Rebuttal Report to the Opinions of Timothy S. Simpson, P.E.; Susan M. Gallardo, PE; James W. Embree, Ph.D., DABT, and Dr. Steven G. Ellis

In the Matter of HUMBOLDT BAYKEEPER and ECOLOGICAL RIGHTS FOUNDATION v UNION PACIFIC RAILROAD COMPANY and NORTH COAST RAILROAD AUTHORITY, CUE VI, LLC

Prepared for:

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1. INTRODUCTION

I was retained by Lawyers for Clean Water on behalf of Humboldt Baykeeper and the Ecological Rights Foundation to prepare this report rebutting certain opinions offered by Timothy S. Simpson, P.E.; Susan M. Gallardo, P.E.; James W. Embree, Ph.D., DABT; and Dr. Steven G. Ellis, in the Matter of Humboldt Baykeeper and Ecological Rights Foundation v. Union Pacific Railroad Company, North Coast Railroad Authority, and CUE VI, LLC.

My qualifications, along with a list of my publications, are contained in my curriculum vita, which was provided with the January 27, 2008, *Expert Report of Bruce A. Bell, PhD, P.E., BCEE* (Expert Report) in this matter.

A list of my testimony at deposition and trial during the last four years was provided with my Expert Report in this matter and has been updated to the date of this report (Appendix A).

A list of the documents that I have utilized in my investigation and in the preparation of this report was provided with my Expert Report in this matter. A list of additional documents that have been provided to me after submission of my Expert Report and/or were used in my investigation and in the preparation of this report is attached as Appendix B.

Compensation to Carpenter Environmental Associates, Inc., for the work that has resulted in this report and for future work including my testimony at trial will be at the rates that were provided with my Expert Report in this matter. My time is billed as a Principal.

Either I or the staff of Carpenter Environmental Associates, Inc., under my supervision has done all work that is summarized in this report.

2. Rebuttal to *Expert Report of Timothy S. Simpson Regarding Storm Water Monitoring for "The Balloon Track," 736 Broadway, Eureka, California,* January 28, 2008, Geomatrix Consultants, Inc.

Mr. Simpson offers the following opinions regarding surface water quality in Clark Slough and on discharges from the Balloon Track site:

- Opinion 1 – The tributary area for Clark Slough is substantially larger than Balloon Track.
- Opinion 2 – Water quality for Clark Slough is influenced by a number of sources besides Balloon Track.
- Opinion 3 – There is no significant difference between the quality of storm water at Balloon Track and typical urban runoff entering Humboldt Bay in other locations.

Rebuttal to Opinion 1

On page 6 of his expert report, Mr. Simpson concludes that, "The tributary area for Clark Slough is substantially larger than the Balloon Track."

The extent of the drainage basin tributary to Clark Slough is irrelevant to the issue of discharges from the Balloon Track site to Clark Slough. Nevertheless, in his report, Mr. Simpson provides "Exhibit 1, Site Map Showing Drainage Area F," to support his opinion that Clark Slough receives storm water from a larger drainage basin in addition to discharge from the Balloon Track property. The extent of the drainage basin shown in Mr. Simpson's Exhibit 1 is unsupported. In particular, the portion of the drainage area delineated in Humboldt Bay that tidally impacts the Slough is unsupported. Mr. Simpson presents no data or analyses to support that portion of Exhibit 1, which is in Humboldt Bay.

Rebuttal to Opinion 2

On page 6 of his expert report, Mr. Simpson claims that, "Water quality for Clark Slough is influenced by a number of sources besides Balloon Track."

Mr. Simpson's entire discussion of contaminant discharges to Clark Slough from other sources in the overall drainage basin is irrelevant to the discharge of pollutants from Balloon Track to Clark Slough and Humboldt Bay. Evaluation of historical site activities conducted at Balloon Track shows potential on-site sources of metals and other contaminants, such as pentachorophenol and dioxin/furans (dioxin), that may impact surface water discharging to Clark Slough and have not been adequately assessed.[1,2]

Laboratory analyses of sediment samples collected on-site by the California Regional Water Quality Control Board, North Coast Region (RWQCB) and by Plaintiffs detected metals that could potentially discharge into Clark Slough. [3,4] Sampling of the ditch sediments by the RWQCB detected pentachlorophenol that could potentially discharge to Clark Slough.[5] Plaintiffs' sampling detected polychlorinated biphenyls (PCBs) and dioxins in ditch sediments that could potentially discharge to Clark Slough.[6,7] The analytical results of Clark Slough sediments collected by Plaintiffs in January 2008 showed highly elevated dioxin concentrations immediately adjacent to the point where the western ditch discharges to Clark Slough.[8,9] On-site sediment containing dioxin, PCBs, and pentachlorophenol may be transported from the site.

Mr. Simpson's attributes zinc, copper, chromium, and arsenic to the off-site presence of exposed building materials and treated lumber. Mr. Simpson ignores that these same materials are present on site and serve as potential sources for contamination detected on

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1 USEPA, Region 3, Mid-Atlantic Brownfields, Rail Yards, http:www.epa.gov/reg3hwmd/bfs/regional/industry/railyard.htm, July 26, 2007.

2 "Environmental Update #20, Environmental Contamination of Rail Yards," Hazardous Substance Research Centers, South & Southwest Outreach Programs, Louisiana State University, November 2005.

3 *Preliminary Assessment/Site Inspection*, State of California Regional Water Quality Control Board (RWQCB), May 7, 2001.

4 STL Sacramento, Analytical Results, August 23, 2007.

5 *Preliminary Assessment/Site Inspection*, RWQCB, May 7, 2001.

6 STL Sacramento, Analytical Results, August 23, 2007.

7 Soil Water Air Protection Enterprise (SWAPE), *Sediment and Water Sampling, January 10, 2008, Former Eureka Rail Yard, "Balloon Track," Eureka, California*, January 25, 2008.

8 SWAPE, *Sediment and Soil Sampling, January 10, 2008, Former Eureka Rail Yard, "Balloon Track," Eureka, California*, February 25, 2008.

9 "Figure 1 – Locations of Sediment and Surface Water Samples Collected on January 10, 2008," SWAPE, January 18, 2008.

site. For example, Mr. Simpson specifically ignored the arsenic present in herbicides documented to have been used on-site.[10]

Rebuttal to Opinion 3

On Page 8 of his expert report, Mr. Simpson claims, "There is no significant difference between the quality of storm water at Balloon Track and typical urban runoff entering Humboldt Bay in other locations."

As an initial matter, Mr. Simpson provides no basis to the claim that storm water discharges from sources other than Balloon Track are "typical" of other "urban runoff." Mr. Simpson compares limited sampling events of off-site storm water discharges, some of which Mr. Simpson notes are dry weather sampling and not storm water samples, collected as part of Baykeeper's "first flush" sampling in 2005 and 2006 to over 6 years of data of surface water sampling at Balloon Track. Except at Station D, surface water sampling on Balloon Tract does not represent surface water being discharged to Clark Slough. The remaining sampling locations on Balloon Track are in freshwater wetlands and are not representative of discharges to Clark Slough. Mr. Simpson fails to explain, and perhaps consider, that Baykeeper's "first flush" sampling locations, with three exceptions, are receiving water locations that do not consist of urban stormwater discharges. Clark Slough, for example, consists of storm water runoff as well as water from tidal interchange with Humboldt Bay, and perhaps other non-storm water discharges. Dry weather samples incorporated by Mr. Simpson in his analysis clearly do not represent urban storm water runoff. As a result of using inappropriate comparisons, Mr. Simpson's comparison fails.

Mr. Simpson's conclusions are also based on limited and selected data. Specifically, Mr. Simpson limits his comparison to only look at concentrations of zinc, copper, and lead, rather than all pollutants detected at Balloon Track, such as arsenic.

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[10] Draft *Final Remedial Action Plan, UPRR Eureka Railroad Yard and Adjacent Lease Properties, Eureka, California*, MFG, Inc., July 1, 2005.

Mr. Simpson does not account for the fact that water discharges from Balloon Track are a combination of surface water, groundwater, and storm water.[11] Additionally, whether other off-site storm water discharges to Humboldt Bay exceed Water Quality Objectives (WQOs) is not relevant to pollutant concentrations in discharges from Balloon Track or in surface water in freshwater wetlands on Balloon Track. What does matter is that contaminants in surface water discharges to Clark Slough at concentrations in excess of WQOs have been detected at Station D.

[12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37] Discharges containing

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[11] Even the tables that Mr. Simpson attaches to his report tabulating the discharges from Balloon Track note that the sampling is not storm water: Station A is listed as "freshwater wetland"; Station C "freshwater wetland receiving water"; Station B: “freshwater wetland"; Station D: “tidally influenced slough"; Station E "tidally influenced slough receiving water”; Station F "freshwater wetland." See Simpson Expert Report, Tables 1-2.

[12] December 2001 Stormwater Observations and Analytical Results, Former Eureka Railroad Yard, Eureka, California, Geomatrix Consultants, January 25, 2002.

