Below are changes made to the Rationale/Petition following the public workshops and comment period.

1. The proposed chlorine acute (19 µg/l) and chronic standards (11 µg/l) have been removed from the rationale and petition (P2012_10) which changes the aquatic life standards contained in NAC 445A.1236 for the following reasons:
    a. There is very little data available for chlorine, particularly at the proposed detection limits. NDEP has not collected any water quality data for chlorine.
    b. Chlorine is highly reactive and volatile, and subject to interferences due to particles, color, organic and inorganic compounds, resulting in a 15 minute holding time for analysis. This results in measurement of chlorine using field instrumentation.

    NDEP will be purchasing a hand held field meter to collect chlorine water quality data and will revisit adding chlorine to Nevada's water quality standards at a later date.

Rationale for Proposed Changes to Select Water Quality Standards for Toxic Materials (NAC 445A.1236) Related to Aquatic Life Beneficial Use

June 2012

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Introduction

Under Section 303 of the Clean Water Act, states and authorized tribes have the responsibility for establishing surface water quality standards that protect the designated uses of a water body and provide a basis for controlling discharges or releases of pollutants. The Nevada Division of Environmental Protection, Bureau of Water Quality Planning (NDEP-BWQP) is proposing revisions to the water quality standards related to the aquatic life beneficial use for the chemicals contained in Nevada Administrative Code (NAC) 445A.1236, "Standards for Toxic Materials Applicable to Designated Waters." Water quality standards contained in NAC 445A.1236, which are referred to as the **Toxics Standards**, were last amended, in part, in 2008. For the ease of discussion throughout this document, any "standard" described by a beneficial use actually refers to the "water quality standard" associated with the describing beneficial use.

Background

Per authorization of the Clean Water Act (Section 304(a)), EPA routinely publishes new or revised water quality criteria that reflect the latest scientific information regarding concentrations of specific chemicals or levels of parameters in water that should not be exceeded to protect aquatic life and human health. These water quality criteria, collectively referred to as the 304(a) criteria, are guidance to be used by States and Tribes in developing enforceable water quality standards. Once new or revised 304(a) criteria are published by EPA, States and Tribes have three options to adopt the new or revised numeric water quality criteria into their standards. These options are: (1) adopt the recommended 304(a) criteria; (2) adopt the 304(a) criteria modified to reflect water conditions of particular places; or (3) adopt criteria derived using other scientifically defensible methods that are sufficient to protect the designated uses of the waters (EPA Water Quality Standards Handbook: Second Edition, EPA-823-B-94-005a, August 1994).

NDEP has generally followed option (1) for adopting and/or revising water quality standards. Utilizing the numeric guidance provided by EPA has been the most straightforward approach to satisfy the statutory requirements of the Clean Water Act. However, this does not preclude the option to develop site-specific numeric criteria that are relevant to a particular body of water and which reflect the local conditions such as the aquatic species present or unique water chemistry.

In 2009, EPA published the most recent National Recommended Water Quality Criteria. This guidance includes previously published criteria that have been revised from earlier criteria; previously published criteria that are unchanged; and newly calculated criteria. The EPA aquatic life criteria guidance generally includes freshwater and saltwater acute and chronic numerical limits. The acute number is established to be protective of aquatic life at short-term exposures to high concentrations of pollutants. The chronic number is established to protect the aquatic life at long-term exposures to low concentrations of pollutants. The acute and chronic criteria provide the magnitude or concentration of a pollutant that is allowed in ambient waters before adverse effects occur. Additionally,

the duration and frequency of exposure to a pollutant must also be considered. For aquatic life criteria, the duration is the period of time over which the instream concentration of the pollutant is averaged. One hour is the maximum period for acute criteria. For chronic criteria, four days (96-hours) is the maximum period over which to average the exposure. How often the criteria can be exceeded without adversely affecting aquatic life is defined as the frequency. The allowable frequency of exceedance for both the acute and the chronic criteria is usually established as not more than once every three years. It is not until the water quality criteria are adopted by a State as water quality standards that they become enforceable regulatory maximum acceptable pollutant concentrations.

A number of the aquatic life standards contained in NAC 445A.1236 consist of a one-hour average (acute) limit and a 96-hour average (chronic) limit. These standards were adopted based on previous criteria recommended by EPA for protection of freshwater aquatic life. As footnoted to the table (NAC 445A.1236), the one-hour average and 96-hour average concentration limits can be exceeded only once every three years.

Nevada Water Quality Standard Regulations

NAC 445A.1236 is the water quality regulation containing standards for toxic materials that are applicable on a statewide basis to surface waters contained in the Nevada water quality regulations and to other waters per the "Tributary Rule" as described in NAC 445A.1239. Toxic material is defined in NAC 445A.110 as "…any pollutant or combination of pollutants which will on the basis of information available to the administrator, cause an organism or its offspring to die or suffer any disease, behavioral abnormality, cancer, genetic mutation, physiological malfunction, including a malfunction in reproduction, or physical deformation, if that pollutant or combination of pollutants is discharged and exposed to or assimilated by the organism, whether directly from the environment or indirectly through food chains."

Chemical standards have been tabulated in NAC 445A.1236 for four categorical uses of a water body: (1) municipal or domestic supply, (2) protection of aquatic life, (3) irrigation, and (4) watering of livestock. Specific water quality standards for individual inorganic chemicals and organic chemical compounds are provided in the table (NAC 445A.1236) to protect the aforementioned designated uses. Although there is some benefit in having water quality standards for toxic materials listed in one regulation which are then applied statewide, this structure of "one-size fits all" standards does not allow the different physical, chemical, or biological characteristics of individual waterbodies in various regions of the state to be considered when applying the standards.

As previously mentioned, in this proposal, NDEP is only proposing to revise the state-wide aquatic life water quality standards. At this time, NDEP is not proposing to change the municipal or domestic supply, irrigation, or watering of livestock standards.

Proposed Revisions to Aquatic Life Standards

The proposed amendments and additions are summarized in the following tables. Table 1 compares the existing and the proposed revisions to aquatic life standards for toxic chemicals in NAC 445A.1236. Table 2 contains proposed new aquatic life standards for inorganic chemicals for inclusion in NAC 445A.1236. Table 3 contains proposed new aquatic life standards for organic chemicals for inclusion in NAC 445A.1236.

Table 1. Comparison of Existing and Proposed Aquatic Life Standards for Organic Chemicals

Chemical	Existing Aquatic Life Standards (µg/l)	Proposed Aquatic Life Standards (µg/l)
Aldrin	3.0	-
1-hour average	-	3.0
Chlordane	2.4	-
1-hour average	-	2.4
24-hour average	0.0043	-
96-hour average	-	0.0043
Demeton	0.1	-
96-hour average	-	0.1
DDT & metabolites	1.1	-
24-hour average	0.0010	-
4,4'-DDT[1]	-	-
1-hour average	-	1.1
96-hour average	-	0.001
Dieldrin	2.5	-
1-hour average	-	0.24
24-hour average	0.0019	-
96-hour average	-	0.056
Endrin	0.18	-
1-hour average	-	0.086
24-hour average	0.0023	-
96-hour average	-	0.036
Guthion	0.01	-
96-hour average	-	0.01
Heptachlor	0.52	-
1-hour average	-	0.52
24-hour average	0.0038	-
96-hour average	-	0.0038
Lindane	2.0	-
1-hour average	-	0.95
24-hour average	0.080	-
Malathion	0.1	-
96-hour average	-	0.1
Methoxychlor	0.03	-
96-hour average	-	0.03
Mirex	0.001	-
96-hour average	-	0.001
Pentachlorophenol	-	-
1-hour average	exp{1.005 (pH)-4.830} (20 µg/l at a pH of 7.8)	$e^{1.005(pH) - 4.869}$ (19 µg/l at a pH of 7.8)
96-hour average	exp{1.005 (pH)-5.290} (13 µg/l at a pH of 7.8)	$e^{1.005(pH) - 5.134}$ (15 µg/l at a pH of 7.8)
Polychlorinated Biphenyls (PCBs)	-	-
24-hour average	0.014	-
96-hour average	-	0.014

[1] This standard applies to DDT and its metabolites (i.e., the total concentration of DDT and its metabolites should not exceed this value).

