Source Water Assessment of Soquel Creek Water District Aromas Red Sands Aquifer Wells

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Executive Summary

Soquel Creek Water District (SCWD) has commissioned this drinking water source assessment of its six water supply wells screened in the Aromas Red Sands Aquifer. The assessment has been performed in accordance with Cal-EPA Department of Health Service (DHS) guidelines. The assessment includes a delineation of the area surrounding each well through which contaminants could potentially migrate and impact the well. In accordance with DHS guidelines, the assessment includes an inventory of all activities that might possibly lead to the release of contaminants within the delineated area enabling a determination to be made as to the susceptibility of each well to contamination.

Several components are required as part of the DHS source water assessment program. One component includes the delineation of the 2-, 5-, and 10-year protection zones for each well. The protection zones or capture zones define the areas contributing water to a pumping well over time. The 10-year capture zone of the SCWD Aromas wells extends approximately 3,500 to 4,000 feet northeast and northwest of the wells in the upgradient direction.

The Physical Barrier Effectiveness (PBE) of each well is also determined. The PBE is an estimate of the ability of the natural geologic materials, hydraulic conditions, and construction features of a well to limit the movement of contaminants to the well. The nature of confinement of the aquifer pumped by each well is the dominant factor controlling the PBE. Wells screened in a confined aquifer have a high level of PBE, while wells screened in an unconfined aquifer such as the Aromas Red Sands can have, at best, a moderate level of PBE. Accordingly, all six SCWD Aromas wells have a moderate level of PBE.

An inventory of Possible Contaminating Activities (PCAs) in the vicinity of the wells was prepared. PCAs are ranked based on the level of contamination risk as: very high, high, medium, and low. The six SCWD Aromas wells are located in a mostly residential area where few high risk PCAs exist.

A vulnerability ranking was performed to determine which PCAs pose the greatest threat of contamination to the wells. The PCA posing the greatest threat to water quality in the Seascape, Sells, Aptivo, San Andreas, and Bonita wells is onsite residential septic systems. For the Country Club well, potential leakage from sewer lines poses the greatest threat to water quality. The drinking water source assessment program is intended to yield data useful for the development of source water protection programs. SCWD's ongoing AB 3030 Management Plan has emphasized protection of groundwater and prevention of contamination through identification of goals and implementation of various programs. These source water assessment results confirmed the appropriateness of existing goals and programs and identified other areas where water quality protection activities might be focused. SCWD can encourage source water protection through the following activities:

- Continue water level and water quality monitoring of the well network to quickly identify evidence of anthropogenic releases or inland movement of the saltwater.
- Continue Public Education dealing with water quality protection and conservation.
- Review regulatory reports and communicate with appropriate regulatory agencies responsible for contaminant release sites.
- Cooperate with Santa Cruz County Environmental Health Service in their efforts to regulate hazardous materials site.

- Consider the density of very high and high risk PCAs when siting new water supply wells. Discourage Recent sampling of SCWD Aromas Red Sands wells has confirmed detections of Cr(VI) at concentrations ranging from 6 to 38 parts per billion (ppb). While these concentrations are below the maximum contamination level (MCL) for chromium, concerns about public health impacts from Cr(VI) in drinking water have been raised during public meetings. The purpose of the focused Cr(VI) evaluation is to determine whether the Cr(VI) detections are the result of anthropogenic (man-made) releases or the result of naturally occurring chromium in the Aromas Red Sands Formation. The evaluation found abundant evidence confirming the latter. The naturally occurring chromium bearing minerals found in the Aromas Red Sands Formation are the source of the Cr(VI) detected in the Aromas Aquifer. Cr(VI) is detected regionally in the Aromas Aquifer as evidenced by detections in water supply wells of other water purveyors in the

surrounding area.

Environmental conditions in Aromas Aquifer water tends to favor Cr(VI) production from dissolved trivalent chromium [Cr(III)] because the Aromas Aquifer waters are well oxygenated, generally have alkaline pH value ranges (greater than 7.0), and sediments are predominantly quartz-rich and low in ferrous iron and aluminum oxides. No anthropogenic sources of Cr(VI) were identified in the inventory of PCAs.

A third component of this study is an assessment of water quality and quantity impacts from increased use of in-home reverse osmosis systems in the area. Because of public concerns regarding Cr(VI) in drinking water, the potential exists for increased use of in-home reverse osmosis systems. Reverse osmosis systems can result in a significant increase in water usage depending on the type of system used. Water quality impacts are also dependent on the type of system as well as the method of wastewater disposal. Reverse osmosis discharges to the regional wastewater treatment plant will have little impact on groundwater quality, while discharges to onsite septic systems will infiltrate groundwater. Point of use systems (treatment at the tap) will have little impact on water use or Cr(VI) concentrations in groundwater due to the small amount of the water supply that is treated. Pont of entry (all water flowing into the house is treated) reverse osmosis systems can more than double the amount of water used by the household potentially overloading septic systems and the discharged wastewater may have Cr(VI) concentrations two to three times that of the inflow water supply.