Appendix 3. NELAC Certified Tests

FLORIDA DEPARTMENT OF HEALTH

State of Florida

Department of Health, Bureau of Laboratories

This is to certify that

E87689

TESTAMERICA ST. LOUIS
13715 RIDER TRAIL NORTH
EARTH CITY, MO 63045

has complied with Florida Administrative Code 64E-1,
for the examination of Environmental samples in the following categories

DRINKING WATER - GROUP II UNREGULATED CONTAMINANTS, DRINKING WATER - OTHER REGULATED CONTAMINANTS, DRINKING WATER - RADIOCHEMISTRY, NON-POTABLE WATER - EXTRACTABLE ORGANICS, NON-POTABLE WATER - GENERAL CHEMISTRY, NON-POTABLE WATER - METALS, NON-POTABLE WATER - PESTICIDES-HERBICIDES-PCB'S, NON-POTABLE WATER - RADIOCHEMISTRY, NON-POTABLE WATER - VOLATILE ORGANICS, SOLID AND CHEMICAL MATERIALS - EXTRACTABLE ORGANICS, SOLID AND CHEMICAL MATERIALS - PESTICIDES-HERBICIDES-PCB'S, SOLID AND CHEMICAL MATERIALS - GENERAL CHEMISTRY, SOLID AND CHEMICAL MATERIALS - METALS, SOLID AND CHEMICAL MATERIALS - RADIOCHEMISTRY, SOLID AND CHEMICAL MATERIALS - VOLATILE ORGANICS

Continued certification is contingent upon successful on-going compliance with the NELAC Standards and FAC Rule 64E-1 regulations. Specific methods and analytes certified are cited on the Laboratory Scope of Accreditation for this laboratory and are on file at the Bureau of Laboratories, P. O. Box 210, Jacksonville, Florida 32231. Clients and customers are urged to verify with this agency the laboratory's certification status in Florida for particular methods and analytes.

EFFECTIVE July 24, 2009 THROUGH June 30, 2010

Max Salfinger, M.D.
Chief, Bureau of Laboratories
Florida Department of Health
DH Form 1697, 7/04
NON-TRANSFERABLE E87689-19-07/24/2009
Supersedes all previously issued certificates

Charlie Crist
Governor

FLORIDA DEPARTMENT OF HEALTH

Ana M. Viamonte Ros, M.D., M.P.H.
State Surgeon General

Laboratory Scope of Accreditation

Attachment to Certificate #: E87689-19, expiration date June 30, 2010. This listing of accredited analytes should be used only when associated with a valid certificate.

State Laboratory ID: E87689 **EPA Lab Code: MO00054** **(314) 298-8566**

E87689
TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045

Matrix: Drinking Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
1,1,1,2-Tetrachloroethane	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
1,1,1-Trichloroethane	EPA 524.2	Other Regulated Contaminants	NELAP	7/17/2003
1,1,2,2-Tetrachloroethane	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
1,1,2-Trichloroethane	EPA 524.2	Other Regulated Contaminants	NELAP	7/17/2003
1,1-Dichloroethane	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
1,1-Dichloroethylene	EPA 524.2	Other Regulated Contaminants	NELAP	7/17/2003
1,1-Dichloropropene	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
1,2,3-Trichlorobenzene	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
1,2,3-Trichloropropane	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
1,2,4-Trichlorobenzene	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
1,2,4-Trimethylbenzene	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
1,2-Dibromo-3-chloropropane (DBCP)	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
1,2-Dibromoethane (EDB, Ethylene dibromide)	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
1,2-Dichlorobenzene	EPA 524.2	Other Regulated Contaminants	NELAP	7/17/2003
1,2-Dichloroethane	EPA 524.2	Other Regulated Contaminants	NELAP	7/17/2003
1,2-Dichloropropane	EPA 524.2	Other Regulated Contaminants	NELAP	7/17/2003
1,3,5-Trimethylbenzene	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
1,3-Dichlorobenzene	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
1,3-Dichloropropane	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
1,4-Dichlorobenzene	EPA 524.2	Other Regulated Contaminants	NELAP	7/17/2003
2,2-Dichloropropane	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
2-Butanone (Methyl ethyl ketone, MEK)	EPA 524.2	Group II Unregulated Contaminants	NELAP	12/10/2008
2-Chlorotoluene	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
2-Hexanone	EPA 524.2	Group II Unregulated Contaminants	NELAP	12/10/2008
4-Chlorotoluene	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
4-Isopropyltoluene	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
4-Methyl-2-pentanone (MIBK)	EPA 524.2	Group II Unregulated Contaminants	NELAP	12/10/2008
Acetone	EPA 524.2	Group II Unregulated Contaminants	NELAP	12/10/2008
Benzene	EPA 524.2	Other Regulated Contaminants	NELAP	7/17/2003
Bromobenzene	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
Bromochloromethane	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
Bromodichloromethane	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
Bromoform	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
Carbon disulfide	EPA 524.2	Group II Unregulated Contaminants	NELAP	12/10/2008
Carbon tetrachloride	EPA 524.2	Other Regulated Contaminants	NELAP	7/17/2003
Chlorobenzene	EPA 524.2	Other Regulated Contaminants	NELAP	7/17/2003

Clients and Customers are urged to verify the laboratory's current certification status with the Environmental Laboratory Certification Program. **Issue Date: 7/24/2009** **Expiration Date: 6/30/2010**

Charlie Crist
Governor

FLORIDA DEPARTMENT OF HEALTH

Ana M. Viamonte Ros, M.D., M.P.H.
State Surgeon General

Laboratory Scope of Accreditation

Attachment to Certificate #: E87689-19, expiration date June 30, 2010. This listing of accredited analytes should be used only when associated with a valid certificate.

State Laboratory ID: E87689 **EPA Lab Code: MO00054** **(314) 298-8566**

E87689
TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045

Matrix: Drinking Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
Chloroethane	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
Chloroform	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
cis-1,2-Dichloroethylene	EPA 524.2	Other Regulated Contaminants	NELAP	7/17/2003
cis-1,3-Dichloropropene	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
Dibromochloromethane	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
Dibromomethane	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
Dichlorodifluoromethane	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
Dichloromethane (DCM, Methylene chloride)	EPA 524.2	Other Regulated Contaminants	NELAP	7/17/2003
Ethylbenzene	EPA 524.2	Other Regulated Contaminants	NELAP	7/17/2003
Gamma emitters	EPA 901.1	Radiochemistry	NELAP	6/5/2009
Gross-alpha	EPA 900.0	Radiochemistry	NELAP	12/10/2008
Gross-beta	EPA 900.0	Radiochemistry	NELAP	12/10/2008
Hexachlorobutadiene	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
Isopropylbenzene	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
Methyl bromide (Bromomethane)	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
Methyl chloride (Chloromethane)	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
Methyl tert-butyl ether (MTBE)	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
Naphthalene	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
n-Butylbenzene	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
n-Propylbenzene	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
Radioactive cesium	EPA 901.1	Radiochemistry	NELAP	12/10/2008
Radium-226	EPA 903.0	Radiochemistry	NELAP	12/10/2008
Radium-228	EPA 904.0	Radiochemistry	NELAP	12/10/2008
sec-Butylbenzene	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
Strontium-90	DOE Sr-02	Radiochemistry	NELAP	12/10/2008
Strontium-90	DOE Sr-03-RC	Radiochemistry	NELAP	12/10/2008
Strontium-90	EPA 905.0	Radiochemistry	NELAP	12/10/2008
Styrene	EPA 524.2	Other Regulated Contaminants	NELAP	7/17/2003
tert-Butylbenzene	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
Tetrachloroethylene (Perchloroethylene)	EPA 524.2	Other Regulated Contaminants	NELAP	7/17/2003
Toluene	EPA 524.2	Other Regulated Contaminants	NELAP	7/17/2003
trans-1,2-Dichloroethylene	EPA 524.2	Other Regulated Contaminants	NELAP	7/17/2003
trans-1,3-Dichloropropylene	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
Trichloroethene (Trichloroethylene)	EPA 524.2	Other Regulated Contaminants	NELAP	7/17/2003
Trichlorofluoromethane	EPA 524.2	Group II Unregulated Contaminants	NELAP	7/17/2003
Tritium	EPA 906.0	Radiochemistry	NELAP	12/10/2008

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State Surgeon General

Laboratory Scope of Accreditation

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E87689
TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045

Matrix: Drinking Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
Uranium	ASTM D5174-91	Radiochemistry	NELAP	12/10/2008
Uranium	EPA 200.8	Radiochemistry	NELAP	6/5/2009
Uranium	EPA 908.0	Radiochemistry	NELAP	12/10/2008
Vinyl chloride	EPA 524.2	Other Regulated Contaminants	NELAP	7/17/2003
Xylene (total)	EPA 524.2	Other Regulated Contaminants	NELAP	7/17/2003

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E87689
TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045

Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
1,1,1,2-Tetrachloroethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,1,1-Trichloroethane	EPA 624	Volatile Organics	NELAP	2/13/2002
1,1,1-Trichloroethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,1,2,2-Tetrachloroethane	EPA 624	Volatile Organics	NELAP	2/13/2002
1,1,2,2-Tetrachloroethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,1,2-Trichloro-1,2,2-trifluoroethane	EPA 8260	Volatile Organics	NELAP	12/10/2008
1,1,2-Trichloroethane	EPA 624	Volatile Organics	NELAP	2/13/2002
1,1,2-Trichloroethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,1-Dichloroethane	EPA 624	Volatile Organics	NELAP	2/13/2002
1,1-Dichloroethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,1-Dichloroethylene	EPA 624	Volatile Organics	NELAP	2/13/2002
1,1-Dichloroethylene	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,1-Dichloropropene	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,2,3-Trichlorobenzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,2,3-Trichloropropane	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,2,4,5-Tetrachlorobenzene	EPA 8270	Extractable Organics	NELAP	7/1/2003
1,2,4-Trichlorobenzene	EPA 625	Extractable Organics	NELAP	2/13/2002
1,2,4-Trichlorobenzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,2,4-Trichlorobenzene	EPA 8270	Extractable Organics	NELAP	7/1/2003
1,2,4-Trimethylbenzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,2-Dibromo-3-chloropropane (DBCP)	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,2-Dibromoethane (EDB, Ethylene dibromide)	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,2-Dichlorobenzene	EPA 624	Volatile Organics	NELAP	2/13/2002
1,2-Dichlorobenzene	EPA 625	Extractable Organics	NELAP	2/13/2002
1,2-Dichlorobenzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,2-Dichlorobenzene	EPA 8270	Extractable Organics	NELAP	10/26/2005
1,2-Dichloroethane	EPA 624	Volatile Organics	NELAP	2/13/2002
1,2-Dichloroethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,2-Dichloropropane	EPA 624	Volatile Organics	NELAP	2/13/2002
1,2-Dichloropropane	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,3,5-Trimethylbenzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,3,5-Trinitrobenzene (1,3,5-TNB)	EPA 8330	Extractable Organics	NELAP	7/1/2003
1,3,5-Trinitrobenzene (1,3,5-TNB)	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
1,3-Dichlorobenzene	EPA 624	Volatile Organics	NELAP	2/13/2002
1,3-Dichlorobenzene	EPA 625	Extractable Organics	NELAP	2/13/2002

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Laboratory Scope of Accreditation

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E87689
TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045

Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
1,3-Dichlorobenzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,3-Dichlorobenzene	EPA 8270	Extractable Organics	NELAP	10/26/2005
1,3-Dichloropropane	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,3-Dinitrobenzene (1,3-DNB)	EPA 8330	Extractable Organics	NELAP	7/1/2003
1,3-Dinitrobenzene (1,3-DNB)	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
1,4-Dichlorobenzene	EPA 624	Volatile Organics	NELAP	2/13/2002
1,4-Dichlorobenzene	EPA 625	Extractable Organics	NELAP	2/13/2002
1,4-Dichlorobenzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,4-Dichlorobenzene	EPA 8270	Extractable Organics	NELAP	10/26/2005
1,4-Dioxane (1,4-Diethyleneoxide)	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,4-Naphthoquinone	EPA 8270	Extractable Organics	NELAP	7/1/2003
1-Naphthylamine	EPA 8270	Extractable Organics	NELAP	7/1/2003
2,2-Dichloropropane	EPA 8260	Volatile Organics	NELAP	7/1/2003
2,3,4,6-Tetrachlorophenol	EPA 8041	Extractable Organics	NELAP	12/10/2008
2,3,4,6-Tetrachlorophenol	EPA 8270	Extractable Organics	NELAP	7/1/2003
2,4,5-T	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
2,4,5-Trichlorophenol	EPA 8041	Extractable Organics	NELAP	12/10/2008
2,4,5-Trichlorophenol	EPA 8270	Extractable Organics	NELAP	10/26/2005
2,4,6-Trichlorophenol	EPA 625	Extractable Organics	NELAP	2/13/2002
2,4,6-Trichlorophenol	EPA 8041	Extractable Organics	NELAP	12/10/2008
2,4,6-Trichlorophenol	EPA 8270	Extractable Organics	NELAP	7/1/2003
2,4,6-Trinitrotoluene (2,4,6-TNT)	EPA 8330	Extractable Organics	NELAP	7/1/2003
2,4,6-Trinitrotoluene (2,4,6-TNT)	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
2,4-D	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
2,4-DB	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
2,4-Diamino-6-nitrotoluene	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
2,4-Dichlorophenol	EPA 625	Extractable Organics	NELAP	2/13/2002
2,4-Dichlorophenol	EPA 8041	Extractable Organics	NELAP	12/10/2008
2,4-Dichlorophenol	EPA 8270	Extractable Organics	NELAP	7/1/2003
2,4-Dimethylphenol	EPA 625	Extractable Organics	NELAP	2/13/2002
2,4-Dimethylphenol	EPA 8041	Extractable Organics	NELAP	12/10/2008
2,4-Dimethylphenol	EPA 8270	Extractable Organics	NELAP	7/1/2003
2,4-Dinitrophenol	EPA 625	Extractable Organics	NELAP	2/13/2002

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TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045

Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
2,4-Dinitrophenol	EPA 8270	Extractable Organics	NELAP	7/1/2003
2,4-Dinitrotoluene (2,4-DNT)	EPA 625	Extractable Organics	NELAP	2/13/2002
2,4-Dinitrotoluene (2,4-DNT)	EPA 8270	Extractable Organics	NELAP	7/1/2003
2,4-Dinitrotoluene (2,4-DNT)	EPA 8330	Extractable Organics	NELAP	7/1/2003
2,4-Dinitrotoluene (2,4-DNT)	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
2,6-Diamino-4-nitrotoluene	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
2,6-Dichlorophenol	EPA 8041	Extractable Organics	NELAP	12/10/2008
2,6-Dichlorophenol	EPA 8270	Extractable Organics	NELAP	7/1/2003
2,6-Dinitrotoluene (2,6-DNT)	EPA 625	Extractable Organics	NELAP	2/13/2002
2,6-Dinitrotoluene (2,6-DNT)	EPA 8270	Extractable Organics	NELAP	7/1/2003
2,6-Dinitrotoluene (2,6-DNT)	EPA 8330	Extractable Organics	NELAP	7/1/2003
2,6-Dinitrotoluene (2,6-DNT)	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
2-Amino-4,6-dinitrotoluene (2-am-dnt)	EPA 8330	Extractable Organics	NELAP	7/1/2003
2-Amino-4,6-dinitrotoluene (2-am-dnt)	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
2-Aminoanthraquinone	EPA 8270	Extractable Organics	NELAP	7/1/2003
2-Butanone (Methyl ethyl ketone, MEK)	EPA 8260	Volatile Organics	NELAP	7/1/2003
2-Chloroethyl vinyl ether	EPA 624	Volatile Organics	NELAP	2/13/2002
2-Chloroethyl vinyl ether	EPA 8260	Volatile Organics	NELAP	7/1/2003
2-Chloronaphthalene	EPA 625	Extractable Organics	NELAP	2/13/2002
2-Chloronaphthalene	EPA 8270	Extractable Organics	NELAP	7/1/2003
2-Chlorophenol	EPA 625	Extractable Organics	NELAP	2/13/2002
2-Chlorophenol	EPA 8041	Extractable Organics	NELAP	12/10/2008
2-Chlorophenol	EPA 8270	Extractable Organics	NELAP	7/1/2003
2-Chlorotoluene	EPA 8260	Volatile Organics	NELAP	7/1/2003
2-Hexanone	EPA 8260	Volatile Organics	NELAP	7/1/2003
2-Methyl-4,6-dinitrophenol	EPA 625	Extractable Organics	NELAP	2/13/2002
2-Methyl-4,6-dinitrophenol	EPA 8041	Extractable Organics	NELAP	12/10/2008
2-Methyl-4,6-dinitrophenol	EPA 8270	Extractable Organics	NELAP	12/10/2008
2-Methylnaphthalene	EPA 8270	Extractable Organics	NELAP	12/10/2008
2-Methylphenol (o-Cresol)	EPA 8041	Extractable Organics	NELAP	12/10/2008
2-Methylphenol (o-Cresol)	EPA 8270	Extractable Organics	NELAP	7/1/2003
2-Naphthylamine	EPA 8270	Extractable Organics	NELAP	7/1/2003

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E87689
TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045

Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
2-Nitroaniline	EPA 8270	Extractable Organics	NELAP	7/1/2003
2-Nitrophenol	EPA 625	Extractable Organics	NELAP	2/13/2002
2-Nitrophenol	EPA 8041	Extractable Organics	NELAP	12/10/2008
2-Nitrophenol	EPA 8270	Extractable Organics	NELAP	7/1/2003
2-Nitrotoluene	EPA 8330	Extractable Organics	NELAP	7/1/2003
2-Nitrotoluene	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
2-Picoline (2-Methylpyridine)	EPA 8270	Extractable Organics	NELAP	7/1/2003
3,3'-Dichlorobenzidine	EPA 625	Extractable Organics	NELAP	2/13/2002
3,3'-Dichlorobenzidine	EPA 8270	Extractable Organics	NELAP	7/1/2003
3,3'-Dimethoxybenzidine	EPA 8270	Extractable Organics	NELAP	7/1/2003
3,3'-Dimethylbenzidine	EPA 8270	Extractable Organics	NELAP	7/1/2003
3,5-Dinitroaniline	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
3/4-Methylphenols (m/p-Cresols)	EPA 8041	Extractable Organics	NELAP	12/10/2008
3/4-Methylphenols (m/p-Cresols)	EPA 8270	Extractable Organics	NELAP	7/24/2006
3-Methylcholanthrene	EPA 8270	Extractable Organics	NELAP	7/1/2003
3-Nitroaniline	EPA 8270	Extractable Organics	NELAP	7/1/2003
3-Nitrotoluene	EPA 8330	Extractable Organics	NELAP	7/1/2003
3-Nitrotoluene	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
4,4'-DDD	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
4,4'-DDD	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
4,4'-DDE	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
4,4'-DDE	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
4,4'-DDT	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
4,4'-DDT	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
4-Amino-2,6-dinitrotoluene (4-am-dnt)	EPA 8330	Extractable Organics	NELAP	7/1/2003
4-Amino-2,6-dinitrotoluene (4-am-dnt)	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
4-Aminobiphenyl	EPA 8270	Extractable Organics	NELAP	7/1/2003
4-Bromophenyl phenyl ether	EPA 625	Extractable Organics	NELAP	2/13/2002
4-Bromophenyl phenyl ether	EPA 8270	Extractable Organics	NELAP	12/10/2008
4-Chloro-3-methylphenol	EPA 625	Extractable Organics	NELAP	2/13/2002
4-Chloro-3-methylphenol	EPA 8041	Extractable Organics	NELAP	12/10/2008
4-Chloro-3-methylphenol	EPA 8270	Extractable Organics	NELAP	7/1/2003

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FLORIDA DEPARTMENT OF HEALTH

Ana M. Viamonte Ros, M.D., M.P.H.
State Surgeon General

Laboratory Scope of Accreditation

Attachment to Certificate #: E87689-19, expiration date June 30, 2010. This listing of accredited analytes should be used only when associated with a valid certificate.

