

# **EXHIBIT B**

**TABLE 1 - Hinkley Background Results Compared to Published Studies within Region**  
*Declaration of Dr. Brian Scroth - Naturally Occurring Chromium in Groundwater*

Study/Report	Naturally Occurring Total Chromium (µg/L)	Naturally Occurring Hexavalent Chromium (µg/L)	Hydrogeologic Setting	Description
<sup>a</sup> Hinkley Background Study, Mean	1.54	1.26	Wells are completed primarily in unconsolidated alluvial and floodplain sediments, composed of sand, gravel, silt and clay. Iron Mountain to the west is comprised primarily of granitic, metavolcanic, and metasedimentary rocks. Mount General to the east is comprised primarily of granitic, igneous and metamorphic rocks of felsic to intermediate composition, volcanic and sedimentary rocks. Two aquifers which are hydraulically connected are present, the Floodplain (Mojave River) and Regional Aquifers. The Floodplain and Regional Aquifers are further divided into Upper and Lower Aquifers which have limited hydraulic connection.	48 supply wells were sampled from over a 1-year period (2-4 times each). Well construction information available for only 20 of the 48 wells. Most wells with logs were screened across both the Upper and Lower Aquifers with 55 to 115 foot long screens. This indicates that blending of reducing water (with low to non-detect chromium) with oxic water from the Upper Aquifer may have occurred. It is probable that most wells without logs are also screened across both aquifers, or primarily the Lower Aquifer. The calculated UTL may be more representative of the Lower than Upper Aquifer.
<sup>a</sup> Hinkley Background Study, UTL	3.23	3.09		
<sup>b</sup> Topock Background Study, Mean	9.37	7.80	Groundwater samples were collected from alluvial and/or fluvial materials typically overlaying a consolidated Miocene conglomerate layer, underlain by metamorphic bedrock.	Six sampling events (25 wells) were used to develop background concentrations from mostly long screened supply wells in the greater Topock area, near Needles California. Fluvial materials were commonly associated with reducing conditions and low to non-detect chromium concentrations, therefore the UTLs may be conservatively low for wells screened in the alluvial aquifer under oxic conditions.
<sup>b</sup> Topock Background Study, UTL	34.1	31.8		
<sup>c</sup> USGS Western Mojave Desert, Range	not calculated	Concentration range: ND to 60	Groundwater samples collected from supply, irrigation and observation wells completed in alluvium derived from San Gabriel Mountains (eroded from mafic, granitic, metamorphic and volcanic rocks).	Approximately 200 wells were sampled. In addition, depth discrete samples were collected, which indicated that Cr(VI) concentrations could vary from <0.1 to 36 µg/L in a single well due to variable redox conditions. Cr(VI) concentrations were low near mountain recharge areas where pH values were neutral and low in discharge areas where there was low dissolved oxygen. The highest Cr(VI) concentrations (up to 61 µg/L) were reported for wells completed within alluvium derived from mafic rocks, with lower concentrations (up to 36 µg/L) reported for alluvium derived from less mafic granitic, volcanic and metamorphic rocks.
<sup>d</sup> USGS Western Mojave Desert, Sheep Creek fan, and Surprise Springs area, Median	NM	7.0	Follow on USGS paper presenting additional results from study listed above. The highest Cr(VI) concentrations were observed in alluvial aquifers eroded from mafic rock. Cr(VI) as high as 27 µg/L was also observed in aquifers eroded from granitic rock. The presence of Cr(VI) in granitic aquifers may be partially attributed to oxidation of Cr(III) to Cr(VI) by manganese oxides.	Results for 157 public supply, irrigation and observation wells in the Western part of the Mojave desert were included. Cr(VI) did not exceed 5 µg/L at pH < 7.5 in any geologic conditions. Range in Cr(VI) = 0.2 - 60 µg/L. Study indicated that majority of chromium detected was in the form of Cr(VI). Cr(VI) distribution in soil samples was found to be greatest above and near the water table, and concentrations rapidly decreased with depth. This observation was supported with chromium groundwater sample results.
<sup>e</sup> ADEQ Sacramento Valley Arizona Study, Mean	42	NM	Wells primarily sampled from alluvial aquifer materials. Mountain ranges forming basin boundaries consist predominantly of granitic, volcanic, and metamorphic rocks, with limited sedimentary outcrops.	Regional Arizona Department of Environmental Quality (ADEQ) groundwater study of basin in NW Arizona (immediately east of the Mojave Basin) comprising 1,500 square miles east of the Colorado River. The upper 95% confidence interval for Cr(T) was 83 µg/L, and the lower 95% confidence interval for Cr(T) was 1 µg/L.