Table 2. Proposed New Aquatic Life Standards for Organic Chemicals for Inclusion in NAC 445A.1236

Chemical	Aquatic Life Standards (µg/l)
Acrolein	-
1-hour average	3
96-hour average	3
alpha-Endosulfan	-
1-hour average	0.22
96-hour average	0.056
beta-Endosulfan	-
1-hour average	0.22
96-hour average	0.056
Chlorpyrifos	-
1-hour average	0.083
96-hour average	0.041
4,4'-DDT[2]	-
1-hour average	1.1
96-hour average	0.001
Diazinon	-
1-hour average	0.17
96-hour average	0.17
Heptachlor Epoxide	-
1-hour average	0.52
96-hour average	0.0038
Nonylphenol	-
1-hour average	28
96-hour average	6.6
Tributyltin (TBT)	-
1-hour average	0.46
96-hour average	0.072

The proposed revisions and additions to NAC 445A.1236 reflect the most recent 304(a) criteria that have been published by EPA for protection and/or propagation of aquatic life. When water quality standards are changed, the question is often asked as to whether or not the affected waters will meet the proposed water quality standards. Unfortunately, there is a limited amount of available data for the parameters that NDEP is proposing to amend or add new aquatic life water quality standards. Therefore, it is difficult to estimate the consequences of these changes to the standards.

[2] This standard applies to DDT and its metabolites (i.e., the total concentration of DDT and its metabolites should not exceed this value).

Organic Chemicals

Acrolein

Acrolein is a volatile organic compound.[3] It is a colorless or yellow liquid with a disagreeable odor. It dissolves in water very easily and quickly changes to a vapor when heated. It also burns easily. Small amounts of acrolein can be formed and can enter the air when trees, tobacco, other plants, gasoline, and oil are burned. Acrolein is used as a pesticide to control algae, weeds, bacteria, and mollusks. It is also used to make other chemicals.

NDEP proposes to introduce water quality standards for acrolein related to aquatic life beneficial use. EPA's 2009 304(a) Criteria lists a Criteria Maximum Concentration of 3 µg/l and a Criterion Continuous Concentration of 3 µg/l for acrolein. The proposed one-hour average and 96-hour average water quality standards for acrolein to be included in NAC 445A.1236 are 3 µg/l and 3 µg/l, respectively.

Existing surface water data for acrolein is restricted to the Colorado River Basin near Las Vegas. Between October 2002 and July 2009, 113 surface water samples were analyzed for acrolein. All surface water results for acrolein are below reporting limits and/or detection limits.

Aldrin

Aldrin is a chlorinated hydrocarbon compound that does not occur naturally in the environment. The primary use of aldrin in the past was for control of corn pests, although it was also used by the citrus industry. Aldrin has been one of the most widely used domestic pesticides. Aldrin quickly transforms into dieldrin in the environment.

NDEP proposes to revise/update water quality standards for aldrin related to aquatic life beneficial use. Currently, NAC 445A.1236 includes single-value standard for aldrin, 3 µg/l. EPA's 2009 304(a) Criteria lists a Criteria Maximum Concentration of 3.0 µg/l for aldrin. NDEP proposes to remove the current single-value standard of 3 µg/l from NAC 445A.1236 and add a one-hour average water quality standard of 3.0 µg/l.

Existing surface water data for aldrin are restricted to the Colorado River Basin near Las Vegas. Between October 2002 and July 2009, 173 surface water samples were analyzed for aldrin. All surface water results for aldrin are below reporting limits and/or detection limits.

alpha-Endosulfan

alpha-Endosulfan is one form of endosulfan. alpha-Endosulfan does not occur naturally in the environment. It looks like a brown-colored crystal and has an odor like turpentine. alpha-endosulfan is a broad-spectrum insecticide of the group of polycyclic chlorinated hydrocarbons called cyclodiene insecticides. alpha-endosulfan is used as an insecticide on crops. Teas, grains, cotton, fruit, vegetables and tobacco are examples of crops that

[3] Acrolein is also known as acrylaldehyde, allyl aldehyde, and 2-propenal.

are treated with alpha-endosulfan. It has also been used specifically in the United States as a wood preservative to protect wood from decay and insect attack. Endosulfan has not been produced in the United States since 1982, but it has been used to make other chemicals.

NDEP proposes to introduce water quality standards for alpha-endosulfan related to aquatic life beneficial use. EPA's 2009 304(a) Criteria lists a Criteria Maximum Concentration of 0.22 µg/l and a Criterion Continuous Concentration of 0.056 µg/l for alpha-endosulfan. The proposed one-hour and 96-hour average water quality standards for alpha-endosulfan to be included in NAC 445A.1236 are 0.22 µg/l and 0.056 µg/l, respectively.

There is no available surface water data for alpha-endosulfan.

beta-Endosulfan

beta-Endosulfan is another form of endosulfan. beta-Endosulfan does not occur naturally in the environment. It looks like a brown-colored crystal and has an odor like turpentine. beta-endosulfan is a broad-spectrum insecticide of the group of polycyclic chlorinated hydrocarbons called cyclodiene insecticides. beta-endosulfan is used as an insecticide on crops. Teas, grains, cotton, fruit, vegetables and tobacco are examples of crops that are treated with beta-endosulfan. It has also been used specifically in the United States as a wood preservative to protect wood from decay and insect attack. Endosulfan has not been produced in the United States since 1982, but it has been used to make other chemicals.

NDEP proposes to introduce water quality standards for beta-endosulfan related to aquatic life beneficial use. EPA's 2009 304(a) Criteria lists a Criteria Maximum Concentration of 0.22 µg/l and a Criterion Continuous Concentration of 0.056 µg/l for beta-endosulfan. The proposed one-hour and 96-hour average water quality standards for beta-endosulfan to be included in NAC 445A.1236 are 0.22 µg/l and 0.056 µg/l, respectively.

Existing surface water data for beta-endosulfan is restricted to the Colorado River Basin near Las Vegas. Between January 2003 and July 2009, 14 surface water samples were analyzed for beta-endosulfan. All surface water results for beta-endosulfan are below reporting limits and/or detection limits.

Chlordane

Chlordane is a pesticide that does not occur naturally in the environment. Technical chlordane is not a single chemical, but is actually a mixture of pure chlordane mixed with many related chemicals. It is a thick liquid whose color ranges from colorless to amber. Chlordane has a mild, irritating smell. From 1948 until 1983, chlordane was used as a pesticide on crops like corn and citrus and on home lawns and gardens. Because of concern about damage to the environment and harm to human health, EPA banned all uses of chlordane in 1983 except to control termites. In 1988, EPA banned all uses.

NDEP proposes to revise/update water quality standards for chlordane related to aquatic life beneficial use. Currently, NAC 445A.1236 includes single-value and 24-hour average standards for chlordane, 2.4 µg/l and 0.0043 µg/l, respectively. EPA's 2009 304(a) Criteria lists a Criteria Maximum Concentration of 2.4 µg/l and a Criterion Continuous Concentration of 0.0043 µg/l for chlordane. The proposed one-hour and 96-hour average water quality standards for chlordane to be included in NAC 445A.1236 are 2.4 µg/l and 0.0043 µg/l, respectively.

Existing surface water data for chlordane is restricted to the Colorado River Basin near Las Vegas. Between November 1997 and July 2009, 144 surface water samples were analyzed for chlordane. Two surface water samples analyzed for chlordane collected on November 6, 1997 from the Las Vegas Wash exceeded the proposed one-hour standard of 2.4 µg/l. These same two grab samples also exceeded the proposed 96-hour standard. The other 142 surface water samples analyzed for chlordane are below the proposed one-hour standard.

Chlorpyrifos

Chlorpyrifos is an organophosphate insecticide used to control foliage and soil-borne insect pests on a variety of food and feed crops. There are no known natural sources of tributyltin chlorpyrifos. Chlorpyrifos is also used on golf courses, as a non-structural wood treatment, and as an adult mosquitocide.

NDEP proposes to introduce water quality standards for chlorpyrifos related to aquatic life beneficial use. EPA's 2009 304(a) Criteria lists a Criteria Maximum Concentration of 0.083 µg/l and a Criterion Continuous Concentration of 0.041 µg/l for chlorpyrifos. The proposed one-hour average and 96-hour average water quality standards for chlorpyrifos to be included in NAC 445A.1236 are 0.083 µg/l and 0.041 µg/l, respectively.