State Laboratory ID: E87689 **EPA Lab Code: MO00054** **(314) 298-8566**

E87689
TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045

Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
4-Chloroaniline	EPA 8270	Extractable Organics	NELAP	7/1/2003
4-Chlorophenyl phenylether	EPA 625	Extractable Organics	NELAP	2/13/2002
4-Chlorophenyl phenylether	EPA 8270	Extractable Organics	NELAP	7/1/2003
4-Chlorotoluene	EPA 8260	Volatile Organics	NELAP	7/1/2003
4-Dimethyl aminoazobenzene	EPA 8270	Extractable Organics	NELAP	7/1/2003
4-Methyl-2-pentanone (MIBK)	EPA 8260	Volatile Organics	NELAP	7/1/2003
4-Nitroaniline	EPA 8270	Extractable Organics	NELAP	7/1/2003
4-Nitrophenol	EPA 625	Extractable Organics	NELAP	2/13/2002
4-Nitrophenol	EPA 8041	Extractable Organics	NELAP	12/10/2008
4-Nitrophenol	EPA 8270	Extractable Organics	NELAP	7/1/2003
4-Nitrotoluene	EPA 8330	Extractable Organics	NELAP	7/1/2003
4-Nitrotoluene	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
7,12-Dimethylbenz(a) anthracene	EPA 8270	Extractable Organics	NELAP	7/1/2003
a-a-Dimethylphenethylamine	EPA 8270	Extractable Organics	NELAP	7/1/2003
Acenaphthene	EPA 625	Extractable Organics	NELAP	2/13/2002
Acenaphthene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Acenaphthene	EPA 8310	Extractable Organics	NELAP	7/1/2003
Acenaphthylene	EPA 625	Extractable Organics	NELAP	2/13/2002
Acenaphthylene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Acenaphthylene	EPA 8310	Extractable Organics	NELAP	7/1/2003
Acetone	EPA 8260	Volatile Organics	NELAP	7/1/2003
Acetonitrile	EPA 8260	Volatile Organics	NELAP	7/1/2003
Acetophenone	EPA 8270	Extractable Organics	NELAP	7/1/2003
Acrolein (Propenal)	EPA 624	Volatile Organics	NELAP	2/13/2002
Acrolein (Propenal)	EPA 8260	Volatile Organics	NELAP	7/1/2003
Acrylonitrile	EPA 624	Volatile Organics	NELAP	2/13/2002
Acrylonitrile	EPA 8260	Volatile Organics	NELAP	7/1/2003
Aldrin	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Aldrin	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Alkalinity as CaCO3	EPA 310.1	General Chemistry	NELAP	2/13/2002
Alkalinity as CaCO3	SM 2320 B	General Chemistry	NELAP	5/4/2007
Allyl chloride (3-Chloropropene)	EPA 8260	Volatile Organics	NELAP	7/1/2003
alpha-BHC (alpha-Hexachlorocyclohexane)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
alpha-BHC (alpha-Hexachlorocyclohexane)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
alpha-Chlordane	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	3/2/2005

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E87689
TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045

Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
Aluminum	EPA 200.7	General Chemistry,Metals	NELAP	2/13/2002
Aluminum	EPA 200.8	Metals	NELAP	2/13/2002
Aluminum	EPA 6010	Metals	NELAP	7/1/2003
Aluminum	EPA 6020	Metals	NELAP	7/1/2003
Ammonia as N	EPA 350.1	General Chemistry	NELAP	2/13/2002
Aniline	EPA 8270	Extractable Organics	NELAP	7/1/2003
Anthracene	EPA 625	Extractable Organics	NELAP	2/13/2002
Anthracene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Anthracene	EPA 8310	Extractable Organics	NELAP	7/1/2003
Antimony	EPA 200.7	Metals	NELAP	2/13/2002
Antimony	EPA 200.8	Metals	NELAP	2/13/2002
Antimony	EPA 6010	Metals	NELAP	7/1/2003
Antimony	EPA 6020	Metals	NELAP	7/1/2003
Aramite	EPA 8270	Extractable Organics	NELAP	7/1/2003
Aroclor-1016 (PCB-1016)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Aroclor-1016 (PCB-1016)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Aroclor-1221 (PCB-1221)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Aroclor-1221 (PCB-1221)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Aroclor-1232 (PCB-1232)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Aroclor-1232 (PCB-1232)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Aroclor-1242 (PCB-1242)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Aroclor-1242 (PCB-1242)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Aroclor-1248 (PCB-1248)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Aroclor-1248 (PCB-1248)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Aroclor-1254 (PCB-1254)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Aroclor-1254 (PCB-1254)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Aroclor-1260 (PCB-1260)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Aroclor-1260 (PCB-1260)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Arsenic	EPA 200.7	General Chemistry,Metals	NELAP	2/13/2002
Arsenic	EPA 200.8	Metals	NELAP	2/13/2002
Arsenic	EPA 6010	Metals	NELAP	7/1/2003
Arsenic	EPA 6020	Metals	NELAP	7/1/2003
Barium	EPA 200.7	Metals	NELAP	2/13/2002
Barium	EPA 200.8	Metals	NELAP	2/13/2002
Barium	EPA 6010	Metals	NELAP	7/1/2003
Barium	EPA 6020	Metals	NELAP	7/1/2003

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E87689
TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045

Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
Benzene	EPA 624	Volatile Organics	NELAP	2/13/2002
Benzene	EPA 8021	Volatile Organics	NELAP	7/1/2003
Benzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Benzo(a)anthracene	EPA 625	Extractable Organics	NELAP	2/13/2002
Benzo(a)anthracene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Benzo(a)anthracene	EPA 8310	Extractable Organics	NELAP	7/1/2003
Benzo(a)pyrene	EPA 625	Extractable Organics	NELAP	2/13/2002
Benzo(a)pyrene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Benzo(a)pyrene	EPA 8310	Extractable Organics	NELAP	7/1/2003
Benzo(b)fluoranthene	EPA 625	Extractable Organics	NELAP	2/13/2002
Benzo(b)fluoranthene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Benzo(b)fluoranthene	EPA 8310	Extractable Organics	NELAP	7/1/2003
Benzo(g,h,i)perylene	EPA 625	Extractable Organics	NELAP	2/13/2002
Benzo(g,h,i)perylene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Benzo(g,h,i)perylene	EPA 8310	Extractable Organics	NELAP	7/1/2003
Benzo(k)fluoranthene	EPA 625	Extractable Organics	NELAP	2/13/2002
Benzo(k)fluoranthene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Benzo(k)fluoranthene	EPA 8310	Extractable Organics	NELAP	7/1/2003
Benzoic acid	EPA 8270	Extractable Organics	NELAP	7/1/2003
Benzyl alcohol	EPA 8270	Extractable Organics	NELAP	7/1/2003
Beryllium	EPA 200.7	General Chemistry,Metals	NELAP	2/13/2002
Beryllium	EPA 200.8	Metals	NELAP	2/13/2002
Beryllium	EPA 6010	Metals	NELAP	7/1/2003
Beryllium	EPA 6020	Metals	NELAP	7/1/2003
beta-BHC (beta-Hexachlorocyclohexane)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
beta-BHC (beta-Hexachlorocyclohexane)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Biochemical oxygen demand	EPA 405.1	General Chemistry	NELAP	2/13/2002
Biochemical oxygen demand	SM 5210 B	General Chemistry	NELAP	5/4/2007
bis(2-Chloroethoxy)methane	EPA 625	Extractable Organics	NELAP	2/13/2002
bis(2-Chloroethoxy)methane	EPA 8270	Extractable Organics	NELAP	7/1/2003
bis(2-Chloroethyl) ether	EPA 625	Extractable Organics	NELAP	2/13/2002
bis(2-Chloroethyl) ether	EPA 8270	Extractable Organics	NELAP	7/1/2003
bis(2-Chloroisopropyl) ether (2,2'-Oxybis(1-chloropropane))	EPA 625	Extractable Organics	NELAP	2/13/2002
bis(2-Chloroisopropyl) ether (2,2'-Oxybis(1-chloropropane))	EPA 8270	Extractable Organics	NELAP	7/1/2003
bis(2-Ethylhexyl) phthalate (DEHP)	EPA 625	Extractable Organics	NELAP	2/13/2002

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State Laboratory ID: E87689 **EPA Lab Code: MO00054** **(314) 298-8566**

E87689
TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045

Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
bis(2-Ethylhexyl) phthalate (DEHP)	EPA 8270	Extractable Organics	NELAP	7/1/2003
Boron	EPA 200.7	Metals	NELAP	2/13/2002
Boron	EPA 6010	Metals	NELAP	7/1/2003
Boron	EPA 6020	Metals	NELAP	7/24/2006
Bromide	EPA 300.0	General Chemistry	NELAP	2/13/2002
Bromide	EPA 9056	General Chemistry	NELAP	7/1/2003
Bromobenzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Bromochloromethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
Bromodichloromethane	EPA 624	Volatile Organics	NELAP	2/13/2002
Bromodichloromethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
Bromoform	EPA 624	Volatile Organics	NELAP	2/13/2002
Bromoform	EPA 8260	Volatile Organics	NELAP	7/1/2003
Butyl benzyl phthalate	EPA 625	Extractable Organics	NELAP	2/13/2002
Butyl benzyl phthalate	EPA 8270	Extractable Organics	NELAP	7/1/2003
Cadmium	EPA 200.7	General Chemistry,Metals	NELAP	2/13/2002
Cadmium	EPA 200.8	Metals	NELAP	2/13/2002
Cadmium	EPA 6010	Metals	NELAP	7/1/2003
Cadmium	EPA 6020	Metals	NELAP	7/1/2003
Calcium	EPA 200.7	General Chemistry,Metals	NELAP	2/13/2002
Calcium	EPA 6010	Metals	NELAP	7/1/2003
Calcium	EPA 6020	Metals	NELAP	11/7/2003
Carbazole	EPA 8270	Extractable Organics	NELAP	7/1/2003
Carbon disulfide	EPA 8260	Volatile Organics	NELAP	7/1/2003
Carbon tetrachloride	EPA 624	Volatile Organics	NELAP	2/13/2002
Carbon tetrachloride	EPA 8260	Volatile Organics	NELAP	7/1/2003
Chemical oxygen demand	EPA 410.4	General Chemistry	NELAP	2/13/2002
Chlordane (tech.)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Chlordane (tech.)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Chloride	EPA 300.0	General Chemistry	NELAP	2/13/2002
Chloride	EPA 9056	General Chemistry	NELAP	7/1/2003
Chlorobenzene	EPA 624	Volatile Organics	NELAP	2/13/2002
Chlorobenzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Chloroethane	EPA 624	Volatile Organics	NELAP	2/13/2002
Chloroethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
Chloroform	EPA 624	Volatile Organics	NELAP	2/13/2002
Chloroform	EPA 8260	Volatile Organics	NELAP	7/1/2003

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Earth City, MO 63045

Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
Chloroprene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Chromium	EPA 200.7	Metals	NELAP	2/13/2002
Chromium	EPA 200.8	Metals	NELAP	2/13/2002
Chromium	EPA 6010	Metals	NELAP	7/1/2003
Chromium	EPA 6020	Metals	NELAP	7/1/2003
Chromium VI	EPA 7196	Metals	NELAP	7/1/2003
Chrysene	EPA 625	Extractable Organics	NELAP	2/13/2002
Chrysene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Chrysene	EPA 8310	Extractable Organics	NELAP	7/1/2003
cis-1,2-Dichloroethylene	EPA 8260	Volatile Organics	NELAP	7/1/2003
cis-1,3-Dichloropropene	EPA 624	Volatile Organics	NELAP	2/13/2002
cis-1,3-Dichloropropene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Cobalt	EPA 200.7	Metals	NELAP	2/13/2002
Cobalt	EPA 200.8	Metals	NELAP	2/13/2002
Cobalt	EPA 6010	Metals	NELAP	7/1/2003
Cobalt	EPA 6020	Metals	NELAP	7/1/2003
Conductivity	EPA 120.1	General Chemistry	NELAP	2/13/2002
Conductivity	EPA 9050	General Chemistry	NELAP	7/1/2003
Copper	EPA 200.7	General Chemistry,Metals	NELAP	2/13/2002
Copper	EPA 200.8	Metals	NELAP	2/13/2002
Copper	EPA 6010	Metals	NELAP	7/1/2003
Copper	EPA 6020	Metals	NELAP	7/1/2003
Corrosivity (pH)	EPA 9040	General Chemistry	NELAP	7/1/2003
Dalapon	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
delta-BHC	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
delta-BHC	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Diallate	EPA 8270	Extractable Organics	NELAP	7/1/2003
Dibenz(a,h)anthracene	EPA 625	Extractable Organics	NELAP	2/13/2002
Dibenz(a,h)anthracene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Dibenz(a,h)anthracene	EPA 8310	Extractable Organics	NELAP	7/1/2003
Dibenzofuran	EPA 8270	Extractable Organics	NELAP	12/10/2008
Dibromochloromethane	EPA 624	Volatile Organics	NELAP	2/13/2002
Dibromochloromethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
Dibromomethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
Dicamba	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Dichlorodifluoromethane	EPA 8260	Volatile Organics	NELAP	7/1/2003

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Earth City, MO 63045

Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
Dichloroprop (Dichlorprop)	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Dieldrin	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Dieldrin	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Diesel range organics (DRO)	EPA 8015	Extractable Organics	NELAP	10/26/2005
Diethyl ether	EPA 8260	Volatile Organics	NELAP	7/1/2003
Diethyl phthalate	EPA 625	Extractable Organics	NELAP	2/13/2002
Diethyl phthalate	EPA 8270	Extractable Organics	NELAP	7/1/2003
Dimethyl phthalate	EPA 625	Extractable Organics	NELAP	2/13/2002
Dimethyl phthalate	EPA 8270	Extractable Organics	NELAP	7/1/2003
Di-n-butyl phthalate	EPA 625	Extractable Organics	NELAP	2/13/2002
Di-n-butyl phthalate	EPA 8270	Extractable Organics	NELAP	7/1/2003
Di-n-octyl phthalate	EPA 625	Extractable Organics	NELAP	2/13/2002
Di-n-octyl phthalate	EPA 8270	Extractable Organics	NELAP	7/1/2003
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	EPA 8041	Extractable Organics	NELAP	12/10/2008
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Endosulfan I	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Endosulfan I	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Endosulfan II	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Endosulfan II	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Endosulfan sulfate	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Endosulfan sulfate	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Endrin	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Endrin	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Endrin aldehyde	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Endrin aldehyde	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Endrin ketone	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	3/2/2005
Ethyl acetate	EPA 8260	Volatile Organics	NELAP	7/1/2003
Ethyl methacrylate	EPA 8260	Volatile Organics	NELAP	7/1/2003
Ethylbenzene	EPA 624	Volatile Organics	NELAP	2/13/2002
Ethylbenzene	EPA 8021	Volatile Organics	NELAP	7/1/2003
Ethylbenzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Famphur	EPA 8270	Extractable Organics	NELAP	7/1/2003
Fluoranthene	EPA 625	Extractable Organics	NELAP	2/13/2002
Fluoranthene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Fluoranthene	EPA 8310	Extractable Organics	NELAP	7/1/2003
Fluorene	EPA 625	Extractable Organics	NELAP	2/13/2002

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Charlie Crist
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FLORIDA DEPARTMENT OF HEALTH

Ana M. Viamonte Ros, M.D., M.P.H.
State Surgeon General

Laboratory Scope of Accreditation

Attachment to Certificate #: E87689-19, expiration date June 30, 2010. This listing of accredited analytes should be used only when associated with a valid certificate.

