

**Statement of  
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Before the  
House Natural Resources Committee  
Subcommittee on Water and Power  
On  
Inland Empire Perchlorate Ground Water Plume Assessment  
Act of 2009 (HR 2316)  
September 22, 2009**

Madam Chairwoman and members of the Subcommittee, I appreciate the opportunity to provide the Department of the Interior's views regarding U.S. Geological Survey (USGS) scientific capability relevant to the Inland Empire Perchlorate Ground Water Plume Assessment Act of 2009 (H.R. 2316).

## **USGS Science in Support of Groundwater Management and Contaminants**

The USGS serves the Nation by providing reliable scientific information to describe and understand the Earth; minimize loss of life and property from natural disasters; manage water, biological, energy, and mineral resources; and enhance and protect our quality of life. The specific mission of the USGS California Water Science Center is to collect, interpret, and provide unbiased and timely scientific information of the highest quality for the responsible planning, use, and management of California's water resources in cooperation with local, State, and other Federal agencies. Scientific issues related to the occurrence and movement of groundwater and contaminants, such as perchlorate, fall within the scope of the USGS mission.

## **Perchlorate issues in Rialto Colton and the "Inland Empire"**

Rialto-Colton Basin is located in western San Bernardino County in California, about 60 miles east of Los Angeles in the upper Santa Ana River watershed (the Inland Empire). The Rialto-Colton Basin is bounded on the northeast by the Bunker Hill and Lytle Creek Basins and on the southwest by the Chino and North Riverside Basins. Groundwater presently constitutes about 79 percent of the drinking-water supply in the Inland Empire. Perchlorate has been detected in the main water-producing aquifers within the Rialto-Colton and adjacent basins and has contaminated water in more than 20 production wells that supply the communities within the Rialto-Colton Basin and surrounding area.

Perchlorate ( $\text{ClO}_4^-$ ) has both synthetic and natural sources. Synthetic perchlorate is a residual of the manufacture and use of rocket propellants, fireworks, flares and other pyrotechnic devices.

Minor concentrations of natural perchlorate have been measured in mined Chilean nitrate fertilizers. Perchlorate is extremely soluble and is carried in groundwater without retardation or absorption. The two major sources of synthetic perchlorate in the area are San Bernardino County's Mid-Valley Sanitary Landfill and a 160-acre site near the landfill. These two sites were used for storage and destruction of perchlorate-containing compounds such as explosives, propellants, and pyrotechnic devices. Chilean nitrate fertilizer was commonly used in the Basin in the early part of the 20<sup>th</sup> century. In addition, imported water from the Colorado River contains measurable perchlorate and also may be a source of perchlorate in the Inland Empire. Recent work shows that low levels of perchlorate have accumulated naturally in unsaturated zones in arid and semiarid areas of the southwestern United States as a result of atmospheric deposition (J.K. Bohlke, USGS, personal commun., 2009).

Perchlorate contamination is of concern to water managers because of the importance of groundwater in this region. Water managers need to know the source, fate, and transport of perchlorate within the Rialto-Colton Basin and adjacent basins in order to effectively mitigate the contamination. Major uncertainties facing water managers include: 1) the source(s) of perchlorate in specific wells; 2) the hydrologic and geologic controls on the migration of perchlorate within the Rialto-Colton Basin; 3) the effectiveness of the Rialto-Colton Fault as a barrier to perchlorate migration from the Rialto Colton basin to the adjacent Chino and North Riverside basins; and 4) the potential vertical movement of perchlorate through long-screened wells.

## **What is the USGS doing in the area?**

The USGS has a long history of hydrologic work in the Rialto-Colton area and adjacent areas in the Inland Empire going back as far as the early 1900s. This work has been updated periodically and collectively forms the basis of our scientific understanding of the regional hydrogeologic setting, the movement of water within aquifers pumped for public supply, and water-quality issues in the area. The USGS operates an extensive groundwater-monitoring network providing the public with real-time information on water levels and water quality. The USGS has developed predictive models in the Rialto-Colton Basin (Woolfenden and Kadhim, 1997; Woolfenden and Koczot, 2001) and the adjacent Lytle Creek and Bunker Hill groundwater basins (Danskin and Freckleton, 1989; Danskin and others, 2006) to assist in the management of the water resources in the area. These models are based on the current scientific understanding of the geology and hydrology in the area, including the areal and vertical extent of aquifers, hydraulic properties, recharge and discharge of groundwater, and the interaction between groundwater and surface water. Most of the USGS research done in the Inland Empire has been in cooperation with local water management agencies such as the San Bernardino Valley Municipal Water District under the auspices of the USGS Cooperative Water Program. In the past five years, about 70 percent of the cost of these studies has been borne by local agencies.

