Preliminary Review of 2006 Analytical Testing Data From Sediment Sampling Conducted at Iron Gate, Copco 1, and JC Boyle Reservoirs Klamath River, Oregon and California

September 22, 2006

Submitted To:
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By:
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SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

ALASKA
COLORADO
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September 22, 2006

Mr. Michael Bowen
California State Coastal Conservancy
1330 Broadway, 11th Floor
Oakland, CA 94612-2530

RE: PRELIMINARY REVIEW OF 2006 ANALYTICAL TESTING DATA FROM SEDIMENT SAMPLING CONDUCTED AT IRON GATE, COPCO 1, AND JC BOYLE RESERVOIRS, KLAMATH RIVER, OREGON AND CALIFORNIA

Dear Mr. Bowen:

This letter report briefly summarizes the results of our preliminary review of the analytical testing data obtained during sampling conducted in June and July 2006 at the above-referenced reservoirs. We understand this report will be incorporated into an initial filing to the Federal Energy Regulatory Commission. This discussion will also be incorporated into our draft report summarizing sediment sampling, to be provided separately.

Our work is in support of Gathard Engineering Consulting (GEC), who is performing a screening level feasibility study related to the decommissioning and removal of the four dams.

BACKGROUND

Based on our discussions with GEC, we learned that previous studies of preliminary sediment volume and size analysis were conducted. However, the analysis did not include physical testing of sediment samples for grain size characteristics or chemical constituents. Therefore, to evaluate sediment erosion and deposition behavior as the dams are demolished, sampling would be needed to estimate the size and distribution of sediment particles. Chemical analysis would also be needed to identify potential contamination in sediment that may be mobilized following demolition, and to determine if further testing would be necessary.

As an initial step, in August 2006, Shannon & Wilson, Inc. completed an *Upland Contaminant Source Study* for GEC. In this 'Phase 1" study, which included a review of records and files and a limited site reconnaissance, several properties along and up-river of the reservoirs were identified as having the potential to contaminate trapped sediment behind the dams. Based on discussion with GEC, the Puget Sound Dredge Disposal Analysis (PSDDA) testing suite (PTI Environmental Services, 2003) and sampling methodology were selected for application at the reservoir sites. Additional test methods were included outside of the PSDDA suite, based on potential contaminants and comments to the *Sediment Sampling Plan* (GEC, 2006). Recommended analytical testing included:

- Conventional parameters (including pH, acid volatile sulfides, calcium carbonate)
- Metals
- Pesticides (organochlorine pesticides and organophosphorus pesticides)
- Chlorinated acid herbicides
- Polychlorinated biphenyls (PCBs)
- Volatile organic compounds (VOCs)
- Semi-volatile organic compounds (SVOCs)
- Nitrogen, phosphorus, and cyanide
- Dioxins

Based on estimated sediment volumes in each reservoir, the location of tributaries, locations where GEC required additional soils information for analysis, and the preliminary results of the *Upland Contaminant Source Study*, 25 boring locations were selected, per discussion between GEC and the California State Coastal Conservancy (Conservancy).

SEDIMENT SAMPLING AND ANALYSIS

Field Activities

Between June 23 and July 12, 2006, under contract to the Conservancy, Shannon & Wilson, Inc. observed and sampled sediment from 26 boring locations. (An additional location was added during the drilling program to further evaluate the vertical extent of granular sediments observed.) Twenty-seven sediment samples were submitted to Analytical Resources, Inc. (ARI), Tukwila, Washington, for analytical testing. All of the samples were submitted for grain size analysis. The majority of the samples were submitted for conventional analysis, VOCs, SVOCs, metals, pesticides, and herbicides. Select samples were further analyzed for organophosphorus pesticides, nitrogen, phosphorus, cyanide, and dioxins. Analytical testing methods performed on each sample are summarized in Table 1.

Analytical Test Results

ARI completed the testing outlined above, under subcontract to GEC. Detected analytes, with the exception of dioxins, are shown in Table 2, which includes PSDDA screening levels, where available. Review of the data with respect to potential contaminants of concern was performed. For this screening level study, no conventional parameter data were evaluated, and no data quality assessment (data validation) was completed. With the exception of dioxins and cyanide (discussed in separate sections below), a summary of the review found:

- One pesticide was detected in one sample, 4,4'-DDE at C3-S1 at 2.2 micrograms per kilogram (µg/kg) below PSDDA criteria; neither 4,4'-DDD nor 4,4'-DDT were detected. The PSDDA screening level for total DDT (the sum of 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT) is 6.9 µg/kg.
- No herbicides were detected.
- No PCBs were detected in any sample.
- Arsenic was detected in three samples: C-1, S-1, IG9-S1, and J-3, S-1. All of the detections were below PSDDA screening levels.
- Chromium, copper, nickel, and zinc were detected in all 25 samples, below available PSDDA criteria.
- Mercury was found in one sample (C-7, S-1) at 0.05 milligram per kilogram (mg/kg), below its PSDDA criterion of 0.41 mg/kg.
- Several SVOCs were detected below PSDDA (where available), including 4-methyphenol, benzoic acid, bis(2-ethylhexyl)phthalate, diethylphthalate, di-n-butylphthalate, fluoranthene, naphthalene, phenanthrene, and pyrene.
- Four VOCs were detected, including ethylbenzene, toluene, total xylenes, and vinyl chloride. Ethylbenzene was detected at 43 µg/kg, above its PSDDA screening level of 10 µg/kg, at C-2, S-1. Total xylenes were detected at 220 µg/kg, above its PSDDA screening level of 40 µg/kg in C-2, S-1.

Two analytes (ethylbenzene and total xylenes) were detected above PSDDA screening criteria. These two analytes, along with the other detected SVOCs and VOCs, which would be expected to volatilize, is likely present because they are bound to the organics in the sediment. Because all of the reservoirs are used for recreational use, a potential source for the low detections could be minor spills from boats or recreational vehicles. Other potential sources and contaminants identified in the *Upland Contaminant Source Study* do not appear to pose a concern, based on this limited testing.

Dioxins

Three samples were submitted for dioxin analysis. The results are summarized in Table 3.

Dioxin concentrations were evaluated by utilizing PSDDA guidelines. Polychlorinated dibenzodioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) meet several requirements for listing as chemicals of concern in dredged material. These compounds are documented to be highly toxic, are persistent in the environment, may bioaccumlate in animal tissues, and are listed as human teratogens and carcinogens. A bulk sediment 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) concentration of 5 picograms per gram (pg/g), or a total toxic equivalent concentration (TEC) of 15 pg/g will trigger the requirement to perform bioaccumulation testing.

The TEC for each individual dioxin/furan concentration is calculated by multiplying each individual concentration by its respective toxicity equivalency factors (TEFs), which adjust the individual dioxin/furan concentration to the relative toxicity of TCDD, the most studied and most toxic dioxin. Once the TEC for each dioxin/furan is calculated, the total TEC is calculated by adding the individually adjusted concentrations. For undetected dioxin/furan compounds, detection limits will be divided by two and used in the calculations.