State Laboratory ID: E87689 **EPA Lab Code: MO00054** **(314) 298-8566**

E87689
TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045

Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
Fluorene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Fluorene	EPA 8310	Extractable Organics	NELAP	7/1/2003
Fluoride	EPA 300.0	General Chemistry	NELAP	2/13/2002
Fluoride	EPA 9056	General Chemistry	NELAP	7/1/2003
Gamma emitters	EPA 901.1	Radiochemistry	NELAP	12/10/2008
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
gamma-Chlordane	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	3/2/2005
Gasoline range organics (GRO)	EPA 8015	Volatile Organics	NELAP	10/26/2005
Gross-alpha	EPA 900.0	Radiochemistry	NELAP	12/10/2008
Gross-alpha	EPA 9310	Radiochemistry	NELAP	12/10/2008
Gross-beta	EPA 900.0	Radiochemistry	NELAP	12/10/2008
Gross-beta	EPA 9310	Radiochemistry	NELAP	12/10/2008
Hardness	EPA 130.2	General Chemistry	NELAP	2/13/2002
Hardness	SM 2340 C	General Chemistry	NELAP	5/4/2007
Heptachlor	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Heptachlor	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Heptachlor epoxide	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Heptachlor epoxide	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Hexachlorobenzene	EPA 625	Extractable Organics	NELAP	2/13/2002
Hexachlorobenzene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Hexachlorobutadiene	EPA 625	Extractable Organics	NELAP	2/13/2002
Hexachlorobutadiene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Hexachlorobutadiene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Hexachlorocyclopentadiene	EPA 625	Extractable Organics	NELAP	2/13/2002
Hexachlorocyclopentadiene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Hexachloroethane	EPA 625	Extractable Organics	NELAP	2/13/2002
Hexachloroethane	EPA 8270	Extractable Organics	NELAP	7/1/2003
Hexachlorophene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Hexachloropropene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Ignitability	EPA 1010	General Chemistry	NELAP	7/1/2003
Indeno(1,2,3-cd)pyrene	EPA 625	Extractable Organics	NELAP	2/13/2002
Indeno(1,2,3-cd)pyrene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Indeno(1,2,3-cd)pyrene	EPA 8310	Extractable Organics	NELAP	7/1/2003
Iodomethane (Methyl iodide)	EPA 8260	Volatile Organics	NELAP	12/10/2008

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Earth City, MO 63045

Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
Iron	EPA 200.7	Metals	NELAP	2/13/2002
Iron	EPA 6010	Metals	NELAP	7/1/2003
Iron	EPA 6020	Metals	NELAP	11/7/2003
Isobutyl alcohol (2-Methyl-1-propanol)	EPA 8260	Volatile Organics	NELAP	7/1/2003
Isodrin	EPA 8270	Extractable Organics	NELAP	7/1/2003
Isophorone	EPA 625	Extractable Organics	NELAP	2/13/2002
Isophorone	EPA 8270	Extractable Organics	NELAP	12/10/2008
Isopropylbenzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Isosafrole	EPA 8270	Extractable Organics	NELAP	7/1/2003
Kepone	EPA 8270	Extractable Organics	NELAP	7/1/2003
Lead	EPA 200.7	General Chemistry,Metals	NELAP	2/13/2002
Lead	EPA 200.8	Metals	NELAP	2/13/2002
Lead	EPA 6010	Metals	NELAP	7/1/2003
Lead	EPA 6020	Metals	NELAP	7/1/2003
Lithium	EPA 6010	Metals	NELAP	7/1/2003
m+p-Xylenes	EPA 8260	Volatile Organics	NELAP	7/24/2006
Magnesium	EPA 200.7	General Chemistry,Metals	NELAP	2/13/2002
Magnesium	EPA 200.8	Metals	NELAP	2/13/2002
Magnesium	EPA 6010	Metals	NELAP	7/1/2003
Magnesium	EPA 6020	Metals	NELAP	11/7/2003
Manganese	EPA 200.7	General Chemistry,Metals	NELAP	2/13/2002
Manganese	EPA 200.8	Metals	NELAP	2/13/2002
Manganese	EPA 6010	Metals	NELAP	7/1/2003
Manganese	EPA 6020	Metals	NELAP	7/1/2003
MCPA	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
MCPP	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Mercury	EPA 245.1	Metals	NELAP	2/13/2002
Mercury	EPA 7470	Metals	NELAP	7/1/2003
Methacrylonitrile	EPA 8260	Volatile Organics	NELAP	7/1/2003
Methapyrilene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Methoxychlor	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Methyl bromide (Bromomethane)	EPA 624	Volatile Organics	NELAP	2/13/2002
Methyl bromide (Bromomethane)	EPA 8260	Volatile Organics	NELAP	7/1/2003
Methyl chloride (Chloromethane)	EPA 624	Volatile Organics	NELAP	2/13/2002
Methyl chloride (Chloromethane)	EPA 8260	Volatile Organics	NELAP	7/1/2003
Methyl methacrylate	EPA 8260	Volatile Organics	NELAP	7/1/2003

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Earth City, MO 63045

Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
Methyl parathion (Parathion, methyl)	EPA 8270	Extractable Organics	NELAP	7/1/2003
Methyl tert-butyl ether (MTBE)	EPA 8260	Volatile Organics	NELAP	7/1/2003
Methylene chloride	EPA 624	Volatile Organics	NELAP	2/13/2002
Methylene chloride	EPA 8260	Volatile Organics	NELAP	7/1/2003
Molybdenum	EPA 200.7	Metals	NELAP	2/13/2002
Molybdenum	EPA 200.8	Metals	NELAP	2/13/2002
Molybdenum	EPA 6010	Metals	NELAP	7/1/2003
Molybdenum	EPA 6020	Metals	NELAP	7/24/2006
Naphthalene	EPA 625	Extractable Organics	NELAP	2/13/2002
Naphthalene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Naphthalene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Naphthalene	EPA 8310	Extractable Organics	NELAP	7/1/2003
n-Butyl alcohol	EPA 8260	Volatile Organics	NELAP	7/1/2003
n-Butylbenzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Nickel	EPA 200.7	General Chemistry,Metals	NELAP	2/13/2002
Nickel	EPA 200.8	Metals	NELAP	2/13/2002
Nickel	EPA 6010	Metals	NELAP	7/1/2003
Nickel	EPA 6020	Metals	NELAP	7/1/2003
Nitrate	EPA 9056	General Chemistry	NELAP	7/1/2003
Nitrate as N	EPA 300.0	General Chemistry	NELAP	2/13/2002
Nitrate as N	EPA 353.1	General Chemistry	NELAP	2/13/2002
Nitrate as N	SM 4500-NO3 H	General Chemistry	NELAP	5/4/2007
Nitrate-nitrite	EPA 300.0	General Chemistry	NELAP	2/13/2002
Nitrite	EPA 9056	General Chemistry	NELAP	12/10/2008
Nitrite as N	EPA 300.0	General Chemistry	NELAP	12/10/2008
Nitrite as N	EPA 354.1	General Chemistry	NELAP	12/10/2008
Nitrite as N	SM 4500-NO2-B	General Chemistry	NELAP	12/10/2008
Nitrobenzene	EPA 625	Extractable Organics	NELAP	2/13/2002
Nitrobenzene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Nitrobenzene	EPA 8330	Extractable Organics	NELAP	7/1/2003
Nitrobenzene	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
Nitroglycerin	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
n-Nitrosodiethylamine	EPA 8270	Extractable Organics	NELAP	7/1/2003
n-Nitrosodimethylamine	EPA 625	Extractable Organics	NELAP	2/13/2002

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Analyte	Method/Tech	Category	Certification Type	Effective Date
n-Nitrosodimethylamine	EPA 8270	Extractable Organics	NELAP	7/1/2003
n-Nitroso-di-n-butylamine	EPA 8270	Extractable Organics	NELAP	7/1/2003
n-Nitrosodi-n-propylamine	EPA 625	Extractable Organics	NELAP	2/13/2002
n-Nitrosodi-n-propylamine	EPA 8270	Extractable Organics	NELAP	12/10/2008
n-Nitrosodiphenylamine	EPA 625	Extractable Organics	NELAP	2/13/2002
n-Nitrosodiphenylamine	EPA 8270	Extractable Organics	NELAP	7/1/2003
n-Nitrosomethylethylamine	EPA 8270	Extractable Organics	NELAP	7/1/2003
n-Nitrosomorpholine	EPA 8270	Extractable Organics	NELAP	7/1/2003
n-Nitrosopiperidine	EPA 8270	Extractable Organics	NELAP	7/1/2003
n-Nitrosopyrrolidine	EPA 8270	Extractable Organics	NELAP	7/1/2003
n-Propylbenzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
o,o,o-Triethyl phosphorothioate	EPA 8270	Extractable Organics	NELAP	7/1/2003
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	EPA 8330	Extractable Organics	NELAP	7/1/2003
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
Oil & Grease	EPA 1664A	General Chemistry	NELAP	2/13/2002
Orthophosphate as P	EPA 300.0	General Chemistry	NELAP	2/13/2002
Orthophosphate as P	EPA 9056	General Chemistry	NELAP	7/1/2003
o-Toluidine	EPA 8270	Extractable Organics	NELAP	7/1/2003
o-Xylene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Pentachlorobenzene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Pentachloroethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
Pentachloronitrobenzene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Pentachlorophenol	EPA 625	Extractable Organics	NELAP	2/13/2002
Pentachlorophenol	EPA 8041	Extractable Organics	NELAP	12/10/2008
Pentachlorophenol	EPA 8270	Extractable Organics	NELAP	7/1/2003
Pentaerythritoltetranitrate (PETN)	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
Perchlorate	EPA 6850	General Chemistry	NELAP	12/10/2008
pH	EPA 150.1	General Chemistry	NELAP	2/13/2002
pH	EPA 9040	General Chemistry	NELAP	7/1/2003
pH	SM 4500-H+-B	General Chemistry	NELAP	5/4/2007
Phenacetin	EPA 8270	Extractable Organics	NELAP	7/1/2003
Phenanthrene	EPA 625	Extractable Organics	NELAP	2/13/2002
Phenanthrene	EPA 8270	Extractable Organics	NELAP	7/1/2003

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Earth City, MO 63045

Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
Phenanthrene	EPA 8310	Extractable Organics	NELAP	7/1/2003
Phenol	EPA 625	Extractable Organics	NELAP	2/13/2002
Phenol	EPA 8041	Extractable Organics	NELAP	12/10/2008
Phenol	EPA 8270	Extractable Organics	NELAP	7/1/2003
Phorate	EPA 8270	Extractable Organics	NELAP	7/1/2003
Phosphorus, total	EPA 365.2	General Chemistry	NELAP	7/24/2006
p-Isopropyltoluene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Potassium	EPA 200.7	Metals	NELAP	2/13/2002
Potassium	EPA 6010	Metals	NELAP	7/1/2003
Potassium	EPA 6020	Metals	NELAP	11/7/2003
Pronamide (Kerb)	EPA 8270	Extractable Organics	NELAP	7/1/2003
Propionitrile (Ethyl cyanide)	EPA 8260	Volatile Organics	NELAP	7/1/2003
Pyrene	EPA 625	Extractable Organics	NELAP	2/13/2002
Pyrene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Pyrene	EPA 8310	Extractable Organics	NELAP	7/1/2003
Pyridine	EPA 8270	Extractable Organics	NELAP	7/1/2003
Radium-226	EPA 903.0	Radiochemistry	NELAP	12/10/2008
Radium-228	EPA 904.0	Radiochemistry	NELAP	12/10/2008
Radium-228	EPA 9320	Radiochemistry	NELAP	12/10/2008
RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine)	EPA 8330	Extractable Organics	NELAP	7/1/2003
RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine)	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
Reactive cyanide	Sec. 7.3 SW-846	General Chemistry	NELAP	7/24/2006
Reactive sulfide	Sec. 7.3 SW-846	General Chemistry	NELAP	7/24/2006
Residue-filterable (TDS)	EPA 160.1	General Chemistry	NELAP	2/13/2002
Residue-filterable (TDS)	SM 2540 C	General Chemistry	NELAP	5/4/2007
Residue-nonfilterable (TSS)	EPA 160.2	General Chemistry	NELAP	2/13/2002
Residue-nonfilterable (TSS)	SM 2540 D	General Chemistry	NELAP	5/4/2007
Residue-total	EPA 160.3	General Chemistry	NELAP	2/13/2002
Residue-total	SM 2540 B	General Chemistry	NELAP	5/4/2007
Safrole	EPA 8270	Extractable Organics	NELAP	7/1/2003
sec-Butylbenzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Selenium	EPA 200.7	Metals	NELAP	2/13/2002
Selenium	EPA 200.8	Metals	NELAP	2/13/2002
Selenium	EPA 6010	Metals	NELAP	7/1/2003
Selenium	EPA 6020	Metals	NELAP	11/7/2003

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Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
Silicon	EPA 200.7	Metals	NELAP	2/13/2002
Silicon	EPA 6010	Metals	NELAP	7/1/2003
Silver	EPA 200.7	Metals	NELAP	2/13/2002
Silver	EPA 200.8	Metals	NELAP	2/13/2002
Silver	EPA 6010	Metals	NELAP	7/1/2003
Silver	EPA 6020	Metals	NELAP	7/1/2003
Silvex (2,4,5-TP)	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Sodium	EPA 200.7	Metals	NELAP	2/13/2002
Sodium	EPA 6010	Metals	NELAP	7/1/2003
Sodium	EPA 6020	Metals	NELAP	11/7/2003
Strontium	EPA 200.7	Metals	NELAP	7/24/2006
Strontium	EPA 6010	Metals	NELAP	7/1/2003
Strontium	EPA 6020	Metals	NELAP	7/24/2006
Strontium-90	DOE Sr-02	Radiochemistry	NELAP	12/10/2008
Strontium-90	DOE Sr-03-RC	Radiochemistry	NELAP	12/10/2008
Strontium-90	EPA 905.0	Radiochemistry	NELAP	12/10/2008
Styrene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Sulfate	EPA 300.0	General Chemistry	NELAP	2/13/2002
Sulfate	EPA 9056	General Chemistry	NELAP	7/1/2003
Sulfide	EPA 376.1	General Chemistry	NELAP	2/13/2002
Sulfide	EPA 9030/9034	General Chemistry	NELAP	5/4/2007
Sulfide	SM 4500-S F (20th/21st Ed.)	General Chemistry	NELAP	5/4/2007
Sulfotepp	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Synthetic Precipitation Leaching Procedure	EPA 1312	General Chemistry	NELAP	7/24/2006
tert-Butylbenzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Tetrachloroethylene (Perchloroethylene)	EPA 624	Volatile Organics	NELAP	2/13/2002
Tetrachloroethylene (Perchloroethylene)	EPA 8260	Volatile Organics	NELAP	7/1/2003
Tetryl (methyl-2,4,6-trinitrophenylnitramine)	EPA 8330	Extractable Organics	NELAP	7/1/2003
Tetryl (methyl-2,4,6-trinitrophenylnitramine)	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
Thallium	EPA 200.7	Metals	NELAP	2/13/2002
Thallium	EPA 200.8	Metals	NELAP	2/13/2002
Thallium	EPA 6010	Metals	NELAP	7/1/2003
Thallium	EPA 6020	Metals	NELAP	7/1/2003
Thionazin (Zinophos)	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Thorium	EPA 200.8	Metals	NELAP	7/24/2006

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Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
Tin	EPA 200.7	Metals	NELAP	7/24/2006
Tin	EPA 6010	Metals	NELAP	7/1/2003
Tin	EPA 6020	Metals	NELAP	7/24/2006
Titanium	EPA 200.7	Metals	NELAP	7/24/2006
Titanium	EPA 6010	Metals	NELAP	7/24/2006
Titanium	EPA 6020	Metals	NELAP	7/24/2006
Toluene	EPA 624	Volatile Organics	NELAP	2/13/2002
Toluene	EPA 8021	Volatile Organics	NELAP	7/1/2003
Toluene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Total cyanide	EPA 9010	General Chemistry	NELAP	7/1/2003
Total cyanide	EPA 9012	General Chemistry	NELAP	7/1/2003
Total nitrate-nitrite	SM 4500-NO3 H	General Chemistry	NELAP	5/4/2007
Total organic carbon	EPA 415.1	General Chemistry	NELAP	5/14/2003
Total organic carbon	EPA 9060	General Chemistry	NELAP	7/1/2003
Total organic carbon	SM 5310B	General Chemistry	NELAP	5/4/2007
Total organic halides (TOX)	EPA 9020	General Chemistry	NELAP	7/1/2003
Total radium	EPA 9315	Radiochemistry	NELAP	12/10/2008
Total sulfides	EPA 9034	General Chemistry	NELAP	7/1/2003
Toxaphene (Chlorinated camphene)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Toxaphene (Chlorinated camphene)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Toxicity Characteristic Leaching Procedure	EPA 1311	General Chemistry	NELAP	7/24/2006
trans-1,2-Dichloroethylene	EPA 624	Volatile Organics	NELAP	2/13/2002
trans-1,2-Dichloroethylene	EPA 8260	Volatile Organics	NELAP	7/1/2003
trans-1,3-Dichloropropylene	EPA 624	Volatile Organics	NELAP	2/13/2002
trans-1,3-Dichloropropylene	EPA 8260	Volatile Organics	NELAP	7/1/2003
trans-1,4-Dichloro-2-butene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Trichloroethene (Trichloroethylene)	EPA 624	Volatile Organics	NELAP	2/13/2002
Trichloroethene (Trichloroethylene)	EPA 8260	Volatile Organics	NELAP	7/1/2003
Trichlorofluoromethane	EPA 624	Volatile Organics	NELAP	12/16/2002
Trichlorofluoromethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
Tri-o-cresylphosphate (TOCP)	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
Tritium	EPA 906.0	Radiochemistry	NELAP	12/10/2008
Uranium	ASTM D5174-91	Radiochemistry	NELAP	12/10/2008
Uranium	EPA 200.8	Metals	NELAP	2/13/2002
Uranium	EPA 6020	Metals	NELAP	6/5/2009

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Charlie Crist
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FLORIDA DEPARTMENT OF HEALTH

Ana M. Viamonte Ros, M.D., M.P.H.
State Surgeon General

Laboratory Scope of Accreditation

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State Laboratory ID: E87689 **EPA Lab Code: MO00054** **(314) 298-8566**

E87689
TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045

Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
Vanadium	EPA 200.7	General Chemistry,Metals	NELAP	2/13/2002
Vanadium	EPA 200.8	Metals	NELAP	2/13/2002
Vanadium	EPA 6010	Metals	NELAP	7/1/2003
Vanadium	EPA 6020	Metals	NELAP	11/7/2003
Vinyl acetate	EPA 8260	Volatile Organics	NELAP	7/1/2003
Vinyl chloride	EPA 624	Volatile Organics	NELAP	2/13/2002
Vinyl chloride	EPA 8260	Volatile Organics	NELAP	7/1/2003
Xylene (total)	EPA 624	Volatile Organics	NELAP	2/13/2002
Xylene (total)	EPA 8021	Volatile Organics	NELAP	7/1/2003
Xylene (total)	EPA 8260	Volatile Organics	NELAP	7/1/2003
Zinc	EPA 200.7	General Chemistry,Metals	NELAP	2/13/2002
Zinc	EPA 200.8	Metals	NELAP	2/13/2002
Zinc	EPA 6010	Metals	NELAP	7/1/2003
Zinc	EPA 6020	Metals	NELAP	7/1/2003

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E87689
TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045

Matrix: Solid and Chemical Materials

Analyte	Method/Tech	Category	Certification Type	Effective Date
1,1,1,2-Tetrachloroethane	EPA 8260	Volatile Organics	NELAP	2/13/2002
1,1,1-Trichloroethane	EPA 8260	Volatile Organics	NELAP	2/13/2002
1,1,2,2-Tetrachloroethane	EPA 8260	Volatile Organics	NELAP	2/13/2002
1,1,2-Trichloro-1,2,2-trifluoroethane	EPA 8260	Volatile Organics	NELAP	12/10/2008
1,1,2-Trichloroethane	EPA 8260	Volatile Organics	NELAP	2/13/2002
1,1-Dichloroethane	EPA 8260	Volatile Organics	NELAP	2/13/2002
1,1-Dichloroethylene	EPA 8260	Volatile Organics	NELAP	2/13/2002
1,1-Dichloropropene	EPA 8260	Volatile Organics	NELAP	2/13/2002
1,2,3-Trichlorobenzene	EPA 8260	Volatile Organics	NELAP	2/13/2002
1,2,3-Trichloropropane	EPA 8260	Volatile Organics	NELAP	2/13/2002
1,2,4,5-Tetrachlorobenzene	EPA 8270	Extractable Organics	NELAP	2/13/2002
1,2,4-Trichlorobenzene	EPA 8260	Volatile Organics	NELAP	2/13/2002
1,2,4-Trichlorobenzene	EPA 8270	Extractable Organics	NELAP	2/13/2002
1,2,4-Trimethylbenzene	EPA 8260	Volatile Organics	NELAP	2/13/2002
1,2-Dibromo-3-chloropropane (DBCP)	EPA 8260	Volatile Organics	NELAP	2/13/2002
1,2-Dibromoethane (EDB, Ethylene dibromide)	EPA 8260	Volatile Organics	NELAP	2/13/2002
1,2-Dichlorobenzene	EPA 8260	Volatile Organics	NELAP	2/13/2002
1,2-Dichlorobenzene	EPA 8270	Extractable Organics	NELAP	10/26/2005
1,2-Dichloroethane	EPA 8260	Volatile Organics	NELAP	2/13/2002
1,2-Dichloropropane	EPA 8260	Volatile Organics	NELAP	2/13/2002
1,3,5-Trimethylbenzene	EPA 8260	Volatile Organics	NELAP	2/13/2002
1,3,5-Trinitrobenzene (1,3,5-TNB)	EPA 8270	Extractable Organics	NELAP	2/13/2002
1,3,5-Trinitrobenzene (1,3,5-TNB)	EPA 8330	Extractable Organics	NELAP	2/13/2002
1,3,5-Trinitrobenzene (1,3,5-TNB)	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
1,3-Dichlorobenzene	EPA 8260	Volatile Organics	NELAP	2/13/2002
1,3-Dichlorobenzene	EPA 8270	Extractable Organics	NELAP	10/26/2005
1,3-Dichloropropane	EPA 8260	Volatile Organics	NELAP	2/13/2002
1,3-Dinitrobenzene (1,3-DNB)	EPA 8330	Extractable Organics	NELAP	12/9/2002
1,3-Dinitrobenzene (1,3-DNB)	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
1,4-Dichlorobenzene	EPA 8260	Volatile Organics	NELAP	2/13/2002
1,4-Dichlorobenzene	EPA 8270	Extractable Organics	NELAP	10/26/2005
1,4-Dioxane (1,4-Diethyleneoxide)	EPA 8260	Volatile Organics	NELAP	2/13/2002
1,4-Naphthoquinone	EPA 8270	Extractable Organics	NELAP	2/13/2002
1-Naphthylamine	EPA 8270	Extractable Organics	NELAP	2/13/2002