[13] January 2002 Stormwater Observations and Analytical Results Former Eureka Railroad Yard, Eureka, California, Geomatrix Consultants, February 14, 2002.

[14] February 2002 Stormwater Observations and Analytical Results, Former Eureka Railroad Yard, Eureka, California, Geomatrix Consultants, March 25, 2002.

[15] December 2002 Stormwater Observations and Analytical Results, Former Eureka Railroad Yard, Eureka, California, Geomatrix Consultants, January 29, 2003.

[16] January 2003 Stormwater Observations and Analytical Results, Former Eureka Railroad Yard, Eureka, California, Geomatrix Consultants, February 27, 2003.

[17] February 2003 Stormwater Observations and Analytical Results, Former Eureka Railroad Yard, Eureka, California, Geomatrix Consultants, March 28, 2003.

[18] March 2003 Stormwater Observations and Analytical Results, Former Eureka Railroad Yard, Eureka, California, Geomatrix Consultants, April 29, 2003.

[19] April 2003 Stormwater Observations and Analytical Results, Former Eureka Railroad Yard, Eureka, California, Geomatrix Consultants, May 28, 2003.

[20] May 2003 Stormwater Observations and Analytical Results, Former Eureka Railroad Yard, Eureka, California, Geomatrix Consultants, June 26, 2003.

[21] December 2003 Stormwater Observations and Analytical Results, Former Eureka Railroad Yard, Eureka, California, MFG, Inc., January 30, 2004.

[22] January 2004 Stormwater Observations and Analytical Results, Former Eureka Railroad Yard, Eureka, California, MFG, Inc., March 23, 2004.

[23] February 2004 Stormwater Observations and Analytical Results, Former Eureka Railroad Yard, Eureka, California, MFG, Inc., April 5, 2004.

[24] March 2004 Stormwater Observations and Analytical Results, Former Eureka Railroad Yard, Eureka, California, MFG, Inc., May 7, 2004.

[25] October 2004 Stormwater Observations and Analytical Results, Former Eureka Railroad Yard, Eureka, California, MFG, Inc., December 8, 2004.

[26] December 2004 Stormwater Observations and Analytical Results, Former Eureka Railroad Yard, Eureka, California, MFG, Inc., January 31, 2005.

[27] January 2005 Stormwater Observations and Analytical Results, Former Eureka Railroad Yard, Eureka, California, MFG, Inc., March 1, 2005.

contamination in excess of the WQOs to waters of the state are not authorized from Balloon Track. [38,39]

Comparisons of discharges of groundwater, surface water and storm water at Balloon Track to Baykeeper's "first flush" discharges are irrelevant and misleading. Typical urban runoff is not the same as first flush runoff.[40] First flush sampling events attempt to capture the storm water runoff from an area**.** Particularly after long dry periods, the first flush sampling often contains higher concentrations of pollutants when compared to pollutant concentrations of sampling conducted later in the storm event. First flush sampling normally would not contain shallow groundwater because of the slower movement of groundwater compared to surface water runoff. Monitoring of water discharges at Balloon Track was not designed to be first flush monitoring and did include contributions from groundwater. Neither the Cleanup and Abatement Order (CAO) nor the storm water sampling plans specify sampling within a specific time of the start of storm.[41,42,43]

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28 February 2005 Stormwater Observations and Analytical Results, Former Eureka Railroad Yard, Eureka, California, MFG, Inc., April 1, 2005.

29 March 2005 Stormwater Observations and Analytical Results, Former Eureka Railroad Yard, Eureka, California, MFG, Inc., May 5, 2005.

30 April 2005 Stormwater Observations and Analytical Results, Former Eureka Railroad Yard, Eureka, California, MFG, Inc., June 1, 2005.

31 May 2005 Stormwater Observations and Analytical Results, Former Eureka Railroad Yard, Eureka, California, MFG, Inc., July 5, 2005.

32 November 2005 Stormwater Observations and Analytical Results, Former Eureka Railroad Yard, Eureka, California, MFG, Inc., December 30, 2005.

33 December 2005 Stormwater Observations and Analytical Results, Former Eureka Railroad Yard, Eureka, California, MFG, Inc., January 30, 2006.

34 January 2006 Stormwater Observations and Analytical Results, Former Eureka Railroad Yard, Eureka, California, MFG, Inc., February 28, 2006.

35 March 2006 Stormwater Observations and Analytical Results, Former Eureka Railroad Yard, Eureka, California, MFG, Inc., April 28, 2006.

36 April 2007 Surface Water Monitoring Report, Former Union Pacific Railroad Yard, Eureka, California, SHN Consulting Engineers and Geologists, Inc., June 1, 2007.

37 June 2006 Stormwater Observations, Former Eureka Railroad Yard, Eureka, California, MFG, Inc., July 15, 2006.

38 State Water Resources Control Board, "Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California," 2005.

39 40 CFR 131.38(c)(2)(i).

40 Hager, Mary Catherine, "Evaluating First Flush," *Stormwater*, Volume 9, Number 1, January/February 2008.

41 Cleanup and Abatement Order No. R1-2001-26 For Union Pacific Railroad Company, 736 Broadway, Eureka, California, Humboldt County, RWQCB, May 9, 2001.

Mr. Simpson's use of box and whisker plots to compare data sets and determine if the data sets are significantly similar is inappropriate. Box and whisker plots are normally used as a tool to determine outliers in a given dataset.[44] Parametric or non-parametric tests can be used to determine if two data sets are statistically similar, depending upon whether or not the data can be fit to an underlying probability distribution.[45] Non-parametric tests determine if the data sets are statistically similar when the data cannot be fit to a known probability distribution. Parametric tests can be used when the underlying probability distribution is known. These tests can be used to determine if two data sets are similar at a statistically significant level; usually the 95% confidence interval.[46,47,48,49]

In order to support an opinion that there is no significant difference between water leaving Balloon Track and typical urban storm water or surface water, leaving aside all the shortcomings identified above, Mr. Simpson needed to show: 1) Baykeeper's first flush study is representative of urban storm water; 2) Baykeeper's first flush results did not include Balloon Track discharges; and 3) there is no statistically significant difference between the two data sets at a particular confidence interval – usually 95% using appropriate statistical testing. Mr. Simpson has not demonstrated any of these conditions.

The southeastern ditch (Figure 1) discharges to a pipe located at the site property line with the Del-Reka Distributing Corporation site, located at 510 West Washington Street. This discharge potentially discharges to Clark Slough and is unmonitored. Without

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42 "Stormwater Work Plan for the Former Eureka Railroad Yard, Eureka, California," Geomatrix Consultants, Inc., August 7, 2001.

43 "Stormwater Work Plan for the Former Eureka Railroad Yard, 2003-2004 Storm Season, Eureka, California," Geomatrix Consultants, Inc., October 16, 2003.

44 "Box Plots," Internet Center for Management of Business Administration Inc., http://www.netmba.com/statistics/plot/box, 2007.

45 Motulsky, Harvey, "Intuitive Biostatistics: Choosing a Statistical Test," http://www.graphpad.com/www/book/Choose.htm, 1995.

46 Trochim, William M.K., "Research Method Knowledge Base: The T-Test," http://www.socialresearchmethods.net/kb/stat_t.php, 2006.

47 Simon, Steve, "Parametric Versus Nonparametric Tests," http://www.childrens-mercy.org/stats/ask/parametric.asp, 2001.

48 Motulsky, Harvey, "Intuitive Biostatistics: Choosing a Statistical Test," http://www.graphpad.com/www/book/Choose.htm, 1995.

49 "The Prism Guide to Interpreting Statistical Results: Interpreting the Kruskal-Wallis Test," http://www.graphpad.com/articles/interpret/ANOVA/kruskal_wallis.htm, 1999.

monitoring at this point, there is further inadequate basis for comparing pollutant levels in discharges from Balloon Track with other pollutant levels in urban storm water discharges Mr. Simpson's "middle plot" also fails to analyze data collected at Balloon Track prior to 2003 because he claims that data is post remediation (see page 9 of Simpson's report); however, Station D and Station F were not impacted by remediation and Stations A and B may not have been impacted, thus all available data were not used.

3. Rebuttal to *Expert Witness Report of Susan M. Gallardo, PE, January 29, 2008, Former Union Pacific Railroad Balloon Track (Balloon Track), Eureka, California, Geomatrix Consultants, Inc.*

Ms. Gallardo has offered the following opinions regarding contamination on Balloon Track site:

- Opinion 1 – Sites where soil and groundwater are affected by petroleum hydrocarbons and metals are common, and Balloon Track is typical for these types of sites.
- Opinion 2 – The mitigation response to the chemical impacts identified at the site was reasonable and typical.

As an initial matter, Ms. Gallardo only references one document that has data regarding sampling of discharges at Balloon Track, which was prepared in 2001 (see pages 1-2 "Data considered"). Ms. Gallardo's opinions thus are apparently formed without analyzing the six plus years of data collected at Balloon Track even though she has represented herself as the Principal-in-Charge for the site through 2003.