For the three samples collected from the selected Klamath River reservoirs and submitted for dioxin testing (Table 3), the total TECs are:

- C-4, S-1: TECs = 4.83 pg/g
- IG7-S1: TECs = 2.48 pg/g
- J4, S1: TECs = 4.13 pg/g

The United States does not have a sediment quality guideline for dioxin. However, examples of frequently cited benchmark criteria include:

- Proposed freshwater sediment Apparent Effects Threshold for benthic fauna: 8.8 pg/g (as cited in Blakely and Norton, 2005)
- U.S. Army Corps of Engineers: 1,000 pg/g (as cited in Church, et al., 2005)
- U.S. EPA, Region 10 Dredge Spoils Disposal Guideline: 4 pg/g (as cited in Church, et al., 2005)
- U.S. EPA Fish and Wildlife (bird and mammal guidelines): 2.5 – 210 pg/g (as cited in Church, et al., 2005)
- PSDDA bioaccumulation trigger: 15 pg/g

The TECs of the sediments evaluated are generally less than all of the criteria listed above, and at least one-third less than the PSDDA bioaccumulation trigger.

Cyanide

Total cyanide was detected at 1.41 and 2.01 mg/kg in two of the three samples submitted for analysis. No PSDDA screening criterion is available. Cyanide as measured and reported as total cyanides in sediments can include hydrogen cyanide (HCN), cyanide ion (CN-), simple cyanides, and metallo- and organo-cyanide complexes. HCN and CN- are grouped as free cyanides and are the most toxic forms of cyanide and the forms of concern. Most complexed cyanides are relatively nontoxic and total cyanide determinations are not typically complete measures of either water or sediment quality. Factors that affect the release or dissociation of free cyanides from complexed cyanide forms include pH, redox potential, photodecomposition of the complex and release of free cyanide, relative strength of the metallo- and organo-cyanide complexes, and possible presence of bacteria responsible for degradation of ferrocyanide complexes.

In sediments, the cyanide in the free form present in the pore water is more relatable to toxicity to benthic organisms than the total cyanide measured in the solid phase. However, given the above factors, it is difficult to predict or model the dissociation and release of the free toxic forms of cyanide to the pore water from the less toxic total cyanide form associated with and normally measured in the solid phase sediments. A general idea of the concentrations of free cyanide in pore water that would be toxic to benthic invertebrates can be drawn from the acute and chronic toxicity criteria for free cyanides in surface waters classified as supporting Warm Water Sport Fish (NR 105, Wis. Admin. Code), which are 45.8 μg/L and 11.47 μg/L, respectively.

Free cyanides as HCN, in general, are not very persistent in the environment due to their volatility, have low adsorption to sediment particles, high water solubility, and inability to substantially bioaccumulate. Where any significant levels of total cyanide are detected in sediments, additional analysis may need to be done to also determine what fractions of the total cyanide are in dissociable forms (amenable to chlorination or weak acid dissociable forms) to give an indication of the potential to release free cyanide with its attendant toxicity.

CONCLUSIONS

Of the 27 sediment samples submitted, only one sample contained concentrations exceeding PSDDA screening criteria. Specifically, ethylbenzenes and total xylenes were detected about 4 to 5 times greater than their respective PSDDA screening criterion. These two analytes are typically volatile and are likely present because of the recreational use of the reservoirs, and the organic-rich nature of the sediment. Given their volatile nature and the apparently limited extent of the detection, it is expected that these compounds will become volatilized during erosion, and/or their concentration will become reduced as mixing occurs. No further action with respect to analytical testing appears warranted for this screening level evaluation.

Calculated dioxin TEC concentrations are less than the PSDDA bioaccumulation trigger and within the range of frequently cited benchmark criteria. Therefore, the detected dioxins are not expected to have a significant impact to biota. Further evaluation will be conducted to evaluate if an appropriate screening level is applicable for project use.

Cyanide was detected in two of three samples. Where any significant levels of total cyanide are detected in sediments, additional analysis may need to be done to also determine what fractions of the total cyanide are in dissociable forms (amenable to chlorination or weak acid dissociable forms) to give an indication of the potential to release free cyanide with its attendant toxicity.

CLOSURE

Within the limitation of scope, schedule, and budget, Shannon & Wilson has prepared this report in a professional manner, using that level of skill and care normally exercised for similar projects under similar conditions by reputable and competent environmental consultants currently practicing in this area.

The scope of work was intended to address only those environmental concerns with significant potential to result in contamination to the subject property. The sampling effort was considered limited in extent and served as a screening effort only. It was not intended to absolutely define the lateral extent of soil and/or groundwater contamination, if any.

The data presented in this report are based on limited research and sampling at the site, and should be considered representative at the time of our observations. Other areas of contamination that were not obvious during our site work could be present at the site. Shannon & Wilson is not responsible for conditions or consequences arising from relevant facts that were concealed, withheld, or not fully disclosed at the time the report was prepared. We also note that the facts and conditions referenced in this report may change over time, and that the data set forth here are applicable to the facts and conditions as described only at the time of this report. We believe that the conclusions stated here are factual, but no guarantee is made or implied.

This report was prepared for the exclusive use of the Conservancy and their respective representatives, and in no way guarantees that any agency or its staff will reach the same conclusions as Shannon & Wilson, Inc. Shannon & Wilson has prepared the enclosed "Important Information About Your Environmental Report" to help you and others in understanding our reports.

If you have any questions regarding the findings presented herein, please call Agnes Tirao at (206) 695-6881 or me at (206) 695-6893.

Sincerely,

SHANNON & WILSON, INC.

Scott W. Gaulke, P.E., L.H.G.
Vice President

ACT:SWG/act

Enclosures: References
Table 1 – Sampling Summary
Table 2 – Analytical Laboratory Testing – 2006 (7 pages)
Table 3 – Dioxin Toxicity Equivalency Factor-Adjusted Concentrations (2 pages)
Important Information About Your Environmental Report

REFERENCES

Blakely, N., and D. Norton, 2005, Spatial extent of dioxin/furan contaminated sediments in Dillenbaugh Creek: Environmental Assessment Program, Olympia, Wash., Washington State Department of Ecology, waterbody No. WA-23-1027, publication No. 05-03-008, April.

Church, S.E., Choate, L.M., Marot, M.E., Fey, D.L., Adams, Monique, Briggs, P.H., and Brown, Z.A., 2005, Geochemical assessment of metals and dioxin in sediment from the San Carlos reservoir and the Gila, San Carlos, and San Francisco rivers, Arizona: U.S. Geological Survey Scientific Investigations Report 2005-5086, 61p.

Gathard Engineering Consulting (GEC), 2006, Klamath sediment study, sediment sampling plan: Plan prepared by Gathard Engineering Consulting, Seattle, Wash., June.

PTI Environmental Services, 2003, Sediment sampling and analysis plan appendix, guidance on the development of sediment sampling and analysis plans meeting the requirements of the sediment management standards (chapter 173-204 Washington Administration Code [WAC]): Appendix prepared by PTI Environmental Services, Bellevue, Wash., for the Washington State Department of Ecology, publication No. 03-09-043, revised April.

Shannon & Wilson, Inc., 2006, Upland contaminant source study, segment of Klamath River, Oregon and California: Report prepared by Shannon & Wilson, Inc., Richland, Wash., for Gathard Engineering Consulting, Seattle, Wash., project no. 22-1-11192-001, August.

Wisconsin Department of Natural Resources, 2003, Consensus-based sediment quality guidelines, Recommendations for use & application, interim guidance: Wisconsin Department of Natural Resources, WT-732 2003.