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E87689
TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045

Matrix: Solid and Chemical Materials

Analyte	Method/Tech	Category	Certification Type	Effective Date
2,2-Dichloropropane	EPA 8260	Volatile Organics	NELAP	2/13/2002
2,3,4,6-Tetrachlorophenol	EPA 8270	Extractable Organics	NELAP	2/13/2002
2,4,5-T	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
2,4,5-Trichlorophenol	EPA 8270	Extractable Organics	NELAP	10/26/2005
2,4,6-Trichlorophenol	EPA 8270	Extractable Organics	NELAP	2/13/2002
2,4,6-Trinitrotoluene (2,4,6-TNT)	EPA 8330	Extractable Organics	NELAP	2/13/2002
2,4,6-Trinitrotoluene (2,4,6-TNT)	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
2,4-D	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
2,4-DB	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
2,4-Diamino-6-nitrotoluene	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
2,4-Dichlorophenol	EPA 8270	Extractable Organics	NELAP	2/13/2002
2,4-Dimethylphenol	EPA 8270	Extractable Organics	NELAP	2/13/2002
2,4-Dinitrophenol	EPA 8270	Extractable Organics	NELAP	2/13/2002
2,4-Dinitrotoluene (2,4-DNT)	EPA 8270	Extractable Organics	NELAP	2/13/2002
2,4-Dinitrotoluene (2,4-DNT)	EPA 8330	Extractable Organics	NELAP	2/13/2002
2,4-Dinitrotoluene (2,4-DNT)	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
2,6-Diamino-4-nitrotoluene	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
2,6-Dichlorophenol	EPA 8270	Extractable Organics	NELAP	5/14/2003
2,6-Dinitrotoluene (2,6-DNT)	EPA 8270	Extractable Organics	NELAP	5/14/2003
2,6-Dinitrotoluene (2,6-DNT)	EPA 8330	Extractable Organics	NELAP	5/14/2003
2,6-Dinitrotoluene (2,6-DNT)	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
2-Amino-4,6-dinitrotoluene (2-am-dnt)	EPA 8330	Extractable Organics	NELAP	5/14/2003
2-Amino-4,6-dinitrotoluene (2-am-dnt)	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
2-Aminoanthraquinone	EPA 8270	Extractable Organics	NELAP	2/13/2002
2-Butanone (Methyl ethyl ketone, MEK)	EPA 8260	Volatile Organics	NELAP	2/13/2002
2-Chloroethyl vinyl ether	EPA 8260	Volatile Organics	NELAP	2/13/2002
2-Chloronaphthalene	EPA 8270	Extractable Organics	NELAP	2/13/2002
2-Chlorophenol	EPA 8270	Extractable Organics	NELAP	2/13/2002
2-Chlorotoluene	EPA 8260	Volatile Organics	NELAP	2/13/2002

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TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045

Matrix: Solid and Chemical Materials

Analyte	Method/Tech	Category	Certification Type	Effective Date
2-Hexanone	EPA 8260	Volatile Organics	NELAP	2/13/2002
2-Methyl-4,6-dinitrophenol	EPA 8270	Extractable Organics	NELAP	12/10/2008
2-Methylnaphthalene	EPA 8270	Extractable Organics	NELAP	12/10/2008
2-Methylphenol (o-Cresol)	EPA 8270	Extractable Organics	NELAP	2/13/2002
2-Naphthylamine	EPA 8270	Extractable Organics	NELAP	2/13/2002
2-Nitroaniline	EPA 8270	Extractable Organics	NELAP	2/13/2002
2-Nitrophenol	EPA 8270	Extractable Organics	NELAP	2/13/2002
2-Nitrotoluene	EPA 8330	Extractable Organics	NELAP	2/13/2002
2-Nitrotoluene	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
2-Picoline (2-Methylpyridine)	EPA 8270	Extractable Organics	NELAP	2/13/2002
3,3'-Dichlorobenzidine	EPA 8270	Extractable Organics	NELAP	2/13/2002
3,3'-Dimethoxybenzidine	EPA 8270	Extractable Organics	NELAP	2/13/2002
3,3'-Dimethylbenzidine	EPA 8270	Extractable Organics	NELAP	2/13/2002
3,5-Dinitroaniline	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
3/4-Methylphenols (m/p-Cresols)	EPA 8270	Extractable Organics	NELAP	7/24/2006
3-Methylcholanthrene	EPA 8270	Extractable Organics	NELAP	2/13/2002
3-Nitroaniline	EPA 8270	Extractable Organics	NELAP	2/13/2002
3-Nitrotoluene	EPA 8330	Extractable Organics	NELAP	2/13/2002
3-Nitrotoluene	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
4,4'-DDD	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
4,4'-DDE	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
4,4'-DDT	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
4-Amino-2,6-dinitrotoluene (4-am-dnt)	EPA 8330	Extractable Organics	NELAP	5/14/2003
4-Amino-2,6-dinitrotoluene (4-am-dnt)	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
4-Aminobiphenyl	EPA 8270	Extractable Organics	NELAP	2/13/2002
4-Bromophenyl phenyl ether	EPA 8270	Extractable Organics	NELAP	12/10/2008
4-Chloro-3-methylphenol	EPA 8270	Extractable Organics	NELAP	2/13/2002
4-Chloroaniline	EPA 8270	Extractable Organics	NELAP	2/13/2002
4-Chlorophenyl phenylether	EPA 8270	Extractable Organics	NELAP	2/13/2002
4-Chlorotoluene	EPA 8260	Volatile Organics	NELAP	2/13/2002
4-Dimethyl aminoazobenzene	EPA 8270	Extractable Organics	NELAP	2/13/2002
4-Methyl-2-pentanone (MIBK)	EPA 8260	Volatile Organics	NELAP	2/13/2002

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TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045

Matrix: Solid and Chemical Materials

Analyte	Method/Tech	Category	Certification Type	Effective Date
4-Nitroaniline	EPA 8270	Extractable Organics	NELAP	2/13/2002
4-Nitrophenol	EPA 8270	Extractable Organics	NELAP	2/13/2002
4-Nitrotoluene	EPA 8330	Extractable Organics	NELAP	2/13/2002
4-Nitrotoluene	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
7,12-Dimethylbenz(a) anthracene	EPA 8270	Extractable Organics	NELAP	2/13/2002
a-a-Dimethylphenethylamine	EPA 8270	Extractable Organics	NELAP	2/13/2002
Acenaphthene	EPA 8270	Extractable Organics	NELAP	2/13/2002
Acenaphthene	EPA 8310	Extractable Organics	NELAP	2/13/2002
Acenaphthylene	EPA 8270	Extractable Organics	NELAP	2/13/2002
Acenaphthylene	EPA 8310	Extractable Organics	NELAP	2/13/2002
Acetone	EPA 8260	Volatile Organics	NELAP	2/13/2002
Acetonitrile	EPA 8260	Volatile Organics	NELAP	2/13/2002
Acetophenone	EPA 8270	Extractable Organics	NELAP	2/13/2002
Acrolein (Propenal)	EPA 8260	Volatile Organics	NELAP	2/13/2002
Acrylonitrile	EPA 8260	Volatile Organics	NELAP	2/13/2002
Aldrin	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Allyl chloride (3-Chloropropene)	EPA 8260	Volatile Organics	NELAP	2/13/2002
alpha-BHC (alpha-Hexachlorocyclohexane)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
alpha-Chlordane	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	3/2/2005
Aluminum	EPA 6010	Metals	NELAP	2/13/2002
Aluminum	EPA 6020	Metals	NELAP	2/13/2002
Aniline	EPA 8270	Extractable Organics	NELAP	2/13/2002
Anthracene	EPA 8270	Extractable Organics	NELAP	2/13/2002
Anthracene	EPA 8310	Extractable Organics	NELAP	2/13/2002
Antimony	EPA 6010	Metals	NELAP	2/13/2002
Antimony	EPA 6020	Metals	NELAP	2/13/2002
Aramite	EPA 8270	Extractable Organics	NELAP	2/13/2002
Aroclor-1016 (PCB-1016)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Aroclor-1221 (PCB-1221)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Aroclor-1232 (PCB-1232)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Aroclor-1242 (PCB-1242)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Aroclor-1248 (PCB-1248)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Aroclor-1254 (PCB-1254)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Aroclor-1260 (PCB-1260)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Arsenic	EPA 6010	Metals	NELAP	2/13/2002

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TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045

Matrix: Solid and Chemical Materials

Analyte	Method/Tech	Category	Certification Type	Effective Date
Arsenic	EPA 6020	Metals	NELAP	2/13/2002
Barium	EPA 6010	Metals	NELAP	2/13/2002
Barium	EPA 6020	Metals	NELAP	2/13/2002
Benzene	EPA 8021	Volatile Organics	NELAP	2/13/2002
Benzene	EPA 8260	Volatile Organics	NELAP	2/13/2002
Benzo(a)anthracene	EPA 8270	Extractable Organics	NELAP	2/13/2002
Benzo(a)anthracene	EPA 8310	Extractable Organics	NELAP	2/13/2002
Benzo(a)pyrene	EPA 8270	Extractable Organics	NELAP	2/13/2002
Benzo(a)pyrene	EPA 8310	Extractable Organics	NELAP	2/13/2002
Benzo(b)fluoranthene	EPA 8270	Extractable Organics	NELAP	2/13/2002
Benzo(b)fluoranthene	EPA 8310	Extractable Organics	NELAP	2/13/2002
Benzo(g,h,i)perylene	EPA 8270	Extractable Organics	NELAP	2/13/2002
Benzo(g,h,i)perylene	EPA 8310	Extractable Organics	NELAP	2/13/2002
Benzo(k)fluoranthene	EPA 8270	Extractable Organics	NELAP	5/14/2003
Benzo(k)fluoranthene	EPA 8310	Extractable Organics	NELAP	5/14/2003
Benzoic acid	EPA 8270	Extractable Organics	NELAP	2/13/2002
Benzyl alcohol	EPA 8270	Extractable Organics	NELAP	2/13/2002
Beryllium	EPA 6010	Metals	NELAP	2/13/2002
Beryllium	EPA 6020	Metals	NELAP	2/13/2002
beta-BHC (beta-Hexachlorocyclohexane)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
bis(2-Chloroethoxy)methane	EPA 8270	Extractable Organics	NELAP	2/13/2002
bis(2-Chloroethyl) ether	EPA 8270	Extractable Organics	NELAP	2/13/2002
bis(2-Chloroisopropyl) ether (2,2'-Oxybis(1-chloropropane))	EPA 8270	Extractable Organics	NELAP	2/13/2002
bis(2-Ethylhexyl) phthalate (DEHP)	EPA 8270	Extractable Organics	NELAP	2/13/2002
Boron	EPA 6010	Metals	NELAP	5/14/2003
Boron	EPA 6020	Metals	NELAP	7/24/2006
Bromide	EPA 9056	General Chemistry	NELAP	2/13/2002
Bromobenzene	EPA 8260	Volatile Organics	NELAP	2/13/2002
Bromochloromethane	EPA 8260	Volatile Organics	NELAP	2/13/2002
Bromodichloromethane	EPA 8260	Volatile Organics	NELAP	2/13/2002
Bromoform	EPA 8260	Volatile Organics	NELAP	2/13/2002
Butyl benzyl phthalate	EPA 8270	Extractable Organics	NELAP	2/13/2002
Cadmium	EPA 6010	Metals	NELAP	2/13/2002
Cadmium	EPA 6020	Metals	NELAP	2/13/2002
Calcium	EPA 6010	Metals	NELAP	12/9/2002
Calcium	EPA 6020	Metals	NELAP	11/7/2003

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Matrix: Solid and Chemical Materials

Analyte	Method/Tech	Category	Certification Type	Effective Date
Carbazole	EPA 8270	Extractable Organics	NELAP	2/13/2002
Carbon disulfide	EPA 8260	Volatile Organics	NELAP	2/13/2002
Carbon tetrachloride	EPA 8260	Volatile Organics	NELAP	2/13/2002
Chlordane (tech.)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Chloride	EPA 9056	General Chemistry	NELAP	5/28/2003
Chlorobenzene	EPA 8260	Volatile Organics	NELAP	2/13/2002
Chloroethane	EPA 8260	Volatile Organics	NELAP	2/13/2002
Chloroform	EPA 8260	Volatile Organics	NELAP	2/13/2002
Chloroprene	EPA 8260	Volatile Organics	NELAP	2/13/2002
Chromium	EPA 6010	Metals	NELAP	2/13/2002
Chromium	EPA 6020	Metals	NELAP	2/13/2002
Chromium VI	EPA 7196	General Chemistry	NELAP	2/13/2002
Chrysene	EPA 8270	Extractable Organics	NELAP	2/13/2002
Chrysene	EPA 8310	Extractable Organics	NELAP	2/13/2002
cis-1,2-Dichloroethylene	EPA 8260	Volatile Organics	NELAP	2/13/2002
cis-1,3-Dichloropropene	EPA 8260	Volatile Organics	NELAP	2/13/2002
Cobalt	EPA 6010	Metals	NELAP	2/13/2002
Cobalt	EPA 6020	Metals	NELAP	2/13/2002
Conductivity	EPA 9050	General Chemistry	NELAP	2/13/2002
Copper	EPA 6010	Metals	NELAP	2/13/2002
Copper	EPA 6020	Metals	NELAP	2/13/2002
Dalapon	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
delta-BHC	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Diallate	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Dibenz(a,h)anthracene	EPA 8270	Extractable Organics	NELAP	2/13/2002
Dibenz(a,h)anthracene	EPA 8310	Extractable Organics	NELAP	2/13/2002
Dibenzofuran	EPA 8270	Extractable Organics	NELAP	12/10/2008
Dibromochloromethane	EPA 8260	Volatile Organics	NELAP	12/16/2002
Dibromomethane	EPA 8260	Volatile Organics	NELAP	2/13/2002
Dicamba	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Dichlorodifluoromethane	EPA 8260	Volatile Organics	NELAP	2/13/2002
Dichloroprop (Dichlorprop)	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Dieldrin	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Diesel range organics (DRO)	EPA 8015	Extractable Organics	NELAP	10/26/2005
Diethyl ether	EPA 8260	Volatile Organics	NELAP	2/13/2002
Diethyl phthalate	EPA 8270	Extractable Organics	NELAP	2/13/2002

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State Surgeon General

Laboratory Scope of Accreditation

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State Laboratory ID: E87689 **EPA Lab Code: MO00054** **(314) 298-8566**

E87689
TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045

Matrix: Solid and Chemical Materials

Analyte	Method/Tech	Category	Certification Type	Effective Date
Dimethyl phthalate	EPA 8270	Extractable Organics	NELAP	2/13/2002
Di-n-butyl phthalate	EPA 8270	Extractable Organics	NELAP	2/13/2002
Di-n-octyl phthalate	EPA 8270	Extractable Organics	NELAP	2/13/2002
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Endosulfan I	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Endosulfan II	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Endosulfan sulfate	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Endrin	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Endrin aldehyde	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Endrin ketone	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	3/2/2005
Ethyl acetate	EPA 8260	Volatile Organics	NELAP	2/13/2002
Ethyl methacrylate	EPA 8260	Volatile Organics	NELAP	2/13/2002
Ethylbenzene	EPA 8021	Volatile Organics	NELAP	2/13/2002
Ethylbenzene	EPA 8260	Volatile Organics	NELAP	2/13/2002
Famphur	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Fluoranthene	EPA 8270	Extractable Organics	NELAP	2/13/2002
Fluoranthene	EPA 8310	Extractable Organics	NELAP	2/13/2002
Fluorene	EPA 8270	Extractable Organics	NELAP	2/13/2002
Fluorene	EPA 8310	Extractable Organics	NELAP	2/13/2002
Fluoride	EPA 9056	General Chemistry	NELAP	2/13/2002
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
gamma-Chlordane	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	3/2/2005
Gasoline range organics (GRO)	EPA 8015	Volatile Organics	NELAP	10/26/2005
Gross-alpha	EPA 9310	Radiochemistry	NELAP	12/10/2008
Gross-beta	EPA 9310	Radiochemistry	NELAP	12/10/2008
Heptachlor	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	5/28/2003
Heptachlor epoxide	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Hexachlorobenzene	EPA 8270	Extractable Organics	NELAP	2/13/2002
Hexachlorobutadiene	EPA 8260	Volatile Organics	NELAP	2/13/2002
Hexachlorobutadiene	EPA 8270	Extractable Organics	NELAP	2/13/2002
Hexachlorocyclopentadiene	EPA 8270	Extractable Organics,Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Hexachloroethane	EPA 8270	Extractable Organics	NELAP	2/13/2002
Hexachlorophene	EPA 8270	Extractable Organics	NELAP	2/13/2002
Hexachloropropene	EPA 8270	Extractable Organics	NELAP	2/13/2002
Ignitability	EPA 1010	General Chemistry	NELAP	2/13/2002

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Matrix: Solid and Chemical Materials