Rebuttal to Opinion 1 -

On page 2 of her report, Ms. Gallardo states that "Sites where soil and groundwater are affected by petroleum hydrocarbons and metals are common, and Balloon Track is typical for these types of sites."

Ms. Gallardo's assertion that the contaminants detected in soil and groundwater at Balloon Track, particularly petroleum hydrocarbons and metals, are commonly detected

at former industrial sites is irrelevant to whether Balloon Track may create an imminent and substantial endangerment.

Balloon Track soils are impacted by metals commonly associated with site-specific activities known to have been performed at Balloon Track including railroad operations and railroad repair activities. Metals concentrations in the soils exceed residential and industrial Preliminary Remediation Goals (PRGs) as well as impact to groundwater screening levels indicating the need for additional investigation and analysis of potential impact to human health and the environment.[50] Metals are commonly found in railroad yard soils due to site activities; therefore, historical site operations are a potential source of the metal contamination confirmed on Balloon Track.[51,52]

For instance, arsenical herbicides were used at the tracks on Balloon Track.[53] Arsenic concentrations have been detected above residential and industrial PRGs and above impact to groundwater screening levels on Balloon Track. Arsenic concentrations in on-site groundwater have been detected Maximum Contaminant Levels (MCLs). Groundwater flow from additional areas containing concentrations of arsenic above impact to groundwater screening levels to Humboldt Bay is unmonitored.[54]

Ms. Gallardo also ignores the presence of dioxin, pentachlorophenol, and PCBs on Balloon Track that are potentially related to historical site activities. Pentachlorophenol is commonly used in the treatment of railroad ties.[55,56] Pentachlorophenol is known to be

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50 USEPA, Region 9: Superfund, "Preliminary Remediation Goals, Frequently Asked Questions," December 18, 2007.

51 USEPA, Region 3, Mid-Atlantic Brownfields, Rail Yards, http:www.epa.gov/reg3hwmd/bfs/regional/industry/railyard.htm, July 26, 2007.

52 "Environmental Update #20, Environmental Contamination of Rail Yards," Hazardous Substance Research Centers, South & Southwest Outreach Programs, Louisiana State University, November 2005.

53 Draft *Final Remedial Action Plan, UPRR Eureka Railroad Yard and Adjacent Lease Properties, Eureka, California*, MFG, Inc., July 1, 2005.

54 Benjamin Ross, Ph.D., *Ground-Water Movement at the Balloon Track Site*, Eureka, California, January 28, 2008.

55 USEPA, Region 3, Mid-Atlantic Brownfields, Rail Yards, http:www.epa.gov/reg3hwmd/bfs/regional/industry/railyard.htm, July 26, 2007.

56 USEPA Region 6, Jasper Creosoting Company, Jasper County, Texas, Fact Sheet.

contaminated with dioxin.[56] Another potential source of the elevated dioxin concentrations on site is the use and improper storage/disposal of herbicides such as 2,4,5 trichlorophenoxyacetic acid (2,4,5-T) and/or 2,4,dichlorophenoxyacetic acid (2,4, D), which are known to be contaminated with dioxin[57] Other potential on-site sources of dioxins include the potential burning of railroad ties and the storage and/or transportation of treated lumber. Regardless of the source of the materials, water discharged from Balloon Track to other waters of the State (Clark Slough, Humboldt Bay) contains metals and potentially other contaminants from site related activities above WQOs.

In her discussion of gasoline additives and metal impacts at Balloon Track, Ms. Gallardo ignored the use of leaded-gasoline on site during site operations and attributes the on-site lead to atmospheric deposition.[58] The on-site use and storage of leaded gas were not discussed in Ms. Gallardo's report as a potential contaminant.

Rebuttal to Opinion 2 –

On page 4 of her report, Ms. Gallardo states that, "The mitigation response to the chemical impacts identified at the site was reasonable and typical."

The mitigation response to the chemical impacts identified at Balloon Track was not typical and reasonable for the following reasons:

- All pollutants were not investigated – dioxin/furans, PCBs, pentachlorophenol.[59,60,61,62]

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56 USEPA, "Preliminary Risk Assessment, Pentachlorophenol ("Penta"), HCB and Dioxin: Questions and Answers," April 2007.

57 Report on Carcinogens, Eleventh Edition; U.S. Department of Health and Human Services, Public Health Service, National Toxicology Program, "2,3,7,8-Tetrachlorodibenzo-*p*-Dioxin (TCDD); "Dioxin," CAS No. 1746-01-6, *Report on Carcinogens, Eleventh Edition*.

59 *Draft Proposed Remedial Action and Site Development Plan*, Geomatrix Consultants, June 1999.

59 *Preliminary Assessment/Site Inspection*, RWQCB, May 7, 2001.

60 STL Sacramento, Analytical Results, August 23, 2007.

61 SWAPE, *Sediment and Water Sampling, January 10, 2008, Former Eureka Rail Yard, "Balloon Track," Eureka, California*, February 25, 2008.

62 Figure 1 – Locations of Sediment and Surface Water Samples Collected on January 10, 2008, SWAPE, January 18, 2008.

- All media were not addressed – sediment.

- Data gaps, particularly in well placement, preclude determination of whether groundwater was impacted in areas described by Drs. Bell and Ross.

- Data gaps prevent the impact from arsenic on groundwater from being fully evaluated. Where a monitoring well could intercept arsenic impacted groundwater, the arsenic concentration exceeded the MCL.

- Data gaps include an insufficient number of groundwater monitoring locations to adequately determine extent of groundwater impacts from site activities, no surface water or sediment sampling in the on-site southeastern wetlands, and failure to monitor the off-site water discharges from the culvert at the Del-Reka Distributing Corporation site, located at 510 West Washington Street, and the lack of sample analysis for all potential pollutants of concern.

- Sampling of discharges at Balloon Track subsequent to remediation of the waste oil pits at the site demonstrates ongoing discharges containing levels of contaminants above WQOs.

4. Rebuttal to *Expert Report of James W. Embree, PH.D., DABT,* January 28, 2008, Geomatrix Consultants, Inc.

On page 4 of his report, Dr. Embree states "it is my opinion that the site does not currently present an imminent and substantial endangerment to health as applied in Section 7003 of RCRA."

Rebuttal to Opinion –

Dr. Embree basis his opinion on four findings: contamination has been mitigated; access to the site is limited; the Health Risk Assessment is based on a hypothetical exposure pathways and documents insignificant risk; the site is under supervision of the RWQCB. These are addressed below; however, as an initial matter, sampling post-remediation demonstrates discharges at Balloon Track containing levels of contaminants above WQOs.

Dr. Embree forms his opinion while ignoring available facts and data:

- Contaminant concentrations of arsenic, lead, antimony, benzo(a)anthracene, copper, iron, and tetrachloroetheylene in on-site soil all exceeded the residential direct contact exposure pathway as defined by the Region 9 PRGs.

- Contaminant concentrations of arsenic in on-site soil exceeded the industrial direct contact exposure pathway as defined by the Region 9 PRGs.

Arsenic concentrations were detected in groundwater above the MCL and may be a risk to human health if the ground water is used as a drinking water source. The beneficial use of groundwater is municipal drinking water.[63]

Exceedances of the PRGs indicate that a potential for human risk due to residual compounds exists and must be further assessed.[64]

Large data gaps exist that inhibit full evaluation of potential arsenic contamination of groundwater and for evaluating the impact to groundwater from the former waste discharge pits. The site has not been characterized for dioxins and PCBs; both of which have been found in on-site sediments at elevated levels.[65,66] It is not acceptable to quantify risk without full site delineation and characterization.[67]

Dr. Ellis claims that the site is not an imminent and substantial endangerment because the RWQCB is supervising the site and is "the public agency charged with protecting public health…" The RWQCB, however, is not the lead agency charged with protecting public health but rather protecting water quality and quantity.[68] The California Health and Safety Code, Division 20, Chapter 6.5 designates the Department of Toxic Substances

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63 RWQBC, "Water Quality Plan for the North Coast Region," January 2007.

64 USEPA, Region 9: Superfund, "Preliminary Remediation Goals, Frequently Asked Questions," December 18, 2007.

65 STL Sacramento, Analytical Results, August 23, 2007.

66 SWAPE, *Sediment and Water Sampling, January 10, 2008, Former Eureka Rail Yard, "Balloon Track," Eureka, California*, January 25, 2008.

67 USEPA, *Interim Final RCRA Facility Investigation (RFI) Guidance, Volume I of IV, EPA 530/SW-89-031*, May 1989.

68 The Board's mission is to "Preserve, enhance, and restore the quality of California's water resources, and ensure their proper allocation and efficient use for the benefit of present and future generations." http://www.waterboards.ca.gov/northcoast/.

