MOULTON NIGUEL WATER DISTRICT
2013 REPORT ON WATER QUALITY RELATIVE TO PUBLIC HEALTH GOALS

Pursuant to SB 1307 (Calderone-Sher; effective 01/01/97) provisions were added to the California Health and Safety Code which mandate that a Public Health Goals report be prepared by July 1, 1998, and every three years thereafter. The report is intended to provide information to the public in addition to the Annual Water Quality Consumer Confidence Reports mailed to each customer.

Moulton Niguel Water District's (District) water system complies with all of the health-based drinking water standards and Maximum Contaminant Levels (MCLs) required by the California Department of Public Health (CDPH) and the Environmental Protection Agency (EPA). The District is not required to make any changes, and is not proposing to make any changes or modifications that would affect the quality of water delivered to its customers.

Background:

Provisions of the California Health and Safety Code specify that water systems larger than 10,000 service connections prepare a special report by July 1, 2013, if their water quality measurements have exceeded any Public Health Goals (PHGs). PHGs are non-enforceable goals established by the California Office of Environmental Health Hazard Assessment (OEHHA). The law also requires that where OEHHA has not adopted a PHG for a constituent, the water suppliers are to use the Maximum Contaminant Level Goals (MCLGs) adopted by the United States Environmental Protection Agency (EPA). Only constituents which have a California primary drinking water standard and for which either a PHG or MCLG has been set are to be addressed.

There are a few constituents that are routinely detected in water systems at levels usually well below the drinking water standards for which no PHG or MCLG has yet been adopted by the OEHHA or EPA including Total Trihalomethanes. These will be addressed in a future report once a PHG has been adopted.

What are Public Health Goals?:

Public Health Goals (PHGs) are established by the California Office of Environmental Health Hazard Assessment (OEHHA), which is part of California Environment Protection Agency (Cal-EPA), and are based solely on public health risk considerations. None of the practical risk-management factors that are considered by the EPA or the Department of Public Health (CDPH) in setting drinking water standards, Maximum Contaminant Levels (MCLs), are considered in setting the PHGs. These factors include analytical detection capability, treatment technology available, and the associated benefits and costs of those various treatments. The PHGs are not enforceable, and are not required to be met by any public water system. Maximum Contaminant Level Goals (MCLGs) are the federal equivalent to PHGs.

Water Quality Data Considered:

All of the water quality data collected in the District's water system between January 1, 2010 and December 31, 2012 for purposes of determining compliance with drinking water standards was considered. This data was summarized in the District's 2010, 2011, and 2012 Annual Water Quality Reports, which were mailed to all of our customers during the months of June and July of each year.

Best Available Treatment Technology and Cost Estimates:

Both the EPA and CDPH have adopted what are known as Best Available Technologiess (BATs), which are the best known methods of reducing contaminant levels to the MCLs. Costs can be estimated for such technologies. However, since many PHGs and all MCLGs are set much lower than the MCL, it is not always possible nor feasible to determine what treatment is needed to further reduce a constituent downward to or near the PHGs or MCLGs, many of which are set at zero. In some cases, installing treatment to try and further reduce very low levels of one constituent may have adverse effects on other aspects of water quality.

Constituents Detected That Exceed a Public Health Goals (PHGs) or Maximum Contaminant Level Goals (MCLGs):

The water distributed by the Moulton Niguel Water District during the period met the MCLs for these constituents. During the 2010-2012 period, our supplier detected minor levels of Gross Alpha, Gross Beta, and Uranium activity, as indicated below:

Parameter	Units	State or Federal MCL	PHG or (MCLG)	Range Average	2010	2011	2012	PHG Report Required
Gross Alpha (particle activity)	pCi/L	15	(0)	Range Average	3.8 – 9.3 5.6	ND - 3 3	ND – 3 3	**YES**
Gross Beta (particle activity)	pCi/L	50	(0)	Range Average	ND – 6.4 4.3	ND – 4 ND	ND – 4 ND	**YES**
Uranium (particle activity)	pCi/L	20	0.43	Range Average	2.9 – 3.7 3.3	2 2	2 2	**YES**
Arsenic	ppb	10	0.004	Range Average	ND – 2.7 2.2	ND ND	ND ND	**YES**
Coliform Bacteria	%	5.0	(0)	Highest Monthly %	1.5	0.6	0.8	**YES**

pCi/L = picocuries per liter ppb = parts per billion ND = Not Detected

The Public Health Goals (PHGs) for Gross Alpha and Gross Beta was set at zero while Uranium was set at 0.43 as targets or goals by regulatory agencies. It is often not possible to remove or reduce a constituent to the PHGs, especially when the PHG is set at zero, because either the technology does not exist or the cost of treatment would be so expensive that the tap water would be unaffordable.

The following is an explanation of constituents that were detected in one or more of our drinking water sources at levels above the PHGs, or if no PHGs, above the MCLGs.

Gross Alpha (particle activity):

Although other health impacts are possible, cancer has been recognized as the major health effect of most studied radionuclides. Moreover, risk assessment procedures to estimate the cancer risk from radionuclides have been well developed. Thus cancer is the principal endpoint that will be used to evaluate the health risk from alpha particle emitters present discussion.

Gross Beta (particle activity):

Although other health impacts are possible, cancer has been recognized as the major health effect of most studied radionuclides. Moreover, risk assessment procedures to estimate the cancer risk from radionuclides have been well developed. Thus, cancer is the principal endpoint that will be used to evaluate the health risk from beta particle/photon emitters. Cancer risk estimates for exposure to beta/photon radioactivity vary with particle energy and how certain organs handle that energy. Therefore, risk-based health protective values vary for the different beta/photon emitting isotopes.