In recent years, the USGS has been working with local water agencies to help them understand the sources, distribution, and migration of perchlorate in the Inland Empire. A recent study completed as part of the USGS Groundwater Assessment and Monitoring (GAMA) Program (Belitz and others, 2003) sampled 99 drinking water wells throughout the Inland Empire and identified perchlorate in about 67 percent of the wells at the reporting level of 0.5 mg/L; about 10 percent had perchlorate concentrations in excess of the California maximum contaminant level of

6 mg/L, but no well had concentrations in excess of the EPA health reference level (Kent and Belitz, in press). Woolfenden (2008) used a particle-tracking model to determine the susceptibility of an aquifer to perchlorate contamination in the Rialto-Colton Basin. Izbicki (2008) collected wellbore flow and depth-dependent water-quality data from a public supply well near Highland, CA located in the northern part of the Inland Empire. Water-quality and isotopic data indicated that the source of perchlorate was Chilean nitrate fertilizer.

The USGS is proposing a cooperative study with the Department of Defense Environmental Security Technology Certification Program (ESTCP) to apply state-of-the-art chemical and multiple-isotope techniques to identify the source of perchlorate within the Inland Empire. The data collected in this study are intended to help identify the areal and vertical extent of perchlorate contamination near the margin plumes in areas having high background perchlorate concentrations from fertilizer or other sources. An important component of this new work is to investigate the impact of well-bore flow on the vertical distribution of perchlorate within aquifers.

## **Inland Empire Water-Resources Study**

The key issues of concern identified in H.R. 2316 are:

- A. The delineation, either horizontally or vertically, of the aquifers in the Rialto-Colton Basin within the State, including the quantity of water in the aquifers;
- B. the availability of groundwater resources for human use;
- C. the salinity of groundwater resources;
- D. the identification of a recent surge in perchlorate concentrations in groundwater, whether significant sources are being flushed through the vadose zone, or if perchlorate is being remobilized;
- E. the identification of impacts and extents of all source areas that contribute to the regional plume to be fully characterized;
- F. the potential of the groundwater resources to recharge;
- G. the interaction between groundwater and surface water;
- H. the susceptibility of the aquifers to contamination, including identifying the extent of commingling of plume emanating within surrounding areas in San Bernardino County, California; and
- I. characterization of surface and bedrock geology, including the effect of the geology on groundwater yield and quality.

### ***Inland Empire Water-Resources: Rialto-Colton Basin 2-Year Study***

The USGS has the capability to complete a 2-year study to address the issues of concern presented in H.R. 2316 for the Rialto-Colton Basin. The tasks required are within the scope of the USGS mission and expertise and could be accomplished under existing authorities.

H.R. 2316 focuses on perchlorate issues in the Rialto-Colton Basin; however, perchlorate is a concern throughout the Inland Empire. If requested, the USGS could consider options for studying this issue throughout the region.

## **Conclusion**

The USGS has the scientific capacity to address issues of concern identified in H.R. 2316, a strong working relationship with many of the people currently working on groundwater quality issues in California's Inland Empire, and a reputation for providing unbiased information.

The problem of groundwater quality affecting drinking water supplies is not unique to communities in Rialto-Colton or the Inland Empire. Perchlorate is an issue throughout the southwestern U.S. Therefore, methods developed to understand the perchlorate contamination in the Rialto-Colton could be useful to water managers in other basins.

We note, however, that the activities called for in H.R. 2316 are already authorized by existing authorities. Any study conducted to fulfill the objectives of the bill would need to compete for funding with other Administration priorities.

Thank you, Madam Chairwoman, for the opportunity to present the views of the Department on H.R. 2316. I will be happy to answer any questions you or the other Members may have.

## **References**

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