**TABLE 1 - Hinkley Background Results Compared to Published Studies within Region**  
*Declaration of Dr. Brian Scroth - Naturally Occurring Chromium in Groundwater*

Study/Report	Naturally Occurring Total Chromium (µg/L)	Naturally Occurring Hexavalent Chromium (µg/L)	Hydrogeologic Setting	Description
<sup>f</sup> USGS Regional Aquifer System Analysis Program, Mean	10.3	NM	Variable, multiple basin study. Maximum Cr(T) concentrations were observed in basins bounded by intermediate volcanic rocks, with lesser concentrations associated with basins bounded by intrusive rocks.	436 samples were collected from 72 basins in central and southern Arizona, southeastern California and Nevada, and western New Mexico. Results for 5 percent of samples collected were greater than 50 µg/L. Range in Cr(T) concentrations was 0 to 300 µg/L, standard deviation = 30.7 µg/L.
<sup>g</sup> CA State Water Resources Control Board, GAMA Program	NM	53% of wells > than 1.0	Variable. State Wide Study.	California Department of Health Services data for 1997-2008 were evaluated. 3,156 out of 5,943 tested public water wells (active and standby) throughout CA have detected Cr(VI) at concentrations greater than the laboratory reporting limit of 1 µg/L. Los Angeles, San Bernardino, and Fresno counties had the highest number of detections greater than 1 µg/L.
<sup>h</sup> Joshua Tree and Copper Mountain groundwater sub-basins, San Bernardino County, Median	NM	13.1	Alluvial deposits, overlying sedimentary and volcanic deposits, which overly granitic and metamorphic basement rocks.	Cr(VI) concentrations for 6 wells (23 samples total) ranged from 0.6 to 36.6 µg/L, with a median of 13.1 µg/L.
<sup>i</sup> Cadiz and Fenner Valleys, Mojave Desert (south eastern CA), Range	NM	15-26	Alluvial basin, bounded by basin and range rocky mountain ranges	Chromium concentrations were generally uniform throughout study area, indicating that Cr(VI) was naturally occurring.
<sup>j</sup> Twentynine Palms Water District, Mean	NM	6.0	Water is supplied from four different alluvial aquifers, the Fortynine Palms Groundwater Basin, the Indian Cove Groundwater Basin, the Eastern Groundwater Basin, and the Mesquite Springs Groundwater Basin.	Public water supply system. Range in Cr(VI) concentrations was ND to 29 µg/L.
<sup>k</sup> Golden State Water Company, Barstow, Range	NM	ND to 1.1	Groundwater is supplied from the Mojave River Basin-Centro sub-basin which is the center of the Mojave Basin extending northwesterly and southeasterly from the Mojave River.	Public water supply system. Range in concentrations was ND to 1.1 µg/L in 2006 samples reported in 2008. 2010 report did not include data for Cr(VI) or Cr(T).
<sup>l</sup> Golden State Water Company, Victorville Desert View Water System, Mean	NM	5.1	Groundwater is supplied from the Mojave River Basin-Este sub-basin which is located in the Lucerne Valley area east of the Mojave River.	Public water supply system. Range in concentrations was 5.0 to 5.1 µg/L.
<sup>m</sup> Golden State Water Company, Victorville Apple Valley South Water System, Mean	NM	2.5	Groundwater is supplied from the Mojave River Basin-Alto sub-basin which is the upper portion of the Mojave River.	Public water supply system. Range in concentrations ND to 6.3 µg/L.