Control as the lead agency for the oversight of cleanup of sites where hazardous substances have been released.[69]

5. Rebuttal to *Expert Report Regarding Former Union Pacific Railroad Yard: Imminent and Substantial Endangerment to the Environment, Dr. Steven G. Ellis, Geomatrix Consultants, Inc.*

On pages 11 and 12 of his report, Dr. Ellis states that imminent and substantial endangerment has not been demonstrated by the data collected during on-site surface water monitoring required by the CAO and because of the biological data from Clark Slough.

Rebuttal to Opinion –

Dr. Ellis's conclusion is admittedly based on data "collected from December 29, 2003 to April 12, 2007" (see page 12), and thus Dr. Ellis did not take into account all of the available water sampling data, or any of the soil and sediment data. Dr. Ellis states that he is analyzing the site's storm water samples and, as explained in rebuttal to Mr. Simpson's report, Dr. Ellis's assertion is incorrect. Dr. Ellis' opinion also did not take into account the data gaps where no data currently exist (e.g. the southeast wetlands; groundwater south of the operations area; unmonitored off-site discharge).

Dr. Ellis limited his analysis to water discharge data collected beginning in December 2003, after remediation of the waste oil pit area. Water sampling data at Stations D and F cannot have been impacted by the waste oil pit. Water sampling at Stations A and B may or may not have been impacted by the waste oil pit. Because Stations D and F could not have been impacted and Stations A and B may not have been impacted, the entire data set should have been evaluated for these stations.

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69 "The Mission of the Department of Toxic Substances Control is to provide the highest level of safety, and to protect public health and the environment from toxic harm." http://www.dtsc.ca.gov/

Dr. Ellis is inconsistent regarding water reaching Clark Slough from ditches. Dr. Ellis first says, without support, that it is his understanding that the amount of water, if any, reaching the Slough from ditches has not been established; however, later in the paragraph he notes that flow rates are measured at the monitoring stations during CAO monitoring events when feasible.

Dr. Ellis also ignores the impact of the unmonitored discharge from the southeastern site ditch into the pipe located at the site property line that enters into the Del-Reka Distributing Corporation site, located at 510 West Washington Street, to Clark Slough.

Dr. Ellis failed to properly consider metals exceedances using acute and chronic exposure criteria. First, Dr. Ellis used dissolved metal concentrations to determine exceedance of the criteria. This is wrong. There are no EPA-approved analytical methods for dissolved metals in the Clean Water Act regulations. EPA Guidance recommends that dissolved metal criteria be converted to total recoverable metals and the converted data compared to the WQOs. [70,71]

Dr. Ellis also uses dilution to explain away exceedances of the WQOs. WQOs apply without dilution at the discharge point from the site.[72,73] No mixing zone exists for these discharges nor can one exist in the absence of an NPDES permit. [74] In addition, Dr. Ellis provides no data that dilution is even available for metals of concern. Additionally, if Clark Slough contains metals of concern with concentrations at or above the relevant WQOs, no dilution is available

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70 40 CFR 136, Guidelines Establishing Test Procedures for the Analysis of Pollutants, Table IB – List of Approved Inorganic Test Procedures."

71 USEPA, *Interim Guidance on Interpretation and Implementation of Aquatic Life Criteria for Metals*, May 1992.

72 State Water Resources Control Board, "Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California," 2005.

73 40 CFR 131.38(c)(2)(i).

74 State Water Resources Control Board, "Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California," 2005.

Dr. Ellis claims that lead concentrations in surface water do not constitute imminent and substantial endangerment. Lead concentrations exceeded the WQO for lead in Station F on March 16, 2006. Lead was not sampled again until February 21, 2007, and was analyzed with a detection limit of 5 parts per million (ppm), greater than the WQO of 3 ppm; and, therefore, may have contained lead concentrations greater than the WQO. Exceedance of the WQO may present and imminent and substantial endangerment to the environment.[75]

Lead concentrations reported at Station A have exceeded the WQO as late as March 2007. No sample was collected in April 2007. Exceedance of the WQO may present and imminent and substantial endangerment to the environment.

Lead concentrations exceeded WQO in Station B on November 21, 2006. Lead was not sampled again until February 21, 2007, and was analyzed with a detection limit of 5 ppm, greater than the WQO of 3 ppm; and, therefore, may have contained lead concentrations greater than the WQO. Exceedance of the WQO may present and imminent and substantial endangerment to the environment.

Copper concentrations have been detected recently above the WQO at Stations A, B, and D. Exceedance of WQO may present and imminent and substantial endangerment to the environment.

[75] In my original report, tables 2 through 5 contained errors and were confusing. To correct the errors and avoid confusion, I am attaching revised Tables 2 through 5 (Appendix C). The recalculation resulted in additional exceedances than reported in my original expert report.

APPENDIX A

UPDATED: February 22, 2008				
CASE	**COURT**	**TYPE**	**ACTION NO.**	**YEAR**
American Canoe Association; Professional Paddlesports Association; Conservation Council of North Carolina; United States of America v. Murphy Farms, Inc., d/b/a Murphy Family Farms and D.M. Farms of Rose Hill, L.L.C.	US District Court for the Eastern District of North Carolina Southern Division	Deposition & Trial Testimony	7-98-CV-4-V(1) 7-98-CV-19-F(1) 5-98-CV-209-F(1)	1998, 2001 & 2004
Interfaith Community Organization v. Honeywell Int'l, et. al.	US District Court for the District of New Jersey	Deposition & Trial Testimony	96-2997	2001 & 2004
Santa Monica Baykeeper, et. al. V. The City of Los Angeles.	United States District Court Central District of California	Deposition Testimony	No. 98-9039 RSWL (SHx), No. 01-191 Consolidated Case	2003 & 2004
Tappan Wire & Cable, Inc. v. County of Rockland, et al.	Supreme Court of the State of New York, Count of Rockland	Trail Testimony	Index No. 3273/00 (WKN)	2004
Friends of Milwaukee's Rivers and Alliance for the Great Lakes v. Milwaukee Metropolitan Sewer District	United States District Court Northern District of Illinois, Eastern Division	Deposition and Trial Testimony	02-C-0270	2005
In Re: Flood Litigation, Upper Guyandotte River, Sub-Watersheds 2A (Mullens) and 2E (Oceana)	Circuit Court of Raleigh County, West Virginia	Deposition and Trial Testimony	Civil Action 02-C-727	2006
BILL THIEBAUT, in his official capacity as District Attorney for the Tenth Judicial District of Colorado, and Sierra Club v. Colorado Springs Utilities and City of Colorado Springs	United States District Court for the District of Colorado	Deposition & Trial Testimony	Civil Action No. 05-CV-01994-WDM-BNB (consolidated with 05-CV-02468-WDM-BNB)	2006 & 2008
Robert C. Carter v. Monsanto Company and Apogee Coal Company	Circuit Court of Putnum County, West Virginia	Deposition Testimony	Civil Action No. 00-C-300	2007

UPDATED: February 22, 2008				
CASE	**COURT**	**TYPE**	**ACTION NO.**	**YEAR**
In the Matter of State of Maryland, Department of the Environment, Plaintiff v. Honeywell International, Inc.and Maryland Port Administration, Defendants, Baltimoreans United in Leadership Development ("BUILD"), New Shilow Baptist Chruch of Turner Station, Herman Fleming, and Tany Fleming, Plaintiffs-Intervenors v. Honeywell International, Inc., and Maryland Port Administration, Defendants	Circuit Court of Baltimore County, Maryland	Deposition	Civil Action MJG-07-724	2008