Existing surface water data for chlorpyrifos is restricted to the Colorado River Basin near Las Vegas. Between May 1993 and October 2009, 335 surface water samples were analyzed for chlorpyrifos. Four surface water samples from the Las Vegas Wash (three collected on March 11, 1995 and one collected on November 29, 2000) exceeded the proposed one-hour standard of 0.083 µg/l. In addition, four other single grab samples exceeded the proposed 96-hour standard of 0.041 µg/l. The other 327 surface water samples analyzed for chlorpyrifos are below the proposed standards.

4,4'-DDT

DDT (dichlorodiphenyltrichloroethane) is a pesticide once widely used to control insects in agriculture and insects that carry diseases such as malaria. DDT does not occur naturally in the environment. DDT is a white, crystalline solid with no odor or taste. Its use in the U.S. was banned in 1972 because of damage to wildlife, but is still used in some countries. Atmospheric deposition is the current source of new DDT contamination in the United States. DDT, and its break-down products DDE and DDD, are persistent, bioacculumative, and toxic pollutants.

NDEP proposes to introduce water quality standards for 4,4'-DDT related to aquatic life beneficial use. EPA's 2009 304(a) Criteria lists a Criteria Maximum Concentration of 1.1 µg/l and a Criterion Continuous Concentration of 0.001 µg/l for 4,4'-DDT. The proposed one-hour average and 96-hour average water quality standards for 4,4'-DDT to be included in NAC 445A.1236 are 1.1 µg/l and 0.001 µg/l, respectively.

The EPA criteria for 4,4'-DDT apply to DDT and its metabolites (i.e., the total concentration of DDT and its metabolites should not exceed this value). Currently, NAC 445A.1236 includes single-value and 24-hour average standards for DDT and its metabolites, 1.1 µg/l and 0.0010 µg/l, respectively. Because the criteria for 4,4'-DDT apply to DDT and its metabolites, NDEP proposes to remove the current single-value and 24-hour standards of 1.1 µg/l and 0.0010 µg/l, respectively from NAC 445A.1236.

Existing surface water data for 4,4'-DDT is restricted to the Colorado River Basin near Las Vegas. Between May 1993 and October 2009, 404 surface water samples were analyzed for 4,4'-DDT. One surface water sample analyzed for 4,4'-DDT collected on November 6, 1997 from the Las Vegas Wash exceeded the proposed one-hour standard of 1.1 µg/l. In addition, two other single grab samples exceeded the proposed 96-hour standard of 0.0010 µg/l. The other 401 surface water samples analyzed for 4,4'-DDT are below the proposed standards.

Diazinon

Diazinon is the common name of an organophosphorus pesticide that does not occur naturally in the environment. Diazinon is used to control pest insects in soil, on ornamental plants, and on fruit and vegetable field crops. It was formerly used as the active ingredient in household and garden products used to control pests such as flies, fleas, and cockroaches. Pure diazinon is colorless and practically odorless oil. Preparations used in agriculture and by exterminators contain 85-90% diazinon and appear as a pale to dark-brown liquid. Diazinon preparations sold in the past for home and garden use contained 1-5% diazinon in a liquid or as solid granules. Most diazinon used is in liquid form, but it is possible to be exposed to the solid form. Diazinon does not dissolve easily in water and does not burn easily.

NDEP proposes to introduce water quality standards for diazinon related to aquatic life beneficial use. EPA's 2009 304(a) Criteria lists a Criteria Maximum Concentration of 0.17 µg/l and a Criterion Continuous Concentration of 0.17 µg/l for diazinon. The proposed one-hour average and 96-hour average water quality standards for diazinon to be included in NAC 445A.1236 are 0.17 µg/l and 0.17 µg/l, respectively.

There is no available surface water data for diazinon.

Dieldrin

Dieldrin is a chlorinated hydrocarbon compound that does not occur naturally in the environment. The primary use of dieldrin in the past was for control of corn pests, although it was also used by the citrus industry. Dieldrin has been one of the most widely

used domestic pesticides. It should be noted that aldrin quickly transforms into dieldrin in the environment.

NDEP proposes to revise/update water quality standards for dieldrin related to aquatic life beneficial use. Currently, NAC 445A.1236 includes single-value and 24-hour average standards for dieldrin, 2.5 µg/l and 0.0019 µg/l, respectively. EPA's 2009 304(a) Criteria lists a Criteria Maximum Concentration of 0.24 µg/l and a Criterion Continuous Concentration of 0.0043 µg/l for dieldrin. NDEP proposes to remove the current single-value and 24-hour standards of 2.5 µg/l and 0.0019 µg/l, respectively from NAC 445A.1236. NDEP proposes to add one-hour average and 96-hour average water quality standards of 0.24 µg/l and 0.056 µg/l, respectively to NAC 445A.1236.

Existing surface water data for dieldrin are restricted to the Colorado River Basin near Las Vegas. Between May 1993 and September 2009, 351 surface water samples were analyzed for dieldrin. Two surface water samples analyzed for dieldrin collected on November 6, 1997 from the Las Vegas Wash exceeded the proposed one-hour standard of 0.24 µg/l. No other single grab samples exceeded the proposed 96-hour standard of 0.0010 µg/l. The other 349 surface water samples analyzed for dieldrin are below the proposed standards.

Endrin

Endrin is the common name of a cyclodiene pesticide that does not occur naturally in the environment. It is a cyclic hydrocarbon having a chlorine-substituted methanobridge structure. Chemically pure endrin is a white crystalline solid, while the technical compound is a light tan powder. Endrin is an insecticide which has been used mainly on field crops such as cotton, maize, sugarcane, rice, cereals, ornamentals, and other crops. It has also been used to control voles and mice in orchards and grasshoppers in non-cropland. Once widely used in the United States, most uses were cancelled in 1980. Endrin has not been produced or sold for general use in the United States since 1986.

NDEP proposes to revise/update water quality standards for endrin related to aquatic life beneficial use. Currently, NAC 445A.1236 includes single-value and 24-hour average standards for endrin, 0.18 µg/l and 0.0023 µg/l, respectively. EPA's 2009 304(a) Criteria lists a Criteria Maximum Concentration of 0.086 µg/l and a Criterion Continuous Concentration of 0.036 µg/l for endrin. NDEP proposes to remove the current single-value and 24-hour standards of 0.18 µg/l and 0.0023 µg/l, respectively from NAC 445A.1236. NDEP proposes to add one-hour average and 96-hour average water quality standards of 0.086 µg/l and 0.036 µg/l, respectively to NAC 445A.1236.

Existing surface water data for endrin are restricted to the Colorado River Basin near Las Vegas. Between November 1997 and July 2009, 147 surface water samples were analyzed for endrin. All surface water results for endrin are below reporting limits and/or detection limits.

Guthion

Guthion, also known as azinphos-methyl, is an organophosphorous pesticide that does not occur naturally in the environment. Guthion was used on many crops, especially apples, pears, cherries, peaches, almonds, and cotton. Many of its former uses have been cancelled by EPA, and its few remaining uses are currently in the process of being phased out. Guthion is a synthetic substance, it does not occur naturally. Pure guthion is a colorless to white odorless crystalline solid that melts at about 72-74ºC (162-165ºF). Technical-grade guthion is a cream to yellow-brown granular solid. Guthion is poorly soluble in water.

NDEP proposes to revise/update water quality standards for guthion related to aquatic life beneficial use. Currently, NAC 445A.1236 includes single-value standard for guthion, 0.01 µg/l. EPA's 2009 304(a) Criteria lists a Criterion Continuous Concentration of 0.01 µg/l for guthion. NDEP proposes to remove the current single-value standard of 0.01 µg/l from NAC 445A.1236 and add a 96-hour average water quality standard of 0.01 µg/l.

Existing surface water data for guthion are restricted to the Colorado River Basin near Las Vegas. Between October 2002 and July 2009, 121 surface water samples were analyzed for guthion. All surface water results for guthion are below reporting limits and/or detection limits.

Heptachlor

Heptachlor is an organochlorine pesticide that does not occur naturally in the environment. Pure heptachlor is a white powder that smells like mothballs (camphor). The less pure grade is tan. Heptachlor was used extensively in the past for killing insects in homes, buildings, and on food crops, especially corn. In the late 1970s, the use of heptachlor was phased out. By 1988, the commercial sale of heptachlor was banned in the United States. Currently it can only be used for fire ant control in power transformers. Bacteria and animals break down heptachlor to form heptachlor epoxide. Therefore, heptachlor epoxide is more likely to be found in the environment than heptachlor.