**TABLE 1 - Hinkley Background Results Compared to Published Studies within Region**  
*Declaration of Dr. Brian Scroth - Naturally Occurring Chromium in Groundwater*

Study/Report	Naturally Occurring Total Chromium (µg/L)	Naturally Occurring Hexavalent Chromium (µg/L)	Hydrogeologic Setting	Description
<sup>n</sup> Golden State Water Company, Lucerne Water System, Mean	NM	2.7	Groundwater is supplied from the Mojave River Basin-Este sub-basin which is located in the Lucerne Valley area east of the Mojave River.	Public water supply system. Range in concentrations ND to 4.6 µg/L.

**References:**

- <sup>a</sup>CH2M HILL. 2007. Groundwater Background Study Report, Hinkley Compressor Station, Hinkley, California. February 7.
- <sup>b</sup>CH2M HILL. 2007. Groundwater Background Study, Steps 3 and 4: Final Report of Results PG&E Topock Compressor Station, Needles, California
- <sup>c</sup>Ball James W., and Izbiki, J.A., 2004. Occurrence of Hexavalent Chromium in Groundwater in the Western Mojave Desert, California
- <sup>d</sup>Izbiki, James A., Ball, James W., Bullen, Thomas, D., Sutley, Stephen J. Sutley. 2008. Chromium, Chromium Isotopes, and Selected Trace Elements, Western Mojave Desert, USA
- <sup>e</sup>Arizona Department of Environmental Quality (ADEQ) Open File Report June 2001. Ambient Groundwater Quality of the Sacramento Valley Basin: A 1999 Baseline Study
- <sup>f</sup>Robertson, Frederick N. 1991. Geochemistry of Ground Water in Alluvial Basins of Arizona, and Adjacent Parts of Nevada, New Mexico, and California. U.S. Geological Survey Professional Paper 1406-C.
- <sup>g</sup>State Water Resources Control Board Division of Water Quality GAMA Program. September 2009. Groundwater Information Sheet Chromium VI.
- <sup>h</sup>Evaluation of Geohydraulic Framework, Recharge Estimates, and Ground-Water Flow of the Joshua Tree Area, San Bernardino County, California. 2004. Nishikawa, Tracy., Izbiki, John A., Hevesi, Joesph A., Stamos, Christina L., and Martin, Peter.
- <sup>i</sup>Metropolitan Water District of Southern California (MWD) and Bureau of Land Management. 2001. Cadiz Groundwater Storage and Dry-Year Supply Program, Final EIR/EIS response to Comments.
- <sup>j</sup>Twentynine Palms Water District. 2010. June 2009 Consumer Confidence Report. June
- <sup>k</sup>Golden State Water Company. 2008 and 2010. Water Quality Report. Barstow Water System.
- <sup>l</sup>Golden State Water Company. 2010. Water Quality Report. Desert View Water System.
- <sup>m</sup>Golden State Water Company. 2010. Water Quality Report. Apple Valley South Water System.
- <sup>n</sup>Golden State Water Company. 2010. Water Quality Report. Lucerne Water System.

**Abbreviations:**

- µg/L = micro-grams per liter
- Cr(T) = total chromium, dissolved
- Cr(VI) = hexavalent chromium, dissolved
- ND = not detected at laboratory reporting limits
- NM = not measured
- UTL= upper tolerance limit
- USGS = United States Geological Survey

# **EXHIBIT C**



Source: Figure adopted from State Water Resources Control Board Division of Water Quality GAMA Program, 2009. Groundwater Information Sheet Chromium VI. September.

**FIGURE 1**  
**Concentration of Hexavalent Chromium**  
**Detected at Active and Standby CDPH Wells**  
*Pacific Gas and Electric Company*  
*Hinkley, California*