TABLE 1
SAMPLING SUMMARY
KLAMATH RIVER SEDIMENT SAMPLING

Boring No.	Sample Number	Depth (Composite)	Additional Geotech Sample Depth	VOCs	Total Sulfides	Metals[1]	Conventionals[2]	PCBs	Pesticides	Herbicides	SVOCs	Dioxins	OP Pesticides	N	P	Cyanide
Iron Gate Reservoir																
IG-1	IG1-S1	0 - 7 feet		X	X	X	X	X	X	X	X					
IG-2	IG2-S1	0 - 1.9 feet		X	X	X	X	X	X	X	X					
IG-3	IG3-S1	0 - 2 feet		X	X	X	X	X	X	X	X					
IG-4	IG4-S1	0.2 - 2.2 feet	0.2 - 2.2 feet	X	X	X	X	X	X	X	X					
IG-5	IG5-S1	0 - 0.7 feet		X	X	X	X	X	X	X	X					
IG-6	IG6-S1	0 - 1.3 feet		X	X	X	X	X	X	X	X					
	IG6-S2	1.6 - 2.2 feet														
IG-7	IG7-S1	0 - 5 feet		X	X	X	X	X	X	X	X	X	X	X	X	X
	IG7-S4	4.6 - 5 feet														
IG-8	IG8-S1	0-4.3 feet		X	X	X	X	X	X	X	X					
IG-9	IG9-S1	0 - 6.5 feet		X	X	X	X	X	X	X	X					
Copco 1 Reservoir																
C-1	C-1, S-1	0 - 0.4 feet		X	X	X	X	X	X	X	X					
	C-1, S-2	0.4 - 1.5 feet														
C-2	C-2, S-1	0 - 4.4 feet		X	X	X	X	X	X	X	X		X			
C-3	C-3, S-1	0 - 5.6 feet		X	X	X	X	X	X	X	X		X			
C-4	C-4, S-1	0 - 7.7 feet		X	X	X	X	X	X	X	X	X		X	X	X
C-5	C-5, S-1	0 - 5.8 feet		X	X	X	X	X	X	X	X		X			
C-6	C-6, S-1	0 - 9.4 feet		X	X	X	X	X	X	X	X					
C-7	C-7, S-1	0 - 5.8 feet		X	X	X	X	X	X	X	X					
C-8	C-8, S-1	0 - 3.6 feet		X	X	X	X	X	X	X	X					
C-9	C-9, S-1	0 - 3.5 feet	0 - 2 feet	X	X	X	X	X	X	X	X					
C-10	C-10, S-1	0 - 9.4 feet	0 - 2 feet	X	X	X	X	X	X	X	X					
C-11	C-11, S-1	0 - 3.9 feet		X	X	X	X	X	X	X	X					
	C-12, S-2C/3C	2.7 - 5.8 feet		X	X	X	X	X	X	X	X					
JC Boyle Reservoir																
J-1	J-1, S-1	0 - 13.2 feet		X	X	X	X	X	X	X	X		X			
J-3	J-3, S-1	0 - 0.4/0.5 feet	0.4 - 0.8 feet	X	X	X	X	X	X	X	X					
J-4	J-4, S-1	0 - 0.3 feet	0 - 0.3 feet	X	X	X	X	X	X	X	X	X		X	X	X
J-5	J-5, S-1	0 - 0.3 feet	0 - 0.3 feet	X	X	X	X	X	X	X	X					

Notes:

[1]Metals = antimony, arsenic, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, zinc

[2]Conventionals = pH, TOC, TVS, ammonia, % solids, $CaCO_3$

N = nitrogen

OP Pesticides = Organochlorine pesticides = Iprodione and PCNB

P = phosphorus

PCBs = polychlorinated biphenyls

SVOCs = semivolatile organic compounds

TOC = total organic carbon

TVS = total volatile solids

VOCs = volatile organic compounds

TABLE 2
ANALYTICAL LABORATORY TESTING - 2006
KLAMATH RIVER SEDIMENT SAMPLING

ARI ID	Client ID	Compound	Value	Screening Level	Units	% of SL
06-11771-JO60A	C3-S1	4,4'-DDE	2.2	0.01	ug/kg	
06-12051-JP06A	C-10,S-1	4-Methylphenol	33	670	ug/kg	5%
06-12041-JP03C	C-2,S-1	4-Methylphenol	91	670	ug/kg	14%
06-11771-JO60A	C3-S1	4-Methylphenol	48	670	ug/kg	7%
06-12110-JP12D	C-4,S-1	4-Methylphenol	96	670	ug/kg	14%
06-12052-JP06B	C-5,S-1	4-Methylphenol	22	670	ug/kg	3%
06-12380-JP58D	C-6,S-1	4-Methylphenol	21	670	ug/kg	3%
06-12092-JP11E	C-7,S-1	4-Methylphenol	71	670	ug/kg	11%
06-12109-JP12C	C-8,S-1	4-Methylphenol	220	670	ug/kg	33%
06-12040-JP03B	C-9,S-1	4-Methylphenol	58	670	ug/kg	9%
06-11677-JO43B	IG8-S1	4-Methylphenol	23	670	ug/kg	3%
06-12485-JP75B	J-1,S-1	4-Methylphenol	310	670	ug/kg	46%
06-12486-JP75C	J-3,S-1	4-Methylphenol	220	670	ug/kg	33%
06-12488-JP75E	J-4,S-1	4-Methylphenol	130	670	ug/kg	19%
06-12487-JP75D	J-5,S-1	4-Methylphenol	270	670	ug/kg	40%
06-12093-JP11F	C-1,S-1	Acid Volatile Sulfide	47.9	0.01	mg/kg	
06-12051-JP06A	C-10,S-1	Acid Volatile Sulfide	1830	0.01	mg/kg	
06-12094-JP11G	C-11,S-1	Acid Volatile Sulfide	189	0.01	mg/kg	
06-12379-JP58C	C-12,S-2C/3C	Acid Volatile Sulfide	656	0.01	mg/kg	
06-12041-JP03C	C-2,S-1	Acid Volatile Sulfide	379	0.01	mg/kg	
06-12110-JP12D	C-4,S-1	Acid Volatile Sulfide	324	0.01	mg/kg	
06-12052-JP06B	C-5,S-1	Acid Volatile Sulfide	177	0.01	mg/kg	
06-12380-JP58D	C-6,S-1	Acid Volatile Sulfide	1990	0.01	mg/kg	
06-12092-JP11E	C-7,S-1	Acid Volatile Sulfide	311	0.01	mg/kg	
06-12109-JP12C	C-8,S-1	Acid Volatile Sulfide	458	0.01	mg/kg	
06-12040-JP03B	C-9,S-1	Acid Volatile Sulfide	298	0.01	mg/kg	
06-11570-JO18A	IG1-S1	Acid Volatile Sulfide	52.8	0.01	mg/kg	
06-11567-JO17A	IG2-S1	Acid Volatile Sulfide	957	0.01	mg/kg	
06-11676-JO43A	IG3-S1	Acid Volatile Sulfide	1560	0.01	mg/kg	
06-11678-JO43C	IG4-S1	Acid Volatile Sulfide	1770	0.01	mg/kg	
06-11362-JN72A	IG5-S1	Acid Volatile Sulfide	136	0.01	mg/kg	
06-11363-JN72B	IG6-S1	Acid Volatile Sulfide	201	0.01	mg/kg	
06-11572-JO18C	IG7-S1	Acid Volatile Sulfide	1410	0.01	mg/kg	
06-11677-JO43B	IG8-S1	Acid Volatile Sulfide	1560	0.01	mg/kg	
06-11571-JO18B	IG9-S1	Acid Volatile Sulfide	160	0.01	mg/kg	
06-12485-JP75B	J-1,S-1	Acid Volatile Sulfide	656	0.01	mg/kg	
06-12486-JP75C	J-3,S-1	Acid Volatile Sulfide	68.1	0.01	mg/kg	
06-12488-JP75E	J-4,S-1	Acid Volatile Sulfide	464	0.01	mg/kg	
06-12487-JP75D	J-5,S-1	Acid Volatile Sulfide	271	0.01	mg/kg	
06-12093-JP11F	C-1,S-1	Alkalinity	51.1	0.01	mgCaCO3/kg	
06-12051-JP06A	C-10,S-1	Alkalinity	1730	0.01	mgCaCO3/kg	
06-12094-JP11G	C-11,S-1	Alkalinity	546	0.01	mgCaCO3/kg	
06-12379-JP58C	C-12,S-2C/3C	Alkalinity	401	0.01	mgCaCO3/kg	
06-12041-JP03C	C-2,S-1	Alkalinity	981	0.01	mgCaCO3/kg	
06-11771-JO60A	C3-S1	Alkalinity	1440	0.01	mgCaCO3/kg	
06-12110-JP12D	C-4,S-1	Alkalinity	1890	0.01	mgCaCO3/kg	
06-12052-JP06B	C-5,S-1	Alkalinity	1500	0.01	mgCaCO3/kg	
06-12380-JP58D	C-6,S-1	Alkalinity	2450	0.01	mgCaCO3/kg	
06-12092-JP11E	C-7,S-1	Alkalinity	111	0.01	mgCaCO3/kg	
06-12109-JP12C	C-8,S-1	Alkalinity	1350	0.01	mgCaCO3/kg	