NDEP proposes to revise/update water quality standards for heptachlor related to aquatic life beneficial use. Currently, NAC 445A.1236 includes single-value and 24-hour average standards for heptachlor, 0.52 µg/l and 0.0038 µg/l, respectively. EPA's 2009 304(a) Criteria lists a Criteria Maximum Concentration of 0.52 µg/l and a Criterion Continuous Concentration of 0.0038 µg/l for heptachlor. NDEP proposes to remove the current single-value and 24-hour standards of 0.52 µg/l and 0.0038 µg/l, respectively from NAC 445A.1236. NDEP proposes to add one-hour average and 96-hour average water quality standards of 0.52 µg/l and 0.0038 µg/l, respectively to NAC 445A.1236.

Existing surface water data for heptachlor are restricted to the Colorado River Basin near Las Vegas. Between October 2002 and July 2009, 133 surface water samples were analyzed for heptachlor. All surface water results for heptachlor are below reporting limits and/or detection limits.

Heptachlor Epoxide

Bacteria and animals break down heptachlor to form heptachlor epoxide. Heptachlor epoxide is more likely to be found in the environment than heptachlor. Heptachlor epoxide does not occur naturally in the environment. Heptachlor epoxide is a white powder.

NDEP proposes to introduce water quality standards for heptachlor epoxide related to aquatic life beneficial use. EPA's 2009 304(a) Criteria lists a Criteria Maximum Concentration of 0.52 µg/l and a Criterion Continuous Concentration of 0.0038 µg/l for heptachlor epoxide. The proposed one-hour average and 96-hour average water quality standards for heptachlor epoxide to be included in NAC 445A.1236 are 0.52 µg/l and 0.0038 µg/l, respectively.

Existing surface water data for heptachlor epoxide is restricted to the Colorado River Basin near Las Vegas. Between November 1997 and October 2009, 237 surface water samples were analyzed for heptachlor epoxide. Two surface water samples analyzed for heptachlor epoxide collected on November 6, 1997 from the Las Vegas Wash exceeded the proposed one-hour standard of 0.52 µg/l. No other single grab samples exceeded the proposed 96-hour standard of 0.0038 µg/l. The other 235 surface water samples analyzed for heptachlor epoxide are below reporting limits and/or detection limits.

Lindane

Lindane, also known as gamma-BHC, gamma-HCH, or γ-HCH, is a white crystalline organic solid that may evaporate into the air as a colorless vapor with a slightly musty odor. Lindane does not occur naturally in the environment. Most of lindane's uses were restricted in 1983. Lindane is currently used primarily for treating wood-inhabiting beetles and seeds. It is also used as a dip for fleas and lice on pets and livestock, for soil treatment, on the foliage of fruit and nut trees, vegetables, timber, ornamentals, and for wood protection.

NDEP proposes to revise/update water quality standards for lindane related to aquatic life beneficial use. Currently, NAC 445A.1236 includes single-value and 24-hour average standards for lindane, 2.0 µg/l and 0.080 µg/l, respectively. EPA's 2009 304(a) Criteria lists a Criteria Maximum Concentration of 0.95 µg/l for lindane. NDEP proposes to remove the current single-value and 24-hour standards of 2.0 µg/l and 0.080 µg/l, respectively from NAC 445A.1236. NDEP proposes to add a one-hour average water quality standard of 0.95 µg/l to NAC 445A.1236.

Existing surface water data for lindane is restricted to the Colorado River Basin near Las Vegas. Between May 1993 and July 2009, 324 surface water samples were analyzed for lindane. Two surface water samples analyzed for lindane collected on November 6, 1997 from the Las Vegas Wash exceeded the proposed one-hour standard of 0.95 µg/l. The other 322 surface water samples analyzed for lindane are below reporting limits and/or detection limits.

Malathion

Malathion is an insecticide in the chemical family known as organophosphates that does not occur naturally in the environment. Pure malathion is a colorless liquid, and technical-grade malathion, which contains >90% malathion and impurities in a solvent, is a brownish-yellow liquid that smells like garlic. Products containing malathion are used outdoors to control a wide variety of insects in agricultural settings and around people's homes. Malathion has also been used in mosquito control and fruit fly eradication programs. Malathion may also be found in some special shampoos for treating lice.

NDEP proposes to revise/update water quality standards for malathion related to aquatic life beneficial use. Currently, NAC 445A.1236 includes single-value standard for malathion, 0.1 µg/l. EPA's 2009 304(a) Criteria lists a Criterion Continuous Concentration of 0.1 µg/l for malathion. NDEP proposes to remove the current single-value standard of 0.1 µg/l from NAC 445A.1236 and add a 96-hour average water quality standard of 0.1 µg/l.

Existing surface water data for malathion is restricted to the Colorado River Basin near Las Vegas. Between October 2002 and July 2009, 99 surface water samples were analyzed for malathion. One surface water grab sample analyzed for malathion collected on October 26, 2005 from Duck Creek downstream on Broadbent Boulevard crossing exceeded the proposed 96-hour standard of 0.1 µg/l. The other 98 surface water samples analyzed for malathion are below reporting limits and/or detection limits.

Methoxychlor

Methoxychlor is an organochlorine pesticide that does not occur naturally in the environment. Pure methoxychlor is a pale-yellow powder with a slight fruity or musty odor. Methoxychlor is used as an insecticide against flies, mosquitoes, cockroaches, chiggers, and a wide variety of other insects. It is used on agricultural crops and livestock, and in animal feed, barns, grain storage bins, home gardens, and on pets.

NDEP proposes to revise/update water quality standards for methoxychlor related to aquatic life beneficial use. Currently, NAC 445A.1236 includes single-value standard for methoxychlor, 0.03 µg/l. EPA's 2009 304(a) Criteria lists a Criterion Continuous Concentration of 0.03 µg/l for methoxychlor. NDEP proposes to remove the current single-value standard of 0.03 µg/l from NAC 445A.1236 and add a 96-hour average water quality standard of 0.03 µg/l.

Existing surface water data for methoxychlor are restricted to the Colorado River Basin near Las Vegas. Between October 2002 and July 2009, 145 surface water samples were analyzed for methoxychlor. All surface water results for methoxychlor are below reporting limits and/or detection limits.

Mirex

Mirex is a chlorinated hydrocarbon insecticide that does not occur naturally in the environment. Mirex is an odorless, white crystalline solid. Mirex has not been manufactured or used in the United States since 1978. Mirex was used to control fire

ants, and as a flame retardant in plastics, rubber, paint, paper, and electrical goods from 1959 to 1972.

NDEP proposes to revise/update water quality standards for mirex related to aquatic life beneficial use. Currently, NAC 445A.1236 includes single-value standard for mirex, 0.001 µg/l. EPA's 2009 304(a) Criteria lists a Criterion Continuous Concentration of 0.001 µg/l for mirex. NDEP proposes to remove the current single-value standard of 0.001 µg/l from NAC 445A.1236 and add a 96-hour average water quality standard of 0.001 µg/l.

Existing surface water data for mirex are restricted to the Colorado River Basin near Las Vegas. Between January 2003 and July 2009, 54 surface water samples were analyzed for mirex. All surface water results for mirex are below reporting limits and/or detection limits.

Nonylphenol

Nonylphenol does not occur naturally in the environment. Nonylphenol is persistent in the aquatic environment, moderately bioaccumulative, and extremely toxic to aquatic organisms. Nonylphenol's main use is in the manufacture of nonylphenol ethoxylates (NPEs). NPEs are nonionic surfactants that are used in a wide variety of industrial applications and consumer products. NPEs, though less toxic than nonylphenol, are also highly toxic to aquatic organisms, and in the environment degrade to more environmentally persistent nonylphenol. NPEs were once commonly used in household laundry detergents. EPA and the detergent manufacturers have cooperated to eliminate this use. However, NPEs are still widely used in large quantities in industrial laundry detergents and have some additional uses that lead to releases to water.

