



# California Regional Water Quality Control Board

## Los Angeles Region



Linda S. Adams  
Cal/EPA Secretary

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Arnold Schwarzenegger  
Governor

October 30, 2009

Mr. Daniel S. Samorano  
Raytheon Company  
1151 East Hermans Road  
TU, Bldg 826  
Tucson, AZ 85706

**NO FURTHER ACTION FOR RADIOACTIVITY ANALYSES IN GROUNDWATER PURSUANT TO CALIFORNIA WATER CODE SECTION 13267 ORDER – RAYTHEON COMPANY (FORMER HUGHES MISSILE SYSTEMS COMPANY), 8433 FALLBROOK AVENUE, CANOGA PARK, CALIFORNIA 91304 (SCP NO. 0693, SITE ID NO. 2043T00)**

Dear Mr. Samorano:

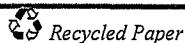
The California Regional Water Quality Control Board, Los Angeles Region (Regional Board) is the State regulatory agency responsible for protecting water quality in Los Angeles and Ventura Counties. To accomplish this, the Regional Board issues investigative orders authorized by the Porter-Cologne Water Quality Control Act (California Water Code [CWC], Division 7).

At the request of the Regional Board, Raytheon's predecessor, Hughes Missile Systems, Inc., conducted eight groundwater sampling events between March 1990 and December 1991 to determine radioactivity levels in groundwater at the site. The results were submitted to the Regional Board in 1992 and indicated that a subset of the well samples had radiological parameters exceeding California Maximum Contaminant Levels (MCLs), but that the concentrations were naturally occurring based on the relative abundances of the individual uranium isotopes.

In response to public concerns regarding radioactivity sampling results from the on-site groundwater monitoring wells, the Regional Board issued a CWC section 13267 Order on March 5, 2008, requiring submittal of a work plan for a site-wide groundwater investigation to verify current radioactivity conditions. The revised work plan was reviewed and conditionally approved by the Regional Board on January 29, 2009. Subsequently, Regional Board staff have received and reviewed the *Groundwater Investigation Report to Verify Current Radioactivity Conditions* (Report), dated August 2009, prepared by Oneida Total Integrated Enterprises (OTIE) on behalf of Raytheon Company for the referenced site.

The Report presents the results of the groundwater sampling from 11 site wells for radioactivity analyses in May 2009. Gross alpha particle activity, uranium, combined radium - 226+228, and gross beta particle activity were detected up to 61.12 pCi/L, 126.5 pCi/L, 18.62 pCi/L, and 54.77 pCi/L, respectively, which exceeded their California MCLs of 15 pCi/L, 20 pCi/L, 5 pCi/L, and 50pCi/L, respectively.

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The data produced during 2009 groundwater investigation are consistent with previous results collected in 1990 and 1991. This current investigation and the 1990/1991 investigation work have demonstrated that the levels of radiological isotopes detected in groundwater at the former Raytheon facility are attributable to naturally occurring sources in the underlying aquifer matrix and geochemical system. OTIE recommends no further action for radioactivity analyses in groundwater at the site.

Based on review of the submitted information and radionuclides related documentation, Regional Board staff have the following findings:

**1. No Suspected Releases of Radioisotopes from Historical Operations at the Site**

The Regional Board has jurisdiction for the investigation and remediation of groundwater contamination at the former Raytheon site, while the Department of Toxic Substances Control (DTSC) has jurisdiction to address environmental contamination in soil as a result of historic operations. On March 4, 2009, DTSC issued the following responses to public comments:

“DTSC has obtained records submitted by Raytheon which includes information on the types radioisotopes used at the site, and the buildings in which the radioisotopes were used. The records indicate that only small amounts of radioactive materials were present, primarily in measurement devices, and that licenses were properly terminated and materials were properly disposed of more than twenty (20) years ago.”