TABLE 2
ANALYTICAL LABORATORY TESTING - 2006
KLAMATH RIVER SEDIMENT SAMPLING

ARI ID	Client ID	Compound	Value	Screening Level	Units	% of SL
06-12040-JP03B	C-9,S-1	Alkalinity	1000	0.01	mgCaCO3/kg	
06-11570-JO18A	IG1-S1	Alkalinity	243	0.01	mgCaCO3/kg	
06-11567-JO17A	IG2-S1	Alkalinity	649	0.01	mgCaCO3/kg	
06-11676-JO43A	IG3-S1	Alkalinity	1230	0.01	mgCaCO3/kg	
06-11678-JO43C	IG4-S1	Alkalinity	1700	0.01	mgCaCO3/kg	
06-11362-JN72A	IG5-S1	Alkalinity	312	0.01	mgCaCO3/kg	
06-11363-JN72B	IG6-S1	Alkalinity	875	0.01	mgCaCO3/kg	
06-11572-JO18C	IG7-S1	Alkalinity	709	0.01	mgCaCO3/kg	
06-11677-JO43B	IG8-S1	Alkalinity	1400	0.01	mgCaCO3/kg	
06-11571-JO18B	IG9-S1	Alkalinity	463	0.01	mgCaCO3/kg	
06-12485-JP75B	J-1,S-1	Alkalinity	1040	0.01	mgCaCO3/kg	
06-12486-JP75C	J-3,S-1	Alkalinity	164	0.01	mgCaCO3/kg	
06-12488-JP75E	J-4,S-1	Alkalinity	394	0.01	mgCaCO3/kg	
06-12487-JP75D	J-5,S-1	Alkalinity	354	0.01	mgCaCO3/kg	
06-12093-JP11F	C-1,S-1	Arsenic	8	57	mg/kg	14%
06-11571-JO18B	IG9-S1	Arsenic	10	57	mg/kg	18%
06-12486-JP75C	J-3,S-1	Arsenic	9	57	mg/kg	16%
06-12379-JP58C	C-12,S-2C/3C	Benzoic Acid	350	650	ug/kg	54%
06-12051-JP06A	C-10,S-1	bis(2-Ethylhexyl)phthalate	110	8,300	ug/kg	1%
06-12094-JP11G	C-11,S-1	bis(2-Ethylhexyl)phthalate	75	8,300	ug/kg	1%
06-12041-JP03C	C-2,S-1	bis(2-Ethylhexyl)phthalate	24	8,300	ug/kg	0%
06-11771-JO60A	C3-S1	bis(2-Ethylhexyl)phthalate	73	8,300	ug/kg	1%
06-12110-JP12D	C-4,S-1	bis(2-Ethylhexyl)phthalate	130	8,300	ug/kg	2%
06-12052-JP06B	C-5,S-1	bis(2-Ethylhexyl)phthalate	85	8,300	ug/kg	1%
06-12380-JP58D	C-6,S-1	bis(2-Ethylhexyl)phthalate	110	8,300	ug/kg	1%
06-12040-JP03B	C-9,S-1	bis(2-Ethylhexyl)phthalate	120	8,300	ug/kg	1%
06-11567-JO17A	IG2-S1	bis(2-Ethylhexyl)phthalate	160	8,300	ug/kg	2%
06-11676-JO43A	IG3-S1	bis(2-Ethylhexyl)phthalate	76	8,300	ug/kg	1%
06-11678-JO43C	IG4-S1	bis(2-Ethylhexyl)phthalate	55	8,300	ug/kg	1%
06-11363-JN72B	IG6-S1	bis(2-Ethylhexyl)phthalate	87	8,300	ug/kg	1%
06-11572-JO18C	IG7-S1	bis(2-Ethylhexyl)phthalate	77	8,300	ug/kg	1%
06-11677-JO43B	IG8-S1	bis(2-Ethylhexyl)phthalate	50	8,300	ug/kg	1%
06-11571-JO18B	IG9-S1	bis(2-Ethylhexyl)phthalate	39	8,300	ug/kg	0%
06-12485-JP75B	J-1,S-1	bis(2-Ethylhexyl)phthalate	100	8,300	ug/kg	1%
06-12488-JP75E	J-4,S-1	bis(2-Ethylhexyl)phthalate	80	8,300	ug/kg	1%
06-12487-JP75D	J-5,S-1	bis(2-Ethylhexyl)phthalate	100	8,300	ug/kg	1%
06-12093-JP11F	C-1,S-1	Calcium	8,780	0.01	mg/kg	
06-12051-JP06A	C-10,S-1	Calcium	4,660	0.01	mg/kg	
06-12094-JP11G	C-11,S-1	Calcium	7,480	0.01	mg/kg	
06-12379-JP58C	C-12,S-2C/3C	Calcium	8,870	0.01	mg/kg	
06-12041-JP03C	C-2,S-1	Calcium	7,670	0.01	mg/kg	
06-11771-JO60A	C3-S1	Calcium	5,590	0.01	mg/kg	
06-12110-JP12D	C-4,S-1	Calcium	5,630	0.01	mg/kg	
06-12052-JP06B	C-5,S-1	Calcium	5,340	0.01	mg/kg	
06-12380-JP58D	C-6,S-1	Calcium	4,330	0.01	mg/kg	
06-12092-JP11E	C-7,S-1	Calcium	9,080	0.01	mg/kg	
06-12109-JP12C	C-8,S-1	Calcium	7,190	0.01	mg/kg	
06-12040-JP03B	C-9,S-1	Calcium	6,930	0.01	mg/kg	
06-11570-JO18A	IG1-S1	Calcium	11,300	0.01	mg/kg	
06-11567-JO17A	IG2-S1	Calcium	8,300	0.01	mg/kg	