Analyte	Method/Tech	Category	Certification Type	Effective Date
Indeno(1,2,3-cd)pyrene	EPA 8270	Extractable Organics	NELAP	2/13/2002
Indeno(1,2,3-cd)pyrene	EPA 8310	Extractable Organics	NELAP	2/13/2002
Iodomethane (Methyl iodide)	EPA 8260	Volatile Organics	NELAP	12/10/2008
Iron	EPA 6010	Metals	NELAP	2/13/2002
Iron	EPA 6020	Metals	NELAP	11/7/2003
Isobutyl alcohol (2-Methyl-1-propanol)	EPA 8260	Volatile Organics	NELAP	2/13/2002
Isodrin	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Isophorone	EPA 8270	Extractable Organics	NELAP	12/10/2008
Isopropylbenzene	EPA 8260	Volatile Organics	NELAP	2/13/2002
Isosafrole	EPA 8270	Extractable Organics	NELAP	2/13/2002
Kepone	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Lead	EPA 6010	Metals	NELAP	2/13/2002
Lead	EPA 6020	Metals	NELAP	2/13/2002
Lithium	EPA 6010	Metals	NELAP	2/13/2002
m+p-Xylenes	EPA 8260	Volatile Organics	NELAP	7/24/2006
Magnesium	EPA 6010	Metals	NELAP	2/13/2002
Magnesium	EPA 6020	Metals	NELAP	11/7/2003
Manganese	EPA 6010	Metals	NELAP	2/13/2002
Manganese	EPA 6020	Metals	NELAP	2/13/2002
MCPA	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
MCPP	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Mercury	EPA 7471	Metals	NELAP	2/13/2002
Methacrylonitrile	EPA 8260	Volatile Organics	NELAP	2/13/2002
Methapyrilene	EPA 8270	Extractable Organics	NELAP	2/13/2002
Methoxychlor	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Methyl bromide (Bromomethane)	EPA 8260	Volatile Organics	NELAP	2/13/2002
Methyl chloride (Chloromethane)	EPA 8260	Volatile Organics	NELAP	2/13/2002
Methyl methacrylate	EPA 8260	Volatile Organics	NELAP	2/13/2002
Methyl parathion (Parathion, methyl)	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Methyl tert-butyl ether (MTBE)	EPA 8260	Volatile Organics	NELAP	2/13/2002
Methylene chloride	EPA 8260	Volatile Organics	NELAP	2/13/2002
Molybdenum	EPA 6010	Metals	NELAP	12/9/2002
Molybdenum	EPA 6020	Metals	NELAP	7/24/2006
Naphthalene	EPA 8260	Volatile Organics	NELAP	2/13/2002
Naphthalene	EPA 8270	Extractable Organics	NELAP	2/13/2002
Naphthalene	EPA 8310	Extractable Organics	NELAP	2/13/2002

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Matrix: Solid and Chemical Materials

Analyte	Method/Tech	Category	Certification Type	Effective Date
n-Butyl alcohol	EPA 8260	Volatile Organics	NELAP	2/13/2002
n-Butylbenzene	EPA 8260	Volatile Organics	NELAP	2/13/2002
Nickel	EPA 6010	Metals	NELAP	2/13/2002
Nickel	EPA 6020	Metals	NELAP	2/13/2002
Nitrate	EPA 9056	General Chemistry	NELAP	2/13/2002
Nitrite	EPA 9056	General Chemistry	NELAP	2/13/2002
Nitrobenzene	EPA 8270	Extractable Organics	NELAP	2/13/2002
Nitrobenzene	EPA 8330	Extractable Organics	NELAP	2/13/2002
Nitrobenzene	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
Nitroglycerin	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
n-Nitrosodiethylamine	EPA 8270	Extractable Organics	NELAP	2/13/2002
n-Nitrosodimethylamine	EPA 8270	Extractable Organics	NELAP	2/13/2002
n-Nitroso-di-n-butylamine	EPA 8270	Extractable Organics	NELAP	2/13/2002
n-Nitrosodi-n-propylamine	EPA 8270	Extractable Organics	NELAP	12/10/2008
n-Nitrosodiphenylamine	EPA 8270	Extractable Organics	NELAP	2/13/2002
n-Nitrosomethylethylamine	EPA 8270	Extractable Organics	NELAP	2/13/2002
n-Nitrosomorpholine	EPA 8270	Extractable Organics	NELAP	2/13/2002
n-Nitrosopiperidine	EPA 8270	Extractable Organics	NELAP	2/13/2002
n-Nitrosopyrrolidine	EPA 8270	Extractable Organics	NELAP	2/13/2002
n-Propylbenzene	EPA 8260	Volatile Organics	NELAP	2/13/2002
o,o,o-Triethyl phosphorothioate	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	EPA 8330	Extractable Organics	NELAP	2/13/2002
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
Orthophosphate as P	EPA 9056	General Chemistry	NELAP	2/13/2002
o-Toluidine	EPA 8270	Extractable Organics	NELAP	12/9/2002
o-Xylene	EPA 8260	Volatile Organics	NELAP	2/13/2002
Paint Filter Liquids Test	EPA 9095	General Chemistry	NELAP	2/13/2002
Parathion, ethyl	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Pentachlorobenzene	EPA 8270	Extractable Organics	NELAP	2/13/2002
Pentachloroethane	EPA 8260	Volatile Organics	NELAP	2/13/2002
Pentachloronitrobenzene	EPA 8270	Extractable Organics	NELAP	2/13/2002
Pentachlorophenol	EPA 8270	Extractable Organics	NELAP	2/13/2002

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State Laboratory ID: E87689 **EPA Lab Code: MO00054** **(314) 298-8566**

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TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045

Matrix: Solid and Chemical Materials

Analyte	Method/Tech	Category	Certification Type	Effective Date
Pentaerythritoltetranitrate (PETN)	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
Perchlorate	EPA 6850	General Chemistry	NELAP	12/10/2008
pH	EPA 9040	General Chemistry	NELAP	2/13/2002
pH	EPA 9045	General Chemistry	NELAP	2/13/2002
Phenacetin	EPA 8270	Extractable Organics	NELAP	2/13/2002
Phenanthrene	EPA 8270	Extractable Organics	NELAP	2/13/2002
Phenanthrene	EPA 8310	Extractable Organics	NELAP	2/13/2002
Phenol	EPA 8270	Extractable Organics	NELAP	2/13/2002
Phorate	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Phosphorus	EPA 6020	Metals	NELAP	7/24/2006
p-Isopropyltoluene	EPA 8260	Volatile Organics	NELAP	2/13/2002
Potassium	EPA 6010	Metals	NELAP	2/13/2002
Potassium	EPA 6020	Metals	NELAP	11/7/2003
Pronamide (Kerb)	EPA 8270	Extractable Organics	NELAP	2/13/2002
Propionitrile (Ethyl cyanide)	EPA 8260	Volatile Organics	NELAP	2/13/2002
Pyrene	EPA 8270	Extractable Organics	NELAP	2/13/2002
Pyrene	EPA 8310	Extractable Organics	NELAP	2/13/2002
Pyridine	EPA 8270	Extractable Organics	NELAP	2/13/2002
Radium-228	EPA 9320	Radiochemistry	NELAP	12/10/2008
RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine)	EPA 8330	Extractable Organics	NELAP	2/13/2002
RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine)	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
Reactive cyanide	EPA 7.3.3.2	General Chemistry	NELAP	2/13/2002
Reactive sulfide	EPA 7.3.4.2	General Chemistry	NELAP	2/13/2002
Safrole	EPA 8270	Extractable Organics	NELAP	2/13/2002
sec-Butylbenzene	EPA 8260	Volatile Organics	NELAP	2/13/2002
Selenium	EPA 6010	Metals	NELAP	2/13/2002
Selenium	EPA 6020	Metals	NELAP	11/7/2003
Silicon	EPA 6010	Metals	NELAP	2/13/2002
Silver	EPA 6010	Metals	NELAP	2/13/2002
Silver	EPA 6020	Metals	NELAP	2/13/2002
Silvex (2,4,5-TP)	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Sodium	EPA 6010	Metals	NELAP	2/13/2002
Sodium	EPA 6020	Metals	NELAP	11/7/2003
Strontium	EPA 6010	Metals	NELAP	12/9/2002

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Analyte	Method/Tech	Category	Certification Type	Effective Date
Strontium	EPA 6020	Metals	NELAP	7/24/2006
Styrene	EPA 8260	Volatile Organics	NELAP	2/13/2002
Sulfate	EPA 9056	General Chemistry	NELAP	2/13/2002
Sulfotepp	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Synthetic Precipitation Leaching Procedure	EPA 1312	General Chemistry	NELAP	2/13/2002
tert-Butylbenzene	EPA 8260	Volatile Organics	NELAP	2/13/2002
Tetrachloroethylene (Perchloroethylene)	EPA 8260	Volatile Organics	NELAP	2/13/2002
Tetryl (methyl-2,4,6-trinitrophenylnitramine)	EPA 8330	Extractable Organics	NELAP	2/13/2002
Tetryl (methyl-2,4,6-trinitrophenylnitramine)	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
Thallium	EPA 6010	Metals	NELAP	2/13/2002
Thallium	EPA 6020	Metals	NELAP	2/13/2002
Thionazin (Zinophos)	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Tin	EPA 6010	Metals	NELAP	5/14/2003
Tin	EPA 6020	Metals	NELAP	7/24/2006
Titanium	EPA 6010	Metals	NELAP	7/24/2006
Titanium	EPA 6020	Metals	NELAP	7/24/2006
Toluene	EPA 8021	Volatile Organics	NELAP	2/13/2002
Toluene	EPA 8260	Volatile Organics	NELAP	2/13/2002
Total cyanide	EPA 9010	General Chemistry	NELAP	2/13/2002
Total cyanide	EPA 9012	General Chemistry	NELAP	2/13/2002
Total nitrate-nitrite	EPA 9056	General Chemistry	NELAP	2/13/2002
Total radium	EPA 9315	Radiochemistry	NELAP	12/10/2008
Total sulfides	EPA 9034	General Chemistry	NELAP	2/13/2002
Toxaphene (Chlorinated camphene)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	2/13/2002
Toxicity Characteristic Leaching Procedure	EPA 1311	General Chemistry	NELAP	2/13/2002
trans-1,2-Dichloroethylene	EPA 8260	Volatile Organics	NELAP	2/13/2002
trans-1,3-Dichloropropylene	EPA 8260	Volatile Organics	NELAP	2/13/2002
trans-1,4-Dichloro-2-butene	EPA 8260	Volatile Organics	NELAP	2/13/2002
Trichloroethene (Trichloroethylene)	EPA 8260	Volatile Organics	NELAP	2/13/2002
Trichlorofluoromethane	EPA 8260	Volatile Organics	NELAP	2/13/2002
Tri-o-cresylphosphate (TOCP)	ST-LC-0005 Rev. 0 (12/07/07)[EPA 8321A]/LC-MS-MS	Extractable Organics	NELAP	12/10/2008
Vanadium	EPA 6010	Metals	NELAP	2/13/2002
Vanadium	EPA 6020	Metals	NELAP	11/7/2003
Vinyl acetate	EPA 8260	Volatile Organics	NELAP	2/13/2002

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Matrix: Solid and Chemical Materials

Analyte	Method/Tech	Category	Certification Type	Effective Date
Vinyl chloride	EPA 8260	Volatile Organics	NELAP	2/13/2002
Xylene (total)	EPA 8021	Volatile Organics	NELAP	2/13/2002
Xylene (total)	EPA 8260	Volatile Organics	NELAP	2/13/2002
Zinc	EPA 6010	Metals	NELAP	2/13/2002
Zinc	EPA 6020	Metals	NELAP	2/13/2002

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Appendix 4. 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) It reflects the total error associated with a measurement.

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)

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) Instrument conditions must be the same for all standards, samples and QC samples. Each analytical batch may contain up to 20 environmental samples, a method blank, and a single Laboratory Control Sample (LCS) and either a Matrix Spike/Matrix Spike Duplicate (MS/MSD) pair or a Matrix Spike and a Sample Duplicate, depending on the analysis requested.

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)

Carrier:
Carriers are stable counterparts of the radioactive isotope(s) to be measured. When used, carriers are added to all samples in an analytical batch so that each sample has a specific measurable QC parameter (yield). The carrier yield is used in the date calculations to correct for all sources of analytical losses. The term carrier can also be used for a non-radioactive compound added to assist in isolation of the target analyte(s).

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)

Clouseau:
TestAmerica custom software developed to document, track and trend non-conformance throughout the laboratory. The software interfaces with our laboratory information management system, QuantIMS and our report narrative generating software, KATO to provide the laboratory with a complete corrective action system.

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 (including spectra obtained by diode array)
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)

Control Chart:
A graphical QC tool to monitor method performance over time and to establish acceptance limits.

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)

Demonstration of Capability (DOC):
Procedure to establish the ability to generate acceptable accuracy and precision.

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) This is a field QC parameter and thus the choice of terminology (equipment blank, rinsate blank, etc.) is determined by the client.

External Standard Calibration:
Calibrations for methods that do not utilize internal standards to compensate for changes in instrument conditions.

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)

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)

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 Detection Limit (IDL):
The minimum amount of a substance that can be measured with a specified degree of confidence that the amount is greater than zero using a specific instrument. The IDL is associated with the instrumental portion of a specific method only, and sample preparation steps are not considered in its derivation. The IDL is a statistical estimation at a specified confidence interval of the concentration at which the relative uncertainty is ±100%. The IDL represents a range where qualitative detection occurs on a specific instrument. Quantitative results are not produced in this range.

Internal Chain of Custody:
An unbroken trail of accountability that ensures the physical security of samples, data and records. Internal Chain of Custody refers to additional documentation procedures implemented within the laboratory that includes special sample storage requirements, and documentation of all signatures and/or initials, dates and times of personnel handling specific samples or sample aliquots.

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.

For aqueous samples, the blank matrix consists of DI water. For solid samples, the blank matrix may consist of sand, glass beads or another inert solid material. If an inert material is not easily identified, the laboratory will use DI water that is taken through the sold sample preparation.

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. TestAmerica St. Louis does not use the term LOD in its' SOPs or reports.

Marginal Exceedance (ME): A large number of analytes in a Laboratory Control Sample make it statistically likely that a few will be outside control limits. This may not indicate that the system is out of control. Upper and lower marginal exceedance (ME) limits are established to determine when corrective action is required. An ME is defined as being byond the LCS control limits (3 standard deviations), but within the ME limits. The ME limits are set at 4 standard deviations around the mean. For DOE work, the ME applies only to organic analyses.

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, wipes, filters 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 Duplicate (MD):
Duplicate aliquot of a sample processed and analyzed independently; under the same laboratory conditions; also referred to as Sample Duplicate; Laboratory Duplicate. TestAmerica St. Louis distinguishes that a Sample Duplicate is a replicate sample collected in the field for analysis where as a Laboratory Duplicate is a replicate aliquot of a single field sample. Sample Duplicates are analyzed like an environmental sample and results are reported accordingly. Laboratory Duplicates are performed as part of laboratory batch QC requirements for precision.

Matrix Spike (spiked sample or fortified sample) (MS):
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) (MSD):
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) For aqueous samples, the blank matrix consists of DI water. For solid samples, the blank matrix may consist of sand, glass beads or another inert solid material. If inert material is not easily identified, the laboratory will use DI water that is taken through the solid sample preparation.

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)

Minimum Detectable Activity or Concentration (MDA/MDC):
For radiological analyses, it is the smallest amount of activity that can be detected given the conditions of a specific sample. It is reported at the 95% confidence interval, meaning that there is a 5% chance that a false signal was reported as activity and a 5% chance that true activity went undetected.

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)

Non-conformance:
An indication, judgment, or state of not having met the requirements of the relevant specifications, contract, or regulation. A deviation from an established protocol or plan. The deviation may be the result of laboratory or client actions, or related to the behavior of the sample. Non-conformance memorandums (NCMs) are documented using the Clouseau software program.

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) Precision is expressed either as Relative Standard Deviation (RSD) for greater than two measurements or as Relative Percent Difference (RPD) for two measurements. Precision is determined, in part, by analyzing date from aggregate LCS results, MS, MSD, and MD. For radiochemical determinations, counting statistics can also provide and estimate of uncertainty.

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)

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)

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)

QuantIMS:
The laboratory's information tracking system.

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) The QL can be based on the MDL, and is generally calculated as 3-5 times the MDL, however, there are analytical techniques and methods where this relationship is not applicable. Also referred to as Practical Quantitation Level (PQL), Estimated Quantitation Level (EQL), and Limit of Quantitiation (LOQ). TestAmerica St. Louis equated the Quantitation Limit to the Reporting Limit. Please see "Reporting Limit" definition.

RadCapture:
Software used to process and report radiochemical data.

Range:
The difference between the minimum and the maximum of a set of values. (EPA-QAD)

Raw Data:
Any original information from a measurement activity or study recorded in laboratory notebooks, worksheets, records, memoranda, notes, or exact copies thereof and that are necessary for the reconstruction and evaluation of the report of the activity or study. Raw data my include photography, microfilm or microfiche copies, computer printouts, magnetic/optical media, including dictated observations, and recorded data from automated instruments. Reports specifying inclusion of "raw data" do not need all of the above included, but sufficient information to create the reported data.

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)

Record Retention:
The systematic collection, indexing and storing of documented information under secure conditions.

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 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)

Reporting Limit (RL):
The level to which date is reported for a specific test method and/or sample. The RL is generally related to the QL. The RL must be minimally at or above the MDL. The Reporting Limit takes into consideration: 305 times the MDL value, technical judgment and publications f analyte performance, and market demand for quantitation. For multi-point calibration methodologies, the reporting limit must be substantiated by analyzing a low level standard which is approximately equal to the reporting limit.

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)

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)

Sample Transfer Utility (STU):
TestAmerica custom software developed to document, and track samples through the laboratory. The software interfaces with our laboratory information management system, QuantIMS. STU employs barcode technology for rapid processing of sample transfer events including removal from storage, transfer between personnel, and sample disposal.

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.

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)

Storage Blank:
A blank matrix stored with field samples of a similar matrix. TestAmerica St. Louis uses DI or HPLC water for all storage blanks.

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)

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)

Surveillance:
Monitors compliance with TestAmerica St. Louis' quality system as defined in laboratory or Corporate Standard Operating Procedures, the TestAmerica Quality Management Plan (QMP), the TestAmerica St. Louis Laboratory Quality Manual (LQM) and other associated official policies and procedures, including any client-specific requirements. The spot assessments of TestAmerica St. Louis' systems are performed monthly.

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)

Target:
Instrument acquisition software used for GC and GC/MS analyses.

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)

Tracer:
Tracers are radioactive and/or massless. Where used, they are added to all samples in an analytical batch so that each sample has a specific measurable QC parameter (yield). Tracers are counted and the yield is used in the data calculations to correct for any and all sources of analytical losses.

TRAQAR:
A computer module interfaced to QuantIMS, which provides a means of producing control charts and limits.

Trip Blank:
A blank matrix placed in a sealed container at the laboratory that is shipped, held unopened in the field, and returned to the laboratory in the shipping container with the field samples. TestAmerica St. Louis purchases pre-prepared trip blanks from our sample container provider. In the event that trip blanks are prepared by TestAmerica St. Louis, we use HPLC water for all Trip Blanks.

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.