NDEP proposes to introduce water quality standards for nonylphenol related to aquatic life beneficial use. EPA's 2009 304(a) Criteria lists a Criteria Maximum Concentration of 28 µg/l and a Criterion Continuous Concentration of 6.6 µg/l for nonylphenol. The proposed one-hour average and 96-hour average water quality standards for nonylphenol to be included in NAC 445A.1236 are 28 µg/l and 6.6 µg/l, respectively.

There is no available surface water data for nonylphenol.

Pentachlorophenol

Pentachlorophenol is an organochlorine compound that does not occur naturally in the environment. Pentachlorophenol is a white organic solid with needle-like crystals and a phenolic odor. Prior to 1987, pentachlorophenol was registered for use as a herbicide, defoliant, mossicide, and as a disinfectant. Pentachlorophenol was one of the most widely used biocides in the United States before regulatory actions to cancel and restrict most uses of pentachlorophenol in 1987. Pentachlorophenol continues to be used as a wood preservative (fungicide).

NDEP proposes to revise/update water quality standards for pentachlorophenol related to aquatic life beneficial use. Currently, NAC 445A.1236 includes one-hour and 96-hour

average standards for pentachlorophenol, exp{1.005 (pH)-4.830} (20 µg/l at a pH of 7.8) and exp{1.005 (pH)-5.290} (13 µg/l at a pH of 7.8), respectively. EPA's 2009 304(a) Criteria lists a Criteria Maximum Concentration of $e^{1.005(pH) - 4.869}$ (19 µg/l at a pH of 7.8) and a Criterion Continuous Concentration of $e^{1.005(pH) - 5.134}$ (15 µg/l at a pH of 7.8) for pentachlorophenol. The proposed one-hour average and 96-hour average water quality standards for pentachlorophenol to be included in NAC 445A.1236 are $e^{1.005(pH) - 4.869}$ and $e^{1.005(pH) - 5.134}$, respectively.

Existing surface water data for pentachlorophenol are restricted to the Colorado River Basin near Las Vegas. Between October 2002 and July 2009, 119 surface water samples were analyzed for pentachlorophenol. All surface water results for pentachlorophenol are below reporting limits and/or detection limits.

Polychlorinated Biphenyls (PCBs)

Polychlrorinated biphenyls (PCBs) are mixtures of up to 209 individual chlorinated compounds (known as congeners). There are no known natural sources of PCBs. PCBs are the chlorinated derivatives of a class of aromatic organic compounds called biphenyls and are manufactured by the direct chlorination of the biphenyl ring system. The commercial products are complex mixtures of chlorobiphenyls and are marketed for various uses according to the percentage of chlorine in the mixture. Prior to 1971, mixtures containing up 1 to 68 percent chlorine were used in a number of other applications, including plasticizers, heat transfer fluids, hydraulic fluids, fluids in vacuum pumps and compressors, lubricants, and wax extenders. Historically, the sole producer of PCBs in the United States marketed four mixtures containing 21 percent, 41 percent, 42 percent, and 54 percent chlorine for use only in closed electrical systems under the registered trademark Aroclor. Currently there is no production of PCBs in the United States.

NDEP proposes to revise/update water quality standards for PCBs related to aquatic life beneficial use. Currently, NAC 445A.1236 includes 24-hour standard for PCBs, 0.014 µg/l. EPA's 2009 304(a) Criteria lists a Criterion Continuous Concentration of 0.014 µg/l for PCBs. NDEP proposes to remove the current single-value standard of 0.014 µg/l from NAC 445A.1236 and add a 96-hour average water quality standard of 0.014 µg/l.

Existing surface water data for PCBs are restricted to the Colorado River Basin near Las Vegas. Between January 2003 and July 2009, 65 surface water samples were analyzed for PCBs. All surface water results for PCBs are below reporting limits and/or detection limits.

Tributyltin (TBT)

Tributyltin (TBT) is the active ingredient of many products that act as biocides. There are no known natural sources of tributyltin. It is primarily used as an antifoulant paint additive on ship and boat hulls, docks, fishnets, and buoys to discourage the growth of marine organisms such as barnacles, bacteria, tubeworms, mussels and algae. TBT by itself is unstable and will break down in the environment unless it is combined with an element such as oxygen. One of the most common TBT compounds is bis(tributyltin)

oxide, or TBTO. This form has been the subject of most TBT testing. TBTO and eight additional TBT compounds are registered for use as marine antifoulants. Other TBT compounds are used as disinfectants, fungicidal wood preservatives, textile disinfectants, and stabilizers in PVC resin. Paper and pulp mills, cooling towers, breweries, textile mills and leather-processing facilities may also use some forms of TBT. Collectively these compounds are referred to as organotins. All of the organotins are now regulated by the "Organotin Antifouling Paint Control Act of 1988." This act regulates the use of these materials in paints and sets standards for the amount of biocides that can leach from the paint into water.

NDEP proposes to introduce water quality standards for tributylin related to aquatic life beneficial use. EPA's 2009 304(a) Criteria lists a Criteria Maximum Concentration of 0.46 µg/l and a Criterion Continuous Concentration of 0.072 µg/l for tributylin. The proposed one-hour average and 96-hour average water quality standards for tributylin to be included in NAC 445A.1236 are 0.46 µg/l and 0.072 µg/l, respectively.

There is no available surface water data for tributyltin (TBT).

Conclusion

This proposal presents the proposed revisions to select water quality standards for toxic chemicals related to aquatic life. The proposed changes involve amending or adding aquatic life standards in NAC 445A.1236, "Standards for Toxic Materials Applicable to Designated Waters." In addition, some modifications to the table are proposed to help with clarification of the toxic standards. The proposed revisions are based on updated criteria values that have been recommended by EPA as the 2009 national recommended water quality criteria for protection of aquatic life. No changes are proposed to be made at this time to standards contained in NAC 445A.1236 related to municipal or domestic supply, irrigation, or watering of livestock. For further information, please see Attachment 1.

ATTACHMENT 1

ATTACHMENT 1

PROPOSED PERMANENT REGULATION OF THE NEVADA STATE ENVIRONMENTAL COMMISSION

Explanation – Matter in bold blue and italics is ***new***; matter in bold red and strikeout is ~~**material to be omitted**~~.

AUTHORITY: §§1-318, NRS 445A.425 and 445A.520.

A REGULATION relating to water quality; making various changes in provisions that establish standards for water quality; and providing other matters properly relating thereto.

R129-12 STANDARDS FOR TOXIC MATERIALS APPLICABLE TO DESIGNATED WATERS

Below are two tables of NAC 445A.1236.

1. **The first table shows the toxic table as it is now with deletions and additions highlighted. Note the first table is not in alphabetical order.**

2. **The second table shows the toxic table with all the changed criteria. The second table is alphabetized by chemical. When this petition is approved, this is what the table will look like.**

NAC 445A.1236 Standards for toxic materials applicable to designated waters.

1. Except as otherwise provided in this section, the standards for toxic materials prescribed in subsection 2 are applicable to the waters specified in 445A.123 to 445A.2234, inclusive. The following criteria apply to this section:

(a) If the standards are exceeded at a site and are not economically controllable, the commission will review and may adjust the standards for the site.

(b) If a standard does not exist for each designated beneficial use, a person who plans to discharge waste must demonstrate that no adverse effect will occur to a designated beneficial use. If the discharge of a substance will lower the quality of the water, a person who plans to discharge must meet the requirements of NRS 445A.565.

(c) If a criterion is less than the detection limit of a method that is acceptable to the Division, laboratory results which show that the substance was not detected will be deemed to show compliance with the standard unless other information indicates that the substance may be present.