TABLE 2
ANALYTICAL LABORATORY TESTING - 2006
KLAMATH RIVER SEDIMENT SAMPLING

ARI ID	Client ID	Compound	Value	Screening Level	Units	% of SL
06-11676-JO43A	IG3-S1	Calcium	6,040	0.01	mg/kg	
06-11678-JO43C	IG4-S1	Calcium	6,630	0.01	mg/kg	
06-11362-JN72A	IG5-S1	Calcium	11,400	0.01	mg/kg	
06-11363-JN72B	IG6-S1	Calcium	8,980	0.01	mg/kg	
06-11572-JO18C	IG7-S1	Calcium	6,790	0.01	mg/kg	
06-11677-JO43B	IG8-S1	Calcium	5,780	0.01	mg/kg	
06-11571-JO18B	IG9-S1	Calcium	9,260	0.01	mg/kg	
06-12485-JP75B	J-1,S-1	Calcium	5,600	0.01	mg/kg	
06-12486-JP75C	J-3,S-1	Calcium	11,600	0.01	mg/kg	
06-12488-JP75E	J-4,S-1	Calcium	8,670	0.01	mg/kg	
06-12487-JP75D	J-5,S-1	Calcium	9,890	0.01	mg/kg	
06-12093-JP11F	C-1,S-1	Chromium	17.2	267	mg/kg	6%
06-12051-JP06A	C-10,S-1	Chromium	30	267	mg/kg	11%
06-12094-JP11G	C-11,S-1	Chromium	38	267	mg/kg	14%
06-12379-JP58C	C-12,S-2C/3C	Chromium	29	267	mg/kg	11%
06-12041-JP03C	C-2,S-1	Chromium	36	267	mg/kg	13%
06-11771-JO60A	C3-S1	Chromium	31	267	mg/kg	12%
06-12110-JP12D	C-4,S-1	Chromium	32	267	mg/kg	12%
06-12052-JP06B	C-5,S-1	Chromium	32	267	mg/kg	12%
06-12380-JP58D	C-6,S-1	Chromium	28	267	mg/kg	10%
06-12092-JP11E	C-7,S-1	Chromium	24.2	267	mg/kg	9%
06-12109-JP12C	C-8,S-1	Chromium	34	267	mg/kg	13%
06-12040-JP03B	C-9,S-1	Chromium	32	267	mg/kg	12%
06-11570-JO18A	IG1-S1	Chromium	34.4	267	mg/kg	13%
06-11567-JO17A	IG2-S1	Chromium	25	267	mg/kg	9%
06-11676-JO43A	IG3-S1	Chromium	33	267	mg/kg	12%
06-11678-JO43C	IG4-S1	Chromium	30	267	mg/kg	11%
06-11362-JN72A	IG5-S1	Chromium	36	267	mg/kg	13%
06-11363-JN72B	IG6-S1	Chromium	26	267	mg/kg	10%
06-11572-JO18C	IG7-S1	Chromium	35	267	mg/kg	13%
06-11677-JO43B	IG8-S1	Chromium	32	267	mg/kg	12%
06-11571-JO18B	IG9-S1	Chromium	39	267	mg/kg	15%
06-12485-JP75B	J-1,S-1	Chromium	31	267	mg/kg	12%
06-12486-JP75C	J-3,S-1	Chromium	16.8	267	mg/kg	6%
06-12488-JP75E	J-4,S-1	Chromium	29	267	mg/kg	11%
06-12487-JP75D	J-5,S-1	Chromium	28	267	mg/kg	10%
06-12093-JP11F	C-1,S-1	Copper	25.3	390	mg/kg	6%
06-12051-JP06A	C-10,S-1	Copper	30.8	390	mg/kg	8%
06-12094-JP11G	C-11,S-1	Copper	37.7	390	mg/kg	10%
06-12379-JP58C	C-12,S-2C/3C	Copper	28.0	390	mg/kg	7%
06-12041-JP03C	C-2,S-1	Copper	39.3	390	mg/kg	10%
06-11771-JO60A	C3-S1	Copper	36.3	390	mg/kg	9%
06-12110-JP12D	C-4,S-1	Copper	37.1	390	mg/kg	10%
06-12052-JP06B	C-5,S-1	Copper	32.5	390	mg/kg	8%
06-12380-JP58D	C-6,S-1	Copper	29.6	390	mg/kg	8%
06-12092-JP11E	C-7,S-1	Copper	22.4	390	mg/kg	6%
06-12109-JP12C	C-8,S-1	Copper	36.5	390	mg/kg	9%
06-12040-JP03B	C-9,S-1	Copper	38.5	390	mg/kg	10%
06-11570-JO18A	IG1-S1	Copper	35.2	390	mg/kg	9%
06-11567-JO17A	IG2-S1	Copper	38.5	390	mg/kg	10%