Regional Board staff has also reviewed the *Supporting Documentation for the Radioactive Materials Investigation at Hughes Aircraft Company-MSG-CP*, dated May 1992, documenting the information on radioactive materials being used at the site approximately from 1964 to 1992. Based on review of the information provided, Regional Board staff concurs with DTSC's statement. Following further consultation with DTSC, Regional Board staff concludes that there is no evidence suggesting that releases of radionuclides resulted from the historical operations at the former Raytheon facility.

**2. Naturally Occurring Uranium and Radium**

During the 2009 groundwater investigation, isotopic uranium analyses were conducted to calculate the relative mass ratios in order to determine if the origin of the uranium was man-made (enriched or depleted) or was consistent with naturally occurring sources. The results of the 2009 groundwater investigation were compared to the published values of typical isotopic abundances. These values were obtained from both the United States Department of Energy's *Guide of Good Practices for Occupational Radiological Protection in Uranium Facilities* (USDOE, 2004) and the United States Environmental Protection Agency's *Depleted Uranium Technical Brief* (USEPA, 2006).

The isotopic analysis of uranium demonstrates that the isotopic mass percentages for the 2009 groundwater samples with elevated uranium levels fall within the range expected for naturally occurring uranium as shown in the table below. The same calculations were previously performed for the October 1991 and December 1991 analytical results and yielded similar ratios. The 2009 groundwater data strongly support the statement that naturally occurring uranium is encountered in groundwater at the site.

**Relative Abundance of Uranium Isotopes**

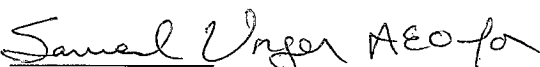
Isotope	U-238	U-235	U-234
Natural Abundance (%)	99.27	0.72	0.0055
October 1991 Sampling Results	99.10 to 99.42	0.57 to 0.88	0.0053 to 0.0067
December 1991 Sampling Results	99.14 to 99.55	0.44 to 0.84	0.0051 to 0.0064
May 2009 Sampling Results	99.13 to 99.50	0.48 to 0.85	0.0050 to 0.0062

Based on the information obtained from the USEPA website at: <http://www.epa.gov/radiation/radionuclides/index.html>, uranium and radium occur naturally in the environment. They are present in virtually all rock, soil, and water. Uranium, radium and their compounds are soluble in water. As a result, groundwater in areas where concentrations of uranium and radium are high in aquifer materials and in surrounding bedrock typically has relatively high uranium and radium content.

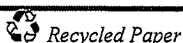
Based upon the information provided to the Regional Board, and with the provision that the information was accurate and representative of site conditions, the Regional Board finds that the May 2009 groundwater investigation for radioactivity analyses carried out at the site is in compliance with the requirements of the CWC section 13267 Order issued to Raytheon Company on March 5, 2008 and that no further action for radioactivity analyses in groundwater is required at the site at this time. However, if new information indicates potential releases of radionuclides from the former Raytheon facility, the Regional Board may require groundwater monitoring for radioactivity analyses at the site.

If you have any questions, please contact Dr. Ann Chang at (213) 620-6070 or [nchang@waterboards.ca.gov](mailto:nchang@waterboards.ca.gov).

Sincerely,

  
Tracy J. Egoscue  
Executive Officer

**California Environmental Protection Agency**



Mr. Daniel S. Samorano  
Raytheon Company

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October 30, 2009

cc: Mr. Stefan Cajina, California Department of Public Health  
Mr. Chris Nagler, Watermaster, California Department of Water Resources  
Mr. Bernard Franklin, Los Angeles County, Department of Public Health  
Mr. Hoover Ng, Water Replenishment District- Southern California  
Mr. Rod Collins, Department of Toxic Substances Control  
Mr. Jacques Marcillac, Oneida Total Integrated Enterprises  
Mr. Kenneth Katich, Trammell Crow Company  
Mr. William Preston Bowling, Aerospace Cancer Museum and Education  
Ms. Christina Walsh, Cleanuprocketdyne.org  
Ms. Bonnie Klea  
Ms. Chris Rowe  
Mr. Daniel Wiseman

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