and (iii) the technical bases for certain related modifications to the Standards proposed in LANL's Notice of Intent to Present Technical Testimony ("LANL's Notice of Intent"). My direct testimony was submitted with LANL's Notice of Intent, filed on May 3, 2021, as **LANL Exhibit 3**.

Q. PLEASE BRIEFLY SUMMARIZE SOME OF THE CONCLUSIONS THAT YOU REACHED IN YOUR DIRECT TESTIMONY.

A. In my direct testimony, I provided the historical context for use classifications of waters within the LANL property and discussed the technical basis supporting LANL's proposed

[1] DOE and predecessor and current operators of LANL are referred to in my testimony collectively as "LANL" to avoid unnecessary entity name complications.

reclassification of certain surface water segments from 20.6.4.128 NMAC ("Section 128") to 20.6.4.126 NMAC ("Section 126"), as well as the technical basis supporting LANL's proposed reclassification of certain surface water segments from Section 128 to new 20.6.4.140 NMAC ("Section 140"). In addition, I testified about NMED's proposed amendments to sections 20.6.4.10(B) and 20.6.4.10(C) NMAC to address the process for amending an existing or designated use or a numeric criterion.

Specifically, I provided the historical context for the development of Section 126 and Section 128 waters, concluding that all waters within lands managed by DOE within LANL are currently classified. I also testified about the October 9, 2015 "Joint Stipulation Regarding Proposed Changes to 20.4.6.128 NMAC" between LANL, NMED, and Amigos Bravos (the "2015 Joint Stipulation"), the process that LANL, NMED, and Amigos Bravos conducted together to evaluate Section 128 waters, and described the assessments conducted by LANL, or jointly with NMED and in a few instances with NMED and Amigos Bravos, using the Hydrology Protocol ("HP")[2] in NMED's Water Quality Management Plan and Continuing Planning Process ("WQMP/CPP"), Appendix C (https://www.env.nm.gov/surface-water-quality/hp/) across all LANL watersheds beginning in 2017. Based on those assessments and other high quality data, relevant portions of which I included with my direct testimony, I supported LANL's recommendations to the New Mexico Water Quality Control Commission ("WQCC") that certain Section 128 waters be reclassified as Section 126 waters and that others be reclassified to new Section 140 waters.

[2] The Hydrology Protocol is provided for in the WQMP/CPP (Section II and Appx C), and provides a methodology for distinguishing among ephemeral, intermittent, and perennial streams and rivers in New Mexico. It also generates documentation of the uses supported by those waters as a result of the flow regime.

Lastly, I testified about NMED's October 2020 discussion draft "Existing Use Analysis Work Plan for Classified Waters Within Los Alamos National Laboratory Identified Under 20.6.4.128 NMAC" ("Draft EUA Work Plan"). I recommended changes to the Draft EUA Work Plan, that such a process to modify existing uses include all available, relevant, high quality data in a collaborative and transparent way, and that the WQCC initiate development of that procedural framework to provide consistency in decision-making and ensure that the required new information and documentation are properly developed to support decisions by the WQCC to modify existing uses.

Q. HAVE YOU REVIEWED THE PRE-FILED DIRECT TESTIMONY FILED IN THIS MATTER BY NMED, THE NEW MEXICO MINING ASSOCIATION ("NMMA"), THE SAN JUAN WATER COMMISSION ("SJWC"), AND AMIGOS BRAVOS?

A. Yes, I have.

Q. DID THE PRE-FILED DIRECT TESTIMONY FILED BY NMED, NMMA, SJWC, AND AMIGOS BRAVOS CAUSE YOU TO RECONSIDER THE CONCLUSIONS AND PROPOSED REVISIONS TO 20.6.4 NMAC CONTAINED IN YOUR DIRECT TESTIMONY?

A. With one exception, the NMED and other parties' testimony does not change my analysis and I maintain and affirm my direct testimony, particularly my direct testimony regarding sections 20.6.4.126, 20.6.4.128, and 20.6.4.140 NMAC addressing classification of waters within lands managed by DOE within LANL and sections 20.6.4.10 and 20.6.4.15 NMAC addressing the Use Attainability Analysis ("UAA") and Existing Use Analysis ("EUA") process and data requirements. The one exception is that LANL's evaluation of additional

data in response to NMED's direct testimony regarding 20.6.4.140 NMAC resulted in LANL's determination that proposed reclassification of the stream reach in Effluent canyon from Section 128 to Section 140 is premature and requires additional study. The direct testimony filed by NMED and the other parties in this matter also raised certain issues and concerns that I will respond to in this rebuttal testimony.

Q. ON WHAT TOPICS ARE YOU OFFERING REBUTTAL TESTIMONY?

A. I am presenting rebuttal testimony to respond to the direct testimony of NMED and other parties to this proceeding relating to the following proposed amendments to 20.6.4 NMAC:

- Review of Standards; Need for Additional Studies section (20.6.4.10(B) NMAC): NMED's proposal to add a new subsection to clarify the required process for amending a designated use and the direct testimony of Jennifer Fullam and NMED Exhibit 73 "Existing Use Analysis for Effluent Canyon, Upper S-Site Canyon and Two-Mile Canyon from Water Canyon upstream to its confluence with Upper Two-Mile Canyon" ("NMED EUA");
- The corollary point that the 2015 Joint Stipulation provides the framework to evaluate LANL Section 128 waters for more protective uses for this 2020 Triennial Review process.
- Use Attainability Analysis section (20.6.4.15 NMAC): NMED's proposals to amend sections 20.6.4.15(A), 20.6.4.15(D) and 20.6.4.15(E) NMAC regarding UAA procedures.
- Definitions sections (20.6.4.7(B), (C), (E)(2) NMAC) and the related WQS Objectives section 20.6.4.6(D) NMAC: NMED's proposed definitions for "baseflow," "climate change," and "effluent dominated" included in the NMED Exhibit 1, Direct Technical

Testimony of Shelly Lemon ("NMED Exhibit 1" or "Lemon Direct") and NMED"s proposal to add a statement that the Standards address threats to water quality from climate change.

- Rio Grande Basin (20.6.4.128 NMAC): NMED's proposed modification of the limited aquatic life designated use for Section 128 (included in the NMED Exhibit 4, Direct Technical Testimony of Jennifer Fullam ("NMED Exhibit 4" or Fullam Direct")) based upon NMED's reinterpretation of the United States Fish and Wildlife Service ("FWS") 2002 study entitled *A Water Quality Assessment of Four Intermittent Streams in Los Alamos County, New Mexico* (the "FWS Report"), NMED's allegation that there is an "apparent discrepancy" between the UAA approved by the WQCC in 2007 to support the WQCC's adoption of Section 128 and the 2002 FWS Report (NMED Exhibit 4 at 29), and NMED's direct testimony that the WQCC erred in establishing limited aquatic life use for Section 128.
- Rio Grande Basin (20.6.4.126 NMAC): supporting the proposed reclassification of certain stream segments from ephemeral and intermittent (under 20.6.4.128 NMAC) to perennial (under 20.6.4.126 NMAC) and rebutting NMED's "declassification" of certain stream segments recently identified as having perennial flow characteristics;
- Rio Grande Basin (20.6.4.140 NMAC): NMED's proposal to establish a new classification for intermittent stream segments and related designated uses and criteria, specifically the direct testimony of Jennifer Fullam and NMED Exhibit 73 and the need for a transparent, stakeholder-involved, credible process for collecting and considering the best available scientific evidence relevant to the classification of LANL waters, and the fact that currently, that process is set forth in the 2015 Joint Stipulation.

II. RECOMMENDED PROCESS AND DATA FOR AN EXISTING USE ANALYSIS

Q. HAVE YOU REVIEWED NMED'S DIRECT TESTIMONY REGARDING ITS PROPOSED EXISTING USE ANALYSIS PROCESS?

A. Yes, I have.

Q. BASED ON YOUR REVIEW OF THE DIRECT TESTIMONY OFFERED BY JENNIFER FULLAM IN SUPPORT OF NMED'S PROPOSAL, WHAT DO YOU UNDERSTAND TO BE THE BASIS FOR NMED'S PROPOSAL?

A. NMED proposes to add a new subsection 20.6.4.10(B) NMAC, as further revised in its Amended Petition (NMED's proposed Amended Petition changes are shown in bold lettering compared to NMED's Original Petition proposal):

> 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 be no less stringent than the existing use.

In NMED Exhibit 4 (Fullam Direct), NMED explains that the new provision is to clarify that existing uses may have higher water quality than required by the designated use and to "clarify" the required process for amending a designated use where the existing use is more "stringent" than the designated use.

Q. DID YOUR DIRECT TESTIMONY ADDRESS THE BASIS FOR NMED'S PROPOSAL?

A. Yes, in my direct testimony I identified and provided technical support for the principles that a change in the designated use must be based upon all available, high quality data and information and that if insufficient data is available, further study should be conducted. Additionally, the change must be made by WQCC decision and there must be a explicit

process to develop the necessary data and information and then bring the proposed change to the WQCC.

Q. WHAT IS YOUR ANALYSIS OF NMED'S BASIS FOR ITS POSITION REGARDING NEW SUBSECTION 20.6.4.10(B) NMAC?

A. While LANL supports the proposal to amend and to add a new subsection for clarification, in my direct testimony (**LANL Exhibit 3,** Section III.6.), LANL suggested language to tighten and further clarify the new subsection, in part because NMED's mixed references to uses and water quality are confusing. LANL recommends the following revisions to proposed 20.6.4.10(B) NMAC (LANL's proposed changes are shown compared to NMED's Original Petition proposal with additions shown in underlining and deletions shown in strikeout):

> In accordance with 40 CFR 131.10~~(i)~~, when an existing use of a water, as defined in 20.6.4.7 NMAC, requires a higher level of protection ~~is more stringent~~ than the current designated use and new supporting evidence demonstrates the presence of that use, the designated use shall be amended accordingly to ~~be no less stringent than~~ protect the existing use. This action can only be taken after the commission has established formal procedures, through the water quality management plan continuing planning process, to amend a designated use that is found to be less restrictive than an existing use. The process described in this section may not be used where the commission has already made a determination concerning the existing use of classified waters of the state.

First, while not specifically called out in my direct testimony but included in our proposed changes to 20.6.4.10(B) NMAC, we recommend that uses not be described with the term "stringent". The use of the term stringent is more suitable in the context of water quality criteria, which we believe is more consistent with EPA regulations (e.g., 40 CFR §§ 131.10(f) ("requiring less stringent water quality criteria"), 131.10(h)(1) (referencing "a use requiring more stringent criteria"); *see also* 131.10(j)(2) and (k)(2)). LANL expert witness, Barry Fulton, addressed this concern in his direct testimony (**LANL Exhibit 6** at

10-12) and in his rebuttal testimony (**LANL Exhibit 62** at 10-12). I adopt and affirm Mr. Fulton's testimony on this point.

Second, the federal regulations, 40 CFR § 131.10(i), are narrower than NMED's proposed 20.6.4.10(B) NMAC in that the federal provision focuses on uses; it does not include water quality. 40 CFR § 131.10(i) provides that when the 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." Accordingly, LANL proposed deleting the reference to subsection (i) as it provides only partial support for NMED's proposed change.

Third, 40 CFR § 131.10(i) does require that the State "revise its standards to reflect the uses actually being attained." This means that there must be a process to revise standards. Because the WQCC is the governmental body in New Mexico with the authority to revise water quality standards, it is important that the WQCC establish that process and that the process enables the WQCC to adopt revised standards, as appropriate. NMED's proposed language does not reference a process, creating uncertainty and confusion as to how existing uses would become designated uses under proposed 20.6.4.10(B) NMAC.

Q. DO YOU SUPPORT NMED'S PROPOSED ADDITION OF 20.6.4.10(B) NMAC AND NMED'S PROPOSED EXISTING USE ANALYSIS PROCESS?

A. No.

Q. WHAT ARE YOUR CONCERNS REGARDING NMED'S PROPOSED ADDITION OF 20.6.4.10(B) NMAC AND NMED'S PROPOSED EXISTING USE ANALYSIS PROCESS?

A. As I noted above, NMED's proposed new 20.6.4.10(B) NMAC does not add clarity, does not identify the process for modifying existing uses, and does not make it clear that it is the WQCC, not NMED, that approves any such changes. LANL has a number of specific concerns with NMED's proposed EUA process, including: (i) NMED's failure to apply the 2015 Joint Stipulation process to support proposed changes during this 2020 Triennial Review; (ii) NMED's effort to simultaneously propose an alternative EUA process for WQCC adoption while applying that unapproved process to modify classifications and water quality standards applied within LANL waters; (iii) NMED's purported declassification of classified Section 128 waters—rather than moving them to Section 126—based on new information showing certain stream reaches are perennial; and (iv) NMED's reliance on a flowchart that is illustrative only as the basis for its purported declassification of certain Section 128 waters. The following rebuttal testimony addresses each of these points.

(i) <u>The 2015 Joint Stipulation Process Applies</u>

The WQCC approved the 2015 Joint Stipulation and directed NMED, LANL, and Amigos Bravos to implement it to evaluate Section 128 waters and recommend any appropriate, agreed-upon changes to the WQCC during the next Triennial Review process (meaning the 2020 Triennial Review). The 2015 Joint Stipulation provides a framework to review the status of Section 128 waters, collect and analyze new information, and bring agreements for more protective uses to the WQCC. When a water is classified through the processes established by WQCC and EPA, the only way to increase protections is to bring data and evidence before the WQCC. *See* 40 CFR § 131.20(b). The work conducted under the 2015 Joint Stipulation provided a way, that was approved by the WQCC, to continue to refine

appropriate uses for Section 128 waters and build on previous work conducted by NMED, the FWS, and LANL. During the period since the 2015 Joint Stipulation was initated, a number of activities have been accomplished, as summarized in **LANL Exhibit 36** – Chronology of Activities Completed Under the Joint Stipulated Agreement. LANL understood—until NMED filed it's Amended Petition and issued a draft EUA process for limited review and comment—that the parties were proceeding to reach agreement on refining the classification of certain stream reaches within LANL by moving them from Section 128 to Section 126, in accordance with the 2015 Joint Stipulation process. Indeed, this is precisely what NMED proposed in its Original Petition.

NMED has never explained its abrupt shift between the time it filed the Original Petition to when it filed the Amended Petition. NMED has suggested that it would not now support a move from Section 128 to Section 126 because a UAA would be required to support recreational use even though NMED has already conducted a UAA and concluded that all waters classified in Section 128 have the existing and attainable use of secondary contact—a conclusion approved by the WQCC and adopted into the Section 126 and Section 128 Standards. However, NMED clearly did not believe a UAA was needed during the pre-petition process through the filing of the Original Petition given that NMED proposed amendments to Section 126 in its Original Petition. Furthermore, if a new UAA was the appropriate technical demonstration document for Section 128 waters studied under the 2015 Joint Stipuation, NMED efforts should have focused on preparing a UAA rather than on crafting a novel Existing Use Analysis document through a rushed and ill-defined process that is not set out in the Standards or described in the WQMP/CPP and has not been adopted by the WQCC.

LANL continues to propose moving certain reaches from Section 128 to Section 126, as I presented in my direct testimony (**LANL Exhibit 3**, Section III.2.), consistent with the only WQCC-approved process to make such modifications in this 2020 Triennial Review, namely the 2015 Joint Stipulation process. To the extent that a UAA may be required to support this move due solely to recreational use, NMED has conducted such UAA with EPA technical assistance and secondary contact has been approved by the WQCC and EPA (**LANL Exhibit 18**). NMED is offering no new information to modify the secondary contact use for all Section 126 and 128 waters as required by 40 CFR § 131.20(a).

Further, LANL is committed to contining to evaluate stream segments in Section 128, when warranted and as information and data become available that justify increased protections, these segments may be moved consistent with a process approved by the WQCC. As provided in 40 CFR § 131.10(k)(3) and an EUA procedural framework, if adopted by the WQCC, the classification of Section 128 waters can continue to be refined.

(ii) NMED's Unapproved EUA Process Does Not Apply

In the direct testimony of Jennifer Fullam and NMED Exhibit 73, the NMED EUA, NMED evaluates Section 140 waters utilizing an EUA process that the WQCC has not approved. Simultaneously, NMED is proposing amendments to the Standards to establish that EUA process as the process for conducting an existing use analysis. This is fundamentally inconsistent with the WQCC's decision directing the parties to implement the 2015 Joint Stipulation. It is contrary to procedural norms in which parties are advised of the relevant process before they are subject to that process. If allowed, it also would enable the NMED to conduct actions affected Standards without WQCC approval. NMED's Amended

Petition proposal for new 20.6.4.10(B) NMAC states, in part: "the designated use shall be amended accordingly to be no less stringent than the existing use" suggesting that NMED can effectuate the amended use despite there being no defined process. The process for existing use analysis and amendment must first be established and approved by the WQCC and only after the process is established should NMED use the WQCC-approved analysis.

Before any EUA process is applied, the EUA procedure should undergo a thorough vetting process established by the WQCC that includes a review, stakeholder and public input, and final approval by the WQCC. NMED did not mention the concept of using an EUA as a component of the 2015 Joint Stipulation until late 2020. NMED provided a draft workplan to the parties on October 27, 2020 (*after* NMED filed its Original Petition on August 19, 2020). NMED did not propose an EUA process until approximately 5 years after the WQCC approved the 2015 Joint Stipulation to address increased protections for LANL Section 128 Waters. This was also 5 years after the parties had already completed work on key provisions of the 2015 Joint Stipulation; including numerous exchanges of information, field work, data collection, benthic sampling and conducting hydrology protocols across all of LANL's watersheds with Section 128 Waters.

During this interim 5 year period, the parties reached tentative agreement on more protective uses for a number of Section 128 waters as envisioned by the 2015 Joint Stipulation. After meeting with NMED in November, 2020 to understand the EUA being proposed post-petition, LANL provided written comments to the EUA on January 6, 2021. The comments addressed a number of legal and technical concerns with the EUA workplan and requested the EUA be set aside and that the process continue to move forward under the 2015 Joint Stipulation. LANL remains concerned that it is inappropriate

for NMED to implement 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, purport to downgrade and declassify existing classified waters. The WQCC should adopt a formal process that includes planning, investigation, and analysis and that is public and transparent, before it revises a classified waters decision. Any such revision should be supported by a reasoned basis and a process that considers all relevant, defensible data to ensure that impartial and balanced decisions are reached. Until an EUA process is formally considered and adopted by the WQCC, the 2015 Joint Stipulation is the only WQCC-approved process for developing revisions to the WQCC's existing classifications of LANL waters.

(iii) NMED Cannot Unilaterally Declassify Section 128 Waters

As I testified on direct (**LANL Exhibit 3** at 10, 11), and as further explained in the direct testimony of Dr. Meyerhoff (**LANL Exhibit 2**) and the Affidavit of Mr. Michael Saladen (**LANL Exhibit 30**) and further documented in **LANL Exhibits 18** and **19**, all surface waters within LANL boundaries were classified and adopted into the Standards by the WQCC during the 2003 Triennial Review. LANL Section 126 waters were classified as perennial with coldwater aquatic life use, livestock watering, wildlife habitat, and secondary contact protections, and Section 128 waters were classified as ephemeral-intermittent with limited aquatic life use, livestock watering, wildlife habitat, and secondary contact protections. As adopted by the WQCC in 2007 and as the Section 128 Standards exist currently, Section 128 includes all LANL waters not specifically identified in Section 126. The actions by the WQCC included and provided protective uses for ***all*** surface waters within LANL boundaries. Upon completion of the UAA by NMED in 2007 (**LANL Exhibit 18**) that was approved and submitted by the WQCC to EPA, the

classifications and associated designated uses of Section 126 and 128 waters were approved by EPA. The map below, Attachment 2 from NMED's 2007 UAA (**LANL Exhibit 18**), identifies the Section 126 and Section 128 stream reaches adopted by the WQCC.

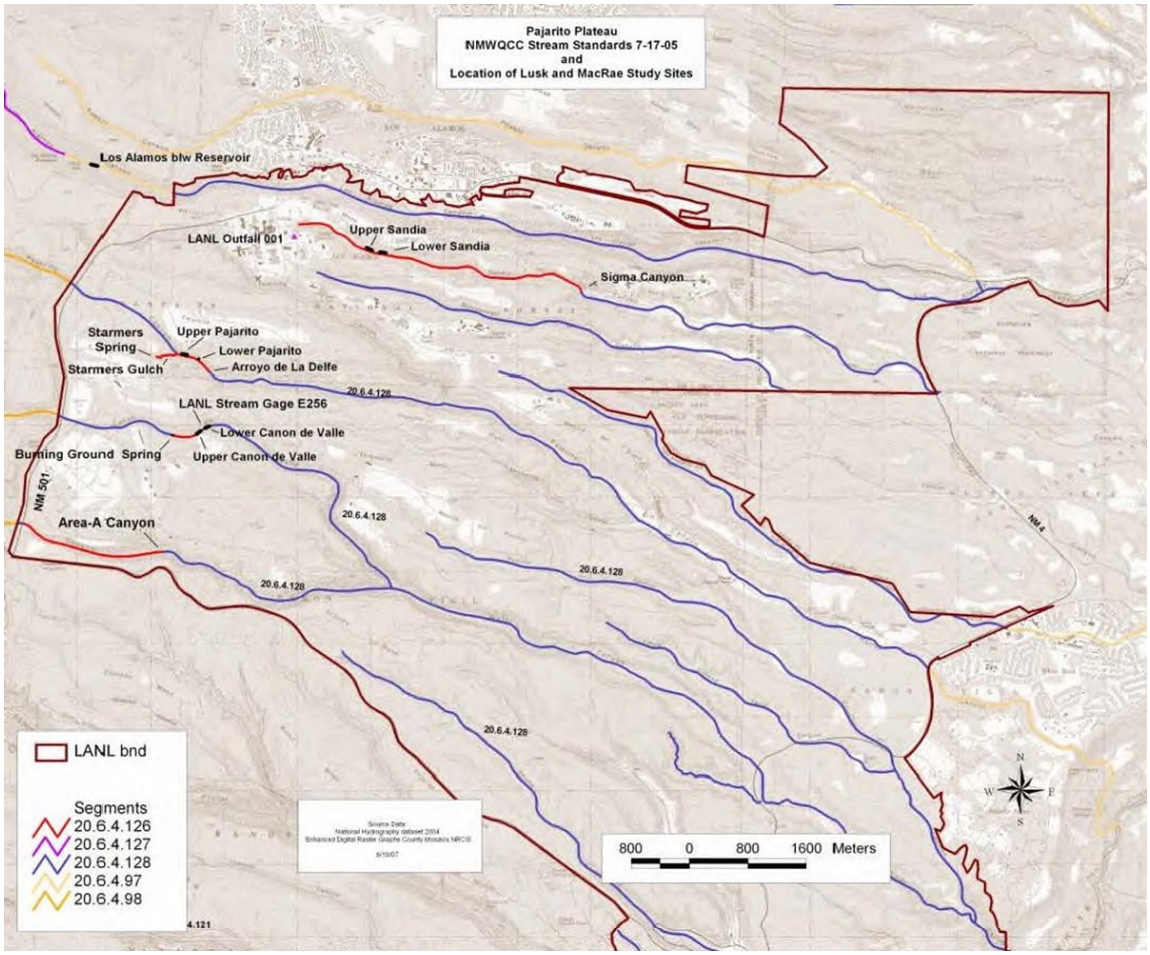

Figure 1 - Attachment 2 from NMED's 2007 UAA Showing 126 and 128 Reaches

NMED is now unilaterally asserting that certain Section 128 stream reaches are unclassified and fall within 20.6.4.99 NMAC ("Section 99"). While NMED is not proposing a change to 20.6.4.126 NMAC, NMED direct testimony of Fullam (NMED Exhibit 4, Section VII at 46-48) indicates that it identified previously unclassified perennial waters at LANL and proposes to designate those stream reaches as unclassified perennial waters, subject to Section 99. NMED's approach is problematic for several reasons. First,

this approach contravenes the WQCC's classification scheme for LANL waters. Second, the approach advocated by NMED ignores the WQCC's directions to follow the 2015 Joint Stipulation process and permits NMED to override WQCC classification determinations at the staff level based on what may be close calls on hydrology or incomplete, or non-representative data.

Third, NMED's position on Section 126 will result in a lower level of aquatic life protection in the affected stream reaches. Unclassified perennial waters (Section 99) have designated uses protecting for primary contact, warmwater aquatic life, livestock watering, and wildlife habitat. LANL proposes to move these limited perennial stream segments to Section 126 where they will have greater aquatic life protection, specifically coldwater aquatic life use, livestock watering, wildlife habitat, and secondary contact protections.

As I testified in my direct testimony (**LANL Exhibit 3**, Section III.2), LANL proposes to move two segments from Section 128 to Section 126: (1) Pajarito canyon from 0.5 miles below Arroyo de La Delfe upstream to Homestead Spring; and (2) Arroyo de la Delfe from Pajarito canyon to Kieling Spring. *See also* **LANL Exhibits 38** and **39**. These waters were only recently identified with a perennial hydrology by implementing the 2015 Joint Stipulation process. NMED's unilateral proposal to declassify classified Section 128 waters by moving them into unclassified Section 99 waters with warmwater aquatic life use protection and primary contact is inappropriate and inconsistent with objectives of the 2015 Joint Stipulation. The new information developed by the parties through the 2015 Joint Stipulation process should not be used to move classified waters into an unclassified category by default. All reclassification decisions should be based upon the science and the data and must be approved by the WQCC.

The WQCC classified all waters within LANL in 2007. The waters within Section 128 were understood to be correctly described as intermittent/ephemeral at the time the WQCC classified them into Section 128 instead of Section 126. Since all LANL waters are already classified, none of the waters within LANL should ever default to unclassified Section 99 based on NMED adminstrative action, including any that were only recently determined to be perennial. NMED ignores all of these facts and, instead, applies an extremely narrow reading of both Section 126 and Section 128 to reach the illogical outcome of declassifying classified waters automatically, by default, without WQCC action.

To elaborate, NMED suggests that because Section 126 currently lists specific perennial reaches, any other reach that is newly determined to meet perennial flow characteristics must not have been classified in 2007, therefore it is an unclassified, Section 99 water. NMED Exhibit 4 at 46-47. Similarly, NMED posits that Section 128 addresses "ephemeral and intermittent portions of watercourses" within LANL, therefore any Section 128 water newly determined to meet perennial flow characteristics must be unclassified. *Id.* LANL has proposed a more logic approach. LANL proposes that the WQCC add "including but not limited to" to Section 126 to clarify that the list of perennial waters in that section is not exclusive; as conditions change and more refining work is done, other small stream reaches may be identified with perennial flow. Where work under the 2015 Joint Stipulation, including HP assessments and other data gathering, have identified limited reaches of 128 water that now have perennial flow, those waters should be reclassified into Section 126. A UAA is not required to evaluate recreational uses, because all waters within LANL were designated for secondary contact recreational use. Thus,

recreational uses for waters that were classified into Section 128 are the same as for Section 126. And the proposed move from Section 128 to Section 126 provides ***greater*** aquatic life use protection (i.e., from limited aquatic life to coldwater aquatic life).

LANL's specific concern is that NMED is utilizing this novel approach to push Section 128 waters to a default, unclassified Section 99 status, but NMED could use the same approach for other waters that have been classified by the WQCC. An approach that LANL urges the WQCC to reject. Not only is this an overreach of staff authority, but it also upends regulatory certainty and renders the process of WQCC classification of waters meaningless. At a minimum, NMED should not be permitted to move any water classified by the WQCC from its classified segment to unclassified segments without WQCC review and approval for each such move.

As discussed in greater detail in the rebuttal testimony of Dr. Richard Meyerhoff (**LANL Exhibit 58**), even if the WQCC adopted this approach, NMED has provided no new information to justify a primary contact use for any of the waters with LANL—whether currently classified under Section 126 or Section 128 or proposed for reclassification under new Section 140. Unclassified perennial waters (Section 99) have designated uses protecting for primary contact, warmwater aquatic life, livestock watering and wildlife habitat. Evidence presented in NMED's 2007 UAA provided the basis for the WQCC's conclusion that recreational use of Section 126 and 128 is limited by low flows and water levels. Stream flow data from LANL gaging stations confirmed that secondary contact is an existing and attainable use for stream reaches in Section 126 and 128, resulting in the WQCC's designation and EPA's approval of secondary contact. NMED's 2007 UAA concluded:

> Primary contact is not an attainable use because flow and water levels are generally too low for full body immersion or prolonged and intimate contact with the water. This is the factor identified in 40 CFR 131.10(g)(2): "Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use…" Hazardous high-flow conditions and restricted access also limit the feasibility of primary contact recreation.

LANL Exhibit 18 at 4. NMED's recent proposal to move these waters into Section 99 provides no evidence that changes the conclusions reached in the 2007 UAA. *See* NMED Exhibit 4, Section VII. It should also be noted that NMED's most recent Integrated Report dated January 22, 2021 listed the LANL waters that NMED is now describing as unclassified Section 99 waters in direct testimony filed May 2021, as falling under Section 128. This is further evidence that NMED's pivot on this point occurred well after the launch of this Triennial Review.

Upon further study, LANL may propose reclassification of additional Section 128 reaches to Section 126 or modifications to the designated uses for these additional unspecified perennial segments at a future time. LANL is committed to further and continued evaluation of Section 128 waters to ensure that the data is collected and analyzed, changed conditions are identified, and appropriate protections are applied to all waters within LANL.

(iv) <u>An Illustrative Flowchart in the WQMP/CPP Cannot Overturn WQCC Classification Determinations and Administratively Declassify Section 128 Waters</u>

In NMED Exhibit 4, NMED justifies its proposal to declassify certain Section 128 classified waters to default Section 99, stating that no rulemaking is required since this is "explicitly" addressed in the WQMP/CPP. NMED Exhibit 4 at 47. This is a vast overstatement. To the extent that this topic is addressed in the WQMP/CPP, it is only by way of an illustrative flowchart, presented in Figure II-1, describing the HP process and

depicting "the primary pathways to determining or amending the applicable water quality standards based upon the Hydrology Protocol results." The flowchart was first proposed for public comment January 14, 2011, with the initial draft of the HP. In response to public comments, NMED stated that the graphic is a flowchart, not a decision tree and that it was not intended to show every possible pathway. NMED modified the flowchart in response to the comments. The revised Figure II-1 was approved by the WQCC on May 10, 2011, and by EPA on December 23, 2011. The 2011 flowchart did not purport to declassify any classified waters. NMED then further modified the flowchart in the 2020 WQMP without explanation in the WQMP text or technical basis. I have attached a copy of the 2011 draft flowchart, the 2011 approved flowchart, the current flowchart, and LANL's recommended revisions to the flowchart, as **LANL Exhibit 78**. LANL's recommended revisions to the flowchart preserve the classified status of LANL waters and avoid unnecessary UAA procedures, while incorporating processes required by 40 CFR §§ 131.10(k) and 131.20 to continue to evaluate designated uses and water quality standards that do not include the uses specified in Clean Water Act section 101(a)(2) and refine and improve the protection of LANL waters and other classified waters throughout the State. The WQMP/CPP illustrative flowchart is not an authorized formal process, nor is it a substitute for a formal procedure to overturn a decision previously reached by the the WQCC. The flowchart cannot be used to declassify Section 128 waters, even where certain segments of those waters should be reclassified. It is illogical and unfounded to expend NMED's and the WQCC's resources to conduct another UAA for recreational use to move from one classified segment to another (from Section 128 to Section 126) when both segments contain the same recreational use because an illustrative flowchart developed by NMED,

is being read by NMED to automatically declassify classified waters. The flowchart does not constitute "new information" under 40 CFR § 131.20(a). The WQCC should reject NMED's proposal to amend 20.6.4.10(B) NMAC and either adopt a new, accurate flowchart or clarify that the flowchart has no regulatory effect.

Q. DOES LANL HAVE ANY ADDITIONAL CONCERNS ABOUT THE EXISTING USE ASSESSMENT AND MODIFICATION PROCESSES PROPOSED BY NMED?

A. Yes, unlike the distinctions adopted by the WQCC for UAA's conducted by NMED as compared with those conducted by third parties in 20.6.4.15(D) and 20.6.4.15(E) NMAC, LANL recommends that the WQCC adopt a uniform procedure for existing use assessments and modifications. LANL, NMED, and Amigos Bravos have worked collaboratively under the 2015 Joint Stipulation process for 5 years. It was not perfect, but it was collaborative, transparent, and generated substantial, high quality data. LANL would encourage the WQCC to adopt a very similar EUA process, with the improvements that it include requirements for data validation, review and acceptance with deadlines. A different process for NMED is a disincentive to collaboration, fails to benefit from combined party resources and efforts, and reduces transparency.

Other than the 2015 Joint Stipulation process, were a new demonstration document required to support changes to the classification of LANL waters, until the WQCC adopts proposed changes to 20.6.4.10 NMAC, the UAA process is the only technical demonstration process provided in either the Standards or the WCMP/CPP. *See* NMED Exhibit 4 at 10 ("this provision . . . it is embedded within other mechanisms for amending a standard and not explicitly referenced"). While EPA may accept something less than a

UAA pursuant to 40 CFR § 131.10(k), under state regulations there is no other approved process that NMED has identified to the public. In addition, simply because a UAA is not strictly required by EPA when moving to increased protections, it does not follow that it would be improper for NMED to conduct a UAA in such cases. To codify this approach, LANL proposes an additional revision to 20.6.4.15(A) NMAC, as follows (underlining and strikeouts proposed in LANL direct testimony with additional proposed revisions shown in bold):

> In accordance with 40 CFR 131.10~~(i)~~, and 20.6.4.10 NMAC, the amendment of a designated use to a different use that requires, ~~based on a~~ more stringent ~~existing use~~ water quality criteria, **may be supported by a use attainability analysis, but** does not **necessarily** require a use attainability analysis. A use attainability analysis must be conducted when designating uses do not include uses specified in Section 101(a)(2) of the federal Clean Water Act or when designating sub-categories of these uses require less restrictive criteria than previously applicable. When removing designated uses that are not Section 101(a)(2) uses, a use attainability analysis is not required.

III. RECLASSIFICATION OF CERTAIN SECTION 128 WATERS TO SECTION 126 AND RELATED AMENDMENTS TO SECTION 128 (20.6.4.128 NMAC)

Q. HAVE YOU REVIEWED NMED'S DIRECT TESTIMONY REGARDING ITS PROPOSED DECLASSIFICATION OF CERTAIN SECTION 128 STREAM SEGMENTS TO SECTION 99?

A. Yes, I have.

Q. WHAT STREAM SEGMENTS DOES NMED PROPOSE TO DECLASSIFY?

A. In its pre-filed direct testimony (NMED Exhibit 4), NMED proposes to declassify those waters currently classified by the WQCC as Section 128 that, through application of the HP, have recently been determined to now be perennial. NMED asserts that by way of

internal departmental administrative process these reaches automatically become declassified into Section 99 as unclassified perennial waters.