APPENDIX B

	Balloon Track/Union Pacific
DATE	TITLE
27-Jan-08	Expert Report of Bruce A Bell, Ph.D., P.E., BCEE In the Matter of Humboldt Baykeeper & Ecological Right Foundation v Union Pacific Railroad Company & North Cost Railroad Authority, CUE VI, LLC
Undated	Expert Report Regarding Former Union Pacific Railroad Yard: Imminent & Substantial Endangerment to the Environment, Dr. Steven G. Ellis, Geomatrix Consultants, Inc.
28-Jan-08	Expert Report of James W. Embree, Ph.D, DABT
29-Jan-08	Expert Witness Report of Susan M. Gallardo, PE, January 29, 2008
29-Jan-08	Expert Report of Timothy S. Simpson Regarding Stormwater Monitoring for "The Balloon Track"
08-Feb-08	Department of Toxic Substances Control Commens on EIR For Sonoma-Marin Area Rail Transit District Project
21-Jan-08	Expedited Dioxin Data, Sediments, January 10, 2008
01-Jul-99	Union Pacific Railroad, Curtis Park Site, Sacramento, DTSC Releases Task Force Report
06-Feb-08	Jasper Creosoting Company, Jasper, Texas
30-Sep-96	EPA Superfund Record of Decision: American Creosote Works, Inc.
18-Dec-07	Region 9: Superfund, Preliminary Remediation Goals, Frequently Asked Questions
	The Prism Guide to Interpreting Statistical Results: Interpreting the Kruskal-Wallis Test
	Parametric Versus Nonparametric Tests
	Research Methods Knowledge Base: The T Test
	Intuitive Biostatistics: Choosing a Statistical Test
	Box Plots Internet Center for Management & Business Administration
10-Jan-08	07040 January 10, 2008 Photographs
16-Feb-08	Preliminary Dioxin TEQ's, January 10, 2008, Sampling Event
15-Feb-08	Preliminary Fish Data, January 10, 2008, Sampling Event
01-Apr-07	Preliminary Risk Assessment, Pentachlorophenol ("Penta"), HCB, & Dioxin: Questions & Answers, Pesticides: Topical & Chemical Fact
	Report on Carcinogens, Eleventh Edition; U.S. Department of Health & Human Services, Public Health Service, National Toxicology Program, "2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD); "Dioxin," CAS No. 1746-01-6, Report on Carcinogens, Eleventh Edition
10-Jan-08	Jim Roger's Inspection Photos January 10, 2008, Sampling Event
09-Mar-22	RWQCB Comments on the Results of Soil & Groundwater Investigation at the Former General Petroleum Parcel
01-May-89	Interim Final RCRA Facility Investigation (RFI) Guidance, Volume I of IV
01-Jan-08	"Evaluating First Flush," Stormwater, January/February 2008, Vol. 9, No. 1
01-May-92	Interim Guidance on Interpretation & Implementation of Aquatic Life Criteria for Metals
	California Codes, California Health & Safety Code, Health & Safety Code Section 25110-25124, Division 20, Chapter 6.5
24-Jan-04	Comment Letter 2 Draft Environmental Impact Report, Sonoma-Marin Area Rail Transit District
01-Feb-99	40 CFR Part 136 - Guidelines Establishing Test Procedures for the Analysis of Pollutants
25-Feb-08	Sediment & Water Sampling, January 10, 2008, Former Eureka Rail Yard, "Balloon Track," Eureka, California
29-Jun-05	Mission Statement - California Department of Toxic Substance Control
29-Jun-05	Mission Statement - California North Coast Water Quality Control Board
	Humboldt Bay First Flush 2005 Report
08-Nov-05	Laboratory Results From First Flush 2005 At Clark Slough

APPENDIX C

Table 2
Analytical Results Summary - Surface Water
Station A
Revised February 22, 2008
CEA No. 07040

LOCATION	DATE	ARSENIC (total) ug/l	COPPER (total) ug/l	COPPER (total) ug/l	COPPER (total) ug/l	LEAD (total) ug/l	LEAD (total) ug/l	LEAD (total) ug/l	ZINC (total) ug/l	ZINC (total) ug/l	ZINC (total) ug/l
Data Compared to:		CCC 150 ug/l	Freshwater CCC at Noted Hardness ug/l	Freshwater CCC at CAO Limits and at Noted Hardness ug/l [1]	Freshwater CMC at Noted Hardness ug/l	Freshwater CCC at Noted Hardness ug/l	Freshwater CCC at CAO Limits and at Noted Hardness ug/l [1]	Freshwater CMC at Noted Hardness ug/l	Freshwater CCC at Noted Hardness ug/l	Freshwater CCC at CAO Limits and at Noted Hardness ug/l [1]	Freshwater CMC at Noted Hardness ug/l
A	11/28/2001	<5	17	17	17	<15	<15	<15	55	55	55
A	12/17/2001	6.5	18	18	18	9.4	9.4	9.4	72	72	72
A	1/8/2002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
A	2/7/2002	1.9	8.8	8.8	8.8	7.4	7.4	7.4	27	27	27
A	12/19/2002	5.7	23	23	23	50	50	50	80	80	80
A	1/13/2003	9.07	27.5	27.5	27.5	58.8	58.8	58.8	92.6	92.6	92.6
A	2/19/2003	5.38	23.8	23.8	23.8	42.3	42.3	42.3	75.6	75.6	75.6
A	3/26/2003	1.42	12.4	12.4	12.4	12.3	12.3	12.3	33.7	33.7	33.7
A	4/2/2003	1.2 J	13	13	13	13.4	13.4	13.4	25.6	25.6	25.6
A	5/8/2003	3.75	18.4	18.4	18.4	14	14	14	24.9	24.9	24.9
A	12/29/2003	NA	<10	<10	<10	<10	<10	<10	<20	<20	<20
A	1/9/2004	NA	<10	<10	<10	<5.0	<5.0	<5.0	<10	<10	<10
A	2/2/2004	NA	48	48	48	40	40	40	540	540	540
A	3/26/2004	NA	13	13	13	<5.0	<5.0	<5.0	14	14	14
A	10/19/2004	NA	21	21	21	17	17	17	37	37	37
A	12/8/2004	NA	5.3	5.3	5.3	<5.0	<5.0	<5.0	16	16	16
A	1/7/2005	NA	6.9	6.9	6.9	9.9	9.9	9.9	21	21	21
A	2/28/2005	NA	8.7	8.7	8.7	5.9	5.9	5.9	19	19	19
A	3/23/2005	NA	7.2	7.2	7.2	<5	<5	<5	11	11	11
A	4/7/2005	NA	7.3	7.3	7.3	<5.0	<5.0	<5.0	15	15	15
A	5/9/2005	NA	15	15	15	<5.0	<5.0	<5.0	14	14	14
A	11/3/2005	NA	17	17	17	<5.0	<5.0	<5.0	14	14	14
A	12/1/2005	NA	7.9	7.9	7.9	<5.0	<5.0	<5.0	13	13	13
A	1/3/2006	NA	6.4	6.4	6.4	7.4	7.4	7.4	13	13	13
A	2/27/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
A	3/16/2006	NA	6.1	6.1	6.1	8.3	8.3	8.3	14	14	14
A	4/30/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
A	5/30/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
A	6/30/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
A	10/1/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
A	11/21/2006	NA	12	12	12	13	13	13	23	23	23
A	12/12/2006	NA	8	8	8.0	<5.0	<5.0	<5.0	12	12	12
A	2/21/2007	NA	8.7	8.7	8.7	6.4	6.4	6.4	13	13	13
A	3/27/2007	NA	30	30	30	6	6	6	21	21	21
A	4/12/2007	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

CAO - Cleanup and Abatement Order (R1-2001-26), Freshwater Criteria
WQO - Water Quality Objective
Red Text - Exceedance of WQO (at CMC or CCC or CAO values)
ug/l - micrograms per liter
CMC - Criteria Maximum Concentration
CCC - Criteria Continuous Concentration

[1]The numbers listed here have been compared to capped calculated CAO values as total recoverable. CAO values listed as dissolved were converted to total recoverable using the equations, conversion factors and a hardness of 100 mg/L as noted in the CFR 131.38 (dissolved CAO limits occur at hardness of 100 mg/L). The total recoverabable values equal the dissolved values, with the exception of lead.

CAO Criteria	
CAO Arsenic	150 ug/L dissolved
CAO Copper	9.0 ug/L dissolved
CAO Lead	2.5 ug/L dissolved
CAO Zinc	120 ug/L dissolved

[2] CAO states that detection limit is 3 ug/L and is controlling. All values under 3.0 ug/L are converted to 3.0 ug/L.

Table 2
Analytical Results Summary - Surface Water
Station A
Revised February 22, 2008
CEA No. 07040

Total Copper CMC at Noted Hardness ug/l	Total Zinc CMC at Noted Hardness ug/l	Total Copper Freshwater CCC at Noted Hardness ug/l	Total Zinc Freshwater CCC at Noted Hardness ug/l	Total Lead Freshwater CCC at Noted Hardness ug/l (2)	Total Lead Freshwater CMC at Noted Hardness ug/l	Total Copper Freshwater CCC at CAO Limits and at Noted Hardness ug/l	Total Zinc Freshwater CCC at CAO Limits and at Noted Hardness ug/l	Total Lead Freshwater CCC at CAO Limits and at Noted Hardness ug/l(2)	Station C Hardness mg/l $CaCO_3$
9	81	6	81	3.0	45	6	81	3.0	63
5	46	4	46	3.0	19	4	46	3.0	32
11	94	7	94	3.0	57	7	94	3.0	75
24	197	15	197	6.7	173	9	120	3.2	180
19	159	12	159	4.9	125	9	120	3.2	140
3	29	2	29	3.0	10	2	29	3.0	19
15	130	10	130	3.6	92	9	120	3.2	110
22	178	14	178	5.8	149	9	120	3.2	160
33	260	20	260	10.2	262	9	120	3.2	250
18	150	12	150	4.4	114	9	120	3.2	130
10	87	7	87	3.0	51	7	87	3.0	69
26	206	16	206	7.2	185	9	120	3.2	190
18	150	12	150	4.4	114	9	120	3.2	130
24	197	15	197	6.7	173	9	120	3.2	180
13	115	9	115	3.0	76	8.9	115	3.0	95
7	63	5	63	3.0	31	5	63	3.0	47
14	120	9	120	3.2	82	9	120	3.2	100
23	188	15	188	6.3	160	9	120	3.2	170
22	178	14	178	5.8	149	9	120	3.2	160
19	159	12	159	4.9	125	9	120	3.2	140
13	116	9	116	3.0	78	9	116	3.0	96
3	28	2	28	3.0	9	2	28	3.0	18
8.0	72	6	72	3.0	38	6	72	3.0	55
10	87	7	87	3.0	51	7	87	3.0	69
NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
7	67	5	67	3.0	34	5	67	3.0	50
NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
10	85	7	85	3.0	49	7	85	3.0	67
7.8	71	6	71	3.0	37	6	71	3.0	54
11	93	7	93	3.0	56	7	93	3.0	74
9	84	7	84	3.0	48	7	84	3.0	66
NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Table 3
Analytical Results Summary - Surface Water
Station B
Revised February 22, 2008
CEA No. 07040