Acronyms:

BS – Blank Spike
BSD – Blank Spike Duplicate
CAR – Corrective Action Report
CCV – Continuing Calibration Verification
CF – Calibration Factor
CFR – Code of Federal Regulations
COC – Chain of Custody
CRS – Change Request Form
DOC – Demonstration of Capability
DQO – Data Quality Objectives
DU – Duplicate
DUP - Duplicate
EHS – Environment, Health and Safety
EPA – Environmental Protection Agency
GC - Gas Chromatography
GC/MS - Gas Chromatography/Mass Spectrometry
HPLC - High Performance Liquid Chromatography
ICP - Inductively Coupled Plasma Atomic Emission Spectroscopy
ICV – Initial Calibration Verification
IDL – Instrument Detection Limit
IH – Industrial Hygiene
IS – Internal Standard
LCS – Laboratory Control Sample
LCSD – Laboratory Control Sample Duplicate
LIMS – Laboratory Information Management System
MD – Matrix Duplicate
MDA/MDC – Minimum Detectable Activity/Concentration
MDL – Method Detection Limit
ME – Marginal Exceedance
MS – Matrix Spike
MSD – Matrix Spike Duplicate
MSDS - Material Safety Data Sheet
NCM – non-conformance memo
NELAC - National Environmental Laboratory Accreditation Conference
NELAP - National Environmental Laboratory Accreditation Program
PT – Performance Testing
QAM – Quality Assurance Manual
QA/QC – Quality Assurance / Quality Control
QAPP – Quality Assurance Project Plan
RF – Response Factor
RL – Reporting Limit
RPD – Relative Percent Difference
RSD – Relative Standard Deviation
SD – Standard Deviation
SOP: Standard Operating Procedure
TAT – Turn-Around-Time
VOA – Volatiles
VOC – Volatile Organic Compound

Appendix 5.

Laboratory Certifications, Accreditations, Validations

TestAmerica St. Louis 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:

Organization	Certificate Number	Organization	Certificate Number
AFCEE	n/a	USACE	n/a
Alaska	MO54-08	USEPA Region 5	n/a
California	2093	USDA	S-37573
Connecticut	PH-0241	USDOE	n/a
Florida	E87689	US NRC	24-24817-01
Illinois	200023	Washington	C1310
Iowa	373		
Kansas	E-10236		
Kentucky	90125		
Louisiana DHH	LA020012		
Louisiana DEQ	4080		
Maryland	310		
Missouri	780		
New Mexico	n/a		
NFESC	NFESC 413		
Nevada	MO00542007A		
New Jersey	MO002		
New York	11616		
Pennsylvania	68-540		
South Carolina	85002		
Texas	T104704193-06-TX		
Utah	QUAN4		

The certificates and parameter lists (which may differ) for each organization may be found on the corporate web site and are posted in the laboratory.

Appendix 6: Calculations

Common Calculations

- Percent Recoveries *(ICV, CCV, LCS, Surrogates, Tracers) are calculated according to the equation:*

$$\%R = 100\left(\frac{Found}{True}\right)$$

- Matrix Spike Recoveries *are calculated according to the following equation:*

$$\%R = 100\left(\frac{SSR - SR}{SA}\right)$$

Where:
SSR = Spike Sample Result
SR = Sample Result
SA = Spike Added

- The relative percent difference (RPD*) of matrix spike/matrix spike duplicates is calculated according to the following equation:*

$$RPD = 100\left[\frac{|MSD - MS|}{\left(\frac{MSD + MS}{2}\right)}\right]$$

Where:
MS = determined spiked sample concentration
MSD = determined matrix spike duplicate concentration

- The relative percent difference (RPD) *of sample/sample duplicates is calculated according to the following equation:*

$$RPD = 100\left[\frac{|SR - SD|}{\left(\frac{SR + SD}{2}\right)}\right]$$

Where:
SR = sample result
SD = sample duplicate result

- The percent difference (%D) is calculated as follows*:*

$$\%Difference = \frac{|R_1 - R_2|}{R_1} \times 100$$

Where:
R_1 = First result
R_2 = Second result

- Standard Deviation (SD) is calculated as follows:

$$SD = \sqrt{\sum_{i=1}^{N} \frac{(X_i - X)^2}{N-1}}$$

Where:

X_i = Value of X as i through N
N = Number of points
X = Average value of X_i

ADDITIONAL Calculations for Metals

- The final concentration for a digested aqueous sample is calculated as follows:

$$mg/L = \frac{C \times V1 \times D}{V2}$$

Where:
C = Concentration (mg/L) from instrument readout
D = Instrument dilution factor
V1 = Final volume in liters after sample preparation
V2 = Initial volume of sample digested in liters

- *The final concentration determined in digested solid samples when reported on a dry weight basis is calculated as follows:*

$$mg/Kg, dry\ weight = \frac{C \times V \times D}{W \times S}$$

Where:
C = Concentration (mg/L) from instrument readout
D = Instrument dilution factor
V = Final volume in liters after sample preparation
W = Weight in Kg of wet sample digested
S = Percent solids/100

Note: A Percent Solids determination must be performed on a separate aliquot when dry weight concentrations are to be reported. If the results are to be reported on wet weight basis the "S" factor should be omitted from the above equation.

Additional Calculations for Organics

- *The calibration factor for an external calibration standard is calculated as follows:*

$$Calibration\ Factor\ (CF) = \frac{Area\ or\ Height\ of\ Peak}{Mass\ Injected\ (ng)}$$

- *Relative Standard Deviation (%RSD), applicable to initial calibration, is calculated as follows:*

$$\%RSD = \frac{SD}{CF_{avg}} \times 100$$

Where:

CF_{avg} = The average of the initial CFs for a compound

SD = The standard deviation (using n-1) of the initial calibration CFs for a compound

- *Aqueous sample concentration using external standard calibration is calculated as follows:*

$$Concentration\,(mg/L) = \frac{(A_x \times V_t \times D_f)}{(CF \times V_i \times V_s)}$$

Where:

A_x = Response for the analyte in the sample
V_i = Volume of extract injected, µL
D_f = Dilution factor
V_t = Volume of total extract, µL
V_s = Volume of sample extracted or purged, mL
CF = Calibration factor, area or height/ng

- *Non-aqueous sample concentration using external standard calibration is calculated as follows:*

$$Concentration\,(mg/kg) = \frac{(A_x \times V_t \times D_f)}{(CF \times V_i \times W \times D)}$$

Where:

A_x = Response for the analyte in the sample
V_i = Volume of extract injected, µL
D_f = Dilution factor
V_t = Volume of total extract, µL
CF = Calibration factor, area or height/ng
W = Weight of sample extracted or purged, g

$$D = \frac{100 - \%Moisture}{100}$$ (D = 1 if wet weight is required)

Additional Calculations for GC/MS SVOA

- Concentration calculation using average response factor:

$$C_{ex} = \frac{R_x C_{is}}{R_{is} \overline{RF}}$$

- Concentration calculation using linear fit:

$$C_{ex} = A + B\frac{(R_x C_{is})}{R_{is}}$$

Where:
C_{ex} = Concentration in extract, µg/ml
R_x = Response for analyte
R_{is} = Response for internal standard
C_{is} = Concentration of internal standard
A = Intercept
B = Slope

- Concentration calculation using quadratic fit:

$$C_{ex} = A + B\left(\frac{R_x C_{is}}{R_{is}}\right) + C\left(\frac{R_x C_{is}}{R_{is}}\right)$$

Where:
C = Curvature

- Aqueous sample concentration is calculated as follows:

$$Concentration, ug/L = \frac{C_{ex} V_t}{V_o}$$

Where:
V_t = Volume of total extract, µL, taking into account dilutions
V_o = Volume of water extracted (ml)

- Sediment/soil, sludge and waste concentration is calculated as follows:

$$Concentration, ug/kg = \frac{C_{ex} V_t}{W_s D}$$

Where:
W_s = Weight of sample extracted or diluted in grams
D = (100 - % moisture in sample)/100, for a dry weight basis or 1 for a wet weight basis

Additional Calculations for GC/MS VOA

- Calculation *(x)* for water and water-miscible waste:

$$x = \frac{(A_x)(I_s)(D_f)}{(A_{is})(V_o)}$$

Where:
A_x = Area of characteristic ion for the compound being measured
A_{is} = Area of the characteristic ion for the internal standard
I_s = Amount of internal standard added in ng
V_o = Volume of water purged, mL

$$D_f = Dilution\,Factor = \frac{Total\,volume\,purged\,(mL)}{Volume\,of\,original\,sample\,used\,(mL)}$$

- Calculation *(x)* for medium level soils:

$$x = \frac{(A_x)(I_s)(V_t)(1000)(D_f)}{(A_{is})(V_a)(W_s)(D)}$$

Where:
A_x, I_s, D_f, A_{is} are the same as for water
V_t = Volume of total extract, mL (typically 25 mL)
V_a = Volume of extract added for purging, µL
W_s = Weight of sample extracted, g

$$D = \frac{100 - \%\,moisture}{100}$$

- Calculation *(x)* for low level soils:

$$x = \frac{(A_x)(I_s)}{(A_{is})(W_s)(D)}$$

Where:
A_x, I_s, A_{is} are the same as for water
D is the same as for medium level soils
W_s = Weight of sample added to the purge vessel, g

Gamma Activity Concentration

The activity concentration of a sample will be calculated using the following equation.

$$ACT_S = \frac{Net\_Counts}{2.22 * E * t_S * Ab * V_A * D_C * D_S}$$

where:

ACT_S	=	the activity in pCi/(units of the volume)
Net_Counts	=	the net area of a peak
2.22	=	the correction factor to pCi
E	=	the efficiency – corrected for transmission
t_S	=	the count time in minutes
Ab	=	the gamma abundance factor
V_A	=	the sample aliquot volume
D_C	=	the decay correction during the analysis
D_S	=	the decay correction from collection date to start of analysis

Gamma Uncertainty of Concentration (at 2σ confidence level)

The Total Promulgated Uncertainty (TPU) will be calculated using the following equation.

The software calculates the 2σ TPU term by incorporating the stochastic counting uncertainty and by examinging the nuclide library for the error in the nuclide half-life and abundance for their respective contributions. The software routine also includes the standard certificate file and the calibration standard uncertainties. Finally, a 1% factor is added in quadrature due to the uncertainty in the preparation of the sample. This is attributed to the maximum allowable variability of the balances.

$$TPU_S = 1.96 * ACT_S * \sqrt{\left(\frac{\Delta P}{P}\right)^2 + \left(\frac{\Delta Ab}{Ab}\right)^2 + \left(\frac{\Delta \varepsilon}{\varepsilon}\right)^2 + \left(\frac{\Delta V}{V}\right)^2 + \left(\frac{sys}{100}\right)^2 + (\Delta Decay)^2}$$

Where:

$$\Delta\ Decay = \left[\frac{\Delta\ T_{1/2}}{T_{1/2}}\right] * \left[\frac{\lambda\ E_r}{1 - e^{-\lambda E_r}} - \lambda\ (T_S + E_r) - 1\right]$$

Where:

TPU_S	= the 2σ uncertainty of the activity of the sample
ACT_S	= the activity in pCi/(units of volume)
1.96	= the statistical multiplication factor for 95% confidence level
ΔP	= the uncertainty in the peak area
ΔAb	= the uncertainty in gamma abundance
Δε	= the uncertainty in the efficiency ε
ΔV	= the uncertainty in the volume
sys	= the systematic error estimate (in %)*
$\Delta T_{1/2}$	= the uncertainty in the half-life
$T_{1/2}$	= the half life of the nuclide of interest
λ	= the decay constant
E_r	= the elapsed real time during count
T_s	= the sample collection time

Gamma MDC

The minimum detectable concentation will be calculated using the following equation.

$$MDC = \frac{4.65 * \sqrt{R_B * t_S} + 2.71}{2.22 * E * t_S * Ab * V_A * D_C * D_S}$$

Where:

MDC	=	Minimum Detectable Activity of the sample
R_B	=	Count rate of detector background (in cpm)
t_S	=	Count time for analysis
E	=	Detector efficiency
Ab	=	Abundance of the gamma emission
V_A	=	sample aliquot volume
D_C	=	Decay during sample analysis
D_S	=	Decay from collection to start of analysis

Alpha Activity Concentration for each region of interest (ROI) in pCi/unit volume.

$$ACT_S = \frac{(C_S - C_B)}{2.22 * E * Ab * Y * D * V_S * t_S)}$$

Where:

ACT_S	=	Activity of the sample
C_S	=	Sample Counts
C_B	=	Background counts
E	=	Detector efficiency
Ab	=	Abundance of the alpha emission
Y	=	Yield
D	=	Decay
t_s	=	Count time for analysis
V_A	=	Sample aliquot volume

Alpha Uncertainty of Concentration (at 2s confidence level)

The 2-sigma (s) Total Propagated Uncertainty (TPU) term for each region of interest (pCi/unit volume) is calculated by the computer software. The software calculates the stochastic counting uncertainty and software reviews the nuclide library for the error in the nuclide half-life and abundance. The software also reviews the standard certificate file to review the calibration standard uncertainty. A 5% factor is added in quadrature (the square root of the sum of the squares) due to the error in the sample volume, the chemical yield and geometry reproducibility.

$$TPU_S = (1.96)|ACT_S|\sqrt{U_C^2 + U_E^2 + U_{Ab}^2 + U_{t1/2}^2 + U_Y^2 + U_V^2 + U_{Prep}^2}$$

Where:

U_C^2	=	Stochastic counting uncertainty
U_E^2	=	Uncertainty in efficiency
U_{Ab}^2	=	Uncertainty in abundance
$U_{t1/2}^2$	=	Uncertainty in half-life
U_Y^2	=	Uncertainty in yield
U_V^2	=	Uncertainty in volume
U_{Prep}^2	=	Uncertainty in prep

Following is the alpha spectroscopy Minimum Detectable Concentration (MDC)

$$MDC = \frac{4.65 * \sqrt{R_B * t_S} + 2.71}{2.22 * E * Ab * Y * D * V_A * t_S}$$

Where:

MDC	=	Minimum Detectable Activity/Concentration of the sample
RB	=	Count rate of detector background (in cpm)
E	=	Detector efficiency
Ab	=	Abundance of the alpha emission
Y	=	Yield
D	=	Decay
t_s	=	Count time for analysis
V_A	=	Sample aliquot volume

Tracer Yield Recovery

$$Y = \frac{(C_T - C_B)}{E * A_T * t_S}$$

Where:

Y	=	Chemical Yield
C_T	=	Tracer Counts
C_B	=	Tracer ROI background counts
A_T	=	Tracer dpm
t_s	=	Count time for analysis
E	=	Detector efficiency

Upon request, and with discussion as to the specification of the application, the laboratory will provide MDAs calculated using non-paired observations as noted below in the DOE QSAS.

When sample and background counts are different, the following equation is used.

$$MDA = \frac{3.29\sqrt{\frac{b}{T_s} + \frac{b}{T_b}}}{K} + \frac{3}{K * Ts}$$

where

b = background count rate in cpm
T = count time in minutes
K = efficiency * $e^{\lambda t}$ * aliquot taken * tracer recovery * ABN
Efficiency = detector efficiency
T = time from sample collection to mid-point of count time (or nuclide separation, as applicable)
Λ – Analyte decay constant = ln2/(half-life)
ABN = abundance
T_s = count time of the sample in minutes
T_b = count time of the background in minutes

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Equations for
Carbon-14 by LSC

Activity

$$\left(\frac{(SampleDPM - BkgDPM)}{DIVRA}\right) \times UnitCorrectionFactor$$

DER (Normalized Absolute Difference)

$$abs\left(\frac{(SampleActity - SampleDuplicateActity)}{\sqrt{(SampleUncertainty)^2 + (SampleDuplicateUncertainty)^2}}\right)$$

As defined by DOE QSAS, Revision 2

DLC

$$\left(\frac{1.645\sqrt{2 \times (CPM_b \times T_s)}}{DEIVTRA}\right) \times UnitCorrectionFactor$$

MDA

$$\left(\left(3.29 \times \frac{\sqrt{\frac{CPMb}{Ts} + \frac{CPMb}{Tb}}}{D \times E \times I \times V \times R \times A}\right) + \frac{2.71}{D \times E \times I \times V \times Ts \times R \times A}\right) \times DilutionFactor \times UnitConversionFactor$$

RER (DOE Alberqueque)

$$abs\left(\frac{(SampleActivity - SampleDuplicateActivity)}{(SampleUncertainty + SampleDuplicateUncertainty)}\right)$$

As Defined by the DOE Alberqueque SOW. This value is determined from 2 sigma propogated uncertainties.

Uncertainty, Count

$$\frac{\sqrt{\frac{C_s}{(T_s)^2} + \frac{C_b}{(T_b)^2}}}{DEIVRA} \times UnitCorrectionFactor \times DilutionFactor \times Sigma$$

Uncertainty, Total Propogated

$$\sqrt{\left(\frac{U_c}{S}\right)^2 + (A \times P)^2} \times S$$

Where:
U_c = Count Uncertainty
S = Sigma
A = Sample Activity
P = PropogatedError Factor

Equation Legend:

C = counts
D = Decay Factor
E = Efficiency
I = Ingrowth Factor
V = Volume (aliquot)
T = Time (count duration)
R = Recovery (carrier/tracer yield)
A = Abundance
P = Propogated Error Factor
s (subscript) = denotes factor is associated with analytical sample
b (subscript) = denotes factor is associated with background sample
x (subscript) = denotes factor is associated with crosstalk correction (Gross alpha/beta only)

NOTE: Some factors listed may not apply to this analysis.

Constants: R=1, A=1, P=0.037

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Equations for
Chlorine-36 by GFPC

Activity

$$\left(\frac{(SampleCPM - BkgCPM)}{DEIVRA}\right) \times UnitCorrectionFactor$$

DER (Normalized Absolute Difference)

$$abs\left(\frac{(SampleActity - SampleDuplicateActity)}{\sqrt{(SampleUncertainty)^2 + (SampleDuplicateUncertainty)^2}}\right)$$

As defined by DOE QSAS, Revision 2

DLC

$$\left(\frac{1.645\sqrt{2 \times (CPM_b \times T_s)}}{DEIVTRA}\right) \times UnitCorrectionFactor$$

MDA

$$\left(\left(3.29 \times \frac{\sqrt{\frac{CPMb}{Ts} + \frac{CPMb}{Tb}}}{D \times E \times I \times V \times R \times A}\right) + \frac{2.71}{D \times E \times I \times V \times Ts \times R \times A}\right) \times DilutionFactor \times UnitConversionFactor$$

RER (DOE Alberqueque)

$$abs\left(\frac{(SampleActivity - SampleDuplicateActivity)}{(SampleUncertainty + SampleDuplicateUncertainty)}\right)$$

As Defined by the DOE Alberqueque SOW. This value is determined from 2 sigma propogated uncertainties.

Uncertainty, Count

$$\frac{\sqrt{\frac{C_s}{(T_s)^2} + \frac{C_b}{(T_b)^2}}}{DEIVRA} \times UnitCorrectionFactor \times DilutionFactor \times Sigma$$

Uncertainty, Total Propogated

$$\sqrt{\left(\frac{U_o}{S}\right)^2 + (A \times P)^2} \times S$$

Where:
U_o = Court Uncertainty
S = Sigma
A = Sample Activity
P = PropogatedError Factor

Equation Legend:

C = counts
D = Decay Factor
E = Efficiency
I = Ingrowth Factor
V = Volume (aliquot)
T = Time (count duration)
R = Recovery (carrier/tracer yield)
A = Abundance
P = Propogated Error Factor
s (subscript) = denotes factor is associated with analytical sample
b (subscript) = denotes factor is associated with background sample
x (subscript) = denotes factor is associated with crosstalk correction (Gross alpha/beta only)

NOTE: Some factors listed may not apply to this analysis.