Q. DO YOU SUPPORT NMED'S PROPOSED RECLASSIFICATION?

A. No, as I testified, above, LANL does not support declassification of any LANL waters. Rather, LANL proposes to reclassify two perennial reaches that are currently classified under Section 128 and move them to Section 126. In addition, because NMED argues that Section 126 currently only identifies specific reaches as classified perennial waters, that all other perennial waters must be unclassified. To address this issue, LANL has also proposed amending Section 126 to include the phrase "including but not limited to" to make it clear that there may be other perennial reaches—either as conditions change or simply because they have not yet been identified—that LANL will propose to reclassify to Section 126 in the future.

Q. WHAT IS YOUR CONCERN REGARDING NMED'S PRE-FILED DIRECT TESTIMONY PROPOSING AUTOMATIC DECLASSIFICATION OF THESE SECTION 128 WATERS?

A. When the WQCC first approved classification of the waters within LANL under Section 126 and Section 128, it was thought that all perennial waters had been identified and placed in Section 126. *See* **LANL Exhibit 30**. Over time there have been changes in flow in certain Section 128 reaches—either from modifications in discharge flows, modified precipitation overtime, fires, or other causes. Additionally, in 2011 NMED developed the HP tool to better enable flow characterization. As directed by the WQCC, NMED, LANL, and Amigos Bravos applied the HP tool under the 2015 Joint Stipulation to refine the initial identification of perennial waters. However, application of more current information

should not result in an automatic, unilateral declassification and reversal of the WQCC's classification decisions. Adopting NMED's interpretation could create disincentives to study Section 128 waters. Yet, ongoing study is critical because conditions at certain surface waters at LANL have changed over time and may continue to change due to natural changes, fires, installation of monitoring, discharge, or treatment structures, and as they receive discharges from a number of storm water and industrial NPDES permitted activities. Automatic declassification raises questions about how permit implementation and oversight can occur in default Section 99 waters that are not reflected in 20.6.4 NMAC. For example, how are these waters documented since these waters will remained described as Section 128 in the Standards and how will these decisions be communicated to the public? How will the start and stop points of these "newly" created unclassified sections be identified and managed under permits? All of these concerns are avoidable—and should be avoided—if the WQCC supports a logical approach; the WQCC should reject NMED's proposed automatic default to Section 99 for newly identified perennial segments of Section 128 classified waters.

IV. RECLASSIFICATION OF CERTAIN 128 WATERS TO NEW SECTION 20.6.4.140 NMAC SHOULD BE CONDUCTED UNDER THE 2015 JOINT STIPULATION PROCESS (20.6.4.140 NMAC)

Q. HAVE YOU REVIEWED NMED'S DIRECT TESTIMONY REGARDING ITS PROPOSED RECLASSIFICATION OF CERTAIN STREAM SEGMENTS TO SECTION 140?

A. Yes, I have.

Q. WHAT STREAM SEGMENTS DOES NMED PROPOSE TO RECLASSIFY UNDER NEW SECTION 140?

A. In its pre-filed direct testimony (NMED Exhibit 4 and NMED Exhibit 73), NMED proposes to reclassify the following stream segments under new Section 140: (a) Effluent canyon from Mortandad canyon to its headwaters; (b) intermittent portions of S-Site canyon from monitoring well MSC 16-06293 to Martin spring; and (c) intermittent portions of Two-Mile canyon from its confluence with Pajarito canyon to Upper Two-Mile canyon.

Q. HAVE YOU ALSO REVIEWED THE EXISTING USE ANALYSIS PREPARED BY NMED FOR EFFLUENT CANYON, UPPER-SITE CANYON AND TWO-MILE CANYON?

A. Yes, I have.

Q. DO YOU SUPPORT NMED'S PROPOSED RECLASSIFICATION UNDER NEW SECTION 140?

A. Yes, with three changes, LANL supports NMED's proposed reclassification of the above-listed stream segments under new Section 140. First, LANL proposes to precisely define, from origin to terminus, the stream segments that would be reclassified as Section 140 waters to establish clear geographic boundaries. Second, LANL proposes to clarify that Section 140 waters are intermittent. Third, while the data support the marginal warmwater aquatic life use for 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, LANL's evaluation of additional data in the context of considering NMED's direct testimony has raised a number of questions about the water quality in Effluent canyon from Mortandad canyon to its headwaters making a decision to reclassify that reach premature. For the reaches that would be reclassified from Section 128 to new Section 140, there is no new information to support

recreational use other than the current use of secondary contact. Therefore, LANL proposes the following language (proposed revisions to NMED Amended Petition shown in underlining for additions, strikeout for deletions, and bold for revisions proposed in rebuttal):

> RIO GRANDE BASIN: Intermittent portions of ~~**Effluent canyon from Mortandad canyon confluence upstream to its headwaters,**~~ S-Site canyon from alluvial groundwater well MSC 16-06293 upstream to Martin Spring, and ~~Two-Mile~~ Twomile[3] canyon from LANL stream gage E244 upstream to its confluence with upper ~~Two Mile~~ 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.

Extensive technical work, scientific data and other information suggests that some intermittent waters presently classified under Section 128 have current uses that are different from their previously determined existing use, based off application of the HP and other technical work, including compilation of stream flow gage data and benthic data collection conducted by the NMED and LANL. This work, in part, has been in fulfillment of the 2015 Joint Stipulation. LANL collected benthic data in Effluent, S-Site and Twomile Canyon reaches which can be used to support placement of specific stream reaches in Section 140. The HP Level 1 scores, with exception of lower Twomile at gage E244, all were solidly intermittent. LANL is in agreement with NMED's Amended Petition proposed amendments to Section 140, with the exception of the terminus description in Twomile Canyon and Effluent canyon. LANL's recommendation, based on the available

[3] Note that for consistency with United States Geologic Survey ("USGS") maps, LANL proposes to use "Twomile" instead of "Two Mile" or "Two-Mile".

data, is that the lower Twomile reach should extend only to gage E244 as indicated in Figure below.

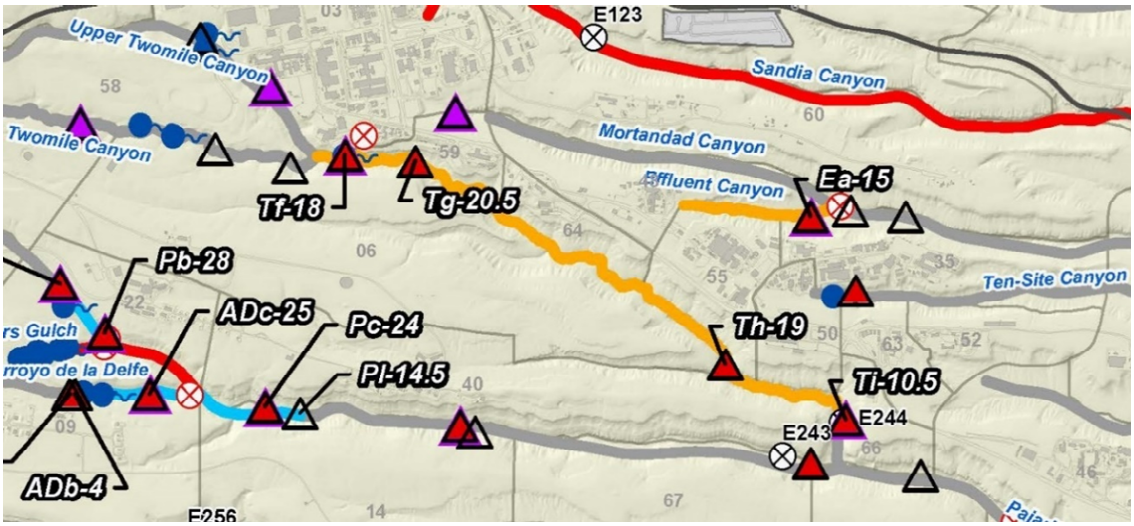

Figure 2 - Twomile Canyon E244 to Upper Confluence

HP Level 1 and HP Level 2 information do not justify extension beyond gage E244. When the HP Level 1 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. Therefore, LANL performed a HP Level 2 assessment. HP Level 2 indicators showed no water in the channel and bivalves, amphibians, and benthic organisms were absent. The photo in Figure 3 shows the channel during the HP 2 evaluation. Water was insufficient for collection of benthic organisms. Environmental Surveillance Gage Flow data from gage E244 between 2014 and 2019 shows average percent days of flow at 21.6%. This is on the lower end of the scale of the USGS classification of intermittent waters. The data does not support marginal warmwater aquatic life use.

Figure 3 - Twomile Canyon above E244

Q. WHAT IS YOUR CONCERN REGARDING NMED'S EUA SUPPORTING RECLASSIFICATION OF CERTAIN LANL WATERS FROM SECTION 128 TO NEW SECTION 140?

A. Even though LANL supports the reclassification, with the reach in lower Twomile ending at gage E244, LANL has noted a number of errors in NMED's EUA.[4] I note these errors in the following paragraphs in this section to ensure that the WQCC has correct information upon which to base its reclassification decisions.

First, as addressed in the rebuttal testimony of Mr. Goering (**LANL Exhibit 60**), NMED relied on proxy data from Mortandad Canyon to reflect the flow regime in Effluent

[4] Despite the fact that the 2015 Joint Stipulation process was intended to be a five year collaborative process, LANL saw NMED's EUA for the first time only a few weeks ago upon the filing of NMED's direct testimony.

Canyon. NMED also incorrectly characterized the flow data from E1-W as demonstrating baseflow or persistent conditions in Effluent Canyon.

Second, the presence or absence of macroinvertebrates has a direct bearing on the appropriate and protective use of Section 128 waters. The presence of a single horsehair worm by itself does not demonstrate more protective uses for Section 128 are justified. However, the presence of a horsehair worm, coupled with a intermittent HP 1 score and supplemental supporting information provided in a HP 2, including the identification of long-lived EPT,[5] provide additional evidence that chronic protections may be justified.

Third, the NMED EUA contains a number of incorrect geographical and TA references and other minor errors that could have been avoided if NMED had followed the 2015 Joint Stipulation process to work with LANL in finalizing its recommendations, including the following that I have listed here:

- Water Canyon terminates at the confluence with the Rio Grande in Los Alamos County, not Santa Fe County.
- Effluent Canyon originates in TA-48 not TA-16.
- S-Site Canyon and Martin Spring originate in TA-16 not TA-33.
- The Figure VI-1 Map (NMED Exhibit 73) inaccurately shows the location of Martin Spring. Martin Spring is located at the head of S-Site Canyon as shown in Figure 4.

[5] The EPT refers to Ephemeroptera (mayflies), Trichoptera (caddisflies), and Plecoptera (stoneflies). Metrics of EPT reflect the health of a waterway.

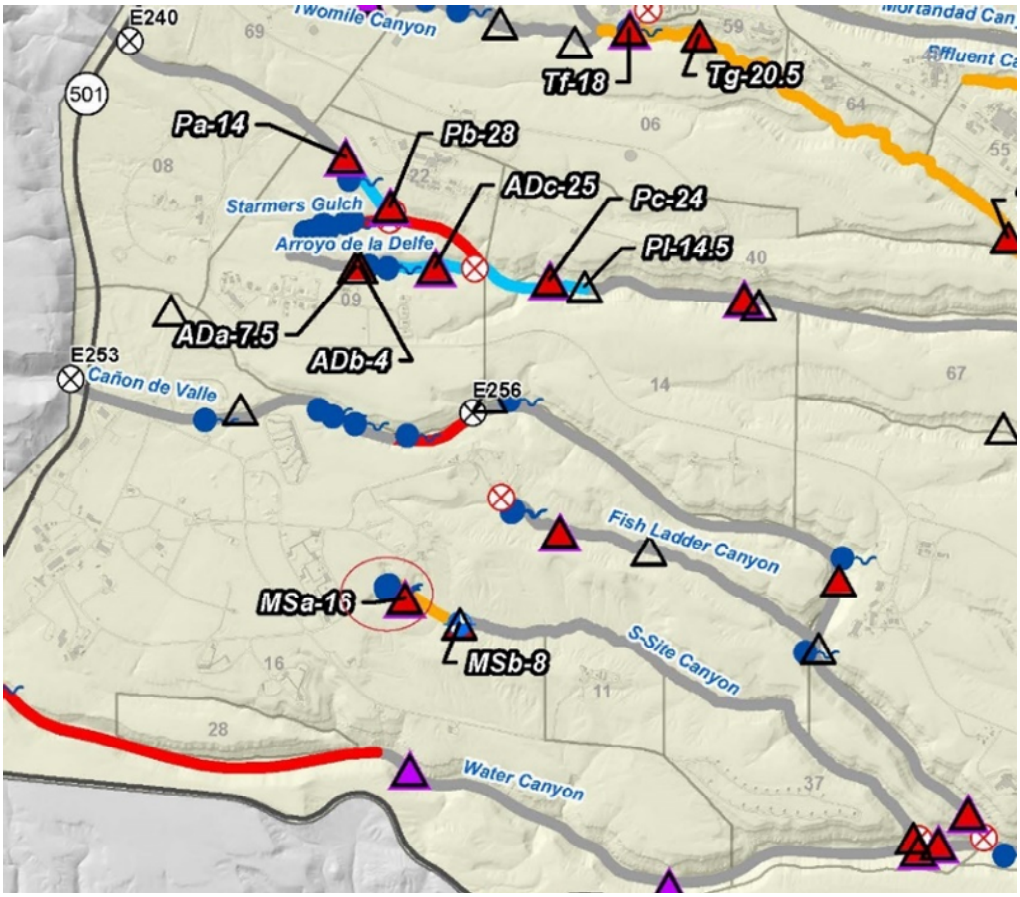

Figure 4 - Martin Spring shown at the Head of S-Site Canyon in the red oval

- Mortandad Canyon in Table VI-1 (NMED Exhibit 73) is identified as passing though the urbanized area of White Rock Canyon and identified in water quality segment 20.6.4.128. The main stem of Mortandad Canyon does not pass through the urbanized area of White Rock but crosses San Ildefonso Pueblo and terminates within Pueblo lands at its confluence with the Rio Grande. A tributary to the Mortandad, Canon de Buey does transverse the urbanized area of White Rock, but is contained entirely within Standards section 20.6.4.98 NMAC.
- NPDES Outfalls 051 and 03A181 are located at TA-55 not TA-26 or TA-11 (NMED Exhibit 73 at 18).
- S-Site Canyon is located within TA-16, TA-11 and TA-37, not TA-33.

Fourth, NMED's direct testimony references the 2002 FWS Report (*see* NMED Exhibit 4 at 29) and inappropriately identifies the 2002 study reaches as "intermittent streams" and incorrectly ascribes discrepancies between the 2007 UAA and conclusions reached in the 2002 FWS Report (NMED Exhibit 4 at 29). The 2002 FWS Report studied the reaches shown below in Figure 5 from the 2002 FWS Report, all of which were located within perennial waters (not "intermittent streams") and assigned attributes of those waters. All of the reaches used in the 2002 FWS Report were classified as LANL 126 waters by the WQCC. The WQCC also established section 20.6.4.127 NMAC - perennial portions of Los Alamos canyon based on findings from the 2002 FWS Report study reaches. The FWS Report refers to these specific segments as intermittent, however these waters have different hydrologic characteristics and aquatic biota present as compared with the remaining ephemeral/intermittent waters on the Pajarito Plateau, which demonstrates the problem with NMED's reliance on a dated study without proper context.

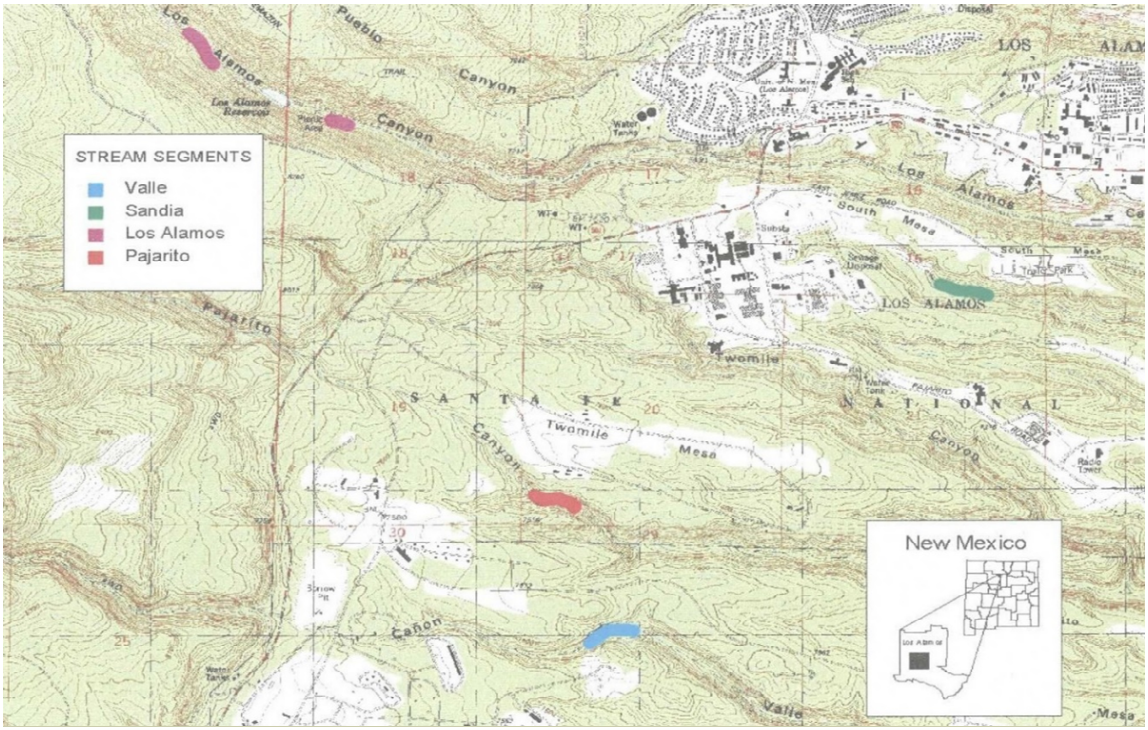

Figure 5 - USFWS Map with Location of Los Alamos, Sandia, Pajarito and Valle Canyon Stream Segements Studied

Fifth, NMED does not adequately consider conditions such as low flow, naturally occurring rapid environmental changes, high turbidity, fluctuating temperature, low dissolved DO or unique chemical characteristics that may result in a use capable of only supporting a limited community of aquatic life. This last issue led LANL to a detailed evaluation of Effluent canyon data in response to NMED's use of non-representative, proxy data from Mortandad canyon to support reclassification of Effluent canyon to Section 140. As discussed in Mr. Goering's rebuttal testimony (**LANL Exhibit 60** at 6-8), there are a number of concerns regarding the proxy data. However, the available data in Effluent canyon, also discussed in Mr. Goering's rebuttal testimony (***id.*** at 8-10), is dated, may not reflect current conditions due to changes in permitted discharges in Effluent canyon, and raises a sufficient number of questions about existing water quality critieria that LANL is reluctantly recommending that the WQCC not reclassify Effluent canyon to Section 140 at this time. That move is premature and requires further study, which LANL commits to undertake.

V. NMED PROPOSED DEFINITIONS THAT ARE NOT NECESSARY (20.6.4.7(B)(1) and (E)(2) NMAC)

Q. HAVE YOU REVIEWED NMED'S DIRECT TESTIMONY REGARDING ITS PROPOSED DEFINITIONS OF "BASEFLOW" IN SECTION 20.6.4.7(B)(1) NMAC AND "EFFLUENT DOMINATED" IN SECTION 20.6.4.7(E)(2) NMAC?

A. Yes, I have.

Q. HAVE YOU ALSO REVIEWED THE DIRECT TESTIMONY OF OTHER PARTIES REGARDING THESE PROPOSED DEFINITIONS?

A. Yes, I have.

Q. PLEASE SUMMARIZE NMED'S PROPOSAL AND THE OTHER PARTIES' DIRECT TESTIMONY REGARDING THESE DEFINITIONS?

A. NMED proposes to add a definition of "baseflow" in section 20.6.4.7(B)(1) NMAC only because that term is now used in the definition of "effluent dominated" in section 20.6.4.7(E)(2) NMAC. Neither term is used elsewhere in the Standards.

Q. DID YOUR DIRECT TESTIMONY ADDRESS THESE DEFINITIONS?

A. No, however, both NMMA and Amigos Bravos recommended in their direct testimony that the WQCC not adopt either definition. LANL agrees with NMMA and Amigos Bravos; the definitions are not used elsewhere in the Standards and are unnecessary, as discussed in greater detail in the rebuttal testimony of Dr. Meyerhoff (**LANL Exhibit 58**).

I would simply add that if the WQCC decides to adopt a definition of "effluent dominated" or "effluent dependent," the definition should be clear that even where an effluent dominated water is of "significant value by providing aquatic life and wildlife habitat," as stated in NMED's Amended Petition, that a currently permitted discharge would not be required to continue in perpetuity. In NMED Exhibit 1, NMED states "more environmental harm may be caused if the discharge [in an effluent dominated stream] ceases, which would eliminate a reliable source of baseflow for aquatic life and wildlife." NMED Exhibit 1 at 14. The DOE and LANL have a zero discharge goal and LANL has diligently pursued and plans to continue to pursue outfall reductions to achieve zero discharge where feasible. LANL urges the WQCC to expressly state that currently permitted discharges in effluent dominated or effluent dependent waters will not be required to continue in perpetuity, if adopting a definition for effluent dominated.

VI. NMED'S PROPOSED DEFINITION OF "CLIMATE CHANGE" IS NOT NECESSARY (20.6.4.7(C)(4) NMAC)

Q. HAVE YOU REVIEWED NMED'S DIRECT TESTIMONY REGARDING ITS PROPOSED DEFINITION OF "CLIMATE CHANGE" IN SECTION 20.6.4.7(C)(4) NMAC AND ITS RELATED PROPOSED AMENDMENT TO 20.6.4.6(D) NMAC?

A. Yes, I have.

Q. HAVE YOU ALSO REVIEWED THE DIRECT TESTIMONY OF OTHER PARTIES REGARDING THESE CLIMATE CHANGE PROPOSALS?

A. Yes, I have.

Q. PLEASE SUMMARIZE NMED'S PROPOSAL AND THE OTHER PARTIES' DIRECT TESTIMONY REGARDING THESE DEFINITIONS?

A. NMED proposes to add a definition of "climate change" in section 20.6.4.7(C)(4) NMAC to mean any significant change in temperature, precipitation, wind patterns or other weather-related effects that lasts for an extended period of time and can be due to natural or human causes. The term is not currently used in the Standards and the definition is unnecessary. NMED also proposed to add a related new section 20.6.4.6(D) NMAC stating that "These surface water quality standards serve to address the inherent threats to water quality due to climate change."

The amendments proposed by Amigos Bravos include:

1. A proposed new subsection 20.6.4.6(C) NMAC, which makes statements about the effects of climate change in New Mexico, including specifically that climate change is affecting the quality of New Mexico's surface waters;
2. A proposal to reject NMED's proposed 20.6.4.6(D) NMAC.

Q. DID YOUR DIRECT TESTIMONY ADDRESS THESE DEFINITIONS?

A. No, however, both NMMA and SJWC recommended in their direct testimony that the WQCC not adopt the "climate change" definition. LANL agrees with NMMA and SJWC; the definition is not used elsewhere in the Standards, is unnecessary, and could be confusing. Moreover, NMED's Statement of Reasons provides no information or reasoning for the adoption of this term.

Q. WHAT IS LANL'S POSITION ON THE AMENDMENTS PROPOSED BY NMED TO ADD 20.6.4.6(D) NMAC, DEFINE "CLIMATE CHANGE" IN 20.6.4.7(C)(4) NMAC AND THE AMENDMENTS PROPOSED BY AMIGOS BRAVOS TO 20.6.4.6(C) AND (D) NMAC?

A. LANL's position is that the WQCC should not adopt any of these proposed new provisions. LANL agrees with the SJWC and Amigos Bravos's recommendation to reject NMED's proposed amendments to 20.6.4.6(D) NMAC and agrees with NMMA and SJWC to reject NMED's proposed new definition of climate change.

Q. PLEASE EXPLAIN THE BASIS FOR LANL'S POSITION.

A. LANL agrees with Amigos Bravos' recommendation to reject NMED's proposed amendments to 20.6.4.6(D) NMAC because NMED is proposing to characterize the water quality effects of climate change as "inherent threats" and to treat parameters that could be affected by climate changes (e.g., July air temperature, annual precipitation) as pollutants in the Standards. However, NMED has not provided enough detail in its testimony to understand what additional changes to 20.6.4 NMAC, not yet proposed, would have to be adopted in order to meet this new objective for the Standards.

Q. DO YOU RECOMMEND THAT THE WQCC ADOPT THE PROPOSED AMENDMENTS?

A. No, I recommend that the WQCC reject Amigos Bravos's proposed new section 20.6.4.6(C), and that the WQCC adopt Amigos Bravos's proposal to reject NMED's proposed new Section 20.6.4.6(D) NMAC.

Q. HAVE OTHER PARTIES TO THIS PROCEEDING MADE RECOMMENDATIONS RELATED TO AMIGOS BRAVOS'S AND NMED'S PROPOSED AMENDMENTS TO 20.6.4.6(C) AND (D) NMAC?

A. Yes.

Q. PLEASE SUMMARIZE THOSE RECOMMENDATIONS.

The SJWC filed direct testimony opposing NMED's addition in its Initial Petition of NMED's proposed 20.6.4.6(D) NMAC. Both NMMA and SJWC recommended that the WQCC reject NMED's proposed new definition of "climate change" in section 20.6.4.7(C)(4) NMAC.

Q. WHAT IS YOUR RECOMMENDATION TO THE WQCC?

A. LANL does not support Amigos Bravos's proposed new section 20.6.4.6(C) NMAC and recommends that the WQCC reject that proposal. LANL also agrees with SJWC and Amigos Bravos in opposing adoption of NMED's proposed new section 20.6.4.6(D) NMAC. Finally, LANL agrees with NMMA and SJWC in opposing NMED's proposal to add the definition of "climate change" in section 20.6.4.7(C)(4) NMAC and recommends that the WQCC reject that definition.

LANL shares the NMED's concerns that climate change could have significant implications on surface waters and hydrologic regimes throughout New Mexico. However,

water quality does not create climate change; the Standards may require future modifications due to climate change but the Standards cannot address climate change. As noted by SJWC, "neither the New Mexico Water Quality Act nor the federal Clean Water Act provides authority for the proposition that a goal of the WQS is to address climate change." SJWC Notice of Intent at 5. By adoption of this term, LANL is concerned that the WQCC could set false expectations about how administration and enforcement of the Standards can affect climate change.

VII. CONCLUSION

Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A. Yes.

Exhibit 60

STATE OF NEW MEXICO
BEFORE THE WATER QUALITY CONTROL COMMISSION

IN THE MATTER OF:

THE PETITION TO AMEND
THE STANDARDS FOR INTERSTATE
AND INTRASTATE SURFACE WATERS,
20.6.4 NMAC **WQCC No. 20-51(R)**

REBUTTAL TESTIMONY OF TIMOTHY J. GOERING ON BEHALF OF TRIAD NATIONAL SECURITY, LLC AND THE U.S. DEPARTMENT OF ENERGY, NATIONAL NUCLEAR SECURITY ADMINISTRATION

June 22, 2021

I. INTRODUCTION

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Timothy J. Goering. My office is located in Technical Area (TA) 59, Building 96 at Los Alamos National Laboratory.

Q. ON WHOSE BEHALF ARE YOU SUBMITTING REBUTTAL TESTIMONY?

A. I am submitting this rebuttal testimony on behalf of Triad National Security, LLC, ("Triad") and the U.S. Department of Energy, National Nuclear Security Administration ("DOE") (collectively "LANL").[1]

Q. HAVE YOU PROVIDED PREVIOUS TESTIMONY IS THIS MATTER?

A. Yes, I provided direct testimony which includes: (i) a summary of my qualifications and experience; (ii) a discussion of LANL's evaluation of and proposed changes to the New Mexico Environment Department's ("NMED") proposed amendments to the Standards for Interstate and Intrastate Surface Waters, 20.6.4 NMAC ("Standards"); and (iii) the technical basis for certain related modifications to the Standards proposed in LANL's Notice of Intent to Present Technical Testimony ("LANL's Notice of Intent"). My direct testimony was submitted with LANL's Notice of Intent, filed on May 3, 2021, as **LANL Exhibit 4**.

Q. PLEASE BRIEFLY SUMMARIZE SOME OF THE CONCLUSIONS THAT YOU REACHED IN YOUR DIRECT TESTIMONY.

A. In my direct testimony, I discussed the technical basis supporting LANL's proposed reclassification of certain surface water segments from 20.6.4.128 NMAC ("Section 128")

[1] DOE and predecessor and current operators of LANL are referred to in my testimony collectively as "LANL" to avoid unnecessary entity name complications.

to 20.6.4.126 NMAC ("Section 126"), as well as the technical basis supporting LANL's proposed reclassification of certain surface water segments from Section 128 to new 20.6.4.140 NMAC ("Section 140").

Specifically, I testified regarding the types of high quality data collected at LANL relevant to surface water quality and stream characteristics. These data include Hydrology Protocol ("HP") Level 1 evaluations conducted by LANL and NMED, HP Level 1 and 2 evaluations conducted solely by LANL,[2] streamgage flow data, benthic data, general field observations and photographs, and temperature, pH, and DO data. I concluded that these data provide a strong technical basis to support the reclassification of the following segments from Section 128 to Section 126: (1) Pajarito Canyon from 0.5 miles below Arroyo de La Delfe upstream to Homestead Spring; and (2) Arroyo de La Delfe from Pajarito Canyon upstream to Kieling Spring. I also concluded that the data support the reclassification of the following segments from Section 128 to new Section 140: (1) Twomile Canyon from LANL stream gage E244 upstream to its confluence with upper Twomile Canyon; (2) S-Site Canyon from alluvial groundwater well MSC 16-06293 upstream to Martin Spring; and (3) Effluent Canyon from its confluence with Mortandad canyon to its headwaters.

I also testified regarding the NMED Surface Water Quality Bureau's ("SWQB") proposed amendments to the Standards for Interstate and Intrastate Surface Waters, 20.6.4 NMAC ("Standards"), set forth in NMED's August 18, 2020 Petition ("Original Petition") and NMED's March 12, 2021 Notice of Amended Petition ("Amended Petition").

[2] NMED was invited to participate in all HP assessments, but was not available for some of this work.

Q. HAVE YOU REVIEWED THE PRE-FILED DIRECT TESTIMONY FILED IN THIS MATTER BY NMED, THE NEW MEXICO MINING ASSOCIATION ("NMMA"), THE SAN JUAN WATER COMMISSION ("SJWC"), AND AMIGOS BRAVOS?

A. Yes, I have.

Q. DID THE PRE-FILED DIRECT TESTIMONY FILED BY NMED, NMMA, SJWC, AND AMIGOS BRAVOS CAUSE YOU TO RECONSIDER THE CONCLUSIONS AND PROPOSED REVISIONS TO 20.6.4 NMAC CONTAINED IN YOUR DIRECT TESTIMONY?

A. With one exception, nothing within the direct testimony filed in this matter by NMED, NMAC, SJWC, or Amigos Bravos has caused me to reconsider the conclusions and proposed revisions to 20.6.4 NMAC set forth in my direct testimony, and I generally affirm the contents of my direct testimony. The one exception is that LANL's evaluation of additional data, which I address in my rebuttal testimony, in response to NMED's direct testimony regarding 20.6.4.140 NMAC, resulted in LANL's determination that proposed reclassification of the stream reach in Effluent canyon from Section 128 to Section 140 is premature and requires additional study. The direct testimony filed by NMED's Jennifer Fullam (NMED Exhibit 4) and the other parties in this matter also raised certain issues and concerns that I will respond to in this rebuttal testimony.

Q. ON WHAT TOPICS ARE YOU OFFERING REBUTTAL TESTIMONY?

A. My rebuttal testimony addresses the following topics:

- NMED based some of its analysis for reclassification of certain segments under the new proposed Section 140 on inappropriate and non-representative data.

- Even without consideration of NMED's use of inappropriate and non-representative data, there are reliable data available that support the proposed reclassification under Section 140 for two stream reaches.
- NMED's reliance on inappropriate data to justify proposed reclassification to Section 140 water exemplifies the need for a transparent, stakeholder-involved, credible process for collecting and evaluating the best available scientific data relevant to reclassification of LANL waters. This process is set forth in the October 9, 2015 "Joint Stipulation Regarding Proposed Changes to 20.4.6.128 NMAC" between LANL, NMED, and Amigos Bravos (the "2015 Joint Stipulation"), **LANL Exhibit 29**.

II. NMED BASED ITS JUSTIFICATION FOR RECLASSIFICATION ON SOME DATA THAT WERE NOT REPRESENTATIVE (20.6.4.140 NMAC)

Q. HAVE YOU REVIEWED NMED'S DIRECT TESTIMONY REGARDING ITS PROPOSED RECLASSIFICATION OF CERTAIN STREAM SEGMENTS TO SECTION 140?

A. Yes, I have.

Q. WHAT STREAM SEGMENTS DOES NMED PROPOSE TO RECLASSIFY UNDER NEW SECTION 140?

A. In its pre-filed direct testimony, NMED proposes to reclassify the following stream segments under new Section 140: (a) Effluent canyon from Mortandad canyon to its headwaters; (b) intermittent portions of S-Site canyon from monitoring well MSC 16-06293 to Martin spring; and (c) and intermittent portions of Two-Mile canyon from its

confluence with Pajarito canyon to Upper Two-Mile canyon. NMED Exhibit 4, Section VI. and NMED Exhibit 73.

Q. HAVE YOU ALSO REVIEWED THE EXISTING USE ANALYSIS PREPARED BY NMED FOR EFFLUENT CANYON, UPPER S-SITE CANYON, AND TWO-MILE CANYON?

A. Yes, I have reviewed NMED Exhibit 73, NMED's Existing Use Analysis for Effluent Canyon, Upper S-Site Canyon and Two-Mile Canyon from Water Canyon upstream to its confluence with upper Two-Mile ("NMED's EUA").

Q. DO YOU SUPPORT NMED'S PROPOSED RECLASSIFICATION UNDER NEW SECTION 140?

A. With three exceptions, LANL supports NMED's proposed reclassification of the above-listed stream segments under new Section 140. The first exception is that LANL proposes to precisely define, from origin to terminus, the stream segments that would be reclassified as Section 140 waters to establish clear geographic boundaries. In that regard, LANL does not support NMED's reclassification of the reach in Twomile Canyon below gage E244 to Section 140. The data do not justify reclassification of the reach below gage E244 to Section 140, for the reasons described below and in my pre-filed direct testimony **(LANL Exhibit 4**) and in the pre-filed direct testimony of Mr. Gallegos (**LANL Exhibit 3**). The reach in Twomile Canyon reclassified under Section 140 should end at gage E244 instead of the confluence at Pajarito Canyon. The second exception is that LANL proposes to clarify that Section 140 waters are intermittent. The third exception is that while the data support the marginal warmwater aquatic life use for 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, LANL's evaluation of additional data in the context of considering NMED's direct testimony has raised a number of questions about the water quality in Effluent canyon from Mortandad canyon to its headwaters causing LANL to conclude, reluctantly, that making a decision to reclassify that reach now is premature.