2. The standards for toxic materials are:

Chemical	Municipal or Domestic Supply~~(1)~~ (µg/l)	Aquatic Life(1,2) (µg/l)	Irrigation~~(1)~~ (µg/l)	Watering of Livestock~~(1)~~ (µg/l)
INORGANIC CHEMICALS(3)				
Antimony	146[a]	-	-	-
Arsenic	50[b]	-	100[*e*]	200[~~a~~ *f*]
1-hour average	-	340[~~g,h~~*c,d*]	-	-
96-hour average	-	150[~~g,h~~*c,d*]	-	-
Barium	2,000[b]	-	-	-
Beryllium	0[a]	-	100[*e*]	-
~~hardness <75 mg/l~~	~~-~~	~~-~~	~~-~~	~~-~~
~~hardness >=75 mg/l~~	~~-~~	~~-~~	~~-~~	~~-~~
Boron	-	-	750[a]	5,000[~~a~~ *f*]

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Chemical	Municipal or Domestic Supply[(1)] (µg/l)	Aquatic Life[(1,2)] (µg/l)	Irrigation[(1)] (µg/l)	Watering of Livestock[(1)] (µg/l)
Cadmium	5[b]	-	10[d,f]	50[d,f]
1-hour average	-	$(1.136672-[\ln(\text{hardness})(0.041838)])*e^{(1.0166[\ln(\text{hardness})]-3.924)}$[g,h,c,d]	-	-
96-hour average	-	$(1.101672-[\ln(\text{hardness})(0.041838)])*e^{(0.7409[\ln(\text{hardness})]-4.719)}$[g,h,c,d]	-	-
Chromium (total)	100[b]	-	100[d,f]	1,000[d,f]
Chromium (VI)	-	-	-	-
1-hour average	-	16[g,h,c,d]	-	-
96-hour average	-	11[g,h,c,d]	-	-
Chromium (III)	-	-	-	-
1-hour average	-	$(0.316)*e^{(0.8190[\ln(\text{hardness})]+3.7256)}$[g,h,c,d]	-	-
96-hour average	-	$(0.860)*e^{(0.8190[\ln(\text{hardness})]+0.6848)}$[g,h,c,d]	-	-
Copper	-	-	200[d,f]	500[d,f]
1-hour average	-	$(0.960)*e^{(0.9422[\ln(\text{hardness})]-1.700)}$[g,h,c,d]	-	-
96-hour average	-	$(0.960)*e^{(0.8545[\ln(\text{hardness})]-1.702)}$[g,h,c,d]	-	-
Cyanide	200[a]	-	-	-
1-hour average	-	22[c,g]	-	-
96-hour average	-	5.2[c,g]	-	-
Fluoride	-	-	1,000[d,f]	2,000[d,f]
Iron	-	-	5,000[d,f]	-
96-hour average	-	1,000[h,c]	-	-
Lead	50[a,b]	-	5,000[d,f]	100[d,f]
1-hour average	-	$(1.46203-[\ln(\text{hardness})(0.145712)])*e^{(1.273[\ln(\text{hardness})]-1.460)}$[g,h,c,d]	-	-
96-hour average	-	$(1.46203-[\ln(\text{hardness})(0.145712)])*e^{(1.273[\ln(\text{hardness})]-4.705)}$[g,h,c,d]	-	-
Manganese	-	-	200[d,f]	-
Mercury	2[b]	-	-	10[d,f]
1-hour average	-	1.4[g,h,c,d]	-	-
96-hour average	-	0.77[g,h,c,d]	-	-
Molybdenum	-	-	-	-
1-hour average	-	6,160[e,h]	-	-
96-hour average	-	1,650[e,h]	-	-
Nickel	13.4[a]	-	200[d,f]	-
1-hour average	-	$(0.998)*e^{(0.8460[\ln(\text{hardness})]+2.255)}$[g,h,c,d]	-	-
96-hour average	-	$(0.997)*e^{(0.8460[\ln(\text{hardness})]+0.0584)}$[g,h,c,d]	-	-
Selenium	50[b]	-	20[d,f]	50[d,f]
1-hour average	-	20[a]	-	-
96-hour average	-	5.0[h,c]	-	-
Silver	-	-	-	-
1-hour average	-	$(0.85)*e^{(1.72[\ln(\text{hardness})]-6.59)}$[g,h,c,d]	-	-
Sulfide (undissociated hydrogen sulfide)	-	-	-	-
96-hour average	-	2.0[h,c]	-	-
Thallium	13[a]	-	-	-

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Chemical	Municipal or Domestic Supply[(1)] (µg/l)	Aquatic Life[(1,2)] (µg/l)	Irrigation[(1)] (µg/l)	Watering of Livestock[(1)] (µg/l)
Zinc	-	-	2,000[a,f]	25,000[a,f]
1-hour average	-	$(0.978) * e^{(0.8473[\ln(\text{hardness})] + 0.884)}$[g,h,c,d]	-	-
96-hour average	-	$(0.986) * e^{(0.8473[\ln(\text{hardness})] + 0.884)}$[g,h,c,d]	-	-
ORGANIC CHEMICALS				
Acrolein	320[a]	-	-	-
1-hour average	-	*3[c]*	-	-
96-hour average	-	*3[c]*	-	-
Aldrin	0[a]	~~3[a]~~ -	-	-
1-hour average	-	*3.0[c]*	-	-
Chlordane	0[a]	~~2.4[a]~~ -	-	-
~~24-hour average~~	-	~~0.0043[a]~~	-	-
1-hour average	-	*2.4[c]*	-	-
96-hour average	-	*0.0043[c]*	-	-
2,4-D	100[a,b]	-	-	-
DDT & metabolites	0[a]	~~1.1[a]~~ -	-	-
~~24-hour average~~	-	~~0.0010[a]~~	-	-
Demeton	-	~~0.1[a]~~ -	-	-
96-hour average	-	*0.1[c]*	-	-
Dieldrin	0[a]	~~2.5[a]~~ -	-	-
~~24-hour average~~	-	~~0.0019[a]~~	-	-
1-hour average	-	*0.24[c]*	-	-
96-hour average	-	*0.056[c]*	-	-
Endosulfan	75[a]	~~0.22[a]~~	-	-
~~24-hour average~~	-	~~0.056[a]~~	-	-
Endrin	0.2[b]	~~0.18[a]~~ -	-	-
~~24-hour average~~	-	~~0.0023[a]~~	-	-
1-hour average	-	*0.086[c]*	-	-
96-hour average	-	*0.036[c]*	-	-
Guthion	-	~~0.01[a]~~ -	-	-
96-hour average	-	*0.01[c]*	-	-
Heptachlor	-	~~0.52[a]~~ -	-	-
~~24-hour average~~	-	~~0.0038[a]~~	-	-
1-hour average	-	*0.52[c]*	-	-
96-hour average	-	*0.0038[c]*	-	-
Lindane	4[b]	~~2.0[a]~~ -	-	-
~~24-hour average~~	-	~~0.080[a]~~	-	-
1-hour average	-	*0.95[c]*	-	-
Malathion	-	~~0.1[a]~~ -	-	-
96-hour average	-	*0.1[c]*	-	-
Methoxychlor	100[a,b]	~~0.03[a]~~ -	-	-
96-hour average	-	*0.03[c]*	-	-

ATTACHMENT 1

Chemical	Municipal or Domestic Supply[(1)] (µg/l)	Aquatic Life[(1,2)] (µg/l)	Irrigation[(1)] (µg/l)	Watering of Livestock[(1)] (µg/l)
Mirex	0[a]	~~0.001[a]~~ -	-	-
96-hour average	-	***0.001[c]***	-	-
Parathion	-	-	-	-
1-hour average	-	0.065[a]	-	-
96-hour average	-	0.013[a]	-	-
Silvex (2,4,5-TP)	10[a,b]	-	-	-
Toxaphene	5[b]	-	-	-
1-hour average	-	0.73[a]	-	-
96-hour average	-	0.0002[a]	-	-
Benzene	5[b]	-	-	-
Monochlorobenzene	488[a]	-	-	-
m-Dichlorobenzene	400[a]	-	-	-
o-Dichlorobenzene	400[a]	-	-	-
p-Dichlorobenzene	75[b]	-	-	-
Ethylbenzene	1,400[a]	-	-	-
Nitrobenzene	19,800[a]	-	-	-
1,2-dichloroethane	5[b]	-	-	-
1,1,1-trichloroethane (TCA)	200[b]	-	-	-
Bis (2-chloroisopropyl) ether	34.7[a]	-	-	-
Chloroethylene (vinyl chloride)	2[b]	-	-	-
1,1-dichloroethylene	7[b]	-	-	-
Trichloroethylene (TCE)	5[b]	-	-	-
Hexachlorocyclopentadine	206[a]	-	-	-
Isophorone	5,200[a]	-	-	-
Trihalomethanes (total)[~~i~~j]	100[b]	-	-	-
Tetrachloromethane (carbon tetrachloride)	5[b]	-	-	-
Phenol	3,500[a]	-	-	-
2,4-dichlorophenol	3,090[a]	-	-	-
Pentachlorophenol	1,010[a]	-	-	-
1-hour average	-	~~exp{1.005 (pH) 4.830}[a]~~ $e^{1.005(pH)-4.869c}$	-	-
96-hour average	-	~~exp{1.005 (pH) 5.290}[a]~~ $e^{1.005(pH)-5.134c}$	-	-
Dinitrophenols	70[a]	-	-	-
4,6-dinitro-2-methylphenol	13.4[a]	-	-	-
Dibutyl phthalate	34,000[a]	-	-	-
Diethyl phthalate	350,000[a]	-	-	-
Dimethyl phthalate	313,000[a]	-	-	-
Di-2-ethylhexyl phthalate	15,000[a]	-	-	-
Polychlorinated Biphenyls (PCBs)	0[a]	-	-	-
~~24-hour average~~	~~-~~	~~0.014[a]~~	~~-~~	~~-~~
96-hour average	-	***0.014[c]***	-	-
Fluoranthene (polynuclear aromatic hydrocarbon)	42[a]	-	-	-
Dichloropropenes	87[a]	-	-	-
Toluene	14,300[a]	-	-	-
alpha-Endosulfan	-	-	-	-
1-hour average	-	***0.22[c]***	-	-
96-hour average	-	***0.056[c]***	-	-