Constants: R=1, A=1, P=0.040

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Equations for

Gross Alpha-Beta Solid, Direct Count

Activity

$$\left(\frac{(SampleCPM - BkgCPM)}{DEIVRA}\right) \times UnitCorrectionFactor$$

CPM, Crosstalk Corrected

$$\left(\frac{(C_s - C_x)}{T_s}\right)$$

Where :

C_x = CrosstalkCounts

Cross Talk Count Determination

$$C_s \times \left(Intercept + \left((ResidualMass)^3 \times V3\right) + \left((ResidualMass)^2 \times V2\right) + \left((ResidualMass) \times V1\right)\right)$$

Where :

V3 = 3rd Order Cross Talk Variable
V2 = 2nd Order Cross Talk Variable
V1 = 1st Order Cross Talk Variable

Note : C_s denotes α counts for β determination, or β counts for α determination

DER (Normalized Absolute Difference)

$$abs\left(\frac{(SampleActity - SampleDuplicateActivity)}{\sqrt{(SampleUncertainty)^2 + (SampleDuplicateUncertainty)^2}}\right)$$

As defined by DOE QSAS, Revision 2

DLC

$$\left(\frac{1.645\sqrt{2 \times (CPM_b \times T_s)}}{DEIVTRA}\right) \times UnitCorrectionFactor$$

Efficiency

$$Intercept + \left((ResidualMass)^3 \times V3\right) + \left((ResidualMass)^2 \times V2\right) + \left((ResidualMass) \times V1\right)$$

Where :

V3 = 3rd Order Efficiency Variable
V2 = 2nd Order Efficiency Variable
V1 = 1st Order Efficiency Variable

MDA

$$\left(\left(3.29 \times \frac{\sqrt{\frac{CPMb}{Ts} + \frac{CPMb}{Tb}}}{D \times E \times I \times V \times R \times A}\right) + \frac{2.71}{D \times E \times I \times V \times Ts \times R \times A}\right) \times DilutionFactor \times UnitConversionFactor$$

RER (DOE Alberqueque)

$$abs\left(\frac{(SampleActivity - SampleDuplicateActivity)}{(SampleUncertainty + SampleDuplicateUncertainty)}\right)$$

As Defined by the DOE Alberqueque SOW. This value is determined from 2 sigma propogated uncertainties.

Uncertainty, Count

$$\frac{\sqrt{\frac{C_s}{(T_s)^2}+\frac{C_b}{(T_b)^2}}}{DEIVRA} \times UnitCorrectionFactor \times DilutionFactor \times Sigma$$

Uncertainty, Total Propogated

$$\sqrt{\left(\frac{U_c}{S}\right)^2+(A\times P)^2}\times S$$

Where:
U_c = Count Uncertainty
S = Sigma
A = Sample Activity
P = Propogated Error Factor

Equation Legend:
- C = counts
- D = Decay Factor
- E = Efficiency
- I = Ingrowth Factor
- V = Volume (aliquot)
- T = Time (count duration)
- R = Recovery (carrier/tracer yield)
- A = Abundance
- P = Propogated Error Factor
- s (subscript) = denotes factor is associated with analytical sample
- b (subscript) = denotes factor is associated with background sample
- x (subscript) = denotes factor is associated with crosstalk correction (Gross alpha/beta only)

NOTE: Some factors listed may not apply to this analysis.

Constants: D=1, I=1, R=1, A=1, P=0.040 for alpha, P=0.037 for beta

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Equations for
Gross Alpha-Beta, Total Dissolution

Activity

$$\left(\frac{(SampleCPM - BkgCPM)}{DEIVRA}\right) \times UnitCorrectionFactor$$

CPM, Crosstalk Corrected

$$\left(\frac{(C_s - C_x)}{T_s}\right)$$

Where :
C_x – CrosstalkCounts

Cross Talk Count Determination

$$C_s \times \left(Intercept + \left((ResidualMass)^3 \times V3\right) + \left((ResidualMass)^2 \times V2\right) + \left((ResidualMass) \times V1\right)\right)$$

Where :
V3 = 3rd Order Cross Talk Variable
V2 = 2nd Order Cross Talk Variable
V1 = 1st Order Cross Talk Variable

Note : C_s denotes α counts for β determination, or β counts for α determination

DER (Normalized Absolute Difference)

$$abs\left(\frac{(SampleActity - SampleDuplicateActity)}{\sqrt{(SampleUncertainty)^2 + (SampleDuplicateUncertainty)^2}}\right)$$

As defined by DOE QSAS, Revision 2

DLC

$$\left(\frac{1.645\sqrt{2 \times (CPM_b \times T_s)}}{DEIVTRA}\right) \times UnitCorrectionFactor$$

Efficiency

$$Intercept + \left((ResidualMass)^3 \times V3\right) + \left((ResidualMass)^2 \times V2\right) + \left((ResidualMass) \times V1\right)$$

Where :
V3 = 3rd Order Efficiency Variable
V2 = 2nd Order Efficiency Variable
V1 = 1st Order Efficiency Variable

MDA

$$\left(\left(3.29 \times \sqrt{\frac{CPMb}{Ts} + \frac{CPMb}{Tb}}\right) + \frac{2.71}{D \times E \times I \times V \times Ts \times R \times A}\right) \times DilutionFactor \times UnitConversionFactor$$

RER (DOE Alberqueque)

$$abs\left(\frac{(SampleActivity - SampleDuplicateActivity)}{(SampleUncertainty + SampleDuplicateUncertainty)}\right)$$

As Defined by the DOE Alberqueque SOW. This value is determined from 2 sigma propogated uncertainties.

Uncertainty, Count

$$\frac{\sqrt{\frac{C_s}{(T_s)^2}+\frac{C_b}{(T_b)^2}}}{DEIVRA} \times UnitCorrectionFactor \times DilutionFactor \times Sigma$$

Uncertainty, Total Propogated

$$\sqrt{\left(\frac{U_o}{S}\right)^2+(A\times P)^2}\times S$$

Where:
U_o = Count Uncertainty
S = Sigma
A = Sample Activity
P = Propogated Error Factor

Equation Legend:

- C = counts
- D = Decay Factor
- E = Efficiency
- I = Ingrowth Factor
- V = Volume (aliquot)
- T = Time (count duration)
- R = Recovery (carrier/tracer yield)
- A = Abundance
- P = Propogated Error Factor
- s (subscript) = denotes factor is associated with analytical sample
- b (subscript) = denotes factor is associated with background sample
- x (subscript) = denotes factor is associated with crosstalk correction (Gross alpha/beta only)

NOTE: Some factors listed may not apply to this analysis.

Constants: D=1, I=1, R=1, A=1, P=0.040 for alpha, P=0.037 for beta

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Equations for

Iodine-129, Precipitation Method by LSC

Activity

$$\left(\frac{(SampleDPM - BkgDPM)}{DIVRA}\right) \times UnitCorrectionFactor$$

Aliquot, Adjusted

$$SampleAliquot \times \left(\frac{DigestionVolume - InitialTracerSplit}{DigestionVolume}\right) \times \left(\frac{ElutionVolume - FinalTracerSplit}{ElutionVolume}\right)$$

NOTE: This value is used for the V coefficient in other listed equations. The aliquot is adjusted to account for the portion of sample removed for chemical recovery (R) determination.

DER (Normalized Absolute Difference)

$$abs\left(\frac{(SampleActity - SampleDuplicateActity)}{\sqrt{(SampleUncertainty)^2 + (SampleDuplicateUncertainty)^2}}\right)$$

As defined by DOE QSAS, Revision 2

DLC

$$\left(\frac{1.645\sqrt{2 \times (CPM_b \times T_s)}}{DEIVTRA}\right) \times UnitCorrectionFactor$$

MDA

$$\left(\left(3.29 \times \frac{\sqrt{\frac{CPMb}{Ts} + \frac{CPMb}{Tb}}}{D \times E \times I \times V \times R \times A}\right) + \frac{2.71}{D \times E \times I \times V \times Ts \times R \times A}\right) \times DilutionFactor \times UnitConversionFactor$$

Recovery, Yield

$$\frac{TracerConcFinal - \left(\frac{ElutionVolume}{TracerSplitFinal}\right)}{TracerConcInitial - \left(\frac{DigestionVolume}{TracerSplitInitial}\right)}$$

RER (DOE Alberqueque)

$$abs\left(\frac{(SampleActivity - SampleDuplicateActivity)}{(SampleUncertainty + SampleDuplicateUncertainty)}\right)$$

As Defined by the DOE Alberqueque SOW. This value is determined from 2 sigma propogated uncertainties.

Uncertainty, Count

$$\frac{\sqrt{\frac{C_s}{(T_s)^2} + \frac{C_b}{(T_b)^2}}}{DEIVRA} \times UnitCorrectionFactor \times DilutionFactor \times Sigma$$

Uncertainty, Total Propogated

$$\sqrt{\left(\frac{U_c}{S}\right)^2 + (A \times P)^2} \times S$$

Where:

Equation Legend:
C = counts
D = Decay Factor
E = Efficiency
I = Ingrowth Factor
V = Volume (aliquot)
T = Time (count duration)
R = Recovery (carrier/tracer yield)
A = Abundance
P = Propogated Error Factor
s (subscript) = denotes factor is associated with analytical sample
b (subscript) = denotes factor is associated with background sample
x (subscript) = denotes factor is associated with crosstalk correction (Gross alpha/beta only)

NOTE: Some factors listed may not apply to this analysis.

Constants: D=1, R=1, A=1, P=0.037

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Equations for

Iodine-129 by LCS w/ Gravimetric Carrier

Activity

$$\left(\frac{(SampleDPM - BkgDPM)}{DIVRA}\right) \times UnitCorrectionFactor$$

DER (Normalized Absolute Difference)

$$abs\left(\frac{(SampleActity - SampleDuplicateActity)}{\sqrt{(SampleUncertainty)^2 + (SampleDuplicateUncertainty)^2}}\right)$$

As defined by DOE QSAS, Revision 2

DLC

$$\left(\frac{1.645\sqrt{2 \times (CPM_b \times T_s)}}{DEIVTRA}\right) \times UnitCorrectionFactor$$

MDA

$$\left(\left(3.29 \times \frac{\sqrt{\frac{CPMb}{Ts} + \frac{CPMb}{Tb}}}{D \times E \times I \times V \times R \times A}\right) + \frac{2.71}{D \times E \times I \times V \times Ts \times R \times A}\right) \times DilutionFactor \times UnitConversionFactor$$

RER (DOE Alberqueque)

$$abs\left(\frac{(SampleActivity - SampleDuplicateActivity)}{(SampleUncertainty + SampleDuplicateUncertainty)}\right)$$

As Defined by the DOE Alberqueque SOW. This value is determined from 2 sigma propogated uncertainties.

Uncertainty, Count

$$\frac{\sqrt{\frac{C_s}{(T_s)^2} + \frac{C_b}{(T_b)^2}}}{DEIVRA} \times UnitCorrectionFactor \times DilutionFactor \times Sigma$$

Uncertainty, Total Propogated

$$\sqrt{\left(\frac{U_o}{S}\right)^2 + (A \times P)^2} \times S$$

Where:
U_o = Court Uncertainty
S = Sigma
A = Sample Activity
P = PropogatedError Factor

Equation Legend:

C = counts
D = Decay Factor
E = Efficiency
I = Ingrowth Factor
V = Volume (aliquot)
T = Time (count duration)
R = Recovery (carrier/tracer yield)
A = Abundance
P = Propogated Error Factor
s (subscript) = denotes factor is associated with analytical sample
b (subscript) = denotes factor is associated with background sample
x (subscript) = denotes factor is associated with crosstalk correction (Gross alpha/beta only)

NOTE: Some factors listed may not apply to this analysis.

Constants: D=1, R=1, A=1, P=0.037

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Equations for
Iron-55 by LSC

Activity

$$\left(\frac{(SampleDPM - BkgDPM)}{DIVRA}\right) \times UnitCorrectionFactor$$

Aliquot, Adjusted

$$SampleAliquot \times \left(\frac{DigestionVolume - InitialTracerSplit}{DigestionVolume}\right) \times \left(\frac{ElutionVolume - FinalTracerSplit}{ElutionVolume}\right)$$

NOTE: This value is used for the V coefficient in other listed equations. The aliquot is adjusted to account for the portion of sample removed for chemical recovery (R) determination.

DER (Normalized Absolute Difference)

$$abs\left(\frac{(SampleActity - SampleDuplicateActity)}{\sqrt{(SampleUncertainty)^2 + (SampleDuplicateUncertainty)^2}}\right)$$

As defined by DOE QSAS, Revision 2

DLC

$$\left(\frac{1.645\sqrt{2 \times (CPM_b \times T_s)}}{DEIVTRA}\right) \times UnitCorrectionFactor$$

MDA

$$\left(\left(3.29 \times \frac{\sqrt{\frac{CPMb}{Ts} + \frac{CPMb}{Tb}}}{D \times E \times I \times V \times R \times A}\right) + \frac{2.71}{D \times E \times I \times V \times Ts \times R \times A}\right) \times DilutionFactor \times UnitConversionFactor$$

Recovery, Yield

$$\frac{TracerConcFinal - \left(\frac{ElutionVolume}{TracerSplitFinal}\right)}{TracerConcInitial - \left(\frac{DigestionVolume}{TracerSplitInitial}\right)}$$

RER (DOE Alberqueque)

$$abs\left(\frac{(SampleActivity - SampleDuplicateActivity)}{(SampleUncertainty + SampleDuplicateUncertainty)}\right)$$

As Defined by the DOE Alberqueque SOW. This value is determined from 2 sigma propogated uncertainties.

Uncertainty, Count

$$\frac{\sqrt{\frac{C_s}{(T_s)^2} + \frac{C_b}{(T_b)^2}}}{DEIVRA} \times UnitCorrectionFactor \times DilutionFactor \times Sigma$$

Uncertainty, Total Propogated

$$\sqrt{\left(\frac{U_c}{S}\right)^2 + (A \times P)^2} \times S$$

Where:

Equation Legend:
C = counts
D = Decay Factor
E = Efficiency
I = Ingrowth Factor
V = Volume (aliquot)
T = Time (count duration)
R = Recovery (carrier/tracer yield)
A = Abundance
P = Propogated Error Factor
s (subscript) = denotes factor is associated with analytical sample
b (subscript) = denotes factor is associated with background sample
x (subscript) = denotes factor is associated with crosstalk correction (Gross alpha/beta only)

NOTE: Some factors listed may not apply to this analysis.

Constants: D=1, I=1, R-1, A=1, P=0.042

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Equations for
Lead-210 by LSC

Activity

$$\left(\frac{(SampleDPM - BkgDPM)}{DIVRA}\right) \times UnitCorrectionFactor$$

Aliquot, Adjusted

$$SampleAliquot \times \left(\frac{DigestionVolume - InitialTracerSplit}{DigestionVolume}\right) \times \left(\frac{ElutionVolume - FinalTracerSplit}{ElutionVolume}\right)$$

NOTE: This value is used for the V coefficient in other listed equations. The aliquot is adjusted to account for the portion of sample removed for chemical recovery (R) determination.

DER (Normalized Absolute Difference)

$$abs\left(\frac{(SampleActity - SampleDuplicateActity)}{\sqrt{(SampleUncertainty)^2 + (SampleDuplicateUncertainty)^2}}\right)$$

As defined by DOE QSAS, Revision 2

DLC

$$\left(\frac{1.645\sqrt{2 \times (CPM_b \times T_s)}}{DEIVTRA}\right) \times UnitCorrectionFactor$$

MDA

$$\left(\left(3.29 \times \frac{\sqrt{\frac{CPMb}{Ts} + \frac{CPMb}{Tb}}}{D \times E \times I \times V \times R \times A}\right) + \frac{2.71}{D \times E \times I \times V \times Ts \times R \times A}\right) \times DilutionFactor \times UnitConversionFactor$$

Recovery, Yield

$$\frac{TracerConcFinal - \left(\frac{ElutionVolume}{TracerSplitFinal}\right)}{TracerConcInitial - \left(\frac{DigestionVolume}{TracerSplitInitial}\right)}$$

RER (DOE Alberqueque)

$$abs\left(\frac{(SampleActivity - SampleDuplicateActivity)}{(SampleUncertainty + SampleDuplicateUncertainty)}\right)$$

As Defined by the DOE Alberqueque SOW. This value is determined from 2 sigma propogated uncertainties.

Uncertainty, Count

$$\frac{\sqrt{\frac{C_s}{(T_s)^2} + \frac{C_b}{(T_b)^2}}}{DEIVRA} \times UnitCorrectionFactor \times DilutionFactor \times Sigma$$

Uncertainty, Total Propogated

$$\sqrt{\left(\frac{U_c}{S}\right)^2 + (A \times P)^2} \times S$$

Where:

Equation Legend:
C = counts
D = Decay Factor
E = Efficiency
I = Ingrowth Factor
V = Volume (aliquot)
T = Time (count duration)
R = Recovery (carrier/tracer yield)
A = Abundance
P = Propogated Error Factor
s (subscript) = denotes factor is associated with analytical sample
b (subscript) = denotes factor is associated with background sample
x (subscript) = denotes factor is associated with crosstalk correction (Gross alpha/beta only)

NOTE: Some factors listed may not apply to this analysis.

Constants: D=1, A=1, P=0.039

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Equations for
Nickel-59/63 by LSC

Activity

$$\left(\frac{(SampleDPM - BkgDPM)}{DIVRA}\right) \times UnitCorrectionFactor$$

DER (Normalized Absolute Difference)

$$abs\left(\frac{(SampleActity - SampleDuplicateActity)}{\sqrt{(SampleUncertainty)^2 + (SampleDuplicateUncertainty)^2}}\right)$$

As defined by DOE QSAS, Revision 2

DLC

$$\left(\frac{1.645\sqrt{2 \times (CPM_b \times T_s)}}{DEIVTRA}\right) \times UnitCorrectionFactor$$

MDA

$$\left(\left(3.29 \times \sqrt{\frac{CPMb}{Ts} + \frac{CPMb}{Tb}}\right) + \frac{2.71}{D \times E \times I \times V \times Ts \times R \times A}\right) \times DilutionFactor \times UnitConversionFactor$$

Recovery, Yield

$$\frac{TracerConcFinal - \left(\frac{ElutionVolume}{TracerSplitFinal}\right)}{TracerConcInitial - \left(\frac{DigestionVolume}{TracerSplitInitial}\right)}$$

RER (DOE Alberqueque)

$$abs\left(\frac{(SampleActivity - SampleDuplicateActivity)}{(SampleUncertainty + SampleDuplicateUncertainty)}\right)$$

As Defined by the DOE Alberqueque SOW. This value is determined from 2 sigma propogated uncertainties.

Uncertainty, Count

$$\frac{\sqrt{\frac{C_s}{(T_s)^2} + \frac{C_b}{(T_b)^2}}}{DEIVRA} \times UnitCorrectionFactor \times DilutionFactor \times Sigma$$

Uncertainty, Total Propogated

$$\sqrt{\left(\frac{U_o}{S}\right)^2 + (A \times P)^2} \times S$$

Where:
U_o = Count Uncertainty
S = Sigma
A = Sample Activity
P = Propogated Error Factor

Equation Legend:

C = counts
D = Decay Factor
E = Efficiency
I = Ingrowth Factor
V = Volume (aliquot)
T = Time (count duration)
R = Recovery (carrier/tracer yield)
A = Abundance
P = Propogated Error Factor
s (subscript) = denotes factor is associated with analytical sample
b (subscript) = denotes factor is associated with background sample
x (subscript) = denotes factor is associated with crosstalk correction (Gross alpha/beta only)

NOTE: Some factors listed may not apply to this analysis.