Q. WHAT IS YOUR CONCERN REGARDING NMED'S PRE-FILED DIRECT TESTIMONY?

A. The decision to reclassify stream segments under new Section 140 should be based on credible scientific data and reliable evidence. In most cases in the NMED's EUA (NMED Exhibit 73), the evidence provided was based on good scientific data (including data collected under the Interim Facility-Wide Groundwater Monitoring Plan ("IFGMP") as well as Level 1 HP surveys conducted jointly with NMED and LANL, and Level 2 HP surveys conducted independently by LANL). However, in its pre-filed direct testimony, NMED relies on some non-representative data that is neither credible nor reliable to support its proposed reclassification under new Section 140.

Q. WHAT IS AN EXAMPLE OF THE NON-REPRESENTATIVE DATA THAT NMED RELIES UPON IN SUPPORT OF ITS PROPOSED RECLASSIFICATION UNDER SECTION 140?

A. In its evaluation of the data for Effluent Canyon, NMED based its conclusions on analysis of an HP Level 1 assessment jointly conducted by NMED and LANL on September 5, 2019, and on an HP Level 2 assessment conducted by LANL on October 22, 2019. These HP Level 1 and Level 2 assessments were conducted in Effluent Canyon in accordance with the requirements of the "Hydrology Protocol for the Determination of Uses Supported

by Ephemeral, Intermittent, and Perennial Waters" (Appendix C of the State of New Mexico Water Quality Management Plan & Continuing Planning Process).

Level 1 and Level 2 HP assessments provide accurate and reliable data for determining hydrologic conditions of surface waters. However, to evaluate aquatic life existing use within Effluent Canyon, NMED also used temperature, pH, and dissolved oxygen data from stream gage location E200, a proxy location in Mortandad Canyon below the confluence with Effluent Canyon. Map 21-069-02 in **LANL Exhibit 79** shows upper Mortandad Canyon and the Effluent Canyon tributary, as well as active NPDES outfalls, and the location of the E200 (inactive) gaging station.

Baseflow sampling locations E-1FW, E-1W, and E-1E, are shown on Map 21-069-01 in **LANL Exhibit 79**. This map also shows the location of E200 below the confluence of Mortandad Canyon with Effluent Canyon. Because E200 is located in Mortandad Canyon rather than Effluent Canyon, samples collected from this location include a mix of water from both upper Mortandad Canyon and Effluent Canyon. The drainage area for E200 is 0.49 mi^2, whereas the drainage area for Effluent Canyon is approximately 0.1 mi^2, approximately 20% of the total drainage area for the watershed at E200. The significant disparity in size between each drainage area is shown on Map 21-069-02 (**LANL Exhibit 79**). Needless to say, during years with significant snowmelt and precipitation, a much larger percentage of the flow at the proxy location E200 originates from upper Mortandad canyon than from Effluent Canyon.

The percentage of flow at E200 originating from discharge in Effluent Canyon is relatively low, particularly during years with significant precipitation. In 2006, LANL conducted a comparison of discharges from outfalls in Effluent Canyon, and upper

Mortandad Canyon to the total discharge measured at gage E200 (Mortandad Canyon Investigation Report, LANL 2006). Two active NPDES outfalls discharge into Effluent Canyon. NPDES Outfall 181 discharges treated cooling water from TA-55, and NPDES Outfall 051 discharges treated effluent from the Radioactive Liquid Waste Treatment Facility ("RLWTF") at TA-50. These are shown on Map 21-069-01 in **LANL Exhibit 79**.

LANL Exhibit 80, "Comparison of NPDES outfall and gage E200 discharge volumes", compares NPDES outfall flows and gage E200 discharge volumes. Discharge from the RLWTF at TA-50 into Effluent Canyon is shown in pink; total discharge from both active outfalls into Effluent Canyon is shown in black for 2004 and 2005. During this period, total discharge from the NPDES outfalls in Effluent Canyon was a relatively small percentage of the total flow measured at E200. The green line represents the total discharge from the two outfalls in Effluent Canyon and the two outfalls in upper Mortandad Canyon. The red line represents discharge from Effluent Canyon, upper Mortandad Canyon, and Ten Site Canyon, a tributary entering Mortandad Canyon below E200.

Data from 2004 and 2005, years with fairly normal runoff volumes, showed streamflow measured at E200 significantly exceeding outfall volumes, with the percentage from the combined Effluent Canyon outfalls a relatively low percentage of the total flow. Given that flow from Effluent Canyon is typically not a significant percentage of the total flow at E200, and given that the drainage area for upper Mortandad Canyon is so much greater than the drainage area for Effluent Canyon, samples collected from E200 are not representative of water from Effluent Canyon, and should not be used to determine aquatic life use for Effluent Canyon.

Q. ARE MORE REPRESENTATIVE DATA AVAILABLE FOR DETERMINING AQUATIC LIFE USE FOR EFFLUENT CANYON?

A. There are more representative data available for determining aquatic life use for Effluent Canyon. These include the data discussed in Mr. Gallegos direct testimony (**LANL Exhibit 3** at 28-29 and **LANL Exhibit 40**), which included HP Level 1 and Level 2 analyses, photographs, benthic taxa summary and EPT[3] findings. There are also temperature ("T"), dissolved oxygen ("DO"), and pH data from three baseflow sampling locations in Effluent Canyon between 2005 and 2010. These locations, E1-FW, E1-W, and E-1E, are shown on Map 21-069-01 (**LANL Exhibit 79**). These data are more representative of flow in Effluent Canyon than proxy data from gage E200 in Mortandad Canyon.

Q. PLEASE SUMMARIZE THESE NON-PROXY DATA FROM EFFLUENT CANYON.

LANL Exhibit 81 shows trends of temperature, pH, and DO at locations E-1FW, E-1W, and E-1E in Effluent Canyon between 2005 and 2010. For comparison purposes, the numeric criteria set forth in 20.6.4.900 NMAC for the marginal warmwater aquatic life use (ALU) proposed for Section 140 are as follows:

> **Marginal warmwater:** dissolved oxygen 5 mg/L or more, pH within the range of 6.6 to 9.0 and maximum temperature 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.

Between 2005 and 2010, temperature data from all three locations in Effluent Canyon (**LANL Exhibit 81**) were considerably below the maximum temperature criterion

[3] The EPT refers to Ephemeroptera (mayflies), Trichoptera (caddisflies), and Plecoptera (stoneflies). Metrics of EPT reflect the health of a waterway.

of 32.2^{o} C for marginal warm water. Some pH concentrations (particularly at upstream location E-1FW), were below the minimum marginal warmwater criterion of 6.6 (**LANL Exhibit 81**). pH concentrations in samples from E1-FW ranged from 4.88 to 6.31, with a median value of 5.85. pH concentrations in samples from E-1W ranged from 6.59 to 6.98, with a median value of 6.70. pH concentrations in samples from E-1E ranged from 6.57 to 8.0, with a median value of 6.90.

Most DO concentrations in samples from Effluent Canyon locations were below the minimum warmwater aquatic life criterion of 5.0 mg/L (**LANL Exhibit 81**). DO concentrations in samples from E1-FW ranged from 0.48 mg/l to 3.33 mg/l, with an average value of 1.83 mg/l. DO concentrations in samples from E-1W ranged from 1.27 mg/l to 4.50 mg/l, with an average value of 2.97 mg/L. DO concentrations in samples from E-1E ranged from 1.19 mg/l to 5.69 mg/l, with an average value of 4.06 mg/l.

In this analysis, there were several outliers for DO which were not used in this evaluation. In October 2006, DO readings from samples collected from all three locations (E-1FW, E-1W, and E-1E) were significantly higher than the average values for these locations, ranging from 95.7 mg/l to 604.6 mg/l. These values are beyond the range of DO found in natural waters, and were considered outliers and excluded from the statistics summarized above.

In summary, temperature, pH and DO data that are more representative than proxy data from gage E200 are available for Effluent Canyon. I did not evaluate these data in connection with my direct testimony as I considered them dated, particularly given that there have been changes in discharges to the canyon in recent years. Having evaluated them in detail on rebuttal in order to put NMED's Mortandad Canyon proxy data in context,

these data, collected between 2005 and 2010, show that the pH and dissolved oxygen parameters do not meet the minimum aquatic life criterion for marginal warmwater in some locations within Effluent Canyon. Based on this analysis, LANL is concerned that there is insufficient current data to support reclassification of Effluent Canyon to Section 140. Additional study is needed and segment-specific standards may be necessary for this stream reach. If the WQCC declines to reclassify Effluent Canyon now, LANL is committed to continuing to evaluate Effluent Canyon surface water to support additional regulatory action in the future, if warranted.

Q. WHAT IS ANOTHER EXAMPLE OF NON-REPRESENTATIVE DATA THAT NMED USED IN SUPPORT OF ITS PROPOSED RECLASSIFICATION UNDER SECTION 140?

A. NMED made assumptions about hydrologic conditions in Effluent Canyon based solely on estimates of flow obtained while collecting grab samples from location E1-W. *See* NMED Exhibit 73 at 21. NMED stated these samples were measured by automated stream gages, when in fact, these were simply estimates of flow obtained during sampling. Flow estimates are required during the collection of surface water samples under the IFGMP, when field conditions allow. However, these types of flow estimates provide very little information regarding intermittent or ephemeral flow conditions within the reach.

In addition, these five grab samples were collected over a three-year period, with some of them apparently collected after precipitation events. The Hydrology Protocol recommends that Level 1 field evaluations be conducted at least 48 hours following a precipitation event to ensure stable baseflow conditions and to reduce variability. NMED cites precipitation from a Los Alamos County rain gage that showed individual samples

were not collected in direct response to significant precipitation events. NMED Exhibit 4 at 38-39 and NMED Exhibit 73, Appendix A.10. at 49-50. However, data from LANL MET stations at TA-53 and TA-6, which are closer to Effluent Canyon, indicate that for four of the five sampling events, precipitation occurred either on the day of, or within the previous 24 or 48 hours prior to sampling. **LANL Exhibit 82**. Thus, the flows observed at E1-W may have been the result of recent precipitation, representing unstable hydrologic conditions. For this reason, these data are not appropriate to assess chronic conditions and whether flow is intermittent or ephemeral. Instead, other factors such as Hydrology Protocol data, and stream gage data (if available) should be used to determine if a reach shows characteristic of intermittent, ephemeral, or perennial flow.

Q. DO YOU HAVE ANY EXAMPLES OF NMED USING NON-REPRESENTATIVE DATA IN OTHER SEGMENTS PROPOSE FOR RECLASSIFICATION TO SECTION 140?

A. Yes, some non-representative data were also used to characterize temperature, pH, and DO at Martin Spring in S-Site Canyon. NMED used data from samples collected from a carbon-filtration treatment system, located adjacent to Martin Spring, along with data from samples from Martin Spring to characterize temperature, pH, and DO in flow from the spring. The data NMED used were downloaded from the Intellus New Mexico database, and included three sampling locations: "Martin Lower SW filt samp port"; "Martin Spring"; and "Martin Upper SW Filt Samp Port." NMED Exhibit 73 at 72-76. The latitude and longitude for all locations were the same, explaining why all three data sets were combined and used in the analysis.

However, samples labelled "Martin Lower SW filt samp port" and the "Martin

Upper SW Filt Samp Port" were actually collected from inlet and outlet sampling ports installed in a filtration system containing granular activated carbon. This carbon filtration system was formerly located adjacent to Martin Spring, and was installed in 2001 as a pilot study to determine the feasibility of removing high explosives and barium contamination from the spring discharge. The carbon filtration system was removed from Martin Spring in 2017.

Samples collected from the inlet and outlet ports on the carbon treatment system are not representative of flow directly from Martin Spring, as the water quality, temperature, pH and DO may have been altered during the flow capture and treatment process. These data should not have been used by NMED in their EUA to evaluate whether flow from the spring meets marginal warmwater aquatic life standards.

III. RELIABLE SCIENTIFIC DATA SUPPORTS NMED'S PROPOSED RECLASSIFICATION UNDER SECTION 140

Q. PLEASE EXPLAIN WHY YOU SUPPORT NMED'S PROPOSED RECLASSIFICATION UNDER SECTION 140, DESPITE NMED'S USE OF NON-REPRESENTATIVE DATA.

A. To be clear, based upon detailed review of all available data for Effluent Canyon, LANL now recommends further study of that reach and that it not be reclassified now. Even though NMED used some non-representative data for the proposed reclassification under Section 140 for water within S-Site Canyon, and Twomile Canyon, most of the data used by NMED in these stream reaches were representative and support the case for the proposed reclassification under Section 140.

My pre-filed direct testimony also supports the proposed reclassification under Section 140. My testimony included a review of available temperature, pH, and DO data for the reaches proposed for reclassification (with the exception of the specific Effluent Canyon data discussed earlier). These data were compared with the use-specific numeric criteria set forth in 20.6.4.900 NMAC for marginal warmwater attainable uses. Although there were limited temperature, pH, and DO data available, the data I reviewed showed that the numeric criteria for marginal warmwater were generally met in these reaches.

I did not evaluate the Effluent Canyon data for E-1FW, E-1W, and E-1E discussed above because I had concerns regarding changes in discharge to the canyon in recent years and that these data from 2005 to 2010 would not be representative of current conditions. While, I certainly consider these data more representative than the proxy data from gage E200 used by NMED to represent Effluent Canyon flow in their testimony, the data is insufficient to support reclassification of Effluent Canyon to Section 140 at this time.

Q. DO YOU HAVE ANY CONCERN REGARDING NMED'S PROPOSED RECLASSIFICATION UNDER NEW SECTION 140 BASED ON THE DATA YOU HAVE REVIEWED?

A. I agree with NMED's proposed reclassification under Section 140, with two exceptions. First, the reach in Twomile Canyon should terminate at gage E244 instead of the confluence at Pajarito Canyon. HP Level 1 and HP Level 2 assessment data do not justify reclassification of Twomile Canyon under Section 140 downstream of gage E244. E244 gage data show seasonal periods of flow in 2017 and 2019, but generally show low periods of intermittent flow with limited seasonality. These data do not support marginal warmwater ALU below gage E244.

Second, there is insufficient data to support NMED's proposal to reclassify Effluent Canyon to Section 140 water. This reclassification should not be based on proxy data from E200 in Mortandad Canyon. LANL recommends and is committed to conducting additional study in the reach. If Effluent Canyon is reclassified to Section 140 water, segment-specific standards should be designated for this reach for pH and DO, because data indicate marginal warmwater aquatic life criteria for these parameters cannot be met for some or all portions of this reach.

Q. ARE THERE ANY CHANGES TO NMED'S REVISED PROPOSED AMENDMENT TO SECTION 140 THAT WOULD ADDRESS THOSE CONCERNS?

A. LANL proposes to precisely define, from origin to terminus, the stream segments that would be added to the new Section 140 waters to establish clear geographic boundaries. At this time, LANL also proposes to remove Effluent Canyon from NMED'S revised proposed amendment to Section 140. Additionally, LANL proposes to clarify that Section 140 waters are intermittent, not "non-perennial" in order to conform to the WQA's definitions. There is no new information to support recreational use other than the current use of secondary contact.

LANL proposes the following language (proposed revisions are shown compared to the Amended Petition, additions are underlined and deletions are shown by strike through, with changes based upon rebuttal in bold):

> RIO GRANDE BASIN: Intermittent portions of ~~**Effluent canyon from Mortandad canyon confluence upstream to its headwaters,**~~ S-Site canyon from alluvial groundwater well MSC 16-06293 upstream to Martin Spring, and ~~Two-Mile~~ Twomile canyon from ~~its confluence with Pajarito canyon to~~ LANL stream gage E244 upstream to its confluence with upper ~~Two-Mile~~ 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, secondary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

IV. NMED'S USE OF NON-REPRESENTATIVE DATA EXEMPLIFIES WHY A TRANSPARENT PROCESS SHOULD BE DEVELOPED FOR THE RECLASSIFICATION OF LANL WATERS

Q. HOW COULD THE PROCESS FOR RECLASSIFYING WATERS UNDER SECTION 140 BE IMPROVED TO AVOID THE USE OF NON-REPRESENTATIVE DATA?

A. The EUA process, which was shared with LANL only late in 2020, is being proposed by NMED to unilaterally, downgrade and declassify existing classified waters at LANL. Although LANL supports reclassification of a waterbody (where appropriate) to provide the highest attainable level of protection, this process must be publically transparent, must be based on the best available data and science, and must be approved by the WQCC prior to implementation. This was not the case for the NMED's EUA, NMED Exhibit 73. Given the NMED's EUA was developed unilaterally in a very short timeframe, with no input or review from LANL, it is not surprising that some of the data used were non-representative, and were not appropriate for determining existing uses. If LANL had had the opportunity to review the Effluent Canyon data with NMED, LANL and NMED likely would have agreed that further study was needed and reclassification based upon available data is premature. An open and transparent process, approved by the WQCC, must be used to determine existing uses and to reclassify waters.

The 2015 Joint Stipulation, **LANL Exhibit 29**, provides the framework for such a process. Under the 2015 Joint Stipulation, NMED, LANL, and Amigos Bravos agreed to work together in a collaborative and transparent process to identify waters that are ephemeral and intermittent, the existing uses of those waters, the presence of macroinvertebrates or shellfish, and significant changes to the chemical, physical, or biological integrity of the waters. Data were shared with all parties in a transparent manner, and the parties agreed to meet and confer regarding the appropriate level of water quality protections with the idea that additional data collection and analysis may be necessary. The parties endeavored to reach an agreement regarding the appropriate level of water quality protection afforded to the waters. If an agreement was reached, NMED agreed to petition the WQCC to propose changes to 20.6.4.128 NMAC expeditiously, but in any case no later than the next Triennial Review (i.e., the current proceedings). The 2015 Stipulation does not state that it terminates upon NMED's petition to the WQCC, and the process could continue to be followed.

Although the 2015 Joint Stipulation applied to Section 128 waters only, a similar approach could be implemented that is collaborative and publically-transparent, and that uses the best available science and data to reclassify other waters or increase use protections throughout the State of New Mexico, as appropriate, to provide the highest attainable level of protection. NMED has acknowledged that that process is not explicitly established in the Standards. LANL recommends that the WQCC adopt an explicit process and, if not the 2015 Joint Stipulation process, something similar. This would ensure that all relevant data are considered, and that the highest level of protection for the waters is attained using a balanced and impartial approach.

V. CONCLUSION

Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A. Yes.

Exhibit 61

STATE OF NEW MEXICO
BEFORE THE WATER QUALITY CONTROL COMMISSION

IN THE MATTER OF:

THE PETITION TO AMEND
THE STANDARDS FOR INTERSTATE
AND INTRASTATE SURFACE WATERS,
20.6.4 NMAC **WQCC No. 20-51(R)**

REBUTTAL TESTIMONY OF BRYAN DAIL ON BEHALF OF TRIAD NATIONAL SECURITY, LLC AND THE U.S. DEPARTMENT OF ENERGY, NATIONAL NUCLEAR SECURITY ADMINISTRATION

June 22, 2021

I. WITNESS BACKGROUND AND QUALIFICATIONS

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Bryan Dail. My business address 1200 Trinity Drive, Suite 150, Los Alamos, New Mexico 87544.

Q. ON WHOSE BEHALF ARE YOU SUBMITTING REBUTTAL TESTIMONY?

A. I am submitting this rebuttal testimony on behalf of Triad National Security, LLC, ("Triad") and the U.S. Department of Energy, National Nuclear Security Administration ("DOE") (collectively "LANL").

Q. HAVE YOU PROVIDED PREVIOUS TESTIMONY IN THIS CASE?

A. Yes, I provided direct testimony which includes: (i) a summary of my qualifications and experience; (ii) a discussion of LANL's evaluation of and proposed changes to the amendments proposed by the New Mexico Environment Department ("NMED") to the Standards for Interstate and Intrastate Surface Waters, 20.6.4 NMAC ("Standards"); and (iii) the technical bases for certain related modifications to the Standards proposed in LANL's Notice of Intent to Present Technical Testimony ("LANL's Notice of Intent"). My direct testimony was submitted with LANL's Notice of Intent, filed on May 3, 2021, as **LANL Exhibit 5**.

II. PURPOSE OF TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?

A. The purpose of my rebuttal testimony is to respond to the direct testimony of NMED and other parties to this proceeding relating to the following proposed amendments to 20.6.4 NMAC:

- General Criteria Section to amend narrative criteria for toxic pollutants (20.6.4.13 NMAC) and related proposed changes to the definitions section (20.6.4.7 NMAC)

I also respond to the following proposed amendments that were not previously addressed by LANL in direct testimony:

- NMED Exhibits 12 and 21;
- Human Health-Organism Only Criteria.

Q. HAVE YOU REVIEWED THE NOTICE OF INTENT TO PRESENT TECHNICAL TESTIMONY ("NOI") AND EXHIBITS FILED BY NMED, THE NEW MEXICO MINING ASSOCIATION ("NMMA"), THE SAN JUAN WATER COMMISSION ("SJWC"), AND AMIGOS BRAVOS RELATED TO THE AMENDMENTS ADDRESSED IN YOUR DIRECT AND REBUTTAL TESTIMONY?

A. Yes.

III. NMED MODIFICATIONS TO THE GENERAL CRITERIA (20.6.4.13 NMAC) AND RELATED PROPOSED CHANGES TO THE DEFINITIONS SECTION (20.6.4.7 NMAC)

Q. HAVE YOU REVIEWED NMED'S PROPOSED AMENDMENTS TO THE GENERAL CRITERIA SECTION?

A. Yes. I reviewed the proposed language in NMED's August 18, 2020 Petition ("Original Petition"), and NMED's March 12, 2021 Notice of Amended Petition ("Amended Petition"), as well as NMED's Statement of Reasons for the proposed amendments. I have also reviewed the language in NMED Exhibit 9, NMED's Proposed Amended Rule - 20.6.4 and the supporting written direct testimony of NMED's witness Kris Barrios, NMED Exhibit 2, providing the rationale for NMED's proposed changes to the general standard for toxic pollutants.

Q. HAVE YOU REVIEWED NMED'S RELATED PROPOSED AMENDMENTS TO THE DEFINITIONS SECTION?

A. Yes.

Q. DOES NMED'S EXHIBIT 9 PROPOSE THE SAME MODIFICATIONS TO 20.6.4.13 AND 20.6.4.7 NMAC THAT WERE PROPOSED IN NMED'S AMENDED PETITION?

A. Yes, Definitions (20.6.4.7 NMAC) and the General Criteria (20.6.4.13 NMAC) are unchanged from the Amended Petition.

Q. PLEASE SUMMARIZE NMED'S CURRENT PROPOSAL.

A. NMED suggests several changes to the definitions section, including several I have addressed in my direct testimony (**LANL Exhibit 5**), regarding Contaminants of Emerging Concern ("CECs"). NMED proposes to specify the toxic pollutants in the general criteria section to include CECs and a toxic pollutants list from the Groundwater rules at 20.6.2.7(T)(2) NMAC.

Q. BASED ON YOUR REVIEW OF MR. BARRIOS'S DIRECT TESTIMONY, WHAT DO YOU UNDERSTAND TO BE THE BASIS FOR NMED'S PROPOSAL TO AMEND THE DEFINITION OF TOXIC POLLUTANTS?

A. Mr. Barrios' testimony indicates that adding CECs and the list of groundwater toxic pollutants to the General Criteria at 20.6.4.13(F) NMAC will "aid in implementing water quality standards and upholding the goals and objectives of the Clean Water Act". NMED Exhibit 2 at 4. Further, he states that "Although EPA has not developed numeric criteria for CECs, clarification that NMED's general criterion for toxic pollutants regulates this

group of pollutants provides greater clarity for implementing water quality standards". *Id.* at 4.

Q. BASED ON YOUR REVIEW OF MR. BARRIOS'S DIRECT TESTIMONY, WHAT DO YOU UNDERSTAND TO BE THE BASIS FOR NMED'S PROPOSAL TO ADD "CONTAMINANTS OF EMERGING CONCERN" TO THE GENERAL CRITERIA SECTION?

A. As noted above, NMED states that it is in support of implementation of water quality standards, and upholding CWA goals and that the General Criteria will regulate these pollutants.

Q. DID YOUR DIRECT TESTIMONY ADDRESS THE BASIS FOR NMED'S PROPOSED CHANGES?

A. Yes.

Q. BASED ON YOUR REVIEW OF NMED'S PROPOSAL AND SUPPORTING DIRECT TESTIMONY, ARE YOU CHANGING YOUR TESTIMONY OR RECOMMENDED PROPOSED REVISIONS TO 20.6.4.13 AND 20.6.4.7 NMAC THAT WERE STATED IN YOUR DIRECT TESTIMONY?

A. I am not changing my testimony; however, the goals of clarifying the General Criteria on pollutants that lack specific criteria, and the plan to implement Standards based on definitions and/or referencing lists that also lack numeric criteria should not be included in changes to 20.6.4 NMAC at this time. Rather, the New Mexico Water Quality Control Commission ("WQCC") should consider adding CECs or other non-numeric pollutants at a time when NMED has demonstrated scientifically supportable translators of the General Criteria, as they have in the past for Plant Nutrients.

Q. PLEASE EXPLAIN LANL'S POSITION.

A. My testimony is unchanged from my direct testimony because the reasoning still stands that in order to regulate or implement Standards based on a narrative standard (NMED's goals in making the proposed changes), one must have ability to translate to a defensible, meaningful, and measureable level. The New Mexico Water Quality Management Plan and Continuing Planning Process ("WQMP/CPP"), approved by the WQCC, states, in regard to the Antidegradation rule, that "If a narrative standard does not have associated numeric thresholds or translators, NMED will not evaluate the narrative standard for antidegradation purposes due to the impracticality of such an evaluation". **LANL Exhibit 70**, Appendix A at 9. Hence, water quality monitoring to assure New Mexico's waters are "free from" pollutants in amounts or duration that can cause harm is impractical until such a time as numeric criteria or defensible translators can be developed and adopted by the WQCC.

Q. DID ANY OTHER PARTY PROPOSE MODIFICATIONS TO THE DEFINITION OF "TOXIC POLLUTANTS"?

A. Yes. Amigos Bravos supported NMED's proposed changes to the addition of Toxic Pollutants, the SJWC opposed adding CECs as toxic pollutants, and the NMMA also opposed the proposed language from NMED.

Q. PLEASE SUMMARIZE THOSE PROPOSED CHANGES.

A. Amigos Bravos concurred with NMED's proposed language on toxic pollutants, referencing CECs, and other toxics for which there are existing criteria. They also proposed adding specific per- and polyfluoroalkyl substances as specific examples to the definitions. The SJWC opposed adding toxic pollutants for which: (i) insufficient data and

effects were known at this time; (ii) monitoring is not routinely conducted; and (iii) there are no regulatory standards. The NMMA opposed NMED's proposed language on the bases of vagueness, being overly broad, and leading to unfettered discretion for NMED as to what monitoring it could require of the regulated community. NMMA also contended that the addition of CECs to the toxics list was not currently scientifically defensible.

Q. DID ANY OTHER PARTY PROPOSE MODIFICATIONS TO THE GENERAL CRITERIA SECTION FOR "TOXIC POLLUTANTS"?

A. No.

Q. WHAT IS YOUR RECOMMENDATION TO THE WQCC WITH RESPECT TO THE DEFINITION OF "TOXIC POLLUTANTS"?

A. As in my prior testimony, I urge the WQCC to adopt LANL/Triad's language, to reference the accepted EPA list of toxics set out in section 307(a) of the federal Clean Water Act, 33 U.S.C. § 1313(a) and provide a placeholder for the WQCC to add pollutants to the list through the rulemaking process.

Q. WHAT IS YOUR RECOMMENDATION TO THE WQCC WITH RESPECT TO THE NARRATIVE CRITERIA FOR "TOXIC POLLUTANTS"?

A. If monitoring to levels that can cause harm to aquatic life or humans through consumption of aquatic life is the goal, then scientifically supportable methods should be used to ascertain those levels or limits. Until such a development, LANL urges the WQCC to avoid adopting vague language that does not identify levels or potential harm. The WQCC should, instead, encourage NMED to carry out investigative work to determine numeric criteria or numerical translators as NMED did for Plant Nutrients, utilizing the public process for greater transparency and regulatory clarity.

Q. DID ANY OTHER PARTY PROPOSE CHANGES TO THESE SECTIONS?

A. None of which I am aware.

Q. WHAT IS YOUR RECOMMENDATION TO THE WQCC?

A. I recommend that the WQCC reject NMED's proposal and adopt the amendments to 20.6.4.13 as proposed in LANL's NOI for the reasons stated in my direct testimony and further addressed above.

IV. ADDITIONAL CHANGES PROPOSED BY NMED

1. NMED EXHIBITS 12 AND 21

Q. HAVE YOU REVIEWED NMED EXHIBITS 12 AND 21 AND THE DIRECT TESTIMONY OF MR. BARRIOS AND MS. LEMON REGARDING THOSE EXHIBITS FILED ON BEHALF OF NMED IN SUPPORT OF THIS CHANGE?

A. Yes.

Q. PLEASE SUMMARIZE YOUR UNDERSTANDING OF THE PROPOSED AMENDMENT TO 20.6.4.900 NMAC.

A. NMED Exhibit 12 is a copy of the federal Clean Water Act section 304(a) and NMED Exhibit 21 is a copy of the federal regulation 40 CFR § 131.20. Section 304(a) requires EPA to develop, publish, and update water quality criteria based upon the latest scientific knowledge and to share that information with states and Tribes to assist them in achieving the goals of the Clean Water Act. 40 CFR § 131.20 addresses the state and tribal obligations to review existing EPA guidance for toxics and provide rational for adoption/non-adoption and perhaps modification of national water quality criteria at least every three years in a "triennial review" as the WQCC is undertaking in these proceedings.

Q. WHAT IS LANL'S POSITION ON THE PROPOSED AMENDMENT TO 20.6.4.900 NMAC?

A. LANL's position is to, whenever possible, support NMED review the 304(a) and Human Health criteria (as required by EPA) and either promote adoption to the WQCC or provide rational for non-adoption to EPA and all affected parties. Currently, NMED's obligation is to inform the regional office of the EPA on decisions regarding adoption/non-adoption, and not other interested parties. In the interest of transparency, these decisions should be made available to the parties in the Triennial Review. NMED notes that its evaluation of the existing federal and state Human Health-Organism Only ("HH-OO") aquatic life criteria concluded that of the "108 pollutants with HH-OO criteria listed in 20.6.4.900(J)(1) NMAC, 23 are equivalent to EPA Section 304(a) criteria and required no amendment, 60 pollutants have EPA Section 304(a) criteria more stringent than the State's, and 25 pollutants have EPA Section 304(a) criteria less stringent than the State's. In addition, 14 pollutants are listed on EPA Section 304(a) guidance but not adopted by the State." NMED Exhibit 2 at 8. In anticipation of a possible need to meet these new pollutant levels, LANL contacted the 10 analytical labs we are contractually obligated to use with the list of the 60 new low-level requirements proposed by NMED. Of these labs, only 3 responded with proposals covering the new analytes. Among the three labs, 28 of the 60 constituent minimum detection levels ("MDL") needed to meet NMED's proposed changes to 20.6.4.900 were not achievable. Moreover, none of the responding lab's methods for the 60 new low level requirements were 40 CFR Part 136 approved methods for NPDES permits. In regard to the state's own Scientific Laboratory Division and the ~104 surface

water discharge permits (and their contract laboratories) that may be required at some point to monitor for these constituents, it is unclear if these levels are technologically achievable.

Q. PLEASE EXPLAIN THE BASIS FOR LANL'S POSITION.

A. LANL supports consideration of promulgated guidance from EPA, as required by Clean Water Act section 304(a), federal regulation 40 CFR § 131.20, and NMED. Consistency between federal and state limits, except where site-specific information warrants otherwise, is conducive to regulatory transparency.

Q. ARE YOU RECOMMENDING MODIFICATIONS TO THIS PROPOSED AMENDMENTS?

A. No.

2. HUMAN HEALTH-ORGANISM ONLY CRITERIA

Q. HAVE YOU REVIEWED THE DIRECT TESTIMONY OF KRIS BARRIOS FILED ON BEHALF OF NMED REGARDING NMED'S PROPOSAL TO AMEND HUMAN HEALTH-ORGANISM ONLY CRITERIA?

A. Yes, in particular I have reviewed NMED Exhibit 2 at 7-9 regarding NMED's proposal for HH-OO Criteria.

Q. PLEASE SUMMARIZE YOUR UNDERSTANDING OF THE PROPOSED AMENDMENT TO THE HUMAN HEALTH CRITERIA.

A. This section of Mr. Barrios' testimony explains NMED's obligation to review EPA's most recent guidance regarding water quality criteria, and, on the occasion of the Triennial Review, either adopt the guidance or explain why NMED will not be recommending that the WQCC adopt the guidance.

Q. WHAT IS LANL'S POSITION ON THE PROPOSED AMENDMENT TO THE HUMAN HEALTH CRITERIA?

A. As explained above, LANL supports a more transparent review of guidance and an earlier discussion with the WQCC and interested parties as to the support/non-support of adopting the most up-to-date EPA guidance.

Q. PLEASE EXPLAIN THE BASIS FOR LANL'S POSITION.

A. As recently as the 2013 Triennial Review, the State provided the rationale for adoption/non-adoption of the EPA's 304(a) guidance to the EPA Regional Administrator as an attachment to the WQCC approved surface water standards, 20.6.4 NMAC. For reasons of regulatory certainty and openness, LANL prefers this process be performed earlier in the Triennial Review process and that it be part of the public record. To NMED's credit, the Department did provide testimony for this Triennial Review explaining why the department would not be adopting recent EPA guidance for Aluminum, Arsenic, Manganese, and Selenium. NMED Exhibit 2, Section IV(B)(3).

Q. ARE YOU RECOMMENDING MODIFICATIONS TO THIS PART OF THE TRIENIAL REVIEW PROCESS?

A. No. However, LANL recommends that this aspect of the Triennial Review process be introduced as a proposal to the WQCC and be part of the public record for all interested parties to review, rather than appended to the WQCC-approved submission to EPA Region 6 as in the 2013 Triennial Review.

Q. PLEASE EXPLAIN THE BASIS FOR YOUR RECOMMENDATION.

A. This would be consistent with all other publically-reviewed proposals, testimonies and rebuttals of the Triennial Review process. NMED's obligation to consider new or

previously non-adopted EPA guidance, upon the occurrence of the Triennial Review, should undergo public and interested party scrutiny. LANL welcomes the more transparent approach taken for this Triennial Review regarding Aluminum, Arsenic, Manganese and Selenium.

