



El Dorado Irrigation District

LETTER OF TRANSMITTAL

EL DORADO IRRIGATION DISTRICT

2890 Mosquito Road, Placerville, CA 95667

Telephone: (530) 622-4534; Fax: (530) 622-8597

In Reply Refer To: FMT0504-081

Date: May 7, 2004

To: State Water Resources Control Board
Division of Water Quality
P.O. Box 100
Sacramento, CA 95812-0100

Attention: Craig J. Wilson, Chief, TMDL Listing Unit

Project:

Project No.

Subject: Effluent Receiving Water Quality Assessment for EDHWWTP Report

We are transmitting:

- ☒ Herewith
- ☐ No. of copies
- ☐ No. of originals
- ☐ Under separate cover

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- ☐ Specification(s)
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- ☒ 2 CD's

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- ☐ Checking
- ☐ Estimate
- ☐ File
- ☐ Information
- ☐ Review and Comment
- ☐ Signature(s)
- ☐ Work

Status:

- ☐ Preliminary
- ☒ Final

Remarks: Enclosed are 2 cd's of the Effluent Receiving Water Quality Assessment for EDHWWTP Report, August 2002, as requested in the attached SWRCB letter dated April 30, 2004.

From:


Tim Sullivan
Project Engineer

TS:cah



Terry Tamminen
Secretary for
Environmental
Protection

State Water Resources Control Board

Executive Office

Arthur G. Baggett Jr., Chair
1001 I Street • Sacramento, California 95814 • (916) 341-5615
Mailing Address: P.O. Box 100 • Sacramento, California • 95812-0100
Fax (916) 341-5621 • <http://www.swrcb.ca.gov>



Arnold Schwarzenegger
Governor

April 30, 2004

Interested Parties

NOTICE OF PUBLIC SOLICITATION OF WATER QUALITY DATA AND INFORMATION— 2004 CLEAN WATER ACT SECTION 303(d) LIST

The State Water Resources Control Board (SWRCB) is required by federal Clean Water Act section 303(d) and Title 40, Code of Federal Regulations section 130.7 to develop a list of water quality limited segments (section 303[d] list). This letter initiates a 45-day solicitation period to request from interested parties numeric data and information regarding water quality conditions in surface waters of California. Data and information received will be used to assess the State's water bodies for possible inclusion on or removal from the existing section 303(d) list. Water bodies not meeting water quality standards after implementation of certain technology-based water quality controls will be placed on the 2004 section 303(d) list.

Water bodies are listed due to deleterious impacts from a pollutant or pollutants and delisted when evidence reveals that such impacts have ceased or never existed. Waters placed on the section 303(d) list will be subject to development of Total Maximum Daily Loads (TMDLs). As required by federal law, water bodies on the section 303(d) list will be scheduled for development of TMDLs. A revised section 303(d) list is planned for submittal to the U.S. Environmental Protection Agency (USEPA) in February 2005. The final list will be based on data and information available to SWRCB no later than the final day of this solicitation period, June 14, 2004. The information gathered in this solicitation will also contribute to the preparation of the 2004 federal Clean Water Act section 305(b) Report on Water Quality.

Regarding this solicitation and the ensuing section 303(d) listing/delisting process, please note the following:

1. SWRCB is currently engaged in the process to adopt the "Water Quality Control Policy for Developing California Clean Water Act Section 303(d) List" (Listing Policy). The Listing Policy will provide guidance on the review and assessment of supporting data and information used to decide which candidate water bodies are placed on or removed from the section 303(d) list. All readily available data and information submitted pursuant to this solicitation will be reviewed and assessed using the final approved Listing Policy. Requirements for data and information from the Listing Policy—including those for quality control and assurance, temporal and spatial characteristics, and minimum sample sizes—will be followed when reviewing all data and information. The provisions of the Listing Policy will not be applied until the Listing Policy has been approved by SWRCB and the Office of Administrative Law.

California Environmental Protection Agency

2. Anyone, including but not limited to, private citizens, public agencies, local, State and federal governmental agencies, non-profit organizations, and businesses possessing information regarding the quality of the State's waters may contribute data and information pursuant to this solicitation.
3. All available data and assessment information generated since May 15, 2001 will be considered.
4. All new data and information must be received by SWRCB by the close of business on June 14, 2004. Information received after June 14, 2004 will be considered in developing the 2006 section 303(d) list submitted by California to USEPA.
5. An interested party may request reassessment of a water body on the existing section 303(d) list. The interested party must (a) describe the reason(s) the listing is inappropriate and clearly state the reason the interested party would come to a different outcome, and (b) provide the data and information necessary to enable SWRCB to conduct a complete reassessment.
6. All data and information submitted should include the following:
 - a. Name of the person or organization providing the information;
 - b. Mailing address, phone number, and email address of a contact responsible for answering questions about the information submitted;
 - c. Bibliographic citations for all published information provided;
 - d. To the extent possible, all information should be submitted in electronic format (e.g., Microsoft [MS] Word, Access database, Excel spreadsheet, ASCII, or Adobe Acrobat files);
 - e. Detailed quality assurance and quality control information about sampling and analysis of all numeric data;
 - f. Water body name and California water body identification number (available from local RWQCB). The preferred statewide Geographic Information System (GIS) projection is the California Teale Albers, NAD27. Please refer to the following web site for details on the Teale Albers projection for GIS information: <http://gis.ca.gov/albers.epl>;
 - g. Geographic extent of the potential water quality limited segment;
 - h. Pollutant(s) of concern;
 - i. Applicable water quality objective or criterion;
 - j. Comparison of results against applicable water quality objective or criterion;
 - k. Designated beneficial use(s) that may be impacted by pollutant(s);
 - l. Complete background information (metadata) for field data (i.e., when and where measurements were taken, number of samples, detection limits, etc.); and
 - m. Full identification of any citizen volunteer water quality monitoring efforts including:
 - 1) The name of the group; and
 - 2) A description of any training in water quality assessment completed by members of the group.

7. All numeric data submitted in support of new listings or changes to existing listings, should be evaluated to address the following:
 - a. data quality assurance assessment(s);
 - b. spatial representation;
 - c. temporal representation;
 - d. age(s) of the data;
 - e. effects of seasonality;
 - f. effects of any events that might influence data evaluation (e.g., storm events, flow conditions, laboratory data qualifiers, etc.);
 - g. the total number of samples;
 - h. the number of samples exceeding standards;
 - i. the source or reference for samples;
 - j. the potential sources of pollutants; and
 - k. any program that might address the water quality problem in lieu of a TMDL.
8. All non-numeric information submitted to support listing or delisting should be evaluated to address the following:
 - a. types of observations;
 - b. spatial representation;
 - c. temporal representation;
 - d. age of information;
 - e. effects of seasonality;
 - f. effects of any events that might influence data evaluation (e.g., storm events, flow conditions, etc.);
 - g. total number of samples or observations;
 - h. number of samples or observations exceeding a guideline or standard;
 - i. perspective on the magnitude of the problem;
 - j. numeric indices derived from qualitative information;
 - k. source(s) of all information; and
 - l. any program that might address the water quality problem in lieu of a TMDL.
9. For purposes of this solicitation, "information" includes any documentation that a water body is or is not meeting, or is or is not likely to meet, existing water quality standards (i.e., beneficial uses of water, water quality objectives/criteria, and the State's non-degradation policy as listed in the State's Water Quality Control Plans [Basin Plans], statewide water quality control plans [e.g., the California Ocean Plan], the California Code of Regulations, and pertinent federal laws and regulations).
10. "Data" are considered to be numeric information (i.e., measurements of specific physical, chemical, or biological characteristics in aquatic environments).

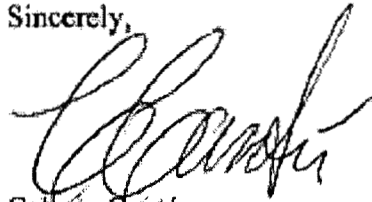


11. Data and information provided may pertain to individual water body segments, entire water bodies, or whole watersheds.
12. The section 303(d) listing/delisting effort is not designed, intended, or able to change existing water quality standards. Interested parties recommending changes to existing water quality standards should contact their local Regional Water Quality Control Board (RWQCB).
13. Please send all data and information to:

Craig J. Wilson
Chief, TMDL Listing Unit
Division of Water Quality
State Water Resources Control Board
P.O. Box 100
Sacramento, CA 95812-0100

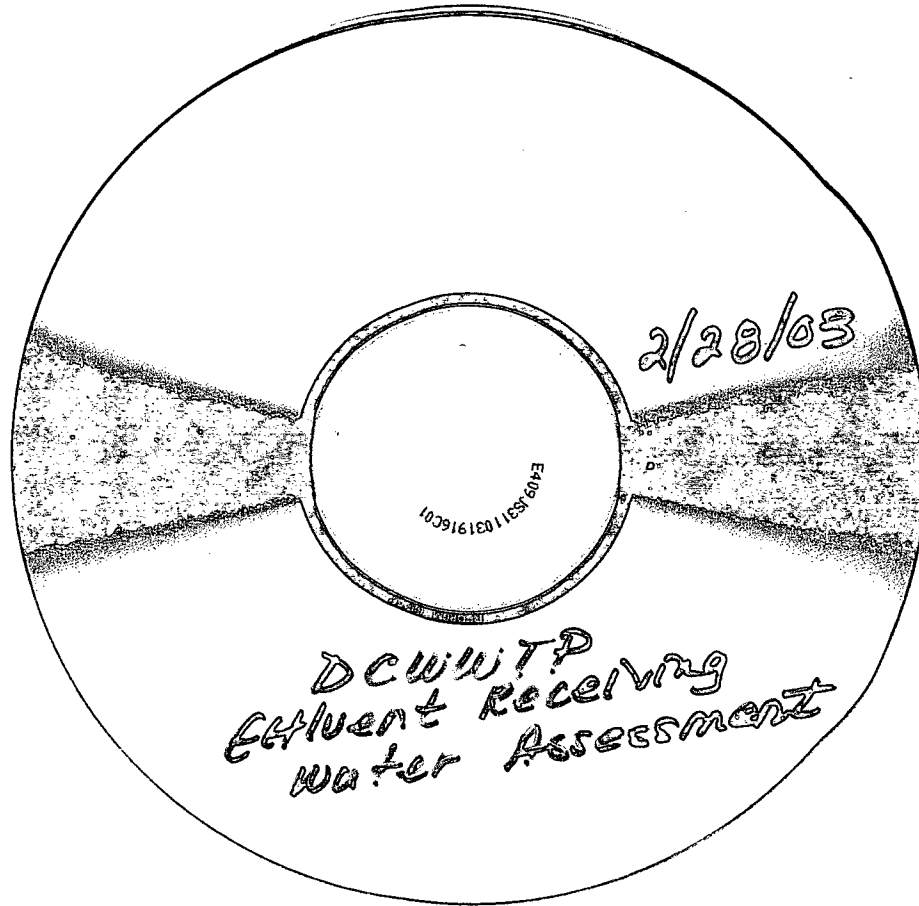
If you have questions regarding data or information you wish to submit or about this SWRCB notice, please contact Craig J. Wilson, Chief, TMDL Listing Unit, at (916) 341-5560 (wilscj@swrcb.ca.gov).

Sincerely,



Celeste Cantú
Executive Director





**PHASE II EFFLUENT AND RECEIVING WATER QUALITY
ASSESSMENT FOR THE
EL DORADO IRRIGATION DISTRICT'S
DEER CREEK WASTEWATER TREATMENT PLANT**

***A QUALITY ASSURANCE PROJECT PLAN FOR THE
COLLECTION AND ANALYSIS OF SAMPLES***

Prepared for:

**El Dorado Irrigation District
2890 Mosquito Road
Placerville, California 95667**

Prepared by:

SWRI SURFACE WATER
RESOURCES, INC.

**455 Capitol Mall Drive, Suite 600
Sacramento, California 95814**

February 1998

**PHASE II EFFLUENT AND RECEIVING WATER QUALITY
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RESOURCES, INC.

February, 1998

QUALITY ASSURANCE PROJECT PLAN APPROVAL FORM

PROJECT TITLE: Phase II Effluent and Receiving Water Quality Assessment for the El Dorado Irrigation District's Deer Creek Wastewater Treatment Plant

COMMITMENT TO IMPLEMENT THIS QUALITY ASSURANCE PROJECT PLAN:

Dr. Michael Bryan

Project Manager (Consultant)
Surface Water Resources, Inc.
455 Capitol Mall, Suite 600
Sacramento, California 95814
(916) 325-4043

Signature

Date

APPROVAL TO PROCEED IN ACCORDANCE WITH THIS PLAN:

Mr. Tim Sullivan

Project Manager
El Dorado Irrigation District
2890 Mosquito Road
Placerville, California 95667
(916) 642-4177

Signature

Date

Ms. Margie Lopez

Water Quality Superintendent
El Dorado Irrigation District
2890 Mosquito Road
Placerville, California 95667
(916) 642-4177

Signature

Date

CONCURRENCES:

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Water Resources Engineer
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(916) 255-3055

Signature

Date

Dr. Nicolas Bloom

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Frontier Geosciences Inc.
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Signature

Date

Mr. George Hampton

Laboratory Director
California Laboratory Services
3249 Fitzgerald Road
Rancho Cordova, California 95742
(916) 638-7301

Signature

Date

Mr. Bob Mitzel

Director of Operations
Alta Analytical Laboratory
5070 Robert J. Mathews Parkway
El Dorado Hills, California 95762
(916) 933-1640

Signature

Date

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1. PROJECT DESCRIPTION

1.1 DESCRIPTION OF PROJECT AREA

El Dorado Irrigation District (District) owns and operates the Deer Creek Wastewater Treatment Plant (WWTP) which provides service to Cameron Park, Shingle Springs, Diamond Springs, and Pleasant Valley. The WWTP is located approximately 35 miles east of Sacramento in section 16, T9N, R9E, MDB&M. Treated municipal wastewater produced at this plant is discharged into Deer Creek, a tributary of the Cosumnes River. In addition, this plant provides reclaimed effluent to various sources in the Cameron Park area. The facility is currently permitted to treat and discharge 2.5 mgd (ADWF). On 8 October, 1997, the District formally dedicated its \$19.5 million upgrade to the Deer Creek WWTP.

1.2 STATEMENT OF PROJECT NEED

Because the concentrations of priority pollutants (e.g., trace metals, organics, pesticides, PCBs, phthalates, esters, and dioxins/furans) in the Deer Creek WWTP effluent have not been well established, an adequate technical basis does not currently exist from which to determine whether Waste Discharge Requirements (WDR) for specific contaminants are warranted for the plant's NPDES permit. Development and implementation of a project plan (based on clean sampling techniques), and appropriate analytical procedures for measuring the concentrations of various contaminants, will provide the technical data necessary to develop contaminant WDRs for the Deer Creek WWTP, if warranted.

1.3 PROJECT OBJECTIVE

The objective of this project is to employ "clean sampling techniques" to collect treated effluent samples from the Deer Creek WWTP for contaminant analyses. A total of 13 trace metals, 73 organics, asbestos, cyanide, tributyltin, and dioxins and furans (**Table 1**) will be monitored over a 12-month period. Data from this study will be compared to current State and federal water quality standards/criteria to determine if WDRs are necessary for the Deer Creek WWTP in order to protect the beneficial uses of the receiving water, Deer Creek, as defined in the Central Valley Regional Water Quality Control Board (CVRWQCB) Order No. 97-211 (NPDES No. 0078662).

Table 1. Contaminants monitored in the treated effluent of the El Dorado Irrigation District's Deer Creek Wastewater Treatment Plant, and applicable State and federal water quality criteria. All concentrations are reported in µg/l, unless otherwise noted.

Contaminants	Monitoring Frequency: Monthly (M) Quarterly (Q)	Reporting Limits	Human Health		Aquatic Life ^b		
			DHS MCL	Title 22 DLR ^a	USEPA 1986	CA Tox. Rule	National Tox. Rule
EPA METHOD 601—PURGEABLE HALOCARBONS	SAMPLE COLLECTION: grab sample /two 40-ml VOA vials / no preservative ANALYZED BY: California Laboratory Services						
1,1,1—Trichloroethane	M	0.5	200	0.5	9,400	--	--
1,1,2,2—Tetrachloroethane	M	0.5	1	0.5	2,400	--	--
1,1,2—Trichloroethane	M	0.5	5	0.5	9,400	--	--
1,1—Dichloroethylene	M	0.5	6	0.5	--	--	--
1,2—Dichloroethane	M	0.5	0.5	0.5	20,000	--	--
1,2—Dichlorobenzene	M	0.5	600	0.5	763	--	--
1,3—Dichlorobenzene	M	0.5	130 ^c	0.5	763	--	--
1,3—Dichloropropene	M	0.5	0.5	0.5	244	--	--
1,4—Dichlorobenzene	M	0.5	5	0.5	763	--	--
Bromoform	M	0.5	100 (80 proposed) ^d	0.5	--	--	--
Bromomethane	M	0.5	--	0.5	--	--	--
Carbon Tetrachloride	M	0.5	0.5	0.5	--	--	--
Chlorobenzene	M	0.5	70	0.5	--	--	--
Chlorodibromomethane	M	0.5	100 ^d	0.5	--	--	--
Chloroform	M	0.5	100 (80 proposed) ^d	0.5	1,240	--	--
Chloromethane	M	0.5	--	0.5	--	--	--
Dichlorobromomethane	M	0.5	100 (80 proposed) ^d	0.5	--	--	--
Dichloromethane (f)	M	0.5	5	0.5	--	--	--
Tetrachloroethylene	M	0.5	5	0.5	--	--	--
Trichloroethylene	M	0.5	5	0.5	21,900	--	--
Vinyl Chloride	M	0.5	0.5	0.5	--	--	--
EPA METHOD 602—PURGEABLE AROMATICS	SAMPLE COLLECTION: grab sample /one 40-ml VOA vial / preserved with HCl ANALYZED BY: California Laboratory Services						
Benzene	M	0.3	1	0.5	--	--	--
Ethylbenzene	M	0.3	700	0.5	--	--	--
Toluene (g)	M	0.3	150	0.5	--	--	--
EPA METHOD 8260—ACROLEIN & ACRYLONITRILE	SAMPLE COLLECTION: grab sample / three 40-ml VOA vials / preserved with HCl ANALYZED BY: California Laboratory Services						
Acrolein	M	40	--	--	21	--	--

Contaminants	Monitoring Frequency: Monthly (M) Quarterly (Q)	Reporting Limits	Human Health		Aquatic Life ^b		
			DHS MCL	Title 22 DLR ^a	USEPA 1986	CA Tox. Rule	National Tox. Rule
Acrylonitrile	M	40	--	--	2,600	--	--
EPA METHOD 608—ORGANOCHLORINE PESTICIDE & PCBs	SAMPLE COLLECTION: 24-hr composite sample / two 1-L amber glass bottles / no preservative ANALYZED BY: California Laboratory Services						
4,4'-DDT	M	0.05	--	--	0.001	0.001	0.001
4,4'-DDD	M	0.05	--	--	--	--	--
4,4'-DDE	M	0.05	--	--	--	--	--
Aldrin	M	0.05	0.05 ^c	--	--	--	--
Chlordane	M	0.2	0.1	0.1	0.0043	0.0043	0.0043
Dieldrin	M	0.05	0.05 ^c	--	0.0557 ^m	0.056	0.0019
Endosulfan I	M	0.05	--	--	0.056	0.056	0.056
Endosulfan II	M	0.05	--	--	0.056	0.056	0.056
Endosulfan sulfate	M	0.05	--	--	--	--	--
Endrin	M	0.05	2	0.1	0.036 ^m	0.036	0.0023
Endrin Aldehyde	M	0.1	--	--	--	--	--
Heptachlor	M	0.02	0.01	0.01	0.0038	0.0038	0.0038
Heptachlor epoxide	M	0.02	0.01	0.01	--	0.0038	0.0038
Hexachlorocyclohexane (BHC)					--		
Alpha	M	0.05	0.7 ^c	--	--	--	--
Beta	M	0.05	0.3 ^c	--	--	--	--
Gamma (Lindane)	M	0.05	0.2	0.2	0.08	--	0.08
Delta	M	0.05	--	--	--	--	--
Kepone	M	0.1	--	--	--	--	--
Methoxychlor	M	0.2	40	10	0.03	--	--
Mirex	M	0.05	--	--	0.001	--	--
Toxaphene	M	0.5	3	1	0.013	0.0002	0.0002
PCBs							
Aroclor 1016	M	0.2	0.5	0.5	0.014	0.014	0.014
Aroclor 1221	M	0.2	0.5	0.5	0.014	0.014	0.014
Aroclor 1232	M	0.2	0.5	0.5	0.014	0.014	0.014
Aroclor 1242	M	0.2	0.5	0.5	0.014	0.014	0.014
Aroclor 1248	M	0.2	0.5	0.5	0.014	0.014	0.014
Aroclor 1254	M	0.2	0.5	0.5	0.014	0.014	0.014
Aroclor 1260	M	0.2	0.5	0.5	0.014	0.014	0.014
EPA METHOD 625—ORGANICS	SAMPLE COLLECTION: 24-hr composite sample / two 1-L amber glass bottles / no preservative ANALYZED BY: California Laboratory Services						
Haloethers							
4-Bromophenyl phenyl ether	M	10	--	--	122	--	--
4-chlorophenyl phenyl ether	M	10	--	--	122	--	--