TABLE 2
ANALYTICAL LABORATORY TESTING - 2006
KLAMATH RIVER SEDIMENT SAMPLING

ARI ID	Client ID	Compound	Value	Screening Level	Units	% of SL
06-11676-JO43A	IG3-S1	Copper	39.1	390	mg/kg	10%
06-11678-JO43C	IG4-S1	Copper	39.0	390	mg/kg	10%
06-11362-JN72A	IG5-S1	Copper	51.3	390	mg/kg	13%
06-11363-JN72B	IG6-S1	Copper	39.0	390	mg/kg	10%
06-11572-JO18C	IG7-S1	Copper	39.2	390	mg/kg	10%
06-11677-JO43B	IG8-S1	Copper	37.5	390	mg/kg	10%
06-11571-JO18B	IG9-S1	Copper	41.6	390	mg/kg	11%
06-12485-JP75B	J-1,S-1	Copper	38.6	390	mg/kg	10%
06-12486-JP75C	J-3,S-1	Copper	24.2	390	mg/kg	6%
06-12488-JP75E	J-4,S-1	Copper	27.0	390	mg/kg	7%
06-12487-JP75D	J-5,S-1	Copper	26.6	390	mg/kg	7%
06-12094-JP11G	C-11,S-1	Diethylphthalate	52	1,200	ug/kg	4%
06-11362-JN72A	IG5-S1	Diethylphthalate	150	1,200	ug/kg	13%
06-12485-JP75B	J-1,S-1	Di-n-Butylphthalate	20	5,100	ug/kg	0%
06-12041-JP03C	**C-2,S-1**	**Ethylbenzene**	**43**	**10**	**ug/kg**	**430%**
06-12041-JP03C	C-2,S-1	Fluoranthene	40	1,700	ug/kg	2%
06-11771-JO60A	C3-S1	Fluoranthene	24	1,700	ug/kg	1%
06-12110-JP12D	C-4,S-1	Fluoranthene	33	1,700	ug/kg	2%
06-12052-JP06B	C-5,S-1	Fluoranthene	21	1,700	ug/kg	1%
06-12485-JP75B	J-1,S-1	Fluoranthene	30	1,700	ug/kg	2%
06-12487-JP75D	J-5,S-1	Fluoranthene	20	1,700	ug/kg	1%
06-12093-JP11F	C-1,S-1	Lead	2	450	mg/kg	0%
06-12051-JP06A	C-10,S-1	Lead	9	450	mg/kg	2%
06-12094-JP11G	C-11,S-1	Lead	6	450	mg/kg	1%
06-12379-JP58C	C-12,S-2C/3C	Lead	6	450	mg/kg	1%
06-12041-JP03C	C-2,S-1	Lead	8	450	mg/kg	2%
06-11771-JO60A	C3-S1	Lead	9	450	mg/kg	2%
06-12110-JP12D	C-4,S-1	Lead	9	450	mg/kg	2%
06-12052-JP06B	C-5,S-1	Lead	8	450	mg/kg	2%
06-12380-JP58D	C-6,S-1	Lead	9	450	mg/kg	2%
06-12092-JP11E	C-7,S-1	Lead	3	450	mg/kg	1%
06-12040-JP03B	C-9,S-1	Lead	10	450	mg/kg	2%
06-11570-JO18A	IG1-S1	Lead	5	450	mg/kg	1%
06-11567-JO17A	IG2-S1	Lead	8	450	mg/kg	2%
06-11676-JO43A	IG3-S1	Lead	9	450	mg/kg	2%
06-11678-JO43C	IG4-S1	Lead	10	450	mg/kg	2%
06-11363-JN72B	IG6-S1	Lead	9	450	mg/kg	2%
06-11572-JO18C	IG7-S1	Lead	8	450	mg/kg	2%
06-11677-JO43B	IG8-S1	Lead	9	450	mg/kg	2%
06-11571-JO18B	IG9-S1	Lead	6	450	mg/kg	1%
06-12485-JP75B	J-1,S-1	Lead	10	450	mg/kg	2%
06-12488-JP75E	J-4,S-1	Lead	6	450	mg/kg	1%
06-12487-JP75D	J-5,S-1	Lead	6	450	mg/kg	1%
06-12093-JP11F	C-1,S-1	Manganese	157	0.01	mg/kg	
06-12051-JP06A	C-10,S-1	Manganese	718	0.01	mg/kg	
06-12094-JP11G	C-11,S-1	Manganese	354	0.01	mg/kg	
06-12379-JP58C	C-12,S-2C/3C	Manganese	447	0.01	mg/kg	
06-12041-JP03C	C-2,S-1	Manganese	345	0.01	mg/kg	
06-11771-JO60A	C3-S1	Manganese	383	0.01	mg/kg	
06-12110-JP12D	C-4,S-1	Manganese	451	0.01	mg/kg	

TABLE 2
ANALYTICAL LABORATORY TESTING - 2006
KLAMATH RIVER SEDIMENT SAMPLING

ARI ID	Client ID	Compound	Value	Screening Level	Units	% of SL
06-12052-JP06B	C-5,S-1	Manganese	338	0.01	mg/kg	
06-12380-JP58D	C-6,S-1	Manganese	541	0.01	mg/kg	
06-12092-JP11E	C-7,S-1	Manganese	213	0.01	mg/kg	
06-12109-JP12C	C-8,S-1	Manganese	341	0.01	mg/kg	
06-12040-JP03B	C-9,S-1	Manganese	665	0.01	mg/kg	
06-11570-JO18A	IG1-S1	Manganese	503	0.01	mg/kg	
06-11567-JO17A	IG2-S1	Manganese	768	0.01	mg/kg	
06-11676-JO43A	IG3-S1	Manganese	939	0.01	mg/kg	
06-11678-JO43C	IG4-S1	Manganese	1,240	0.01	mg/kg	
06-11362-JN72A	IG5-S1	Manganese	665	0.01	mg/kg	
06-11363-JN72B	IG6-S1	Manganese	506	0.01	mg/kg	
06-11572-JO18C	IG7-S1	Manganese	876	0.01	mg/kg	
06-11677-JO43B	IG8-S1	Manganese	1,090	0.01	mg/kg	
06-11571-JO18B	IG9-S1	Manganese	666	0.01	mg/kg	
06-12485-JP75B	J-1,S-1	Manganese	358	0.01	mg/kg	
06-12486-JP75C	J-3,S-1	Manganese	172	0.01	mg/kg	
06-12488-JP75E	J-4,S-1	Manganese	240	0.01	mg/kg	
06-12487-JP75D	J-5,S-1	Manganese	259	0.01	mg/kg	
06-12092-JP11E	C-7,S-1	Mercury	0.05	0.41	mg/kg	12%
06-12093-JP11F	C-1,S-1	N-Ammonia	54.8	0.01	mg-N/kg	
06-12051-JP06A	C-10,S-1	N-Ammonia	1210	0.01	mg-N/kg	
06-12094-JP11G	C-11,S-1	N-Ammonia	307	0.01	mg-N/kg	
06-12379-JP58C	C-12,S-2C/3C	N-Ammonia	522	0.01	mg-N/kg	
06-12041-JP03C	C-2,S-1	N-Ammonia	650	0.01	mg-N/kg	
06-11771-JO60A	C3-S1	N-Ammonia	628	0.01	mg-N/kg	
06-12110-JP12D	C-4,S-1	N-Ammonia	924	0.01	mg-N/kg	
06-12052-JP06B	C-5,S-1	N-Ammonia	584	0.01	mg-N/kg	
06-12380-JP58D	C-6,S-1	N-Ammonia	1330	0.01	mg-N/kg	
06-12092-JP11E	C-7,S-1	N-Ammonia	141	0.01	mg-N/kg	
06-12109-JP12C	C-8,S-1	N-Ammonia	634	0.01	mg-N/kg	
06-12040-JP03B	C-9,S-1	N-Ammonia	219	0.01	mg-N/kg	
06-11570-JO18A	IG1-S1	N-Ammonia	292	0.01	mg-N/kg	
06-11567-JO17A	IG2-S1	N-Ammonia	347	0.01	mg-N/kg	
06-11676-JO43A	IG3-S1	N-Ammonia	759	0.01	mg-N/kg	
06-11678-JO43C	IG4-S1	N-Ammonia	663	0.01	mg-N/kg	
06-11362-JN72A	IG5-S1	N-Ammonia	58.9	0.01	mg-N/kg	
06-11363-JN72B	IG6-S1	N-Ammonia	129	0.01	mg-N/kg	
06-11572-JO18C	IG7-S1	N-Ammonia	717	0.01	mg-N/kg	
06-11677-JO43B	IG8-S1	N-Ammonia	816	0.01	mg-N/kg	
06-11571-JO18B	IG9-S1	N-Ammonia	365	0.01	mg-N/kg	
06-12485-JP75B	J-1,S-1	N-Ammonia	915	0.01	mg-N/kg	
06-12486-JP75C	J-3,S-1	N-Ammonia	54.6	0.01	mg-N/kg	
06-12488-JP75E	J-4,S-1	N-Ammonia	127	0.01	mg-N/kg	
06-12487-JP75D	J-5,S-1	N-Ammonia	43.6	0.01	mg-N/kg	
06-12041-JP03C	C-2,S-1	Naphthalene	43	2,100	ug/kg	2%
06-11771-JO60A	C3-S1	Naphthalene	22	2,100	ug/kg	1%
06-12110-JP12D	C-4,S-1	Naphthalene	38	2,100	ug/kg	2%
06-12040-JP03B	C-9,S-1	Naphthalene	23	2,100	ug/kg	1%
06-12485-JP75B	J-1,S-1	Naphthalene	34	2,100	ug/kg	2%
06-12487-JP75D	J-5,S-1	Naphthalene	22	2,100	ug/kg	1%