Q. HAVE OTHER PARTIES TO THIS PROCEEDING MADE RECOMMENDATIONS RELATED TO THE TRIENNIAL REVIEW PROCESS?

A. No, not to my knowledge.

Q. WHAT IS YOUR RECOMMENDATION TO THE WQCC?

A. LANL recommends that the WQCC require that consideration of the existing, but not yet adopted 304(a) guidance be noticed to interested parties and the public as part of NMED's proposed changes to 20.6.4 NMAC.

VI. CONCLUSION

Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A. Yes.

Exhibit 62

STATE OF NEW MEXICO
BEFORE THE WATER QUALITY CONTROL COMMISSION

IN THE MATTER OF:

THE PETITION TO AMEND
THE STANDARDS FOR INTERSTATE
AND INTRASTATE SURFACE WATERS,
20.6.4 NMAC **WQCC No. 20-51(R)**

REBUTTAL TESTIMONY OF BARRY FULTON
BENCHMARK ENVIRONMENTAL, LLC,
ON BEHALF OF TRIAD NATIONAL SECURITY, LLC
AND THE U.S. DEPARTMENT OF ENERGY, NATIONAL NUCLEAR SECURITY ADMINISTRATION

June 22, 2021

Rebuttal Testimony of Barry Fulton
Case No. WQCC 20-51 (R)

I. WITNESS BACKGROUND AND QUALIFICATIONS

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Barry Fulton. My business address is 266 Morgan Drive, McCall, Idaho 83638.

Q. ON WHOSE BEHALF ARE YOU SUBMITTING REBUTTAL TESTIMONY?

A. I am submitting this rebuttal testimony on behalf of Triad National Security, LLC, ("Triad") and the U.S. Department of Energy, National Nuclear Security Administration ("DOE") (collectively "LANL").

Q. HAVE YOU PROVIDED PREVIOUS TESTIMONY IN THIS CASE?

A. Yes, I provided written direct testimony, which includes: (i) a summary of my qualifications and experience; (ii) a discussion of LANL's evaluation of and recommended changes to the amendments to the Standards for Interstate and Intrastate Surface Waters, 20.6.4 NMAC ("Standards") proposed by the New Mexico Environment Department ("NMED"); and (iii) the technical bases for certain related changes to the Standards proposed in LANL's Notice of Intent to Present Technical Testimony ("LANL's Notice of Intent"). My direct testimony was submitted with LANL's Notice of Intent, filed on May 3, 2021, as **LANL Exhibit 6**.

II. PURPOSE OF TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?

A. The purpose of my rebuttal testimony is to respond to the direct testimony of NMED and other parties to this proceeding relating to the following proposed amendments to 20.6.4 NMAC:

- Definition of "marginal coldwater" (20.6.4.7(M)(1) NMAC)
- Definition of "Limited aquatic life" (20.6.4.7(L)(2) NMAC)

- Use of the term "stringency" (20.6.4.10 and 20.6.4.15 NMAC)
- Modification of human health-based water quality criteria to reflect natural background (20.6.4.10(F) NMAC)
- Human health organism only ("HH-OO") criteria for arsenic (20.6.4.900 NMAC)
- Applicability of HH-OO criteria in tributaries (20.6..4.11(G) NMAC)

Q. HAVE YOU REVIEWED THE NOTICE OF INTENT TO PRESENT TECHNICAL TESTIMONY ("NOI") AND EXHIBITS FILED BY NMED, THE NEW MEXICO MINING ASSOCIATION ("NMMA"), THE SAN JUAN WATER COMMISSION ("SJWC"), AND AMIGOS BRAVOS RELATED TO THE AMENDMENTS ADDRESSED IN YOUR DIRECT AND REBUTTAL TESTIMONY?

A. Yes.

III. NMED MODIFICATIONS TO DEFINITION OF MARGINAL COLDWATER (20.6.4.7(M)(1) NMAC)

Q. HAVE YOU REVIEWED NMED'S PROPOSED AMENDMENTS TO THE DEFINITION OF "MARGINAL COLDWATER" (20.6.4.7(M)(1) NMAC)?

A. Yes. I reviewed the proposed amendments in NMED's August 18, 2020 Petition ("Original Petition"), and NMED's March 12, 2021 Notice of Amended Petition ("Amended Petition"), as well as NMED's Statement of Reasons for the proposed amendments. I have also reviewed NMED Exhibit 9, NMED's Proposed Amended Rule-20.6.4 NMAC and the supporting written direct testimony of NMED's witness Jennifer Fullam (NMED Exhibit 4) providing the rationale for NMED's proposed modifications to the definition of marginal coldwater.

Q. DOES NMED EXHIBIT 9 PROPOSE THE SAME MODIFICATIONS TO 20.6.4.7(M)(1) THAT WERE PROPOSED IN NMED'S AMENDED PETITION?

A. Yes.

Q. PLEASE SUMMARIZE NMED'S CURRENT PROPOSAL?

A. NMED is proposing to amend the definition of "Marginal Coldwater" in reference to a designated use for aquatic life as follows:

> 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~~)].

NMED's proposed amendments to the definition of "Marginal Coldwater" address three issues. First, hydrologic characteristics (e.g., "intermittent or low flows") would no longer be included as a limiting condition towards the maintenance of a coldwater aquatic life. Second, a general duration with which coldwater aquatic life may be limited is introduced to the definition (e.g., "during at least some portion of the year"). And third, the numeric temperature criterion associated with marginal coldwater (25°C) is deleted from the definition.

Q. BASED ON YOUR REVIEW OF MS. FULLAM'S DIRECT TESTIMONY, WHAT DO YOU UNDERSTAND TO BE THE BASIS FOR NMED'S PROPOSAL TO REMOVE REFERENCES TO HYDROLOGIC CONDITION IN THE DEFINITION OF "MARGINAL COLDWATER"?

A. I understand NMED is proposing to remove references to hydrologic conditions in the definition of marginal coldwater to clarify that this designated use is not limited to ephemeral or intermittent waters. As Ms. Fullam explains in her direct testimony, "the

[marginal coldwater] definition as presently written could potentially be interpreted as applicable only to intermittent or low-flow waters when, in fact, it is the appropriate designated use for waters that can attain the numeric criteria, regardless of the hydrologic regime." NMED Exhibit 4 at 6. Ms. Fullam's direct testimony provides examples where perennial waterbodies of the state are currently classified as marginal coldwater.

Ms. Fullam's direct testimony also explains the reference to hydrologic condition originated when language in the water quality standards changed from "fishery" to "aquatic life" designated uses in 2005. The current "marginal coldwater" designated use was previously referred to as "marginal coldwater fishery", which, in part, referred to "a stream reach, lake or impoundment known to support a coldwater fish population during at least some portion of the year . . . ." *Id.* at 5. As part of the 2005 amendments to the Standards, the reference to intermittent flow was added to reflect the "allowable seasonality" of these waters to support coldwater aquatic life. *Id.* at 6. However, NMED is proposing to delete intermittent flow from the definition.

Q. BASED ON YOUR REVIEW OF MS. FULLAM'S DIRECT TESTIMONY, WHAT DO YOU UNDERSTAND TO BE THE BASIS FOR NMED'S PROPOSAL TO REMOVE NUMERIC TEMPERATURE CRITERIA FROM THE DEFINITION OF "MARGINAL COLDWATER?"

A. Based on Ms. Fullam's testimony, I understand NMED is proposing to remove numeric temperature criteria from the definition because definitions for aquatic life uses in 20.6.4.7 NMAC describe the use and not the criteria. Ms. Fullam's direct testimony states that including all criteria in the definition for designated uses would render the definition

lengthy and overly cumbersome for reference and implementation of water quality standards. NMED Exhibit 4 at 6.

Q. DID YOUR DIRECT TESTIMONY ADDRESS THE BASIS FOR NMED'S PROPOSED CHANGES?

A. Yes, my direct testimony recommended including hydrologic regimes and numeric temperature criteria in the definition of marginal coldwater similar to how hydrologic regimes and temperature criteria are included in the definition of "marginal warmwater" provided at 20.6.4.7(M)(2) NMAC.

In addition, my direct testimony recommended that the amended language, "at least some portion of the year" in reference to the timeframe under which conditions limit coldwater aquatic life, be more specific so that it is clear how NMED intends to apply the water quality standards to temperature data.

Q. BASED ON YOUR REVIEW OF NMED'S PROPOSAL AND SUPPORTING DIRECT TESTIMONY, ARE YOU CHANGING YOUR TESTIMONY OR RECOMMENDED PROPOSED REVISIONS TO 20.6.4.7(M)(1) NMAC THAT WERE STATED IN YOUR DIRECT TESTIMONY?

A. I maintain and affirm my recommendations that hydrologic regime (e.g., intermittent or low flow) and the temperature criterion (25°C [77°F]) be retained in the definition of marginal coldwater aquatic life and striking the language "during at least some portion of the year."

Q. PLEASE EXPLAIN THE REASONS YOU ARE MAINTAINING AND AFFIRMING YOUR RECOMMENDATIONS.

A. I maintain and affirm my recommendations for the following reasons:

i. I recommend the language "intermittent or low flows" be retained in the definition of marginal coldwater so that it is clear these conditions can limit the maintenance of a coldwater aquatic life population. Doing so would maintain consistency with the definition of "marginal warmwater" provided at 20.6.4.7(M)(2) NMAC.

In Ms. Fullam's direct testimony, NMED states that its reason for excluding the language "intermittent or low flows" from the definition of marginal coldwater aquatic life is that, as presently written, the definition could potentially be interpreted as applicable only to intermittent or low-flow waters. The current definition states ". . . natural intermittent or low flows, or other natural habitat conditions severely limit maintenance of a coldwater aquatic life population . . . ." NMED Exhibit 4 at 6. In my opinion, this language is clear that hydrology is not the only factor that could limit coldwater aquatic life. As noted above, the same language, "natural intermittent or low flow or other natural habitat conditions" is included in the definition of marginal warmwater at 20.6.4.7(M)(2) NMAC, which NMED is not proposing to amend despite marginal warmwater being an appropriate designated use for perennial waters.

ii. I recommend retaining the temperature criterion in the definition of marginal coldwater for consistency with the definition of marginal warmwater and to provide greater regulatory certainty when classifying and assessing surface waters based on temperature data.

iii. I recommend that the New Mexico Water Quality Control Commission ("WQCC") reject NMED's proposed language "during at least some portion of the year." As described in my direct testimony, the phrase "at least some portion of the year" is vague, which creates uncertainty in the implementation of the water quality standards. This

qualifying language is not included in the definition of "marginal warmwater," which creates further disparity between the two definitions. NMED's direct testimony did not address how this would be implemented or provide specific justification for the amended language. Ms. Fullam described that intermittent flow was added as part of the 2005 amendments to NMAC to reflect "allowable seasonality," which appears to be the basis of the proposed language "during at least some portion of the year." However, NMED's proposal to delete the phrase "intermittent flows" from the definition does not add clarity and should be rejected.

Q. DID ANY OTHER PARTY PROPOSE MODIFICATIONS TO THE DEFINITION OF "MARGINAL COLDWATER"?

A. Yes. The SJWC addressed NMED's proposed amendments to the definition of marginal coldwater.

Q. CAN YOU SUMMARIZE THOSE PROPOSED CHANGES?

A. The SJWC recommends rejecting the proposed changes to the definition of marginal coldwater because NMED did not provide sufficient justification and the NMED proposed changes would be inconsistent with the definition of "marginal warmwater."

Q. BASED ON YOUR REVIEW OF THE SJWC PROPOSAL AND SUPPORTING DIRECT TESTIMONY, ARE YOU CHANGING YOUR TESTIMONY OR RECOMMENDED PROPOSED REVISIONS TO 20.6.4.7(M)(1) NMAC THAT WERE STATED IN YOUR DIRECT TESTIMONY?

A. No.

Q. PLEASE EXPLAIN.

A. The SJWC proposal and supporting direct testimony are consistent with my proposed changes to: (1) retain intermittent or low flow; (2) reject the language "at least some portion of the year" in reference to natural conditions that may limit coldwater aquatic life; and (3) retain the temperature criterion in the definition. As stated above and in SJWC's supporting direct testimony, these amendments would be inconsistent with the definition of "marginal warmwater".

Q. WHAT IS YOUR RECOMMENDATION TO THE WQCC WITH RESPECT TO THE DEFINITION OF "MARGINAL COLDWATER"?

A. I recommend that the WQCC reject NMED's proposal and that the WQCC adopt the amendments to 20.6.4.7(M)(1) NMAC proposed by LANL in **LANL Exhibit 57** to LANL's NOI for the reasons stated in my direct testimony and further addressed above.

IV. NMED MODIFICATIONS TO THE DEFINITION OF LIMITED AQUATIC LIFE (20.6.4.7(L)(2) NMAC)

Q. HAVE YOU REVIEWED NMED'S PROPOSED AMENDMENTS TO THE DEFINITION OF "LIMITED AQUATIC LIFE" (20.6.4.7(L)(2) NMAC)?

A. Yes. I reviewed the proposed language in NMED's Original Petition, and NMED's Amended Petition, as well as NMED's Statement of Reasons for the proposed amendments. I have also reviewed NMED Exhibit 9 and the supporting written direct testimony of NMED's witness Jennifer Fullam providing the rationale for NMED's proposed modifications to the definition of limited aquatic life.

Q. DOES NMED EXHIBIT 9 PROPOSE THE SAME MODIFICATIONS TO 20.6.4.7(M)(1) NMAC THAT WERE PROPOSED IN NMED'S AMENDED PETITION?

A. Yes.

Q. DID THE ANALYSIS IN PRE-FILED DIRECT TESTIMONY PROVIDED BY NMED WITNESS FULLAM CAUSE YOU TO RECONSIDER THE STATEMENTS AND PROPOSED REVISIONS TO 20.6.4.7(L)(2) NMAC CONTAINED IN YOUR DIRECT TESTIMONY?

A. No. The testimony from witness Fullam does not change my analysis. My testimony recommended hydrologic regimes be included in the definition of "limited aquatic life". The purpose of this change is to remain inclusive of the definition's meaning and clarify that a limited aquatic life designated use can apply to surface waters of differing hydrology depending on site-specific characteristics. A key rationale in Ms. Fullam's testimony was her concern that perennial waters may be excluded by the specification of "ephemeral and intermittent." NMED Exhibit 4 at 4-5. I agree that "limited aquatic life" should not be limited to ephemeral or intermittent waters, as the current definition states. My recommended change at 20.6.4.7(L)(2) NMAC improves on the proposal from NMED by providing greater clarity that "limited aquatic life" as a designated use may apply to various hydrologic regimes.

I maintain and affirm my position that the definition of "limited aquatic life" should clarify that this subcategory may include "ephemeral, intermittent, or perennial" surface waters. I support the inclusion of "low-flows" proposed by NMED as stated in my direct testimony.

Q. DID ANY OTHER PARTY PROPOSE MODIFICATIONS TO THE DEFINITION OF "LIMITED AQUATIC LIFE"?

A. No.

Q. WHAT IS YOUR RECOMMENDATION TO THE WQCC WITH RESPECT TO THE DEFINITION OF "LIMITED AQUATIC LIFE"?

A. I recommend that the WQCC reject NMED's proposal and instead adopt the amendments to 20.6.4.7(L)(2) NMAC proposed by LANL in **LANL Exhibit 57**, which includes the changes proposed by NMED as well as additional clarification on hydrologic regimes for the reasons stated in my direct testimony and further addressed above.

V. NMED PROPOSED AMENDMENTS TO REVIEW OF STANDARDS (20.6.4.10 AND 20.6.4.15 NMAC)

Q. HAVE YOU REVIEWED NMED'S PROPOSED REVISIONS TO 20.6.4.10 AND 20.6.4.15 NMAC?

A. Yes. I reviewed the proposed language in NMED's Original Petition, and NMED's Amended Petition, as well as NMED's Statement of Reasons for the proposed amendments. I have also reviewed NMED Exhibit 9 and the supporting written direct testimony of NMED's witness Jennifer Fullam providing the rationale for NMED's proposed modifications to the 20.6.4.10 and 20.6.4.15 NMAC.

Q. DID THE ANALYSIS IN PRE-FILED DIRECT TESTIMONY PROVIDED BY NMED, OR ANY OTHER, WITNESSES CAUSE YOU TO RECONSIDER THE TESTIMONY AND PROPOSED REVISIONS TO 20.6.4.10(B), 20.6.4.15(A) AND 20.6.4.15(D)(2)(C) NMAC CONTAINED IN YOUR DIRECT TESTIMONY?

A. No. The testimony from NMED's witnesses does not change my analysis. I maintain and affirm that 20.6.10 and 20.6.4.15 NMAC should be amended to limit the usage of the term "stringent" to refer to the magnitude of numeric criteria rather than sub-categories of designated uses, consistent with 40 CFR § 131.10 and as stated in my direct testimony.

Q. DID ANY OTHER PARTY PROPOSE MODIFICATIONS TO THESE SECTIONS?

A. Yes. SJWC's witness Jane DeRose-Bamman provides direct testimony consistent with my recommendation to limit use of the term "stringency" throughout NMAC to refer to criteria rather than a designated use. Her testimony also addresses NMED's improper use of the term "stringent" relative to 40 CFR § 131.10 in that "stringent" applies to criteria, not uses. SJWC Exhibit 2 at 15.

Q. DID THE ANALYSIS IN PRE-FILED DIRECT TESTIMONY PROVIDED BY NMED WITNESSES CAUSE YOU TO RECONSIDER THE TESTIMONY AND PROPOSAL TO REVISE NMED'S PROPOSED AMENDMENT TO 20.6.4.10(F) NMAC?

A. No. The testimony from NMED's witnesses did not directly address my recommendations for 20.6.4.10(F) NMAC. I maintain and affirm my recommendations as stated in my direct testimony and further addressed below.

Q. WHAT IS YOUR RECOMMENDATION TO THE WQCC?

A. Regarding use of the term "stringency" in 20.6.4.10(B), 20.6.4.15(A) and 20.6.4.15(D)(2)(c) NMAC, I recommend that the WQCC reject NMED's proposal and adopt the amendments to proposed by LANL in **LANL Exhibit 57** for the reasons stated in my direct testimony and further addressed above. In addition to these recommendations provided in my direct written testimony, I also recommend that the WQCC reject NMED's proposal in 20.6.4.7(A)(8) NMAC, which states, "An attainable use may or may not be as stringent as the designated use." Again, the term stringent should refer to criteria and not the use.

Although NMED is not proposing to amend 20.6.4.10(F) NMAC, it proposes amendments to 20.6.4.10(B) NMAC regarding the modification of criteria to reflect the natural condition of a waterbody and amendments to 20.6.4.15 NMAC regarding application of UAAs to modify designated uses in accordance with federal regulations. These proposed amendments are also relevant to 20.6.4.10(F) NMAC, which disallows any modification to domestic water supply, primary or secondary contact, or HH-OO criteria based on natural background conditions. Therefore, I recommend the WQCC adopt my recommended changes to 20.6.4.10(F) NMAC as described in my direct written testimony and further addressed below.

I recommend the WQCC revise language in 20.6.4.10(F) to clarify that domestic water supply, primary or secondary contact, or HH-OO criteria may be modified to reflect natural background if it can be demonstrated such uses would be protected at natural background concentrations (*see* **LANL Exhibit 57**). EPA (1997) states that "For human health uses, where natural background concentration is documented, this new information should result in, at a minimum, a re-evaluation of the human health use designation. Where 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." **LANL Exhibit 83.** However, 20.6.4.10(F) NMAC states "Domestic water supply, primary or secondary contact, or HH-OO criteria shall not be modified based on natural background." This provision implies that under no circumstance can human-health criteria or uses be modified to reflect natural background conditions regardless of whether

such uses are existing or attainable, which is inconsistent with federal regulations at 40 CFR § 131.10.

I maintain and affirm the basis of this proposal and offer additional proposed language to 20.6.4.10(F) NMAC as follows, to provide greater clarity and consistency with 40 CFR § 131 and 20.6.4.15 NMAC (proposed new language shown in bold and new deletions shown in bold strikethrough compared to LANL's pre-filed testimony and LANL Exhibit 1):

> **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 interferences by humans. Domestic water supply, primary or secondary contact, or human health-organism only criteria shall not be modified based on natural background *unless* ***it is demonstrated*** *such uses would be protected at* ~~***natural***~~ *background concentrations* ***or such uses are not attainable in accordance with 20.6.4.15 NMAC***.

VI. OTHER PROPOSALS ADDRESSED IN YOUR DIRECT TESTIMONY

1. HH-OO CRITERIA FOR ARSENIC

Q. DID THE ANALYSIS IN PRE-FILED DIRECT TESTIMONY PROVIDED BY WITNESSES FOR NMED, NMMA, SJWC, OR AMIGOS BRAVOS CAUSE YOU TO RECONSIDER YOUR STATEMENTS AND RECOMMENDATIONS RELATED TO HH-OO CRITERIA FOR ARSENIC IN 20.6.4.900 NMAC?

A. No. I maintain and affirm that the WQCC should not update the HH-OO criteria for arsenic consistent with NMED's amended petition.

NMED's witness Kris Barrios (NMED Exhibit 2) and NMED Exhibit 48 (WQCC 05-05(R) Statement of Reasons Excerpt for Arsenic) provide the basis for New Mexico's current HH-OO criterion of 9.0 µg/L. As described in those exhibits, New Mexico's

current HH-OO criterion for arsenic was derived using a New Mexico-specific bioaccumulation factor, EPA risk assumptions, and adjusted based on inorganic arsenic. In my direct testimony (**LANL Exhibit 6**), I recommended these issues be addressed before the WQCC adopts EPA Section 304(a) criteria. However, this is no longer relevant because NMED has withdrawn its proposal in the Amended Petition and provided additional information on New Mexico's current arsenic HH-OO criterion in its exhibits.

Q. DID ANY OTHER PARTY PROPOSE MODIFICATIONS TO THESE SECTIONS?

A. No.

Q. WHAT IS YOUR RECOMMENDATION TO THE WQCC?

A. I agree with NMED's withdrawal of the proposal to modify arsenic HH-OO criterion.

2. HH-OO CRITERIA FOR PERSISTENT TOXIC POLLUTANTS

Q. DID THE ANALYSIS IN PRE-FILED DIRECT TESTIMONY PROVIDED BY WITNESSES FOR NMED, NMMA, SJWC, OR AMIGOS BRAVOS CAUSE YOU TO RECONSIDER YOUR STATEMENTS AND RECOMMENDATIONS RELATED TO THE APPLICABILITY OF HH-OO CRITERIA FOR PERSISTENT TOXIC POLLUTANTS TO ALL TRIBUTARIES OF WATERS WITH AQUATIC LIFE USE DESIGNATIONS (20.6.4.11(G) NMAC) CONTAINED IN YOUR DIRECT TESTIMONY?

A. No. I maintain and affirm that HH-OO criteria for persistent toxic pollutants should not be required to apply to all tributaries of waters with a designated, existing or attainable aquatic life use. Although NMED is not proposing changes to 20.6.4.11(G) NMAC, it has proposed multiple changes to HH-OO criteria for persistent toxic pollutants at 20.6.4.900

NMAC, a definition for persistent toxic pollutants at 20.6.4.7(P)(3) NMAC, and amendments to 20.6.4.15 NMAC regarding application of UAAs to modify designated uses in accordance with federal regulations. These amendments are also relevant to 20.6.4.11(G) NMAC, which states "the HH-OO criteria for persistent toxic polluntants, 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."

As stated in my direct written testimony (**LANL Exhibit 6**), tributaries of waters with a designated, existing or attainable aquatic life use might be fishless, or support only limited populations of fish or shellfish, due to natural low flow or physical habitat conditions. However, downstream waters containing fish populations may fully support HH-OO criteria regardless of conditions in upstream tributaries, particularly for ephemeral or intermittent tributaries or tributaries that lack a hydrologic connection to downstream waters. The current proposal in 20.6.4.11(G) NMAC disallows any adjustment to HH-OO criteria for persistent toxic pollutants in tributaries regardless of whether downstream waters support HH-OO criteria. Federal regulations at 40 CFR § 131.10(b) state, "In designating uses of a water body and the appropriate criteria for those uses, the State shall take into consideration the water quality standards of downstream waters and ensure that its water quality standards provide for the attainment and maintenance of the water quality standards of downstream waters." Accordingly, as long as fish consumption and HH-OO criteria are being met in downstream waters, there are situations where modifying or removing HH-OO criteria in tributaries would still be protective of downstream uses and consistent with federal regulations. Similarly, where the tributary flow does not have reasonable potential to cause or contribute to the downstream failure to meet the HH-OO

criteria, modifying or removing HH-OO criteria in tributaries would still be protective of downstream uses and consistent with federal regulations.

Q. WHAT IS YOUR RECOMMENDATION TO THE WQCC?

A. I recommend that the WQCC reject NMED's proposal and adopt the amendments to 20.6.4.11(G) NMAC related to the application of HH-OO criteria for persistent toxic pollutants to tributaries proposed by LANL in **LANL Exhibit 57** for the reasons stated in my direct testimony, **LANL Exhibit 6**, and further addressed above. The Standards should allow for such adjustments where appropriate and protective of human-health uses.

VII. CONCLUSION

Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A. Yes.

Exhibit 63

STATE OF NEW MEXICO
BEFORE THE WATER QUALITY CONTROL COMMISSION

IN THE MATTER OF:

THE PETITION TO AMEND
THE STANDARDS FOR INTERSTATE
AND INTRASTATE SURFACE WATERS,
20.6.4 NMAC **WQCC No. 20-51(R)**

REBUTTAL TESTIMONY OF JOHN TOLL, WINDWARD ENVIRONMENTAL, LLC, ON BEHALF OF TRIAD NATIONAL SECURITY, LLC AND THE U.S. DEPARTMENT OF ENERGY, NATIONAL NUCLEAR SECURITY ADMINISTRATION

June 22, 2021

Rebuttal Testimony of John Toll
Case No. WQCC 20-51 (R)

I. WITNESS BACKGROUND AND QUALIFICATIONS

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is John Toll. I am the managing partner at Windward Environmental LLC ("Windward"). My business address is 200 First Avenue West, Suite 500, Seattle, WA 98119.

Q. ON WHOSE BEHALF ARE YOU SUBMITTING REBUTTAL TESTIMONY?

A. I am submitting this rebuttal testimony on behalf of Triad National Security, LLC, ("Triad") and the U.S. Department of Energy, National Nuclear Security Administration ("DOE") (collectively "LANL").

Q. HAVE YOU PROVIDED PREVIOUS TESTIMONY IN THIS CASE?

A. Yes, I provided direct testimony, which includes: (i) a summary of my qualifications and experience; (ii) a discussion of LANL's evaluation of and recommended changes to the amendments proposed by the New Mexico Environment Department ("NMED") to the Standards for Interstate and Intrastate Surface Waters, 20.6.4 NMAC ("Standards") set forth in NMED's August 18, 2020 Petition ("Original Petition") and NMED's March 12, 2021 Notice of Amended Petition ("Amended Petition"); and (iii) the technical bases for certain related changes to the Standards proposed in LANL's Notice of Intent to Present Technical Testimony ("LANL's Notice of Intent"). My direct testimony was submitted with LANL's Notice of Intent, filed on May 3, 2021, as **LANL Exhibit 7**.

II. PURPOSE OF TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?

A. The purpose of my rebuttal testimony is to respond to the following proposed topics and amendments that were not previously addressed by LANL in direct testimony:

- Additional topics and changes proposed by NMED in its Notice of Intent including: (a) New Mexico's delay in adoption of the federal CWA section 304(a) copper criteria developed by the United States Environmental Protection Agency ("EPA"); (b) NMED testimony on criteria for site-specific standards; (c) proposed modification to the definition of "attainable" in 20.6.4.7(A) NMAC;
- Additional changes proposed by Amigos Bravos in its Notice of Intent regarding: (a) proposed modification to 20.6.4.6(C) NMAC (Objective); (b) proposed modifications to NMED's definition for "contaminants of emerging concern;" and (c) proposed new section 20.6.4.14(F) NMAC;

Q. HAVE YOU REVIEWED THE NOTICE OF INTENT TO PRESENT TECHNICAL TESTIMONY ("NOI") AND EXHIBITS FILED BY NMED, THE NEW MEXICO MINING ASSOCIATION ("NMMA"), THE SAN JUAN WATER COMMISSION ("SJWC"), AND AMIGOS BRAVOS RELATED TO THE AMENDMENTS ADDRESSED IN YOUR DIRECT AND REBUTTAL TESTIMONY?

A. Yes.

III. ADDITIONAL NMED POSITIONS

1. DELAY IN ADOPTING EPA SECTION 304(A) COPPER CRITERIA

Q. HAVE YOU REVIEWED THE DIRECT TESTIMONY OF KRIS BARRIOS FILED ON BEHALF OF NMED IN SUPPORT OF THE RECOMMENDATION TO DELAY ADOPTING EPA'S 2007 SECTION 304(A) COPPER CRITERIA?

A. Yes. I have reviewed the direct testimony of Mr. Barrios, NMED Exhibit 2, and in particular page 14, lines 7-21 regarding NMED's approach to EPA'S 2007 section 304(a) copper criteria.

Q. PLEASE SUMMARIZE YOUR UNDERSTANDING OF THAT TESTIMONY.

A. Mr. Barrios states that NMED is not proposing to adopt EPA's 2007 recommended aquatic life criteria for copper, which are calculated using the Biotic Ligand Model ("BLM"). Instead, it proposes to retain New Mexico's current hardness-based numeric water quality criteria.

Mr. Barrios testified that "the BLM provides a more accurate assessment of copper bioavailability than New Mexico's hardness-based criteria calculation," but that data scarcity has impeded the adoption of EPA's BLM-based recommended aquatic life criteria for copper.

Mr. Barrios' testimony correctly noted that the New Mexico Water Quality Control Commission ("WQCC") adopted a provision [20.6.4.10(D)(4)(c) NMAC] during the 2010 Triennial Review adding the copper BLM as a scientifically defensible method for developing site-specific criteria.

Q. WHAT IS LANL'S POSITION ON NMED'S PROPOSAL TO FURTHER DELAY ADOPTING EPA SECTION 304(A) COPPER CRITERIA?

A. LANL does not oppose NMED's proposal to further delay adopting EPA section 304(a) copper criteria, in the context of Mr. Barrios' direct testimony on this issue as a whole.

Q. PLEASE EXPLAIN THE BASIS FOR LANL'S POSITION.

A. Since WQCC adopted 20.6.4.10(D)(4)(c) NMAC during the 2009 Triennial Review (WQCC 08-13(R)), LANL has been developing data to support implementation of EPA's

2007 section 304(a) recommended aquatic life criteria for copper for the Pajarito Plateau. NMED's Surface Water Quality Bureau ("SWQB") is apprised of that effort. LANL has been appreciative of SWQB's ongoing interest in the effort to collect a robust dataset and develop site-specific water quality criteria ("SSWQC") that are consistent with that dataset.

Q. ARE YOU RECOMMENDING MODIFICATIONS TO NMED'S PROPOSAL TO FURTHER DELAY ADOPTING EPA SECTION 304(A) COPPER CRITERIA?

A. No, not at this time.

Q. PLEASE EXPLAIN THE BASIS FOR YOUR RECOMMENDATION.

A. The SWQB is aware that LANL is preparing to petition for the adoption of EPA's section 304(a) recommended aquatic life criteria for copper as SSWQC for the Pajarito Plateau and are apprised of LANL's data and analyses that support its decision to petition for copper SSWQC.

The SWQB and EPA Region 6 have had the opportunity to review LANL's work plan for developing its petition and a demonstration report in support of the proposed petition. LANL is encouraged by SWQB's continued commitment to evaluate the implementation of the BLM for copper on a segment-specific basis.

Q. HAVE OTHER PARTIES TO THIS PROCEEDING MADE RECOMMENDATIONS RELATED TO NMED'S RECOMMENDED DELAY IN ADOPTING EPA SECTION 304(A) CRITERIA FOR COPPER?

A. No.

Q. WHAT IS YOUR RECOMMENDATION TO THE WQCC?

A. My recommendation to the WQCC is to accept NMED's proposal to further delay adopting EPA section 304(a) copper criteria, with the knowledge that a subsequent petition to adopt

EPA's section 304(a) recommended aquatic life criteria for copper as SSWQC for the Pajarito Plateau region will be forthcoming, potentially as soon as later this summer.

2. CRITERIA FOR SITE-SPECIFIC STANDARDS (20.6.4.10 NMAC)

Q. HAVE YOU REVIEWED THE DIRECT TESTIMONY OF JENNIFER FULLAM FILED ON BEHALF OF NMED RELATED TO THE ADOPTION OF A SITE-SPECIFIC CRITERION?

A. Yes. I have reviewed the direct testimony of Ms. Fullam, NMED Exhibit 4, and in particular page 10, line 1 through page 12, line 5 regarding adoption of site-specific standards criteria.

Q. PLEASE SUMMARIZE YOUR UNDERSTANDING OF NMED'S PROPOSED AMENDMENTS TO 20.6.4.10 NMAC.

A. Ms. Fullam states that NMED has proposed amending 20.6.4.10 NMAC "to clarify when and how a designated use or criterion may be amended for a surface water of the State." Her direct testimony asserts the following:

- "The intent of 20.6.4.10 NMAC is to specify the regulatory process necessary for amending water quality standards." NMED Exhibit 4 at 10, lines 1-2.
- "Several mechanisms trigger an amendment of designated uses and the criteria that protect those uses." *Id.* at 10, lines 6-7.

Though she claims "several," Ms. Fullam lists two mechanisms that trigger a designated use amendment, and one mechanism that triggers a criterion amendment absent a designated use amendment.

- Mechanisms that Ms. Fullam identified as triggering a designated use amendment are (1) the existing use is determined to be "more stringent" than the designated use (*id.* at 10, lines 7-17), and (2) the designated use is determined to be unattainable (*id.* at 10-11).
- The mechanism that Ms. Fullam identified as triggering a criterion amendment is that the designated use is supported, but "a particular criterion is unattainable due to localized conditions." *Id.* at 11, lines 4-9.

Q. WHAT IS LANL'S POSITION ON THE PROPOSED AMENDMENT TO 20.6.4.10 NMAC TO "CLARIFY" THE DEFINITION OF ACCEPTABLE CONDITIONS FOR DEVELOPING SITE-SPECIFIC CRITERIA?[1]

A. It is inaccurate to characterize the proposed amendment to 20.6.4.10(B) NMAC as a "clarification." For example, nowhere does the current 20.6.4.10 NMAC restrict the adoption of site-specific criteria to "instances in which the designated use is supported, but a particular criterion is unattainable due to localized conditions." This clause would substantively change, not merely clarify, 20.6.4.10 NMAC.

Q. PLEASE EXPLAIN THE BASIS FOR LANL'S POSITION.

A. The amendment to 20.6.4.10(B) NMAC proposed in Ms. Fullam's direct testimony conflicts with 20.6.4.10(D)(1) NMAC,[2] which is where terms under which the WQCC may

[1] LANL's position on proposed amendments to 20.6.4.10 NMAC pertaining to designated use amendments are addressed in the direct testimony provided by Mr. Barry Fulton at **LANL Exhibit 6**.