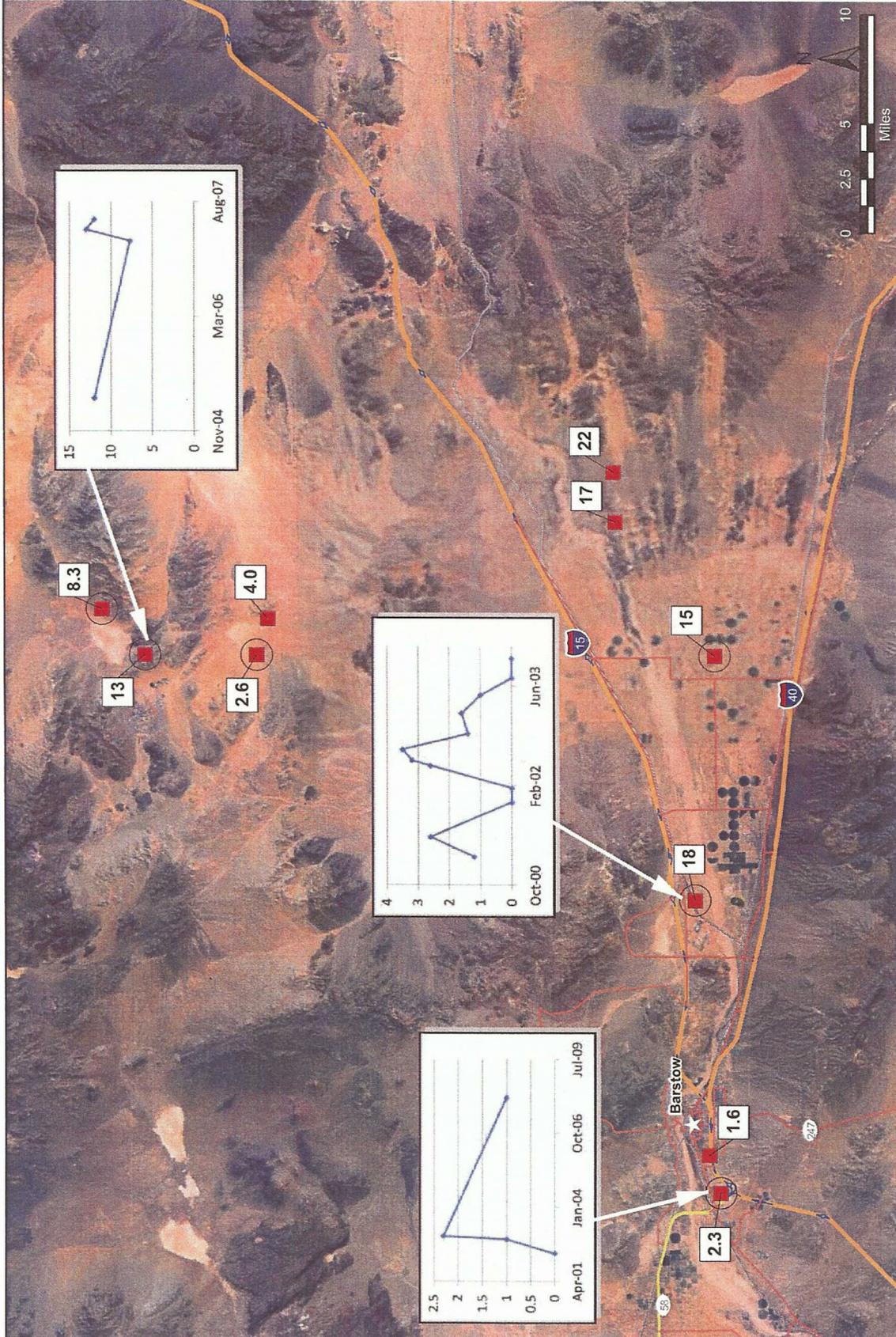
# **EXHIBIT D**



# **EXHIBIT E**



# **EXHIBIT F**



**FIGURE 4a**  
**Detected Cr(6) Results in the Mojave Area**  
**Water Supply Wells**  
 Pacific Gas and Electric Company  
 Hinkley, California