TABLE 2
ANALYTICAL LABORATORY TESTING - 2006
KLAMATH RIVER SEDIMENT SAMPLING

ARI ID	Client ID	Compound	Value	Screening Level	Units	% of SL
06-12093-JP11F	C-1,S-1	Nickel	16	140	mg/kg	11%
06-12051-JP06A	C-10,S-1	Nickel	25	140	mg/kg	18%
06-12094-JP11G	C-11,S-1	Nickel	32	140	mg/kg	23%
06-12379-JP58C	C-12,S-2C/3C	Nickel	26	140	mg/kg	19%
06-12041-JP03C	C-2,S-1	Nickel	32	140	mg/kg	23%
06-11771-JO60A	C3-S1	Nickel	27	140	mg/kg	19%
06-12110-JP12D	C-4,S-1	Nickel	28	140	mg/kg	20%
06-12052-JP06B	C-5,S-1	Nickel	27	140	mg/kg	19%
06-12380-JP58D	C-6,S-1	Nickel	23	140	mg/kg	16%
06-12092-JP11E	C-7,S-1	Nickel	21	140	mg/kg	15%
06-12109-JP12C	C-8,S-1	Nickel	30	140	mg/kg	21%
06-12040-JP03B	C-9,S-1	Nickel	28	140	mg/kg	20%
06-11570-JO18A	IG1-S1	Nickel	29	140	mg/kg	21%
06-11567-JO17A	IG2-S1	Nickel	21	140	mg/kg	15%
06-11676-JO43A	IG3-S1	Nickel	29	140	mg/kg	21%
06-11678-JO43C	IG4-S1	Nickel	26	140	mg/kg	19%
06-11362-JN72A	IG5-S1	Nickel	40	140	mg/kg	29%
06-11363-JN72B	IG6-S1	Nickel	21	140	mg/kg	15%
06-11572-JO18C	IG7-S1	Nickel	30	140	mg/kg	21%
06-11677-JO43B	IG8-S1	Nickel	29	140	mg/kg	21%
06-11571-JO18B	IG9-S1	Nickel	31	140	mg/kg	22%
06-12485-JP75B	J-1,S-1	Nickel	26	140	mg/kg	19%
06-12486-JP75C	J-3,S-1	Nickel	26	140	mg/kg	19%
06-12488-JP75E	J-4,S-1	Nickel	32	140	mg/kg	23%
06-12487-JP75D	J-5,S-1	Nickel	34	140	mg/kg	24%
06-12041-JP03C	C-2,S-1	Phenanthrene	36	1,500	ug/kg	2%
06-11771-JO60A	C3-S1	Phenanthrene	24	1,500	ug/kg	2%
06-12110-JP12D	C-4,S-1	Phenanthrene	32	1,500	ug/kg	2%
06-12485-JP75B	J-1,S-1	Phenanthrene	27	1,500	ug/kg	2%
06-12041-JP03C	C-2,S-1	Pyrene	32	2,600	ug/kg	1%
06-11771-JO60A	C3-S1	Pyrene	22	2,600	ug/kg	1%
06-12110-JP12D	C-4,S-1	Pyrene	25	2,600	ug/kg	1%
06-12485-JP75B	J-1,S-1	Pyrene	27	2,600	ug/kg	1%
06-12093-JP11F	C-1,S-1	Sulfide	42.6	0.01	mg/kg	
06-12051-JP06A	C-10,S-1	Sulfide	1350	0.01	mg/kg	
06-12094-JP11G	C-11,S-1	Sulfide	246	0.01	mg/kg	
06-12379-JP58C	C-12,S-2C/3C	Sulfide	631	0.01	mg/kg	
06-12041-JP03C	C-2,S-1	Sulfide	397	0.01	mg/kg	
06-11771-JO60A	C3-S1	Sulfide	121	0.01	mg/kg	
06-12110-JP12D	C-4,S-1	Sulfide	288	0.01	mg/kg	
06-12052-JP06B	C-5,S-1	Sulfide	82.3	0.01	mg/kg	
06-12380-JP58D	C-6,S-1	Sulfide	1410	0.01	mg/kg	
06-12092-JP11E	C-7,S-1	Sulfide	480	0.01	mg/kg	
06-12109-JP12C	C-8,S-1	Sulfide	710	0.01	mg/kg	
06-12040-JP03B	C-9,S-1	Sulfide	213	0.01	mg/kg	
06-11570-JO18A	IG1-S1	Sulfide	344	0.01	mg/kg	
06-11567-JO17A	IG2-S1	Sulfide	1440	0.01	mg/kg	
06-11676-JO43A	IG3-S1	Sulfide	2100	0.01	mg/kg	
06-11678-JO43C	IG4-S1	Sulfide	1800	0.01	mg/kg	
06-11362-JN72A	IG5-S1	Sulfide	160	0.01	mg/kg	