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Chemical	Municipal or Domestic Supply~~(1)~~ (µg/l)	Aquatic Life(1,2) (µg/l)	Irrigation~~(1)~~ (µg/l)	Watering of Livestock~~(1)~~ (µg/l)
beta-Endosulfan	-	-	-	-
1-hour average	-	***0.22[c]***	-	-
96-hour average	-	***0.056[c]***	-	-
Chlorpyrifos	-	-	-	-
1-hour average	-	***0.083[c]***	-	-
96-hour average	-	***0.041[c]***	-	-
4,4'-DDT	-	-	-	-
1-hour average	-	***1.1[c,i]***	-	-
96-hour average	-	***0.001[c,i]***	-	-
Diazinon	-	-	-	-
1-hour average	-	***0.17[c]***	-	-
96-hour average	-	***0.17[c]***	-	-
Heptachlor Epoxide	-	-	-	-
1-hour average	-	***0.52[c]***	-	-
96-hour average	-	***0.0038[c]***	-	-
Nonylphenol	-	-	-	-
1-hour average	-	***28[c]***	-	-
96-hour average	-	***6.6[c]***	-	-
Tributyltin (TBT)	-	-	-	-
1-hour average	-	***0.46[c]***	-	-
96-hour average	-	***0.072[c]***	-	-

Footnotes

(1) ~~**Single concentration limits and 24-hour average concentration limits must not be exceeded.**~~ One-hour average and 96-hour average concentration limits may be exceeded only once every 3 years. See reference a.

(2) Aquatic life standards apply to surface waters only; "hardness" is expressed as mg/L $CaCO_3$; and "e" refers to the base of the natural logarithm whose value is 2.718.

(3) The standards for metals are expressed as total recoverable, unless otherwise noted.

References

a. U.S. Environmental Protection Agency, Pub. No. EPA 440/5-86-001, Quality Criteria for Water (Gold Book) (1986).

b. Federal Maximum Contaminant Level (MCL), 40 C.F.R. §§ 141.11, 141.12, 141.61 and 141.62 (1992).

~~h.~~***c.*** U.S. Environmental Protection Agency, National Recommended Water Quality Criteria, ~~**May 2005**~~ ***2009***.

~~g.~~***d.*** This standard applies to the dissolved fraction.

~~c.~~***e.*** U.S. Environmental Protection Agency, Pub. No. EPA 440/9-76-023, Quality Criteria for Water (Red Book) (1976).

~~d.~~***f.*** National Academy of Sciences, Water Quality Criteria (Blue Book) (1972).

g. This standard is expressed as free cyanide.

~~e.~~***h.*** Nevada Division of Environmental Protection, *Aquatic Life Water Quality Criteria for Molybdenum*, Tetra Tech, Inc., (June 2008).

i. This standard applies to DDT and its metabolites (i.e., the total concentration of DDT and its metabolites should not exceed this value).

j. The ~~**criteria**~~ ***standard*** for trihalomethanes (TTHMs) is the sum of the concentrations of bromodichloromethane, dibromochloromethane, tribromomethane (bromoform) and trichloromethane (chloroform). See reference b.

ATTACHMENT 1

1. This table shows the toxic table with all the changed criteria, it is alphabetized by chemical. When this petition is approved, this is what the NAC 445A.1236 will look like.

NAC 445A.1236 Standards for toxic materials applicable to designated waters.

1. Except as otherwise provided in this section, the standards for toxic materials prescribed in subsection 2 are applicable to the waters specified in 445A.123 to 445A.2234, inclusive. The following criteria apply to this section:

(a) If the standards are exceeded at a site and are not economically controllable, the commission will review and may adjust the standards for the site.

(b) If a standard does not exist for each designated beneficial use, a person who plans to discharge waste must demonstrate that no adverse effect will occur to a designated beneficial use. If the discharge of a substance will lower the quality of the water, a person who plans to discharge must meet the requirements of NRS 445A.565.

(c) If a criterion is less than the detection limit of a method that is acceptable to the Division, laboratory results which show that the substance was not detected will be deemed to show compliance with the standard unless other information indicates that the substance may be present.

2. The standards for toxic materials are:

Chemical	Municipal or Domestic Supply (µg/l)	Aquatic Life[1,2] (µg/l)	Irrigation (µg/l)	Watering of Livestock (µg/l)
INORGANIC CHEMICALS[3]				
Antimony	146[a]	-	-	-
Arsenic	50[b]	-	100[e]	200[f]
1-hour average	-	340[c,d]	-	-
96-hour average	-	150[c,d]	-	-
Barium	2,000[b]	-	-	-
Beryllium	0[a]	-	100[e]	-
Boron	-	-	750[a]	5,000[f]
Cadmium	5[b]	-	10[f]	50[f]
1-hour average	-	$(1.136672-[\ln(\text{hardness})(0.041838)])^{*}e^{(1.0166[\ln(\text{hardness})]-3.924)c,d}$	-	-
96-hour average	-	$(1.101672-[\ln(\text{hardness})(0.041838)])^{*}e^{(0.7409[\ln(\text{hardness})]-4.719)c,d}$	-	-
Chromium (total)	100[b]	-	100[f]	1,000[f]
Chromium (VI)	-	-	-	-
1-hour average	-	16[c,d]	-	-
96-hour average	-	11[c,d]	-	-
Chromium (III)	-	-	-	-
1-hour average	-	$(0.316) * e^{(0.8190[\ln(\text{hardness})]+3.7256)c,d}$	-	-
96-hour average	-	$(0.860) * e^{(0.8190[\ln(\text{hardness})]+0.6848)c,d}$	-	-

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Chemical	Municipal or Domestic Supply (µg/l)	Aquatic Life[1,2] (µg/l)	Irrigation (µg/l)	Watering of Livestock (µg/l)
Copper	-	-	200[f]	500[f]
1-hour average	-	$(0.960) * e^{(0.9422[\ln(\text{hardness})] - 1.700)}$[c,d]	-	-
96-hour average	-	$(0.960) * e^{(0.8545[\ln(\text{hardness})] - 1.702)}$[c,d]	-	-
Cyanide	200[a]	-	-	-
1-hour average	-	22[c,g]	-	-
96-hour average	-	5.2[c,g]	-	-
Fluoride	-	-	1,000[f]	2,000[f]
Iron	-	-	5,000[f]	-
96-hour average	-	1,000[c]	-	-
Lead	50[a,b]	-	5,000[f]	100[f]
1-hour average	-	$(1.46203-[\ln(\text{hardness})(0.145712)])* e^{(1.273[\ln(\text{hardness})] - 1.460)}$[c,d]	-	-
96-hour average	-	$(1.46203-[\ln(\text{hardness})(0.145712)])* e^{(1.273[\ln(\text{hardness})] - 4.705)}$[c,d]	-	-
Manganese	-	-	200[f]	-
Mercury	2[b]	-	-	10[f]
1-hour average	-	1.4[c,d]	-	-
96-hour average	-	0.77[c,d]	-	-
Molybdenum	-	-	-	-
1-hour average	-	6,160[h]	-	-
96-hour average	-	1,650[h]	-	-
Nickel	13.4[a]	-	200[f]	-
1-hour average	-	$(0.998) * e^{(0.8460[\ln(\text{hardness})] + 2.255)}$[c,d]	-	-
96-hour average	-	$(0.997) * e^{(0.8460[\ln(\text{hardness})] + 0.0584)}$[c,d]	-	-
Selenium	50[b]	-	20[f]	50[f]
1-hour average	-	20[a]	-	-
96-hour average	-	5.0[c]	-	-
Silver	-	-	-	-
1-hour average	-	$(0.85) * e^{(1.72[\ln(\text{hardness})] - 6.59)}$[c,d]	-	-
Sulfide (undissociated hydrogen sulfide)	-	-	-	-
96-hour average	-	2.0[c]	-	-
Thallium	13[a]	-	-	-
Zinc	-	-	2,000[f]	25,000[f]
1-hour average	-	$(0.978) * e^{(0.8473[\ln(\text{hardness})] + 0.884)}$[c,d]	-	-
96-hour average	-	$(0.986) * e^{(0.8473[\ln(\text{hardness})] + 0.884)}$[c,d]	-	-
ORGANIC CHEMICALS				