Contaminants	Monitoring Frequency: Monthly (M) Quarterly (Q)	Reporting Limits	Human Health		Aquatic Life ^b		
			DHS MCL	Title 22 DLR ^a	USEPA 1986	CA Tox. Rule	National Tox. Rule
Bis (2-chloroethyl) ether	M	10	--	--	122	--	--
Bis (2-chloroisopropyl) ether	M	10	--	--	122	--	--
Phenols							
2,4,5-Trichlorophenol	M	10	--	--	--	--	--
2,4,6—Trichlorophenol	M	10	--	--	970	--	--
2,4—Dichlorophenol	M	10	--	--	365	--	--
2,4—Dimethylphenol	M	10	400 ^c	--	--	--	--
2,4—Dinitrophenol	M	25	--	--	--	--	--
2-Chlorophenol	M	10	--	--	2,000	--	--
2—Methyl-4,6-dinitrophenol	M	25	--	--	150	--	--
2-Methylphenol	M	10	--	--	--	--	--
2-Nitrophenol	M	10	--	--	150	--	--
3/4-Methylphenol	M	10	--	--	--	--	--
4—Chloro 3 methylphenol	M	20	--	--	--	--	--
4-Nitrophenol	M	25	--	--	150	--	--
Pentachlorophenol	M	10	1	0.2	3.2	15	13
Phenol	M	10	5 ^c	--	2,560	--	--
Phthalate Esters							
Bis(2-ethylhexyl)phthalate	M	5	4	3	3	--	--
Butylbenzyl phthalate	M	5	100 (proposed) ^d	--	3	--	--
Diethyl phthalate	M	5	4	--	3	--	--
Dimethyl phthalate	M	5	4	--	3	--	--
Di-n-butyl phthalate	M	5	4	--	3	--	--
Di-n-octylphthalate	M	5	4	--	3	--	--
Nitrosamines							
N-nitrosodimethylamine	M	10	--	--	--	--	--
N-Nitroso-di-n-propylamine	M	10	--	--	--	--	--
N-nitrosodiphenylamine	M	10	--	--	--	--	--
Nitroaromatics & Isophorone							
2, 4—dinitrotoluene	M	10	--	--	230	--	--
2,6DNT (2,6-Dinitrotoluene)	M	10	--	--	--	--	--
2-Nitroaniline	M	25	--	--	--	--	--
3-Nitroaniline	M	25	--	--	--	--	--
4-Nitroaniline	M	25	--	--	--	--	--
Isophorone	M	10	--	--	--	--	--
Nitrobenzene	M	10	--	--	--	--	--
PAHs							

Contaminants	Monitoring Frequency: Monthly (M) Quarterly (Q)	Reporting Limits	Human Health		Aquatic Life ^b		
			DHS MCL	Title 22 DLR ^a	USEPA 1986	CA Tox. Rule	National Tox. Rule
2-Methylnaphthalene	M	10	0.2	--	--	--	--
Acenaphthene	M	10	0.2	--	520	--	--
Acenaphthylene	M	10	0.2	--	--	--	--
Anthracene	M	10	0.2	--	--	--	--
Benzo (a) anthracene	M	10	0.1 (proposed) ^d	--	--	--	--
Benzo (a) pyrene	M	10	0.2	0.1	--	--	--
Benzo (b) fluoranthene	M	10	0.2 (proposed) ^d	--	--	--	--
Benzo (g,h,i) perylene	M	10	0.2	--	--	--	--
Benzo (k) fluoranthene	M	10	0.2	--	--	--	--
Chrysene	M	10	0.2	--	--	--	--
Dibenzo (a,h) anthracene	M	10	0.2	--	--	--	--
Fluoranthene	M	10	0.2	--	--	--	--
Fluorene	M	10	0.2	--	--	--	--
Indeno (1,2,3-c,d) pyrene	M	10	0.2	--	--	--	--
Naphthalene	M	10	0.2	--	620	--	--
Phenanthrene	M	10	0.2	--	--	--	--
Pyrene	M	10	0.2	--	--	--	--
Chlorinated Benzenes							
1,2,4-Trichlorobenzene	M	10	70	--	--	--	--
Chlorinated Organics							
2-chloronaphthalene	M	10	--	--	--	--	--
3,3-dichlorobenzidine	M	20	--	--	--	--	--
4-chloroaniline	M	20	--	--	--	--	--
Bis (2-chloroethoxy) methane	M	10	--	--	--	--	--
Bis(2-chloroethyl) ether	M	10	--	--	--	--	--
Bis(2-chloroisopropyl) ether	M	10	--	--	--	--	--
Hexachlorobenzene	M	10	1	0.5	30	--	--
Hexachlorobutadiene	M	10	--	--	9.3	--	--
Hexachlorocyclopentadiene	M	10	50	1	5.2	--	--
Hexachloroethane	M	10	--	--	--	--	--
Miscellaneous							
1, 2 - diphenylhydrazine	Q	10	--	--	--	--	--
Benzidine	M	100	--	--	--	--	--
Benzoic Acid	M	25	--	--	--	--	--
Benzyl alcohol	M	20	--	--	--	--	--
Dibenzofuran	M	10	--	--	--	--	--

Contaminants	Monitoring Frequency: Monthly (M) Quarterly (Q)	Reporting Limits	Human Health		Aquatic Life ^b		
			DHS MCL	Title 22 DLR ^a	USEPA 1986	CA Tox. Rule	National Tox. Rule
EPA METHOD 1613B—DIOXINS & FURANS	SAMPLE COLLECTION:	24-hr composite sample / two 1-L amber glass bottles / no preservative					
	ANALYZED BY:	Alta Analytical					
		pg/l	pg/l	pg/l	pg/l		
2,3,7,8-TCDD	Q	10	30	50	5,600	--	--
1,2,3,7,8-PeCDD	Q	50	--	--	5,600	--	--
1,2,3,4,7,8-HxCDD	Q	50	--	--	5,600	--	--
1,2,3,6,7,8-HxCDD	Q	50	--	--	5,600	--	--
1,2,3,7,8,9-HxCDD	Q	50	--	--	5,600	--	--
1,2,3,4,6,7,8-HpCDD	Q	50	--	--	5,600	--	--
OCDD	Q	100	--	--	5,600	--	--
2,3,7,8-TCDF	Q	10	--	--	--	--	--
1,2,3,7,8-PeCDF	Q	50	--	--	--	--	--
2,3,4,7,8-PeCDF	Q	50	--	--	--	--	--
1,2,3,4,7,8-HxCDF	Q	50	--	--	--	--	--
1,2,3,6,7,8-HxCDF	Q	50	--	--	--	--	--
2,3,4,6,7,8-HxCDF	Q	50	--	--	--	--	--
1,2,3,7,8,9-HxCDF	Q	50	--	--	--	--	--
1,2,3,4,6,7,8-HpCDF	Q	50	--	--	--	--	--
1,2,3,4,7,8,9-HpCDF	Q	50	--	--	--	--	--
OCDF	Q	100	--	--	--	--	--
ASBESTOS—EPA/600/R-94/134—(100.2)	SAMPLE COLLECTION:	24-hr composite sample / two 1-L amber glass bottles / no preservative					
	ANALYZED BY:	EMSL Analytical, Inc.					
Asbestos (j)	Q	0.2 mf/l	7 mf/l	0.2 mf/l	--	--	--
CYANIDE—EPA 335.2	SAMPLE COLLECTION:	24-hr composite sample / 500-ml polyethylene bottle / preserved with NaOH					
	ANALYZED BY:	California Laboratory Services					
Cyanide	M	5.0	200	100	5.2 ^m	5.2	5.2
TRIBUTYLTIN—GC/FPD	SAMPLE COLLECTION:	24-hr composite sample / one 1-L polycarbonate bottle / no preservative					
	ANALYZED BY:	ToxScan					
Tributyltin	Q	0.002	--	--	0.063 ^k	--	0.026 ^e
TRACE METALS—ICP/MS (Method 1638), except for Hg, which is CV AFS (Method 1631)	SAMPLE COLLECTION:	24-hr composite sample / one 1-L Teflon bottle / preserved by Lab					
	ANALYZED BY:	Frontier Geosciences Inc.					
Aluminum (Al)	M	0.99	0.05-0.2 ^j	50	--	--	--
Antimony (Sb)	M	0.023	6	6	1,600	--	--
Arsenic (As)	M	0.37	50	2	148 ^m	150	190
Cadmium (Cd)	M	0.027	5	1	2.2 ^f	2.0 ^g	1.0 ^h
Chromium III (Cr)	M	0.068 ^l	50	10	75.4 ^f	156 ^g	181 ^h
Chromium VI (Cr)	M	0.068 ^l	50	10	11 ^m	11	11

Contaminants	Monitoring Frequency: Monthly (M) Quarterly (Q)	Reporting Limits	Human Health		Aquatic Life ^b		
			DHS MCL	Title 22 DLR ^a	USEPA 1986	CA Tox. Rule	National Tox. Rule
Copper (Cu)	M	0.059	1300 ^d	--	8.1 ^f	7.8 ^g	10.3 ^h
Lead (Pb)	M	0.028	Removed	--	2.6 ^f	2.1 ^g	2.6 ^h
Mercury (Hg)	M	0.0006	2	1	0.908 ^{m,n}	0.77	0.012
Nickel (Ni)	M	0.037	100	10	45.5 ^f	45 ^g	137 ^h
Selenium (Se)	M	0.18	50	5	5.0 ^m	5.0	5.0
Silver (Ag) /i/	M	0.083	Removed	--	0.12	--	--
Thallium (Tl)	M	0.029	2	1	40	--	--
Zinc (Zn)	M	0.21	5000 ^j	--	104 ^f	103 ^g	92 ^h

^a State of California 1998.

^b Water quality criteria for the chronic protection of freshwater aquatic life.

^c DHS action level (DWR 1997).

^d USEPA Drinking Water Standard (Primary MCL) (DWR 1997).

^e CVRWQCB 1995.

^f Criteria from U.S. EPA 1995 Updates: Water quality criteria documents for the protection of aquatic life in ambient water (EPA-820-B-96-001), based on hardness of 85 mg/L as CaCO₃.

^g California Toxics Rule, criteria for a water hardness of 85 mg/l (as CaCO₃).

^h National Toxics Rule, criteria for a water hardness of 85 mg/l (as CaCO₃).

ⁱ Silver criterion from California Toxics Rule is reported as the acute (CMC) value.

^j DHS Secondary maximum contaminant level (MCL) (DWR 1997). Values represent millions of fibers greater than 10 microns in length.

^k U.S. EPA Draft Ambient water quality criteria for tributyltin (EPA-822-D-97-001)

^l Reporting limit provided in table is for total chromium.

^m U.S. EPA 1995 Updates (EPA-820-B-96-001).

ⁿ U.S. EPA Criterion Continuous Concentration (CCC) for Mercury (II). This CCC may not adequately protect rainbow trout, coho salmon, and bluegill (EPA-820-B-96-001).

2. QUALITY ASSURANCE PROJECT PLAN OVERVIEW

2.1 PURPOSE OF THIS PLAN

The purpose of this Quality Assurance Project Plan (QAPP) is to relate objectives of the project to specific field sampling and laboratory analytical procedures to achieve those objectives. In addition, this QAPP was written to ensure that all field-sampling procedures are conducted in a technically appropriate, efficient, and cost-effective manner, ultimately contributing to the attainment of project objectives as stated in this plan. This QAPP will address the experimental design and methodologies employed to physically collect effluent samples in the field, as well as procedures for the transport of samples to specified analytical laboratories.

This QAPP is written to provide sufficient detail to demonstrate the following:

- Sample-collection procedures are appropriate for achieving project objectives;
- identified analytical procedures are appropriate for achieving project objectives;
- quality control (QC) procedures are sufficient for obtaining data of known and adequate quality; and
- data collected will be defensible if challenged technically or legally.

Surface Water Resources, Inc. (SWRI) reserves the flexibility to modify protocols identified in this QAPP, as necessary, due to constraints not anticipated upon drafting this document. Any modifications to the sampling protocols discussed herein would be performed in order to best meet: 1) the project objectives; and 2) SWRI's scope-of-work commitments as stated in this QAPP and the District's work plan submitted to the CVRWQCB on 31 October, 1997 and approved by the RWQCB on 21 November, 1997. Any significant modifications to sampling protocols discussed in this QAPP will be clearly documented and communicated to Project Managers for the District and the CVRWQCB.

2.2 UNDERLYING LOGIC AND ORGANIZATION OF THIS PLAN

This QAPP has been written to incorporate all applicable criteria required for an EPA-defined Category III project. Category III projects are defined by the U.S. EPA as projects intended to produce results used to evaluate and select basic options, or to perform feasibility studies or preliminary assessments of unexplored areas which might lead to further work (USEPA 1991). This plan specifically addresses the following:

- relationship of field sampling and laboratory analysis methodologies to the project and data quality objective(s);
- quality and quantity of data that will be collected and how the intended quality will be consistently obtained; and
- data recording, calculating, review, and reporting procedures.

It should be noted that sections of an EPA Category III QAPP that were clearly not applicable to this monitoring project were not included in this plan. Also, this QAPP includes information pertaining to the analytical methodologies to be employed by the contract laboratories involved with the project, and the contaminant-specific detection limits associated with these methodologies. Although technically outside the scope of an EPA Category III QAPP, this information is included because it is critical to achieving the stated project objective.

2.3 QUALITY ASSURANCE PROJECT PLAN APPROVAL FORM

Signatures on this form indicate that the principals involved with this project have reviewed this QAPP and agree that adherence to the sampling/analysis methodologies and data quality objectives outlined herein will acceptably meet the stated project objective.

3. PROJECT APPROACH

Sampling of treated effluent for 11 trace metals and various contaminants identified under EPA Methods 608 (including PCBs) and 625 began in June of 1997, and will be completed in May, 1998. Effluent monitoring for aluminum, antimony, cyanide, and additional organic constituents identified under EPA Methods 601, 602, 625, and 8260 will occur monthly during 1998. Because dioxins and furans, asbestos, and tributyltin have not been found in Deer Creek WWTP effluent in the past, because the probability of their presence today remains low, and because analytical costs for quantifying these constituents is high, they will be monitored quarterly throughout 1998. Finally, samples of Deer Creek water will be collected quarterly during 1988 at the R2 location (immediately downstream of effluent mixing) and analyzed for any trace metals approaching levels of concern for the protection of freshwater aquatic life in the undiluted effluent (Figure 1).

All composite effluent samples will be collected from the effluent monitoring station in the Water Quality Building of the Deer Creek WWTP using an American Sigma (model 900) or equivalent automated composite sampler. Composite effluent samples collected will be 24-hour, time-weighted, composites. Sample collection will occur over a three-day period to facilitate implementation of appropriate sampling techniques for each "class" of constituents requiring unique sampling procedures (i.e., metals, organics, dioxins and furans). Effluent grab samples will be collected in 40-ml VOA vials for volatile organic analyses (i.e., EPA Methods 601, 602, and 8260). A detailed discussion of procedures employed to collect effluent samples is provided in Sections 6.

As designated in **Table 1**, different laboratories were selected to perform the analytical work for various contaminants. This assured that high-quality analyses would be performed for all classes of contaminants. Frontier Geosciences Inc., of Seattle, Washington will perform all trace metals analyses. California Laboratory Services (CLS) of Rancho Cordova, California will analyze for cyanide and constituents identified under EPA Methods 601, 602, 608, 625 and 8260. CLS will

	1997							1998												1999	
Constituents	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
Trace Metals																					
EPA 608																					
EPA 625																					
EPA 601																					
EPA 602																					
EPA 8260																					
EPA 625 ^a																					
Antimony																					
Cyanide																					
EPA 1613A																					
Asbestos																					
Tributyltin																					
Deer Creek ^b																					
Reports																					

^a Additional organic constituents analyzed using EPA Method 625.

^b Collect samples of Deer Creek water at R2 and analyze for any trace metal(s) approaching concentrations of concern for the protection of aquatic life in the undiluted effluent.

Figure 1. Schedule for conducting the Phase II ERWQA for the El Dorado Irrigation District's Deer Creek WWTP.

send the asbestos samples to EMSL Analytical, Inc., located at 1720 S. Amphlett Blvd., Suite 130, San Mateo, California 94402 [(415) 570-5401], and the tributyltin sample to ToxScan, located at 42 Hangar Way, Watsonville, California 95076 [(408) 724-4522]. Alta Analytical of El Dorado Hills, California, will conduct analysis of effluent samples for dioxins and furans. Laboratory Quality Assurance Plans for each laboratory are available upon request from the laboratories themselves, or from SWRI's Project Manager.

Trace metal samples will be shipped to Frontier Geosciences Inc., by overnight mail (using Federal Express or equivalent carrier) for delivery the following morning. All samples to be analyzed by CLS and Alta Analytical will be hand delivered to these laboratories by sampling personnel. Standard chain-of-custody procedures will be followed for all sample transfers and shipments.

4. PROJECT TEAM ORGANIZATION

4.1 AUTHORITY AND RESPONSIBILITY

Project Manager (District): Tim Sullivan, P.E., will serve as the District's Project Manager for this monitoring project and, therefore, will serve as the District's primary contact person for SWRI and the CVRWQCB. Mr. Sullivan will be responsible for reviewing and approving this QAPP for the District, as well as all SWRI project reports submitted to the District.

Water Quality Superintendent (District): As Water Quality Superintendent, Margie Lopez will provide technical oversight on the project for the District. She will coordinate, as needed, with project managers for the District and SWRI to assure that the study will achieve the District's objectives.

Project Manager (SWRI): Michael Bryan, Ph.D., will serve as SWRI's Project Manager for all phases of this project and will, therefore, serve as the primary contact within SWRI. In addition, Dr. Bryan will keep Mr. Sullivan briefed on all project activities and schedules, and will answer project-related questions as they arise. Dr. Bryan will personally conduct all field sampling for

the project. He also will hand deliver the appropriate samples to CLS and Alta Analytical, as well as oversee overnight shipments of trace metal samples to Frontier Geosciences Inc. Finally, Dr. Bryan will be the primary author of all technical reports for the project.

Project Manager (CVRWQCB): Richard McHenry, P.E., will serve as the CVRWQCB's Project Manager for this project and, therefore, will serve as the CVRWQCB's primary contact person for the District and SWRI. Mr. McHenry will be responsible for reviewing and approving this QAPP for the CVRWQCB.

4.2 ANALYTICAL LABORATORY PERSONNEL

Dr. Nicolas Bloom (Laboratory Manager) will be the project contact person at Frontier Geosciences Inc., regarding all analyses performed and laboratory reports issued. Mr. George Hampton (Laboratory Director) and Mr. Bob Mitzel (Director of Operations) will serve as the project contacts at CLS and Alta Analytical, respectively.

4.3 QUALITY ASSURANCE PERSONNEL

Quality Assurance Manager (SWRI): Dr. Bryan of SWRI will provide quality assurance oversight on the project. Each of the analytical laboratories has designated QA/QC officers that can be identified through the project contacts identified in this QAPP.

4.4 PROJECT COMMUNICATION

Coordination of the sampling component of this project with laboratory analytical work will be accomplished through scheduled meetings, phone calls, and site visits. Dr. Bryan will be in contact with the Project Managers for the District, the CVRWQCB, and the three analytical laboratories on an as-needed basis to facilitate the timely integration of field and laboratory work in order to assure that high-quality, compatible results are obtained from all sampling events.

Dr. Bryan will be responsible for completing a progress report by 15 July, 1998, and a final project report by 15 February, 1999. Each report will minimally consist of, but not be limited to the following:

- brief introduction;
- disclosure of any significant deviation(s) from the protocols identified in the QAPP that could compromise the integrity of the data, the justification for procedural deviations, and identification of any limitations such procedural deviations may impart on data quality or inferences which can be drawn from the data generated;
- summary of constituent concentrations for each sample collected and analyzed; and
- conclusions.

5. QUALITY ASSURANCE OBJECTIVES

Quality assurance (QA) is a set of operating principles that, if strictly followed during sample collection and analysis, will produce data of known and defensible quality. This section describes the QA objectives that specific measurements must meet in order to achieve the project objectives. The quality control (QC) procedures to be followed to attain the stated QA objectives are discussed in Section 7 of this QAPP. Thus, Section 5 specifies the quantitative and qualitative requirements, whereas Section 7 describes how these specifications will be met (USEPA 1991).

5.1 DETERMINING QUALITY ASSURANCE OBJECTIVES

Quality Assurance objectives should be defined in terms of the project requirements, and not in terms of the capabilities of the intended methods. If QA objectives exceed the capabilities of available methods, either the method must be modified or the QAPP must reflect such deficiencies. Nevertheless, the QAPP must include sufficient evidence to prove that the methods selected are capable of achieving the desired performance defined by the data quality objectives

(USEPA 1991). Data-collection criteria should provide a balance between constraints of time and cost and the quality of data necessary to achieve project objectives. This QAPP is designed to accomplish the following QA/QC objectives:

- development and implementation of a technically appropriate experimental design and sampling and analytical methodologies that, when employed for all sampling events, will facilitate achieving the project objective;
- establish quality assurance objectives and equipment specifications that must be met to produce unadulterated samples for analysis;
- define quality assurance objectives for the laboratory analytical procedures; and
- use assessment samples (i.e., QC samples) and procedures to verify the quality of the samples and analytical data collected.