[2] 20.6.4.10.D(1) NMAC: The Commission may adopt site-specific numeric criteria applicable to all of parts 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;

adopt site-specific criteria are defined. 20.6.4.10 NMAC is clear as written. No amendment is needed to clarify when the WQCC may adopt site-specific criteria.

Q. DO YOU RECOMMEND THAT THE WQCC ADOPT THE PROPOSED AMENDMENT?

A. No. I recommend that the WQCC reject NMED's proposed amendment to 20.6.4.10(B) NMAC. If the WQCC were to decide that 20.6.4.10 should be "clarified" or changed regarding when the WQCC may adopt site-specific criteria for a surface water of the state, then I would recommend that the WQCC adopt the following language from the Idaho Water Quality Standards:

> *The following are acceptable conditions for developing site-specific criteria:*
>
> *i. Resident species of a water body are more or less sensitive than those species used to develop a water quality criterion.*
>
> *1) Natural adaptive processes have enabled a viable, balanced aquatic community to exist in waters where natural background levels of a pollutant exceed the water quality criterion (i.e., resident species have evolved a greater resistance to higher concentrations of a pollutant).*
>
> *2) The composition of aquatic species in a water body is different from those used to derive a water quality criterion (i.e., more or less sensitive species to a pollutant are present or representative of a water body than have been used to derive a criterion).*
>
> *ii. Biological availability and/or toxicity of a pollutant may be altered due to differences between the physicochemical characteristics of the water in a water body and the laboratory water used in developing a water quality criterion (e.g., alkalinity, hardness, pH, salinity, total organic carbon, suspended solids, turbidity, natural complexing, fate and transport water, or temperature).*
>
> *iii. The effect of seasonality on the physicochemical characteristics of a water body and subsequent effects on biological availability and/or toxicity of a pollutant may justify seasonally dependent site-specific criteria.*

---

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;

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."

iv. Water quality criteria may be derived to protect and maintain existing ambient water quality.

v. Other factors or combinations of factors that upon review of the [New Mexico Water Quality Control Commission] may warrant modifications to the criteria."

Q. HAVE OTHER PARTIES TO THIS PROCEEDING MADE RECOMMENDATIONS RELATED TO NMED'S PROPOSED AMENDMENT?

A. No.

3. NMED'S PROPOSED MODIFICATION TO THE DEFINITION OF "ATTAINABLE" IN 20.6.4.7(A) NMAC

Q. HAVE YOU REVIEWED NMED'S PROPOSED MODIFICATION TO THE DEFINITION OF "ATTAINABLE" IN 20.6.4.7(A) NMAC?

A. Yes.

Q. PLEASE SUMMARIZE YOUR UNDERSTANDING OF THE PROPOSED AMENDMENT TO 20.6.4.7(A) NMAC.

A. NMED has proposed replacing the term "attainable" in 20.6.4.7(A)(8) NMAC with the term "attainable use," and modifying the definition.

Q. WHAT IS LANL'S POSITION ON THE PROPOSED AMENDMENT TO 20.6.4.7(A)(8) NMAC?

A. LANL opposes adoption of the proposed amendment.

Q. PLEASE EXPLAIN THE BASIS FOR LANL'S OPPOSITION.

A. NMED's proposed amendment to 20.6.4.7(A)(8) NMAC would replace "'Attainable' means achievable by the imposition of effluent limits" with "'Attainable Use' means a use that is achievable by the imposition of effluent limits." By limiting an attainable use to a use that is "achievable by the imposition of effluent limits," NMED's proposal excludes 5

of the 6 factors identified in 40 CFR § 131.10(g)(2) through (6) that prevent a use from being attainable, namely:

- Natural, 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 without violating State water conservation requirements to enable uses to be met.
- Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place.
- Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the use.
- Physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses.
- Controls more stringent than those required by sections 301(b) and 306 of the federal Clean Water Act would result in substantial and widespread economic and social impact.

Q. ARE YOU RECOMMENDING MODIFICATIONS TO THIS PROPOSED AMENDMENT?

A. I am recommending that NMED's proposed amendment to 20.6.4.7(A)(8) NMAC be rejected.

Q. PLEASE EXPLAIN THE BASIS FOR YOUR RECOMMENDATION.

A. The proposed amendment would affect the implementation of New Mexico's Surface Water Quality Standards by excluding 5 of the 6 factors specified in the federal Clean Water Act regulations (40 CFR § 131.10(g)(2) through (6)), that are to be considered in establishing a water's attainable use, from the definition of "attainable use" that the proposed amendment would insert into the Standards.

Q. HAVE OTHER PARTIES TO THIS PROCEEDING MADE RECOMMENDATIONS RELATED TO NMED'S PROPOSED AMENDMENT?

A. No.

IV. ADDITIONAL CHANGES PROPOSED BY AMIGOS BRAVOS

1. NMED'S PROPOSAL TO ADD A DEFINITION FOR "CONTAMINANTS OF EMERGING CONCERN" AND AMIGOS BRAVOS'S PROPOSAL TO MODIFY NMED'S PROPOSED DEFINITION

Q. HAVE YOU REVIEWED NMED'S AND OTHER PARTIES' DIRECT TESTIMONY REGARDING THE PROPOSED DEFINITION OF "CONTAMINANTS OF EMERGING CONCERN"?

A. Yes. I have reviewed the following direct testimony and exhibits:

NMED's direct testimony and exhibits

- NMED Exhibit 2: Page 4, line 5 through page 5, line 7
- NMED Exhibit 9: Page 3
- NMED Exhibit 35

Amigos Bravos's direct testimony and exhibits

- Amigos Bravos Exhibit 1: Page 2
- Amigos Bravos Exhibit 3: Section III (pages 6-10)

- Amigos Bravos Exhibit 9: Page 7, Item 28

SJWC direct testimony

- SJWC Exhibit 2, Direct Technical Testimony of Jane DeRose-Bamman: Item 2.B, pages 7-8 and item 5.A, pages 16-17

Q. PLEASE SUMMARIZE YOUR UNDERSTANDING OF NMED'S PROPOSED AMENDMENT TO ADD A DEFINITION FOR "CONTAMINANTS OF EMERGING CONCERN" AND AMIGOS BRAVOS'S PROPOSAL TO MODIFY NMED'S PROPOSED DEFINITION FOR "CONTAMINANTS OF EMERGING CONCERN."

A. NMED has proposed adding the following definition to 20.6.4.7(C)(7) NMAC for Contaminants of Emerging Concern:

> "Contaminants of emerging concern" or "CECs" refer to water contaminants including, but not limited to, pharmaceuticals and personal care products that may cause significant ecological or human health effects at low concentrations. CECs are generally chemical compounds that, although suspected to potentially have impacts, may not have regulatory standards, and the concentrations to which negative impacts are observed have not been fully studied.

Amigos Bravos has proposed amending the definition proposed by NMED as follows:

> "Contaminants of emerging concern" or "CECs" refer to water contaminants including, but not limited to, <u>per- and polyfluoroalkyl substances</u>, pharmaceuticals and personal care products that may cause significant ecological or human health effects at low concentrations <u>and are not already considered "toxic pollutants" by the department</u>. CECs are generally chemical compounds that, although suspected to potentially have impacts, may not have regulatory standards, and the concentrations to which negative impacts are observed have not been fully studied.

Q. WHAT IS LANL'S POSITION ON THE PROPOSED AMENDMENTS TO ADD A DEFINITION FOR "CONTAMINANTS OF EMERGING CONCERN?"

A. LANL opposes adding a CEC definition to 20.6.4.7(C) NMAC because the term is not used in a substantive manner any place within the Standards. If the WQCC nevertheless decides to add a CEC definition, the definition should be the same definition as proposed by the EPA Office of Water/Office of Research and Development ("OW/ORD") Emerging Contaminants Workgroup in its white paper, "Aquatic Life Criteria for Contaminants of Emerging Concern, Part I, General Challenges and Recommendations." (**LANL Exhibit 84**):

> *"The term 'contaminant of emerging concern' (CEC) is being used… to identify chemicals and other substances that have no regulatory standard, have been recently 'discovered' in natural streams (often because of improved analytical chemistry detection levels), and potentially cause deleterious effects in aquatic life at environmentally relevant concentrations. They are pollutants not currently included in routine monitoring programs and may be candidates for future regulation depending on their (eco)toxicity, potential health effects, public perception, and frequency of occurrence in environmental media. CECs are not necessarily new chemicals. They include pollutants that have often been present in the environment, but whose presence and significance are only now being evaluated."*

Q. PLEASE EXPLAIN THE BASIS FOR LANL'S POSITION.

A. Adding a definition of a term that is not used in 20.6.4 NMAC would obscure the fact that 20.6.4.7(C) NMAC is not an appropriate regulatory mechanism for conducting CEC research.

Q. ARE YOU RECOMMENDING MODIFICATIONS TO THIS PROPOSED AMENDMENT?

A. I am recommending that the WQCC reject the proposed amendment. If the WQCC does not reject the proposed amendment, then my recommendation is that the WQCC modify the proposed amendment, and instead adopts the CEC definition proposed by the EPA

OW/ORD Emerging Contaminants Workgroup in its White Paper, Aquatic Life Criteria for Contaminants of Emerging Concern: General Challenges and Recommendations.

Q. PLEASE EXPLAIN THE BASIS FOR YOUR RECOMMENDATION.

A. The OW/ORD Emerging Contaminants Workgroup CEC definition is more rigorous and complete than the definitions proposed by NMED and Amigos Bravos, and it represents the recommendations of some of the nation's top ecotoxicologists, biologists and environmental risk assessors.

Q. HAVE OTHER PARTIES TO THIS PROCEEDING MADE RECOMMENDATIONS RELATED TO NMED'S PROPOSED AMENDMENT?

A. Yes. The SJWC opposes NMED's proposal to include CECs in the toxic pollutants regulation found in 20.6.4.13(F)(1) NMAC.

Q. PLEASE SUMMARIZE THE SJWC RECOMMENDATIONS REGARDING NMED'S PROPOSED CEC DEFINITION.

A. In the Direct Technical Testimony of Jane DeRose-Bamman, SJWC states that "NMED has provided no bases for its proposal to add COECs to the toxic pollutants standard." SJWC Exhibit 2 at 8. SJWC opposed NMED's proposed definition "because it would allow NMED to regulate contaminants that are not routinely monitored, may not yet have regulatory standards, and may not yet have been fully studied to determine their negative impacts." *Id.* at 16. SJWC goes on to say that "If COECs are only 'suspected to potentially have impacts' and those potential 'negative' impacts 'have not been fully studied,' then neither the 'sound scientific rationale' federal requirement nor the 'credible scientific data' state requirement have been met." *Id.* at 16-17. SJWC further states that many CECs do not even meet the 20.6.4.7(T)(2) NMAC definition of "toxic pollutant." *Id.* at 17.

Importantly, SJWC makes the point that 20.6.4.13(F) NMAC "already provides authority to regulate any contaminant that meets the [20.6.4.7(T)(2) NMAC] definition of a toxic pollutant." That includes CECs. *Id.*

Q. WHAT IS YOUR RECOMMENDATION TO THE WQCC?

A. I agree with and support the direct testimony of Jane DeRose-Bamman submitted by SJWC. The key points are 1) CECs generally do not meet the 20.6.4.7(T)(2) NMAC definition of "toxic pollutant," and 2) 20.6.4.13(F) NMAC already provides authority to regulate any contaminant that meets the 20.6.4.7(T)(2) NMAC definition of a toxic pollutant. My recommendation to the WQCC is that CECs not be included in the definition of toxic pollutant 20.6.4.7(T)(2) NMAC. LANL is proposing that the term "toxic pollutant" only apply to specific chemicals or compounds that the WQCC determines are toxic. Including CECs in the definition of "toxic pollutant" or implying that they are toxic, as proposed in NMED's proposed amendment to 20.6.4.13.F, would allow "toxic pollutant" to apply to substances NMED determines meets a general set of criteria. Equally concerning, NMED's proposal would effectively bypass the WQCC's review. Therefore, my recommendation to the WQCC is that CECs also not be included in the toxic pollutants regulation found in 20.6.4.13(F)(1) NMAC.

2. <u>PROPOSAL TO ADD NEW SECTION 20.6.4.14(F) NMAC</u>

Q. HAVE YOU REVIEWED AMIGOS BRAVOS EXHIBIT 3 AND ITS PROPOSAL TO ADD A NEW SECTION UNDER 20.6.4.14(F) NMAC, AUTHORIZING NMED TO ADD MONITORING AND REPORTING REQUIREMENTS AS A CONDITION IN FEDERAL PERMITS?

A. Yes. I have reviewed Amigos Bravos Exhibit 3, specifically Section III (pages 6-10), and Amigos Bravos's proposal to add a new section to 20.6.4.14(F) to include sampling and monitoring requirements as a condition in federal permits.

Q. PLEASE SUMMARIZE YOUR UNDERSTANDING OF AMIGOS BRAVOS'S PROPOSED AMENDMENT TO 20.6.4.14 NMAC.

A. The proposed amendment simply states that NMED may include sampling and monitoring of CECs as a condition in a federal permit under Section 401 of the federal Clean Water Act.

Q. WHAT IS LANL'S POSITION ON THE PROPOSED AMENDMENT TO 20.6.4.14 NMAC?

A. LANL opposes the proposed amendment**.**

Q. PLEASE EXPLAIN THE BASIS FOR LANL'S POSITION.

A. National Pollutant Discharge Elimination System ("NPDES") monitoring is performed for specific reasons:

> to determine compliance with effluent limitations established in NPDES permits, establish a basis for enforcement actions, assess treatment efficiency, characterize effluents and characterize receiving water. Regulations requiring the establishment of monitoring and reporting conditions in NPDES permits are at Title 40 of the Code of Federal Regulations (CFR) §122.44(i) and §122.48. Regulations at §122.44(i) require permittees to monitor… <u>using the test methods established at Part 136</u> unless another method is required under 40 CFR subchapters N or O.

See NPDES Permit Writers' Manual Section 8.1.1 (emphasis added).

40 CFR § 122.44(i)(1)(B) does provide that in the case of pollutants or pollutant parameters for which there are no methods approved under 40 CFR part 136 or 40 CFR chapter I, subchapter N or O, monitoring shall be conducted according to a test procedure

specified in the permit. 40 CFR § 136.5 specifies the process for approval of alternative test procedures ("ATPs") for limited use. It is an administrative process that delegates authority to Regional ATP Coordinators, whose decisions must be reviewed and approved by a National ATP Coordinator.

40 CFR § 136.5 establishes no technical criteria for adopting an ATP, but there is good recent guidance available for evaluating whether an ATP is suitable for NPDES monitoring when 40 CFR Part 136-approved methods are not available.

Guidance is provided in a November 22, 2020 memorandum to the EPA Regional Administrators from the EPA Assistant Administrator for the Office of Water (**LANL Exhibit 85**). The memo specifically addresses The Office of Water's interim strategy for per- and polyfluoroalkyl substances ("PFAS") in federally issued NPDES permits, but its recommendations are generally applicable.

The EPA guidance describes when EPA NPDES permit writers might consider incorporating permit requirements for monitoring PFAS. It stipulates that:

- Compounds that could be considered for monitoring are those that will be part of EPA's multi-lab validated wastewater analytical method;
- The permits in which those PFAS could be considered for monitoring are for facilities where PFAS are expected to be present in point source wastewater discharges;
- The way to establish whether a pollutant is "expected to be present in point source wastewater discharges" is covered in the NPDES Permit Writers Manual, Section 6.2.1.5: "Because of the raw materials stored or used at the facility, products or byproducts of the facility operation, or available data and

information from similar facilities, the permit writer has a strong basis for expecting that the pollutant could be present in the discharge."

The Assistant Administrator further recommended a phased approach to any potential PFAS monitoring provision, such that monitoring requirements would not be triggered until after EPA's multi-lab validated methods are made available to the public. EPA's guidance provides a basis for evaluating the suitability of including monitoring provisions in an NPDES permit for any CEC.

The Assistant Administrator went on to say that "EPA water quality methods are developed with particular attention to accuracy and precision and have been through single- and multi-lab validation." **LANL Exhibit 85** at 2.

EPA's guidance provides a basis for evaluating whether an ATP is suitable for including sampling and monitoring of CECs as a condition in a federal permit under Section 401 of the federal Clean Water Act. The CEC should satisfy the presence threshold criterion:

- The CEC is expected to be present in point source wastewater discharges because of a) the raw materials stored or used at the facility, b) products or byproducts of the facility operation, or c) available data and information from similar facilities.

If this presence threshold is met, then the ATP should meet the reliability criteria:

- Developed with attention to accuracy and precision that is consistent with what is required of Part 136-approved methods;
- Subjected to single- and multi-lab validation.

CEC ATPs generally will not satisfy the presence threshold criterion, but even if a particular ATP does, it will not satisfy the reliability criteria at this time. Therefore, LANL opposes Amigos Bravos's proposed amendment to 20.6.4.14 NMAC.

Q. DO YOU RECOMMEND THAT THE WQCC ADOPT THE PROPOSED AMENDMENT?

A. No, I recommend that the WQCC reject the Amigos Bravos proposal to add a new Section 20.6.4.14(F) NMAC.

Q. PLEASE EXPLAIN THE BASIS FOR YOUR RECOMMENDATION.

A. Amigos Bravos's proposed new Section 20.6.4.14(F) NMAC would fall outside NMED's authority under Section 401 of the federal Clean Water Act and the WQCC regulations on 401 certifications, 20.6.2.2001 NMAC, which limits NMED's authority to either:

> (1) certify that the discharge will comply with the applicable provisions of Sections 208(e), 301, 302, 303, 306 and 307 of the federal Clean Water Act and with appropriate requirements of state law; (2) certify that the discharge will comply with the applicable provisions of Sections 208(e), 301, 302, 303, 306 and 307 of the federal Clean Water Act and with appropriate requirements of state law upon inclusion of specified conditions in the permit and include the justification for the conditions; or (3) deny certification and include reasons for the denial.

Amigos Bravos's proposed new section 20.6.4.14(F) NMAC is not tied to determining compliance with Sections 208(e), 301, 302, 303, 306 and 307 of the federal Clean Water Act or requirements of state law. The proposal is intended to provide information for later WQCC regulatory decisions. The Water Quality Act, Section 74-6-9.B, authorizes constituent agencies to "develop facts and make studies and investigations." It does not authorize the WQCC to task regulated entities to perform those functions.

Q. HAVE OTHER PARTIES TO THIS PROCEEDING MADE RECOMMENDATIONS RELATED TO AMIGOS BRAVOS'S PROPOSED AMENDMENT?

A. No. However, other parties may comment about Amigos Bravos's proposed amendment in their rebuttal testimony.

V. CONCLUSION

Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A. Yes.

Exhibit 64

STATE OF NEW MEXICO
BEFORE THE WATER QUALITY CONTROL COMMISSION

IN THE MATTER OF:

THE PETITION TO AMEND
THE STANDARDS FOR INTERSTATE
AND INTRASTATE SURFACE WATERS,
20.6.4 NMAC **WQCC No. 20-51(R)**

REBUTTAL TESTIMONY OF DAVID DEFOREST, WINDWARD ENVIRONMENTAL, LLC, ON BEHALF OF TRIAD NATIONAL SECURITY, LLC AND THE U.S. DEPARTMENT OF ENERGY, NATIONAL NUCLEAR SECURITY ADMINISTRATION

June 22, 2021

I. WITNESS BACKGROUND AND QUALIFICATIONS

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is David DeForest. My business address is 200 First Avenue West, Suite 500, Seattle, Washington 98119.

Q. ON WHOSE BEHALF ARE YOU SUBMITTING REBUTTAL TESTIMONY?

A. I am submitting this rebuttal testimony on behalf of Triad National Security, LLC, ("Triad") and the U.S. Department of Energy, National Nuclear Security Administration ("DOE") (collectively "LANL").

Q. HAVE YOU PROVIDED PREVIOUS TESTIMONY IN THIS CASE?

A. Yes, I provided direct testimony, which includes: (i) a summary of my qualifications and experience; (ii) a discussion of LANL's evaluation of and proposed changes to the amendments proposed by the New Mexico Environment Department ("NMED") to the Standards for Interstate and Intrastate Surface Waters, 20.6.4 NMAC ("Standards"); and (iii) the technical bases for certain related modifications to the Standards proposed in LANL's Notice of Intent to Present Technical Testimony ("LANL's Notice of Intent"). My direct testimony was submitted with LANL's Notice of Intent, filed on May 3, 2021, as **LANL Exhibit 8**.

II. PURPOSE OF TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?

A. The purpose of my rebuttal testimony is to respond to the direct testimony of NMED and other parties to this proceeding relating to the following proposed amendments to 20.6.4:

- Aquatic life criteria for dissolved aluminum (20.6.4.900(I) and (J) NMAC)

Q. HAVE YOU REVIEWED THE NOTICE OF INTENT TO PRESENT TECHNICAL TESTIMONY ("NOI") AND EXHIBITS FILED BY NMED, THE NEW MEXICO MINING ASSOCIATION ("NMMA"), THE SAN JUAN WATER COMMISSION ("SJWC"), AND AMIGOS BRAVOS RELATED TO THE AMENDMENTS ADDRESSED IN YOUR DIRECT AND REBUTTAL TESTIMONY?

A. Yes.

III. NMED PROPOSALS RELATED TO AQUATIC LIFE CRITERIA FOR DISSOLVED ALUMINUM

Q. HAVE YOU REVIEWED NMED'S PROPOSED AMENDMENTS RELATED TO AQUATIC LIFE CRITERIA FOR DISSOLVED ALUMINUM?

A. Yes. I reviewed the proposed language in NMED's August 18, 2020 Petition ("Original Petition"), and NMED's March 12, 2021 Notice of Amended Petition ("Amended Petition"), as well as NMED's Statement of Reasons for the proposed amendments. I have also reviewed the proposed language in NMED Exhibit 9, NMED's Proposed Amended Rule-20.6.4 NMAC and the supporting written direct testimony of NMED's witnesses Jennifer Fullam and Kris Barrios, both of whom provide the rationale for NMED's proposals related to aquatic life criteria for dissolved aluminum.

Q. DOES NMED EXHIBIT 9 PROPOSE THE SAME MODIFICATIONS TO 20.6.4.900(I) AND (J) NMAC FOR ALUMINUM THAT WERE PROPOSED IN NMED'S AMENDED PETITION?

A. Yes.

Q. PLEASE SUMMARIZE NMED'S CURRENT PROPOSALS.

A. Under the Standards, the criteria for aluminum are hardness based criteria that apply to waters with a pH range of 6.5 to 9.0 standard units (SU). NMED is proposing to add

dissolved criteria for waters outside this pH range. Specifically, NMED "is proposing to incorporate the previously approved chronic and acute dissolved aluminum criteria of 87 μg/L and 750 μg/L, respectively. These would be the applicable aluminum criteria for waters with a pH outside the applicable range for hardness-based aluminum criteria, for purposes of the federal CWA." NMED Exhibit 4 at 21. As such, NMED "does not propose adopting the EPA's recommended acute and chronic aquatic life criteria for aluminum as a replacement of the current hardness-based water quality standard." NMED Exhibit 2 at 10.

Q. BASED ON YOUR REVIEW OF MS. FULLAM'S DIRECT TESTIMONY, WHAT DO YOU UNDERSTAND TO BE THE BASIS FOR NMED'S PROPOSAL TO ADOPT EPA'S 1988 DISSOLVED ALUMINUM CRITERIA FOR WATERS WITH A PH OUTSIDE THE 6.5 TO 9.0 RANGE?

A. Ms. Fullam recognizes that EPA provided a pH range of 6.5-9.0 to which the 1988 dissolved aluminum criteria were applicable (as noted in EPA's supporting document for its 1988 ambient water quality criteria (EPA 1988), "this document addresses the toxicity of aluminum to freshwater organisms in waters in which the pH is between 6.5 and 9.0, because the water quality criterion for pH (USEPA 1976) states that a pH range of 6.5 to 9.0 appears to adequately protect freshwater fishes and bottom-dwelling invertebrate fish food organisms from effects of the hydrogen ion."). *See* NMED Exhibit 66 at 1. Ms. Fullam's testimony points to no specific technical basis for extrapolating EPA's 1988 dissolved aluminum criteria outside of a pH range of 6.5 to 9.0. Ms. Fullam's direct testimony is proposing to adopt EPA's 1988 dissolved aluminum criteria outside the pH range of 6.5-9.0 based on an interpretation of prior decisions of the New Mexico Water

quality Control Commission ("WQCC") but any prior technical basis, if there was one, for doing so is not provided.

Q. DID THE ANALYSIS IN PRE-FILED DIRECT TESTIMONY PROVIDED BY NMED WITNESS FULLAM CAUSE YOU TO RECONSIDER THE STATEMENTS AND PROPOSED REVISIONS TO 20.6.4.900(I) AND (J) NMAC CONTAINED IN YOUR DIRECT TESTIMONY?

A. No.

Q. BASED ON YOUR REVIEW OF MR. BARRIOS'S DIRECT TESTIMONY, WHAT DO YOU UNDERSTAND TO BE THE BASIS FOR NMED'S CONCERNS REGARDING EPA'S LINEAR REGRESSION EXTENSION OF THE MODEL FOR PH RANGES 5.0 TO 6.0 AND 8.7 TO 10.5?

A. The EPA's recommended 2018 aquatic life criteria are based on multiple linear regression ("MLR") models that are used to calculate criteria as a function of pH, hardness, and dissolved organic carbon ("DOC"). As noted in Mr. Barrios's direct testimony, the EPA extrapolated the models outside the pH, hardness, and DOC ranges in the tests used to develop the MLR models (pH of 6.0-8.7, hardness of 9.8-428 mg/L, and DOC of 0.08-12.3 mg/L). *See* NMED Exhibit 2 at 10. Mr. Barrios also notes that EPA cautions against using the MLR models outside the range of testing and that NMED has concerns in the linear extrapolation of the model for pH range of 5.0-6.0 and from 8.7-10.5. *Id.* Lastly, Mr. Barrios notes that EPA's MLR model guidance acknowledges temperature as a factor that influences aluminum solubility, but temperature is not included in the model. EPA has not explain why temperature was not included in the MLR model. *Id.*

Q. DID THE ANALYSIS IN PRE-FILED DIRECT TESTIMONY PROVIDED BY NMED WITNESS BARRIOS CAUSE YOU TO RECONSIDER THE STATEMENTS AND PROPOSED REVISIONS TO 20.6.4.900(I) AND (J) NMAC CONTAINED IN YOUR DIRECT TESTIMONY?

A. No.

Q. BASED ON YOUR REVIEW OF MS. FULLAM'S AND MR. BARRIOS'S DIRECT TESTIMONIES, ARE THEIR PROPOSALS CONSISTENT?

A. No. Specifically, Ms. Fullam's direct testimony states that the EPA's 1988 dissolved aluminum criteria should be extrapolated outside the range of pH in the tests used to support development of the 1988 criteria, while Mr. Barrios's direct testimony states that the EPA's 2018 aluminum criteria should not be adopted because the MLR models used to develop the criteria should not be extrapolated beyond the pH conditions of the tests used to develop the MLR models.

Q. DID YOUR DIRECT TESTIMONY ADDRESS THE BASES FOR NMED'S PROPOSED CHANGES?

A. Yes. My direct testimony addresses the fact that the science does not support extrapolating aluminum criteria outside the 6.5-9.0 pH range unless one accounts for 3 water quality parameters – hardness, pH and DOC – in calculating numerical water quality criteria.

Q. WHAT IS YOUR ANALYSIS OF NMED'S BASES FOR ITS POSITIONS?

A. Regarding Mr. Barrios's direct testimony expressing concerns in a linear extrapolation of the MLR model to pH ranges of 5.0-6.0 and 8.7-10.5, he correctly notes that EPA expresses caution in applying the model beyond the range of data used to develop the model. However, Mr. Barrios's direct testimony fails to disclose that EPA recommends

extrapolating EPA's 2018 MLR model to the pH 5.0-10.5 range because doing so results in criteria that "will be more protective of the aquatic environment in situations where pH plays a critical role in aluminum toxicity."

EPA's 2018 MLR model not only accounts for the effects of pH, hardness, and DOC on aluminum toxicity, but it also accounts for the interactive effects of these parameters as well. For example, in waters with low organic matter, increasing hardness has a greater mitigating influence on aluminum toxicity at lower pH where Al^{3+} is the dominant aluminum species than at higher pH where aluminum hydroxides are more dominant (hardness ions compete with Al^{3+} for uptake by organisms, but do not compete with precipitated aluminum forms). Thus, although there is greater uncertainty when extrapolating EPA's 2018 MLR model beyond the empirically tested range, the model captures the mechanistic understanding of how pH, hardness, and DOC interact to influence aluminum toxicity.

In contrast, Ms. Fullam's direct testimony proposes that EPA's 1988 dissolved aluminum criteria should now be extrapolated below a pH of 6.5 even though the acute and chronic criteria are constants that are not adjusted for pH, and despite the fact that the criteria do not account for the interactive effects of hardness and DOC. Accordingly, there is greater uncertainty in extrapolating EPA's 1988 dissolved aluminum criteria to pH conditions outside of the 6.5-9.0 range than for EPA's 2018 MLR model.

Q. BASED ON YOUR REVIEW OF NMED'S PROPOSALS AND SUPPORTING DIRECT TESTIMONIES, ARE YOU CHANGING YOUR POSITION ON RECOMMENDED PROPOSED REVISIONS TO 20.6.4.900(I) AND (J) NMAC THAT WERE STATED IN YOUR DIRECT TESTIMONY?

A. No.

Q. PLEASE EXPLAIN WHY OR WHY NOT.

A. The NMED testimony provided by Ms. Fullam and Mr. Barrios do not reflect the state-of-the-science on aluminum bioavailability and toxicity, and the testimony of both are inconsistent with EPA guidance. Regarding the 1988 criteria, EPA never intended for those criteria to be applied outside of the 6.5-9.0 range. Although the State of New Mexico, in the early 1990s, may have adopted EPA's 1988 dissolved aluminum criteria without clarifying the pH range to which the criteria would apply, no technical basis for doing so was provided at the time and there is no technical basis now based on recent advances in aluminum toxicology and EPA's update aluminum criteria guidance. Regarding the 2018 MLR-based criteria, the EPA recommends extrapolating the criteria to the pH range of 5.0-10.5 in order to develop criteria that will be more protective in situations where pH plays a critical role in aluminum toxicity.

Q. DID ANY OTHER PARTY PROPOSE MODIFICATIONS TO THE AQUATIC LIFE CRITERIA FOR DISSOLVED ALUMINUM?

A. No.

Q. HAS THE ANALYSIS IN PRE-FILED DIRECT TESTIMONY PROVIDED BY WITNESSES FOR NMED OR ANY OTHER WITNESS CAUSED YOU TO RECONSIDER YOUR STATEMENTS AND RECOMMENDATIONS RELATED TO AQUATIC LIFE CRITERIA FOR DISSOLVED ALUMINUM, AS PROPOSED IN YOUR DIRECT TESTIMONY?

A. No. I maintain and affirm that NMED's proposed amendment to the aluminum water quality standards be rejected. As stated in my direct testimony, the science does not support

extrapolating aluminum criteria outside the 6.5-9.0 pH range, unless one accounts for 3 water quality parameters – hardness, pH and DOC – in calculating numerical water quality criteria. Since NMED's proposed change does not account for hardness and DOC, and is inconsistent with clear guidance on the applicability of EPA's 1988 dissolved aluminum criteria, it should be rejected.

Q. WHAT IS YOUR RECOMMENDATION TO THE WQCC WITH RESPECT TO THE AQUATIC LIFE CRITERIA FOR DISSOLVED ALUMINUM?

A. I recommend that the WQCC reject NMED's proposals and adopt the amendments to 20.6.4.900(I) and (J) NMAC proposed by LANL in **LANL Exhibit 57** for the reasons stated in my direct testimony and further addressed above.

VI. CONCLUSION

Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A. Yes.

Exhibit 65

STATE OF NEW MEXICO
BEFORE THE WATER QUALITY CONTROL COMMISSION

IN THE MATTER OF:

THE PETITION TO AMEND
THE STANDARDS FOR INTERSTATE
AND INTRASTATE SURFACE WATERS,
20.6.4 NMAC, **WQCC No. 20-51(R)**

REBUTTAL TESTIMONY OF NANCY JUDD, WINDWARD ENVIRONMENTAL, LLC, ON BEHALF OF TRIAD NATIONAL SECURITY, LLC AND THE U.S. DEPARTMENT OF ENERGY, NATIONAL NUCLEAR SECURITY ADMINISTRATION

June 22, 2021

I. INTRODUCTION

Q. PLEASE STATE YOUR NAME, POSITION, AND BUSINESS ADDRESS.

A. My name is Nancy Judd. I am a Partner at Windward Environmental, LLC ("Windward"). My business address is 200 1st Avenue West, Suite 500, Seattle, Washington 98119.

Q. ON WHOSE BEHALF ARE YOU SUBMITTING DIRECT TESTIMONY?

A. I am submitting this rebuttal testimony on behalf of Triad National Security, LLC, ("Triad") and the U.S. Department of Energy, National Nuclear Security Administration ("DOE") (collectively "LANL").

Q. HAVE YOU PROVIDED PREVIOUS TESTIMONY IN THIS CASE?

A. No.

Q. PLEASE SUMMARIZE YOUR EDUCATIONAL AND PROFESSIONAL EXPERIENCE.

A. My resume is attached to LANL's Notice of Intent to Present Rebuttal Technical Testimony as **LANL Exhibit 66**. I am a board-certified toxicologist with over 20 years of experience in toxicology and risk assessment. At Windward, I have managed numerous projects involving environmental risk assessment and the evaluation and protection of water quality on sites ranging in size and complexity from waterfront parcels to 150 mile riverine mega sites. I have also served on the Delegate's Table for the Washington State Human Health Water Quality Criteria Policy Forum. Prior to my employment with Windward, I was employed as a research scientist at the Institute for Risk Analysis and Risk Communication at the University of Washington. I also served as a United States Peace Corp volunteer for two years at the Discovery Bay Marine Lab in Jamaica. I have a master's of science degree in toxicology from the University of Washington and have

numerous first author publications and presentations related to water quality, which is the subject of my testimony in this proceeding.

Q. HAVE YOU PREVIOUSLY TESTIFIED IN STATE OR FEDERAL REGULATORY PROCEEDINGS ON SURFACE WATER QUALITY-RELATED ISSUES?

A. No.

II. PURPOSE OF TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?

A. The purpose of my testimony is to respond to direct testimony of witnesses for Amigos Bravos regarding:

- toxicity evaluation of per- and polyfluoroalkyl substances ("PFAS")
- Amigos Bravos's recommendation to classify three PFAS as "toxic pollutants" [perfluorooctanoic acid (PFOA, CAS# 335-67-1), perfluorooctane sulfonate (PFOS, CAS# 1763-23-1), and perfluorohexane sulfonic acid (PFHxS, CAS# 335-46-4)] for purposes of New Mexico's Standards for Interstate and Intrastate Surface Waters, 20.6.4 NMAC ("Standards"); and
- Amigos Bravos's proposal to amend the proposed definition of "contaminants of emerging concern" to include additional PFAS not classified as Toxic Pollutants, including PFNA (CAS# 375-95-1), PFBS (CAS# 375-73-5), 8:2 FTS (CAS# 39108-34-4), NEtFOSAA (CAS# 2991-50-6), NMeFOSAA (2355-31-9), and PFOSA (or FOSA) (CAS# 754-91-6).

Q. HAVE YOU REVIEWED THE NOTICE OF INTENT TO PRESENT TECHNICAL TESTIMONY ("NOI") AND EXHIBITS FILED BY AMIGOS BRAVOS RELATED TO THE ABOVE PROPOSALS?

A. Yes.

Q. HAVE YOU ALSO REVIEWED THE NOI AND EXHIBITS FILED BY NMED, THE NEW MEXICO MINING ASSOCIATION ("NMMA"), AND THE SAN JUAN WATER COMMISSION ("SJWC") THAT RELATE TO THIS ISSUE?

A. Yes.

III. LANL RESPONSE TO PFAS ISSUES RAISED BY AMIGOS BRAVOS

1. RESPONSE TO AMIGOS BRAVOS PFAS TOXICITY EVALUATION

Q. HAVE YOU REVIEWED THE DIRECT TESTIMONY OF JAMIE C. DEWITT FILED ON BEHALF OF AMIGOS BRAVOS DESCRIBING RESEARCH, REGULATORY AND LITIGATION ACTIVITIES RELATED TO PFAS?

A. Yes.

Q. DO YOU AGREE WITH DR. DEWITT'S TOXICITY EVALUATION?

A. While the summaries of toxicity studies on PFAS presented by Dr. DeWitt are accurate, I disagree with her recommendations for how the currently available toxicity information should inform changes to 20.6.4 NMAC.

2. RESPONSE TO AMIGOS BRAVOS PROPOSAL TO INCLUDE PFAS AS TOXIC POLLUTANTS UNDER THE SURFACE WATER REGULATIONS (20.6.4.7(T)(2) NMAC)

Q. PLEASE SUMMARIZE YOUR UNDERSTANDING OF AMIGOS BRAVOS'S PROPOSAL TO CLASSIFY CERTAIN PFAS AS TOXIC POLLUTANTS UNDER THE SURFACE WATER REGULATIONS (20.6.4.7(T)(2) NMAC).

A. In Dr. DeWitt's direct testimony, Amigos Bravos asserts that three PFAS compounds (PFOA, PFOS, and PFHxS) have already been determined to be "toxic pollutants" for New Mexico groundwater regulations (20.6.2.7 NMAC) and by extension should also be considered "toxic pollutants" for New Mexico surface water regulations (20.6.4 NMAC). Amigos Bravos Exhibit 9 at 7. She also asserts that six additional PFAS compounds should be considered "toxic pollutants" for New Mexico surface water based on her knowledge of the toxicological effects of these and other PFAS compounds, the accumulated toxicity data for these compounds which has been summarized by national and international agencies and organizations, and actions taken to limit these compounds in Colorado. *Id.*

Q. WHAT IS LANL'S POSITION ON AMIGOS BRAVOS' PROPOSAL?

A. LANL disagrees with Amigos Bravos's proposed addition of PFAS as "toxic pollutants" under 20.4.6 NMAC and, as presented in **LANL Exhibit 57**, proposes that the definition of "toxic pollutants" in 20.6.4.7(T)(2) NMAC be amended as follows:

> 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~~ <u>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.</u>

This proposed definition provides certainty on the chemicals that are toxic pollutants and provides the numeric criteria for some of those chemicals directly in 20.4.6 NMAC, reducing confusion and regulatory uncertainty. The New Mexico Water Quality Control Commission ("WQCC") can add to the list in 20.6.4.7(T)(2) NMAC and add

numeric criteria for these toxic pollutants in 20.4.6.900 NMAC, as NMED has proposed to do for many other chemicals as part of the current Triennial Review process.

Q. PLEASE EXPLAIN THE BASIS FOR LANL'S POSITION.

A. There are numerous chemicals defined as "toxic pollutants" for groundwater regulation in New Mexico in 20.6.2 NMAC (https://www.srca.nm.gov/parts/title20/20.006.0002.html) that are not currently identified as toxic pollutants for surface water in 20.6.4 NMAC and not included in 20.6.4.900 NMAC. LANL's proposed changes provide clarity on the list of toxic pollutants for New Mexico surface waters (20.6.4 NMAC). Values for potential PFAS numeric criteria appropriate for the designated uses in New Mexico's Standards are not currently available as discussed below.

The Colorado Water Quality Control Commission ("Colorado WQCC") policy for narrative standards for PFAS cited by Dr. DeWitt "does not directly implement any portions of the division's Safe Drinking Water Act (SDWA) responsibilities or establish state drinking water standards for any PFAS." **LANL Exhibit 86** at 2. Instead, Colorado notes that its policy "could be used in cleanup actions for drinking water sources contaminated by PFAS and for the protection of drinking water sources." ***Id.*** The Colorado WQCC PFAS translational values identified by Dr. DeWitt were not developed following EPA guidance for human health water quality criteria (**LANL Exhibit 87**) as specified in 20.4.6.13(F) NMAC and they have not been adopted as numeric surface water criteria in Colorado, nor should they be for New Mexico.

Currently, EPA has not developed human health criteria for any PFAS under Section 304(a) of the federal Clean Water Act, although scoping for the development of human health and aquatic life ambient water quality criteria for PFOA and PFOS is

underway. **LANL Exhibit 88.** EPA is also moving forward with maximum contaminant level ("MCL") processes for drinking water for PFOS and PFOA under the federal Safe Drinking Water Act (**LANL Exhibit 89**). I recommend that New Mexico consider the implementation of EPA's MCL and human health ambient water quality criteria for PFAS for the appropriate uses (i.e., domestic water supply ("DWS") and Human Health-Organism Only ("HH-OO")) when they become available and follow the process for adoption of criteria established in 20.6.4.13(F) NMAC.

Q. HAVE OTHER PARTIES TO THIS PROCEEDING MADE RECOMMENDATIONS RELATED TO AMIGOS BRAVOS'S PROPOSED AMENDMENT?

A. Yes. NMMA provides a recommendation related to the definition of toxic pollutants in 20.6.4.7 NMAC.

Q. PLEASE SUMMARIZE THE NMMA RECOMMENDATIONS.

A. NMMA asserts in its NOI at 5 that NMED's existing definition of "toxic pollutants" does not provide clarity on the pollutants that NMED will require dischargers to address and treat as toxic. NMMA proposes the same revision as proposed by LANL (and provided above), which NMMA states will facilitate implementation of the regulation by providing the certainty of an existing list of surface water toxic pollutants as is provided in 20.6.2.7 NMAC for groundwater, and the option for the WQCC to add pollutants to the list as needed.

Q. WHAT IS YOUR RECOMMENDATION TO THE WQCC?

A. LANL recommends the proposed changes to the definition of "toxic pollutants" as specified above and included in **LANL Exhibit 57**. Development of MCLs and HH

ambient water quality criteria for PFAS by EPA provides a pathway for the addition of PFAS for the appropriate designated uses (DWS and HH-OO) in the future and following the process for adoption of criteria as laid out in 20.4.6.13(F) NMAC.

3. RESPONSE TO AMIGOS BRAVOS'S PROPOSAL TO AMEND DEFINITION OF CONTAMINANTS OF EMERGING CONCERN TO INCLUDE PFAS AND OTHER CONTAMINANTS NOT REGULATED AS TOXIC POLLUTANTS

Q. PLEASE SUMMARIZE YOUR UNDERSTANDING OF AMIGOS BRAVOS'S PROPOSAL TO AMEND THE DEFINITION OF CONTAMINANTS OF EMERGING CONCERN.

A. Dr. DeWitt in her direct testimony, Amigos Bravos Exhibit 9 at 8, recommends amending NMED's proposed definition of contaminants of emerging concern in 20.6.4.7(C) NMAC to include **"**per- and polyfluoroalkyl substances" and contaminants that "are not considered "toxic pollutants" by the department" and cites the U.S. PFAS Action Plan (EPA, 2020) which refers to them as "emerging contaminants."

Q. WHAT IS LANL'S POSITION ON AMIGOS BRAVOS' PROPOSAL?

A. LANL disagrees with the revisions proposed by Amigos Bravos to 20.4.6.7(C) NMAC. LANL also disagrees with the addition of the definition of "contaminants of emerging concern" proposed by NMED and reference to this term in 20.6.4.13(F)(1) NMAC, as indicated in **LANL Exhibit 57**.

Q. PLEASE EXPLAIN THE BASIS FOR LANL'S POSITION.

A. LANL's concern with the broad expansion of toxic pollutants and the addition of contaminants of emerging concern was discussed by Dr. Bryan Dail in **LANL Exhibit 5**. In brief, LANL is concerned that the uncertain and unbounded expansion of toxic pollutants to include chemicals for which numeric criteria have not been approved by the

WQCC creates uncertainty for both the regulated community and regulators. The potential repercussions of NMED's proposed changes are exemplified in the amendments proposed by Amigos Bravos, which would expand this list to include several thousand PFAS compounds, the majority of which lack any toxicity data useful for criteria development or appropriate analytical methods.

Q. IF PFAS ARE NOT INCLUDED AS TOXIC POLLUTANTS IN 20.4.6 NMAC HOW WILL NMED ADDRESS IMMEDIATE PUBLIC CONCERNS ABOUT THE PREVALENCE OF THESE CHEMICALS?

A. I agree with Dr. DeWitt that "[m]onitoring and characterization data can further our understanding of the prevalence of these compounds in surface waters, identify levels of PFAS to which humans and other living organisms are exposed, and provide data for development of mitigation and management strategies that can potentially prevent harm to human and ecological health." Amigos Bravos Exhibit 9 at 9. I disagree that water quality standards, which are immediately enforceable, are the appropriate tool for directing the collection of this information. As noted in Rachel Conn's testimony (Amigos Bravos Exhibit 3 at 9), NMED is implementing a statewide program in 19 counties across New Mexico to assess the prevalence of PFAS in ground and surface water. The program began in mid-2020 and will continue through mid-2021. NMED has recently announced that no "imminent health threats" have been identified and none of the measured concentrations of PFOS and PFOA to date (as of January 18, 2021) as part of this program have exceeded EPA's Lifetime Health Advisory (**LANL Exhibit 90**). The information from this and other studies including those conducted as part of EPA's Unregulated Contaminant Monitoring Rule ("UMRC5") (**LANL Exhibit 91**), which proposes the inclusion of 29 PFAS

compounds, will help inform our understanding of exposure and ultimately inform the development of mitigation and management strategies including the regulation of these chemicals.

Q. HAVE OTHER PARTIES TO THIS PROCEEDING MADE RECOMMENDATIONS RELATED TO AMIGOS BRAVOS'S PROPOSED AMENDMENT?

A. Yes. As previously discussed, NMED proposed a definition for "contaminants of emerging concerns" in 20.4.6.7(C) NMAC. NMMA and SJWC both commented on NMED's proposed definitions and the application of the term.

Q. PLEASE SUMMARIZE THOSE RECOMMENDATIONS.

A. Kris Barrios asserts in NMED Exhibit 2 at 3-4 that NMED proposed adding "contaminants of emerging concern" to the general criterion for toxic pollutants in 20.6.4.13(F)(1) NMAC to "clarify" that "toxic pollutants" "include pollutants that are known or suspected toxins but do not have numeric criteria". NMMA and SJWC both object to the broad and ambiguous definition of "contaminants of emerging concern" proposed by NMED and the implications of and lack of rationale for the expansions of toxic pollutants in 20.6.4.13(F)(1) NMAC to include "contaminants of emerging concern." *See* NMMA, NOI at 4-5; SJWC Exhibit 2 at 16-17. Thus, like LANL, both NMMA and SJWC oppose the inclusion of the term CEC and its sole application in 20.6.4.13(F)(1) NMAC.

Q. WHAT IS YOUR RECOMMENDATION TO THE WQCC?

A. LANL recommends that the WQCC decline to include the definition of "contaminants of emerging concern" proposed by NMED or reference this term in the toxic pollutant narrative criteria in 20.6.4.13(F)(1) NMAC. LANL also disagrees with the edits proposed

by Amigos Bravos to this term and recommends against the WQCC adopting these proposed changes. These proposed amendments would potentially add thousands of chemicals that lack the toxicity information needed for development of criteria to 20.4.6 NMAC and create tremendous uncertainty for regulators and the regulated community. Other better avenues are available and currently being used by NMED and EPA for gathering information about the prevalence and concentrations of these chemicals in drinking and surface water, including NMED's 2020-2021 statewide PFAS monitoring program (**LANL Exhibit 90**) and the UMRC5 program which EPA has committed will include monitoring for a number of PFAS compounds (**LANL Exhibit 91**).

IV. CONCLUSION

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.

Exhibit 66

Nancy L. Judd, MS, DABT
Partner/Senior Risk Assessor

Summary of Expertise

Ms. Judd is a board-certified toxicologist with more than 20 years of multidisciplinary experience in marine biology, human health toxicology, risk assessment, and sediment and water quality analysis. She applies this expertise to quantify human health and ecological risks under complex exposure settings, ranging from small sites to Superfund megasites and including sites where metals are of primary concern. As a senior risk assessor, her detailed analysis and interpretation of ecological, toxicological, and regulatory data combined with site-specific exposure evaluations generate legally defensible findings that inform cleanup activity. For the past 14 years, Ms. Judd has focused on contaminated aquatic environments.

Her innovative risk assessment approaches to aquatic contamination, environmental modeling, and human health toxicology have proven useful to government agencies, industrial businesses, and academics. In addition, she advises clients with National Pollutant Discharge Elimination System (NPDES) permits on how they may be affected by changes in water quality criteria (WQC) and what implementation tools are available to help them meet those WQC. As a research scientist at the Institute for Risk Analysis and Risk Communication at the University of Washington, Ms. Judd developed methods for predicting disease outcomes based on exposure, increasing community involvement in the risk assessment process, and protecting susceptible populations.

As with her other work, Ms. Judd's peer-reviewed articles on WQC, bioaccumulation modeling, fish consumption, and human health risk assessment (HHRA) make important contributions to the knowledge base underlying environmental policy. Her technical expertise—particularly in WQC and sediment associated risk evaluations—has merited Ms. Judd's appointment to various state and national organizations.

Areas of Specialization

- Risk assessment of metals and organics for human health and ecological protection
- Water quality criteria development and implementation tools
- Sediment quality investigation
- Probabilistic modeling for exposure and risk assessment
- Management of large, complex risk assessment projects

Education

- MS, Toxicology, University of Washington, 2000
- BA with Honors, Biology, Occidental College, 1996

Work History

- Partner/Senior Risk Assessor, Windward Environmental LLC, 2005-present
- Research Scientist, Institute for Risk Analysis and Risk Communication, University of Washington, 2000-2005
- United States Peace Corps volunteer, Discovery Bay Marine Lab, Jamaica, 1996-1998
- Intern, Southern California Coastal Water Research Project (SCCWRP), 1992

Memberships

- Society of Environmental Toxicology and Chemistry

Honors

- Member of Editorial Board for *Integrated Environmental Assessment and Management*
- 2012-2014 Member Delegate's Table for the Washington State Human Health Water Quality Criteria Policy Forum
- 2003 Best Paper in Risk Analysis (The Society for Risk Analysis)

Nancy L. Judd, MS, DABT (*cont.*)
Partner/Senior Risk Assessor

Project Experience

Development of Water Quality Criteria and Implementation Tools

Ms. Judd represented the Association of Washington Businesses (AWB) as a member of the delegate's table for the Washington State Human Health Water Quality Criteria Policy Forum. The delegate's table was organized by the Washington State Department of Ecology (Ecology) to discuss revisions to the state's human health WQC. Ms. Judd continues to provide feedback on the process and strategic advice to AWB members. She has also advised individual clients and presented at Environmental Law and Education Center (ELEC) and Legal Seminars International (LSI) conferences on the implications of proposed Washington State WQC on NPDES permit holders and available implementation tools.

Upper Columbia River Remedial Investigation/Feasibility Study

Ms. Judd manages the Windward team's efforts on the baseline ecological risk assessment (BERA) under way at the 150-mile-long Upper Columbia River megasite in Washington State, where the primary contaminants of concern are metals. The primary contaminants of interest are metals associated with mining and smelter operations. Given the complexity of the site, the BERA evaluates risk separately for the upland and in-water portions of the site. Ms. Judd directs Windward's technical work in preparing the sampling quality assurance project plans (QAPPs), writing data summary reports, establishing toxicity reference values, developing the exposure assessments, and quantitatively characterizing risk. In addition, Ms. Judd critiques materials related to the HHRA, which is being conducted by the US Environmental Protection Agency (EPA). As project manager, she provides strategic advice, assigns staff, reviews staff work products, integrates multiple components of the BERA, manages the budget, and represents the client in meetings with regulators.

Lower Duwamish Waterway Fishers Study

Ms. Judd led the planning stage of the fishers study performed for the Lower Duwamish Waterway (LDW) Superfund megasite in Seattle, Washington. Conducted in collaboration with EPA and state and local health departments, and taking into consideration issues of environmental justice, the study sought information from people who either consumed seafood from the LDW or had intimate knowledge of LDW seafood consumption. The effort was a collaborative interdisciplinary process, incorporated multiple methods, and included a year-long on-river survey along with post-survey key informant interviews. The on-river survey, after first being tested and translated by community members, was carried out by a local community organization and conducted in six different languages. During the effort, fishers identifying themselves as representing more than 25 different ethnicities were surveyed. Of the 25% who reported harvesting resident species, more than one-half said they ate or shared their catch. Results will inform the design of institutional controls (e.g., languages of advisory signs) to prevent human health risk due to consumption of seafood from this contaminated waterbody.

The Boeing Company Sediment Strategy

Ms. Judd provided technical support to The Boeing Company, a NPDES permittee and Superfund liability holder in Washington State, related to the development and application of fish consumption rates. Washington State Sediment Management Standards (SMS), cleanup values, and human health-based WQC are all affected by changes in the rate of fish consumption applied at Boeing sites. Ms. Judd's work helped the client prepare for potential changes in the fish consumption rate used by the state in different regulations, and the possible effects on the client's NPDES permit conditions and Superfund liability.

Nancy L. Judd, MS, DABT (*cont.*)
Partner/Senior Risk Assessor

Lower Passaic River Remedial Investigation

Ms. Judd managed a critical bioaccumulation modeling task for the remedial investigation (RI) of the Lower Passaic River (LPR) Superfund megasite in New Jersey. The task required the development of a mechanistic chemical bioaccumulation model for hydrophobic organic chemicals and simultaneous calibration for 11 bioaccumulative organic chemicals (or chemical groups) and several fish species. Created to support the risk assessments and feasibility studies that will define future remediation of the 17-mile contaminated river, the model allows users to estimate chemical concentrations in the LPR food chain based on changes in exposure conditions (e.g., contaminant concentrations in sediment). The model is based on ecological characteristics of species in the food chain and concentrations in sediment and water. In addition to predicting tissue concentrations of contaminants, the model can also be used to estimate concentrations in sediment and water expected to result in compliance with human health- and ecological risk-based tissue concentration requirements. As task manager, Ms. Judd provided strategic and technical support, supported the report describing model development and underlying assumptions, and prepared summaries to be shared with the client group.

East Waterway Supplemental Remedial Investigation

Ms. Judd managed the HHRA and led the food web modeling task for the East Waterway (EW) supplemental remedial investigation (SRI) in Seattle, Washington. In consultation with EPA and its partners, she described the site- and receptor-specific pathways by which different populations are exposed to contaminants in EW water, sediment, and seafood. Using SRI field data on contaminant concentrations in these media, she estimated quantitative cancer and non-cancer risks from dozens of chemicals. The SRI required a mechanistic bioaccumulation model (i.e., food web model), which Ms. Judd developed and used to predict risk-based threshold concentrations in sediment (e.g., for polychlorinated biphenyls [PCBs], dichlorodiphenyltrichloroethane [DDT], and tetrachlorodibenzo-p-dioxin [TCDD]), back-calculating them from tissue concentrations expected to be protective of human and ecological health.

Portland Harbor Remedial Investigation/Feasibility Study

Ms. Judd led bioaccumulation modeling for the Portland Harbor RI/feasibility study (FS) megasite in Portland, Oregon. Using data generated by simulations of contaminant fate and transport as input in the bioaccumulation model, she predicted the concentrations of various chemicals that would be present in biological organisms under alternative remedial options. As part of the process, Ms. Judd developed mechanistic bioaccumulation models for more than a dozen bioaccumulative organic chemicals (e.g., PCBs, TCDD, and pesticides) and developed statistical models of the relationship between the concentrations of a given chemical in two different environmental media (i.e., biota-sediment accumulation regressions and factors for chemicals for mechanistic food web model development was not appropriate). Ms. Judd also served in a peer review role for the Portland Harbor HHRA.

Select Publications and Presentations

Water Quality-Related Publications and Presentations

- Judd, N. 2017. New approaches to long-standing challenges with metals: TRV development and evaluating effects in the field. SETAC North America. Minneapolis, MN. November 12-16, 2017.
- Judd, N, Lowney Y, Anderson P, Baird S, Bay SM, Breidt J, Buonanduci M, Dong Z, Essig D, Garry MR, Jim RC, Kirkwood G, Moore S, Niemi C, O'Rourke R, Ruffle B, Schaider LA, Vidal-Dorsch DE. 2015. Fish consumption as a driver of risk-management decisions and human health-based water quality criteria. Environ Toxicol Chem 34(11):2427-2436.

Nancy L. Judd, MS, DABT (*cont.*)
Partner/Senior Risk Assessor

- Judd, N. 2014. Impacts of Washington's Proposals on Business and NPDES Permits. Environmental Law Education Center Conference. Seattle, WA. November 17, 2014.
- Nancy, J., Lowney, Y. 2014. Fish Consumption as a driver of human health-based water quality criteria. SETAC North America. Vancouver, BC. November 9-13, 2014.
- Judd, N. 2012. Impact of proposed fish consumption rate on water quality criteria and NPDES permits. Presentation at Law Seminars International (LSI) Clean Water and Stormwater Conference, Seattle, WA. May 9, 2012.
- Judd N. 2012. Impact of proposed fish consumption rate on water quality criteria and NPDES permits. Toxics in Washington. Fish Consumption Rate, Puget Sound Sediment Rules & Water Quality Standards, Seattle, WA, June 26, 2012. Environmental Law Education Center.

Other Publications and Presentations

- Toll, JE, DV DeForest, RC Santore, N Judd. 2020 Sediment benchmarks based on acid volatile sulfide and simultaneously extracted metals—when is organic carbon normalization meaningful? Integr Environ Assess Manag 16(1). In press.
- Judd N, Bergquist B, David D, Santore R, Toll J. 2018. Weight of evidence approach for benthic metals assessment. SETAC North America, Sacramento, CA, November 4-8, 2018. Windward Environmental LLC.
- Judd N, Tear L, Toll J. 2014. From sediment to tissue and tissue to sediment: an evaluation of statistical bioaccumulation models. Integr Environ Assess Manage 10(1):102-113.
- Judd, N. 2012. Evaluation of statistical bioaccumulation models for the prediction of tissue and sediment concentrations. Presentation at SETAC North America conference, Long Beach, CA. November 13, 2012.
- Toll, J, Judd N, Replinger S, Tear L. 2010. Modeling bioaccumulation for prediction of tissue and sediment concentrations. Poster presented at SETAC North America conference. Portland, OR. November 7-11, 2010.
- Judd, NL, Replinger S, Andersen HB, Toll JE, Tear LM. 2010. Development and application of statistical models of bioaccumulation for use in developing preliminary remediation goals. Poster presentation, Society for Environmental Toxicology and Chemistry Pacific Northwest Regional Chapter, Port Townsend, WA, April 15-17, 2010.
- Judd, NL, Drew CH, Acharya C, Mitchell TA, Donatuto JL, Burns GW, Burbacher TM, Faustman EM, Marine Resources for Future Generations. 2005. Framing scientific analyses for risk management of environmental hazards by communities: case studies with seafood safety issues. Environ Health Persp 113(11):1502-1508.
- Faustman, EM, Gohlke J, Judd NL, Lewandowski TA, Bartell SM, Griffith WC. 2005. Modeling developmental processes in animals: applications in neurodevelopmental toxicology. Environ Toxicol Pharm 19: 615-624.
- Judd, N, Griffith WC, Faustman EM. 2004. Contribution of PCB exposure from fish consumption to total dioxin-like dietary exposure. Regul Toxicol Pharm 40:125-135.
- Judd, NL, Griffith WC, Faustman EM. 2004. Consideration of cultural and lifestyle factors in defining susceptible populations for environmental disease. Toxicology 198:121-133.
- Judd, NL, Griffith WC, Kalman DA, Faustman EM. 2003. Assessment of PCB congener analytical methods: do they meet risk assessment needs? Arch Environ Contamin Toxicol 44:132-139.
- Judd, NL, Karr JR, Griffith WC, Faustman EM. 2003. Challenges in defining background levels for human and ecological risk assessments. Hum Ecol Risk Assess 9(7):1623-1632.
- Judd, N, O'Neill SM, Kalman DA. 2003. Are seafood PCB data sufficient to assess health risk for high seafood consumption groups? Hum Ecol Risk Assess 9(3):691-707.
- Judd, NL, Griffith WC, Takaro T, Faustman EM. 2003. A model for optimization of biomarker testing frequency to minimize disease and cost: examples of beryllium sensitization testing. Risk Anal 23 (6):1211-1220.

Nancy L. Judd, MS, DABT (*cont.*)
Partner/Senior Risk Assessor

- Judd, NL, Karr JR, Griffith WC, Faustman EM. 2003. Defining background contaminant levels for human and ecological risk assessment in Puget Sound and beyond. Puget Sound update.
- Judd, NL, Griffith WC, Ylitalo GM, Faustman EM. 2002. Alternative strategies for PCB risk reduction from contaminated seafood: options for children as susceptible populations. Bull Environ Contam Toxicol 69:847-854.
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Exhibit 67

United States Environmental Protection Agency

Office of Water
EPA-823-B-12-002
2012

Water Quality Standards Handbook

CHAPTER 2: DESIGNATION OF USES

The WQS Handbook does not impose legally binding requirements on the EPA, states, tribes or the regulated community, nor does it confer legal rights or impose legal obligations upon any member of the public. The Clean Water Act (CWA) provisions and the EPA regulations described in this document contain legally binding requirements. This document does not constitute a regulation, nor does it change or substitute for any CWA provision or the EPA regulations.

Water Quality Standards Handbook
CHAPTER 2: DESIGNATION OF USES

(40 CFR 131.10)

CHAPTER 2 DESIGNATION OF USES

2.1 Use Classification – 40 CFR 131.10(a)

UPDATED INFORMATION

Use Classification
2002 Symposium on Designated Uses – This website links to proceedings from these discussions, which highlighted a desire for clear guidance on designating uses and using subcategories and other use refinements to ensure adequate designation.
Coordinating CSO Long-Term Planning with Water Quality Reviews (2001) (PDF) (79 pp, 498K) – This document provides guidance on how states and tribes should implement the CSO control policy and other wet weather water pollution control programs to attain water quality standards.

Federal Rules Involving Designated Uses
Water Quality Standards for Puerto Rico (2004) - This federal register notice promulgated primary contact recreation uses and associated water quality criteria for six water bodies.
Water Quality Standards for Kansas (2003) – This federal register notice promulgated primary and secondary contact recreation uses and aquatic life uses for a large number of water bodies to replace previously disapproved uses.
Advanced Notice of Proposed Rulemaking for Water Quality Standards (1998) -See pages 36748 to 36762 for an overview of designated uses policy and EPA's thinking on program development in 1998.
Water Quality Standards for Idaho (1997) - This federal register notice promulgated use designations for five water bodies as well as a variance procedure.

A water quality standard defines the water quality goals of a water body or portion thereof, in part, by designating the use or uses to be made of the water. States adopt water quality standards to protect public health or welfare, enhance the quality of water, and serve the purposes of the Clean Water Act. "Serve the purposes of the Act" (as defined in sections 101(a)(2), and 303(c) of the Act) means that water quality standards should:

- provide, wherever attainable, water quality for the protection and propagation of fish, shellfish, and wildlife, and recreation in and on the water ("fishable/swimmable"), and

- consider the use and value of State waters for public water supplies, propagation of fish and wildlife, recreation, agriculture and industrial purposes, and navigation.

These sections of the Act describe various uses of waters that are considered desirable and should be protected. The States must take these uses into consideration when classifying State waters and are free to add use classifications. Consistent with the requirements of the Act and Water Quality Standards Regulation, States are free to develop and adopt any use classification system they see as appropriate, except that waste transport and assimilation is not an acceptable use in any case (see 40 CFR 131.10(a)). Among the uses listed in the Clean Water Act, there is no hierarchy. EPA's Water Quality Standards Regulation emphasizes the uses specified in section 101(a)(2) of the Act (first bullet, above). To be consistent with the 101(a)(2) interim goal of the Act, States must provide water quality for the *protection and propagation of fish, shellfish, and wildlife, and provide for recreation in and on the water* ("fishable/swimmable") where attainable (see 40 CFR 131.10(j)).

DESIGNATED USES 40 CFR 131.3(f)
Uses specified in Water Quality Standards for each water body or segment whether or not they are being attained.

2.1.1 Public Water Supplies

This use includes waters that are the source for drinking water supplies and often includes waters for food processing. Waters for drinking water may require treatment prior to distribution in public water systems.

2.1.2 Protection and Propagation of Fish, Shellfish, and Wildlife

This classification is often divided into several more specific subcategories, including coldwater fish, warmwater fish, and shellfish. For example, some coastal States have a use specifically for oyster propagation. The use may also include protection of aquatic flora. Many States differentiate between self-supporting fish populations and stocked fisheries. Wildlife protection should include waterfowl, shore birds, and other water-oriented wildlife.

TYPES OF USES CWA SECTION 303(c)(2)(A)

- Public water supplies
- Protection and propagation of fish, shellfish, and wildlife
- Recreation
- Agriculture
- Industry
- Navigation
- Coral reef preservation
- Marinas
- Groundwater recharge
- Aquifer protection
- Hydroelectric power

2.1.3 Recreation

Recreational uses have traditionally been divided into primary contact and secondary contact recreation. The primary contact recreation classification protects people from illness due to activities involving the potential for ingestion of, or immersion in, water. Primary contact recreation usually includes swimming, water-skiing, skin-diving, surfing, and other activities likely to result in immersion. The secondary contact recreation classification is protective when immersion is unlikely. Examples are boating, wading, and rowing. These two broad uses can be logically subdivided into an almost infinite number of subcategories (e.g., wading, fishing, sailing, powerboating, rafting.). Often fishing is considered in the recreational use categories.

Recreation in and on the water, on the other hand, may not be attainable in certain waters, such as wetlands, that do not have sufficient water, at least seasonally. However, States are encouraged to recognize and protect recreational uses that do not directly involve contact with water, including hiking, camping, and bird watching.

A number of acceptable State options may be considered for designation of recreational uses.

Option 1

Designate primary contact recreational uses for all waters of the State, and set bacteriological criteria sufficient to support primary contact recreation. This option fully conforms with the requirement in section 131.6 of the Water Quality Standards Regulation to designate uses consistent with the provisions of sections 101(a)(2) and 303(c)(2) of the CWA. States are not required to conduct use attainability analyses (for recreation) when primary contact recreational uses are designated for all waters of the State.

Option 2

Designate either primary contact recreational uses or secondary contact recreational uses for all waters of the State and, where secondary contact recreation is designated, set bacteriological criteria sufficient to support primary contact recreation. EPA believes that a secondary contact recreational use (with criteria sufficient to support primary contact recreation) is consistent with the CWA section 101(a)(2) goal. The rationale for this option is discussed in the preamble to the Water Quality Standards Regulation, which states: ". . . even though it may not make sense to encourage use of a stream for swimming because of the flow, depth or the velocity of the water, the States and EPA must recognize that swimming and/or wading may occur anyway. In order to protect public health, States must set criteria to reflect recreational uses if it appears that recreation will in fact occur in the stream." Under this option, future revisions to the bacteriological criterion for specific stream segments would be subject to the downgrading provisions of the Federal Water Quality Standards Regulation (40 CFR 131.10).

Option 3

Designate either primary contact recreation, secondary contact recreation (with bacteriological criteria sufficient to support primary contact recreation), or conduct use attainability analyses demonstrating that recreational uses consistent with the CWA section 101(a)(2) goal are not attainable for all waters of the State. Such use attainability analyses are required by section 131.10 of the Water Quality Standards Regulation, which also specifies six factors that may be used by States in demonstrating that attaining a use is not feasible. Physical factors, which are important in determining attainability of aquatic life uses, may not be used as the basis for not designating a recreational use consistent with the CWA section 101(a)(2) goal. This precludes States from using 40 CFR 131.10(g) factor 2 (pertaining to low-flows) and factor 5 (pertaining to physical factors in general). The basis for this policy is that the States and EPA have an obligation to do as much as possible to protect the health of the public. In certain instances, people will use whatever water bodies are available for recreation, regardless of the physical conditions. In conducting use attainability analyses (UAAs) where available data are scarce or nonexistent, sanitary surveys are useful in determining the sources of bacterial water quality indicators. Information on land use is also useful in predicting bacteria levels and sources.

Other Options

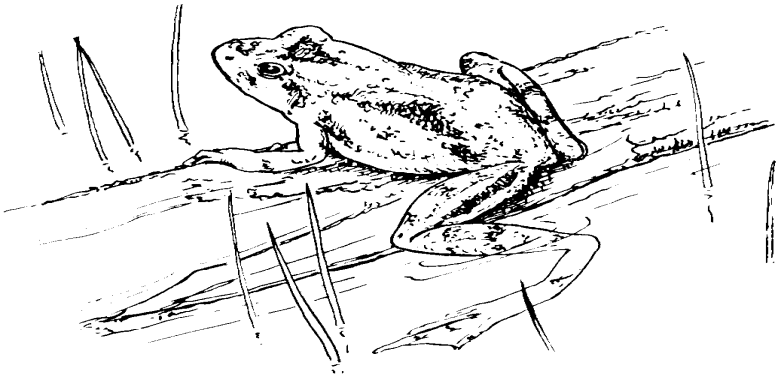
- States may apply bacteriological criteria sufficient to support primary contact recreation with a rebuttable presumption that the indicators show the presence of human fecal pollution. Rebuttal of this presumption, however, must be based on a sanitary survey that demonstrates a lack of contamination from human sources. The basis for this option is the

absence of data demonstrating a relationship between high densities of bacteriological water quality indicators and increased risk of swimming-associated illness in animal-contaminated waters. Maine is an example of a State that has successfully implemented this option.

- Where States adopt a standards package that does not support the swimmable goal and does not contain a UAA to justify the omission, EPA may conditionally approve the package provided that (1) the State commits, in writing, to a schedule for rapid completion of the UAAs, generally within 90 days (see conditional approval guidance in section 6.2 of this Handbook); and (2) the omission may be considered a minor deficiency (i.e., after consultation with the State, EPA determines that there is no basis for concluding that the UAAs would support upgrading the use of the water body). Otherwise, failure to support the swimmable goal is a major deficiency and must be disapproved to allow prompt Federal promulgation action.
- States may conduct basinwide use attainability analyses if the circumstances relating to the segments in question are sufficiently similar to make the results of the basinwide analyses reasonably applicable to each segment.

States may add other recreation classifications as they see fit. For example, one State protects "consumptive recreation" (i.e., "human consumption of aquatic life, semi-aquatic life, or terrestrial wildlife that depend on surface waters for survival and well-being"). States also may adopt seasonal recreational uses (see section 2.6, this Handbook).

2.1.4 Agriculture and Industry



The agricultural use classification defines waters that are suitable for irrigation of crops, consumption by livestock, support of vegetation for range grazing, and other uses in support of farming and ranching and protects livestock and crops from injury due to irrigation and other exposures. The industrial use classification includes industrial cooling and process water supplies. This classification protects industrial equipment from damage from cooling and/or process waters. Specific criteria would depend on the industry involved.

The *Report of the Committee on Water Quality Criteria*, the "Green Book" (FWPCA, 1968) and *Water Quality Criteria 1972*, the "Blue Book" (NAS/NAE, 1973) provide information for certain parameters on protecting agricultural and industrial uses, although section 304(a)(1) criteria for protecting these uses have not been specifically developed for numerous other parameters, including toxics.

Where criteria have not been specifically developed for agricultural and industrial uses, the criteria developed for human health and aquatic life are usually sufficiently stringent to protect these uses. States also may establish criteria specifically designed to protect these uses.

2.1.5 Navigation

States may adopt other uses they consider to be necessary. Some examples include coral reef preservation, marinas, groundwater recharge, aquifer protection, and hydroelectric power. States also may establish criteria specifically designed to protect these uses.

2.1.6 Other Uses

States may adopt other uses they consider to be necessary. Some examples include coral reef preservation, marinas, groundwater recharge, aquifer protection, and hydroelectric power. States also may establish criteria specifically designed to protect these uses.

2.2 Consider Downstream Uses – 40 CFR 131.10(b)

UPDATED INFORMATION

EPA Response to Sierra Club Petition Regarding Defined Portions of the Mississippi and Missouri Rivers (2004) –This EPA response evaluated current WQS and existing scientific knowledge at the time for each pollutant and designated use at issue within the petition area. It also provided EPA's current perspective on downstream use protection and identified a path forward for better understanding the science of numeric nutrient criteria in large rivers.

When designating uses, States should consider extraterritorial effects of their standards. For example, once States revise or adopt standards, upstream jurisdictions will be required, when revising their standards and issuing permits, to provide for attainment and maintenance of the downstream standards.

Despite the regulatory requirement that States ensure downstream standards are met when designating and setting criteria for waters, occasionally downstream standards are not met owing to an upstream pollutant source. The Clean Water Act offers three solutions to such problems.

First, the opportunity for public participation for new or revised water quality standards provides potentially affected parties an approach to avoiding conflicts of water quality standards. States and Tribes are encouraged to keep other States informed of their water quality standards efforts and to invite comment on standards for common water bodies.

Second, permit limits under the National Pollutant Discharge Elimination System (NPDES) program (see section 402 of the Act) are required to be developed such that applicable water quality standards are achieved. The permit issuance process also includes opportunity for public participation and, thus, provides a second opportunity to consider and resolve potential problems regarding extraterritorial effects of water quality standards. In a decision in *Arkansas* v. *Oklahoma* (112 section 1046, February 26, 1992), the U.S. Supreme Court held that the Clean Water Act clearly authorized EPA to require that point sources in upstream States not violate water quality standards in downstream States, and that EPA's interpretation of those standards should govern.

Third, NPDES permits issued by EPA are subject to certification under the requirements of section 401 of the Act. Section 401 requires that States grant, deny, or condition "certification" for federally permitted or licensed activities that may result in a discharge to waters of the United States. The decision to grant or to deny certification, or to grant a conditional certification is based

on a State's determination regarding whether the proposed activity will comply with applicable water quality standards and other provisions. Thus, States may deny certification and prohibit EPA from issuing an NPDES permit that would violate water quality standards. Section 401 also allows a State to participate in extraterritorial actions that will affect that State's waters if a federally issued permit is involved.

In addition to the above sources for solutions, when the problem arises between a State and an Indian Tribe qualified for treatment as a State for water quality standards, the dispute resolution mechanism could be invoked (see section 1.7, of this Handbook).

2.3 Use Subcategories - 40 CFR 131.10(c)

States are required to designate uses considering, at a minimum, those uses listed in section 303(c) of the Clean Water Act (i.e., public water supplies, propagation of fish and wildlife, recreation, agriculture and industrial purposes, and navigation). However, flexibility inherent in the State process for designating uses allows the development of subcategories of uses within the Act's general categories to refine and clarify specific use classes. Clarification of the use class is particularly helpful when a variety of surface waters with distinct characteristics fit within the same use class, or do not fit well into any category. Determination of non-attainment in waters with broad use categories may be difficult and open to alternative interpretations. If a determination of non-attainment is in dispute, regulatory actions will be difficult to accomplish (USEPA, 1990a).

The State selects the level of specificity it desires for identifying designated uses and subcategories of uses (such as whether to treat recreation as a single use or to define a subcategory for secondary recreation). However, the State must be at least as specific as the uses listed in sections 101(a) and 303(c) of the Clean Water Act.

Subcategories of aquatic life uses may be on the basis of attainable habitat (e.g., coldwater versus warmwater habitat); innate differences in community structure and function (e.g., high versus low species richness or productivity); or fundamental differences in important community components (e.g., warmwater fish communities dominated by bass versus catfish). Special uses may also be designated to protect particularly unique, sensitive, or valuable aquatic species, communities, or habitats.

Data collected from biosurveys as part of a developing biocriteria program may assist States in refining aquatic life use classes by revealing consistent differences among aquatic communities inhabiting different waters of the same designated use. Measurable biological attributes could then be used to divide one class into two or more subcategories (USEPA, 1990a).

If States adopt subcategories that do not require criteria sufficient to fully protect the goal uses in section 101(a)(2) of the Act (see section 2.1, above), a use attainability analysis pursuant to 40 CFR 131.10(j) must be conducted for waters to which these subcategories are assigned. Before adopting subcategories of uses, States must provide notice and opportunity for a public hearing because these actions are changes to the standards.

2.4 Attainability of Uses - 40 CFR 131.10(d)

When designating uses, States may wish to designate only the uses that are attainable. However, if the State does not designate the uses specified in section 101(a)(2) of the Act, the State must perform a use attainability analysis under section 131.10(j) of the regulation. States are encouraged to designate uses that the State believes can be attained in the future.

"Attainable uses" are, at a minimum, the uses (based on the State's system of water use classification) that can be achieved 1) when effluent limits under sections 301(b)(1)(A) and (B) and section 306 of the Act are imposed on point source dischargers and 2) when cost-effective and reasonable best management practices are imposed on nonpoint source dischargers.

2.5 Public Hearing for Changing Uses - 40 CFR 131.10(e)

UPDATED INFORMATION

A Framework for Incorporating Community Preferences in Use Attainment and Related Water Quality Decision-Making (2010) –This document clarifies that estimating the gains from use attainment is not required by the CWA or Water Quality Standards regulation, but evaluating community preferences for water quality against the costs may aid in conducting a balanced analysis.

The Water Quality Standards Regulation requires States to provide opportunity for public hearing before adding or removing a use or establishing subcategories of a use. As mentioned in section 2.2 above, the State should consider extraterritorial effects of such changes.

2.6 Seasonal Uses - 40 CFR 131.10(f)

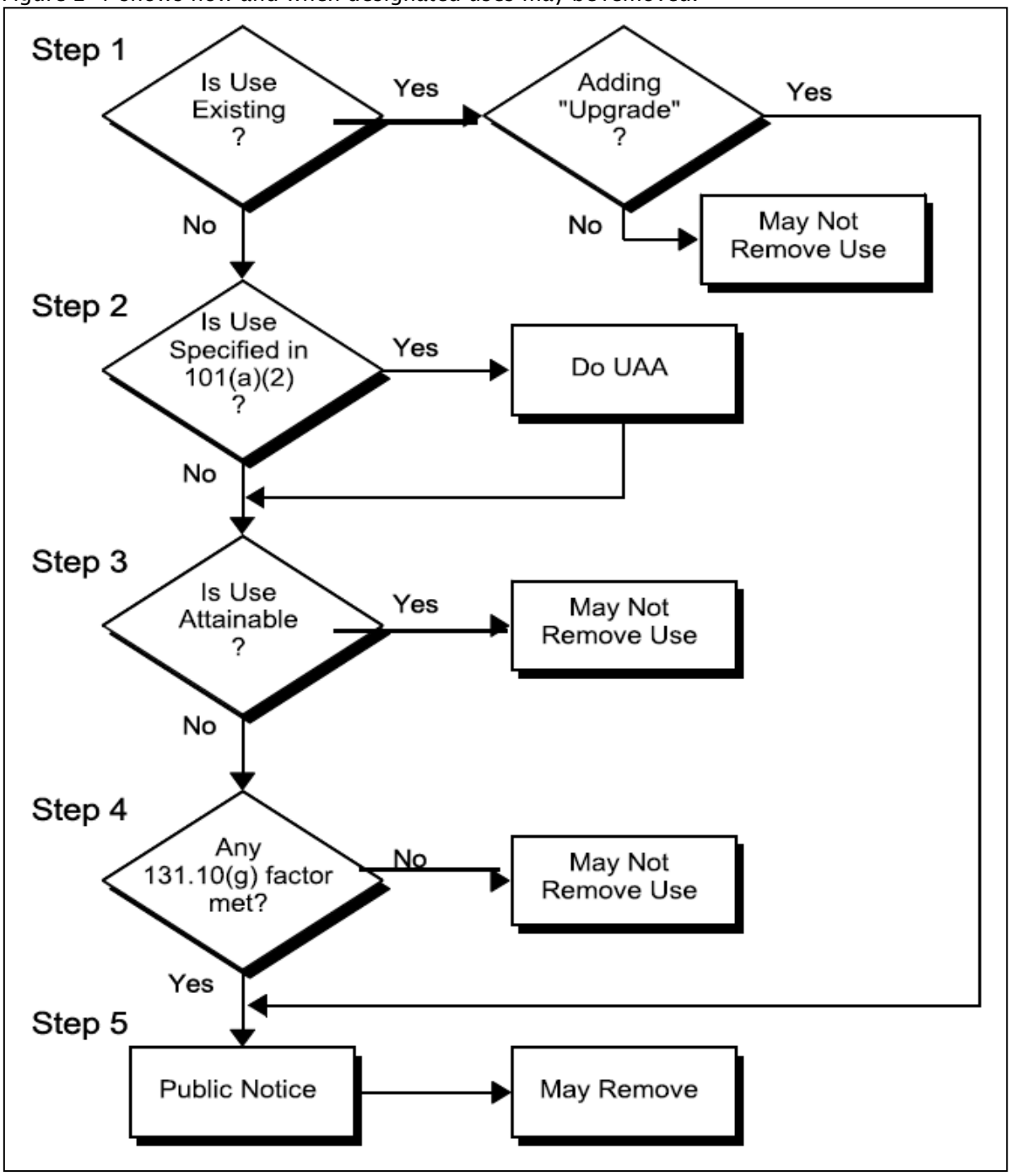
In some areas of the country, uses are practical only for limited seasons. EPA recognizes seasonal uses in the Water Quality Standards Regulation. States may specify the seasonal uses and criteria protective of that use as well as the time frame for the ". . . season, so long as the criteria do not prevent the attainment of any more restrictive uses attainable in other seasons."

For example, in many northern areas, body contact recreation is possible only a few months out of the year. Several States have adopted primary contact recreational uses, and the associated microbiological criteria, for only those months when primary contact recreation actually occurs, and have relied on less stringent secondary contact recreation criteria to protect for incidental exposure in the "non-swimming" season.

Seasonal uses that may require more stringent criteria are uses that protect sensitive organisms or life stages during a specific season such as the early life stages of fish and/or fish migration (e.g., EPA's *Ambient Water Quality Criteria for Dissolved Oxygen* (see Appendix I) recommends more stringent dissolved oxygen criteria for the early life stages of both coldwater and warmwater fish).

2.7 Removal of Designated Uses - 40 CFR 131.10(g) and (h)

Figure 2-1 shows how and when designated uses may be removed.



UPDATED INFORMATION

Letter: Mr. Derek Smithee, State of Oklahoma Water Resources Board. Questions and Answers on EPA's Existing Use Policy (2008) (PDF) (12 pp, 3.8MB) – This letter answers Oklahoma's questions on several issues related to existing uses, including the difference between an existing and a designated use and how existing uses might be determined.
Water Quality Standards: Examples of Alternatives to Changing Long-term Designated Uses to Achieve Water Quality Goals (2005) (PDF) (14 pp, 830K) – These case studies, developed by States and EPA, present initial examples of approaches and tools that provide potential alternatives to changing long-term underlying designated uses and criteria.

2.7.1 Step 1 – Is the Use Existing?

Once a use has been designated for a particular water body or segment, the water body or water body segment cannot be reclassified for a different use except under specific conditions. If a designated use is an existing use (as defined in 40 CFR 131.3) for a particular water body, the existing use cannot be removed unless a use requiring more stringent criteria is added (see section 4.4, this Handbook, for further discussion of existing uses). However, uses requiring more stringent criteria may always be added because doing so reflects the goal of further improvement of water quality. Thus, a recreational use for wading may be deleted if a recreational use for swimming is added, or the State may add the swimming use and keep the wading use as well.

2.7.2 Step 2 – Is the Use Specified in Section 101(a)(2)?

If the State wishes to remove a designated use specified in section 101(a)(2) of the Act, the State must perform a use attainability analysis (see section 131.10(j)). Section 2.9 of this Handbook discusses use attainability analyses for aquatic life uses.

2.7.3 Step 3 – Is the Use Attainable?

A State may change activities within a specific use category but may not change to a use that requires less stringent criteria, unless the State can demonstrate that the designated use cannot be attained. (See section 2.4, above, for the definition of "attainable uses.") For example, if a State has a broad aquatic life use, EPA generally assumes that the use will support all aquatic life. The State may demonstrate that, for a specific water body, such parameters as dissolved oxygen or temperature will not support trout but will support perch when technology-based effluent limitations are applied to point source dischargers and when cost-effective and reasonable best management practices are applied to nonpoint sources.

2.7.4 Step 4 – Is a Factor from 131.10(g) Met?

Even after the previous steps have been considered, the designated use may be removed, or subcategories of a use established, only under the conditions given in section 131.10(g). The State must be able to demonstrate that attaining the designated use is not feasible because:

1. naturally occurring pollutant concentrations prevent the attainment of the use;
2. natural, 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 without violating State water conservation requirements to enable uses to be met;

3. human-caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place;
4. dams, diversions, or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the use;
5. physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to [chemical] water quality, preclude attainment of aquatic life protection uses; or
6. controls more stringent than those required by sections 301(b)(1)(A) and (B) and 306 of the Act would result in substantial and widespread economic and social impact.

2.7.5 Step 5 - Provide Public Notice

As provided for in section 131.10(e), States must provide notice and opportunity for public hearing in accordance with section 131.20(b) (discussed in section 6.1 of this Handbook). Of course, EPA intends for States to make appropriate use of all public comments received through such notice.

2.8 Revising Uses to Reflect Actual Attainment - 40 CFR 131.10(i)

When performing its triennial review, the State must evaluate what uses are being attained. If a water body is designated for a use that requires less stringent criteria than a use that is being attained, the State must revise the use on that water body to reflect the use that is being attained.

2.9 Use Attainability Analyses – 40 CFR 131.10(j) and (k)

UPDATED INFORMATION

Use Attainability Analyses –This website links to facts, background materials, case studies, and helpful information on Use Attainability Analyses.
Memo on Improving the Effectiveness of the Use Attainability Analysis Process (2006) - This memo highlights five key points on UAA and emphasizes that designating the right uses is on the critical path to effective water quality standards implementation.
Use Attainability Analysis Case Studies – This website provides overviews of several use attainability analyses.
Interim Economic Guidance for Water Quality Standards (1995) – This document provides guidance for use by states and tribes in understanding the economic factors that may be considered, and the types of tests that can be used to determine if a designated use cannot be attained, if a variance can be granted, or if degradation of high-quality water is warranted.
UAAs and Other Tools for Managing Designated Uses (2006) (PDF) (466 pp) – This document provides access to a number of case studies, models and tools for water quality managers.

Under section 131.10(j) of the Water Quality Standards Regulation, States are required to conduct a use attainability analysis (UAA) whenever:

(1) the State designates or has designated uses that do not include the uses specified in section 101(a)(2) of the Act; or

(2) the State wishes to remove a designated use that is specified in section 101(a)(2) of the Act or adopt subcategories of uses specified in section 101(a)(2) that require less stringent criteria.

States are not required to conduct UAAs when designating uses that include those specified in section 101(a)(2) of the Act, although they may conduct these or similar analyses when determining the appropriate subcategories of section 101(a)(2) goal uses.

States may also conduct generic use attainability analyses for groups of water body segments provided that the circumstances relating to the segments in question are sufficiently similar to make the results of the generic analyses reasonably applicable to each segment.

As defined in the Water Quality Standards Regulation (40 CFR 131.3), a use attainability analysis is:

. . . a structured scientific assessment of the factors affecting the attainment of a use which may include physical, chemical, biological, and economic factors as described in section 131.10(g).

The evaluations conducted in a UAA will determine the attainable uses for a water body (see sections 2.4 and 2.8, above).

The physical, chemical, and biological factors affecting the attainment of a use are evaluated through a *water body survey and assessment*. The guidance on water body survey and assessment techniques that appears in this Handbook is for the evaluation of fish, aquatic life, and wildlife uses only (EPA has not developed guidance for assessing recreational uses). Water body surveys and assessments conducted by the States should be sufficiently detailed to answer the following questions:

- What are the aquatic use(s) currently being achieved in the water body?
- What are the causes of any impairment of the aquatic uses?
- What are the aquatic use(s) that can be attained based on the physical, chemical, and biological characteristics of the water body?

The analysis of economic factors determines whether substantial and widespread economic and social impact would be caused by pollution control requirements more stringent than (1) those required under sections 301(b)(1)(A) and (B) and section 306 of the Act for point source dischargers, and (2) cost-effective and reasonable best management practices for nonpoint source dischargers.

2.9.1 Water Body Survey and Assessment - Purpose and Application

The purpose of this section is to identify the physical, chemical, and biological factors that may be examined to determine whether an aquatic life protection use is attainable for a given waterbody. The specific analyses included in this guidance are optional. However, they represent the type of analyses EPA believes are sufficient for States to justify changes in uses designated in a water quality standard and to determine uses that are attainable. States may use alternative analyses as long as they are scientifically and technically supportable. This guidance specifically addresses streams and river systems. More detailed guidance is given in the *Technical Support Manual: Waterbody Surveys and Assessments for Conducting Use Attainability Analyses, Volume I* (USEPA, 1983c). EPA has also developed guidance for estuarine and marine systems and lakes, which is summarized in following sections. More detailed guidance for these aquatic systems is available in the *Technical Support Manual, Volume II, Estuarine Systems*, and *Volume III, Lake Systems* (USEPA, 1984a,b).

UPDATED INFORMATION

Integrated Report Guidance
Integrated Reporting (IR) Guidance under Sections 303(d), 305(b), and 314 of the Clean Water Act – This website provides guidance for assessment, listing, and reporting of water quality conditions and includes listings of impaired waters under Section 303(d) of the CWA.
Consolidated Assessment and Listing Methodology – This document describes the methodology that streamlines reporting requirements under Sections 305(b) and 303(d) of the CWA.

303(d) Listing
303(d) Listing of Impaired Waters Guidance – This website provides guidance on listing impaired waters.
Section 303(d) Program Guidance – This website provides guidance regarding currently effective TMDL statutory and regulatory requirements and recommends a framework for EPA approval decisions on State Section 303(d) lists.

Several approaches for analyzing the aquatic life protection uses to determine if such uses are appropriate for a given water body are discussed. States are encouraged to use existing data to perform the physical, chemical, and biological evaluations presented in this guidance document. Not all of these evaluations are necessarily applicable. For example, if an assessment reveals that the physical habitat is the limiting factor precluding a use, a chemical evaluation would not be required. In addition, wherever possible, States also should consider grouping together water bodies having similar physical, chemical, and biological characteristics either to treat several water bodies or stream segments as a single unit or to establish representative conditions applicable to other similar water bodies or stream segments within a river basin. Using existing data and establishing representative conditions applicable to a number of water bodies or segments should conserve the limited resources available to the States.

Table 2-1 summarizes the types of physical, chemical, and biological factors that may be evaluated when conducting a UAA. Several approaches can be used for conducting the physical, chemical, and biological evaluations, depending on the complexity of the situation. Details on the various evaluations can be found in the *Technical Support Manual: Waterbody Surveys and Assessments for Conducting Use Attainability Analyses, Volume I* (USEPA, 1983c). A survey need not consider all of the parameters listed; rather, the survey should be designed on the basis of the water body characteristics and other considerations relevant to a particular survey.
These approaches may be adapted to the water body being examined. Therefore, a close working relationship between EPA and the States is essential so that EPA can assist States in determining the appropriate analyses to be used in support of any water quality standards revisions. These analyses should be made available to all interested parties before any public forums on the water quality standards to allow for full discussion of the data and analyses.

2.9.2 Physical Factors

Section 101(a) of the Clean Water Act recognizes the importance of preserving the physical integrity of the Nation's water bodies. Physical habitat plays an important role in the overall aquatic ecosystem and impacts the types and number of species present in a particular body of water. Physical parameters of a water body are examined to identify factors that impair the propagation and protection of aquatic life and to determine what uses could be obtained in the water body given such limitations. In general, physical parameters such as flow, temperature, water depth, velocity, substrate, reaeration rates, and other factors are used to identify any physical limitations that may preclude attainment of the designated use. Depending on the water body in question, any of the physical parameters listed in Table 2-1 may be appropriately examined. A State may use any of these parameters to identify physical limitations and characteristics of a water body. Once a State has identified any physical limitations based on evaluating the parameters listed, careful consideration of "reversibility" or the ability to restore the physical integrity of the water body should be made.

Table 2-1. Summary of Typical Factors Used in Conducting a Water Body Survey and Assessment Physical Factors

Physical Factors	Chemical Factors	Biological Factors

• instream characteristics
  ○ size (mean width/depth
  ○ flow velocity
  ○ annual hydrology
  ○ total volume
  ○ reaeration rates
  ○ gradient/pools/riffles
  ○ temperature
  ○ sedimentation
  ○ channel modifications
  ○ channel stability
• substrate composition and characteristics
• channel debris
• sludge deposits
• riparian characteristics
• downstream characteristics
	• dissolved oxygen
	• toxicants
	• suspended solids
	• nutrients
	  ○ nitrogen
	  ○ phosphorus
	• sediment oxygen
	• salinity
	• hardness
	• alkalinity
	• pH
	• dissolved solids
		• biological inventory (existing use analysis)
		  ○ fish
		  ○ macroinvertebrates
		  ○ microinvertebrates
		  ○ phytoplankton
		  ○ periphyton
		  ○ macrophytes
		• biological potential analysis
		  ○ diversity indices
		  ○ HIS models
		  ○ tissue analysis
		  ○ recovery index
		  ○ intolerant species analysis
		  ○ omnivore-carnivore comparison
		• biological potential analysis reference reach comparison

Such considerations may include whether it would cause more environmental damage to correct the problem than to leave the water body as is, or whether physical impediments such as dams can be operated or modified in a way that would allow attainment of the use.

Several assessment techniques have been developed that correlate physical habitat characteristics to fishery resources. The identification of physical factors limiting a fishery is a critical assessment that provides important data for management of the water body. The U.S. Fish and Wildlife Service has developed habitat evaluation procedures (HEP) and habitat suitability indices (HSI). Several States have begun developing their own models and procedures for habitat assessments. Parameters generally included in habitat assessment procedures are temperature, turbidity, velocity, depth, cover, pool and riffle sizes, riparian vegetation, bank stability, and siltation. These parameters are correlated to fish species by evaluating the habitat variables important to the life cycle of the species. The value of habitat for other groups of aquatic organisms such as macroinvertebrates and periphyton also may be considered. Continued research and refinement of habitat evaluation procedures reflect the importance of physical habitat.

If physical limitations of a stream restrict the use, a variety of habitat modification techniques might restore a habitat so that a species could thrive where it could not before. Some of the techniques that have been used are bank stabilization, flow control, current deflectors, check dams, artificial meanders, isolated oxbows, snag clearing when determined not to be detrimental to the life cycle or reproduction of a species, and installation of spawning beds and artificial spawning channels. If the habitat is a limiting factor to the propagation and/or survival of aquatic life, the feasibility of modifications might be examined before additional controls are imposed on dischargers.

2.9.3 Chemical Evaluations

The chemical characteristics of a water body are examined to determine why a designated use is not being met and to determine the potential of a particular species to survive in the water body if the concentration of particular chemicals were modified. The State has the discretion to determine the parameters required to perform an adequate water chemistry evaluation. A partial list of the parameters that may be evaluated is provided in Table 2-1.

As part of the evaluation of the water chemistry composition, a natural background evaluation is useful in determining the relative contribution of natural background contaminants to the water body; this may be a legitimate factor that effectively prevents a designated use from being met. To determine whether the natural background concentration of a pollutant is adversely impacting the survival of species, the concentration may be compared to one of the following:

- 304(a) criteria guidance documents; or
- site-specific criteria; or
- State-derived criteria.

Another way to obtain an indication of the potential for the species to survive is to determine if the species are found in other waterways with similar chemical concentrations.

In determining whether human-caused pollution is irreversible, consideration needs to be given to the permanence of the damage, the feasibility of abating the pollution, or the additional environmental damage that may result from removing the pollutants. Once a State identifies the chemical or water quality characteristics that are limiting attainment of the use, differing levels of remedial control measures may be explored. In addition, if instream toxicants cannot be removed by natural processes and cannot be removed by human effort without severe long-term environmental impacts, the pollution may be considered irreversible.

In some areas, the water's chemical characteristics may have to be calculated using predictive water quality models. This will be true if the receiving water is to be impacted by new dischargers, changes in land use, or improved treatment facilities. Guidance is available on the selection and use of receiving water models for biochemical oxygen demand, dissolved oxygen, and ammonia for instream systems (USEPA, 1983d,e) and dissolved oxygen, nitrogen, and phosphorus for lake systems, reservoirs, and impoundments (USEPA, 1983f).

2.9.4 Biological Evaluations

UPDATED INFORMATION

Primer on Using Biological Assessments to Support Water Quality Management (2011) (PDF) (107 pp, 6.9MB) - See page 39 for an example of the use of biological assessments to support Use Attainability Analysis in Ohio.

In evaluating what aquatic life protection uses are attainable, the biology of the water body should be evaluated. The interrelationships between the physical, chemical, and biological characteristics are complex, and alterations in the physical and/or chemical parameters result in biological changes. The biological evaluation described in this section encourages States to:

- provide a more precise statement of which species exist in the water body and should be protected;
- determine the biological health of the water body; and
- determine the species that could potentially exist in the water body if the physical and chemical factors impairing a use were corrected.

This section of the guidance will present the conceptual framework for making these evaluations. States have the discretion to use other scientifically and technically supportable assessment methodologies deemed appropriate for specific water bodies on a case-by-case basis. Further details on each of the analyses presented can be found in the *Technical Support Manual for Conducting Use Attainability Analyses* (USEPA, 1983c).

Biological Inventory (Existing Use Analysis)

The identification of which species are in the water body and should be protected serves several purposes:

- By knowing what species are present, the biologist can analyze, in general terms, the health of the water body. For example, if the fish species present are principally carnivores, the quality of the water is generally higher than in a water body dominated by omnivores. It also allows the biologist to assess the presence or absence of intolerant species.
- Identification of the species enables the State to develop baseline conditions against which to evaluate any remedial actions. The development of a regional baseline based upon several site-specific species lists increases an understanding of the regional fauna. This allows for easier grouping of water bodies based on the biological regime of the area.
- By identifying the species, the decision-maker has the data needed to explain the present condition of the water body to the public and the uses that must be maintained.

The evaluation of the existing biota may be simple or complex depending on data availability. As much information as possible should be gathered on the categories of organisms listed in Table 2-1. It is not necessary to obtain complete data for all six categories. However, it is recommended that fish should be included in any combination of categories chosen because:

- the general public can relate better to statements about the condition of the fish community;

- fish are typically present even in the smallest streams and in all but the most polluted waters;
- fish are relatively easy to identify, and samples can be sorted and identified at the field site;
- life-history information is extensive for many fish species so that stress effects can be evaluated (Karr, 1981). In addition, since fish are mobile, States are encouraged to evaluate other categories of organisms.

Before any field work is conducted, existing data should be collected. EPA can provide data from intensive monitoring surveys and special studies. Data, especially for fish, may be available from State fish and game departments, recreation agencies, and local governments, or through environmental impact statements, permit reviews, surveys, and university or other studies.

Biological Condition/Biological Health Assessment

The biological inventory can be used to gain insight into the biological health of the water body by evaluating:

- species richness or the number of species;
- presence of intolerant species;
- proportion of omnivores and carnivores;
- biomass or production; and
- number of individuals per species.

The role of the biologist becomes critical in evaluating the health of the biota because the knowledge of expected richness or expected species comes only from understanding the general biological traits and regimes of the area. Best professional judgments by local biologists are important. These judgments are based on many years of experience and on observations of the physical and chemical changes that have occurred over time.

Many methods for evaluating biotic communities have been and continue to be developed. The *Technical Support Manual for Conducting Use Attainability Analyses* (USEPA, 1983c) and *Rapid Bioassessment Protocols for Use in Streams and Rivers* (USEPA, 1989e) describe methods that States may want to consider using in their biological evaluations.

A number of other methods have been and are being developed to evaluate the health of biological components of the aquatic ecosystem including short-term *in situ* or laboratory bioassays and partial or full life-cycle toxicity tests. These methods are discussed in several EPA publications, including the *Biological Methods Manual* (USEPA, 1972). Again, it is not the intent of this document to specify tests to be conducted by the States. This will depend on the information available, the predictive accuracy required, site-specific conditions of the water body being examined, and the cooperation and assistance the State receives from the affected municipalities and industries.

Biological Potential Analysis

A significant step in the use attainability analysis is the evaluation of what communities could potentially exist in a particular water body if pollution were abated or if the physical habitat were modified. The approach presented is to compare the water body in question to reference reaches within a region. This approach includes the development of baseline conditions to facilitate the comparison of several water bodies at less cost. As with the other analyses mentioned previously, available data should be used to minimize resource impacts.

The biological potential analysis involves:

- defining boundaries of fish faunal regions;
- selecting control sampling sites in the reference reaches of each area;
- sampling fish and recording observations at each reference sampling site;
- establishing the community characteristics for the reference reaches of each area; and
- comparing the water body in question to the reference reaches.

In establishing faunal regions and sites, it is important to select reference areas for sampling sites that have conditions typical of the region.

The establishment of reference areas may be based on physical and hydrological characteristics. The number of reference reaches needed will be determined by the State depending on the variability of the waterways within the State and the number of classes that the State may wish to establish. For example, the State may want to use size, flow, and substrate as the defining characteristics and may consequently desire to establish classes such as small, fast running streams with sandy substrate or large, slow rivers with cobble bottom. It is at the option of the State to:

- choose the parameters to be used in classifying and establishing reference reaches; and
- determine the number of classes (and thus the refinement) within the faunal region.

This approach can also be applied to other aquatic organisms such as macroinvertebrates (particularly freshwater mussels) and algae.

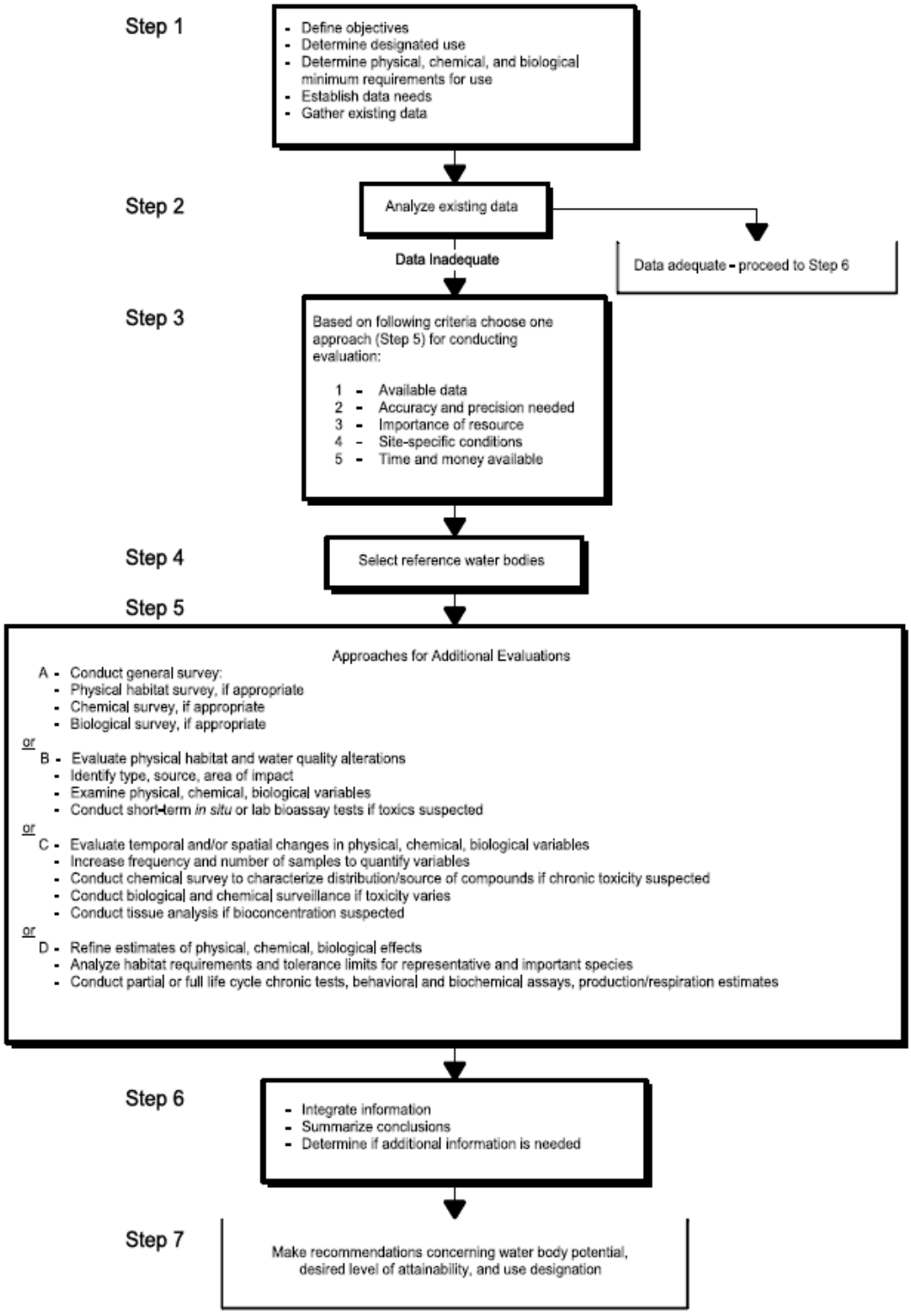
Selection of the reference reaches is of critical importance because the characteristics of the aquatic community will be used to establish baseline conditions against which similar reaches (based on physical and hydrological characteristics) are compared. Once the reference reaches are established, the water body in question can be compared to the reference reach. The results of this analysis will reveal whether the water body in question has the typical biota for that class or a less desirable community and will provide an indication of what species may potentially exist if pollution were abated or the physical habitat limitations were remedied.

2.9.5 Approaches to Conducting the Physical, Chemical, and Biological Evaluations

In some cases, States that assess the status of their aquatic resources, will have relatively simple situations not requiring extensive data collection and evaluation. In other situations, however, the complexity resulting from variable environmental conditions and the stress from multiple uses of the resource will require both intensive and extensive studies to produce a sound evaluation of the system. Thus, procedures that a State may develop for conducting a water body assessment should be flexible enough to be adaptable to a variety of site-specific conditions.

A common experimental approach used in biological assessments has been a hierarchical approach to the analyses. This can be a rigidly tiered approach. An alternative is presented in Figure 2-2.

Figure 2-2. Steps in a Use Attainability Analysis



The flow chart is a general illustration of a thought process used to conduct a use attainability analysis. The process illustrates several alternative approaches that can be pursued separately or, to varying degrees, simultaneously depending on:

- the amount of data available on the site;
- the degree of accuracy and precision required;
- the importance of the resource;
- the site-specific conditions of the study area; and
- the controversy associated with the site.

The degree of sophistication is variable for each approach. Emphasis is placed on evaluating available data first. If information is found to be lacking or incomplete, then field testing or field surveys should be conducted.

The major elements of the process are briefly described below.

Steps 1 and 2

Steps 1 and 2 are the basic organizing steps in the evaluation process. By carefully defining the objectives and scope of the evaluation, there will be some indication of the level of sophistication required in subsequent surveys and testing. States and the regulated community can then adequately plan and allocate resources to the analyses. The designated use of the water body in question should be identified as well as the minimum chemical, physical, and biological requirements for maintaining the use. Minimum requirements may include, for example, dissolved oxygen levels, flow rates, temperature, and other factors. All relevant information on the waterbody should be collected to determine if the available information is adequate for conducting an appropriate level of analysis. It is assumed that all water body evaluations, based on existing data, will either formally or informally be conducted through Steps 1 and 2.

Steps 3 and 4

If the available information proves inadequate, then decisions regarding the degree of sophistication required in the evaluation process will need to be made. These decisions will, most likely, be based on the five criteria listed in Step 3 of Figure 2-2. Based on these decisions, reference areas should be chosen (Step 4), and one or more of the testing approaches should be followed.

Steps 5A, B, C, D

These approaches are presented to illustrate several possible ways of analyzing the water body. For example, in some cases chemical data may be readily available for a water body but little or no biological information is known. In this case, extensive chemical sampling may not be required, but enough samples should be taken to confirm the accuracy of the available data set. Thus, to accurately define the biological condition of the resource, 5C may be chosen, but 5A may be pursued in a less intensive way to supplement the chemical data already available.

Step 5A is a general survey to establish relatively coarse ranges for physical and chemical variables, and the numbers and relative abundances of the biological components (fishes, invertebrates, primary producers) in the water body. Reference areas may or may not need to be evaluated here, depending on the types of questions being asked and the degree of accuracy required.

Step 5B focuses more narrowly on site-specific problem areas with the intent of separating, where possible, biological impacts due to physical habitat alteration versus those due to chemical impacts. These categories are not mutually exclusive but some attempt should be made to define the causal factors in a stressed area so that appropriate control measures can be implemented if necessary.

Step 5C would be conducted to evaluate possibly important trends in the spatial and/or temporal changes associated with the physical, chemical, and biological variables of interest. In general, more rigorous quantification of these variables would be needed to allow for more sophisticated statistical analyses between reference and study areas which would, in turn, increase the degree of accuracy and confidence in the predictions based on this evaluation. Additional laboratory testing may be included, such as tissue analyses, behavioral tests, algal assays, or tests for flesh tainting. Also, high-level chemical analyses may be needed, particularly if the presence of toxic compounds is suspected.

Step 5D is, in some respects, the most detailed level of study. Emphasis is placed on refining cause-effect relationships between physical- chemical alterations and the biological responses previously established from available data or steps 5A through 5C. In many cases, state-of-the-art techniques will be used. This pathway would be conducted by the States only where it may be necessary to establish, with a high degree of confidence, the cause-effect relationships that are producing the biological community characteristics of those areas. Habitat requirements or tolerance limits for representative or important species may have to be determined for those factors limiting the potential of the ecosystem. For these evaluations, partial or full life-cycle toxicity tests, algal assays, and sediment bioassays may be needed along with the shorter term bioassays designed to elucidate sublethal effects not readily apparent in toxicity tests (e.g., preference-avoidance responses, production-respiration estimates, and bioconcentration estimates).

The CWA indicates that all of its programs protect waters of the United States, and as a result, there is only one definition for that key threshold term. Thus, the EPA has not defined waters of the United States separately for WQS but, instead, relies on the established definitions, interpretations, and decisions described above in administering the WQS program.

States and tribes may choose to expand their coverage of WQS beyond waters of the United States to include other waters as “waters of the state.” For example, a state or tribe may specifically designate isolated wetlands (that do not meet the definition of waters of the United States) as waters to which state and tribal WQS apply.

Steps 6 and 7

After field sampling is completed, all data must be integrated and summarized. If this information is still not adequate, then further testing may be required and a more detailed pathway chosen. With adequate data, States should be able to make reasonably specific recommendations concerning the natural potential of the water body, levels of attainability consistent with this potential, and appropriate use designations. The evaluation procedure outlined here allows States a significant degree of latitude for designing assessments to meet their specific goals in water quality and water use.

2.9.6 Estuarine Systems

This section provides an overview of the factors that should be considered in developing use attainability analyses for estuaries. Anyone planning to conduct a use attainability analysis for an estuary should consult the *Technical Support Manual: Waterbody Surveys and Assessments for Conducting Use Attainability Analyses, Volume II: Estuarine Systems* (USEPA, 1984a) for more detailed guidance. Also, much of the information for streams and rivers that is presented above and in Volume I of the Technical Support Manual, particularly with respect to chemical evaluations, will apply to estuaries and is not repeated here.

The term "estuaries" is generally used to denote the lower reaches of a river where tide and river flows interact. Estuaries are very complex receiving waters that are highly variable in description and are not absolutes in definition, size, shape, aquatic life, or other attributes. Physical, chemical, and biological attributes may require consideration unique to estuaries and are discussed below.

Physical Processes

Estuarine flows are the result of a complex interaction of the following physical factors:
tides;

- wind shear;
- freshwater inflow (momentum and buoyancy);
- topographic frictional resistance;
- Coriolis effect;
- vertical mixing; and
- horizontal mixing.

In performing a use attainability study, one may simplify the complex prototype system by determining which of these effects or combination of effects is most important at the time scale of the evaluation (days, months, seasons, etc.).

Other ways to simplify the approach to analyzing an estuary is to place it in a broad classification system to permit comparison of similar types of estuaries. The most common groupings are based on geomorphology, stratification, circulation patterns, and time scales. Each of these groupings is discussed below.

Geomorphological classifications can include types such as drowned river valleys (coastal plain estuaries), fjords, bar-built estuaries, and other estuaries that do not fit the first three classifications (those produced by tectonic activity, faulting, landslides, or volcanic eruptions).

Stratification is most often used for classifying estuaries influenced by tides and freshwater inflows. Generally, highly stratified estuaries have large river discharges flowing into them, partially mixed estuaries have medium river discharges; and vertically homogeneous have small river discharges.

Circulation in an estuary (i.e., the velocity patterns as they change over time) is primarily affected by the freshwater outflow, the tidal inflow, and the effect of wind. In turn, the difference in density between outflow and inflow sets up secondary currents that ultimately affect the salinity distribution across the estuary. The salinity distribution is important because it affects the distribution of fauna and flora within the estuary. It is also important because it is indicative of the mixing properties of the estuary as they may affect the dispersion of pollutants (flushing properties). Additional factors such as friction forces and the size and geometry of the estuary also contribute to the circulation patterns. The complex geometry of estuaries, in combination with the presence of wind, the effect of the Earth's rotation (Coriolis effect), and other effects, often results in residual currents (i.e., of longer period than the tidal cycle) that strongly influence the mixing processes in estuaries.

Consideration of time scales of the physical processes being evaluated is very important for any water quality study.

Short-term conditions are much more influenced by a variety of short-term events that perhaps have to be analyzed to evaluate a "worst case" scenario. Longer term (seasonal) conditions are influenced predominantly by events that are averaged over the duration of that time scale.

Estuary Substrate Composition

Characterization of sediment/substrate properties is important in a use attainability analysis because such properties:

- determine the extent to which toxic compounds in sediments are available to the biota; and
- determine what types of plants and animals could potentially become established, assuming no interference from other factors such as nutrient, dissolved oxygen (DO), and/or toxics problems.

The bottom of most estuaries is a mix of sand, silt, and mud that has been transported and deposited by ocean currents or by freshwater sources. Rocky areas may also be present, particularly in the fjord-type estuary. None of these substrate types is particularly hospitable to aquatic plants and animals, which accounts in part for the paucity of species seen in an estuary.

The amount of material transported to the estuary will be determined by the types of terrain through which the river passes, and upon land use practices that may encourage runoff and erosion. It is important to take land use practices into consideration when examining the attainable uses of the estuary. Deposition of particles varies with location in the estuaries and velocity of the currents.

It is often difficult for plants to colonize estuaries because of a lack of suitable anchorage points and because of the turbidity of the water, which restricts light penetration (McLusky, 1971). Submerged aquatic vegetation (SAV) (macrophytes) develops in sheltered areas where silt and mud accumulate. These plants help to slow the currents, leading to further deposition of silt. The growth of plants often keeps pace with rising sediment levels so that over a long period of time substantial deposits of sediment and plant material may be seen.

SAV serves very important roles as habitat and as a food source for much of the biota of the estuary. Major estuary studies have shown that the health of SAV communities serves as an important indicator of estuary health.

Adjacent Wetlands

Tidal and freshwater wetlands adjacent to the estuary can serve as a buffer to protect the estuary from external phenomena. This function may be particularly important during wet weather periods when relatively high stream flows discharge high loads of sediment and pollutants to the estuary. The wetlands slow the peak velocity, to some extent alleviate the sudden shock of salinity changes, and filter some of the sediments and nutrients that would otherwise be discharged directly into the estuary.

Hydrology and Hydraulics

The two most important sources of freshwater to the estuary are stream flow and precipitation. Stream flow generally represents the greatest contribution to the estuary. The location of the salinity gradient in a river-controlled estuary is to a large extent a function of stream flow. Location of the iso-concentration lines may change considerably, depending upon whether stream flow is high or low. This in turn may affect the biology of the estuary, resulting in population shifts as biological species adjust to changes in salinity. Most estuarine species are adapted to survive temporary changes in salinity either by migration or some other mechanism (e.g., mussels can close their shells). However, many cannot withstand these changes indefinitely. Response of an estuary to rainfall events depends upon the intensity of rainfall, the drainage area affected by the rainfall, and the size of the estuary. Movement of the salt front is dependent upon tidal influences and freshwater flow to the estuary. Variations in salinity generally follow seasonal patterns such that the salt front will occur farther down-estuary during a rainy season than during a dry season. The salinity profile also may vary from day to day, reflecting the effect of individual rainfall events, and may undergo major changes due to extreme meteorological events.

Anthropogenic activity also may have a significant effect on salinity in an estuary. When feeder streams are used as sources of public water supply and the withdrawals are not returned, freshwater flow to the estuary is reduced, and the salt wedge is found farther up the estuary. If the water is

returned, usually in the form of wastewater effluent, the salinity gradient of the estuary may not be affected, although other problems attributable to nutrients and other pollutants in the wastewater may occur.

Salinity also may be affected by the way that dams along the river are operated. Flood control dams result in controlled discharges to the estuary rather than relatively short but massive discharge during high-flow periods. Dams operated to impound water for water supplies during low-flow periods may drastically alter the pattern of freshwater flow to the estuary, and although the annual discharge may remain the same, seasonal changes may have significant impact on the estuary and its biota.

Influence of Physical Characteristics on Use Attainability

"Segmentation" of an estuary can provide a useful framework for evaluating the influence of estuarine physical characteristics such as circulation, mixing, salinity, and geomorphology on use attainability. Segmentation is the compartmentalization of an estuary into subunits with homogeneous physical characteristics. In the absence of water pollution, physical characteristics of different regions of the estuary tend to govern the suitability for major water uses. Once the segment network is established, each segment can be subjected to a use attainability analysis. In addition, the segmentation process offers a useful management structure for monitoring conformance with water quality goals in future years.

The segmentation process is an evaluation tool that recognizes that an estuary is an interrelated ecosystem composed of chemically, physically, and biologically diverse areas. It assumes that an ecosystem as diverse as an estuary cannot be effectively managed as only one unit because different uses and associated water quality goals will be appropriate and feasible for different regions of the estuary. However, after developing a network based upon physical characteristics, sediment boundaries can be refined with available chemical and biological data to maximize the homogeneity of each segment.

A potential source of concern about the construction and utility of the segmentation scheme for use attainability evaluations is that the estuary is a fluid system with only a few obvious boundaries, such as the sea surface and the sediment-water interface. Fixed boundaries may seem unnatural to scientists, managers, and users, who are more likely to view the estuary as a continuum than as a system composed of separable parts. The best approach to dealing with such concerns is a segmentation scheme that stresses the dynamic nature of the estuary. The scheme should emphasize that the segment boundaries are operationally defined constructs to assist in understanding a changeable, intercommunicating system of channels, embayments, and tributaries.

To account for the dynamic nature of the estuary, it is recommended that estuarine circulation patterns be a prominent factor in delineating the segment network. Circulation patterns control the transport of and residence times for heat, salinity, phytoplankton, nutrients, sediment, and other pollutants throughout the estuary. Salinity should be another important factor in delineating the segment network. The variations in salinity concentrations from head of tide to the mouth typically produce a separation of biological communities based on salinity tolerances or preferences.

Chemical Parameters

The most critical chemical water quality indicators for aquatic use attainment in an estuary are dissolved oxygen, nutrients and chlorophyll-a, and toxicants. Dissolved oxygen (DO) is an important water quality indicator for all fisheries uses. In evaluating use attainability, assessments of DO impacts should consider the relative contributions of three different sources of oxygen demand:

- photosynthesis/respiration demand from phytoplankton;
- water column demand; and
- benthic oxygen demand.

If use impairment is occurring, assessments of the significance of each oxygen sink can be used to evaluate the feasibility of achieving sufficient pollution control to attain the designated use.

Chlorophyll-a is the most popular indicator of algal concentrations and nutrient overenrichment, which in turn can be related to diurnal DO depressions due to algal respiration. Typically, the control of phosphorus levels can limit algal growth near the head of the estuary, while the control of nitrogen levels can limit algal growth near the mouth of the estuary; however, these relationships are dependent upon factors such as nitrogen phosphorus ("N/P") ratios and light penetration potential, which can vary from one estuary to the next. Excessive phytoplankton concentrations, as indicated by chlorophyll-a levels, can cause adverse DO impacts such as:

- wide diurnal variations in surface DO due to daytime photosynthetic oxygen production and nighttime oxygen depletion by respiration; and
- depletion of bottom DO through the decomposition of dead algae.

Excessive chlorophyll-a levels also result in shading, which reduces light penetration for submerged aquatic vegetation (SAV). Consequently, the prevention of nutrient over-enrichment is probably the most important water quality requirement for a healthy SAV community.

The nutrients of greatest concern in the estuary are nitrogen and phosphorus. Their sources typically are discharges from sewage treatment plants and industries and runoff from urban and agricultural areas. Increased nutrient levels lead to phytoplankton blooms and a subsequent reduction in DO levels and light penetration, as discussed above.

Sewage treatment plants are typically the major source of nutrients, particularly phosphorus, to estuaries in urban areas. Agricultural land uses and urban land uses represent significant nonpoint sources of nutrients, particularly nitrogen. It is important to base control strategies on an understanding of the sources of each type of nutrient, both in the estuary and in its feeder streams.

Point sources of nutrients are typically much more amenable to control than nonpoint sources. Because phosphorus removal for municipal wastewater discharges is typically less expensive than nitrogen removal operations, the control of phosphorus discharges is often the method of choice for

the prevention or reversal of use impairment in the upper estuary (i.e., tidal fresh zone). However, nutrient control in the upper reaches of the estuary may cause algal blooms in the lower reaches, e.g., control of phosphorus in the upper reaches may reduce the algal blooms there, but in doing so also increase the amount of nitrogen transported to the lower reaches where nitrogen is the limiting nutrient causing a bloom there. Tradeoffs between nutrient controls for the upper and lower estuary should be considered in evaluating measures for prevention of reversing use impairment.

Potential interferences from toxic substances, such as pesticides, herbicides, heavy metals, and chlorinated effluents, also need to be considered in a use attainability study. The presence of certain toxicants in excessive concentrations within bottom sediments of the water column may prevent the attainment of water uses (particularly fisheries propagation/harvesting and sea grass habitat uses) in estuary segments that satisfy water quality criteria for DO, chlorophyll-a/nutrient enrichment, and fecal coliform.

Biological Community Characteristics

The *Technical Support Manual, Volume II* (USEPA, 1984a) provides a discussion of the organisms typically found in estuaries in more detail than is appropriate for this Handbook. Therefore, this discussion will focus on more general characteristics of estuarine biota and their adaptations to accommodate a fluctuating environment.

Salinity, light penetration, and substrate composition are the most critical factors to the distribution and survival of plant and animal communities in an estuary. The estuarine environment is characterized by variations in circulation, salinity, temperature, and dissolved oxygen supply. Colonizing plants and animals must be able to withstand the fluctuating conditions in estuaries.

The depth to which attached plants may become established is limited by turbidity because plants require light for photosynthesis. Estuaries are typically turbid because of large quantities of detritus and silt contributed by surrounding marshes and rivers. Algal growth also may hinder light penetration. If too much light is withheld from the lower depths, animals cannot rely heavily on visual cues for habitat selection, feeding, or finding a mate.

Estuarine organisms are recruited from the sea, freshwater environments, and the land. The major environmental factors to which organisms must adjust are periodic submersion and desiccation as well as fluctuating salinity, temperature, and dissolved oxygen.
Several generalizations concerning the responses of estuarine organisms to salinity have been noted (Vernberg, 1983) and reflect a correlation of an organism's habitat to its tolerance:

- organisms living in estuaries subjected to wide salinity fluctuations can withstand a wider range of salinities than species that occur in high-salinity estuaries;
- intertidal zone animals tend to tolerate wider ranges of salinities than do subtidal and open-ocean organisms;
- low intertidal species are less tolerant of low salinities than are high intertidal species; and
- more sessile animals are likely to be more tolerant of fluctuating salinities than organisms that are highly mobile and capable of migrating during times of salinity stress.

Estuaries are generally characterized by low diversity of species but high productivity because they serve as the nursery or breeding grounds for some species. Methods to measure the biological health and diversity of estuaries are discussed in USEPA (1984a).

Techniques for Use Attainability Evaluations

In assessing use levels for aquatic life protection, determination of the present use and whether this corresponds to the designated use is evaluated in terms of biological measurements and indices. However, if the present use does not correspond to the designated use, physical and chemical factors are used to explain the lack of attainment and the highest level the system can achieve.

The physical and chemical evaluations may proceed on several levels depending on the level of detail required, amount of knowledge available about the system (and similar systems), and budget for the use attainability study. As a first step, the estuary is classified in terms of physical processes so that it can be compared with reference estuaries in terms of differences in water quality and biological communities, which can be related to man-made alteration (i.e., pollution discharges).

The second step is to perform desktop or simple computer model calculations to improve the understanding of spatial and temporal water quality conditions in the present system. These calculations include continuous point source and simple box model-type calculations. A more detailed discussion of the desktop and computer calculations is given in USEPA (1984a).

The third step is to perform detailed analyses through the use of more sophisticated computer models. These tools can be used to evaluate the system's response to removing individual point and nonpoint source discharges, so as to assist with assessments of the cause(s) of any use impairment.

2.9.7 Lake Systems

This section will focus on the factors that should be considered in performing use attainability analyses for lake systems. Lake systems are in most cases linked physically to rivers and streams and exhibit a transition from riverine habitat and conditions to lacustrine habitat and conditions. Therefore, the information presented in section 2.9.1 through 2.9.5 and the *Technical Support Manual, Volume I* (USEPA, 1983c) will to some extent apply to lake systems. EPA has provided guidance specific to lake systems in the *Technical Support Manual for Conducting Use Attainability Analyses, Volume III: Lake Systems* (USEPA, 1984b). This manual should be consulted by anyone performing a use attainability analysis for lake systems.

Aquatic life uses of a lake are defined in reference to the plant and animal life in a lake. However, the types and abundance of the biota are largely determined by the physical and chemical characteristics of the lake. Other contributing factors include the location, climatological conditions, and historical events affecting the lake.

Physical Parameters

The physical parameters that describe the size, shape, and flow regime of a lake represent the basic characteristics that affect physical, chemical, and biological processes. As part of a use attainability analysis, the physical parameters must be examined to understand non-water quality factors that affect the lake's aquatic life.

The origins of a lake determine its morphologic characteristics and strongly influence the physical, chemical, and biological conditions that will prevail. Therefore, grouping lakes formed by the same process often will allow comparison of similar lake systems. Measurement of the following morphological characteristics may be of importance to a water body survey:

- surface area;
- volume;
- inflow and outflow;
- mean depth;
- maximum depth;
- length;length of shoreline;
- depth-area relationships;
- depth-volume relationships; and
- bathymetry (submerged contours).

These physical parameters can in some cases be used to predict biological parameters. For example, mean depth has been used as an indicator of productivity. Shallow lakes tend to be more productive, and deep, steep-sided lakes tend to be less productive. These parameters may also be used to calculate other characteristics of the lake such as mass flow rate of a chemical, surface loading rate, and detention time.

Total lake volume and inflow and outflow rates are physical characteristics that indirectly affect the lake's aquatic community. Large inflows and outflows for lakes with small volumes produce low detention times or high flow-through rates. Aquatic life under these conditions may be different than when relatively small inflows and outflows occur for a large-volume lake where long detention times occur.

The shape factor (lake length divided by lake width) also may be correlated to chemical and biological characteristics. This factor has been used to predict parameters such as chlorophyll-a levels in lakes. For more detailed lake analysis, information describing the depth-area and depth-volume relationships and information describing the bathymetry may be required.

In addition to the physical parameters listed above, it is also important to obtain and analyze information concerning the lake's contributing watershed. Two major parameters of concern are the drainage area of the contributing watershed and the land uses of that watershed. Drainage area will aid in the analysis of inflow volumes to the lake due to surface runoff. The land use classification of the area around the lake can be used to predict flows and also nonpoint source pollutant loadings to

the lake.

The physical parameters discussed above may be used to understand and analyze the various physical processes that occur in lakes. They can also be used directly in simplistic relationships that predict productivity to aid in aquatic use attainability analyses.

Physical Processes

Many complex and interrelated physical processes occur in lakes. These processes are highly dependent on the lake's physical parameters, location, and characteristics of the contributing watershed. Several of the major processes are discussed below.

Lake Currents

Water movement in a lake affects productivity and the biota because it influences the distribution of nutrients, microorganisms, and plankton. Lake currents are propagated by wind, inflow/outflow, and the Coriolis force. For small shallow lakes, particularly long and narrow lakes, inflow/outflow characteristics are most important, and the predominant current is a steady-state flow through the lake. For very large lakes, wind is the primary generator of currents, and except for local effects, inflow/outflow have a relatively minor effect on lake circulation. Coriolis effect, a deflecting force that is the function of the Earth's rotation, also plays a role in circulation in large lakes such as the Great Lakes.

Heat Budget

Temperature and its distribution within lakes and reservoirs affects not only the water quality within the lake but also the thermal regime and quality of a river system downstream of the lake. The thermal regime of a lake is a function of the heat balance around the body of water. Heat transfer modes into and out of the lake include heat transfer through the air-water interface, conduction through the mud-water interface, and inflow and outflow heat advection.

Heat transfer through the air-water interface is primarily responsible for typical annual temperature cycles. Heat is transferred across the air-water interface by three different processes: radiation exchange, evaporation, and conduction. The heat flux of the air-water interface is a function of location (latitude/longitude and elevation), season, time of day, and meteorological conditions (cloud cover, dew-point, temperature, barometric pressure, and wind).

Light Penetration

Transmission of light through the water column influences primary productivity (phytoplankton and macrophytes), distribution of organisms, and behavior of fish. The reduction of light through the water column of a lake is a function of scattering and absorption. Light transmission is affected by the water surface film, floatable and suspended particulates, turbidity, dense populations of algae and bacteria, and color.

An important parameter based on the transmission of light is the depth to which photosynthetic activity is possible. The minimum light intensity required for photosynthesis has been established to be about 1.0 percent of the incident surface light (Cole, 1979). The portion of the lake from the surface to the depth at which the 1.0 percent intensity occurs is referred to as the "euphotic zone."

Lake Stratification

Lakes in temperate and northern latitudes typically exhibit vertical density stratification during certain seasons of the year. Stratification in lakes is primarily due to temperature differences, although salinity and suspended solids concentrations may also affect density. Typically, three zones of thermal stratification are formed.

The upper layer of warmer, lower density water is termed the "epilimnion," and the lower, stagnant layer of colder, higher density water is termed the "hypolimnion." The transition zone between the epilimnion and the hypolimnion, referred to as the "metalimnion," is characterized by the maximum rate of temperature decline with depth (the thermocline). During stratification, the presence of the thermocline suppresses many of the mass transport phenomena that are otherwise responsible for the vertical transport of water quality constituents within a lake. The aquatic community present in a lake is highly dependent on the thermal structure.

With respect to internal flow structure, three distinct classes of lakes are defined:

- strongly stratified, deep lakes characterized by horizontal isotherms;
- weakly stratified lakes characterized by isotherms that are tilted along the longitudinal axis of the reservoir; and
- non-stratified, completely mixed lakes characterized by isotherms that are essentially vertical.

Retardation of mass transport between the hypolimnion and the epilimnion results in sharply differentiated water quality and biology between the lake strata.

One of the most important differences between the layers is often dissolved oxygen. As this is depleted from the hypolimnion without being replenished, life functions of many organisms are impaired, and the biology and biologically mediated reactions fundamental to water quality are altered.

Vertical stratification of a lake with respect to nutrients can also occur. Dissolved nutrients are converted to particulate organic material through photosynthetic processes in the epilimnion in ecologically advanced lakes. This assimilation lowers the ambient nutrient concentrations in the epilimnion. When the algae die and sink to the bottom, nutrients are carried to the hypolimnion where they are released by decomposition.

Temperature also has a direct effect on biology of a lake because most biological processes (e.g., growth, respiration, reproduction, migration, mortality, and decay) are strongly influenced by ambient temperature.

Annual Circulation Pattern and Lake Classification

Lakes can be classified on the basis of their pattern of annual mixing. These classifications are described below.

1. Amictic – Lakes that never circulate and are permanently covered with ice, primarily in the Antarctic and very high mountains.
2. Holomictic – Lakes that mix from top to bottom as a result of wind-driven circulation. Several subcategories are defined:
    - Oligomictic – Lakes characterized by circulation that is unusual, irregular, and short in duration; generally small to medium tropical lakes or very deep lakes.
    - Monomictic – Lakes that undergo one regular circulation per year.
    - Dimictic – Lakes that circulate twice a year, in spring and fall, one of the most common types of annual mixing in cool temperate regions such as central and eastern North America.
    - Polymictic – Lakes that circulate frequently or continuously, cold lakes that are continually near or slightly above 4°C, or warm equatorial lakes where air temperature changes very little.
3. Meromictic – Lakes that do not circulate throughout the entire water column. The lower water stratum is perennially stagnant.

Lake Sedimentation

Deposition of sediment received from the surrounding watershed is an important physical process in lakes. Because of the low water velocities through the lake or reservoir, sediments transported by inflowing waters tend to settle out.

Sediment accumulation rates are strongly dependent both on the physiographic characteristics of a specific watershed and on various characteristics of the lake. Prediction of sedimentation rates can be estimated in two basic ways:

- periodic sediment surveys on a lake; and
- estimation of watershed erosion and bed load.

Accumulation of sediment in lakes can, over many years, reduce the life of the water body by reducing the water storage capacity. Sediment flow into the lake also reduces light penetration, eliminates bottom habitat for many plants and animals, and carries with it adsorbed chemicals and organic matter that settle to the bottom and can be harmful to the ecology of the lake. Where sediment accumulation is a major problem, proper watershed management including erosion and sediment control must be put into effect

Chemical Characteristics

Freshwater chemistry is discussed in section 2.9.3 and in the *Technical Support Manual, Volume I* (USEPA, 1983c). Therefore, the discussion here will focus on chemical phenomena that are of particular importance to lakes. Nutrient cycling and eutrophication are the primary factors of concern in this discussion, but the effects of pH, dissolved oxygen, and redox potential on lake processes are also involved.

Water chemistry in a lake is closely related to the stages in the annual lake turnover. Once a thermocline has formed, the dissolved oxygen levels in the hypolimnion tend to decline. This occurs because the hypolimnion is isolated from surface waters by the thermocline and there is no mechanism for aeration.

The decay of organic matter and the respiration of fish and other organisms in the hypolimnion serve to deplete DO. Extreme depletion of DO may occur in ice- and snow-covered lakes in which light is insufficient for photosynthesis. If depletion of DO is great enough, fish kills may result. With the depletion of DO, reducing conditions prevail and many compounds that have accumulated in the sediment by precipitation are released to the surrounding water. Chemicals solubilized under such conditions include compounds of nitrogen, phosphorus, iron, manganese, and calcium. Phosphorus and nitrogen are of particular concern because of their role in the eutrophication process in lakes.

Nutrients released from the bottom sediments during stratified conditions are not available to phytoplankton in the epilimnion. However, during overturn periods, mixing of the layers distributes the nutrients throughout the water column. The high nutrient availability is short-lived because the soluble reduced forms are rapidly oxidized to insoluble forms that precipitate out and settle to the bottom. Phosphorus and nitrogen are also deposited through sorption to particles that settle to the bottom and as dead plant material that is added to the sediments.

Of the many raw materials required by aquatic plants (phytoplankton and macrophytes) for growth, carbon, nitrogen, and phosphorus are the most important. Carbon is available from carbon dioxide, which is in almost unlimited supply. Since growth is generally limited by the essential nutrient that is in lowest supply, either nitrogen or phosphorus is usually the limiting nutrient for growth of primary producers. If these nutrients are available in adequate supply, massive algal and macrophyte blooms may occur with severe consequences for the lake. Most commonly in lakes, phosphorus is the limiting nutrient for aquatic plant growth. In these situations, adequate control of phosphorus, particularly from anthropogenic sources, can control growth of aquatic vegetation. Phosphorus can in some cases, be removed from the water column by precipitation, as described in the *Technical Support Manual, Volume III* (USEPA, 1984b).

Eutrophication and Nutrient Cycling

The term "eutrophication" is used in two general ways: (1) eutrophication is defined as the process of nutrient enrichment in a water body; and (2) eutrophication is used to describe the effects of nutrient enrichment, that is, the uncontrolled growth of plants, particularly phytoplankton, in a lake or reservoir. The second use also encompasses changes in the composition of animal communities in the water body. Both uses are commonly found in the literature, and the distinction, if important, must be discerned from the context of use.

Eutrophication is often greatly accelerated by anthropogenic nutrient enrichment, which has been termed "cultural eutrophication." Nutrients are transported to lakes from external sources, and once in the lake, may be recycled internally. A consideration of attainable uses in a lake must include an understanding of the sources of nitrogen and phosphorus, the significance of internal cycling, especially of phosphorus, and the changes that might be anticipated if eutrophication could be controlled.

Significance of Chemical Phenomena to Use Attainability

The most critical water quality indicators for aquatic use attainment in a lake are DO, nutrients, chlorophyll-a, and toxicants. In evaluating use attainability, the relative importance of three forms of oxygen demand should be considered: respiratory demand of phytoplankton and macrophytes during non-photosynthetic periods, water column demand, and benthic demand. If use impairment is occurring, assessments of the significance of each oxygen sink can be useful in evaluating the feasibility of achieving sufficient pollution control, or in implementing the best internal nutrient management practices to attain a designated use.

Chlorophyll-a is a good indicator of algal concentrations and of nutrient overenrichment. Excessive phytoplankton concentrations, as indicated by high chlorophyll-a levels, can cause adverse DO impacts such as:

- wide diurnal variation in surface DO due to daytime photosynthesis and nighttime respiration, and

- depletion of bottom DO through the decomposition of dead algae.

As discussed previously, nitrogen and phosphorus are the nutrients of concern in most lake systems, particularly where anthropogenic sources result in increased nutrient loading. It is important to base control strategies on an understanding of the sources of each type of nutrient, both in the lake and in its feeder streams.

Also, the presence of toxics such as pesticides, herbicides, and heavy metals in sediments or the water column should by considered in evaluating uses. These pollutants may prevent the attainment of uses (particularly those related to fish propagation and maintenance in water bodies) that would otherwise be supported by the water quality criteria for DO and other parameters.

Biological Characteristics

A major concern for lake biology is the eutrophication due to anthropogenic sources of nutrients. The increased presence of nutrients may result in phytoplankton blooms that can, in turn, have adverse impacts on other components of the biological community. A general trend that results from eutrophication is an increase in numbers of organisms but a decrease in diversity of species, particularly among nonmotile species. The biological characteristics of lakes are discussed in more detail in the *Technical Support Manual, Volume III*.

Techniques for Use Attainability Evaluations

Techniques for use attainability evaluations of lakes are discussed in detail in the *Technical Support Manual, Volume III*. Several empirical (desktop) and simulation (computer-based mathematical) models that can be used to characterize and evaluate lakes for use attainability are presented in that document and will not be included here owing to the complexity of the subject.