ATTACHMENT 1

Chemical	Municipal or Domestic Supply (µg/l)	Aquatic Life[1,2] (µg/l)	Irrigation (µg/l)	Watering of Livestock (µg/l)
Acrolein	320[a]	-	-	-
1-hour average	-	*3*[c]	-	-
96-hour average	-	*3*[c]	-	-
Aldrin	0[a]	-	-	-
1-hour average	-	3.0[c]	-	-
alpha-Endosulfan	-	-	-	-
1-hour average	-	0.22[c]	-	-
96-hour average	-	0.056[c]	-	-
beta-Endosulfan	-	-	-	-
1-hour average	-	0.22[c]	-	-
96-hour average	-	0.056[c]	-	-
Benzene	5[b]	-	-	-
Bis (2-chloroisopropyl) ether	34.7[a]	-	-	-
Chlordane	0[a]	-	-	-
1-hour average	-	2.4[c]	-	-
96-hour average	-	0.0043[c]	-	-
Chloroethylene (vinyl chloride)	2[b]	-	-	-
Chlorpyrifos	-	-	-	-
1-hour average	-	0.083[c]	-	-
96-hour average	-	0.041[c]	-	-
2,4-D	100[a,b]	-	-	-
DDT & metabolites	0[a]	-	-	-
4,4'-DDT	-	-	-	-
1-hour average	-	1.1[c,i]	-	-
96-hour average	-	0.001[c,i]	-	-
Demeton	-	-	-	-
96-hour average	-	0.1[c]	-	-
Diazinon	-	-	-	-
1-hour average	-	0.17[c]	-	-
96-hour average	-	0.17[c]	-	-
Dibutyl phthalate	34,000[a]	-	-	-
m-Dichlorobenzene	400[a]	-	-	-
o-Dichlorobenzene	400[a]	-	-	-
p-Dichlorobenzene	75[b]	-	-	-
1,2-dichloroethane	5[b]	-	-	-
1,1-dichloroethylene	7[b]	-	-	-
2,4-dichlorophenol	3,090[a]	-	-	-
Dichloropropenes	87[a]	-	-	-

ATTACHMENT 1

Chemical	Municipal or Domestic Supply (µg/l)	Aquatic Life[1,2] (µg/l)	Irrigation (µg/l)	Watering of Livestock (µg/l)
Dieldrin	0[a]	-	-	-
1-hour average	-	0.24[c]	-	-
96-hour average	-	0.056[c]	-	-
Di-2-ethylhexyl phthalate	15,000[a]	-	-	-
Diethyl phthalate	350,000[a]	-	-	-
Dimethyl phthalate	313,000[a]	-	-	-
4,6-dinitro-2-methylphenol	13.4[a]	-	-	-
Dinitrophenols	70[a]	-	-	-
Endosulfan	75[a]	-	-	-
Endrin	0.2[b]	-	-	-
1-hour average	-	0.086[c]	-	-
96-hour average	-	0.036[c]	-	-
Ethylbenzene	1,400[a]	-	-	-
Fluoranthene (polynuclear aromatic hydrocarbon)	42[a]	-	-	-
Guthion	-	-	-	-
96-hour average	-	0.01[c]	-	-
Heptachlor	-	-	-	-
1-hour average	-	0.52[c]	-	-
96-hour average	-	0.0038[c]	-	-
Heptachlor Epoxide	-	-	-	-
1-hour average	-	0.52[c]	-	-
96-hour average	-	0.0038[c]	-	-
Hexachlorocyclopentadine	206[a]	-	-	-
Isophorone	5,200[a]	-	-	-
Lindane	4[b]	-	-	-
1-hour average	-	0.95[c]	-	-
Malathion	-	-	-	-
96-hour average	-	0.1[c]	-	-
Methoxychlor	100[a,b]	-	-	-
96-hour average	-	0.03[c]	-	-
Mirex	0[a]	-	-	-
96-hour average	-	0.001[c]	-	-
Monochlorobenzene	488[a]	-	-	-
Nitrobenzene	19,800[a]	-	-	-
Nonylphenol	-	-	-	-
1-hour average	-	28[c]	-	-
96-hour average	-	6.6[c]	-	-

ATTACHMENT 1

Chemical	Municipal or Domestic Supply (µg/l)	Aquatic Life[1,2] (µg/l)	Irrigation (µg/l)	Watering of Livestock (µg/l)
Parathion	-	-	-	-
1-hour average	-	0.065[a]	-	-
96-hour average	-	0.013[a]	-	-
Pentachlorophenol	1,010[a]	-	-	-
1-hour average	-	$e^{1.005(pH) - 4.869}$[c]	-	-
96-hour average	-	$e^{1.005(pH) - 5.134}$[c]	-	-
Phenol	3,500[a]	-	-	-
Polychlorinated Biphenyls (PCBs)	0[a]	-	-	-
96-hour average	-	0.014[c]	-	-
Silvex (2,4,5-TP)	10[a,b]	-	-	-
Tetrachloromethane (carbon tetrachloride)	5[b]	-	-	-
Toluene	14,300[a]	-	-	-
Toxaphene	5[b]	-	-	-
1-hour average	-	0.73[a]	-	-
96-hour average	-	0.0002[a]	-	-
Tributyltin (TBT)	-	-	-	-
1-hour average	-	0.46[c]	-	-
96-hour average	-	0.072[c]	-	-
1,1,1-trichloroethane (TCA)	200[b]	-	-	-
Trichloroethylene (TCE)	5[b]	-	-	-
Trihalomethanes (total)[j]	100[b]	-	-	-

Footnotes

(1) One-hour average and 96-hour average concentration limits may be exceeded only once every 3 years. See reference a.

(2) Aquatic life standards apply to surface waters only; "hardness" is expressed as mg/L $CaCO_3$; and "e" refers to the base of the natural logarithm whose value is 2.718.

(3) The standards for metals are expressed as total recoverable, unless otherwise noted.

References

a. U.S. Environmental Protection Agency, Pub. No. EPA 440/5-86-001, Quality Criteria for Water (Gold Book) (1986).
b. Federal Maximum Contaminant Level (MCL), 40 C.F.R. §§ 141.11, 141.12, 141.61 and 141.62 (1992).
c. U.S. Environmental Protection Agency, National Recommended Water Quality Criteria, 2009.
d. This standard applies to the dissolved fraction.
e. U.S. Environmental Protection Agency, Pub. No. EPA 440/9-76-023, Quality Criteria for Water (Red Book) (1976).
f. National Academy of Sciences, Water Quality Criteria (Blue Book) (1972).
g. This standard is expressed as free cyanide.
h. Nevada Division of Environmental Protection, Aquatic Life Water Quality Criteria for Molybdenum, Tetra Tech, Inc., (June 2008).
i. This standard applies to DDT and its metabolites (i.e., the total concentration of DDT and its metabolites should not exceed this value).

j. The standard for trihalomethanes (TTHMs) is the sum of the concentrations of bromodichloromethane, dibromochloromethane, tribromomethane (bromoform) and trichloromethane (chloroform). See reference b.