It is necessary to define both qualitative and quantitative estimates of the quality of the field samples and analytical data needed to meet project objectives. In doing so, this QAPP focuses on the definition, implementation, and assessment of data quality objectives (DQOs) that are specified for the entire field component of the project. The DQOs for this project are defined according to the six attributes listed below.

Precision: The level of agreement among multiple measurements of the same parameter.

Bias: The difference between an observed value and the “true” value of the parameter being measured (precision and bias together constitute a measure of “accuracy”).

Completeness: The quantity of samples that are successfully collected and analyzed with respect to the quantity intended in the experimental design.

Equipment Specifications: Physical design, construction, and/or preparation requirements of sampling equipment needed to collect unadulterated samples.

Representativeness: The degree to which the data collected accurately represent the population of interest.

Comparability: The similarity of data from different sources (e.g., locations or periods in time) included within individual or multiple data sets.

5.1.1 Quantitative Quality Assurance Objectives: Sample Collection

Quantitative QA objectives constitute a critical element of this QAPP, as they provide information necessary to assess the degree to which identified methods can produce the quality of samples and subsequent analytical data desired to achieve project objectives. The quantitative DQOs of bias and precision, (accuracy), reporting limits, and completeness (as they relate to field samples and associated analytical data collection) are described individually below.

Bias and Precision (Accuracy): For analysis of all constituents monitored under this program, accuracy of constituent concentration will be insured by the contract laboratories performing the analysis via conducting applicable QA/QC procedures when analyzing project samples.

Analytical Reporting Limits: The analytical reporting limit for a contaminant is the lowest concentration that can be consistently and accurately quantified using the indicated analysis method. Reporting limits for the analyses being performed for this project are provided in **Table 1**. The reporting limit provided in Table 1 with regard to chromium is for total chromium.

Completeness: Completeness objectives are presented as the percentage of all planned field sample collections and subsequent laboratory analyses that are actually made during the project. All monthly and quarterly effluent composite and grab samples must be collected. Hence, the completeness objective is 100% for all constituents to be monitored during the project.

5.1.2 Qualitative Quality Assurance Objectives: Equipment Specifications and Data Representativeness and Comparability

5.1.2.1 Sampling Equipment Specifications

Automated Composite Sampler: All 24-hour composite samples for this project will be collected into appropriate, decontaminated sample containers via an American Sigma, model 900 or compatible automated composite sampler. It should be noted that this is a refrigerated composite sampler. Hence, all composite effluent samples will be kept at approximately 4°C throughout their collection.

Tubing: The following two types of tubing will be used in the collection of composite samples:

- semi-rigid, Teflon-lined, polyethylene tubing; and
- silicone tubing (which goes through the pumphead of the composite sampler).

Prior to its use each month, all tubing used to collect effluent samples for trace metals, cyanide, tributyltin, asbestos, and organics will be decontaminated by Frontier Geosciences Inc., according to procedures discussed in Section 7. Alta Analytical will decontaminate a separate set of this same type of tubing according to procedures discussed in Section 7. This tubing will be used to collect composite effluent samples for dioxin and furan analyses.

Sample Collection Containers

Trace Metals and Tributyltin: All composite effluent samples for trace metals and tributyltin will be collected in a 2.5-L, clear borosilicate glass bottle.

Dioxins and Furans: All dioxin and furan samples will be collected in a 4-L, clear borosilicate glass bottle.

Cyanide, Asbestos, and Constituents under EPA Methods 608 (including PCBs) and 625:

Composite effluent samples for cyanide, asbestos, and the organic constituents identified under EPA Methods 608 (including PCBs) and 625 (see **Table 1**) will be collected into a 9.5-L, clear glass ISCO sample bottle.

Prior to their use, all sample collection containers will be decontaminated according to procedures discussed in Section 7.

Constituents under EPA Methods 601, 602, and 8260: Effluent grab samples for the organic constituents identified under EPA Methods 601, 602, and 8260 (see **Table 1**) will be collected directly into six "certified-clean" 40-ml glass VOA vials obtained from CLS, and manufactured by Environmental Sampling Supply.

Sample Transport Containers

Trace Metals: Both the equipment blank and the composite effluent samples for trace metal analyses will be transferred from the 2.5-L, glass collection bottle into 1-L Teflon bottles for shipment to Frontier Geosciences Inc., Seattle WA. The Teflon bottles will be decontaminated by Frontier Geosciences Inc., each month according to procedures discussed in Section 7. In addition, these bottles will be filled with a 0.4% acid solution by Frontier Geosciences Inc., prior to shipment to SWRI. This acid solution will remain in the bottle until the time of sample collection in order to prevent bottle contamination during shipment and storage. Immediately prior to use, the 0.4% acid solution will be emptied from the bottle, and the sample collected. These Teflon bottles will contain no preservative; rather, these samples will be preserved by Frontier Geosciences Inc., staff upon receipt using ultra pure acids.

Tributyltin: All tributyltin samples will be transferred from their 2.5-L, glass collection bottle into a certified-clean 1-L polycarbonate or amber glass bottle obtained from CLS, and manufactured by Environmental Sampling Supply. This sample transport container will contain no preservative.

Dioxins and Furans: Dioxin and furan samples will be transferred from their 4-L, glass collection bottle into two (2) certified-clean, 1-L amber glass bottles obtained from Alta Analytical, and manufactured by I-Chem. These sample transport containers will contain no preservative.

A portion of the composite effluent sample collected in the ISCO sample container will be transferred into the following sample transport containers at the site of collection. Samples will then be delivered to CLS in these transport containers.

- ***EPA Methods 608 (including PCBs) and 625:*** Four (4) certified-clean, 1-L, amber-glass bottles obtained from CLS, and manufactured by Environmental Sampling Supply. These transport containers will contain no sample preservative.
- ***Cyanide:*** One (1) certified-clean, 500-ml, polyethylene bottle obtained from CLS, and manufactured by Environmental Sampling Supply. The bottle will contain 5 ml of 10N NaOH to preserve the sample.
- ***Asbestos:*** Two (2) certified-clean, 1-L, amber-glass bottles obtained from CLS, and manufactured by Environmental Sampling Supply. These transport containers will contain no sample preservative.

Constituents under EPA Methods 601, 602, and 8260: These samples will be transported in the 40-ml VOA vials in which they were collected. Four of these vials will contain HCl to preserve the samples used for the EPA 8260 and 602 analysis. The other two vials (used for EPA Method 601) will contain no preservative.

5.1.2.2 Data Representativeness and Comparability

Representativeness is the degree to which a sample or group of samples is indicative of the population being studied. An environmental sample is representative of a particular parameter of interest when the average value obtained from multiple samples tends towards the true value of that parameter in the environment. Representativeness is typically achieved by collecting a sufficiently large number of unbiased samples (USEPA 1991), and/or by collecting a composite sample. Both multiple and composite samples will be analyzed during this study in order to obtain representative effluent contaminant concentration data.

Comparability is the degree to which one data set can be compared to another. For example, methods used at different locations or points in time should be comparable. Comparability of

monthly samples/data collected throughout this project will be achieved by adhering to the sampling analysis methodologies outlined in this QAPP during all months of the project.

5.2 WHAT IF QUALITY ASSURANCE OBJECTIVES ARE NOT MET?

Failure to completely meet the DQOs defined above for critical field sampling activities will have the following consequences regarding overall project integrity, quality, and technical defensibility.

5.2.1 Quantitative QA Objectives

Analytical QA/QC and Reporting Limits: Adherence by each laboratory to their Quality Assurance Plan and standard operating procedures for specific test methods will assure that these DQOs are met.

Collection of Samples: Equipment failure and other factors beyond SWRI's control may prevent the collection of effluent samples, as planned, during a particular sampling event. Not meeting the stated DQO of collecting 100% of planned effluent samples would have unacceptable consequences to the overall integrity and technical defensibility of this project. Therefore, in the event that an effluent sample cannot be collected from a given sampling event, re-sampling will occur as soon thereafter as possible in order to assure that all planned samples are ultimately collected and analyzed.

5.2.2 Qualitative QA Objectives

Equipment Specifications: All equipment acquired for use in this project meets the qualitative QA specifications identified in Section 5.1.2 of this plan. This QAPP serves to define standard field sampling procedures to be employed during each sampling event, thereby assuring consistency of methodologies and approaches throughout the project. Thus, adherence to the procedures outlined in this QAPP will assure that the samples collected and subsequent

analytical data produced will be: 1) representative of effluent quality at the time of sampling; and 2) comparable among sampling events (i.e., through time).

6. COLLECTION OF EFFLUENT SAMPLES

This section of the QAPP defines specific locations, equipment, and sample collection protocols that will be followed throughout the project.

6.1 SAMPLING LOCATION

All effluent samples will be collected from the effluent monitoring station located within the Water Quality Building of the Deer Creek WWTP.

6.2 SAMPLING EQUIPMENT AND PROCEDURES

In order to collect sufficient volumes of effluent for laboratory analyses, effluent sampling will be conducted over three consecutive days each month. The procedures for collecting effluent samples are discussed in detail below.

Day 1: Trace Metals. Frontier Geosciences Inc., will decontaminate all tubing used in the collection of samples, the sample collection bottle, and the sample transport bottles according to standard operating procedures defined in **Appendix A**. Following decontamination, all sampling equipment will be shipped to SWRI in sealed, certified-clean bags to insure the equipment remains free of contamination prior to use. Certified-clean bags will not be opened until equipment is used at the Deer Creek WWTP.

Certified-clean vinyl gloves (Oak Technical Inc.; No. HF02529) will be worn when the certified-clean bags containing decontaminated equipment are opened at the project site. Tubing will be removed from the bags in such a way that the ends of the tubing do not touch any surfaces, and will be immediately installed into the American Sigma automated sampler.

The 2.5-L, glass collection bottle will be removed from its certified-clean bag, placed into the refrigerated sampler, and connected to the delivery end of the silicone tubing via a plastic fitting associated with the container's cap. A bottle of Milli-Q deionized water, provided by Frontier Geosciences Inc., will be removed from its certified-clean bag, and the sampling end of the Teflon-lined tubing placed into the Milli-Q bottle. The automated sampler will then be programmed to continuously pump Milli-Q water into the 2.5-L, glass collection bottle. A 1-L Teflon sample transport container will be removed from its certified-clean bag and the 0.4% acid solution decanted. Once emptied, this 1-L Teflon bottle will be filled with the Milli-Q water now contained within the 2.5-L, glass sample collection container. This sample constitutes the equipment blank for that sampling event. Such an equipment blank for trace metals will be collected and analyzed during every monthly sampling event. The Teflon bottle containing the equipment blank will receive a label identifying the date and time of collection, contents, and personnel that collected the sample. This equipment blank will be held at approximately 4°C until collection of the 24-hour effluent sample is complete.

After collection of the blank, the composite sampler will be set-up to collect the 24-hour composite effluent sample for trace metal and tributyltin analyses using the same 2.5-L, glass collection bottle. The free end of the semi-rigid tubing will be placed in the center of the effluent monitoring station "well", approximately 4-6 inches below the surface of the effluent, and the tubing fixed in place. The composite sampler will then be calibrated to collect approximately 100 ml of effluent once every hour for a 24-hour period, creating a sample volume of approximately 2.4 liters.

Upon collection of all 24 aliquots, the sample collection container will be disconnected from the silicone tubing and removed from the refrigerated portion of the composite sampler. A second 1-L Teflon sample transport container will then be removed from its certified-clean bag, and its 0.4% acid solution decanted. This 1-L Teflon bottle will be filled with the effluent sample and labeled properly. Upon return to the SWRI office, both metal samples (equipment blank and effluent sample) will be placed into a cooler containing blue ice along with a completed chain-of-

custody form, the cooler taped closed, and shipped to Frontier Geosciences Inc., for delivery the following morning.

Day 1 (Continued): Tributyltin. The second liter of the 24-hour composite sample collected on day 1 will be transferred from the 2.5-L, glass sample collection container into a 1-L polycarbonate or amber glass bottle, placed in a cooler containing blue ice, and hand delivered to CLS for tributyltin analysis. CLS will forward the sample to ToxScan, 42 Hangar Way, Watsonville, California 95076 [(408) 724-4522], where the actual analysis will be done. ToxScan will analyze for tributyltin by pentel derivativization using a gas chromatograph with a FPT detector (i.e., the method that has been develop for the USEPA). An equipment blank will be analyzed along with the effluent sample the first time that tributyltin is analyzed (i.e., February, 1998). In the event that the equipment blank shows non-detectable levels of tributyltin, thereby confirming that the sampling procedure being employed does not contaminate the sample, no equipment blank will be collected for analysis during the remaining three quarterly sampling events.

Day 2: EPA Methods 608 (including PCBs) and 625, Cyanide, and Asbestos. Immediately after the 24-hour composite sample for trace metals and tributyltin has been collected, collection of the 24-hour composite sample for EPA Methods 608 and 625, cyanide, and asbestos will commence using the same equipment set-up, but a different sample collection container. The 9.5-L, clear-glass ISCO sample container, decontaminated by CLS according to standard procedures identified in **Appendix B**, will be used to collect this 24-hour composite sample. The composite sampler will be re-calibrated to collect approximately 375 ml of effluent each hour for a 24-hour period, creating approximately 9 liters of sample.

Upon collection of this composite sample, the ISCO sample collection container will be removed from the refrigerated sampler and its content poured into the appropriate certified-clean sample transport bottles (see **Table 1**, and Section 5.1.2.1). All samples will receive labels identifying the date and time of collection, contents, and personnel having collected the sample. Samples will be placed into a cooler containing blue ice for transport to CLS.

An equipment blank will be analyzed along with the effluent sample the first time analyses are performed for EPA 608 and 625, cyanide, and asbestos. In the event that the equipment blank shows non-detectable levels of the constituents being analyzed, thereby confirming that the sampling procedure being employed does not contaminate the sample, no equipment blank will be collected for analysis during subsequent sampling events.

Day 2 (Continued): EPA Methods 601, 602, and 8260. A grab sample will be collected for volatile organics outlined under EPA Methods 601, 602, and 8260. Grab samples will be collected immediately following the collection of the 24-hour composite sample for organics. Non-powdered, certified-clean vinyl gloves (Oak Technical Inc.; No. HF02529), will be worn during the collection of these samples. The four 40-ml VOA vials containing the HCl preservative will be filled by dipping one of the vials without HCl into the effluent well, and transferring the effluent into the vial containing HCl preservative. The vial will be overflowed to make sure all air is removed, and then will be capped and placed into the cooler containing blue ice. This process will be repeated for the other three vials containing HCl. To fill the two vials without preservative (for EPA Method 601), each vial will be submerged into the effluent well. Holding the vile at a 45-degree angle below the effluent surface, the vile will be uncapped. After all air has escaped, the vile will be capped, removed from the effluent well, labeled, and placed into the cooler containing blue ice. This process will be repeated for the second non-preserved vial.

Upon collection of all samples for EPA Methods 608 (including PCBs), 625, 601, 602, and 8260, cyanide, and asbestos, a chain-of-custody form will be filled-out and placed into the cooler with these samples. The samples will then immediately be delivered to CLS. CLS will forward the asbestos sample to EMSL Analytical, Inc., located at 1720 S. Amphlett Blvd., Suite 130, San Mateo, California 94402 for analysis.

For the January, 1998 sampling event, travel blanks will be prepared by CLS and will accompany the EPA Method 601, 602, and 8260 samples from time of collection to delivery to CLS.

Analytical results for the travel blanks used during the first month's sampling event, and the likelihood of contamination of samples, will be used to determine the necessity of using and analyzing travel blanks for subsequent months. An equipment blank will be analyzed along with the effluent sample for all other analytical procedures during the initial month that those procedures are conducted.

Day 3: Dioxins and Furans. Alta Analytical will decontaminate all tubing used in the collection of samples and the sample collection bottle according to standard operating procedures defined in **Appendix C**. First, all tubing used to collect previous samples will be removed from the Sigma composite sampler and replaced with the same type of tubing that has been decontaminated by Alta Analytical. Second, the decontaminated 4-L, glass sample collection bottle will be put into place inside the refrigerated sampler. The sampling end of the semi-rigid, Teflon-lined tubing is then inserted into a 4-L bottle of certified-clean water provided by Alta Analytical. The composite sampler is then programmed to pump 2 liters of this water into the sample collection container. This water will be then transferred into two (2) certified-clean, 1-L amber glass bottles, and will constitute the equipment blank for the sampling event. The equipment blank will be stored in a refrigerator at approximately 4°C until collection of the effluent sample is completed and both samples can be hand delivered to Alta Analytical.

Following collection of the equipment blank at the WWTP, the free end of the semi-rigid tubing will be placed into the center of the effluent monitoring station "well", approximately 4-6 inches below the surface of the effluent, and the tubing fixed in place. The composite sampler will be calibrated to collect approximately 125 ml of effluent once every hour for a 24-hour period, creating a sample volume of approximately 3 liters. Upon collection of the 24-hour composite effluent sample, the sample collection container will be removed from the refrigerated sampler and its contents transferred into two (2) certified-clean, 1-L amber glass bottles. This effluent sample, along with its equipment blank, will then be transported to Alta Analytical in a cooler containing blue ice and a completed chain-of-custody form.

7. QUALITY CONTROL PROCEDURES

7.1 SAMPLING EQUIPMENT DECONTAMINATION PROCEDURES

Prior to the collection of effluent samples for trace metal, tributyltin, cyanide, asbestos, and non-volatile organic analyses, all sampling tubing will be decontaminated according to standard operating procedures developed by Frontier Geosciences (**Appendix A**). These procedures also will be used to decontaminate the sample collection container used to collect the trace metal and tributyltin samples as well as the Teflon sample transport containers used for trace metals.

The 9.5-L glass ISCO sample container used to collect the 24-hour composite sample for analyses of non-volatile organic constituents will be decontaminated according to procedures developed by CLS (**Appendix B**). Sample transport containers for composite samples will be certified-clean containers provided by CLS and manufactured by Environmental Sampling Supply. All effluent grab samples for volatile organics will be collected in certified-clean, 40-ml VOA vials manufactured by Environmental Sampling Supply.

Prior to the collection of equipment blank and effluent samples for dioxin and furan analyses, all tubing will be replaced with similar tubing decontaminated by Alta Analytical according to procedures defined in **Appendix C**. The 4-L sample collection container also will be decontaminated according to standard operating procedures developed by Alta Analytical (**Appendix C**). Sample transport containers for dioxin and furan samples will be certified-clean, 1-L amber glass bottles provided by Alta Analytical and manufactured by I-Chem.

7.2 SAMPLE LOGGING AND FIELD STORAGE

As samples are collected, field notes pertaining to the collection process will be recorded by Dr. Bryan and maintained in SWRI's project files (**Appendix D**). The information contained in the field notes will include, but is not limited to, date and time of sample collection, initials of other individuals assisting in the collection and delivery of samples, and comments related to any

significant deviations from the protocols defined in this QAPP. All samples will be maintained on ice in coolers throughout the sample transfer period.

7.3 SAMPLE TRANSPORT AND CHAIN-OF-CUSTODY PROCEDURES

Following the completion of a field-sampling event, Dr. Bryan will personally transport the trace metal samples back to the SWRI office, and oversee their packaging and overnight shipment to Frontier Geosciences Inc., (414 Pontius North, Seattle, WA [(206) 622-6960]). Specific sample-shipping procedures are described below.

1. The shipping containers will be clearly labeled with sufficient information (company name, site of collection, time and date container was sealed) to enable positive identification by laboratory personnel.
2. Individual sample containers will be packed in bubble wrap or other material to prevent breakage and transported in a sealed cooler containing blue ice.
3. A Frontier Geosciences Inc. chain-of-custody form (**Appendix E**) will be placed inside the cooler.

Dr. Bryan will personally hand deliver all other effluent samples to CLS (3249 Fitzgerald Rd., Rancho Cordova, CA [(916) 638-7301]) or Alta Analytical (5070 Robert J. Matthews Pkw, El Dorado Hills, CA [(916) 933-1640]). Samples delivered to these laboratories will be transported from the site of collection in a cooler containing blue ice, and will be accompanied by the appropriate chain-of-custody form (**Appendix E**). Upon transfer of sample possession, the chain-of-custody forms will be signed by Dr. Bryan and the laboratory staff receiving the samples. The sampler's copy of the chain-of-custody forms will be kept in SWRI's project files.

Upon receipt of samples by analytical laboratory staff, the condition of the samples will be recorded. It will be assumed that samples were received in good condition unless otherwise noted in the report issued by the laboratory performing the analyses.

7.4 INTERNAL QUALITY CONTROL CHECKS

This section of the QAPP describes all internal quality control (QC) checks that will be associated with the collection of field samples. The QC procedures specified follow from the QA objectives stated in Section 5 of this plan. Thus, Section 5 specifies the analytical requirements, while Section 7.4 describes how these specifications will be met (USEPA 1991).

7.4.1 QC Checks on Effluent Sampling Procedures

Because the potential for contamination of trace metal samples during collection is high, an equipment blank will be collected and analyzed for trace metals during each monthly sampling event (Table 2). This equipment blank will be kept refrigerated for the 24 hours that the effluent sample is being collected, then shipped in the same cooler with the effluent sample to Frontier Geosciences Inc. Results of effluent sample analyses can then be corrected, if necessary, based on trace metal concentrations detected in the equipment blank.

Because the potential for contamination during collection, albeit low, does exist for many of the other contaminants being monitored, a minimum of one equipment blank will be analyzed during the project for all constituent analyses being performed, with the exception of asbestos and dioxins/furans (Table 2). Because the potential to contaminate the effluent sample upon its collection with asbestos is *deminimus*, no equipment blank need be collected or analyzed. Because the volatile organics samples (i.e. EPA 601, 602, and 8260) will be collected directly into certified-clean sample containers using clean sampling techniques, the potential for contamination of the sample during its collection is *deminimus*. Therefore, equipment blanks will not be collected for these constituents. However, travel blanks will be prepared by CLS and analyzed during the first month that these contaminants are monitored in the effluent. If the travel blanks show no detectable levels of the 601, 602, and 8260 constituents, thereby confirming that contamination is not being introduced by sample handling in the field, the use and analysis of travel blanks may be discontinued thereafter.

Alta Analytical will store the equipment blanks collected for dioxin and furan analyses. These blanks will only be analyzed in the event that detectable levels of dioxins and/or furans are determined to exist in the effluent samples. If detectable levels of one or more of these compounds are found in the effluent, analysis of the equipment blank will aid in determining whether the detected compounds truly exist in the effluent or whether they were introduced into the sample during its collection.

The QC checks described above are not meant to replace any of the QA/QC measures outlined previously, or those conducted by the analytical laboratories. Rather, they constitute an integral part of an overall QA/QC program.

Table 2. Quality control checks for effluent sampling procedures in the form of equipment or travel blanks.

Contaminant Group	Type & Frequency of QC procedure	Acceptance Criteria/ Use of Blank	Corrective Action/ Action
Trace Metals	<ul style="list-style-type: none"> • Equipment blank • All sampling events 	Minimal to no detectable levels in blank	<ul style="list-style-type: none"> • Effluent results corrected from blank • Identify and eliminate contamination source, if possible
Organics Analysis EPA Method 608 (including PCBs) and 625, and cyanide	<ul style="list-style-type: none"> • Equipment blank • Once during project, preferably during first sampling event. 	No detectable concentration of any constituents in blank	<ul style="list-style-type: none"> • Effluent results corrected from blank • Identify and eliminate contamination source
Volatile Organics EPA Methods 601, 602, 8260	<ul style="list-style-type: none"> • Travel blank • Once during project, preferably during first sampling event. 	No detectable concentration of any constituents in blank	<ul style="list-style-type: none"> • Effluent results corrected from blank • Identify and eliminate contamination source
Tributyltin	<ul style="list-style-type: none"> • Equipment blank • Once during project, preferably during first sampling event. 	No detectable concentration of any constituents in blank	<ul style="list-style-type: none"> • Effluent results corrected from blank • Identify and eliminate contamination source
Asbestos	<ul style="list-style-type: none"> • N/A 	N/A	<ul style="list-style-type: none"> • N/A
Dioxin/Furans	<ul style="list-style-type: none"> • Equipment blank • Collected during each sampling event 	No analysis required if no detectable concentration found in effluent sample	<ul style="list-style-type: none"> • Analyze blank to confirm effluent findings, if necessary

7.4.2 QC Checks on Data Recording, Reduction, and Storage

Dr. Bryan will perform a QC check on data sheet correctness, completeness and legibility prior to filing field data sheets to SWRI's permanent project files.

7.4.3 QC Checks on Analytical Procedures

Frontier Geosciences Inc., CLS, and Alta Analytical will employ their own internal QA/QC measures for the work they are to perform for this project to insure the accuracy of analytical results. Because laboratory QA/QC procedures are outside the scope of this QAPP, these QA/QC measures will not be discussed here. However, Dr. Bryan has spoken with the Project Managers at these laboratories regarding this issue, and has found the QA/QC protocols to be followed by each laboratory to be acceptable for meeting the objective of this project. Moreover, Quality Assurance Plans for each laboratory are available upon request from the laboratories directly, or from SWRI.

8. ANALYTICAL PROCEDURES AND CALIBRATIONS

This section of the QAPP describes all analytical procedures used for physical measurements conducted in the field. All methods selected must be appropriate for their intended use. This section, when coupled with QC measures described in Section 7, provides enough detail to permit experienced field personnel to carry out the necessary procedures unambiguously. Requirements of this section can often be met by referencing appropriate standard methods (USEPA 1991).

During each sampling event, calibration of the automated sampler will be performed prior to the collection of effluent samples to assure that adequate volumes of effluent are collected. Electronic calibration of automated samplers will be confirmed through the manual collection of a hourly aliquot into a graduated cylinder or beaker for volumetric measurement.

9. DATA REDUCTION, VALIDATION, AND REPORTING

9.1 DATA REDUCTION

No data reduction will be needed for the field-sampling component of this project. For each of the three analytical laboratories, data reduction of laboratory analytical results will be the responsibility of the individual identified in the Approval Form of this QAPP.

9.2 DATA VALIDATION

Field data that is to be summarized in project reports will be evaluated for validity, accuracy, and completeness by Dr. Bryan. In addition, Dr. Bryan will coordinate with Frontier Geosciences Inc., CLS, and Alta Analytical personnel, as needed, to assure they are able to clearly identify all individual samples, and have the information they need to appropriately process all samples. Validation of laboratory analytical results will be the responsibility of individual named in the Approval Form of this QAPP for each laboratory.

9.3 DATA REPORTING

A progress report disclosing analytical results for the first 6 months of sampling will be written by Dr. Bryan and submitted to the District by or before 15 July, 1998. The final project report will be completed by or before 15 February, 1999. These project reports will include, but not limited to, the following:

- brief introduction;
- description of the sampling event and any deviation(s) from the protocols identified in this QAPP, the justification for any procedural deviations, and identification of any limitations such procedural deviations may impart on data quality or inferences which can be drawn from the data generated;

- summary of contaminant concentrations determined by the analytical laboratories for each sample collected; and
- conclusions.

The Project Manager for the District will be responsible for forwarding SWRI's technical reports to the RWQCB on or before the dates identified above.

10. CALCULATION OF DATA QUALITY INDICATORS

This section is meant to complement section 5 (QA Objectives) and section 7.4 (internal QC Checks) of this QAPP. Section 5 specifies which particular data quality indicators will be employed, whereas section 7 uses these indicators to generate acceptance criteria. Because different equations can be used to calculate data quality indicators, section 10 must provide the exact equations to prevent confusion among future data users and reviewers (USEPA 1991).

No data quality indicators are necessary for the field-sampling component of this project. Data quality indicators will be generated by the analytical laboratories, and will be included as part of their standard QA/QC data in each laboratory report.

11. CORRECTIVE ACTION

The corrective action plan must include predetermined acceptance limits, the corrective action to be initiated whenever such limits are not met, and the names of the individuals responsible for implementing necessary corrective actions. Routine QC procedures already identified in section 7 of this plan need not be repeated here. This section is primarily devoted to "non-routine" corrective action not described elsewhere. Non-routine corrective action may result from unforeseen logistical constraints/problems with these sampling procedures as identified in this QAPP.

Dr. Bryan will be responsible for assessing whether the DQOs identified in the QAPP were met, and for implementing corrective actions, as necessary, to achieve these project objectives. In the event that unforeseen logistical constraints arise while sampling in the field, Dr. Bryan will be responsible for: 1) implementing the necessary deviations from procedures identified in this QAPP to solve the problem; and 2) clearly documenting (in the field notes) what problem arose and the corrective action taken. If any significant modifications to procedures identified in this QAPP are required, such modifications will be clearly communicated to all individuals identified in the Approval Form.

12. REFERENCES

- CVRWQCB (Central Valley Regional Water Quality Control Board). 1995. A compilation of water quality goals. Staff Report of the California Regional Water Quality Control Board, Central Valley Region, July 1995.
- DWR (California Department of Water Resources). 1997. Quality assurance technical document 3: Compilation of federal and state drinking water standards and criteria. State of California, The Resources Agency, Department of Water Resources, Division of Local Assistance. June, 1997.
- State of California. 1998. Title 22 Code of Regulations, 5th Edition. Detection Limits for Reporting (DLRs), taken from Tables 64432-A and 64445.1-A
- USEPA (U.S. Environmental Protection Agency). 1986. Quality criteria for water 1986. Office of Water Regulations and Standards, Washington D.C. EPA Publication No. 440/5-86-001.
- USEPA (U.S. Environmental Protection Agency). 1991. Preparation aids for the development of category III quality assurance project plans. Office of Research and Development, Risk Reduction Engineering Laboratory, Cincinnati, OH. PB91-211920.
- USEPA (U.S. Environmental Protection Agency). 1996. 1995 updates: water quality criteria documents for the protection of aquatic life in ambient water. Office of Water Regulations and Standards, Washington D.C. EPA Publication No. 820-B-96-001.

**APPENDIX A: PROCEDURE FOLLOWED TO DECONTAMINATE THE
COMPOSITE SAMPLER TUBING AND THE 2.5-L, GLASS BOTTLE
USED FOR TRACE METAL AND TRIBUTYL TIN SAMPLE
COLLECTION**

**APPENDIX B: PROCEDURE FOLLOWED TO DECONTAMINATE THE 9.5-L,
GLASS ISCO CONTAINER USED FOR EPA 608 AND 625,
ASBESTOS, AND CYANIDE SAMPLE COLLECTION**

Standard procedure used by CLS to decontaminate the 9.5-L, glass ISCO sample collection container prior to use each month to collect a composite effluent sample for asbestos, cyanide, and organics analyses.

- 1) wash with Alconox or equivalent detergent;
- 2) triple rinse with deionized, organic-free water;
- 3) triple rinse with hexane;
- 4) triple rinse with deionized, organic-free water;
- 5) allow cleaned container to air-dry; and
- 6) place cleaned cap on container.

**APPENDIX C: PROCEDURE FOLLOWED TO DECONTAMINATE THE
COMPOSITE SAMPLER TUBING AND THE 4-L, GLASS BOTTLE
USED FOR DIOXIN AND FURAN SAMPLE COLLECTION**

Standard procedure used by Alta Analytical to decontaminate the composite sampler tubing and 4-L, glass sample collection container prior to its use for collecting a composite effluent sample for dioxin and furan analyses.

Sample Collection Container:

- 1) wash with Alconox or equivalent detergent and rinse with deionized water;
- 2) rinse with acetone;
- 3) rinse with toluene;
- 4) rinse with hexane;
- 5) rinse with methylene chloride;
- 6) allow container to air-dry; and
- 7) place cover over top of container.

Tubing:

- 1) wash with Alconox or equivalent detergent and rinse with deionized water;
- 2) rinse with acetone;
- 3) allow tubing to air-dry; and
- 4) place tubing in a clean plastic bag.

APPENDIX D: SWRI EFFLUENT SAMPLING DATA SHEET

APPENDIX E: ANALYTICAL LABORATORY CHAIN-OF-CUSTODY FORMS

**Effluent and Receiving Water Quality Monitoring
For
Deer Creek Wastewater Treatment Plant**

***A Quality Assurance Project Plan for the
Collection and Analysis of Samples***

Prepared for:

El Dorado Irrigation District
2890 Mosquito Road
Placerville, CA 95667

Prepared by:



ROBERTSON - BRYAN, INC.
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February 2002

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APPENDICES

- Appendix A: RWQCB Letters Dated September 10, 2001, December 27, 2001, and January 25, 2002
- Appendix B: Constituents Previously Monitored Meeting the RWQCB's Water Code Section 13267 Letter Requirements
- Appendix C: Procedure Followed to Decontaminate the Composite Sampler Tubing and the 2.5-L Glass Sample-Collection Container
- Appendix D: Procedure Followed to Decontaminate the 10-L Glass Bottle Used for All Analyses Conducted by CLS
- Appendix E: Procedure Followed to Decontaminate the Composite Sampler Tubing and the 4-L Amber Glass Bottle Used for Dioxin and Furan Sample Collection
- Appendix F: Field Sampling Data Sheet
- Appendix G: Analytical Laboratory Chain-of-Custody Forms

ACRONYMS AND ABBREVIATIONS

CQL	criterion quantitation limit
CTR	California Toxics Rule
District	El Dorado Irrigation District
DQO	data quality objective
EC	specific conductance
L	liter
MDL	method detection limit
ML	minimum level
NPDES	National Pollutant Discharge Elimination System
NTR	National Toxics Rule
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RL	reporting limit
RWQCB	Regional Water Quality Control Board, Central Valley Region
SIP	Statewide Implementation Plan
SMD	Sewer Maintenance District
SWRCB	State Water Resources Control Board
U.S. EPA	United States Environmental Protection Agency
WDR	waste discharge requirement

1 PROJECT DESCRIPTION

1.1 DESCRIPTION OF PROJECT AREA

The El Dorado Irrigation District (District) owns and operates the Deer Creek Wastewater Treatment Plant (DCWWTP), which provides sewerage service to Cameron Park and the Mother Lode Service areas. The treatment plant is in Section 16, T9N, R9E, MDB&M, located adjacent to Deer Creek. Treated municipal wastewater is discharged to Deer Creek, a tributary to the Cosumnes River. The discharges from this facility to Deer Creek are permitted by the Central Valley Regional Water Quality Control Board (RWQCB) for an average dry weather design flow of 2.5 million gallons per day (mgd) and 8.9 mgd during peak wet weather periods under NPDES Permit No. CA0078956, RWQCB Order No. 5-01-045.

1.2 STATEMENT OF PROJECT NEED

The RWQCB has required the District to perform effluent and receiving water monitoring, pursuant to California Water Code Section 13267, as directed in Section 1.2 of the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries* (SWRCB 2000), also referred to as the Statewide Implementation Plan, or "SIP." The RWQCB request was made in letters to the District dated September 10, 2001 and revised on December 27, 2001 (henceforth referred to as the 13267 letter) (**Appendix A**). The 13267 letter states:

"In order to prepare appropriate NPDES permits, it is necessary to have adequate characterization of the discharged effluent and the receiving water."

The Water Code Section 13267 letter requires the District to:

"...submit data sufficient to (1) determine if priority pollutants require effluent limitations (Reasonable Potential Analysis) and (2) calculate water quality-based effluent limitations."

In addition to monitoring priority pollutants, the RWQCB 13267 letter requires monitoring of other constituents, including organophosphorus pesticides, drinking water constituents, and conventional constituents, such as pH and hardness, some of which are currently monitored by the District as required by its NPDES permit (see **Table 1** for a complete list).

Development and implementation of this Quality Assurance Project Plan (QAPP) provides assurance that the appropriate data will be collected to meet the requirements of the Water Code Section 13267 letters, and that the quality of the data will be adequate to address RWQCB staff needs.

1.3 PREVIOUS MONITORING STUDIES

The District conducted effluent and receiving water studies at the DCWWTP during 1997 and 1998, at the request of the RWQCB, to characterize the levels of priority pollutants and other conventional constituents. The results of this effluent and receiving water study were presented in a report to the RWQCB titled "*Phase II Effluent and Receiving Water Quality Assessment for the El Dorado Irrigation District's Deer Creek Wastewater Treatment Plant*" (SWRI, 1999). This study evaluated many of the constituents requiring monitoring per the 13267 letter. Some of the previously evaluated constituents had reporting limits higher than those specified in the 13267 letter. However, there were some constituents evaluated that were monitored at the frequency required by the 13267 letter and with reporting limits at or below those required by the 13267 letter. These constituents, their monitoring frequency, and reporting limits along with the 13267 monitoring requirements are summarized in **Appendix B**.

Note, some of the volatile organic constituents listed in Appendix B will be reanalyzed, because of the need to run an analytical method to obtain results for constituents not previously reported, or to obtain results for constituents with reporting limits higher than those required by the 13267 letter. The analyses that do not need to be repeated include:

- Cyanide (EPA Method 335.2)
- PCBs (EPA Method 8082)
- Mercury (CV-AFS)
- Trace metals (ICP/MS): aluminum, antimony, arsenic, cadmium, chromium, copper, lead, nickel, selenium, silver, thallium, and zinc

The 13267 letter requires that dioxins and furans be sampled semi-annually, therefore, additional samples for dioxins and furans analyses will need to be collected.

1.4 PROJECT OBJECTIVES

The following objectives have been defined for this effluent and receiving water monitoring study.

1. Determine whether the DCWWTP discharge has CTR/NTR constituents and/or non-priority metals/organics that: a) cause; b) have reasonable potential to cause; or c) significantly contribute to an excursion in the receiving water above current State numeric/narrative standards or federal water quality criteria.
2. Considering: a) seasonal effluent quality; b) seasonal rates of effluent discharge; c) seasonal receiving water flows; d) aquatic life present in the receiving water; and e) expected bioavailability (in the receiving water) of constituents detected at measurable levels, determine whether effluent quality provides adequate protection of receiving water's aquatic life against effluent-related acute and chronic toxicity.

3. Provide data sufficient to conduct the determination based on the analysis in Section 1.3 of the SIP and to calculate water quality-based effluent limitations in accordance with Section 1.4 of the SIP.
4. For any constituent found to pose a significant risk to the receiving water's aquatic life or other beneficial uses, and/or have reasonable potential to cause or significantly contribute to an excursion above any applicable CTR/NTR criteria or Basin Plan objective in the receiving water, determine the most appropriate action(s) to be taken to reduce or eliminate said risk.

Table 1. Constituents to be monitored.

CTR/ NTR #	Contaminants	Laboratory	Analytical Method	Reporting Limits	13267 Letter Criterion Quantitation Limit	Human Health		Aquatic Life ^a	
						DHS MCL ^b	CTR/NTR ^c	U.S. EPA Criteria ^d	CTR/NTR ^c
VOLATILE ORGANICS									
25	2-Chloroethyl vinyl ether	CLS	EPA 502.2	1.0	1	--	--	--	--
28	1,1-Dichloroethane	CLS	EPA 8260B	1.0	1	5	--	--	--
30	1,1-Dichloroethene	CLS	EPA 8260B	0.5	0.5	6	0.057	--	--
41	1,1,1-Trichloroethane	CLS	EPA 8260B	2.0	2	200	--	--	--
42	1,1,2-Trichloroethane	CLS	EPA 8260B	0.5	0.5	5	0.60	9,400 LOEL ^e	--
37	1,1,2,2-Tetrachloroethane	CLS	EPA 8260B	0.5	0.5	1	0.17	2,400 LOEL ^e	--
75	1,2-Dichlorobenzene	CLS	EPA 8260B	2.0	0.5	600	2,700	763 LOEL ^e	--
29	1,2-Dichloroethane	CLS	EPA 8260B	0.5	2	0.5	0.38	20,000 LOEL ^e	--
	cis-1,2-Dichloroethene	CLS	EPA 8260B	0.5	0.5	6	--	--	--
31	1,2-Dichloropropane	CLS	EPA 8260B	0.5	0.5	5	0.52	--	--
101	1,2,4-Trichlorobenzene	CLS	EPA 8260B	5.0	5	70 (5 proposed)	--	50 LOEL ^e	--
76	1,3-Dichlorobenzene	CLS	EPA 8260B	2.0	2	130 ^f	400	763 LOEL ^e	--
32	1,3-Dichloropropene	CLS	EPA 8260B	0.5	0.5	0.5	10	244 LOEL ^e	--
77	1,4-Dichlorobenzene	CLS	EPA 8260B	2.0	2	5	400	763 LOEL ^e	--
19	Benzene	CLS	EPA 8260B	0.5	0.5	1	1.2	--	--
20	Bromoform	CLS	EPA 8260B	2.0	2	100 (80 proposed) ^g	4.3	--	--
34	Bromomethane	CLS	EPA 8260B	2.0	2	--	48	--	--
21	Carbon Tetrachloride	CLS	EPA 8260B	0.5	0.5	0.5	0.25	--	--
22	Chlorobenzene	CLS	EPA 8260B	2.0	2	70	680	--	--
24	Chloroethane	CLS	EPA 8260B	2.0	2	--	--	--	--
26	Chloroform	CLS	EPA 8260B	0.5	0.5	100 (80 proposed) ^g	--	1,240 LOEL ^e	--
35	Chloromethane	CLS	EPA 8260B	2.0	2.0	--	--	--	--
23	Dibromochloromethane	CLS	EPA 8260B	0.5	0.5	100 (80 proposed) ^g	0.401	--	--
27	Dichlorobromomethane	CLS	EPA 8260B	0.5	0.5	100 (80 proposed) ^g	0.56	--	--
36	Dichloromethane	CLS	EPA 8260B	2.0	2	5	4.7	--	--
33	Ethylbenzene	CLS	EPA 8260B	2.0	2	700 (300 proposed)	3,100	--	--
89	Hexachlorobutadiene	CLS	EPA 8260B	1.0	1	--	0.44	9.3 LOEL ^e	
94	Naphthalene	CLS	EPA 8260B	10.0	10	--	--	620 LOEL ^e	
38	Tetrachloroethene	CLS	EPA 8260B	0.5	0.5	5	0.8	840 LOEL ^e	--
39	Toluene	CLS	EPA 8260B	2.0	2	150	6,800	--	--

Table 1. Constituents to be monitored.

CTR/ NTR #	Contaminants	Laboratory	Analytical Method	Reporting Limits	13267 Letter Criterion Quantitation Limit	Human Health		Aquatic Life ^a	
						DHS MCL ^b	CTR/NTR ^c	U.S. EPA Criteria ^d	CTR/NTR ^e
40	Trans-1,2-dichloroethene	CLS	EPA 8260B	1.0	1	10	700	--	--
43	Trichloroethene	CLS	EPA 8260B	2.0	2	5	2.7	21,900 LOEL ^e	--
44	Vinyl Chloride	CLS	EPA 8260B	0.5	0.5	0.5	2	--	--
	Methyl-tert-butyl ether (MTBE)	CLS	EPA 8260B	3.0	3	13 (5 ^h)	--	--	--
	Trichlorofluoromethane	CLS	EPA 8260B	5.0	5	150	--	--	--
	1,1,2-Trichloro-1,2,2- trifluoroethane	CLS	EPA 8260B	10.0	10	1200	--	--	--
	Styrene	CLS	EPA 8260B	0.5	0.5	100	--	--	--
	Xylenes	CLS	EPA 8260B	0.5	0.5	1750	--	--	--
17	Acrolein	CLS	EPA 8316	5.0	5	--	320	21 LOEL ^e	--
18	Acrylonitrile	CLS	EPA 8316	2.0	2	--	0.059	2,600 LOEL ^e	--
SEMI-VOLATILE ORGANICS									
56	Acenaphthene	CLS	EPA 610	0.2	1	--	1,200	520	--
57	Acenaphthylene	CLS	EPA 610	0.2	10	--	--	--	--
58	Anthracene	CLS	EPA 610	0.2	10	--	9,600	--	--
60	Benzo (a) anthracene	CLS	EPA 610	0.2	5	0.1 (proposed) ^j	0.0044	--	--
61	Benzo (a) pyrene	CLS	EPA 610	0.1	2	0.2	0.0044	--	--
62	Benzo (b) fluoranthene	CLS	EPA 610	0.5	2	0.2 (proposed) ^j	0.0044	--	--
63	Benzo (g,h,i) perylene	CLS	EPA 610	0.2	5	--	--	--	--
64	Benzo (k) fluoranthene	CLS	EPA 610	0.2	2	--	0.0044	--	--
73	Chrysene	CLS	EPA 610	0.2	5	--	0.0044	--	--
74	Dibenzo (a,h) anthracene	CLS	EPA 610	0.1	0.1	--	0.0044	--	--
86	Fluoranthene	CLS	EPA 610	0.2	10	--	300	--	--
87	Fluorene	CLS	EPA 610	0.2	10	--	1,300	--	--
92	Indeno (1,2,3-c,d) pyrene	CLS	EPA 610	0.05	0.05	--	0.0044	--	--
99	Phenanthrene	CLS	EPA 610	0.2	5	--	--	--	--
100	Pyrene	CLS	EPA 610	0.2	10	--	960	--	--
88	Hexachlorobenzene	CLS	EPA 8270C	1.0	1	1	0.00075	30 LOEL ^e	--
91	Hexachloroethane	CLS	EPA 8270C	2.0 (1.46 MDL ^j)	1	--	1.9	540 LOEL ^e	--
85	1,2-Diphenylhydrazine	CLS	EPA 8270C	1.0	1	--	0.040	--	--
45	2-Chlorophenol	CLS	EPA 8270C	2.0	2	--	120	2,000 LOEL ^e	--
46	2,4-Dichlorophenol	CLS	EPA 8270C	2.0 (1.07 MDL ^j)	1	--	93	365 LOEL ^e	--
47	2,4-Dimethylphenol	CLS	EPA 8270C	2.0	2	400 ^j	540	--	--

Table 1. Constituents to be monitored.

CTR/ NTR #	Contaminants	Laboratory	Analytical Method	Reporting Limits	13267 Letter Criterion Quantitation Limit	Human Health		Aquatic Life ^a	
						DHS MCL ^b	CTR/NTR ^c	U.S. EPA Criteria ^d	CTR/NTR ^c
49	2,4-Dinitrophenol	CLS	EPA 8270C	5.0	5	--	70	--	--
82	2,4-Dinitrotoluene	CLS	EPA 8270C	5.0	5	--	0.11	230 LOEL ^e	--
55	2,4,6-Trichlorophenol	CLS	EPA 8270C	10.0	10	--	2.1	970 LOEL ^e	--
83	2,6-Dinitrotoluene	CLS	EPA 8270C	5.0	5	--	--	--	--
50	2-Nitrophenol	CLS	EPA 8270C	10.0	10	--	--	150 LOEL ^e	--
71	2-Chloronaphthalene	CLS	EPA 8270C	10.0	10	--	1,700	--	--
78	3,3'-Dichlorobenzidine	CLS	EPA 8270C	5.0	5	--	0.04	--	--
52	4-Chloro-3-methylphenol	CLS	EPA 8270C	5.0	5	--	--	--	--
48	4,6 Dinitro-2-methylphenol	CLS	EPA 8270C	10.0	10	--	13.4	150 LOEL ^e	--
51	4-Nitrophenol	CLS	EPA 8270C	10.0	10	--	--	150 LOEL ^e	--
69	4-Bromophenyl phenyl ether	CLS	EPA 8270C	10.0	10	--	--	122 LOEL ^e	--
72	4-Chlorophenyl phenyl ether	CLS	EPA 8270C	5.0	5	--	--	122 LOEL ^e	--
59	Benzidine	CLS	EPA 8270C	5.0	5	--	0.00012	--	--
65	Bis (2-chloroethoxy) methane	CLS	EPA 8270C	5.0	5	--	--	--	--
66	Bis (2-chloroethyl) ether	CLS	EPA 8270C	1.0	1	--	0.031	122 LOEL ^e	--
67	Bis (2-chloroisopropyl) ether	CLS	EPA 8270C	10.0	10	--	1,400	122 LOEL ^e	--
68	Bis (2-ethylhexyl) phthalate	CLS	EPA 8270C	5.0	5	--	1.8	--	--
70	Butyl benzyl phthalate	CLS	EPA 8270C	10.0	10	100 (proposed) ^j	3,000	--	--
81	Di-n-butyl phthalate	CLS	EPA 8270C	10.0	10	--	2,700	3	--
84	Di-n-octyl phthalate	CLS	EPA 8270C	10.0	10	--	--	3	--
79	Diethyl phthalate	CLS	EPA 8270C	2.0	2	--	23,000	3	--
80	Dimethyl phthalate	CLS	EPA 8270C	2.0	2	--	313,000	3	--
90	Hexachlorocyclopentadiene	CLS	EPA 8270C	5.0	5	50	240	5.2 LOEL ^e	--
93	Isophorone	CLS	EPA 8270C	1.0	1	--	8.4	--	--
98	N-Nitrosodimethylamine	CLS	EPA 8270C	5.0	5	--	0.00069	--	--
96	N-Nitroso-di-n-propylamine	CLS	EPA 8270C	5.0	5	--	0.005	--	--
97	N-Nitrosodiphenylamine	CLS	EPA 8270C	1.0	1	--	5.0	--	--
95	Nitrobenzene	CLS	EPA 8270C	10.0	10	--	17	--	--
54	Phenol	CLS	EPA 8270C	1.0	1	5 ⁱ	21,000	2,560 LOEL ^e	--
INORGANICS									
	Barium (Ba)	Frontier	ICP/MS	100.0	100	1,000	--	--	--
3	Beryllium (Be)	Frontier	ICP/MS	1.0	1	4	--	--	--
	Iron (Fe)	Frontier	ICP/MS	100.0	100	300 ^h	--	--	--
	Manganese (Mn)	Frontier	ICP/MS	20.0	20	50 ^h	--	--	--
	Fluoride	CLS	EPA 300	100	100	2,000	--	--	--
5b	Chromium VI (Cr)	CLS	EPA 7199	5.0	5	50 ^{Error! Bookmark not defined.}	--	11	11
	Asbestos	CLS (sub to EMSL)	EPA/600/R-93/116(PCM)	0.2 mf/l ^k	0.2 mf/l ^k	7 mf/l ^k	7 mf/l ^k	--	--

Table 1. Constituents to be monitored.

CTR/ NTR #	Contaminants	Laboratory	Analytical Method	Reporting Limits	13267 Letter Criterion Quantitation Limit	Human Health		Aquatic Life ^a	
						DHS MCL ^b	CTR/NTR ^c	U.S. EPA Criteria ^d	CTR/NTR ^c
	Tributyltin	CLS (sub to Toxscan)	EV-024/025	0.002	0.06	--	--	0.063 (proposed)	--
PESTICIDES - PCBs									
110	4,4'-DDD	CLS	EPA 8081A	0.05	0.05	--	0.00083	--	--
109	4,4'-DDE	CLS	EPA 8081A	0.05	0.05	--	0.00059	--	--
108	4,4'-DDT	CLS	EPA 8081A	0.01	0.01	--	0.00059	0.001	0.001
112	Endosulfan I	CLS	EPA 8081A	0.02	0.02	--	110	0.056	0.056
103	Alpha-BHC	CLS	EPA 8081A	0.01	0.01	0.7 ^f	0.0039	--	--
102	Aldrin	CLS	EPA 8081A	0.005	0.005	0.05 ^f	0.00013	--	--
113	Endosulfan II	CLS	EPA 8081A	0.01	0.01	--	110	0.056	0.056
104	Beta-BHC	CLS	EPA 8081A	0.005	0.005	0.3 ^f	0.014	--	--
107	Chlordane	CLS	EPA 8081A	0.1	0.1	0.1	0.00057	0.0043	0.0043
106	Delta-BHC	CLS	EPA 8081A	0.005	0.005	--	--	--	--
111	Dieldrin	CLS	EPA 8081A	0.01	0.01	0.05 ^f	0.00014	0.056	0.056
114	Endosulfan sulfate	CLS	EPA 8081A	0.05	0.05	--	110	--	--
115	Endrin	CLS	EPA 8081A	0.01	0.01	2	0.76	0.036	0.036
116	Endrin Aldehyde	CLS	EPA 8081A	0.01	0.01	--	0.76	--	--
117	Heptachlor	CLS	EPA 8081A	0.01	0.01	0.01	0.00021	0.0038	0.0038
118	Heptachlor epoxide	CLS	EPA 8081A	0.01	0.01	0.01	0.00010	0.0038	0.0038
105	Gamma (Lindane)	CLS	EPA 8081A	0.02	0.02	0.2	0.019	--	--
126	Toxaphene	CLS	EPA 8081A	0.5	0.5	3	0.00073	0.0002	0.0002
	Methoxychlor	CLS	EPA 8081A	10.0	10	40 (30 proposed)	--	--	--
119	Aroclor 1016	CLS	EPA 8082	0.5	0.5	0.5	0.00017 ^f	0.014 ^f	0.014 ^f
120	Aroclor 1221	CLS	EPA 8082	0.5	0.5	0.5	0.00017 ^f	0.014 ^f	0.014 ^f
121	Aroclor 1232	CLS	EPA 8082	0.5	0.5	0.5	0.00017 ^f	0.014 ^f	0.014 ^f
122	Aroclor 1242	CLS	EPA 8082	0.5	0.5	0.5	0.00017 ^f	0.014 ^f	0.014 ^f
123	Aroclor 1248	CLS	EPA 8082	0.5	0.5	0.5	0.00017 ^f	0.014 ^f	0.014 ^f
124	Aroclor 1254	CLS	EPA 8082	0.5	0.5	0.5	0.00017 ^f	0.014 ^f	0.014 ^f
125	Aroclor 1260	CLS	EPA 8082	0.5	0.5	0.5	0.00017 ^f	0.014 ^f	0.014 ^f
16	2,3,7,8-TCDD	Alta	1613	Sample specific	5	30 pg/l	0.013 pg/l	<10 pg/l	--
	1,2,3,7,8-PeCDD	Alta	1613	Sample specific		--	--	--	--
	1,2,3,4,7,8-HxCDD	Alta	1613	Sample specific		--	--	--	--
	1,2,3,6,7,8-HxCDD	Alta	1613	Sample specific		--	--	--	--
	1,2,3,7,8,9-HxCDD	Alta	1613	Sample specific		--	--	--	--
	1,2,3,4,6,7,8-HpCDD	Alta	1613	Sample specific		--	--	--	--
	OCDD	Alta	1613	Sample specific		--	--	--	--
	2,3,7,8-TCDF	Alta	1613	Sample specific		--	--	--	--
	1,2,3,7,8-PeCDF	Alta	1613	Sample specific		--	--	--	--

Table 1. Constituents to be monitored.

CTR/ NTR #	Contaminants	Laboratory	Analytical Method	Reporting Limits	13267 Letter Criterion Quantitation Limit	Human Health		Aquatic Life ^a	
						DHS MCL ^b	CTR/NTR ^c	U.S. EPA Criteria ^d	CTR/NTR ^c
	2,3,4,7,8-PeCDF	Alta	1613	Sample specific		--	--	--	--
	1,2,3,4,7,8-HxCDF	Alta	1613	Sample specific		--	--	--	--
	1,2,3,6,7,8-HxCDF	Alta	1613	Sample specific		--	--	--	--
	2,3,4,6,7,8-HxCDF	Alta	1613	Sample specific		--	--	--	--
	1,2,3,7,8,9-HxCDF	Alta	1613	Sample specific		--	--	--	--
	1,2,3,4,6,7,8-HpCDF	Alta	1613	Sample specific		--	--	--	--
	1,2,3,4,7,8,9-HpCDF	Alta	1613	Sample specific		--	--	--	--
	OCDF	Alta	1613	Sample specific		--	--	--	--
	Dibromochloropropane	CLS	504	0.01	0.01	0.2	--	--	--
	Ethylene dibromide	CLS	504	0.02	0.02	0.05	--	--	--
	Alachlor	CLS	EPA 8141A	1.0	1	2	--	--	--
	Atrazine	CLS	EPA 8141A	1.0	1	3	--	--	--
	Molinate	CLS	EPA 8141A	2.0	2	20	--	--	--
	Simazine	CLS	EPA 8141A	4.0	4	4	--	--	--
	Thiobencarb	CLS	EPA 8141A	1.0	1	70 (1 ^h)	--	--	--
	Diazinon	CLS	EPA 8141A	0.25	0.25	--	--	--	--
	Chlorpyrifos	CLS	EPA 507	1.0	1	--	--	--	--
	Endothall	CLS	EPA 548.1	45.0	45	100	--	--	--
	Carbofuran	CLS	EPA 632	5.0	5	18	--	--	--
	Oxamyl	CLS	EPA 632	20.0	20	200	--	--	--
	Bentazon	CLS	EPA 8151A	2.0	2	18	--	--	--
	2,4-D	CLS	EPA 8151A	10.0	10	70	--	--	--
	Dalapon	CLS	EPA 8151A	10.0	10	200	--	--	--
	Dinoseb	CLS	EPA 8151A	2.0	2	7	--	--	--
	Picloram	CLS	EPA 8151A	1.0	1	500	--	--	--
	2,4,5-TP (Silvex)	CLS	EPA 8151A	1.0	1	50	--	--	--
	Pentachlorophenol	CLS	EPA 8151A	1.0	1	1	0.28	6.7 (at pH 7)	6.7 (at pH 7)
	Di(2-ethylhexyl)adipate	CLS	EPA 8270C	5.0	5	400	--	--	--
	Diquat	CLS	EPA 549.1	4.0	4	20	--	--	--
	Glyphosate	CLS	EPA 547	25.0	25	700	--	--	--
OTHER CONSTITUENTS									
	Specific conductance (EC)	CLS	EPA 120.1	--	--	--	--	--	--
	Hardness (as CaCO ₃)	CLS	EPA 130.2	1,000	--	--	--	--	--
	Total dissolved solids	CLS	EPA 160.1	1,000	--	500,000 – 1,000,000 ^h	--	--	--
	Chloride	CLS	EPA 300.0	500	--	250,000 ^h	--	230,000	--
	Nitrate (as N)	CLS	EPA 300.0	500	2,000	10,000 ^m	--	--	--
	Nitrite (as N)	CLS	EPA 300.0	400	400	1,000	--	--	--
	Sulfate	CLS	EPA 300.0	500	500	250,000 ^h	--	--	--

Table 1. Constituents to be monitored.

CTR/ NTR #	Contaminants	Laboratory	Analytical Method	Reporting Limits	13267 Letter Criterion Quantitation Limit	Human Health		Aquatic Life ^a	
						DHS MCL ^b	CTR/NTR ^c	U.S. EPA Criteria ^d	CTR/NTR ^e
	Ammonia	CLS	EPA 350.2	4,000					
	Phosphorus, Total (as P)	CLS	EPA 365.2	500	--	--	--	--	--
	Sulfide (as S)	CLS	EPA 376.2	1000	--	--	--	--	--
	Sulfite (as SO ₃)	CLS	SM4500-SO ₃	2000	--	--	--	--	--
	MBAS (Foaming agents)	CLS	SM5540C	500	--	500 ^h	--	--	--
	pH	District	In situ	0.1	--	--	--	6.5-9	--
	Temperature	District	In situ	--	--	--	--	--	--
	Flow	District	In situ	--	--	--	--	--	--

^a Water quality criteria for the chronic protection of freshwater aquatic life.

^b From A Compilation of Water Quality Goals, Regional Water Quality Control Board, Central Valley Region, August 2000.

^c U.S. EPA, Federal Register, Vol. 65, No. 97 (Thursday, May 18, 2000), pp. 31682-31719.

^d From National Recommended Water Quality Criteria – Correction, Office of Water, U.S. Environmental Protection Agency Publication No. EPA 822-Z-99-001, April 1999.

^e Lowest observable effect level. From A Compilation of Water Quality Goals, Regional Water Quality Control Board, Central Valley Region, August 2000.

^f DHS action level from Quality Assurance Technical Document 3: Compilation of Federal and State Drinking Water Standards and Criteria, State of California, The Resources Agency, Department of Water Resources, Division of Local Assistance, June 1997.

^g For total trihalomethanes (sum of bromodichloromethane, bromoform, chloroform, and dibromochloromethane).

^h DHS secondary maximum contaminant level (MCL).

ⁱ Laboratory method detection limit.

^j U.S. EPA primary maximum contaminant level (MCL).

^k Value represents millions of fibers per liter; limited to fibers greater than 10 microns in length.

^l The aquatic life and human health criteria apply to the sum of the seven aroclors.

^m DHS primary maximum contaminant level (MCL) for the sum of nitrate and nitrite.

2 QUALITY ASSURANCE PROJECT PLAN OVERVIEW

2.1 PURPOSE OF THIS PLAN

The purpose of this QAPP is to relate objectives of the project to specific field sampling and laboratory analytical procedures, data quantity, and data quality to achieve those objectives. In addition, this QAPP was written to ensure that all field-sampling procedures are conducted in a technically appropriate, efficient, and cost-effective manner, ultimately contributing to the attainment of project objectives. This QAPP addresses the methodologies employed to physically collect effluent and creek samples in the field, procedures for the transport of samples to specified analytical laboratories, and the laboratory methods and reporting limits for quantifying constituent concentrations.

This QAPP was written to demonstrate:

- ❑ sample-collection procedures are appropriate for achieving project objectives;
- ❑ identified analytical procedures are appropriate for achieving project objectives;
- ❑ quality control (QC) procedures are sufficient for obtaining data of known and adequate quality; and
- ❑ data collected will be defensible if challenged technically or legally.

Robertson-Bryan, Inc. (RBI) and the District reserve the flexibility to modify protocols identified in this QAPP, as necessary, due to constraints not anticipated upon drafting this document. Any modifications to the sampling protocols discussed herein would be performed, as necessary, in order to best meet the project objectives. Any significant modifications to sampling protocols discussed in this QAPP will be clearly documented and communicated to Project Managers for the District and the RWQCB.

2.2 UNDERLYING LOGIC AND ORGANIZATION OF THIS PLAN

This QAPP has been written to incorporate all applicable criteria required for U.S. EPA-defined Category III projects. Category III projects are defined by the U.S. EPA as projects intended to produce results used to evaluate and select basic options, or to perform feasibility studies or preliminary assessments of unexplored areas which might lead to further work (USEPA 1991). This plan specifically addresses the following:

- ❑ relationship of field sampling and laboratory analysis methodologies to both project and data quality objective(s);
- ❑ quality and quantity of data that will be collected and how the intended quality will be consistently obtained; and
- ❑ data recording, calculating, review, and reporting procedures.

It should be noted that sections of a U.S EPA Category III QAPP clearly not applicable to this monitoring project were not included in this plan.

2.3 QUALITY ASSURANCE PROJECT PLAN APPROVAL FORM

Signatures on this form indicate that the principals involved with this project have reviewed this QAPP and agree that adherence to the sampling/analysis methodologies and data quality objectives outlined herein will acceptably achieve the stated project objectives.

3 PROJECT APPROACH

3.1 EFFLUENT AND RECEIVING WATER CONSTITUENT QUANTIFICATION

Constituents listed in **Table 1** will be monitored in the effluent and receiving water over a 12-month period according to the schedule presented in **Table 2**. Data from this study will be compared to current federal and State water quality criteria/objectives, based on the procedures contained in the SIP (SWRCB 2000), to determine if water quality-based effluent limitations are needed in the DCWWTP NPDES permit to protect the beneficial uses of Deer Creek.

Volatile organics, inorganics, and other conventional constituents will be sampled in the effluent every month. Pesticides, PCBs, and semi-volatile organics will be sampled on a quarterly basis. Dioxins and furans will be sampled once during the wet season and once during the dry season.

Monitoring of Deer Creek will be conducted in a manner that effectively characterizes background contaminant levels. During the first four months, the creek will be sampled and analyzed for all constituents identified in **Table 1**, except for dioxins and furans, at the same frequency as the effluent. Because there is no assimilative capacity for dioxins or furans in the receiving water, it is only necessary to determine whether dioxins and furans are present in the effluent. Per item #4 in a letter from Kenneth Landau of the RWQCB to RBI dated January 25, 2002, the receiving water frequency will be re-evaluated after laboratory results for the initial four (4) months of requested monitoring have been compiled.

The exception to this will be receiving water monitoring for hardness, specific conductance, pH, temperature, and flow. Because some CTR/NTR criteria are a function of hardness, this constituent will be monitored monthly in the effluent and receiving water. In addition, the District, for its NPDES permit compliance, is already conducting monitoring for some constituents contained in the 13267 letter at frequencies exceeding the 13267 letter requirements including: pH, ammonia, and temperature. The District will continue its current monitoring program for these constituents.

Finally, the receiving water will not be sampled for any constituent if there is no visible flow. Effluent samples will, nevertheless, be collected and analyzed.

3.2 EFFLUENT AND RECEIVING WATER FLOW MEASUREMENTS

DCWWTP effluent discharge rates to Deer Creek are monitored on a continuous basis. In addition, the District currently maintains a streamflow gage upstream of the DCWWTP discharge point. Therefore, no additional procedures beyond those currently employed maintain the flow measuring devices will be implemented to measure effluent or receiving water flows.

Table 2. Effluent and receiving water sampling schedule for the Deer Creek WWTP.

Constituent		Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
EPA Method 120.1 Specific conductance (EC)	Effluent RI	■	■	■	■	■	■	■	■	■	■	■	■
EPA Method 130.2 Hardness	Effluent RI	■	■	■	■	■	■	■	■	■	■	■	■
EPA Method 150.1 pH	Effluent RI	Per NPDES permit – Daily Per NPDES permit – Weekly											
EPA Method 160.1 TDS	Effluent RI	■	■	■	■	■	■	■	■	■	■	■	■
EPA Method 300 Anions (Cl, F, NO ₂ , NO ₃ , SO ₄)	Effluent RI	■	■	■	■	■	■	■	■	■	■	■	■
EPA Method 335.2 Cyanide	Blank Effluent RI	■	■	■	■	■	■	■	■	■	■	■	■
EPA Method 350.2 Ammonia	Effluent RI	Per NPDES permit – Daily											
EPA Method 365.3 Total Phosphorus	Effluent RI	■	■	■	■	■	■	■	■	■	■	■	■
EPA Method 376.2 Sulfide	Effluent RI	■	■	■	■	■	■	■	■	■	■	■	■
SM4500-SO ₃ Sulfite	Effluent RI	■	■	■	■	■	■	■	■	■	■	■	■
SM5540C MBAS (Foaming Agents)	Effluent RI	■	■	■	■	■	■	■	■	■	■	■	■
EPA Method 502.2 2-Chloroethyl vinyl ether	Blank Effluent RI	■	■	■	■	■	■	■	■	■	■	■	■
EPA Method 504 Ethylene Dibromide & DBCP	Blank Effluent RI	■	■	■	■	■	■	■	■	■	■	■	■
EPA Method 547 Glyphosate	Blank Effluent RI	■	■	■	■	■	■	■	■	■	■	■	■
EPA Method 548.1 Endothall	Blank Effluent RI	■	■	■	■	■	■	■	■	■	■	■	■
EPA Method 549.1 Diquat	Blank Effluent RI	■	■	■	■	■	■	■	■	■	■	■	■
EPA Method 632 Carbamates	Blank Effluent RI	■	■	■	■	■	■	■	■	■	■	■	■
EPA Method 1613 Dioxins & Furans	Blank Effluent RI	■	■	■	■	■	■	■	■	■	■	■	■
EPA Method 7199 Chromium VI	Effluent RI	■	■	■	■	■	■	■	■	■	■	■	■
EPA Method 8081A Organochlorine Pesticides	Blank Effluent RI	■	■	■	■	■	■	■	■	■	■	■	■
EPA Method 507 / 8141A Organophosphorus Pesticides	Blank Effluent RI	■	■	■	■	■	■	■	■	■	■	■	■
EPA Method 8151A Chlorophenoxyacid Herbicides	Blank Effluent RI	■	■	■	■	■	■	■	■	■	■	■	■
EPA Method 8260B Volatile Organics	Blank Effluent RI	■	■	■	■	■	■	■	■	■	■	■	■
EPA Method 8270C Semi-volatile Organics	Blank Effluent RI	■	■	■	■	■	■	■	■	■	■	■	■
EPA Method 8316 Acrolein & Acrylonitrile	Blank Effluent RI	■	■	■	■	■	■	■	■	■	■	■	■
EPA/600/R-93/116(PCM) – Asbestos	Effluent RI	■	■	■	■	■	■	■	■	■	■	■	■

Table 2. Effluent and receiving water sampling schedule for the Deer Creek WWTP.

Constituent		Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
ICP-MS Trace Metals – Ba, Cu, Be, Fe, and Mn only	Blank	■	■	■	■	■	■	■	■	■	■	■	■
	Effluent	■	■	■	■	■	■	■	■	■	■	■	■
	RI	■	■	■	■	■	■	■	■	■	■	■	■
EV-024/025 Tributyltin	Blank	■	■	■	■	■	■	■	■	■	■	■	■
	Effluent	■	■	■	■	■	■	■	■	■	■	■	■
	RI	■	■	■	■	■	■	■	■	■	■	■	■
Temperature	Effluent	Per NPDES permit – Daily											
	RI	Per NPDES permit – Weekly											
Flow	Effluent	Per NPDES permit – Continuous											
	RI	Per NPDES permit – Continuous											

■ Sample will be collected this month.

■ Collection of a sample this month will be determined after review of the first four months of sampling results and discussions with RWQCB staff (see RWQCB letter dated January 25, 2002, item #4 (Appendix A)).

4 PROJECT TEAM ORGANIZATION

4.1 AUTHORITY AND RESPONSIBILITY

Project Manager (District): Tim Sullivan will serve as the District's Project Manager for this monitoring project and, therefore, will serve as the District's primary contact person for RBI and the RWQCB. Mr. Sullivan will be responsible for reviewing and approving this QAPP for the District, as well as all RBI project reports submitted to the District.

Project Manager (RBI): Michelle Brown, will serve as RBI's Project Manager for all phases of this project and will, therefore, serve as the primary contact within RBI. In addition, Ms. Brown will keep Mr. Sullivan briefed on all project activities and schedules, and will answer project-related questions as they arise. Ms. Brown will prepare all technical reports for the project.

Principal-in-Charge (RBI): Dr. Michael Bryan will serve as RBI's principal-in-charge for the project. Dr. Bryan will review and approve this QAPP and all technical reports prior to their distribution to the District and RWQCB staff.

4.2 ANALYTICAL LABORATORY PERSONNEL

Ms. Anne Fowler will be the project contact at Frontier Geosciences. Mr. James Liang and Ms. Martha Maier will serve as the project contacts at CLS and Alta Analytical, respectively.

4.3 QUALITY ASSURANCE PERSONNEL

Quality Assurance Manager (RBI): Dr. Bryan of RBI will provide quality assurance oversight on the project. Each of the analytical laboratories has designated QA/QC officers that can be identified through the project contacts identified in this QAPP.

4.4 PROJECT COMMUNICATION

Coordination of the sampling component of this project with laboratory analytical work will be accomplished through scheduled meetings, phone calls, and site visits. RBI will be in contact with the Project Managers for the District, assigned RWQCB staff, and the analytical laboratories on an as-needed basis to facilitate the timely integration of field and laboratory work in order to assure that high-quality, compatible results are obtained from all sampling events.

5 QUALITY ASSURANCE OBJECTIVES

Quality assurance (QA) is a set of operating principles that, if strictly followed during sample collection and analysis, will produce data of known and defensible quality. This section describes the QA objectives that specific measurements must meet in order to achieve the project objectives. The QC procedures to be followed to attain the stated QA objectives are discussed in Section 8 of this QAPP. Thus, Section 5 specifies the quantitative and qualitative requirements, whereas Section 8 describes how these specifications will be met (USEPA 1991).

5.1 DETERMINING QUALITY ASSURANCE OBJECTIVES

QA objectives should be defined in terms of the project requirements, and not in terms of the capabilities of the intended methods. If QA objectives exceed the capabilities of available methods, either the method must be modified or the QAPP must reflect such deficiencies. Nevertheless, the QAPP must include sufficient evidence to prove that the methods selected are capable of achieving the desired performance defined by the data quality objectives (USEPA 1991). Data-collection criteria should provide a balance between constraints of time and cost and the quality of data necessary to achieve project objectives. This QAPP is designed to accomplish the following QA/QC objectives:

- ❑ develop and implement a technically appropriate experimental design and sampling and analytical methodologies that, when employed for all sampling events, will facilitate achieving the project objectives;
- ❑ establish quality assurance objectives and equipment specifications that must be met to produce unadulterated samples for analysis;
- ❑ define quality assurance objectives for the laboratory analytical procedures; and
- ❑ use assessment samples (i.e., QC samples) and procedures to verify the quality of the samples and analytical data collected.

It is necessary to define both qualitative and quantitative estimates of the quality of the field samples and analytical data needed to meet project objectives. In doing so, this QAPP focuses on the definition, implementation, and assessment of data quality objectives (DQOs) that are specified for the entire field component of the project. The DQOs for this project are defined according to the six attributes listed below.

Precision: The level of agreement among multiple measurements of the same parameter.

Bias: The difference between an observed value and the "true" value of the parameter being measured (precision and bias together constitute a measure of "accuracy").

Completeness: The quantity of samples that are successfully collected and analyzed with respect to the quantity intended in the experimental design.

Equipment Specifications: Physical design, construction, and/or preparation requirements of sampling equipment needed to collect unadulterated samples.

Representativeness: The degree to which the data collected accurately represent the population of interest.

Comparability: The similarity of data from different sources (e.g., locations or periods in time) included within individual or multiple data sets.

5.1.1 Quantitative Quality Assurance Objectives: Sample Collection

Quantitative QA objectives constitute a critical element of this QAPP, as they provide information necessary to assess the degree to which identified methods can produce the quality of samples and subsequent analytical data desired to achieve project objectives. The quantitative DQOs of bias and precision (accuracy), reporting limits, and completeness (as they relate to field samples and associated analytical data collection) are described individually below.

Bias and Precision (Accuracy): For analysis of all constituents monitored under this project, accuracy of constituent concentration will be ensured by collecting unadulterated samples and performing the appropriate analysis, including conducting applicable QA/QC procedures when analyzing project samples.

Analytical Reporting Limits: The analytical reporting limit for a contaminant is the lowest concentration that can be consistently and accurately quantified using the indicated analysis method. Reporting limits for the analyses being performed for this project are provided in Table 1. The reporting limit provided in Table 1 with regard to chromium is for total chromium.

Completeness: Completeness objectives are presented as the percentage of all planned field sample collections (see Table 2) and subsequent laboratory analyses that are actually made during the project. All monthly and quarterly effluent composite and grab samples must be collected. Hence, the completeness objective is 100% for all constituents to be monitored during the project.

5.1.2 Qualitative Quality Assurance Objectives: Equipment Specifications and Data Representativeness and Comparability

5.1.2.1 Sampling Equipment Specifications

Automated Composite Sampler

All 24-hour composite samples for this project will be collected into appropriate, decontaminated sample-collection containers using an automated composite sampler. The sampler will be refrigerated to keep the composite effluent samples as cold as possible throughout their collection.

Tubing

Two types of tubing will be used for composite sample collection:

- semi-rigid, Teflon-lined, polyethylene tubing, which will be connected to the intake side of the composite sampler; and
- silicone tubing, which goes through the pump-head of the composite sampler.

Prior to its use each month, Frontier Geosciences will decontaminate the tubing that will be used to collect all but the dioxins and furans sample according to the procedures in **Appendix C**. A separate set of tubing will be decontaminated by Alta Analytical for collection of the dioxins and furans samples according to the procedures in **Appendix E**.

Sample Collection and Transport Containers

Three sample collection containers will be used to collect composite samples, each to be used for certain constituent group analyses. Frontier Geosciences will decontaminate a 2.5-L, glass container to collect trace metals, mercury, and tributyltin samples (Appendix B). CLS will decontaminate a 10-L glass container that will be used to collect samples analyzed by that laboratory (Appendix D). Alta Analytical will decontaminate a 4-L amber glass container that will be used to collect dioxins and furans samples (Appendix E). Each laboratory will provide clean sample transport containers for the analyses they will be performing. **Table 3** summarizes the sample collection and transport containers for each analytical method, along with the analytical laboratory that will be performing each analysis and the frequency of each analysis.

5.1.2.2 Data Representativeness and Comparability

Representativeness is the degree to which a sample or group of samples is indicative of the population being studied. An environmental sample is representative of a particular parameter of interest when the average value obtained from multiple samples tends towards the true value of that parameter in the environment. Representativeness is typically achieved by collecting a sufficiently large number of unbiased samples (USEPA 1991), and/or by collecting a composite sample. Multiple and/or composite samples will be analyzed during this study in order to obtain representative effluent and receiving water contaminant concentration data.

Comparability is the degree to which one data set can be compared to another. For example, methods used at different locations or points in time should be comparable. Comparability of monthly samples/data collected throughout this project will be achieved by adhering to the sampling and analysis methodologies outlined in this QAPP during all months of the project.

5.2 WHAT IF QUALITY ASSURANCE OBJECTIVES ARE NOT MET?

Failure to completely meet the DQOs defined above for critical field sampling activities will have the following consequences regarding overall project integrity, quality, and technical defensibility.

5.2.1 Quantitative QA Objectives

Analytical QA/QC and Reporting Limits

Adherence by each laboratory to their respective Laboratory Quality Assurance Plan and standard operating procedures for specific test methods will assure that these DQOs are met.

Table 3. Sample collection and transport containers.

Day	Sampling Frequency	Analytical Method	Analysis	Laboratory	Effluent Sample Collection Method/Container	Receiving Water Sample Collection Method/Container	Sample-Transport Containers (for collection of one sample) ^a	Preservative
1	Initial setup							
2	Monthly	ICP-MS	Trace Metals	Frontier	24-hr composite: 2.5-L, glass sample-collection container	Grab: Sample-transport container	Two 500-ml HDPE	Preserved at lab
2	Monthly	/600/R-93/116(PCM)	Asbestos	CLS	24-hr composite: 10-L glass sample-collection container	Grab: Sample-transport container	Two 1-L amber glass	None
	Monthly	120.1	EC	CLS			One 1-L polyethylene	None
		130.2	Hardness					
		150.1	pH					
		160.1	TDS					
		300	Anions (Cl, F, NO ₂ , NO ₃ , SO ₄)					
		SM5540C	Foaming Agents					
	Monthly	335.2	Cyanide	CLS			One 500-ml polyethylene	NaOH
	Monthly	350.2	Ammonia	CLS			One 500-ml polyethylene	H ₂ SO ₄
	Monthly	365.2	Total Phosphorus					
	Monthly	376.2	Sulfide	CLS			One 250-ml polyethylene	ZnAc
	Quarterly	506	Di(2-ethylhexyl)adipate	CLS	Grab: Sample transport container	Grab Sample transport container	One 1-L amber glass	None
	Quarterly	547	Glyphosate	CLS			One 1-L amber glass	None
	Quarterly	548.1	Endothall	CLS			Two 1-L amber glass	None
	Quarterly	549.1	Diquat	CLS			One 1-L polyethylene	None
	Monthly	SM4500-SO3	Sulfite	CLS			One 125-ml polyethylene	None
	Monthly	7199	Chromium VI	CLS			500-ml polyethylene	None
	Monthly	502.2	2-Chloroethyl vinyl ether	CLS			Two 40-ml VOAs	None
	Monthly	8260B	Volatile organics	CLS			Two 40-ml VOAs	HCl
	Monthly	8316	Acrolein & Acrylonitrile	CLS			Three 40-ml VOAs	None
	Quarterly	504	Ethylene Dibromide & DBCP	CLS			Two 40-ml VOAs	HCl
	Monthly	SM4500-SO3	Sulfite	CLS	Grab: Sample transport container	Grab Sample transport container	One 125-ml polyethylene	None
	Monthly	7199	Chromium VI	CLS			500-ml polyethylene	None
	Monthly	502.2	2-Chloroethyl vinyl ether	CLS			Two 40-ml VOAs	None
	Monthly	8260B	Volatile organics	CLS			Two 40-ml VOAs	HCl
	Monthly	8316	Acrolein & Acrylonitrile	CLS			Three 40-ml VOAs	None
	Quarterly	504	Ethylene Dibromide & DBCP	CLS			Two 40-ml VOAs	HCl
3	Monthly	EV-024/025	Tributyltin	CLS	24-hr composite:	Grab: Sample-	Two 1-L amber glass	None

^a The container(s) listed is/are for the collection of "one sample" at one location (i.e., blank, effluent, or receiving water). If collecting blanks, effluent, and receiving water samples during a particular sampling event, then you will need three times the number of bottles shown. For example, if collecting a blank, effluent, and receiving water sample for cyanide analysis, then you will need three 500-ml polyethylene bottles with NaOH preservative, one for each location.

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					2.5-L, glass sample-collection container	transport container		
3	Quarterly	610	PAHs	CLS	24-hr composite: 10-L glass sample-collection container	Grab Sample transport container	One 1-L amber glass	None
	Quarterly	632	Carbamates	CLS			One 1-L amber glass	None
	Quarterly	8081A	OC Pesticides	CLS			Two 1-L amber glass	None
	Quarterly	507 / 8141A	OP Pesticides	CLS			One 1-L amber glass	None
	Quarterly	8151A	Herbicides	CLS			Two 1-L amber glass	None
	Quarterly	8270C	Semi-volatile organics	CLS			Two 1-L amber glass	None
4	Semi-annually	1613	Dioxins and Furans	Alta Analytical	24-hr composite: 3.8-L amber glass container	Not applicable	Two 1-L amber glass	None

Collection of Samples

Equipment failure and other factors beyond the control of sampling personnel may prevent the collection of effluent samples, as planned, during a particular sampling event. Not meeting the stated DQO of collecting 100% of planned effluent samples would have unacceptable consequences to the overall integrity and technical defensibility of this project. Therefore, in the event that an effluent sample cannot be collected from a given sampling event, re-sampling will occur as soon thereafter as possible in order to assure that all planned samples are ultimately collected and analyzed.

5.2.2 Qualitative QA Objectives

Equipment Specifications

All equipment acquired for use in this project meets the qualitative QA specifications identified in Section 5.1.2 of this plan. This QAPP serves to define standard field sampling procedures to be employed during each sampling event, thereby assuring consistency of methodologies and approaches throughout the project. Thus, adherence to the procedures outlined in this QAPP will assure that the samples collected and subsequent analytical data produced will be: 1) representative of effluent and receiving water quality at the time of sampling; and 2) comparable among sampling events (i.e., through time).

6 COLLECTION OF COMPOSITE EFFLUENT SAMPLES

This section of the QAPP defines specific locations, equipment, and sample collection protocols that will be followed throughout the project.

6.1 SAMPLING LOCATION

Effluent samples will be collected immediately prior to the discharge point, after the effluent has been fully treated by the plant.

6.2 SAMPLING EQUIPMENT AND PROCEDURES

In order to collect sufficient volumes of effluent for laboratory analyses, effluent sampling will be conducted from three to six days each month, depending on the constituents being analyzed that month. The procedures for collecting effluent samples are discussed in detail below.

Pre-sampling Activities: Pre-sampling activities consist of ordering the necessary bottles from the analytical laboratories and verifying all necessary equipment is available. The first sampling event will differ from the subsequent sampling events in that equipment blanks will be collected for many analyses (see Table 2).

1. Review Table 2 to determine the analyses to be conducted that month, and what equipment blanks will be collected.
2. Send all sample-collection containers and tubing to the appropriate laboratory for decontamination.
 - a. For the initial sampling event, send Frontier Geosciences the tubing for decontamination at least two weeks prior to the sampling event. Frontier Geosciences will be providing the 2.5-L, glass container. At the completion of each sampling event, this bottle shall be sent back to Frontier Geosciences with the trace metals sample for cleaning. The tubing will have to be sent back separately, as it will be used for collection of additional composites during subsequent days.
 - b. Arrange for delivery of the 10-L glass sample-collection container to CLS for cleaning at least one week prior to the sampling event.
 - c. Arrange for delivery of the 4-L amber glass sample-collection container and a set of tubing to Alta Analytical for decontamination.
3. Contact Anne Fowler at Frontier Geosciences (206-622-6960; annef@frontiergeosciences.com) to order cleaning of tubing and 2.5-L, glass sample-collection bottle, sample transport bottles, and a sufficient volume of reagent water for equipment blanks, blue ice, and chain-of-custody forms. See Table 3 for sample bottle requirements.
4. Contact Mark Smith at CLS (916-638-7301; marks@californialab.com) to order cooler, sample transport bottles, blue ice, chain-of-custody forms, and labels. For

- the first sampling event, order enough bottles to collect equipment blanks, and also order travel blanks for volatiles analyses. The bottle order and number of coolers needed will vary depending on whether quarterly samples are being collected or not. Request a minimum of two coolers to have a small one dedicated to transport of tributyltin samples. Three coolers will be needed during months in which quarterly samples are collected. See Table 3 for sample bottle requirements.
5. Contact Martha Maier at Alta Analytical (916-933-1640) to order at least 2-L of reagent water for equipment blank, sample transport bottles, blue ice, chain-of-custody forms, and labels, if sampling for dioxins and furans that month. See Table 3 for sample bottle requirements.
 6. Upon receiving coolers with bottles from the various laboratories, check coolers to verify that all equipment was received and no bottles are broken. Make arrangements for receipt/replacement of bottles as necessary.

Day 1: Preparation of Equipment Blanks. Day 1 sampling activities consist of collecting the equipment blanks and setting up the composite sampler to collect a 24-hour composite sample of effluent. The equipment blanks are obtained by pumping reagent water through the decontaminated composite sampler tubing and into the sample collection container.

All sampling tubing will be shipped in sealed bags to ensure the equipment remains free of contamination prior to use. Do not open the bags until equipment is to be used or filled. Wear powder-free, vinyl gloves (Oak Technical, Inc.; No. 96-284 or similar glove) when the bags containing decontaminated equipment are opened at the project site.

Trace Metals Blanks (collected every sampling event) – for first sampling event, see next section.

1. Remove one set of tubing from the bags in such a way that the ends of the tubing do not touch any surfaces, and immediately install into one of the composite samplers.
2. Remove the 2.5-L, glass sample-collection container from its bag, place it into the composite sampler, and connect it to the delivery end of the silicone tubing.
3. Remove the 2.5-L bottle of reagent water, provided by Frontier Geosciences, from its bag and place the sampling end of the Teflon-lined semi-rigid tubing into the reagent water bottle.
4. Program the composite sampler to continuously pump all of the reagent water into the collection bottle.
5. Remove two 500-ml HDPE sample-transport containers from their bags and fill with the reagent water contained within the sample collection container. These samples constitute the equipment blanks for the trace metals sampling event. Such equipment blanks will be collected and analyzed during every monthly sampling event. Put bottles back into inner clean bags and refrigerate the

equipment blanks until collection of the 24-hour effluent sample is complete. Do not put labels on the bottles as this will violate Frontier Geosciences protocols. Each bottle has a unique number engraved which is used to identify it on the chain-of-custody form.

Other Equipment Blanks (February 2002 only)

6. Make arrangement for delivery of blanks to CLS.
7. Reagent water will be required for this first sampling event to prepare equipment blanks for the following additional analyses:
 - a. Tributyltin
 - b. Cyanide
 - c. Glyphosate
 - d. Endothall
 - e. Diquat
 - f. PAHs
 - g. Carbamates
 - h. Organochlorine pesticides
 - i. Organophosphorus pesticides
 - j. Herbicides
 - k. Semi-volatile organics
 - l. Dioxins and furans
8. Begin as directed under Steps 1-5 under the "Trace Metals Blanks" section above, setting up the composite sample-collection bottle and tubing.
9. Collect a tributyltin equipment blank:
 - a. Pump an additional 2.5 L of Frontier Geosciences' reagent water into the 2.5-L, glass sample-collection container.
 - b. Pour the reagent water into two 1-L, amber glass bottles, labeled as equipment blanks for tributyltin analysis.
 - c. Discard the remaining reagent water and replace the lid to prevent contamination while collecting the remaining equipment blanks.
10. Place samples in CLS cooler with blue ice.
11. Set up the same composite sampler used to collect the trace metals and tributyltin blanks to collect the 24-hour composite effluent sample using the same 2.5-L, glass sample-collection container used to collect the equipment blanks.
 - a. Place the free end of the semi-rigid tubing in the center of the effluent discharge and fix the tubing in place.
 - b. Calibrate the composite sampler to collect approximately 100 ml of effluent once every hour for a 24-hour period, for a sample volume of approximately 2.4 liters.
12. Remove the second set of tubing from the bags in such a way that the ends of the tubing do not touch any surfaces, and immediately install into second composite sampler.

13. Place the 10-L glass sample-collection container decontaminated by CLS into the second composite sampler. Pump CLS reagent water into the container. As each reagent water bottle is emptied, open another bottle, transferring sampling end of tubing from the empty reagent bottle to a new, filled reagent bottle. Continue until the sample collection container is filled.
14. Fill the appropriate sample-transport bottles (listed in Table 3) for the analyses listed in Step 1 (above) with the reagent water contained in the sample-collection container. Collection of these blanks is only required during the first sampling event to verify that the sample collection procedures do not result in sample contamination.
15. Replace the lid on the 10-L glass container when done filling sample-transport bottles.
16. Label bottles (except those for trace metals and mercury analyses) with the date and time sample was collected, contents, the analytical method to be used, and name of sample collection personnel.
17. Place bottles upright in the appropriate cooler with blue ice.

In the event that the equipment blanks show non-detectable levels of constituent being analyzed, thereby confirming that the sampling procedure being employed does not contaminate the sample, no equipment blank will be collected for analysis during the remaining sampling events.
18. Label bottles with the date and time sample was collected, contents, the analytical method to be used, and name of sample collection personnel.
19. Complete chain-of-custody form.
 - a. Specify "NPDES/SIP analyses and reporting limits for all analyses" on the CLS chain-of-custody form to obtain the appropriate reporting limits for the requested analyses.
 - b. Specify "J-flags for all analyses" to obtain estimated concentrations for constituents having concentrations less than the reporting limit.
20. After collection of the equipment blank(s) is complete, set up the composite sampler to collect 10-L of effluent using the same 10-L glass container and discard effluent sample. This will rinse the tubing of any remaining reagent water, prior to collection of the trace metals effluent sample. Replace lid on 10-L container and set aside.
21. Deliver cooler with blanks to CLS. Hold trace metals and mercury blanks until completion of effluent and receiving water sampling.

Day 2 – Sample Collection for Trace Metals: Day 2 consists of collecting samples for trace metals and mercury analyses.

1. Upon collection of all 24 aliquots, remove the sample-collection container from the composite sampler.
2. With vinyl, powder-free gloves on, remove two 500-ml HDPE bottles from their bags. Do not put labels on the bottles as this will violate Frontier Geosciences protocols. Each bottle has a unique number engraved which is used to identify it on the chain-of-custody form.
3. Fill the bottles with the effluent sample. Put sample bottles back into inner clean bags and place trace metals samples (equipment blanks and effluent) into the Frontier Geosciences cooler with blue ice until sampling of the receiving water is complete.
4. Place bottles upright in the appropriate cooler with blue ice until sampling of receiving water is complete.
5. Complete chain-of-custody forms.
 - a. Specify "Total recoverable and dissolved on creek samples; total recoverable only on blank and effluent." on the chain-of-custody to have Frontier Geosciences report both the total recoverable and dissolved fractions for the creek samples collected.
6. After collection of the trace metals samples is complete, set up the composite sampler to collect the 24-hour composite effluent sample using the same 2.5-L, glass sample-collection container. Place the free end of the semi-rigid tubing in the center of the effluent discharge and fix the tubing in place. Calibrate the composite sampler to collect approximately 100 ml of effluent once every hour for a 24-hour period, for a sample volume of approximately 2.4 liters.

Day 3 – Sample Collection for Tributyltin: Day 3 consists of collecting samples for tributyltin analyses.

1. Make arrangements for CLS to pick up tributyltin samples, or hand deliver to laboratory when sampling is complete.
2. Upon collection of all 24 aliquots, remove the sample-collection container from the composite sampler.
3. With vinyl, powder-free gloves on, fill two 1-L, amber bottles provided by CLS for the tributyltin sample.
4. Label bottles with the date and time sample was collected, contents, the analytical method to be used, and name of sample collection personnel.
5. Place bottles upright in the appropriate cooler with blue ice until sampling of receiving water is complete.
6. Set the 2.5-L, glass sample collection container aside. *It will be returned upon completion of sampling along with composite sampler tubing.*
7. Complete chain-of-custody forms.

Day 3 (Continued): Place the 10-L glass sample collection container decontaminated by CLS into the composite sampler. Do not replace tubing. Fill the container with 10-L of effluent and discard, to rinse container. Recalibrate the composite sampler to collect 400 ml of effluent each hour for a 24-hour period, for a composite volume of 9.6 liters.

Day 4 – Collection of Samples: Day 4 consists of collecting the remaining samples for monthly analyses, as well as samples for quarterly analyses, if being analyzed that month.

2. Make arrangements for CLS to pick up samples collected that day, or hand deliver to laboratory when sampling is complete.
3. Upon collection of all 24 aliquots, remove the sample-collection container from the composite sampler and pour the contents into the appropriate clean sample transport bottles listed under “Day 3” of Table 3. Note, sulfite and chromium VI are to be collected as grab samples, therefore, do not fill bottles for these analyses with the effluent composite.
4. Fill the 40-ml VOA vials as follows. Note, the VOA vials are to be collected as grab samples, therefore, do not fill the VOAs with composited effluent.
 - a. Fill vials containing preservative by collecting sample into a vial without preservative and transferring the effluent into the container with preservative. Overflow the vials to make sure all air is removed, then cap the vial, label it, and place into the CLS cooler containing blue ice.
 - b. Fill vials without preservative by submerging them into the effluent. Holding the vial at a 45-degree angle below the effluent surface, uncap the vial. After all air has escaped, cap the vial, label it, and place it into the CLS cooler containing blue ice.
5. Label all bottles with the date and time sample was collected, contents, the analytical method to be used, and name of sample collection personnel.
6. Place bottles upright in the CLS cooler with blue ice until sampling of receiving water is complete.
7. Complete chain-of-custody form.
 - a. Specify “NPDES/SIP analyses and reporting limits for all analyses” on the CLS chain-of-custody form to obtain the appropriate reporting limits for the requested analyses.
 - b. Specify “J-flags for all analyses” to obtain estimated concentrations for constituents having concentrations less than the reporting limit.

Day 4 (Continued): If samples for quarterly analyses are being collected, then additional effluent composite sample will need to be collected. Immediately after preparing samples, re-

calibrate, if necessary, the composite sampler using the same equipment set-up to collect 400 ml of effluent every hour for 24 hours for a total sample volume of 9.6 liters.

Day 5: Sample Collection: Day 5 consists of collecting samples for analyses of constituents monitored on a quarterly basis.

1. Make arrangements for CLS to pick up samples, or hand deliver to laboratory when sampling is complete.
2. Upon collection of all 24 aliquots, disconnect the sample-collection container from the silicone tubing and remove it from the composite sampler.
3. With vinyl, powder-free gloves on, fill bottles listed under "Day 4" of Table 3.
4. Label all bottles with the date and time sample was collected, contents, the analytical method to be used, and name of sample collection personnel.
5. Place bottles upright in the CLS appropriate cooler with blue ice until sampling of receiving water is complete.
6. Complete CLS chain-of-custody form.
 - a. Specify "NPDES/SIP analyses and reporting limits for all analyses" to obtain the appropriate reporting limits for the requested analyses.
 - b. Specify "J-flags for all analyses" to obtain estimated concentrations for constituents having concentrations less than the reporting limit.
7. Remove all tubing and ship tubing and 2.5-L glass container to Frontier Geosciences for decontamination for the next sampling event [414 Pontius North, Seattle, WA, 98109, (206) 622-6960].

Day 5 (Continued): If samples for dioxins and furans are being collected, then commence with this step.

Dioxins and Furans Equipment Blank (collected every sampling event)

1. Install composite sampler tubing decontaminated by Alta Analytical.
2. Place the decontaminated 4-L amber glass sample-collection container inside the composite sampler.
3. Insert the sampling end of the semi-rigid, Teflon-lined tubing into the reagent water bottle provided by Alta Analytical.
4. Program to composite sampler to continuously pump the reagent water into the sample-collection container.
5. Transfer the pumped reagent water into two 1-L, amber glass bottles provided by Alta Analytical. This constitutes the equipment blank for this sampling event.
22. Label all bottles with the date and time sample was collected, contents, the analytical method to be used, and name of sample collection personnel.

6. Refrigerate the equipment blanks until collection of the 24-hour effluent sample is complete.
7. After emptying, place the same 4-L amber glass sample-collection container inside the composite sampler and calibrate the sampler to collect 125 ml of effluent every hour for 24-hours to create a volume of approximately 3 liters.

Day 6 – Collection of Dioxins and Furans Sample: This day consists of collecting the dioxins and furans effluent sample.

1. Remove the sample-collection container from the composite sampler and transfer the contents to two 1-L amber glass containers.
2. Label all bottles with the date and time sample was collected, contents, the analytical method to be used, and name of sample collection personnel.
3. Place bottles upright in the Alta Analytical cooler with blue ice.
4. Complete chain-of-custody form.
 - a. Specify under the special instructions, that the equipment blank is only to be analyzed if dioxins and/or furans were detected in the effluent sample. If one or more congener is detected in the effluent sample, the equipment blank will be analyzed to confirm that the congeners were not introduced via the sample-collection and transport procedures.
 - b. Request concentrations less than the reporting limit be estimated and reported.
5. Deliver cooler with samples to Alta Analytical [5070 Robert J. Mathews Parkway, El Dorado Hills, CA 95762, (916) 933-1640]. Alta Analytical does not offer a courier service to pick up samples.
6. Store tubing and container to use for the next dioxins and furans sampling event.

7 COLLECTION OF RECEIVING WATER SAMPLES

This section of the QAPP defines specific locations, equipment, and sample collection protocols that will be followed throughout the project.

7.1 SAMPLING LOCATION

All receiving water samples will be collected at the R1 (upstream) monitoring location, as identified in the District's NPDES permit for each facility.

7.2 SAMPLING EQUIPMENT AND PROCEDURES

The collection of receiving water samples will occur during the same days that effluent samples are collected. All creek samples will be collected directly into the appropriate sample-transport containers (see Table 3), in the following manner.

1. Carry sample-collection containers to the R1 site in a cooler.
2. Once at the site and immediately prior to collecting samples, put on vinyl gloves, and remove the first sample-transport container to be filled.
3. Wade into receiving water at the appropriate location, and move upstream several meters, being careful to minimize the disturbance of bottom sediments.
4. While facing upstream, submerge the sample bottle below the water surface immediately upstream of your position with the cap still on the bottle. Take care to submerge the bottle in a portion of the creek where sediments have not been disturbed.
5. Rub the bottle to remove any dust that may be present. This additional step is important to prevent having dust on the outside of the sample bottle (which may contain contaminants) from being pulled into the bottle during filling. This is not necessary for Frontier Geosciences bottles, which are clean both inside and outside.
6. Remove the bottle cap under water after waiting 5-10 seconds, allow the bottle to fill, and replace the cap while the bottle is still under water.
7. Fill bottles containing preservative by dipping one of the bottles without preservative into the receiving water, and transferring the creek water into the bottle containing preservative. Overflow the VOA vials to make sure all air is removed.
8. Label the bottle, as appropriate, and place it into the cooler.
9. Repeat these steps for all other creek samples to be collected.

Under high-flow events, when personnel cannot safely wade into the creek, follow the same protocol from the shoreline.

All creek samples will be placed into the same cooler containing the effluent samples and equipment/blanks, along with blue ice and a completed chain-of-custody form(s), and the cooler(s) delivered to the appropriate laboratory as described in Section 8.3.

8 QUALITY CONTROL PROCEDURES

8.1 SAMPLING EQUIPMENT DECONTAMINATION PROCEDURES

Frontier Geosciences will decontaminate the sampling tubing that will be used to collect all but the dioxins and furans samples according to standard operating procedures developed by Frontier Geosciences (Appendix C). These procedures also will be used to decontaminate the 2.5-L, glass sample-collection container. Alta Analytical will decontaminate a separate set of tubing and a 4-L amber glass container that will be used to collect the effluent composite for dioxins and furans analysis according to the procedures in Appendix E.

Clean sample-transport containers will be provided by Frontier Geosciences, CLS, and Alta Analytical.

8.2 SAMPLE LOGGING AND FIELD STORAGE

As samples are collected, field notes pertaining to the collection process will be recorded (Appendix F). The information contained in the field notes will include, but is not limited to, date and time of sample collection, initials of individuals assisting in the collection and delivery of samples, observations of effluent and receiving water flow and appearance, weather, and comments related to any significant deviations from the protocols defined in this QAPP. All samples will be maintained on ice in coolers throughout the sample collection period.

8.3 SAMPLE TRANSPORT AND CHAIN-OF-CUSTODY PROCEDURES

Following the completion of a field-sampling event, sampling personnel will prepare samples to be analyzed by CLS for pick-up, and prepare the trace metals and mercury samples for overnight shipment. Trace metals samples will be shipped to Frontier Geosciences (414 Pontius North, Seattle, WA 98109 [(206) 622-6960]). Specific sample-shipping procedures are described below.

1. The shipping container(s) will be clearly labeled with sufficient information (company name, site of collection, time and date container was sealed) to enable positive identification by laboratory personnel.
2. Individual sample containers will be packed in bubble wrap or other material to prevent breakage and transported in a sealed cooler containing blue ice.
3. A chain-of-custody form (Appendix G) will be placed inside the cooler, in a sealed plastic bag (e.g., Ziploc).

Sampling personnel will deliver dioxins and furans samples to Alta Analytical (5070 Robert J. Matthews Parkway, El Dorado Hills, CA [(916) 933-1640]). Samples delivered to Alta Analytical will be transported from the collection site in a cooler containing blue ice, accompanied by the appropriate chain-of-custody form (Appendix G). Upon transfer of sample

possession, the chain-of-custody forms will be signed by sampling personnel and the laboratory personnel receiving the samples.

Upon receipt of samples by analytical laboratory staff, the condition of the samples will be recorded. It will be assumed that samples were received in good condition unless otherwise noted in the report issued by the laboratory performing the analyses.

8.4 INTERNAL QUALITY CONTROL CHECKS

This section of the QAPP describes all internal QC checks that will be associated with the collection of field samples. The QC procedures specified follow from the QA objectives stated in Section 5 of this plan. Thus, Section 5 specifies the requirements, while Section 8.4 describes how these specifications will be met (USEPA 1991).

8.4.1 QC Checks on Effluent Sampling Procedures

Because the potential for contamination of trace metal samples during collection is high, an equipment blank will be collected and analyzed for trace metals during each monthly sampling event (Table 4). This equipment blank will be kept refrigerated while the effluent sample is being collected, then shipped in the same cooler with the effluent sample to Frontier Geosciences. Results of effluent sample analyses can then be corrected, if necessary, based on trace metal concentrations detected in the equipment blank.

Because the potential for contamination during collection, albeit low, does exist for many of the other contaminants being monitored, a minimum of one equipment blank will be analyzed during the project for most constituent analyses (Table 4). Because the contamination potential for asbestos, anions, TDS, hardness, foaming agents, sulfide, or sulfite samples is minimal, no equipment blank will be collected or analyzed. Because the volatile organics samples (i.e. EPA Methods 502.2, 504, 8260B, and 8316) will be collected directly into clean sample containers using clean sampling techniques, equipment blanks will not be collected for these constituents. However, travel blanks will be prepared by CLS and analyzed during the first month that these contaminants are monitored in the effluent. If the travel blanks show no detectable levels of the 502.2, 504, 8260, and 8316 constituents, thereby confirming that contamination is not being introduced by sample handling in the field or sample transport, the use and analysis of travel blanks may be discontinued thereafter (Table 4).

Table 4. Quality control checks for effluent sampling procedures.

Contaminant Group	QC Type & Frequency	Acceptance Criteria/Use of Blank	Corrective Action/Action
Trace Metals and Mercury	<ul style="list-style-type: none"> Equipment blank All sampling events 	Minimal to no detectable levels in blank	<ul style="list-style-type: none"> Effluent results corrected from blank results Identify and eliminate contamination source, if possible
EPA Methods 335.2, 547, 548.1, 549.1, 610, 632, 8081A, 8082, 8141A, 8151A, 8270C, Tributyltin	<ul style="list-style-type: none"> Equipment blank Once during project, preferably during first sampling event. 	No detectable concentration of any constituents in blank	<ul style="list-style-type: none"> Effluent results corrected from blank Identify and eliminate contamination source
EPA Methods 502.2, 504, 8260B, and 8316	<ul style="list-style-type: none"> Travel blank Once during project, preferably during first sampling event. 	No detectable concentration of any constituents in blank	<ul style="list-style-type: none"> Effluent results corrected from blank Identify and eliminate contamination source
Dioxin/Furans	<ul style="list-style-type: none"> Equipment blank Collected during each sampling event 	No analysis required if no detectable concentration found in <i>effluent</i> sample	<ul style="list-style-type: none"> Analyze blank to confirm effluent findings, if necessary
Ammonia Anions (Cl, F, NO ₂ , NO ₃ , SO ₄) Asbestos Foaming Agents (MBAS) Hardness pH Specific conductance (EC) Sulfide Sulfite TDS	<ul style="list-style-type: none"> N/A 	N/A	<ul style="list-style-type: none"> N/A

Alta Analytical will store the equipment blanks collected for dioxin and furan analyses. These blanks will only be analyzed in the event that detectable levels of dioxins and/or furans are determined to exist in the effluent samples. If detectable levels of one or more of these compounds are found in the effluent, analysis of the equipment blank will aid in determining whether the detected compounds truly exist in the effluent or whether they were introduced into the sample during its collection and/or transport.

The QC checks described above are not meant to replace any of the QA/QC measures outlined previously, or those conducted by the analytical laboratories. Rather, they constitute an integral part of an overall QA/QC program.

8.4.2 QC Checks on Data Recording, Reduction, and Storage

Data sheet correctness, completeness, and legibility will be reviewed by Dave Thomas (RBI) prior to filing field data sheets to the permanent project files.

8.4.3 QC Checks on Analytical Procedures

The analytical laboratories will employ their own internal QA/QC measures for the work they are to perform for this project to insure the accuracy of analytical results. Because laboratory QA/QC procedures are outside the scope of this QAPP, these QA/QC measures will not be discussed here. However, RBI has contacted these laboratories regarding this issue, and has

found the QA/QC protocols to be followed by each laboratory to be acceptable for meeting the objectives of this project. Moreover, Quality Assurance Plans for each laboratory are available upon request from the laboratories directly, or from RBI.

9 ANALYTICAL PROCEDURES AND CALIBRATIONS

This section of the QAPP describes all analytical procedures used for physical measurements conducted in the field. All methods selected must be appropriate for their intended use. This section, when coupled with QC measures described in Section 8, provides enough detail to permit experienced field personnel to carry out the necessary procedures unambiguously. Requirements of this section can often be met by referencing appropriate standard methods (USEPA 1991).

During each sampling event, calibration of the automated sampler will be performed prior to the collection of effluent samples to assure that adequate volumes of effluent are collected. Electronic calibration of automated samplers will be confirmed, prior to initiation of sampling, through the manual collection of an hourly aliquot into a graduated cylinder or beaker for volumetric measurement.

10 DATA REDUCTION, VALIDATION, AND REPORTING

10.1 DATA REDUCTION

No data reduction will be needed for the field-sampling component of this project. For each of the analytical laboratories, data reduction of laboratory analytical results will be the responsibility of the individual identified in the Approval Form of this QAPP.

10.2 DATA VALIDATION

Field data that is to be summarized in project reports will be evaluated for validity, accuracy, and completeness by RBI's project manager. In addition, RBI's project manager will coordinate with analytical laboratory personnel, as needed, to assure they are able to clearly identify all individual samples, and have the information they need to appropriately process all samples. Validation of laboratory analytical results will be the responsibility of individual named in the Approval Form of this QAPP for each laboratory.

10.3 DATA REPORTING

10.3.1 Definitions

Method Detection Limit (MDL) is the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero, as defined in 40 CFR 136, Appendix B, revised as of May 14, 1999. For low-level mercury and trace metals analyses, the estimated MDL is defined as three times the standard deviation of the prep-blanks.

Minimum Level (ML) is the concentration at which the entire analytical system must give a recognizable signal and acceptable calibration point. The ML is the concentration in a sample that is equivalent to the concentration of the lowest calibration standard analyzed by a specific analytical procedure, assuming that all the method specified sample weights, volumes, and processing steps have been followed. The ML represents the lowest quantifiable concentration in a sample based on proper application of all method-based analytical procedures and the absence of any matrix interferences. For low-level mercury and trace metals analyses, the ML is defined as 3-5 times the estimated MDL.

Criterion Quantitation Limit (CQL) is to be equal to or lower than the ML specified in the SIP.

Reporting Limit (RL) is the lowest quantifiable concentration that the laboratory can determine. Ideally, the reporting limit should be equal to or lower than the CQL.

Estimated Concentration is the estimated chemical concentration that results from the confirmed detection of the substance by the analytical method below the reported ML value.

10.3.2 Laboratory Reporting Protocols

The laboratories shall report the results of analytical determinations for the presence of chemical constituents in a sample using the following reporting:

1. Sample results greater than or equal to the RL shall be reported as measured by the laboratory (i.e., the measured chemical concentration in the sample).
2. Sample results less than the RL, but greater than or equal to the laboratory's MDL, shall be reported as "Detected, but Not Quantified," or DNQ. The estimated concentration of the sample shall also be reported.
3. For purposes of data collection, the laboratory shall write the estimated chemical concentration next to DNQ as well as the words "Estimated Concentration" (may be shortened to "Est. Conc."). The laboratory, if such information is available, may include numerical estimates of the data quality for the reported result. Numerical estimates of data quality may be percent accuracy (\pm a percentage of the reported value), numerical ranges (low to high), or any other means considered appropriate by the laboratory.
4. Sample results less than the laboratory's MDL shall be reported as "Not Detected" or ND.

10.3.3 Project Reporting

A final report disclosing analytical results for the 12 months of sampling will be prepared by RBI. This project report will include, but not be limited to, the following:

- brief introduction;
- description of any sampling event(s) for which substantial deviation(s) from the protocols identified in this QAPP were required, the justification for deviations, and identification of any limitations the procedural deviations may impart on data quality or inferences which can be drawn from the data generated;
- summary of contaminant concentrations determined by the analytical laboratories for each sample collected; and
- conclusions/recommendations.

The report shall have the following constituent information:

1. Name of constituent
2. Sampling location
3. Date the sample was collected.
4. Time the sample was collected.
5. Date the sample was analyzed. For organic analyses, the extraction date will also be indicated to assure that the hold times are not exceeded for prepared samples.
6. Analytical method utilized.
7. Measured or estimated concentration.
8. Required criterion quantitation limit (CQL).

9. Laboratory's method detection limit.
10. Laboratory's lowest reporting limit (RL)
11. Any additional comments.

The Project Managers for RBI and the District will be responsible for forwarding the final project report to the RWQCB by or before March 1, 2003.

11 CORRECTIVE ACTION

The corrective action plan must include predetermined acceptance limits, the corrective action to be initiated whenever such limits are not met, and the names of the individuals responsible for implementing necessary corrective actions. Routine QC procedures already identified in Section 8 of this plan need not be repeated here. This section is primarily devoted to "non-routine" corrective action not described elsewhere. Non-routine corrective action may result from unforeseen logistical constraints/problems with these sampling procedures as identified in this QAPP.

Dr. Bryan, the Quality Assurance Manager, will be responsible for assessing whether the DQOs identified in the QAPP were met, and for implementing corrective actions, as necessary, to achieve these project objectives. In the event that unforeseen logistical constraints arise while sampling in the field, Dr. Bryan will be responsible for supervising: 1) deviations from procedures identified in this QAPP to solve the problem; and 2) documentation (in the field notes) of problem and the corrective action taken. If any significant modifications to procedures identified in this QAPP are required, such modifications will be clearly communicated to all individuals identified in the Approval Form and addressed in the final project report.

12 REFERENCES

- California Department of Water Resources. 1997. Quality Assurance Technical Document 3: Compilation of Federal and State Drinking Water Standards and Criteria. State of California, The Resources Agency, Department of Water Resources, Division of Local Assistance. June 1997.
- Central Valley Regional Water Quality Control Board. 2000. A Compilation of Water Quality Goals. Staff Report of the California Regional Water Quality Control Board, Central Valley Region. August 2000.
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- SWRI 1999. Phase II Effluent and Receiving Water Quality Assessment for the El Dorado Irrigation District's Deer Creek Wastewater Treatment Plant. Prepared for the Central Valley Regional Water Quality Control Board. February 12, 1999.
- U.S. Environmental Protection Agency. 2000. Federal Register, Vol. 65, No. 97 (Thursday, May 18, 2000), pp. 31682-31719.
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- U.S. Environmental Protection Agency. 1991. Preparation Aids for the Development of Category III Quality Assurance Project Plans. Office of Research and Development, Risk Reduction Engineering Laboratory, Cincinnati, Ohio. PB91-211920.

**APPENDIX A: RWQCB Letters Dated September 10, 2001, December 27, 2001, and
January 25, 2002**

TO BE PROVIDED IN FINAL COPY

**APPENDIX B: Constituents Previously Monitored Meeting the RWQCB's Water
Code Section 13267 Letter Requirements**

Constituents listed in this appendix are constituents monitored in 1997 and 1998 with reporting limits and monitoring frequencies meeting or exceeding the RWQCB's Water Code 13267 letter requirements.

CTR/ NTR #	Constituent	Analytical Method	13267 Letter Sampling Frequency	1999 ERWQA Sampling Frequency	Number of Samples Collected	Reporting Limit Range	13267 Letter Criterion Quantitation Limit
14	Cyanide	335.2	Monthly	Monthly	12	5	5
	Acenaphthylene	610	Quarterly	Monthly	12	10	10
58	Anthracene	610	Quarterly	Monthly	12	10	10
62	Benzo (b) fluoranthene	610	Quarterly	Monthly	12	10	10
86	Fluoranthene	610	Quarterly	Monthly	12	10	10
87	Fluorene	610	Quarterly	Monthly	12	10	10
100	Pyrene	610	Quarterly	Monthly	12	10	10
16	2,3,7,8-TCDD	1613	Semi-annually	Semi-annually	2		0.000005
	1,2,3,7,8-PeCDD	1613	Semi-annually	Semi-annually	2		0.000005
	1,2,3,4,7,8-HxCDD	1613	Semi-annually	Semi-annually	2		0.000005
	1,2,3,6,7,8-HxCDD	1613	Semi-annually	Semi-annually	2		0.000005
	1,2,3,7,8,9-HxCDD	1613	Semi-annually	Semi-annually	2		0.000005
	1,2,3,4,6,7,8-HpCDD	1613	Semi-annually	Semi-annually	2		0.000005
	OCDD	1613	Semi-annually	Semi-annually	2		0.000005
	2,3,7,8-TCDF	1613	Semi-annually	Semi-annually	2		0.000005
	1,2,3,7,8-PeCDF	1613	Semi-annually	Semi-annually	2		0.000005
	2,3,4,7,8-PeCDF	1613	Semi-annually	Semi-annually	2		0.000005
	1,2,3,4,7,8-HxCDF	1613	Semi-annually	Semi-annually	2		0.000005
	1,2,3,6,7,8-HxCDF	1613	Semi-annually	Semi-annually	2		0.000005
	2,3,4,6,7,8-HxCDF	1613	Semi-annually	Semi-annually	2		0.000005
	1,2,3,7,8,9-HxCDF	1613	Semi-annually	Semi-annually	2		0.000005
	1,2,3,4,6,7,8-HpCDF	1613	Semi-annually	Semi-annually	2		0.000005
	1,2,3,4,7,8,9-HpCDF	1613	Semi-annually	Semi-annually	2		0.000005
	OCDF	1613	Semi-annually	Semi-annually	2		0.000005
119	Aroclor 1016	8082	Quarterly	Monthly	12	0.2-0.5	0.5
120	Aroclor 1221	8082	Quarterly	Monthly	12	0.2-0.5	0.5
121	Aroclor 1232	8082	Quarterly	Monthly	12	0.2-0.5	0.5
122	Aroclor 1242	8082	Quarterly	Monthly	12	0.2-0.5	0.5
123	Aroclor 1248	8082	Quarterly	Monthly	12	0.2-0.5	0.5
124	Aroclor 1254	8082	Quarterly	Monthly	12	0.2-0.5	0.5
125	Aroclor 1260	8082	Quarterly	Monthly	12	0.2-0.5	0.5
	Methoxychlor	8081A	Quarterly	Monthly	12	0.2-0.5	10
114	Endosulfan sulfate	8081A	Quarterly	Monthly	12	0.05-0.1	0.05
41	1,1,1-Trichloroethane	8260B	Monthly	Monthly	12	0.5	2
37	1,1,2,2-Tetrachloroethane	8260B	Monthly	Monthly	12	0.5	0.5
42	1,1,2-Trichloroethane	8260B	Monthly	Monthly	12	0.5	0.5
30	1,1-Dichloroethene	8260B	Monthly	Monthly	12	0.5	1
75	1,2-Dichlorobenzene	8260B	Monthly	Monthly	12	0.5	2
29	1,2-Dichloroethane	8260B	Monthly	Monthly	12	0.5	0.5
76	1,3-Dichlorobenzene	8260B	Monthly	Monthly	12	0.5	0.5
32	1,3-Dichloropropene	8260B	Monthly	Monthly	12	0.5	0.5
77	1,4-Dichlorobenzene	8260B	Monthly	Monthly	12	0.5	2
19	Benzene	8260B	Monthly	Monthly	12	0.3	0.5
27	Bromodichloromethane	8260B	Monthly	Monthly	12	0.5	0.5
20	Bromoform	8260B	Monthly	Monthly	12	0.5	2

El Dorado Irrigation District
Deer Creek Wastewater Treatment Plant

CTR/ NTR #	Constituent	Analytical Method	13267 Letter Sampling Frequency	1999 ERWQA Sampling Frequency	Number of Samples Collected	Reporting Limit Range	13267 Letter Criterion Quantitation Limit
34	Bromomethane	8260B	Monthly	Monthly	12	0.5	2
21	Carbon Tetrachloride	8260B	Monthly	Monthly	12	0.5	0.5
22	Chlorobenzene	8260B	Monthly	Monthly	12	0.5	2
26	Chloroform	8260B	Monthly	Monthly	12	0.5	0.5
35	Chloromethane	8260B	Monthly	Monthly	12	0.5	2
23	Dibromochloromethane	8260B	Monthly	Monthly	12	0.5	0.5
36	Dichloromethane	8260B	Monthly	Monthly	12	0.5	2
33	Ethylbenzene	8260B	Monthly	Monthly	12	0.3	2
94	Naphthalene	8260B	Quarterly	Monthly	12	10	10
38	Tetrachloroethene	8260B	Monthly	Monthly	12	0.5	0.5
39	Toluene	8260B	Monthly	Monthly	12	0.3	2
43	Trichloroethene	8260B	Monthly	Monthly	12	0.5	2
44	Vinyl Chloride	8260B	Monthly	Monthly	12	0.5	0.5
55	2,4,6-Trichlorophenol	8270C	Quarterly	Monthly	12	10	10
50	2-Nitrophenol	8270C	Quarterly	Monthly	12	10	10
69	4-Bromophenyl phenyl ether	8270C	Quarterly	Monthly	12	10	10
67	Bis (2-chloroisopropyl) ether	8270C	Quarterly	Monthly	12	10	10
70	Butyl benzyl phthalate	8270C	Quarterly	Monthly	12	5-10	10
81	Di-n-butyl phthalate	8270C	Quarterly	Monthly	12	5-10	10
84	Di-n-octyl phthalate	8270C	Quarterly	Monthly	12	5-10	10
95	Nitrobenzene	8270C	Quarterly	Monthly	12	10	10
81	Di-n-butyl phthalate	8270C	Quarterly	Monthly	12	5-10	10
84	Di-n-octyl phthalate	8270C	Quarterly	Monthly	12	5-10	10
8	Mercury	CVAFS	Monthly	Monthly	12	0.00003- 0.00015	0.0006
	Aluminum	ICP/MS	Monthly	Monthly	10	0.05-59	50
1	Antimony	ICP/MS	Monthly	Monthly	12	0.0006- 0.024	5
2	Arsenic	ICP/MS	Monthly	Monthly	12	0.02-0.39	1
4	Cadmium	ICP/MS	Monthly	Monthly	12	0.001- 0.014	0.25
5	Chromium	ICP/MS	Monthly	Monthly	12	0.01-0.19	5
6	Copper	ICP/MS	Monthly	Monthly	17	0.007-0.18	0.5
7	Lead	ICP/MS	Monthly	Monthly	12	0.001-0.06	0.5
9	Nickel	ICP/MS	Monthly	Monthly	12	0.01-0.08	5
10	Selenium	ICP/MS	Monthly	Monthly	12	0.03-0.99	5
11	Silver	ICP/MS	Monthly	Monthly	12	0.0008- 0.12	1
12	Thallium	ICP/MS	Monthly	Monthly	12	0.0002- 0.10	1
13	Zinc	ICP/MS	Monthly	Monthly	12	0.01-0.16	10

**APPENDIX C: Procedure Followed to Decontaminate the Composite Sampler Tubing
and the 2.5-L Glass Sample-Collection Container**

2.5 L Borosilicate Glass Bottles: New bottles are cleaned by heating to 65-75°C in 30% HCL for at least 48 hours. Next, the bottles are rinsed 3 times with reagent water and filled with 0.1% HCL. These bottles are capped tightly and placed in a clean oven at 60-70°C overnight. After cooling, they are rinsed three more times and placed in a class-100 clean air station until dry. The bottles are then tightly capped and double bagged in new polyethylene zipper bags until needed. A random selection (5%) of all newly cleaned bottles should be tested for mercury contamination before using. This is done by filling with 1% (v/v) 0.2 N BrCl and allowing to sit overnight. The solution is then analyzed for total mercury. Ninety-five percent of the bottles tested must show total mercury levels of less than 1 ng/L; otherwise, the batch of newly cleaned bottles is not cleared for use and must be re-cleaned.

New Tubing. New Teflon tubing is cleaned by heating it in a vat of 30% HCL for at least eight hours. New Silastic, Bev-a-line, and Masterflex tubing is cleaned by submersion in a vat of 30% HCL for a minimum of eight hours. Tubing over five feet in length is filled with the aid of Masterflex L/S peristaltic pump. Shorter lengths can be gravity filled. Tubing is then rinsed copiously with reagent water until the pH paper shows that water both coming out of the tubing and on the surface of the tubing is neutral. The tubing is then drained and placed in a class 100 clean air station to dry. Once dry, the tubing is double-bagged in clean polyethylene zipper bags, and stored in clean cabinets until needed.

The above was provided by Frontier Geosciences, February 2002.

APPENDIX D: Procedure Followed to Decontaminate the 10-L Glass Bottle Used for All Analyses Conducted by CLS

Standard procedure used by CLS to decontaminate the 9.5-L glass sample-collection container prior to use each month to collect a composite effluent sample for asbestos, cyanide, and organics analyses.

- 1) wash with Alconox or equivalent detergent;
- 2) triple rinse with deionized, organic-free water;
- 3) triple rinse with hexane;
- 4) triple rinse with deionized, organic-free water;
- 5) allow cleaned container to air-dry; and
- 6) place cleaned cap on container.

**APPENDIX E: Procedure Followed to Decontaminate the Composite Sampler Tubing
and the 4-L Amber Glass Bottle Used for Dioxin and Furan Sample
Collection**

Standard procedure used by Alta Analytical to decontaminate the composite sampler tubing and 4-L glass sample-collection container prior to its use for collecting a composite effluent sample for dioxin and furan analyses.

Sample-collection container:

- 1) wash with Alconox or equivalent detergent and rinse with deionized water;
- 2) rinse with acetone;
- 3) rinse with toluene;
- 4) rinse with hexane;
- 5) rinse with methylene chloride;
- 6) allow container to air-dry; and
- 7) place cover over top of container.

Tubing:

- 1) wash with Alconox or equivalent detergent and rinse with deionized water;
- 2) rinse with acetone;
- 3) allow tubing to air-dry; and
- 4) place tubing in a clean plastic bag.

APPENDIX F: Sample Field Sampling Data Sheet

Sampling Personnel: _____

Location: _____

Sample Location		Type
		Effluent
		Creek
		Blank
		Grab
		Composite
		Trace Metals and Mercury
		Tributyltin
		Asbestos
		EC
		Hardness
		pH
		Anions (Cl, F, NO ₂ , NO ₃ , SO ₄)
		TDS
		MBAS
		Cyanide
		Ammonia
		Total Phosphorus
		Sulfide
		Chromium VI
		Method 1613B - Dioxins and Furans
		Sulfite
		Method 502.2 - Chloroethyl vinyl ether
		Method 504 - Ethylene dibromide and DBCP
		EPA 506 - Di(2-ethylhexyl)adipate
		Method 8260B - Volatile Organics
		Method 8316 - Acrolein and Acrylonitrile
		Method 547 - Glyphosate
		Method 548.1 - Endrin/Heptachlor Epoxide
		Method 549.1 - Diquat
		Method 610 - PAHs

Activities: (set up composite sampler, delivered samples, etc.) _____

Weather: (Wind, temperature, etc.) _____

Creek Observations: (Flow level, color, etc.)

Comments/Deviations from QAPP Protocols:

APPENDIX G: Analytical Laboratory Chain-of-Custody Forms

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