Uranium (particle activity):

A Public Health Goal (PHG) has been developed for uranium in drinking water based on its radioactivity. All isotopes of uranium are radioactive, and the total radioactivity depends on the ratio of isotopes. The ionizing radiation from uranium is considered to be inherently carcinogenic. The PHG for uranium is based on the United States Environmental Protection Agency's (EPA) latest cancer risk calculations for uranium exposure (EPA, 1999), and recent data on ratio of uranium isotopes in California drinking water (Wong et al., 1999), from which is calculated the uranium specific activity of 0.79 pCi/µg (radioactivity output per mass unit). The resulting PHG of 0.5 ppb (0.43 pCi/L) developed for natural uranium in drinking water is based on a *de minimis* 10^{-6} lifetime cancer risk for exposure to ionizing radiation. OEHHA considers cancer risks below the *de minims* one in a million theoretical risk to be negligible.

Uranium is a naturally occurring radioactive element that is ubiquitous in the earth's crust. Uranium is found in ground and surface waters due to its natural occurrence in geological formations. Uranium occurs as a trace element in many types of rocks. Because its abundance in geological formations varies from place to place, uranium is a highly variable source of contamination in drinking water.

The EPA has established a Maximum Contaminant Level (MCL) for natural uranium of 30 µg/L (ppb), based on a cost-benefit analysis (EPA, 2000). The EPA Maximum Contaminant Level Goal (MCLG) is zero. The State of California has an MCL for uranium of 20 pCi/L based on earlier studies of toxicity to the kidney in rabbits.

Arsenic:

Arsenic is a naturally occurring element in the earth's crust and is very widely distributed in the environment. All humans are exposed to microgram quantities of arsenic (inorganic and organic) largely from food (25 to 50 µg/day) and to a lesser degree from drinking water and air. Some edible

seafood may contain higher concentrations of arsenic, which is predominantly in less acutely toxic organic forms.

The EPA's final rule on arsenic in drinking water (EPA, 2001) developed an MCLG of zero. The MCLG is the functional equivalent of the California PHG for drinking water. The EPA also established a national primary drinking water regulation or MCL for arsenic of 10 ppb. EPA's upper bound (90th percentile) estimates of lifetime cancer risk at 10 ppb ranged up to 6.1 in 10,000. This federal regulation did not become fully effective until 2006. In California, the MCL for arsenic will be determined by the Department of Health Services to be as close to the PHG as possible considering other factors such as cost and analytical feasibility.

The EPA's final rule on arsenic in drinking water (EPA, 2001) established an MCL of 10 ppb and a MCLG of zero.

Coliform Bacteria:

The following discussion relates to the detection within the water system of coliform bacteria above the MCLG for coliform. The District collects between 124-155 samples each month for coliform bacteria analysis. Occasionally, a sample was found to be positive for coliform bacteria, but re-test samples were negative and follow up actions were taken. A maximum of 1.5% of these samples was positive in any given month during the reporting period. The MCL for coliform is 5.0% positive samples of all samples analyzed per month and the MCLG is zero. The District complies with the requirements set by the EPA.

The reason for the coliform drinking water standard is to minimize the possibility of the water containing pathogens, which are organisms that cause waterborne disease. Because coliform is only a surrogate indicator of potential presence of pathogens, it is not possible to estimate a specific numerical health risk.

While EPA normally sets MCLGs "at a level where no known or anticipated adverse effects on persons would occur," they indicate they cannot do so with coliforms. Coliform bacteria are indicator organisms that are ubiquitous in nature and are not generally considered harmful. They are used because of the ease in monitoring and analysis. If a positive sample is found, it indicates a potential problem that needs to be investigated and follow up sampling must be performed. It is not unusual for a system to have an occasional positive sample. It is difficult, if not impossible, to assure that a system will never get a positive coliform sample.

Chloramines are added as a disinfectant to the water to ensure that the water is microbiologically safe. The chloramines residual levels are carefully controlled to provide optimum health protection without causing the water to have undesirable taste and odor, or increasing the disinfection by-product levels. This careful balance of treatment processes is essential to continue supplying our customers with safe drinking water.

Other equally important measures that the District has implemented include an effective cross-connection control program, maintenance of a disinfectant residual throughout our system, an effective monitoring and surveillance program and maintaining positive pressures in our distribution system. The District has installed disinfection residual systems at all of its reservoir sites. These systems help maintain higher disinfectant residuals throughout the entire distribution system. The total capital cost of

installing these systems was approximately $2.6 million dollars. The District's annual operating cost for providing this best available treatment technology is approximately $150,000 dollars.

The District's system has already taken all of the steps described by CDPH as "best available technology" for coliform bacteria.

Recommendations:

The drinking water quality of the Moulton Niguel Water District meets or exceeds all State of California Department of Public Health and United States Environmental Protection Agency drinking water standards set to protect public health. Additional costly treatment processes would be required to further reduce the levels of the constituents identified in this report that are already significantly below the health-based Maximum Contaminant Levels established to provide "safe drinking water." The effectiveness of the treatment processes to provide any significant reductions in constituent levels at these already low values is uncertain. The health protection benefits of these further hypothetical reductions are not at all clear and may not be quantifiable. Therefore, the District is not proposing any further action to implement additional water treatment processes. The District will continue to monitor and test drinking water on a weekly basis to ensure all water quality standards are met and to assess the performance of current treatment processes to continue to provide high-level water quality for the future.