TABLE 2
ANALYTICAL LABORATORY TESTING - 2006
KLAMATH RIVER SEDIMENT SAMPLING

ARI ID	Client ID	Compound	Value	Screening Level	Units	% of SL
06-11363-JN72B	IG6-S1	Sulfide	350	0.01	mg/kg	
06-11572-JO18C	IG7-S1	Sulfide	1000	0.01	mg/kg	
06-11677-JO43B	IG8-S1	Sulfide	2700	0.01	mg/kg	
06-11571-JO18B	IG9-S1	Sulfide	631	0.01	mg/kg	
06-12485-JP75B	J-1,S-1	Sulfide	557	0.01	mg/kg	
06-12486-JP75C	J-3,S-1	Sulfide	10.3	0.01	mg/kg	
06-12488-JP75E	J-4,S-1	Sulfide	284	0.01	mg/kg	
06-12487-JP75D	J-5,S-1	Sulfide	156	0.01	mg/kg	
06-12051-JP06A	C-10,S-1	Toluene	3.7	0.01	ug/kg	
06-13025-JP11E	C-7,S-1	Toluene	680	0.01	ug/kg	
06-12485-JP75B	J-1,S-1	Toluene	390	0.01	ug/kg	
06-12486-JP75C	J-3,S-1	Toluene	3.6	0.01	ug/kg	
06-12110-JP12D	C-4,S-1	Total Cyanide	2.01	0.01	mg/kg	
06-12488-JP75E	J-4,S-1	Total Cyanide	1.41	0.01	mg/kg	
06-12110-JP12D	C-4,S-1	Total Kjeldahl Nitrogen	5130	0.01	mg-N/kg	
06-11572-JO18C	IG7-S1	Total Kjeldahl Nitrogen	4170	0.01	mg-N/kg	
06-12488-JP75E	J-4,S-1	Total Kjeldahl Nitrogen	2730	0.01	mg-N/kg	
06-12110-JP12D	C-4,S-1	Total Phosphorus	1420	0.01	mg/kg	
06-11572-JO18C	IG7-S1	Total Phosphorus	1360	0.01	mg/kg	
06-12488-JP75E	J-4,S-1	Total Phosphorus	902	0.01	mg/kg	
06-12041-JP03C	**C-2,S-1**	**Total Xylenes**	**220**	**40**	**ug/kg**	**550%**
06-12486-JP75C	J-3,S-1	Vinyl Chloride	1.1	0.01	ug/kg	
06-12093-JP11F	C-1,S-1	Zinc	38.1	410	mg/kg	9%
06-12051-JP06A	C-10,S-1	Zinc	67	410	mg/kg	16%
06-12094-JP11G	C-11,S-1	Zinc	68	410	mg/kg	17%
06-12379-JP58C	C-12,S-2C/3C	Zinc	72	410	mg/kg	18%
06-12041-JP03C	C-2,S-1	Zinc	76	410	mg/kg	19%
06-11771-JO60A	C3-S1	Zinc	75	410	mg/kg	18%
06-12110-JP12D	C-4,S-1	Zinc	72	410	mg/kg	18%
06-12052-JP06B	C-5,S-1	Zinc	64	410	mg/kg	16%
06-12380-JP58D	C-6,S-1	Zinc	64	410	mg/kg	16%
06-12092-JP11E	C-7,S-1	Zinc	57.3	410	mg/kg	14%
06-12109-JP12C	C-8,S-1	Zinc	75	410	mg/kg	18%
06-12040-JP03B	C-9,S-1	Zinc	71	410	mg/kg	17%
06-11570-JO18A	IG1-S1	Zinc	66	410	mg/kg	16%
06-11567-JO17A	IG2-S1	Zinc	80	410	mg/kg	20%
06-11676-JO43A	IG3-S1	Zinc	76	410	mg/kg	19%
06-11678-JO43C	IG4-S1	Zinc	76	410	mg/kg	19%
06-11362-JN72A	IG5-S1	Zinc	76	410	mg/kg	19%
06-11363-JN72B	IG6-S1	Zinc	89	410	mg/kg	22%
06-11572-JO18C	IG7-S1	Zinc	73	410	mg/kg	18%
06-11677-JO43B	IG8-S1	Zinc	74	410	mg/kg	18%
06-11571-JO18B	IG9-S1	Zinc	78	410	mg/kg	19%
06-12485-JP75B	J-1,S-1	Zinc	75	410	mg/kg	18%
06-12486-JP75C	J-3,S-1	Zinc	28.5	410	mg/kg	7%
06-12488-JP75E	J-4,S-1	Zinc	50	410	mg/kg	12%
06-12487-JP75D	J-5,S-1	Zinc	53	410	mg/kg	13%

Note: Table provided by Gathard Engineering Consultants. Data is provided within this report as background information only
PCNB and Iprodione (organochlorine pesticides), and dioxin data are not included.

TABLE 3
DIOXIN TOXICITY EQUIVALENCY FACTOR-ADJUSTED CONCENTRATIONS
KLAMATH RIVER SEDIMENT SAMPLING

Analyte	C-4, S-1 pg/g	TEFs	TEQs	Total TEQs
Furans				
2,3,7,8-TCDF	0.631	0.1	0.0631	
1,2,3,7,8-PeCDF	< 0.823	0.05	0.020575	
2,3,4,7,8-PeCDF	1.12	0.5	0.56	
1,2,3,4,7,8-HxCDF	1.45	0.1	0.145	
1,2,3,6,7,8-HxCDF	2.76	0.1	0.276	
2,3,4,6,7,8-HxCDF	2.1	0.1	0.21	
1,2,3,7,8,9-HxCDF	< 0.403	0.1	0.02015	
1,2,3,4,6,7,8-HpCDF	38	0.01	0.38	
1,2,3,4,7,8,9, -HpCDF	1.6	0.01	0.016	
OCDF	81.7	0.001	0.0817	
Dioxins				
2,3,7,8-TCDD	< 0.205	1	0.1025	
1,2,3,7,8-PeCDD	< 1.96	0.5	0.49	
1,2,3,4,7,8-HxCDD	< 0.62	0.1	0.081	
1,2,3,6,7,8-HxCDD	4.98	0.1	0.498	
1,2,3,7,8,9-HxCDD	3.15	0.1	0.315	
1,2,3,4,6,7,8-HpCDD	83.6	0.01	0.836	
OCDD	737	0.001	0.737	**4.83**
Analyte	**IG7-S1 pg/g**	**TEFs**	**TEQs**	**Total TEQs**
Furans				
2,3,7,8-TCDF	0.39	0.1	0.039	
1,2,3,7,8-PeCDF	0.348	0.05	0.0174	
2,3,4,7,8-PeCDF	0.285	0.5	0.1425	
1,2,3,4,7,8-HxCDF	1.1	0.1	0.11	
1,2,3,6,7,8-HxCDF	0.925	0.1	0.0925	
2,3,4,6,7,8-HxCDF	0.986	0.1	0.0986	
1,2,3,7,8,9-HxCDF	< 0.158	0.1	0.0079	
1,2,3,4,6,7,8-HpCDF	18.9	0.01	0.189	
1,2,3,4,7,8,9, -HpCDF	1.18	0.01	0.0118	
OCDF	44.7	0.001	0.0447	
Dioxins				
2,3,7,8-TCDD	< 0.0776	1	0.0388	
1,2,3,7,8-PeCDD	0.347	0.5	0.1735	
1,2,3,4,7,8-HxCDD	0.919	0.1	0.0919	
1,2,3,6,7,8-HxCDD	2.69	0.1	0.269	
1,2,3,7,8,9-HxCDD	2.24	0.1	0.224	
1,2,3,4,6,7,8-HpCDD	51.7	0.01	0.517	
OCDD	413	0.001	0.413	**2.48**

TABLE 3
DIOXIN TOXICITY EQUIVALENCY FACTOR-ADJUSTED CONCENTRATIONS
KLAMATH RIVER SEDIMENT SAMPLING

Analyte	J4-S1 pg/g	TEFs	TEQs	Total TEQs
Furans				
2,3,7,8-TCDF	0.279	0.1	0.0279	
1,2,3,7,8-PeCDF	0.278	0.05	0.0139	
2,3,4,7,8-PeCDF	0.296	0.5	0.148	
1,2,3,4,7,8-HxCDF	1.08	0.1	0.108	
1,2,3,6,7,8-HxCDF	2.34	0.1	0.234	
2,3,4,6,7,8-HxCDF	2.27	0.1	0.227	
1,2,3,7,8,9-HxCDF	0.341	0.1	0.0341	
1,2,3,4,6,7,8-HpCDF	36.8	0.01	0.368	
1,2,3,4,7,8,9, -HpCDF	2.04	0.01	0.0204	
OCDF	120	0.001	0.12	
Dioxins				
2,3,7,8-TCDD	< 0.0615	1	0.03075	
1,2,3,7,8-PeCDD	0.362	0.5	0.181	
1,2,3,4,7,8-HxCDD	0.876	0.1	0.0876	
1,2,3,6,7,8-HxCDD	3.47	0.1	0.347	
1,2,3,7,8,9-HxCDD	1.74	0.1	0.174	
1,2,3,4,6,7,8-HpCDD	98.5	0.01	0.985	
OCDD	1020	0.001	1.02	**4.13**

Notes:
< = not detected above detection limit
TEFs = toxicity equivalency factors
TEQs = toxicity equivalents
pg/g = picograms per gram

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Attachment to and part of Report 21-1-12195-001

Date: September 22, 2006
To: Mr. Michael Bowen
California State Coastal Conservancy

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL/ENVIRONMENTAL REPORT

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include: the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used: (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors which were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the
ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland