SANTA SUSANA FIELD LABORATORY
SURFACE WATER SAMPLING PROGRAM
LABORATORY MDLs, REPORTING LIMITS, STATE MINIMUM LEVELS, AND PERMIT LIMITS COMPARISON
ANNUAL UPDATE

March 1, 2007

Analyte	Laboratory MDL	Laboratory RL	SWRCB ML GCMS (ug/L)	Laboratory vs ML(1)	Monthly Ave. Permit Limit Dis. 001, 002, 011, 018	Daily Max Permit Limit Dis. 001, 002, 011, 018	Permit Limit Dis. 003-010	30- Day Permit Limit Dis. 012-014	Daily Max Permit Limit Dis. 012-014	30- Day Permit Limit Dis. 015-017	7-Day Permit Limit Dis. 015-017	Daily Max Permit Limit Dis. 015-017
624 - Low-level					**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
1,1,1-Trichloroethane	0.30	1	2									
1,1,2,2-Tetrachloroethane	0.24	1	1									
1,1,2-Trichloroethane	0.30	1	2									
1,1-Dichloroethane	0.27	1	1									
1,1-Dichloroethene	0.42	1	2		3.2	6.0						
1,2-Dichlorobenzene	0.32	1	2									
1,2-Dichloroethane	0.28	0.5	2									
1,2-Dichloropropane	0.35	1	1									
1,3-Dichlorobenzene	0.35	2	2									
1,3-Dichloropropene (reported as cis & trans)	0.32	0.5	2									
1,4-Dichlorobenzene	0.37	1.0	2									
Benzene	0.28	0.5	2									
Bromodichloromethane	0.30	1.0	2									
Bromoform	0.40	1.0	2									
Bromomethane	0.42	1.0	2									
Carbon tetrachloride	0.28	0.5	2									
Chlorobenzene	0.36	1.0	2									
Chloroethane	0.40	1.0	2									
Chloroform	0.33	1.0	2									
Chloromethane	0.40	1.0	2									
Dibromochloromethane	0.28	1.0	2									
Ethylbenzene	0.25	0.5	2									
Methylene chloride	0.95	5.0	2	MDL<ML<RL								
Tetrachloroethene	0.32	1.0	2									
Toluene	0.36	0.5	2									
trans-1,2-Dichloroethene	0.27	1.0	1									
Trichloroethene	0.26	1.0	2		--	5.0						
Vinyl chloride	0.30	0.5	2									
1,2,3-Trichloropropane	0.40	1.0	na									
1,2-Dibromoethane (EDB)	0.40	1.0	na					50				
m,p-Xylenes	0.60	1.0	na									
Naphthalene	0.41	1.0	na					21				
o-Xylene	0.30	0.5	na									
Trichlorofluoromethane	0.34	1.0	na									
VOC - Add-ons	**8260/624**	**8260/624**	**SWRCB**									
	MDL	**RL**	**Attach B**									
	ug/L	**ug/L**	**GCMS ML**		**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
1,1,2-Trichloro-1,2,2-Trifluoromethane (Freon 113)	1.5	5	na									
1,2-Dichloro-1,1,2-Trichloroethane (Freon 123a)	na	2.5	na									
Cyclohexane (TIC)	na	2.5	na									

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Oxygenates	**8260/624**	**8260/624**	**SWRCB**									
	MDL	**RL**	**Attach B**									
	ug/L	**ug/L**	**GCMS ML**		**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
Di-isopropyl Ether (DIPE)	0.25	5.0	na									
Ethyl tert-Butyl Ether (ETBE)	0.28	5.0	na									
Methyl-tert-butyl Ether (MTBE)	0.32	1.0	na									
tert-Amyl Methyl Ether (TAME)	0.33	5.0	na									
tert-Butanol (TBA)	4.9	25	na					12				
	8260/624	**8260/624**	**SWRCB**									
	MDL	**RL**	**ML**									
624/8260B A-A+2CVE LOW	**ug/L**	**ug/L**	**GCMS (ug/L)**		**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
Acrolein	1.3	5	5									
Acrylonitrile	0.7	2	2									
2-Chloroethylvinylether	1.8	5	1	ML< MDL								
			SWRCB									
625+NDMA+Hydrazine Low-level	**MDL**	**RL**	**ML**									
	ug/L	**ug/L**	**GC/MS (ug/L)**		**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
1,2,4-Trichlorobenzene	0.1	1	5									
1,2-Dichlorobenzene	0.1	0.5	2									
1,2-Diphenylhydrazine/Azobenzene	0.1	1	1									
1,3-Dichlorobenzene	0.1	0.5	1									
1,4-Dichlorobenzene	0.2	0.5	1									
2,4,6-Trichlorophenol	0.1	1	10		6.5	13.0						
2,4-Dichlorophenol	0.2	2	5									
2,4-Dimethylphenol	0.3	2	2									
2,4-Dinitrophenol	0.9	5	5									
2,4-Dinitrotoluene	0.2	5	5		9.1	18.3						
2,6-Dinitrotoluene	0.2	5	5									
2-Chloronaphthalene	0.1	0.5	10									
2-Chlorophenol	0.2	1	5									
2-Nitrophenol	0.1	2	10									
3,3-Dichlorobenzidine	0.4	5	5									
4,6-Dinitro-2-methylphenol	0.2	5	5									
4-Bromophenyl phenyl ether	0.1	1	5									
4-Chloro-3-methylphenol	0.2	2	1	MDL<ML<RL								
4-Chlorophenyl phenyl ether	0.1	0.5	5									
4-Nitrophenol	2.5	5	10									
Acenaphthene	0.1	0.5	1									
Acenaphthylene	0.1	0.5	10									
Anthracene	0.1	0.5	10									
Benzidine	1	5	5									
Benzo(a)anthracene	0.1	5	5									
Benzo(a)pyrene	0.1	2	10									
Benzo(b)fluoranthene	0.1	2	10									
Benzo(g,h,i)perylene	0.1	5	5									
Benzo(k)fluoranthene	0.1	0.5	10									

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Bis(2-chloroethoxy)methane	0.1	0.5	5									
Bis(2-chloroethyl)ether	0.1	0.5	1									
Bis(2-chloroisopropyl)ether	0.1	0.5	2									
Bis(2-ethylhexyl)phthalate	1.7	5	5		--	Permit (4)<ML						
Butyl benzyl phthalate	0.7	5	10									
Chrysene	0.1	0.5	10									
Dibenz(a,h)anthracene	0.1	0.5	10									
Diethyl phthalate	0.1	1	2									
Dimethyl phthalate	0.1	0.5	2									
Di-n-butyl phthalate	0.2	2	10									
Di-n-octyl phthalate	0.1	5	10									
Fluoranthene	0.1	0.5	1									
Fluorene	0.1	0.5	10									
Hexachlorobenzene	0.1	1	1									
Hexachlorobutadiene	0.2	2	1	MDL<ML<RL								
Hexachlorocyclopentadiene	0.1	5	5									
Hexachloroethane	0.2	3	1	MDL<ML<RL								
Indeno(1,2,3-cd)pyrene	0.1	2	10									
Isophorone	0.1	1	1									
Naphthalene	0.1	1	1									
Nitrobenzene	0.1	1	1									
n-Nitrosodimethylamine	0.1	2	5		8.1	16.3						
n-Nitroso-di-n-propylamine	0.1	2	5									
n-Nitrosodiphenylamine	0.1	1	1									
Pentachlorophenol	0.1	2	5		8.2	16.5						
Phenanthrene	0.1	0.5	5									
Phenol	0.3	1	1									
Pyrene	0.1	0.5	10									
		DMA	**SWRCB**									
PCB, LL in Water (EPA 608)	**MDL**	**RL**	**ML**									
	ug/L	**ug/L**	**ug/L**		**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
Aroclor 1016	0.35	0.5	0.5									
Aroclor 1221	0.1	0.5	0.5									
Aroclor 1232	0.25	0.5	0.5									
Aroclor 1242	0.25	0.5	0.5									
Aroclor 1248	0.25	0.5	0.5									
Aroclor 1254	0.25	0.5	0.5									
Aroclor 1260	0.3	0.5	0.5									
		DMA	**SWRCB**									
Pesticides in Water, Low Level (EPA 608)	**MDL**	**RL**	**ML**									
	ug/L	**ug/L**	**ug/L**		**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
Aldrin	0.0015	0.005	0.005									
alpha-BHC	0.0025	0.01	0.01		0.01	0.03						
beta-BHC	0.004	0.01	0.005	MDL<ML<RL								
delta-BHC	0.0035	0.005	0.005									
gamma-BHC (Lindane)	0.003	0.01	0.02									

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Chlordane	0.030	0.1	0.1									
4,4'-DDD	0.002	0.005	0.05									
4,4'-DDE	0.003	0.005	0.05									
4,4'-DDT	0.004	0.01	0.01									
Dieldrin	0.002	0.005	0.01									
Endosulfan I	0.002	0.005	0.02									
Endosulfan II	0.003	0.005	0.01									
Endosulfan sulfate	0.003	0.01	0.05									
Endrin	0.002	0.005	0.01									
Endrin aldehyde	0.002	0.01	0.01									
Heptachlor	0.003	0.01	0.01									
Heptachlor epoxide	0.0025	0.005	0.01									
Toxaphene	0.070	0.1	0.5									
		DMA	**SWRCB**									
	MDL	**RL**	**ML**									
ICP/MS 200.8	**ug/L**	**ug/L**	**ug/L**		**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
Antimony	0.05	1	0.5	MDL<ML<RL	--	6.0	6.0					
Arsenic	0.70	1	2		--	10						
Beryllium	0.075	0.5	0.5		--	4.0						
Cadmium (Low Level test code)	0.050	0.2	0.25		2.0	3.1/4.0	4.0		3.1	2		4
Chromium	0.70	2	0.5	ML<MDL	see Cr VI	see Cr VI						50
Copper	0.40	1	0.5	MDL<ML<RL	7.1	14.0	14.0	6.7	13.5	16.7		13.5
Lead	0.10	1	0.5	MDL<ML<RL	2.6	5.2	5.2	2.6	5.2			19/62
Manganese	0.50	1	n/a			50						
Nickel	0.90	1	1		35	96				43		86
Selenium	0.30	2	2		4.1	8.2	5 (outfall 008)		5			5
Silver	0.10	1	0.25	MDL<ML<RL	2.0	4.1						
Thallium	0.15	1	1		--	2.0	2.0					
Zinc	2.5	5	1	ML<MDL	54	119	159 (outfall 008)		159	61		123
		DMA	**SWRCB**									
	MDL	**RL**	**ML**									
ICP 200.7	**ug/L**	**ug/L**	**ug/L**		**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
Antimony	7	RL (10)>permit	50		--	6.0	6.0					
Arsenic	7	10	10		--	10						
Beryllium	0.9	2	2		--	4.0						
Cadmium	2	RL (5)>permit	10		2.0	4.0	4.0			2		4
Chromium	2	5	10		see Cr VI	see Cr VI						50
Copper	3	RL (10)>permit	10		7.1	14.0	14.0	6.7	13.5	6.7		13.5
Lead	3	RL (5)>permit	5		2.6	5.2	5.2	2.6	5.2			
Nickel	2	10	20		35	96				43		86
Selenium	8	RL (10)>permit	10		4.1	8.2						
Silver	6	RL (10)>permit	10		2.0	4.1						
Thallium	7	RL (10)>permit	10		--	2.0	2.0					
Zinc	4	20	20		54	119				61		123

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		DMA	SWRCB									
	MDL	RL	ML									
ICP 200.7	mg/L	mg/L	mg/L		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Boron	0.020	0.05	na				1		1			1
Iron	0.015	0.04	na			0.3						
Barium	0.006	0.01	na			1.0						1
			SWRCB									
	MDL	RL	ML									
Mercury	ug/L	ug/L	ug/L		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
245.1	0.15	0.2	0.2		Permit (.05)<ML	Permit (.1)<ML	Permit (.13)<ML	Permit (.05)<ML	Permit (.1)<ML	Permit (.05)<ML		Permit (.1)<ML
		DMA	SWRCB									
	MDL	RL	ML									
Chromium VI	ug/L	ug/L	ug/L		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
218.6/7199	0.20	1	10		Permit (8.1)<ML	16.3						
		DMA	SWRCB									
	MDL	RL	ML									
	ug/L	ug/L	ug/L		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Cyanide by EPA 335.2	2.2	RL (5)>permit	5		Permit (4.3)<ML	8.5						
		DMA	SWRCB									
	MDL	RL	Attach B									
8260B-Mod	ug/L	ug/L	ML		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
1,4-Dioxane	1.0	2	na						3			
		DMA	SWRCB									
	MDL	RL	Attach B									
8015-Mod	ug/L	ug/L	ML		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Volatile Fuel Hydrocarbons	25	100	na						100			
		DMA	SWRCB									
	MDL	RL	Attach B									
8015-Mod	ug/L	ug/L	ML		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Extractable Fuel Hydrocarbons	100	RL (500) >permi	na						100			
Extractable Fuel Hydrocarbons (low-Level)		100	na						100			
		DMA	SWRCB									
	MDL	RL	Attach B									
418.1	ug/L	ug/L	ML		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Total Recoverable Hydrocarbons	600	1000	na									
		DMA	SWRCB									
	MDL	RL	Attach B									
	ug/L	ug/L	ML (ug/L)		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Perchlorate by EPA 314.0	0.8	4	na		--	6.0	6.0		6.0			6.0

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			SWRCB									
			Attach B									
	ug/L	ug/L	ML (ug/L)		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
2,3,7,8, TCDD			na		1.40E-08	2.80E-08	2.80E-08	1.40E-08	2.80E-08	1.40E-08		2.80E-08
		DMA	SWRCB									
	MDL	RL	Attach B									
General Chemistry	mg/L	mg/L			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Suspended Soilids (TSS)	10	10	na		15	45		15	45	30	45	
BOD	0.59	2	na		20	30				30	45	
Conductivity (umhos/cm)	1	1	na									
Settleable Solids (ml/L)	0.1	0.1	na		0.1	0.3		0.1	0.3	0.1		0.3
Oil & Grease	1.2	5	na		10	15	15	10	15	10		15
Ammonia-N	0.3	0.5	na		1.96	10.1	10.1 (outfall 008)	1.96	10.1	1.96		10.1
Turbidity (NTU)	0.04	1	na									
Total Residual Chlorine	0.1	0.1	na			0.1						0.1
Total Organic Carbon	0.5	1	na									
Total Dissolved Solids	10	10	na			950	850 - 950		950			950
Chloride	0.11	0.5	na			150	150		150			150
Sulfate	0.15	0.5	na			300	250-300		300			300
Detergents (MBAS)	0.044	0.1	na			0.5						0.5
Nitrate + Nitrite-N	0.15	0.26	na			8	8 - 10		8			8
Nitrate-N	0.06	0.11	na			8	8 (outfall 008)		8			8
Nitrite-N	0.09	0.15	na			1	1 (outfall 008)		1			1
Fluoride	0.15	0.5	na			1.6	1.6		1.6			1.6
			SWRCB									
	MDL	RL	Attach B									
Radiochemistry	pCi/L	pCi/L	ML		pCi/L	pCi/L	pCi/L	pCi/L	pCi/L	pCi/L	pCi/L	pCi/L
Gross Alpha**	na	3	na			15	15					
Gross Beta**	na	4	na			50	50					
Radium 226 + 228**	na	1	na			5	5					
Tritium**	na	400	na			20000	20000					
Strontium 90**	na	2	na			8	8					
			SWRCB									
	MDL	RL	Attach B									
	ug/L	ug/L	ML (ug/L)		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Monomethyl hydrazine**	0.357	5	na									
			SWRCB									
	MDL	RL	Attach B									
Toxicity	% Survival	% Survival	ML		% Survival	% Survival	% Survival	% Survival	% Survival	% Survival	% Survival	% Survival
Acute Toxicity**	na	na	na			70	70		70			70
	TUc	TUc			TUc	TUc	TUc	TUc	TUc	TUc	TUc	TUc
Chronic Toxicity**	na	na	na			1.0	1.0		1.0			1.0

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			SWRCB									
	MDL	RL	Attach B									
Biological	MPN	MPN	ML		MPN	MPN	MPN	MPN	MPN	MPN	MPN	MPN
Total Coliform**	na	na	na									
Fecal Coliform**	na	na	na									

SWRCB = State Water Resources Control Board
Dis. 001-003 = Discharge locations 001, 002, and 003 (Dis. Is typically used for all locations)
** The SWRCB does not have MLs established for these analyses. As required In the NPDES Permit, a full list of MDL/RL's will be supplied to the RWQCB on an annual basis.
TBS-to be submitted to the RWQCB on an annual basis
na-not applicable
Columns are used to compare laboratory's reporting limits (RLs) and method detection limits (MDLs) to the SWRCB MLs and the permit limits
(1) This column indicates the status of analytical capabilities if the ML is < the laboratory RL or MDL.
If nothing is displayed in the cell, the RL meets the ML and the Permit Limit.
The following designations which are in the table, summarize the comparison of RLs, MDLs, MLs, and permit limits:

ML< MDL	The laboratory MDL does not meet the ML
MDL<ML<RL	The ML is less than RL, but greater than the MDL
Permit<ML	The established permit limit is less than the ML (the permit limit is in parentheses)
RL>permit	RL is greater than the permit limit


TestAmerica
ANALYTICAL TESTING CORPORATION
Quality Assurance
Manual
200 mL
±5%
150
100
50

QUALITY ASSURANCE / QUALITY CONTROL MANUAL

For

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Effective Date: January 15, 2007
(See Table of Contents for Revision Dates of Each Section)

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This manual is considered confidential within TestAmerica and may not be altered in any manner by other than a duly appointed representative from TestAmerica. If the document has been provided to external users or regulators, it is for the exclusive purpose of reviewing TestAmerica-Irvine's quality systems and shall not be used in any other way without the written permission of an appointed representative of TestAmerica.

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Section 3.0
(NELAC 5.2 and 5.3)
INTRODUCTION

3.1 INTRODUCTION AND COMPLIANCE REFERENCES

3.1.1 TestAmerica-Irvine's Quality Assurance Manual (QAM) is a document prepared to define the overall policies, organization objectives and functional responsibilities for achieving TestAmerica's data quality goals. Each TestAmerica laboratory maintains a local perspective in its scope of services and client relations and maintains a national perspective in terms of quality.

3.1.2 The QAM has been prepared to assure compliance with the 2003 National Environmental Laboratory Accreditation Conference (NELAC) standards and ISO/IEC Guide 17025 (1999). In addition, the policies and procedures outlined in this manual are compliant with the various accreditation and certification programs listed in Appendix 5.

3.1.3 The QAM has been prepared to be consistent with the requirements of the following documents:

3.1.3.1 EPA 600/4-88/039, *Methods for the Determination of Organic Compounds in Drinking Water,* EPA, Revised July 1991.

3.1.3.2 EPA 600/R-95/131, *Methods for the Determination of Organic Compounds in Drinking Water,* Supplement III, EPA, August 1995.

3.1.3.3 EPA 600/4-79-019, *Handbook for Analytical Quality Control in Water and Wastewater Laboratories,* EPA, March 1979.

3.1.3.4 EPA SW-846, *Test Methods for the Evaluation of Solid Waste, 3rd Edition,* September 1986; Update I, July 1992; Update II, September 1994; and Update III, December 1996.

3.1.3.5 Federal Register, 40 CFR Parts 136, 141, 172, 173, 178, 179 and 261,

3.1.3.6 USEPA Contract Laboratory Program. *Statement of Work for Inorganics Analysis. Multi-Media, Multi-Concentration*. Document ILM04.0.

3.1.3.7 USEPA Contract Laboratory Program. *Statement of Work for Organics Analysis. Multi-Media, Multi-Concentration.* Document Number OLMO3.1, August 1994.

3.1.3.8 APHA, *Standard Methods for the Examination of Water and Wastewater,* 18th Edition, 19th Edition and 20th Edition.

3.2 TERMS AND DEFINITIONS

3.2.1 A Quality Assurance program is a company-wide system designed to ensure that data produced by TestAmerica-Irvine conforms to the standards set by state and/or federal

regulations. The program functions at the management level through company goals and management policies, and at the analytical level through standard operating procedures and quality control.

3.2.2 See Appendix 6 for glossary and acronyms.

3.3 SCOPE / FIELDS OF TESTING

3.3.1 TestAmerica-Irvine analyzes thousands of environmental and industrial samples every month. Sample matrices vary among air, drinking water, effluent water, groundwater, hazardous waste, sludge and soils. The Quality Assurance Program contains specific procedures and methods to test samples of differing matrices for chemical, physical and biological parameters. The Program also contains guidelines on maintaining documentation of analytical process, reviewing results, servicing clients and tracking samples through the laboratory. The technical and service requirements of all requests to provide analyses are thoroughly evaluated before commitments are made to accept the work. All measurements are made using published reference methods or methods developed and validated by the laboratory.

3.3.2 The methods covered by this manual include the most frequently requested water, air, industrial waste, and soil methodologies needed to provide analytical services in the United States and its territories. The specific list of test methods used by the laboratory can be found in Appendix 4 of the QAM. The approach of this manual is to define the minimum level of quality assurance and quality control necessary to meet requirements. All methods performed by TestAmerica-Irvine shall meet these criteria as appropriate. In some instances, quality assurance project plans (QAPPs), project specific data quality objectives (DQOs) or local regulations may require criteria other than those contained in this manual. In these cases the laboratory will abide by the requested criteria following review and acceptance of the requirements by the Laboratory Director/Manager and the Quality Assurance Manager. In some cases QAPPs and DQOs may specify less stringent requirements. The Laboratory Director and the QA Manager must determine if it is in the lab's best interest to follow the less stringent requirements. The lab must ensure that it meets the method requirements or must appropriately denote the final report if modifications were made to the reported method.

3.4 MANAGEMENT OF THE MANUAL

3.4.1 Review Process.

3.4.1.1 The manual is reviewed annually by the Quality Assurance Manager and laboratory personnel to assure that it reflects current practices and meets the requirements of TestAmerica-Irvine's clients and regulators. Occasionally the manual may need changes in order to meet new or changing regulations and operation. The Quality Assurance Manager will review the changes in the normal course of business and incorporate changes into revised sections of the document. The updates will be reviewed by the Quality Assurance Manager, Laboratory Director, Technical Director, relevant operational staff and Corporate Quality Assurance (if a change is made to the Corporate template) and then formally incorporated into the document in periodic updates. The QAM is based on a Corporate QAM template that is prepared and approved by the Executive Vice Presidents (EVP) of Operations and Corporate Quality Assurance. This template is reviewed annually by the EVPs of Operations, Corporate Quality Assurance, and each laboratory. Necessary changes are coordinated by the Vice

President of Quality Assurance and distributed to each laboratory for inclusion in the laboratory specific QA Manuals.

3.4.1.2 Policies in the QAM that require immediate attention may be addressed through the use of Corporate QA/QC Policy memoranda. QA/QC Policy Memoranda are published from time to time to facilitate immediate changes to QA/QC Policy. QA/QC Policy Memoranda supersede the QAM and all other Standard Operating Procedures (see Section 5.3). All policy memoranda are dated, archived and distributed by their placement into the front of the QAM between the cover page and Section 2. At a minimum, each policy memorandum is approved by the same authorized signatories as shown on the cover page of the QA Manual. In addition, Corporate QA/QC Policy Memoranda are signed by the Executive Vice Presidents of the Eastern and Western Divisions and Corporate Quality Assurance. The QA/QC Policy memoranda are incorporated into the QAM during the periodic updates and are then removed from use. Policy memorandum may also include an expiration date if appropriate. An example format can be found in Figure 3-1. A similar procedure is followed for local laboratory changes.

3.4.1.3 Laboratory-specific QAM changes are approved and documented through the Management of Change process, described in Section 17.

3.4.2 Control

3.4.2.1 This manual is considered confidential within TestAmerica and may not be altered in any manner by other than a duly appointed representative from TestAmerica. If the document has been provided to external users or regulators, it is for the exclusive purpose of reviewing TestAmerica-Irvine's quality systems and shall not be used in any other way without the written permission of an appointed representative of TestAmerica. The procedure for control of distribution is incorporated by reference to the current revision of DOCCNTRL.SOP, "Document Control."

3.4.3 The order of precedence in the event of a conflict between policies is outlined in Section 5.3 of this QAM Manual.

Figure 3-1:

Example Format for a QA/QC Policy Memorandum

Corporate (or Laboratory) QA/QC Policy Memorandum # _____

Effective Date: _____ Expiration Date: When Appropriate QAM Section is Revised

Corporate: *(Only needed for Corporate Memorandum – Delete if Laboratory)*

_____	_____
EVP of Operations - West Date	Vice-President/Quality Assurance Date
_____	_____
EVP of Operations - East Date	Director of Quality Assurance Date

Local:

_____	_____
Technical Director Approval Date	Quality Assurance Approval Date
_____	_____
Laboratory Director/Manager Approval Date	Date

1. **Purpose**

2. **Procedure**

3. **Documentation**

4. **Attachments**

5. **References/Cross References**

Section 4.0
ORGANIZATION AND MANAGEMENT

4.1 ORGANIZATION

4.1.1 TestAmerica-Irvine is part of a national network of laboratories known as TestAmerica Analytical Testing Corp. This Quality Assurance Manual (QAM) is applicable to the TestAmerica-Irvine laboratory only.

TestAmerica-Irvine
17461 Derian Avenue, Suite 100
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EPA Laboratory Number CA01531

4.1.2 The Corporate organization chart can be found in Figure 4-1 and the laboratory's organization chart can be found in Appendix 2. The locations of other TestAmerica labs are as follows:

TestAmerica Analytical Testing Corp – Colorado Springs, CO
TestAmerica Analytical Testing Corp – Colton, CA
TestAmerica Analytical Testing Corp – Phoenix, AZ
TestAmerica Analytical Testing Corp – Buffalo Grove, IL
TestAmerica Analytical Testing Corp – King of Prussia, PA
TestAmerica Analytical Testing Corp – Anchorage, AK
TestAmerica Analytical Testing Corp – Beaverton, OR
TestAmerica Analytical Testing Corp – Bend, OR
TestAmerica Analytical Testing Corp – Bothell, WA
TestAmerica Analytical Testing Corp – Spokane, WA
TestAmerica Analytical Testing Corp – Honolulu, HI
TestAmerica Analytical Testing Corp – Morgan Hill, CA
TestAmerica Analytical Testing Corp – Sacramento, CA
TestAmerica Analytical Testing Corp – Cedar Falls, IA
TestAmerica Analytical Testing Corp – Dayton, OH
TestAmerica Analytical Testing Corp – Indianapolis, IN
TestAmerica Analytical Testing Corp – Nashville, TN
TestAmerica Analytical Testing Corp – Orlando, FL
TestAmerica Analytical Testing Corp – Pontiac, MI
TestAmerica Analytical Testing Corp – Watertown, WI

4.2 ROLES AND RESPONSIBILITIES

4.2.1 In order for the Quality Assurance program to function properly, all members of the staff must clearly understand and meet their individual responsibilities as they relate to QA/QC. The following descriptions define each role in its relationship to the Quality Assurance program. More extensive job descriptions are maintained by the laboratory's human resource department.

4.2.2 Responsibility for the Quality Assurance Program

The responsibility for quality lies with every employee of TestAmerica-Irvine. All employees have access to the QAM and are responsible for knowing the content of this manual and upholding the standards therein. Each person carries out his/her daily tasks in a manner consistent with the goals and in accordance with the procedures in this manual and the laboratory's SOPs.

4.2.3 Chief Executive Officer (CEO)

The CEO reports directly to the Board of Directors and is ultimately responsible for the quality and performance of all TestAmerica Analytical Testing Corp. operations. He establishes the overall quality standard and data integrity program for the company, providing the necessary leadership and resources to assure that the standard and integrity program are met.

4.2.4 Executive Vice-President (EVP) – Eastern Division and EVP – Western Division

The EVP serves as the ranking executive for all respective company operational functions and reports to the CEO of the corporation. There is an EVP in the Eastern Division and an EVP in the Western Division. Each EVP has full responsibility for the overall administrative and operational management of respective company operational functions. The EVPs participate with the CEO and the Board of Directors in formulating strategic direction for the company, being specifically accountable for the Laboratory Division. They ensure the attainment of corporate objectives through the selection, development, motivation, and evaluation of top management personnel. The EVP approves all operating budgets and capital expenditures and participates in the selection and approval of banking, legal, and accounting relationships.

The EVP reviews and approves the Corporate QAM template used by each laboratory to prepare a laboratory-specific QAM. The EVP is also responsible for restricting any laboratory from performing analyses that cannot be consistently and successfully performed to meet the standards set forth in this manual.

4.2.5 Director of Operations

The Director of Operations reports to the EVP-Western Division or EVP-Eastern Division and the Laboratory Directors/Managers in the specific region report to the appropriate Director of Operations. The Director of Operations is responsible for the administrative and operational management in the applicable region. The Director of Operations is responsible for restricting any laboratory from performing analyses that cannot be consistently and successfully performed to meet the standards set forth in this manual.

4.2.6 Vice-President – Quality Assurance (VP-QA)

The Vice-President of Quality Assurance reports directly to the CEO. With the aid of the EVPs, VPs, Laboratory Director/Managers, Quality Assurance Director and laboratory Quality Assurance Managers, the VP-QA has the responsibility for the establishment, general overview and Corporate maintenance of the quality assurance program within TestAmerica Analytical Testing Corp. Additional responsibilities of the VP of QA include:

4.2.6.1 Review of QA/QC aspects of corporate SOPs, national projects and expansions or changes in services.

4.2.6.2 Coordination/preparation of the corporate QAM Template that is used by each laboratory to prepare its own laboratory-specific QAM.

4.2.6.3 With the assistance of the Corporate QA Director, oversight of the QA/QC programs within each laboratory. This includes a final review of each laboratory-specific QAM and receipt of each laboratory's QA monthly report.

4.2.6.4 Participation, as needed, in the hiring of laboratory Quality Assurance staff.

4.2.6.5 Maintenance of corporate Quality Policy memorandums and corporate SOPs. Maintenance of data investigation records that are reported to Corporate management.

4.2.6.6 Assistance with certification activities.

4.2.6.7 With the assistance of the Health and Safety Director, development and implementation of the TestAmerica Safety and Chemical Hygiene Program.

4.2.7 Quality Assurance Director (Corporate)

The Quality Assurance Director (QAD) reports to the VP-QA and may report data integrity issues directly to the CEO as needed. Together with the VP-QA, the QAD has the responsibility for the establishment, general overview and Corporate maintenance of the Quality Assurance program within TestAmerica Analytical Testing Corp.

4.2.8 Ethics and Compliance Officer (ECO)

4.2.8.1 TestAmerica has designated two senior members of the Corporate staff to fulfill the role of Ethics and Compliance Officer (ECO) – one to work primarily with the eastern locations (Vice President of Quality Assurance) and the other to work primarily with the western locations (Director of Quality Assurance). Each ECO acts as a back-up to the other ECO and both are involved in data investigations. The Vice President of Quality Assurance/ECO reports to the CEO and has a direct line of communication to the entire senior Corporate and lab management staff. The Director of Quality Assurance may report violations to the CEO or the Vice President of Quality Assurance and has a direct line of communication to the entire senior Corporate and lab management staff.

4.2.8.2 The ECO ensures that the organization distributes the data integrity and ethical practices policies to all employees and ensures annual trainings and orientation of new hires to the ethics program and its policies. The ECO is responsible for establishing a mechanism to foster employee reporting of incidents of illegal, unethical, or improper practices in a safe and confidential environment.

4.2.8.3 The ECO monitors and audits procedures to determine compliance with policies and to make recommendations for policy enhancements to the CEO, Laboratory Director/Manager or other appropriate individuals within the laboratory. The ECO will assist the laboratory QA Manager in the coordination of internal auditing of ethical policy related activities and processes within the laboratory, in conjunction with the laboratories regular internal auditing function.

4.2.8.4 The ECO will also participate in investigations of alleged violations of policies and work with the appropriate internal departments to investigate misconduct, remedy the situation, and prevent recurrence of any such activity.

4.2.9 Health and Safety Director (HSD) (Corporate)

The Health and Safety Director reports directly to the VP-QA. The Health and Safety Director is responsible for the development and implementation of the TestAmerica Safety and Chemical Hygiene program. Responsibilities include:

4.2.9.1 Consolidation and tracking all safety and health-related information and reports for the company, and manages compliance activities for TestAmerica locations.

4.2.9.2 Coordination/preparation of the corporate Safety Manual / Chemical Hygiene Plan (CHP) Template that is used by each laboratory to prepare its own laboratory-specific Safety Manual/ CHP.

4.2.9.3 Preparation of information and training materials for laboratory Safety Officers.

4.2.9.4 Assistance in the internal and external coordination of employee exposure and medical monitoring programs to insure compliance with applicable safety and health regulations.

4.2.9.5 Serving as Department of Transportation (D.O.T.) focal point and providing technical assistance to location management.

4.2.9.6 Serving as Hazardous Waste Management main contact and providing technical assistance to location management.

4.2.10 Laboratory Director

TestAmerica-Irvine's Laboratory Director is responsible for the overall quality, financial, technical, human resource and service performance of the whole laboratory and reports to the EVP-Western Division, The Laboratory Director/Manager provides the resources necessary to implement and maintain an effective and comprehensive quality assurance and data integrity program.

Specific responsibilities include, but are not limited to:

4.2.10.1 Provides one or more technical directors for the appropriate fields of testing. The name(s) of the Technical Director will be included in the national database. If the Technical Director is absent for a period of time exceeding 15 consecutive calendar days, the Laboratory Director must designate another full time staff member meeting the qualifications of the Technical Director to temporarily perform this function. If the absence exceeds 65 consecutive calendar days, the primary accrediting authority must be notified in writing.

4.2.10.2 Ensures that all analysts and supervisors have the appropriate education and training to properly carry out the duties assigned to them and ensures that this training has been documented.

4.2.10.3 Ensures that personnel are free from any commercial, financial and other undue pressures which might adversely affect the quality of their work.

4.2.10.4 Ensures TestAmerica's human resource policies are adhered to and maintained.

4.2.10.5 Ensures that sufficient numbers of qualified personnel are employed to supervise and perform the work of the laboratory.

4.2.10.6 Ensures that appropriate corrective actions are taken to address analyses identified as requiring such actions by internal and external performance or procedural audits. Procedures that do not meet the standards set forth in the QAM or laboratory SOPs may be temporarily suspended by the Laboratory Director.

4.2.10.7 Reviews and approves all SOPs prior to their implementation and ensures all approved SOPs are implemented and adhered to.

4.2.10.8 Pursues and maintains appropriate laboratory certification and contract approvals. Supports ISO 17025 requirements.

4.2.10.9 Ensures client specific reporting and quality control requirements are met.

4.2.10.10 Captains the management team, consisting of the QA Manager, the Technical Directors, and other department managers as direct reports.

4.2.11 Quality Assurance Manager

The QA Manager has responsibility and authority to ensure the continuous implementation of the quality system based on ISO 17025.

The QA Manager reports directly to the Laboratory Director and has access to Corporate QA for advice and resources. This position is able to evaluate data objectively and perform assessments without outside (i.e., managerial) influence. Corporate QA may be used as a resource in dealing with regulatory requirements, certifications and other quality assurance related items. The QA Manager directs the activities of the QA officers to accomplish specific responsibilities, which include, but are not limited to:

4.2.11.1 Having functions independent from laboratory operations for which he/she has quality assurance oversight.

4.2.11.1.1 Maintaining and updating the QAM.

4.2.11.2 Monitoring and evaluating laboratory certifications; scheduling proficiency testing samples.

4.2.11.3 Monitoring and communicating regulatory changes that may affect the laboratory to management.

4.2.11.4 Training and advising the laboratory staff on quality assurance/quality control procedures that are pertinent to their daily activities.

4.2.11.5 Having a general knowledge of the analytical test methods for which data audit/review is performed (and/or having the means of getting this information when needed).

4.2.11.6 Arranging for or conducting internal audits on quality systems and the technical operation.

4.2.11.7 Maintaining records of all ethics-related training, including the type and proof of attendance.

4.2.11.8 Maintain, improve, and evaluate the Project Information and Problem Electronic (PIPE) database and the corrective and preventive action systems (Section 13.0).

4.2.11.9 Notifying laboratory management of deficiencies in the quality system and ensuring corrective action is taken. Procedures that do not meet the standards set forth in the QAM or laboratory SOPs are temporarily suspended following the procedures outlined in Section 13.

4.2.11.10 Monitoring standards of performance in quality control and quality assurance.

4.2.11.11 Reviews and approves all SOPs prior to their implementation and ensures all approved SOPs are implemented and adhered to.

4.2.11.12 Coordinating of document control of SOPs, MDLs, control limits, and miscellaneous forms and information.

4.2.11.13 Review a percentage of all final data reports for internal consistency. Review of Chain of Custody, correspondence with the analytical request, batch QC status, completeness

of any corrective action statements, 5% of calculations, format, holding time, sensibility and completeness of the project file contents.

4.2.11.14 Review of external audit reports and data validation requests.

4.2.11.15 Follow-up with audits to ensure client QAPP requirements are met.

4.2.11.16 Establishment of reporting schedule and preparation of various quality reports for the Laboratory Director, clients and/or Corporate QA.

4.2.11.17 Development of suggestions and recommendations to improve quality systems.

4.2.11.18 Research of current state and federal requirements and guidelines.

4.2.11.19 Captains the QA team to enable communication and to distribute duties and responsibilities.

4.2.12 Technical Directors

The Technical Directors report directly to the Laboratory Director. They are accountable for all analyses and analysts with respect to ISO 17025. The scope of responsibility ranges from the new-hire process and existing technology through the ongoing training and development programs for existing analysts and second- and third-generation instrumentation. Specific responsibilities include, but are not limited to:

4.2.12.1 Coordinating, writing, and reviewing preparation of all test methods, i. e., Standard Operating Procedures, with regard to quality, integrity, regulatory and optimum and efficient production techniques, and subsequent analyst training and interpretation of the SOPs for implementation and unusual project samples. He insures that the SOPs are properly managed and adhered to at the bench. He develops standard costing of SOPs to include supplies, labor, overhead, and capacity (design vs. demonstrated versus first-run yield) utilization.

4.2.12.2 Reviewing and approving, with input from the QA Manager, proposals from marketing, in accordance with an established procedure for the review of requests and contracts. This procedure addresses the adequate definition of methods to be used for analysis and any limitations, the laboratory's capability and resources, the client's expectations. Differences are resolved before the contract is signed and work begins. A system documenting any significant changes is maintained, as well as pertinent discussions with the client regarding his requirements or the results of the analyses during the performance of the contract. All work subcontracted by the laboratory must be approved and requested by the client. Any deviations from the contract must be disclosed to the client. Once the work has begun, any amendments to the contract must be discussed with the client and so documented.

4.2.12.3 Monitoring the validity of the analyses performed and data generated in the laboratory. This activity begins with reviewing and supporting all new business contracts, insuring data quality, analyzing internal and external non-conformances to identify root cause issues and implementing the resulting corrective and preventive actions, facilitating the data review process (training, development, and accountability at the bench), and providing technical and troubleshooting expertise on routine and unusual or complex problems.

4.2.12.4 Providing training and development programs to applicable laboratory staff as new hires and, subsequently, on a scheduled basis. Training includes instruction on calculations, instrumentation management to include troubleshooting and preventive maintenance.

4.2.12.5 Enhancing efficiency and improving quality through technical advances and improved LIMS utilization. Capital forecasting and instrument life cycle planning for second generation methods and instruments as well as asset inventory management.

4.2.12.6 Coordinating sample management from "cradle to grave," insuring that no time is lost in locating samples.

4.2.12.7 Reviews and approves all SOPs prior to their implementation and ensures all approved SOPs are implemented and adhered to.

4.2.12.8 Scheduling all QA/QC-related requirements for compliance, e.g., MDLs, etc.

4.2.12.9 Captains department supervisors to communicate quality, technical, personnel, and instrumental issues for a consistent team approach.

4.2.12.10 Coordinates audit responses with supervisors and QA Manager.

4.2.13 Hazardous Waste Coordinator

The Hazardous Waste Coordinator reports directly to the Laboratory Director. The duties consist of

4.2.13.1 Staying current with the hazardous waste regulations.

4.2.13.2 Continuing training on hazardous waste issues.

4.2.13.3 Reviewing and updating annually the Hazardous Waste Contingency Plan in the Chemical Hygiene/Safety Manual.

4.2.13.4 Auditing the staff with regard to compliance with the Hazardous Waste Contingency Plan.

4.2.13.5 Contacting the hazardous waste subcontractors for review of procedures and opportunities for minimization of waste.

4.2.14 Department Managers

Report to the Laboratory Director. Each one is responsible to:

4.2.14.1 Ensure that analysts in their department adhere to applicable SOPs and the QA Manual. He performs frequent SOP and QA Manual review to determine if analysts are in compliance and if new, modified, and optimized measures are feasible and should be added to these documents.

4.2.14.2 With regard to analysts, participates in the selection, training (as documented in Section 8.1.4), development of performance objectives and standards of performance, appraisal (measurement of objectives), scheduling, counseling, discipline, and motivation of analysts and documents these activities in accordance with systems developed by the QA and Personnel Departments. He evaluates staffing sufficiency and overtime needs. Training consists of familiarization with SOP, QC, Safety, and computer systems.

4.2.14.3 Encourage the development of analysts to become cross-trained in various methods and/or operate multiple instruments efficiently while performing maintenance and documentation, self-supervise, and function as a department team.

4.2.14.4 Provide guidance to analysts in resolving problems encountered daily during sample prep/analysis in conjunction with the Technical Director, Operations Manager, and/or QA Manager. Each is responsible for 100% of the data review and documentation, non-conformance and CPAR issues, the timely and accurate completion of performance evaluation samples and MDLs, for his department.

4.2.14.5 Ensure all logbooks are maintained, current, and properly labeled or archived.

4.2.14.6 Report all non-conformance conditions to the QA Manager and/or Laboratory Director.

4.2.14.7 Ensure that preventive maintenance is performed on instrumentation as detailed in the QA Manual or SOPs. He is responsible for developing and implementing a system for preventive maintenance, troubleshooting, and repairing or arranging for repair of instruments.

4.2.14.8 Maintain adequate and valid inventory of reagents, standards, spare parts, and other relevant resources required to perform daily analysis.

4.2.14.9 Achieve optimum turnaround time on analyses and compliance with holding times.

4.2.14.10 Conduct efficiency and cost control evaluations on an ongoing basis to determine optimization of labor, supplies, overtime, first-run yield, capacity (designed vs. demonstrated), second- and third-generation production techniques/instruments, and long-term needs for budgetary planning.

4.2.14.11 Develop, implement, and enhance calibration programs.

4.2.14.12 Provide written responses to external and internal audit issues.

4.2.15 Laboratory Analysts

Laboratory analysts are responsible for conducting analysis and performing all tasks assigned to them by the group leader or supervisor. The responsibilities of the analysts are listed below:

4.2.15.1 Perform analyses by adhering to analytical and quality control protocols prescribed by current SOPs, this QA Manual, and project-specific plans honestly, accurately, timely, safely, and in the most cost-effective manner.

4.2.15.2 Document standard and sample preparation, instrument calibration and maintenance, data calculations, sample matrix effects, and any observed non-conformance on worklists, benchsheets, lab notebooks and/or the Non-Conformance Database.

4.2.15.3 Report all non-conformance situations, instrument problems, matrix problems and QC failures, which might affect the reliability of the data, to their supervisor, the Department Manager and/or the QA Manager or member of QA staff.

4.2.15.4 Perform 100% review of the data generated prior to entering and submitting for secondary level review.

4.2.15.5 Suggest method improvements to their Department Manager and the QA Manager. These improvements, if approved, will be incorporated. Ideas for the optimum performance of their assigned area, for example, through the proper cleaning and maintenance of the assigned instruments and equipment, are encouraged.

4.2.15.6 Work cohesively as a team in their department to achieve the goals of accurate results, optimum turnaround time, cost effectiveness, cleanliness, complete documentation, and personal knowledge of environmental analysis.

4.2.16 Laboratory Technicians

4.2.16.1 Prepare samples for analysis by weighing, extracting or digesting, filtering, or concentrating samples.

4.2.16.2 Prepare method specific QC Samples with each preparation batch. All personnel must adhere to all QC procedures specified in the analytical method and in accordance to procedures or policies and are responsible for the full documentation of these procedures.

4.2.17 Quality Assurance Scientist

4.2.17.1 The QA Scientist reports to the facility QA Manager and performs the following functions:

4.2.17.1.1 reviews data deliverable packages to ensure completeness and accuracy.

4.2.17.1.2 Generates and reviews, in conjunction with the Quality Assurance Manager, Control Charts and Method Detection Limit (MDL) studies.

4.2.17.1.3 Assists the QA Manager and lab staff with internal audits, corrective action review and overall implementation of the QA program and fills in as the “deputy” for QA Manager in their absence.

4.2.18 Safety Officer

The Safety Officer reports to the Laboratory Director and ensures that systems are maintained for the safe operation of the laboratory. The Safety Officer is responsible to:

4.2.18.1 Conduct ongoing, necessary safety training and conduct new employee safety orientation.

4.2.18.2 Assist in developing and maintaining the Chemical Hygiene/Safety Manual.

4.2.18.3 Administer dispersal of all Material Safety Data Sheet (MSDS) information.

4.2.18.4 Perform regular chemical hygiene and housekeeping instruction.

4.2.18.5 Give instruction on proper labeling and practice.

4.2.18.6 Serve as chairman of the laboratory safety committee.

4.2.18.7 Provide and train personnel on protective equipment.

4.2.18.8 Oversee the inspection and maintenance of general safety equipment – fire extinguishers, safety showers, eyewash fountains, etc. and ensure prompt repairs as needed.

4.2.18.9 Supervise and schedule fire drills and emergency evacuation drills.

4.2.18.10 Determine what initial and subsequent exposure monitoring, if necessary to determine potential employee exposure to chemicals used in the laboratory.

4.2.18.11 When determined necessary, conduct exposure monitoring assessments.

4.2.18.12 Determine when a complaint of possible over-exposure is “reasonable” and should be referred for medical consultation.

4.2.18.13 Assist in the internal and external coordination of the medical consultation/monitoring program conducted by TestAmerica’s medical consultants.

4.2.19 Sample Control Manager

The Sample Control Manager reports to the Laboratory Director. The responsibilities are outlined below:

4.2.19.1 Direct the logging of incoming samples into the LIMS.

4.2.19.2 Ensure the verification of data entry from login.

4.2.19.3 Schedule and oversee all sample courier operations.

4.2.19.4 Schedule and oversee all field sampling operations.

4.2.19.5 Oversee the processing of bottle orders

4.2.19.6 Acts as a liaison between Project Managers and Analysts in respect to handling rush orders and resolving inconsistencies and problems with chain-of-custody forms, and routing of subcontracted analyses.

4.2.19.7 Oversees the disposal of samples in accordance with the Waste Disposal SOP, the Hazardous Waste Contingency Plan in the Chemical Hygiene/Safety Manual, and the U. S. Department of Agriculture requirements.

4.2.20 Client Services Manager

The Client Services Manager reports to the Laboratory Director and serves as the interface between the laboratory's technical departments and the laboratory's clients. The staff consists of the Project Management team. With the overall goal of total client satisfaction, the functions of this position are outlined below:

4.2.20.1 Technical training and growth of the Project Management team.

4.2.20.2 Technical liaison for the Project Management team.

4.2.20.3 Human resource management of the Project Management team.

4.2.20.4 Responsible to ensure that clients receive the proper sampling supplies.

4.2.20.5 Accountable for response to client inquiries concerning sample status.

4.2.20.6 Responsible for assistance to clients regarding the resolution of problems concerning Chains-of-Custody.

4.2.20.7 Ensuring that client specifications, when known, are met by communicating project and quality assurance requirements to the laboratory.

4.2.20.8 Notifying the department managers of incoming projects and sample delivery schedules.

4.2.20.9 Accountable to clients for communicating sample progress in daily status meeting with agreed-upon due dates.

4.2.20.10 Responsible for discussing with client any project-related problems, resolving service issues, and coordinating technical details with the laboratory staff.

4.2.20.11 Responsible for staff familiarization with specific quotes, sample log-in review, and final report completeness.

4.2.20.12 Oversee the creation and delivery of all data package projects in-house to ensure timely and accurate delivery of reports.

4.2.20.13 Inform clients of data package-related problems and resolve service issues.

4.2.20.14 Coordinate requests for sample containers and other services (data packages).

4.2.21 Project Manager

4.2.21.1 The Project Manager (PM) thoroughly coordinating client projects, maintaining clients' satisfaction and reviewing laboratory reports, addresses all project status and technical questions

generated by the client. The PM is also responsible for reviewing potential work and incoming work with laboratory department representatives at daily operations meetings.

4.2.22 Project Manger Assistant

4.2.22.1 The Project Manager Assistant (PMA) provides clerical support to the project management staff in order to allow them to focus on client service and report review. The PM assistant performs faxing duties, prepares and sends electronic data deliverables (EDD) to clients, generates historical data as a cross reference for the laboratory, retrieves laboratory data, and tracks project reports.

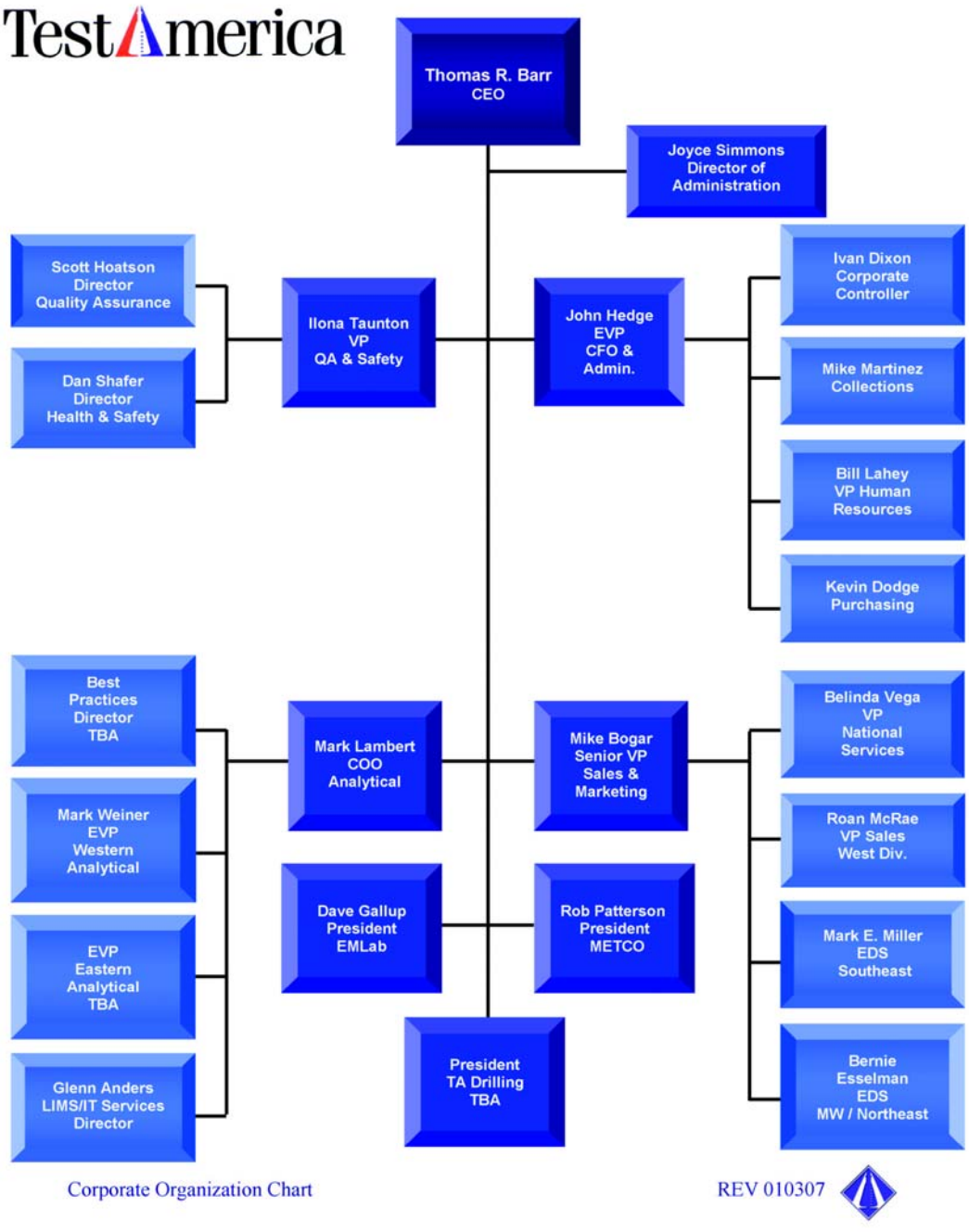
4.3 DEPUTIES

The following table defines who assumes the responsibilities of key personnel in their absence:

Key Personnel	Deputy
Laboratory Director	Director of Project Management
QA Manager	Senior QA Scientist
Department Manager	Department Group Leader
Safety Officer	Hazardous Waste Coordinator
Director of Project Management	Department Group Leader
Hazardous Waste Coordinator	Safety Officer

Figure 4-1

Corporate Organization Chart



Section 5.0
(NELAC 5.4.2)
QUALITY SYSTEM

5.1 QUALITY POLICY STATEMENT

5.1.1 The management of TestAmerica Analytical Testing Corp. and TestAmerica-Irvine are committed to providing quality data to its clients by adhering to approved methodologies, regulatory requirements and the QA/QC protocols described in this manual.

5.1.2 In all aspects of the laboratory and business operations, management is dedicated in maintaining the highest ethical standards. An Ethics Policy and Code of Ethical Conduct can be viewed in Appendix 1. Training on ethical and legal responsibilities is provided and each employee signs off on the policy annually as a condition of employment.

5.1.3 It is TestAmerica's policy to continually improve systems and provide support to quality improvement efforts. The company recognizes that the implementation of a quality assurance program requires management's commitment and support as well as the involvement of the entire staff.

5.1.4 Every staff member at TestAmerica-Irvine plays an integral part in quality assurance and is held responsible and accountable for the quality of their work. It is therefore required that all laboratory personnel read, review, understand and agree to comply with the procedures and requirements established by this document.

5.2 ETHICS AND DATA INTEGRITY

5.2.1 TestAmerica is committed to ensuring the integrity of its data and meeting the quality needs of its clients. The seven elements of TestAmerica's ethics and data integrity program include:

5.2.1.1 An Ethics Policy and Code of Ethical Conduct (Appendix 1).

5.2.1.2 An Ethics and Compliance Officer (ECO).

5.2.1.3 A training program.

5.2.1.4 Self governance through disciplinary action for violations.

5.2.1.5 A confidential mechanism for anonymously reporting alleged misconduct and a means for conducting internal investigations of all alleged misconduct. (SOP: CP-01-06)

5.2.1.6 Procedures and guidance for recalling data if necessary (SOP: CP-01-06).

5.2.1.7 An effective external and internal monitoring system that includes procedures for internal audits (Section 16).

5.2.2 As an American Council of Independent Laboratories (ACIL) member, all TestAmerica laboratories adhere to the following ACIL Code of Ethics:

5.2.2.1 Produce results, which are accurate and include QA/QC information that meets client pre-defined Data Quality Objectives (DQOs).

5.2.2.2 Present services in a confidential, honest and forthright manner.

5.2.2.3 Provide employees with guidelines and an understanding of the ethical and quality standards of our industry.

5.2.2.4 Operate our facilities in a manner that protects the environment and the health and safety of employees and the public.

5.2.2.5 Obey all pertinent federal, state and local laws and regulations and encourage other members of our industry to do the same.

5.2.2.6 Educate clients as the extent and kinds of services available.

5.2.2.7 Assert competency only for work for which adequate personnel and equipment are available and for which adequate preparation has been made.

5.2.2.8 Promote the status of environmental laboratories, their employees, and the value of services rendered by them.

5.3 QUALITY SYSTEM SUPPORTING DOCUMENTATION

5.3.1 The laboratory's quality system is communicated through a variety of documents prepared by the laboratory:

5.3.1.1 Quality Assurance Manual (QAM)

5.3.1.2 Corporate Standard Operating Procedures (SOPs)

5.3.1.2.1 Corporate SOPs are developed for use by all relevant laboratories. They are approved by both Corporate and laboratory management and are then incorporated into the laboratory's normal SOP distribution, training and tracking system. Corporate SOPs may be general or technical.

5.3.1.3 Laboratory SOPs – General and Technical

5.3.1.4 Corporate TestAmerica QA/QC Policy Memorandums (see Section 3.4)

5.3.1.5 Laboratory QA/QC Policy Memorandums (see Section 3.4)

5.3.2 Order of Precedence

5.3.2.1 In the event of a conflict or discrepancy between policies, the order of precedence is as follows:

5.3.2.1.1 TestAmerica QA/QC Policy Memorandum - Corporate
5.3.2.1.2 Laboratory QA/QC Policy Memorandum
5.3.2.1.3 Quality Assurance Manual
5.3.2.1.4 Corporate SOPs
5.3.2.1.5 Laboratory SOPs
5.3.2.1.6 Other (memos, flow charts, etc.)

5.4 QA/QC OBJECTIVES FOR THE MEASUREMENT OF DATA

5.4.1 Quality Assurance and Quality Control are activities undertaken to achieve the goal of producing data that accurately characterize the sites or materials that have been sampled. Quality Assurance is generally understood to be more comprehensive than Quality Control. It is defined as "*the total integrated program for assuring the reliability of monitoring and measuring data."*

5.4.2 Quality Control is generally understood to be limited to the analyses of samples and to be synonymous with the term *"analytical quality control"* (AQC). AQC refers to the routine application of statistically based procedures to evaluate and control the accuracy of results from analytical measurements. The AQC program includes procedures for estimating and controlling precision and bias and for determining reporting limits.

5.4.3 Request for Proposals (RFPs) and Quality Assurance Project Plans (QAPP) provide a mechanism for the client and the laboratory to discuss the data quality objectives in order to ensure that analytical services closely correspond to client needs. The client is responsible for developing the QAPP. In order to ensure the ability of the laboratory to meet the Data Quality Objectives (DQOs) specified in the QAPP, clients are advised to allow time for the laboratory to review the QAPP before being finalized. Additionally, the laboratory will provide support to the client for developing the sections of the QAPP that concern laboratory activities.

5.4.4 Historically, laboratories have described their QA objectives in terms of precision, accuracy, representativeness, comparability and completeness (PARCC).

5.4.4.1 Precision

The laboratory objective for precision is to meet the precision demonstrated for the analytical methods on similar samples and to meet data requirements for the analyses published by the US EPA. Precision is defined as the degree of reproducibility of measurements under a given set of analytical conditions (exclusive of field sampling variability). Precision is documented on the basis of replicate analysis, usually duplicate or matrix spike duplicate samples. The calculation of precision is described in Section 25.

5.4.4.2 Accuracy

The laboratory objective for accuracy is to meet the performance for accuracy demonstrated for the analytical methods on similar samples and to meet the recovery data published by the US EPA. Accuracy is defined as the degree of bias in a measurement system. Accuracy is

documented on the basis of recovery of matrix spikes. Accuracy may also be documented through the use of laboratory control samples. A statement of accuracy is expressed as an interval of acceptance recovery about the mean recovery. The calculation of accuracy is described in Section 25.

5.4.4.3 Representativeness

The laboratory objective for representativeness is to provide data which is representative of the sampled medium. Representativeness is defined as the degree to which data represent a characteristic of a population or set of samples and is measurement of both analytical and field sampling precision. The representativeness of the analytical data is a function of the procedures used in procuring and processing the samples. The representativeness can be documented by the relative percent difference between separately procured, but otherwise identical samples or sample aliquots.

5.4.4.3.1 The representativeness of the data from the sampling sites depends on both the sampling procedures and the analytical procedures. The laboratory can assist the client with enacting proper sampling and handling methods in order to assure the integrity of the samples.

5.4.4.4 Comparability

The comparability objective is to provide analytical data for which the accuracy, precision, representativeness and reporting limit statistics are similar to these quality indicators generated by other laboratories for similar samples, and data generated by TestAmerica-Irvine over time.

The comparability objective is documented by inter-laboratory studies carried out by regulatory agencies or carried out for specific projects or contracts, by comparison of periodically generated statements of accuracy, precision and reporting limits with those of other laboratories, and by the degree to which approval from the US EPA or other pertinent regulatory agencies is obtained for any procedure for which significant modifications have been made.

5.4.4.5 Completeness

The completeness objective for data is 90% (or as specified by a particular project), expressed as the ratio of the valid data to the total data over the course of the project. Data will be considered valid if they are adequate for their intended use. Data usability will be defined in a QAPP, project scope or regulatory requirement. Data validation is the process for reviewing data to determine its usability and completeness. If the completeness objective is not met, actions will be taken internally and with the data user to improve performance. This may take the form of an audit to evaluate the methodology and procedures as possible sources for the difficulty or may result in a recommendation to use a different method.

5.4.4.6 Selectivity

Selectivity is defined as: The capability of a test method or instrument to respond to a target substance or constituent in the presence of non-target substances. Target analytes are separated from non-target constituents and subsequently identified/detected through one or more of the following, depending on the analytical method: Extractions (separation), digestions (separation), interelement corrections (separation), use of matrix modifiers (separation), specific

retention times (separation and identification), confirmations with different columns or detectors (separation and identification), specific wavelengths (identification), specific mass spectra (identification), Specific Electrodes (separation and identification), etc.

5.4.5 Criteria for Quality Indicators

5.4.5.1 The laboratory prepares a Quality Control Limit Summary that contains tables that summarize the precision and accuracy acceptability limits for analyses performed at TestAmerica-Irvine. This summary includes an effective date, is updated each time new limits are generated and is located in a limited-access folder on the laboratory's network. Unless otherwise noted, limits within these tables are laboratory generated. Some acceptability limits are derived from US EPA methods when they are required. Where US EPA method limits are not required, TestAmerica-Irvine has developed limits from evaluation of data from similar matrices. Criteria for development of limits is contained in Section 25.

5.4.6 Statistical Quality Control

5.4.6.1 Statistically derived precision and accuracy limits are required by selected methods (such as SW-846) and programs (such as the Ohio Voluntary Action Plan (VAP)). TestAmerica-Irvine routinely utilizes statistically derived limits to evaluate method performance and determine when corrective action is appropriate. The analysts are instructed to use the current limits in the laboratory (dated and approved by the Technical Director and QA Manager) and entered into the Laboratory Information Management System (LIMS). The Quality Assurance department maintains an archive of all limits used within the laboratory. If a method defines the QC limits, the method limits are used. The laboratory's SOP, CNTRLLIM.SOP covers these processes in greater detail.

5.4.6.2 If a method requires the generation of historical limits, the lab develops them from recent data in the QC database of LIMS following the guidelines described in Section 25. All calculations and limits are documented and dated when approved and effective. On occasion, a client requests contract-specified limits for a specific project.

5.4.6.3 Surrogate recoveries are determined for a specific time period as in 5.4.6.1. The resulting ranges are entered in LIMS.

5.4.6.4 Current QC limits are entered and maintained in the LIMS analyte database. As sample results and the related QC are entered into LIMS, the sample QC values are compared with the limits in LIMS to determine if they are within the acceptable range. The analyst then evaluates if the sample needs to be rerun or re-extracted/rerun or if a comment should be added to the report explaining the reason for the QC outlier.

5.4.6.5 QC Charts

As the QC limits are calculated or when lab personnel changes occur, QC charts are generated showing warning and control limits for the purpose of evaluating trends. The Quality Assurance Manager evaluates these periodically to determine if adjustments need to be made or for corrective actions to methods. All findings are documented and kept on file.

Section 6.0
(NELAC 5.4.3)
DOCUMENT CONTROL

6.1 OVERVIEW

6.1.1 The QA Department is responsible for the control of documents used in the laboratory to ensure that approved, up-to-date documents are in circulation and out-of-date (obsolete) documents are taken out of use or destroyed. This library of documents consists of the QA Manual, Standard Operating Procedures, various forms and information summaries, method sources, textbooks, and regulations, corrective action reports, audit reports and responses, logbooks, standard logs, training files, MDL studies, PT studies, certifications and related correspondence, and instrument instruction books. Hard copy and electronic systems are included. Unique identification of each item is a component of the system.

6.1.1.1 The archiving of actual analytical data is discussed in Section 15, including paper records and electronic records.

6.1.1.2 The maintenance of purchasing data is discussed in Section 9.

6.1.1.3 The maintenance of sales and marketing contracts is discussed in Section 7.

6.2 DOCUMENT APPROVAL AND ISSUE

6.2.1 The pertinent elements of a control system for each document include a unique name and number, the number of pages of the item, the created/revised date, and the laboratory's name. The QA Manager is responsible for the maintenance of the system and maintains the items in either the QA office or at a certified and secure off-site record storage facility (Cor-o-van).

6.2.2 In order to develop a new document, a Department submits an electronic draft of the document to QA for suggestions and approval before use. Upon approval, QA adds the identifying version information to the document and retains the official document on file (hard copy and electronic copy). The official original is provided as needed to those using it.

6.2.3 The QA department maintains a table of contents of the official versions of the items.

6.2.4 If changes are required, the suggestions are submitted to QA by marking a copy of the existing item, QA makes the changes retaining the marked-up copy and the new version on file. All copies of the previous versions are destroyed (the original is maintained).

6.2.5 In using the documents, employees understand that the name of the document, unique identifier, page numbers/total pages, and date created/revised are always present on future copies.

6.3 PROCEDURES FOR DOCUMENT CONTROL POLICY

6.3.1 For changes to the QA Manual, the QA Manager will create a Record of Management Decision (ROMD) that addresses the change. This ROMD is to have signed approval from the QA Manager, Laboratory Director, and Director of Quality Assurance. A copy of this ROMD must be added to all controlled copies of the QA Manual. Only controlled copies are available inside the laboratory. Previous revisions and back-up data are stored by the QA department. Electronic copies are stored on the laboratory server in the QA folder for the applicable procedure.

6.3.2 For changes to SOPs, the QA Manager will create a Record of Management Decision (ROMD) that addresses the change. This ROMD is to have signed approval from the QA Manager. A copy of this ROMD must be added to all controlled copies of the SOP. The QA Department has a complete file of all current and previous versions, showing changes, of each SOP. Additionally, there are controlled notebooks of current SOPs in the lab. These are updated by the QA department. There is a table of contents. Electronic versions of current, previous, and in-transition SOPs are maintained on a QA hard drive that is backed up weekly. Electronic copies are stored on the laboratory server in the QA folder for the applicable procedure.

6.3.3 Changes to facilities, the QA Manual, certifications, personnel, safety/health, capabilities are documented in the Management of Change log as prescribed in Section 14.

6.3.4 Forms, worksheets, miscellaneous instructions and information are organized by department in the QA office. There is a table of contents. Electronic versions are kept on a hard drive in the QA department; hard copies are kept in QA files. The procedure for the care of these documents is in DOCCTRL.SOP

6.3.5 Reference books, regulations, and other external protocols are listed, with location, in the QA office. This list is updated as needed.

6.3.6 Logbooks and preparation worksheets are initialized and stored in an archiving system described in the document ARCHIV.SOP for easy tracking and retrieval.

6.3.7 Certification correspondence, audit reports and responses, control charts, MDLs, training files, subcontractor credentials, and PT studies are stored by date in the QA office in appropriate files. These documents are not uniquely identified.

6.4 OBSOLETE DOCUMENTS

6.4.1 All invalid or obsolete documents are removed, or otherwise prevented from unintended use. The laboratory has specific procedures as described above to accomplish this. In general, obsolete documents are collected from employees according to distribution lists and are marked obsolete on the cover or destroyed. At least one copy of the obsolete document is archived as described in Section 15.

Section 7.0
(NELAC 5.4.4)
Review of Work Requests

7.1 REVIEW OF WORK REQUESTS - OVERVIEW

7.1.1 TestAmerica-Irvine has established procedures for the review of work requests and contracts. The procedures include evaluation of the laboratory's and/or network capabilities and available resources to meet the requirements within the requested time period. All requirements, including all methods and data quality must be adequately defined, documented, evaluated and understood.

7.1.2 The appropriateness of methods, and the laboratory's and/or network capability to perform must be established. Alternate test methods that are capable of meeting the clients' requirements may be proposed. The laboratory must be certified, as required, for all proposed tests and it must be able to meet the requested detection and quality control limits. A review of the lab's ability to analyze any non-routine analytes is also part of this review process

7.1.3 The offeror, in association with the Laboratory Director(s), must determine if the laboratory nominated has the necessary physical, personnel, and information resources to meet the contract. Each proposal is checked for its impact on the capacity of the laboratory's equipment and personnel. As part of the review, the scope of the project, including the proposed turnaround time and deliverables will be checked for feasibility.

7.1.4 Electronic and/or hard copy deliverable requirements are evaluated against the lab's capacity for production of the requested documentation.

7.1.5 In addition to in-house capabilities, this process covers a review of any work that may need to be subcontracted by the laboratory. This discussion includes an assessment of the availability of qualified subcontracting labs and the client's acceptance of potential subcontractors. (See Section 8 for Subcontracting procedures.)

7.1.6 The offeror reviews the findings with the client and discusses any potential conflict, deficiency, lack of accreditation, or inability of the lab to complete the work as defined in the scope presented. The offeror also discusses any options or revisions that would allow the laboratory to perform the project successfully.

7.1.7 The client is advised of any deviation from the contract, and all differences between the request and the final contract are resolved and documented in writing before any work begins. It is necessary that the contract be acceptable to both the laboratory and the client.

7.1.8 When there are amendments or changes in scope to the original contract by the client, personnel affected by the changes will be given copies of the amendments for their review and approval.

7.2 REVIEW SEQUENCE AND KEY PERSONNEL

Appropriate personnel will review the work request at each stage of evaluation. .

7.2.1 For routine projects and other simple tasks, a review by the Project Manager is considered adequate. The Project Manager confirms that the laboratory has any required certifications, that it can meet the clients' data quality and reporting requirements and that the lab has the capacity to meet the clients turn around and deliverable requirements. In addition the Project Manager must also be aware of standard Terms and Conditions and Insurance requirements. Project Managers should contact the appropriate Regional Account Manager, Regional Inside Sales Coordinator, or Corporate Contract Administrator if any of the details are unknown, differ from what standard payment policy and insurance coverage includes, or if the task falls outside the Project Manager's job responsibilities. Payment terms exceeding 90 days must be approved. The Chief Financial Officer can be contacted for approval or forward information to the Corporate Contract Administrator. The following info will need to be provided: the payment terms requested, the projected revenue and duration of the project. If the project is a National Account, the Project Manager should notify the Director of National Accounts or the Corporate Contract Administrator.

7.2.2 Where the scope of a request is of a size where a simple review by the Project Manager is not feasible, the documents will be forwarded to the Regional Account Manager and/or Regional Inside Sales Coordinator. This team should review the documents and determine the person or team of persons needed to best review the scope. This team will also coordinate the response, including technical and cost proposal. When the bid opportunity includes technical and/or contractual sections, the subsets of 7.2.4 should be followed with the exception that the Regional Inside Sales Coordinator will act as the distribution source in lieu of the Corporate Contracts Administrator.

7.2.3 For complex or large projects, the proposal or contract should be directed to either the Executive Director of Sales (EDS) if regional in scope, or to the Director of National Accounts (DNA) if stemming from a national client or has the potential to be national in scope. Either the EDS or the DNA will determine the appropriate course of action.

7.2.3.1 The proposal will be forwarded to the Corporate Contracts Administrator, who distributes it to the following personnel (or whatever resources deemed appropriate):

7.2.3.1.1 The Chief Financial Officer evaluates contractual obligations, bonding issues and payment terms.

7.2.3.1.2 The Laboratory Director and/or laboratory QA Manager reviews method capabilities, analyte lists, reporting limits and quality control limits. If the contract is national in scope, the request will be coordinated through the Vice President of National Accounts and the team of DNAs will determine the most appropriate action.

7.2.3.1.3 The Laboratory Director or Department Managers will review and agree to the proposed turnaround time or suggest a term that is more feasible.

7.2.3.1.4 The laboratory Quality Assurance Manager reviews QA/QC issues, including certification. The Vice President of Quality Assurance or the Corporate Quality Assurance Director also review QA/QC requirements of large/multi-lab contracts.

7.2.3.1.5 The Regional Accounts Manager or the Director of National Accounts will propose final pricing and review the offer with the appropriate Lab Director/Manager(s) before issuing the formal laboratory quotation**.** Regional Account Managers may employ the assistance of the Regional Inside Sales Coordinator for creation of the formal quote. If the quotation involves a National Account, the DNA should be brought into process before the submittal to the client.

7.2.3.1.6 The Information Systems Director evaluates the final report formatting and EDD requirements. Input from IT will be based on the scope of the program and the deliverables. If the program requires an electronic data deliverable format that is not currently in the EDD library of the laboratory or laboratories nominated for the contract, the specifications must be reviewed and approved by the Director of LIMS Support (or designee). If it is necessary for development, either time and/or cost must be considered in the program budget. Laboratory Director(s) and/or EDSs and Director of National Accounts may waive the cost of development if deemed appropriate.

7.2.3.1.7 The Client Services Manager goes over the statement of work guideline capabilities.

7.2.3.1.8 In the event that one of the above personnel is not available to review the proposal, his or her back-up will fulfill the review requirements and sign-off on the review.

7.2.3.2 The initiator of the review process, be it the Director of National Accounts or Regional Account Manager, assisted by the Corporate Contracts Administrator, Regional Inside Sales Manager, and any other appropriate resources, will then submit the technical and pricing proposal, including any variances for client approval.

7.2.3.3 The Corporate Contracts Administrator maintains copies of all signed contracts.

7.3 DOCUMENTATION

Appropriate records are maintained for every contract or work request. Where applicable, all stages of the contract review process are documented on the ***Contract Tracker*** and include records of any significant changes.

7.3.1 A Contract Summary should be completed by the primary bidder and a copy provided to every laboratory Project Manager who may be involved in the work. This summary provides an at-a-glance review of the project for questions and project references.

7.3.2 The contract will be distributed to and maintained by the appropriate sales/marketing personnel. A copy of the contract and formal quote will be filed with the laboratory Project Manager and the Lab Director/Manager. Summary contract and pricing documents may be prepared and issued. It is the responsibility of the offeror to confirm complete understanding and transfer of information to the Project Management level in each laboratory to ensure a smooth transition from proposal to activation.

7.3.3 Records are maintained of pertinent discussions with a client relating to the client's requirements or the results of the work during the period of execution of the contract. The Project Manager keeps a phone log of conversations with the client. Communications between Sales and Marketing should be captured in Salesforce and pertinent information should be

copied to all appropriate Project Management and technical staff. All telephone conversations with clients are retained as part of each project manager's "phone log." Phone Logs are archived in the same manner as other laboratory logbooks.

Work Acceptance Checklist

Date Received:
Received by:
Date Due:
Client:
Project:
Reviewed by:
Final response offered by:

1) What laboratory (or laboratories) is nominated for this project? Can the lab perform all of the requested methods and meet all the required reporting limits and deliverables? Y N
Exceptions:

2) Is the Lab certified for the requested methods and analytes? Y N NA
Exceptions:

3) Is the scope and schedule clearly defined and Does the lab have enough capacity (staff and equipment) to perform the work? Y N
Approved by:

Exceptions:

4) Have we evaluated the deliverable requirements? Y N NA
Can the lab create the requested final report in the TAT requested? Y N
Level 2 3 4 Hardcopy and/or PDF
Do we need to request an extension on the TAT?
Conditions for TAT (e.g.. Level IV available 15 days following receipt of last sample in the SDG)

5) Can the Lab create the requested Electronic Deliverable? Y N NA
Routine or under what conditions:
Verified by:

6) Does some of the work need to be subcontracted?

Laboratory	Approved Sub?	Test Methods	Certifications?

6a) is a qualified subcontract lab available to do the work, that can generate the required deliverables and is approved by the client? Y N

7) Have any exceptions/deviations to the requested analyses been discussed with the client (including Subcontracting work)? Y N
Please provide details, either list here or include an attachment
When? Who with?

8) Was the work accepted by the lab? Date of acceptance:

Section 8.0
(NELAC 5.4.5)
SUBCONTRACTING OF TESTS

8.1 OVERVIEW

8.1.1 A subcontract laboratory is defined by TestAmerica Analytical Testing Corp. as a laboratory external to the TestAmerica network. However, there are some situations where a network lab must be defined as a subcontract laboratory. These situations must be identified prior to the commencement of a project to determine if client or agency notification and approval of the subcontractor is required prior to the use of a network lab on a project. The laboratory will advise the client of a subcontract arrangement in writing and when appropriate or contractually required, gain the approval of the client using a Client-Approved Subcontractor Form (Figure 8-1).

8.1.2 When subcontracting analytical services, the laboratory will assure, to the extent necessary, that the subcontract laboratory maintains a program consistent with the requirements of this document, the requirements specified in NELAC/ISO 17025 and/or the client's Quality Assurance Project Plan (QAPP). Additionally, work requiring accreditation will be placed with an appropriately accredited laboratory. The laboratory performing the subcontracted work will be identified in the final report, as will non-NELAC accredited work. The laboratory assumes responsibility to the client for the subcontractor's work, except in the case where a client or a regulating authority specified which subcontractor is to be used.

8.2 QUALIFYING AND MONITORING SUBCONTRACTORS

8.2.1 To begin the process, the Project Manager may nominate a laboratory as a subcontractor based on need. The decision to nominate a laboratory is approved by the Laboratory Manager. The Laboratory Manager requests that the QA Manager begin the process of approving the subcontract laboratory.

8.2.2 The QA Manager must complete the Subcontracting Approval Form (Figure 8-2) and have supporting documentation on file prior to initiation of any work. In some cases a network laboratory or Corporate QA may have already completed an approval of a subcontracting laboratory. A listing of all approved subcontracting laboratories and supporting documentation is available on the TestAmerica intranet site. If this option is used, the laboratory must ensure that the subcontracting lab is capable of meeting the needs of the current project. A letter or e-mail is sent to the lab requesting the following information. An example request letter is posted on the intranet site.
Note: The lab does not need to complete the approval form (Figure 8-2) if information on the intranet site is sufficient to meet the needs of the project.
Note: There are some instances where a subcontracting laboratory accredited by a State or Agency program may not require all elements listed below. If the accreditation is NELAC, follow the guidelines below. If the accreditation is not NELAC, contact Corporate QA for approval.

8.2.2.1 Copy of Quality Assurance Manual. Ensure data quality limits for relevant methods are acceptable and that training procedures are adequate. (Optional if Laboratory is NELAC accredited.)

8.2.2.2 SOP for method. Some labs may not submit copies due to internal policies. In these cases, a copy of the first page and signature page of the SOP is acceptable. A table of contents including effective dates may also be acceptable. The SOP can be examined if an on-site audit is performed. (Optional if Laboratory is NELAC accredited.)

8.2.2.3 The most recent 2 sets of full proficiency results relevant to the analyses of interest and any associated corrective action. These should be updated annually. (Optional if Laboratory is NELAC accredited.)

8.2.2.4 Copy of necessary certifications verifying that the required approvals are current. Ensure that all needed analytes are included; some may not be accredit-able (if so, document). Certificate and scope of International Standard accreditation are required, when applicable. Project Management requests a copy of the current certification at the start-up phase of the client's project and each subsequent project.

8.2.2.5 Example final report to confirm format is compliant and provides the necessary information. (Optional if Laboratory is NELAC accredited.)

8.2.2.6 SOQ or Summary list of Technical Staff and Qualifications – position, education and years of experience. (Optional if Laboratory is NELAC accredited.)

8.2.2.7 USDA permit if soils less than three feet deep from New York, North Carolina, South Carolina, Georgia, Florida, Tennessee, Alabama, Mississippi, Louisiana, Arkansas, Texas, Oklahoma, New Mexico, Arizona, California, Hawaii, or outside the continental U. S. are to be analyzed. These samples require special shipping measures; check with the QA Department. It may be necessary to heat-treat the samples before shipping; however, some analytes/tests may be irrelevant after heat treatment.

8.2.2.8 Insurance Certificate. This is required by TestAmerica's Chief Financial Officer.

8.2.2.9 State Audit with Corrective Action Response. (Optional if Laboratory is NELAC accredited.)

8.2.2.10 Description of Business Ethics and Data Integrity Plan. (Optional if Laboratory is NELAC accredited.)

8.2.2.11 Copy of Raw Data Associated with First Project Sent to the Laboratory. The raw data is reviewed by the QA Manager and the Project Manager to ensure that the results meet the client's needs. This requirement can be skipped if an on-site visit of the laboratory is planned. (Optional if Laboratory is NELAC accredited.)

8.2.3 The client will assume responsibility for the quality of the data generated from the use of a subcontractor they have requested the lab to use. The qualified subcontractors on the intranet site are known to meet minimal standards. TestAmerica does not certify laboratories. The subcontractor is on our approved list and can only be recommended to the extent that TestAmerica-Irvine would use them.

8.2.4 The status and performance of qualified subcontractors will be monitored periodically by the Laboratory QA Manager who originally posts a subcontracting lab to the intranet site.

8.2.4.1 Complaints shall be investigated. Documentation of the complaint, investigation and corrective action will be maintained in the subcontractor's file on the intranet site. Complaints can be posted by any network laboratory.

8.2.4.2 An annual review of all qualified subcontractors will be conducted by the Laboratory QA Manager that originally posted the subcontract laboratory. During this review, the Quality Assurance Manager may request, as needed, updates of the subcontractor's Quality Assurance Manual and certificates with scopes. The documents, and any complaints on file, will be reviewed.

8.2.4.2.1 Subcontractors in good standing will be retained on the intranet listing. The QA Manager will notify all network laboratories and Corporate QA if any laboratory is removed from the intranet site. This notification will be posted on the intranet site and e-mailed to all Lab Directors/Managers, QA Managers and Sales and Marketing Directors.

8.3 CONTINGENCY PLANNING

8.3.1 The Laboratory Manager may waive the full qualification of a subcontractor process temporarily to meet emergency needs. In the event this provision is utilized, Corporate QA must be informed, and the Quality Assurance Manager will be required to verify adequacy of proficiency scores and certifications. The laboratory must also request a copy of the raw data to support the analytical results for the first project submitted to the subcontract laboratory. The raw data is reviewed by the Quality Assurance Manager and the Project Manager to ensure that the results meet the client's needs. The Quality Assurance Manager will immediately request full documentation and qualify the subcontractor under the provisions above within 30 calendar days.

8.3.2 When a laboratory needs to place work in another laboratory because of unforeseen reasons or on a continuing basis, the Project Manager will attempt to place the work in a qualified network laboratory. On those occasions when the work can't be kept in the network, the Project Manager or client will nominate a laboratory as a subcontractor. A client that specifies the use of a particular subcontractor assumes responsibility for that subcontractor's work. Documentation that a subcontractor was designated by the client must be maintained with the project file. This documentation can be as simple as placing a hard copy of an e-mail from the client in the project folder.

8.3.3 When using a network laboratory, the Project Manager will determine if the laboratory needs to be classified as a subcontractor. Before using a subcontractor and unless otherwise pre-arranged in a work proposal approved by the client, the Project Manager must notify the client of the subcontract arrangement and when appropriate, obtain written approval from the client using a Client-Approved Subcontractor Form (Figure 8-1). The notification and form are retained in the project folder.

8.3.4 Prior to sending samples to the subcontracted laboratory, the Project Manager confirms their certification status to determine if it's current and scope-inclusive. The information is documented on a Subcontracted Sample Form (Figure 8-3) and the form is retained in the project folder. For network laboratories, certifications can be viewed on the company website.

8.3.5 The Sample Control department is responsible for ensuring compliance with quality assurance requirements and applicable shipping regulations, including those of the USDA, when shipping samples to a subcontracted laboratory.

8.3.6 All subcontracted samples must be accompanied by a Chain-of-Custody (CoC). A copy of the original CoC sent by the client must be included with all samples subbed within the network.

8.4 OVERSIGHT AND REPORTING

8.4.1 The Project Manager will communicate with the subcontracted laboratory to monitor the status of the analyses, facilitate successful execution of the work and ensure the timeliness and completeness of the analytical report.

8.4.2 Non-NELAC accredited work must be identified in the subcontractor's report as appropriate. If NELAC accreditation is not required, the report does not need to include this information.

8.4.3 The results submitted by a non-network subcontract laboratory are provided to the client using the subcontractor's original report with any accompanying documentation.

8.4.3.1 The results submitted by a network laboratory may be transferred electronically and the results reported by the network lab are identified on the final report. The final report must include a copy of the completed COC for all subcontracted work. For samples that are subbed within the network, the sub lab, in most cases, does not send a final signed report to the original lab. The original lab essentially signs off on the report to the client.

Figure 8-1

Example of Client-Approved Subcontractor Form

Client Information:

Client Name & Account Number:_____

Client Contact: _____

Client Address: _____

_____

Project Information: (Please choose all applicable.)

- **Certification required: □ State □ NELAC □ A2LA □ Method___**

  □ Target compound_____ □ Other_____

- **Required Turn around time (method provisional)_____**

Subcontractor's Information:

Subcontractor's Name: _____

Subcontractor's Contact: _____

Subcontractor's Email: _____

Subcontractor's Address: _____

_____

Subcontractor's Phone Number: _____

Analytical Test/Compound/Method to be subcontracted: _____

Certification Statement:

I hereby give TestAmerica-Irvine permission to use the above noted subcontractor for the above noted testing procedures/methods. I realize that the above subcontractor will be held liable for the validity of the above mentioned testing procedures/methods. All subcontractors shall meet the requirements as spelled out in project information and will follow all analytical holding times and turn around times for analytical reports. The subcontract laboratory, and not TestAmerica Analytical Testing Corp., will be held liable for liquidated damages for delays in subcontracted analytical reports and/or electronic data deliverables.

Client Signature **Date**

Figure 8-2

Subcontracting Laboratory Approval Form (Initial / Renewal)

SUBCONTRACTING LABORATORY APPROVAL

Reference: Section 8 – Quality Assurance Manual

Date: _____
Laboratory: _____

Address: _____
_____

Contact and e-mail address: _____
Phone: Direct _____ Fax _____

Requested Item[3]	Date Received	Reviewed/ Accepted	Date
1. QA Manual[3]			
2. Copy of State Certification[1]			
3. State Audit with Corrective Action Response (or NELAC or A2LA Audit)[3]			
4. Most Recent (and relevant) 2 Sets of WP/WS Reports with Corrective Action Response[1,3]			
5. SOQ or Summary list of Technical Staff and Qualifications [3]			
6. SOPs for Methods to Be Loadshifted[2,3]			
7. USDA Soil Permit			
8. Insurance Certificate			
9. Sample Report[3]			
10. Description of Business Ethics and Data Integrity Plan[3]			

1 - Required when emergency procedures are implemented.
2 - Some labs may not submit copies due to internal policies. In these cases, a copy of the first page and signature page of the SOP is acceptable. This requirement may also be fulfilled by supplying a table of SOPs with effective dates.
3 – If the laboratory has NELAC accreditation, Item #1,3,4, 5, 6, 9 and 10 are optional.

On Site Audit Planned: YES NO If yes, Date Completed: _____ By Whom: _____

Comments:

Lab Acceptable for Subcontracting Work: YES NO Limitations: _____

QA Manager: _____ Date: _____

Figure 8-3

Example Subcontracted Sample Form

Date/Time: _____

Subcontracted Laboratory Information:

- Subcontractor's Name: _____
- Subcontractor Point of Contact: _____
- Subcontractor's Address: _____
- Subcontractor's Phone: _____
- Analyte/Method: _____
- Certified for State of Origin: _____
- NELAC Certified: Yes_____No_____
- A2LA (or ISO 17025) Certified: Yes_____No_____
- CLP-like Required: Yes_____No_____
  (Full doc required)
- Requested Sample Due Date: _____
  (Must be put on COC)

Project Manager: _____

Laboratory Sample # Range: _____
(Only of Subcontracted Samples)

Laboratory Project Number (Billing Control #): _____

All subcontracted samples are to be sent via bonded carrier and Priority Overnight. Please attach tracking number below and maintain these records in the project files.

PM Signature_____**Date**_____

Section 9.0
(NELAC 5.4.6)
Purchasing Services and Supplies

9.1 GLASSWARE

9.1.1 All volumetric glassware must be Class A. Pyrex (or equivalent) glass should be used where possible. For safety purposes, thick-wall glassware should be used where available.

9.2 REAGENTS, STANDARDS, & SUPPLIES

9.2.1 Purchase

The nature of the analytical laboratory demands that all material used in any of the procedures is of a known quality. The wide variety of materials and reagents available makes it advisable to specify recommendations for the name, brand, and grade of materials to be used in any determination. This information is contained in the method Standard Operating Procedure (SOP). The analyst should complete the Purchase Requistion Entry Form (See Figure 9-1) when requesting reagents, standards, or supplies. The analyst must provide the vendor, catalog number, item description, package size, and the quantity needed. All requistions are forwarded to the labaoratory's Purchasing Agent for approval. New items or non-standard orders may need additional approval by the Laboratory Manager. The order is then placed through the purchase requisition database.

9.2.2 Receiving

Sample Control is responsible for receiving the shipment and notifying the laboratory. It is the responsibility of the ordering department to check the order for accuracy and to date the material when received. Once the ordered reagents or materials are received, the analyst compares the information on the label or packaging to ensure that the purchase meets the quality level specified in the SOP and meets any applicable specifications described below. Material Safety Data Sheets are received and reviewed by the Health and Safety Officer before being filed in the laboratory area where the material is stored. Anyone may review these for relevant information on the safe handling and emergency precautions of on-site.

9.2.3 Specifications

9.2.3.1 There are many different grades of analytical reagents available to the analyst. All methods in use in the laboratory specify the grade of reagent that must be used in the procedure. If the quality of the reagent is not specified, it may be assumed that it is not significant in that procedure and, therefore, any grade reagent may be used. It is the responsibility of the analyst to check the procedure carefully for the suitability of grade of reagent.

9.2.3.2 Chemicals must not be used past the manufacturer's expiration date and must not be used past the expiration time noted in a method SOP. If dates are not provided, the laboratory may contact the manufacturer to determine an expiration date.

9.2.3.2.1 The laboratory assumes a five year expiration date on inorganic dry chemicals unless noted otherwise by the manufacturer or by the reference source method.

- An expiration date can not be extended if the dry chemical is discolored or appears otherwise physically degraded, the dry chemical must be discarded.

- Expiration dates can be extended if the dry chemical is found to be satisfactory based on acceptable performance of quality control samples (Continuing Calibration Verification (CCV), blanks, Laboratory Control Sample (LCS), etc.).

- If the dry chemical is used for the preparation of standards, the expiration dates can be extended 6 months if the dry chemical is compared to an unexpired independent source in performing the method and the performance of the dry chemical is found to be satisfactory. The comparison must show that the dry chemical meets CCV limits. The comparison studies are filed with all other data for the method used. A specific reference to the comparison study (instrument, date, recovery, etc) in the standard comments in the laboratory's LIMS.

9.2.3.3 Wherever possible, standards must be traceable to NBS/NIST standards, and records to that effect are available to the user.

9.2.3.4 Compressed gas pressures are checked daily. A minimum of 2 full tanks (or six-packs for helium) should be on-hand at all times. Gas quality must meet method or manufacturer specification or be of a grade that does not cause any analytical interference.

9.2.3.5 Water used in the preparation of standards or reagents must meet at least ASTM Type II quality criteria for conductivity. It must have a conductivity of less than 1.0 μS at 25 ^{o}C. The conductivity is checked and recorded daily. If the water's conductivity is greater than the specified limit, the Laboratory Manager and/or QA Manager must be notified immediately in order to notify all departments, decide on cessation (based on intended use) of activities, and make arrangements for correction.

9.2.3.6 The laboratory may purchase reagent grade (or other similar quality) for use in the laboratory. This water must be certified "clean" by the supplier for all target analytes or otherwise verified by the laboratory prior to use. This verification is documented.

9.2.3.7 Prior to release to the laboratory, the lot of reagent or solvent must be analyzed by the primary method of use and found to contain no target analytes at levels at or above the method reporting limits. The following are to be tested by lot number: methylene chloride, methanol, hexane, acetone, nitric acid, hydrochloric acid, and sodium sulfate.

9.2.3.8 Standard lots are verified before first time use if the laboratory switches manufacturers or has historically had a problem with the type of standard.

9.2.3.9 VOA vials (preserved and unpreserved) must be certified clean and the certificates must be maintained. All lots must also be verified clean prior to use. This verification record must be maintained on file. See the laboratory's "Container and Reagent Verification" SOP for specific testing and documentation requirements.

9.2.4 Storage

Reagent and chemical storage is important from the aspects of both integrity and safety. Light-sensitive reagents may be stored in brown-glass containers. Table 9-1 details specific storage instructions for reagents and chemicals. Section 22 discusses conditions for standard storage.

9.3 PURCHASE OF EQUIPMENT/INSTRUMENTS/SOFTWARE

9.3.1 When a new piece of equipment is needed, either for additional capacity or for replacing inoperable equipment, the analyst or department manager makes a supply request to the Laboratory Manager. If they agree with the request, the Purchasing Agent is requested to contact appropriate vendors for price quotations and specifies instrument features. Based on this information and previous experience, a decision is made as to which one can best satisfy the requirements. For expenditures over $1000, the Laboratory Manager must have submit an capital expenditure request and have written approval from the Executive Vice President. A supply request form is then submitted to the Purchasing Agent, who places a purchase order with the vendor of choice.

9.3.2 Upon receipt of a new or used piece of equipment, it is given a coded name, such as "GCMS77" and a New Instrumentation Checklist is initiated (see figure 9-2). The instrument is added to the equipment list described in Section 21 that is maintained by the QA Department. IT must be notified so that can be linked for back-ups. A maintenance logbook is created. The instrument's capability is assessed to determine if it is adequate or not for the specific application. For instruments, a calibration curve is generated, followed by MDLs, DOCs, and other relevant criteria (see Section 20). For software, its operation must be deemed reliable and so stated in the instrument's maintenance logbook. Evidence of all verifications should be filed at the instrument and in the QA Department. Software certificates supplied by the vendors are filed with the LIMS Administrator. The manufacturer's operation manual is retained at the bench.

9.4 SERVICES

9.4.1 Service to analytical instruments (except analytical balances) is performed on an as needed basis. Routine preventative maintenance is discussed in Section 21. Service to analytical balances is performed at a minimum of an annual basis or more frequently as needed. The need for service is determined by analysts and/or Department Managers. The service providers that perform the services are approved by the Technical Manager.

9.5 SUPPLIERS

9.5.1 Evaluation of suppliers is accomplished by ensuring the supplier ships the product or material ordered and that the material is of the appropriate quality. This is documented by signing off on packing slips or other supply receipt documents. The purchasing documents contain the data that adequately describe the services and supplies ordered.

9.5.1.1 The laboratory must maintain a listing of all suppliers of critical consumables, supplies and services.

Figure 9.1 Material Request Order Screen

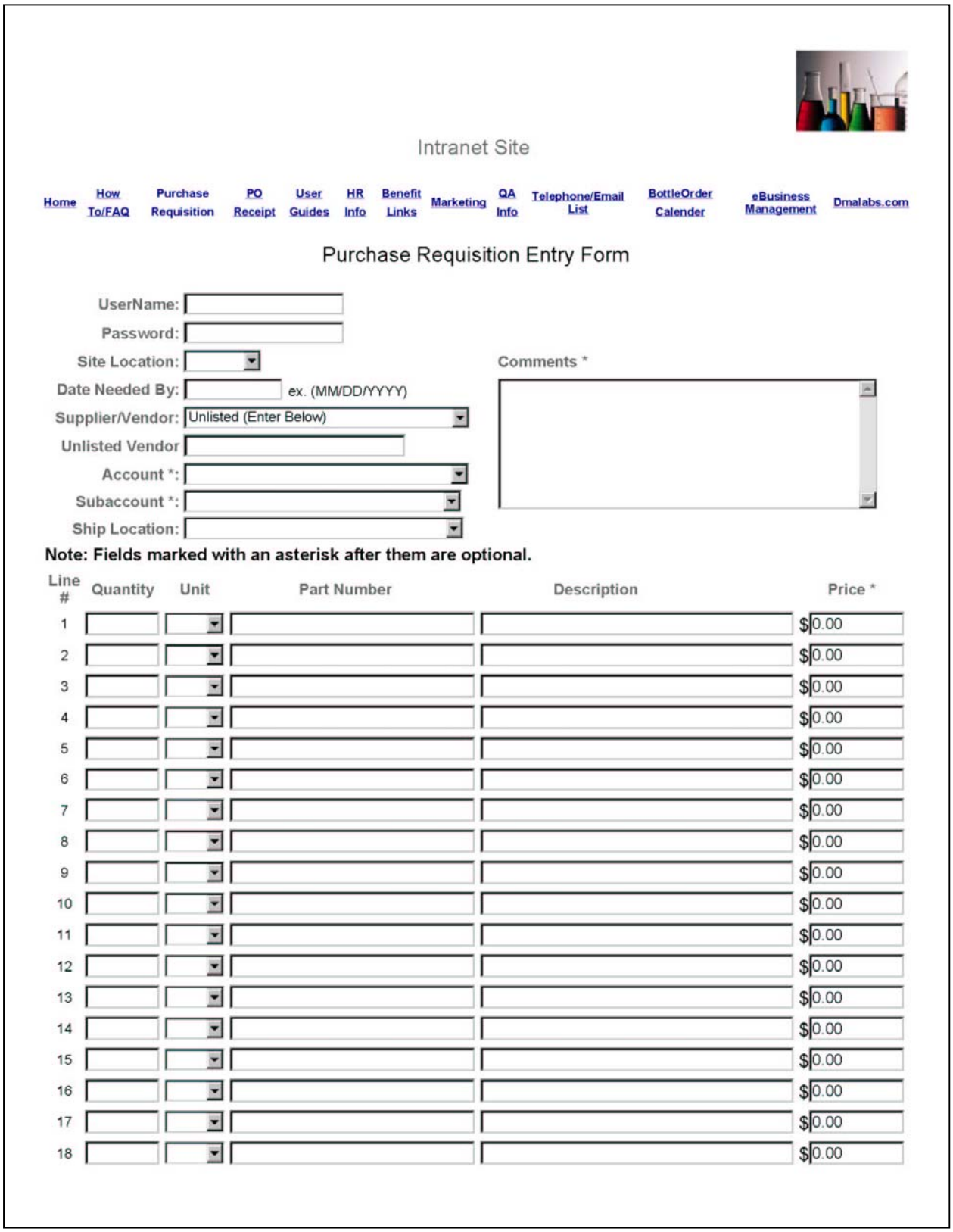


Figure 9-2 New Instrument Checklist

New Instrumentation Checklist

Department:	
ID Number:	
Date Installed:	
Method(s) Performed:	

Type*:			
Manufacturer:			
Model Number:			
Serial Number:			

*IC, GC, Autosampler, Purge&Trap, etc.

For QA:

Item	Date/Initials	Comments
Maintenance logbook created		
IT informed (so data backup process can be updated)		
Instrument tagged with ID number		
Instrument ID number entered into Element		
Passing MDLs performed for all relevant methods and matrices		
Laboratory equipment list updated		

G:\Depts\QUALITY\EQUIPMT\New Instrumentation Checklist.doc
Version 10/21/05

TABLE 9-1 STORAGE OF REAGENTS AND CHEMICALS

CHEMICAL STORAGE REQUIREMENTS

Concentrated acids and bases	1
Bulk dry chemicals	2
Working solutions containing organic compounds	3
Working solutions containing only inorganics	4
Flammable solvents	5
Non-flammable solvents	6

STORAGE REQUIREMENT KEY

1. Stored in the original containers at room temperature. All organic acids must be stored separately from inorganic acids. Acids should not be stored with bases.
2. Bulk reagents are stored at room temperature in the reagent storage room of the laboratory.
3. Stored refrigerated at 4°C± 2°C.
4. Stored at room temperature; refrigeration is optional.
5. Stored in solvent cabinets at room temperature
6. Stored separately from the flammable solvents in cabinets at room temperature.

Section 10.0
(NELAC 5.4.7)
SERVICE TO THE CLIENT

TestAmerica-Irvine cooperates with clients and their representatives to monitor the laboratory's performance in relation to work performed for the client. It is the laboratory's goal to meet all client requirements in addition to statutory and regulatory requirements discussed in Section 5. The laboratory has procedures to ensure confidentiality to other clients (Section 16 and 26).

Note: ISO 17025/NELAC 2003 states that a laboratory "shall afford clients or their representatives cooperation to clarify the client's request". This topic is discussed in Section 7.

10.1 SPECIAL SERVICES

The laboratory's standard procedures for reporting data are described in Section 26. When requested the following special services are provided:

10.1.1 The laboratory will provide the client or the client's representative reasonable access to the relevant areas of the laboratory for the witnessing of tests performed for the client.

10.1.2 The laboratory will work with client-specified third party data validators as specified in the client's contract.

10.1.3 The laboratory will provide the client with all requested information pertaining to the analysis of their samples. An additional charge may apply for additional data/information that was not requested prior to the time of sample analysis or previously agreed upon.

10.2 CLIENT COMMUNICATION

Project managers are an important communication link to the clients. The lab shall inform its clients of any delays in project completion as well as any non-conformances in either sample receipt or sample analysis. Project management will maintain ongoing client communication throughout the entire client project.

10.2.1 Technical Directors and the QA Manager are available to discuss any technical questions or concerns that the client may have.

10.3 REPORTING

10.3.1 The laboratory will work with the client to produce any special communication reports required by the contract.

10.4 CLIENT SURVEYS

10.4.1 The laboratory assesses both positive and negative client feedback. The results are used to improve overall laboratory quality and client service.

10.4.1.1 TestAmerica-Irvine participates in the American Council of Independent Laboratories (ACIL) Seal of Excellence program. This program includes the submission of a survey to laboratory clients. The clients send their responses directly to ACIL.

10.4.1.2 TestAmerica's Sales and Marketing team periodically develops lab and client specific surveys to assess client satisfaction.

Section 11.0
(NELAC 5.4.8)
COMPLAINTS

Addressing complaints is a normal function of conducting business and a valuable tool to improve services to and relationships with clients. The concept of a complaint encompasses inquiries, concerns or issues arising from clients or other parties, including accrediting authorities and laboratory staff. The process of complaint resolution utilizes the procedures outlined in Section 13 and is documented in a Corrective Action Report (CAR). It is TestAmerica-Irvine's goal to provide a satisfactory resolution to complaints in a timely and professional manner.

11.1 EXTERNAL COMPLAINTS

11.1.1 Complaints related to analytical reports are generally investigated by a Project Manager. These types of complaints may include, but are not limited to: report content and/or format, potential errors, turnaround time, and compliance with project requirements. The investigation may include discussions with the analyst, QA Manager, Laboratory Manager, and Department Manager, and is documented in a CAR.

11.1.2 Complaints related to quality systems, accreditation issues, and audit findings shall be investigated by the QA Manager.

11.1.3 If the complaint and/or subsequent investigation points to a QA systems failure, the QA Manager shall initiate an internal audit of the area/department involved and document the audit findings in the CAR.

11.1.4 The laboratory shall inform the initiator of the complaint of the results of the investigation and the corrective action taken, if any.

11.2 INTERNAL COMPLAINTS

11.2.1 Internal complaints include, but are not limited to: errors and non-conformances, training issues, internal audit findings, and deviations from methods. Corrective actions may be initiated by any staff member who observes a nonconformance and shall follow the procedures outlined in Section 13. In addition, Corporate management, Sales and Marketing and Information Technology (IT) may initiate a complaint.

11.3 MANAGEMENT REVIEW

11.3.1 Complaints and associated laboratory corrective actions shall be addressed in the Quality Assurance Report to Management (Section 17).

Section 12.0
(NELAC 5.4.9)
CONTROL OF NON-CONFORMING WORK

12.1 SUMMARY

12.1.1 When data discrepancies are discovered or deviations and departures from laboratory standard procedures, policies and/or client requests have occurred, corrective action is taken immediately. First, the management team evaluates the significance of the nonconforming work. Then, a corrective action plan is initiated based on the outcome of the evaluation. If it is determined that the nonconforming work is an isolated incident, the plan could be as simple as adding a qualifier to the final results. If it is determined that the nonconforming work is a systematic or improper practices issue, the corrective action plan could include a more in depth investigation and a possible suspension of an analytical method. In all cases, the actions taken are documented using the laboratory's corrective action system (see Section 13).

12.1.2 Due to the frequently unique nature of environmental samples, sometimes departures from documented policies and procedures are needed.

12.1.2.1 When an analyst encounters such a situation, the problem is presented to the group leader or department manager. The Department Manager may elect to discuss it with the Laboratory Manager, QA Manager or have a representative contact the client to decide on a logical course of action. Once an approach is agreed upon, the analyst documents it using the laboratories corrective action system described in Section 13. This information can then be supplied to the client in the form of a footnote or a case narrative with the report.

12.1.2.2 Project Management may encounter situations where a client may request that a special procedure be applied to a sample that is not standard lab practice. An example might be the need to report a compound that the lab does not normally report. The lab would not have validated the method for this compound following the procedures in Section 20. The client may request that the compound be reported based only on the calibration. Such a request would need to be approved by the Laboratory Manager and QA Manager, documented and included in the project folder. The deviation must also be noted on the final report with a statement that the compound is not reported in compliance with NELAC requirements and the reason. Data being reported to a non-NELAC state would need to note the change made to how the method is normally run. (See Section 20.3.2 for additional requirements.)

12.1.3 On a monthly basis, the laboratory management team reviews the non-conformance corrective actions to determine if any trends are present. If trends are found, such as repeated occurrences, further corrective action is taken to eliminate the reoccurrences as outlined in Section 13.

12.2 RESPONSIBILITIES AND AUTHORITIES

12.2.1 SOP CP01-06 (Internal Investigation of Potential Data Discrepancies and Determination for Data Recall) outlines the general procedures for the reporting and investigation of data discrepancies and alleged incidents of misconduct or violations of the company's data integrity policies as well as the policies and procedures related to the determination of the potential need to recall data.

12.2.2 Under certain circumstances the Laboratory Manager, a Department Manager, or the QA Manager may exceptionally authorize departures from documented procedures or policies. The departures may be a result of: procedural changes due to the nature of the sample, a one-time procedure for a client, QC failures with insufficient sample to reanalyze, etc. In most cases the client will be informed of the departure prior to the reporting of the data. Any departures must be well documented using the laboratory's corrective action system described in Section 13. This information may also need to be documented in logbooks and/or data review checklists as appropriate. Any impacted data must be referenced in a case narrative and/or flagged with an appropriate data qualifier.

12.2.3 Any nonconforming work or data discrepancy discovered by any laboratory staff member must be reported to laboratory management within 24-hours. The reporting of issues involving alleged violations of the company's data integrity policies or procedures or manual integration procedures must be conveyed to an Ethics and Compliance Officer (ECO) within 24 hours.

12.2.4 Whether an inaccurate result was reported due to calculation or quantitation errors, data entry errors, improper practices, or failure to follow standard operating procedures, the data must be evaluated to determine the possible effect.

12.2.5 The Laboratory Manager, QA Manager, Executive Vice President (EVP) – Eastern Division, EVP – Western Division and the ECOs have the authority and responsibility to halt work, withhold final reports, or suspend an analysis for due cause.

12.3 EVALUATION OF SIGNIFICANCE AND ACTIONS TAKEN

12.3.1 For each nonconforming issue reported, an evaluation of its significance and the level of management involvement needed is made. This includes reviewing its impact on the final data, whether or not it is an isolated or systematic issue, and how it relates to any special client requirements.

12.3.2 SOP CP01-06 (Internal Investigation of Potential Data Discrepancies and Determination for Data Recall) distinguishes between situations when it would be appropriate for the laboratory QA Manager and Laboratory Manager (or his/her designee) to make the decision on the need for client notification (written or verbal) and data recall (report revision) and when the decision must be made with the assistance of the ECO and Corporate management. Laboratory-level decisions are documented and approved using the laboratory's standard nonconformance/corrective action reporting (Section 13) in lieu of the data recall determination form contained in SOP CP01-06.

12.4 PREVENTION OF NONCONFORMING WORK

12.4.1 If it is determined that the nonconforming work could recur, further corrective actions must be made following the laboratory's corrective action system (Section 13).

12.4.2 On a monthly basis, the management team evaluates non-conformances to determine if any nonconforming work has been repeated multiple times. If so, the laboratory's corrective action process is followed.

12.5 METHOD SUSPENSION/RESTRICTION

12.5.1 In some cases it may be necessary to suspend/restrict the use of a method or target compound which constitutes significant risk and/or liability to the laboratory. Suspension/ restriction procedures can be initiated by any of the persons noted in Section 12.2.5 above.

12.5.2 Prior to suspension/restriction, confidentiality will be respected, and the problem and the required corrective and preventive action will be stated in writing and presented to the Laboratory Director/Manager.

12.5.3 The Laboratory Manager shall arrange for the appropriate personnel to meet with the QA Manager. This meeting shall be held to confirm that there is a problem and that suspension/restriction of the method is required.

12.5.4 The suspension/restriction meeting will conclude with a discussion of the steps necessary to bring the method, target, or test fully back on line. The QA Manager will also initiate a corrective action report as described in Section 13. A copy of the meeting notes and agreed upon steps should be faxed or e-mailed by the laboratory to the appropriate EVP and Corporate QA. This fax/e-mail acts as notification of the incident.

12.5.5 After suspension/restriction, the lab will hold all reports to clients pending review. No faxing, mailing or distributing through electronic means may occur. The report must not be posted for viewing on the internet. It is the responsibility of the Laboratory Manager to hold all reporting and to notify all relevant laboratory personnel regarding the suspension/restriction (i.e., Project Management, Log-in, etc…). Clients will NOT generally be notified at this time. Analysis may proceed in some instances depending on the non-conformance issue.

12.5.6 Within 72 hours, the QA Manager will determine if compliance is now met and reports can be released, OR determine the plan of action to bring work into compliance, and release work. A team, with all principals involved (Laboratory Manager, Quality Assurance Manager, Department Manager) can devise a start-up plan to cover all steps from client notification through compliance and release of reports. Sales and Marketing should be notified if clients must be notified or if the suspension/restriction affects the laboratory's ability to accept work. The QA Manager must approve start-up or elimination of any restrictions after all corrective action is complete. This approval is given by final signature on the completed corrective action report as described in Section 13.

Section 13.0
(NELAC 5.4.10)
CORRECTIVE ACTION

A major component of the TestAmerica Quality Assurance (QA) program is the problem investigation and feedback mechanism designed to keep the laboratory staff informed on quality related issues and to provide insight to problem resolution. When nonconforming work or departures from policies and procedures in the quality system or technical operations are identified, the corrective action procedure provides a systematic approach to assess the issues, restore the laboratory's system integrity, and prevent reoccurrence. Corrective actions are documented using Non-Conformance Reports (NCR) and Corrective Action Reports (CAR) (see Figure 13-1).

13.1 DEFINITIONS

13.1.1 Technical Corrective Action*:* Actions necessary to correct or repair analysis-specific non-conformances. The acceptance criteria for method specific quality control and protocols as well as the associated corrective actions are contained in the method specific SOPs. The analyst will most frequently be the one to identify the need for this action as a result of calibration checks and QC sample analysis. May or may not necessarily prevent recurrence.

13.1.2 Corrective Action*:* The action taken to eliminate the causes of an existing nonconformity, defect, or other undesirable situation in order to prevent recurrence. (ISO 8402)

13.2 GENERAL

13.2.1 Problems within the quality system or within technical operations may be discovered in a variety of ways, such as quality control sample failures, internal or external audits, proficiency testing performance, client complaints, staff observation, etc.

13.2.2 The purpose of a corrective action system is to:

13.2.2.1 Identify non-conformance events and assign responsibility for investigation.

13.2.2.2 Resolve non-conformance events and assign responsibility for any required corrective action.

13.2.2.3 Identify Systematic Problems before they become serious

13.2.2.4 Identify and track Client complaints and provide resolution (see more on client complaints in Section 11).

13.2.3 A Non-Conformance Report (NCR) is used to document the following types of corrective actions:

13.2.3.1 Deviations from an established procedure or SOP

13.2.3.2 QC outside of limits (non matrix related)

13.2.3.3 Reporting / Calculation Errors

13.2.3.4 Health and Safety Violations

13.2.3.5 Client Complaints

13.2.4 A Corrective Action Report (CAR) is used to document the following types of corrective actions:

13.2.4.1 Questionable trends that are found in the monthly review of NCRs.

13.2.4.2 Issues found while reviewing NCRs that warrant further investigation.

13.2.4.3 Internal and External Audit Findings.

13.2.4.4 Failed or Unacceptable PT results.

13.2.4.5 Corrective actions that cross multiple departments in the laboratory.

13.2.5 There are four main components to a closed-loop corrective action process once an issue has been identified: Cause Analysis, Selection and Implementation of Corrective Actions (both short and long term), Monitoring of the Corrective Actions, and Follow-up Audits.

13.2.5.1 CAUSE ANALYSIS

13.2.5.1.1 Upon discovery of a non-conformance event, the event must be defined and documented. An NCR or CAR must be initiated, someone is assigned to investigate the issue and the event is investigated for cause. Table 13-1 provides some general guidelines on determining responsibility for assessment.

13.2.5.1.2 The cause analysis step is the key to the process as a long term corrective action cannot be determined until the cause is determined.

13.2.5.1.3 If the cause is not readily obvious, the Department Manager, Lab Manager, or QA Manager (or QA designee) is consulted.

13.2.5.2 SELECTION AND IMPLEMENTATION OF CORRECTIVE ACTIONS

13.2.5.2.1 Where corrective action is needed the laboratory shall identify potential corrective actions. The action(s) most likely to eliminate the problem and prevent recurrence are selected and implemented. Responsibility for implementation is assigned.

13.2.5.2.2 Corrective actions shall be to a degree appropriate to the magnitude of the problem identified through the cause analysis.

13.2.5.2.3 Whatever corrective action is determined to be appropriate, the laboratory shall document and implement the changes. The NCR or CAR is used for this documentation.

13.2.5.3 MONITORING OF THE CORRECTIVE ACTIONS

13.2.5.3.1 The Department Manager and QA Manager are responsible to ensure that the corrective action taken was effective.

13.2.5.3.2 Each NCR and CAR is entered into a database for tracking purposes and a monthly summary of all corrective actions is printed out for review to aid in ensuring that the corrective actions have taken effect.

13.2.5.3.3 The QA Manager and Laboratory Manager review the monthly summary of NCRs and CARs for trends. This is part of the QA Report (see Section 17). If a significant trend develops that adversely affects quality, an audit of the area is performed and corrective action implemented.

13.2.5.4 ADDITIONAL AUDITS

13.2.5.4.1 Additional audits shall be performed as soon as possible when the identification of a nonconformance casts doubt on the laboratory's compliance with its own policies and procedures, or on its compliance with state or federal requirements. (Section 16 includes additional information regarding internal audit procedures.)

13.2.5.4.2 These audits often follow the implementation of the corrective actions to verify effectiveness. An additional audit would only be necessary when a critical issue or risk to business is discovered.

13.3 TECHNICAL CORRECTIVE ACTIONS

13.3.1 In addition to providing acceptance criteria and specific protocols for technical corrective actions in the method SOPs, the laboratory has general procedures to be followed to determine when departures from the documented policies and procedures and quality control have occurred (see Section 12 for information regarding the control of non-conforming work). The documentation of these procedures is through the use of an NCR or CAR.

13.3.2 Table 13-1 includes examples of general technical corrective actions for analytical methods that might be found in specific method SOPs.

13.3.2.1 Table 13-1 provides some general guidelines for identifying the individual(s) responsible for assessing each QC type and initiating corrective action. The table also provides general guidance on how a data set should be treated if associated QC measurements are unacceptable. Specific procedures are included in Method SOPs, QAM Sections 20 and 21, and SOP CP01-06 (Internal Investigation of Potential Data Discrepancies and Determination for Data Recall). All corrective actions are documented using an NCR or CAR. Technical Corrective Actions are reviewed at a minimum monthly by the QA Manager, Department Supervisors/Managers and Laboratory Director/Manager through the QA Monthly Report which includes a summary of all corrective actions.

13.3.3 To the extent possible, samples shall be reported only if all quality control measures are acceptable. If a quality control measure is found to be out of control, and the data is still to be reported, all samples associated with the failed quality control measure shall be reported with an appropriate data qualifier.

13.4 BASIC CORRECTIONS

13.4.1 When mistakes occur in records, each mistake shall be crossed out, and not erased, deleted, made illegible, or otherwise obliterated (e.g. no white-out), and the correct value entered alongside. All such corrections shall be initialed (or signed) and dated by the person making the correction. In the case of records stored electronically, the original "uncorrected" file must be maintained intact and a second "corrected" file is created.

13.4.1.1 This same process applies to adding additional information to a record. All additions made later than the initial must also be initialed (or signed) and dated.

13.4.1.2 When corrections are due to reasons other than obvious transcription errors, the reason for the corrections (or additions) shall also be documented.

Figure 13-1a

CORRECTIVE ACTION REPORT

Example Screens:

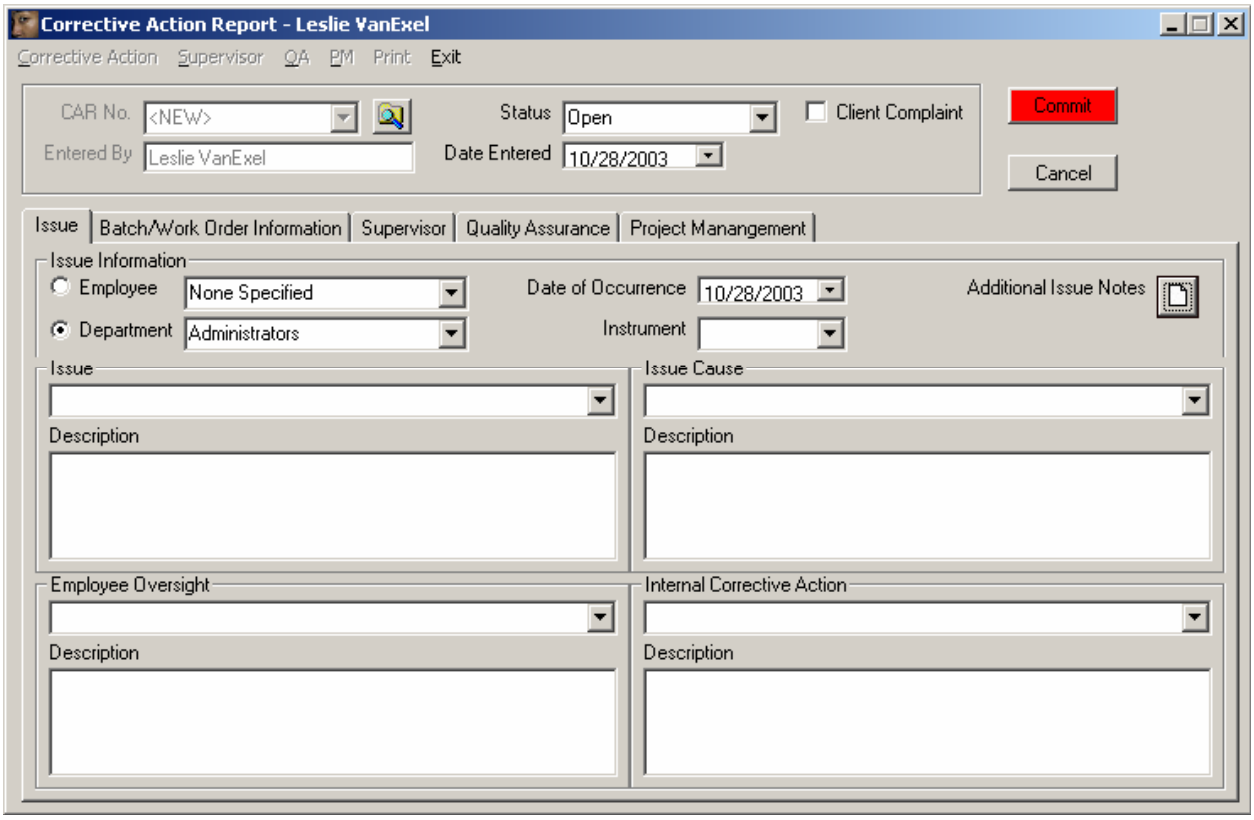


Figure 13-1b

Figure 13-1c

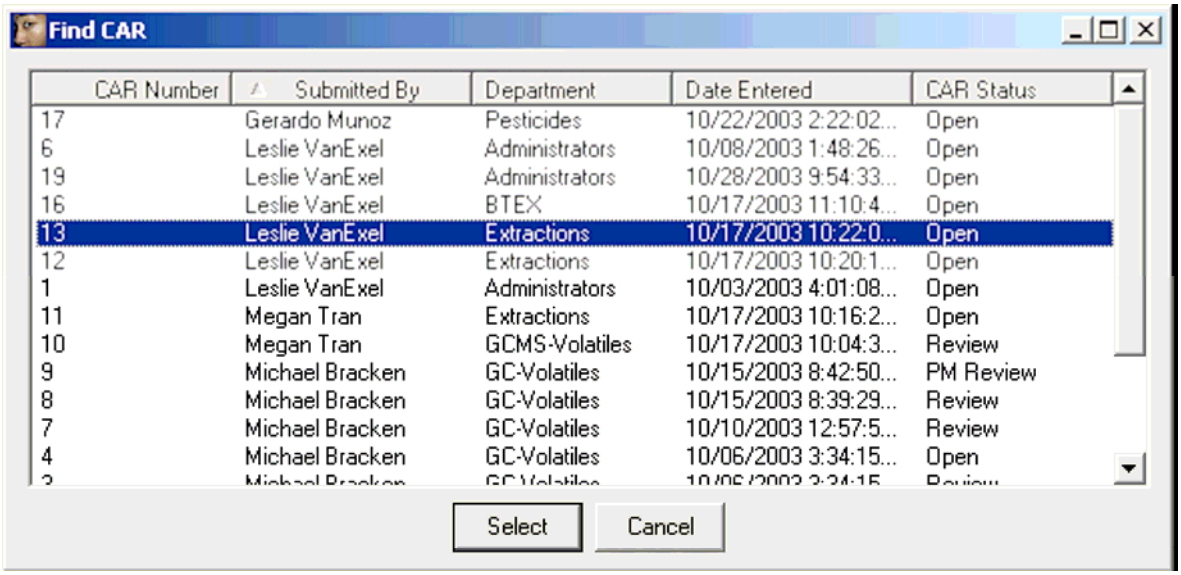


Table 13-1

GENERAL CORRECTIVE ACTION PROCEDURES

QC Activity ***(Individual Responsible for Initiation/Assessment)***	**Acceptance Criteria**	**Recommended Corrective Action**
Initial Instrument Blank *(Analyst)*	Instrument response < MDL or MRL[1].	Prepare another blank. If same response, determine cause of contamination: reagents, environment, instrument equipment failure, etc.
Initial Calibration Standards *(Analyst, Reviewer)*	Correlation coefficient > 0.990 (organics) or >0.995 (inorganics) or RSD within acceptance limits (for average RF or CF)	Reanalyze standards. If still unacceptable, remake standards.
Independent Calibration Verification (second source) *(Analyst, Reviewer)*	Percent recovery within acceptance range.	Reanalyze standard. If still unacceptable, then remake calibration standards or use new primary standards.
Continuing Calibration Standards *(Analyst, Reviewer)*	Percent recovery within acceptance range.	Reanalyze standard. If still unacceptable, then correct problem, recalibrate if necessary and rerun affected samples.
Matrix Spike/Matrix Spike Duplicate *(Analyst, Reviewer)*	Within limits documented in specific method SOP	If the acceptance criteria for duplicates or matrix spikes are not met because of matrix interferences, the acceptance of the analytical batch is determined by the validity of the LCS. If the LCS is within acceptable limits the batch is acceptable. The results of the duplicates, matrix spikes and the LCS are reported with the data set.

QC Activity ***(Individual Responsible for Initiation/Assessment)***	**Acceptance Criteria**	**Recommended Corrective Action**
Laboratory Control Sample *(Analyst, Reviewer)*	Within limits specified in specific method SOP	Batch must be re-prepared and re-analyzed. If LCS is out high and samples are ND, can report with qualifier. Otherwise, if there is insufficient sample or the holding time cannot be met, contact client and report with flags.
Surrogates *(Analyst, Reviewer)*	Within limits of method	Individual sample must be repeated to confirm.
Method Blank *(Analyst, Reviewer)*	< RL[1]	Reanalyze blank. If still positive, determine source of contamination. If necessary, reprocess (i.e. digest or extract) entire sample batch. Report blank results.
Performance Testing (PT) Samples *(QA Manager, Department Manager)*	Criteria supplied by PT Supplier	Any failures or warnings must be investigated for cause. Failures may result in the need to repeat a PT sample to show the problem is corrected.
Internal/External Audits *(QA Manager, Department Manager, Laboratory Director)*	Defined in Quality System documentation such as SOPs, QAM, etc …	Non-conformances must be investigated through CAR system and necessary corrections must be made.
Reporting/Calculation Errors *(Depends on issue – possible individuals include: Analysts, Data Reviewers, Project Managers, Department Manager, QA Manager, Corporate QA, Corporate Management)*	SOP CP01-06 (Internal Investigation of Potential Data Discrepancies and Determination for Data Recall)	Corrective action is determined by type of error. Follow procedures in SOP CP-01-06.

QC Activity ***(Individual Responsible for Initiation/Assessment)***	**Acceptance Criteria**	**Recommended Corrective Action**
Client Complaints *(Project Managers, Lab Director, Sales and Marketing)*		Corrective action is determined by the type of complaint. For example, a complaint regarding an incorrect address on a report will result in the report being corrected and then follow-up must be performed on the reasons the address was incorrect. Perhaps a database needs to be updated.
QA Monthly Report (See Section 17 for example.) *(QA Manager, Lab Director, Department Managers)*	QAM, SOPs	Corrective action is determined by the type of issue. For example, CARs for the month are reviewed and possible trends are investigated.
Health and Safety Violation *(Safety Officer, Lab Director, Department Manager)*	Chemical Hygiene Plan	Non-conformance is investigated and corrected through CAR system.

Note:
1. See specific method SOP for blank requirements. Concentrations up to five times the reporting limit will be allowed for the ubiquitous laboratory and reagent contaminants: methylene chloride, toluene, acetone, 2-butanone and phthalates provided they appear in similar levels in the reagent blank and samples. This allowance presumes that the detection limit is significantly below any regulatory limit to which the data are to be compared and that blank subtraction will not occur. For benzene and ethylene dibromide (EDB) and other analytes for which regulatory limits are extremely close to the detection limit, the method blank must be below the method detection limit

Section 14.0
(NELAC 5.4.11)
PREVENTIVE ACTION

Dedicating resources to an effective preventive action system emphasizes Test America's commitment to its Quality Assurance (QA) program. It is beneficial to identify and address negative trends before they develop into complaints, problems and corrective actions. Additionally, customer service and satisfaction can be improved through continuous improvements to laboratory systems.

Preventive Action is a proactive process to identify opportunities for improvement rather than a reaction to the identification of problems or complaints. Preventive action identifies negative trends and attempts to correct them before they become significant.

14.1 Opportunities for improvement may be discovered during management reviews, internal or external audits, proficiency testing performance, client complaints, staff observation, etc.

14.2 Preventive action may be initiated by any employee of the company.

14.3 Documentation of Preventive Action is required. Even when the QA Manager has no direct role in the Preventive Action, the QA Manager shall, at a minimum, serve to verify correct documentation of the process. Preventive Actions are documented with the use of the Corrective Action Report (CAR) database system. *"Preventive Action" is selected in the "Issue" drop down menu.*

14.4 The following elements are part of a Preventive Action system:

14.4.1 Identification of an Opportunity for Preventive Action. The need for preventive action is identified (describe in "Issue" section of CAR database). Correctly defining the root cause of a potential problem is essential for a successful Preventive Action. (Identification of root cause is documented in the "Issue Cause" section). Additionally, a rough cost benefit analysis should be undertaken at this point to assess the worst case scenario of no action compared to the resources to be spent to perform the preventive action. Resources expended in Preventive Actions should be appropriate to the magnitude of the potential problem. *(This information is documented in the "Additional Issue Notes" section.)*

14.4.2 Procedure for the Preventive Action. At this point, all of the technical resources should become involved. The Preventive Action, once correctly identified, will only be as good as the plan to investigate it. *(Summary of plan for investigation should be included in the "Additional Notes Section" and actual steps to be taken for preventive action are to be included in "Internal Corrective Action" box. A time frame for implementation must also be included.)*

14.4.3 Define the Control to be used to measure the effectiveness of the Plan once undertaken. *(Document in "Internal Corrective Action" box.)* Statistics or accounting principles will likely be used to define how the success of the Preventive Action will be determined.

14.4.4 Execution of the Preventive Action. A time period for evaluation is, if not already defined, determined in this step. *(Document planned date and responsible person for evaluation in "Internal Corrective Action" box.)*

14.4.5 Evaluation of the plan using the defined controls. The plan is evaluated to confirm that is effective. Any needed changes are documented in the *"Additional Notes Box"* and the *"Internal Corrective Action"* box.

14.4.6 Verification of the effectiveness of the Preventive Action. This step uses the same controls as the evaluation and serves to affirm the conclusions of that evaluation.

14.4.7 Close-Out by documenting the permanent changes to the Quality System as a result of the Preventive Action. *(The CAR is closed out by QA Manager.)*

14.5 Any Preventive Actions undertaken or attempted shall be taken into account during the Annual Management Review (Section 17). A highly detailed recap is not required; a simple recount of success and failure within the Preventive Action program will provide to Management a measure for evaluation.

14.6 MANAGEMENT OF CHANGE

The Management of Change System is designed to manage significant events and changes that occur within the laboratory. Through these procedures, the potential risks inherent with a new event or change are identified and evaluated. The risks are minimized or eliminated through pre-planning and the development of preventive measures. The types of changes covered under this system include: Facility Changes, Major Accreditation Changes, Changes to the QA Manual, Addition or Deletion to Division's Capabilities, Key Personnel Changes, Laboratory Information Management System (LIMS) changes.

14.6.1 Exemptions: Changes that do not require the application of the Management of Change System include: Maintenance, repairs and activities which are "repair or replacement in-kind", and other changes at the discretion of the Laboratory Director.

14.6.2 When it is determined that the Management of Change process is required, the Management of Change Request Form (CRF) is completed (Figure 14-1) and submitted to the Laboratory Director. Part A describes the change, Part B identifies all the reviews required, Part C shows the assigned tasks necessary to complete the change, Part D identifies the approval signatures necessary prior to making the change, and Part E documents a review to ensure that the procedures were properly implemented. Figure 14-2 provides information for completing part D of the form.

14.6.3 The QA Department is the administrator of the Management of Change System. Responsibilities include:

14.6.3.1 Maintaining copies of all initiated CRFs until they are completed

14.6.3.2 Maintaining a list of all incomplete CRFs and notifiying the Laboratory Director of all incomplete forms that are past the suggested review date. This notification is documented in the QA Report (Section 17).

14.6.3.3 Maintaining copies of all completed CRFs.

14.6.3.4 Reviewing forms for completeness.

14.6.3.5 Analyzing system to determine its effectiveness and initiating corrections as needed.

Figure 14-1 Management of Change Request Form

TestAmerica
ANALYTICAL TESTING CORPORATION

MANAGEMENT OF CHANGE REQUEST FORM (CRF)

Part A – Request Information *(To Be Completed by Initiator)*

- ❑ Attach any information on existing or proposed specifications if applicable.
- ❑ Check all reasons for request:

☐ Facilities	☐ Temporary	☐ Personnel
☐ Safety/Health	☐ Accreditation	☐ Other:
☐ QAM	☐ Capabilities	

- ❑ If temporary, specify date when modifications are to be removed: _____

Description and justification/impact of change:

Initiator: _____ Date: _____

Part B – Preliminary Review *(To Be Completed by Lab Director)*

Check off boxes that require a review and give to responsible person(s).

	Required Reviews	Date Reviewed	Preliminary Review Comments *(Attach any additional comments.)*	Reviewer Initials
	Lab Director			
	Technical Director/Dept Manager			
	QA Manager			
	Project Management			
	LIMS Administrator			
	Exec VP-Operations			
	VP/QA			
	QA Director			
	Safety			
	Exec VP/Sales & Marketing			
	President/CEO			
	Other:			

Part C – Assigned Tasks, person(s), and dates necessary to complete the change are assigned by the Laboratory Director. Instructions for Lab Director: Fill out part C, obtain all Approval Signatures in Part D, and then give photocopy of CRF to each person assigned a task and QA Manager.

Tasks Required to complete the change:	Person(s) Assigned:	Date Task Assigned:	Target Completion Date:	Date Task Completed
				:

Part D – Approvals: Approvals are required prior to proceeding with the tasks in Part C (see Figure 14-2 for recommended approval authorities). The Lab Director is responsible for obtaining the required signatures and for assigning a review person and suggested date of review in Part E.

Proceed with Change?		Signature and Title	Date
Yes	No		

Part E – Confirmation

Assigned person to confirm that Part C tasks were completed: _____

Suggested date of review: _____

Date review completed: _____

Review performed by:

_____ _____
Signature Date:

Comments/Recommendations:

- ❑ All assigned tasks are complete (write the date each assigned task was completed in the table in Part C)
- ❑ Some / All assigned tasks incomplete (notify Lab Director and determine a new date for review)

Table 14-2

Management of Change Approval Authority Table

Change	Approval Authority Needed
Facility	Laboratory Director / Corporate
Accreditation	Laboratory Director / Corporate (VP of QA, Operations, Sales & Marketing)
QA Manual	Laboratory Director / QA Manager (VP of QA if change to Corporate policies or format.)
Capabilities	Laboratory Director / QA Manager/Technical Director /Sales & Marketing
Personnel	Laboratory Director
Safety/Health	Laboratory Director / Safety Officer (Director of Safety if change to corporate policies or format.)
Other	Laboratory Director determines persons who must approve the change.

Section 15.0
(NELAC 5.4.12)
CONTROL OF RECORDS

TestAmerica-Irvine maintains a record system appropriate to its needs and that complies with applicable standards or regulations as required. The system produces unequivocal, accurate records that document all laboratory activities. The laboratory retains all original observations, calculations and derived data, calibration records and a copy of the analytical report for a minimum of five years after it has been issued. The laboratory's Record Archiving SOP (ARCHIV.SOP) addresses all specifics of how data is archived.

15.1 GENERAL

15.1.1 The laboratory has established procedures for identification, collection, indexing, access, filing, storage, maintenance and disposal of quality and technical records. Quality records are maintained by the Quality Assurance (QA) Manager in a database, which is backed up as part of the regular network backup. Quality records include reports from internal audits and management reviews as well as records of corrective and preventive actions, original SOPs, historical quality control limits, etc... Records are of two types; either electronic or hard copy paper formats depending on whether the record is computer or hand generated (some records may be in both formats). Technical records are maintained by the specific department that generated them until they are moved either to the data storage shelving area or are shipped off-site, at which time they are the responsibility of the Data Archive Specialist.

15.1.2 All records are legible and are stored and retained in such a way that they are secure and readily retrievable at the laboratory. Records generated from the previous six months and up to one year are kept at the laboratory. Records older than this are stored at Cor-O-Van, an off-site document storage company. Both the laboratory and Cor-O-Van provide a suitable environment to prevent damage or deterioration and to prevent loss. Records are maintained for a minimum of five years unless otherwise specified by a client or regulatory requirement (i.e., City of Scottsdale – 10 years; Drinking Water Copper and Lead – 12 years).

15.1.3 All records are held secure and in confidence. Records maintained at the laboratory are located either in the department that originally generated the data or on the data storage shelves adjacent to Sample Receiving**.** Records archived off-site are stored in a secure location where a record is maintained of any entry into the storage facility. Logs are maintained in each storage box to note removal and return of records.

15.1.4 The laboratory has procedures to protect and back-up records stored electronically and to prevent unauthorized access to or amendment of these records. All analytical data is maintained as hard copy or in a secure readable electronic format. Analytical reports are maintained as electronic copies in pdf format. See Section 20.12.1 'Computer and Electronic Data Related Requirements' for more information.

15.1.5 The record keeping system allows for historical reconstruction of all laboratory activities that produced the analytical data, as well as rapid recovery of historical data (Records stored off site should be accessible within 2 days of a request for such records). The history of the sample from when the laboratory took possession of the samples must be readily

understood through the documentation. This shall include inter-laboratory transfers of samples and/or extracts.

15.1.5.1 The records include the identity of personnel involved in sampling, sample receipt, preparation, or testing. All analytical work contains the initials (at least) of the personnel involved. The laboratory's copy of the chain of custody is stored with the invoice and the work order sheet generated by the LIMS. The chain of custody would indicate the name of the sampler. If any sampling notes are provided with a work order, they are kept with this package.

15.1.5.2 All information relating to the laboratory facilities equipment, analytical test methods, and related laboratory activities, such as sample receipt, sample preparation, or data verification are documented. The LIMS maintains an audit trail of data verification steps.

15.1.5.3 The record-keeping system facilitates the retrieval of all working files and archived records for inspection and verification purposes (e.g., set format for naming electronic files, set format for what is included with a given analytical data set. Instrument data is stored sequentially by instrument. A given day's analyses are maintained in the order of the analysis. Run logs are maintained for each instrument or method; a copy of each day's run long or instrument sequence is stored with the data to aid in re-constructing an analytical sequence. Where an analysis is performed without an instrument, bound logbooks or bench sheets are used to record and file data. Standard and reagent information is recorded in logbooks or entered into the LIMS for each method as required.

15.1.5.4 Changes to hardcopy records shall follow the procedures outlined in Section 13 and 20. Changes to electronic records in LIMS or instrument data are recorded in audit trails.

15.1.5.5 The reason for a signature or initials on a document is clearly indicated in the records such as "sampled by," "prepared by," "reviewed by", "Analyzed by" or "Analyst name".

15.1.5.6 All generated data except those that are generated by automated data collection systems, are recorded directly, promptly and legibly in permanent dark ink.

15.1.5.7 Also see Section 20.12.1 'Computer and Electronic Data Related Requirements'**.**

15.2 TECHNICAL RECORDS

15.2.1 The laboratory retains records of original observations, derived data and sufficient information to establish an audit trail, calibration records, staff records and a copy of each analytical report issued, for a minimum of five years unless other wise specified by a client or regulatory requirement (i.e., Drinking Water and Ohio VAP – 10 years; Drinking Water Copper and Lead – 12 years). The records for each analysis shall contain sufficient information to enable the analysis to be repeated under conditions as close as possible to the original. The records shall include the identity of laboratory personnel responsible for the sampling, performance of each analysis and checking of results.

15.2.2 Observations, data and calculations are recorded at the time they are made and are identifiable to the specific task.

15.2.3 Changes to hardcopy records shall follow the procedures outlined in Section 13 and 20. Changes to electronic records in LIMS or instrument data are recorded in audit trails.

15.3 RECORDS MANAGEMENT, STORAGE AND DISPOSAL

15.3.1 All records (including those pertaining to test equipment), certificates and reports are safely stored, held secure and in confidence to the client. Certification-related records are available to the accrediting body upon request.

15.3.2 All information necessary for the historical reconstruction of data is maintained by the laboratory. Records that are stored only on electronic media must be supported by the hardware and software necessary for their retrieval.

15.3.3 Records that are stored or generated by computers or personal computers have hard copy, write-protected backup copies, or an electronic audit trail controlling access**.**

15.3.4 TestAmerica-Irvine has a record management system for control of laboratory notebooks, instrument logbooks, standards logbooks, and records for data reduction, validation, storage and reporting. Laboratory notebooks are issued on a per analysis basis, and are numbered sequentially within a given type of information (e.g. Maintenance, Analytical, Temperature Monitoring). No analysis has more than one active notebook at a time, so all data are recorded sequentially within a series of sequential notebooks. Bench sheets are filed sequentially instrument, date, and batch. Standards are primarily maintained in the LIMS. Some standards, particularly those prepared on a daily basis, are documented in controlled logbooks**.**

15.3.5 Records are considered archived when moved off-site. Access to archived hard-copy information is documented with an access log and in/out records are used in archived boxes to note data that is removed and returned. All records shall be protected against fire, theft, loss, environmental deterioration, vermin and, in the case of electronic records, electronic or magnetic sources. Access to the data is limited to TestAmerica employees**.**

15.3.6 In the event that the laboratory transfers ownership or goes out of business, TestAmerica-Irvine shall ensure that the records are maintained or transferred according to clients instructions. In addition, in cases of bankruptcy, appropriate regulatory and state legal requirements concerning laboratory records must be followed. In the event of the closure of the laboratory, all records will revert to the control of the Corporate headquarters. Should the entire company cease to exist, as much notice as possible will be given to clients and the accrediting bodies who have worked with the laboratory during the previous 5 years of such action**.**

15.3.7 Records Disposal

15.3.7.1 Records are removed from the archive and disposed after 5 years unless otherwise specified by a client or regulatory requirement. Records are destroyed in a manner that ensures their confidentiality such as shredding, mutilation or incineration.

15.3.7.2 Electronic copies of records must be destroyed by erasure or physically damaging off-line storage media so no records can be read.

15.3.7.3 If a third party records management company is hired to dispose of records, a "Certificate of Destruction" is required.

15.3.8 Laboratory sample tracking is discussed in Section 24.

15.4 SAMPLE HANDLING RECORDS

Sample handling is discussed in Section 24. Records of all procedures to which a sample is subjected while in the possession of the laboratory are maintained. These include but are not limited to records pertaining to:

15.4.1 sample preservation including appropriateness of sample container and compliance with holding time requirement; these items are recorded and reported via the LIMS;

15.4.2 sample identification, receipt, acceptance or rejection and login; these items are recorded and reported via the LIMS;

15.4.3 sample storage and tracking including shipping receipts, sample transmittal / chain of custody forms; and

15.4.4 procedures for the receipt and retention of samples, including all provisions necessary to protect the integrity of samples.

15.5 LABORATORY SUPPORT ACTIVITIES

In addition to documenting all the above-mentioned activities, the following are retained (previous discussions in this section relate where and how these data are stored):

15.5.1 all original raw data, whether hard copy or electronic, for calibrations, samples and quality control measures, including analysts' work sheets and data output records (chromatograms, strip charts, and other instrument response readout records)**;**

15.5.2 a written description or reference to the specific test method used which includes a description of the specific computational steps used to translate parametric observations into a reportable analytical value**;**

15.5.3 copies of final reports**;**

15.5.4 archived SOPs**;**

15.5.5 correspondence relating to laboratory activities for a specific project**;**

15.5.6 all corrective action reports, audits and audit responses**;**

15.5.7 proficiency test results and raw data; and

15.5.8 results of data review, verification, and crosschecking procedures

15.6 ANALYTICAL RECORDS

The essential information to be associated with analysis, such as strip charts, tabular printouts, computer data files, analytical notebooks, and run logs, include (previous discussions relate where most of this information is maintained – specifics may be added below):

15.6.1 laboratory sample ID code**;**

15.6.2 date of analysis and time of analysis is required if the holding time is seventy-two (72) hours or less, or when time critical steps are included in the analysis (e.g., drying times, incubations, etc.); instrumental analyses have the date and time of analysis recorded as part of their general operations. Where a time critical step exists in an analysis, location for such a time is included as part of the documentation in a specific logbook or on a benchsheet.

15.6.3 instrumentation identification and instrument operating conditions/parameters. Operating conditions/parameters are typically recorded in instrument maintenance logs where available.

15.6.4 analysis type**;**

15.6.5 all manual calculations (e.g., manual integrations)**;**

15.6.6 analyst's or operator's initials/signature**;**

15.6.7 sample preparation including cleanup, separation protocols, incubation periods or subculture, ID codes, volumes, weights, instrument printouts, meter readings, calculations, reagents**;**

15.6.8 test results**;**

15.6.9 standard and reagent origin, receipt, preparation, and use**;**

15.6.10 calibration criteria, frequency and acceptance criteria**;**

15.6.11 data and statistical calculations, review, confirmation, interpretation, assessment and reporting conventions**;**

15.6.12 quality control protocols and assessment**;**

15.6.13 electronic data security, software documentation and verification, software and hardware audits, backups, and records of any changes to automated data entries; and

15.6.14 method performance criteria including expected quality control requirements. These are indicated both in the LIMS and on specific analytical report formats**.**

15.7 ADMINISTRATIVE RECORDS

The laboratory also maintains the following records in either electronic or hard copy form:

15.7.1 personnel qualifications, experience and training records**;**

15.7.2 records of demonstration of capability for each analyst; and

15.7.3 a log of names, initials and signatures for all individuals who are responsible for signing or initialing any laboratory record.

Section 16.0
(NELAC 5.4.13)
AUDITS

Audits measure laboratory performance and insure compliance with accreditation/certification and project requirements. Audits specifically provide management with an on-going assessment of the quality of results produced by the laboratory, including how well the policies and procedures of the Quality Assurance (QA) system, as well as the Ethics Policy and Data Integrity Plan, are being executed. They are also instrumental in identifying areas where improvement in the QA system will increase the reliability of data. Audits are of four main types: internal, external, performance, and system.

16.1 INTERNAL AUDITS

16.1.1 Annually, the laboratory prepares a schedule of internal audits to be performed throughout the year. These audits are intended to verify that operations continue to comply with the requirements of the laboratory QA system, ethics policies and the NELAC standard. There are various types of internal audits that occur on a regular basis. Performance (Section 16.4) and System (Section 16.5) Audits are also considered to be internal audits.

16.1.2 It is the responsibility of the QA Manager to plan and organize audits as required by the schedule and requested by management. Personnel shall not audit their own activities except when it can be demonstrated that an effective audit will be carried out. In general, the auditor

16.1.2.1 is neither the person responsible for the process being audited nor the immediate supervisor of the person responsible for the project/process.

16.1.2.2 should be free of any conflicts of interest.

16.1.2.3 should be free from bias and influences that could affect objectivity.

16.1.2.4 should have a minimum of 4 years practical laboratory experience, at least 2 years of which should have been in quality assurance activities. If this experience criteria is not met, the audit must be reviewed by an individual that meets this criteria.

16.1.3 Technical specialists may assist with audits, performing such activities as preparing technical portions of audit checklists and conducting the technical portion of an audit.

16.1.4 Report/Data Audits

16.1.4.1 On a regular basis, the QA Manager identifies and pulls a work order that has been reported in the previous week and gathers up all associated raw data for the work order including standard and reagent logs, calibration files (initial and continuing), sequence files, maintenance logs, all instrument data and logs. All results included on the work order are audited.

16.1.4.2 The QA Manager tracks the method, matrix and analyst in order to ensure that these audits include a review of a variety of methods and analysts.

16.1.4.3 The work order information is checked against the COC and is audited for accuracy, documentation completeness and compliance with the method SOP as well as compliance to manual integration policies.

16.1.4.3.1 Include review of manual integrations against laboratory policies and review audit trail files and/or perform MintMiner scan on any relevant data files For laboratories using Mintminer, perform Mintminer scans on archived data files to ensure tape back-up is working properly and verify data has not been changed since originally reported. Mintminer scans will be maintained in a binder with the Raw Data Review Checklist.

16.1.4.3.2 Review both hardcopy as well as electronic data.

16.1.4.4 Ensure that the raw data for calibrations, calculations, quality controls, chromatograms, and manual integrations are reviewed to ensure complete documentation and compliance with laboratory policies. Ensure that CARs have been completed as needed.

16.1.4.5 Compare final reported results to the original raw data.

16.1.4.6 Use the Report and Raw Data Review Checklist (Figure 16-1) to document the audit.

16.1.5 Monthly Audits

16.1.5.1 The QA Manager is responsible for a monthly technical audit to be performed. This is a detailed audit on a minimum of one analytical method/area or analyst. This audit includes comparison of the method SOP to the reference method(s).

16.1.5.1.1 Analytical Method audits must include assessment on any corresponding preparation or extraction processes as well as data review processes. Extractions processes do not need to be examined at the time of the determinative method audit if extraction method audits are individually scheduled.

16.1.5.1.2 If the audit is of a Wet Chemistry analyst then assess their performance during a single day. With the variety of tests they may perform all tests could not be covered in a single day.

16.1.5.1.3 Audit for compliance to manual integration and ethics policies.

16.1.6 Quarterly/Semi-Annual Audits

16.1.6.1 Typical quarterly or semi-annual audits might include: Inspection of Archiving procedures, Balance Calibration Logbooks, Thermometer Logs, Maintenance Logbooks, Pipet Calibration Logbooks, Reagent and Standard Documentation, Resistivity/Conductivity Logbooks and Micro logbooks. Generally these audits are performed quarterly, but may be extended to semi-annually if previous audits showed no deficiencies.

16.1.7 Other Audits

16.1.7.1 The following items may require an additional technical and/or performance audit. The depth of the audit will depend on the severity of the deficiency:

16.1.7.1.1 Failure of a PT sample.

16.1.7.1.2 Multiple Corrective Action Reports (CARs) or non-conformance reports in data audits for Documentation issues.

16.1.7.1.3 QC failures discovered during data audits.

16.1.7.1.4 Suspected ethical improprieties.

16.1.7.2 Systematic problems identified during the corrective action process (Section 13).

16.1.7.3 Investigation of client complaints. (Sections 11 and 13)

16.2 EXTERNAL AUDITS

16.2.1 External audits are performed when certifying agencies or clients submit samples for analysis and/or conduct on-site inspections. It is TestAmerica's policy to cooperate fully with certifying agencies. It is also TestAmerica's policy to comply fully with system audits conducted by regulatory agencies and clients. The QA Manager is responsible to coordinate with the laboratory staff to identify corrective actions should any deficiencies be discovered during an external audit. Audit responses are due in the time allotted by the client or agency performing the audit.

NELAC: If the audit response report is not acceptable to the primary accrediting authority after second submittal, the lab shall have accreditation revoked for all or any portion of its scope of a accreditation for any or all fields of testing, a method, or analyte within a field of testing.

16.2.2 TestAmerica-Irvine cooperates with clients and their representatives to monitor the laboratory's performance in relation to work performed for the client. The client may only view data and systems related directly to the client's work. All efforts are made to keep other client information confidential.

16.2.3 Confidential Business Information (CBI) Considerations

During on-site audits, on-site auditors may come into possession of information claimed as business confidential. A business confidentiality claim is defined as "a claim or allegation that business information is entitled to confidential treatment for reasons of business confidentiality or a request for a determination that such information is entitled to such treatment." When information is claimed as business confidential, the laboratory must place on (or attach to) the information at the time it is submitted to the auditor, a cover sheet, stamped or typed legend or other suitable form of notice, employing language such as "trade secret", "proprietary" or "company confidential". Confidential portions of documents otherwise non-confidential must be clearly identified. CBI may be purged of references to client identity by the responsible laboratory official at the time of removal from the laboratory. However, sample identifiers may not be obscured from the information. Additional information regarding CBI can be found in within the 2003 NELAC standards.

16.3 AUDIT FINDINGS

16.3.1.1 Internal or External Audit findings should be documented using the corrective action process and database (see Section 13).

16.3.1.2 If any audit finding casts doubt on the effectiveness of the operations or on the correctness or validity of the laboratory's test results, the laboratory shall take timely corrective action, and shall notify clients in writing if the investigations show that the laboratory results have been affected. Once corrective action is implemented, a follow-up audit is scheduled to ensure that the problem has been corrected.

16.3.1.2.1 The procedures must be in accordance to SOP CP-01-06 "Internal Investigations of Data Discrepancies and Determination of Data Recall".

16.3.1.2.2 Clients must be notified promptly in writing, of any event such as the identification of defective measuring or test equipment that casts doubt on the validity of results given in any test report or amendment to a test report. The investigation must begin within 24 hours of discovery of the problem and all efforts are made to notify the client within two weeks after the completion of the investigation.

16.4 PERFORMANCE AUDITS

16.4.1 The laboratory is involved in performance audits conducted semi-annually through the analysis of Proficiency Testing (PT) samples provided by a third party. In the past, these EPA proficiency testing studies have been referred to as Water Pollution Study (WP) and Water Supply Study (WS). Additional PTs (including soil studies) are analyzed as required by clients and state certifying agencies.

16.4.1.1 It is TestAmerica's policy that PT samples be treated as typical samples in the normal production process where this is possible. Further, where PT samples present special or unique problems in the normal production process they need to be treated differently, as would any special or unique request submitted by any client.

16.4.1.2 Holding time begins when the vial is opened. Full volume PTs follow normal hold time procedures and storage requirements.

16.4.1.3 Login will obtain the normal COC information from the documentation provided with the PTs with review by QA or other designated staff.

16.4.1.4 Vials will be prepared as required in the instruction set provided with the samples. After preparation to full volume the sample may be spiked, digested, concentrated, etc., as would be done for any normal sample requiring similar analysis.

16.4.1.5 PT samples will not undergo multiple preps, multiple runs, multiple methods (unless being used to evaluate multiple methods), multiple dilutions, UNLESS this is what would be done to a normal client sample (e.g. if a client requests, as PT clients do, that we split VOA coeluters, then dual analysis IS normal practice).

16.4.1.6 The type, composition, concentration and frequency of quality control samples analyzed with the PT samples shall be the same as with routine environmental samples.

16.4.1.7 Instructions may be included in the laboratory's SOPs for how low level samples are analyzed, including concentration of the sample or adjustment of the normality of titrant. When a PT sample falls below the range of the routine analytical method, the low-level procedure may be used.

16.4.1.8 No special reviews shall be performed by operation and QA, UNLESS this is what would be done to a normal client sample. To the degree that special report forms or login procedures are required by the PT supplier, it is reasonable that the laboratory WOULD apply special review procedures, as would be done for any client requesting unusual reporting or login processes.

16.4.2 Corporate QA may arrange for double blind PT studies to be performed in the laboratories. Results are given to Management and Corrective actions of any findings are implemented at each facility by the QA Managers and Laboratory Directors. The Double Blind PT studies are used to evaluate the entire laboratory process from initial proposals through to the final invoicing process. These are not done more frequently than annually.

16.4.3 Written responses to unacceptable PT results are required. In some cases it may be necessary for blind QC samples to be submitted to the laboratory to show a return to control.

16.5 SYSTEM AUDITS

16.5.1 An annual systems audit is required to ensure compliance to analytical methods and SOPs, the laboratory's Data Integrity and Business Ethics Plan (DIBEP) and Ethics Policies, NELAC quality systems, client and State requirements. This audit can be performed in portions throughout the year, but a schedule must show that all aspects are reviewed annually. The semi-annual, quarterly and monthly internal audits may be used for parts of the systems audits if they are scheduled as such.

16.5.2 It is the responsibility of the QA Manager to plan and organize the audits as required by a predetermined schedule.

16.5.3 Such audits shall be carried out by trained and qualified personnel who are, wherever resources permit, independent of the activity to be audited.

16.5.4 System audits evaluate procedures and documentation in the laboratory. Example audit checklists can be found in Figure 16-2.

Figure 16-1

Example Report and Raw Data Review Checklist

Work Order #:_____ Reviewed By:_____
Client:_____ Date Reviewed:_____
PM:_____

Method/Analysis				
1. Instrument/Date analyzed				
2. Calibration Criteria met				
3. Holding times met or properly documented				
4. Instrument QC met criteria:				
a) Tuning - ICV/ICB				
b) CCV/CCB				
c) Performance Check				
5. Method/Matrix/Batch QC met criteria				
a) BLK				
b) LCS/LCSD/DUP				
c) MS/MSD				
6. Sample results met QC criteria				
a) Surrogate(s)				
b) Result within calibration range				
6. All calculations confirmed				
7. Results reported correctly				
a) Client Sample ID (compare with COC)				
b) Dates				
c) Batch ID #				
d) Data Qualifier Usage				
9. Standards:				
a) Traceable				
b) Shelf life OK				
10. Unusual time gaps in autosampler sequences				
11. Checklist completely filled out				
12. Samples Integrated and Documented properly				
13. Mint Miner Generated and Reviewed				
a) Copy attached				
13. Corrections Documented Properly				

Comments/Errors found:

DATAREV_CHECKLIST.xls
(11/03/06)

Figure 16-2

Example Internal Audit Checklists

INTERNAL AUDIT

TestAmerica Analytical Testing Corp. – *Irvine*

Date(s):	
Area Audited	Archiving (Example 1) or Method (Example 2)
Persons Contacted During Audit:	
Auditor	

Date Reported to Manager of Audited Area:	
Reported To:	
Department Manager Signature and Date:	
Date reported to Laboratory Director:	

Department Manager: Please review the checklist and comments attached. Comments are identified by the item number in the checklist. Please submit response to comments within one week of the "Date Reported to Supervisor." Once supervisor review is complete, please return all internal audit (IA) documentation to the auditor.

Date auditor submitted IA report to QA:_____
SOP update initiated – No_____ Yes_____
CAR initiated – No_____ Yes_____ CAR #_____

Audit complete and accepted by QA (including acceptance of response):

Date: _____ QA Signature: _____

Scheduled Date for Follow-up Audit: _____ Who: _____

Follow-up Audit completed and reported to management:

Date: _____ QA Signature: _____

AUDIT CHECKLIST: Archiving

		Yes	No
1.	The archive log(s) include: ❑ A unique box identifier. ❑ A description of the contents of the box. ❑ The location of the box. ❑ The date of disposal.		
2.	Access to archived information is documented with an access log (either per archive area or per box). The log contains the date/time, initials and description of items removed, reviewed or returned.		
3.	Archive boxes are labeled with a unique box identifier and a means for identifying the time for disposal. This would also apply to electronic records.		
4.	Archive locations are protected against fire, theft, loss, environmental deterioration and vermin. In addition, electronic records are protected against electronic or magnetic sources.		
5.	Instructions for the retrieval of electronic records are archived with the electronic records when necessary to facilitate retrieval.		
6.	The laboratory has identified a time period to maintain data records? (_____ years).		
7.	Records that are stored by computers or personal computers (PCS) have hard copy or write-protected back-up copies.		
8.	Records stored only on electronic media, are supported by the hardware and software necessary for their retrieval.		
9.	The LIMS is backed up a minimum of once per day.		
10.	All information necessary for the historical reconstruction of data are maintained by the laboratory. Examples: ❑ Copy of COC. ❑ Log-in Record. ❑ Internal Chain Record (where applicable). ❑ Worksheets/Logbooks/Notebooks ❑ Standard Preparation Log ❑ Calibration Logs – Balance, instrument, pipet, thermometers, …. ❑ Run Logs ❑ Raw Data ❑ Final Report ❑ QA Manual/SOPs ❑ MDLs ❑ QC Limits		

Comments (may add additional page(s)):

AUDIT CHECKLIST: Method Audit (xxxx)	**Yes**	**No**
1. Does method have written SOP? Note: An SOP is a written procedure that has been numbered and approved by QA and management.		
2. Compare SOP to original published method. Are there any discrepancies? Note: List any discrepancies using table format below. A2LA or State method audit checklists may be helpful.		
3. Examine worksheets/benchsheets and runlogs. Do worksheets/benchsheets and runlogs have all required information as per published method and written SOP? Is method number included on worksheet?		
4. Observe method. Are procedures in compliance with written SOP? Note: List any discrepancies using table format below. Compare to published method if SOP is unavailable.		

Comments:

Section 17.0
(NELAC 5.4.14)
MANAGEMENT REVIEWS

17.1 QUALITY ASSURANCE REPORT

17.1.1 A comprehensive Quality Assurance (QA) Report shall be prepared each month by the laboratory's QA Department and forwarded to the Laboratory Director for review and comments. The reviewed report shall then be submitted to the Technical Directors and Department Managers as well as corporate Quality Assurance. All aspects of the QA system are reviewed to evaluate the suitability of policies and procedures.

17.1.2 The TestAmerica QA Report template is comprised of a discussion of three key QA issues facing the laboratory and ten specific sections (Figure 17-1):

17.1.2.1 SOPs: Report SOPs that have been finalized, SOPs that are in QA for review, SOPs that are due to QA for review and the number of SOPs that need to be written.

17.1.2.2 Corrective Action Reports: Report the total number of CARs, the number of unresolved CARs and their highlights, discuss and attach a non-conformance summary, remark on missed holding times. Summarize any data recall decisions that were made following SOP: CP01-06.

17.1.2.3 MDLs and Control Limits: Report which MDLs/ MDL verifications have been completed, those in QA for review, and those due. Report the same for Control Limits.

17.1.2.4 Audits: Report Internal audits completed and External Audits conducted. Include all relevant information such as which methods, by whom, corrective actions needed by when and discuss unresolved audit findings.

17.1.2.5 Performance Evaluation Tests: Report the PT tests that are currently being tested with their due dates, report recent PT results by study, acceptable, total reported and the month and year.

17.1.2.6 Certifications: Report on any certification programs being worked on by due date, packages completed.

17.1.2.7 Training: Report on any training that has been conducted, training that is needed and issues relating to Analyst Demonstration of Capability.

17.1.2.8 Regulatory Updates: Include information on new state or federal regulations that may impact the laboratory. Report new methods that require new instrumentation, deletion of methods, changes in sampling requirements and frequencies etc…

17.1.2.9 Miscellaneous: Include any issues that may impact quality within the laboratory. This section is also used to communicate the status on any Management of Change Request Forms (CRFs) that have missed targeted due dates.

17.1.2.10 Next Month: Report on plans for the upcoming month.

17.1.2.11 Lab Director Comments Section: This section gives the Laboratory Director the opportunity to comment on issues discussed in the report and to document plans to resolve these issues. Unresolved issues that reappear in subsequent monthly reports must be commented on by the Laboratory Director.

17.2 ANNUAL REVIEW

17.2.1 The senior lab management team (Laboratory Director, Technical Directors, QA Manager,) conducts an annual review of its quality systems and LIMS to ensure its continuing suitability and effectiveness in meeting client and regulatory requirements and to introduce any necessary changes or improvements. Corporate Operations and Corporate QA personnel may be included in this meeting at the discretion of the Laboratory Director.

17.2.2 This review uses information generated during the preceding year to assess the "big picture" by ensuring that routine quality actions taken and reviewed on a monthly basis are not components of larger systematic concerns. The monthly review (see Section 17.1) should keep the quality systems current and effective, therefore, the annual review is a formal senior management process to review specific existing documentation. Significant issues from the following documentation are compiled or summarized by the QA Manager prior to the review meeting:

17.2.2.1 Matters arising from the previous annual review.

17.2.2.2 Prior Monthly QA Reports (summarizing items such as SOPs, CARs, MDLs, audits (internal and external), Proficiency Testing results, certification and training issues).

17.2.2.3 Review of report reissue requests.

17.2.2.4 Review of client feedback and complaints.

17.2.2.5 Issues arising from any prior management or staff meetings.

17.2.2.6 Minutes from prior Senior Management team meetings. Issues that may be raised from these meetings include:
17.2.2.6.1 Adequacy of staff, equipment and facility resources.
17.2.2.6.2 Adequacy of policies and procedures.
17.2.2.6.3 Future plans for resources and testing capability and capacity.

17.2.2.7 The annual internal double blind PT program sample performance (if performed),

17.2.2.8 Review of the ACIL seal of excellence program performance.

17.2.2.9 Compliance to the Ethics Policy and Data Integrity and Business Ethics Plan (DIBEP): Including any evidence/incidents of inappropriate actions or vulnerabilities related to data Integrity.

17.2.3 The annual review includes the previous 12 months. Based on the annual review, a report is generated by the QA Manager and management. The report is distributed to Senior

Management and the V.P. of Quality Assurance and/or the Quality Assurance Director. The report includes, but is not limited to:

17.2.3.1 The date of the review and the names and titles of participants.

17.2.3.2 A reference to the existing data quality related documents and topics that were reviewed.

17.2.3.3 Quality system or operational changes or improvements that will be made as a result of the review.

- An implementation schedule including assigned responsibilities for the changes. (Action Table).

17.2.3.4 The QA Manual is reviewed at this time and revised to reflect any significant changes made to the quality systems.

17.3 POTENTIAL INTEGRITY RELATED MANAGERIAL REVIEWS

17.3.1 Potential integrity issues (data or business related) must be handled and reviewed in a confidential manner until such time as a follow-up evaluation, full investigation, or other appropriate actions have been completed and issues clarified. SOP CP-01-06 “Internal Investigations of Data Discrepancies and Determination of Data Recall” shall be followed.

17.3.2 All investigations that result in finding of inappropriate activity shall be documented and shall include any disciplinary actions involved, corrective actions taken, and all appropriate notifications of clients. All documentation of these investigations and actions taken shall be maintained for five years or the life of the affected raw data storage whichever is greater.

Figure 17-1

Example QA Monthly Report to Management

LABORATORY: x
PERIOD COVERED:
PREPARED BY: DATE:
TO: x, Division/Laboratory Director
CC: x, Operations Manager (or Technical Directors)
X, Quality Assurance - Corporate

THREE KEY ISSUES:

1.
2.
3.

---

1. **SOPs**
   - 1.1 The following SOPs were finalized (or reviewed for accuracy) (Include updated SOP Summary):
   - 1.2 The following SOPs are in QA for review:
   - 1.3 The following SOPs are due to QA:
   - 1.4 Number of SOPs that need to be written:

2. **Corrective Action Reports**
   - 2.1 Total Number of CARs (*Include category breakdown if available*):
   - 2.2 Number of Unresolved CARs:
   - 2.3 Highlights:
     - 2.3.1
   - 2.4 Attach Non-Conformance Summary
     - 2.4.1 Discussion
   - 2.5 Number of Data Investigations/Recalls (SOP: CP01-06)
     - 2.5.1 Discussion

3. **MDLs and Control Limits**
   - 3.1 MDLs/Verifications Completed:
   - 3.2 MDLs/Verifications in for QA Review:
   - 3.3 MDLs Due:
   - 3.4 Control Limits Completed:
   - 3.5 Control Limits under QA Review:
   - 3.6 Control Limits Due:

4. **AUDITS**
   - 4.1 <u>INTERNAL AUDITS (Attach a copy of Schedule)</u>
     The following internal audits were performed (include raw data, method and general):
     - 4.1.1 Report/Data Audit

Date of Audit	Work Order #	Method	Matrix	Analyst(s)	Corrective Action (Due Date or Completed)

     - 4.1.2 Method / General Audits

4.2 EXTERNAL AUDITS
(Include source, date, highlights, date Corrective Action Package is due, Progress on Corrective Action Packages, …)

4.3 Unresolved Audit Findings:

5. **PT SAMPLES**
5.1 The following PT samples are now in house (Due Dates):
5.2 The following PT results have been received:

Study	# Acceptable	# Reported	Month/Year

6. **CERTIFICATIONS**
6.1 Certification Packages Being Worked On (Include Due Date):
6.2 Certification Packages Completed (Send any new Certificates):

7. **TRAINING**
7.1 Training Courses Conducted:
7.2 Training Performed:
7.3 Training Needed:

8. **REGULATORY UPDATE**
8.1 Include information on new state or federal regulations that may impact the laboratory – new methods that require new instrumentation, deletion of methods, changes in sampling requirements or frequencies, …

9. **MISCELLANEOUS**
9.1 (Include any issues that may impact quality within the laboratory. Also include information regarding the status of any Management of Change Request Forms (CRFs) that have missed targeted due dates.)

10. **NEXT MONTH**
(Items planned for next month)

LAB DIRECTOR COMMENTS AND PLANNED CORRECTIVE ACTIONS:
LAB DIRECTOR REVIEW: DATE:

Section 18.0
(NELAC 5.5.2)
PERSONNEL

18.1 OVERVIEW

18.1.1 All personnel must demonstrate competence in the areas where they have responsibility. Any staff that is undergoing training shall have appropriate supervision until they have demonstrated their ability to perform their job function on their own. Staff shall be qualified for their tasks based on appropriate education, training, experience and/or demonstrated skills as required.

18.1.2 The laboratory employs sufficient personnel with the necessary education, training, technical knowledge and experience for their assigned responsibilities.

18.1.3 All personnel are responsible for complying with all QA/QC requirements that pertain to TestAmerica-Irvine and their area of responsibility. Each staff member must have a combination of experience and education to adequately demonstrate a specific knowledge of their particular area of responsibility. Technical staff must also have a general knowledge of lab operations, test methods, QA/QC procedures and records management.

18.1.4 Laboratory management is responsible for formulating goals for lab staff with respect to education, training and skills and ensuring that the laboratory has a policy and procedures for identifying training needs and providing training of personnel. The training shall be relevant to the present and anticipated responsibilities of the lab staff.

18.1.5 The laboratory only uses personnel that are employed by or under contract to, the laboratory. Contracted personnel, when used, must meet competence standards of the laboratory and work in accordance to the laboratory's quality system.

18.1.6 The laboratory maintains job descriptions for all personnel who manage, perform or verify work affecting the quality of the environmental testing the laboratory performs. (Also see Section 4 for position descriptions/responsibilities).

18.1.7 Job descriptions define the minimal level of qualifications, experience and skills necessary to perform responsibilities.

18.2 EDUCATION AND EXPERIENCE REQUIREMENTS FOR TECHNICAL PERSONNEL

TestAmerica makes every effort to hire analytical staff that posses a college degree (AA, BA, BS) in an applied science with some chemistry in the curriculum. Exceptions can be made based upon the individual's experience and ability to learn. There are competent analysts and technicians in the industry who have not earned a college degree. Experience and specialized training are occasionally accepted in lieu of a college degree (basic lab skills such as using a balance, colony counting, aseptic or quantitation techniques, etc. are also considered). For any analysis: thorough training and working with another experienced staff member until proficiency has been demonstrated is required. As a general rule:

18.2.1.1 H.S. diploma and practical experience is required for the following analyses:

- Extractions
- Digestions,
- Gravimetric Analyses
- Some electrode methods (pH, DO, Redox, potential)

18.2.1.2 A college degree in an applied science or 2 years of college and at least 1 year of college chemistry or 2 years prior analytical experience is required for the following analyses:

- Titrimetric Analyses
- Single component metals analyses
- Single component or short list chromatography (Fuels, BTEX, IC)

18.2.1.3 A college degree in an applied science or 2 years of college chemistry or at least 5 years of prior analytical experience is required for the following.

- ICP
- ICP/MS
- Long list GC analyses (Pesticides, Herbicides)
- GC/MS

18.2.1.4 Technical Directors/Department Managers

18.2.1.4.1 General and Quality Assurance Officer/Manager: Bachelors Degree in an applied science or engineering with 24 semester hours in chemistry and at least 2 years experience in environmental analysis of representative analytes for which they will oversee. A masters or doctorate degree may substitute for one year of experience. The QA officer also requires documented training and/or experience in QA/QC procedures and must be knowledgeable in the quality system.

18.2.1.4.2 Wet Chem only: Associates degree in an applied science or engineering or 2 years of college with 16 semester hours in chemistry. Additionally the person must have at least 2 years relevant experience.

18.2.1.4.3 Microbiology: Bachelors degree in applied science with at least 16 semester hours in general microbiology and biology and at least 2 years of relevant experience. A Masters or doctorate degree can substitute for 1 year of experience.

18.3 The laboratory maintains records of relevant authorization/competence, education, professional qualifications, training, skills and experience of technical personnel (including contracted personnel) as well as the date that approval/authorization was given. These records are kept on file at the laboratory. Also see “Demonstration of Capability” in Section 20.

18.4 The training of technical staff is kept up to date by:

18.4.1 Each employee must have documentation in their training file that they have read, understood and agreed to follow the most recent version of the Standard Operating Procedures in their area of responsibility. This documentation is updated as SOPs are updated.

18.4.2 Documentation from any training courses or workshops on specific equipment, analytical techniques or other relevant topics are maintained in their training file.

18.4.3 Documentation of continued proficiency by at least one of the following once per year:

18.4.3.1 acceptable performance of a blind sample (single blind to the analyst). Note: successful analysis of a blind performance sample on a similar test method using the same technology (e.g. GCMS volatiles by purge and trap for methods 524.2, 624, or 5030/8260 would only require the documentation for one of the test methods). The laboratory determines the acceptance limits prior to analysis.

18.4.3.2 another demonstration of capability (see Section 20)

18.4.3.3 at least 4 consecutive laboratory control samples with acceptable levels of precision and accuracy.

18.4.3.4 If the above 3 items cannot be performed, analysis of authentic samples with results statistically indistinguishable from those obtained by another trained analyst.

18.5 DATA INTEGRITY AND ETHICS TRAINING PROGRAM

Ethics and data integrity training is integral to the success of TestAmerica and is provided for each employee at TestAmerica-Irvine. It is a formal part of the initial employee orientation and is also required annually for all employees at all levels and departments throughout the laboratory. Senior management at each facility performs the ethics training to their staff.

18.5.1 Key Topics covered in the presentation include:

- organizational mission and its relationship to the critical need for honesty and full disclosure in all analytical reporting.
- Ethics Policy and Code of Ethical Conduct (Appendix 1)
- How and when to report ethical/data integrity issues. Confidential reporting.
- Record keeping.
- Discussion regarding data integrity procedures.
- Specific examples of breaches of ethical behavior (e.g. peak shaving, altering data or computer clocks, improper macros, etc., accepting/offering kickbacks, illegal accounting practices, unfair competition/collusion)
- Internal monitoring. Investigations and data recalls.
- Consequences for infractions including potential for immediate termination, debarment, or criminal prosecution.
- Importance of proper written narration / data qualification by the analyst and project manager with respect to those cases where the data may still be usable but are in one sense or another partially deficient.

18.5.2 All training is documented by signature on the signed Ethics Policy and Code of Ethical Conduct demonstrating that the employee has participated in the training and understands their obligations related to ethical behavior and data integrity. An attendance sheet is recommended for larger group trainings to assist in tracking training needs.

18.5.2.1 New employees who are hired after the annual training view the PowerPoint slides in the "Normal" slide setting so that they can read the notes down below the slides. A quiz is administered with the presentation. The new employee then meets with the Training Coordinator or the QA Manager to ask any questions, review their quiz results and to sign a copy of the Ethics Policy and Code of Ethical Conduct.

PERSONNEL QUALIFICATIONS FORM

TestAmerica
ANALYTICAL TESTING CORPORATION

Name:

TITLE:

EDUCATION/QUALIFICATIONS:

PRESENT POSITION IN COMPANY:

RELEVANT EXPERIENCE:

EMPLOYMENT HISTORY:

General Process Audit (Training), page 1 of 3

GENERAL PROCESSES AUDIT

Trainer: _____ **Method:** _____ **Date:** _____

Trainee: _____ **Department:** _____

Processes and Techniques	Yes	No	NA	Response
1.0 Sample Selection				
1.1 How do you prioritize samples and how many samples are in a batch?				1) Expiring ≤ 20 Samples/batch 2) Rush 3) Due
1.2 How do you know the holding time, due date or if it's a rush?				-Query work lists at the beginning of shift. The expiration (hold) times are listed along with the TAT (due date). Rushes are not specifically coded, refer to TAT and Rush Bin.
1.3 How do you know the appropriate preservative, sample container and sample amount?				-The SOP lists preservative, sample container and amount needed. Be sure to chose the right container and preservative and that the bench sheet agrees. If there is a problem, (wrong pres., container or not enough sample) alert the manager and PM and note it in the comment section on the bench sheet.
1.4 What do you do if there is only one sample container for volatile and non-volatile analysis requested? (SUBSAMP.SOP-R2)				-VOL has 1st dibs to sub-sample from the container. If that's not possible: Do not take sample into extraction lab area. If sample is a brass sleeve, mark the end from where the aliquot was taken so VOL group can sample from the other end. AVOID CONTAMINATION!
2.0 Sample Procedures				
2.1 How do you know the balance has been calibrated that day? What do you do if it hasn't been calibrated? (BAL.SOP-R4)				-Balances are calibrated every morning. A round sticker with initials and the date indicate that it passed calibration that day. -DON'T use the scale and alert your manager.
2.2 What temp should a fridge/freezer be at? What do you do if the temp is out of that range? How do you know the thermometer is calibrated? What is the Correction Factor? (THERMA.SOP-R4)				-Fridge: (> 0°C- ≤6°C) -Freezer: (−10°C - −20°C) -NOTE: BOD 20°C ±1°C -Tell your manager if the temp is out of range, the temp must be corrected or the samples must be moved and a CAR to document the problem. -Thermometers are calibrated annually and labeled. Tell your manager if a thermometer is past due for calibration. -CF is the value that must be added to the thermometer's raw reading to determine the actual temp. It's on the calibration label on the thermometer.
2.3 How do you sub-sample a soil? How precise is must the measurement be? (SUBSAMP.SOP-R2)				-Scrape out ½ inch layer in brass sleeve (not necessary for jars) with a spatula, then if possible, mix 2X more sample than needed within container, then measure out target amount. For VOL & unmixable matrices, take portions from different areas in the container. -Measure and record actual weight to the nearest hundreth on bench sheet. Refer to method SOP for target weights.
2.4 How do you mix and determine the volume of a water sample? (SUBSAMP.SOP-R2)				-Shake sample thoroughly before pouring. If there's sediment, shake and pour several times without allowing sediment to settle. There is no need to shake samples for dissolved analyses. Note: If sediment interferes with analysis-notify PM of sediment, decant liquid portion into a grad. cyl. and return sediment portion to fridge. Note VOL: To avoid losing compounds, take sample from a cool container, do not agitate. However, centrifuge the sample if there's not enough sediment-free liquid to extract for analysis. -Use a calibrated air tight glass syringe or a graduated cylinder, volumetric flask or other appropriate container to determine volume. Measure on a flat surface at shoulder height to read the meniscus without paradox.
2.5 How do you know if the method requires a certain pH? If it does, how do you measure pH? What do you do if the sample is the incorrect pH? Why is pH important?				-Refer to SOP for pH requirements. -To avoid possible contamination when checking the pH, use a disposable pipette to draw out a small amount of sample to analyze the pH on a test strip. NOTE VOL: Extract sample to be analyzed, test pH from sample left in VOA. -Tell manager and PM and note it in the comment section on the bench sheet. -pH determines if the correct preservative was used. Preserving a sample properly prolongs the holding time for that sample.
2.6 What is the purpose of an MS/MSD and a BS? How do you choose and prepare an MS/MSD for water/soil sample? (SUBSAMP.SOP-R2)				-Matrix Spikes are used to verify how an analyte (the spike) is affected by the matrix. The Duplicate ensures the precision of the spike recovery results. The Blank Spike verifies the overall performance of the method. -Chose the best representative sample of the batch. Weigh out the source sample, then the MS, then the MSD separately so as to not treat QC different from samples. (Do not mix total sample amount needed for source sample and QC and from that weigh out MS/MSD and source sample)

General Process Audit (Training), page 2 of 3

GENERAL PROCESSES AUDIT

3.0 Spiking/Surrogating				
3.1 If a chemical expresses an expiration date only as month/year, what day is it expired? (STDCNTRL.SOP-R3)				-The expiration date is assumed to be the last day of the month. -Always check to make sure you have the correct standard and that it has not expired.
3.2 How do you know the spike/surrogate syringe or pipette is calibrated (if necessary)? How should it be labeled? What do you do if there is a problem? (PIP.SOP-R1)				-All pipettes are calibrated monthly. Only syringes ≥ 500 µl are calibrated every 6 months. -They are labeled with a simple name that describes its use and the date it was last calibrated. -Tell the team leader /manager if a pipette is out of calibration. Do NOT use it!
3.3 How do you know how much spike/surrogate to use for a test?				-Refer to the SOP. If it doesn't match what you know, tell your manager. Make sure it is current and it agrees with the procedure in the SOP.
3.4 What is the proper technique of cleaning, drawing up standard and injecting into a sample?				-Under the hood, clean syringe ≥2 times with same solvent used for the test. Discard any waste into waste container under the hood. -At eye level, draw up standard. Point syringe tip upwards and push out any bubbles placing a kim wipe at the tip of the syringe to absorb any excess standard then discards kim wipe in waste under the hood. -Inject into sample container without touching the sides of the container or the sample itself.
4.0 Logbook/Bench Sheet				
4.1 How do you fill out the logbook and why is it important? (LOGBOOK.SOP-R2)				-All pages must be numbered and chronological (don't tear out a page!). Write in blue or black ink only. Draw a "Z-type" pattern across blank lines of blank portions of a page after the last entry of the page. -Logbooks are permanent records of original observations. Do not transcribe into the logbook.
4.2 What kinds of comments or irregularities/problems would you note and where?				-Problems: Instrument conditions/issues, sample descriptions: oily, emulsions, odor, color, initial/final volume, pH, anything unusual, etc. -On the bench sheet in the comments section. !!!The more information, the better!!!
4.3 How do you fix a mistake? (LOGBOOK.SOP-R2)				-Single line cross out, date and initial. NEVER OBLITERATE DATA!
5.0 Quality Assurance				
5.1 Where are Standard Operating Procedures (SOP) located?				-Department Manager's and QA have controlled copies. They are always available.
5.2 When and why is it necessary to report a corrective action report (CAR) and to whom can you report a problem? (CAR.SOP-R3)				-Write a CAR any time there is a deviation from the SOP, QC out of limits not due to matrix issues, calculation/reporting error, health and safety violations, etc. -All deviations must be documented. -Tell your manager and PM and create the CAR in elmt. QA Admin > CAR > Create New > Describe the problem and include the batch number.
5.3 How do you know if there are any special instructions for particular clients?				-Project managers, sample control…can write comments that appear in the comment section of the queried work list. There is a specific SOP just for BP. Manager's must communicate to their group any special project orders.
5.4 How should solutions/standards/ solvents and wash bottles be labeled? Does water need to be labeled? How is a chemical received by the lab labeled? (STDCNTRL.SOP-R3)				-Hazard info, Chem. Name and Conc., Elmt ID, CAS #, Initials, Prep date and Exp. date. There is a label avail. to fill out. If any info is unavailable, NA *must* be written. For small vials-Elmt ID, Chem. Name and Conc., Exp date, Prep date and Initial. -Label everything!!! incl. Water-(Rinse H20, DI Water) *and* wash bottles. -Chem. Rec'd-Date Rec'd, Date Opened and initials, Elmt ID
5.5 Have you completed a DOC for this analysis? (NELAC-REQ)				-DOCs are done initially and then annually. 4 LCS or PT samples must pass before being able to perform the test/analysis solo. If not completed or passing, the tech/analyst is not approved to do the test.
6.0 Ethics				
6.1 When is manual integration appropriate? (MANINT.SOP-R3)				-Manual integration may be used when the baseline was incorrectly assigned. The analyst must NOT adjust the baseline for the purpose of increasing or decreasing peak areas solely to meet QA/QC acceptance limits. An explanation of the change must be documented.

General Process Audit (Training), page 3 of 3

GENERAL PROCESSES AUDIT

6.2 When is the audit trail feature used? (MANINT.SOP-R3)				-If the inst. software is capable of producing an audit trail, it must always be active, NO EXCEPTIONS!
6.3 Have you gone through Ethics training? (NELAC-REQ)				-Ethics training must be completed upon beginning employment and annually. If you have not completed training, tell your Dept. Manager.
7.0 Health and Safety				
7.1 What Personal Protective Equipment is necessary while performing this test? (LSP-R2)				-Safety Goggles: Dealing with solvents/acids -Safety Glasses: Any time within the red lines or handling samples/chemicals -Lab Coat and Gloves: Always when working with samples/chemicals. Never when not dealing with samples, ie, at your desk, copying, in carpeted areas, etc.
7.2 Where is the Material Safety Data Sheet (MSDS) binder located? (LSP-R2)				1) Department Manager's area 2) QA Department has a copy of all MSDS.
7.3 What are the chemicals that are of concern? What things should be known about those chemicals?				-Any chemical you work with. Is it soluble, volatile, flammable? What does it look like? What symptoms are associated with it? How can you be exposed to it? What to do if you are exposed, etc. -Tell your manager or the H & S Officer if you have any concerns.
7.4 What do you do if there is a large spill? (LSP-R2)				Do NOT try to clean it. Think of you SAFETY first always. If possible, ISOLATE the spill with absorbent hot hogs located by spill kits, NOTIFY your manager. Keep people away from the spill.
7.5 What's the appropriate technique for working under a hood?				-Make sure exhaust fan is on. Place chemicals ≥6in. into the hood. Keep sash at or below the marked calibration line. Limit the amount of chemicals in the hood.
7.6 Have you gone through H&S training? (NELAC-REQ)				-H&S training must be completed upon beginning employment and annually. If you have not completed training, tell your Dept. Manager.
8.0 Analysts				
8.1 What are control charts and how are they created? What are they used for? (CNTRLLIM.SOP-R3)				-Graphical rep of % recovery and RPD for MS/MSD, DUP and LCS. -ELMT creates CC based on a selected data set. Follow procedure in Control Charts SOP. -Review limits for a sanity check. Control Charts are used to establish QC limits and can be used to determine systematic problems.
8.2 What is an MDL and how is it determined? (MDL.SOP-R4)				-The min. conc. of a substance that can be measured and reported with 99% confidence. ie. the lowest level we can detect, but not accurately quantify. -≥7 replicate samples spiked ≤ the lowest calibration standard or the RL (whichever is lower) and analyzed over ≥ 2 days. -Review the MDL. The RL should be 2-5 X's the MDL and the spike should not be 10 X's the MDL. Refer to the Determination of MDLs SOP.
8.3 How are significant figures determined? What is reported? (SIGFIG-R6)				-<5 – round down, >5 – round up, =5 round up or down to get an even number -Perform all calculations, before rounding. -Results are reported in 2 sig.figs. except pH and QC which are 3 sig.figs.
8.4 When is it appropriate to use data qualifiers? When shouldn't they be used? (DATAQUAL.SOP-R2)				-DQ are used to inform the end user of an event that may affect the quality or usability of the data. ELMT highlights problems in red. -Use of a DQ multiple times = systematic problem that needs to be corrected. -DO NOT use to pass data of poor quality. DO NOT use to replace a CAR, but do use to supplement a CAR. Type full sentence explanation of event when using the A-01 qualifier. Clients see DQs. DO NOT use for comments.
8.5 What type of calibration technique is used to make the curve, linear or non-linear? Is internal or external calibration technique? How is the instrument response determined? (ICAL.SOP-R0)				-2 types of **Linear** curves: Avg. RF/CF-Linear compares inst. response to sample response (if int., also involves int. std) Linear regression-calc. of a straight line over 2 axes. **Non-Linear** (Quadratic or 2nd Order curves)-are based on analyte response on a given column. Used if an analyte does not respond in a linear fashion. DO NOT use to mask inst. problems or detector saturation. -Ext Calib-methods w/o internal standards. -Int Calib-methods that utilize internal standards to compensate for changes in instrument conditions. -Inst. Resp-expressed as either peak area or peak height or a numerical representation of a type of count on a detector.
8.6 How do you know the acceptance criteria for the ICV, CCV, surrogate, internal stds, spikes, etc? How are they calculated?				-Refer to method SOP. Be able to answer for the current test. If ELMT has different criteria then the SOP, tell your manager/QA. -Refer to Calculations section of the method SOP. Perform the calculations. Knowing the calc. enables you to recognize if a result doesn't make sense.

GPA_R1- August 23, 2006

QA OFFICER TRAINING SUMMARY

Trainee: _____ **Date:** _____.

SOPs Reviewed: *See Attached SOP Sign-off Summary Table*___

SOPs Signed-off in QA Office: Y / N

I. LABORATORY (Time frames may be adjusted based on past experience. Group Supervisor must initial and date when training is complete.)

	Actual Time Spent	Supervisor Initials	Date
Metals (2 days)			
Conventionals (2 days)			
Organic Prep (1/2 day)			
GC (2 days)			
GC/MS (2 days)			
Login (1/2 day)			
Field Services (1 day)			
Report Generation/Customer Service (1½ day)			

II. QUALITY ASSURANCE AND QUALITY CONTROL

	Trainers Initials	Date
Review of Sample Quality Control – Terms and Intended Use (MS/MSD, LCS, Surrogates, Blanks, …)		
Review of Instrument Quality Control – Terms and Intended Use (ICV, CCV, Interference checks, …)		
Read and Discuss Laboratory QA Manual		
Review Manual Integration Procedures		
Review MDL Procedures – Evaluation and Documentation. Evaluate 4 MDL Studies – ❑ VOA ❑ SVOA ❑ Metal ❑ Conventional		
Review Miscellaneous QC Procedures – Retention Time Window studies, IDL, Thermometer Checks, Balance Checks, …		
Data Archive Procedures		
PT Samples – Schedule and Procedures (Internal and External)		
Non-Conformance and Corrective Action Documentation		
Auditing Procedures – ❑ Conduct 2 Internal Audits - General ❑ Conduct 2 Internal Audits – Method ❑ Coordinate 1 External Audit		
Determination of QC Limits		
Review of Chain of Custody		
General Lab Documentation (Sequences, Maintenance, Logbooks/Worksheets, Observations, Modifications, Standards)		
Review SOP Preparation and Maintenance Procedures		
Training Documentation Procedures		

III. GENERAL

	Trainers Initials	Date
Review QA Officer Responsibilities ❑ with Division Manager ❑ with Vice President, Quality Assurance		
LIMS Training ❑ ❑ ❑		
Review Statement of Services (SOS)		
Review Health and Safety Manual		
Access the EPA Internet Site and Pertinent State Sites to Review Regulatory Requirements: RCRA, UST, SDWA, CWA, NPDES, ….		
Preparation of Monthly QA/QC Report		
Review and Sign-off on Ethics Policy		

IV. ADDITIONAL TRAINING

Attach sheet to describe what was discussed. General Training Topics might include: Waste Disposal, DOT Shipping, Safety, …. Attach the agenda of any courses attended during initial training period.

Comments (include any additional training requirements):

Trainee: _____ Date: _____

Trainer(s): _____ Date: _____

Trainer(s): _____ Date: _____

Division/Lab Director: _____ Date: _____

QA, Vice President: _____ Date: _____

Standard Operating Procedures - Sign-Off

TestAmerica
ANALYTICAL TESTING CORPORATION

SOP Read and Understand Memo
for Employee Training File

This memo applies to the following SOP(s):

TITLE	REVISION	DATE

I have read and fully understand the above SOP. I agree to follow procedures stated in this SOP. I am aware that if I have questions pertaining to the analysis or reporting of data that I may contact my immediate Supervisor, the QA Manager, or the Lab Director.

Employee: _____

Signature _____

Date: _____

Return this signed form to QA within 5 days for filing in your training file.

Date Issued: 1/8/2007

Section 19.0
(NELAC 5.5.3)
ACCOMODATION AND ENVIRONMENTAL CONDITIONS

TestAmerica-Irvine is designed to accommodate an efficient workflow and to provide a safe and comfortable work environment for employees. OSHA and other regulatory agency guidelines regarding required amounts of bench and fume hood space, lighting, ventilation (temperature and humidity controlled), access, and safety equipment are met or exceeded. Traffic flow through sample preparation and analysis areas is minimized to reduce the likelihood of contamination. Adequate floor space and bench top area is provided to allow unencumbered sample preparation and analysis space. Sufficient space is also provided for storage of reagents and media, glassware, and portable equipment. Laboratory HVAC and deionized water systems are designed to minimize potential trace contaminants.

The laboratory is separated into specific areas for sample receiving, sample preparation, volatile organic sample analysis, non-volatile organic sample analysis, inorganic sample analysis, microbiological sample analysis, and administrative. Ample space is also provided for refrigerated sample storage before analysis and archival storage of samples after analysis.

19.1 ENVIRONMENT

19.1.1 Laboratory accommodation, test areas, energy sources, lighting, heating and ventilation are adequate to facilitate proper performance of tests.

19.1.2 The environment in which these activities are undertaken does not invalidate the results or adversely affect the required accuracy of any measurements.

19.1.3 The laboratory provides for the effective monitoring, control and recording of environmental conditions that may effect the results of environmental tests. Such environmental conditions include temperature and barometric pressure levels in the laboratory.

19.1.3.1 In instances where monitoring or control of any of the above-mentioned items are specified in a test method or by regulation, the laboratory meets and documents adherence to the laboratory facility requirements.

19.1.3.2 When any of the method or regulatory required environmental conditions change to a point where they may adversely affect test results, analytical testing will be discontinued until the environmental conditions are returned to the required levels (see Section 12).

19.1.3.3 Environmental conditions of the facility housing the computer network and LIMS are regulated to protect against raw data loss.

19.2 WORK AREAS

19.2.1 There is effective separation between neighboring areas when the activities therein are incompatible with each other. Examples include:

19.2.1.1 Volatile organic chemical handling areas, including sample preparation and waste disposal, and volatile organic chemical analysis areas

19.2.1.2 All laboratory areas that handle samples and extracts are physically separated from non-analytical areas such as project management and data review.

19.2.2 Access to and use of all areas affecting the quality of analytical testing is defined and controlled by secure access to the laboratory building as described below in the Building Security section.

19.2.3 Adequate measures are taken to ensure good housekeeping in the laboratory and to ensure that any contamination does not adversely affect data quality. These measures include regular janitorial service to control dirt, dust, and cobwebs within the laboratory.

19.2.4 Work areas are available to ensure an unencumbered work area. Work areas include:

19.2.4.1 Access and entryways to the laboratory.

19.2.4.2 Sample receipt areas.

19.2.4.3 Sample storage areas.

19.2.4.4 Chemical and waste storage areas.

19.2.4.5 Data handling and storage areas.

19.2.4.6 Sample processing areas.

19.2.4.7 Sample analysis areas.

19.2.5 Refer to Standard Methods, 20th Ed., 9020B, section 2 for specific requirements for microbiological laboratory facility requirements.

19.3 FLOOR PLAN

19.3.1 A floor plan can be found in Appendix 3.

19.4 BUILDING SECURITY

19.4.1 Building keys and alarm codes are distributed to employees as necessary.

19.4.2 Visitors to the laboratory sign in and out in a visitor's logbook. A visitor is defined as any person who visits the laboratory who is not an employee of TestAmerica-Irvine.

19.4.3 Visitors (with the exception of TestAmerica employees) are escorted by laboratory personnel at all times, or the location of the visitor is noted in the visitor's logbook.

19.4.4 Signs are posted in the laboratory designating employee only areas - "Authorized employees beyond this point".

Section 20.0
(NELAC 5.5.4)
TEST METHODS AND METHOD VALIDATION

TestAmerica-Irvine uses methods that are appropriate to meet our clients' requirements and that are within the scope of the laboratory's capabilities. These include sampling, handling, transport, storage and preparation of samples, and, where appropriate, an estimation of the measurement of uncertainty as well as statistical techniques for analysis of environmental data.

Instructions are available in the laboratory for the operation of equipment as well as for the handling and preparation of samples. All instructions, Standard Operating Procedures (SOPs), reference methods and manuals relevant to the working of the laboratory are readily available to all staff. Deviations from published methods are documented (with justification) in the laboratory's approved SOPs. SOPs are submitted to clients for review at their request. Significant deviations from published methods require client approval and regulatory approval where applicable.

20.1 STANDARD OPERATING PROCEDURES (SOPs)

20.1.1 TestAmerica - Irvine maintains SOPs that accurately reflect all phases of the laboratory such as assessing data integrity, corrective actions, handling customer complaints as well as all analytical methods and sampling procedures. The method SOPs are derived from the most recently promulgated/approved, published methods and are specifically adapted to the laboratory facility. Modifications or clarifications to published methods are clearly noted in the SOPs. All SOPs are controlled in the laboratory *(See Section 6 on Document Control)*:

20.1.2 All SOPs contain a revision number, effective date, and appropriate approval signatures. Controlled copies are available to all staff.

20.1.3 Procedures for preparation, review, revision and control are incorporated by reference to SOPs: SOP_T.SOP (Technical SOPs, Creation and Maintenance) and DOCCNTRL.SOP (Document Control).

20.1.4 SOPs are reviewed at a minimum of every 2 years (Annually for Drinking Water SOPs), and where necessary, revised to ensure continuing suitability and compliance with applicable requirements.

20.2 LABORATORY METHOD MANUAL(S)

20.2.1 For each test method, the laboratory shall have available the published referenced method as well as the laboratory developed SOP. Each test method contains or references the following (where applicable and not necessarily in this order).

20.2.1.1 Identification of the test method

20.2.1.2 Applicable matrices

20.2.1.3 Detection and/or reporting limit

20.2.1.4 Scope and application, including the analyte list

20.2.1.5 Summary of the method

20.2.1.6 Definitions

20.2.1.7 Interferences
20.2.1.8 Safety
20.2.1.9 Equipment and supplies
20.2.1.10 Reagents and standards
20.2.1.11 Sample collection, preservation, shipment and storage
20.2.1.12 Quality control
20.2.1.13 Calibration and standardization
20.2.1.14 Procedure
20.2.1.15 Data analysis and calculations
20.2.1.16 Method performance
20.2.1.17 Pollution prevention
20.2.1.18 Data assessment and acceptance criteria
20.2.1.19 Corrective actions for out of control data
20.2.1.20 Contingencies for handling-out-of control or unacceptable data
20.2.1.21 Waste management
20.2.1.22 References
20.2.1.23 Any tables, diagrams, flowcharts and validation data

> **Note**:
> If more stringent standards or requirements are included in a mandated test method or by regulation, the laboratory shall demonstrate that such requirements are met. If it is not clear which requirements are more stringent, the standard from the method or regulation is to be followed.

20.2.2 General SOPs (non-technical) must contain scope/application, definitions, safety issues, procedure, documentation, contingencies, attachments, and references.

20.3 SELECTION OF METHODS

Appropriate test and sampling methods are chosen to meet our clients' requirements and analytical data quality objectives. The methods should be capable of measuring the specific parameter of interest, in the concentration range of interest, and with the required precision and accuracy.

20.3.1 Sources of Methods

20.3.1.1 In general, TestAmerica-Irvine follows procedures from the referenced methods shown below in 20.3.1.3. In all cases, the laboratory must follow specific project or regulatory program required methodologies. When specified, such requirements will be followed.

20.3.1.2 When clients do not specify the method to be used or methods are not required, the methods used will be clearly validated and documented in an SOP and available to clients and/or the end user of the data.

20.3.1.3 The analytical methods used by the laboratory are those currently accepted and approved by the U. S. EPA and the state or territory from which the samples were collected. Reference methods include:

- Methods for Chemical Analysis of Water and Wastes (MCAWW) - EPA/600/4-79-020 - Revised March 1983
- Code of Federal Regulations (CFR) 40, Parts 136 - Revised as of July 1, 1995, Appendix A to Part 136 - Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater (EPA 600 Series)
- Test Methods for Evaluating Solid Waste, Physical Chemical Methods EPA SW-846 3rd Edition, September 1986, Update I, July 1992, Update II, September 1994, Update III, December 1996
- Methods for the Determination of Organic Compounds in Drinking Water - Supplement III EPA/600/R-95/131 - August 1995 (EPA 500 Series)
- Technical Notes on Drinking Water Methods, EPA-600/R94-173, October 1994
- EPA Methods for the Determination of Inorganic Substances in Environmental Samples (EPA/600/R-93/100) August 1993
- EPA Methods for the Determination of Metals in Environmental Samples (EPA/600/R-94/111), May 1994
- Manual for the Certification of Laboratories Analyzing Drinking Water (EPA 815-R-05-004, January 2005) ***(DW labs only)***
- Standard Methods for the Examination of Water and Wastewater, (APHA, AWWA, WEF 19th and 20th Editions)
- Code of Federal Regulations (CFR) 40, Parts 136, 141, 172, 173, 178, 179 and 261
- California LUFT Manual
- California Title 22 Code, California AB 1803

20.3.1.4 Other reference procedures for non-routine analyses may include methods established by specific states (e.g., Underground Storage Tank methods), ASTM or equipment manufacturers. Sample type, source, and the governing regulatory agency requiring the analysis will determine the method utilized.

20.3.1.5 The laboratory shall inform the client when a method proposed by the client may be inappropriate or out of date. After the client has been so informed, the client shall have the final say on what method is used.

20.3.2 Demonstration of Capability

Before the laboratory may institute a new method and begin reporting results, the laboratory shall confirm that it can properly operate the method. In general this demonstration does not test the performance of the method in real world samples, but in an applicable and available

clean matrix sample. If the method is for the testing of analytes that are not conducive to spiking, demonstration of capability may be performed on quality control samples.

20.3.2.1 A demonstration of capability is performed whenever there is a change in instrument type, method or personnel.

20.3.2.2 The demonstration of capability must be thoroughly documented and approved by the Technical Director and QA Manager prior to analyzing client samples. All associated documentation must be retained in accordance with the laboratories archiving procedures (see Section 15, Control of Records).

20.3.2.3 The laboratory must write an SOP, demonstrate satisfactory performance, and conduct a method detection limit study (when applicable). There may be other requirements as stated within the published method or regulations (i.e., retention time window study).

Note: In some instances a situation may arise where a client requests that an unusual analyte be reported using a method where this analyte is not normally reported. If the analyte is being reported for regulatory purposes, the method must meet all procedures outlined within this Quality Assurance Manual (SOP, MDL, Demonstration of Capability). If the client states that the information is not for regulatory purposes, the result may be reported as long as the following criteria are met:

- The instrument is calibrated for the analyte to be reported using the criteria for the method and ICV/CCV criteria are met (unless an ICV/CCV is not required by the method).
- The reporting limit is set at or above the first standard of the curve for the analyte.
- The client request is documented and the lab informs the client of its procedure for working with unusual compounds. The final report must be footnoted: Reporting Limit based on the low standard of the calibration curve.
- See Section 12.1.2.2 (Control of Non-Conforming Work).

20.3.2.4 General Initial Demonstration of Capability (IDOC) procedures

20.3.2.4.1 The spiking standard used must be prepared independently from those used in instrument calibration.

20.3.2.4.2 The analyte(s) shall be diluted in a volume of clean matrix sufficient to prepare four aliquots at the concentration specified by a method or if unspecified to a concentration 1-4 times the laboratory RL.

20.3.2.4.3 At least four aliquots shall be prepared (including any applicable clean-up procedures) and analyzed according to the test method (either concurrently or over a period of days).

20.3.2.4.4 Using all of the results, calculate the mean recovery in the appropriate reporting units and the standard deviations for each parameter of interest.

20.3.2.4.5 When it is not possible to determine mean and standard deviations, such as for presence, absence and logarithmic values, the laboratory will assess performance against criteria described in the Method SOP.

20.3.2.4.6 Compare the information obtained above to the corresponding acceptance criteria for precision and accuracy in the test method (if applicable) or in laboratory generated

acceptance criteria (LCS or interim criteria) if there is no mandatory criteria established. If any one of the parameters do not meet the acceptance criteria, the performance is unacceptable for that parameter.

20.3.2.4.7 When one or more of the tested parameters fail at least one of the acceptance criteria, the analyst must proceed according to 20.3.2.4.7.1 or 20.3.2.4.7.2:

20.3.2.4.7.1 Locate and correct the source of the problem and repeat the test for all parameters of interest beginning with 20.3.2.4.3 above.

20.3.2.4.7.2 Beginning with 20.3.2.4.3 above, repeat the test for all parameters that failed to meet criteria. Repeated failure, however, will confirm a general problem with the measurement system. If this occurs, locate and correct the source of the problem and repeat the test for all compounds of interest beginning with 20.3.2.4.1 above.

20.3.2.5 A certification statement (see Figure 20-1) shall be used to document the completion of each demonstration of capability. A copy of the certification is archived in the analyst's training folder.

20.3.2.6 Methods on-line prior to the effective date of this Section shall be updated to the procedures outlined above as new analysts perform their demonstration of capability. A copy of the new record will replace that which was used for documentation in the past. At a minimum the precision and accuracy of four mid-level laboratory control samples must have been compared to the laboratory's quality control acceptance limits.

20.4 LABORATORY DEVELOPED METHODS AND NON-STANDARD METHODS

Any new method developed by the laboratory must be fully defined in an SOP/Methods Manual (Section 20.2) and validated by qualified personnel with adequate resources to perform the method. Method specifications and the relation to client requirements must be clearly conveyed to the client if the method is a non-standard method (not a published or routinely accepted method). Client must also be in agreement to the use of the non-standard method. The information included in the checklist below (Figure 20-2) is needed before samples are accepted for analysis by a new method.

20.5 VALIDATION OF METHODS

Validation is the confirmation by examination and the provision of objective evidence that the particular requirements for a specific intended use are fulfilled. (From 2003 NELAC Standard)

20.5.1 All non-standard methods, laboratory designed/developed methods, standard methods used outside of their scope, and major modifications to published methods must be validated to confirm they are fit for their intended use. The validation will be as extensive as necessary to meet the needs of the given application. The results are documented with the validation procedure used and contain a statement as to the fitness for use.

20.6 METHOD DETECTION LIMITS

Method detection limits (MDL) are determined in accordance with 40 CFR part 136, Appendix B. MDL is also sometimes referred to as Limit of Detection (LOD). The MDL theoretically represents the concentration level for each analyte within a method at which the Analyst is 99% confident that the value is not zero. The method detection limit is determined for each analyte initially during the

method validation process and updated as required in the analytical methods, whenever there is a significant change in the procedure or equipment, or based on project specific requirements. The Analyst prepares seven or eight replicates of solution spiked at one to five times the estimated method detection limit (most often at the lowest standard in the calibration curve) into the applicable matrix with all the analytes of interest. Each of these aliquots is extracted (including any applicable clean-up procedures) and analyzed in the same manner as the samples. Where possible, the seven replicates are analyzed over 2-4 days to provide a more realistic MDL.

20.6.1 MDL's are performed for each individual instrument and non-microbiological method analysis. Unless there are requirements to the contrary, the laboratory will use the highest calculated MDL for all instruments used for a given method as the MDL for reporting purposes.

20.6.2 MDL's must be run against acceptable instrument QC, including ICV's and Tunes. This is to insure that the instrument is in proper working condition and falsely high or low MDL's are not calculated.

20.6.3 Use only clean matrix which is free of target analytes (e.g.: Nanopure water, Ottawa Sand) unless a project specific MDL is required in a real life matrix.

20.6.4 The Reporting Limit (also may be referred to as Limit of Quantitation or LOQ) should generally be between 2 and 5 times the MDL. If the MDL is being performed during method development, use this guideline to determine the Reporting Limit for the analysis**.** If a sample is diluted, the reported MDL is adjusted according to the dilution factor.

20.6.5 If the MDL is < 1/10 of the spike concentration the MDL must be repeated (including extraction or digestion) using a lower spike level unless the % recovery is < 50% or > 150% of the "true value". Note: The concentration of the spike will be at a level below the calibration range.

20.6.6 The calculated MDL cannot be not greater than the spike amount.

20.6.7 If the most recent calculated MDL does not permit qualitative identification of the analyte then the laboratory may use technical judgment for establishing the MDL. (e.g. calculate what level would give a qualitative ID, compare with IDL (20.7), spike at a level where qualitative ID is determined and assign that value as MDL, minimum sensitivity requirements, etc.). The rationale must be documented and the QA Manager must approve any adjustments made based on judgment.

20.6.8 Each of the 7 spikes must be qualitatively identifiable (e.g. appear in both columns for dual column methods, 2 mass ions for GCMS mass spectra, etc). Manual integrations are not allowed for compound identification (cannot force the baseline to detect).

20.6.9 The method detection limit is calculated as follows:

$$\text{Method Detection Limit} = t_{(n-1,\ 1-a\ =\ 0.99)} \times (\text{Standard Deviation of replicates})$$

where $t_{(n-1,\ 1-a\ =\ 0.99)} = 3.143$ for seven replicates.

20.6.10 Because of the inherent variability in results outside of the calibration range, TestAmerica does not recommend the reporting of results below the lowest calibration point in a curve however, it is recognized that some projects and agencies require the reporting of results below the RL. Any result that falls between the MDL and the Reporting limit, when reported, will be qualified as an estimated value.

20.6.11 Detections reported down to the MDL must be qualitatively identified.

20.6.12 MDLs and Reporting limits are adjusted in LIMs based on moisture content and sample aliquot size.

20.7 INSTRUMENT DETECTION LIMITS (IDL):

20.7.1 The IDL is sometimes used to develop MDLs, verify reasonableness of MDLs, or in some cases required by the analytical method. IDLs are most used in metals analyses but may be useful in demonstration of instrument performance in other areas.

20.7.2 IDLs are calculated to determine an instrument's sensitivity independent of any preparation method. IDLs are calculated either using 7 replicate spike analyses, like MDL but without sample preparation, or by the analysis of 10 instrument blanks and calculating 3 x the absolute value of the standard deviation.

20.7.3 If IDL is > than MDL it may be used as the reported MDL.

20.8 VERIFICATION OF DETECTION AND REPORTING LIMITS

20.8.1 Once an MDL is established, it must be verified, on each instrument, by analyzing a Quality Control sample (prepared as a sample) at 2-3 times the calculated MDL for single analyte analyses (e.g. most wet chemistry methods, Atomic Absorption, etc.) and 1-4 times the calculated MDL for multiple analyte methods (e.g GC, GCMS, ICP, etc.). The analytes must be qualitatively identified. This verification does not apply to methods that are not readily spiked (e.g. pH, turbidity, etc.) or where the lab does not report to the MDL. If the MDL does not verify, then the lab will not report to the MDL or redevelop their MDL. MDLs must be verified at least annually.

20.8.2 When a Reporting limit is established, it must be initially verified by the analysis of a Low level QC sample (LCS at 1-2 the reporting limit) and annually thereafter. *The annual requirement is waved for methods that have an annually verified MDL]*

20.9 RETENTION TIME WINDOWS

20.9.1 Most organic analyses and some inorganic analyses use chromatography techniques for qualitative and quantitative determinations. For every chromatography analysis each analyte will have a specific time of elution from the column to the detector. This is known as the analyte's retention time. The variance in the expected time of elution is defined as the retention time window. As the key to analyte identification in chromatography, retention time windows must be established on every column for every analyte used for that method. These records are kept with the files associated with an instrument for later quantitation of the analytes.

20.9.2 For GC, HPLC and IC methods, there must be sufficient separation between analyte peaks so as to not misidentify analytes. The valley between two peaks cannot be any less than 25% of the peak heights of the analytes. This also applies to GCMS in the case where the two compounds share the same quantitation ion.

20.9.2.1 Some analytes do not separate sufficiently to be able to identify or quantitate them as separate analytes (e.g. m-xylene and p-xylene) and are quantitated and reported as a single analyte (e.g. m,p-xylenes).

20.9.3 Once the analyst has determined that the instrument is in optimum working condition through calibration and calibration verification procedures, he or she uses a mid-range calibration or calibration verification standard to establish the retention times for each of the individual

analytes in a method. The Analyst makes three injections of the same standard over a 72-hour (24 hr period for 300.0) period, tabulating the retention times for each analyte for each of the three injections. The width of retention time window is normally the average absolute retention time ± 3 Standard Deviations. A peak outside the retention time window will not be identified by the computer as a positive match of the analyte of interest.

20.9.4 Based on analyst experience, there may be instances where method default retention time windows may be used (e.g. for 8000 series methods a default of 0.03 minutes may be used). The same concept is applied, any peak outside of that window will not be identified by the computer as a positive match.

20.9.5 The calibration verification standard at the beginning of a daily run may be used to adjust the retention time for an analyte. This is essentially re-centering the window but the size of the window remains the same. The RTs are verified when all analytes are within their RT windows and are properly identified.

20.10 EVALUATION OF SELECTIVITY

20.10.1 The laboratory evaluates selectivity by following the checks within the applicable analytical methods, which include mass spectral tuning, second column confirmation, ICP interelement interference checks, chromatography retention time windows, sample blanks, spectrochemical, atomic absorption and specific electrode response factors.

20.11 ESTIMATION OF UNCERTAINTY OF MEASUREMENT

20.11.1 Uncertainty is "a parameter associated with the result of a measurement, that characterizes the dispersion of the values that could reasonably be attributed to the measurand" (as defined by the International Vocabulary of Basic and General Terms in Metrology, ISO Geneva, 1993, ISBN 92-67-10175-1). Knowledge of the uncertainty of a measurement provides additional confidence in a result's validity. Its value accounts for all the factors which could possibly affect the result, such as adequacy of analyte definition, sampling, matrix effects and interferences, climatic conditions, variances in weights, volumes, and standards, analytical procedure, and random variation. Some national accreditation organizations require the use of an "expanded uncertainty": the range within which the value of the measurand is believed to lie within at least a 95% confidence level with the coverage factor k=2.

20.11.2 Uncertainty is not error. Error is a single value, the difference between the true result and the measured result. On environmental samples, the true result is never known. The measurement is the sum of the unknown true value and the unknown error. Unknown error is a combination of systematic error, or bias, and random error. Bias varies predictably, constantly, and independently from the number of measurements. Random error is unpredictable, assumed to be Gaussian in distribution, and reducible by increasing the number of measurements.

20.11.3 The uncertainty associated with results generated at TestAmerica-Irvine is determined by using the Laboratory Control Sample (LCS) accuracy range for a given analyte. The LCS limits are used to assess the performance of the measurement system since they take into consideration all of the laboratory variables associated a given test over time (except for variability associated with the sampling). The percent recovery of the LCS is compared either to the method-required LCS accuracy limits or to the statistical, historical, in-house LCS accuracy limits.

20.11.4 To calculate the uncertainty for the specific result reported, multiply the result by the decimal of the lower end of the LCS range percent value for the, and multiply the result by the decimal of the upper end of the LCS range percent value. These calculated values represent a 99%-certain range for the reported result. As an example, suppose that the result reported is 1.0 mg/l, and the LCS percent recovery range is 50 to 150%. The uncertainty range would be 0.5 to 1.5 mg/l, which could also be written as 1.0 +/- 0.5 mg/l.

20.11.5 In the case where a well recognized test method specifies limits to the values of major sources of uncertainty of measurement (e.g. 524.2, 525, etc) and specifies the form of presentation of calculated results, no further discussion of uncertainty is required.

20.12 CONTROL OF DATA

TestAmerica-Irvine has policies and procedures in place to ensure the authenticity, integrity, and accuracy of the analytical data generated by the laboratory.

20.12.1 Computer and Electronic Data Related Requirements

The three basic objectives of our computer security procedures and policies are shown below. More detail is outlined in the SOP COMPSECU.SOP (Computer Security).

20.12.1.1 Maintain the database integrity: Assurance that data is reliable and accurate through data verification (review) procedures, password-protecting access, anti-virus protection, data change requirements, as well as an internal Element permissions procedure.

- LIMS Database Integrity is achieved through data input validation, internal user controls, and data change requirements.
- Spreadsheets and other software developed in-house must be verified with documentation through hand calculations prior to use.

  Note: "Commercial off-the-shelf software in use within the designed application range is considered to be sufficiently validated." *From NELAC 2003 Standard.* However, laboratory specific configurations or modifications are validated prior to use.
- In order to assure accuracy, all data entered or transferred into the LIMS data system goes through a minimum of two levels of review.
- The QA department performs random data audits to ensure the correct information has been reported.
- Changes to reports are documented in the Element Set-Back database.
- Analytical data file security is provided through three policies.
  - The first policy forbids unauthorized personnel from using laboratory data acquisition computers.
  - The second policy is the implementation of network passwords and login names that restrict directory access.
  - The third layer is maintained through our LIMS and includes the use of username/password combinations to gain access to the LIMS system, the fact that all data in the LIMS is associated with the user to added/reviewed the data, and the restriction of review authority of data.

- All software installations will be in accordance with any relevant copyright licensing regulations.
- All software installed on any computer within the laboratory must be approved by the Information Technology Department, the Technical Manager, or the Laboratory Manager. Shrink-wrapped or otherwise sealed OEM software that is directly related to instrument usage does not need approval but the Information Technology department must be notified of the installation.
- Anti-virus software shall be installed on all servers and workstations. The anti-virus software shall be configured to check for virus signature file and program updates on a daily basis and these updates will be pushed to all servers and workstations. The anti-virus software will be configured to clean any virus-infected file if possible, otherwise the file will be deleted. Floppy disks brought from any outside source that are not OEM software must be scanned for viruses before being accessed.
- **Interlab (TestAmerica Labs) Element Permissions Policy**

  - PURPOSE

    The purpose of this policy is to provide a mechanism for maintaining the integrity of information contained in each laboratory's Element database while providing the necessary access for information sharing to staff at other laboratory facilities.

  - DEFINITIONS

    Home Laboratory: The laboratory facility that owns the Element system.

  - POLICIES

    (a) All permissions for the laboratory's Element system must only be granted by a representative of that laboratory.

    - If someone outside of the home lab needs permissions for Project Management or other uses, they must go through the Lab Director or his/her designated representative.
    - Permissions must never be granted without the knowledge of the home laboratory.

    (b) Only laboratory analytical or QA staff from the home laboratory may have edit permissions for laboratory analysis data.

    (c) Any changes made in laboratory's Element system:

    - Must be documented and traceable.
    - If made by staff of an affiliate lab, written permission from the home lab to make the changes (email approval is sufficient) is required.
    - No corrections may be made in another laboratories system without their knowledge.

(d) Data qualifiers in laboratory reports must only be corrected, edited, etc. by the staff at the home laboratory.

(e) Full analytical data "View" only permissions may be granted to outside Project Management and Sales staff. Query permissions may also be granted so status may be checked.

(f) All qualifiers must be approved by QA staff before adding to Static Tables in Element.

(g) Please contact Corporate QA or IT staff if you have any questions regarding implementation or interpretation of this policy.

20.12.1.2 Ensure information availability: Protection against loss of information or service through scheduled back-ups, secure storage of media, line filter, Uninterruptible Power Supply (UPS), and maintaining older versions of software as revisions are implemented.

- Insured by timely backup procedures on reliable backup media, stable file server network architecture, and UPS protection
- UPS Protection:
  - Each fileserver is protected by an APC power protection/backup unit In the event of a power outage, there is approximately 15-30 minutes of up-time for the servers prior to shutdown. This allows for proper shutdown procedures to be followed with the fileservers.
- File Server Architecture
  - All files are maintained on multiple Windows 2000 servers which are secured physically in the Information Technology office. Access to these servers is limited to members of the Information Technology staff.
  - All supporting software is maintained for at least 5 years from the last raw data generated using that software. (Length of time is dependent on local regulations or client requirements. E.g. OH VAP requires 10 years)
- System Back-up Overview and Procedures
  - Data from both servers and instrument attached PC's are backed up and purged via a custom program located on a server at each location.
  - A SQL Server Database Maintenance Plan has been defined to create a daily archive of all data within the Element database to a backup location. This backup is initiated automatically by the database management system.
  - On a weekly basis a complete set of backup tapes will be stored in a fire safe located in each lab. These tapes must not be purged or reused until the monthly tape has been made and forwarded to the corporate office.
  - On a monthly basis: A complete set of backup tapes will be placed in the lab fire safe for long term storage. In addition, a complete set of backup tapes will be stored offsite in a fire safe.

- Instrument data back-ups are verified on a periodic basis by the QA department when performing electronic data audits. The audit takes place on data that has been moved to a back-up location ensuring that it has been moved.

20.12.1.3 Maintain confidentiality: Ensure data confidentiality through physical access controls, and encryption of when electronically transmitting data*.*

- All servers are located in a secure area of the IT department offices. Access to the servers is limited to IT staff members, lab directors, the President and Vice President of Operations.
- The company website contains SSL (Secure Socket Layer) encryption for secure website sessions and data transfers.
- The reporting portion of the Element system requires a project manager to enter their unique password anytime they create a report that displays a signature on it (.PDF).
- Electronic documents such as PDF files and electronic data deliverables will be made available to clients via the secure web site. The logon page for this web site contains an agreement that the customer must accept before they will be logged on which states that the customer agrees not to alter any electronic data made available to them.
- If electronic documents are made available outside of the web site, the customer must sign an agreement in advance that states they will not alter the data in any way.

20.12.2 Data Reduction

Analytical results are reduced to appropriate concentration units specified by the analytical method, taking into account factors such as dilution, sample weight or volume, etc. Blank correction will be applied only when required by the method or per manufacturer's indication; otherwise, it should not be performed. Calculations are independently verified by appropriate laboratory staff. If the formulas outlined in this section are not used, the correct formula can be found in the appropriate method SOP.

20.1.1.1 All raw data must be retained in the daily sequence/batch folder, computer file (if appropriate), and/or logbook. All criteria pertinent to the method must be recorded. In addition, a response of the values entered into LIMS must be verified and retained. At the time the observations or calculations are made, the documentation must be signed or initialed and dated (month/day/year) in an easily identifiable and clear reference to the task performed.

20.12.2.2 In general, concentration results are reported in milligrams per liter (mg/l) or micrograms per liter (µg/l) for liquids and milligrams per kilogram (mg/kg) or micrograms per kilogram (µg/kg) for solids. The units "mg/l" and "mg/kg" are the same as "parts per million (ppm)". The units "µg/l" and "µg/kg" are the same as "parts per billion (ppb)." For values greater than 10,000 mg/l, results can be reported in percent, i.e., 10,000 mg/l = 1%.

- Several environmental methods, such as color, turbidity, conductivity, use very specific, non-concentration units to report results (e.g., NTU, umhos/cm etc).
- Occasionally, the client requests that results be reported in units which take into account the measured flow of water or air during the collection of the sample. When they provide this information, the calculations can be performed and reported.

20.12.2.3 The rounding rule is: round up if the digit to be discarded is larger than 5; round down if the digit to be discarded is less than 5. If the digit is exactly 5, round down if the preceding digit is even; round up if the preceding digit is odd.

20.12.2.4 In reporting, the analyst or the instrument output records the raw data result using values of known certainty plus one uncertain digit. If final calculations are performed external to LIMS, the result should be reported to three significant figures. In general, sample results are reported to 2 significant figures on the final report.

20.12.2.5 For those methods that do not have an instrument printout or an instrumental output compatible with the LIMS System, the raw results and dilution factors are entered directly into LIMS by the analyst, and the software calculates the final result for the analytical report. LIMS has a defined significant figure criterion for each analyte.

20.12.2.6 The laboratory strives to import data directly from instruments or calculation spreadsheets to ensure that the reported data are free from transcription and calculation errors. For those analyses with an instrumental output compatible with the LIMS, the raw results and dilution factors are transferred into LIMS electronically after reviewing the quantitation report, and removing unrequested or poor spectrally-matched compounds. The analyst prints a copy of what has been entered to check for errors. This printout and the instrument's printout of calibrations, concentrations, retention times, chromatograms, and mass spectra, if applicable, are retained with the data file. The data file is stored in a monthly folder on the instrument computer; periodically, this file is transferred to the server and, eventually, to a tape file.

20.12.3 Logbook / Worksheet Use Guidelines

20.12.3.1 Logbooks and worksheets are filled out 'real time' and have enough information on them to trace the events of the applicable analysis/task. (e.g. calibrations, standards, analyst, sample ID, date, time on short holding time tests, temperatures when applicable, calculations are traceable, etc.)

20.12.3.2 Corrections are made following the procedures outlined in Section 13.4.

20.12.3.3 Logbooks are controlled by the QA department at each facility. A record is maintained of all logbooks in the lab.

20.12.3.4 Unused portions of pages must be "Z"'d, signed and dated.

20.12.3.5 Worksheets are created with the approval of the QA Manager at the facility. The QA Manager controls all worksheets following the procedures in Section 6.

20.12.4 Review / Verification Procedures

Review procedures are out lined in several SOPs (LOGIN.SOP, "Sample Control"; DATAREV.SOP, "General Data Review" and PMDATA.SOP, "Data Reporting, Validation, and Distribution") to ensure that reported data are free from calculation and transcription errors, that QC parameters have been reviewed and evaluated before data is reported. The laboratory also has an SOP discussing Manual Integrations to ensure the authenticity of the data (MANINT.SOP, "Manual Integration/Data Integrity"). The general review concepts are discussed below, more specific information can be found in the SOPs.

20.12.4.1 The data review process at TestAmerica-Irvine starts at the Sample Control level. Sample Control personnel review chain-of-custody forms and input the sample information and required analyses into a computer LIMS. The Sample Control Department Manager or designee

reviews the transaction of the chain-of-custody forms and the inputted information. The Project Managers perform final review of the chain-of-custody forms and inputted information.

20.12.4.2 The next level of data review occurs with the Analysts. As results are generated, analysts review their work to ensure that the results generated meet QC requirements and relevant EPA methodologies. The Analysts transfer the data into the LIMS and add data qualifiers if applicable (see Appendix 7 for list of common data qualifiers). To ensure data compliance, a different analyst performs a second level of review. Second level review is accomplished by checking reported results against raw data and evaluating the results for accuracy. During the second level review, blank runs, QA/QC check results, continuing calibration results, laboratory control samples, sample data, qualifiers and spike information are evaluated. Approximately 15% of all sample data from manual methods and from automated methods, all GC/MS spectra and all manual integrations are reviewed. Manual integrations are also electronically reviewed utilizing auditing software to help ensure compliance to ethics and manual integration policies. Issues that deem further review include the following:

- QC data are outside the specified control limits for accuracy and precision
- Reviewed sample data does not match with reported results
- Unusual detection limit changes are observed
- Samples having unusually high results
- Samples exceeding a known regulatory limit
- Raw data indicating some type of contamination or poor technique
- Inconsistent peak integration
- Transcription errors
- Results outside of calibration range

20.12.4.3 Unacceptable analytical results may require reanalysis of the samples. Any problems are brought to the attention of the Laboratory Director, Project Manager, Quality Assurance Manager, or Department Manager for further investigation. Corrective action is initiated whenever necessary.

20.12.4.4 The results are then entered or directly transferred into the computer database and a hard copy (or .pdf) is printed for the client.

20.12.4.5 As a final review prior to the release of the report, the Project Manager reviews the results for appropriateness and completeness. This review and approval ensures that client requirements have been met and that the final report has been properly completed. The process includes, but is not limited to, verifying that chemical relationships are evaluated, COC is followed, cover letters/ narratives are present, flags are appropriate, and project specific requirements are met. The following are some examples of chemical relationships that are reviewed (if data is available):

- Total Results are $\geq$ Dissolved results (e.g. metals)
- Total Solids (TS) $\geq$ TDS or TSS
- TKN $\geq$ Ammonia
- Total Phosphorus $\geq$ Orthophosphate

- COD ≥ TOC
- Total cyanide ≥ Amenable Cyanide
- TDS ≥ individual anions

20.12.4.6 Any identified analytical problems are brought to the attention of both the Laboratory Director and the Quality Assurance Manager for corrective action. Furthermore, any project that requires a data package is subject to a tertiary data review for transcription errors and acceptable quality control requirements. The Project Manager then signs the final, typed report. (*Also see section 26 on Reporting Results*). The accounting personnel also check the report for any clerical or invoicing errors. When complete, the report is sent out to the client.

20.12.4.7 A visual summary of the flow of samples and information through the laboratory, as well as data review and validation, is presented in Figure 20-3.

20.12.5 Manual Integrations

Computerized data systems provide the analyst with the ability to re-integrate raw instrument data in order to optimize the interpretation of the data. Though manual integration of data is an invaluable tool for resolving variations in instrument performance and some sample matrix problems, the technique can be used improperly to make unacceptable data appear to meet quality control acceptance limits. Improper re-integrations lead to legally indefensible data, a poor reputation, or possible laboratory decertification. Because guidelines for re-integration of data are not provided in the methods and most methods were written prior to widespread implementation of computerized data systems, TestAmerica-Irvine trains all analytical staff on proper manual integration techniques using the guidelines described in SOP MANINT.SOP.

20.12.5.1 The analyst must adjust baseline or the area of a peak in some situations, for example when two compounds are not adequately resolved or when a peak shoulder needs to be separated from the peak of interest. The analyst must use professional judgment and common sense to determine when manual integrating is required. Analysts are encouraged to ask for assistance from a senior analyst or manager when in doubt.

20.12.5.2 Analysts shall not increase or decrease peak areas to achieve acceptable QC recoveries that would have otherwise been unacceptable. The intentional recording or reporting of incorrect information (or the intentional omission of correct information) is against company principals and policy and is grounds for immediate termination.

20.12.5.3 Client samples, performance evaluation samples, and quality control samples are all treated equally when determining whether or not a peak area or baseline should be manually adjusted.

20.12.5.4 ALL manual integrations are documented by printing before and after chromatograms/spectra with a brief explanation of why the integration was performed. The chromatograms/spectra must be scaled in such a way that the reviewer can easily identify the changes. All manual integrations receive a second level review.

Figure 20-1a

TestAmerica-Irvine

Initial Demonstration of Capability

Employee: _____

Department: _____

Procedure(s): _____

Matrix: _____

SOP Name/Revision: _____

	Task	Initials / Date Completed
1	Employee has read and understands the published procedure(s).	_____/_____
2	Employee has read, understands and agrees to follow the applicable SOP(s) without deviation.	_____/_____
3	Employee has been trained on MANINT.SOP. *(If trained within the past 12 months, note when the training took place.)*	_____/_____
4	Using the SOP as a ***step-by-step*** reference, the trainer has demonstrated the entire procedure to the Employee. *If any inaccuracies or contradictions in the SOP are discovered at this time, notify the area Supervisor and the QA Manager before proceeding further.*	_____/_____
5	Employee has performed the procedure under the direct supervision of an experienced staff member. (**including standard and reagent preparation and calibration where applicable**)	_____/_____
6	Employee has independently performed the procedure and results have been reviewed and confirmed by experienced staff member.	_____/_____
7	Technical staff only: Employee has demonstrated precision and accuracy by generating acceptable results on 4 replicates of _____ (Type of proficiency sample)	_____/_____

The employee named above has successfully demonstrated proficiency to perform the above mentioned procedure, maintain applicable QA/QC requirements, and report results on his or her own.

Employee Signature:_____ Date:_____

Trainer Signature:_____ Date:_____

Supervisory Signature:_____ Date:_____

Lab Director/QA approval:_____ Date:_____

Figure 20-1b

DEMONSTRATION OF CAPABILITY CERTIFICATION STATEMENT

Date: **Page 17 of 1**
Laboratory Name:
Laboratory Address:
Analyst(s) Name(s):

Matrix:
SOP# and Rev#:
Parameter:

We, the undersigned, CERTIFY that:

1. The analysts identified above, using the cited test method(s), which is in use at this facility for the analyses of samples under the National Environmental Laboratory Accreditation Program, have met the Demonstration of Capability.

2. The test method(s) was performed by the analyst(s) identified on this certification.

3. A copy of the test method(s) and the laboratory-specific SOPs are available for all personnel on-site.

4. The data associated with the demonstration capability are true, accurate, complete, and self explanatory.[1]

5. All raw data (including a copy of this certification form) necessary to reconstruct and validate these analyses have been retained at the facility, and that the associated information is well organized and available for review by authorized assessors.

Technical Director's Name and Title	Signature	Date
Quality Assurance Manager	Signature	Date

[1] True: Consistent with supporting data.
Accurate: Based on good laboratory practices consistent with sound scientific principles/practices.
Complete: Includes the results of all supporting performance testing.
Self-Explanatory: Date properly labeled and stored so that the results are clear and require no additional explanation.

Figure 20-2

New Method / Additional Analyte Checklist

The following items are **required** to be completed prior to the acceptance of client samples. Fill in any blanks that do not apply with "NA". Provide associated instrument QC when samples or QC samples are analyzed (includes run log).

New Method _____ Added Analytes _____

1_____ Standard Operating Procedure

- Note: For additional analytes, a **ROMD [or whatever an internal communication memo is named in your lab]** can be used to add the analytes, include RL and matrix.
  - _____ Analysis SOP
  - _____ Preparation SOP
  - _____ SOP for any other relevant process
  - _____ Pages from any applicable logbooks (instrument, standards, etc)

2_____Evaluation of Selectivity. As applicable: e.g. Retention Time Window Study, second column confirmation, Interelement correction checks, spectral or fluorescence profiles, etc.

3_____ Initial Calibration Curve (Include Tune verification or similar (e.g. degradation checks) if applicable)

4_____ Method Detection Limit (MDL) Study (summary and raw data)

- _____ Water
- _____ Soil
- _____ Other

5_____ Real Sample and MS, MSD ***(CA ELAP Requirement)***

- Tap Water for water only methods
- Local Soil sample for SW-846 methods (if applying for soil or soil/water)
- Local water sample may be used in lieu of tap water if it is a non- drinking water method
- Does not have to contain the target analytes

6_____ Reporting Limit Verification standard

- Spike a blank matrix at the RL and process through the entire method. MDL study should be able to be used if recovery is good. Note the spike level(s) and recovery(~~y~~ies)

7_____ Demonstration of Capability (DOC) per analyst (Precision and Accuracy (P&A) verification)

- 4 LCS for each matrix – most acceptance criteria are in the methods. The MDL study may be used if DOC criteria is met.
- Non-Standard methods – 3 x (1 LCS at LOQ-25%, 50%, 75% of the calibration range + Blank) prepared each day. (see NELAC Chpt 5, appedx C.3.3 (b))

8_____ Acceptable PT sample(s) if available

Notes: PT sample required for all new methods
PT sample required for all new analytes under NELAP

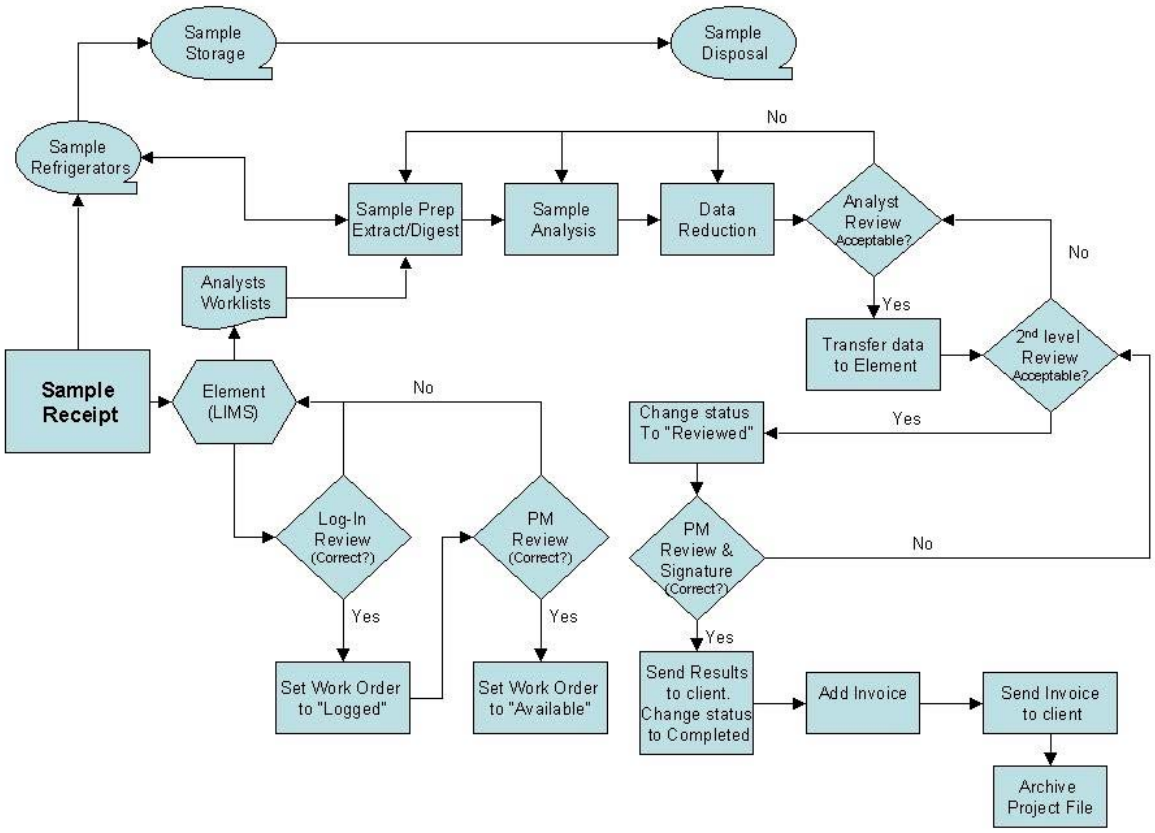
Submitted by _____ Date _____

9_____ Certification/Approval from Regulatory Agency where available.

QA Review / Acceptance _____ Date _____

Figure 20-3

Work Flow



Section 21
(NELAC 5.5.5)
EQUIPMENT (AND CALIBRATIONS)

TestAmerica purchases the most technically advanced analytical instrumentation for sample analyses. Instrumentation is purchased on the basis of accuracy, dependability, efficiency and sensitivity. Each laboratory is furnished with all items of sampling, preparation, analytical testing and measurement equipment necessary to correctly perform the tests for which the laboratory has capabilities. Each piece of equipment or software is capable of achieving the required accuracy and complies with specifications relevant to the method being performed. Before being placed into use, the equipment (including sampling equipment) is calibrated and checked to establish that it meets its intended specification. The calibration routines for analytical instruments establish the range of quantitation. Calibration procedures are specified in each laboratory method SOP. A list of laboratory equipment and instrumentation is presented in Table 21-1. Equipment is only operated by authorized and trained personnel. Manufacturers instructions for equipment use are readily accessible to all appropriate laboratory personnel.

21.1 PREVENTIVE MAINTENANCE

21.1.1 TestAmerica-Irvine follows a well-defined program to ensure proper equipment operation and to prevent the failure of laboratory equipment or instrumentation during use. This program of preventive maintenance helps to avoid delays due to instrument failure.

21.1.2 Routine preventive maintenance procedures and frequency, such as lubrication, cleaning, and replacements, should be performed according to the procedures outlined in the manufacturer's manual. Qualified personnel must also perform maintenance when there is evidence of degradation of peak resolution, a shift in the calibration curve, loss of sensitivity, or failure to continually meet one of the quality control criteria.

21.1.2.1 Calibrations, routine maintenance, and adjustments are part of the analysts' and Department Managers' responsibilities. However, service contracts may be in place for some instruments to cover any major repairs.

21.1.2.2 High purity gases, reagents, and spare parts are kept on hand to minimize repair time and optimize instrument performance.

21.1.3 Table 21-2 summarize the schedule for routine maintenance. It is the responsibility of each Department Manager or the Technical Manager to ensure that instrument maintenance logs are kept for all equipment in his/her department. Preventative maintenance procedures may also be outlined in analytical SOPs or instrument manuals. (Note: for some equipment, the log used to monitor performance is also the maintenance log. Multiple pieces of equipment may share the same log.)

21.1.4 Instrument maintenance logbooks are controlled and are used to document instrument problems, instrument repair and maintenance activities. Maintenance logbooks shall be kept for all major pieces of equipment. Instrument maintenance logs may also be used to specify instrument parameters.

21.1.4.1 Documentation must include all major maintenance activities such as contracted preventive maintenance and service and in-house activities such as the replacement of electrical components, lamps, tubing, valves, columns, detectors, cleaning and adjustments.

21.1.4.2 Each entry in the instrument logbook includes the Analyst's initials, the date, a detailed description of the problem (or maintenance needed/scheduled), a detailed explanation of the solution or maintenance performed, and a verification that the equipment is functioning properly (state what was used to determine a return to control. e.g. CCV run on *'date'* was acceptable, or instrument recalibrated on 'date' with acceptable verification, etc.).

21.1.4.3 When maintenance or repair is performed by an outside agency, service receipts detailing the service performed can be stapled into the logbooks adjacent to pages describing the maintenance performed. This stapled in page must be signed across the page entered and the logbook so that it is clear that a page is missing if only half a signature is found in the logbook.

21.1.4.4 In addition, the maintenance log contains:

21.1.4.4.1 The identification of the instrument/equipment **(**instrument's Serial Number and Model Number)
21.1.4.4.2 The date the instrument/equipment was put into use.
21.1.4.4.3 If available, the condition when the instrument was received (e.g. new, used, reconditioned).
21.1.4.4.4 Any maintenance procedures and frequency or a reference to their location.

21.1.5 If an instrument requires repair (subjected to overloading or mishandling, gives suspect results, or otherwise has shown to be defective or outside of specified limits) it shall be taken out of operation and tagged as out of service or otherwise isolated until such a time as the repairs have been made and the instrument can be demonstrated as operational by calibration and/or verification or other test to demonstrate acceptable performance. The laboratory shall examine the effect of this defect on previous analyses (see Sections 12 and 13).

21.1.6 In the event of equipment malfunction that cannot be resolved, service shall be obtained from the instrument vendor manufacturer, or qualified service technician, if such a service can be tendered. If on-site service is unavailable, arrangements shall be made to have the instrument shipped back to the manufacturer for repair. Back up instruments, which have been approved, for the analysis shall perform the analysis normally carried out by the malfunctioning instrument. If the back up is not available and the analysis cannot be carried out within the needed timeframe, the samples shall be subcontracted using the procedures outlined in Section 8.

21.1.6.1 If an instrument is sent out for service, it must be recalibrated and verified (including new MDL) prior to return to lab operations.

21.2 SUPPORT EQUIPMENT

21.2.1 This section applies to all devices that may not be the actual test instrument, but are necessary to support laboratory operations. These include but are not limited to: balances, ovens, refrigerators, freezers, incubators, water baths, field sampling devices, temperature measuring devices, thermal/pressure sample preparation devices and volumetric dispensing

devices if quantitative results are dependent on their accuracy, as in standard preparation and dispensing or dilution into a specified volume. All raw data records associated with the support equipment are retained to document instrument performance.

21.2.2 Weights and Balances

21.2.2.1 The accuracy of the balances used in the laboratory is checked every working day, before use. All balances are placed on stable counter tops.

21.2.2.2 Each balance is checked daily with at least two certified ASTM type 1 weights spanning its range of use. The weights are recalibrated/recertified annually to NIST standards and are used for no other purpose.

21.2.2.3 All balances are serviced annually by a qualified service representative, who supplies the laboratory with a certificate that identifies traceability of the calibration to the NIST standards.

21.2.2.4 All of this information is recorded in logbooks, and the recalibration/recertification certificates are kept on file. The laboratory's balance calibration SOP (BAL.SOP) addressed balance calibrations in greater detail.

21.2.3 pH, Conductivity, and Turbidity Meters

21.2.3.1 The pH meters used in the laboratory are accurate to $\pm$ 0.1 pH units, and have a scale readability of at least 0.05 pH units. The meters automatically compensate for the temperature, and are calibrated with at least two working range buffer solutions before each use.

21.2.3.2 Conductivity meters are also calibrated before each use with a standard that reflects the sample conductivity. These meters do not exceed an error of 1% or one umhos/cm.

21.2.3.3 Turbidity meters are also calibrated before each use. All of this information is documented in logbooks. Consult pH and Conductivity, and Turbidity SOPs for further information.

21.2.4 Thermometers

21.2.4.1 All thermometers are calibrated on an annual basis with a NIST-traceable thermometer. IR thermometers, digital probes and thermocouples are calibrated quarterly.

21.2.4.2 The NIST thermometer is recalibrated every three years by an approved outside service and the provided certificate of traceability is kept on file. The NIST thermometer has increments of at most 0.2 ºC, and has a range applicable to all method and certification requirements. The NIST traceable thermometer is used for no other purpose than to calibrate other thermometers.

21.2.4.3 All of this information is documented in logbooks. Monitoring method-specific temperatures, including incubators, heating blocks, water baths, and ovens, is documented in

method-specific logbooks. More information on this subject can be found in the laboratory's SOP THERMA.SOP.

21.2.5 Refrigerators/Freezer Units, Waterbaths, Ovens and Incubators

21.2.5.1 The temperatures of all refrigerator units and freezers used for sample and standard storage are monitored each working day.

21.2.5.2 Ovens, waterbaths and incubators are monitored on days of use.

21.2.5.3 All of this equipment has a unique identification number, and is assigned a unique thermometer for monitoring.

21.2.5.4 Sample storage refrigerator temperatures are kept between > 0ºC and $\leq$ 6 ºC.

21.2.5.5 Specific temperature settings/ranges for other refrigerators, ovens waterbaths, and incubators can be found in method specific SOPs.

21.2.5.6 All of this information is documented in Daily Temperature Logbooks and method-specific logbooks.

21.2.6 Autopipettors, Dilutors, and Syringes

21.2.6.1 Mechanical volumetric dispensing devices including burettes (except Class A Glassware) are checked for accuracy at least quarterly. Glass micro-syringes are considered the same as Class A glassware.

21.2.6.2 The laboratory maintains a sufficient inventory of autopipettors, and dilutors of differing capacities that fulfill all method requirements.

21.2.6.3 These devices are given unique identification numbers, and the delivery volumes are verified gravimetrically, at a minimum, on a quarterly basis.

21.2.6.4 For those dispensers that are not used for analytical measurements, a label is applied to the device stating that it is not calibrated. Any device not regularly verified can not be used for any quantitative measurements.

21.2.6.5 Micro-syringes are purchased from Hamilton Company. Each syringe is traceable to NIST. The laboratory keeps on file an "Accuracy and Precision Statement of Conformance" from Hamilton attesting established accuracy.

21.2.6.6 See the laboratory's SOP PIPET.SOP for further details on pipettor, dispenser, and syringe calibration checks.

21.2.7 Field Sampling Devices (Isco Auto samplers)

21.2.7.1 Each Auto Sampler (ISCO) is assigned a unique identification number in order to keep track of the calibration. This number is also recorded on the sampling documentation.

21.2.7.2 The Auto Sampler is calibrated monthly by setting the sample volume to 100ml and recording the volume received. The results are filed in a logbook/binder. The Auto Sampler is programmed to run three (3) cycles and each of the three cycles is measured into a graduated cylinder to verify 100ml are received.

21.2.7.3 If the RSD (Relative Standard Deviation) between the 3 cycles is greater than 10%, the procedure is repeated and if the result is still greater than 10%, then the Auto Sampler is taken out of service until it is repaired and calibration verification criteria can be met. The results of this check are kept in a logbook/binder.

21.3 INSTRUMENT CALIBRATIONS

21.3.1 Calibration of analytical instrumentation is essential to the production of quality data. Strict calibration procedures are followed for each method. These procedures are designed to determine and document the method detection limits, the working range of the analytical instrumentation and any fluctuations that may occur from day to day.

21.3.2 Sufficient raw data records are retained to allow an outside party to reconstruct all facets of the initial calibration. Records contain, but are not limited to, the following: calibration date, method, instrument, analyst(s) initials or signatures, analysis date, analytes, concentration, response, type of calibration (Avg RF, curve, or other calculations that may be used to reduce instrument responses to concentration.)

21.3.3 Sample results must be quantitated from the initial calibration and may not be quantitated from any continuing instrument calibration verification unless otherwise required by regulation, method or program.

21.3.4 If the initial calibration results are outside of the acceptance criteria, corrective action is performed and any affected samples are reanalyzed if possible. If the reanalysis is not possible, any data associated with an unacceptable initial calibration will be reported with appropriate data qualifiers (see Section 13).

21.3.4.1 Instruments are calibrated initially and as needed after that and least annually.

21.3.5 CALIBRATION STANDARDS

Calibration standards are prepared using the procedures indicated in the Reagents and Standards section of the determinative method SOP. However, the general procedures are described below.

21.3.5.1 For each analyte and surrogate (if applicable) of interest, prepare calibration standards at the minimum number of concentrations as stated in the analytical methods. If a reference or mandated method does not specify the number of calibration standards, the minimum number is three, not including blanks or a zero standard. All of the standard solutions are prepared using Class A volumetric glassware and/or microsyringes and appropriate laboratory quality solvents and stock standards.

21.3.5.2 Standards for instrument calibration are obtained from a variety of sources. All standards are traceable to NIST whenever possible. Dilution (intermediate) standards are prepared from stock standards purchased from commercial suppliers. All standard preparation information is recoreded in LIMS or a standard preparation logbook. These records contain, at a mimimum: concentration, date of receipt, date of standard preparation, any dilutions made, lot number, supplier, type of solvent and a unique code number to identify the standard.

21.3.5.3 The lowest concentration calibration standard that is analyzed during an initial calibration must be at or below the stated reporting limit for the method based on the final volume of extract (or sample).

21.3.5.4 The other concentrations define the working range of the instrument/method or correspond to the expected range of concentrations found in actual samples that are also within the working range of the instrument/method. Results of samples not bracketed by initial instrument calibration standards (within calibration range to 3 significant figures) must be reported as having less certainty, e.g., defined qualifiers or flags (additional information may be included in the case narrative). The lowest calibration standard must be at or above the detection limit. The exception to these rules is ICP methods or other methods where the referenced method does not specify two or more standards.

21.3.5.5 Given the number of target compounds addressed by some of the organic methods, it may be necessary to prepare several sets of calibration standards, each set consisting of the appropriate number of solutions at different concentrations. The initial calibration will then involve the analysis of each of these sets of the appropriate number of standards.

21.3.5.6 All initial calibrations are verified with a standard obtained from a second source (or different lot if a second source is not available) and traceable to a national standard, when available. This verification occurs immediately after the calibration curve has been analyzed, and before the analysis of any samples.

21.3.6 CALIBRATION FOR ORGANIC METHODS (GC, HPLC, GCMS)

21.3.6.1 Many of the organic analytical methods utilize an internal standard calibration (GCMS and some GC). Because of the complex nature of the multi-peak chromatograms produced by the method, some instruments necessitate the use of external standard calibration (most GC and HPLC). Surrogate compounds are included in the calibration processes for all appropriate organic analyses.

21.3.6.2 Once the operating parameters have been established according to the method, each instrument is calibrated for the appropriate method. The Analyst prepares five or more standard solutions at various concentrations containing all of the analytes of interest, internal standards, and surrogates that are appropriate for the method. Note: There are a several EPA methods that have different requirements and are exceptions (e.g. EPA 547) where a minimum of 3 calibration standards are prepared and analyzed.

21.3.6.3 The standard solutions are introduced into the instrument in the same manner as samples are; whether it be by direct injection, by headspace analysis, or by purge and trap. The calibration factor (CF) for methods that use external standards, and the response factor (RF) for methods that use internal standards are calculated for the five standards.

21.3.6.3.1 External standard calibration involves comparison of instrument responses from the sample to the responses from the target compounds in the calibration standards. Sample peak areas (or peak heights) are compared to peak areas (or heights) of the standards. The ratio of the response to the amount of analyte in the calibration standard is defined as the Calibration factor (CF). **Note:** The calibration models in section 21.4.6.7 or 21.4.6.8 are used for Ion Chromatography (Avg. CF is not used)

21.3.6.3.2 Internal standard calibration involves the comparison of instrument responses from the target compounds in the sample to the responses of specific standards added to the sample or sample extract prior to injection. The ratio of the peak area (or height) of the target compound in the sample or sample extract to the peak area (or height) of the internal standard in the sample or sample extract is compared to a similar ratio derived for each calibration standard. The ratio is termed the response factor (RF), and may also be known as a relative response factor in other methods.

- In many cases, internal standards are recommended. These recommended internal standards are often brominated, fluorinated, or stable isotopically labeled analogs of specific target compounds, or are closely related compounds whose presence in environmental samples is highly unlikely. The use of specific internal standards is available in the method SOP.
- Whichever internal standards are employed, the analyst needs to demonstrate that the measurement of the internal standard is not affected by method analytes and surrogates or by matrix interferences. In general, internal standard calibration is not as useful for GC and HPLC methods with non-MS detectors because of the inability to chromatographically resolve many internal standards from the target compounds. The use of MS detectors makes internal standard calibration practical because the masses of the internal standards can be resolved from those of the target compounds even when chromatographic resolution cannot be achieved.
- When preparing calibration standards for use with internal standard calibration, add the same amount of the internal standard solution to each calibration standard, such that the concentration of each internal standard is constant across all of the calibration standards, whereas the concentrations of the target analytes will vary. The internal standard solution will contain one or more internal standards and the concentration of the individual internal standards may differ within the spiking solution (e.g., not all internal standards need to be at the same concentration in this solution). The mass of each internal standard added to each sample extract immediately prior to injection into the instrument or to each sample prior to purging must be the same as the mass of the internal standard in each calibration standard. The volume of the solution spiked into sample extracts should be such that minimal dilution of the extract occurs (e.g., 10 uL of solution added to a 1 mL final extract results in only a negligible 1% change in the final extract volume which can be ignored in the calculations).
- An ideal internal standard concentration would yield a response factor of 1 for each analyte. However, this is not practical when dealing with more than a few target analytes. Therefore, as a general rule, the amount of internal standard should produce an instrument response (e.g., area counts) that is no more than 100 times that produced by the lowest concentration of the least responsive target analyte associated with the internal standard. This should result in a

minimum response factor of approximately 0.01 for the least responsive target compound.

Calibration Factors and Response Factors for each analyte are calculated as follows:

$$\textbf{Calibration Factor (CF)} = \frac{A(s)}{C(s)}$$

$$\textbf{Response Factor (RF)} = \frac{A(s) \times C(is)}{A(is) \times C(s)}$$

Where:
A(s) = Peak area (or height) of the analyte or surrogate.
A(is) = Peak area (or height) of the internal standard.
C(s) = Concentration (or mass) of the analyte or surrogate, in ug/L.
C(is) = Concentration (or mass) of the internal standard, in ug/L.

Note: In the equation above, RF is unitless, i.e., the units from the two area terms and the two concentration terms cancel out. Therefore, units other than ug/L may be used for the concentrations of the analyte, surrogate, and internal standard, provided that both C(s) and C(is) are expressed in the same units. The mass of the analyte and internal standard may also be used in calculating the RF value.

21.3.6.4 The CF or RF for each analyte at each concentration is tabulated to determine the graphical linearity of concentration versus response factor or calibration factor. The five CFs or RFs for each analyte in the initial calibration must have an acceptable Percent Relative Standard Deviation (% RSD) that is determined by each analytical method. If the RSD of the calibration or response factors is less than or equal to the acceptance limit stated in the published method over the calibration range, then linearity through the origin may be assumed, and the average calibration response factor may be used to determine sample concentrations. The CFs or RFs for each compound are calculated and kept in the calibration files.

The % Relative Standard Deviation is calculated as follows:

$$\%RSD = (SD / \overline{x_i}) \times 100$$

Where SD = Standard Deviation of initial 5 CFs or RFs for each compound calculated as follows:

$$SD = \sqrt{\sum_{i=1}^{n} \frac{\left(x_i - \overline{x_i}\right)^2}{n-1}}$$

Where:

$\overline{x_i}$ = Mean (Average) of initial 5 CFs or RFs for each compound.

n = number of standards

x_i = individual CF or RF

21.3.6.5 Policies regarding the use of calibration standard results for creating the calibration curve are as follows:

21.3.6.5.1 A low calibration standard may be excluded from the calibration if the signal-to-noise ratio or spectral criteria are not suitable. The reporting level must be elevated to be the lowest calibration standard used for calibration.

21.3.6.5.2 The upper calibration standard may be excluded if it saturates the detector or is obviously becoming non-linear. Any sample exceeding the upper standard used in the calibration must be diluted and re-analyzed.

21.3.6.5.3 Mid-calibration standards may not be excluded unless an obvious reason is found, i.e., cracked vial, incorrectly made, etc. The failed standard should be re-run immediately and inserted into the initial calibration. If not useful, recalibration is required.

21.3.6.6 Percent RSD Corrective Action

Given the potentially large numbers of analytes that may be analyzed in some methods, it is likely that some analytes may exceed the acceptance limit for the RSD for a given calibration. In those instances, the following steps are recommended, but not required.

21.3.6.6.1 The first step is generally to check the instrument operating conditions. This option will apply in those instances where a linear instrument response is expected. It may involve some trade-offs to optimize performance across all target analytes. For instance, changes to the operating conditions necessary to achieve linearity for problem compounds may cause the RSD for other compounds to increase, but as long as all analytes meet the RSD limits for linearity, the calibration is acceptable.

21.3.6.6.2 If the RSD for any analyte is greater than the applicable acceptance criteria in the applicable analytical (as specified in the laboratory's method-specific SOP), the analyst may wish to review the results (area counts, calibration or response factors, and RSD) for those analytes to ensure that the problem is not associated with just one of the initial calibration standards. If the problem appears to be associated with a single standard, that one standard may be reanalyzed and the RSD recalculated. Replacing the standard may be necessary in some cases.

21.3.6.6.3 A third alternative is to narrow the calibration range by replacing one or more of the calibration standards with standards that cover a narrower range. If linearity can be achieved using a narrower calibration range, document the calibration linearity, and proceed with analyses. The changes to the upper end of the calibration range will affect the need to dilute samples above the range, while changes to the lower end will affect the overall sensitivity of the method. Consider the regulatory limits or action levels associated with the target analytes when adjusting the lower end of the range.

NOTE: When the purpose of the analysis is to demonstrate compliance with a specific regulatory limit or action level, the laboratory must ensure that the method quantitation limit is at least as low as the regulatory limit or action level.

21.3.6.7 Alternatively, the least squares regression may be used to determine linearity. A five point line must result in a correlation coefficient (r) of 0.99 or better using the least squares method to be considered acceptable. In many cases it may be preferred that the curves be forced through zero (not to be confused with including the origin as an additional data point, which is not allowed). **Note:** EPA method 8000B does not allow forcing through zero however the agency has revaluated this position and has since changed this stance to allow forcing through zero. In addition, from EPA Method 8000C: "However, the use of a linear regression or forcing the regression through zero may NOT be used as a rationale for reporting results below the calibration range demonstrated by the analysis of the standards.").

21.3.6.8 Instead of a linear curve model (either Average RF or least squares regression), a second order curve (Quadratic) may be used (and preferred) as long as it contains at least six data points. As a rule of thumb, if there is a consistent trend in RFs (or CFs) in the calibration curve, either up or down, then quadratic curve fit may be indicated as the preferred calibration routine for that analyte. The coefficient of determination (COD or r^2) for the quadratic curve must be at least 0.99 for it to be considered acceptable. Some limitations on the use of Quadratic Curve fits:

21.3.6.8.1 Care MUST be exercised to assure that the results from this equation are real, positive, and fit the range of the initial calibration.

21.3.6.8.2 They **may not** be used to mask instrument problems that can be corrected by maintenance. (Not to be used where the analyte is normally found to be linear in a properly maintained instrument).

21.3.6.8.3 They **may not** be used to compensate for detector saturation. If it is suspected that the detector is being saturated at the high end of the curve, remove the higher concentration standards from the curve and try a 1st order fit or average RF.

Coefficient of Determination

$$r^2 = \frac{\left(\sum xy\right)^2}{\sum x^2 \sum y^2}$$

Correlation Coefficient

$$r = \frac{\left(\sum xy\right)}{\sqrt{\sum x^2 \sum y^2}}$$

Where:

y = Response or Response ratio (see below)

x = Concentration

Linear Regression / Least Squares Curve fit:

The calibration curve if defined by the equation:

$$y = mx+b$$

The sample concentration is determined by using the formula

$$x = (y-b) / m$$

Where:

y = Response or Response ratio (see below)

x = Concentration

m = slope

b = y intercept

Quadratic Curve Fits

The calibration curve is defined by the equation

$$y = ax^2 + bx + c$$

The sample concentration is determined using the formula :

$$x = \frac{-b \pm \sqrt{b^2 - 4a(c-y)}}{2a}$$

Where:

y = Response or Response Ratio (see below)

x = Concentration

a = variable to define the curvature

b = variable similar to the slope

c = y intercept.

Response Ratio (y) = $\frac{R_S * C_{IS}}{R_{IS}}$

Where:

R_S = Reponse of Sample or Standard

C_{IS} = Concentration of Internal Standard

R_{IS} = Response of Internal Standard

21.3.7 Calibration for Inorganic Analyses

21.3.7.1 EPA Method 7000 from EPA SW-846 is a general introduction to the quality control requirements for metals analysis. For inorganic methods, quality control measures set out in the individual methods and in the *Standard Methods for the Examination of Water and Wastewater* (20th Edition) may also be included. Standard Operating Procedures for the analysis and the quality control documentation measures are kept in the departments' SOP reference binders.

21.3.7.2 In general, inorganic instrumentation is calibrated with external standards. Some exceptions would be Inductively Coupled Plasma (ICP), Inductively Coupled Plasma Mass Spec (ICPMS), and Ion Chromatography Mass Spec (ICMS). These analyses may use an internal standard to compensate for viscosity or other matrix effects. While the calibration procedures are much the same for inorganics as they are for organics, CF's or RF's are not used. The calibration model in 21.4.6.7 is generally used for most methods, however in some instances the model from section 21.4.6.8 may be used. A correlation coefficient (r) of 0.995 or greater must be used to accept a calibration curve generated for an inorganic procedure. Correlation coefficients are determined by hand-held scientific calculators or by computer and recorded on the raw data (logbook or printout). Curves are not allowed to be stored in calculator memories and must be written on the raw data for the purposes of data validation.

21.3.7.3 "Calibrations" for titrimetric analyses are performed by standardizing the titrants against a primary standard solution. See specific methods in *Standard Methods for the Examination of Water and Wastewater* (20th Edition) for more information.

21.3.7.4 Spreadsheets that are used for general chemistry calculations must have all cells containing calculations locked to prevent accidental changes to the calculations.

21.3.7.5 Instrument technologies (e.g. ICP) with validated techniques from the instrument manufacturer or other methods using a zero point and single point calibration require the following:

21.3.7.5.1 The instrument is calibrated using a zero point and a single point calibration standard.

21.3.7.5.2 The linear range is established by analyzing a series of standards, one at the reporting limit (RL).

21.3.7.5.3 Sample results within the established linear range do not need to be qualified.

21.3.7.5.4 The zero point and single standard is run daily with each analytical batch.

21.3.7.5.5 A standard at the RL is analyzed daily with each analytical batch and must meet established acceptance criteria.

21.3.7.5.6 The linearity is verified at a frequency established by the manufacturer or method.

21.3.8 Calibration Verification

21.3.8.1 The calibration relationship established during the initial calibration must be verified at periodic intervals as specified in the laboratory method SOPs in accordance with the referenced analytical methods and NELAC (2003) standard, section 5.5.5.10. The process of calibration verification applies to both external standard and internal standard calibration techniques, as well as to linear and non-linear calibration models.

NOTE: The process of calibration verification referred to is fundamentally different from the approach called "calibration" in some methods. As described in those methods, the calibration factors or response factors calculated during calibration are used to update the calibration factors or response factors used for sample quantitation. This approach, while employed in other EPA programs, amounts to a daily single-point calibration, and is not appropriate nor permitted in SW-846 chromatographic procedures for trace environmental analyses.

21.3.8.2 Generally, the initial calibrations must be verified at the beginning of each 12-hour analytical shift during which samples are analyzed. (Some methods may specify more frequent verifications). The 12-hour analytical shift begins with the injection of the calibration verification standard (or the MS tuning standard in MS methods). The shift ends after the completion of the analysis of the last sample or standard that can be injected within 12 hours of the beginning of the shift.

21.3.8.3 A continuing instrument calibration verification (CCV) must be repeated at the beginning and end of each analytical batch for non-GC/MS methods. Some methods have more frequent CCV requirements see specific SOPs. Most Inorganic methods require the CCV to be analyzed after ever 10 samples.

21.3.8.4 The acceptance limits for calibration verifications can be found in each method SOP. As a rule of thumb: GCMS $\pm$ 20%, GC and HPLC $\pm$ 15%, Inorganics: $\pm$ 10 or 15%. Actual methods may have wider or tighter limits; see the method SOP for specifics.

21.3.8.5 If the response (or calculated concentration) for an analyte is within the acceptance limits of the response obtained during the initial calibration, then the initial calibration is considered still valid, and the analyst may continue to use the CF, RF or % drift values from the initial calibration to quantitate sample results.

21.3.8.6 If the response (or calculated concentration) for any analyte varies from the mean response obtained during the initial calibration by more than the acceptance criteria, then the initial calibration relationship may no longer be valid. If routine corrective action procedures fail to produce a second consecutive (immediate) calibration verification within acceptance criteria, then either the laboratory has to demonstrate performance after corrective action with two consecutive successful calibration verifications, or a new initial instrument calibration must be performed. However, sample data associated with an unacceptable calibration verification may be reported as qualified data under the following special conditions:

21.3.8.6.1 When the acceptance criteria for the calibration verification are exceeded high, i.e., high bias, and there are associated samples that are non-detects, then those non-detects may be reported. Otherwise, the samples affected by the unacceptable calibration verification shall be reanalyzed after a new calibration curve has been established, evaluated and accepted.

21.3.8.6.2 When the acceptance criteria for the calibration verification are exceeded low, i.e., low bias, those sample results may be reported if they exceed a maximum regulatory limit/decision level. Otherwise, the samples affected by the unacceptable verification

shall be reanalyzed after a new calibration curve has been established, evaluated and accepted.

21.3.8.7 Verification of Linear Calibrations

Calibration verification for linear calibrations involves the calculation of the percent drift or the percent difference of the instrument response between the initial calibration and each subsequent analysis of the verification standard. Use the equations below to calculate % Drift or % Difference, depending on the procedure specified in the method SOP. Verification standards are evaluated based on the % Difference from the average CF or RF of the initial calibration or based on % Drift or % Recovery if a linear or quadratic curve is used.

The Percent Difference is calculated as follows:

$$\% \text{ Difference} = \frac{(CF(v) \text{ or } RF(v)) - (\text{Avg. CF or RF})}{(\text{Avg. CF or RF})} \times 100$$

Where:

CF(v) or RF(v) = CF or RF from verification standard

Avg. CF or RF = Average CF or RF from Initial Calibration.

The Percent Drift is calculated as follows:

$$\% \text{ Drift} = \frac{\text{Result - True Value}}{\text{True Value}} \times 100$$

The Percent Recovery is calculated as follows:

$$\% \text{ Recovery} = \frac{\text{Result}}{\text{True Value}} \times 100$$

21.3.8.8 Verification of a Non-Linear Calibration

Calibration verification of a non-linear calibration is performed using the percent drift or percent recovery calculations described in 21.4.8.7 above.

21.3.8.9 Regardless of whether a linear or non-linear calibration model is used, if initial verification criterion is not met, then no sample analyses may take place until the calibration has been verified or a new initial calibration is performed that meets the specifications listed in the method SOPs. If the calibration cannot be verified after the analysis of a single verification standard, then adjust the instrument operating conditions and/or perform instrument maintenance, and analyze another aliquot of the verification standard. If the calibration cannot be verified with the second standard, then a new initial calibration is performed.

21.3.8.10 All target analytes and surrogates, including those reported as non-detects, must be included in periodic calibration verifications for purposes of retention time confirmation and to demonstrate that calibration verification criteria are being met.

21.3.8.11 All samples must be bracketed by periodic analyses of standards that meet the QC acceptance criteria (e.g., calibration and retention time). The frequency is found in the determinative methods or SOPs located in binders in each department.

21.3.8.11.1 If an internal standard calibration is being used (basically GCMS) then bracketing standards are not required, only daily verifications are needed. The results from these verification standards must meet the calibration verification criteria and the retention time criteria (if applicable).

21.4 POLICY ON TENTATIVELY IDENTIFIED COMPOUNDS (TICS) – GCMS ANALYSIS

21.4.1.1 For samples containing components not associated with the calibration standards, a library search may be made for the purpose of tentative identification. The necessity to perform this type of identification will be determined by the purpose of the analyses being conducted. Data system library search routines should not use normalization routines that would misrepresent the library or unknown spectra when compared to each other.

21.4.1.2 For example, the RCRA permit or waste delisting requirements may require the reporting of non-target analytes. Only after visual comparison of sample spectra with the nearest library searches may the analyst assign a tentative identification. Use the following guidelines for making tentative identifications:

21.4.1.2.1 Relative intensities of major ions in the reference spectrum (ions greater than 10% of the most abundant ion) should be present in the sample spectrum.

21.4.1.2.2 The relative intensities of the major ions should agree within ± 20%. (Example: For an ion with an abundance of 50% in the standard spectrum, the corresponding sample ion abundance must be between 30 and 70%).

21.4.1.2.3 Molecular ions present in the reference spectrum should be present in the sample spectrum.

21.4.1.2.4 Ions present in the sample spectrum but not in the reference spectrum should be reviewed for possible background contamination or presence of coeluting compounds.

21.4.1.2.5 Ions present in the reference spectrum but not in the sample spectrum should be reviewed for possible subtraction from the sample spectrum because of background contamination or coeluting peaks. Data system library reduction programs can sometimes create these discrepancies.

21.4.1.3 The concentration of any non-target analytes identified in the sample (Sec. 21.5.1.2) should be estimated. The same formulae as calibrated analytes should be used with the following modifications: The areas A_x and A_{is} should be from the total ion chromatograms, and the RF for the compound should be assumed to be 1.

21.4.1.4 The resulting concentration should be reported indicating: (1) that the value is an estimate, and (2) which internal standard was used to determine concentration. Use the nearest internal standard free of interferences.

Note: The above guidelines above are from EPA SW846 III edition, method 8260B.

21.4.1.5 For general reporting if TICs are requested, the ten (10), largest non-target analyte peaks whose area count exceeds 10% of the nearest internal standard will be termed "Tentatively Identified Compounds" (TICs). More or fewer TICs may be identified based on client requirements.

21.4.1.6 TIC Reporting Limits

21.4.1.6.1 In general Reporting limits cannot be specified because of the unknown nature of the TIC. Any reporting limit that is reported can only be evaluated as an estimate as the quantitation is based on the assumption that the TIC responds exactly as the IS responds which is most likely not the case. In general, it is not recommended to set a Reporting limit at too low of a concentration as it gives a false impression.

21.4.1.6.2 TICs that meet the above identification criteria (21.5.1.1-5) at 10% area of the IS: The RL would be 10% of the concentration of the internal standard used for quantitation. (e.g. 2.5 ug/L for 8260B, 4.0 ug/L for 8270C). In general, if the 10% area criteria is not met, the TIC RLs should be set at a level approximately 5x the level of the poorest performer in the analysis.

21.4.1.6.3 If a compound meets the TIC criteria, the reporting limit will reflect the ratio between the TIC and the IS or 5x the level of the poorest performer whichever is lower.

21.5 POLICY ON GC/MS TUNING

21.5.1 Prior to any GCMS analytical sequence, including calibration, the instrument parameters for the tune and subsequent sample analyses within that sequence must be set.

21.5.2 Prior to tuning/auto-tuning the mass spec, the parameters may be adjusted within the specifications set by the manufacturer or the analytical method. These generally don't need any adjustment but it may be required based on the current instrument performance. If the tune verification does not pass it may be necessary to clean the source or perform additional maintenance. Any maintenance is documented in the maintenance log.

21.5.3 The concentration of the BFB or DFTPP must be at or below the concentrations that are referenced in the analytical methods. Part of the purpose of the tune is to demonstrate sensitivity and analyzing solutions at higher concentrations does not support this purpose. Tune failures may be due to saturation and a lower BFB/DFTPP concentration may be warranted.

21.5.4 Tune evaluations usually utilize the "Autofind" function and are set up to look at the apex +/- 1 scan and average the three scans. Background correction is required prior to the start of the peak but no more than 20 scans before. Background correction cannot include any part of the target peak.

21.5.5 Other Options or if Auto Tune Fails

21.5.5.1 Sometimes the instrument does not always correctly identify the apex on some peaks when the peak is not perfectly shaped. In this case, manually identify and average the apex peak +/- 1 scan and background correct as in 21.6.4 above. This is consistent with EPA 8260 and 8270.

21.5.5.2 Or the scan across the peak at one half peak height may be averaged and background corrected. This is consistent with Standard Methods 6200, EPA 624 and EPA 625.

21.5.5.3 Adjustments such as adjustments to the repeller and ion focus lenses, adjusting the EM Voltage, etc. may be made prior to tune verification as long as all of the subsequent injections in the 12 hour tune cycle are analyzed under the same MS tune settings and it is documented in the run sequence log and/or maintenance log that an adjustment was made. Excessive adjusting (more than 2 tries) without clear documentation is not allowed. Necessary maintenance is performed and documented in instrument log.

21.5.5.4 A single scan at the Apex (only) may also be used for the evaluation of the tune. For SW 846 and EPA 600 series methods, background correction is still required.

21.5.5.5 Cleaning the source or other maintenance may be performed and then follow steps for tune evaluation above. The maintenance must be documented in the maintenance log and should be noted in the sequence run log. Note: If significant maintenance was performed, see methods 8000B or 8000C then the instrument may require automatic recalibration prior to proceeding.

21.5.6 Tune evaluation printouts must include the chromatogram and spectra as well as the Tune evaluation information. In addition, the verifications must be sent directly to the printer (no screen Prints). This ability should be built into the instrument software.

21.5.7 Since the limits are expressed in whole percentages, the results may be rounded to whole percentage before comparing to criteria when assessing the tune verification against the tune requirements. However, the comparison to the criteria is usually done automatically by the software and if the printout says “Fail” then there would have to be documentation of the hand calculation on the raw data and comparison to the criteria if the lab intends to still accept the tune. In most cases the analyst is better off performing an adjustment and rerunning the tune standard.

21.5.8 All MS tune settings must remain constant between running the tune check and all other samples. It is recommended that a separate tune method not be used, however a separate method may be used as long as the MS conditions between the methods are the same as the sample analysis method and tracked so any changes that are made to the analysis method are also made to the tune method.

Table 21-1
Equipment List

Laboratory Equipment and Instrumentation

Equipment/Instrument	Manufacturer	Model	Serial Number	Year Put into Service	Condition When Received
Accelerated Solvent Extractor	Dionex	ASE 200	96040278	2000	New
Accelerated Solvent Extractor	Dionex	ASE 200	120362	2001	New
Accelerated Solvent Extractor	Dionex	ASE200	97040463	2001	New
Accelerated Solvent Extractor	Dionex	ASE 200	96090216	2001	New
Accelerated Solvent Extractor	Dionex	ASE200	99120782	2002	New
Air Concentrator	Entech	2000		1993	New
Ammonia Probe	Orion	96-12		*	*
Atomic Absorption Spectrophotometer	Perkin Elmer	SIMAA 6000	5016	1995	New
Auto Sampler	O.I. Analytical	MPM-16		1993	New
Auto Sampler	Perkin Elmer	AS-72	1464	1995	New
Auto Sampler	Perkin Elmer	CETAC	060019ASX	2001	New
Auto Sampler	Perkin Elmer	AS 91	913S3040101	1997	New
Auto Sampler	Perkin Elmer	AS 93	1075	2002	New
Auto Sampler	Perkin Elmer	AS 90	3380	1995	New
Auto Sampler	Dionex	AS			New
Auto Sampler	Dionex	AS	96060542		New
Auto Sampler	Dionex	AS	3080145		New
Auto Sampler	Dionex	AS	3080145		New
Auto Sampler	Dionex	AS50	0411004Y	2002	New
Auto Sampler	Dionex	AS50	99010302	2005	New
Auto Sampler	Dionex	AS40	932811		New
Auto Sampler	Hewlett Packard	7673A		*	*
Auto Sampler	Hewlett Packard	7673A		*	*
Auto Sampler	LEAP			*	*
Auto Sampler	Perkin Elmer	CETAC	080002ADX	2004	New
Auto Sampler	Perkin Elmer	AS 91	6060	1995	New
Auto Sampler	Hewlett Packard	7673B		*	*
Auto Sampler	Agilent	7683		*	*
Auto Sampler	Hewlett Packard	18596M		*	*
Auto Sampler	Agilent	7683		*	*
Auto Sampler	Perkin Elmer	AS 91	3023	2006	New
Auto Sampler for GC/MS	O.I. Analytical	4552	12243	2001	New
Auto Sampler for GC/MS	Varian	Archon	14636	2006	New

Equipment/Instrument	Manufacturer	Model	Serial Number	Year Put into Service	Condition When Received
Auto Sampler for GC/MS	Varian	Archon	14633	2006	New
Auto Sampler for GC/MS	Varian	Archon	14634	2006	New
Auto Sampler for GC/MS	Varian	Archon	14632	2006	New
Auto Sampler for GC/MS	Varian	Archon	13171	2006	New
Auto Sampler for GC/MS	O.I. Analytical	DPM 16		2003	New
Auto Sampler for GC/MS	Varian	Archon	14638	2006	New
Auto Sampler for GC/MS	O.I. Analytical	4552	14418	2004	New
Auto Sampler for GC/MS	Varian	Archon	14407	2006	New
Auto Sampler for GC/MS	O.I. Analytical	4552	14417	2006	New
Auto Sampler for GC/MS	Varian	Archon	14418	2006	New
Auto Sampler for GC/MS	Varian	Archon	14195	2006	New
Auto Sampler for GC/MS	Varian	Archon	13388	2006	New
Auto Sampler for GC/MS	Hewlett Packard	7673B		1993	New
Auto Sampler for GC/MS	Hewlett Packard	7673B		1995	New
Auto Sampler for GC/MS	Hewlett Packard	7673B		1993	New
Auto Sampler for GC/MS	Agilent	7683		2003	New
Auto Sampler for GC/MS	Agilent	7683		2005	New
Auto Sampler for GC/MS	Hewlett Packard	7673B		1993	New
Auto Sampler for GC/MS	Varian	Archon	14492	2006	New
Auto Sampler for GC/MS	Varian	Archon	14637	2006	New
Auto Sampler for GC/MS	Varian	Archon	14639	2006	New
Auto Sampler for GC/MS	Varian	Archon	13389	2006	New
Autosampler	Archon		14411	2006	New
Autosampler	Agilent	7683B	CN63340749	2006	New
Autosampler	Hewlett Packard	18593B	3120A26939	1992	New
Block Digestor	Bioscience	163-466T		1997	New
Block Digestor	Bioscience	2091B1		1997	New
BOD auto-analyzer	ManTech	BODAssayPlus			New
BOD Incubator	Fisher		00037-090-00	*	*
BOD Incubator				*	*
BOD probe	Jenco			*	*
Centrifuge	IEC	--	3634P-14	*	*
Centrifuge	Fisher Scientific	AccuSpin 300	603101639	2003	*
Centrifuge	Precision	Durafuge 100	40317924	2003	*
Centrifuge	International Centrifuge Co.	HN	98323M-1	*	*
COD Reactor	Bioscience Inc.	2091B1	34613302	*	*
COD Reactor	Bioscience Inc.	163-466T	COD-T349	*	*
Concentrator	O.I. Analytical	4560		1999	New
Conductivity Probe	Yellow Springs	32	COD0031	*	*
Conductivity/Dissolved Oxygen Probe	Corning	M90	1253	*	*

Equipment/Instrument	Manufacturer	Model	Serial Number	Year Put into Service	Condition When Received
Cyanide Distillation Unit	Andrews Glass	MIDI System	MCVA13908221	*	*
Cyanide Distillation Unit	Andrews Glass	MIDI System	33212579	*	*
Digestion Unit	Buchi	K-435	000-0032-294-00DMC	*	*
Distillation Unit	Buchi	K-324	4.1193E+11	*	*
Drying Oven	Fisher		40200001	*	*
Drying Oven	Fisher	630G	800121	*	*
Drying Oven	Lab Line			*	*
Drying Oven	Scientific Products	DX-61	194002	*	*
Drying Oven	Fisher	630G	801N0001	*	*
Dual Auto Sampler	O.I. Analytical	MPM 16		1992	New
Dual Auto Sampler	O.I. Analytical	MPM 16		1993	New
Dual Auto Sampler	O.I. Analytical	MPM 16		1997	New
Dual Auto Sampler	O.I. Analytical	MPM/DPM 16		1993	New
Dual Auto Sampler	O.I. Analytical	MPM 16		1992	New
Dual Auto Sampler	Hewlett Packard	7673B		*	*
Dual Auto Sampler	Hewlett Packard	7673B		*	*
Dual Auto Sampler	Hewlett Packard	7673		*	*
Dual Auto Sampler	Hewlett Packard	7673		*	*
Dual Auto Sampler	O.I. Analytical	MPM 16		*	*
Fixed Wavelength Infrared Spectrophotometer	Foxboro	Miran1FF	2592	1997	New
Fixed Wavelength Infrared Spectrophotometer	Foxboro	Miran1FF	2733	*	New
Flashpoint Tester	Koehler	K-162		1992	New
Fluoride Probe	Orion	96-09	9609BN	*	*
Gas Chromatograph	Agilent	6890N	US10423014	*	*
Gas Chromatograph (Dual ECD)	Hewlett Packard	5890 Series II	3223A43015	*	*
Gas Chromatograph (Dual ECD)	Hewlett Packard	5890 Series II	336A51142	*	*
Gas Chromatograph (Dual ECD)	Hewlett Packard	5890A	2728A14467	*	*
Gas Chromatograph (Dual ECD)	Hewlett Packard	5890Series II	2750A15311	*	*
Gas Chromatograph (Dual ECD)	Agilent	6890	US10215019	*	*
Gas Chromatograph (Dual ECD)	Agilent	6890N	US10250081	*	*
Gas Chromatograph (Dual ECD)	Hewlett Packard	5890 Series II	3235A45184	*	*
Gas Chromatograph (Dual FID)	Hewlett Packard	5890 Series II	3126A36534	*	*
Gas Chromatograph (Dual	Hewlett Packard	5890 Series II	3133A37568	*	*

Equipment/Instrument	Manufacturer	Model	Serial Number	Year Put into Service	Condition When Received
FID)					
Gas Chromatograph (Dual FID)	Hewlett Packard	5890II	3235A44731	*	*
Gas Chromatograph (Dual FID)	Hewlett Packard	5890 Series II	2950A26022	*	*
Gas Chromatograph (ECD)	Hewlett Packard	5890 Series II	3203A40480	*	*
Gas Chromatograph (FID)	Hewlett Packard	5890 Series II	3126A36955	1997	New
Gas Chromatograph (FID)	Hewlett Packard	5890 Series II		*	*
Gas Chromatograph (FID/PID)	Hewlett Packard	5890 Series II	3133A37156	1992	New
Gas Chromatograph (FID/PID)	Hewlett Packard	5890 Series II	3203A40477	1993	New
Gas Chromatograph (FID/PID)	Hewlett Packard	5890 Series II	3203A41169	1993	New
Gas Chromatograph (FID/PID)	Hewlett Packard	5890A	2750A15898	1997	New
Gas Chromatograph (FID/PID)	Hewlett Packard	5890 Series II	3223A42733	1993	New
Gas Chromatograph (FID/PID)	Hewlett Packard	5890 Series II	3223A60064	1993	New
Gas Chromatograph (FID/PID)	Hewlett Packard	5890 Series II	3336A60064	1993	New
Gas Chromatograph (FID/PID)	Hewlett Packard	5890 Series II	3033A33301	1998	New
Gas Chromatograph (FID/PID)	Hewlett Packard	5890 Series II	3336A60066	1997	New
Gas Chromatograph (FID/PID)	Hewlett Packard	5890 Series II		*	*
Gas Chromatograph (FID/PID/ELCD)	Hewlett Packard	5890 Series II	3203A40699	1993	New
Gas Chromatograph /Mass Spectrometer	Hewlett Packard	6890/5973A	US00022931	2000	New
Gas Chromatograph /Mass Spectrometer	Hewlett Packard	6890/5973A	US00020097	1999	New
Gas Chromatograph /Mass Spectrometer	Hewlett Packard	5890Ser.II/5971	3140A39653	1993	New
Gas Chromatograph /Mass Spectrometer	Hewlett Packard			*	New
Gas Chromatograph/Mass Spectrometer	Hewlett Packard	6890/5973A	US00007750	2001	New
Gas Chromatograph/Mass Spectrometer	Agilent	6850/5973N	US00001207	2001	New
Gas Chromatograph/Mass Spectrometer	Agilent	6850/5973	US00001206	2001	New

Equipment/Instrument	Manufacturer	Model	Serial Number	Year Put into Service	Condition When Received
Gas Chromatograph/Mass Spectrometer	Agilent	6850/5973N	US01874908	2002	New
Gas Chromatograph/Mass Spectrometer	Agilent	6850/5973N	US10440793	2002	New
Gas Chromatograph/Mass Spectrometer	Agilent	6850/5973N	US00002860	2003	New
Gas Chromatograph/Mass Spectrometer	Agilent	6890N/5973	US00034262	2004	New
Gas Chromatograph/Mass Spectrometer	Agilent	6890N/5973	CN10318006	2004	New
Gas Chromatograph/Mass Spectrometer	Agilent	6890N/5973	CN10318007	2004	New
Gas Chromatograph/Mass Spectrometer	Hewlett Packard	6890N/5973		2006	New
Gas Chromatograph/Mass Spectrometer	Hewlett Packard	6890N/5973		2005	New
Gas Chromatograph/Mass Spectrometer	Hewlett Packard	5890II/5972		1997	New
Gas Chromatograph/Mass Spectrometer	Hewlett Packard	6890N/5973		2000	New
Gas Chromatograph/Mass Spectrometer	Hewlett Packard	5890Ser.II/5972	3235A46723	1995	New
Gas Chromatograph/Mass Spectrometer	Hewlett Packard	5890Ser.II/5971	3133A37717	1993	New
Gas Chromatograph/Mass Spectrometer	Agilent	6890/5973	US10130035	2003	New
Gas Chromatograph/Mass Spectrometer	Agilent	6890N/5973	US10341048	2005	New
Gas Chromatograph/Mass Spectrometer	Hewlett Packard	5890Ser.II/5971	3033A30488	1993	New
Gas Chromatograph/Mass Spectrometer	Hewlett Packard	5890Ser.II	3033A32428	1987	New
Gas Chromatograph/Mass Spectrometer	Agilent	6890N/5973	US10206070/A12019	2006	New
Gas Chromatograph/Mass Spectrometer	Agilent	6890N/5973N	US10222064/A13016	2006	New
Gas Chromatograph/Mass Spectrometer	Agilent	5975B/6890N	US62724086/CN10636107	2006	New
Gas Chromatograph/Mass Spectrometer	Hewlett Packard	6890N/5973		2001	New
Gas Chromatograph/Mass Spectrometer	Hewlett Packard	5890IIB/5971A	2921A24077/3188A02848	1992	New
Hot Block	Environmental Express			*	*

Equipment/Instrument	Manufacturer	Model	Serial Number	Year Put into Service	Condition When Received
Hot Block	Environmental Express			*	*
Hot Block	Environmental Express			*	*
Hot Block	Environmental Express			*	*
Hot Block	Environmental Express			*	*
Hot Block	Environmental Express			*	*
Hot Plate				*	*
Hot Plate				*	*
Inductively Coupled Plasma Spectrophotometer/MS	Perkin Elmer	ELAN6100E	1650004	2001	New
Inductively Coupled Plasma Spectrophotometer/MS	Perkin Elmer	ELAN6100E	G1970008	2004	New
Inductively Coupled PlasmaSpectrophotometer	Perkin Elmer	Optima 3000	069N4092201	1997	New
Inductively Coupled PlasmaSpectrophotometer	Perkin Elmer	Optima 4300	077N1100901	2002	New
Inductively Coupled PlasmaSpectrophotometer	Perkin Elmer	Optima 5300DV	077N5112802	2006	New
Injector Tower	Hewlett Packard	7673		*	*
Ion Chromatograph	Dionex	DX 500	98060923	1996	New
Ion Chromatograph	Dionex	DX 100	40452	1997	New
Ion Chromatograph	Dionex	DX 600	139082221	2002	New
Ion Chromatograph	Dionex	ICS-1000	3110585	2002	New
Ion Chromatograph	Dionex	CD25A	1060463	2005	New
Ion Chromatograph	Dionex	DX-4500	892835	1989	New
Ion Chromatograph	Dionex	LC30-1	96040006	2002	New
Ion Chromatograph	Dionex	CD25-1	70432	2002	New
Ion Chromatograph (with UV/VIS)	Dionex	DX 500	94120366	2000	New
Ion Chromatograph/Mass spectrometer	Metrohm/Agilent/	LC30-1/LC110/IC800		2005	New
Kiln	Cress	E2418	0503DD	2005	New
Mercury Analyzer	Perkin Elmer	FIMS 400	4109	1995	New
Mercury Analyzer	Perkin Elmer	FIMS 400	4167	1995	New
Orbital shaker	Lab-Line	--		*	New
pH Meter	Beckman	Phi - 40		*	*
pH Meter	Beckman	Phi - 40		*	*
pH Meter	Beckman	Phi - 32		*	*
pH Meter	Mettler Toledo	SevenEasy	1227116127		New
pH Probe	Orion	91-56	9156000	*	*
pH Probe	Orion	91-56		*	*

Equipment/Instrument	Manufacturer	Model	Serial Number	Year Put into Service	Condition When Received
Purge & Trap Concentrator	O.I. Analytical	4460A		1992	New
Purge & Trap Concentrator	O.I. Analytical	4460A		1993	New
Purge & Trap Concentrator	O.I. Analytical	4560		1993	New
Purge & Trap Concentrator	O.I. Analytical	4460A		1997	New
Purge & Trap Concentrator	O.I. Analytical	4560		1993	New
Purge & Trap Concentrator	O.I. Analytical	4560		1992	New
Purge & Trap Concentrator	O.I. Analytical	4460A		1993	New
Purge & Trap Concentrator	O.I. Analytical	4560		1998	New
Purge & Trap Concentrator	O.I. Analytical	4560		2001	New
Purge & Trap Concentrator	O.I. Analytical	4560		2000	New
Purge & Trap Concentrator	O.I. Analytical	4560		2001	New
Purge & Trap Concentrator	O.I. Analytical	4560		2001	New
Purge & Trap Concentrator	O.I. Analytical	4560		2002	New
Purge & Trap Concentrator	O.I. Analytical	4560		2002	New
Purge & Trap Concentrator	O.I. Analytical	4560		2003	New
Purge & Trap Concentrator	O.I. Analytical	4560		2004	New
Purge & Trap Concentrator	O.I. Analytical	4560		2004	New
Purge & Trap Concentrator	O.I. Analytical	4560		2004	New
Purge & Trap Concentrator	O.I. Analytical	4560		2006	New
Purge & Trap Concentrator	O.I. Analytical	4560		2005	New
Purge & Trap Concentrator	O.I. Analytical	4560		2000	New
Purge & Trap Concentrator	O.I. Analytical	4560		1997	New
Purge & Trap Concentrator	O.I. Analytical	4460A		*	*
Purge & Trap Concentrator	O.I. Analytical	4560	H351460339	2006	New
Purge & Trap Concentrator	O.I. Analytical			*	New
Purge & Trap Concentrator	O.I. Analytical	4560	E324406	2006	New
Purge & Trap Concentrator	O.I. Analytical	4560		2001	New
Purge and Trap Water/Soil AutoSampler	O.I. Analytical	4552		1993	New
Purge and Trap Water/Soil AutoSampler	EST	8100		2006	New
Rapid Vap	Labconco		266435	1	1
Rapid Vap	Labconco		705319	*	New
Rapid Vap	Labconco		21098412F	*	New
Rapid Vap	Labconco		010194458E	*	New
Rapid Vap	Labconco	7910000	40824527		New
Rotator	N/A			*	*
Rotator	N/A			*	*
Rotator	N/A			*	*
Rotator	N/A			*	*
SPE-Controller	Horizon Technology	SPE-DEX	20357	2002	New
SPE-Extractor	Horizon Technology	SPE-DEX 4790	30359	2002	New

Equipment/Instrument	Manufacturer	Model	Serial Number	Year Put into Service	Condition When Received
SPE-Extractor	Horizon Technology	SPE-DEX 4790	30360	2002	New
TOC Analyzer w/AS	Tekmar-Dohrmann	Phoenix 8000	US02106006	2002	New
TOC Analyzer w/AS and Solids Module	Shimadzu	TOC-5000A	33N01036A	1992	New
Turbidity Meter	HF Instruments	DRT-100B	24942	*	*
Turbo Vap	Zymark		4053	*	New
Turbo Vap	Zymark	--		*	*
Turbo Vap II	Zymark		4516	*	New
Turbo Vap II	Zymark		4272	*	New
Turbo Vap II	Zymark		TV0239N11193	*	New
Turbo Vap LV	Caliper LifeSciences	103200/2	TV0429N12434	*	*
Turbo Vap LV	Caliper LifeSciences	103200/2	TV0429N12435	*	*
UV/VS Spectrometer	Thermospectronic	Genesys20		2002	New

*Although equipment is operational and calibration maintained, this information is not available.

Table 21-2
Schedule of Routine Maintenance

Preventive Maintenance Procedures for Laboratory Equipment		
Instrument/Equipment Type	**Activity**	**Frequency**
GC	Change septum	As needed - record
	Check gases	Daily – record
	Replace or clip column	As needed – record. Rerun calibration/RT study
	Clean detector	As needed – record
	Check autosampler seals	Daily
	Clean injectors; replace liners	As needed – record
	Clean or replace PID lamp	As needed -- record
	Vendor repair	As needed –record work order
IC	Check seals for leakage	Each use
	Replace seals/valves/lamps	As needed – record
	Replace suppressor (IC only)	As needed – record
	Replace column	As needed – record. Rerun calibration/RT study
	Vendor repair	As needed –record work order
GC/MS	Bake trap (VOC only)	Daily
	Clean source	As needed – record
	Change vacuum pump oil	Biannually – record
	Clean injector; replace liner (SVOC only)	Daily
	Replace column	As needed – record. Rerun calibration/RT study
	Vendor repair	As needed –record work order
ICP	Torch inspection	Each use
	Clean torch and nebulizer	As needed – record
	Inspect filters	Daily
	Change filters	As needed – record
	Inspect pump tubing	Daily
	Change pump tubing	As needed – record
	Vendor repair	As needed –record work order
ICP/MS	Inspect/replace pump tubing	Daily
	Inspect torch, injector, cones	Daily
	Clean/replace ion lens	As needed – record
	Replace o-rings on torch	As needed – record
	Check/replace gas filters	As needed – record
	Change rough pump oil	As needed – record
Atomic Absorption	Inspect graphite tube	Each use
	Inspect contact rings	Each use

Preventive Maintenance Procedures for Laboratory Equipment		
Instrument/Equipment Type	**Activity**	**Frequency**
	Clean windows	Each use
	Align lamp	Each use
	Vendor repair	As needed –record work order
UV/VIS	Check paper	Daily
	Clean sample compartment	As needed
	Auto-check calibration	Daily at start-up
	Wavelength calibration	Six months-record
	Vendor repair	As needed –record work order
InfraRed Spectrometer	Clean lens, optimize	As needed – record
	Vendor repair	As needed –record work order
Mercury Analyzer	Inspect tubes and reagents	Daily
	Vendor repair	As needed –record work order
Turbidimeter	Check lamp	Each use
	Clean sample holder	Each use
	Vendor repair	As needed –record work order
pH Meter	Clean electrode	Each use
	Inspect electrode	Each use
	Vendor repair	As needed –record work order
Total Organic Carbon Analyzer	Check gas flow	Daily
	Check fluid level (IC reservoirs)	Daily
	Replace “O” rings	As needed – record
	Check needle	Each use
	Replace scrubbers (halogen and CO2)	Yearly – record
	Replace catalyst	As needed – record
	Vendor repair	As needed –record work order
Temperature Devices: refrigerators, incubators, evaporators, flash point tester, COD reactor, water circulator, drying ovens	Monitor temperature	Daily or when used (refrigerators 2 times per day) -- record
	Vendor repair	As needed –record work order
Weighing Balances	Clean pan	Each use
	Check calibration	Daily – record
	Vendor repair	As needed –record work order
Zero Headspace Extractors	Verify rotation speed	Each use – record
	Check for leakage	Each use
	Vendor repair	As needed –record work order
TCLP Extractors	Verify rotation speed	Each use– record
	Check for leakage	Each use
	Vendor repair	As needed –record work order

Table 21-3
Periodic Calibration

Instrument	Type of Calibration/ Number of Standards	Frequency	Acceptance Limits	Corrective Action
Analytical Balance	Accuracy determined using A2LA-accredited NIST weights. Minimum of 2 standards bracketing the weight of interest. Inspected and calibrated by accredited person annually.	Daily	± 3 of expected value in last decimal place (e.g. for 1g, 0.9997 to 1.0003)	Clean, check level, insure lack of drafts, and that unit is warmed up, recheck. If fails, call service.
Top Loading Balance	Accuracy determined using A2LA-accredited NIST weights. Minimum of 2 standards bracketing the weight of interest. Inspected and calibrated by accredited person annually.	Daily	± 3 of expected value in last decimal place (e.g. for 1g, 0.97 to 1.03)	Clean. Replace.
NIST Reference Weights	Accuracy determined by accredited weights and measurement laboratory.	1 year	As per certificate.	Replace.
Weights	Accuracy determined by comparison to reference weights.	1 year	± 3 of expected value in last decimal place (e.g. for 1g, 0.9997 to 1.0003)	Clean. Replace.
NIST-Traceable Thermometer	Accuracy determined by A2LA-accredited weights and measurement laboratory.	3 years	As per certificate.	Replace.
Thermometers (glass)	Against NIST-traceable thermometer	Yearly at appropriate temperature range for intended use	Correction factor of ± 2°C	Replace
Thermometers (digital)	Against NIST-traceable thermometer	Quarterly at appropriate temperature range for intended use.	Correction factor of ± 2°C	Replace
InfraRed Temperature Guns	Against NIST-traceable thermometer	Quarterly at appropriate temperature range for intended use.	Correction factor of ± 1.0°C	Repair/replace

Instrument	Type of Calibration/ Number of Standards	Frequency	Acceptance Limits	Corrective Action
Refrigerator	Temperature checked using NIST-traceable thermometer.	Daily. If out of range, check again in two hours.	>0 to 6°C	Adjust. Repair. While waiting for repair, seal door, attach "Out of Service" sign, move items to functional unit. Notify supervisor.
Freezer	Temperature checked using NIST-traceable thermometer	Daily. If out of range, check again in two hours.	-10 to -20°C	Adjust. Repair. While waiting for repair, seal door, attach "Out of Service" sign, move items to functional unit. Notify supervisor.
Oven	Temperature checked using NIST-traceable thermometer.	When in use.	104 ± 1°C (drying) 180 ± 2°C (TDS)	Adjust. Replace.
Incubator	Temperature checked using NIST-traceable thermometer.	When in use.	BOD: 20 ± 1.0°C	Adjust. Replace.
Water Bath	Temperature checked using NIST-traceable thermometer.	When in use.	± 2°C	Adjust. Replace.
TurboVaps	Temperature checked against NIST-traceable thermometer	Annually	± 2°C	Adjust. Replace.
Volumetric Dispensing Devices (Eppendorf ® pipette, automatic dilutor or dispensing devices)	One delivery by weight. Using DI water, dispense into tared vessel. Record weight with device ID number.	Monthly	± 2% Calculate accuracy by dividing weight by stated volume times 100 for percent.	Adjust. Replace.
Glass Microliter Syringes	None	Accuracy must be initially de-monstrated if syringe was not received with a certificate attesting to established accuracy.	± 1%	Not applicable.
Conductivity Meter	Cell impedance calibrated with KCl standard; 2 points	Each use.	2nd source reference within vendor limits	Recalibrate.
Deionized Water	Check in-line conductivity meter on system with conductivity meter in Inorganics Department.	Daily	>16 Megohms	Record on log. Report discrepancies to QA Manager.

Section 22
(NELAC 5.5.6)
MEASUREMENT TRACEABILITY

22.1 GENERAL

The following definitions are provided by the American Association for Laboratory Accreditation:

22.1.1 "Traceability is the property of a measurement result whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons, each step in the chain having stated uncertainties." There are six essential elements:

- An unbroken chain of comparison
- A calculated measurement uncertainty for each step in the chain to allow for an overall uncertainty calculation
- Documentation of each step in each calibration report
- All steps in the chain are performed by individuals with evidence of technical competence and accredited by a recognized accreditation body
- Reference to International Standard (SI) units
- Recalibration at appropriate intervals to preserve traceability

22.1.2 Calibration is defined as "determining and documenting the deviation of the indication of a measuring instrument (or the stated value of a material measure) from the conventional 'true' value of the measurand."

22.1.3 Uncertainty is defined as "a parameter associated with the result of a measurement that characterizes the dispersion of the value that could reasonably be attributed to the measurand." Measurement of Uncertainty is discussed is Section 20 of this QA Manual.

22.2 TRACEABILITY

22.2.1 NIST-Traceable Weights and Thermometers

22.2.1.1 Reference standards of measurement shall be used for calibration only and for no other purpose, unless it can be shown that their performance as reference standards would not be invalidated.

22.2.1.2 For NIST-traceable weights and thermometers, TestAmerica-Irvine requires that all calibrations must be conducted by a calibration laboratory accredited by A2LA, NVLAP (National Voluntary Laboratory Accreditation Program), APLAC (Asia-Pacific Laboratory Accreditation Cooperation), or EA (European Cooperation for Accreditation). A certificate and scope of accreditation is kept on file at the laboratory.

22.2.2 Reference Standards/Materials

22.2.2.1 Reference standards/materials, where commercially available, are traceable to certified reference materials. Commercially prepared standard materials are purchased from vendors accredited by A2LA or NVLAP. (See Section 9 for additional information on purchasing).

22.2.2.2 All reference, primary and working standards/materials, whether commercially purchased or laboratory prepared, must be checked regularly to ensure that the variability of the standard or material from the 'true' value does not exceed method requirements. These checks are generally performed as an integral part of the analysis method (e.g. calibration checks, laboratory control samples).

22.2.2.3 All standards and materials must be stored and handled according to method or manufacturer's requirements in order to prevent contamination or deterioration. Refer to laboratory SOP STDCNTRL.SOP ("Standard and Reagent Preparation, Control, and Documentation" for additional details]. For safety requirements, please refer to method SOPs and the laboratory Chemical Hygiene Plan.

22.3 DOCUMENTATION AND LABELING OF STANDARDS, REAGENTS, AND REFERENCE MATERIALS

22.3.1 All manufacturer or vendor supplied Certificate of Analysis or Purity must be retained, stored appropriately, and readily available for use and inspection. These records are maintained in binders or file folders in each department. Records must be kept of the date of receipt and date of expiration of standards, reagents and reference materials. In addition, records of preparation of laboratory standards, reagents, and reference materials must be retained, stored appropriately, and be readily available for use and inspection. For detailed information on documentation and labeling, please refer to laboratory SOP STDCNTRL.SOP ("Standard and Reagent Preparation, Control, and Documentation").

22.3.1.1 Commercial materials purchased for preparation of calibration solutions, spike solutions, etc. are usually accompanied with an assay certificate or the purity is noted on the label. If the assay purity is 96% or better, the weight provided by the vendor may be used without correction. If the assay purity is less than 96% a correction will be made to concentrations applied to solutions prepared from the stock commercial material.

22.3.2 All standards, reagents, and reference materials must be labeled in an unambiguous manner. Standards are logged into Element©,TestAmerica-Irvine's Laboratory Information Management System (LIMS), and are assigned a unique identification number. The following information is typically recorded in the electronic database within Element©:

- Standard ID
- Description of Standard
- Department
- Preparer's name
- Final volume and number of vials prepared
- Solvent type and lot number
- Preparation Date
- Expiration Date
- Standard source type (stock or daughter)

- Standard type (spike, surrogate, other)
- Parent standard ID (if applicable)
- Parent Standard Analyte Concentration (if applicable)
- Parent Standard Amount used (if applicable)
- Component Analytes
- Final concentration of each analyte
- Comment box (text field)

22.3.3 Records are maintained electronically for standard and reference material preparation. These records show the traceability to purchased stocks or neat compounds. These records also include method of preparation, date of preparation, expiration date and preparer's name or initials. Preparation procedures are provided in the Method SOPs.

22.3.4 All standards, reagents, and reference materials must be clearly labeled with a minimum of the following information:

- Standard Name
- Expiration Date
- Standard ID (from Element©)

22.3.4.1 In addition, the following information should be included (depending on label space):

- Date of receipt for commercially purchased items or date of preparation for laboratory prepared items
- Date opened (for multi-use containers, if applicable)
- Description of standard (if different from manufacturer's label or if standard was prepared in the laboratory)
- Concentration (if applicable)
- Special Health/Safety warnings if applicable
- Initials of analyst preparing standard or opening container

22.3.4.2 All containers of prepared reagents must include a preparation date, expiration date, an ID number to trace back to preparation, and health & safety information.

22.3.4.2.1 Procedures for preparation of reagents can be found in the Method SOPs.

22.3.5 To maintain traceability, standard ID numbers must be noted on all associated logbooks, worksheets and raw data.

22.3.6 All reagents and standards must be stored in accordance to the following priority: 1-with the manufacturer's recommendations; 2-with requirements in the specific analytical methods; 3-according the laboratory's Standard Control SOP.

Section 23.0
(NELAC 5.5.7)
SAMPLING

23.1 SAMPLING

TestAmerica –Irvine provides sampling services. Sampling procedures are described in FIELD.SOP ("Field Sampling").

23.1 SAMPLING CONTAINERS

TestAmerica–Irvine offers clean sampling containers for use by clients. These containers are obtained from reputable container manufacturers and meet EPA specifications as required (Specifications and Guidance for Contaminant-Free Sample Containers OSWER Directive #9240.0-05A Dec 92). Any certificates of cleanliness that are provided by the supplier are maintained at the laboratory. For polyethylene bottles that are not purchased in defined lots, the laboratory tests each type of container for each preservative based on the date the shipment was received. Testing is performed for trace-level metals by ICPMS and anions by IC. Additionally, all VOA vials, both preserved and unpreserved, are lot tested for low-level volatiles prior to approval for use.

23.1.1 Preservatives

Upon request, preservatives are provided to the client in pre-cleaned sampling containers. In some cases containers may be purchased pre-preserved from the container supplier. Whether prepared by the laboratory or bought pre-preserved, the grades of the preservatives are at a minimum:

- Hydrochloric Acid – Reagent ACS (Certified VOA Free) or equivalent
- Methanol – Purge and Trap grade
- Nitric Acid – Instra-Analyzed or equivalent
- Sodium Bisulfate – ACS Grade or equivalent
- Sodium Hydroxide – Instra-Analyzed or equivalent
- Sulfuric Acid – Instra-Analyzed or equivalent
- Sodium Thiosulfate – ACS Grade or equivalent

23.1.2 Preparing Container Orders

23.1.2.1 When new containers arrive at the laboratory, the date of receipt is recorded on the packing list received with them for retained documentation. Upon request, the containers are then sent to clients for use in collecting samples. The shipping date, type and number of containers are maintained on file by the lab. Shipping personnel insure that container stock is rotated so that "first in" is "first out." When a client requests containers, a client services representative creates a container request in LIMS; it is then stored permanently in LIMS with a unique container order number. Copies of the container request are printed for the shipping

department. One copy goes to the client with the containers; one copy is filed in the shipping department.

23.1.2.2 The laboratory also provides EnCore sampling devices when requested.

23.1.2.3 If containers are provided directly to the client from the manufacturer or from other sources, TestAmerica –Irvine will not be responsible for any of the above records.

23.2 FIELD QUALITY CONTROL (QC)

Common field quality control samples are defined in the following paragraphs. The frequency of field quality control samples should be specified in the site specific Quality Assurance Project Plan (QAPP) or by the client. TestAmerica provides trip blanks for VOC analysis with the sample containers for all volatile organic analyses. All blanks generated in the field will be analyzed in the analytical sequence along with the field samples.

23.2.1 Equipment Blank / Rinseate Blank - The equipment blank, sometimes referred to as a rinseate blank, is a sample of the water used to decontaminate sampling equipment. The source water should be as free of target analytes as possible. An aliquot of this water is poured over or through the sample collection device after decontamination, collected in a sample container, preserved with appropriate reagents, and returned to the laboratory. This serves as a check on sampling device cleanliness, and will also be affected by the site and sample handling conditions evaluated by the other types of blanks.

23.2.2 Field Blank - The field blank is water that is as free of target analytes as possible and from the same source as the equipment blank. The water is poured into a sampling container at the sampling site, preserved with the appropriate reagents, and returned to the laboratory. This serves as a check on reagent and environmental contamination.

23.2.3 Trip Blank - The trip blank pertains to volatile analysis only. This serves as a check on sample contamination originating from sample transport, sample container contamination, shipping and storage, or from certain site conditions. Trip blanks are often referred to as travel blanks. They are prepared using pre-cleaned sample containers. They are filled with organic-free water (the source of the organic free water is the same source of water used to prepare volatile standards, method blanks, LCS and sample dilutions), sealed and taken into the field with the empty containers which will be used for sampling. The recommended frequency is one trip blank per cooler (in duplicate or triplicate), per volatiles method.

23.2.4 Field Duplicates - Field duplicates are replicate samples collected from the same sampling point or location during a field collection event. This control sample is used to demonstrate the ability of both the sampling and analytical process to generate data of acceptable precision.

23.3 SAMPLING CONTAINERS, PRESERVATION REQUIREMENTS, HOLDING TIMES

The preservation and holding time criteria specified in the following tables are derived from the source documents for the methods. If method required holding times or preservation requirements are not met, the reports will be qualified using a flag, footnote or case narrative. “Analyze immediately” is an EPA designation reserved for tests which, for compliance

monitoring projects, should be performed by field instrumentation or a laboratory "generally within 15 minutes" of sampling (Federal Register, Vol. 48, No. 209, p 11). TestAmerica will qualify data for these parameters if analysis cannot be performed within 15 minutes of sampling. "ASAP" is an EPA designation for tests for which rapid analysis is advised, but for which neither EPA nor the laboratory have a basis for a holding time.

Tables 23-1 to 23-7 detail holding times, preservation and container requirements, and sample volumes.

23.4 DEFINITION OF HOLDING TIME

23.4.1 The date and time of sampling documented on the chain-of-custody (COC) form establishes the day and time zero. When the maximum allowable holding time is expressed in days, the holding time is based on day measured. Holding times expressed in 72 hours or less are measured from date and time zero. The first day of holding time ends twenty-four hours after sampling. Holding times for analysis include any necessary reanalysis.

23.4.2 Semi-Volatile - Holding times for sample preparation for semi-volatile organics are measured from the date and time of sampling until the solvent contacts the sample. If a sample is to be extracted on the day of expiration, the actual time of extraction must be recorded on the sample preparation worksheet. Holding times for analysis are measured from the date and time of initiation of extraction to the time of injection into the gas chromatograph.

23.4.3 Volatiles - Holding times for volatile organics are measured from the date and time of sampling to the date and time of injection into the gas chromatograph. The time of initiation of purging is considered the injection time, but data systems record the start of the chromatographic run rather than the start of purging. Hence, if a sample is so near expiration that the start-of-purging time rather than the chromatographic run time is needed to document the integrity of the sample; the analyst must record the start-of-purging time in the instrument log. Extractions, e.g. for high level soils, must be completed in time to allow for analysis to be initiated within the maximum allowable holding time.

23.4.4 Inorganic - For inorganic and metals analysis, the preparation/digestion/distillation must be started within the maximum holding time as measured from the sampling date and time.

23.5 SAMPLE ALIQUOTS / SUBSAMPLING

23.5.1 It is the laboratory's responsibility to take a representative subsample or aliquot of the sample provided for analysis. In that regard the following guidelines apply to analysts:

23.5.2 Analysts should handle each sample as if it is potentially dangerous. At a minimum, safety glasses, gloves, and lab coats must be worn when preparing aliquots for analysis.

23.5.3 For water samples, when volatile organics are not requested, before taking each aliquot for analysis, invert the sample container end-over-end three times and immediately pour off the aliquot. Especially when suspended solids are present, adequate mixing of the sample is extremely important.

23.5.4 For solid samples, when volatile organics are not requested, if the solid can be mixed, stir before removing the aliquot. Mix more than is needed for the analysis to be performed (e.g. if 30 g are needed, mix 50-100 g, if 1 g is needed, mix 20 g, etc…).

23.5.4.1 If the solid cannot be easily mixed, take several aliquots from various areas of the container to make up the final aliquot.

23.5.4.2 For soil samples, avoid debris in the subsample aliquot as much as possible (e.g. gravel, sticks, roots and grass).

23.5.4.3 If the solid is extremely heterogeneous, and the client has given no instructions, utilize the following technique: separate the like materials into groups on a clean surface and take portions of masses from each group, proportional to their contribution to the original sample, to make a composite. Record in detail exactly how the composite was created. For very unusual samples, consult with the QA department or Department Manager.

23.5.5 For solid samples, when volatile organics analysis is requested, the sample should be manipulated as little as possible. In most cases, the sample will arrive already preserved or in an EnCore™ sampler of the correct mass (requiring quick preservation of the entire amount). If the client requests volatiles on a solid sample which has been collected in a jar and is in a common container from which aliquots for other test methods must be taken, login should deliver the container to the volatiles department for preparing a proper aliquot prior to any other aliquots being taken out.

23.5.6 For multiphasic samples, the client should instruct the laboratory as to the intent of the testing and how to handle the sample. If the entire sample is to be accounted for, and the phases do not mix easily with inversion/stirring, such that a representative aliquot can be taken, the analyst should record the percent by volume of each phase. The analysis must be conducted on each phase separately; the final results are combined mathematically, weighting the individual phase results by volume. One exception to this procedure is the situation addressed in the TCLP and SPLP methods for wastes containing free liquids. However, if the leachate and final filtrate are not miscible, it is necessary to combine mathematically the concentrations of the two (or more) solutions by volume.

Table 23-1 Drinking Water (SDWA)

PARAMETER	CONTAINER	PRESERVATION[1,2] Temp.	PRESERVATION[1,2] Chemical	HOLDING TIME[3]	SAMPLE VOLUME
Asbestos	Plastic/Glass	4ºC	None	48 hours[5]	1 L
Coliforms (Total and Fecal)	Plastic/Glass[20]	10ºC	$Na_2S_2O_3$	30 hours[21]	120 mL
Cyanide	Plastic/Glass	4ºC	NaOH to pH >12	14 days	500 mL
Fluoride	Plastic/Glass	None	None	None	250 mL

PARAMETER	CONTAINER	PRESERVATION[1,2] Temp.	Chemical	HOLDING TIME[3]	SAMPLE VOLUME
Heterotrophic Plate Count	Plastic/Glass[20]	10°C	$Na_2S_2O_3$	8 hours (24 hours[22])	120 mL
Mercury	Plastic/Glass	None	HNO_3 to pH<2	28 days	250 mL
Metals[4]	Plastic/Glass	None	HNO_3 to pH<2	6 months	250 mL
Nitrate	Plastic/Glass	4ºC	None	48 hours[6]	250 mL
Nitrate-Nitrite	Plastic/Glass	None	H_2SO_4 to pH<2	28 days	250 mL
Nitrite	Plastic/Glass	4ºC	None	48 hours	250 mL
THMs Only	Glass[8]	4ºC	$Na_2S_2O_3$	14 days	3 X 40 mL
Volatile Organic Compounds	Glass[8]	4ºC	HCl to pH <2 $Na_2S_2O_3$ or Ascorbic acid[9]	14 days	3 X 40 mL
EDB, DBCP, 1,2,3-TCP (EPA 504.1)	Glass[8]	4ºC	$Na_2S_2O_3$	14 days	3 X 40 mL
Organochlorine Pesticides/PCBs (EPA 505)[10]	Glass[8]	4ºC	$Na_2S_2O_3$	14 days[11]	3 X 40 mL
Nitrogen and Phos. Pesticides (EPA 507)	Glass-Amber[8]	4ºC	$Na_2S_2O_3$	14 days[12]	1 L
Total PCBs (EPA 508A)	Glass-Amber[8]	4ºC	None	14 days[13]	1 L
Pesticides and PCBs (EPA 508.1)[14]	Glass-Amber[8]	4ºC	HCl to pH <2 $Na_2S_2O_3$[9]	14 days[13]	1 L
Chlorinated Acids (EPA 515.1)	Glass-Amber[8]	4ºC	$Na_2S_2O_3$	14 days[12]	1 L
Semivolatiles (EPA 525.2)	Glass-Amber[8]	4ºC	HCl to pH <2 $Na_2S_2O_3$[9]	14 days[13]	1 L
N-Methylcarbamoyloxamines and N-Methcarbamates (EPA 531.1)	Glass[8]	4ºC	$Na_2S_2O_3$, Monochloroacetic Acid buffer to pH<3	28 days	3 X 60 mL
Glyphosate (EPA 547)	Glass[8]	4ºC	$Na_2S_2O_3$	14 days	3 X 60 mL
Endothall (EPA 548)	$Na_2S_2O_3$	4ºC	None	7 days[15]	1 L
Diquat/Parquat (EPA 549.1)	Glass-Amber[8] (Silanized or PVC amber)	4ºC	H_2SO_4 to PH <2 $Na_2S_2O_3$[9]	7 days[16]	1 L

PARAMETER	CONTAINER	PRESERVATION[1,2] Temp.	Chemical	HOLDING TIME[3]	SAMPLE VOLUME
Chlorinated Disinfection Byproducts, Chlorinated Solvents, and Halogenated Pesticides/Herbicides (EPA 551)	Glass[8]	4ºC	Phosphate Buffer and Ammonium Chloride[19]	14 days[17]	3 X 60 mL
Haloacetic Acids (EPA 552.1)	Glass-Amber[8]	4ºC	Ammonium Chloride	28 days[18]	250 mL

Key to Table 23-1

1. Sample preservation should be performed immediately upon sample collection. For composite chemical samples, each aliquot should be preserved at the time of collection. When use of an automated sampler makes it impossible to preserve each aliquot, then chemical samples may be preserved by maintaining at 4°C until compositing and sample splitting is completed.
2. When any sample is to be shipped by common carrier or sent through the United States mails, it must comply with the Department of Transportation Hazardous Materials Regulations (49 CFR Part 172). The person offering such material for transportation is responsible for ensuring compliance. For the preservation requirements of Table 6-8, the Office of Hazardous Materials, Materials Transportation Bureau, Department of Transportation has determined that the Hazardous Materials Regulations do not apply to the following materials: Hydrochloric acid, (HCl) in water, solutions at concentrations of 0.04% by weight or less (pH about 1.96 or greater); Nitric acid (HNO_3) in water solutions at concentrations of 0.15% by weight or less (pH about 1.62 or greater); Sulfuric acid (H_2SO_4) in water solutions at concentrations of 0.35% by weight or less pH about 1.15 or greater); and Sodium hydroxide (NaOH) in water solutions at concentrations of 0.080% by weight or less (pH about 12.30 or less).
3. Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before analysis and still be considered valid.
4. All metals except Hg.
5. Instructions for containers, preservation procedures and holding times as specified in Method 100.2 must bed adhered to for all compliance analysis including those conducted with Method 100.1.
6. If the sample is chlorinated, the holding time for an un-acidified sample kept at 4°C is extended to 14 days.
7. Nitrate-Nitrite refers to a measurement of total nitrite.
8. With Teflon lined septum.
9. If chlorinated add $Na_2S_2O_3$ prior to acidification.
10. Heptaclor has a 7 day hold time
11. 14 days until extraction. 24 hours after extraction.
12. 14 days until extraction. 28 days after extraction.
13. 14 days until extraction. 30 days after extraction.
14. For cyanazine, cool to 4°C only.
15. 7 days until derivitation. 1 day after derivatation.
16. 7 days until extraction. 21 days after extraction.
17. 14 days until extraction. 14 days after extraction.
18. 28 days until extraction. 48 hours after extraction.
19. Sodium Sulfite may be used as a dechlorinating agent in some instances. Verify with laboratory prior to sampling.

Key to Table 23-1

20. Sterilized. Plastic must be Polypropylene.
21. 40 CFR part 141.74 regulations to avoid filtration or disinfection state 8 hours (DW compliance testing). Most facilities are using either disinfection or filtration so the 8 would not apply in most cases.
22. 40 CFR part 141.74 regulations for Disinfection By-Product rule state 8 hours (DW compliance testing) where SM 9215 allows up to 24 hours if sample is stored between > 0 and $\leq 4^{o}$ C

Table 23-2 NPDES - Inorganic

PARAMETER	CONTAINER [1]	PRESERVATION[2,3] Temp.	Chemical	HOLDING TIME[4]	SAMPLE VOLUME
Acidity	Plastic/Glass	4ºC	None	14 days	100 mL
Alkalinity	Plastic/Glass	4ºC	None	14 days	100 mL
Ammonia	Plastic/Glass	4ºC	H_2SO_4 to pH<2	28 days	400 mL
BOD 5 Day	Plastic/Glass	4ºC	None	48 hours	1000 mL
Boron	Plastic[5]	None	HNO_3 to pH<2	6 months	200 mL
Bromide	Plastic/Glass	None	None	28 days	100 mL
CBOD 5 Day	Plastic/Glass	4ºC	None	48 hours	1000 mL
COD	Plastic/Glass	4ºC	H_2SO_4 to pH<2	25 days	100 mL
Chloride	Plastic/Glass	None	None	28 days	50 mL
Chlorine, Residual	Plastic/Glass	None	None	15 min.[6]	200 mL
Color	Plastic/Glass	4ºC	None	48 hours	50 mL
Cyanide -Total	Plastic/Glass	4ºC	NaOH to pH >12, 0.6 g ascorbic Acid[7]	14 days	100 mL
Cyanide -Amenable	Plastic/Glass	4ºC	NaOH to pH >12, 0.6 g ascorbic Acid[7]	14 days	100 mL
Fluoride	Plastic	None	None	28 days	300 mL
Hardness	Plastic/Glass	None	HNO_3 to pH<2[8]	6 months	100 mL
Hexavalent, Chromium	Plastic/Glass	4ºC	None	24 hours	200 mL
Hydrogen Ion (pH)	Plastic/Glass	None	None	15 min.[6]	200 mL
Kjeldahl and organic Nitrogen	Plastic/Glass	4ºC	H_2SO_4 to pH <2	28 days	500 mL

PARAMETER	CONTAINER [1]	PRESERVATION[2,3] Temp.	Chemical	HOLDING TIME[4]	SAMPLE VOLUME
Mercury[11]	Plastic/Glass	None	HNO_3 to pH<2	28 days	200 mL
Metals[9,10]	Plastic/Glass	None	HNO_3 to pH<2	6 months	200 mL
Nitrate	Plastic/Glass	4ºC	None	48 hours	100 mL
Nitrate-Nitrite	Plastic/Glass	4ºC	H_2SO_4 to pH <2	28 days	100 mL
Nitrite	Plastic/Glass	4ºC	None	48 hours	100 mL
Oil and Grease	Glass	4ºC	H_2SO_4 to pH <2[12]	28 days	1 L
Organic Carbon (TOC)	Glass	4ºC	H_2SO_4 to pH <2[12]	28 days	250 mL
Orthophosphate	Plastic/Glass	4ºC	Filter immediately.	48 hours	250 mL
Oxygen, Dissolved Probe	Glass[13]	None	None	15 min.[6]	200 mL
Oxygen, Winkler	Glass[13]	None	Fix on site and store in dark.	8 hours	300 mL
Phenols	Glass	4ºC	H_2SO_4 to pH <2	28 days	500 mL
Phosphorus, Elemental	Glass	4ºC	None	48 hours	250 mL
Phosphorus, Total	Plastic/Glass	4ºC	H_2SO_4 to pH <2	28 days	250 mL
Residue, Total	Plastic/Glass	4ºC	None	7 days	1 L
Residue, Filterable	Plastic/Glass	4ºC	None	7 days	1 L
Residue, Non-Filterable	Plastic/Glass	4ºC	None	7 days	1 L
Residue, Settleable	Plastic/Glass	4ºC	None	48 hours	1 L
Residue, Volatile	Plastic/Glass	4ºC	None	7 days	1 L
Silica	Plastic[5]	4ºC	None	28 days	250 mL
Specific Conductance	Plastic/Glass	4ºC	None	28 days	250 mL
Sulfate	Plastic/Glass	4ºC	None	28 days	250 mL
Sulfide	Plastic/Glass	4ºC	Zinc acetate plus NaOH to pH>9	7 days	500 mL
Sulfite	Plastic/Glass	None	None	15 min.[6]	200 mL
Surfactants	Plastic/Glass	4ºC	None	48 hours	1 L
Temperature	Plastic/Glass	None	None	N/A	100 mL

PARAMETER	CONTAINER [1]	PRESERVATION[2,3] Temp.	Chemical	HOLDING TIME[4]	SAMPLE VOLUME
Turbidity	Plastic/Glass	4ºC	None	48 hours	1 L

Key to Table 23-2

1. Plastic should be Polyethylene.
2. Sample preservation should be performed immediately upon sample collection. For composite chemical samples, each aliquot should be preserved at the time of collection. When use of an automated sampler makes it impossible to preserve each aliquot, then chemical samples may be preserved by maintaining at 4°C until compositing and sample splitting is completed.
3. When any sample is to be shipped by common carrier or sent through the United States mails, it must comply with the Department of Transportation Hazardous Materials Regulations (49 CFR Part 172). The person offering such material for transportation is responsible for ensuring compliance. For the preservation requirements of Table 6-8, the Office of Hazardous Materials, Materials Transportation Bureau, Department of Transportation has determined that the Hazardous Materials Regulations do not apply to the following materials: Hydrochloric acid, (HCl) in water, solutions at concentrations of 0.04% by weight or less (pH about 1.96 or greater); Nitric acid (HNO_3) in water solutions at concentrations of 0.15% by weight or less (pH about 1.62 or greater); Sulfuric acid (H_2SO_4) in water solutions at concentrations of 0.35% by weight or less pH about 1.15 or greater); and Sodium hydroxide (NaOH) in water solutions at concentrations of 0.080% by weight or less (pH about 12.30 or less).
4. Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before analysis and still be considered valid.
5. May also be collected in quartz or PFTE Plastic.
6. 40 CFR Part 136 requires this analyte to be analyzed immediately after collection. Collection is defined as within 15 minutes of collection.
7. Should only be used in the presence of residual chlorine.
8. H_2SO_4 to a pH <2 is also acceptable.
9. Except Mercury and Hexavalent Chromium.
10. Samples should be filtered on site before adding HNO_3 preservative for dissolved metals.
11. Samples collected for determination of trace level mercury (100 ng/L) using EPA 1631 must be collected in tightly capped fluoropolymer or glad bottles and preserved with BrCl or HCl solution within 48 hours of sample collection. The time to preservation may be extended to 28 days if a sample is oxidized in the sample bottle. Samples collected for dissolved trace level mercury should be filtered in the laboratory. However, if circumstances prevent overnight shipping, samples should be filtered in a designated clean area in the field in accordance with procedures given in Method 1669. Samples that been collected for determination of total or dissolved trace level mercury must be analyzed within 90 days of sample collection.
12. HCl to a pH <2 is also acceptable.
13. Should have glass lid or top.

Table 23-3 NPDES - Organic

PARAMETER	CONTAINER	PRESERVATION[1,2] Temp.	Chemical	HOLDING TIME[3]	SAMPLE VOLUME
Purgeable Halocarbons	Glass[4]	4ºC	0.0008 % $Na_2S_2O_3$[5]	14 days	40 mL
Purgeable Aromatic Hydrocarbons	Glass[4]	4ºC	0.0008 % $Na_2S_2O_3$[5], HCl to pH<2[6]	14 days	40 mL
Acrolein and Acrylonitrile	Glass[4]	4ºC	0.0008 % $Na_2S_2O_3$[5], adjust pH to 4-5[7]	14 days	40 mL
Phenols[9]	Glass[4]	4ºC	0.0008 % $Na_2S_2O_3$[5]	7 days[8]	1 L
Benzidines[9]	Glass[4]	4ºC	0.0008 % $Na_2S_2O_3$[5]	7 days[8, 11]	1 L
Phthalate esters[9]	Glass[4]	4ºC	None	7 days[8]	1 L
Nitosamines[9,12]	Glass[4]	4ºC	0.0008 % $Na_2S_2O_3$[5,13]	7 days[8]	1 L
PCBs[9]	Glass[4]	4ºC	None	7 days[8]	1 L
Nitroaromatics and Isophorone[9]	Glass[4]	4ºC	0.0008 % $Na_2S_2O_3$[5,13]	7 days[8]	1 L
Polynuclear Aromatic Hydrocarbons[9]	Glass[4]	4ºC	0.0008 % $Na_2S_2O_3$[5,13]	7 days[8]	1 L
Haloethers[9]	Glass[4]	4ºC	0.0008 % $Na_2S_2O_3$[5]	7 days[8]	1 L
Chlorinated Hydrocarbons[9]	Glass[4]	4ºC	None	7 days[8]	1 L
CDD/CDFs[9] – Aqueous: Field/Lab Preservation	Glass	0-4ºC	pH <9, 0.0008 % $Na_2S_2O_3$[5]	1 year	1 L
CDD/CDFs[9] – Solids/Mixed Phase/Tissue - Field Preservation	Glass	4ºC	None	7 days	1 L
CDD/CDFs[9] – Solids/Mixed Phase/Tissue - Lab Preservation	Glass	< -10ºC	None	1 year	1 L
Pesticides[9]	Glass	4ºC	pH 5-9 [14]	7 days[8]	1 L

Key to Table 23-3

1. Sample preservation should be performed immediately upon sample collection. For composite chemical samples, each aliquot should be preserved at the time of collection. When use of an automated sampler makes it impossible to preserve each aliquot, then chemical samples may be preserved by maintaining at 4°C until compositing and sample splitting is completed.
2. When any sample is to be shipped by common carrier or sent through the United States mails, it must comply with the Department of Transportation Hazardous Materials Regulations (49 CFR Part 172). The person offering such material for transportation is responsible for ensuring compliance. For the preservation requirements of Table 6-8, the Office of Hazardous Materials, Materials Transportation Bureau, Department of Transportation has determined that the Hazardous Materials Regulations do not apply to the following materials: Hydrochloric acid, (HCl) in water, solutions at concentrations of 0.04% by weight or less (pH about 1.96 or greater); Nitric acid (HNO_3) in water solutions at concentrations of 0.15% by weight or less (pH about 1.62 or greater); Sulfuric acid (H_2SO_4) in water solutions at concentrations of 0.35% by weight or less pH about 1.15 or greater); and Sodium hydroxide (NaOH) in water solutions at concentrations of 0.080% by weight or less (pH about 12.30 or less).
3. Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before analysis and still be considered valid.
4. With Teflon lined septum.
5. Should only be used in the presence of residual chlorine.
6. Samples receiving no pH adjustments must be analyzed within 7 days. If 2-chlorovinylethylether is a target analyte, the sample should not be acidified.
7. The pH adjustment is not required if acrolein is not being measured. Samples for acrolein receiving no pH adjustment must be analyze within three days of sampling.
8. 7 days until extraction, 40 days after extraction.
9. When the extractable analytes of concern fall within a single chemical category, the specified preservative and maximum holding times should be observed for optimum safeguard of sample integrity. When the analytes of concern fall within two or more categories, the sample may be preserved by cooling to 4°C reducing residual chlorine with 0.0008 % sodium thiosulfate, storing in the dark, and adjusting the pH to 6-9. Samples preserved in this manner may be held for 7 days before extraction and for 40 days after extraction. Exceptions to this optional preservation and holding time procedure are noted in footnote 5 (re the requirement for thiosulfate reduction of residual chlorine) and footnotes 10 and 11(re the analysis of Benzidine).
10. If 1,2-diphenylhydrazine is likely to be present, adjust pH to of the sample to 4.0 $\pm$ 0.2 to prevent rearrangement to benzidine.
11. Extracts may be stored up to 7 days before analysis if storage is conducted under an inert (oxidant-free) atmosphere.
12. For the analysis of diphenylnitrosamine, add 0.008 % $Na_2S_2O_3$ and ajust pH to 7-10 with NaOH within 24 hours of sampling.
13. Store in dark.
14. The pH adjustment may be performed upon receipt in the laboratory and may be omitted if the samples are extracted within 72 hours of collection. For the analysis of aldrin , add 0.0008 % $Na_2S_2O_3$.

Table 23-4 RCRA - Aqueous

PARAMETER	CONTAINER [1]	PRESERVATION[2,3] Temp.	Chemical	HOLDING TIME[4]	SAMPLE VOLUME
Chloride	Plastic/Glass	4ºC	None	28 days	100 mL
Cyanide -Total	Plastic/Glass	4ºC	NaOH to pH >12[5]	14 days	250 mL
Cyanide -Amenable	Plastic/Glass	4ºC	NaOH to pH >12[5]	14 days	250 mL
Hydrogen Ion (pH)	Plastic/Glass	None	None	24 hours	100 mL
Nitrate	Plastic/Glass	4ºC	None	48 hours	28 days
Oil and Grease	Glass	4ºC	HCl	28 days	1 L
Organic carbon (TOC)	Plastic/Glass	4ºC	pH to <2[6] Store in dark	28 days	28 days
Sulfate	Plastic/Glass	4ºC	None	28 days	400 mL
Sulfide	Plastic/Glass	4ºC	Add Zn Acetate	7 days	400 mL
Chromium VI	Plastic/Glass	4ºC	None	24 hours	250 mL
Mercury	Plastic/Glass	None	HNO_3 to pH<2	28 days	250 mL
Other Metals	Plastic/Glass	None	HNO_3 to pH<2	6 months	250 mL
Acrolein and Acrylonitrile	Glass[10]	4ºC	0.0008 % $Na_2S_2O_3$[7]	14 days	1 L
Benzidines	Glass[10]	4ºC	0.0008 % $Na_2S_2O_3$[7]	7 days[8]	1 L
Chlorinated Hydrocarbons	Glass[10]	4ºC	0.0008 % $Na_2S_2O_3$[7]	7 days[8]	1 L
Dioxins and Furans	Glass[10]	4ºC	0.0008 % $Na_2S_2O_3$[7]	7 days[8]	1 L
Haloethers	Glass[10]	4ºC	0.0008 % $Na_2S_2O_3$[7]	7 days[8]	1 L
Nitroaromatics and cyclic ketones	Glass[10]	4ºC	0.0008 % $Na_2S_2O_3$[7], store in dark	7 days[8]	1 L
Nitrosomines	Glass[10]	4ºC	0.0008 % $Na_2S_2O_3$[7], store in dark	7 days[8]	1 L
Organochlorine Pesticides	Glass[10]	4ºC	None	7 days[8]	1 L
Organophosphorus Pesticides	Glass[10]	4ºC	Adjust pH[9]	7 days[8]	1 L
PCBs	Glass[10]	4ºC	None	7 days[8]	1 L
Phenols	Glass[10]	4ºC	0.0008 % $Na_2S_2O_3$[7]	7 days[8]	1 L
Phthalate Esters	Glass[10]	4ºC	None	7 days[8]	1 L

PARAMETER	CONTAINER [1]	PRESERVATION[2,3] Temp.	Chemical	HOLDING TIME[4]	SAMPLE VOLUME
Polynuclear Aromatic Hydrocarbons	Glass[10]	4ºC	0.0008 % $Na_2S_2O_3$[7], store in dark	7 days[8]	1 L
Purgeable Hydrocarbons	Glass[10]	4ºC	0.0008 % $Na_2S_2O_3$[7] Adjust pH <2[2]	14 days	40 mL
Purgeable Halocarbons	Glass[10]	4ºC	0.0008 % $Na_2S_2O_3$[7]	14 days	40 mL
Total Organic Halides (TOX)	Glass[10]	4ºC	Adjust pH to <2 with H_2SO_4	28 days	1 L
Radiological Tests (Alpha, Beta, Radium)	Plastic/Glass	None	HNO_3 to pH<2	6 months	250 mL

Key to Table 23-4

1. Plastic should be Polyethylene.
2. Sample preservation should be performed immediately upon sample collection. For composite chemical samples, each aliquot should be preserved at the time of collection. When use of an automated sampler makes it impossible to preserve each aliquot, then chemical samples may be preserved by maintaining at 4°C until compositing and sample splitting is completed.
3. When any sample is to be shipped by common carrier or sent through the United States mails, it must comply with the Department of Transportation Hazardous Materials Regulations (49 CFR Part 172). The person offering such material for transportation is responsible for ensuring compliance. For the preservation requirements of Table 6-8, the Office of Hazardous Materials, Materials Transportation Bureau, Department of Transportation has determined that the Hazardous Materials Regulations do not apply to the following materials: Hydrochloric acid, (HCl) in water, solutions at concentrations of 0.04% by weight or less (pH about 1.96 or greater); Nitric acid (HNO_3) in water solutions at concentrations of 0.15% by weight or less (pH about 1.62 or greater); Sulfuric acid (H_2SO_4) in water solutions at concentrations of 0.35% by weight or less pH about 1.15 or greater); and Sodium hydroxide (NaOH) in water solutions at concentrations of 0.080% by weight or less (pH about 12.30 or less).
4. Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before analysis and still be considered valid.
5. If oxidizing agents are present, add 5 mL 0.1 N $NaAsO_2$ or 0.06 g of ascorbic acid per L. See Cyanide SOP for additional information about other interferences.
6. Adjust pH to <2 with H_2SO_4, HCl, or solid $NaHSO_4$. Free Chlorine must be removed prior to adjustment.
7. Free Chlorine must be removed by the appropriate addition of $Na_2S_2O_3$.
8. 7 days until extraction. 40 days after extraction.
9. Adjust pH to 5-8 using NaOH or H_2SO_4.
10. With Teflon lined septum.

Table 23-5 RCRA – Non-Aqueous

PARAMETER	CONTAINER [1]	PRESERVATION Temp.	PRESERVATION Chemical	HOLDING TIME[2]	SAMPLE WEIGHT
Chloride	Glass	4ºC	None	28 days	50 g
Cyanide -Total	Glass	4ºC	None	14 days	50 g
Cyanide -Amenable	Glass	4ºC	None	14 days	50 g
Hydrogen Ion (pH)	Glass	4ºC	None	24 hours	50 g
Nitrate	Glass	4ºC	None	N/A	50 g
Oil and Grease	Glass	4ºC	None	28 days	50 g
Sulfide	Glass	4ºC	Add Zn Acetate, zero headspace	7 days	50 g
Chromium VI	Glass	4ºC	None	24 hours	50 g
Mercury	Plastic/Glass	None	None	28 days	50 g
Other Metals	Plastic/Glass	None	None	6 months	50 g
Acrolein and Acrylonitrile	Glass[4]	4ºC	None	14 days	50 g
Benzidines	Glass[4]	4ºC	None	14 days[3]	50 g
Chlorinated Hydrocarbons	Glass[4]	4ºC	None	14 days[3]	50 g
Dioxins and Furans	Glass[4]	4ºC	None	14 days[3]	50 g
Haloethers	Glass[4]	4ºC	None	14 days[3]	50 g
Nitroaromatics and cyclic ketones	Glass[4]	4ºC	None	14 days[3]	50 g
Nitrosomines	Glass[4]	4ºC	None	14 days[3]	50 g
Organochlorine Pesticides	Glass[4]	4ºC	None	14 days[3]	50 g
Organophosphorus Pesticides	Glass[4]	4ºC	None	14 days[3]	50 g
PCBs	Glass[4]	4ºC	None	14 days[3]	50 g
Phenols	Glass[4]	4ºC	None	14 days[3]	50 g
Phthalate Esters	Glass[4]	4ºC	None	14 days[3]	50 g
Polynuclear Aromatic Hydrocarbons	Glass[4]	4ºC	None	14 days[3]	50 g
Purgeable Hydrocarbons	Glass[4]	4ºC	None	14 days[5]	50 g

PARAMETER	CONTAINER [1]	PRESERVATION Temp.	PRESERVATION Chemical	HOLDING TIME[2]	SAMPLE WEIGHT
Purgeable Halocarbons	Glass[4]	4ºC	None	14 days[5]	50 g
Total Organic Halides (TOX)	Glass[4]	4ºC	None	28 days	50 g

Key to Table 23-5

1. Plastic should be Polyethylene.
2. Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before analysis and still be considered valid.
3. 14 days until extraction. 40 days after extraction.
4. With Teflon Lined Septum
5. See Volatile SOP for more detailed preservation requirements.

Table 23-6 Air Samples

PARAMETER	CONTAINER [1]	PRESERVATION Temp.	PRESERVATION Chemical	HOLDING TIME[2]	SAMPLE WEIGHT
Volatile Organics	Tedlar Bag	None	None	72 hrs[3,4]	1 L

Key to Table 23-6

1. Plastic should be Polyethylene.
2. Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before analysis and still be considered valid.
3. Holding Time is based on SW 846 Method 0040 "SAMPLING OF PRINCIPAL ORGANIC HAZARDOUS CONSTITUENTS FROM COMBUSTION SOURCES USING TEDLAR® BAGS". Some states specifically enforce this holding time (e.g. Florida, New Jersey) and others have not specified this information in their regulatory requirements.
4. The holding time is 72 hours unless the laboratory has a documented validation study that indicates a longer HT is acceptable for the analytes of interest.

Section 24
(NELAC 5.5.8)
HANDLING OF SAMPLES

Sample management procedures at TestAmerica-Irvine ensure that sample integrity and custody are maintained and documented from sampling/receipt through disposal.

24.1 SAMPLE HANDLING

24.1.1 Chain of Custody

The chain-of-custody form is the written documented history of any sample. This form is completed by the sampling personnel and accompanies the samples to the laboratory where it is received and stored under the laboratory's custody. The purpose of the chain–of-custody (COC) form is to provide a legal written record of the handling of samples from the time of collection until they are received at the laboratory. It also serves as the primary written request for analyses from the client to the laboratory. The COC form acts as a purchase order for analytical services when no other contractual agreement is in effect. An example of a COC form may be found in Figure 24-1.

24.1.2 Field Documentation

At the sampling site, each sample is labeled with the following information:

- client's sample identification
- date, time and location of sampling
- name of the client
- name of the sampler
- sampling procedure used
- and any other pertinent information

During the sampling process, the chain-of-custody form is completed. This form includes information such as the address and phone number of the client, the analyses requested, the containers and preservatives used, and the sampling date and time (see Figure 24-1). The samples are stored in a cooler with ice and remain solely in the possession of the client's field technician until the samples are delivered to the laboratory. The sample collector must assure that each container is in his/her physical possession or in his/her view at all times, or stored in such a place and manner to preclude tampering. The field technician relinquishes the samples in writing on the COC form to the sample control personnel at the laboratory or to a TestAmerica courier.

NOTE: Independent couriers are not required to sign the COC form. The COC is usually kept in the sealed sample cooler. The receipt from the courier is attached to the original COC.

24.1.3 Legal/Evidentiary Chain-of-Custody

If samples are identified for legal/evidentiary purposes on the COC, login will complete the custody seal (Figure 24-2), retain the shipping record with the COC, and initiate an internal COC (Figure 24-3) for laboratory use by analysts and a sample disposal record (Figure 24-4).

24.2 SAMPLE RECEIPT

Sample acceptance, receipt, tracking and storage procedures are summarized in the following sections.

24.2.1 Laboratory Receipt

When samples arrive at the laboratory, sample receiving personnel inspect the coolers and samples. The integrity of each sample must be determined by comparing sample labels or tags with the COC and by visual checks of the container for possible damage. Any problems or deviations are recorded on a Notification of Discrepancy (NOD) form (figure 24-5).

24.2.1.1 Inspection of samples include a check for:

- Complete documentation to include sample identification, location, date and time of collection, collector's name, preservation type, sample type and any additional comments concerning the samples.
- Complete sample labels to include unique identification in indelible ink.
- Use of appropriate sample containers (see Section 23)
- Adherence to holding times as specified in the test method and/or summarized in Section 23.
- Adequate sample volume for required analyses (see Section 23).
- Damage or signs of contamination to sample container. Volatile vials are also inspected for headspace

24.2.1.2 Check and record the temperature of the samples that require thermal preservation.

24.2.1.2.1 Samples shall be deemed acceptable if arrival temperature is just above freezing and less than or equal to 6° C. Samples that are hand-delivered immediately after collection may not be at the required temperatures; however, if there is evidence that the chilling process has begun, such as the arrival on ice, the samples shall be considered acceptable. This will be documented on the chain of custody.

24.2.1.2.2 If the samples were shipped in ice and solid ice is still present and in direct contact with samples, report the samples as "received on ice." Direct contact means samples must be surrounded by ice cubes or crushed ice. Ice present in a plastic bottle or other container does not constitute direct contact. Samples shipped with only "blue ice" may not be reported as "received on ice".

24.2.1.3 Verify all sample containers are labeled as containing the correct preservation as specified in the test method. The check for correct pH as specified in the test method is performed and documented at the time of analysis. Chlorine is also checked at the time of analysis on samples requiring BOD, CBOD, and cyanide; presence or absence is recorded.

24.2.1.4 After inspecting the samples, the sample control personnel sign and date the chain-of-custody form, make any necessary notes of the samples' conditions and store them in appropriate refrigerators.

24.2.1.5 If samples are received without a chain-of-custody form, TestAmerica will provide a generic chain-of-custody form to be completed by the client when the samples are brought to

the laboratory. The client is always provided with a copy of the completed chain-of-custody form for their records.

24.2.1.6 If analyses with short holding times are requested, the dates are inspected to ensure that holding times have not been already violated.

24.2.1.7 Samples received after normal working hours are left in their coolers and placed in the walk-in refrigerator. The person receiving the samples must record the date and time received, the presence or absence of ice and custody seals, the temperature of samples, and initials.

24.2.1.8 Any deviations from the checks described in section 24.2.1 that question the suitability of the sample for analysis, or incomplete documentation as to the tests required will be resolved by consultation with the client. If the sample acceptance criteria (Section 24.3) are not met, the laboratory shall either:

24.2.1.8.1 Retain all correspondence and/or records of communications with the client regarding the disposition of rejected samples, or

24.2.1.8.2 Fully document any decision to proceed with sample analysis that does not meet sample acceptance criteria.

24.2.2 Sample Log-in

24.2.2.1 All samples that are received by the laboratory are logged into the LIMS to allow the laboratory to track and evaluate sample progress. Each group of samples that are logged in together (typically one project from a given client/sampling event) is assigned a unique job number. Within each job, each sampling point (or sample) receives a unique number. Sample numbers are generated sequentially over time, and are not re-assigned. A sample may be composed of more than one bottle since different preservatives may be required to perform all analyses requested. Even if multiple containers are received for a single sample, each container is uniquely identified with an alphabetic letter added to the sample number. The LIMS generates sample labels that are attached to each bottle for a given sample.

24.2.2.2 Each job/set of samples is logged into LIMS with a minimum of the following information:

- Client Name, Project Name, Address, Phone, Fax, Report to information, invoice to information (most of this information is “default information” that is stored in the LIMS).
- Date and time sampled;
- Date and time received;
- Project description, sample description;
- Sample matrix, special sample remarks;
- Reporting requirements (i.e., QC level, report format, invoicing format);
- Turn-around-time requirements;
- Parameters (methods and reporting limits or MDLs are default information for a given parameter)

24.3 SAMPLE ACCEPTANCE POLICY

24.3.1 The laboratory has a written sample acceptance policy (Figure 24-6) that clearly outlines the circumstances under which samples shall be accepted or rejected. These include:

- a chain of custody filled out completely;
- samples must be properly labeled;
- proper sample containers with adequate volume for the analysis and necessary QC;
- samples must be preserved according to the requirements of the requested analytical method;
- sample holding times must be adhered to;
- all samples submitted for Volatile Organic analyses must have a Trip Blank submitted at the same time;
- the project manager will be notified if any sample is received in damaged condition.

24.3.2 Data from samples which do not meet these criteria are flagged and the nature of the variation from policy is defined. A copy of the sample acceptance policy is provided with all laboratory-supplied container shipments.

24.4 SAMPLE STORAGE

24.4.1 In order to avoid deterioration, contamination or damage to a sample during storage and handling, from the time of receipt until all analyses are complete, samples are stored in matrix-specific refrigerators. In addition, samples to be analyzed for volatile organic parameters are stored in separate refrigerators designated for volatile organic parameters only. To ensure the integrity of the samples during storage, refrigerator blanks are maintained in the volatile sample refrigerators and analyzed every two weeks. Samples are not stored in refrigeration units containing standards or reagents.

24.4.2 Analysts and technicians retrieve the sample container allocated to their analysis from the designated refrigerator and place them on carts, analyze the sample, and return the remaining sample or empty container to the refrigerator from which it originally came. All samples are kept in the refrigerators for two to three weeks after analysis, which meets or exceeds most sample holding times. After two to three weeks the samples are moved to a room temperature sample archive area where they are stored for an additional three weeks before they are disposed of. This six week holding period allows samples to be checked if a discrepancy or question arises. Special arrangements may be made to store samples for longer periods of time. This extended holding period allows additional metal analyses to be performed on the archived sample and assists clients in dealing with legal matters or regulatory issues.

24.4.3 Access to the laboratory is controlled such that sample storage need not be locked at all times unless a project specifically demands it. Samples are accessible to laboratory personnel only. Visitors to the laboratory are prohibited from entering the refrigerator and laboratory areas unless accompanied by an employee of TestAmerica.

24.5 HAZARDOUS SAMPLES AND FOREIGN SOILS

To minimize exposure to personnel and to avoid potential accidents, hazardous and foreign soil samples are stored in an isolated area designated for hazardous waste only. For any sample that is known to be hazardous at the time of receipt or, if after completion of analysis the result exceeds the acceptable regulatory levels, a Hazardous Sample Notice must be completed by the analyst. This form may be completed by Sample Control, Project Managers, or analysts and must be attached to the report. The sample itself is clearly marked with a red stamp, stamped on the sample label reading "HAZARDOUS" or "FOREIGN SOIL" and placed in a colored and/or marked bag to easily identify the sample. The date, log number, lab sample number, and the result or brief description of the hazard are all written on the Hazardous & Foreign Soil Sample Notice. A copy of the form must be included with the original COC and Work Order and the original must be given to the Sample Control Custodian. Analysts will notify Sample Control of any sample determined to be hazardous after completion of analysis by completing a Hazardous Sample Notice. All hazardous samples are either returned to the client or disposed of appropriately through a hazardous waste disposal firm that lab-packs all hazardous samples and removes them from the laboratory. Foreign soil samples are sent out for incineration by a USDA-approved waste disposal facility.

24.6 SAMPLE SHIPPING

In the event that the laboratory needs to ship samples, the samples are placed in a cooler with enough ice to ensure the samples remain just above freezing and at or below 6°C during transit. The samples are carefully surrounded by packing material to avoid breakage (yet maintain appropriate temperature), and a trip blank is enclosed for those samples requiring volatile organic analyses. The chain-of-custody form is signed by the sample control technician and attached to the shipping paperwork. Samples are generally shipped overnight express or hand-delivered by a TestAmerica courier to maintain sample integrity. All personnel involved with shipping and receiving samples must be trained to maintain the proper chain-of-custody documentation and to keep the samples intact and on ice.

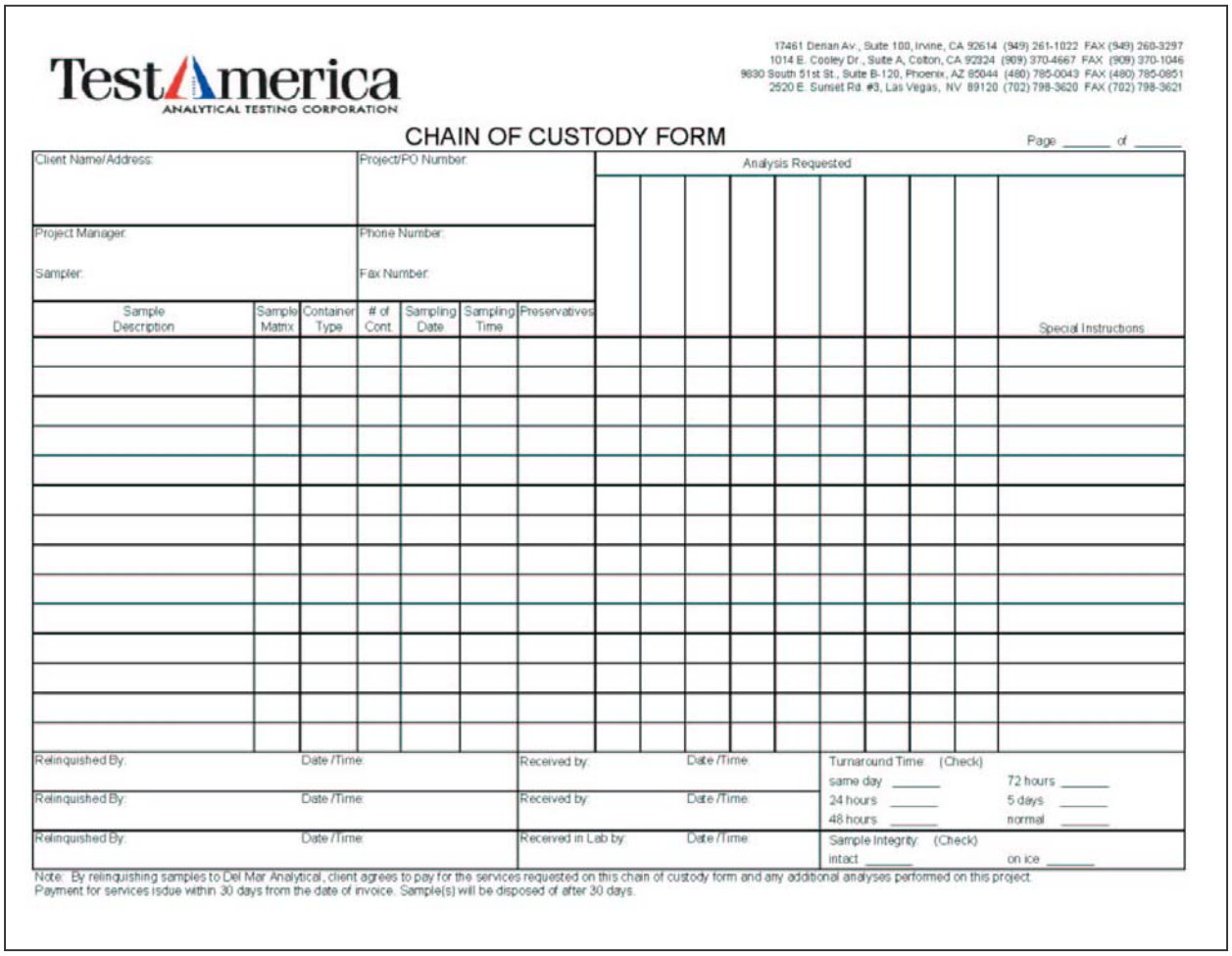
24.7 SAMPLE DISPOSAL

24.7.1 Several possibilities for sample disposal exist: the sample may be consumed completely during analysis, the sample may be returned to the customer or location of sampling for disposal, or the sample may be disposed of in accordance with the laboratory's waste disposal procedures (SOP: "Waste Disposal", CF10-01.1) All procedures in the laboratory Chemical Hygiene Plan/Safety Manual are followed during disposal. Samples are normally maintained in the laboratory no longer than two months from receipt unless otherwise requested.

24.7.2 If a sample is part of a known litigation, the affected legal authority, sample data user, and/or submitter of the sample must participate in the decision about the sample's disposal. All documentation and correspondence concerning the disposal decision process must be kept on file. Pertinent information includes the date of disposal, nature of disposal (such as sample depletion, hazardous waste facility disposal, return to client), names of individuals who conducted the arrangements and physically completed the task. A Waste Disposal Record (Figure 24-4) should be completed.

Figure 24-1

Chain of Custody



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ANALYTICAL TESTING CORPORATION

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1014 E. Cooley Dr., Suite A, Colton, CA 92324 (909) 370-4667 FAX (909) 370-1046
9830 South 51st St., Suite B-120, Phoenix, AZ 85044 (480) 785-0043 FAX (480) 785-0851
2520 E. Sunset Rd. #3, Las Vegas, NV 89120 (702) 798-3620 FAX (702) 798-3621

CHAIN OF CUSTODY FORM

Page _____ of _____

Client Name/Address:	Project/PO Number:	Analysis Requested
Project Manager:	Phone Number:	
Sampler:	Fax Number:	

Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Sampling Time	Preservatives	Special Instructions

Relinquished By:	Date /Time:	Received by:	Date /Time:	Turnaround Time: (Check)
				same day _____ 72 hours _____
Relinquished By:	Date /Time:	Received by:	Date /Time:	24 hours _____ 5 days _____
				48 hours _____ normal _____
Relinquished By:	Date /Time:	Received in Lab by:	Date /Time:	Sample Integrity: (Check)
				intact _____ on ice _____

Note: By relinquishing samples to Del Mar Analytical, client agrees to pay for the services requested on this chain of custody form and any additional analyses performed on this project. Payment for services isdue within 30 days from the date of invoice. Sample(s) will be disposed of after 30 days.

Figure 24-2

Example Custody Seal

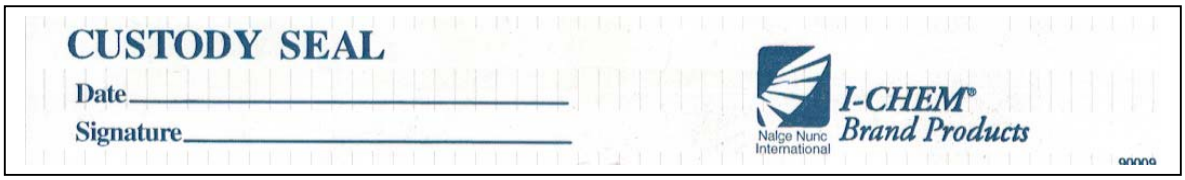

Figure 24-3

Example Internal Chain of Custody Form

TestAmerica
ANALYTICAL TESTING CORPORATION

17461 Derian Avenue. Suite 100 Irvine, CA 92614 (949) 261-1022 fax:(949) 260-3297

WORK ORDER
IPL2715

Client:	Project Name:
Client Code:	Project Number:
Project Manager:	Printed:

Internal Sample Custody

Refrigerator ID:

Sample	In	Out	In	Out	In	Out	In	Out	Archived	Disposed
IPL2715-01G										
IPL2715-01H										
IPL2715-01I										
IPL2715-01L										
IPL2715-01M										
IPL2715-01P										
IPL2715-01Q										
IPL2715-01R										
IPL2715-01S										
IPL2715-01T										

Reviewed By _____ Date _____ Time _____

12/28/2006 10:08:48AM
Page 13 of 16

Figure 24-4

Sample Disposal Record

SAMPLE ARCHIVE/DISPOSAL TRACKING FORM

Month/Year: _____

Matrix: _____

SAMPLE NUMBERS		DATE	INITIALS	DATE	INITIALS	COMMENTS
STARTING	ENDING	REMOVED		DISPOSED		

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Figure 24-5

Notification of Discrepancy Form

TestAmerica
ANALYTICAL TESTING CORPORATION

NOTIFICATION OF DISCREPANCY

DATE: _____ **TIME:** _____ **PM:** _____ **SC INITIALS:** _____

CLIENT/PROJECT NAME:

Rush/Short Hold? ☐ Yes ☐ No | **WORK ORDER #:**

- ☐ **Project Not Set Up in ELM** ☐ **New Client** ☐ **COC Received ON HOLD**
- ☐ **Analysis Requested on COC – Not Listed for Project in ELM**
  PM To Add Analysis: _____
- ☐ **Clarification of Analysis:** _____
- ☐ **Hold Time Expired: (Analysis)** _____
- ☐ **Turnaround Time Not Checked:** _____
- ☐ **Did Not Receive Sample(s) Listed on COC:** _____
  _____
- ☐ **Received Extra Sample(s) Not Listed on COC:** _____
  _____
- ☐ **Sample Description(s) or Date/Time Sampled Do Not Match COC:**
  _____
  _____
  _____
- ☐ **Improper Preservative:** _____
- ☐ **Sample Received Broken:** _____
- ☐ **Improper Temperature (_____°) (Comments):** _____
- ☐ **Insufficient Sample Volume:** _____
- ☐ **Other:**

_____
_____
_____
_____

PROJECT MANAGER RESOLUTION:	(Date & Time when returned to SC)
Approval By:	**Date:** **Time:**

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Figure 24-6a

Sample Acceptance Policy, front

TestAmerica
ANALYTICAL TESTING CORPORATION

TestAmerica Sample Acceptance Policy

All incoming work will be evaluated against the criteria listed below. Where applicable, data from any samples that do not meet the criteria listed below will be noted on the laboratory report defining the nature and substance of the variation. In addition the client will be notified either by telephone, fax or e-mail ASAP after the receipt of the samples.

1) Samples must arrive with labels intact with a Chain of Custody filled out completely. The following information must be recorded.
   - Client name, address, phone number and fax number (if available)
   - Project name and/or number
   - The sample identification
   - Date, time and location of sampling
   - The collectors name
   - The matrix description
   - The container description
   - The total number of each type of container
   - Preservatives used
   - Analysis requested
   - Requested turnaround time (TAT)
   - Any special instructions
   - Purchase Order number or billing information (e.g. quote number) if available
   - The date and time that each person received or relinquished the sample(s), including their signed name.
   - The date and time of receipt must be recorded between the last person to relinquish the samples and the person who receives the samples in the lab, and they must be exactly the same.
   - **Information must be legible**

2) Samples must be properly labeled.
   - Use durable labels (labels provided by TestAmerica are preferred)
   - Include a unique identification number
   - Include sampling date and time & sampler ID
   - Include preservative used.
   - Use indelible ink
   - **Information must be legible**

3) Proper sample containers with adequate volume for the analysis and necessary QC are required for each analysis requested. See TA Sample Container Guide.

4) Samples must be preserved according to the requirements of the requested analytical method (See TA Sample Container Guide). Most analytical methods require chilling samples to 4° C (other than water samples for metals analysis). For these methods, the criteria are met if the samples are chilled to below 6° C and above freezing (0°C). For methods with other temperature criteria (e.g. some bacteriological methods require $\leq$ 10 °C), the samples must arrive within $\pm$ 2° C of the required temperature or within the method specified range. **Note:** Samples that are hand delivered to the laboratory immediately after collection may not have had time to cool sufficiently. In this case the samples will be considered acceptable as long as there is evidence that the chilling process has begun (arrival on ice).

Continued on other side.

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Figure 24-6b

Sample Acceptance Policy, back

- Chemical preservation (pH) will be verified prior to analysis and the project manager will be notified immediately if there is a discrepancy. If analyses will still be performed, all affected results will be flagged to indicate improper preservation.

- For Volatile Organic analyses in drinking water (Methods 502.2 or 524.2). Residual chlorine must be neutralized prior to preservation. If there is prior knowledge that the samples are not chlorinated, state it on the COC and use the VOA vials pre-preserved with HCl. The following are other options for a sampler and laboratory where the presence of chlorine is not known:
  - 1. Test for residual chlorine in the field prior to sampling.
    - If no chlorine is present, the samples are to be preserved using HCl as usual.
    - If chlorine is present, add either ascorbic acid or sodium thiosulfate prior to adding HCl.
  - 2. Use VOA vials pre-preserved with sodium thiosulfate or ascorbic acid and add HCl after filling the VOA vial with the sample.

5) Sample Holding Times
   - TestAmerica will make every effort to analyze samples within the regulatory holding time. Samples must be received in the laboratory with enough time to perform the sample analysis. Except for short holding time samples (< 48hr HT) sample must be received with at least 48 hrs (working days) remaining on the holding time for us to ensure analysis.

   - Analyses that are designated as "field" analyses (Odor, pH, Dissolved Oxygen, Disinfectant Residual; a.k.a. Residual Chlorine, and Redox Potential) should be analyzed ASAP by the field sampler prior to delivering to the lab. However, if the analyses are to be performed in the laboratory, TestAmerica will make every effort to analyze the samples within 24 hours from receipt of the samples in the testing laboratory. Samples for "field" analyses received after 4:00 pm on Friday or on the weekend will be analyzed no later than the next business day after receipt (Monday unless a holiday). Samples will remain refrigerated and sealed until the time of analysis. The actual times of all "field" sample analyses are noted on the "Short Hold Time Detail Report" in the final report. Only samples analyzed outside of these criteria will be qualified on the final report with an 'H' to indicate holding time exceedance.

6) All samples submitted for Volatile Organic analyses must have a Trip Blank submitted at the same time. TestAmerica will supply a blank with the bottle order.

7) The project manager will be notified if any sample is received in damaged condition TestAmerica will request that a sample be resubmitted for analysis.

8) Recommendations for packing samples for shipment.

   - Pack samples in Ice rather than "Blue" ice packs.

   - Soil samples should be placed in plastic zip-lock bags. The containers often have dirt around the top and do not seal very well and are prone to intrusion from the water from melted ice.

   - Water samples would be best if wrapped with bubble-wrap or paper (newspaper, or paper towels work) and then placed in plastic zip-lock bags.

   - Fill extra cooler space with bubble wrap.

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Updated September 6, 2006

Section 25.0
(NELAC 5.5.9)
ASSURING THE QUALITY OF TEST RESULTS

In order to assure our clients of the validity of their data,TestAmerica-Irvine continuously evaluates the quality of the analytical process. The analytical process is controlled not only by instrument calibration as discussed in Section 21, but also by routine process quality control measurements (e.g. Blanks, Laboratory Control Samples (LCS), Matrix Spikes (MS), duplicates (DU), surrogates, Internal Standards (IS)). These quality control checks are performed as required by the method or regulations to assess precision and accuracy. In addition to the routine process quality control samples, Proficiency Testing (PT) Samples (concentrations unknown to laboratory) are analyzed to help ensure laboratory performance.

25.1 NEGATIVE CONTROLS

25.1.1 Method Blanks are used to assess preparation and analysis for possible contamination during the preparation and processing steps.

25.1.1.1 The Method Blank is prepared from a clean matrix similar to that of the associated samples that is free from target analytes (for example: Reagent water or Ottawa sand) and is processed along with and under the same conditions as the associated samples.

25.1.1.2 The method blank goes through all of the steps of the process (including as necessary: filtration, clean-ups, etc.).

25.1.1.3 The specific frequency of use for method blanks during the analytical sequence is defined in the specific standard operating procedure for each analysis. Generally it is 1 for each batch of samples; not to exceed 20 environmental samples.

25.1.1.4 Evaluation criteria and corrective action for method blanks is defined in the specific standard operating procedure for each analysis. Generally, corrective action is taken if the concentration of a target analyte in the blank is at or above the reporting limit as established by the method or regulation:

- The source of contamination is investigated
- Measures are taken to minimize or eliminate the source of the contamination
- Affected samples are reprocessed or the results are qualified on the final report.

25.1.2 Calibration Blanks are prepared and analyzed along with calibration standards. They are prepared using the same reagents that are used to prepare the standards. In some analyses the calibration blank may be included in the calibration curve.

25.1.3 Instrument Blanks are blank reagents or reagent water that may be processed during an analytical sequence in order to assess contamination in the analytical system. In general, instrument blanks are used to differentiate between contamination caused by the analytical system and that caused by the sample handling or sample prep process. Instrument blanks may also be inserted throughout the analytical sequence to minimize the effect of carryover from samples with high analyte content.

25.1.4 Trip Blanks are required to be submitted by the client with each shipment of samples requiring volatiles analyses. A trip blank is prepared by the laboratory by filling a clean container with pure deionized water that has been purged to remove any volatile compounds. Appropriate preservatives are also added to the container. The trip blank is sent with the bottle order and is intended to reflect the environment that the containers are subjected to throughout shipping and handling and help identify possible sources if contamination is found. The field sampler returns the trip blank in the cooler with the field samples. Trip Blanks are also sometimes referred to as Travel Blanks.

25.1.5 Field Blanks are sometimes used for specific projects by the field samplers. A field blank prepared in the field by filling a clean container with pure de-ionized water and appropriate preservative, if any, for the specific sampling activity being undertaken. (EPA OSWER)

25.1.6 Equipment Blanks are also sometimes created in the field for specific projects. An equipment blank is a sample of analyte-free media which has been used to rinse common sampling equipment to check effectiveness of decontamination procedures. (NELAC)

25.2 POSITIVE CONTROLS

25.2.1 Laboratory Control Sample (LCS)

25.2.1.1 The LCS is generally used to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system.

25.2.1.2 The LCS is prepared from a clean matrix similar to that of the associated samples that is free from target analytes (for example: Reagent water or Ottawa sand) and is processed along with and under the same conditions as the associated samples. The LCS is spiked with verified known amounts of analytes or is made of a material containing known and verified amounts of analytes, taken through all preparation and analysis steps. Where there is no preparation taken for an analysis (such as in aqueous volatiles), or when all samples and standards undergo the same preparation and analysis process (such as Phosphorus), a calibration verification standard is reported as the LCS.

25.2.1.3 Certified pre-made reference material purchased from an NIST accredited vendor may also be used for the LCS when the material represents the sample matrix or the analyte is not easily spiked (e.g. solid matrix LCS for metals, TDS, etc.)

25.2.1.4 The LCS goes through all of the steps of the process (including as necessary: filtration, clean-ups, etc.).

25.2.1.5 The specific frequency of use for LCS during the analytical sequence is defined in the specific standard operating procedure for each analysis. It is generally 1 for each batch of samples; not to exceed 20 environmental samples.

25.2.1.6 If the mandated or requested test method does not specify the spiking components, the laboratory shall spike all reportable components to be reported in the Laboratory Control Sample (and Matrix Spike). However, in cases where the components interfere with accurate assessment (such as simultaneously spiking chlordane, toxaphene and PCBs in Method 608), the test method has an extremely long list of components or components are incompatible, at a minimum, a representative number of the listed components (see below) shall be used to control the test method. The selected components of each spiking mix shall represent all chemistries, elution patterns and masses permit specified analytes and other client requested

components. However, the laboratory shall ensure that all reported components are used in the spike mixture within a two-year time period.

25.2.1.6.1 For methods that have 1-10 target analytes, spike all components

25.2.1.6.2 For methods that include 11-20 target analytes, spike at least 10 or 80%, whichever is greater.

25.2.1.6.3 For methods with more than 20 target analytes, spike at least 16 components.

25.2.1.6.4 Exception: Due to analyte incompatibility in pesticides, Toxaphene and Chlordane are only spiked at client request based on specific project needs.

25.2.1.6.5 Exception: Due to analyte incompatibility between the various PCB aroclors, aroclors 1016 and 1260 are used for spiking as they cover the range of all of the aroclors. Specific aroclors may be used by request on a project specific basis.

25.2.1.7 Accuracy Calculation: Percent Recovery (%R) Calculation (applies to LCS, CCV, Surrogates, and Matrix Spikes.

$$\%R = \frac{AV}{TV} \times 100$$

Where

AV = Analyzed Value

TV = True Value

25.3 SAMPLE SPECIFIC CONTOLS

25.3.1 Matrix Spikes (MS)

25.3.1.1 The Matrix spike is used to assess the effect sample matrix of the spiked sample has on the precision and accuracy of the results generated by the method used.

25.3.1.2 An MS is essentially a sample fortified with a known amount of the test analyte(s). At a minimum, with each matrix-specific batch of samples processed, an MS is carried through the complete analytical procedure. Unless specified by the client, samples used for spiking are randomly selected and rotated between different client projects.

25.3.1.3 If the mandated or requested test method does not specify the spiking components, the laboratory shall spike all reportable components to be reported in the Laboratory Control Sample and Matrix Spike. However, in cases where the components interfere with accurate assessment (such as simultaneously spiking chlordane, toxaphene and PCBs in Method 608), the test method has an extremely long list of components or components are incompatible, a representative number of the listed components (see LCS analytes 25.2.1.6 above) may be used to control the test method. The selected components of each spiking mix shall represent all chemistries, elution patterns and masses, permit-specified analytes and other client requested components. However, the laboratory shall ensure that all reported components are used in the spike mixture within a two-year time period.

25.3.1.4 The percent recovery calculation for matrix spikes is essentially the same as the calculation shown in 25.2.1.7 except that:

AV = Sp – Sa

Where:
Sp = Spike result
Sa = Sample result

25.3.2 Surrogate Spikes

25.3.2.1 Surrogate Spikes are similar to matrix spikes except the analytes are compounds with properties that mimic the analyte of interest and are unlikely to be found in environment samples.

25.3.2.2 Surrogate compounds are added to all samples, standards, and blanks, for all organic chromatography methods except when the matrix precludes its use or when a surrogate is not available. The recovery of the surrogates is compared to the acceptance limits for the specific method (also see section 25.5 below). Poor surrogate recovery may indicate a problem with sample composition and shall be reported, with data qualifiers, to the client whose sample produced poor recovery.

25.3.3 Duplicates

25.3.3.1 For a measure of analytical precision, with each matrix-specific batch of samples processed, a duplicate sample, matrix spike duplicate, or LCS duplicate is carried through the complete analytical procedure. Duplicate samples are usually analyzed with methods that do not require matrix spike analysis. Duplicate LCS samples are usually analyzed when insufficient sample volume is supplied for the LIMS specified matrix spike sample. The recoveries for the spiked duplicate samples should meet the same laboratory established recovery limits as the accuracy QC samples. The precision measurement is reported as "Relative Percent Difference" (RPD). Poor precision between duplicates (except LCS/LCSD) may indicate non-homogeneous matrix or sampling.

25.3.3.2 Precision Calculation (Relative Percent Difference - RPD)

$$RPD = \frac{|S - D|}{\frac{(S + D)}{2}} \times 100$$

Where:
S=Sample Concentration
D=Duplicate Concentration

25.4 INTERNAL STANDARDS

25.4.1 In most organic analyses, internal standards are spiked into all environmental and quality control samples (including the initial calibration standards). An internal standard is also used with some metals analyses. It is added to sample extracts after the extraction (post-prep). The acceptance criteria in most methods are 50% to 200% of the responses in the mid-point of the corresponding calibration curve. Consult the method-specific SOPs for details on the internal standard compounds and calculations.

25.4.2 When the internal standard recoveries fall outside these limits, if there are not obvious chromatographic interferences, one sample from each affected project is reprocessed and reanalyzed to confirm a possible matrix effect. If the recoveries confirm or there is obvious interference, results are reported from the original analysis and a qualifier is added. If the internal standard recoveries from the reprocessed sample fulfill criteria, all affected samples are reprocessed and results from the re-analyses are reported.

25.5 ACCEPTANCE CRITERIA (CONTROL LIMITS)

25.5.1 Each individual analyte in the LCS, MS, or Surrogate Spike are evaluated against the control limits as published in the test method. Where there are no established acceptance criteria, the laboratory calculates control limits with the use of control charts or, in some cases, utilizes client project specific or regulatory mandated control limits. When this occurs, the regulatory or project limits will supersede the laboratory's in-house limits.

25.5.1.1 For methods, analytes and matrices with very limited data (e.g., unusual matrices not analyzed often), interim limits are established using available data or by analogy to similar methods or matrices.

25.5.2 Once control limits have been established, they are verified, reviewed, and updated if necessary on an annual basis unless the method requires more frequent updating (e.g. EPA SW846 8000 series methods). Control limits are established per method (as opposed to per instrument) regardless of the number of instruments utilized.

25.5.2.1 The lab should consider the effects of the spiking concentration on matrix spike control limits, and to avoid censoring of data. The acceptance criteria for matrix spike recovery and precision are often a function of the spike concentration used. Therefore, caution must be used when pooling matrix spike/matrix spike duplicate data to generate control limits.

25.5.2.2 Not only should the results all be from a similar matrix, but the spiking levels should also be approximately the same (within a factor of 2). Similarly, the matrix spike and surrogate results should all be generated using the same set of extraction, cleanup and analysis techniques. For example, results from solid samples extracted by ultrasonic extraction are not mixed with those extracted by Soxhlet.

25.5.2.3 The laboratory should try and avoid discarding data that do not meet a preconceived notion of acceptable performance. This results in a censored data set, which, when used to develop acceptance criteria, will lead to unrealistically narrow criteria. For a 99% confidence interval, 1 out of every 100 observations likely will still fall outside the limits. For methods with long analyte lists this may mean occasional failures every batch or two. While professional judgment is important in evaluating data to be used to develop acceptance criteria, specific results are not discarded simply because they do not meet one's expectations. However, data points shall be discarded if they were the result of human or mechanical error or sample concentration exceeded spike level by > 4x. (Right clicking on the control chart and selecting View Data from the drop down menu allows the QA Manager to view a table of all the charted points with any qualifiers. This assists the QA Manager in determining if any points should be discarded prior to limit generation.)

25.5.3 Laboratory generated % Recovery acceptance (control) limits are generally established by taking ± 3 Standard Deviations (99% confidence level) from the average recovery of at least 20-30 data points. The system defaults to collecting the previous 3 months data. This time frame should be shortened if there are more than 200 points since the system slows down tremendously. The time frame should be extended if there are not 20-30 points.

25.5.3.1 Regardless of the calculated limit, the limit should be no tighter than the Initial Calibration Verification (CCV). (Unless the analytical method specifies a tighter limit).

25.5.3.2 In-house limits cannot be any wider than those mandated in a regulated analytical method.

25.5.3.3 The lowest acceptable recovery limit will be 10% (the analyte must be detectable). Exception: The lowest acceptable recovery limit for Benzidine will be 5% and the analyte must be detectable.

25.5.3.4 The maximum acceptable recovery limit will be 150%.

25.5.3.5 The maximum acceptable RPD limit will be 35% for waters and 40% for soils. The minimum RPD limit is 10%.

25.5.3.6 If either the high or low end of the control limit changes by ≤ 5% from previous, the control chart is visually inspected and, using professional judgment, they may be left unchanged if there is no affect on laboratory ability to meet the existing limits.

25.5.4 The laboratory prepares a Quality Control Limit Summary that contains tables that summarize the precision and accuracy acceptability limits for analyses performed at TestAmerica-Irvine. This summary includes an effective date, is updated each time new limits are generated and is located in a limited-access directory on the laboratory's server. Unless otherwise noted, limits within these tables are laboratory generated. The analysts are instructed to use the current limits in the laboratory (dated and approved by the Technical Director and QA Manager) and entered into the Laboratory Information Management System (LIMS). The Quality Assurance department maintains an archive of all limits used within the laboratory.

25.5.5 A LCS that is within the acceptance criteria establishes that the analytical system is in control and is used to validate the process. Samples that are analyzed with an LCS with recoveries outside of the acceptance limits may be determined as out of control and should be reanalyzed if possible. If reanalysis is not possible, then the results for all affected analytes for samples within the same batch must be qualified when reported. The internal corrective action process (see Section 13) is also initiated if an LCS exceeds the acceptance limits. Sample results may be qualified and reported without reanalysis if:

25.5.5.1 The analyte results are below the reporting limit and the LCS is above the upper control limit.

25.5.5.2 If the analytical results are above the relevant regulatory limit and the LCS is below the lower control limit.

25.5.6 If the MS/MSDs do not meet acceptance limits, the MS/MSD and the associated spiked sample is reported with a qualifier for those analytes that do not meet limits. If obvious

preparation errors are suspected, or if requested by the client, unacceptable MS/MSDs are reprocessed and reanalyzed to prove matrix interference. A more detailed discussion of acceptance criteria and corrective action can be found in the SOP for each analytical method.

25.5.7 If a surrogate standard falls outside the acceptance limits, if there is not obvious chromatographic matrix interference, one sample from each affected project is reprocessed and reanalyzed to confirm a possible matrix effect. If the recoveries confirm or there is obvious chromatographic interference, results are reported from the original analysis and a qualifier is added. If the surrogate recoveries from the reprocessed sample fulfill criteria, all affected samples are reprocessed and results from the re-analyses are reported.

25.6 METHOD DETECTION LIMITS (MDLs)

25.6.1 MDLs , calculated as described in Section 20.6, are updated annually, or more often if required by the method. Once values are approved, they are distributed to the analysts, entered in LIMS analyte by analyte, and tabulated in a limited-access directory on the laboratory's server but can be viewed by all analysts in a read-only format.

25.7 ADDITIONAL PROCEDURES TO ASSURE QUALITY CONTROL

25.7.1 The laboratory has written procedures to assure the accuracy of the test method including calibration (see Section 21), use of certified reference materials (see Section 22) and use of PT samples (see Section 16).

25.7.2 A discussion regarding MDLs, Limit of Detection (LOD) and Limit of Quantitation (LOQ) can be found in Section 20.

25.7.3 Use of formulae to reduce data is discussed in the method standard operating procedures and in Section 21.

25.7.4 Selection of appropriate reagents and standards is included in Section 9 and 22.

25.7.5 A discussion on selectivity of the test is included in Section 5.

25.7.6 Constant and consistent test conditions are discussed in Section 19.

25.7.7 The laboratories sample acceptance policy is included in Section 24.

25.7.8 A listing of the type of test result correlations that are looked at during report review (e.g. Total Chromium should be greater or equal to Hexavalent Chromium) is included in Section 20.12.4.5.

Section 26.0
(NELAC 5.5.10)
REPORTING RESULTS

26.1 GENERAL

26.1.1 The results of each test are reported accurately, clearly, unambiguously, and objectively in accordance with State and Federal regulations as well as client requirements. Analytical results are issued in a format that is intended to satisfy customer and laboratory accreditation requirements as well as provide the end user with the information needed to properly evaluate the results. Where there is a conflict between the client requested formats and accreditation requirements or data usability information, accreditation requirements and data usability information will take precedence over client requests. A variety of report formats are available to meet specific needs.

26.1.2 In cases where a client asks for simplified reports, there must be a written request from the client. There still must be enough information that would show any analyses that were out of conformance (QC out of limits) and there should be a reference to a full report that is made available to the client.

26.1.3 Review of reported data is included in Section 20.

26.2 TEST REPORTS

Analytical results are reported in a format that is satisfactory to the client and meets all requirements of applicable accrediting authorities and agencies. A variety of report formats are available to meet specific needs. The report is printed on laboratory letterhead, reviewed, and signed by the appropriate project manager. At a minimum, the standard laboratory report shall contain the following information:

26.2.1 A report title (e.g. Analytical Report For Samples) with a “sample results” column header.

26.2.2 Each report page printed on company letterhead, which includes the laboratory name, address and telephone number.

26.2.3 A unique identification of the report (e.g. work order number) and on each page an identification in order to ensure the page is recognized as part of the report and a clear identification of the end.

26.2.3.1 Page numbers of report are represented as page # of ##. Where the first number is the page number and the second is the total number of pages.

26.2.4 A copy of the chain of custody (COC)

26.2.4.1 Any COCs involved with Subcontracting are included

26.2.4.2 In most cases the applicable COC is not paginated but is an integral part of the report. If the COC is not a paginated portion of the report then there will be a statement on the

front of the report to effect of “The Chain of Custody, X page(s), is included and is an integral part of this report.". The number of pages of the CoC (X) is entered into Element so that it is correct for each report.

26.2.4.3 Any additional addenda to the report must be treated in a similar fashion so it is a recognizable part of the report and cannot accidentally get separated from the report (eg. Sampling information).

26.2.5 The name and address of client and a project name/number, if applicable.

26.2.6 Client project manager or other contact

26.2.7 Description and unambiguous identification of the tested sample(s) including the client identification code.

26.2.8 Date of receipt of sample, date and time of collection, and date(s) of test preparation and performance, and time of preparation or analysis if the required holding time for either activity is less than or equal to 72 hours.

26.2.9 Date reported or date of revision, if applicable.

26.2.10 Method of analysis including method code (EPA, Standard Methods, etc).

26.2.11 Reporting limit.

26.2.12 Method detection limits (if requested)

26.2.13 Definition of Data qualifiers and reporting acronyms (e.g. ND).

26.2.14 Sample results including surrogate recoveries, if applicable.

26.2.15 Condition of samples at receipt including temperature. This may be accomplished in a narrative or by attaching sample login sheets (see 26.2.4.3 regarding additional addenda).

26.2.16 A statement to the effect that the results relate only to the items tested and the sample as received by the laboratory.

26.2.17 A statement that the report shall not be reproduced except in full, without prior express written approval by the laboratory.

26.2.18 A signature and title of the person(s) accepting responsibility for the content of the report and date of issue. Signatories are appointed by the Lab Director. For applying an electronic signature see the Electronic Signature Policy (Section 26.4).

26.2.19 When NELAC accreditation is required, the lab shall certify that the test results meet all requirements of NELAC or provide reasons and/or justification if they do not.

26.2.20 Where applicable, a narrative to the report that explains the issue(s) and corrective action(s) taken in the event that a specific accreditation or certification requirement was not met.

26.2.21 When Soil samples are analyzed, a specific identification as to whether soils are reported on a "wet weight" or "dry weight" basis.

26.2.22 Appropriate laboratory certification number for the state of origin of the sample, if applicable.

26.2.23 If the report is a "Partial" report (client requests some results before all of it is complete), it must state that it is "Partial" on the report and that a complete report will follow once all of the work has been completed.

26.2.24 Any out of network subcontracted analysis results are provided as a separate report on the official letterhead of the subcontractor. All in-network subcontracting is clearly identified on the report as to which laboratory performed a specific analysis.

26.3 REPORTING LEVEL

26.3.1 TestAmerica-Irvine offers four levels of quality control reporting. Each level, in addition to its own specific requirements, contains all the information provided in the preceding level. The packages provide the following information in addition to the information described above:

26.3.1.1 Level I is a report with the features described in Section 26.2 above.

26.3.1.2 Level II is a Level I report plus case narrative and summary QC information, including results for the method blank, percent recovery for laboratory control samples and matrix spike samples, and the RPD values for all MSD and sample duplicate analyses.

26.3.1.3 Level III contains all the information supplied in Level II, raw data for all samples and batch QC, and relevant calibration summary information.

26.3.1.4 Level IV is the same as Level III with the addition of all raw supporting data for the relevant calibrations.

26.3.2 In addition to the various levels of QC packaging, the laboratory also provides reports in diskette deliverable form. Initial reports may be provided to clients by facsimile. All faxed reports are followed by hardcopy. Procedures used to ensure client confidentiality are outlined in Section 26.7.

26.4 ELECTRONIC REPORTING AND SIGNATURE POLICY

Following the lead of the Federal Paperwork Reduction Act, TestAmerica Analytical Testing Corp. has implemented policies and procedures to help reduce paper usage. One of these procedures is to generate final reports and provide them to clients in pdf format.

Laboratory Director/Manager appointed representatives approve final reports using an electronic signature that is applied to the report at the time of generation. This policy is prepared to state that the electronically applied signatures on TestAmerica Analytical Testing Corp. reports are as legally binding as a handwritten "wet signature". This policy is intended to

prevent the possibility of non-repudiation (denial that an individual signed the document) and to insure authenticity and security. In order to ensure the electronic signatures are valid and unequivocally represent the identity of the signer, TestAmerica uses 21 CFR Part 11 "Electronic Records; Electronic Signatures" from the FDA as well as EPA's procurement policy (EPS 00-01) as guidance documents for this policy.

In order to ensure authenticity of the reports, the following conditions must be met:

26.4.1 Report Content

26.4.1.1 State that the report was electronically signed.

26.4.1.2 The printed name and title of the signer must be underneath the signature

26.4.1.3 The date and time when the signature was executed is represented in the "Report Issued" entry on the cover page of the report.

26.4.1.4 The meaning of the signature: (e.g. reviewed and approved)

In order to insure the integrity of the signatures the following security features have been implemented.

26.4.2 General requirements

26.4.2.1 The identity of the signatory must be verified before an electronic signature can be created for that person.

26.4.2.2 Each electronic signature shall be unique to a single individual and shall not be reused by or assigned to another individual

26.4.2.3 Persons using an electronic signature shall certify that the electronic signatures in the system are intended to be the legally binding equivalent to their traditional handwritten signature. On this certification, the signatory will state that their passwords are to remain completely confidential and can only be used by the genuine owner of the password and the sign-off may not take place until each page has been viewed. See Figure 26-1.

26.4.3 Components and Controls

26.4.3.1 Two distinct identification components are utilized for each individual. The components are a) user name b) password

26.4.3.2 Each signing will require the entry of the username and the password must be reentered.

26.4.3.3 The signatures may not be copied, excised or transferred from the report by ordinary means.

26.4.3.4 The report may not be changed once the signature has been applied and the pdf files are stored on the file server with security as well as password protected to ensure no changes may be made to the file.

26.4.3.4.1 In the case where a client requests that the pdf be unsecure so that the report may be inserted into their reports, the client must sign an agreement stating that they will not alter the report. This can be achieved by requiring agreement each time it is accessed on the web or by signing off on an agreement (see Figure 26-2).

26.4.3.4.2 Pdf reports must be backed up on a Magnetic tape or other durable storage media (e.g. DVD) and maintained secure for up to 5 years or longer for specific client needs.

26.5 SUPPLEMENTAL INFORMATION FOR TEST

26.5.1 The lab identifies any unacceptable QC analyses or any other unusual circumstances or observations such as environmental conditions and any non-standard conditions that may have affected the quality of a result. This is typically in the form of a footnote or a qualifier and/or a narrative explaining the discrepancy in the front of the report. See Appendix 7 for a list of the laboratory's standard footnotes and qualifiers.

26.5.2 Numeric results with values outside of the calibration range, either high or low are qualified as 'estimated'.

26.5.3 Where quality system requirements are not met, a statement of compliance/non-compliance with requirements and/or specifications, including identification of test results derived from any sample that did not meet NELAC sample acceptance requirements such as improper container, holding time, or temperature.

26.5.4 Where applicable, a statement on the estimated uncertainty of measurements; information on uncertainty is needed when a client's instructions so require.

26.5.5 Opinions and Interpretations - The test report contains objective information, and generally does not contain subjective information such as opinions and interpretations. If such information is required by the client, the Laboratory Director will determine if a response can be prepared. If so, the Laboratory Director will designate the appropriate member of the management team to prepare a response. The response will be fully documented, and reviewed by the Laboratory Director, before release to the client. There may be additional fees charged to the client at this time, as this is a non-routine function of the laboratory.

Note: Review of data deliverable packages for submittal to regulatory authorities requires responses to non-conforming data concerning potential impact on data quality. This necessitates a limited scope of interpretation, and this work is performed by the QA Department. This is the only form of "interpretation" of data that is routinely performed by the laboratory.

26.5.5.1 When opinions or interpretations are included in the report, the laboratory provides an explanation as to the basis upon which the opinions and interpretations have been made. Opinions and interpretations are clearly noted as such and where applicable, a comment should be added suggesting that the client verify the opinion or interpretation with their regulator.

26.6 ENVIRONMENTAL TESTING OBTAINED FROM SUBCONTRACTORS

26.6.1 If TestAmerica-Irvine is not able to provide the client the requested analysis, the samples would be subcontracted following the procedures outlined in Section 8.

26.6.2 Data reported from analyses performed by a subcontractor laboratory are clearly identified as such on the analytical report provided to the client. Results from a subcontract laboratory outside of the TestAmerica network are reported to the client on the subcontract laboratory's original report stationary and the report includes any accompanying documentation.

26.7 CLIENT CONFIDENTIALITY

26.7.1 In situations involving the transmission of environmental test results by telephone, facsimile or other electronic means, client confidentiality must be maintained.

26.7.2 TestAmerica will not intentionally divulge to any person (other than the Client or any other person designated by the Client in writing) any information regarding the services provided by TestAmerica or any information disclosed to TestAmerica by the Client. Furthermore, information known to be potentially endangering to national security or an entity's proprietary rights will not be released.

Note: This shall not apply to the extent that the information is required to be disclosed by TestAmerica under the compulsion of legal process. TestAmerica will, to the extent feasible, provide reasonable notice to the client before disclosing the information.

Note: Authorized representatives of an accrediting authority are permitted to make copies of any analyses or records relevant to the accreditation process, and copies may be removed from the laboratory for purposes of assessment.

26.7.3 Report deliverable formats are discussed with each new client. If a client requests that reports be faxed or e-mailed, the reports are faxed with a cover sheet or e-mailed with the following note that includes a confidentiality statement similar to the following:

- *This material is intended only for the use of the individual(s) or entity to whom it is addressed, and may contain information that is privileged and confidential. If you are not the intended recipient, or the employee or agent responsible for delivering this material to the intended recipient, you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited. If you have received this communication in error, please notify us immediately by e-mail or by phone (1-949-261-1022) and delete this material from any computer.*

26.8 FORMAT OF REPORTS

The format of reports are designed to accommodate each type of environmental test carried out and to minimize the possibility of misunderstanding or misuse.

26.9 AMENDMENTS TO TEST REPORTS

26.9.1 Corrections, additions, or deletions to reports are only made when justification arises through supplemental documentation. Justification is documented using the laboratory's corrective action system (see Section 13).

26.9.2 The revised report is retained on the Archive data server, as is the original report. The revised report is stored in the Archive data server under the workorder number followed by "revised". The revised report will have the word "revised" next to the date rather than the word "reported".

26.9.3 When the report is re-issued, a notation is placed on the cover/signature page of the report with a brief explanation of reason for the re-issue.

26.10 POLICIES ON CLIENT REQUESTS FOR AMMENDMENTS

26.10.1 Sample Reanalysis Policy

Because there is a certain level of uncertainty with any analytical measurement a sample reanalysis may result in either a higher or lower value from an initial sample analysis. There are also variables that may be present (e.g. sample homogeneity, analyte precipitation over time, etc.) that may affect the results of a reanalysis. Based on the above comments, the laboratory will reanalyze samples at a client's request with the following caveats.

26.10.1.1 Homogenous samples: If a reanalysis agrees with the original result to within the RPD limits for MS/MSD or Duplicate analyses, or within $\pm$ 1 reporting limit for samples $\leq$ 5x the reporting limit, the original analysis will be reported and the client will be charged for a second analysis. At the client's request, both results may be reported on the same report but not on two separate reports.

26.10.1.2 If the reanalysis does not agree (as defined above) with the original result, then the laboratory will investigate the discrepancy and reanalyze the sample a third time for confirmation and report the confirmed result at no additional cost.

26.10.1.3 Charges may be dropped based upon Laboratory Director/Manager approval.

26.10.1.4 Due to the potential for increased variability, reanalysis may not be applicable to Non-homogenous, Encore, and Sodium Bisulfate preserved samples. See the Department Manager or Laboratory Director if unsure.

26.10.2 Policy on Data Omissions or Reporting Limit Increases

Fundamentally, our policy is simply to not omit previously reported results (including data qualifiers) or to not raise reporting limits and report sample results as ND. This policy has few exceptions. Exceptions are:

26.10.2.1 Laboratory Error.

26.10.2.2 Sample identification is indeterminate (confusion between COC and sample labels).

26.10.2.3 An incorrect analysis (not analyte) was requested (e.g. COC said 8315 but client wanted 8310). A written request for the change is required.

26.10.2.4 Incorrect limits reported based on regulatory requirements.

26.10.2.5 The requested change has absolutely *no possible* impact on the interpretation of the analytical results and there is *no possibility* of the change being interpreted as misrepresentation by anyone inside or outside of our company.

26.10.3 Multiple Reports

TestAmerica does not issue multiple reports for the same workorder where there is different information on each report. (This does not refer to copies of the same report.)

Figure 26-1.

Read and Understand Memo for
Electronic Reporting and Electronic Signatures Policy

I have read and understand the TestAmerica Policy on Electronic Reporting and Electronic Signatures and agree to follow procedures stated in this document. Futhermore, I agree to maintain my password secure and confidential and will not divulge this password to anyone. I am aware that my electronic signature is as legally binding as that of my signature signed with a pen. I will not apply my signature until I have reviewed each page.

Employee: _____

Signature: _____

Date: _____

Return this signed form to HR within 5 days for filing in your Personnel File

Figure 26-2

AGREEMENT FOR ELECTRONIC REPORTS

TestAmerica Analytical Testing Corp. provides laboratory services and certified lab reports ("Reports") to the undersigned client ("Client"). Client desires to receive the Reports in both written hard copy and electronic format. Both TestAmerica and the Client desire to protect and preserve the integrity of the Reports.

TestAmerica agrees to provide Client with the Reports in both hard copy and electronic format. Client agrees to accept all responsibility for and indemnify and hold TestAmerica harmless from all claims or demands from third parties, including attorneys' fees and costs incurred by TestAmerica, due to alterations or deletions to the Reports by Client, or the use of incomplete Reports by Client.

Client agrees not to alter any Reports whether in the hard copy or electronic format and to use reasonable efforts to preserve the Reports in the form and substance originally provided by TestAmerica.

Date: _____Company Name: _____

Completed By: _____

Title/Position: _____

Client Signature: _____ _____

Date: _____Company Name: TestAmerica - Irvine

Received By: _____

Title/Position: _____

Signature: _____

Please sign and FAX to 949-260-3297

Appendix 1

TESTAMERICA ETHICS POLICY AND CODE OF ETHICAL CONDUCT

It is the policy of TestAmerica that every employee shall at all times and in all ways comply with federal, state and local laws, and that every employee shall adhere to the highest standards of ethics, morality, honesty and decency in the performance of the duties of his or her job. TestAmerica strives to create an ethical "culture" through top-down example with an emphasis on doing things the "right way" for the "right reasons". The consequences of non-compliance can be severe to both the environment and the company. The actions of one employee can jeopardize the entire company. The company has a zero tolerance policy for illegal, unethical and improper practices that affect the integrity of all data the company produces.

1.1 TestAmerica Code of Ethical Conduct

TestAmerica has adopted a Code of Ethical Conduct, to which each employee must adhere, as follows:

a) To serve human health and environmental interests by performing analytical and testing responsibilities in a manner that justifies the public trust.

b) To present services in a confidential, honest, and candid manner. Facility/location procedures, client names and their results are not discussed outside of the company except with an approved client agent.

c) To produce results that are both accurate and defensible.

d) To comply with all written procedures (i.e., Quality Assurance (QA) Manual, Standard Operating Procedures (SOPs), Safety Manual, Human Resources Manual, etc.). Members of management must comply with all applicable federal, state, and local laws and regulations consistent with accepted professional and analytical practices.

e) To understand and adhere to the guidelines of ethical and quality work that meet the standards required by the environmental testing industry.

1.2 Data Quality Assurance Program

TestAmerica wants to ensure a national standard of quality at all TestAmerica locations.

Each TestAmerica laboratory has a Quality Assurance Manual that focuses on quality related test specifications performed by that laboratory. Documented quality systems are designed to insure that work performed in the laboratory is accurate, precise, complete, comprehensive, and reflects the needs of the customer/client.

1.3 Ethics Quality Commitment, Objective, and Policy

TestAmerica wants to ensure quality analytical and data management services to meet the needs of customers/clients while satisfying the requirements of appropriate state and federal regulations. This enables the customer/client to make rational, confident, cost-effective decisions on the assessment and resolution of environmental problems. Protocols and procedures utilized by laboratories, with emphasis on the Quality Assurance/Quality Control (QA/QC) requirements, are based on EPA guidelines.

It is the policy of TestAmerica to incorporate quality into all analytical programs by adhering to the following practices:

a) TestAmerica will not offer any analysis for which we cannot demonstrate consistent quality and defensible analyses;

b) Employees who are aware of falsification or misrepresentation of facts regarding analytical results or the manipulation of data are required to immediately inform the appropriate member of Management;

c) TestAmerica has “Open Door” and “Open Line” Policies which enable every TestAmerica employee to have free access to the respective Manager and Corporate Officers. Such Open Door Policies are intended to foster two-way communications and provide each employee with access to Laboratory and Corporate Management. Such Policies are also intended to encourage each employee to consider it his or her duty and responsibility to “come forward”. Any employee who disagrees with or has a concern or question about any Company practice, process, procedure, or policy, or about any Supervisory/Managerial request, instruction, or directive should come forward. This includes concerns about any undue pressures placed upon an employee which adversely affects the quality of work produced. Such contact should be made to members of Laboratory or Corporate Management. Any contacts with a Manager or representative of Corporate shall be treated as “confidential”, within the confines of any legal requirements placed upon the Company, if the employee so requests. The employee may also contact their Human Resources representative.

d) No employee of TestAmerica will compare or disclose results for any Performance Testing (PT) sample, or other similar QA or QC requirements, with any employee of any other laboratory, including any other TestAmerica laboratory, prior to the required submission date of the results to the person, organization, or entity supplying the PT sample.

1.4 TestAmerica Code of Ethical Conduct Agreement

I. I understand that I am charged with meeting ethical standards in performing all of my duties and responsibilities;

II. I have been formally instructed to consider quality as an important aspect of my job responsibilities. The provisions of the “Ethics Policy and Code of Ethical Conduct” have also been reviewed with me. In as much, it is understood that ethical performance and data integrity must supersede any other operational objective.

III. I also agree to the following:

a) I shall not report data inconsistent with actual values observed or measured.

b) I shall not modify data (either sample or QC data) unless the modification can be technically justified through a measurable analytical process, such as one deemed acceptable to the

laboratory's Standard Operating Procedures, Quality Assurance Manual or Technical Director. All such modifications must be clearly and thoroughly documented in the appropriate laboratory notebooks/worksheets and/or raw data and include my initials or signature and date.

c) I shall not intentionally report dates and times of analyses that do not represent the true and actual dates and times the analyses were conducted.

d) I shall not intentionally represent another individual's work as my own or represent my work as someone else's.

e) I shall not make false statements to, or seek to otherwise deceive, members of Management or their representatives, agents, or clients/customers. I will not, through acts of commission, omission, erasure, or destruction, improperly report measurement standards, quality control data, test results or conclusions.

f) I shall not condone any accidental or intentional reporting of inauthentic data by other employees and will immediately report its occurrence. If I have actual knowledge of such acts committed by any other employees, and I do not report such information to designated members of Management, it shall be considered as serious as if I personally committed the offense. Accordingly, in that event, I understand that I may be subject to immediate termination of employment.

g) I shall immediately inform my supervisor or other member of management regarding any intentional or unintentional reporting of my own inauthentic data. Such report shall be given both orally and in writing to the supervisor or other member of management contacted and to the local Quality Assurance Officer/Manager. The Quality Assurance Officer/Manager will initial and date the information and return a copy to me.

h) I shall not accept gifts of a value that would adversely influence judgment.

i) I shall avoid conflicts of interest and report any potential conflicts to the management (e.g. employment or consulting with competitors, clients, or vendors)

j) I shall not participate in unfair competition practices (e.g. slandering competitors, collusion with other labs to restrict others from bidding on projects)

k) I shall not misrepresent certifications and status of certifications to clients or regulators

l) I shall not intentionally discharge wastes illegally down the drain or onto the ground.

m) I shall protect confidential client information, business information and trade secrets that are vital to the interests and the success of TestAmerica. Such confidential information includes, but is not limited to the following: Client lists, client contact representatives, specific client/project information, pending projects and proposals, scientific data, SOPs, financial information and marketing strategies.

n) I understand that any attempt by management or an employee to circumvent these policies will be subject to disciplinary action.

I understand the critical importance of accurately reporting data, measurements, and results, whether initially requested by a client, or retained by TestAmerica and submitted to a client at a later date, or retained by TestAmerica for subsequent internal use.

I understand that if any supervisor, manager, or representative of management instructs, requests, or directs me to perform any of the aforementioned improper laboratory practices, or if I am in doubt or uncertain as to whether or not such laboratory practices are proper, I will not comply. In fact, I must report such event to all appropriate members of Management including, but not limited to, the Manager, all supervisors and managers with direct line reporting relationship between me and the Manager, and the local Quality Assurance representative, excluding such individuals who participated in such perceived improper instruction, request, or directive. In addition, I may contact Corporate Quality Assurance / Ethics Compliance Officer(s) for assistance.

The Ethics and Compliance Officers are:

- Ilona Taunton: ITaunton@TestAmericaInc.com (Located in Asheville, NC)

  Office: (828) 258-3746

  Cell: (828) 712-9242

- Scott Hoatson: SHoatson@TestAmericaInc.com (Located in Portland, OR)

  Office: (503) 906-9200

  Cell: (206) 714-2171

I should obtain a ruling, in writing, as to whether such practice is or is not improper and will abide by such ruling. However, if I have not received a timely ruling, or if I believe such ruling is incorrect, I may appeal to the Division Exec VP/COO or President/CEO and will abide by such written ruling.

I understand that if my job includes supervisory responsibilities, I shall not instruct, request, or direct any subordinate to perform any laboratory practice which is unethical or improper. Also, I shall not discourage, intimidate, or inhibit an employee who may choose to appropriately appeal my supervisory instruction, request, or directive which the employee perceives to be improper, nor retaliate against those who do.

I have read and fully understand all provisions of the “Ethics Policy and Code of Ethical Conduct” and realize that even one instance of variance from the above Code of Ethical Conduct will result in discipline, up to and including termination of employment. I have also viewed the 2006/2007 Ethics Presentation.

_____ _____

(Dated) (Employee’s Signature)

_____

(Print Name)

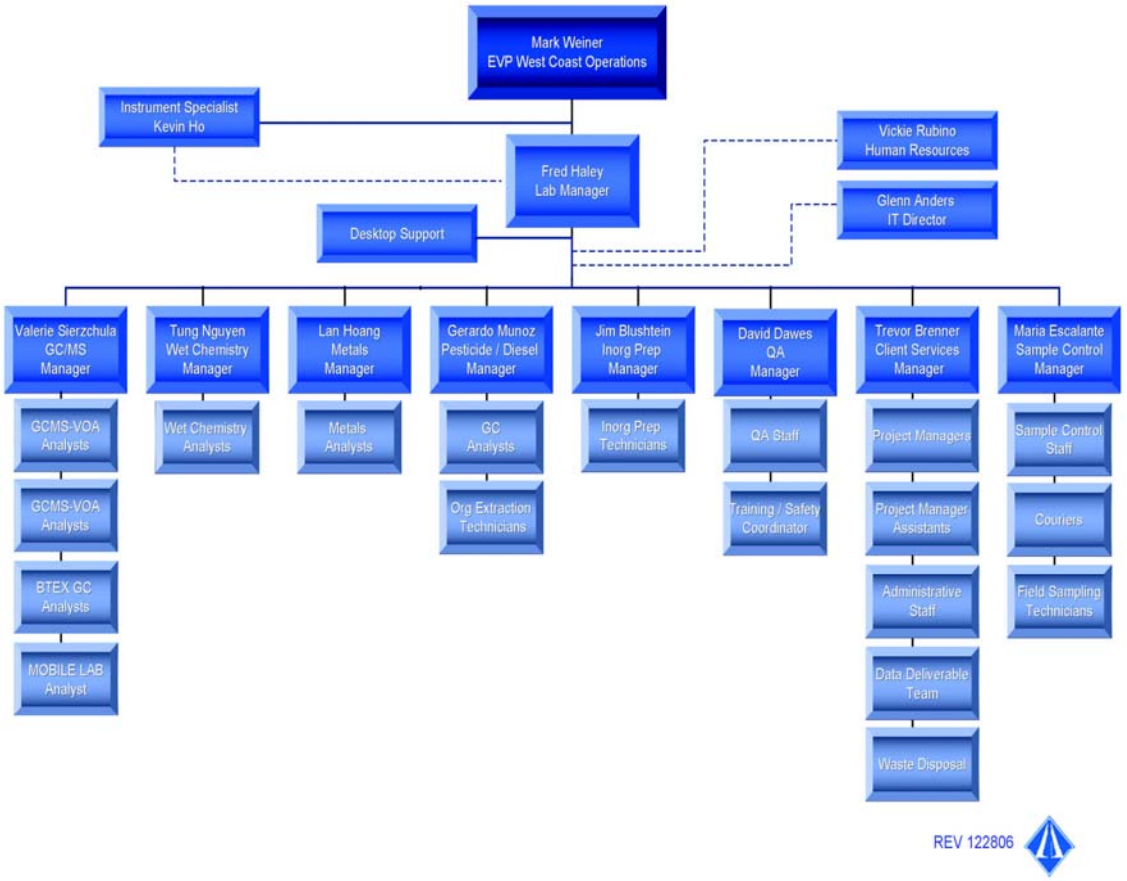
NOTE: This Ethics Policy and Code of Ethical Conduct must be signed at the time of hire (or within 2 weeks of an employee’s initial receipt of this Policy, if later) and re-signed annually. Such signature is a condition of continued employment. Failure to sign will result in immediate termination of employment.

2/06

Appendix 2

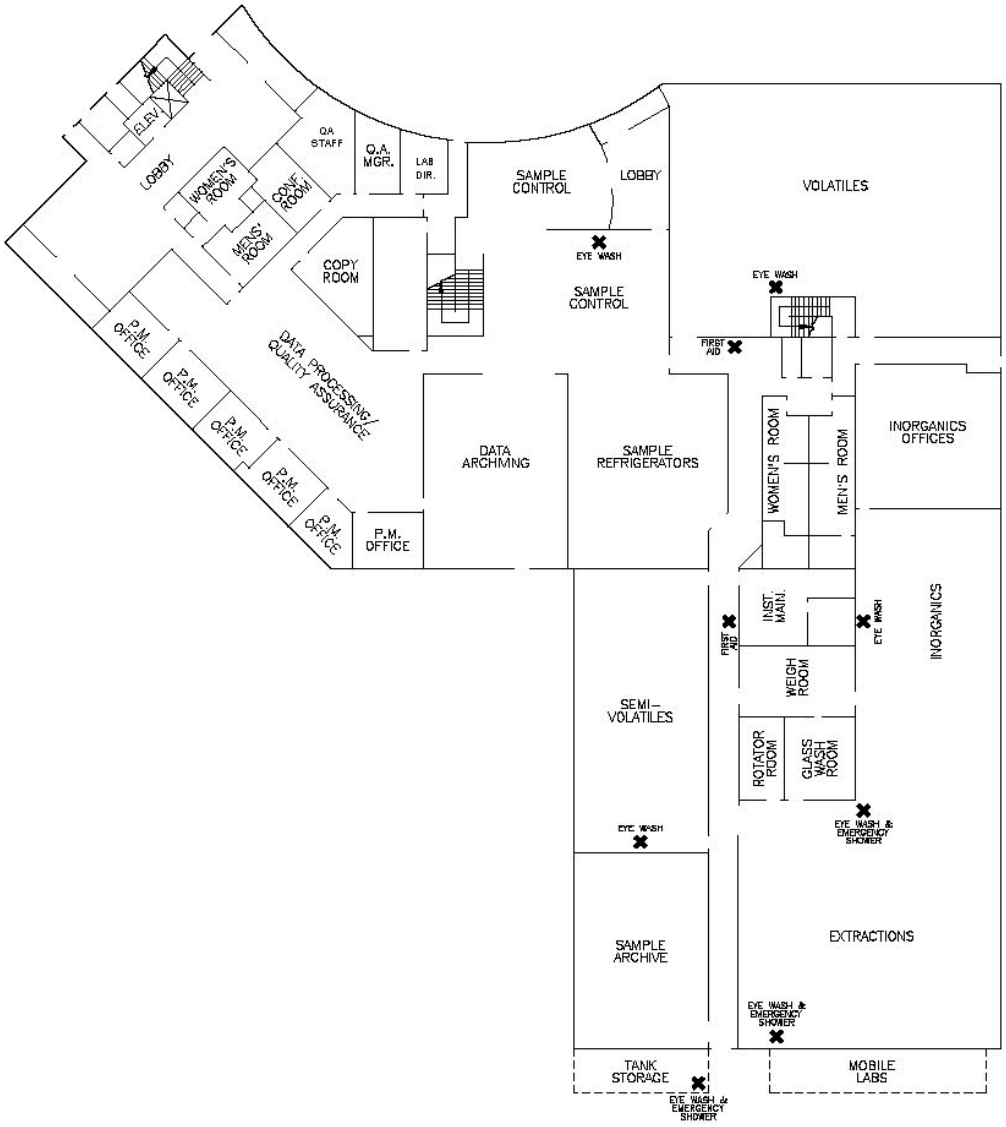
Laboratory Organization Chart

TestAmerica Irvine Laboratory

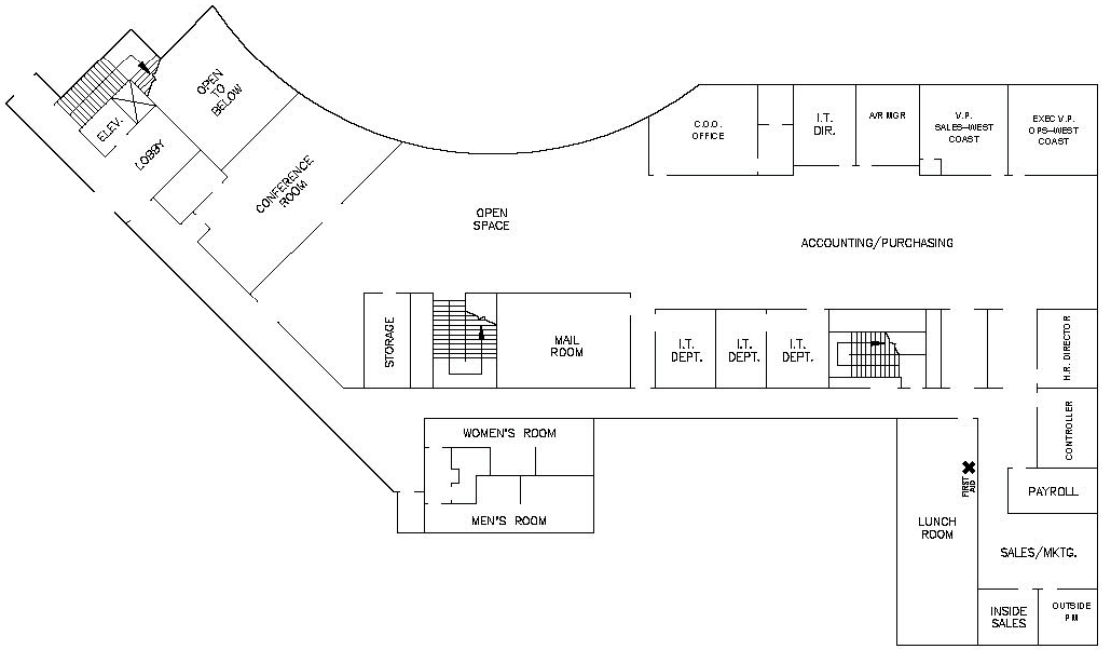


Appendix 3

Laboratory Floor Plan



FIRST FLOOR
IRVINE LABORATORY



SECOND FLOOR
CORPORATE OFFICES

Appendix 4

The following tables are summaries of select method-specified calibration and QC requirements for select laboratory methods. For more information, actual limits, and any method-deviations, please see the current revision of the laboratory's SOP.

QC Acceptance Criteria for Method EPA 8260B

Method	Applicable Parameter	QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
EPA 8260B	Volatile Organic Compounds	BFB tuning	Prior to initial calibration and calibration verification	Table 2 criteria met (Method 8260B – Table4)	Retune instrument and verify
		5-point initial calibration for all analytes. (6-point for quadratic regression)	Initial calibration prior to sample analysis.	SPCCs minimum RFs: ≥ 0.10 (BF, CM, DM) and ≥ 0.30 (CB, TE). %RSD of RFs: ≤ 30(for CCCs, Ketone and Alcohols); ≤ 15for others. Calibration Curve (If %RSD > 15): coefficient factor, r ≥ 0.99	Correct problem then repeat initial calibration.
		Retention time window calculated for each analyte	Each initial calibration and calibration verifications	± 3 times standard deviation for each analyte retention time from 72-hour study	Correct problem then reanalyze all samples analyzed since the last retention time check
		2nd source Calibration verification (same as LCS)	Daily, before sample analysis and every 12 hours of analysis time	SPCCs minimum RFs met. CCCs: ≤ 20% drift from initial calibration. Others: in-house recovery limits.	Correct problem then repeat initial calibration
		Method blank	One per analytical batch of 20 samples	No analytes detected ≥ RL.	Correct problem and re-analyze method blank and all samples processed with the contaminated blank unless sample results are ND for the contamination compound or sample results are > 20 times the level found in the blank
		LCS for all analytes (2nd source)	One LCS per analytical batch	In-house statistical limits	If sufficient sample is available for re-analysis, correct problem and re-analyze the LCS and all samples in the affected analytical batch unless

Method	Applicable Parameter	QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
					samples are ND for the affected compound(s) and LCS is biased high
EPA 8260B	Volatile Organic Compounds	MS/MSD	One MS/MSD per every 20 project samples per matrix	In-house statistical limits	Qualifier to indicate matrix interfernce
		Internal standard	Every sample, calibration check, method blank, LCS, MS/MSD	Retention time within ±30 seconds from last mid-point calibration standard Absolute areas within 50-200% of level in last mid-point calibration standard	Determine, correct problem and re-analyze samples
		Surrogate spike	Every sample, calibration check, method blank, LCS, MS/MSD	In-house statistical limits	Determine, correct problem and re-analyze samples. For matrix effect, flag result accordingly. For other causes, fill out a CAR
		MDL study	One full MDL run originally. Verification every quarter.	MDLs established per 40CFR – Part 136	None
		Initial Demonstration of Capability (4 replicates of LCS)	Once per analyst	Average recovery and precision within in-house statistical limits	Recalculate results; determine and correct problem with the system and then rerun demonstration for those analytes that did not meet criteria

QC Acceptance Criteria for Method EPA 8270C

Method	Applicable Parameter	QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
EPA 8270C	Volatile Organic Compounds	DFTPP tuning	Prior to initial calibration and calibration verification	Table 3 of method 8270C DDT degradation ≤ 20%, Benzidine and Pentachlorophenol tailing factors ≤ 3 and ≤ 5 respectively	Retune instrument and verify
		5-point initial calibration for all analytes. (6-point for quadratic regression)	Initial calibration prior to sample analysis.	SPCCs minimum RFs: ≥ 0.05 %RSD of RFs: ≤ 30(for CCCs); ≤ 15 for others. Calibration Curve (If %RSD > 15): coefficient factor, r ≥ 0.99	Correct problem then repeat initial calibration.
		Retention time window calculated for each analyte	Each initial calibration and calibration verifications	± 3 times standard deviation for each analyte retention time from 72-hour study	Correct problem then reanalyze all samples analyzed since the last retention time check
		2nd source Calibration verification (same as LCS)	Once, after ICAL	SPCCs minimum RFs met. CCCs: ≤ 20% drift from initial calibration. Others: in-house recovery limits.	Correct problem then repeat initial calibration
		Method blank	One per analytical batch of 20 samples	No analytes detected ≥ RL.	Correct problem, re-extract and/or re-analyze method blank and all samples processed with the contaminated blank unless sample results are ND for the contamination compound or sample results are > 20 times the level found in the blank
		LCS for all analytes (2nd source)	One LCS per analytical batch	In-house statistical limits	If sufficient sample is available for re-analysis, correct problem and re-analyze the LCS and all samples in the affected analytical batch unless samples are ND for the affected compound(s) and LCS is biased high

Method	Applicable Parameter	QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
EPA 8270C	Volatile Organic Compounds	MS/MSD	One MS/MSD per every 20 project samples per matrix	In-house statistical limits	Qualifier to indicate matrix interfernce
		Internal standard	Every sample, calibration check, method blank, LCS, MS/MSD	Retention time within ±30 seconds from last mid-point calibration standard Absolute areas within 50-200% of level in last mid-point calibration standard	Determine, correct problem and re-analyze samples
		Surrogate spike	Every sample, calibration check, method blank, LCS, MS/MSD	In-house statistical limits	Determine, correct problem and re-analyze samples. For matrix effect, flag result accordingly. For other causes, fill out a CAR
		MDL study	One full MDL run originally. Verification every quarter.	MDLs established per 40CFR – Part 136	None
		Initial Demonstration of Capability (4 replicates of LCS)	Once per analyst	Average recovery and precision within in-house statistical limits	Recalculate results; determine and correct problem with the system and then rerun demonstration for those analytes that did not meet criteria

QC Acceptance Criteria for Method EPA 8081A

Method	Applicable Parameter	QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
EPA 8081A	DDT, BHC and other Organochlorine Pesticides	5-point initial calibration for all analytes.	Initial calibration prior to sample analysis.	%RSD of RFs (or Average of %RSD): ≤ 20 for all compounds Calibration Curve (If %RSD > 20 and <50): Correlation coefficient, r ≥ 0.99	1. % RSD may be used if the average % RSD of all compounds is 20% and sample results are ND for any target compound with %RSD > 20% 2. Correct problem then repeat initial calibration
		Second-source calibration verification for all analytes	Once per five-point initial calibration	All target analytes within ±15% of expected value	1. If the average recovery of all compounds is within 15% and sample results are ND, then the results will be reported with an additional form indicating the individual compounds exceeding the 15% limit 2. Otherwise, correct problem then repeat initial calibration
		Retention time window calculated for each analyte	Every 6 months	± 3 times standard deviation for each analyte retention time from 72-hour study	None
		Continuing calibration verification	After every 20 samples and at the end of the analysis sequence	All target analytes within ±15% of expected value and all compounds correctly identified by RT	1. If the average recovery of all compounds is within 15% and sample results are ND, then the results will be reported with an additional form indicating the individual compounds exceeding the 15% limit. 2. Correct problem then repeat initial calibration verification and reanalyze all samples since last successful calibration verification.
		Breakdown check (Endrin and DDT pesticides analysis only)	Daily prior to analysis of samples and every 12 hours	Degradation ≤15%	Repeat breakdown check

Method	Applicable Parameter	QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
EPA 8081A	DDT, BHC and other Organochlorine Pesticides	Method blank	One per analytical batch	No analytes detected ≥ RL	Correct problem then reprep and analyze method blank and all associated samples unless sample results are ND for the contamination compound or sample results are >x 10 times the level found in the blank
		LCS for all analytes	One LCS per analytical batch	In-house statistical limits	If sufficient sample is available for re-extraction correct problem then reprep and analyze the LCS and all samples in the affected analytical batch unless samples are ND for the affected compound(s) and LCS is biased high
		Surrogate spike	Every sample, spiked sample, standard, and method blank	In-house statistical limits	1. Re-analyze the sample one time. Evaluate data and, if matrix effects are indicated, report results and Flag surrogate recovery 2. If sample is available for re-extraction, correct problem then re-extract and analyze samples 3. Otherwise report results with a corrective action report indicating the cause of the problem
		MS/MSD	One MS/MSD per every 20 project samples per matrix	In-house statistical limits	Qualify samples to indicate matrix interference
		MDL study	One full MDL run originally. Verified every quarter	MDLs established per 40CFR – Part 136	None
		Initial Demonstrattion of Capability (4 replicates of LCS)	Once per analyst	Average recovery and precision within in-house statistical limits	Recalculate results; locate and fix problem with system and then rerun demonstration for those analytes that did not meet criteria

QC Acceptance Criteria for Method EPA 8082

Method	Applicable Parameter	QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
EPA 8082	PCBs	Minimum 5-point initial calibration Aroclors 1016 and 1260 (Additional 3-point calibrations are to be created and maintained whenever other Aroclors are identified in samples	Initial calibration prior to sample analysis.	%RSD of RFs : ≤ 20 for each compound Calibration Curve (If %RSD > 20): Linear, NOT forced through zero, r ≥ 0.990	Correct problem then repeat initial calibration.
		Retention time window calculated for each analyte	Each initial calibration	± 3 times standard deviation for each analyte retention time from 72-hour study	None
		Second-source calibration verification for all analytes	Once per initial calibration	All analytes within ±15% of expected value	4. Re-analyze once to confirm. 5. Correct problem then repeat initial calibration.
		Retention time window check	All CCVs	Each congener is within established absolute RT window	Determine the cause, correct the problem and reanalyze all affected samples.
		Continuing calibration verification	After every 10-20 samples and at the end of the analysis sequence	All analytes within ±15% of expected value	1. If the ICV/CCV result is > 115% of the expected value and all samples are ND for the compound then report the results with a CAR and flag the results with a 'C' qualifier. 2. If the CCV result is < 85% of the expected value, reanalyze the samples against an acceptable calibration curve one time. 3. If the CCV fails again due to matrix interference and the sample is ND or a hit, report results with a CAR and flag 'C4'. If there is a PCB hit in the sample at or below the RL, then analyze a standard at the RL. If the area count of the sample is < the area count of the RL standard, report as ND and flag 'C4.'

		Second Column Confirmation	Every sample	Results agree within 40%	If the second column does not agree within 40% but still confirms the presence of the analyte then confirmation is qualitative. The higher result must be reported or the sample reanalyzed under a new calibration or on another instrument
		Method blank	One per analytical batch	No analytes detected ≥ RL	Correct problem then reprep and analyze method blank and all associated samples unless sample results are ND for the contamination compound or sample results are **>** x20 times the level found in the blank
		LCS for all analytes	One LCS per analytical batch	In-house statistical limits	If sufficient sample is available for re-extraction correct problem then reprep and analyze the LCS and all samples in the affected analytical batch unless samples are ND for the affected compound(s) and LCS is biased high
		Surrogate spike	Every sample, spiked sample, standard, and method blank	In-house statistical limits	2. Re-analyze the sample one time. Evaluate data and, if matrix effects are indicated, report results and Flag surrogate recovery 3. If sample is available for re-extraction, correct problem then re-extract and analyze samples 6. Otherwise report results with a corrective action report indicating the cause of the problem
		MS/MSD	One MS/MSD per every 20 project samples per matrix	In-house statistical limits	Qualify samples to indicate matrix interference
		MDL study	One full MDL run originally. Verified every quarter	MDLs established per 40CFR – Part 136	None
		Initial Demonstrattion of Capability (4 replicates of LCS)	Once per analyst	Average recovery and precision within in-house statistical limits	Recalculate results; locate and fix problem with system and then rerun demonstration for those analytes that did not meet criteria

QC Acceptance Criteria for Method EPA 8015

Method	Applicable Parameter	QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
EPA 8015	Volatile Fuel Hydrocarbons (VFH, C6-C12)	5-point initial calibration	Initial calibration prior to sample analysis.	20% RSD for calibration point RFs	Correct problem then repeat initial calibration
		Second-source calibration verification (ICV/CCV)	Initially and every 12 hours or 10 samples	±15% of expected value	7. Re-analyzed once 8. Correct problem and re-analyze all affected samples.
		Retention time window calculated for each analyte	Every 6 months	± 3 times standard deviation for each analyte retention time from 72-hour study	None
		Method blank	One per analytical batch	No analytes detected ≥ RL	Correct problem then reprep and analyze method blank and all associated samples unless sample results are ND for the contamination compound or sample results are >20 times the level found in the blank
		LCS for all analytes	One LCS per analytical batch	In-house statistical limits	If sufficient sample is available, correct problem and analyze the LCS and all samples in the affected analytical batch unless samples are ND and LCS is biased high
		Surrogate spike	Every sample, spiked sample, standard, and method blank	In-house statistical limits	3. Evaluate secondary surrogate. 4. If matrix effects are indicated, report results and flag surrogate recovery
		MS/MSD	One MS/MSD per every 20 project samples per matrix	In-house statistical limits	Qualify samples to indicate matrix interference
		MDL study	One full MDL run originally. Verified every quarter	MDLs established per 40CFR – Part 136	None

Method	Applicable Parameter	QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
EPA 8015	Volatile Fuel Hydrocarbons (VFH, C6-C12)	Initial Demonstrattion of Capability (4 replicates of LCS)	Once per analyst	Average recovery and precision within in-house statistical limits	Recalculate results; locate and fix problem with system and then rerun demonstration for those analytes that did not meet criteria

QC Acceptance Criteria for Method EPA 6010B

Method	Applicable Parameter	QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
EPA 6010B	ICP Metals	Initial multipoint calibration (minimum 3 standards and a blank)	Daily initial calibration prior to sample analysis	Correlation coefficient ≥0.995 for linear regression	Correct problem then repeat initial calibration
		2nd source initial calibration verification	Immediately after initial calibration	All analytes within ±10% of expected value	1) Reanalyze once 2) If still out, correct problem then repeat initial calibration
		Calibration blank	After every 10 samples and at end of the analysis sequence	No analytes beyond ≥ ±RL	Reanalyze the blank. If it still fails, correct problem then analyze calibration blank and previous 10 samples unless sample results >10 times the absolute level found in the blank
		Continuing calibration verification (Instrument Check Standard)	After every 10 samples and at end of the analysis sequence	All analyte(s) within ±10% of expected value	Repeat calibration and reanalyze all samples since last successful CCV
		Interference check solution (ICSA)	At least weekly, before sample analysis	Interfering elements (Al, Ca, Fe, Mg) within ±20% of expected value . Target elements: ±2 Reporting Limit.	Dilute ICSA and/or samples
		Method blank	One per analytical batch	No analytes detected ≥ RL	Correct problem then reprep and analyze method blank and all samples processed with the contaminated blank unless sample results are ND for the contaminatate compound or sample results are > x 10 times the level found in the blank
		LCS for all elements	One LCS per analytical batch	All elements within ±20% of expected value	If sufficient sample is available for re-extraction correct problem then reprep and analyze the LCS and all samples in the affected analytical batch unless samples are ND for the affected element(s) and the LCS is biased high

Method	Applicable Parameter	QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
EPA 6010B	ICP Metals	MS/MSD	One MS/MSD per every 20 project samples per matrix	Within 75-125% of expected results	None
		Internal standard	Each sample	Within 30-120% of the intensity level in the initial calibration standard	Correct problem and/or dilute sample
		MDL study	One full MDL run originally. Verification every quarter	MDLs established per CFR 40 – Part 136	None
		Initial Demonstrtion of Capability (4 replicates of LCS)	Once per analyst	Average and precision within in-house statistical limits	Recalculate results; locate and fix problem with system and then rerun demonstration for those analytes that did not meet criteria

Summary of Calibration and QC Procedures for Method EPA 6020

Method	Applicable Parameter	QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
EPA 6020	ICPMS Metals	Pre-calibration mass tuning & performance check	Daily, before initial calibration	See ICPMS – Mass tuning and performance check	Correct problem then retune instrument and verify
		Initial multipoint calibration (3 standards and a blank in triplicate)	Daily initial calibration prior to sample analysis	Correlation coefficient $\geq$0.995 for linear regression	Correct problem then repeat initial calibration
		2nd source initial calibration verification (ICV)	Immediately after initial calibration	All analytes within $\pm$10% of expected value	1) Reanalyze once 2) If still out, correct problem then repeat initial calibration
		Calibration blank (ICB / CCB)	After ICV and CCV	No analytes $\geq$ $\pm$RL	Reanalyze the blank. If it still fails, correct problem then analyze calibration blank and previous 10 samples unless sample results are >10x the absolute level found in the blank
		Interference check solution (ICSA / ICSAB)	Daily, before sample analysis and every 12 hours	Target elements: within $\pm$5ppb (Zn: 15ppb) in ICSA and $\pm$30% (Zn: $\pm$50%) of expected value in ICSAB. Interfering elements: NA (above linear range)	Terminate analysis; correct problem; reanalyze ICS; reanalyze all affected samples
		Continuing calibration verification (CCV)	After every 10 samples and at the end of the analysis sequence	All analytes within $\pm$10% of expected value	Repeat calibration and reanalyze all samples since last successful calibration
		LCS for all elements	One LCS per analytical batch of 20 samples	All elements within $\pm$20% of expected value	If sufficient sample is available for re-extraction correct problem then reprep and analyze the LCS and all samples in the affected analytical batch unless samples are ND for the affected element(s) and the LCS is biased high

Method	Applicable Parameter	QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
EPA 6020	ICPMS Metals	Method blank	One per analytical batch	No analytes detected ≥ RL	Correct problem then reprep and analyze method blank and all samples processed with the contaminated blank unless sample results are ND for the contaminatate compound or sample results are > 10 times the level found in the blank
		MS/MSD	One MS/MSD per analytical batch	Within 75-125% of expected results	Perform Post-digestion spike
		Post-digestion spike	When MS/MSD fails	Within 75-125% of expected results	Qualifier to indicate matrix interference. Issue a CAR for other causes
		Internal standard	Each sample	Within 30-120% of the intensity level in the initial calibration standard	Correct problem and/or dilute sample
		Initial Demonstration of Capability (4 replicates of LCS)	Once per analyst	Average recovery of all elements within ±20% of expected value and precision within 20%	Recalculate results; locate and fix problem with system and then rerun demonstration for those analytes that did not meet criteria
		IDL Study	Quarterly	IDLs calculated from the average standard deviations of three blanks run on three non-consecutive days (each blank run 7 consecutive times)	None
		MDL study	Biannually	MDLs established per CFR 40 – Part 13	None

QC Acceptance Criteria for Method EPA 300.0

Method	Applicable Parameter	QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
EPA 300.0	Common Anions	Multipoint calibration for all analytes (minimum 3 standards and one calibration blank)	Initial calibration prior to sample analysis	Correlation coefficient ≥0.995 for linear regression	Correct problem then repeat initial calibration
		Second-source calibration verification	Once per multipoint calibration	All analytes within ±10% of expected value	Correct problem then repeat initial calibration
		Retention time window calculated for each analyte	Annually	± 3 times standard deviation for each analyte retention time from 72-hour study	Correct problem then reanalyze all samples analyzed since the last retention time check
		Instrument Performance Check (IPC)	Daily, before sample analysis or when elutent is changed	All analytes within ±10% of expected value	Correct problem then repeat initial calibration
		Continuing calibration verification (CCV)	After every 10 samples and at the end of the analysis sequence (second source standard)	All analytes within +/- 10% of excepted value	1. Correct problem then repeat initial calibration verification and reanalyze all samples since last successful calibration verification 2. If the recovery is > 110% and sample results are ND results may be reported without re-analysis
EPA 300.0	Common Anions	Method blank	One per analytical batch	No analytes detected ≥ RL	Correct problem then reprep and analyze method blank and all samples processed with the contaminated blank unless sample results are ND for the contamination compound or sample results are > 10 times the level found in the blank

Method	Applicable Parameter	QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
		LCS for all analytes. ICV or CCVs are reported as LCS since it is a second source standard.	One LCS per analytical batch	All analytes within +/- 10% of excepted value	If sufficient sample is available for re-extraction correct problem then reprep and analyze the LCS and all samples in the affected analytical batch unless samples are ND and LCS is biased high.
		MS/MSD	One MS/MSD per every 20 project samples per matrix	In-house statistical limits	None
		Initial Demonstration of Capability (4 replicates of LCS)	Once per analyst	Average recovery within +/- 10% of expected value and precision within +20%	Recalculate results; locate and fix problem with system and then rerun demonstration for those analytes that did not meet criteria
		MDL study	One full MDL run originally. Verified quarterly.	MDLs established per 40CFR – Part 136	None

Acceptance Criteria for Method EPA 7470A/7471A - Mercury

Method	Applicable Parameter	QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
EPA 7470A/ 7471A	Mercury	Initial calibration (5 points and a blank)	Daily	Linear regression and forced through zero curve , $r \geq 0.995$	Correct problem and repeat calibration
		2^{nd} source initial calibration verification (ICV)	Immediately after calibration	Recovery within 90-110% of expected value	Reprep and re-analyze ICV. If still outs, reprep calibration standards and re-calibrate
		Calibration Blank (ICB and CCB)	After ICV and CCV	Free of mercury or below reporting limit	Re-analyze samples bracketed by affected ICB and/or CCBs unless results are not detected or >10x the level found in the calibration blank
		Method blank	One per analytical batch of 20 samples	Free of mercury or below reporting limit	Re-digest and re-analyze the batch unless sample results are not detected or >10x the level found in the method blank
		LCS	One per analytical batch of 20 samples	Within in-house statistical limits	Re-digest and re-analyze the batch unless sample results are not detected and LCS is biased high
		MS / MSD	One MS/MSD set per batch	Within in-house statistical limits	Qualify samples to indicate matrix interference or issue a CAR for other causes
		Continuous calibration verification (CCV)	After every 10 sample analysis	Recovery within 80-120%	Re-analyze all samples bracketed by non-compliant CCVs
		MDL	One full MDL study originally. Verified quarterly	Established per 40CFR – Part 136	None
		Initial Demonstration of Capability (4 replicates of LCS)	Per analyst	Average recovery within in-house statistical limits	Correct problem and repeat the process

QC Acceptance Criteria for Method EPA 7196A – Hexavalent Chromium

Method	Applicable Parameter	QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
EPA 7196A/ SM 3500Cr D	Hexavalent Chromium (Cr+6)	Initial Calibration (4-point and a blank)	Daily	Correlation coefficient (r) > 0.995	Reprep standards and recalibrate
		2nd source calibration verification (ICV)	Immediately after calibration	Recovery within 90-110% of expected value	Reprep, rerun and verify result. Otherwise recalibrate
		Continuing calibration verification (CCV)	Every 10 samples and at end of run	EPA 7169A: recovery within 80-120% SM 3500Cr D: recovery within 90-110%	Reanalyzed once. If still fails, recalibrate and reanalyze all samples bracketed by the failed CCV.
		LCS	One per analytical batch	Recovery within in-house statistical limits	Correct problem, re-extract and rerun all associated samples unless sample results are not detected and LCS is biased high
		MS/MSD-soluble	One MS/MSD per analytical batch	Recovery within in-house statistical limits	Perform a post-digestion spike (PDS). Perform a PDS on all samples with results above the RL. If PDS ≥ 85% then flag as matrix interference (MI). If <85 and ≥ 50%, dilute and re-analyze if dilution still >RL otherwise use PDS as single-point MSA and flag as MI (no MSA for SM3500). If <50%, dilute and reanalyze with PDS and flag as MI
		MS-insoluble	One MS per analytical batch (SOILS ONLY)	Recovery within in-house statistical limits	Perform a post-digestion spike (PDS)
		MDL study	One full MDL study originally, reviewed after significant instrument maintenance or method modification	Established per 40 CFR – Part 136	None
		Initial Demonstration of Capability (4 replicates of LCS)	One per analyst	Average recovery and RSD within in-house statistical limits	Identify, correct problem and repeat process

QC Acceptance Criteria for Method EPA 9014 - Cyanide

Method	Applicable Parameter	QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
9014	Cyanide	Initial Calibration 5-point and a blank)	Daily, prior to sample analysis	Linear regression, r >= 0.995	Correct problem then repeat initial calibration
		2nd source initial and continuous calibration verification (ICV / CCV)	Immediately after calibration and after every 10 samples	Within ±15% of expected value	Re-prepare / re-run ICV or CCV and verify recovery. Otherwise, recalibrate and re-run samples not bracketed between compliant CCVs
		Method blank (distilled)	One per analytical batch of 20 samples	Not detected or below Reporting Limit	Redistill method blank and all associated samples, unless sample results are not detected or > 10x the blank level
		LCS (distilled)	One LCS per analytical batch	Within ± 10% of the undistilled standard and true value	Correct the problem and redistill all associated samples, unless LCS is biased high and samples are not detected
		MS / MSD	One MS / MSD per analytical batch	Within in-house statistical limit	Qualify sample to indicate matrix interference
		MDL	Initially and after extensive instrument maintenance	Established per 40CFR – Part 136	None
		Demonstration of Capability (4 replicates of QC check)	Per analyst	Within in-house statistical limits	Identify, correct problem and repeat process

Appendix 5

Glossary/Acronyms

Glossary:

Acceptance Criteria:
Specified limits placed on characteristics of an item, process, or service defined in requirement documents. (ASQC)

Accreditation:
The process by which an agency or organization evaluates and recognizes a laboratory as meeting certain predetermined qualifications or standards, thereby accrediting the laboratory. In the context of the National Environmental Laboratory Accreditation Program (NELAP), this process is a voluntary one. (NELAC)

Accrediting Authority:
The Territorial, State, or Federal Agency having responsibility and accountability for environmental laboratory accreditation and which grants accreditation (NELAC) [1.5.2.3]

Accuracy:
The degree of agreement between an observed value and an accepted reference value. Accuracy includes a combination of random error (precision) and systematic error (bias) components which are due to sampling and analytical operations; a data quality indicator. (QAMS)

Analytical Detection Limit:
The smallest amount of an analyte that can be distinguished in a sample by a given measurement procedure throughout a given (e.g. 0.95) confidence interval. (applicable only to radiochemistry)

Assessor Body:
The organization that actually executes the accreditation process, i.e., receives and reviews accreditation applications, reviews QA documents, reviews proficiency testing results, performs on-site assessments, etc., whether EPA, the State, or contracted private party. (NELAC)

Accrediting Authority Review Board (AARD):
Five representatives from the Territories, States, EPA, and/or other Federal Agencies, appointed by the NELAP Director, in consultation with the NELAC Board of Directors, for the purpose of reviewing the processes and procedures used by EPA to approve accrediting authorities in accordance with NELAC standards. (NELAC) [1.6.3]

Analyst:
The designated individual who performs the “hands-on” analytical methods and associated techniques and who is the one responsible for applying required laboratory practices and other pertinent quality controls to meet the required level of quality. (NELAC)

Assessment:
The evaluation process used to measure or establish the performance, effectiveness, and conformance of an organization and/or its systems to defined criteria (to the standards and requirements of NELAC). (NELAC)

Assessment Criteria:
The measures established by NELAC and applied in establishing the extent to which an applicant is in conformance with NELAC requirements. (NELAC)

Assessment Team:
The group of people authorized to perform the on-site inspection and proficiency testing data evaluation required to establish whether an applicant meets the criteria for NELAP accreditation. (NELAC)

Assessor:
One who performs on-site assessments of accrediting authorities and laboratories' capability and capacity for meeting NELAC requirements by examining the records and other physical evidence for each one of the tests for which accreditation has been requested. (NELAC)

Audit:
A systematic evaluation to determine the conformance to quantitative and qualitative specifications of some operational function or activity. (EPA-QAD)

Batch:
Environmental samples which are prepared and/or analyzed together with the same process and personnel, using the same lot(s) of reagents. A preparation batch is composed of one to 20 environmental samples of the same matrix, meeting the above mentioned criteria and with a maximum time between the start of processing of the first and last sample in the batch to be 24 hours. An analytical batch is composed of prepared environmental samples (extracts, digestates or concentrates) and /or those samples not requiring preparation, which are analyzed together as a group using the same calibration curve or factor. An analytical batch can include samples originating from various environmental matrices and can exceed 20 samples. (NELAC Quality Systems Committee)

Blank:
A sample that has not been exposed to the analyzed sample stream in order to monitor contamination during sampling, transport, storage or analysis. The blank is subjected to the usual analytical and measurement process to establish a zero baseline or background value and is sometimes used to adjust or correct routine analytical results. (ASQC)

Blind Sample:
A sample for analysis with a composition known to the submitter. The analyst/laboratory may know the identity of the sample but not its composition. It is used to test the analyst's or laboratory's proficiency in the execution of the measurement process.

Calibration:
To determine, by measurement or comparison with a standard, the correct value of each scale reading on a meter, instrument, or other device. The levels of the applied calibration standard should bracket the range of planned or expected sample measurements. (NELAC)

Calibration Curve:
The graphical relationship between the known values, such as concentrations, of a series of calibration standards and their instrument response. (NELAC)

Calibration Method:
A defined technical procedure for performing a calibration. (NELAC)

Calibration Standard:
A substance or reference material used to calibrate an instrument (QAMS)

Certified Reference Material (CRM):
A reference material one or more of whose property values are certified by a technically valid procedure, accompanied by or traceable to a certificate or other documentation which is issued by a certifying body. (ISO Guide 30–2.2)

Chain of Custody:
An unbroken trail of accountability that ensures the physical security of samples and includes the signatures of all who handle the samples. (NELAC) [5.12.4]

Clean Air Act:
The enabling legislation in 42 U>S>C> 7401 et seq., Public Law 91-604, 84 Stat. 1676 Pub. L. 95-95, 91 Stat., 685 and Pub. L. 95-190, 91 Stat., 1399, as amended, empowering EPA to promulgate air quality standards, monitor and enforce them. (NELAC)

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA/SUPERFUND):
The enabling legislation in 42 U.S.C. 9601-9675 et seq., as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), 42 U.S.C. 9601 et seq., to eliminate the health and environmental threats posed by hazardous waste sites. (NELAC)

Compromised Samples:
Those samples which are improperly sampled, insufficiently documented (chain of custody and other sample records and/or labels), improperly preserved, collected in improper containers, or exceeding holding times when delivered to a laboratory. Under normal conditions, compromised samples are not analyzed. If emergency situation require analysis, the results must be appropriately qualified. (NELAC)

Confidential Business Information (CBI):
Information that an organization designates as having the potential of providing a competitor with inappropriate insight into its management, operation or products. NELAC and its representatives agree to safeguarding identified CBI and to maintain all information identified as such in full confidentiality.

Confirmation:
Verification of the identity of a component through the use of an approach with a different scientific principle from the original method. These may include, but are not limited to:

Second column confirmation
Alternate wavelength
Derivatization
Mass spectral interpretation
Alternative detectors or
Additional Cleanup procedures

(NELAC)

Conformance:
An affirmative indication or judgement that a product or service has met the requirements of the relevant specifications, contract, or regulation; also the state of meeting the requirements. (ANSI/ASQC E4-1994)

Contributor:
A participant in NELAC who is not a Voting Member. Contributors include representatives of laboratories, manufacturers, industry, business, consumers, academia, laboratory associations, laboratory accreditation associations, counties, municipalities, and other political subdivisions, other federal officials not engaged in environmental activities, and other persons who are interested in the objectives and activities of NELAC. (NELAC) [Art III, Const]

Corrective Action:
The action taken to eliminate the causes of an existing nonconformity, defect or other undesirable situation in order to prevent recurrence. (ISO 8402)

Data Audit:
A qualitative and quantitative evaluation of the documentation and procedures associated with environmental measurements to verify that the resulting data re of acceptable quality (i.e., that they meet specified acceptance criteria). (NELAC)

Data Reduction:
The process of transforming raw data by arithmetic or statistical calculations, standard curves, concentration factors, etc., and collation into a more useable form. (EPA-QAD)

Deficiency:
An unauthorized deviation from acceptable procedures or practices, or a defect in an item. (ASQC)

Detection Limit:
The lowest concentration or amount of the target analyte that can be identified, measured, and reported with confidence that the analyte concentration is not a false positive value. See Method Detection Limit. (NELAC)

Document Control:
The act of ensuring that documents (and revisions thereto) are proposed, reviewed for accuracy, approved for release by authorized personnel, distributed properly, and controlled to ensure use of the correct version at the location where the prescribed activity if performed. (ASQC)

Duplicate Analyses:
The analyses or measurements of the variable of interest performed identically on two subsamples of the same sample. The results from duplicate analyses are used to evaluate analytical or measurement precision but not the precision of sampling, preservation or storage internal to the laboratory. (EPA-QAD)

Environmental Detection Limit (EDL):
The smallest level at which a radionuclide in an environmental medium can be unambiguously distinguished for a given confidence interval using a particular combination of sampling and

measurement procedures, sample size, analytical detection limit, and processing procedure. The EDL shall be specified for the 0.95 or greater confidence interval. The EDL shall be established initially and verified annually for each test method and sample matrix. (NELAC Radioanalysis Subcommittee)

Equipment Blank:
Sample of analyte-free media which has been used to rinse common sampling equipment to check effectiveness of decontamination procedures. (NELAC)

External Standard Calibration:
Calibrations for methods that do not utilize internal standards to compensate for changes in instrument conditions.

Federal Insecticide, Fungicide and Rodenticide Act (FIFRA):
The enabling legislation under 7 U.S.C. 135 et seq., as amended, that empowers the EPA to register insecticides, fungicides, and rodenticides. (NELAC)

Federal Water Pollution Control Act (Clean Water Act, CWA):
The enabling legislation under 33 U.S.C. 1251 et seq., Public Law 92-50086 Stat 816, that empowers EPA to set discharge limitations, write discharge permits, monitor, and bring enforcement action for non-compliance. (NELAC)

Field Blank:
Blank prepared in the field by filing a clean container with pure de-ionized water and appropriate preservative, if any, for the specific sampling activity being undertaken (EPA OSWER)

Field of Testing:
NELAC's approach to accrediting laboratories by program, method and analyte. Laboratories requesting accreditation for a program-method-analyte combination or for an up-dated/improved method are required to submit to only that portion of the accreditation process not previously addressed (see NELAC, section 1.9ff). (NELAC)

Finding:
An assessment conclusion that identifies a condition having a significant effect on an item or activity. As assessment finding is normally a deficiency and is normally accompanied by specific examples of the observed condition. (NELAC)

Holding Times (Maximum Allowable Holding Times):
The maximum times that samples may be held prior to analyses and still be considered valid or not compromised. (40 CFR Part 136)

Inspection:
An activity such as measuring, examining, testing, or gauging one or more characteristics of an entity and comparing the results with specified requirements in order to establish whether conformance is achieved for each characteristic. (ANSI/ASQC E4-1994)

Interdependent Analytes:
Analytes analyzed using methods in which the ability to correctly identify and quantitate a series of analytes is indicative of the laboratory's ability to correctly determine the presence or absence of similar analytes. (NELAC) [2.C5.1]

Internal Standard:
A known amount of standard added to a test portion of a sample and carried through the entire measurement process as a reference for evaluating and controlling the precision and bias of the applied analytical test method. (NELAC)

Internal Standard Calibration:
Calibrations for methods that utilize internal standards to compensate for changes in instrument conditions.

Instrument Blank:
A clean sample (e.g. distilled water) processed through the instrumental steps of the measurement process; used to determine instrument contamination. (EPA-QAD)

Instrument Response:
Instrument response is normally expressed as either peak area or peak height however it may also reflect a numerical representation of some type of count on a detector (e.g. Photomultiplier tube, or Diode array detector) and is used in this document to represent all types.

Laboratory:
A defined facility performing environmental analyses in a controlled and scientific manner. (NELAC)

Laboratory Control Sample (however named, such as laboratory fortified blank, spiked blank, or QC check sample):
A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes, taken through all preparation and analysis steps. Where there is no preparation taken for an analysis (such as in aqueous volatiles), or when all samples and standards undergo the same preparation and analysis process (such as Phosphorus), there is no LCS. It is generally used to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system.

An LCS shall be prepared at a minimum of 1 per batch of 20 or less samples per matrix type per sample extraction or preparation method except for analytes for which spiking solutions are not available such as total suspended solids, total dissolved solids, total volatile solids, total solids, pH, color, odor, temperature, dissolved oxygen or turbidity. The results of these samples shall be used to determine batch acceptance.

Note: NELAC standards allow a matrix spike to be used in place of this control as long as the acceptance criteria are as stringent as for the LCS. (NELAC)

Laboratory Duplicate:
Aliquots of a sample taken from the same container under laboratory conditions and processed and analyzed independently. (NELAC)

Least Squares Regression (1st Order Curve):
The least squares regression is a mathematical calculation of a straight line over two axes. The y axis represents the instrument response (or Response ratio) of a standard or sample and the x axis represents the concentration. The regression calculation will generate a correlation

coefficient (r) that is a measure of the "goodness of fit" of the regression line to the data. A value of 1.00 indicates a perfect fit. In order to be used for quantitative purposes, r must be greater than or equal to 0.99 for organics and 0.995 for inorganics.

Limit of Detection (LOD):
An estimate of the minimum amount of a substance that an analytical process can reliably detect. An LOD is analyte- and matrix-specific and may be laboratory dependent. (Analytical Chemistry, 55, p.2217, December 1983, modified) See also Method Detection Limit.

LIMS Raw Data (LRD):
LRD are original observations recorded by the LIMS that are needed to verify, calculate or derive data that are or may be reported. Original observations mean the first occurrence of human-readable information. The media to which the LRD are first recorded is the LRD storage media. The media may be paper, magnetic or optical storage media.

As an example: *Person A* places a sample into a laboratory instrument that analyzes the sample and transmits signals to a personal computer (PC). The PC software captures the signals, analyzes them and displays a graphical representation of the analyzed signals on the monitor. *Person B* examines the graphic, concludes it is realistic and then issues a command to the PC software to record the analyzed data on a disk. The data stored on the disk are the LRD and the disk is the LRD storage medium. The instrument, communications components, PC, PC software, monitor, recording device and disk are a LIMS. Alternatively, *Person B* could issue a command to first record the analyzed signal to paper before it is recorded to disk. In this case, the paper is the LRD storage medium.

Manager (however named):
The individual designed as being responsible for the overall operation, all personnel, and the physical plant of the environmental laboratory. A supervisor may report to the manager. In some cases, the supervisor and the manager may be the same individual. (NELAC)

Matrix:
The component or substrate that contains the analyte of interest. For purposes of batch and QC requirement determinations, the following matrix distinctions shall be used:

> Aqueous: Any aqueous sample excluded from the definition of Drinking Water matrix or Saline/Estuarine source. Includes surface water, groundwater, effluents, and TCLP or other extracts.
>
> Drinking Water: any aqueous sample that has been designated as a potable or potential potable water source.
>
> Saline/Estuarine: any aqueous sample from an ocean or estuary, or other salt water source such as the Great Salt Lake.
>
> Non-aqueous Liquid: any organic liquid with <15% settleable solids.
>
> Biological Tissue: any sample of a biological origin such as fish tissue, shellfish, or plant material. Such samples shall be grouped according to origin.

Solids: includes soils, sediments, sludges, and other matrices with >15% settleable solids.

Chemical Waste: a product or by-product of an industrial process that results in a matrix not previously defined.

Air: whole gas or vapor samples including those contained in flexible or rigid wall containers and the extracted concentrated analytes of interest from a gas or vapor that are collected with a sorbant tube, impinger solution, filter, or other device. (NELAC)

Matrix Spike (spiked sample or fortified sample):
Prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. Matrix spikes are used, for example, to determine the effect of the matrix on a method's recovery efficiency.

Matrix spikes shall be performed at a frequency of one in 20 samples per matrix type per sample extraction or preparation method except for analytes for which spiking solutions are not available such as, total suspended solids, total dissolved solids, total volatile solids, total solids, pH, color, odor, temperature, dissolved oxygen or turbidity. The selected sample(s) shall be rotated among client samples so that various matrix problems may be noted and/or addressed. Poor performance in a matrix spike may indicate a problem with the sample composition and shall be reported to the client whose sample was used for the spike. (QAMS)

Matrix Spike Duplicate (spiked sample or fortified sample duplicate):
A second replicate matrix spike is prepared in the laboratory and analyzed to obtain a measure of the precision of the recovery for each analyte.

Matrix spike duplicates or laboratory duplicates shall be analyzed at a minimum of 1 in 20 samples per matrix type per sample extraction or preparation method. The laboratory shall document their procedure to select the use of an appropriate type of duplicate. The selected sample(s) shall be rotated among client samples so that various matrix problems may be noted and/or addressed. Poor performance in the duplicates may indicate a problem with the sample composition and shall be reported to the client whose sample was used for the duplicate. (QAMS)

Method Blank:
A sample of a matrix similar to the batch of associated samples (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences are present at concentrations that impact the analytical results for sample analyses. (NELAC)

Method Detection Limit:
The minimum concentration of a substance (an analyte) that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte. (40 CFR Part 136, Appendix B)

National Environmental Laboratory Accreditation Conference (NELAC):

A voluntary organization of State and Federal environmental officials and interest groups purposed primarily to establish mutually acceptable standards for accrediting environmental laboratories. A subset of NELAP. (NELAC)

National Environmental Laboratory Accreditation Program (NELAP):
The overall National Environmental Laboratory Accreditation Program of which NELAC is a part. (NELAC)

Negative Control:
Measures taken to ensure that a test, its components, or the environment do not cause undesired effects, or produce incorrect test results. (NELAC)

NELAC Standards:
The plan of procedures for consistently evaluating and documenting the ability of laboratories performing environmental measurements to meet nationally defined standards established by the National Environmental Laboratory Accreditation Conference. (NELAC)

Non-interdependent Analytes:
Analytes that are analyzed using methods in which the ability to correctly identify and quantitate a series of analytes in a sample is not indicative of the laboratory's ability to correctly identify and quantitate similar analytes. (NELAC) [2.C.5.2]

Objective Evidence:
Any documented statement of fact, other information, or records, either quantitative or qualitative, pertaining to the quality of an item or activity, based on observations, measures, or tests that can be verified. (ASQC)

Performance Audit:
The routine comparison of independently obtained qualitative and quantitative measurement system data with routinely obtained data in order to evaluate the proficiency of an analyst or laboratory. (NELAC)

Performance Based Measurement System (PBMS):
A set of processes wherein the data quality needs, mandates or limitations of a program or project are specified and serve as criteria for selecting appropriate test methods to meet those needs in a cost-effective manner. (NELAC)

Positive Control:
Measures taken to ensure that a test and/or its components are working properly and producing correct or expected results from positive test subjects. (NELAC)

Precision:
The degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves; a data quality indicator. Precision is usually expressed as standard deviation, variance or range, in either absolute or relative terms. (NELAC)

Preservation:
Refrigeration and/or reagents added at the time of sample collection (or later) to maintain the chemical and/or biological integrity of the sample. (NELAC)

Primary Accrediting Authority:
The agency or department designated at the Territory, State, or Federal level as the recognized authority with responsibility and accountability for granting NELAC accreditation for a specified field of testing. (NELAC) [1.5.2.3]

PT Fields of Testing:
NELAC's approach to offering proficiency testing by regulatory or environmental program, matrix type, and analyte. (NELAC)

Proficiency Testing:
A means of evaluating a laboratory's performance under controlled conditions relative to a given set of criteria through analysis of unknown samples provided by an external source. (NELAC) [2.1]

Proficiency Testing Program:
The aggregate of providing rigorously controlled and standardized environmental samples to a laboratory for analysis, reporting of results, statistical evaluation of the results and the collective demographics and results summary of all participating laboratories. (NELAC)

Proficiency Test Sample (PT):
A sample, the composition of which is unknown to the analyst and is provided to test whether the analyst/laboratory can produce analytical results within specified acceptance criteria. (QAMS)

Protocol:
A detailed written procedure for field and/or laboratory operation (e.g. sampling, analysis) which must be strictly followed. (EPA-QAD)

Pure Reagent Water:
Shall be water (defined by national or international standard) in which no target analytes or interferences are detected as required by the analytical method. (NELAC)

Quality Assurance:
An integrated system of activities involving planning, quality control, quality assessment, reporting and quality improvement to ensure that a product or service meets defined standards of quality with a stated level of confidence. (QAMS)

Quality Assurance [Project] Plan (QAPP):
A formal document describing the detailed quality control procedures by which the quality requirements defined for the data and decisions pertaining to a specific project are to be achieved. (EAP-QAD)

Quality Control:
The overall system of technical activities which purpose is to measure and control the quality of a product or service so that it meets the needs of users. (QAMS)

Quality Control Sample:
An uncontaminated sample matrix spiked with known amounts of analytes from a source independent from the calibration standards. It is generally used to establish intra-laboratory or

analyst specific precision and bias or to assess the performance of all or a portion of the measurement system. (EPA-QAD)

Quality Manual:
A document stating the management policies, objectives, principles, organizational structure and authority, responsibilities, accountability, and implementation of an agency, organization, or laboratory, to ensure the quality of its product and the utility of its product to its users. (NELAC)

Quality System:
A structured and documented management system describing the policies, objectives, principles, organizational authority, responsibilities, accountability, and implementation plan of an organization for ensuring quality in its work processes, products (items), and services. The quality system provides the framework for planning, implementing, and assessing work performed by the organization and for carrying out required QA and QC (ANSI/ASQC-E-41994)

Quantitation Limits:
The maximum or minimum levels, concentrations, or quantities of a target variable (e.g. target analyte) that can be quantified with the confidence level required by the data user. (NELAC)

Range:
The difference between the minimum and the maximum of a set of values. (EPA-QAD)

Reagent Blank (method reagent blank):
A sample consisting of reagent(s), without the target analyte or sample matrix, introduced into the analytical procedure at the appropriate point and carried through all subsequent steps to determine the contribution of the reagents and of the involved analytical steps. (QAMS)

Reference Material:
A material or substance one or more properties of which are sufficiently well established to be used for the calibration of an apparatus, the assessment of a measurement method, or for assigning values to materials. (ISO Guide 30-2.1)

Reference Method:
A method of known and documented accuracy and precision issued by an organization recognized as competent to do so. (NELAC)

Reference Standard:
A standard, generally of the highest metrological quality available at a given location, from which measurements made at that location are derived. (VIM-6.0-8)

Replicate Analyses:
The measurements of the variable of interest performed identically on two or more sub-samples of the same sample within a short time interval. (NELAC)

Requirement:
Denotes a mandatory specification; often designated by the term “shall”. (NELAC)

Resource Conservation and Recovery Act (RCRA):

The enabling legislation under 42 USC 321 et seq. (1976), that gives EPA the authority to control hazardous waste from the “cradle-to-grave”, including its generation, transportation, treatment, storage, and disposal. (NELAC)

Resume:
The summary (usually written) of an individual’s relevant technical and management experience, including training. (NELAC)

Safe Drinking Water Act (SDWA):
The enabling legislation, 42 USC 300f et seq. (1974), (Public Law 93-523), that requires the EPA to protect the quality of drinking water in the U.S. by setting maximum allowable contaminant levels, monitoring, and enforcing violations. (NELAC)

Sample Duplicate:
Two samples taken from and representative of the same population and carried through all steps of the sampling and analytical procedures in an identical manner. Duplicate samples are used to assess variance of the total method including sampling and analysis. (EPA-QAD)

Second Order Polynomial Curve (Quadratic): The 2^{nd} order curves are a mathematical calculation of a slightly curved line over two axis. The y axis represents the instrument response (or Response ratio) of a standard or sample and the x axis represents the concentration. The 2^{nd} order regression will generate a coefficient of determination (COD or r^2) that is a measure of the "goodness of fit" of the quadratic curvature the data. A value of 1.00 indicates a perfect fit. In order to be used for quantitative purposes, r^2 must be greater than or equal to 0.99.

Secondary Accrediting Authority:
The Territorial, State, or Federal Agency that grants NELAC accreditation to laboratories, based upon their accreditation by a NELAP-recognized Primary Accrediting Authority. See also Reciprocity and Primary Accrediting Authority. (NELAC) [1.5.2.3]

Selectivity:
(Analytical chemistry) the capability of a test method or instrument to respond to a target substance of constituent in the presence of non-target substances. (EPA-QAD)

Sensitivity:
The capability of a method or instrument to discriminate between measurement responses representing different levels (e.g. concentrations) of a variable of interest. (NELAC)

Spike:
A known mass of target analyte added to a blank, sample or sub-sample; used to determine recovery efficiency or for other quality control purposes.

If the mandated or requested test method does not specify the spiking components, the laboratory shall spike all reportable components to be reported in the Laboratory Control Sample and Matrix Spike. However, in cases where the components interfere with accurate assessment (such as simultaneously spiking chlordane, toxaphene and PCBs in Method 608), the test method has an extremely long list of components or components are incompatible, a representative number (at a minimum 10%) of the listed components may be used to control the test method. The selected components of each spiking mix shall represent all chemistries,

elution patterns and masses permit specified analytes and other client requested components. However, the laboratory shall ensure that all reported components are used in the spike mixture within a two-year time period.. (NELAC)

Standard:
The document describing the elements of laboratory accreditation that has been developed and established within the consensus principles of NELAC and meets the approval requirements of NELAC procedures and policies. (ASQC)

Standard Operating Procedures (SOPs):
A written document which details the method of an operation, analysis, or action whose techniques and procedures are thoroughly prescribed and which is accepted as the method for performing certain routine or repetitive tasks. (QAMS)

Standardized Reference Material (SRM):
A certified reference material produced by the U.S. National Institute of Standards and Technology or other equivalent organization and characterized for absolute content, independent of analytical method. (EPA-QAD)

Supervisor (however named):
The individual(s) designated as being responsible for a particular area or category of scientific analysis. This responsibility includes direct day-to-day supervision of technical employees, supply and instrument adequacy and upkeep, quality assurance/quality control duties, and ascertaining that technical employees have the required balance of education, training and experience to perform the required analyses. (NELAC)

Surrogate:
A substance with properties that mimic the analyte of interest. It is unlikely to be found in environment samples and is added to them for quality control purposes.

Surrogate compounds must be added to all samples, standards, and blanks, for all organic chromatography methods except when the matrix precludes its use or when a surrogate is not available. Poor surrogate recovery may indicate a problem with sample composition and shall be reported to the client whose sample produced poor recovery. (QAMS)

Systems Audit (also Technical Systems Audit):
A thorough, systematic, qualitative on-site assessment of the facilities, equipment, personnel, training, procedures, record keeping, data validation, data management, and reporting aspects of a total measurement system. (EPA-QAD)

Technical Director:
Individuals(s) who has overall responsibility for the technical operation of the environmental testing laboratory. (NELAC)

Test:
A technical operation that consists of the determination of one or more characteristics or performance of a given product, material, equipment, organism, physical phenomenon, process, or service according to a specified procedure. The result of a test is normally recorded in a document sometimes called a test report or a test certificate. (ISO/IEC Guide 2-12.1, amended)

Test Method:
An adoption of a scientific technique for a specific measurement problem, as documented in a laboratory SOP. (NELAC)

Testing Laboratory:
A laboratory that performs tests. (ISO/IEC Guide 2-12.4)

Test Sensitivity/Power:
The minimum significant difference (MSD) between the control and test concentration that is statistically significant. It is dependent on the number of replicates per concentration, the selected significance level, and the type of statistical analysis (see Chapter 5, Appendix D, Section 2.4.a). (NELAC)

Toxic Substances Control Act (TSCA):
The enabling legislation in 15 USC 2601 et seq., (1976) that provides for testing, regulating, and screening all chemicals produced or imported into the United States for possible toxic effects prior to commercial manufacture. (NELAC)

Traceability:
The property of a result of a measurement whereby it can be related to appropriate standards, generally international or national standards, through an unbroken chain of comparisons. (VIM-6.12)

Uncertainty:
A parameter associated with the result of a measurement that characterizes the dispersion of the value that could reasonably be attributed to the measured value.

United States Environmental Protection Agency (EPA):
The Federal governmental agency with responsibility for protecting public health and safeguarding and improving the natural environment (i.e., the air, water, and land) upon which human life depends. (US-EPA)

Validation:
The process of substantiating specified performance criteria. (EPA-QAD)

Verification:
Confirmation by examination and provision of evidence that specified requirements have been met. (NELAC)
NOTE:
In connection with the management of measuring equipment, verification provides a means for checking that the deviations between values indicated by a measuring instrument and corresponding known values of a measured quantity are consistently smaller than the maximum allowable error defined in a standard, regulation or specification peculiar to the management of the measuring equipment.

The result of verification leads to a decision either to restore in service, to perform adjustment, to repair, to downgrade, or to declare obsolete. In all cases, it is required that a written trace of the verification performed shall be kept on the measuring instrument's individual record.

Work Cell:

A well-defined group of analysts that together perform the method analysis. The members of the group and their specific functions within the work cell must be fully documented. (NELAC)

Acronyms:

CAR – Corrective Action Report
CCV – Calibration Verification
CF – Calibration Factor
COC – Chain of Custody
DOC – Demonstration of Capability
DQO – Data Quality Objectives
ECO – Ethics Compliance Officer
EPA – Environmental Protection Agency
GC - Gas Chromatography
GC/MS - Gas Chromatography/Mass Spectrometry
HPLC - High Performance Liquid Chromatography
IC – Ion Chromatography
IC/MS -- Ion Chromatography/Mass Spectrometry
ICP (ICP-AES) - Inductively Coupled Plasma Atomic Emission Spectroscopy
ICP/MS -- Inductively Coupled Plasma/ Mass Spectrometry
ICV – Initial Calibration Verification
IDL – Instrument Detection Limit
IH – Industrial Hygiene
IS – Internal Standard
LCS – Laboratory Control Sample
LIMS – Laboratory Information Management System
MDL – Method Detection Limit
MS – Matrix Spike
MSA – Method of Standard Additions
MSD – Matrix Spike Duplicate
MSDS - Material Safety Data Sheet
NELAC - National Environmental Laboratory Accreditation Conference
NELAP - National Environmental Laboratory Accreditation Program
PT – Performance Testing
PS – Post Spike
QAM – Quality Assurance Manual
QAO – Quality Assurance Officer
QA/QC – Quality Assurance / Quality Control
QAPP – Quality Assurance Project Plan
RF – Response Factor
RPD – Relative Percent Difference
RSD – Relative Standard Deviation
SD – Standard Deviation
SOP – Standard Operating Procedure
TAT – Turn-Around-Time
VOA – Volatile Organic Analysis (Volatiles)
VOC – Volatile Organic Compound

Appendix 6

Laboratory Certification/Recognition

Laboratory Certifications, Accreditations, Validations

TestAmerica-Irvine maintains certifications, accreditations, certifications, and validations with numerous state and national entities. Programs vary but may include on-site audits, reciprocal agreements with another entity, performance testing evaluations, review of the QA Manual, Standard Operating Procedures, Method Detection Limits, training records, etc. At the time of this QA Manual revision, the laboratory has accreditation/certification/licensing with the following organizations:

State	Agency	Program	License Number
CA	DHS-ELAP	DW, WW, HW	1197
CA	DHS-ELAP	WW, HW	1794[1]
CA	DHS-ELAP	WW, HW	2536[2]
CA	DHS-NELAP	DW, WW, HW	01108CA
AZ	DHS	DW, WW, HW	AZ0671
NV	DEP	DW, WW, RCRA	CA72
UT	DHS-ELCP	DW, WW,HW	DEL9492611022
WA	DOE	WW, HW	C2025
NM	DWB	DW	--
CNMI	DEQ	DW	--
GUAM	EPA	DW	--
HI	DOH	DW	--
--	ACIL	Seal Of Excellence	300
--	USDA	Foreign Soil	S-669307

[1]for mobile lab (EPA # CA01102)
[2]for mobile lab (EPA# CA01473)

The certificates and parameter lists (which may differ) for each organization may be found on the corporate web site, the laboratory's public server, the final report review table, and in the following offices: QA, marketing, and project management.

Claims of Accreditation Status

TestAmerica-Irvine has agreed to make only valid claims as to its accreditation/certification status by any authority by ensuring that the expiration dates are not exceeded and the method-specific scope or parameter lists are supportable, as required by each. Any false claims would be reported to that authority. The agreement covers the use of the authority's name, such as "Authority-Accredited," logo, or certificate number. The only valid proof of accreditation/certification is the current certificate and scope of the authority. It is the responsibility of the laboratory to make these documents available to all staff, and it is the staff's duty to reference only the current documents.

A report with scope and non-scope analytes may only be presented on the same report if the non-accredited results are clearly and unambiguously identified. No report with non-scope analytes may be associated with the logo, "Authority accredited" phrase, or the certificate number. Only the analytes specified by a unique method are valid within the scope. There shall be no intentional misleading of the users of the laboratory's services in this regard.

No opinions and/or interpretations based on results outside the laboratory's scope may be presented on a document referenced by "Authority-accredited, the logo, or the certificate number. If these are made, they must be written in a separate letter which is not endorsed by the authority.

The "Authority-accredited" logo may only be affixed to equipment calibrated by a laboratory that is accredited by the authority. If calibration labels contain the logo, they must also show the calibration laboratory's name or its certificate number, the instrument's unique identification, the date of the last calibration, and a cross-reference to the last calibration certificate.

Should the company decide to use the "Authority-accredited" logo in marketing activities, no misrepresentation may occur. Only reference to the accredited scope at a specific laboratory site is allowed. If any "Authority-accredited" language is used in proposals or quotations, any non-scope analytes must be clearly denoted as not accredited by that authority. The same is true for any use of laboratory letterhead with the "Authority-accredited" wording or logo. The logo may not be affixed to any material, item, product, part, or packaging, thereby implying accreditation status to that piece. In literature, any use of the logo must be positioned adjacent to the accredited laboratory's name and clearly state that the presence of the logo does not imply certification/approval of the products tested. At no time may the logo appear to suggest that a person is accredited. Misrepresentation of accreditation status is never allowed and must be reported if it occurs. If in doubt, the idea of the logo's use may be presented to the authority for approval.

If accreditation is terminated or suspended, the laboratory will immediately cease to use the "Authority-accredited" wording, the logo, or the certificate number reference in any way and inform clients impacted by the change.

Appendix 7

Data Qualifiers

Qualifier	Arizona Code	Text
-		Negative Ion Balance
+		Positive Ion Balance
<	<	Result is less than the indicated value.
>	>	Result is greater than the indicated value.
A-01	N1	[Custom Value]
A1	A1	Too numerous to count.
A10	N1	Results based upon colony counts outside the acceptable range.
A12	N1	Atypical growth
A13	N1	Atypical growth appears to have a toxic effect on surrounding growth, thus affecting the plate count.
A2	A2	Sample incubation period exceeded method requirement.
A3	A3	Sample incubation period was shorter than method requirement.
A4	A4	Target organism detected in associated method blank.
A5	A5	Incubator/water bath temperature was outside method requirements.
A6	A6	Target organism not detected in associated positive control.
A7	A7	Micro sample received without adequate headspace.
A8	N1	Result is greater than or equal to the indicated value.
A9	N1	Bacterial results confirmed
B	B1	Analyte was detected in the associated Method Blank.
B-1	B7	Analyte was detected in the associated method blank. Analyte concentration in the sample is greater than 10x the concentration found in the method blank.
B2	B2	Non-target analyte detected in method blank and sample, producing interference.
B3	B3	Target analyte detected in calibration blank at or above the method reporting limit.
B4	B4	Target analyte detected in blank at/above method acceptance criteria.
B5	B5	Target analyte detected in method blank at or above the method reporting limit, but below the trigger level or MCL.
B6	B6	Target analyte detected in calibration blank at or above the method reporting limit, but below the trigger level or MCL.
BQC	N1	Reported for batch QC purposes only. See re-analysis (RE) for final result.
BQC1	N1	Reported for batch QC purposes only. See original analysis for final result.
C	V1	Calibration Verification recovery was above the method control limit for this analyte. Analyte not detected, data not impacted.
C-1	V7	Calibration Verification recovery was above the method control limit for this analyte, however the average % difference for all analytes met method criteria. See Calibration Summary form. [Custom Value]
C-2	V8	Calibration Verification recovery was below the method control limit for this analyte, however the average % difference for all analytes met method criteria. See Calibration Summary form. [Custom Value]
C4	N1	Calibration Verification recovery was below the method control limit for this analyte.

Qualifier	Arizona Code	Text
C5	N1	Calibration Verification recovery was below the method control limit for this analyte. An additional check standard was analyzed at the reporting limit to ensure instrument sensitivity at the reporting limit. Samples ND.
C6	V4	CCV recovery was below method acceptance limits. The sample could not be reanalyzed due to insufficient sample.
C-7	N1	Calibration Verification recovery was below the method control limit due to matrix interference carried over from analytical samples. The matrix interference was confirmed by reanalysis with the same result.
C8	N1	Calibration Verification recovery was above the method control limit for this analyte. A high bias may be indicated.
CBP	N1	Calibration verification recovery for this analyte is outside of limits as stated in BP-GCLN Technical Requirements however the calibration verification meets the requirements as stated in the analytical method.
CF1	C1	Confirmatory analysis not performed as required by the method.
CF2	C4	Confirmatory analysis was past holding time.
CF5	N1	The sample was originally analyzed with a positive result, however the reanalysis did not confirm the presence of the analyte.
CIG	W1	The % RSD for this compound was above 20%. The average % RSD for all compounds in the calibration met the 20% criteria specified in EPA method 8000B. See the attached Initial Calibration Criteria form.
CIN	W2	The % RSD for this compound was above 15%. The average % RSD for all compounds in the calibration met the 15% criteria specified in EPA methods 8260B/8270C. See the attached Initial Calibration Criteria form.
cl	N1	Compound reported based on total Chlordane result being less than the reporting limit.
CN1	N1	The cyanide value was greater after chlorination than before chlorination due to the sample matrix. An additional Weak Acid Dissociable Cyanide analysis was performed.
CN2	N1	The cyanide value was greater after chlorination than before chlorination due to the sample matrix.
CN3	N1	Reactive sulfide results reported from total determination method.
CN4	N1	Amenable cyanide results reported from total determination method.
CR	N1	The carbon range of the fuel found in the sample = [Custom Value]
CSTM	N1	[Custom Value]
DNQ	N1	Detected but not quantified.
DR	N1	Sample dried prior to screening.
E	N1	Concentration exceeds the calibration range and therefore result is semi-quantitative.
E1	E1	Concentration estimated. Analyte exceeded calibration range. Reanalysis not possible due to insufficient sample.
E3	E3	Concentration estimated. Analyte exceeded calibration range. Reanalysis not performed due to holding time requirements.
FT	N1	This analysis was performed in the field by the sampler whose name appears on the attached Chain of Custody form.
H	H1	Sample analysis performed past method-specified holding time.
H-1	H1	Sample analysis performed past the method-specified holding time per client's approval.

Qualifier	Arizona Code	Text
H2	H2	Initial analysis within holding time. Reanalysis for the required dilution was past holding time.
H3	H3	Sample was received and analyzed past holding time.
H5	N1	The sample was prepared outside of the required 8 hour holding time, however it was stored at >0° and <4°C and prepared within the method allowed 24 hour holding time.
H6	N1	The sample was received at the laboratory either past, or with insufficient time remaining on, the required 8 hour holding time. However, it was stored at >0° and <4°C and prepared within the method allowed 24 hour hold time.
H8	H3	The sample was extracted past the holding time.
H9	N1	Sample analysis performed past the EPA recommended holding time.
HTI	N1	The holding time for this test is immediate. The laboratory measurement, therefore, cannot be used for compliance purposes.
HFT	N1	The holding time for this test is immediate. It was analyzed in the laboratory as soon as possible after receipt.
I	E7	Internal Standard recovery was outside of method limits. Matrix interference was confirmed by reanalysis.
ID	N1	Due to the low levels of analyte found in the sample, the analyte was qualitatively identified based on the compound's retention time and the presence of a single mass ion.
ID2	N1	Secondary ion abundance outside of method requirements. Identification based on analytical judgment
J	E4	Estimated value. Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL). The user of this data should be aware that this data is of limited reliability.
K	K1	The sample dilutions set-up for the BOD analysis did not meet the oxygen depletion criteria of at least 2 mg/l. Therefore the reported result is an estimated value only.
K-1	K2	The sample dilutions set up for the BOD analysis failed to meet the criteria of a residual dissolved oxygen of at least 1 mg/l. Therefore the reported result is an estimated value only.
K-2	K4	The seed depletion was outside the method acceptance limits. Therefore, the reported result is an estimated value only.
K-3	K5	The dilution water D.O. depletion was > 0.2 mg/L.
K-4	N1	The seed depletion was not within method recommended limits. The LCS, which is a means of checking dilution water quality and seed effectiveness, was within acceptance limits. The acceptable LCS demonstrates that the data is valid.
L	L3	Laboratory Control Sample and/or Laboratory Control Sample Duplicate recovery was above the acceptance limits. Analyte not detected, data not impacted.
L1	L3	Laboratory Control Sample and/or Laboratory Control Sample Duplicate recovery was above acceptance limits.
L2	L4	Laboratory Control Sample and/or Laboratory Control Sample Duplicate recovery was below acceptance limits.

Qualifier	Arizona Code	Text
L4	K6	Laboratory Control Sample and/or Laboratory Control Sample Duplicate recovery was below the acceptance limits. A low bias to sample results is indicated.
L6	N1	Per the EPA methods, benzidine is known to be subject to oxidative losses during solvent concentration.
M1	M1	The MS and/or MSD were above the acceptance limits due to sample matrix interference. See Blank Spike (LCS).
M10	M7	Matrix Spike recovery was low. Data Reported per ADEQ policy 0154.000.
M13	N1	The sample spiked had a pH of less than 2. 2-Chloroethylvinylether degrades under acidic conditions.
M2	M2	The MS and/or MSD were below the acceptance limits due to sample matrix interference. See Blank Spike (LCS).
M-3	N1	Results exceeded the linear range in the MS/MSD and therefore are not available for reporting. The batch was accepted based on acceptable recovery in the Blank Spike (LCS).
M4	M4	The sample required a dilution due to matrix interference. Because of this dilution, the matrix spike concentrations in the sample were reduced to a level where the recovery calculation does not provide useful information. See Blank Spike (LCS).
M5	N1	Due to CCV failure, the MS/MSD results were not available for reporting. The batch was accepted based on acceptable recovery in the Blank Spike (LCS).
M7	N1	The MS and/or MSD were above the acceptance limits. See Blank Spike (LCS).
M8	N1	The MS and/or MSD were below the acceptance limits. See Blank Spike (LCS).
M9	M6	Matrix Spike recovery was high. Data Reported per ADEQ policy 0154.000.
MCP	N1	No results were reported for the MS and/or MSD due to a clogged autosampler port. Batch was accepted based on Blank Spike (LCS) recoveries.
MEN	N1	Unspiked sample results were determined from the sample portion received in an Encore sampler. The sample portions used for the MS/MSD were taken from an additional sample sleeve due to an insufficient number of Encore samplers supplied.
MHA	M3	Due to high levels of analyte in the sample, the MS/MSD calculation does not provide useful spike recovery information. See Blank Spike (LCS).
MNR	N1	No results were reported for the MS/MSD. The sample used for the MS/MSD required dilution due to the sample matrix. Because of this, the spike compounds were diluted below the detection limit.
MNR1	Q8	There was no MS/MSD analyzed with this batch due to insufficient sample volume. See Blank Spike/Blank Spike Duplicate.
MNR2	Q12	Insufficient sample received to meet method QC requirements. See case narrative.
MNR3		Insufficient sample received to meet method QC requirements.
N1	N1	See case narrative.
N2	N2	See corrective action report.
Neg	Neg	The reported result is a negative value.

Qualifier	Arizona Code	Text
NFP	N1	Non-fuel pattern present.
P	Q3	The sample, as received, was not preserved in accordance to the referenced analytical method.
P1	Q4	Sample received and analyzed without chemical preservation.
P10		Sample received with chemical preservation; pH measured in lab >2
P2	Q5	Sample received without chemical preservation, but preserved by the laboratory.
P3	Q6	Sample was received above recommended temperature.
P4	Q10	Sample received in inappropriate sample container.
P5	Q9	Insufficient sample received to meet method QC requirements.
P6	Q4	Sample received unpreserved, however the sample was analyzed within 7 days per EPA recommendation.
P7	N1	Sample filtered in lab.
P8	N1	Sample unable to be adjusted to correct pH due to matrix.
P9	Q3	This analyte has been shown to degrade upon preservation with HCl and cannot accurately be quantitated.
pH	N1	pH = [Custom Value]
P-HS	Q2	Sample container contained headspace.
QB	N1	Quantitated against a Bunker C Oil standard.
QC4	N1	Quantitation begun immediately before the retention time of tert-Butanol (TBA).
QCM	N1	Quantitation begun immediately following the methanol peak.
QD	N1	Quantitated against a diesel fuel standard.
QG1	N1	Quantitated against a gasoline standard.
QJ	N1	Quantitated against a jet fuel standard.
QM	N1	Quantitated against a motor oil standard.
QMS	N1	Quantitated against a mineral spirits standard.
QP	N1	Hydrocarbon result partly due to individual peak(s) in quantitation range.
qr	N1	Qualitative result based on chromatographic comparison with a known standard.
QS	N1	Quantitated against a Stoddard solvent standard.
QT	N1	Quantitated against a therminol standard.
QU	N1	Unquantitated hydrocarbons present in the sample outside of the reported carbon range.
QV	N1	The molecular weight of 100 was used to convert Volatile Fuel Hydrocarbons from mg/m3 to ppm by volume (ppmv).
R	R4	The RPD exceeded the method control limit due to sample matrix effects. The individual analyte QA/QC recoveries, however, were within acceptance limits.
R-1	C6	The RPD between the primary and confirmatory analysis exceeded 40%. Per method 8000B, the higher value was reported.
R-10	C7	The RPD between the primary and confirmatory analysis exceeded 40%. Per method 8000B, the lower value was reported due to apparent chromatographic problems.

Qualifier	Arizona Code	Text
R-11	R2	RPD exceeded the laboratory control limit. See case narrative.
R-2	R1	The RPD exceeded the acceptance limit.
R-3	Q11	The RPD exceeded the acceptance limit due to sample matrix effects.
R-4	R9	Due to the low levels of analyte in the sample, the duplicate RPD calculation does not provide useful information.
R-6	R11	The RPD calculation does not provide useful information due to varying sample weights when Encore samplers are used.
R-7	R6	LFB/LFBD RPD exceeded the acceptance limit. Recovery met acceptance criteria.
R-9	R9	Sample RPD exceeded the laboratory control limit.
RL1	D1	Reporting limit raised due to sample matrix effects.
RL2	D1	Reporting limit raised due to high concentrations of hydrocarbons.
RL3	D1	Reporting limit raised due to high concentrations of non-target analytes.
RL4	D3	Reporting limit raised due to insufficient sample volume.
RL5	D1	Reporting limit raised due to high single peak analyte.
RL6	D1	The reporting limit raised due to high toxaphene concentrations.
RL7	D2	Sample required dilution due to high concentrations of target analyte.
S	M5	Analyzed by standard addition.
S10	N1	Insufficient sample available for reanalysis.
SB	N1	Sustained burning when exposed to open flame.
SC	N1	Analytical results not reliable due to potential sample container contamination.
SF	N1	Reactive sulfide results reported from total determination method.
T1	T1	Method promulgated by EPA, but not by ADHS at this time
T3	T3	Method not promulgated by EPA or ADHS.
T4	T2	The cited licensed method does not contain this analyte as part of the method compound list.
T5	N1	Less than the prescribed sample amount was available to perform the leachate extraction. The volume of extraction fluid was adjusted proportionately based on the method prescribed ratio of extraction fluid to sample weight.
T6	N1	The temperature during the 18 hour TCLP extraction exceeded the 21-25 degrees C range stated in EPA Method 1311. The temperature range during the extraction was [Custom Value] degrees C.
T7	T4	Tentatively identified compound. Concentration is estimated based on the closest internal standard.
TMP	N1	Temperature taken in the field at the time of sampling.
TRM	N1	Per client request, the sample was digested according to section 4.1.4 of "Methods for the Chemical Analysis of Water and Wastes 1983". The sample was subsequently prepared and analyzed by EPA Method 245.1.
TVO	N1	Based on the sum of the concentrations of the compounds in the EPA 8010/8020 list.
X	N1	Exceeds regulatory limit.
X1	N1	Exceeds specified permit limit.
Z	S6	Due to sample matrix effects, the surrogate recovery was below the acceptance limits.

Qualifier	Arizona Code	Text
Z1	S10	Surrogate recovery was above acceptance limits.
Z2	S4	Surrogate recovery was above the acceptance limits. Data not impacted.
Z3	S8	The sample required a dilution due to the nature of the sample matrix. Because of this dilution, the surrogate spike concentration in the sample was reduced to a level where the recovery calculation does not provide useful information.
Z5	N1	Due to sample matrix effects, the surrogate recovery was outside acceptance limits. Secondary surrogate recovery was within the acceptance limits.
Z6	S7	Surrogate recovery was below acceptance limits.
Z7	S11	Surrogate recovery was high. Data reported per ADEQ policy 0154.000.
Z8	S12	Surrogate recovery was low. Data reported per ADEQ policy 0154.000.
Z9	N1	Unable to calculate surrogate recovery due to matrix interference.
ZX	N1	Due to sample matrix effects, the surrogate recovery was outside the acceptance limits.

TestAmerica
ANALYTICAL TESTING CORPORATION
17461 Derian Avenue, Suite 100 Irvine, CA 92614 (949)261-1022 fax: (949)260-3297

Certifications/Accreditations

TestAmerica
ANALYTICAL TESTING CORPORATION

CERTIFICATION/ACCREDITATION STATUS
Last Updated: 11/06/06

IRVINE FIXED LABORATORY (CA01531)

State	Agency	Program	License Number	Latest Update	Expiration Date
CA	DHS-ELAP	DW, WW, HW	1197	05/22/06	05/31/08
CA	DHS-NELAP	DW, WW, HW	01108CA	08/14/06	01/31/07
AZ	DHS	DW, WW, HW	AZ0671	11/06/06	10/13/07
NV	DEP	DW, WW, RCRA	CA72	01/04/06	07/31/06*
UT	DHS-ELCP	DW, WW,HW	DEL9492611022	05/01/06	01/31/07
WA	DOE	WW, HW	C2025	09/05/06	09/04/07
NM	DWB	DW	--	06/22/06	01/31/07
CNMI	DEQ	DW	--	09/16/05	09/16/06**
GUAM	EPA	DW	--	11/10/05	11/10/06**
HI	DOH	DW	--	06/02/06	05/31/07
--	USDA	Foreign Soil	S-669307	9/29/04	09/30/09

* Extended through 09/30/06 per NDEP
** Renewal in progress

IRVINE MOBILE LABORATORIES

Lab # (EPA #)	State	Agency	Program	License Number	Latest Update	Expiration Date
1 (CA01102)	CA	DHS-ELAP	WW, HW	1794	08/31/06	08/31/08
3 (CA01473)	CA	DHS-ELAP	WW, HW	2536	01/01/05	01/31/07

STATE OF CALIFORNIA
DEPARTMENT OF HEALTH SERVICES
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

ENVIRONMENTAL LABORATORY CERTIFICATION

Is hereby granted to

SEQ CORPORATION dba TESTAMERICA

IRVINE LABORATORY

17461 DERIAN AVENUE, SUITE 100

IRVINE, CA 92614

Scope of certification is limited to the
"Accredited Fields of Testing"
which accompanies this Certificate.

Continued certification status depends on successful completion of site visit, proficiency testing studies, and payment of applicable fees.

This Certificate is granted in accordance with provisions of Section 100825, et seq. of the Health and Safety Code.

Certificate No.: **1197**

Expiration Date: **05/31/2008**

Effective Date: **05/01/2006**

Richmond, California
subject to forfeiture or revocation

George C. Kulasingam, Ph.D.
Program Chief
Environmental Laboratory Accreditation Program

State of California—Health and Human Services Agency
Department of Health Services

Sandra Shewry
Director

Arnold Schwarzenegger
Governor

August 14, 2006

Certificate No.: **1197**

FRED HALEY
SEQ CORPORATION dba TESTAMERICA
17461 DERIAN AVENUE, SUITE 100
IRVINE, CA 92614

Dear FRED HALEY:

This is to advise you that the laboratory named above continues to be certified as an environmental testing laboratory pursuant to the provisions of the California Environmental Laboratory Improvement Act (Health and Safety Code (HSC), Division 101, Part 1, Chapter 4, Section 100825, et seq.). Certification for all currently certified Fields of Testing that the laboratory has applied for renewal shall remain in effect until **05/31/2008** unless revoked.

Please note that the renewal application for certification is subject to an on-site visit, and continued use of the certificate is contingent upon:

* **successful completion of the site visit;**
* **acceptable performance in the required performance evaluation (PE) studies;**
* **timely payment of all fees, including an annual fee due before May 31, 2007;**
* **compliance with Environmental Laboratory Accreditation Program (ELAP) statutes (HSC, Section 100825, et seq.) and Regulations (California Code of Regulations (CCR),Title 22, Division 4, Chapter 19).**

An updated "Approved Fields of Testing" will be issued to the laboratory upon completion of the renewal process. The application for the next renewal must be received 90 days before the expiration of this certificate to remain in force according to the CCR, Section 64801 through 64827.

Please note that the laboratory is required to notify ELAP of any major changes in the laboratory such as the transfer of ownership, change of laboratory director, change in location, or structural alterations which may affect adversely the quality of analyses (HSC, Section 100845(b)(d)). Please include the above certificate number in all your correspondence to ELAP.

If you have any questions, please contact ELAP at (510) 620-3155.

Sincerely,

George C. Kulasingam, Ph.D.
Program Chief
Environmental Laboratory Accreditation Program

CALIFORNIA DEPARTMENT OF HEALTH SERVICES
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM
Accredited Fields of Testing

DEL MAR ANALYTICAL, INC. **Lab Phone** (949) 261-1022
IRVINE LABORATORY
17461 DERIAN AVENUE, SUITE 100
IRVINE, CA 92614

Certificate No: 1197 **Renew Date:** **5/31/2006**

Field of Testing: 102 - Inorganic Chemistry of Drinking Water

102.030	001	Bromide	EPA 300.0
102.030	003	Chloride	EPA 300.0
102.030	005	Fluoride	EPA 300.0
102.030	006	Nitrate	EPA 300.0
102.030	007	Nitrite	EPA 300.0
102.030	008	Phosphate, Ortho	EPA 300.0
102.030	010	Sulfate	EPA 300.0
102.040	001	Bromide	EPA 300.1
102.040	002	Chlorite	EPA 300.1
102.040	003	Chlorate	EPA 300.1
102.040	004	Bromate	EPA 300.1
102.045	001	Perchlorate	EPA 314.0
102.100	001	Alkalinity	SM2320B
102.120	001	Hardness	SM2340B
102.121	001	Hardness	SM2340C
102.130	001	Conductivity	SM2510B
102.140	001	Total Dissolved Solids	SM2540C
102.145	001	Total Dissolved Solids	EPA 160.1
102.190	001	Cyanide, Total	SM4500-CN E
102.192	001	Cyanide, amenable	SM4500-CN G
102.200	001	Fluoride	SM4500-F C
102.260	001	Total Organic Carbon	SM5310B
102.261	001	DOC	SM5310B
102.262	001	Total Organic Carbon	SM5310C
102.263	001	DOC	SM5310C
102.270	001	Surfactants	SM5540C
102.520	001	Calcium	EPA 200.7
102.520	002	Magnesium	EPA 200.7
102.520	003	Potassium	EPA 200.7
102.520	004	Silica	EPA 200.7
102.520	005	Sodium	EPA 200.7
102.520	006	Hardness (calc.)	EPA 200.7

Field of Testing: 103 - Toxic Chemical Elements of Drinking Water

103.130	001	Aluminum	EPA 200.7
103.130	007	Chromium	EPA 200.7
103.130	008	Copper	EPA 200.7
103.130	009	Iron	EPA 200.7
103.130	011	Manganese	EPA 200.7
103.130	012	Nickel	EPA 200.7
103.130	015	Silver	EPA 200.7
103.130	017	Zinc	EPA 200.7
103.130	018	Boron	EPA 200.7
103.140	001	Aluminum	EPA 200.8
103.140	002	Antimony	EPA 200.8
103.140	003	Arsenic	EPA 200.8
103.140	004	Barium	EPA 200.8

As of 12/29/2005 , this list supersedes all previous lists for this certificate number.
Customers: Please verify the current accreditation standing with the State.

103.140	005	Beryllium	EPA 200.8
103.140	006	Cadmium	EPA 200.8
103.140	007	Chromium	EPA 200.8
103.140	008	Copper	EPA 200.8
103.140	009	Lead	EPA 200.8
103.140	010	Manganese	EPA 200.8
103.140	012	Nickel	EPA 200.8
103.140	013	Selenium	EPA 200.8
103.140	014	Silver	EPA 200.8
103.140	015	Thallium	EPA 200.8
103.140	016	Zinc	EPA 200.8
103.140	018	Vanadium	EPA 200.8
103.150	009	Lead	EPA 200.9
103.150	012	Selenium	EPA 200.9
103.160	001	Mercury	EPA 245.1
103.310	001	Chromium (VI)	EPA 218.6
Field of Testing: 106 - Radiochemistry of Drinking Water			
106.092	001	Uranium	EPA 200.8
Field of Testing: 108 - Inorganic Chemistry of Wastewater			
108.020	001	Conductivity	EPA 120.1
108.040	001	Hardness	EPA 130.2
108.050	001	pH	EPA 150.1
108.060	001	Residue, Filterable	EPA 160.1
108.070	001	Residue, Non-filterable	EPA 160.2
108.080	001	Residue, Total	EPA 160.3
108.090	001	Residue, Volatile	EPA 160.4
108.100	001	Residue, Settleable	EPA 160.5
108.110	001	Turbidity	EPA 180.1
108.112	001	Boron	EPA 200.7
108.112	002	Calcium	EPA 200.7
108.112	003	Hardness (calc.)	EPA 200.7
108.112	004	Magnesium	EPA 200.7
108.112	005	Potassium	EPA 200.7
108.112	006	Silica	EPA 200.7
108.112	007	Sodium	EPA 200.7
108.120	001	Bromide	EPA 300.0
108.120	002	Chloride	EPA 300.0
108.120	003	Fluoride	EPA 300.0
108.120	004	Nitrate	EPA 300.0
108.120	005	Nitrite	EPA 300.0
108.120	006	Nitrate-nitrite, Total	EPA 300.0
108.120	007	Phosphate, Ortho	EPA 300.0
108.120	008	Sulfate	EPA 300.0
108.130	001	Acidity	EPA 305.1
108.140	001	Alkalinity	EPA 310.1
108.174	001	Chlorine Residual, Total	EPA 330.5
108.180	001	Cyanide, amenable	EPA 335.1
108.181	001	Cyanide, Total	EPA 335.2
108.201	001	Ammonia	EPA 350.2
108.202	001	Ammonia	EPA 350.3
108.212	001	Kjeldahl Nitrogen	EPA 351.3
108.250	001	Dissolved Oxygen	EPA 360.1
108.264	001	Phosphate, Ortho	EPA 365.3
108.265	001	Phosphorus, Total	EPA 365.3
108.291	001	Sulfide	EPA 376.2

108.310	001	Biochemical Oxygen Demand	EPA 405.1
108.323	001	Chemical Oxygen Demand	EPA 410.4
108.330	001	Oil and Grease	EPA 413.1
108.340	001	Total Organic Carbon	EPA 415.1
108.350	001	Total Recoverable Petroleum Hydrocarbons	EPA 418.1
108.360	001	Phenols, Total	EPA 420.1
108.370	001	Surfactants	EPA 425.1
108.380	001	Oil and Grease	EPA 1664
108.390	001	Turbidity	SM2130B
108.400	001	Acidity	SM2310B
108.410	001	Alkalinity	SM2320B
108.420	001	Hardness (calc)	SM2340B
108.421	001	Hardness	SM2340C
108.430	001	Conductivity	SM2510B
108.440	001	Residue, Total	SM2540B
108.441	001	Residue, Filterable	SM2540C
108.442	001	Residue, Non-filterable	SM2540D
108.443	001	Residue, Settleable	SM2540F
108.470	001	Cyanide, Manual Distillation	SM4500-CN C
108.472	001	Cyanide, Total	SM4500-CN E
108.473	001	Cyanide, amenable	SM4500-CN G
108.480	001	Fluoride	SM4500-F C
108.490	001	pH	SM4500-H+ B
108.500	001	Ammonia	SM4500-NH3 C
108.501	001	Kjeldahl Nitrogen	SM4500-NH3 C
108.502	001	Ammonia	SM4500-NH3 E
108.531	001	Dissolved Oxygen	SM4500-O G
108.580	001	Sulfide	SM4500-S= D
108.581	001	Sulfide	SM4500-S= E (18th)
108.590	001	Biochemical Oxygen Demand	SM5210B
108.591	001	Carbonaceous BOD	SM5210B
108.602	001	Chemical Oxygen Demand	SM5220D
108.610	001	Total Organic Carbon	SM5310B
108.640	001	Surfactants	SM5540C

Field of Testing: 109 - Toxic Chemical Elements of Wastewater

109.010	001	Aluminum	EPA 200.7
109.010	002	Antimony	EPA 200.7
109.010	003	Arsenic	EPA 200.7
109.010	004	Barium	EPA 200.7
109.010	005	Beryllium	EPA 200.7
109.010	007	Cadmium	EPA 200.7
109.010	009	Chromium	EPA 200.7
109.010	010	Cobalt	EPA 200.7
109.010	011	Copper	EPA 200.7
109.010	012	Iron	EPA 200.7
109.010	013	Lead	EPA 200.7
109.010	015	Manganese	EPA 200.7
109.010	016	Molybdenum	EPA 200.7
109.010	017	Nickel	EPA 200.7
109.010	019	Selenium	EPA 200.7
109.010	021	Silver	EPA 200.7
109.010	023	Thallium	EPA 200.7
109.010	024	Tin	EPA 200.7
109.010	026	Vanadium	EPA 200.7
109.010	027	Zinc	EPA 200.7

109.020	001	Aluminum	EPA 200.8
109.020	002	Antimony	EPA 200.8
109.020	003	Arsenic	EPA 200.8
109.020	004	Barium	EPA 200.8
109.020	005	Beryllium	EPA 200.8
109.020	006	Cadmium	EPA 200.8
109.020	007	Chromium	EPA 200.8
109.020	008	Cobalt	EPA 200.8
109.020	009	Copper	EPA 200.8
109.020	010	Lead	EPA 200.8
109.020	011	Manganese	EPA 200.8
109.020	012	Molybdenum	EPA 200.8
109.020	013	Nickel	EPA 200.8
109.020	014	Selenium	EPA 200.8
109.020	015	Silver	EPA 200.8
109.020	016	Thallium	EPA 200.8
109.020	017	Vanadium	EPA 200.8
109.020	018	Zinc	EPA 200.8
109.050	001	Arsenic	EPA 206.2
109.104	001	Chromium (VI)	EPA 218.6
109.121	001	Copper	EPA 220.2
109.161	001	Lead	EPA 239.2
109.190	001	Mercury	EPA 245.1
109.280	001	Selenium	EPA 270.2
109.311	001	Thallium	EPA 279.2
109.811	001	Chromium (VI)	SM3500-Cr D
Field of Testing:		110 - Volatile Organic Chemistry of Wastewater	
110.040	040	Halogenated Hydrocarbons	EPA 624
110.040	041	Aromatic Compounds	EPA 624
110.040	042	Oxygenates	EPA 624
110.040	043	Other Volatile Organics	EPA 624
Field of Testing:		111 - Semi-volatile Organic Chemistry of Wastewater	
111.101	032	Polynuclear Aromatic Hydrocarbons	EPA 625
111.101	034	Phthalates	EPA 625
111.101	036	Other Extractables	EPA 625
111.170	030	Organochlorine Pesticides	EPA 608
111.170	031	PCBs	EPA 608
Field of Testing:		114 - Inorganic Chemistry of Hazardous Waste	
114.010	001	Antimony	EPA 6010B
114.010	002	Arsenic	EPA 6010B
114.010	003	Barium	EPA 6010B
114.010	004	Beryllium	EPA 6010B
114.010	005	Cadmium	EPA 6010B
114.010	006	Chromium	EPA 6010B
114.010	007	Cobalt	EPA 6010B
114.010	008	Copper	EPA 6010B
114.010	009	Lead	EPA 6010B
114.010	010	Molybdenum	EPA 6010B
114.010	011	Nickel	EPA 6010B
114.010	012	Selenium	EPA 6010B
114.010	013	Silver	EPA 6010B
114.010	014	Thallium	EPA 6010B
114.010	015	Vanadium	EPA 6010B
114.010	016	Zinc	EPA 6010B

114.020	001	Antimony	EPA 6020
114.020	002	Arsenic	EPA 6020
114.020	003	Barium	EPA 6020
114.020	004	Beryllium	EPA 6020
114.020	005	Cadmium	EPA 6020
114.020	006	Chromium	EPA 6020
114.020	007	Cobalt	EPA 6020
114.020	008	Copper	EPA 6020
114.020	009	Lead	EPA 6020
114.020	010	Molybdenum	EPA 6020
114.020	011	Nickel	EPA 6020
114.020	012	Selenium	EPA 6020
114.020	013	Silver	EPA 6020
114.020	014	Thallium	EPA 6020
114.020	015	Vanadium	EPA 6020
114.020	016	Zinc	EPA 6020
114.040	001	Arsenic	EPA 7060A
114.103	001	Chromium (VI)	EPA 7196A
114.106	001	Chromium (VI)	EPA 7199
114.131	001	Lead	EPA 7421
114.140	001	Mercury	EPA 7470A
114.141	001	Mercury	EPA 7471A
114.170	001	Selenium	EPA 7740
114.221	001	Cyanide, Total	EPA 9012A
114.222	001	Cyanide	EPA 9014
114.230	001	Sulfides, Total	EPA 9034
114.240	001	pH	EPA 9040
114.241	001	pH	EPA 9045
114.250	001	Fluoride	EPA 9056
114.280	001	Organic Lead	HML 939-M

Field of Testing: 115 - Extraction Test of Hazardous Waste

115.020	001	Toxicity Characteristic Leaching Procedure (TCLP)	EPA 1311
115.030	001	Waste Extraction Test (WET)	CCR Chapter11, Article 5, Appendix II
115.040	001	Synthetic Precipitation Leach ng Procedure (SPLP)	EPA 1312

Field of Testing: 116 - Volatile Organic Chemistry of Hazardous Waste

116.020	030	Nonhalogenated Volatiles	EPA 8015B
116.030	001	Gasoline-range Organics	EPA 8015B
116.040	041	Methyl tert-butyl Ether (MTBE)	EPA 8021B
116.040	062	BTEX	EPA 8021B
116.080	000	Volatile Organic Compounds	EPA 8260B
116.080	120	Oxygenates	EPA 8260B
116.100	001	Total Petroleum Hydrocarbons - Gasoline	LUFT GC/MS
116.100	010	BTEX and MTBE	LUFT GC/MS
116.110	001	Total Petroleum Hydrocarbons - Gasoline	LUFT

Field of Testing: 117 - Semi-volatile Organic Chemistry of Hazardous Waste

117.010	001	Diesel-range Total Petroleum Hydrocarbons	EPA 8015B
117.016	001	Diesel-range Total Petroleum Hydrocarbons	LUFT
117.017	001	TRPH Screening	EPA 418.1
117.110	000	Extractable Organics	EPA 8270C
117.210	000	Organochlorine Pesticides	EPA 8081A
117.220	000	PCBs	EPA 8082

Field of Testing: 120 - Physical Properties of Hazardous Waste

120.010	001	Ignitability	EPA 1010
120.070	001	Corrosivity - pH Determination	EPA 9040B

120.080	001	Corrosivity - pH Determination	EPA 9045C

STATE OF CALIFORNIA
DEPARTMENT OF HEALTH SERVICES
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

ENVIRONMENTAL LABORATORY CERTIFICATION

Is hereby granted to

SEQ CORPORATION dba TESTAMERICA

IRVINE LABORATORY

17461 DERIAN AVENUE, SUITE 100

IRVINE, CA 92614

Scope of certification is limited to the
"Accredited Fields of Testing"
which accompanies this Certificate.

Continued certification status depends on successful completion of site visit, proficiency testing studies, and payment of applicable fees.

This Certificate is granted in accordance with provisions of Section 100825, et seq. of the Health and Safety Code.

Certificate No.: **1197**

Expiration Date: **05/31/2008**

Effective Date: **05/22/2006**

Richmond, California
subject to forfeiture or revocation

George C. Kulasingam

George C. Kulasingam, Ph.D.
Program Chief
Environmental Laboratory Accreditation Progra

CALIFORNIA DEPARTMENT OF HEALTH SERVICES

ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM - NELAP RECOGNIZED

Fields of Accreditation

SEQ CORPORATION dba TESTAMERICA
IRVINE LABORATORY
17461 DERIAN AVENUE, SUITE 100
IRVINE, CA 92614

Lab Phone (949) 261-1022

Certificate No: 01108CA Renew Date: 01/31/2007

102 - Inorganic Chemistry of Drinking Water

102.020	001	EPA 180.1	Turbidity
102.022	001	SM2130B	Turbidity
102.030	001	EPA 300.0	Bromide
102.030	003	EPA 300.0	Chloride
102.030	005	EPA 300.0	Fluoride
102.030	006	EPA 300.0	Nitrate
102.030	007	EPA 300.0	Nitrite
102.030	008	EPA 300.0	Phosphate, Ortho
102.030	010	EPA 300.0	Sulfate
102.045	001	EPA 314.0	Perchlorate
102.100	001	SM2320B	Alkalinity
102.120	001	SM2340B	Hardness
102.121	001	SM2340C	Hardness
102.130	001	SM2510B	Conductivity
102.140	001	SM2540C	Total Dissolved Solids
102.145	001	EPA 160.1	Total Dissolved Solids
102.150	001	SM4110B	Chloride
102.150	002	SM4110B	Fluoride
102.150	003	SM4110B	Nitrate
102.150	004	SM4110B	Nitrite
102.150	005	SM4110B	Phosphate, Ortho
102.150	006	SM4110B	Sulfate
102.190	001	SM4500-CN E	Cyanide, Total
102.192	001	SM4500-CN G	Cyanide, amenable
102.200	001	SM4500-F C	Fluoride
102.210	001	SM4500-H+ B	pH
102.212	001	EPA 150.1	pH
102.260	001	SM5310B	Total Organic Carbon
102.261	001	SM5310B	DOC
102.270	001	SM5540C	Surfactants
102.520	001	EPA 200.7	Calcium
102.520	002	EPA 200.7	Magnesium
102.520	003	EPA 200.7	Potassium
102.520	004	EPA 200.7	Silica

As of 08/14/2006, this list supersedes all previous lists for this certificate number.
Customers: Please verify the current accreditation standing with the State.

102.520	005	EPA 200.7	Sodium
102.520	006	EPA 200.7	Hardness (calc.)

103 - Toxic Chemical Elements of Drinking Water

103.130	001	EPA 200.7	Aluminum
103.130	003	EPA 200.7	Barium
103.130	007	EPA 200.7	Chromium
103.130	008	EPA 200.7	Copper
103.130	009	EPA 200.7	Iron
103.130	011	EPA 200.7	Manganese
103.130	012	EPA 200.7	Nickel
103.130	015	EPA 200.7	Silver
103.130	017	EPA 200.7	Zinc
103.140	001	EPA 200.8	Aluminum
103.140	002	EPA 200.8	Antimony
103.140	003	EPA 200.8	Arsenic
103.140	004	EPA 200.8	Barium
103.140	005	EPA 200.8	Beryllium
103.140	006	EPA 200.8	Cadmium
103.140	007	EPA 200.8	Chromium
103.140	008	EPA 200.8	Copper
103.140	009	EPA 200.8	Lead
103.140	010	EPA 200.8	Manganese
103.140	012	EPA 200.8	Nickel
103.140	013	EPA 200.8	Selenium
103.140	014	EPA 200.8	Silver
103.140	015	EPA 200.8	Thallium
103.140	016	EPA 200.8	Zinc
103.150	009	EPA 200.9	Lead
103.150	012	EPA 200.9	Selenium
103.160	001	EPA 245.1	Mercury

108 - Inorganic Chemistry of Wastewater

108.016	001	EPA 110.2	Color
108.020	001	EPA 120.1	Conductivity
108.040	001	EPA 130.2	Hardness
108.050	001	EPA 150.1	pH
108.060	001	EPA 160.1	Residue, Filterable
108.070	001	EPA 160.2	Residue, Non-filterable
108.080	001	EPA 160.3	Residue, Total
108.090	001	EPA 160.4	Residue, Volatile
108.100	001	EPA 160.5	Residue, Settleable
108.110	001	EPA 180.1	Turbidity

108.112	001	EPA 200.7	Boron
108.112	002	EPA 200.7	Calcium
108.112	003	EPA 200.7	Hardness (calc.)
108.112	004	EPA 200.7	Magnesium
108.112	005	EPA 200.7	Potassium
108.112	006	EPA 200.7	Silica
108.112	007	EPA 200.7	Sodium
108.120	001	EPA 300.0	Bromide
108.120	002	EPA 300.0	Chloride
108.120	003	EPA 300.0	Fluoride
108.120	004	EPA 300.0	Nitrate
108.120	005	EPA 300.0	Nitrite
108.120	006	EPA 300.0	Nitrate-nitrite, Total
108.120	007	EPA 300.0	Phosphate, Ortho
108.120	008	EPA 300.0	Sulfate
108.130	001	EPA 305.1	Acidity
108.140	001	EPA 310.1	Alkalinity
108.174	001	EPA 330.5	Chlorine Residual, Total
108.181	001	EPA 335.2	Cyanide, Total
108.191	001	EPA 340.2	Fluoride
108.201	001	EPA 350.2	Ammonia
108.202	001	EPA 350.3	Ammonia
108.250	001	EPA 360.1	Dissolved Oxygen
108.264	001	EPA 365.3	Phosphate, Ortho
108.265	001	EPA 365.3	Phosphorus, Total
108.291	001	EPA 376.2	Sulfide
108.310	001	EPA 405.1	Biochemical Oxygen Demand
108.323	001	EPA 410.4	Chemical Oxygen Demand
108.330	001	EPA 413.1	Oil and Grease
108.340	001	EPA 415.1	Total Organic Carbon
108.350	001	EPA 418.1	Total Recoverable Petroleum Hydrocarbons
108.360	001	EPA 420.1	Phenols, Total
108.370	001	EPA 425.1	Surfactants
108.380	001	EPA 1664	Oil and Grease
108.385	001	SM2120B	Color
108.390	001	SM2130B	Turbidity
108.410	001	SM2320B	Alkalinity
108.420	001	SM2340B	Hardness (calc.)
108.421	001	SM2340C	Hardness
108.430	001	SM2510B	Conductivity
108.440	001	SM2540B	Residue, Total

108.441	001	SM2540C	Residue, Filterable
108.442	001	SM2540D	Residue, Non-filterable
108.443	001	SM2540F	Residue, Settleable
108.472	001	SM4500-CN E	Cyanide, Total
108.480	001	SM4500-F C	Fluoride
108.490	001	SM4500-H+ B	pH
108.500	001	SM4500-NH3 C	Ammonia
108.501	001	SM4500-NH3 C	Kjeldahl Nitrogen
108.502	001	SM4500-NH3 E	Ammonia
108.530	001	SM4500-O C	Dissolved Oxygen
108.580	001	SM4500-S= D	Sulfide
108.590	001	SM5210B	Biochemical Oxygen Demand
108.591	001	SM5210B	Carbonaceous BOD
108.602	001	SM5220D	Chemical Oxygen Demand
108.610	001	SM5310B	Total Organic Carbon
108.640	001	SM5540C	Surfactants

109 - Toxic Chemical Elements of Wastewater

109.010	001	EPA 200.7	Aluminum
109.010	002	EPA 200.7	Antimony
109.010	003	EPA 200.7	Arsenic
109.010	004	EPA 200.7	Barium
109.010	005	EPA 200.7	Beryllium
109.010	007	EPA 200.7	Cadmium
109.010	009	EPA 200.7	Chromium
109.010	010	EPA 200.7	Cobalt
109.010	011	EPA 200.7	Copper
109.010	012	EPA 200.7	Iron
109.010	013	EPA 200.7	Lead
109.010	015	EPA 200.7	Manganese
109.010	016	EPA 200.7	Molybdenum
109.010	017	EPA 200.7	Nickel
109.010	019	EPA 200.7	Selenium
109.010	021	EPA 200.7	Silver
109.010	023	EPA 200.7	Thallium
109.010	024	EPA 200.7	Tin
109.010	026	EPA 200.7	Vanadium
109.010	027	EPA 200.7	Zinc
109.020	001	EPA 200.8	Aluminum
109.020	002	EPA 200.8	Antimony
109.020	003	EPA 200.8	Arsenic
109.020	004	EPA 200.8	Barium

109.020	005	EPA 200.8	Beryllium
109.020	006	EPA 200.8	Cadmium
109.020	007	EPA 200.8	Chromium
109.020	008	EPA 200.8	Cobalt
109.020	009	EPA 200.8	Copper
109.020	010	EPA 200.8	Lead
109.020	011	EPA 200.8	Manganese
109.020	012	EPA 200.8	Molybdenum
109.020	013	EPA 200.8	Nickel
109.020	014	EPA 200.8	Selenium
109.020	015	EPA 200.8	Silver
109.020	016	EPA 200.8	Thallium
109.020	017	EPA 200.8	Vanadium
109.020	018	EPA 200.8	Zinc
109.050	001	EPA 206.2	Arsenic
109.104	001	EPA 218.6	Chromium (VI)
109.161	001	EPA 239.2	Lead
109.190	001	EPA 245.1	Mercury
109.280	001	EPA 270.2	Selenium
109.811	001	SM3500-Cr D	Chromium (VI)

110 - Volatile Organic Chemistry of Wastewater

110.040	001	EPA 624	Benzene
110.040	002	EPA 624	Bromodichloromethane
110.040	003	EPA 624	Bromoform
110.040	004	EPA 624	Bromomethane
110.040	005	EPA 624	Carbon Tetrachloride
110.040	006	EPA 624	Chlorobenzene
110.040	007	EPA 624	Chloroethane
110.040	008	EPA 624	2-Chloroethyl Vinyl Ether
110.040	009	EPA 624	Chloroform
110.040	010	EPA 624	Chloromethane
110.040	011	EPA 624	Dibromochloromethane
110.040	012	EPA 624	1,2-Dichlorobenzene
110.040	013	EPA 624	1,3-Dichlorobenzene
110.040	014	EPA 624	1,4-Dichlorobenzene
110.040	015	EPA 624	1,1-Dichloroethane
110.040	016	EPA 624	1,2-Dichloroethane
110.040	017	EPA 624	1,1-Dichloroethene
110.040	018	EPA 624	trans-1,2-Dichloroethene
110.040	019	EPA 624	1,2-Dichloropropane
110.040	020	EPA 624	cis-1,3-Dichloropropene

110.040	021	EPA 624	trans-1,3-Dichloropropene
110.040	022	EPA 624	Ethylbenzene
110.040	023	EPA 624	Methylene Chloride
110.040	024	EPA 624	1,1,2,2-Tetrachloroethane
110.040	025	EPA 624	Tetrachloroethene
110.040	026	EPA 624	Toluene
110.040	027	EPA 624	1,1,1-Trichloroethane
110.040	028	EPA 624	1,1,2-Trichloroethane
110.040	029	EPA 624	Trichloroethene
110.040	030	EPA 624	Trichlorofluoromethane
110.040	031	EPA 624	Vinyl Chloride
110.040	040	EPA 624	Halogenated Hydrocarbons
110.040	041	EPA 624	Aromatic Compounds
110.040	042	EPA 624	Oxygenates
110.040	043	EPA 624	Other Volatile Organics

111 - Semi-volatile Organic Chemistry of Wastewater

111.100	001	EPA 625	Acenaphthene
111.100	002	EPA 625	Acenaphthylene
111.100	003	EPA 625	Anthracene
111.100	004	EPA 625	Benzidine
111.100	005	EPA 625	Benz(a)anthracene
111.100	006	EPA 625	Benzo(b)fluoranthene
111.100	007	EPA 625	Benzo(k)fluoranthene
111.100	008	EPA 625	Benzo(g,h,i)perylene
111.100	009	EPA 625	Benzo(a)pyrene
111.100	010	EPA 625	Benzyl Butyl Phthalate
111.100	011	EPA 625	Bis(2-chloroethoxy)methane
111.100	012	EPA 625	Bis(2-chloroethyl) Ether
111.100	013	EPA 625	Bis(2-chloroisopropyl) Ether
111.100	014	EPA 625	Di(2-ethylhexyl) Phthalate
111.100	015	EPA 625	4-Bromophenyl Phenyl Ether
111.100	016	EPA 625	4-Chloro-3-methylphenol
111.100	017	EPA 625	2-Chloronaphthalene
111.100	018	EPA 625	2-Chlorophenol
111.100	019	EPA 625	4-Chlorophenyl Phenyl Ether
111.100	020	EPA 625	Chrysene
111.100	021	EPA 625	Dibenz(a,h)anthracene
111.100	022	EPA 625	1,2-Dichlorobenzene
111.100	023	EPA 625	1,3-Dichlorobenzene
111.100	024	EPA 625	1,4-Dichlorobenzene
111.100	025	EPA 625	3,3'-Dichlorobenzidine

111 100	026	EPA 625	2,4-Dichlorophenol
111.100	027	EPA 625	Diethyl Phthalate
111.100	028	EPA 625	2,4-Dimethylphenol
111.100	029	EPA 625	Dimethyl Phthalate
111.100	030	EPA 625	Di-n-butyl phthalate
111.100	031	EPA 625	Di-n-octyl phthalate
111.100	032	EPA 625	2,4-Dinitrophenol
111.100	033	EPA 625	2,4-Dinitrotoluene
111.100	034	EPA 625	2,6-Dinitrotoluene
111.100	035	EPA 625	Fluoranthene
111.100	036	EPA 625	Fluorene
111.100	037	EPA 625	Hexachlorobenzene
111.100	038	EPA 625	Hexachlorobutadiene
111.100	039	EPA 625	Hexachlorocyclopentadiene
111.100	040	EPA 625	Hexachloroethane
111.100	041	EPA 625	Indeno(1,2,3-c,d)pyrene
111.100	042	EPA 625	Isophorone
111.100	043	EPA 625	2-Methyl-4,6-dinitrophenol
111.100	044	EPA 625	Naphthalene
111.100	045	EPA 625	Nitrobenzene
111.100	046	EPA 625	2-Nitrophenol
111.100	047	EPA 625	4-Nitrophenol
111.100	048	EPA 625	N-nitrosodimethylamine
111.100	049	EPA 625	N-nitrosodi-n-propylamine
111.100	050	EPA 625	N-nitrosodiphenylamine
111.100	051	EPA 625	Pentachlorophenol
111.100	052	EPA 625	Phenanthrene
111.100	053	EPA 625	Phenol
111.100	054	EPA 625	Pyrene
111.100	055	EPA 625	1,2,4-Trichlorobenzene
111.100	056	EPA 625	2,4,6-Trichlorophenol
111.170	001	EPA 608	Aldrin
111.170	002	EPA 608	a-BHC
111.170	003	EPA 608	b-BHC
111.170	004	EPA 608	d-BHC
111.170	005	EPA 608	g-BHC (Lindane)
111.170	006	EPA 608	Chlordane
111.170	007	EPA 608	4,4'-DDD
111.170	008	EPA 608	4,4'-DDE
111.170	009	EPA 608	4,4'-DDT
111.170	010	EPA 608	Dieldrin

111.170	011	EPA 608	Endosulfan I
111.170	012	EPA 608	Endosulfan II
111.170	013	EPA 608	Endosulfan Sulfate
111.170	014	EPA 608	Endrin
111.170	015	EPA 608	Endrin Aldehyde
111.170	016	EPA 608	Heptachlor
111.170	017	EPA 608	Heptachlor Epoxide
111.170	018	EPA 608	Toxaphene
111.170	019	EPA 608	PCB-1016
111.170	020	EPA 608	PCB-1221
111.170	021	EPA 608	PCB-1232
111.170	022	EPA 608	PCB-1242
111.170	023	EPA 608	PCB-1248
111.170	024	EPA 608	PCB-1254
111.170	025	EPA 608	PCB-1260
111.170	030	EPA 608	Organochlorine Pesticides
111.170	031	EPA 608	PCBs
111.270	001	EPA 413.1	Oil and Grease

114 - Inorganic Chemistry of Hazardous Waste

114.010	001	EPA 6010B	Antimony
114.010	002	EPA 6010B	Arsenic
114.010	003	EPA 6010B	Barium
114.010	004	EPA 6010B	Beryllium
114.010	005	EPA 6010B	Cadmium
114.010	006	EPA 6010B	Chromium
114.010	007	EPA 6010B	Cobalt
114.010	008	EPA 6010B	Copper
114.010	009	EPA 6010B	Lead
114.010	010	EPA 6010B	Molybdenum
114.010	011	EPA 6010B	Nickel
114.010	012	EPA 6010B	Selenium
114.010	013	EPA 6010B	Silver
114.010	014	EPA 6010B	Thallium
114.010	015	EPA 6010B	Vanadium
114.010	016	EPA 6010B	Zinc
114.020	001	EPA 6020	Antimony
114.020	002	EPA 6020	Arsenic
114.020	003	EPA 6020	Barium
114.020	004	EPA 6020	Beryllium
114.020	005	EPA 6020	Cadmium
114.020	006	EPA 6020	Chromium

114.020	007	EPA 6020	Cobalt
114.020	008	EPA 6020	Copper
114.020	009	EPA 6020	Lead
114.020	010	EPA 6020	Molybdenum
114.020	011	EPA 6020	Nickel
114.020	012	EPA 6020	Selenium
114.020	013	EPA 6020	Silver
114.020	014	EPA 6020	Thallium
114.020	015	EPA 6020	Vanadium
114.020	016	EPA 6020	Zinc
114.040	001	EPA 7060A	Arsenic
114.103	001	EPA 7196A	Chromium (VI)
114.106	001	EPA 7199	Chromium (VI)
114.131	001	EPA 7421	Lead
114.140	001	EPA 7470A	Mercury
114.141	001	EPA 7471A	Mercury
114.170	001	EPA 7740	Selenium
114.222	001	EPA 9014	Cyanide
114.230	001	EPA 9034	Sulfides, Total
114.240	001	EPA 9040	pH
114.241	001	EPA 9045	pH
114.250	001	EPA 9056	Fluoride

115 - Extraction Test of Hazardous Waste

115.020	001	EPA 1311	Toxicity Characteristic Leaching Procedure (TCLP)
115.030	001	CCR Chapter11, Article 5, Appendix II	Waste Extraction Test (WET)
115.040	001	EPA 1312	Synthetic Precipitation Leaching Procedure (SPLP)

116 - Volatile Organic Chemistry of Hazardous Waste

116.030	001	EPA 8015B	Gasoline-range Organics
116.040	002	EPA 8021B	Benzene
116.040	039	EPA 8021B	Ethylbenzene
116.040	041	EPA 8021B	Methyl tert-butyl Ether (MTBE)
116.040	047	EPA 8021B	Toluene
116.040	056	EPA 8021B	Xylenes, Total
116.080	000	EPA 8260B	Volatile Organic Compounds
116.080	001	EPA 8260B	Acetone
116.080	002	EPA 8260B	Acetonitrile
116.080	003	EPA 8260B	Acrolein
116.080	004	EPA 8260B	Acrylonitrile
116.080	006	EPA 8260B	Allyl Chloride
116.080	007	EPA 8260B	Benzene
116.080	010	EPA 8260B	Bromochloromethane

116.080	011	EPA 8260B	Bromodichloromethane
116.080	012	EPA 8260B	Bromoform
116.080	013	EPA 8260B	Bromomethane
116.080	015	EPA 8260B	Carbon Disulfide
116.080	016	EPA 8260B	Carbon Tetrachloride
116.080	018	EPA 8260B	Chlorobenzene
116.080	019	EPA 8260B	Chloroethane
116.080	020	EPA 8260B	2-Chloroethyl Vinyl Ether
116.080	021	EPA 8260B	Chloroform
116.080	022	EPA 8260B	Chloromethane
116.080	026	EPA 8260B	Dibromochloromethane
116.080	027	EPA 8260B	Dibromochloropropane
116.080	028	EPA 8260B	1,2-Dibromoethane
116.080	029	EPA 8260B	Dibromofluoromethane
116.080	030	EPA 8260B	Dibromomethane
116.080	031	EPA 8260B	1,2-Dichlorobenzene
116.080	032	EPA 8260B	1,3-Dichlorobenzene
116.080	033	EPA 8260B	1,4-Dichlorobenzene
116.080	035	EPA 8260B	trans-1,4-Dichloro-2-butene
116.080	036	EPA 8260B	Dichlorodifluoromethane
116.080	037	EPA 8260B	1,1-Dichloroethane
116.080	038	EPA 8260B	1,2-Dichloroethane
116.080	039	EPA 8260B	1,1-Dichloroethene
116.080	040	EPA 8260B	trans-1,2-Dichloroethene
116.080	041	EPA 8260B	cis-1,2-Dichloroethene
116.080	042	EPA 8260B	1,2-Dichloropropane
116.080	043	EPA 8260B	1,3-Dichloropropane
116.080	044	EPA 8260B	2,2-Dichloropropane
116.080	045	EPA 8260B	1,1-Dichloropropene
116.080	046	EPA 8260B	cis-1,3-Dichloropropene
116.080	047	EPA 8260B	trans-1,3-Dichloropropene
116.080	050	EPA 8260B	1,4-Dioxane
116.080	053	EPA 8260B	Ethylbenzene
116.080	055	EPA 8260B	Ethyl Methacrylate
116.080	056	EPA 8260B	Hexachlorobutadiene
116.080	057	EPA 8260B	Hexachloroethane
116.080	058	EPA 8260B	2-Hexanone (MBK)
116.080	059	EPA 8260B	Iodomethane
116.080	060	EPA 8260B	Isobutyl Alcohol
116.080	064	EPA 8260B	Methyl tert-butyl Ether (MTBE)
116.080	065	EPA 8260B	Methylene Chloride

116.080	066	EPA 8260B	Methyl Ethyl Ketone
116.080	067	EPA 8260B	Methyl Methacrylate
116.080	068	EPA 8260B	4-Methyl-2-pentanone (MIBK)
116.080	078	EPA 8260B	Propionitrile
116.080	081	EPA 8260B	1,1,1,2-Tetrachloroethane
116.080	082	EPA 8260B	1,1,2,2-Tetrachloroethane
116.080	083	EPA 8260B	Tetrachloroethene
116.080	084	EPA 8260B	Toluene
116.080	086	EPA 8260B	1,2,3-Trichlorobenzene
116.080	087	EPA 8260B	1,2,4-Trichlorobenzene
116.080	088	EPA 8260B	1,1,1-Trichloroethane
116.080	089	EPA 8260B	1,1,2-Trichloroethane
116.080	092	EPA 8260B	1,2,3-Trichloropropane
116.080	093	EPA 8260B	Vinyl Acetate
116.080	094	EPA 8260B	Vinyl Chloride
116.080	095	EPA 8260B	Xylenes, Total
116.080	096	EPA 8260B	tert-Amyl Methyl Ether (TAME)
116.080	097	EPA 8260B	tert-Butyl Alcohol (TBA)
116.080	098	EPA 8260B	Ethyl tert-butyl Ether (ETBE)
116.080	099	EPA 8260B	Bromobenzene
116.080	100	EPA 8260B	n-Butylbenzene
116.080	101	EPA 8260B	sec-Butylbenzene
116.080	102	EPA 8260B	tert-Butylbenzene
116.080	103	EPA 8260B	2-Chlorotoluene
116.080	104	EPA 8260B	4-Chlorotoluene
116.080	105	EPA 8260B	Isopropylbenzene
116.080	106	EPA 8260B	N-propylbenzene
116.080	107	EPA 8260B	Styrene
116.080	108	EPA 8260B	1,2,4-Trimethylbenzene
116.080	109	EPA 8260B	1,3,5-Trimethylbenzene
116.080	120	EPA 8260B	Oxygenates
116.100	001	LUFT GC/MS	Total Petroleum Hydrocarbons - Gasoline
116.110	001	LUFT	Total Petroleum Hydrocarbons - Gasoline

117 - Semi-volatile Organic Chemistry of Hazardous Waste

117.010	001	EPA 8015B	Diesel-range Total Petroleum Hydrocarbons
117.016	001	LUFT	Diesel-range Total Petroleum Hydrocarbons
117.017	001	EPA 418.1	TRPH Screening
117.110	001	EPA 8270C	Acenaphthene
117.110	002	EPA 8270C	Acenaphthylene
117.110	007	EPA 8270C	Aniline
117.110	008	EPA 8270C	Anthracene

117.110	010	EPA 8270C	Benzidine
117.110	011	EPA 8270C	Benz(a)anthracene
117.110	012	EPA 8270C	Benzo(b)fluoranthene
117.110	013	EPA 8270C	Benzo(k)fluoranthene
117.110	014	EPA 8270C	Benzo(g,h,i)perylene
117.110	015	EPA 8270C	Benzo(a)pyrene
117.110	016	EPA 8270C	Benzoic Acid
117.110	018	EPA 8270C	Benzyl Alcohol
117.110	019	EPA 8270C	Benzyl Butyl Phthalate
117.110	020	EPA 8270C	Bis(2-chloroethoxy)methane
117.110	021	EPA 8270C	Bis(2-chloroethyl) Ether
117.110	022	EPA 8270C	Bis(2-chloroisopropyl) Ether
117.110	023	EPA 8270C	Di(2-ethylhexyl) Phthalate
117.110	024	EPA 8270C	4-Bromophenyl Phenyl Ether
117.110	025	EPA 8270C	Carbazole
117.110	026	EPA 8270C	4-Chloroaniline
117.110	027	EPA 8270C	4-Chloro-3-methylphenol
117.110	029	EPA 8270C	2-Chloronaphthalene
117.110	030	EPA 8270C	2-Chlorophenol
117.110	031	EPA 8270C	4-Chlorophenyl Phenyl Ether
117.110	032	EPA 8270C	Chrysene
117.110	036	EPA 8270C	Dibenz(a,h)anthracene
117.110	037	EPA 8270C	Dibenzofuran
117.110	039	EPA 8270C	1,2-Dichlorobenzene
117.110	040	EPA 8270C	1,3-Dichlorobenzene
117.110	041	EPA 8270C	1,4-Dichlorobenzene
117.110	042	EPA 8270C	3,3'-Dichlorobenzidine
117.110	043	EPA 8270C	2,4-Dichlorophenol
117.110	045	EPA 8270C	Diethyl Phthalate
117.110	053	EPA 8270C	2,4-Dimethylphenol
117.110	054	EPA 8270C	Dimethyl Phthalate
117.110	055	EPA 8270C	Di-n-butyl phthalate
117.110	056	EPA 8270C	Di-n-octyl phthalate
117.110	060	EPA 8270C	2,4-Dinitrophenol
117.110	064	EPA 8270C	1,2-Diphenylhydrazine
117.110	067	EPA 8270C	Fluoranthene
117.110	068	EPA 8270C	Fluorene
117.110	069	EPA 8270C	Hexachlorobenzene
117.110	070	EPA 8270C	Hexachlorobutadiene
117.110	071	EPA 8270C	Hexachlorocyclopentadiene
117.110	072	EPA 8270C	Hexachloroethane

117.110	075	EPA 8270C	Indeno(1,2,3-c,d)pyrene
117.110	076	EPA 8270C	Isophorone
117.110	080	EPA 8270C	2-Methyl-4,6-dinitrophenol
117.110	083	EPA 8270C	2-Methylnaphthalene
117.110	084	EPA 8270C	2-Methylphenol
117.110	085	EPA 8270C	3-Methylphenol
117.110	086	EPA 8270C	4-Methylphenol
117.110	087	EPA 8270C	Naphthalene
117.110	092	EPA 8270C	2-Nitroaniline
117.110	093	EPA 8270C	3-Nitroaniline
117.110	094	EPA 8270C	4-Nitroaniline
117.110	095	EPA 8270C	Nitrobenzene
117.110	096	EPA 8270C	2-Nitrophenol
117.110	097	EPA 8270C	4-Nitrophenol
117.110	100	EPA 8270C	N-nitrosodimethylamine
117.110	101	EPA 8270C	N-nitrosodi-n-propylamine
117.110	102	EPA 8270C	N-nitrosodiphenylamine
117.110	110	EPA 8270C	Pentachlorophenol
117.110	112	EPA 8270C	Phenanthrene
117.110	113	EPA 8270C	Phenol
117.110	119	EPA 8270C	Pyrene
117.110	120	EPA 8270C	Pyridine
117.110	129	EPA 8270C	1,2,4-Trichlorobenzene
117.110	130	EPA 8270C	2,4,5-Trichlorophenol
117.110	131	EPA 8270C	2,4,6-Trichlorophenol
117.210	000	EPA 8081A	Organochlorine Pesticides
117.210	001	EPA 8081A	Aldrin
117.210	002	EPA 8081A	a-BHC
117.210	003	EPA 8081A	b-BHC
117.210	004	EPA 8081A	d-BHC
117.210	005	EPA 8081A	g-BHC (Lindane)
117.210	007	EPA 8081A	a-Chlordane
117.210	008	EPA 8081A	g-Chlordane
117.210	009	EPA 8081A	Chlordane (tech.)
117.210	013	EPA 8081A	4,4'-DDD
117.210	014	EPA 8081A	4,4'-DDE
117.210	015	EPA 8081A	4,4'-DDT
117.210	020	EPA 8081A	Dieldrin
117.210	021	EPA 8081A	Endosulfan I
117.210	022	EPA 8081A	Endosulfan II
117.210	023	EPA 8081A	Endosulfan Sulfate

117.210	024	EPA 8081A	Endrin
117.210	025	EPA 8081A	Endrin Aldehyde
117.210	026	EPA 8081A	Endrin Ketone
117.210	027	EPA 8081A	Heptachlor
117.210	028	EPA 8081A	Heptachlor Epoxide
117.210	033	EPA 8081A	Methoxychlor
117.210	039	EPA 8081A	Toxaphene
117.210	040	EPA 8081A	Trifluralin
117.220	000	EPA 8082	PCBs
117.220	001	EPA 8082	PCB-1016
117.220	002	EPA 8082	PCB-1221
117.220	003	EPA 8082	PCB-1232
117.220	004	EPA 8082	PCB-1242
117.220	005	EPA 8082	PCB-1248
117.220	006	EPA 8082	PCB-1254
117.220	007	EPA 8082	PCB-1260

120 - Physical Properties of Hazardous Waste

120.010	001	EPA 1010	Ignitability
120.070	001	EPA 9040B	Corrosivity - pH Determination
120.080	001	EPA 9045C	Corrosivity - pH Determination

Arizona
Department of
Health Services

ENVIRONMENTAL LABORATORY LICENSE

Issued to:

Laboratory Director: **Fred Haley**
Owner/Representative: **Thomas Barr**

TestAmerica-Irvine
AZ0671

is in compliance with Environmental Laboratory's applicable standards for the State of Arizona and maintains on file a List of Parameters for which the laboratory is certified to perform analysis.

PERIOD OF LICENSURE FROM: 10/14/2006 TO: 10/13/2007

GREAT SEAL OF THE STATE OF ARIZONA
DITAT DEUS
1912

Steven D. Baker, Chief
Office of Laboratory Services
Bureau of State Laboratory Services

Monday, September 25 2006

AZ License: AZ0671

Lab Director: Mr. Fred Haley

Lab Name: TestAmerica-Irvine
Phone: (949) 261-1022
Fax: (949) 261-1228

Program HW

Parameter	EPA Method	Billing Code	Cert Date
Perchlorate	EPA 314.0	NIIIA1	10/14/04
Acid-Base Partition	EPA 3650B	*	10/14/04
Alumina Column	EPA 3610B	*	10/14/04
Aluminum	EPA 6010B	MTL3	10/14/04
Aluminum	EPA 6020	MTL7	10/14/04
Antimony	EPA 6010B	MTL3	10/14/04
Antimony	EPA 6020	MTL7	10/14/04
Arsenic	EPA 6010B	MTL3	10/14/04
Arsenic	EPA 6020	MTL7	10/14/04
Barium	EPA 6010B	MTL3	10/14/04
Barium	EPA 6020	MTL7	10/14/04
Beryllium	EPA 6010B	MTL3	10/14/04
Beryllium	EPA 6020	MTL7	10/14/04
Cadmium	EPA 6010B	MTL3	10/14/04
Cadmium	EPA 6020	MTL7	10/14/04
Calcium	EPA 6010B	MTL3	10/14/04
Cation-Exchange Capacity Of Soil	EPA 9081	MISC23	10/14/04
Chromium Total	EPA 6010B	MTL3	10/14/04
Chromium Total	EPA 6020	MTL7	10/14/04
Chromium, Hexavalent	EPA 7196A	MTL4	10/14/04
Chromium, Hexavalent	EPA 7199	MISC24	10/14/04
Clean Up	EPA 3600C	*	10/14/04
Cobalt	EPA 6010B	MTL3	10/14/04
Cobalt	EPA 6020	MTL7	10/14/04
Continuous Liquid-Liquid Extraction	EPA 3520C	*	10/14/04
Copper	EPA 6010B	MTL3	10/14/04
Copper	EPA 6020	MTL7	10/14/04
Corrosivity Ph Determination	EPA 9040B	NIA6	10/14/04
Corrosivity Ph Determination	EPA 9041A	NIA6	10/14/04
Cyanide	EPA 9010B	MISC7	10/14/04
Cyanide	EPA 9014	MISC7	10/14/04
Dissolved In Water	EPA 3005A	*	10/14/04
Extraction Procedure Toxicity	EPA 1310A	HAZ4	10/14/04
Florisil Column	EPA 3620B	*	10/14/04
Fluoride	EPA 9214	NIB3	10/14/04
Funnel Liquid-Liquid Extraction	EPA 3510C	*	10/14/04
Ignitability (Flash Point)	EPA 1010	HAZ2	10/14/04
Iron	EPA 6010B	MTL3	10/14/04
Lead	EPA 6010B	MTL3	10/14/04

AZ License: AZ0671 **Lab Name: TestAmerica-Irvine**

Program HW

Parameter	EPA Method	Billing Code	Cert Date
Lead	EPA 6020	MTL7	10/14/04
Lithium	EPA 6010B	MTL3	10/14/04
Magnesium	EPA 6010B	MTL3	10/14/04
Manganese	EPA 6010B	MTL3	10/14/04
Manganese	EPA 6020	MTL7	10/14/04
Mercury	EPA 7470A	MTL5	10/14/04
Mercury	EPA 7471A	MTL5	10/14/04
Molybdenum	EPA 6010B	MTL3	10/14/04
Nickel	EPA 6010B	MTL3	10/14/04
Nickel	EPA 6020	MTL7	10/14/04
Organochlorine Pesticides	EPA 8081A	SOC9	10/14/04
Paint Filter Liquids Test	EPA 9095A	MISC24	10/14/04
Phenolics	EPA 9065	MISC8	10/14/04
Polychlorinated Biphenyls	EPA 8082	SOC9	10/14/04
Potassium	EPA 6010B	MTL3	10/14/04
Preparation And Extraction	EPA 3500B	*	10/14/04
Pressurized Fluid Extraction	EPA 3545	*	10/14/04
Purge And Trap	EPA 5030B	*	10/14/04
Sediments, Sludges And Soils	EPA 3050B	*	10/14/04
Selenium	EPA 6010B	MTL3	10/14/04
Semivolatile Organics	EPA 8270C	SOC16	10/14/04
Silica Gel Cleanup	EPA 3630C	*	10/14/04
Silver	EPA 6010B	MTL3	10/14/04
Silver	EPA 6020	MTL7	10/14/04
Sodium	EPA 6010B	MTL3	10/14/04
Specific Conductance	EPA 9050A	NIA7	10/14/04
Strontium	EPA 6010B	MTL3	10/14/04
Sulfide	EPA 9030B	MISC11	10/14/04
Sulfide	EPA 9034	MISC11	10/14/04
Sulfur Cleanup	EPA 3660B	*	10/14/04
Sulfuric Acid/Permanganate Cleanup	EPA 3665A	*	10/14/04
Synthetic Precipitation Leaching Procedure (Splp)	EPA 1312	HAZ6	10/14/04
Thallium	EPA 6010B	MTL3	10/14/04
Thallium	EPA 6020	MTL7	10/14/04
Tin	EPA 6010B	MTL3	10/14/04
Total Metals	EPA 3010A	*	10/14/04
Total Organic Carbon	EPA 9060	MISC1	10/14/04
Total Recoverable In Water	EPA 3005A	*	10/14/04
Toxicity Characteristics Leaching Procedure	EPA 1311	HAZ5	10/14/04
Vanadium	EPA 6010B	MTL3	10/14/04
Volatile Organics	EPA 8021B	VOC1	10/14/04

AZ License: AZ0671 **Lab Name: TestAmerica-Irvine**

Program HW

Parameter	EPA Method	Billing Code	Cert Date
Volatile Organics	EPA 8260B	VOC8	10/14/04
Waste Dilution	EPA 3580A	*	10/14/04
Zinc	EPA 6010B	MTL3	10/14/04
Zinc	EPA 6020	MTL7	10/14/04

Total Licensed Parameters in this Program: 84

Program SDW

Parameter	EPA Method	Billing Code	Cert Date
Alkalinity	SM 2320B	NIA1	10/14/04
Aluminum	EPA 200.7	MTL3	10/14/04
Aluminum	EPA 200.8	MTL7	10/14/04
Antimony	EPA 200.8	MTL7	10/14/04
Arsenic	EPA 200.7	MTL3	10/14/04
Arsenic	EPA 200.8	MTL7	10/14/04
Barium	EPA 200.7	MTL3	10/14/04
Barium	EPA 200.8	MTL7	10/14/04
Beryllium	EPA 200.7	MTL3	10/14/04
Beryllium	EPA 200.8	MTL7	10/14/04
Bromate	EPA 300.1	NIIIA1	03/09/06
Bromide	EPA 300.1	NIIIA1	03/09/06
Cadmium	EPA 200.7	MTL3	10/14/04
Cadmium	EPA 200.8	MTL7	10/14/04
Calcium	EPA 200.7	MTL3	10/14/04
Chloride	EPA 300.0	NIIIA1	10/14/04
Chlorite	EPA 300.1	NIIIA1	03/09/06
Chromium Total	EPA 200.7	MTL3	10/14/04
Chromium Total	EPA 200.8	MTL7	10/14/04
Copper	EPA 200.7	MTL3	10/14/04
Copper	EPA 200.8	MTL7	10/14/04
Cyanide	SM 4500 CN C	MISC7	10/14/04
Cyanide Amenable	SM 4500 CN G	MISC7	10/14/04
Fluoride	EPA 300.0	NIIIA1	10/14/04
Fluoride	SM 4500-F C	NIB3	10/14/04
Hardness	SM 2340B	NIA5	10/14/04
Hydrogen Ion (Ph)	EPA 150.1	NIA6	10/14/04
Iron	EPA 200.7	MTL3	10/14/04
Lead	EPA 200.8	MTL7	10/14/04
Magnesium	EPA 200.7	MTL3	10/14/04
Manganese	EPA 200.7	MTL3	10/14/04
Manganese	EPA 200.8	MTL7	10/14/04
Mercury	EPA 245.1	MTL5	10/14/04

AZ License: AZ0671 **Lab Name: TestAmerica-Irvine**

Program SDW

Parameter	EPA Method	Billing Code	Cert Date
Nickel	EPA 200.7	MTL3	10/14/04
Nickel	EPA 200.8	MTL7	10/14/04
Nitrate	EPA 300.0	NIIIA1	10/14/04
Nitrite	EPA 300.0	NIIIA1	10/14/04
Ortho-Phosphate	EPA 300.0	NIIIA1	10/14/04
Perchlorate	EPA 314.0	MISC24	10/14/04
Preliminary Filtration	SM 3030B	*	10/14/04
Residue Filterable	SM 2540C	NIA8	10/14/04
Selenium	EPA 200.8	MTL7	10/14/04
Silica	EPA 200.7	MTL3	10/14/04
Silver	EPA 200.7	MTL3	10/14/04
Silver	EPA 200.8	MTL7	10/14/04
Sodium	EPA 200.7	MTL3	10/14/04
Strontium	EPA 200.7	MTL3	10/14/04
Sulfate	EPA 300.0	NIIIA1	10/14/04
Thallium	EPA 200.8	MTL7	10/14/04
Total Organic Carbon	SM 5310C	MISC1	09/30/05
Turbidity, Ntu: Nephelometric	EPA 180.1	NIA9	10/14/04
Uranium	EPA 200.8	MTL7	08/17/05
Zinc	EPA 200.7	MTL3	10/14/04
Zinc	EPA 200.8	MTL7	10/14/04

Total Licensed Parameters in this Program: 54

Program WW

Parameter	EPA Method	Billing Code	Cert Date
Acidity	SM 2310B	NIIA1	10/14/04
Alkalinity, Total	EPA 310.1	NIA1	10/14/04
Alkalinity, Total	SM 2320B	NIA1	10/14/04
Aluminum	EPA 200.7	MTL3	10/14/04
Aluminum	EPA 200.8	MTL7	10/14/04
Ammonia	EPA 350.3	NIIB1	10/14/04
Ammonia	SM 4500-NH3 C	NIIB1	10/14/04
Antimony	EPA 200.7	MTL3	10/14/04
Antimony	EPA 200.8	MTL7	10/14/04
Arsenic	EPA 200.7	MTL3	10/14/04
Arsenic	EPA 200.8	MTL7	10/14/04
Barium	EPA 200.7	MTL3	10/14/04
Barium	EPA 200.8	MTL7	10/14/04
Base/Neutrals And Acids	EPA 625	SOC16	10/14/04
Beryllium	EPA 200.7	MTL3	10/14/04
Beryllium	EPA 200.8	MTL7	10/14/04

AZ License: AZ0671 **Lab Name: TestAmerica-Irvine**

Program WW

Parameter	EPA Method	Billing Code	Cert Date
Beryllium	EPA 210.2	MTL2	10/14/04
Biochemical Oxygen Demand	EPA 405.1	DEM1	10/14/04
Biochemical Oxygen Demand	SM 5210B	DEM1	10/14/04
Boron	EPA 200.7	MTL3	10/14/04
Bromide	EPA 300.0	NIIIA1	10/14/04
Cadmium	EPA 200.7	MTL3	10/14/04
Cadmium	EPA 200.8	MTL7	10/14/04
Calcium	EPA 200.7	MTL3	10/14/04
Chemical Oxygen Demand	EPA 410.4	DEM2	10/14/04
Chloride	EPA 300.0	NIIIA1	10/14/04
Chromium Total	EPA 200.7	MTL3	10/14/04
Chromium Total	EPA 200.8	MTL7	10/14/04
Chromium, Hexavalent	SM 3500-CR D	MTL4	10/14/04
Cobalt	EPA 200.7	MTL3	10/14/04
Cobalt	EPA 200.8	MTL7	10/14/04
Copper	EPA 200.7	MTL3	10/14/04
Copper	EPA 200.8	MTL7	10/14/04
Cyanide Amenable To Chlorination	EPA 335.1	MISC7	10/14/04
Cyanide Amenable To Chlorination	SM 4500-CN G	MISC7	10/14/04
Cyanide, Total	EPA 335.2	MISC7	10/14/04
Cyanide, Total	SM 4500-CN C	MISC7	10/14/04
Cyanide, Total	SM 4500-CN E	MISC7	10/14/04
Fluoride	EPA 300.0	NIIIA1	10/14/04
Fluoride	EPA 340.2	NIB3	10/14/04
Hardness	SM 2340B	NIA5	10/14/04
Hydrogen Ion (Ph)	EPA 150.1	NIA6	10/14/04
Iron	EPA 200.7	MTL3	10/14/04
Kjeldahl Nitrogen	SM 4500-NH3 C	NIIB3	10/14/04
Lead	EPA 200.7	MTL3	10/14/04
Lead	EPA 200.8	MTL7	10/14/04
Magnesium	EPA 200.7	MTL3	10/14/04
Manganese	EPA 200.7	MTL3	10/14/04
Manganese	EPA 200.8	MTL7	10/14/04
Mercury	EPA 245.1	MTL5	10/14/04
Molybdenum	EPA 200.7	MTL3	10/14/04
Molybdenum	EPA 200.8	MTL7	10/14/04
Nickel	EPA 200.7	MTL3	10/14/04
Nickel	EPA 200.8	MTL7	10/14/04
Nitrate	EPA 300.0	NIIIA1	10/14/04
Nitrite	EPA 300.0	NIIIA1	10/14/04
Oil And Grease	EPA 1664	MISC6	10/14/04

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Program WW

Parameter	EPA Method	Billing Code	Cert Date
Oil And Grease	EPA 1664A	MISC6	10/14/04
Oil And Grease	EPA 413.1	MISC6	10/14/04
Organic Carbon, Total	EPA 415.1	MISC1	10/14/04
Organochlorine Pesticides And Polychlorinated Biphenyls	EPA 608	SOC9	10/14/04
Phenols	EPA 420.1	MISC8	10/14/04
Phosphorus Total	EPA 365.3	NIIB6	10/14/04
Potassium	EPA 200.7	MTL3	10/14/04
Residue Filterable	EPA 160.1	NIA8	10/14/04
Residue Nonfilterable	EPA 160.2	NIIA5	10/14/04
Residue Total	EPA 160.3	NIIA4	10/14/04
Residue, Settleable Solids	EPA 160.5	NIIA6	10/14/04
Selenium	EPA 200.7	MTL3	10/14/04
Selenium	EPA 200.8	MTL7	10/14/04
Silica, Dissolved	EPA 200.7	MTL3	10/14/04
Silver	EPA 200.7	MTL3	10/14/04
Silver	EPA 200.8	MTL7	10/14/04
Sodium	EPA 200.7	MTL3	10/14/04
Specific Conductance	EPA 120.1	NIA7	10/14/04
Specific Conductance	SM 2510B	NIA7	10/14/04
Strontium	EPA 200.7	MTL3	10/14/04
Sulfate	EPA 300.0	NIIIA1	10/14/04
Sulfide	EPA 376.2	MISC11	10/14/04
Sulfide	SM 4500-S D	MISC11	10/14/04
Surfactants (Mbas)	EPA 425.1	NIIA3	10/14/04
Thallium	EPA 200.7	MTL3	10/14/04
Thallium	EPA 200.8	MTL7	10/14/04
Tin	EPA 200.7	MTL3	10/14/04
Total, Fixed And Volatile Solids In Sludge	SM 2540G	NIIA7	10/14/04
Turbidity	EPA 180.1	NIA9	10/14/04
Vanadium	EPA 200.7	MTL3	10/14/04
Vanadium	EPA 200.8	MTL7	10/14/04
Volatile Organics	EPA 624	VOC8	10/14/04
Zinc	EPA 200.7	MTL3	10/14/04
Zinc	EPA 200.8	MTL7	10/14/04

Total Licensed Parameters in this Program: 91

Instruments	Quantity	Date
GAS CHROMATOGRAPH	11	07/29/04
GAS CHROMATOGRAPH/MASS SPECTROMETER	11	07/29/04
ION CHROMATOGRAPH	4	07/29/04

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INDUCTIVELY COUPLED PLASMA SPECTROMETER	2	07/29/04
INDUCTIVELY COUPLED PLASMA/MASS SPECTROMETER	2	07/29/04
MERCURY ANALYZER	1	07/29/04

Softwares
ENVIROQUANT - GCMS
TURBOCHROM - GC
PERKIN ELMER - ICP
PERKIN ELMER - ICP/MS
PERKIN ELMER - AA
PERKIN ELMER - MERCURY ANALYZER
TURBOCHROME-IC

Administrator Leo Drozdoff
(775) 687-4670

Administration
Facsimile 687-5856

Water Quality Planning
Water Pollution Control
Facsimile 687-4684

Mining Regulations &
Reclamation
Facsimile 684-5259

State of Nevada
KENNY C. GUINN
Governor

ALLEN BIAGGI, *Director*

Air Pollution Control
Air Quality Planning
Facsimile 687-6396

Waste Management
Federal Facilities

Corrective Actions
Facsimile 687-8335

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DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL PROTECTION
901 S. Stewart St. Ste. 4001
Carson City, Nevada 89701-5249

David Dawes
Del Mar Analytical CA72
17461 Derian Ave. STE 100
Irvine, CA 92614-5843

August 1, 2005

STATE OF NEVADA
CERTIFIED PARAMETER LIST
CERTIFICATE EXPIRATION DATE: July 31, 2006

Pursuant to regulations adopted by the State Board of Health and the Environmental Commission, the State of Nevada will accept data from this laboratory for the following contaminants under the Safe Drinking Water Act, Clean Water Act and the Resource Recovery and Conservation Act. Please be advised that it is the responsibility of the laboratory to make your clientele aware of changes. In particular it is important that the clients are aware of the loss of any previously certified parameters. If the laboratory subcontracts samples to other laboratories, it is the responsibility of the laboratory to ensure that the contracting laboratory is Nevada certified for all contracted parameters. The clients must be made aware of any subcontracted work. Proficiency testing results should be submitted prior to Decmeber 31, 2005.

This parameter list supercedes any previously issued parameter lists.

Drinking Water	Methods	Drinking Water	Methods
Aluminum	200.7	Copper	200.8
Aluminum	200.8	Iron	200.7
Antimony	200.8	Lead	200.7
Arsenic	200.8	Lead	200.8
Barium	200.7	Lead	200.9
Barium	200.8	Manganese	200.7
Beryllium	200.8	Manganese	200.8
Boron	200.7	Molybdenum	200.8
Cadmium	200.8	Nickel	200.7
Chromium	200.7	Nickel	200.8
Chromium	200.8	Selenium	200.8
Copper	200.7	Selenium	200.9

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Drinking Water	Methods
Silica	200.7
Silver	200.7
Silver	200.8
Thallium	200.8
Vanadium	200.7
Vanadium	200.8
Zinc	200.7
Zinc	200.8
Mercury	245.1
pH	4500-H B
Bromide	300.0
Chloride	300.0
Fluoride	300.0
Nitrate + Nitrite as N	300.0
Potassium	200.7
Nitrate as N	300.0
Total Dissolved Solids 180 C	2540C
Alkalinity	2320B
Sodium	200.7
Turbidity	2130B
Nitrite as N	300.0
Ortho-Phosphate as P	300.0
Cyanide	4500-CN E
Sulfate	300.0
Perchlorate	314.0
Total Hardness as CaCO3	2340B
Total Hardness as CaCO3	2340C
Calcium	200.7
Magnesium	200.7
MBAS	5540C
Color	2120B
Odor	2150B

Wastewater	Methods
Acenaphthene	625
Acenaphthylene	625
Aniline	625
Anthracene	625
Benzidine	625
Benzo(a)anthracene	625
Benzo(b)fluoranthene	625
Benzo(k)fluoranthene	625
Benzo(g,h,I)perylene	625
Benzo(a)pyrene	625
Benzyl alcohol	625
4-Bromophenyl-phenylether	625
Butylbenzylphthalate	625
Carbazole	625
4-Cloroaniline	625
bis(2-Chloroethoxy)methane	625
bis(2-Chloroethyl)ether	625
bis(2-Chloroisopropyl)ether	625
1-Chloronapthalene	625
2-Chloronaphthalene	625
4-Chlorophenyl-phenylether	625
Chrysene	625
Dibenz(a,h)anthracene	625
Dibenzofuran	625
Di-n-butylphthalate	625
1,2-Dichlorobenzene	625
1,3-Dichlorobenzene	625
1,4-Dichlorobenzene	625
3,3'-Dichlorobenzidine	625
Diethylphthalate	625
Dimethylphthalate	625
2,4-Dinitrotoluene	625
2,6-Dinitrotoluene	625
Di-n-octylphthalate	625
bis(2-ethylhexyl)phthalate	625
Fluoranthene	625
Fluorene	625
Hexachlorobenzene	625
Hexachlorobutadiene	625
Hexachlorocyclopentadiene	625
Hexachlorethane	625

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Wastewater	Methods	Wastewater	Methods
Indeno(1,2,3-cd)pyrene	625	Sulfide	4500-S2 D
Isophrone	625	Sulfide	376.2
2-Methylnaphthalene	625	Perchlorate	314.0
Naphthalene	625	PCB's IN WATER	608
2-Nitroaniline	625	Aldrin	608
3-Nitroaniline	625	alpha-BHC	608
4-Nitroaniline	625	beta-BHC	608
Nitrobenzene	625	delta-BHC	608
N-Nitrosodiethylamine	625	Lindane	608
N-Nitrosodimethylamine	625	4,4'-DDD	608
N-Nitrosodiphenylamine	625	4,4'-DDE	608
N-Nitroso-di-n-propylamine	625	4,4'-DDT	608
Phenanthrene	625	Dieldrin	608
Pyrene	625	Endrin	608
Pyridine	625	Endrin Aldehyde	608
1,2,4-Trichlorobenzene	625	Endosulfan I	608
Benzoic acid	625	Endosulfan II	608
4-Chloro-3-methylphenol	625	Endosulfan sulfate	608
2-Chlorophenol	625	Heptachlor	608
2,4-Dichlorophenol	625	Heptachlor Epoxide	608
2,6-Dichlorophenol	625	Methoxychlor	608
2,4-Dimethylphenol	625	Chlordane	608
2,4-Dinitrophenol	625	Toxaphene	608
2-Methylphenol	625	BOD	405.1
3 & 4-Methylphenol	625	BOD	5210B
2-Methyl-4,6-dinitrophenol	625	CBOD	405.1
2-Nitrophenol	625	CBOD	5210B
4-Nitrophenol	625	COD	5220D
Pentachlorophenol	625	TOC	415.1
Phenol	625	TOC	5310B
2,4,5-Trichlorophenol	625	Ammonia	350.2
2,4,6-Trichlorophenol	625	Ammonia	350.3
Alkalinity	2320B	COD	410.4
Alkalinity	310.1	TDS (Total dissolved Solids) 180C	2540C
Conductivity at 25 deg	120.1	TDS (Total dissolved Solids) 180C	160.1
Conductivity at 25 deg	2510B	Total Solids 105 C	2540B

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Wastewater	Methods
Total Solids 105 C	160.3
Total Kjeldahl Nitrogen	4500-NH3 C
Total Phosphorus	365.2
Cyanide	335.2
Cyanide	4500-CN E
Bromide	300.0
Chloride	300.0
Fluoride	300.0
Nitrate as N	300.0
Nitrate + Nitrite as N	300.0
Nitrite as N	300.0
Ortho-phosphate as P	300.0
Sulfate	300.0
Phenolics	420.1
Grease and Oil (gravimetric)	413.1
Grease and Oil	1664.0
Volatile Solids	160.4
Turbidity	2130B
Turbidity	180.1
Surfactants (MBAS)	5540C
Surfactants (MBAS)	425.1
Aluminum	200.7
Aluminum	200.8
Antimony	200.7
Antimony	200.8
Arsenic	200.7
Arsenic	200.8
Arsenic	200.9
Barium	200.7
Barium	200.8
Beryllium	200.7
Beryllium	200.8
Boron	200.7
Cadmium	200.7
Cadmium	200.8
Calcium	200.7
Chromium	200.7
Chromium	200.8
Chromium (Hexavalent)	218.6
Cobalt	200.7
Cobalt	200.8
Copper	200.7
Copper	200.8
Iron	200.7
Iron	200.8
Lead	200.7
Lead	200.8
Lead	200.9
Magnesium	200.7
Manganese	200.7
Manganese	200.8
Molybdenum	200.7
Molybdenum	200.8
Nickel	200.7
Nickel	200.8
Potassium	200.7
Selenium	200.7
Selenium	200.8
Selenium	200.9
Silica	200.7
Silver	200.7
Silver	200.8
Sodium	200.7
Strontium	200.7
Thallium	200.7
Thallium	200.8
Thallium	200.9
Tin	200.7
Titanium	200.7
Vanadium	200.7
Vanadium	200.8
Zinc	200.7
Zinc	200.8

RCRA Water	Methods
pH	9040B
Sulfides	9034
Bromide	9056
Nitrate	9056
Nitrate + Nitrite	9056
Nitrite	9056
Ortho-phosphate	9056
Chloride	9056
Fluoride	9056
Sulfate	9056

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RCRA Water	Methods	RCRA Water	Methods
Cyanide	9014	Zinc	6020
Aluminum	6010B	Hexavalent Chromium	7199
Antimony	6020	TCLP	1311
Arsenic	6010B	SPLP	1312
Arsenic	6020	Benzene	8021B
Barium	6010B	Ethylbenzene	8021B
Barium	6020	Toluene	8021B
Beryllium	6010B	Xylenes	8021B
Beryllium	6020	MTBE	8021B
Boron	6010B	GRO in Water	8015B
Cadmium	6010B	DRO in Water	8015B
Cadmium	6020	Acetone	8260B
Calcium	6010B	Benzene	8260B
Chromium	6010B	Bromobenzene	8260B
Chromium	6020	Bromodichloromethane	8260B
Cobalt	6010B	Bromoform	8260B
Copper	6010B	Bromochloromethane	8260B
Copper	6020	2-Butanone	8260B
Iron	6010B	Carbon tetrachloride	8260B
Lead	6010B	Chlorobenzene	8260B
Lead	6020	Chlorodibromomethane	8260B
Magnesium	6010B	Chloroethane	8260B
Manganese	6010B	Chloroform	8260B
Manganese	6020	Chloromethane	8260B
Mercury	7470A	Dibromomethane	8260B
Molybdenum	6010B	1,2-Dichlorobenzene	8260B
Molybdenum	6020	1,3-Dichlorobenzene	8260B
Nickel	6010B	1,4-Dichlorobenzene	8260B
Nickel	6020	Dichlorodifluoromethane	8260B
Potassium	6010B	1,1-Dichloroethane	8260B
Selenium	6010B	1,2-Dichloroethane	8260B
Selenium	6020	1,1-Dichloroethylene	8260B
Silver	6010B	cis-1,2-Dichloroethene	8260B
Silver	6020	trans-1,2-Dichloroethylene	8260B
Sodium	6010B	1,2-Dichloropropane	8260B
Strontium	6010B	2,2-Dichloropropane	8260B
Thallium	6010B	cis-1,3-Dichloropropylene	8260B
Thallium	6020	trans-1,3-Dichloropropylene	8260B
Tin	6010B	Ethylbenzene	8260B
Titanium	6010B	Hexachlorobutadiene	8260B
Vanadium	6010B	2-Hexanone	8260B
Vanadium	6020	Isopropyl Benzene	8260B
Zinc	6010B	Methylene chloride	8260B

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RCRA Water	Methods	RCRA Water	Methods
4-Methyl-2-pentanone (MIBK)	8260B	4-Bromophenyl-phelylether	8270C
Naphthalene	8260B	Butylbenzylphthalate	8270C
1,1,1,2-Tetrachloroethane	8260B	Carbazole	8270C
1,1,2,2-Tetrachloroethane	8260B	4-Cloroaniline	8270C
Tetrachloroethylene	8260B	bis(2-Chloroethoxy)methane	8270C
Toluene	8260B	bis(2-Chloroethyl)ether	8270C
1,2,3-Trichlorobenzene	8260B	bis(2-Chloroisopropyl)ether	8270C
1,1,1-Trichloroethane	8260B	2-Chloronaphthalene	8270C
1,1,2-Trichloroethane	8260B	4-Chlorophenyl-phenylether	8270C
Trichloroethylene	8260B	Chrysene	8270C
Trichlorofluoromethane	8260B	Dibenzo(a,h)anthracene	8270C
1,2,3-Trichloropropane	8260B	Dibenzofuran	8270C
1,1,2-Trichlorotrifluoroethane	8260B	Di-n-butylphthalate	8270C
Vinyl chloride	8260B	1,2-Dichlorobenzene	8270C
Xylenes, total	8260B	1,3-Dichlorobenzene	8270C
PCBs Water	8082	1,4-Dichlorobenzene	8270C
PCBs Oil	8082	3,3'-Dichlorobenzidine	8270C
Aldrin	8081A	Diethylphthalate	8270C
alpha-BHC	8081A	Dimethylphthalate	8270C
beta-BHC	8081A	2,4-Dinitrotoluene	8270C
delta-BHC	8081A	2,6-Dinitrotoluene	8270C
Lindane	8081A	Fluoranthene	8270C
4,4'-DDD	8081A	Fluorene	8270C
4,4'-DDE	8081A	Hexachlorobenzene	8270C
4,4'-DDT	8081A	Hexachlorobutadiene	8270C
Dieldrin	8081A	Hexachlorocyclopentadiene	8270C
Endrin Aldehyde	8081A	Hexachlorethane	8270C
Endosulfan I	8081A	Isophrone	8270C
Endosulfan II	8081A	2-Methylnaphthalene	8270C
Endosulfan sulfate	8081A	Naphthalene	8270C
Heptachlor Epoxide	8081A	2-Nitroaniline	8270C
Methoxychlor	8081A	3-Nitroaniline	8270C
Chlordane, technical	8081A	4-Nitroaniline	8270C
Toxaphene	8081A	Nitrobenzene	8270C
Acenaphthene	8270C	N-Nitrosodiethylamine	8270C
Acenaphthylene	8270C	N-Nitrosodimethylamine	8270C
Aniline	8270C	N-Nitrosodiphenylamine	8270C
Anthracene	8270C	N-Nitroso-di-n-propylamine	8270C
Benzidine	8270C	Pentachlorophenol	8270C
Benzo(b)fluoranthene	8270C	Phenanthrene	8270C
Benzo(k)fluoranthene	8270C	Pyrene	8270C
Benzo(g,h,i)perylene	8270C	Pyridine	8270C
Benzyl alcohol	8270C	1,2,4-Trichlorobenzene	8270C

Del Mar Analytical CA72
17461 Derian Ave. STE 100
Irvine, CA 92614-5843

August 1, 2005

STATE OF NEVADA
CERTIFIED PARAMETER LIST
CERTIFICATE EXPIRATION DATE: July 31, 2006

RCRA Water	Methods
Benzoic acid	8270C
4-Chloro-3-methylphenol	8270C
2-Chlorophenol	8270C
2,4-Dichlorophenol	8270C
2,4-Dimethylphenol	8270C
4,6-Dinitro-2-methylphenol	8270C
2,4-Dinitrophenol	8270C
2-Methylphenol	8270C
3 & 4-Methylphenol	8270C
2-Nitrophenol	8270C
4-Nitrophenol	8270C
Phenol	8270C
2,4,5-Trichlorophenol	8270C

RCRA Soil	Methods
Aluminum	6010B
Antimony	6010B
Antimony	6020
Arsenic	6010B
Arsenic	6020
Barium	6010B
Barium	6020
Beryllium	6010B
Beryllium	6020
Boron	6010B
Cadmium	6010B
Cadmium	6020
Calcium	6010B
Chromium	6010B
Chromium	6020
Cobalt	6010B
Cobalt	6020
Copper	6010B
Copper	6020
Hexavalent Chromium	7199
Hexavalent Chromium	7196A
Iron	6010B
Lead	6010B
Lead	6020
Magnesium	6010B
Manganese	6010B
Manganese	6020
Mercury	7471A
Molybdenum	6010B
Molybdenum	6020
Nickel	6010B
Nickel	6020
Potassium	6010B
Selenium	6010B
Selenium	6020
Silver	6010B
Silver	6020
Sodium	6010B
Strontium	6010B
Thallium	6010B
Thallium	6020
Tin	6010B
Titanium	6010B
Vanadium	6010B
Vanadium	6020
Zinc	6010B
Zinc	6020
Ignitability	1010
TCLP	1311
SPLP	1312
Bromide	9056
Chloride	9056
Fluoride	9056
Fluoride	9214
Nitrate	9056
Phosphate P	9056
Sulfate	9056
Corrosivity	9045C
Cyanide	9014
Aldrin	8081A
alpha-BHC	8081A
beta-BHC	8081A
delta-BHC	8081A
Lindane	8081A
4,4'-DDD	8081A
4,4'-DDE	8081A
4,4'-DDT	8081A
Dieldrin	8081A
Endrin	8081A
Endrin Aldehyde	8081A
Endosulfan I	8081A
Endosulfan II	8081A

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CERTIFIED PARAMETER LIST
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RCRA Soil	Methods	RCRA Soil	Methods
Endosulfan sulfate	8081A	Methylene chloride	8260B
Heptachlor	8081A	4-Methyl-2-pentanone (MIBK)	8260B
Heptachlor Epoxide	8081A	Naphthalene	8260B
Methoxychlor	8081A	1,1,1,2-Tetrachloroethane	8260B
Chlordane, technical	8081A	1,1,2,2-Tetrachloroethane	8260B
Toxaphene	8081A	Tetrachloroethylene	8260B
PCBs Soil	8082	Toluene	8260B
GRO in Soil	8015B	1,2,3-Trichlorobenzene	8260B
DRO in Soil	8015B	1,2,4-Trichlorobenzene	8260B
Acetone	8260B	1,1,1-Trichloroethane	8260B
Acrolien	8260B	1,1,2-Trichloroethane	8260B
Acrylonitrile	8260B	Trichloroethylene	8260B
Benzene	8260B	Trichlorofluoromethane	8260B
Bromobenzene	8260B	1,2,3-Trichloropropane	8260B
Bromodichloromethane	8260B	1,1,2-Trichlorotrifluoroethane	8260B
Bromoform	8260B	Vinyl chloride	8260B
Bromochloromethane	8260B	Xylenes, total	8260B
Bromomethane	8260B	Acenaphthene	8270C
2-Butanone	8260B	Acenaphthylene	8270C
Carbon tetrachloride	8260B	Aniline	8270C
Chlorobenzene	8260B	Anthracene	8270C
Chlorodibromomethane	8260B	Benzidine	8270C
Chloroethane	8260B	Benzo(a)anthracene	8270C
Chloroform	8260B	Benzo(b)fluoranthene	8270C
Chloromethane	8260B	Benzo(k)fluoranthene	8270C
Dibromomethane	8260B	Benzo(g,h,i)perylene	8270C
1,2-Dichlorobenzene	8260B	Benzo(a)pyrene	8270C
1,3-Dichlorobenzene	8260B	Benzyl alcohol	8270C
1,4-Dichlorobenzene	8260B	4-Bromophenyl-phelylether	8270C
Dichlorodifluoromethane	8260B	Butylbenzylphthalate	8270C
1,1-Dichloroethane	8260B	Butylbenzylphthalate	8270C
1,2-Dichloroethane	8260B	Carbazole	8270C
1,1-Dichloroethylene	8260B	4-Cloroaniline	8270C
cis-1,2-Dichloroethene	8260B	bis(2-Chloroethoxy)methane	8270C
trans-1,2-Dichloroethylene	8260B	bis(2-Chloroethyl)ether	8270C
1,2-Dichloropropane	8260B	bis(2-Chloroisopropyl)ether	8270C
2,2-Dichloropropane	8260B	1-Chloronapthhalene	8270C
cis-1,3-Dichloropropylene	8260B	2-Chloronaphthalene	8270C
trans-1,3-Dichloropropylene	8260B	4-Chlorophenyl-phenylether	8270C
Ethylbenzene	8260B	Chrysene	8270C
Hexachlorobutadiene	8260B	Dibenz(a,h)anthracene	8270C
2-Hexanone	8260B	Dibenzofuran	8270C
Isopropyl Benzene	8260B	Di-n-butylphthalate	8270C

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August 1, 2005

STATE OF NEVADA
CERTIFIED PARAMETER LIST
CERTIFICATE EXPIRATION DATE: July 31, 2006

RCRA Soil	Methods	RCRA Soil	Methods
1,2-Dichlorobenzene	8270C	N-Nitrosodimethylamine	8270C
1,3-Dichlorobenzene	8270C	N-Nitrosodiphenylamine	8270C
1,4-Dichlorobenzene	8270C	N-Nitroso-di-n-propylamine	8270C
3,3'-Dichlorobenzidine	8270C	Pentachlorophenol	8270C
Diethylphthalate	8270C	Phenanthrene	8270C
Dimethylphthalate	8270C	Pyrene	8270C
2,4-Dinitrotoluene	8270C	Pyridine	8270C
2,6-Dinitrotoluene	8270C	1,2,4-Trichlorobenzene	8270C
Di-n-octylphthalate	8270C	Benzoic acid	8270C
bis(2-ethylhexyl)phthalate	8270C	4-Chloro-3-methylphenol	8270C
Fluoranthene	8270C	2-Chlorophenol	8270C
Fluorene	8270C	2,4-Dichlorophenol	8270C
Hexachlorobenzene	8270C	2,6-Dichlorophenol	8270C
Hexachlorobutadiene	8270C	2,4-Dimethylphenol	8270C
Hexachlorocyclopentadiene	8270C	4,6-Dinitro-2-methylphenol	8270C
Hexachlorethane	8270C	2,4-Dinitrophenol	8270C
Indeno(1,2,3-cd)pyrene	8270C	2-Methylphenol	8270C
Isophrone	8270C	3 & 4-Methylphenol	8270C
2-Methylnaphthalene	8270C	2-Nitrophenol	8270C
Naphthalene	8270C	4-Nitrophenol	8270C
2-Nitroaniline	8270C	Pentachlorophenol	8270C
3-Nitroaniline	8270C	Phenol	8270C
4-Nitroaniline	8270C	2,4,5-Trichlorophenol	8270C
Nitrobenzene	8270C	2,4,6-Trichlorophenol	8270C
N-Nitrosodiethylamine	8270C	==========	

**********END OF REPORT**********

Summary of Changes: Added Chromium (Hexavalent) by 218.6, Total Phosphorus by 365.2
Please review this parameter list carefully and contact us with any omissions or corrections.
Please return previously issued parameter list.

Don LaFara — 1/4/2006

Donald LaFara, Program Manager — Date
Environmental Lab Services
Nevada Division of Environmental Protection

Sara Rairick — 1/4/2006

Sara Rairick, LCO — Date
Environmental Lab Services
Nevada Division of Environmental Protection

State of Utah
JON HUNTSMAN Jr.
Governor
GARY HERBERT
Lieutenant Governor

Utah Department of Health
David N. Sundwall, MD
Executive Director

Epidemiology and Laboratory Services
Patrick F. Luedtke, MD, MPH.
Director of Public Health Laboratories

Bureau of Laboratory Improvement
David B Mendenhall, MPA, MT (ASCP)
Bureau Director

NELAP Recognized

5/1/2006

Del Mar Analytical
Fred Haley
17461 Derian Ave STE 100
Irvine CA 92614

ID # DEL
Account # 9492611022

Director,

On the basis of your most recent assessment, Proficiency Testing results and continuing compliance with the ELCP requirements, the laboratory listed is certified for environmental monitoring under the Safe Drinking Water Act and authorized to perform the following methods, for the analytes and matrix listed:

Drinking Water

Inorganics and Metals

150.1	pH
160.1	Residue, Filterable
180.1	Turbidity
200.7	Metals and Trace Elements in Water
200.7	Aluminum
200.7	Barium
200.7	Calcium
200.7	Chromium
200.7	Iron
200.7	Magnesium
200.7	Manganese
200.7	Nickel
200.7	Potassium
200.7	Silica
200.7	Silver
200.7	Sodium
200.7	Zinc
200.8	Metals And Trace Elements In Water and Wastes
200.8	Aluminum
200.8	Antimony
200.8	Arsenic
200.8	Barium
200.8	Beryllium
200.8	Cadmium
200.8	Chromium
200.8	Manganese
200.8	Nickel
200.8	Selenium
200.8	Silver
200.8	Thallium

The expiration for the laboratory's certification is 1/31/2007. The Utah Environmental Laboratory Certification Program (ELCP) encourages clients and data users to verify the most current certification letter for the authorized method. For further assistance please call Lorna Ward 801-584-8469.

Inorganics and Metals	
200.8	Zinc
2320 B	Alkalinity - Titration Method
2340 B	Hardness by Calculation (CaCO3)
2340 C	Hardness by EDTA Titrimetic Method (CaCO3)
245.1	Mercury
2510 B	Conductivity by Laboratory Method
2540 C	Total Dissolved Solids
300.0	Inorganic Anions In Water
300.0	Bromide
300.0	Chloride
300.0	Fluoride
300.0	Phosphate
4500 (CN-) E	Cyanide by Colormetric Method
4500 (CN-) G	Cyanides Amenable to Chlorination after Distillation
5310 B	TOC by Combustion-Infrared Method
5540 C	Anionic Surfactants as MBAS
Nitrate	
300.0	Nitrate
Nitrite	
300.0	Nitrite
Pb/Cu	
200.7	Copper
200.8	Copper
200.8	Lead
Sulfates	
300.0	Sulfate

The effective date of this certificate letter is: 2/1/2006.

The analytes by method which a laboratory is authorized to perform at any given time will be those indicated in the most recent certificate letter. The most recent certification letter supersedes all previous certification or authorization letters. It is the certified laboratory's responsibility to review this letter for discrepancies. The certified laboratory must document any discrepancies in this letter and send notice to this bureau within 15 days of receipt. This certificate letter will be recalled in the event your laboratory's certification is revoked.

Respectfully,

Patrick F. Luedtke, MD, MPH.
Director of Public Health Laboratories
Deputy Director of Epidemiology and Laboratory Services

The expiration for the laboratory's certification is 1/31/2007. The Utah Environmental Laboratory Certification Program (ELCP) encourages clients and data users to verify the most current certification letter for the authorized method. For further assistance please call Lorna Ward 801-584-8469.

State of Utah
JON HUNTSMAN Jr.
Governor
GARY HERBERT
Lieutenant Governor

Utah Department of Health
David N. Sundwall, MD
Executive Director

Epidemiology and Laboratory Services
Patrick F. Luedtke, MD, MPH.
Director of Public Health Laboratories

Bureau of Laboratory Improvement
David B Mendenhall, MPA, MT (ASCP)
Bureau Director

NELAP Recognized

5/1/2006

Del Mar Analytical
Fred Haley
17461 Derian Ave STE 100
Irvine CA 92614

ID # DEL
Account # 9492611022

Director,

In recognition of your NELAP accreditation and in compliance with the ELCP requirements, the laboratory listed is certified for environmental monitoring under the Clean Water Act and authorized to perform the following methods, for the analytes and matrix listed:

Non-Potable Water

Inorganics and Metals

130.2	Hardness, Total (mg/L as CaCO3) (Titrimetric, EDTA)
160.1	Residue, Filterable (Gravimetric, Dried at 180-C)
160.2	Residue, Non-Filterable (Gravimetric, Dried at 103-105-C)
160.3	Residue, Total (Gravimetric, Dried at 103-105-C)
160.4	Residue, Volatile (Gravimetric, Ignition at 550-C)
160.5	Settleable Matter (Volumetric, Imhoff Cone)
180.1	Turbidity
200.7	Metals and Trace Elements in Water
200.7	Aluminum
200.7	Antimony
200.7	Arsenic
200.7	Barium
200.7	Beryllium
200.7	Boron
200.7	Cadmium
200.7	Calcium
200.7	Chromium
200.7	Cobalt
200.7	Copper
200.7	Iron
200.7	Lead
200.7	Magnesium
200.7	Manganese
200.7	Molybdenum
200.7	Nickel
200.7	Potassium

The expiration for the laboratory's certification is 1/31/2007. The Utah Environmental Laboratory Certification Program (ELCP) encourages clients and data users to verify the most current certification letter for the authorized method. For further assistance please call Lorna Ward 801-584-8469.

Inorganics and Metals

200.7	Selenium
200.7	Silica
200.7	Silver
200.7	Sodium
200.7	Thallium
200.7	Tin
200.7	Vanadium
200.7	Zinc
200.7	Hardness
200.8	Metals And Trace Elements In Water and Wastes
200.8	Aluminum
200.8	Antimony
200.8	Arsenic
200.8	Barium
200.8	Beryllium
200.8	Cadmium
200.8	Chromium
200.8	Cobalt
200.8	Copper
200.8	Lead
200.8	Manganese
200.8	Molybdenum
200.8	Nickel
200.8	Selenium
200.8	Silver
200.8	Thallium
200.8	Vanadium
200.8	Zinc
2320 B	Alkalinity (Titration)
2340 B	Hardness (Calculation)
2340 C	Hardness (Titrimetric, EDTA)
245.1	Mercury
2540 B	Total Solids Dried at 103-105-C
2540 C	Total Dissolved Solids Dried at 180-C
2540 D	Total Suspended Solids Dried at 103-105-C
2540 F	Settleable Solids
300.0	Inorganic Anions In Water By Ion Chromatography
300.0	Bromide
300.0	Chloride
300.0	Fluoride
300.0	Nitrate
300.0	Nitrite
300.0	ortho-Phosphate
300.0	Sulfate
335.2	Cyanide, Total
340.2 [1974]	Fluoride
350.3	Nitrogen, Ammonia
365.3	Phosphorous, All Forms
376.2	Sulfide
405.1	Biochemical Oxygen Demand
410.4	Chemical Oxygen Demand
415.1	Organic Carbon, Total
418.1	Petroleum Hydrocarbons
420.1	Phenolics

The expiration for the laboratory's certification is 1/31/2007. The Utah Environmental Laboratory Certification Program (ELCP) encourages clients and data users to verify the most current certification letter for the authorized method. For further assistance please call Lorna Ward 801-584-8469.

Inorganics and Metals

4500 (CN-) E	Cyanide (Colorimetric)
4500 (N org) C	Nitrogen Total Kjeldahl (Semi-Micro-Kjeldahl Method)
4500 (NH3) E	Nitrogen (Ammonia) (Titrimetric)
4500 (S2-) D	Sulfide (Methylene Blue)
5210 B	Biochemical Oxygen Demand 5-Day Test
5220 D	Chemical Oxygen Demand (Colorimetric, Closed Reflux))

Organics

608	Organochlorine Pesticides and Polychlorinated Biphenyls
608	Aldrin
608	alpha-BHC
608	beta-BHC
608	delta-BHC
608	gamma-BHC (Lindane)
608	Chlordane
608	4,4'-DDD
608	4,4'-DDE
608	4,4'-DDT
608	Dieldrin
608	Endosulfan I
608	Endosulfan II
608	Endosulfan Sulfate
608	Endrin
608	Endrin Aldehyde
608	Heptachlor
608	Heptachlor Epoxide
608	Toxaphene
608	Aroclor 1016
608	Aroclor 1221
608	Aroclor 1232
608	Aroclor 1242
608	Aroclor 1248
608	Aroclor 1254
608	Aroclor 1260
624	Purgeables
624	Benzene
624	Bromodichloromethane
624	Bromoform
624	Bromomethane
624	Carbon Tetrachloride
624	Chlorobenzene
624	Chloroethane
624	2-Chloroethylvinyl Ether
624	Chloroform
624	Chloromethane
624	Dibromochloromethane
624	1,2-Dichlorobenzene
624	1,3-Dichlorobenzene
624	1,4-Dichlorobenzene
624	1,1-Dichloroethane
624	1,2-Dichloroethane
624	1,1-Dichloroethene
624	trans-1,2-Dichloroethene
624	1,2-Dichloropropane
624	cis-1,3-Dichloropropene

The expiration for the laboratory's certification is 1/31/2007. The Utah Environmental Laboratory Certification Program (ELCP) encourages clients and data users to verify the most current certification letter for the authorized method. For further assistance please call Lorna Ward 801-584-8469.

Organics

624	trans-1,3-Dichloropropene
624	Ethylbenzene
624	Methylene Chloride
624	1,1,2,2-Tetrachloroethane
624	Tetrachloroethylene
624	Toluene
624	1,1,1-Trichloroethane
624	1,1,2-Trichloroethane
624	Trichloroethene
624	Trichlorofluoromethane
624	Vinyl Chloride
625	Base/Neutrals and Acids
625	Acenaphthene
625	Acenaphthylene
625	Anthracene
625	Benzidine
625	Benzo(a)anthracene
625	Benzo(b)fluoranthene
625	Benzo(k)fluoranthene
625	Benzo(g,h,i)perylene
625	Benzo(a)pyrene
625	Benzyl Butyl Phthalate
625	bis(2-Chloroethyl)ether
625	bis(2-Chloroethoxy)methane
625	bis(2-Chloroisopropyl)ether
625	4-Bromophenyl Phenyl Ether
625	2-Chloronaphthalene
625	4-Chlorophenyl Phenyl Ether
625	Chrysene
625	Dibenz(a,h)anthracene
625	Di-n-butylphthalate
625	1,2-Dichlorobenzene
625	1,3-Dichlorobenzene
625	1,4-Dichlorobenzene
625	3,3'-Dichlorobenzidine
625	Diethyl phthalate
625	Dimethyl phthalate
625	2,4-Dinitrotoluene
625	2,6-Dinitrotoluene
625	Di-n-octylphthalate
625	Fluoranthene
625	Fluorene
625	Hexachlorobenzene
625	Hexachlorobutadiene
625	Hexachlorocyclopentadiene
625	Hexachloroethane
625	Indeno(1,2,3-cd)pyrene
625	Isophorone
625	Naphthalene
625	Nitrobenzene
625	N-Nitrosodimethylamine
625	N-Nitrosodi-n-propylamine
625	N-Nitrosodiphenylamine
625	Phenanthrene

The expiration for the laboratory's certification is 1/31/2007. The Utah Environmental Laboratory Certification Program (ELCP) encourages clients and data users to verify the most current certification letter for the authorized method. For further assistance please call Lorna Ward 801-584-8469.

Organics

625	Pyrene
625	1,2,4-Trichlorobenzene
625	4-Chloro-3-methylphenol
625	2-Chlorophenol
625	2,4-Dichlorophenol
625	2,4-Dimethylphenol
625	2,4-Dinitrophenol
625	2-Methyl-4,6-dinitrophenol
625	2-Nitrophenol
625	4-Nitrophenol
625	Pentachlorophenol
625	Phenol
625	2,4,6-Trichlorophenol

The effective date of this certificate letter is: 2/1/2006.

The analytes by method which a laboratory is authorized to perform at any given time will be those indicated in the most recent certificate letter. The most recent certification letter supersedes all previous certification or authorization letters. It is the certified laboratory's responsibility to review this letter for discrepancies. The certified laboratory must document any discrepancies in this letter and send notice to this bureau within 15 days of receipt. This certificate letter will be recalled in the event your laboratory's certification is revoked.

Respectfully,

Patrick F. Luedtke, MD, MPH.
Director of Public Health Laboratories
Deputy Director of Epidemiology and Laboratory Services

The expiration for the laboratory's certification is 1/31/2007. The Utah Environmental Laboratory Certification Program (ELCP) encourages clients and data users to verify the most current certification letter for the authorized method. For further assistance please call Lorna Ward 801-584-8469.

The State of Washington
Department of Ecology

This is to certify that

TestAmerica, Irvine
Irvine, CA

has complied with provisions set forth in Chapter 173-50 WAC and is hereby recognized by the Department of Ecology as an ACCREDITED LABORATORY for the analytical parameters listed on the accompanying Scope of Accreditation. This certificate is effective September 5, 2006, and shall expire September 4, 2007.

Witnessed under my hand on September 5, 2006.

Stewart M. Lombard

Stewart M. Lombard
Lab Accreditation Unit Supervisor

Laboratory ID
C2025

Scope of Accreditation

TestAmerica, Irvine

Irvine, CA

is accredited by the State of Washington Department of Ecology to perform analyses for the parameters listed below using the analytical methods indicated. This Scope of Accreditation may apply to any of the following matrix types: non-potable water, drinking water, solid and chemical materials, and air and emissions. Accreditation for all parameters is final unless indicated otherwise in a note. Accreditation is for the latest version of a method unless otherwise specified in a note. EPA refers to the U.S. Environmental Protection Agency. SM refers to American Public Health Association's publication, Standard Methods for the Examination of Water and Wastewater, 18th, 19th or 20th Edition, unless otherwise noted. ASTM stands for the American Society for Testing and Materials. PSEP stands for Puget Sound Estuary Program. Other references are detailed in the notes section.

Matrix Type/Parameter Name	Reference	Method Number	Notes
Non-potable Water			
Bromide	EPA	300.0	1
Chloride	EPA	300.0	1
Cyanide, Total	SM	4500-CN E	1
Cyanide, Total	EPA	335.2(8.7)	1
Fluoride	EPA	300.0	1
Nitrate	EPA	300.0	1
Nitrite	EPA	300.0	1
Nitrogen, Total Kjeldahl	SM	4500-Norg C	1
Orthophosphate	EPA	300.0	1
Sulfate	EPA	300.0	1
Aluminum	EPA	200.7	1
Aluminum	EPA	200.8	1
Antimony	EPA	200.8	1
Antimony	EPA	200.7	1
Arsenic	EPA	200.8	1
Arsenic	EPA	200.7	1
Barium	EPA	200.7	1
Barium	EPA	200.8	1
Beryllium	EPA	200.8	1

Matrix Type/Parameter Name	Reference	Method Number	Notes
Beryllium	EPA	200.7	1
Cadmium	EPA	200.8	1
Cadmium	EPA	200.7	1
Chromium	EPA	200.8	1
Chromium	EPA	200.7	1
Cobalt	EPA	200.8	1
Cobalt	EPA	200.7	1
Copper	EPA	200.8	1
Copper	EPA	200.7	1
Iron	EPA	200.7	1
Lead	EPA	200.8	1
Lead	EPA	200.7	1
Manganese	EPA	200.7	1
Manganese	EPA	200.8	1
Mercury	EPA	245.1	1
Molybdenum	EPA	200.8	1
Molybdenum	EPA	200.7	1
Nickel	EPA	200.8	1
Nickel	EPA	200.7	1
Selenium	EPA	200.8	1
Selenium	EPA	200.7	1
Silver	EPA	200.7	1
Silver	EPA	200.8	1
Thallium	EPA	200.7	1
Thallium	EPA	200.8	1
Vanadium	EPA	200.8	1
Vanadium	EPA	200.7	1
Zinc	EPA	200.8	1
Zinc	EPA	200.7	1
Organochlorine Pesticides	EPA	608	1

Matrix Type/Parameter Name	Reference	Method Number	Notes
Polychlorinated Biphenyls	EPA	608	1
BNA Extr (Semivolatile) Organics	EPA	625	1

Solid and Chemical Materials

Cyanide, Total	EPA	9014(7.2)	1
Fluoride	EPA	9056	1
Antimony	EPA	6020	1
Antimony	EPA	6010	1
Arsenic	EPA	6020	1
Arsenic	EPA	6010	1
Barium	EPA	6010	1
Barium	EPA	6020	1
Beryllium	EPA	6020	1
Beryllium	EPA	6010	1
Cadmium	EPA	6020	1
Cadmium	EPA	6010	1
Chromium	EPA	6020	1
Chromium	EPA	6010	1
Cobalt	EPA	6020	1
Cobalt	EPA	6010	1
Copper	EPA	6020	1
Copper	EPA	6010	1
Lead	EPA	6010	1
Lead	EPA	6020	1
Mercury, Liquid Waste	EPA	7470	1
Mercury, Solid Waste	EPA	7471	1
Nickel	EPA	6010	1
Nickel	EPA	6020	1
Selenium	EPA	6010	1
Selenium	EPA	6020	1
Silver	EPA	6010	1

Matrix Type/Parameter Name	Reference	Method Number	Notes
Silver	EPA	6020	1
Thallium	EPA	6020	1
Thallium	EPA	6010	1
Vanadium	EPA	6020	1
Vanadium	EPA	6010	1
Zinc	EPA	6010	1
Zinc	EPA	6020	1
Organochlorine Pesticides	EPA	8081	1
Polychlorinated Biphenyls	EPA	8082	1
BNA Extr (Semivolatile) Organics	EPA	8270	1

Accredited Parameter Note Detail

(1) Accreditation is based in part on third-party recognition of California NELAP.

S M Lombard

Authentication Signature

September 6, 2006

Date

Stewart M. Lombard, Lab Accreditation Unit Supervisor

Parameters Denied Accreditation

TestAmerica, Irvine

Irvine, CA

Parameter Name	Reference	Method Number	Notes	Matrix
Total Organic Carbon	EPA	415.1	1	N

Denied Parameter Accreditation Footnotes

(1) Withheld pending submittal of recent, acceptable PT sample result.

Matrix Definitions - D = Drinking Water; N = Non-potable Water; S = Solid and Chemical Material; A = Air and Emissions.

Commonwealth of the Northern Mariana Islands
OFFICE OF THE GOVERNOR
Division of Environmental Quality
P.O. Box 501304 C.K., Saipan, MP 96950-1304
Tels.: (670) 664-8500 /01
Fax: (670) 664-8540

November 8, 2005

Fred Haley
Laboratory Director
Del Mar Analytical, Irvine
17461 Derian Av., Suite 100
Irvine, CA 92614

Dear Mr. Haley:

The CNMI Division of Environmental Quality has received Del Mar Analytical Laboratory in Irvine initial certification fee of $3000.00. CNMI DEQ hereby grants your laboratory **Certification Status** for the specified test listed in the following page.

Be advised that it is the laboratory's responsibility to submit PT results directly to DEQ from an approved PT provider whenever a PT study is run and the responses to all "Not Acceptable" results, provide a copy of the current home state drinking water certification, including copies of the on-site evaluation report and their responses as they occur, and pay an annual renewal fee of $1500.00 to maintain CNMI DEQ certification.

In closing, we would like to extend our congratulations and to thank you for your interest in providing analytical service for CNMI public water supplies. Should you have any further questions concerning the report, please do not hesitate to contact us at (670) 664-8500.

Sincerely,

Gloria S. Castro
Acting Director

cc: Joe M. Kaipat, CNMI DEQ Safe Drinking Water Manager
files

Attachment

Del Mar Analytical, Irvine
17461 Derian Av., Suite 100
Irvine, CA 92614

Renewal Date: 11/08/05

List of analytes and methodologies for which certification is to be given:

Analyte	Method
Aluminum	200.7
Barium	200.7
Chromium	200.7
Copper	200.7
Iron	200.7
Manganese	200.7
Nickel	200.7
Silver	200.7
Zinc	200.7
Boron	200.7
Calcium	200.7
Magnesium	200.7
Potassium	200.7
Sodium	200.7
Aluminum	200.8
Antimony	200.8
Arsenic	200.8
Barium	200.8
Beryllium	200.8
Cadmium	200.8
Chromium	200.8
Copper	200.8
Lead	200.8
Manganese	200.8
Nickel	200.8
Selenium	200.8
Silver	200.8
Thallium	200.8
Zinc	200.8
Vanadium	200.8
Mercury	245.1
Chloride	300
Fluoride	300
Nitrate	300
Nitrite	300
Phosphate, Ortho	300
Sulfate	300
Total Cyanide	SM 4500-CN E
Fluoride	SM 4500-F C
Fluoride	SM 4500-F C
Total Dissolved Solids	SM 2540 C
Total Dissolved Solids	160.1
Alkalinity	SM 2320 B
Specific Conductance	SM 2510 B
Turbidity	180.1
Turbidity	SM 2130 B

GUAM ENVIRONMENTAL PROTECTION AGENCY

AHENSIAN PRUTEKSION LINA'LA GUAHAN

P.O. Box 22439 GMF • BARRIGADA, GUAM 96921 • TEL: 475-1658/9 • FAX: 477-9402

Mr. David C. Dawes
Quality Assurance Manager
Del Mar Analytical
17461Derian Ave, Suite 100
Irvine, CA 92324

NOV 10 2005

Dear Mr. Dawes:

This letter is in response to your request for certification through reciprocity using EPA methods in the analyses of various drinking water parameters.

Based on the review of all the documentations you have submitted to our office (Lab Certification granted by the State of California, Department of Health Services, Quality Assurance Program Manual (QAPM), SOPs and Proficiency Testing (PT) results), **Guam EPA is pleased to grant your facility and applicable personnel "Full certification through reciprocity" utilizing the EPA Methods shown in the attachment.** Certification of these methods is required under the Guam Safe Drinking Water Act and the National Primary Drinking Water Regulations. Please note that Guam EPA only certifies methods used for primary drinking water parameters. Secondary drinking water parameters such as color, iron and TDS and unregulated parameters can be analyzed using those methods recommended by USEPA in the Manual for the Certification of Drinking Water Laboratories Analyzing Drinking Water (Fifth Edition). Use of these methods does not require certification or approval from Guam EPA provided that the laboratory's Standard Operating Procedures (SOPs) meet the required QA/QC requirements for the parameter involved.

This certification is valid for one year from its issuance provided that Del Mar Analytical's NELAP or USEPA certification remains current and the laboratory successfully analyzed proficiency testing samples.

Should you have any questions, please contact Mr. Alex Soto at (671) 475-1650/58.

Sincerely,

Randel L. Sablan
GEPA Acting-Administrator

"ALL LIVING THINGS OF THE EARTH ARE ONE"

Guam Environmental Protection Agency
Environmental Monitoring and Analytical Services
Laboratory Certification Program
15-6101 Mariner Ave. Tiyan Barrigada, Guam 96913
Tel nos: (671) 475-1655/50

Del Mar Analytical Irvine Laboaratory
List of Certified Parameters

Metals

#	Method #	Parameter
1	EPA 200.7	Calcium
2	EPA 200.8	Antimony
3	EPA 200.8	Arsenic
4	EPA 200.8	Barium
5	EPA 200.8	Beryllium
6	EPA 200.8	Cadmium
7	EPA 200.8	Chromium
8	EPA 200.8	Copper
9	EPA 200.8	Lead
10	EPA 200.8	Mercury
11	EPA 200.8	Selenium
12	EPA 200.8	Thallium

Inorganics

13	EPA 150.1	pH
14	EPA 180.1	Turbidity
15	EPA 300.0	Nitrate-N
16	EPA 300.0	Nitrate-NO3
17	EPA 300.0	Nitrite-N
18	EPA 300.0	Nitrate/Nitrite-N
19	SM2320B	Bicarbonate Alkalinity
20	SM2320B	Carbonate Alkalinity
21	SM2320B	Hydroxide Alkalinity
22	SM2510B	Specific Conductance

LINDA LINGLE
GOVERNOR OF HAWAII

CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
STATE LABORATORIES DIVISION
2725 WAIMANO HOME ROAD
PEARL CITY, HAWAII 96782-1496

In reply, please refer to:
File: EHASB/Chemistry

June 2, 2006

Mr. David C. Dawes
Quality Assurance Manager
Del Mar Analytical, Inc.
Irvine Laboratory
17461 Derian Ave. Suite 100
Irvine, California 92614-5845

Dear Mr. Dawes:

After a review of the required documents, we are pleased to recommend that the data for drinking water analyses be "accepted" for regulatory purposes by the Hawaii Department of Health, Safe Drinking Water Branch until **May 31, 2007** for the parameters listed on the following pages. **All testing for regulatory drinking water purposes must be done with approved methods that are specified in this certification, and PT studies should be passed using these methodologies. The laboratory annually must successfully complete a PT study for each analyte to be certified. Failure to do so, would result in the loss of approval status with this state. In addition, the laboratory should perform its first PT study within the first half of the year.**

It is the laboratory's responsibility to keep the Department of Health Certification Program informed by continuing to submit results of applicable PT studies, copies of in-state on-site evaluation reports, and immediate notification of any significant changes. The certification of your laboratory in Hawaii is based on your ELAP and or on your NELAP certification. As a result, any changes to your ELAP and or your NELAP certification status must be submitted immediately.

All samples that are contracted out by your laboratory for Hawaii regulatory drinking water monitoring purposes must be analyzed by laboratories that have been approved by the Hawaii Safe Drinking Water Program. A list of Hawaii approved certified laboratories is available from Richard Kiyokane (808-453-6679) or from the Hawaii Safe Drinking Water Program (808-586-4271).

To avoid interruption of your approval, you must submit a written request for renewal at <u>least two months prior to the expiration date indicated above</u>.

If you have any questions, please call Richard Kiyokane, Laboratory Certification Officer, at (808) 453-6679. Thank you for your time and efforts.

Sincerely,

A. Christian Whelen, Ph.D.
State Laboratories Administrator

ACW:rk

Enclosure

c: S. Yamada, Chief, Safe Drinking Water Branch

It is recommended that data from the following laboratory be accepted for drinking water analyses for regulatory purposes by the State of Hawaii, Department of Health, Safe Drinking Water Branch , for the contaminants listed until **May 31, 2007**.

DEL MAR ANALYTICAL, INC.
IRVINE LABORATORY
17461 DERIAN AVENUE, SUITE 100
IRVINE, CALIFORNIA 92614
DAVID C. DAWES, QUALITY ASSURANCE MANAGER

Inorganic Chemistry Trace Metals in Drinking Water

Antimony	EPA 200.8
Arsenic	EPA 200.8
Barium	EPA 200.8
Beryllium	EPA 200.8
Cadmium	EPA 200.8
Chromium	EPA 200.8
Copper	EPA 200.8
Lead	EPA 200.8
Manganese	EPA 200.8
Nickel	EPA 200.8
Selenium	EPA 200.8
Silver	EPA 200.8
Thallium	EPA 200.8
Vanadium	EPA 200.8
Zinc	EPA 200.8

Inorganic Chemistry of Drinking Water

Cyanide	SM 4500-CN E

RECOMMENDED:

Richard Kiyokane 6/2/06
Richard Kiyokane Date
Certification Officer

APPROVED:

A. Christian Whelen 6/2/06
A. Christian Whelen, Ph.D. Date
State Laboratories Administrator

Soil Permit

Permit Number: S-69307

UNITED STATES DEPARTMENT OF AGRICULTURE

Animal and Plant Health Inspection Service

Plant Protection and Quarantine

Issued To: Del Mar Analytical, Inc.
(David C. Dawes)
17461 Derian Avenue, Suite 100
Irvine, California 92614-5817

TELEPHONE: (949) 261-1022

Under the authority of the Federal Plant Pest Act of May 23, 1957, permission is hereby granted to the facility/individual named above subject to the following conditions:

1. Valid for shipments of soil not heat treated at the port of entry, only if a Compliance Agreement (PPQ Form 519) has been completed and signed. Compliance Agreements and Soil Permits are non-transferable. If you hold a Soil Permit and you leave your present employer or company, you must notify your local USDA office promptly. A copy of this permit must accompany all shipments.
2. To be shipped in sturdy-leakproof containers and released without treatment at the POE.
3. To be used only for analysis, and only in the facility of the permittee at Del Mar Analytical, Inc., located in Irvine, California.
4. No use of soil for growing purposes is authorized, including the isolation or culture of organisms imported in soil.
5. All unconsumed soil, containers, and effluent is to be autoclaved, incinerated, or heat treated by the permittee at the conclusion of the project as approved and prescribed by PPQ.
6. This permit authorizes shipments from all foreign sources, including Guam, Hawaii, Puerto Rico, and the U.S. Virgin Islands through any U.S. port of entry staffed by PPQ.
7. The permittee must notify the office of the Orange County Agricultural Commissioner upon arrival of shipment(s) at Area Code (714) 447-7100.

SEPTEMBER 30, 2009
Expiration Date

Approving Official LIA STEWART

WARNING: Any alteration, forgery, or unauthorized use of this Federal form is subject to civil penalties of up to $250,000 (7 U.S.C. s 7734(b)) or punishable by a fine of not more than $10,000, or imprisonment of not more than 5 years, or both (18 U.S.C. s 1001).

COUNTY SANITATION DISTRICTS
OF LOS ANGELES COUNTY

[illegible] CA 90601-1400
[illegible] CA 90607-4998
[illegible] 562) 699-5422

JAMES F. STAHL
Chief Engineer and General Manager

September 11, 2006
Laboratory I.D. No. **10256**

Mr. David C. Dawes
Quality Assurance Manager
TestAmerica - Irvine
17461 Derian Avenue, Suite 100
Irvine, California 92614-5817

Dear Mr. Dawes:

The County Sanitation Districts of Los Angeles County (Districts) *Wastewater Ordinance* specifies that all required industrial wastewater analyses be performed by a California State Certified laboratory or by a laboratory approved by the Sanitation Districts.

The Districts recognize your certification as an Environmental Laboratory by the State of California Department of Health Services. The Districts will accept sample results from the use of appropriate methodologies, as determined by the Districts, that you are certified to perform. The laboratory identification number appearing on this letter **must** be included on all analysis reports submitted to the Districts.

Continued recognition of your certification shall be maintained by periodic satisfactory completion of split sample analyses, compliance with Districts' requirements and an adequate rating on any future visits by Districts' personnel. Please notify the District upon any changes of name, address, telephone number, or supervisory personnel.

If you have any questions regarding this laboratory approval, please contact David B. Whipple of the Sanitation Districts' Industrial Waste Section at extension 2909.

Very truly yours,

James F. Stahl

Paul C Martyn

Paul C. Martyn
Head, Industrial Waste Section

LMS:DBW:dfd
Docs: 688574

State of New Mexico
ENVIRONMENT DEPARTMENT
Drinking Water Bureau
525 Camino de Los Marquez,
Santa Fe, New Mexico 87505
Telephone (505) 827-1400
Fax (505) 827-7545

BILL RICHARDSON
Governor

RON CURRY
Secretary

Ana Marie Ortiz
Director

June 22 2006

Del Mar Analytical- Irvine Lab
17461 Derian Avenue
Suite 100
Irvine Ca, 92614

The Drinking Water Bureau of the New Mexico Environment Department (NMED-DWB) has received and reviewed your certification/accreditation information from the State of California Department of Health. The documentation is acceptable and your New Mexico certification is now valid through January 31, 2007.

This certification is to perform drinking water analysis in compliance with the Federal Safe Drinking Water Act, pursuant to 40 CFR Part 141, and the New Mexico Environment Department Drinking Water regulations for the Primary Regulated Contaminants including Inorganic Chemistry and Toxic Chemical Elements.

You must advise NMED-DWB of any change in your accreditation by the State of California and continue to provide this office with performance evaluation results. You are also required. To provide evidence of renewal of accreditation by the State of California to continue certification past January 31, 2007. Laboratories certified by New Mexico can be purged from the list if there is no evidence that they are performing drinking water compliance samples analysis for public water supply systems in New Mexico.

If you have any questions or require additional information, please contact me at 505-476-8635.

Sincerely,

Joe Chavez

STATE OF CALIFORNIA
DEPARTMENT OF HEALTH SERVICES
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

ENVIRONMENTAL LABORATORY CERTIFICATION

Is hereby granted to

TESTAMERICA ANALYTICAL TESTING CORPORATION

IRVINE

17461 DERIAN AVENUE, SUITE 100

IRVINE, CA 92606

Scope of certification is limited to the
"Accredited Fields of Testing"
which accompanies this Certificate.

Continued certification status depends on successful completion of site visit, proficiency testing studies, and payment of applicable fees.

This Certificate is granted in accordance with provisions of
Section 100825, et seq. of the Health and Safety Code.

Certificate No.: **1794**

Expiration Date: **08/31/2008**

Effective Date: **08/01/2006**

Richmond, California
subject to forfeiture or revocation

George C. Kalasingam, Ph.D.
Program Chief
Environmental Laboratory Accreditation Program

State of California—Health and Human Services Agency
Department of Health Services

SANDRA SHEWRY
Director

ARNOLD SCHWARZENEGGER
Governor

March 9, 2006

Certificate No.: 2536

MOBILE LAB #3 (GCMS)

FRED HALEY
DEL MAR ANALYTICAL, INC.
17461 DERIAN AVE SUITE 100
IRVINE, CA 92614

Dear FRED HALEY:

This is to advise you that the laboratory named above has been certified as an environmental testing laboratory pursuant to the provisions of the California Environmental Laboratory Improvement Act (Health and Safety Code (HSC), Division 101, Part 1, Chapter 4, Section 100825, et seq.).

The Fields of Testing for which this laboratory has been certified under this Act are indicated on the enclosed "Accredited Fields of Testing." Certification shall remain in effect until **January 31, 2007** unless revoked. This certificate is subject to an annual fee as prescribed by Section 100860(a), HSC, due on January 31, 2006.

Your application for renewal must be received 90 days before the expiration of your certificate to remain in force according to the California Code of Regulations, Title 22, Division 4, Chapter 19, Section 64801 through 64827.

Any changes in laboratory location or structural alterations, which may affect adversely the quality of analysis in the fields of testing for which the laboratory has been granted certification, require prior notification. Notification is also required for changes in ownership or laboratory director within 30 days after the change (HSC, Section 100845(b) and (d)).

Your continued cooperation is essential to maintain high quality of the data produced by environmental laboratories certified by the State of California.

If you have any questions, please contact Nelia Beaman at (510) 620-3155.

Sincerely,

George C. Kulasingam, Ph.D.
Program Chief
Environmental Laboratory Accreditation Program

Enclosure

CALIFORNIA DEPARTMENT OF HEALTH SERVICES
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM
Accredited Fields of Testing

DEL MAR ANALYTICAL, INC.
IRVINE MOBILE # 3
17461 DERIAN AVE SUITE 100
IRVINE, CA 92614

Lab Phone (949) 261-1022
Vehicle ID: 1GDJP32KOL3500707
License Plate: 4P16311
License State: CA

Certificate No: 2536 **Renew Date: 01/31/2007**

Field of Testing: 116 - Volatile Organic Chemistry of Hazardous Waste

116.080	000	Volatile Organic Compounds	EPA 8260B
116.100	001	Total Petroleum Hydrocarbons - Gasoline	LUFT GC/MS

As of 03/09/2006 , this list supersedes all previous lists for this certificate number.
Customers: Please verify the current accreditation standing with the State.

State of California—Health and Human Services Agency
Department of Health Services

California Department of Health Services

Sandra Shewry
Director

Arnold Schwarzenegger
Governor

July 1, 2006

Certificate No.: **1775**

JOSEPH A. LeMAY
AQUATIC TESTING LABORATORIES
4350 TRANSPORT STREET, UNIT 107
VENTURA, CA 93003

Dear JOSEPH A. LeMAY:

This is to advise you that the laboratory named above continues to be certified as an environmental testing laboratory pursuant to the provisions of the California Environmental Laboratory Improvement Act (Health and Safety Code (HSC), Division 101, Part 1, Chapter 4, Section 100825, et seq.). Certification for all currently certified Fields of Testing that the laboratory has applied for renewal shall remain in effect until **07/31/2008** unless revoked.

Please note that the renewal application for certification is subject to an on-site visit, and continued use of the certificate is contingent upon:

* **successful completion of the site visit;**
* **acceptable performance in the required performance evaluation (PE) studies;**
* **timely payment of all fees, including an annual fee due before July 31, 2007;**
* **compliance with Environmental Laboratory Accreditation Program (ELAP) statutes (HSC, Section 100825, et seq.) and Regulations (California Code of Regulations (CCR),Title 22, Division 4, Chapter 19).**

An updated "Approved Fields of Testing" will be issued to the laboratory upon completion of the renewal process. The application for the next renewal must be received 90 days before the expiration of this certificate to remain in force according to the CCR, Section 64801 through 64827.

Please note that the laboratory is required to notify ELAP of any major changes in the laboratory such as the transfer of ownership, change of laboratory director, change in location, or structural alterations which may affect adversely the quality of analyses (HSC, Section 100845(b)(d)). Please include the above certificate number in all your correspondence to ELAP.

If you have any questions, please contact ELAP at (510) 620-3155.

Sincerely,

George C. Kulasingam, Ph.D.
Program Chief
Environmental Laboratory Accreditation Program

California Department of Health Services

STATE OF CALIFORNIA
DEPARTMENT OF HEALTH SERVICES
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

ENVIRONMENTAL LABORATORY CERTIFICATION

Is hereby granted to

AQUATIC TESTING LABORATORIES

4350 TRANSPORT STREET, UNIT 107
VENTURA, CA 93003

Scope of certification is limited to the
"Accredited Fields of Testing"
which accompanies this Certificate.

Continued certification status depends on successful completion of site visit, proficiency testing studies, and payment of applicable fees.

This Certificate is granted in accordance with provisions of
Section 100825, et seq. of the Health and Safety Code.

Certificate No.: **1775**

Expiration Date: **07/31/2008**

Effective Date: **07/01/2006**

Richmond, California
subject to forfeiture or revocation

George C. Kulasingam

George C. Kulasingam, Ph.D.
Program Chief
Environmental Laboratory Accreditation Program

STATE OF CALIFORNIA
DEPARTMENT OF HEALTH SERVICES
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

ENVIRONMENTAL LABORATORY CERTIFICATION

Is hereby granted to

SEQ CORPORATION dba TESTAMERICA

IRVINE LABORATORY

17461 DERIAN AVENUE, SUITE 100

IRVINE, CA 92614

Scope of certification is limited to the
"Accredited Fields of Testing"
which accompanies this Certificate.

Continued certification status depends on successful completion of site visit, proficiency testing studies, and payment of applicable fees.

This Certificate is granted in accordance with provisions of Section 100825, et seq. of the Health and Safety Code.

Certificate No.: **1197**

Expiration Date: **05/31/2008**

Effective Date: **05/22/2006**

Richmond, California
subject to forfeiture or revocation

George C. Kulasingam

George C. Kulasingam, Ph.D.
Program Chief
Environmental Laboratory Accreditation Progra

CALIFORNIA DEPARTMENT OF HEALTH SERVICES

ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM - NELAP RECOGNIZED

Fields of Accreditation

SEQ CORPORATION dba TESTAMERICA
IRVINE LABORATORY
17461 DERIAN AVENUE, SUITE 100
IRVINE, CA 92614

Lab Phone (949) 261-1022

Certificate No: 01108CA Renew Date: 01/31/2007

102 - Inorganic Chemistry of Drinking Water

102.020	001	EPA 180.1	Turbidity
102.022	001	SM2130B	Turbidity
102.030	001	EPA 300.0	Bromide
102.030	003	EPA 300.0	Chloride
102.030	005	EPA 300.0	Fluoride
102.030	006	EPA 300.0	Nitrate
102.030	007	EPA 300.0	Nitrite
102.030	008	EPA 300.0	Phosphate, Ortho
102.030	010	EPA 300.0	Sulfate
102.045	001	EPA 314.0	Perchlorate
102.100	001	SM2320B	Alkalinity
102.120	001	SM2340B	Hardness
102.121	001	SM2340C	Hardness
102.130	001	SM2510B	Conductivity
102.140	001	SM2540C	Total Dissolved Solids
102.145	001	EPA 160.1	Total Dissolved Solids
102.150	001	SM4110B	Chloride
102.150	002	SM4110B	Fluoride
102.150	003	SM4110B	Nitrate
102.150	004	SM4110B	Nitrite
102.150	005	SM4110B	Phosphate, Ortho
102.150	006	SM4110B	Sulfate
102.190	001	SM4500-CN E	Cyanide, Total
102.192	001	SM4500-CN G	Cyanide, amenable
102.200	001	SM4500-F C	Fluoride
102.210	001	SM4500-H+ B	pH
102.212	001	EPA 150.1	pH
102.260	001	SM5310B	Total Organic Carbon
102.261	001	SM5310B	DOC
102.270	001	SM5540C	Surfactants
102.520	001	EPA 200.7	Calcium
102.520	002	EPA 200.7	Magnesium
102.520	003	EPA 200.7	Potassium
102.520	004	EPA 200.7	Silica

As of 08/14/2006, this list supersedes all previous lists for this certificate number.
Customers: Please verify the current accreditation standing with the State.

102.520	005	EPA 200.7	Sodium
102.520	006	EPA 200.7	Hardness (calc.)

103 - Toxic Chemical Elements of Drinking Water

103.130	001	EPA 200.7	Aluminum
103.130	003	EPA 200.7	Barium
103.130	007	EPA 200.7	Chromium
103.130	008	EPA 200.7	Copper
103.130	009	EPA 200.7	Iron
103.130	011	EPA 200.7	Manganese
103.130	012	EPA 200.7	Nickel
103.130	015	EPA 200.7	Silver
103.130	017	EPA 200.7	Zinc
103.140	001	EPA 200.8	Aluminum
103.140	002	EPA 200.8	Antimony
103.140	003	EPA 200.8	Arsenic
103.140	004	EPA 200.8	Barium
103.140	005	EPA 200.8	Beryllium
103.140	006	EPA 200.8	Cadmium
103.140	007	EPA 200.8	Chromium
103.140	008	EPA 200.8	Copper
103.140	009	EPA 200.8	Lead
103.140	010	EPA 200.8	Manganese
103.140	012	EPA 200.8	Nickel
103.140	013	EPA 200.8	Selenium
103.140	014	EPA 200.8	Silver
103.140	015	EPA 200.8	Thallium
103.140	016	EPA 200.8	Zinc
103.150	009	EPA 200.9	Lead
103.150	012	EPA 200.9	Selenium
103.160	001	EPA 245.1	Mercury

108 - Inorganic Chemistry of Wastewater

108.016	001	EPA 110.2	Color
108.020	001	EPA 120.1	Conductivity
108.040	001	EPA 130.2	Hardness
108.050	001	EPA 150.1	pH
108.060	001	EPA 160.1	Residue, Filterable
108.070	001	EPA 160.2	Residue, Non-filterable
108.080	001	EPA 160.3	Residue, Total
108.090	001	EPA 160.4	Residue, Volatile
108.100	001	EPA 160.5	Residue, Settleable
108.110	001	EPA 180.1	Turbidity

108.112	001	EPA 200.7	Boron
108.112	002	EPA 200.7	Calcium
108.112	003	EPA 200.7	Hardness (calc.)
108.112	004	EPA 200.7	Magnesium
108.112	005	EPA 200.7	Potassium
108.112	006	EPA 200.7	Silica
108.112	007	EPA 200.7	Sodium
108.120	001	EPA 300.0	Bromide
108.120	002	EPA 300.0	Chloride
108.120	003	EPA 300.0	Fluoride
108.120	004	EPA 300.0	Nitrate
108.120	005	EPA 300.0	Nitrite
108.120	006	EPA 300.0	Nitrate-nitrite, Total
108.120	007	EPA 300.0	Phosphate, Ortho
108.120	008	EPA 300.0	Sulfate
108.130	001	EPA 305.1	Acidity
108.140	001	EPA 310.1	Alkalinity
108.174	001	EPA 330.5	Chlorine Residual, Total
108.181	001	EPA 335.2	Cyanide, Total
108.191	001	EPA 340.2	Fluoride
108.201	001	EPA 350.2	Ammonia
108.202	001	EPA 350.3	Ammonia
108.250	001	EPA 360.1	Dissolved Oxygen
108.264	001	EPA 365.3	Phosphate, Ortho
108.265	001	EPA 365.3	Phosphorus, Total
108.291	001	EPA 376.2	Sulfide
108.310	001	EPA 405.1	Biochemical Oxygen Demand
108.323	001	EPA 410.4	Chemical Oxygen Demand
108.330	001	EPA 413.1	Oil and Grease
108.340	001	EPA 415.1	Total Organic Carbon
108.350	001	EPA 418.1	Total Recoverable Petroleum Hydrocarbons
108.360	001	EPA 420.1	Phenols, Total
108.370	001	EPA 425.1	Surfactants
108.380	001	EPA 1664	Oil and Grease
108.385	001	SM2120B	Color
108.390	001	SM2130B	Turbidity
108.410	001	SM2320B	Alkalinity
108.420	001	SM2340B	Hardness (calc.)
108.421	001	SM2340C	Hardness
108.430	001	SM2510B	Conductivity
108.440	001	SM2540B	Residue, Total

108.441	001	SM2540C	Residue, Filterable
108.442	001	SM2540D	Residue, Non-filterable
108.443	001	SM2540F	Residue, Settleable
108.472	001	SM4500-CN E	Cyanide, Total
108.480	001	SM4500-F C	Fluoride
108.490	001	SM4500-H+ B	pH
108.500	001	SM4500-NH3 C	Ammonia
108.501	001	SM4500-NH3 C	Kjeldahl Nitrogen
108.502	001	SM4500-NH3 E	Ammonia
108.530	001	SM4500-O C	Dissolved Oxygen
108.580	001	SM4500-S= D	Sulfide
108.590	001	SM5210B	Biochemical Oxygen Demand
108.591	001	SM5210B	Carbonaceous BOD
108.602	001	SM5220D	Chemical Oxygen Demand
108.610	001	SM5310B	Total Organic Carbon
108.640	001	SM5540C	Surfactants

109 - Toxic Chemical Elements of Wastewater

109.010	001	EPA 200.7	Aluminum
109.010	002	EPA 200.7	Antimony
109.010	003	EPA 200.7	Arsenic
109.010	004	EPA 200.7	Barium
109.010	005	EPA 200.7	Beryllium
109.010	007	EPA 200.7	Cadmium
109.010	009	EPA 200.7	Chromium
109.010	010	EPA 200.7	Cobalt
109.010	011	EPA 200.7	Copper
109.010	012	EPA 200.7	Iron
109.010	013	EPA 200.7	Lead
109.010	015	EPA 200.7	Manganese
109.010	016	EPA 200.7	Molybdenum
109.010	017	EPA 200.7	Nickel
109.010	019	EPA 200.7	Selenium
109.010	021	EPA 200.7	Silver
109.010	023	EPA 200.7	Thallium
109.010	024	EPA 200.7	Tin
109.010	026	EPA 200.7	Vanadium
109.010	027	EPA 200.7	Zinc
109.020	001	EPA 200.8	Aluminum
109.020	002	EPA 200.8	Antimony
109.020	003	EPA 200.8	Arsenic
109.020	004	EPA 200.8	Barium

109.020	005	EPA 200.8	Beryllium
109.020	006	EPA 200.8	Cadmium
109.020	007	EPA 200.8	Chromium
109.020	008	EPA 200.8	Cobalt
109.020	009	EPA 200.8	Copper
109.020	010	EPA 200.8	Lead
109.020	011	EPA 200.8	Manganese
109.020	012	EPA 200.8	Molybdenum
109.020	013	EPA 200.8	Nickel
109.020	014	EPA 200.8	Selenium
109.020	015	EPA 200.8	Silver
109.020	016	EPA 200.8	Thallium
109.020	017	EPA 200.8	Vanadium
109.020	018	EPA 200.8	Zinc
109.050	001	EPA 206.2	Arsenic
109.104	001	EPA 218.6	Chromium (VI)
109.161	001	EPA 239.2	Lead
109.190	001	EPA 245.1	Mercury
109.280	001	EPA 270.2	Selenium
109.811	001	SM3500-Cr D	Chromium (VI)

110 - Volatile Organic Chemistry of Wastewater

110.040	001	EPA 624	Benzene
110.040	002	EPA 624	Bromodichloromethane
110.040	003	EPA 624	Bromoform
110.040	004	EPA 624	Bromomethane
110.040	005	EPA 624	Carbon Tetrachloride
110.040	006	EPA 624	Chlorobenzene
110.040	007	EPA 624	Chloroethane
110.040	008	EPA 624	2-Chloroethyl Vinyl Ether
110.040	009	EPA 624	Chloroform
110.040	010	EPA 624	Chloromethane
110.040	011	EPA 624	Dibromochloromethane
110.040	012	EPA 624	1,2-Dichlorobenzene
110.040	013	EPA 624	1,3-Dichlorobenzene
110.040	014	EPA 624	1,4-Dichlorobenzene
110.040	015	EPA 624	1,1-Dichloroethane
110.040	016	EPA 624	1,2-Dichloroethane
110.040	017	EPA 624	1,1-Dichloroethene
110.040	018	EPA 624	trans-1,2-Dichloroethene
110.040	019	EPA 624	1,2-Dichloropropane
110.040	020	EPA 624	cis-1,3-Dichloropropene

110.040	021	EPA 624	trans-1,3-Dichloropropene
110.040	022	EPA 624	Ethylbenzene
110.040	023	EPA 624	Methylene Chloride
110.040	024	EPA 624	1,1,2,2-Tetrachloroethane
110.040	025	EPA 624	Tetrachloroethene
110.040	026	EPA 624	Toluene
110.040	027	EPA 624	1,1,1-Trichloroethane
110.040	028	EPA 624	1,1,2-Trichloroethane
110.040	029	EPA 624	Trichloroethene
110.040	030	EPA 624	Trichlorofluoromethane
110.040	031	EPA 624	Vinyl Chloride
110.040	040	EPA 624	Halogenated Hydrocarbons
110.040	041	EPA 624	Aromatic Compounds
110.040	042	EPA 624	Oxygenates
110.040	043	EPA 624	Other Volatile Organics

111 - Semi-volatile Organic Chemistry of Wastewater

111.100	001	EPA 625	Acenaphthene
111.100	002	EPA 625	Acenaphthylene
111.100	003	EPA 625	Anthracene
111.100	004	EPA 625	Benzidine
111.100	005	EPA 625	Benz(a)anthracene
111.100	006	EPA 625	Benzo(b)fluoranthene
111.100	007	EPA 625	Benzo(k)fluoranthene
111.100	008	EPA 625	Benzo(g,h,i)perylene
111.100	009	EPA 625	Benzo(a)pyrene
111.100	010	EPA 625	Benzyl Butyl Phthalate
111.100	011	EPA 625	Bis(2-chloroethoxy)methane
111.100	012	EPA 625	Bis(2-chloroethyl) Ether
111.100	013	EPA 625	Bis(2-chloroisopropyl) Ether
111.100	014	EPA 625	Di(2-ethylhexyl) Phthalate
111.100	015	EPA 625	4-Bromophenyl Phenyl Ether
111.100	016	EPA 625	4-Chloro-3-methylphenol
111.100	017	EPA 625	2-Chloronaphthalene
111.100	018	EPA 625	2-Chlorophenol
111.100	019	EPA 625	4-Chlorophenyl Phenyl Ether
111.100	020	EPA 625	Chrysene
111.100	021	EPA 625	Dibenz(a,h)anthracene
111.100	022	EPA 625	1,2-Dichlorobenzene
111.100	023	EPA 625	1,3-Dichlorobenzene
111.100	024	EPA 625	1,4-Dichlorobenzene
111.100	025	EPA 625	3,3'-Dichlorobenzidine

111 100	026	EPA 625	2,4-Dichlorophenol
111.100	027	EPA 625	Diethyl Phthalate
111.100	028	EPA 625	2,4-Dimethylphenol
111.100	029	EPA 625	Dimethyl Phthalate
111.100	030	EPA 625	Di-n-butyl phthalate
111.100	031	EPA 625	Di-n-octyl phthalate
111.100	032	EPA 625	2,4-Dinitrophenol
111.100	033	EPA 625	2,4-Dinitrotoluene
111.100	034	EPA 625	2,6-Dinitrotoluene
111.100	035	EPA 625	Fluoranthene
111.100	036	EPA 625	Fluorene
111.100	037	EPA 625	Hexachlorobenzene
111.100	038	EPA 625	Hexachlorobutadiene
111.100	039	EPA 625	Hexachlorocyclopentadiene
111.100	040	EPA 625	Hexachloroethane
111.100	041	EPA 625	Indeno(1,2,3-c,d)pyrene
111.100	042	EPA 625	Isophorone
111.100	043	EPA 625	2-Methyl-4,6-dinitrophenol
111.100	044	EPA 625	Naphthalene
111.100	045	EPA 625	Nitrobenzene
111.100	046	EPA 625	2-Nitrophenol
111.100	047	EPA 625	4-Nitrophenol
111.100	048	EPA 625	N-nitrosodimethylamine
111.100	049	EPA 625	N-nitrosodi-n-propylamine
111.100	050	EPA 625	N-nitrosodiphenylamine
111.100	051	EPA 625	Pentachlorophenol
111.100	052	EPA 625	Phenanthrene
111.100	053	EPA 625	Phenol
111.100	054	EPA 625	Pyrene
111.100	055	EPA 625	1,2,4-Trichlorobenzene
111.100	056	EPA 625	2,4,6-Trichlorophenol
111.170	001	EPA 608	Aldrin
111.170	002	EPA 608	a-BHC
111.170	003	EPA 608	b-BHC
111.170	004	EPA 608	d-BHC
111.170	005	EPA 608	g-BHC (Lindane)
111.170	006	EPA 608	Chlordane
111.170	007	EPA 608	4,4'-DDD
111.170	008	EPA 608	4,4'-DDE
111.170	009	EPA 608	4,4'-DDT
111.170	010	EPA 608	Dieldrin

111.170	011	EPA 608	Endosulfan I
111.170	012	EPA 608	Endosulfan II
111.170	013	EPA 608	Endosulfan Sulfate
111.170	014	EPA 608	Endrin
111.170	015	EPA 608	Endrin Aldehyde
111.170	016	EPA 608	Heptachlor
111.170	017	EPA 608	Heptachlor Epoxide
111.170	018	EPA 608	Toxaphene
111.170	019	EPA 608	PCB-1016
111.170	020	EPA 608	PCB-1221
111.170	021	EPA 608	PCB-1232
111.170	022	EPA 608	PCB-1242
111.170	023	EPA 608	PCB-1248
111.170	024	EPA 608	PCB-1254
111.170	025	EPA 608	PCB-1260
111.170	030	EPA 608	Organochlorine Pesticides
111.170	031	EPA 608	PCBs
111.270	001	EPA 413.1	Oil and Grease

114 - Inorganic Chemistry of Hazardous Waste

114.010	001	EPA 6010B	Antimony
114.010	002	EPA 6010B	Arsenic
114.010	003	EPA 6010B	Barium
114.010	004	EPA 6010B	Beryllium
114.010	005	EPA 6010B	Cadmium
114.010	006	EPA 6010B	Chromium
114.010	007	EPA 6010B	Cobalt
114.010	008	EPA 6010B	Copper
114.010	009	EPA 6010B	Lead
114.010	010	EPA 6010B	Molybdenum
114.010	011	EPA 6010B	Nickel
114.010	012	EPA 6010B	Selenium
114.010	013	EPA 6010B	Silver
114.010	014	EPA 6010B	Thallium
114.010	015	EPA 6010B	Vanadium
114.010	016	EPA 6010B	Zinc
114.020	001	EPA 6020	Antimony
114.020	002	EPA 6020	Arsenic
114.020	003	EPA 6020	Barium
114.020	004	EPA 6020	Beryllium
114.020	005	EPA 6020	Cadmium
114.020	006	EPA 6020	Chromium

114.020	007	EPA 6020	Cobalt
114.020	008	EPA 6020	Copper
114.020	009	EPA 6020	Lead
114.020	010	EPA 6020	Molybdenum
114.020	011	EPA 6020	Nickel
114.020	012	EPA 6020	Selenium
114.020	013	EPA 6020	Silver
114.020	014	EPA 6020	Thallium
114.020	015	EPA 6020	Vanadium
114.020	016	EPA 6020	Zinc
114.040	001	EPA 7060A	Arsenic
114.103	001	EPA 7196A	Chromium (VI)
114.106	001	EPA 7199	Chromium (VI)
114.131	001	EPA 7421	Lead
114.140	001	EPA 7470A	Mercury
114.141	001	EPA 7471A	Mercury
114.170	001	EPA 7740	Selenium
114.222	001	EPA 9014	Cyanide
114.230	001	EPA 9034	Sulfides, Total
114.240	001	EPA 9040	pH
114.241	001	EPA 9045	pH
114.250	001	EPA 9056	Fluoride

115 - Extraction Test of Hazardous Waste

115.020	001	EPA 1311	Toxicity Characteristic Leaching Procedure (TCLP)
115.030	001	CCR Chapter11, Article 5, Appendix II	Waste Extraction Test (WET)
115.040	001	EPA 1312	Synthetic Precipitation Leaching Procedure (SPLP)

116 - Volatile Organic Chemistry of Hazardous Waste

116.030	001	EPA 8015B	Gasoline-range Organics
116.040	002	EPA 8021B	Benzene
116.040	039	EPA 8021B	Ethylbenzene
116.040	041	EPA 8021B	Methyl tert-butyl Ether (MTBE)
116.040	047	EPA 8021B	Toluene
116.040	056	EPA 8021B	Xylenes, Total
116.080	000	EPA 8260B	Volatile Organic Compounds
116.080	001	EPA 8260B	Acetone
116.080	002	EPA 8260B	Acetonitrile
116.080	003	EPA 8260B	Acrolein
116.080	004	EPA 8260B	Acrylonitrile
116.080	006	EPA 8260B	Allyl Chloride
116.080	007	EPA 8260B	Benzene
116.080	010	EPA 8260B	Bromochloromethane

116.080	011	EPA 8260B	Bromodichloromethane
116.080	012	EPA 8260B	Bromoform
116.080	013	EPA 8260B	Bromomethane
116.080	015	EPA 8260B	Carbon Disulfide
116.080	016	EPA 8260B	Carbon Tetrachloride
116.080	018	EPA 8260B	Chlorobenzene
116.080	019	EPA 8260B	Chloroethane
116.080	020	EPA 8260B	2-Chloroethyl Vinyl Ether
116.080	021	EPA 8260B	Chloroform
116.080	022	EPA 8260B	Chloromethane
116.080	026	EPA 8260B	Dibromochloromethane
116.080	027	EPA 8260B	Dibromochloropropane
116.080	028	EPA 8260B	1,2-Dibromoethane
116.080	029	EPA 8260B	Dibromofluoromethane
116.080	030	EPA 8260B	Dibromomethane
116.080	031	EPA 8260B	1,2-Dichlorobenzene
116.080	032	EPA 8260B	1,3-Dichlorobenzene
116.080	033	EPA 8260B	1,4-Dichlorobenzene
116.080	035	EPA 8260B	trans-1,4-Dichloro-2-butene
116.080	036	EPA 8260B	Dichlorodifluoromethane
116.080	037	EPA 8260B	1,1-Dichloroethane
116.080	038	EPA 8260B	1,2-Dichloroethane
116.080	039	EPA 8260B	1,1-Dichloroethene
116.080	040	EPA 8260B	trans-1,2-Dichloroethene
116.080	041	EPA 8260B	cis-1,2-Dichloroethene
116.080	042	EPA 8260B	1,2-Dichloropropane
116.080	043	EPA 8260B	1,3-Dichloropropane
116.080	044	EPA 8260B	2,2-Dichloropropane
116.080	045	EPA 8260B	1,1-Dichloropropene
116.080	046	EPA 8260B	cis-1,3-Dichloropropene
116.080	047	EPA 8260B	trans-1,3-Dichloropropene
116.080	050	EPA 8260B	1,4-Dioxane
116.080	053	EPA 8260B	Ethylbenzene
116.080	055	EPA 8260B	Ethyl Methacrylate
116.080	056	EPA 8260B	Hexachlorobutadiene
116.080	057	EPA 8260B	Hexachloroethane
116.080	058	EPA 8260B	2-Hexanone (MBK)
116.080	059	EPA 8260B	Iodomethane
116.080	060	EPA 8260B	Isobutyl Alcohol
116.080	064	EPA 8260B	Methyl tert-butyl Ether (MTBE)
116.080	065	EPA 8260B	Methylene Chloride

116.080	066	EPA 8260B	Methyl Ethyl Ketone
116.080	067	EPA 8260B	Methyl Methacrylate
116.080	068	EPA 8260B	4-Methyl-2-pentanone (MIBK)
116.080	078	EPA 8260B	Propionitrile
116.080	081	EPA 8260B	1,1,1,2-Tetrachloroethane
116.080	082	EPA 8260B	1,1,2,2-Tetrachloroethane
116.080	083	EPA 8260B	Tetrachloroethene
116.080	084	EPA 8260B	Toluene
116.080	086	EPA 8260B	1,2,3-Trichlorobenzene
116.080	087	EPA 8260B	1,2,4-Trichlorobenzene
116.080	088	EPA 8260B	1,1,1-Trichloroethane
116.080	089	EPA 8260B	1,1,2-Trichloroethane
116.080	092	EPA 8260B	1,2,3-Trichloropropane
116.080	093	EPA 8260B	Vinyl Acetate
116.080	094	EPA 8260B	Vinyl Chloride
116.080	095	EPA 8260B	Xylenes, Total
116.080	096	EPA 8260B	tert-Amyl Methyl Ether (TAME)
116.080	097	EPA 8260B	tert-Butyl Alcohol (TBA)
116.080	098	EPA 8260B	Ethyl tert-butyl Ether (ETBE)
116.080	099	EPA 8260B	Bromobenzene
116.080	100	EPA 8260B	n-Butylbenzene
116.080	101	EPA 8260B	sec-Butylbenzene
116.080	102	EPA 8260B	tert-Butylbenzene
116.080	103	EPA 8260B	2-Chlorotoluene
116.080	104	EPA 8260B	4-Chlorotoluene
116.080	105	EPA 8260B	Isopropylbenzene
116.080	106	EPA 8260B	N-propylbenzene
116.080	107	EPA 8260B	Styrene
116.080	108	EPA 8260B	1,2,4-Trimethylbenzene
116.080	109	EPA 8260B	1,3,5-Trimethylbenzene
116.080	120	EPA 8260B	Oxygenates
116.100	001	LUFT GC/MS	Total Petroleum Hydrocarbons - Gasoline
116.110	001	LUFT	Total Petroleum Hydrocarbons - Gasoline

117 - Semi-volatile Organic Chemistry of Hazardous Waste

117.010	001	EPA 8015B	Diesel-range Total Petroleum Hydrocarbons
117.016	001	LUFT	Diesel-range Total Petroleum Hydrocarbons
117.017	001	EPA 418.1	TRPH Screening
117.110	001	EPA 8270C	Acenaphthene
117.110	002	EPA 8270C	Acenaphthylene
117.110	007	EPA 8270C	Aniline
117.110	008	EPA 8270C	Anthracene

117.110	010	EPA 8270C	Benzidine
117.110	011	EPA 8270C	Benz(a)anthracene
117.110	012	EPA 8270C	Benzo(b)fluoranthene
117.110	013	EPA 8270C	Benzo(k)fluoranthene
117.110	014	EPA 8270C	Benzo(g,h,i)perylene
117.110	015	EPA 8270C	Benzo(a)pyrene
117.110	016	EPA 8270C	Benzoic Acid
117.110	018	EPA 8270C	Benzyl Alcohol
117.110	019	EPA 8270C	Benzyl Butyl Phthalate
117.110	020	EPA 8270C	Bis(2-chloroethoxy)methane
117.110	021	EPA 8270C	Bis(2-chloroethyl) Ether
117.110	022	EPA 8270C	Bis(2-chloroisopropyl) Ether
117.110	023	EPA 8270C	Di(2-ethylhexyl) Phthalate
117.110	024	EPA 8270C	4-Bromophenyl Phenyl Ether
117.110	025	EPA 8270C	Carbazole
117.110	026	EPA 8270C	4-Chloroaniline
117.110	027	EPA 8270C	4-Chloro-3-methylphenol
117.110	029	EPA 8270C	2-Chloronaphthalene
117.110	030	EPA 8270C	2-Chlorophenol
117.110	031	EPA 8270C	4-Chlorophenyl Phenyl Ether
117.110	032	EPA 8270C	Chrysene
117.110	036	EPA 8270C	Dibenz(a,h)anthracene
117.110	037	EPA 8270C	Dibenzofuran
117.110	039	EPA 8270C	1,2-Dichlorobenzene
117.110	040	EPA 8270C	1,3-Dichlorobenzene
117.110	041	EPA 8270C	1,4-Dichlorobenzene
117.110	042	EPA 8270C	3,3'-Dichlorobenzidine
117.110	043	EPA 8270C	2,4-Dichlorophenol
117.110	045	EPA 8270C	Diethyl Phthalate
117.110	053	EPA 8270C	2,4-Dimethylphenol
117.110	054	EPA 8270C	Dimethyl Phthalate
117.110	055	EPA 8270C	Di-n-butyl phthalate
117.110	056	EPA 8270C	Di-n-octyl phthalate
117.110	060	EPA 8270C	2,4-Dinitrophenol
117.110	064	EPA 8270C	1,2-Diphenylhydrazine
117.110	067	EPA 8270C	Fluoranthene
117.110	068	EPA 8270C	Fluorene
117.110	069	EPA 8270C	Hexachlorobenzene
117.110	070	EPA 8270C	Hexachlorobutadiene
117.110	071	EPA 8270C	Hexachlorocyclopentadiene
117.110	072	EPA 8270C	Hexachloroethane

117.110	075	EPA 8270C	Indeno(1,2,3-c,d)pyrene
117.110	076	EPA 8270C	Isophorone
117.110	080	EPA 8270C	2-Methyl-4,6-dinitrophenol
117.110	083	EPA 8270C	2-Methylnaphthalene
117.110	084	EPA 8270C	2-Methylphenol
117.110	085	EPA 8270C	3-Methylphenol
117.110	086	EPA 8270C	4-Methylphenol
117.110	087	EPA 8270C	Naphthalene
117.110	092	EPA 8270C	2-Nitroaniline
117.110	093	EPA 8270C	3-Nitroaniline
117.110	094	EPA 8270C	4-Nitroaniline
117.110	095	EPA 8270C	Nitrobenzene
117.110	096	EPA 8270C	2-Nitrophenol
117.110	097	EPA 8270C	4-Nitrophenol
117.110	100	EPA 8270C	N-nitrosodimethylamine
117.110	101	EPA 8270C	N-nitrosodi-n-propylamine
117.110	102	EPA 8270C	N-nitrosodiphenylamine
117.110	110	EPA 8270C	Pentachlorophenol
117.110	112	EPA 8270C	Phenanthrene
117.110	113	EPA 8270C	Phenol
117.110	119	EPA 8270C	Pyrene
117.110	120	EPA 8270C	Pyridine
117.110	129	EPA 8270C	1,2,4-Trichlorobenzene
117.110	130	EPA 8270C	2,4,5-Trichlorophenol
117.110	131	EPA 8270C	2,4,6-Trichlorophenol
117.210	000	EPA 8081A	Organochlorine Pesticides
117.210	001	EPA 8081A	Aldrin
117.210	002	EPA 8081A	a-BHC
117.210	003	EPA 8081A	b-BHC
117.210	004	EPA 8081A	d-BHC
117.210	005	EPA 8081A	g-BHC (Lindane)
117.210	007	EPA 8081A	a-Chlordane
117.210	008	EPA 8081A	g-Chlordane
117.210	009	EPA 8081A	Chlordane (tech.)
117.210	013	EPA 8081A	4,4'-DDD
117.210	014	EPA 8081A	4,4'-DDE
117.210	015	EPA 8081A	4,4'-DDT
117.210	020	EPA 8081A	Dieldrin
117.210	021	EPA 8081A	Endosulfan I
117.210	022	EPA 8081A	Endosulfan II
117.210	023	EPA 8081A	Endosulfan Sulfate

117.210	024	EPA 8081A	Endrin
117.210	025	EPA 8081A	Endrin Aldehyde
117.210	026	EPA 8081A	Endrin Ketone
117.210	027	EPA 8081A	Heptachlor
117.210	028	EPA 8081A	Heptachlor Epoxide
117.210	033	EPA 8081A	Methoxychlor
117.210	039	EPA 8081A	Toxaphene
117.210	040	EPA 8081A	Trifluralin
117.220	000	EPA 8082	PCBs
117.220	001	EPA 8082	PCB-1016
117.220	002	EPA 8082	PCB-1221
117.220	003	EPA 8082	PCB-1232
117.220	004	EPA 8082	PCB-1242
117.220	005	EPA 8082	PCB-1248
117.220	006	EPA 8082	PCB-1254
117.220	007	EPA 8082	PCB-1260

120 - Physical Properties of Hazardous Waste

120.010	001	EPA 1010	Ignitability
120.070	001	EPA 9040B	Corrosivity - pH Determination
120.080	001	EPA 9045C	Corrosivity - pH Determination

State of California—Health and Human Services Agency
Department of Health Services

SANDRA SHEWRY
Director

ARNOLD SCHWARZENEGGER
Governor

January 22, 2007

Certificate No.: 01120CA

MR. RODNEY MELGARD
EBERLINE SERVICES, INC.
P.O. BOX 4040
RICHMOND, CA 94804

Dear MR. RODNEY MELGARD:

This is to advise you that the laboratory named above has been accredited under National Environmental Laboratory Accreditation Program (NELAP) as an environmental testing laboratory pursuant to the provisions of the California Environmental Laboratory Improvement Act (Health and Safety Code (HSC), Division 101, Part 1, Chapter 4, Section 100825, et seq.).

The Fields of Accreditation for which this laboratory has been accredited under this Act are enclosed. Accreditation shall remain in effect until **January 31, 2008** unless revoked or withdrawn at your written request. To maintain accreditation, the laboratory shall comply with the National Environmental Laboratory Accreditation Conference (NELAC) Standards and all associated California Environmental Laboratory Accreditation Program (ELAP) regulations and statutes.

Please note that your laboratory is required to notify California ELAP of any major changes in key accreditation criteria within 30 calendar days of the change. This written notification includes but is not limited to changes in ownership, location, key personnel, and major instrumentation (Section 100845(b) and (d), HSC, and NELAC Standards Section 4.3.2). The certificate must be returned to California ELAP upon loss of accreditation.

Your continued cooperation is essential to maintain high quality of the data produced by environmental laboratories accredited by the State of California.

If you have any questions, please contact Jane Jensen at (510) 620-3155.

Sincerely,

George C. Kulasingam

George C. Kulasingam, Ph.D., Chief
Environmental Laboratory Accreditation Program Branch

Enclosure

STATE OF CALIFORNIA
DEPARTMENT OF HEALTH SERVICES
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

NELAP - RECOGNIZED

ACCREDITATION

Is hereby granted to

EBERLINE SERVICES, INC.

RICHMOND, CA

2030 WRIGHT AVENUE

RICHMOND, CA 94804

Scope of accreditation is limited to the
"NELAP Fields of Accreditation"
which accompanies this Certificate.

Continued accredited status depends on successful
ongoing participation in the program.

This Certificate is granted in accordance with provisions of
Section 100825, et seq. of the Health and Safety Code.

Certificate No.: **01120CA**

Expiration Date: **01/31/2008**

Effective Date: **01/31/2006**

Richmond, California
subject to forfeiture or revocation

George C. Kulasingam, Ph.D.
Program Chief
Environmental Laboratory Accreditation Program

CALIFORNIA DEPARTMENT OF HEALTH SERVICES

ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM - NELAP RECOGNIZED

Fields of Accreditation

EBERLINE SERVICES, INC.
RICHMOND, CA
2030 WRIGHT AVENUE
RICHMOND, CA 94804

Lab Phone (510) 235-2633

Certificate No: 01120CA Renew Date: 01/31/2008

106 - Radiochemistry of Drinking Water

106.010	001	EPA 900.0	Gross Alpha
106.010	002	EPA 900.0	Gross Beta
106.020	001	EPA 901.0	Radioactive Cesium
106.030	001	EPA 901.1	Radioactive Cesium
106.030	002	EPA 901.1	Radioactive Iodine
106.030	003	EPA 901.1	Gamma Emitters
106.040	001	EPA 902.0	Radioactive Iodine
106.050	001	EPA 903.0	Total Alpha Radium
106.050	002	EPA 903.0	Radium-226
106.051	001	EPA 903.1	Radium-226
106.060	001	EPA 904.0	Radium-228
106.070	001	EPA 905.0	Strontium-89, 90
106.070	002	EPA 905.0	Strontium-89
106.070	003	EPA 905.0	Strontium-90
106.080	001	EPA 906.0	Tritium
106.090	001	EPA 908.0	Uranium
106.091	001	EPA 908.1	Uranium
106.110	001	EPA 00-01	Gross Alpha
106.110	002	EPA 00-01	Gross Beta
106.120	001	EPA 00-02	Gross Alpha
106.130	001	EPA 00-07	Uranium
106.150	002	EPA Ra-03	Radium-226
106.160	001	EPA Ra-04	Radium-226
106.170	001	EPA Ra-05	Radium-228
106.180	001	EPA Sr-04	Strontium-89, 90
106.180	002	EPA Sr-04	Strontium-89
106.180	003	EPA Sr-04	Strontium-90
106.190	012	EPA (March, 1979), p92	Gamma Emitters
106.200	001	DOE Ra-05	Radium-226
106.210	001	DOE Sr-01	Strontium-89, 90
106.220	001	DOE Sr-02	Strontium-89, 90
106.230	001	DOE U-02	Uranium
106.240	001	DOE U-04	Uranium
106.250	001	DOE 4.5.2.3	Radioactive Cesium

As of 01/22/2007, this list supersedes all previous lists for this certificate number.
Customers: Please verify the current accreditation standing with the State.

106.250	002	DOE 4.5.2.3	Radioactive Iodine
106.250	003	DOE 4.5.2.3	Gamma Emitters
106.260	001	SM7110B	Gross Alpha
106.260	002	SM7110B	Gross Beta
106.270	001	SM7110C	Gross Alpha
106.280	001	SM7120	Radioactive Cesium
106.280	002	SM7120	Radioactive Iodine
106.280	003	SM7120	Gamma Emitters
106.290	001	SM7500-Cs B	Radioactive Cesium
106.300	001	SM7500-3H B	Tritium
106.310	001	SM7500-I B	Radioactive Iodine
106.320	001	SM7500-I C	Radioactive Iodine
106.340	001	SM7500-Ra B	Total Alpha Radium
106.340	002	SM7500-Ra B	Radium-226
106.350	001	SM7500-Ra C	Radium-226
106.360	001	SM7500-Ra D	Radium-228
106.370	001	SM7500-Sr B	Strontium-89, 90
106.370	002	SM7500-Sr B	Strontium-89
106.370	003	SM7500-Sr B	Strontium-90
106.380	001	SM7500-U B	Uranium
106.390	001	SM7500-U C	Uranium
106.400	001	ASTM D2459-72	Radioactive Cesium
106.410	001	ASTM D2460-90	Total Alpha Radium
106.411	002	ASTM D2460-97	Radium-226
106.421	001	ASTM D2907-97	Uranium
106.431	001	ASTM D3454-97	Radium-226
106.440	001	ASTM D3649-91	Radioactive Cesium
106.440	002	ASTM D3649-91	Radioactive Iodine
106.440	003	ASTM D3649-91	Gamma Emitters
106.452	001	ASTM D3972-97	Uranium
106.460	001	ASTM D4107-91	Tritium
106.471	001	ASTM D4785-93	Radioactive Iodine
106.480	001	ASTM D5174-97	Uranium
106.490	001	USGS R-1110-76	Radioactive Cesium
106.500	001	USGS R-1111-76	Radioactive Cesium
106.510	001	USGS R-1120-76	Gross Alpha
106.510	002	USGS R-1120-76	Gross Beta
106.520	001	USGS R-1140-76	Radium-226
106.520	002	USGS R-1140-76	Total Alpha Radium
106.530	001	USGS R-1141-76	Radium-226
106.540	001	USGS R-1142-76	Radium-228

106.550	001	USGS R-1160-76	Strontium-89, 90
106.550	002	USGS R-1160-76	Strontium-89
106.550	003	USGS R-1160-76	Strontium-90
106.560	001	USGS R-1171-76	Tritium
106.570	001	USGS R-1180-76	Uranium
106.580	001	USGS R-1181-76	Uranium
106.590	001	USGS R-1182-76	Uranium
106.610	001	SM7500-Rn	Radon-222
106.620	001	ASTM D5072-92	Radon-222
106.630	001	EPA 600/2-87/082, p22	Radon-222
106.990	001	DOE Th-01	Thorium 230, 232

112 - Radiochemistry of Wastewater

112.010	001	EPA 900.0	Gross Alpha
112.010	002	EPA 900.0	Gross Beta
112.020	001	EPA 903.0	Total Alpha Radium
112.021	001	EPA 903.1	Radium-226
112.030	001	SM7110B	Gross Alpha
112.030	002	SM7110B	Gross Beta
112.040	001	SM7500-Ra B	Total Alpha Radium
112.050	001	SM7500-Ra C	Radium-226
112.060	001	ASTM D1890-90	Gross Beta
112.070	001	ASTM D1943-90	Gross Alpha
112.080	001	ASTM D2460-90	Total Alpha Radium
112.090	001	ASTM D3454-91	Radium-226
112.100	001	USGS 76-177, p.75 & 78	Gross Alpha
112.100	002	USGS 76-177, p.75 & 78	Gross Beta
112.100	003	USGS 76-177, p.81	Radium-226
112.130	001	EPA 901.0	Cesium
112.140	001	EPA 901.1	Cesium
112.140	002	EPA 901.1	Gamma
112.140	003	EPA 901.1	Iodine
112.150	001	EPA 902.0	Iodine
112.160	001	EPA 904.0	Radium-228
112.170	001	EPA 905.0	Strontium
112.180	001	EPA 906.0	Tritium
112.190	001	EPA 908.0	Uranium
112.230	001	SM303	Strontium
112.240	001	SM304	Radium-228
112.250	001	SM306	Tritium
112.260	001	SM7120	Gamma
112.260	002	SM7120	Iodine

112.260	003	SM7120	Cesium
112.300	001	SM7500-I C	Iodine
112.350	001	SM7500-U C	Uranium
112.380	001	ASTM D3649-91	Cesium
112.380	002	ASTM D3649-91	Gamma
112.380	003	ASTM D3649-91	Iodine
112.390	001	ASTM D3972-90	Uranium
112.400	001	ASTM D4785-88	Iodine
112.420	001	USGS R-1110-76	Cesium
112.430	001	USGS R-1111-76	Cesium
112.440	001	USGS R-1142-76	Radium-228
112.450	001	USGS R-1160-76	Strontium
112.460	001	USGS R-1180-76	Uranium
112.470	001	USGS R-1181-76	Uranium
112.480	001	USGS R-1182-76	Uranium
112.490	001	DOE 4.5.2.3	Cesium
112.490	002	DOE 4.5.2.3	Gamma
112.490	003	DOE 4.5.2.3	Iodine
112.500	001	DOE Sr-01	Strontium
112.510	001	DOE Sr-02	Strontium
112.520	001	DOE U-02	Uranium
112.530	001	DOE U-04	Uranium

118 - Radiochemistry of Hazardous Waste

118.010	001	EPA 9310	Gross Alpha
118.010	002	EPA 9310	Gross Beta
118.020	001	EPA 9315	Radium, Total
118.030	001	EPA 9320	Radium-228
118.060	001	EPA 00-07	Thorium
118.060	002	EPA 00-07	Uranium
118.070	001	EPA (March, 1979), p33	Thorium
118.080	001	EPA 901.1	Gamma
118.090	001	EPA AM-01-1	Americium-241
118.100	001	EPA H-01	Tritium
118.110	001	EPA Pu-01	Plutonium
118.130	001	EPA Ra-03	Radium-226
118.140	001	EPA Ra-04	Radium-226
118.150	001	EPA Ra-05	Radium-228
118.170	001	EPA Sr-04	Strontium
118.200	001	DOE 4.5.2.3	Gamma
118.210	001	DOE Am-01	Americium-241
118.211	001	DOE Am-02	Americium-241

118.212	001	DOE Am-03	Americium-241
118.230	001	DOE Pu-02	Plutonium
118.250	001	DOE Ra-04	Radium-226
118.260	002	DOE Se-01	Uranium
118.270	001	DOE Sr-01	Strontium
118.271	001	DOE Sr-02	Strontium
118.280	001	DOE Tc-01	Technetium
118.290	001	DOE U-02	Uranium

State of California—Health and Human Services Agency
Department of Health Services

Sandra Shewry
Director

Arnold Schwarzenegger
Governor

July 1, 2006

Certificate No.: **1237**

NORMAN E. HESTER, Ph.D
TRUESDAIL LABORATORIES, INC.
14201 FRANKLIN AVENUE
TUSTIN, CA 92780

Dear NORMAN E. HESTER, Ph.D:

This is to advise you that the laboratory named above continues to be certified as an environmental testing laboratory pursuant to the provisions of the California Environmental Laboratory Improvement Act (Health and Safety Code (HSC), Division 101, Part 1, Chapter 4, Section 100825, et seq.). Certification for all currently certified Fields of Testing that the laboratory has applied for renewal shall remain in effect until **07/31/2008** unless revoked.

Please note that the renewal application for certification is subject to an on-site visit, and continued use of the certificate is contingent upon:

* **successful completion of the site visit;**
* **acceptable performance in the required performance evaluation (PE) studies;**
* **timely payment of all fees, including an annual fee due before July 31, 2007;**
* **compliance with Environmental Laboratory Accreditation Program (ELAP) statutes (HSC, Section 100825, et seq.) and Regulations (California Code of Regulations (CCR),Title 22, Division 4, Chapter 19).**

An updated "Approved Fields of Testing" will be issued to the laboratory upon completion of the renewal process. The application for the next renewal must be received 90 days before the expiration of this certificate to remain in force according to the CCR, Section 64801 through 64827.

Please note that the laboratory is required to notify ELAP of any major changes in the laboratory such as the transfer of ownership, change of laboratory director, change in location, or structural alterations which may affect adversely the quality of analyses (HSC, Section 100845(b)(d)). Please include the above certificate number in all your correspondence to ELAP.

If you have any questions, please contact ELAP at (510) 620-3155.

Sincerely,

George C. Kulasingam, Ph.D.
Program Chief
Environmental Laboratory Accreditation Program

STATE OF CALIFORNIA
DEPARTMENT OF HEALTH SERVICES
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

ENVIRONMENTAL LABORATORY CERTIFICATION

Is hereby granted to

TRUESDAIL LABORATORIES, INC.

14201 FRANKLIN AVENUE

TUSTIN, CA 92780

Scope of certification is limited to the
"Accredited Fields of Testing"
which accompanies this Certificate.

Continued certification status depends on successful completion of site visit, proficiency testing studies, and payment of applicable fees.

This Certificate is granted in accordance with provisions of Section 100825, et seq. of the Health and Safety Code.

Certificate No.: **1237**

Expiration Date: **07/31/2008**

Effective Date: **07/01/2006**

Richmond, California
subject to forfeiture or revocation

George C. Kulasingam, Ph.D.
Program Chief
Environmental Laboratory Accreditation Program

CALIFORNIA DEPARTMENT OF HEALTH SERVICES
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM
Accredited Fields of Testing

TRUESDAIL LABORATORIES, INC. **Lab Phone** (714) 730-6239

14201 FRANKLIN AVENUE
TUSTIN, CA 92780

Certificate No: 1237 **Renew Date:** **7/31/2006**

Field of Testing: 101 - Microbiology of Drinking Water			
101.010	001	Heterotrophic Bacteria	SM9215B
101.020	001	Total Coliform	SM9221A,B
101.021	001	Fecal Coliform	SM9221E (MTF/EC)
101.050	001	Total Coliform	SM9222A,B,C
101.051	001	Fecal Coliform	SM9221E (MF/EC)
101.060	002	Total Coliform	SM9223
101.060	003	E. coli	SM9223
101.070	002	Total Coliform	Colisure
101.070	003	E. coli	Colisure
101.120	001	Total Coliform (Enumeration)	SM9221A,B,C
101.130	001	Fecal Coliform (Enumeration)	SM9221E (MTF/EC)
101.140	001	Total Coliform (Enumeration)	SM9222A,B,C
101.160	001	Total Coliform (Enumeration)	SM9223
Field of Testing: 102 - Inorganic Chemistry of Drinking Water			
102.030	001	Bromide	EPA 300.0
102.030	003	Chloride	EPA 300.0
102.030	005	Fluoride	EPA 300.0
102.030	006	Nitrate	EPA 300.0
102.030	007	Nitrite	EPA 300.0
102.030	008	Phosphate, Ortho	EPA 300.0
102.030	010	Sulfate	EPA 300.0
102.045	001	Perchlorate	EPA 314.0
102.050	001	Cyanide	EPA 335.4
102.100	001	Alkalinity	SM2320B
102.120	001	Hardness	SM2340B
102.121	001	Hardness	SM2340C
102.130	001	Conductivity	SM2510B
102.140	001	Total Dissolved Solids	SM2540C
102.145	001	Total Dissolved Solids	EPA 160.1
102.150	001	Chloride	SM4110B
102.150	002	Fluoride	SM4110B
102.150	003	Nitrate	SM4110B
102.150	004	Nitrite	SM4110B
102.150	005	Phosphate, Ortho	SM4110B
102.150	006	Sulfate	SM4110B
102.163	001	Free & Total Chlorine	SM4500-Cl G
102.170	001	Chloride	SM4500-Cl- B
102.171	001	Chloride	SM4500-Cl- D
102.180	001	Chlorine Dioxide	SM4500-ClO2 D
102.182	001	Chlorite	SM4500-ClO2 E
102.190	001	Cyanide, Total	SM4500-CN E
102.192	001	Cyanide, amenable	SM4500-CN G
102.200	001	Fluoride	SM4500-F C
102.220	001	Nitrite	SM4500-NO2 B

102.230	001	Nitrate	SM4500-NO3 D
102.240	001	Phosphate, Ortho	SM4500-P E
102.251	001	Sulfate	SM4500-SO4 E
102.262	001	Total Organic Carbon	SM5310C
102.263	001	DOC	SM5310C
102.270	001	Surfactants	SM5540C
102.280	001	UV254	SM5910B
102.510	001	Calcium	SM3120B
102.510	002	Magnesium	SM3120B
102.510	003	Potassium	SM3120B
102.510	004	Silica	SM3120B
102.510	005	Sodium	SM3120B
102.510	006	Hardness (calc.)	SM3120B
102.520	001	Calcium	EPA 200.7
102.520	002	Magnesium	EPA 200.7
102.520	003	Potassium	EPA 200.7
102.520	004	Silica	EPA 200.7
102.520	005	Sodium	EPA 200.7
102.520	006	Hardness (calc.)	EPA 200.7
102.533	001	Silica	SM4500-Si D

Field of Testing: 103 - Toxic Chemical Elements of Drinking Water

103.060	001	Aluminum	SM3120B
103.060	002	Arsenic	SM3120B
103.060	003	Barium	SM3120B
103.060	004	Beryllium	SM3120B
103.060	005	Cadmium	SM3120B
103.060	007	Chromium	SM3120B
103.060	008	Copper	SM3120B
103.060	009	Iron	SM3120B
103.060	011	Manganese	SM3120B
103.060	012	Nickel	SM3120B
103.060	015	Silver	SM3120B
103.060	017	Zinc	SM3120B
103.130	001	Aluminum	EPA 200.7
103.130	002	Arsenic	EPA 200.7
103.130	003	Barium	EPA 200.7
103.130	004	Beryllium	EPA 200.7
103.130	005	Cadmium	EPA 200.7
103.130	007	Chromium	EPA 200.7
103.130	008	Copper	EPA 200.7
103.130	009	Iron	EPA 200.7
103.130	011	Manganese	EPA 200.7
103.130	012	Nickel	EPA 200.7
103.130	015	Silver	EPA 200.7
103.130	017	Zinc	EPA 200.7
103.130	018	Boron	EPA 200.7
103.140	001	Aluminum	EPA 200.8
103.140	002	Antimony	EPA 200.8
103.140	003	Arsenic	EPA 200.8
103.140	004	Barium	EPA 200.8
103.140	005	Beryllium	EPA 200.8
103.140	006	Cadmium	EPA 200.8
103.140	007	Chromium	EPA 200.8
103.140	008	Copper	EPA 200.8

103.140	009	Lead	EPA 200.8
103.140	010	Manganese	EPA 200.8
103.140	011	Mercury	EPA 200.8
103.140	012	Nickel	EPA 200.8
103.140	013	Selenium	EPA 200.8
103.140	014	Silver	EPA 200.8
103.140	015	Thallium	EPA 200.8
103.140	016	Zinc	EPA 200.8
103.140	017	Boron	EPA 200.8
103.140	018	Vanadium	EPA 200.8
103.160	001	Mercury	EPA 245.1
103.310	001	Chromium (VI)	EPA 218.6

Field of Testing: 104 - Volatile Organic Chemistry of Drinking Water

104.010	044	Tetrachloroethene	EPA 502.2
104.010	050	Trichloroethene	EPA 502.2
104.015	001	Bromodichloromethane	EPA 502.2
104.015	002	Bromoform	EPA 502.2
104.015	003	Chloroform	EPA 502.2
104.015	004	Dibromochloromethane	EPA 502.2
104.015	005	Trihalomethanes	EPA 502.2
104.020	002	Methyl tert-butyl Ether (MTBE)	EPA 502.2
104.030	001	1,2-Dibromoethane	EPA 504.1
104.030	002	1,2-Dibromo-3-chloropropane	EPA 504.1
104.035	001	1,2,3-Trichloropropane	SRL 524M-TCP
104.040	000	Volatile Organic Compounds	EPA 524.2
104.040	001	Benzene	EPA 524.2
104.040	007	n-Butylbenzene	EPA 524.2
104.040	008	sec-Butylbenzene	EPA 524.2
104.040	009	tert-Butylbenzene	EPA 524.2
104.040	010	Carbon Tetrachloride	EPA 524.2
104.040	011	Chlorobenzene	EPA 524.2
104.040	015	2-Chlorotoluene	EPA 524.2
104.040	016	4-Chlorotoluene	EPA 524.2
104.040	019	1,3-Dichlorobenzene	EPA 524.2
104.040	020	1,2-Dichlorobenzene	EPA 524.2
104.040	021	1,4-Dichlorobenzene	EPA 524.2
104.040	022	Dichlorodifluoromethane	EPA 524.2
104.040	023	1,1-Dichloroethane	EPA 524.2
104.040	024	1,2-Dichloroethane	EPA 524.2
104.040	025	1,1-Dichloroethene	EPA 524.2
104.040	026	cis-1,2-Dichloroethene	EPA 524.2
104.040	027	trans-1,2-Dichloroethene	EPA 524.2
104.040	028	Dichloromethane	EPA 524.2
104.040	029	1,2-Dichloropropane	EPA 524.2
104.040	033	cis-1,3-Dichloropropene	EPA 524.2
104.040	034	trans-1,3-Dichloropropene	EPA 524.2
104.040	035	Ethylbenzene	EPA 524.2
104.040	037	Isopropylbenzene	EPA 524.2
104.040	039	Naphthalene	EPA 524.2
104.040	041	N-propylbenzene	EPA 524.2
104.040	042	Styrene	EPA 524.2
104.040	044	1,1,2,2-Tetrachloroethane	EPA 524.2
104.040	045	Tetrachloroethene	EPA 524.2
104.040	046	Toluene	EPA 524.2

104.040	048	1,2,4-Trichlorobenzene	EPA 524.2
104.040	049	1,1,1-Trichloroethane	EPA 524.2
104.040	050	1,1,2-Trichloroethane	EPA 524.2
104.040	051	Trichloroethene	EPA 524.2
104.040	052	Trichlorofluoromethane	EPA 524.2
104.040	054	1,2,4-Trimethylbenzene	EPA 524.2
104.040	055	1,3,5-Trimethylbenzene	EPA 524.2
104.040	056	Vinyl Chloride	EPA 524.2
104.040	057	Xylenes, Total	EPA 524.2
104.045	001	Bromodichloromethane	EPA 524.2
104.045	002	Bromoform	EPA 524.2
104.045	003	Chloroform	EPA 524.2
104.045	004	Dibromochloromethane	EPA 524.2
104.045	005	Trihalomethanes	EPA 524.2
104.050	002	Methyl tert-butyl Ether (MTBE)	EPA 524.2
104.050	004	tert-Amyl Methyl Ether (TAME)	EPA 524.2
104.050	005	Ethyl tert-butyl Ether (ETBE)	EPA 524.2
104.050	006	Trichlorotrifluoroethane	EPA 524.2
104.050	007	tert-Butyl Alcohol (TBA)	EPA 524.2
104.050	008	Carbon Disulfide	EPA 524.2
104.050	009	Methyl Isobutyl Ketone	EPA 524.2

Field of Testing: 105 - Semi-volatile Organic Chemistry of Drinking Water

105.010	000	Pesticides	EPA 505
105.010	002	Alachlor	EPA 505
105.010	003	Atrazine	EPA 505
105.010	004	Chlordane	EPA 505
105.010	006	Endrin	EPA 505
105.010	007	Heptachlor	EPA 505
105.010	008	Heptachlor Epoxide	EPA 505
105.010	009	Hexachlorobenzene	EPA 505
105.010	010	Hexachlorocyclopentadiene	EPA 505
105.010	011	Lindane	EPA 505
105.010	012	Methoxychlor	EPA 505
105.010	013	Simazine	EPA 505
105.010	014	Toxaphene	EPA 505
105.010	015	PCBs as Aroclors (screen)	EPA 505
105.030	000	N-, P- Pesticides	EPA 507
105.030	001	Alachlor	EPA 507
105.030	002	Atrazine	EPA 507
105.030	007	Molinate	EPA 507
105.030	009	Simazine	EPA 507
105.030	010	Thiobencarb	EPA 507
105.040	000	Chlorinated Pesticides	EPA 508
105.040	003	Chlordane (total)	EPA 508
105.040	007	Endrin	EPA 508
105.040	008	Heptachlor	EPA 508
105.040	009	Heptachlor Epoxide	EPA 508
105.040	010	Hexachlorobenzene	EPA 508
105.040	011	Hexachlorocyclopentadiene	EPA 508
105.040	012	Lindane	EPA 508
105.040	013	Methoxychlor	EPA 508
105.040	015	Toxaphene	EPA 508
105.040	016	PCBs as Aroclors (screen)	EPA 508
105.083	001	2,4-D	EPA 515.4

105.083	002	Dinoseb	EPA 515.4
105.083	003	Pentachlorophenol	EPA 515.4
105.083	004	Picloram	EPA 515.4
105.083	005	2,4,5-TP	EPA 515.4
105.083	006	Dalapon	EPA 515.4
105.083	007	Bentazon	EPA 515.4
105.083	008	Dicamba	EPA 515.4
105.083	009	Chlorinated Acids	EPA 515.4
105.090	001	Alachlor	EPA 525.2
105.090	003	Atrazine	EPA 525.2
105.090	004	Benzo(a)pyrene	EPA 525.2
105.090	006	Chlordane	EPA 525.2
105.090	008	Di(2-ethylhexyl) Adipate	EPA 525.2
105.090	009	Di(2-ethylhexyl) Phthalate	EPA 525.2
105.090	029	Polynuclear Aromatic Hydrocarbons	EPA 525.2
105.090	030	Adipates	EPA 525.2
105.090	031	Phthalates	EPA 525.2
105.090	032	Other Extractables	EPA 525.2
105.180	001	Bromoacetic Acid	EPA 552.1
105.180	003	Chloroacetic Acid	EPA 552.1
105.180	005	Dibromoacetic Acid	EPA 552.1
105.180	006	Dichloroacetic Acid	EPA 552.1
105.180	007	Trichloroacetic Acid	EPA 552.1
105.180	008	Haloacetic Acids (HAA5)	EPA 552.1
Field of Testing:		106 - Radiochemistry of Drinking Water	
106.010	001	Gross Alpha	EPA 900.0
106.010	002	Gross Beta	EPA 900.0
106.050	001	Total Alpha Radium	EPA 903.0
106.051	001	Radium-226	EPA 903.1
106.080	001	Tritium	EPA 906.0
106.090	001	Uranium	EPA 908.0
106.092	001	Uranium	EPA 200.8
106.260	001	Gross Alpha	SM7110B
106.260	002	Gross Beta	SM7110B
106.270	001	Gross Alpha	SM7110C
106.350	001	Radium-226	SM7500-Ra C
106.380	001	Uranium	SM7500-U B
106.610	001	Radon-222	SM7500-Rn
Field of Testing:		107 - Microbiology of Wastewater	
107.010	001	Heterotrophic Bacteria	SM9215B
107.020	001	Total Coliform	SM9221B
107.040	001	Fecal Coliform	SM9221C,E (MTF/EC)
107.060	001	Total Coliform	SM9222B
107.100	001	Fecal Streptococci	SM9230B
107.100	002	Enterococci	SM9230B
Field of Testing:		108 - Inorganic Chemistry of Wastewater	
108.020	001	Conductivity	EPA 120.1
108.040	001	Hardness	EPA 130.2
108.050	001	pH	EPA 150.1
108.060	001	Residue, Filterable	EPA 160.1
108.070	001	Residue, Non-filterable	EPA 160.2
108.080	001	Residue, Total	EPA 160.3
108.090	001	Residue, Volatile	EPA 160.4

108.100	001	Residue, Settleable	EPA 160.5
108.110	001	Turbidity	EPA 180.1
108.112	001	Boron	EPA 200.7
108.112	002	Calcium	EPA 200.7
108.112	003	Hardness (calc.)	EPA 200.7
108.112	004	Magnesium	EPA 200.7
108.112	005	Potassium	EPA 200.7
108.112	006	Silica	EPA 200.7
108.112	007	Sodium	EPA 200.7
108.120	001	Bromide	EPA 300.0
108.120	002	Chloride	EPA 300.0
108.120	003	Fluoride	EPA 300.0
108.120	004	Nitrate	EPA 300.0
108.120	005	Nitrite	EPA 300.0
108.120	006	Nitrate-nitrite, Total	EPA 300.0
108.120	007	Phosphate, Ortho.	EPA 300.0
108.120	008	Sulfate	EPA 300.0
108.130	001	Acidity	EPA 305.1
108.140	001	Alkalinity	EPA 310.1
108.170	001	Chlorine Residual, Total	EPA 330.1
108.180	001	Cyanide, amenable	EPA 335.1
108.181	001	Cyanide, Total	EPA 335.2
108.191	001	Fluoride	EPA 340.2
108.201	001	Ammonia	EPA 350.2
108.202	001	Ammonia	EPA 350.3
108.211	001	Kjeldahl Nitrogen	EPA 351.2
108.240	001	Nitrite	EPA 354.1
108.250	001	Dissolved Oxygen	EPA 360.1
108.262	001	Phosphate, Ortho	EPA 365.2
108.263	001	Phosphorus, Total	EPA 365.2
108.264	001	Phosphate, Ortho	EPA 365.3
108.265	001	Phosphorus, Total	EPA 365.3
108.270	001	Dissolved Silica	EPA 370.1
108.290	001	Sulfide	EPA 376.1
108.291	001	Sulfide	EPA 376.2
108.300	001	Sulfite	EPA 377.1
108.310	001	Biochemical Oxygen Demand	EPA 405.1
108.323	001	Chemical Oxygen Demand	EPA 410.4
108.330	001	Oil and Grease	EPA 413.1
108.350	001	Total Recoverable Petroleum Hydrocarbons	EPA 418.1
108.360	001	Phenols, Total	EPA 420.1
108.370	001	Surfactants	EPA 425.1
108.380	001	Oil and Grease	EPA 1664
108.390	001	Turbidity	SM2130B
108.400	001	Acidity	SM2310B
108.410	001	Alkalinity	SM2320B
108.420	001	Hardness (calc.)	SM2340B
108.421	001	Hardness	SM2340C
108.430	001	Conductivity	SM2510B
108.440	001	Residue, Total	SM2540B
108.441	001	Residue, Filterable	SM2540C
108.442	001	Residue, Non-filterable	SM2540D
108.443	001	Residue, Settleable	SM2540F
108.447	001	Boron	SM3120B

108.447	002	Calcium	SM3120B
108.447	003	Hardness (calc.)	SM3120B
108.447	004	Magnesium	SM3120B
108.447	005	Potassium	SM3120B
108.447	006	Silica	SM3120B
108.447	007	Sodium	SM3120B
108.462	001	Chlorine	SM4500-Cl D
108.470	001	Cyanide, Manual Distillation	SM4500-CN C
108.471	001	Cyanide, Total	SM4500-CN D
108.472	001	Cyanide, Total	SM4500-CN E
108.473	001	Cyanide, amenable	SM4500-CN G
108.480	001	Fluoride	SM4500-F C
108.490	001	pH	SM4500-H+ B
108.500	001	Ammonia	SM4500-NH3 C
108.501	001	Kjeldahl Nitrogen	SM4500-NH3 C
108.510	001	Nitrite	SM4500-NO2 B
108.531	001	Dissolved Oxygen	SM4500-O G
108.540	001	Phosphate, Ortho	SM4500-P E
108.541	001	Phosphorus, Total	SM4500-P E
108.550	001	Dissolved Silica	SM4500-Si D
108.560	001	Sulfite	SM4500-SO3 B
108.580	001	Sulfide	SM4500-S= D
108.590	001	Biochemical Oxygen Demand	SM5210B
108.591	001	Carbonaceous BOD	SM5210B
108.602	001	Chemical Oxygen Demand	SM5220D
108.611	001	Total Organic Carbon	SM5310C
108.630	001	Oil and Grease	SM5520B
108.640	001	Surfactants	SM5540C
108.660	001	Chemical Oxygen Demand	HACH8000
108.904	001	Calcium	SM3500-Ca D
Field of Testing:		109 - Toxic Chemical Elements of Wastewater	
109.010	001	Aluminum	EPA 200.7
109.010	002	Antimony	EPA 200.7
109.010	003	Arsenic	EPA 200.7
109.010	004	Barium	EPA 200.7
109.010	005	Beryllium	EPA 200.7
109.010	007	Cadmium	EPA 200.7
109.010	009	Chromium	EPA 200.7
109.010	010	Cobalt	EPA 200.7
109.010	011	Copper	EPA 200.7
109.010	012	Iron	EPA 200.7
109.010	013	Lead	EPA 200.7
109.010	015	Manganese	EPA 200.7
109.010	016	Molybdenum	EPA 200.7
109.010	017	Nickel	EPA 200.7
109.010	019	Selenium	EPA 200.7
109.010	021	Silver	EPA 200.7
109.010	023	Thallium	EPA 200.7
109.010	024	Tin	EPA 200.7
109.010	026	Vanadium	EPA 200.7
109.010	027	Zinc	EPA 200.7
109.020	001	Aluminum	EPA 200.8
109.020	002	Antimony	EPA 200.8
109.020	003	Arsenic	EPA 200.8

109.020	004	Barium	EPA 200.8
109.020	005	Beryllium	EPA 200.8
109.020	006	Cadmium	EPA 200.8
109.020	007	Chromium	EPA 200.8
109.020	008	Cobalt	EPA 200.8
109.020	009	Copper	EPA 200.8
109.020	010	Lead	EPA 200.8
109.020	011	Manganese	EPA 200.8
109.020	012	Molybdenum	EPA 200.8
109.020	013	Nickel	EPA 200.8
109.020	014	Selenium	EPA 200.8
109.020	015	Silver	EPA 200.8
109.020	016	Thallium	EPA 200.8
109.020	017	Vanadium	EPA 200.8
109.020	018	Zinc	EPA 200.8
109.104	001	Chromium (VI)	EPA 218.6
109.190	001	Mercury	EPA 245.1
109.430	001	Aluminum	SM3120B
109.430	002	Antimony	SM3120B
109.430	003	Arsenic	SM3120B
109.430	004	Barium	SM3120B
109.430	005	Beryllium	SM3120B
109.430	007	Cadmium	SM3120B
109.430	009	Chromium	SM3120B
109.430	010	Cobalt	SM3120B
109.430	011	Copper	SM3120B
109.430	012	Iron	SM3120B
109.430	013	Lead	SM3120B
109.430	015	Manganese	SM3120B
109.430	016	Molybdenum	SM3120B
109.430	017	Nickel	SM3120B
109.430	019	Selenium	SM3120B
109.430	021	Silver	SM3120B
109.430	023	Thallium	SM3120B
109.430	024	Vanadium	SM3120B
109.430	025	Zinc	SM3120B
Field of Testing: 110 - Volatile Organic Chemistry of Wastewater			
110.010	000	Halogenated Volatiles	EPA 601
110.020	000	Aromatic Volatiles	EPA 602
110.030	000	Acrolein, Acrylonitrile	EPA 603
110.040	040	Halogenated Hydrocarbons	EPA 624
110.040	041	Aromatic Compounds	EPA 624
110.040	042	Oxygenates	EPA 624
110.040	043	Other Volatile Organics	EPA 624
Field of Testing: 111 - Semi-volatile Organic Chemistry of Wastewater			
111.101	032	Polynuclear Aromatic Hydrocarbons	EPA 625
111.101	033	Adipates	EPA 625
111.101	034	Phthalates	EPA 625
111.101	036	Other Extractables	EPA 625
111.170	030	Organochlorine Pesticides	EPA 608
111.170	031	PCBs	EPA 608
Field of Testing: 112 - Radiochemistry of Wastewater			
112.010	001	Gross Alpha	EPA 900.0

112.010	002	Gross Beta	EPA 900.0
112.021	001	Radium-226	EPA 903.1
112.030	001	Gross Alpha	SM7110B
112.030	002	Gross Beta	SM7110B
112.050	001	Radium-226	SM7500-Ra C
Field of Testing: 114 - Inorganic Chemistry of Hazardous Waste			
114.010	001	Antimony	EPA 6010B
114.010	002	Arsenic	EPA 6010B
114.010	003	Barium	EPA 6010B
114.010	004	Beryllium	EPA 6010B
114.010	005	Cadmium	EPA 6010B
114.010	006	Chromium	EPA 6010B
114.010	007	Cobalt	EPA 6010B
114.010	008	Copper	EPA 6010B
114.010	009	Lead	EPA 6010B
114.010	010	Molybdenum	EPA 6010B
114.010	011	Nickel	EPA 6010B
114.010	012	Selenium	EPA 6010B
114.010	013	Silver	EPA 6010B
114.010	014	Thallium	EPA 6010B
114.010	015	Vanadium	EPA 6010B
114.010	016	Zinc	EPA 6010B
114.020	001	Antimony	EPA 6020
114.020	002	Arsenic	EPA 6020
114.020	003	Barium	EPA 6020
114.020	004	Beryllium	EPA 6020
114.020	005	Cadmium	EPA 6020
114.020	006	Chromium	EPA 6020
114.020	007	Cobalt	EPA 6020
114.020	008	Copper	EPA 6020
114.020	009	Lead	EPA 6020
114.020	010	Molybdenum	EPA 6020
114.020	011	Nickel	EPA 6020
114.020	012	Selenium	EPA 6020
114.020	013	Silver	EPA 6020
114.020	014	Thallium	EPA 6020
114.020	015	Vanadium	EPA 6020
114.020	016	Zinc	EPA 6020
114.025	001	Mercury	EPA 6020A
114.103	001	Chromium (VI)	EPA 7196A
114.106	001	Chromium (VI)	EPA 7199
114.140	001	Mercury	EPA 7470A
114.141	001	Mercury	EPA 7471A
114.221	001	Cyanide, Total	EPA 9012A
114.222	001	Cyanide	EPA 9014
114.230	001	Sulfides, Total	EPA 9034
114.240	001	pH	EPA 9040
114.241	001	pH	EPA 9045
114.250	001	Fluoride	EPA 9056
114.270	001	Fluoride	EPA 9214
Field of Testing: 115 - Extraction Test of Hazardous Waste			
115.010	001	Extraction Procedure Toxicity (EPTox)	EPA 1310A
115.020	001	Toxicity Characteristic Leaching Procedure (TCLP)	EPA 1311

115.030	001	Waste Extraction Test (WET)	CCR Chapter11, Article 5, Appendix II
115.040	001	Synthetic Precipitation Leaching Procedure (SPLP)	EPA 1312
Field of Testing:		116 - Volatile Organic Chemistry of Hazardous Waste	
116.020	030	Nonhalogenated Volatiles	EPA 8015B
116.020	031	Ethanol and Methanol	EPA 8015B
116.030	001	Gasoline-range Organics	EPA 8015B
116.040	041	Methyl tert-butyl Ether (MTBE)	EPA 8021B
116.040	062	BTEX	EPA 8021B
116.080	000	Volatile Organic Compounds	EPA 8260B
116.080	120	Oxygenates	EPA 8260B
116.110	001	Total Petroleum Hydrocarbons - Gasoline	LUFT
Field of Testing:		117 - Semi-volatile Organic Chemistry of Hazardous Waste	
117.010	001	Diesel-range Total Petroleum Hydrocarbons	EPA 8015B
117.016	001	Diesel-range Total Petroleum Hydrocarbons	LUFT
117.017	001	TRPH Screening	EPA 418.1
117.110	000	Extractable Organics	EPA 8270C
117.150	000	Carbonyl Compounds	EPA 8315A
117.210	000	Organochlorine Pesticides	EPA 8081A
117.220	000	PCBs	EPA 8082
117.240	000	Organophosphorus Pesticides	EPA 8141A
117.250	000	Chlorinated Herbicides	EPA 8151A
Field of Testing:		118 - Radiochemistry of Hazardous Waste	
118.010	001	Gross Alpha	EPA 9310
118.010	002	Gross Beta	EPA 9310
Field of Testing:		120 - Physical Properties of Hazardous Waste	
120.010	001	Ignitability	EPA 1010
120.030	001	Corrosivity	EPA 1110
120.040	001	Reactive Cyanide	Section 7.3 SW-846
120.050	001	Reactive Sulfide	Section 7.3 SW-846
120.070	001	Corrosivity - pH Determination	EPA 9040B
120.080	001	Corrosivity - pH Determination	EPA 9045C
Field of Testing:		126 - Microbiology of Recreational Water	
126.010	001	Total Coliform (Enumeration)	SM9221A,B,C
126.020	001	Total Coliform (Enumeration)	SM9222A,B
126.030	001	Fecal Coliform (Enumeration)	SM9221E
126.050	001	Total Coliform and E. coli	SM9223
126.080	001	Enterococci	IDEXX

STATE OF CALIFORNIA
DEPARTMENT OF HEALTH SERVICES
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

NELAP - RECOGNIZED

ACCREDITATION

Is hereby granted to

VISTA ANALYTICAL LABORATORY, INC

1104 WINDFIELD WAY

EL DORADO HILLS, CA 95762-5702

Scope of accreditation is limited to the
"NELAP Fields of Accreditation"
which accompanies this Certificate.

Continued accredited status depends on successful
ongoing participation in the program.

This Certificate is granted in accordance with provisions of
Section 100825, et seq. of the Health and Safety Code.

Certificate No.: **02102CA**

Expiration Date: **01/31/2008**

Effective Date: **01/31/2007**

Richmond, California
subject to forfeiture or revocation

George C. Kulasingam, Ph.D.
Program Chief
Environmental Laboratory Accreditation Program

State of California—Health and Human Services Agency
Department of Health Services

SANDRA SHEWRY
Director

ARNOLD SCHWARZENEGGER
Governor

January 8, 2007

Certificate No.: 02102CA

MARTHA MAIER
VISTA ANALYTICAL LABORATORY, INC
1104 WINDFIELD WAY
EL DORADO HILLS, CA 95762-5702

Dear MARTHA MAIER:

This is to advise you that the laboratory named above has been accredited under National Environmental Laboratory Accreditation Program (NELAP) as an environmental testing laboratory pursuant to the provisions of the California Environmental Laboratory Improvement Act (Health and Safety Code (HSC), Division 101, Part 1, Chapter 4, Section 100825, et seq.).

The Fields of Accreditation for which this laboratory has been accredited under this Act are enclosed. Accreditation shall remain in effect until **January 31, 2008** unless revoked or withdrawn at your written request. To maintain accreditation, the laboratory shall comply with the National Environmental Laboratory Accreditation Conference (NELAC) Standards and all associated California Environmental Laboratory Accreditation Program (ELAP) regulations and statutes.

Please note that your laboratory is required to notify California ELAP of any major changes in key accreditation criteria within 30 calendar days of the change. This written notification includes but is not limited to changes in ownership, location, key personnel, and major instrumentation (Section 100845(b) and (d), HSC, and NELAC Standard Section 4.3.2). The certificate must be returned to California ELAP upon loss of accreditation.

Your continued cooperation is essential to maintain high quality of the data produced by environmental laboratories accredited by the State of California.

If you have any questions, please contact Aida Dente at (510) 620-3155.

Sincerely,

George C. Kulasingam, Ph.D.
Program Chief
Environmental Laboratory Accreditation Program

Enclosure

CALIFORNIA DEPARTMENT OF HEALTH SERVICES

ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM - NELAP RECOGNIZED

Fields of Accreditation

VISTA ANALYTICAL LABORATORY, INC **Lab Phone** (916) 933-1640

1104 WINDFIELD WAY
EL DORADO HILLS, CA 95762-5702

Certificate No: 02102CA Renew Date: 01/31/2008

105 - Semi-volatile Organic Chemistry of Drinking Water			
105.230	001	EPA 1613	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)
111 - Semi-volatile Organic Chemistry of Wastewater			
111.090	001	EPA 613	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)
111.110	000	EPA 1613	Dioxins
111.110	001	EPA 1613	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)
111.110	002	EPA 1613	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)
111.110	003	EPA 1613	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)
111.110	004	EPA 1613	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)
111.110	005	EPA 1613	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)
111.110	006	EPA 1613	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)
111.110	007	EPA 1613	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)
111.110	008	EPA 1613	2,3,7,8-Tetrachlorodibenzofuran (TCDF)
111.110	009	EPA 1613	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)
111.110	010	EPA 1613	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)
111.110	011	EPA 1613	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)
111.110	012	EPA 1613	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)
111.110	013	EPA 1613	1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)
111.110	014	EPA 1613	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)
111.110	015	EPA 1613	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)
111.110	016	EPA 1613	1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)
111.110	017	EPA 1613	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)
111.110	018	EPA 1613	Total TCDD
111.110	019	EPA 1613	Total PeCDD
111.110	020	EPA 1613	Total HxCDD
111.110	021	EPA 1613	Total HpCDD
111.110	022	EPA 1613	Total TCDF
111.110	023	EPA 1613	Total PeCDF
111.110	024	EPA 1613	Total HxCDF
111.110	025	EPA 1613	Total HpCDF
117 - Semi-volatile Organic Chemistry of Hazardous Waste			
117.120	000	EPA 8280A	Dioxins and Dibenzofurans
117.120	001	EPA 8280A	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)
117.120	002	EPA 8280A	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)

As of 01/08/2007, this list supersedes all previous lists for this certificate number.
Customers: Please verify the current accreditation standing with the State.

117.120	003	EPA 8280A	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)
117.120	004	EPA 8280A	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)
117.120	005	EPA 8280A	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)
117.120	006	EPA 8280A	2,3,7,8-Tetrachlorodibenzofuran (TCDF)
117.120	007	EPA 8280A	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)
117.120	008	EPA 8280A	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)
117.120	009	EPA 8280A	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)
117.120	010	EPA 8280A	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)
117.120	011	EPA 8280A	1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)
117.120	012	EPA 8280A	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)
117.120	013	EPA 8280A	Total TCDD
117.120	014	EPA 8280A	Total PeCDD
117.120	015	EPA 8280A	Total HxCDD
117.120	016	EPA 8280A	Total TCDF
117.120	017	EPA 8280A	Total PeCDF
117.120	018	EPA 8280A	Total HxCDF
117.120	019	EPA 8280A	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)
117.120	020	EPA 8280A	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)
117.120	021	EPA 8280A	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)
117.120	022	EPA 8280A	1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)
117.120	023	EPA 8280A	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)
117.120	024	EPA 8280A	Total HpCDD
117.120	025	EPA 8280A	Total HpCDF
117.130	000	EPA 8290	Dioxins and Dibenzofurans
117.130	001	EPA 8290	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)
117.130	002	EPA 8290	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)
117.130	003	EPA 8290	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)
117.130	004	EPA 8290	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)
117.130	005	EPA 8290	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)
117.130	006	EPA 8290	2,3,7,8-Tetrachlorodibenzofuran (TCDF)
117.130	007	EPA 8290	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)
117.130	008	EPA 8290	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)
117.130	009	EPA 8290	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)
117.130	010	EPA 8290	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)
117.130	011	EPA 8290	1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)
117.130	012	EPA 8290	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)
117.130	013	EPA 8290	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)
117.130	014	EPA 8290	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)
117.130	015	EPA 8290	1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)
117.130	016	EPA 8290	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)
117.130	017	EPA 8290	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)

STATE OF CALIFORNIA
DEPARTMENT OF HEALTH SERVICES
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

ENVIRONMENTAL LABORATORY CERTIFICATION

Is hereby granted to

WECK LABORATORIES, INC.

14859 E CLARK AVENUE

INDUSTRY, CA 91745

Scope of certification is limited to the
"Accredited Fields of Testing"
which accompanies this Certificate.

Continued certification status depends on successful completion of site visit, proficiency testing studies, and payment of applicable fees.

This Certificate is granted in accordance with provisions of Section 100825, et seq. of the Health and Safety Code.

Certificate No.: **1132**

Expiration Date: **03/31/2008**

Effective Date: **03/01/2006**

Richmond, California
subject to forfeiture or revocation

George C. Kulasingam, Ph.D.
Program Chief
Environmental Laboratory Accreditation Program

State of California—Health and Human Services Agency
Department of Health Services

Sandra Shewry
Director

Arnold Schwarzenegger
Governor

March 1, 2006

Certificate No.: **1132**

ALFREDO E. PIERRI
WECK LABORATORIES, INC.
14859 EAST CLARK AVENUE
INDUSTRY, CA 91745

Dear ALFREDO E. PIERRI:

This is to advise you that the laboratory named above continues to be certified as an environmental testing laboratory pursuant to the provisions of the California Environmental Laboratory Improvement Act (Health and Safety Code (HSC), Division 101, Part 1, Chapter 4, Section 100825, et seq.). Certification for all currently certified Fields of Testing that the laboratory has applied for renewal shall remain in effect until **03/31/2008** unless revoked.

Please note that the renewal application for certification is subject to an on-site visit, and continued use of the certificate is contingent upon:

- **successful completion of the site visit;**
- **acceptable performance in the required performance evaluation (PE) studies;**
- **timely payment of all fees, including an annual fee due before March 31, 2007;**
- **compliance with Environmental Laboratory Accreditation Program (ELAP) statutes (HSC, Section 100825, et seq.) and Regulations (California Code of Regulations (CCR),Title 22, Division 4, Chapter 19).**

An updated "Approved Fields of Testing" will be issued to the laboratory upon completion of the renewal process. The application for the next renewal must be received 90 days before the expiration of this certificate to remain in force according to the CCR, Section 64801 through 64827.

Please note that the laboratory is required to notify ELAP of any major changes in the laboratory such as the transfer of ownership, change of laboratory director, change in location, or structural alterations which may affect adversely the quality of analyses (HSC, Section 100845(b)(d)). Please include the above certificate number in all your correspondence to ELAP.

If you have any questions, please contact ELAP at (510) 620-3155.

Sincerely,

George C. Kulasingam, Ph.D.
Program Chief
Environmental Laboratory Accreditation Program

CALIFORNIA DEPARTMENT OF HEALTH SERVICES
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM
Accredited Fields of Testing

WECK LABORATORIES, INC. **Lab Phone** (626) 336-2139

14859 E CLARK AVENUE
INDUSTRY, CA 91745

Certificate No: 1132 **Renew Date: 03/31/2006**

Field of Testing:	103 - Toxic Chemical Elements of Drinking Water		
103.130	018	Boron	EPA 200.7
103.140	011	Mercury	EPA 200.8
103.140	017	Boron	EPA 200.8
103.140	018	Vanadium	EPA 200.8
103.310	001	Chromium (VI)	EPA 218.6
Field of Testing:	104 - Volatile Organic Chemistry of Drinking Water		
104.035	001	1,2,3-Trichloropropane	SRL 524M-TCP
104.036	001	1,2,3-Trichloropropane	SRL 525M-TCP
104.040	000	Volatile Organic Compounds	EPA 524.2
104.040	001	Benzene	EPA 524.2
104.040	007	n-Butylbenzene	EPA 524.2
104.040	008	sec-Butylbenzene	EPA 524.2
104.040	009	tert-Butylbenzene	EPA 524.2
104.040	010	Carbon Tetrachloride	EPA 524.2
104.040	011	Chlorobenzene	EPA 524.2
104.040	015	2-Chlorotoluene	EPA 524.2
104.040	016	4-Chlorotoluene	EPA 524.2
104.040	019	1,3-Dichlorobenzene	EPA 524.2
104.040	020	1,2-Dichlorobenzene	EPA 524.2
104.040	021	1,4-Dichlorobenzene	EPA 524.2
104.040	022	Dichlorodifluoromethane	EPA 524.2
104.040	023	1,1-Dichloroethane	EPA 524.2
104.040	024	1,2-Dichloroethane	EPA 524.2
104.040	025	1,1-Dichloroethene	EPA 524.2
104.040	026	cis-1,2-Dichloroethene	EPA 524.2
104.040	027	trans-1,2-Dichloroethene	EPA 524.2
104.040	028	Dichloromethane	EPA 524.2
104.040	029	1,2-Dichloropropane	EPA 524.2
104.040	033	cis-1,3-Dichloropropene	EPA 524.2
104.040	034	trans-1,3-Dichloropropene	EPA 524.2
104.040	035	Ethylbenzene	EPA 524.2
104.040	037	Isopropylbenzene	EPA 524.2
104.040	039	Naphthalene	EPA 524.2
104.040	041	N-propylbenzene	EPA 524.2
104.040	042	Styrene	EPA 524.2
104.040	044	1,1,2,2-Tetrachloroethane	EPA 524.2
104.040	045	Tetrachloroethene	EPA 524.2
104.040	046	Toluene	EPA 524.2
104.040	048	1,2,4-Trichlorobenzene	EPA 524.2
104.040	049	1,1,1-Trichloroethane	EPA 524.2
104.040	050	1,1,2-Trichloroethane	EPA 524.2
104.040	051	Trichloroethene	EPA 524.2
104.040	052	Trichlorofluoromethane	EPA 524.2
104.040	054	1,2,4-Trimethylbenzene	EPA 524.2

As of 10/01/2004 , this list supersedes all previous lists for this certificate number.
Customers: Please verify the current accreditation standing with the State.

104.040	055	1,3,5-Trimethylbenzene	EPA 524.2
104.040	056	Vinyl Chloride	EPA 524.2
104.040	057	Xylenes, Total	EPA 524.2
104.045	001	Bromodichloromethane	EPA 524.2
104.045	002	Bromoform	EPA 524.2
104.045	003	Chloroform	EPA 524.2
104.045	004	Dibromochloromethane	EPA 524.2
104.045	005	Trihalomethanes	EPA 524.2
104.050	002	Methyl tert-butyl Ether (MTBE)	EPA 524.2
104.050	004	tert-Amyl Methyl Ether (TAME)	EPA 524.2
104.050	005	Ethyl tert-butyl Ether (ETBE)	EPA 524.2
104.050	006	Trichlorotrifluoroethane	EPA 524.2
104.050	007	tert-Butyl Alcohol (TBA)	EPA 524.2
104.050	008	Carbon Disulfide	EPA 524.2
104.050	009	Methyl Isobutyl Ketone	EPA 524.2

Field of Testing: 110 - Volatile Organic Chemistry of Wastewater

110.040	040	Halogenated Hydrocarbons	EPA 624
110.040	041	Aromatic Compounds	EPA 624
110.040	042	Oxygenates	EPA 624
110.040	043	Other Volatile Organics	EPA 624

STATE OF CALIFORNIA
DEPARTMENT OF HEALTH SERVICES
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

NELAP - RECOGNIZED

ACCREDITATION

Is hereby granted to

WECK LABORATORIES, INC.

14859 E CLARK AVENUE

INDUSTRY, CA 91745

Scope of accreditation is limited to the
"NELAP Fields of Accreditation"
which accompanies this Certificate.

Continued accredited status depends on successful
ongoing participation in the program.

This Certificate is granted in accordance with provisions of
Section 100825, et seq. of the Health and Safety Code.

Certificate No.: **04229CA**

Expiration Date: **10/31/2007**

Effective Date: **10/31/2006**

Richmond, California
subject to forfeiture or revocation

George C. Kulasingam, Ph.D.
Program Chief
Environmental Laboratory Accreditation Program

CALIFORNIA DEPARTMENT OF HEALTH SERVICES

ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM - NELAP RECOGNIZED

Fields of Accreditation

WECK LABORATORIES, INC.

Lab Phone (626) 336-2139

14859 E CLARK AVENUE
INDUSTRY, CA 91745

Certificate No: 04229CA **Renew Date: 10/31/2007** **INTERIM**

101 - Microbiology of Drinking Water			
101.010	001	SM9215B	Heterotrophic Bacteria
101.020	001	SM9221A,B	Total Coliform
101.021	001	SM9221E (MTF/EC)	Fecal Coliform
101.060	002	SM9223	Total Coliform
101.060	003	SM9223	E. coli
101.120	001	SM9221A,B,C	Total Coliform (Enumeration)
101.130	001	SM9221E (MTF/EC)	Fecal Coliform (Enumeration)
101.180	001	SM9221E	Total Coliform (Enumeration)
102 - Inorganic Chemistry of Drinking Water			
102.020	001	EPA 180.1	Turbidity
102.030	001	EPA 300.0	Bromide
102.030	003	EPA 300.0	Chloride
102.030	005	EPA 300.0	Fluoride
102.030	006	EPA 300.0	Nitrate
102.030	007	EPA 300.0	Nitrite
102.030	008	EPA 300.0	Phosphate, Ortho
102.030	010	EPA 300.0	Sulfate
102.040	001	EPA 300.1	Bromide
102.040	002	EPA 300.1	Chlorite
102.040	003	EPA 300.1	Chlorate
102.040	004	EPA 300.1	Bromate
102.045	001	EPA 314.0	Perchlorate
102.050	001	EPA 335.4	Cyanide
102.060	001	EPA 353.2	Nitrate calc.
102.061	001	EPA 353.2	Nitrite
102.070	001	EPA 365.1	Phosphate, Ortho
102.100	001	SM2320B	Alkalinity
102.120	001	SM2340B	Hardness
102.130	001	SM2510B	Conductivity
102.140	001	SM2540C	Total Dissolved Solids
102.163	001	SM4500-Cl G	Chlorine, Free and Total
102.180	001	SM4500-ClO2 D	Chlorine Dioxide
102.190	001	SM4500-CN E	Cyanide, Total

As of 10/10/2006, this list supersedes all previous lists for this certificate number.
Customers: Please verify the current accreditation standing with the State.

102.192	001	SM4500-CN G	Cyanide, amenable
102.210	001	SM4500-H+ B	pH
102.262	001	SM5310C	Total Organic Carbon
102.263	001	SM5310C	DOC
102.270	001	SM5540C	Surfactants
102.280	001	SM5910B	UV254
102.520	001	EPA 200.7	Calcium
102.520	002	EPA 200.7	Magnesium
102.520	003	EPA 200.7	Potassium
102.520	004	EPA 200.7	Silica
102.520	005	EPA 200.7	Sodium
102.520	006	EPA 200.7	Hardness (calc.)
103 - Toxic Chemical Elements of Drinking Water			
103.130	001	EPA 200.7	Aluminum
103.130	002	EPA 200.7	Arsenic
103.130	003	EPA 200.7	Barium
103.130	004	EPA 200.7	Beryllium
103.130	005	EPA 200.7	Cadmium
103.130	007	EPA 200.7	Chromium
103.130	008	EPA 200.7	Copper
103.130	009	EPA 200.7	Iron
103.130	011	EPA 200.7	Manganese
103.130	012	EPA 200.7	Nickel
103.130	015	EPA 200.7	Silver
103.130	017	EPA 200.7	Zinc
103.140	001	EPA 200.8	Aluminum
103.140	002	EPA 200.8	Antimony
103.140	003	EPA 200.8	Arsenic
103.140	004	EPA 200.8	Barium
103.140	005	EPA 200.8	Beryllium
103.140	006	EPA 200.8	Cadmium
103.140	007	EPA 200.8	Chromium
103.140	008	EPA 200.8	Copper
103.140	009	EPA 200.8	Lead
103.140	010	EPA 200.8	Manganese
103.140	012	EPA 200.8	Nickel
103.140	013	EPA 200.8	Selenium
103.140	014	EPA 200.8	Silver
103.140	015	EPA 200.8	Thallium
103.140	016	EPA 200.8	Zinc
103.160	001	EPA 245.1	Mercury

104 - Volatile Organic Chemistry of Drinking Water			
104.030	003	EPA 504.1	1,2,3-Trichloropropane
104.030	004	EPA 504.1	EDB and DBCP
104.040	000	EPA 524.2	Volatile Organic Compounds
104.045	005	EPA 524.2	Trihalomethanes
104.050	011	EPA 524.2	Oxygenates
105 - Semi-volatile Organic Chemistry of Drinking Water			
105.030	000	EPA 507	N-, P- Pesticides
105.040	000	EPA 508	Chlorinated Pesticides
105.040	016	EPA 508	PCBs as Aroclors (screen)
105.082	009	EPA 515.3	Chlorinated Acids
105.090	029	EPA 525.2	Polynuclear Aromatic Hydrocarbons
105.090	030	EPA 525.2	Adipates
105.090	031	EPA 525.2	Phthalates
105.090	032	EPA 525.2	Other Extractables
105.090	034	EPA 525.2	Pesticides
105.100	000	EPA 531.1	Carbamates
105.120	001	EPA 547	Glyphosate
105.140	001	EPA 548.1	Endothall
105.150	001	EPA 549.2	Diquat
105.170	031	EPA 551.1	Disinfection Byproducts
105.200	009	EPA 552.2	Haloacetic Acids
105.220	001	EPA 632	Diuron
106 - Radiochemistry of Drinking Water			
106.010	001	EPA 900.0	Gross Alpha
106.010	002	EPA 900.0	Gross Beta
106.092	001	EPA 200.8	Uranium
106.270	001	SM7110C	Gross Alpha
107 - Microbiology of Wastewater			
107.010	001	SM9215B	Heterotrophic Bacteria
107.020	001	SM9221B	Total Coliform
107.030	001	SM9221B	Total Coliform with Chlorine Present
107.040	001	SM9221C,E (MTF/EC)	Fecal Coliform
107.050	001	SM9221E	Fecal Coliform with Chlorine Present
107.242	001	Enterolert	Enterococci
108 - Inorganic Chemistry of Wastewater			
108.016	001	EPA 110.2	Color
108.070	001	EPA 160.2	Residue, Non-filterable
108.090	001	EPA 160.4	Residue, Volatile
108.100	001	EPA 160.5	Residue, Settleable

108.110	001	EPA 180.1	Turbidity
108.112	001	EPA 200.7	Boron
108.112	002	EPA 200.7	Calcium
108.112	003	EPA 200.7	Hardness (calc.)
108.112	004	EPA 200.7	Magnesium
108.112	005	EPA 200.7	Potassium
108.112	006	EPA 200.7	Silica
108.112	007	EPA 200.7	Sodium
108.120	001	EPA 300.0	Bromide
108.120	002	EPA 300.0	Chloride
108.120	003	EPA 300.0	Fluoride
108.120	004	EPA 300.0	Nitrate
108.120	005	EPA 300.0	Nitrite
108.120	006	EPA 300.0	Nitrate-nitrite, Total
108.120	007	EPA 300.0	Phosphate, Ortho
108.120	008	EPA 300.0	Sulfate
108.180	001	EPA 335.1	Cyanide, amenable
108.181	001	EPA 335.2	Cyanide, Total
108.200	001	EPA 350.1	Ammonia
108.211	001	EPA 351.2	Kjeldahl Nitrogen
108.231	001	EPA 353.2	Nitrate calc.
108.232	001	EPA 353.2	Nitrate-nitrite, Total
108.260	001	EPA 365.1	Phosphate, Ortho
108.261	001	EPA 365.1	Phosphorus, Total
108.264	001	EPA 365.3	Phosphate, Ortho
108.265	001	EPA 365.3	Phosphorus, Total
108.323	001	EPA 410.4	Chemical Oxygen Demand
108.360	001	EPA 420.1	Phenols, Total
108.380	001	EPA 1664	Oil and Grease
108.410	001	SM2320B	Alkalinity
108.420	001	SM2340B	Hardness (calc.)
108.430	001	SM2510B	Conductivity
108.440	001	SM2540B	Residue, Total
108.441	001	SM2540C	Residue, Filterable
108.465	001	SM4500-Cl G	Chlorine
108.470	001	SM4500-CN C	Cyanide, Manual Distillation
108.472	001	SM4500-CN E	Cyanide, Total
108.473	001	SM4500-CN G	Cyanide, amenable
108.490	001	SM4500-H+B	pH
108.501	001	SM4500-NH3 C	Kjeldahl Nitrogen
108.502	001	SM4500-NH3 E	Ammonia

108.531	001	SM4500-O G	Dissolved Oxygen
108.560	001	SM4500-SO3 B	Sulfite
108.580	001	SM4500-S=D	Sulfide
108.590	001	SM5210B	Biochemical Oxygen Demand
108.591	001	SM5210B	Carbonaceous BOD
108.611	001	SM5310C	Total Organic Carbon
108.620	001	SM5320B	Total Organic Halides
108.640	001	SM5540C	Surfactants

109 - Toxic Chemical Elements of Wastewater

109.010	001	EPA 200.7	Aluminum
109.010	002	EPA 200.7	Antimony
109.010	003	EPA 200.7	Arsenic
109.010	004	EPA 200.7	Barium
109.010	005	EPA 200.7	Beryllium
109.010	007	EPA 200.7	Cadmium
109.010	009	EPA 200.7	Chromium
109.010	010	EPA 200.7	Cobalt
109.010	011	EPA 200.7	Copper
109.010	012	EPA 200.7	Iron
109.010	013	EPA 200.7	Lead
109.010	015	EPA 200.7	Manganese
109.010	016	EPA 200.7	Molybdenum
109.010	017	EPA 200.7	Nickel
109.010	019	EPA 200.7	Selenium
109.010	021	EPA 200.7	Silver
109.010	023	EPA 200.7	Thallium
109.010	024	EPA 200.7	Tin
109.010	025	EPA 200.7	Titanium
109.010	026	EPA 200.7	Vanadium
109.010	027	EPA 200.7	Zinc
109.020	001	EPA 200.8	Aluminum
109.020	002	EPA 200.8	Antimony
109.020	003	EPA 200.8	Arsenic
109.020	004	EPA 200.8	Barium
109.020	005	EPA 200.8	Beryllium
109.020	006	EPA 200.8	Cadmium
109.020	007	EPA 200.8	Chromium
109.020	008	EPA 200.8	Cobalt
109.020	009	EPA 200.8	Copper
109.020	010	EPA 200.8	Lead
109.020	011	EPA 200.8	Manganese

109.020	012	EPA 200.8	Molybdenum
109.020	013	EPA 200.8	Nickel
109.020	014	EPA 200.8	Selenium
109.020	015	EPA 200.8	Silver
109.020	016	EPA 200.8	Thallium
109.020	017	EPA 200.8	Vanadium
109.020	018	EPA 200.8	Zinc
109.104	001	EPA 218.6	Chromium (VI)
109.190	001	EPA 245.1	Mercury
109.360	001	EPA 1631	Mercury
109.811	001	SM3500-Cr D	Chromium (VI)
110 - Volatile Organic Chemistry of Wastewater			
110.040	040	EPA 624	Halogenated Hydrocarbons
110.040	041	EPA 624	Aromatic Compounds
110.040	042	EPA 624	Oxygenates
110.040	043	EPA 624	Other Volatile Organics
110.050	001	EPA 1624	Acrolein
110.050	002	EPA 1624	Acrylonitrile
111 - Semi-volatile Organic Chemistry of Wastewater			
111.101	030	EPA 625	Pesticides
111.101	032	EPA 625	Polynuclear Aromatic Hydrocarbons
111.101	033	EPA 625	Adipates
111.101	034	EPA 625	Phthalates
111.101	036	EPA 625	Other Extractables
111.170	030	EPA 608	Organochlorine Pesticides
111.170	031	EPA 608	PCBs
111.210	006	EPA 632	Diuron
111.271	001	EPA 1664	Oil and Grease
112 - Radiochemistry of Wastewater			
112.010	001	EPA 900.0	Gross Alpha
112.010	002	EPA 900.0	Gross Beta
114 - Inorganic Chemistry of Hazardous Waste			
114.010	001	EPA 6010B	Antimony
114.010	002	EPA 6010B	Arsenic
114.010	004	EPA 6010B	Beryllium
114.010	005	EPA 6010B	Cadmium
114.010	006	EPA 6010B	Chromium
114.010	007	EPA 6010B	Cobalt
114.010	008	EPA 6010B	Copper
114.010	009	EPA 6010B	Lead

114.010	010	EPA 6010B	Molybdenum
114.010	011	EPA 6010B	Nickel
114.010	012	EPA 6010B	Selenium
114.010	013	EPA 6010B	Silver
114.010	014	EPA 6010B	Thallium
114.010	015	EPA 6010B	Vanadium
114.010	016	EPA 6010B	Zinc
114.020	001	EPA 6020	Antimony
114.020	002	EPA 6020	Arsenic
114.020	003	EPA 6020	Barium
114.020	004	EPA 6020	Beryllium
114.020	005	EPA 6020	Cadmium
114.020	006	EPA 6020	Chromium
114.020	007	EPA 6020	Cobalt
114.020	008	EPA 6020	Copper
114.020	009	EPA 6020	Lead
114.020	010	EPA 6020	Molybdenum
114.020	011	EPA 6020	Nickel
114.020	012	EPA 6020	Selenium
114.020	013	EPA 6020	Silver
114.020	014	EPA 6020	Thallium
114.020	015	EPA 6020	Vanadium
114.020	016	EPA 6020	Zinc
114.103	001	EPA 7196A	Chromium (VI)
114.106	001	EPA 7199	Chromium (VI)
114.140	001	EPA 7470A	Mercury
114.141	001	EPA 7471A	Mercury
114.222	001	EPA 9014	Cyanide
114.230	001	EPA 9034	Sulfides, Total
114.240	001	EPA 9040	pH
114.241	001	EPA 9045	pH
114.250	001	EPA 9056	Fluoride
115 - Extraction Test of Hazardous Waste			
115.020	001	EPA 1311	Toxicity Characteristic Leaching Procedure (TCLP)
115.030	001	CCR Chapter11, Article 5, Appendix II	Waste Extraction Test (WET)
116 - Volatile Organic Chemistry of Hazardous Waste			
116.020	030	EPA 8015B	Nonhalogenated Volatiles
116.030	001	EPA 8015B	Gasoline-range Organics
116.040	052	EPA 8021B	BTEX
116.080	000	EPA 8260B	Volatile Organic Compounds
116.080	120	EPA 8260B	Oxygenates

As of 10/10/2006, this list supersedes all previous lists for this certificate number.
Customers: Please verify the current accreditation standing with the State.

116.090	001	EPA 8316	Acrylamide
116.100	001	LUFT GC/MS	Total Petroleum Hydrocarbons - Gasoline
116.100	010	LUFT GC/MS	BTEX and MTBE
117 - Semi-volatile Organic Chemistry of Hazardous Waste			
117.010	001	EPA 8015B	Diesel-range Total Petroleum Hydrocarbons
117.110	000	EPA 8270C	Extractable Organics
117.111	071	EPA 8270C	Pesticides
117.111	073	EPA 8270C	Polynuclear Aromatic Hydrocarbons
117.111	074	EPA 8270C	Adipates
117.111	075	EPA 8270C	Phthalates
117.111	076	EPA 8270C	Other Extractables
117.150	000	EPA 8315A	Carbonyl Compounds
117.150	001	EPA 8315A	Acetaldehyde
117.150	005	EPA 8315A	Formaldehyde
117.170	000	EPA 8330	Nitroaromatics and Nitramines
117.210	000	EPA 8081A	Organochlorine Pesticides
117.220	000	EPA 8082	PCBs
117.240	000	EPA 8141A	Organophosphorus Pesticides
117.250	000	EPA 8151A	Chlorinated Herbicides
117.270	000	EPA 8318	Carbamates, N-methylcarbamates
120 - Physical Properties of Hazardous Waste			
120.010	001	EPA 1010	Ignitability
120.040	001	Section 7.3 SW-846	Reactive Cyanide
120.050	001	Section 7.3 SW-846	Reactive Sulfide
120.070	001	EPA 9040B	Corrosivity - pH Determination
120.080	001	EPA 9045C	Corrosivity - pH Determination