LOCATION	DATE	ARSENIC (total) ug/l	COPPER (total) ug/l	COPPER (total) ug/l	COPPER (total) ug/l	LEAD (total) ug/l	LEAD (total) ug/l	LEAD (total) ug/l	ZINC (total) ug/l	ZINC (total) ug/l	ZINC (total) ug/l
Data Compared to:		CCC 150 ug/l	Freshwater CCC at Noted Hardness ug/l	Freshwater CCC at CAO Limits and at Noted Hardness ug/l (1)	Freshwater CMC at Noted Hardness ug/l	Freshwater CCC at Noted Hardness ug/l	Freshwater CCC at CAO Limits and at Noted Hardness ug/l (1)	Freshwater CMC at Noted Hardness ug/l	Freshwater CCC at Noted Hardness ug/l	Freshwater CCC at CAO Limits and at Noted Hardness ug/l (1)	Freshwater CMC at Noted Hardness ug/l
B	11/28/2001	27	400	400	400	790	790	790	1100	1100	1100
B	12/17/2001	5.7	21	21	21	3.2	3.2	3.2	40	40	40
B	1/8/2002	14	55	55	55	110	110	110	120	120	120
B	2/7/2002	11	26	26	26	32	32	32	54	54	54
B	12/19/2002	<2	16	16	16	19	19	19	45	45	45
B	1/13/2003	5.34/4.37	33.7/35.3	33.7/35.3	33.7/35.3	160/176	160/176	160/176	179/197	179/197	179/197
B	2/19/2003	<1/1.25	24.4/26.4	24.4/26.4	24.4/26.4	66.8/74.2	66.8/74.2	66.8/74.2	85.7/95.9	85.7/95.9	85.7/95.9
B	3/26/2003	3.49/4.16	19.6/20	19.6/20	19.6/20	31.9/30.3	31.9/30.3	31.9/30.3	53.6/53.2	53.6/53.2	53.6/53.2
B	4/2/2003	6.43 J/ 4.65 J	38/34	38/34	38/34	106/107	106/107	106/107	123/120	123/120	123/120
B	5/8/2003	6.62/5.99	25.4/25.1	25.4/25.1	25.4/25.1	81.9/81.6	81.9/81.6	81.9/81.6	70.3/69.8	70.3/69.8	70.3/69.8
B	12/29/2003	NA	29/19	29/19	29/19	5.9/5.1	5.9/5.1	5.9/5.1	16/17	16/17	16/17
B	1/9/2004	NA	10/<10	10/<10	10/<10	<5.0/5.2	<5.0/5.2	<5.0/5.2	<10/<10	<10/<10	<10/<10
B	2/2/2004	NA	13/20	13/20	13/20	<5.0/18	<5.0/18	<5.0/18	18/35	18/35	18/35
B	3/26/2004	NA	11/15	11/15	11/15	<5.0/<5.0	<5.0/<5.0	<5.0/<5.0	16/21	16/21	16/21
B	10/19/2004	NA	12/10	12/10	12/10	5.4/5.6	5.4/5.6	5.4/5.6	18/11	18/11	18/11
B	12/8/2004	NA	8.5/8.7	8.5/8.7	8.5/8.7	<5.0/<5.0	<5.0/<5.0	<5.0/<5.0	16/25	16/25	16/25
B	1/7/2005	NA	<5.0/<5.0	<5.0/<5.0	<5.0/<5.0	5.3/6.1	5.3/6.1	5.3/6.1	<10/11	<10/11	<10/11
B	2/28/2005	NA	5.1/4.8	5.1/4.8	5.1/4.8	1.6/1.4	1.6/1.4	1.6/1.4	6.5/8.3	6.5/8.3	6.5/8.3
B	3/23/2005	NA	10/9.5	10/9.5	10/9.5	<5.0/<5.0	<5.0/<5.0	<5.0/<5.0	<10/<10	<10/<10	<10/<10
B	4/7/2005	NA	7.5/6.7	7.5/6.7	7.5/6.7	<5.0/<5.0	<5.0/<5.0	<5.0/<5.0	12/<10	12/<10	12/<10
B	5/9/2005	NA	7.3/7.6	7.3/7.6	7.3/7.6	<5.0/<5.0	<5.0/<5.0	<5.0/<5.0	<10/<10	<10/<10	<10/<10
B	11/3/2005	NA	9.2/7.4	9.2/7.4	9.2/7.4	6.1/<5.0	6.1/<5.0	6.1/<5.0	18/15	18/15	18/15
B	12/1/2005	NA	19/17	19/17	19/17	6.4/5.6	6.4/5.6	6.4/5.6	18/17	18/17	18/17
B	1/3/2006	NA	7.4/7.4	7.4/7.4	7.4/7.4	7.4/7.7	7.4/7.7	7.4/7.7	<10/<10	<10/<10	<10/<10
B	2/27/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
B	3/16/2006	NA	6.6/6.1	6.6/6.1	6.6/6.1	9.5/9.1	9.5/9.1	9.5/9.1	14/25	14/25	14/25
B	4/30/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
B	5/30/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
B	6/30/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
B	10/1/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
B	11/21/2006	NA	25/19	25/19	25/19	33/21	33/21	33/21	67/48	67/48	67/48
B	12/12/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
B	2/21/2007	NA	10	10	10	<5.0	<5.0	<5.0	<10	<10	<10
B	3/27/2007	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
B	4/12/2007	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

CAO - Cleanup and Abatement Order (R1-2001-26), Freshwater Criteria
WQO - Water Quality Objective
Red Text - Exceedance of WQO (at CMC or CCC or CAO). [Note: If one duplicate exceeded the criteria and the other was less than the MDL, it was considered an exceedance.]
ug/l - micrograms per liter
CMC - Criteria Maximum Concentration
CCC - Criteria Continuous Concentration

(1)The numbers listed here have been compared to capped calculated CAO values as total recoverable. CAO values listed as dissolved were converted to total recoverable using the equations, conversion factors and a hardness of 100 mg/L as noted in the CFR 131.38 (dissolved CAO limits occur at hardness of 100 mg/L). The total recoverabable values equal the dissolved values, with the exception of lead.

CAO Criteria	
CAO Arsenic	150 ug/L dissolved
CAO Copper	9.0 ug/L dissolved
CAO Lead	2.5 ug/L dissolved
CAO Zinc	120 ug/L dissolved

(2) CAO states that detection limit is 3 ug/L and is controlling. All values under 3.0 ug/L are converted to 3.0 ug/L.

Table 3
Analytical Results Summary - Surface Water
Station B
Revised February 22, 2008
CEA No. 07040

Total Copper Freshwater CMC at Noted Hardness ug/l	Total Zinc Freshwater CMC at Noted Hardness ug/l	Total Copper Freshwater CCC at Noted Hardness ug/l	Total Zinc Freshwater CCC at Noted Hardness ug/l	Total Lead Freshwater CCC at Noted Hardness ug/l (2)	Total Lead Freshwater CMC at Noted Hardness ug/l	Total Copper Freshwater CCC at CAO Limits and at Noted Hardness ug/l	Total Zinc Freshwater CCC at CAO Limits and at Noted Hardness ug/l	Total Lead Freshwater CCC at CAO Limits and at Noted Hardness ug/l(2)	Station C Hardness mg/l $CaCO_3$
9	81	6	81	3.0	45	6	81	3.0	63
12	105	8	105	3.0	67	8	105	3.0	86
11	94	7	94	3.0	57	7	94	3.0	75
24	197	15	197	6.7	173	9	120	3.2	180
19	159	12	159	4.9	125	9	120	3.2	140
3	29	2	29	3.0	10	2	29	3.0	19
15	130	10	130	3.6	92	9	120	3.2	110
22	178	14	178	5.8	149	9	120	3.2	160
33	260	20	260	10.2	262	9	120	3.2	250
18	150	12	150	4.4	114	9	120	3.2	130
10	87	7	87	3.0	51	7	87	3.0	69
26	206	16	206	7.2	185	9	120	3.2	190
18	150	12	150	4.4	114	9	120	3.2	130
24	197	15	197	6.7	173	9	120	3.2	180
13	115	9	115	3.0	76	9	115	3.0	95
7	63	5	63	3.0	31	5	63	3.0	47
14	120	9	120	3.2	82	9	120	3.2	100
23	188	15	188	6.3	160	9	120	3.2	170
22	178	14	178	5.8	149	9	120	3.2	160
19	159	12	159	4.9	125	9	120	3.2	140
13	116	9	116	3.0	78	9	116	3.0	96
3	28	2	28	3.0	9	2	28	3.0	18
8	72	6	72	3.0	38	6	72	3.0	55
10	87	7	87	3.0	51	7	87	3.0	69
NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
7	67	5	67	3.0	34	5	67	3.0	50
NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
10	85	7	85	3.0	49	7	85	3.0	67
8	71	6	71	3.0	37	6	71	3.0	54
11	93	7	93	3.0	56	7	93	3.0	74
9	84	7	84	3.0	48	7	84	3.0	66
NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Table 4
Analytical Results Summary - Surface Water
Station D
Revised February 22, 2008
CEA No. 07040