**CH2MHILL**

**Legend**

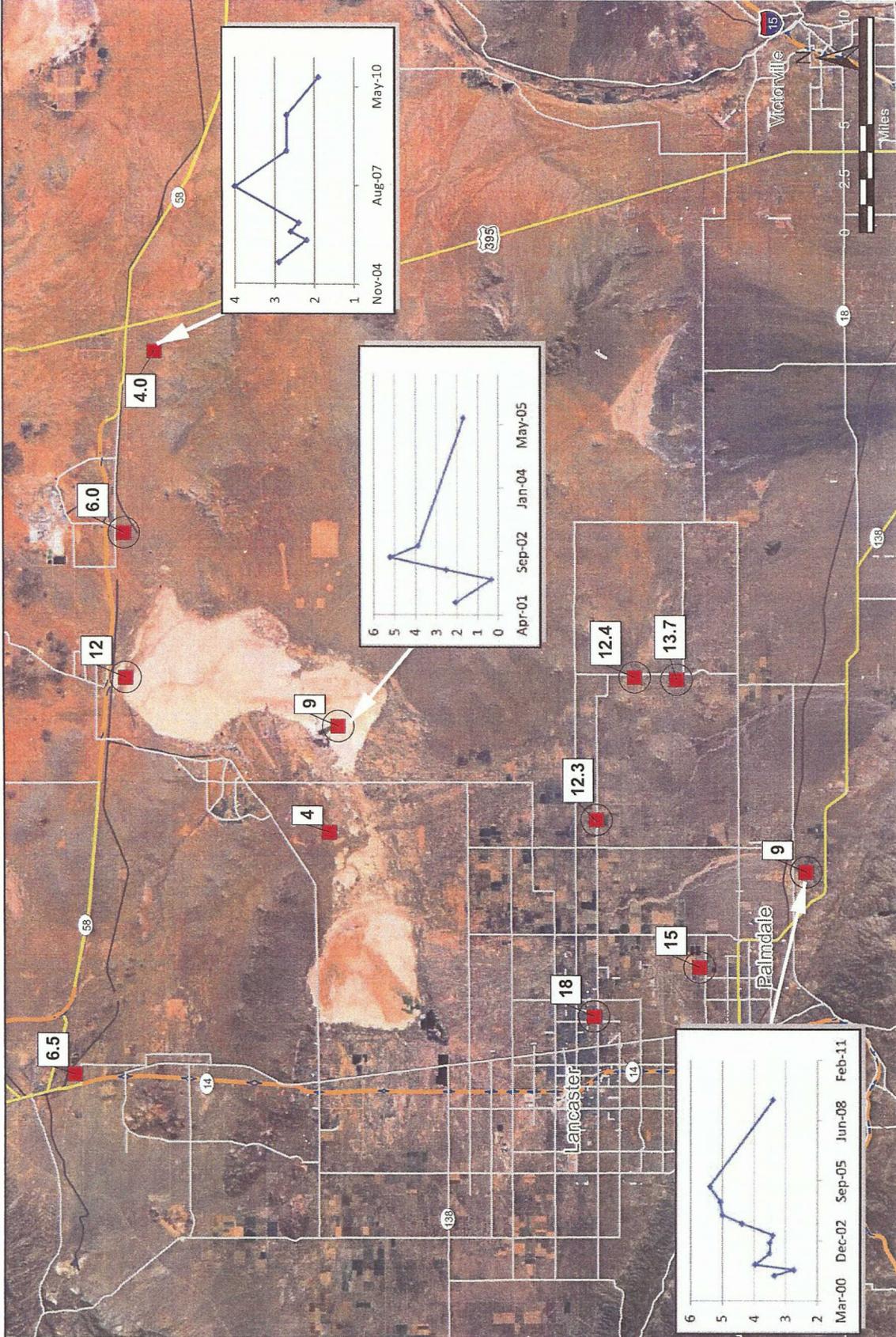
- Water Supply Wells - CDPH
- Cluster of Water Supply Wells
- 26 Highest Concentration of Cr(6) Detected at Well or Well Cluster

Graph Represents Cr(6) Detections from the Well(s) Over Time

Note: results are in µg/L

Source: <http://geotracker.waterboards.ca.gov/gama/pubmap/?CMD=runreport&myaddress=Hinkley+California>

# **EXHIBIT G**



**FIGURE 4b**  
**Detected Cr(6) Results in the Mojave Area**  
**Water Supply Wells**  
 Pacific Gas and Electric Company  
 Hinkley, California

Graph Represents Cr(6) Detections from the Well(s) Over Time

Note: results are in µg/L

Source: <http://geotracker.waterboards.ca.gov/gama/pubmapapp?CMD=runreport&myaddress=Hinkley,California>

**Legend**

- Water Supply Wells - CDPH
- Cluster of Water Supply Wells
- 6.5 Highest Concentration of Cr(6) Detected at Well or Well Cluster