LOCATION	DATE	ESTUARY ARSENIC (total) ug/l	ESTUARY COPPER (total) ug/l	ESTUARY COPPER (total) ug/l	ESTUARY LEAD (total) ug/l	ESTUARY ZINC (total) ug/l	FRESHWATER COPPER (total) ug/l	FRESHWATER COPPER (total) ug/l	FRESHWATER COPPER (total) ug/l	FRESHWATER LEAD (total) ug/l	FRESHWATER LEAD (total) ug/l	FRESHWATER LEAD (total) ug/LI	FRESHWATER ZINC (total) ug/l	FRESHWATER ZINC (total) ug/l	FRESHWATER ZINC (total) ug/l
Data Compared to:		CCC(1): 36 ug/l	CCC(1) 3.7 ug/l	CMC(1) 5.8 ug/l	CCC(1) 8.5 ug/l	CCC(1) 86 ug/l	Freshwater CCC at Noted Hardness ug/l	Freshwater CCC at CAO Limits and at Noted Hardness ug/l(2)	Freshwater CMC at Noted Hardness ug/l	Freshwater CCC at Noted Hardness ug/l	Freshwater CCC at CAO Limits and at Noted Hardness ug/l(2)	Freshwater CMC at Noted Hardness ug/l	Freshwater CCC at Noted Hardness ug/l	Freshwater CCC at CAO Limits and at Noted Hardness ug/l(2)	Freshwater CMC at Noted Hardness ug/l
D	11/28/2001	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
D	12/17/2001	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
D	1/8/2002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
D	2/7/2002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
D	12/19/2002	17	5.9	5.9	1	1.3	5.9	5.9	5.9	1	1	1	1.3	1.3	1.3
D	1/13/2003	28.1	3.56	3.56	1.22	14.3	3.56	3.56	3.56	1.22	1.22	1.22	14.3	14.3	14.3
D	2/19/2003	20.1	3.18	3.18	<1	15.9	3.18	3.18	3.18	<1	<1	<1	16	16	16
D	3/26/2003	17.6	4.24	4.24	<1	19.9	4.24	4.24	4.24	<1	<1	<1	20	20	20
D	4/2/2003	56.8 J	24.3	24.3	2.77	27.2	24.3	24.3	24.3	2.77	2.77	2.77	27	27	27
D	5/8/2003	9.78	1.87	1.87	<1	10.3	1.87	1.87	1.87	<1	<1	<1	10	10	10
D	12/29/2003	NA	33	33	<5.0	24	33	33	33	<5.0	<5.0	<5.0	24	24	24
D	1/9/2004	NA	<10	<10	<5.0	<10	<10	<10	<10	<5.0	<5.0	<5.0	<10	<10	<10
D	2/2/2004	NA	16	16	<5.0	27	16	16	16.0	<5.0	<5.0	<5.0	27	27	27
D	3/26/2004	NA	5	5	<5.0	26	5	5	5	<5.0	<5.0	<5.0	26	26	26
D	10/19/2004	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
D	12/8/2004	NA	<5.0	<5.0	<5.0	27	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	27	27	27
D	1/7/2005	NA	<5.0	<5.0	<5.0	<10	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<10	<10
D	2/28/2005	NA	2.4	2.4	<1	7.9	2.4	2.4	2.4	<1	<1	<1	8	8	8
D	3/23/2005	NA	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<10	<10	<10
D	4/7/2005	NA	<5	<5	<5	10	<5	<5	<5	<5	<5	<5	10	10	10
D	5/9/2005	NA	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<10	<10	<10
D	11/3/2005	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
D	12/1/2005	NA	9.5	9.5	<5	13	9.5	9.5	9.5	<5	<5	<5	13	13	13
D	1/10/2006	NA	<5.0	<5.0	<5	<10	<5.0	<5.0	<5.0	<5	<5	<5	<10	<10	<10
D	2/27/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
D	3/16/2006	NA	<5.0	<5.0	<3	<10	<5.0	<5.0	<5.0	<3	<3	<3	<10	<10	<10
D	4/30/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
D	5/30/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
D	6/30/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
D	10/1/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
D	11/21/2006	NA	160	160	<5.0	34	160	160	160	<5.0	<5.0	<5.0	34	34	34
D	12/12/2006	NA	19	19	<5.0	16	19	19	19	<5.0	<5.0	<5.0	16	16	16
D	2/21/2007	NA	6.6	6.6	<5.0	<10	6.6	6.6	6.6	<5.0	<5.0	<5.0	<10	<10	<10
D	3/27/2007	NA	<5.0	<5.0	<5.0	<10	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<10	<10
D	4/12/2007	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

CAO - Cleanup and Abatement Order (R1-2001-26), Freshwater Criteria
WQO - Water Quality Objective
Red Text - Exceedance of WQO (at CMC or CCC or CAO values)
ug/l - micrograms per liter
CMC - Criteria Maximum Concentration
CCC - Criteria Continuous Concentration

(1)The numbers listed here have been converted from dissolved to total recoverable. The WQO for each metal is listed in the CFR 131.38 as dissolved solids. The dissolved solids values are listed below. As the data for comparison is recoreded in total recoverable, a conversion factor as described in the CFR 131.38 was applied to convert the criteria from dissolved to total recoverable. Conversion factors listed below.

Criteria	
WQO Arsenic	36 ug/L dissolved
WQO Copper	3.1 ug/L dissolved
WQO Lead	8.1 ug/L dissolved
WQO Zinc	81 ug/L dissolved
WQO Copper	4.8 ug/L dissolved

Conversion Factors	
CF Arsenic	1.000
CF Copper	0.830
CF Lead	0.951
CF Zinc	0.946
CF Copper	0.830

(2)The numbers listed here have been compared to capped calculated CAO values as total recoverable. CAO values listed as dissolved were converted to total recoverable using the equations, conversion factors and a hardness of 100 mg/L as noted in the CFR 131.38 (dissolved CAO limits occur at hardness of 100 mg/L). The total recoverabable values equal the dissolved values, with the exception of lead.

CAO Criteria	
CAO Arsenic	150 ug/L dissolved
CAO Copper	9.0 ug/L dissolved
CAO Lead	2.5 ug/L dissolved
CAO Zinc	120 ug/L dissolved

(3) CAO states that detection limit is 3 ug/L and is controlling. All values under 3.0 ug/L are converted to 3.0 ug/L.

Table 4
Analytical Results Summary - Surface Water
Station D
Revised February 22, 2008
CEA No. 07040

LOCATION	DATE	Total Copper Freshwater CMC at Noted Hardness ug/l	Total Zinc Freshwater CMC at Noted Hardness ug/l	Total Copper Freshwater CCC at Noted Hardness ug/l	Total Zinc Freshwater CCC at Noted Hardness ug/l	Total Lead Freshwater CCC at Noted Hardness ug/l (3)	Total Lead Freshwater CMC at Noted Hardness ug/l	Total Copper Freshwater CCC at CAO Limits and at Noted Hardness ug/l	Total Zinc Freshwater CCC at CAO Limits and at Noted Hardness ug/l	Total Lead Freshwater CCC at CAO Limits and at Noted Hardness ug/l (3)	Station C Hardness mg/l $CaCO_3$
Data Compared to:											
D	11/28/2001	9	81	6	81	3.0	45	6	81	3.0	63
D	12/17/2001	12	105	8	105	3.0	67	8	105	3.0	86
D	1/8/2002	10.7	94	7	94	3.0	57	7	94	3.0	75
D	2/7/2002	24.4	197	15	197	6.7	173	9	120	3.2	180
D	12/19/2002	19.2	159	12	159	4.9	125	9	120	3.2	140
D	1/13/2003	2.9	29	2	29	3.0	10	2	29	3.0	19
D	2/19/2003	15	130	10	130	3.6	92	9	120	3.2	110
D	3/26/2003	22	178	14	178	5.8	149	9	120	3.2	160
D	4/2/2003	33	260	20	260	10.2	262	9	120	3.2	250
D	5/8/2003	18	150	12	150	4.4	114	9	120	3.2	130
D	12/29/2003	10	87	7	87	3.0	51	7	87	3.0	69
D	1/9/2004	26	206	16	206	7.2	185	9	120	3.2	190
D	2/2/2004	18	150	12	150	4.4	114	9	120	3.2	130
D	3/26/2004	24	197	15	197	6.7	173	9	120	3.2	180
D	10/19/2004	13	115	9	115	3.0	76	9	115	3.0	95
D	12/8/2004	7	63	5	63	3.0	31	5	63	3.0	47
D	1/7/2005	14	120	9	120	3.2	82	9	120	3.2	100
D	2/28/2005	23	188	15	188	6.3	160	9	120	3.2	170
D	3/23/2005	22	178	14	178	5.8	149	9	120	3.2	160
D	4/7/2005	19	159	12	159	4.9	125	9	120	3.2	140
D	5/9/2005	13	116	9	116	3.0	78	9	116	3.0	96
D	11/3/2005	3	28	2	28	3.0	9	2	28	3.0	18
D	12/1/2005	8	72	6	72	3.0	38	6	72	3.0	55
D	1/10/2006	10	87	7	87	3.0	51	7	87	3.0	69
D	2/27/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
D	3/16/2006	7	67	5	67	3.0	34	5	67	3.0	50
D	4/30/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
D	5/30/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
D	6/30/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
D	10/1/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
D	11/21/2006	10	85	7	85	3.0	49	7	85	3.0	67
D	12/12/2006	8	71	6	71	3.0	37	6	71	3.0	54
D	2/21/2007	11	93	7	93	3.0	56	7	93	3.0	74
D	3/27/2007	9	84	7	84	3.0	48	7	84	3.0	66
D	4/12/2007	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Table 5
Analytical Results Summary - Surface Water
Station F
Revised February 22, 2008
CEA No. 07040

LOCATION	DATE	ARSENIC (total) ug/L	COPPER (total) ug/L	COPPER (total) ug/l	COPPER (total) ug/L	LEAD (total) ug/l	LEAD (total) ug/l	LEAD (total) ug/L	ZINC (total) ug/L	ZINC (total) ug/l	ZINC (total) ug/L
Data Compared to:		CCC: 150 ug/l	Freshwater CCC at Noted Hardness ug/l	Freshwater CCC at CAO Limits and at Noted Hardness ug/l[1]	Freshwater CMC at Noted Hardness ug/l	Freshwater CCC at Noted Hardness ug/l	Freshwater CCC at CAO Limits and at Noted Hardness ug/l[1]	Freshwater CMC at Noted Hardness ug/l	Freshwater CCC at Noted Hardness ug/l	Freshwater CCC at CAO Limits and at Noted Hardness ug/l[1]	Freshwater CMC at Noted Hardness ug/l
F	11/28/2001	<5	24	24	24	<15	<15	<15	190	190	190
F	12/17/2001	13	17	17	17	29	29	29	300	300	300
F	1/8/2002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
F	2/7/2002	21	27	27	27	87	87	87	560	560	560
F	12/19/2002	7.1	34	34	34	130	130	130	230	230	230
F	1/13/2003	5.03	19.7	19.7	19.7	55.6	55.6	55.6	123	123	123
F	2/19/2003	2.33	25.7	25.7	25.7	71	71	71	140	140	140
F	3/26/2003	4.3	9	9	9	4.85	4.85	4.85	3.03	3.03	3.03
F	4/2/2003	<1 UJ	13	13	13	16.9	16.9	16.9	40.9	40.9	40.9
F	5/8/2003	3.01	19	19	19	10.7	10.7	10.7	37.3	37.3	37.3
F	12/29/2003	NA	40	40	40	7.8	7.8	7.8	190	190	190
F	1/9/2004	NA	62	62	62	130	130	130	320	320	320
F	2/2/2004	NA	22	22	22	39	39	39	110	110	110
F	3/26/2004	NA	25	25	25	<5.0	<5.0	<5.0	39	39	39
F	10/19/2004	NA	13	13	13	18	18	18	37	37	37
F	12/8/2004	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
F	1/7/2005	NA	8.3	8.3	8.3	21	21	21	46	46	46
F	2/28/2005	NA	14	14	14	6.3	6.3	6.3	47	47	47
F	3/23/2005	NA	12	12	12	<5	<5	<5	32	32	32
F	4/7/2005	NA	5.9	5.9	5.9	7.4	7.4	7.4	47	47	47
F	5/9/2005	NA	7.4	7.4	7.4	8.3	8.3	8.3	43	43	43
F	11/3/2005	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
F	12/1/2005	NA	7.4	7.4	7.4	5.9	5.9	5.9	34	34	34
F	1/3/2006	NA	6.5	6.5	6.5	16	16	16	32	32	32
F	2/27/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
F	3/16/2006	NA	<5	<5	<5	11	11	11	28	28	28
F	4/30/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
F	5/30/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
F	6/30/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
F	10/1/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
F	11/21/2006	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
F	12/12/2006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
F	2/21/2007	NA	6.2	6.2	6.2	<5.0	<5.0	<5.0	63	63	63
F	3/27/2007	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
F	4/12/2007	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

CAO - Cleanup and Abatement Order (R1-2001-26), Freshwater Criteria
WQO - Water Quality Objective
Red Text - Exceedance of WQO (at CMC or CCC or CAO values)
ug/l - micrograms per liter
CMC - Criteria Maximum Concentration
CCC - Criteria Continuous Concentration

[1]The numbers listed here have been compared to capped calculated CAO values as total recoverable. CAO values listed as dissolved were converted to total recoverable using the equations, conversion factors and a hardness of 100 mg/L as noted in the CFR 131.38 (dissolved CAO limits occur at hardness of 100 mg/L). The total recoverabable values equal the dissolved values, with the exception of lead.

CAO Criteria	
CAO Arsenic	150 ug/L dissolved
CAO Copper	9.0 ug/L dissolved
CAO Lead	2.5 ug/L dissolved
CAO Zinc	120 ug/L dissolved

[2] CAO states that detection limit is 3 ug/L and is controlling. All values under 3.0 ug/L are converted to 3.0 ug/L.

Table 5
Analytical Results Summary - Surface Water
Station F
Revised February 22, 2008
CEA No. 07040

Total Copper Freshwater CMC at Noted Hardness ug/l	Total Zinc Freshwater CMC at Noted Hardness ug/l	Total Copper Freshwater CCC at Noted Hardness ug/l	Total Zinc Freshwater CCC at Noted Hardness ug/l	Total Lead Freshwater CCC at Noted Hardness ug/l (2)	Total Lead Freshwater CMC at Noted Hardness ug/l	Total Copper Freshwater CCC at CAO Limits and at Noted Hardness ug/l	Total Zinc Freshwater CCC at CAO Limits and at Noted Hardness ug/l	Total Lead Freshwater CCC at CAO Limits and at Noted Hardness ug/l(2)	Station C Hardness mg/l $CaCO_3$
9	81	6	81	3.0	45	6	81	3.0	63
12	105	8	105	3.0	67	8	105	3.0	86
11	94	7	94	3.0	57	7	94	3.0	75
24	197	15	197	6.7	173	9	120	3.2	180
19	159	12	159	4.9	125	9	120	3.2	140
3	29	2	29	3.0	10	2	29	3.0	19
15	130	10	130	3.6	92	9	120	3.2	110
22	178	14	178	5.8	149	9	120	3.2	160
33	260	20	260	10.2	262	9	120	3.2	250
18	150	12	150	4.4	114	9	120	3.2	130
10	87	7	87	3.0	51	7	87	3.0	69
26	206	16	206	7.2	185	9	120	3.2	190
18	150	12	150	4.4	114	9	120	3.2	130
24	197	15	197	6.7	173	9	120	3.2	180
13	115	9	115	3.0	76	9	115	3.0	95
7	63	5	63	3.0	31	5	63	3.0	47
14	120	9	120	3.2	82	9	120	3.2	100
23	188	15	188	6.3	160	9	120	3.2	170
22	178	14	178	5.8	149	9	120	3.2	160
19	159	12	159	4.9	125	9	120	3.2	140
13	116	9	116	3.0	78	9	116	3.0	96
3	28	2	28	3.0	9	2	28	3.0	18
8	72	6	72	3.0	38	6	72	3.0	55
10	87	7	87	3.0	51	7	87	3.0	69
NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
7	67	5	67	3.0	34	5	67	3.0	50
NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
10	85	7	85	3.0	49	7	85	3.0	67
8	71	6	71	3.0	37	6	71	3.0	54
11	93	7	93	3.0	56	7	93	3.0	74
9	84	7	84	3.0	48	7	84	3.0	66
NS	NS	NS	NS	NS	NS	NS	NS	NS	NS