Constants: I=1, A=1, P=0.042 for Ni-59, P=0.039 for Ni-63

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Equations for
Plutonium-241 by LSC

Activity

$$\left(\frac{(SampleDPM - BkgDPM)}{DIVRA}\right) \times UnitCorrectionFactor$$

DER (Normalized Absolute Difference)

$$abs\left(\frac{(SampleActity - SampleDuplicateActity)}{\sqrt{(SampleUncertainty)^2 + (SampleDuplicateUncertainty)^2}}\right)$$

As defined by DOE QSAS, Revision 2

DLC

$$\left(\frac{1.645\sqrt{2 \times (CPM_b \times T_s)}}{DEIVTRA}\right) \times UnitCorrectionFactor$$

MDA

$$\left(\left(3.29 \times \sqrt{\frac{\frac{CPMb}{Ts} + \frac{CPMb}{Tb}}{D \times E \times I \times V \times R \times A}}\right) + \frac{2.71}{D \times E \times I \times V \times Ts \times R \times A}\right) \times DilutionFactor \times UnitConversionFactor$$

RER (DOE Alberqueque)

$$abs\left(\frac{(SampleActivity - SampleDuplicateActivity)}{(SampleUncertainty + SampleDuplicateUncertainty)}\right)$$

As Defined by the DOE Alberqueque SOW. This value is determined from 2 sigma propogated uncertainties.

Uncertainty, Count

$$\frac{\sqrt{\frac{C_s}{(T_s)^2} + \frac{C_b}{(T_b)^2}}}{DEIVRA} \times UnitCorrectionFactor \times DilutionFactor \times Sigma$$

Uncertainty, Total Propogated

$$\sqrt{\left(\frac{U_c}{S}\right)^2 + (A \times P)^2} \times S$$

Where:
U_c = Count Uncertainty
S = Sigma
A = Sample Activity
P = Propogated Error Factor

Equation Legend:

C = counts
D = Decay Factor
E = Efficiency
I = Ingrowth Factor
V = Volume (aliquot)
T = Time (count duration)
R = Recovery (carrier/tracer yield)
A = Abundance
P = Propogated Error Factor
s (subscript) = denotes factor is associated with analytical sample
b (subscript) = denotes factor is associated with background sample
x (subscript) = denotes factor is associated with crosstalk correction (Gross alpha/beta only)

NOTE: Some factors listed may not apply to this analysis.

Constants: A=1, P=0.045

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TestAmerica
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Equations for
Promethium-147 by LSC

Activity

$$\left(\frac{(SampleDPM - BkgDPM)}{DIVRA}\right) \times UnitCorrectionFactor$$

Aliquot, Adjusted

$$SampleAliquot \times \left(\frac{VolumeCounted}{FinalVolume}\right)$$

NOTE: This value is used for the V coefficient in other listed equations. The aliquot is adjusted to represent the the amount of sample actually counted.

DER (Normalized Absolute Difference)

$$abs\left(\frac{(SampleActity - SampleDuplicateActity)}{\sqrt{(SampleUncertainty)^2 + (SampleDuplicateUncertainty)^2}}\right)$$

As defined by DOE QSAS, Revision 2

DLC

$$\left(\frac{1.645\sqrt{2 \times (CPM_b \times T_s)}}{DEIVTRA}\right) \times UnitCorrectionFactor$$

MDA

$$\left(\left(3.29 \times \frac{\sqrt{\frac{CPMb}{Ts} + \frac{CPMb}{Tb}}}{D \times E \times I \times V \times R \times A}\right) + \frac{2.71}{D \times E \times I \times V \times Ts \times R \times A}\right) \times DilutionFactor \times UnitConversionFactor$$

RER (DOE Alberqueque)

$$abs\left(\frac{(SampleActivity - SampleDuplicateActivity)}{(SampleUncertainty + SampleDuplicateUncertainty)}\right)$$

As Defined by the DOE Alberqueque SOW. This value is determined from 2 sigma propogated uncertainties.

Uncertainty, Count

$$\frac{\sqrt{\frac{C_s}{(T_s)^2} + \frac{C_b}{(T_b)^2}}}{DEIVRA} \times UnitCorrectionFactor \times DilutionFactor \times Sigma$$

Uncertainty, Total Propogated

$$\sqrt{\left(\frac{U_c}{S}\right)^2 + (A \times P)^2} \times S$$

Where:
U_c = Count Uncertainty
S = Sigma
A = Sample Activity
P = Propogated Error Factor

Equation Legend:
C = counts
D = Decay Factor
E = Efficiency
I = Ingrowth Factor
V = Volume (aliquot)
T = Time (count duration)
R = Recovery (carrier/tracer yield)
A = Abundance
P = Propogated Error Factor
s (subscript) = denotes factor is associated with analytical sample
b (subscript) = denotes factor is associated with background sample
x (subscript) = denotes factor is associated with crosstalk correction (Gross alpha/beta only)

NOTE: Some factors listed may not apply to this analysis.

Constants: A=1, P=0.042

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Equations for
Radium-226

Activity

$$\left(\frac{(SampleCPM - BkgCPM)}{DEIVRA}\right) \times UnitCorrectionFactor$$

DER (Normalized Absolute Difference)

$$abs\left(\frac{(SampleActity - SampleDuplicateActity)}{\sqrt{(SampleUncertainty)^2 + (SampleDuplicateUncertainty)^2}}\right)$$

As defined by DOE QSAS, Revision 2

DLC

$$\left(\frac{1.645\sqrt{2 \times (CPM_b \times T_s)}}{DEIVTRA}\right) \times UnitCorrectionFactor$$

Ingrowth Factor

$$1 + \left(3 \times \left(1 - E^{\left(\frac{-0.6931}{Rn222\,Halflife}\right) \times \left(\left(CountDateTime + \left(\frac{T_s}{2880}\right)\right) - Ba\,PrecipitationTime\right) \times 1440}\right)\right)$$

Corrects for ingrowth of Ra-222

MDA

$$\left(\left(3.29 \times \frac{\sqrt{\frac{CPMb}{Ts} + \frac{CPMb}{Tb}}}{D \times E \times I \times V \times R \times A}\right) + \frac{2.71}{D \times E \times I \times V \times Ts \times R \times A}\right) \times DilutionFactor \times UnitConversionFactor$$

RER (DOE Alberqueque)

$$abs\left(\frac{(SampleActivity - SampleDuplicateActivity)}{(SampleUncertainty + SampleDuplicateUncertainty)}\right)$$

As Defined by the DOE Alberqueque SOW. This value is determined from 2 sigma propogated uncertainties.

Uncertainty, Count

$$\frac{\sqrt{\frac{C_s}{(T_s)^2} + \frac{C_b}{(T_b)^2}}}{DEIVRA} \times UnitCorrectionFactor \times DilutionFactor \times Sigma$$

Uncertainty, Total Propogated

$$\sqrt{\left(\frac{U_c}{S}\right)^2 + (A \times P)^2} \times S$$

Where:
U_c = Count Uncertainty
S = Sigma
A = Sample Activity
P = PropogatedError Factor

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Equation Legend:

C = counts
D = Decay Factor
E = Efficiency
I = Ingrowth Factor
V = Volume (aliquot)
T = Time (count duration)
R = Recovery (carrier/tracer yield)
A = Abundance
P = Propogated Error Factor
s (subscript) = denotes factor is associated with analytical sample
b (subscript) = denotes factor is associated with background sample
x (subscript) = denotes factor is associated with crosstalk correction (Gross alpha/beta only)

NOTE: Some factors listed may not apply to this analysis.

Constants: I=1, A=1, P=0.039

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Equations for
Radium-228

Activity

$$\frac{(CPM_s - CPM_b)}{V \times E \times R} \times \frac{\lambda \times t_2}{1 - EXP(-\lambda \times t_2)} \times \frac{1}{1 - EXP(-\lambda \times t_3)} \times \frac{1}{EXP(-\lambda t_1)} \times UnitCorrectionFactor$$

Where:
t_1 = Count Start Time - Y Precipitation Time
t_2 = Sample Count Duration
t_3 = Y Precipitation Time - Yingrowth Start Time
λ = Ac-228 Halflife (in days)
NOTE: Recovery (R) is product of Ba Yield x Y Yield

DER (Normalized Absolute Difference)

$$abs\left(\frac{(SampleActity - SampleDuplicateActiv)}{\sqrt{(SampleUncertainty)^2 + (SampleDuplicateUncertainty)^2}}\right)$$

As defined by DOE QSAS, Revision 2

DLC

$$\frac{\left(1.645 x \sqrt{2 x CPM_b x T_s}\right) x (\lambda t_2)}{V x E x R x T_s x (1 - EXP(-\lambda t_2)) x (1 - EXP(-\lambda t_3)) x EXP(-\lambda t_1)} x Unit\ Correction\ Factor$$

Where:
$t_1 = Count\ Start\ Time\ x\ Y\ precipitation\ Time$
$t_2 = Sample\ Count\ Duration$
$t_3 = Y\ precipitation\ Time - Y\ Ingrowth\ Start\ Time$
$\lambda = Ac - 228\ Halflife$
Note: Recovery (R) is product of Ba Yield x Y Yield

MDA

$$\frac{\left(\left(3.29 x \sqrt{\frac{CPM_b}{T_s} + \frac{CPM_b}{T_b}}\right) + \frac{2.71}{T_s}\right) x (\lambda t_2)}{V x E x R x (1 - EXP(-\lambda t_2)) x (1 - EXP(-\lambda t_3)) x EXP(-\lambda t_1)} x Unit\ Correction\ Factor$$

Where:
$t_1 = Count\ Start\ Time\ x\ Y\ precipitation\ Time$
$t_2 = Sample\ Count\ Duration$
$t_3 = Y\ precipitation\ Time - Y\ Ingrowth\ Start\ Time$
$\lambda = Ac - 228\ Halflife$
Note: Recovery (R) is product of Ba Yield x Y Yield

RER (DOE Alberqueque)

$$abs\left(\frac{(SampleActivity - SampleDuplicateActivity)}{(SampleUncertainty + SampleDuplicateUncertainty)}\right)$$

As Defined by the DOE Alberqueque SOW. This value is determined from 2 sigma propogated uncertainties.

Uncertainty, Count

$$\frac{\sqrt{\frac{C_s}{(T_s)^2} + \frac{C_b}{(T_b)^2}}}{DEIVRA} \times UnitCorrectionFactor \times DilutionFactor \times Sigma$$

Uncertainty, Total Propogated

$$\sqrt{\left(\frac{U_o}{S}\right)^2 + (A \times P)^2} \times S$$

Where:
U_o = Count Uncertainty
S = Sigma
A = Sample Activity
P = Propogated Error Factor

Equation Legend:
C = counts
D = Decay Factor
E = Efficiency
I = Ingrowth Factor
V = Volume (aliquot)
T = Time (count duration)
R = Recovery (carrier/tracer yield)
A = Abundance
P = Propogated Error Factor
s (subscript) = denotes factor is associated with analytical sample
b (subscript) = denotes factor is associated with background sample
x (subscript) = denotes factor is associated with crosstalk correction (Gross alpha/beta only)

NOTE: Some factors listed may not apply to this analysis.

Constants: A=1, P=0.040

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Equations for
Strontium, Total by GFPC

DER (Normalized Absolute Difference)

$$\text{abs}\left(\frac{(\text{SampleActivity}-\text{SampleDuplicateActivity})}{\sqrt{(\text{SampleUncertainty})^2+(\text{SampleDuplicateUncertainty})^2}}\right)$$

As defined by DOE QSAS, Revision 2

DLC

$$\left(\frac{1.645\sqrt{2\times(CPM_b\times T_s)}}{DEIVTRA}\right)\times\text{UnitCorrectionFactor}$$

Ingrowth Factor

$$1+\left(1-e^{(-\lambda t_1)}\right)$$

Where :

$\lambda = Y - 90$ *Halflife*

$t_1 = Y$ *Separation Time to Midpoint of Count*

MDA

$$\left(\left(3.29\times\frac{\sqrt{\frac{CPMb}{Ts}+\frac{CPMb}{Tb}}}{D\times E\times I\times V\times R\times A}\right)+\frac{271}{D\times E\times I\times V\times Ts\times R\times A}\right)\times\text{DilutionFactor}\times\text{UnitConversionFactor}$$

RER (DOE Alberqueque)

$$\text{abs}\left(\frac{(\text{SampleActivity}-\text{SampleDuplicateActivity})}{(\text{SampleUncertainty}+\text{SampleDuplicateUncertainty})}\right)$$

As Defined by the DOE Alberqueque SOW. This value is determined from 2 sigma propogated uncertainties.

Uncertainty, Count

$$\frac{\sqrt{\frac{C_s}{(T_s)^2}+\frac{C_b}{(T_b)^2}}}{DEIVRA}\times\text{UnitCorrectionFactor}\times\text{DilutionFactor}\times\text{Sigma}$$

Uncertainty, Total Propogated

$$\sqrt{\left(\frac{U_c}{S}\right)^2+(A\times P)^2}\times S$$

Where:
U_c = Count Uncertainty
S = Sigma
A = Sample Activity
P = PropogatedError Factor

Equation Legend:
- C = counts
- D = Decay Factor
- E = Efficiency
- I = Ingrowth Factor
- V = Volume (aliquot)
- T = Time (count duration)
- R = Recovery (carrier/tracer yield)
- A = Abundance
- P = Propogated Error Factor
- s (subscript) = denotes factor is associated with analytical sample
- b (subscript) = denotes factor is associated with background sample
- x (subscript) = denotes factor is associated with crosstalk correction (Gross alpha/beta only)

NOTE: Some factors listed may not apply to this analysis.

Constants: A=1, P=0.035

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TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Equations for
Strontium-90 by GFPC

Activity, Sr-90

$$\frac{CPMs - CPMb}{DEIVRA} \times DilutionFactor \times UnitConversionFactor$$

NOTE: Recovery (R) is product of Y Yield and Total Sr Yield

DER (Normalized Absolute Difference)

$$abs\left(\frac{(SampleActivity - SampleDuplicateActivity)}{\sqrt{(SampleUncertainty)^2 + (SampleDuplicateUncertainty)^2}}\right)$$

As defined by DOE QSAS, Revision 2

DLC, Sr-90

$$\left(\frac{1.645\sqrt{2\times(CPM_b \times T_s)}}{DEIVTRA}\right) \times DilutionFactor \times UnitCorrectionFactor$$

NOTE: Recovery(R) is product of Y Yield and Total Sr Yield

MDA, Sr-90

$$\left(\left(3.29\times\frac{\sqrt{\frac{CPMb}{Ts}+\frac{CPMb}{Tb}}}{DEIVRA}\right)+\frac{2.71}{DEIVT_sRA}\right) \times DilutionFactor \times UnitConversionFactor$$

NOTE: Recovery(R) is product of Y Yield and Total Sr Yield

RER (DOE Alberqueque)

$$abs\left(\frac{(SampleActivity - SampleDuplicateActivity)}{(SampleUncertainty + SampleDuplicateUncertainty)}\right)$$

As Defined by the DOE Alberqueque SOW. This value is determined from 2 sigma propogated uncertainties.

Uncertainty, Count

$$\frac{\sqrt{\frac{C_s}{(T_s)^2}+\frac{C_b}{(T_b)^2}}}{DEIVRA} \times UnitCorrectionFactor \times DilutionFactor \times Sigma$$

Uncertainty, Total Propogated

$$\sqrt{\left(\frac{U_c}{S}\right)^2 + (A \times P)^2} \times S$$

Where:
U_c = Count Uncertainty
S = Sigma
A = Sample Activity
P = Propogated Error Factor

Equation Legend:
C = counts
D = Decay Factor
E = Efficiency
I = Ingrowth Factor
V = Volume (aliquot)
T = Time (count duration)
R = Recovery (carrier/tracer yield)
A = Abundance
P = Propogated Error Factor
s (subscript) = denotes factor is associated with analytical sample
b (subscript) = denotes factor is associated with background sample
x (subscript) = denotes factor is associated with crosstalk correction (Gross alpha/beta only)

NOTE: Some factors listed may not apply to this analysis.

Constants: A=1, P=0.041

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Equations for
Strontium-89 by GFPC

Activity

$$\left(\frac{(SampleCPM - BkgCPM)}{DEIVRA}\right) \times UnitCorrectionFactor$$

DER (Normalized Absolute Difference)

$$abs\left(\frac{(SampleActity - SampleDuplicateActity)}{\sqrt{(SampleUncertainty)^2 + (SampleDuplicateUncertainty)^2}}\right)$$

As defined by DOE QSAS, Revision 2

DLC

$$\left(\frac{1.645\sqrt{2 \times (CPM_b \times T_s)}}{DEIVTRA}\right) \times UnitCorrectionFactor$$

MDA

$$\left(\left(3.29 \times \frac{\sqrt{\frac{CPMb}{Ts} + \frac{CPMb}{Tb}}}{D \times E \times I \times V \times R \times A}\right) + \frac{2.71}{D \times E \times I \times V \times Ts \times R \times A}\right) \times DilutionFactor \times UnitConversionFactor$$

RER (DOE Alberqueque)

$$abs\left(\frac{(SampleActivity - SampleDuplicateActivity)}{(SampleUncertainty + SampleDuplicateUncertainty)}\right)$$

As Defined by the DOE Alberqueque SOW. This value is determined from 2 sigma propogated uncertainties.

Uncertainty, Count

$$\frac{\sqrt{\frac{C_s}{(T_s)^2} + \frac{C_b}{(T_b)^2}}}{DEIVRA} \times UnitCorrectionFactor \times DilutionFactor \times Sigma$$

Uncertainty, Total Propogated

$$\sqrt{\left(\frac{U_o}{S}\right)^2 + (A \times P)^2} \times S$$

Where:
U_o = Count Uncertainty
S = Sigma
A = Sample Activity
P = PropogatedError Factor

Equation Legend:

C = counts
D = Decay Factor
E = Efficiency
I = Ingrowth Factor
V = Volume (aliquot)
T = Time (count duration)
R = Recovery (carrier/tracer yield)
A = Abundance
P = Propogated Error Factor
s (subscript) = denotes factor is associated with analytical sample
b (subscript) = denotes factor is associated with background sample
x (subscript) = denotes factor is associated with crosstalk correction (Gross alpha/beta only)

NOTE: Some factors listed may not apply to this analysis.

Constants: A=1

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Equations for
Total Activity by LSC

Activity

$$\left(\frac{SampleDPM - BkgDPM}{\left(\frac{VolumeCounted}{VolumeCollected}\right) \times Aliquot}\right) \times UnitConversionFactor$$

Aliquot, Adjusted

$$SampleAliquot \times \left(\frac{VolumeCounted}{FinalVolume}\right)$$

NOTE: This value is used for the V coefficient in other listed equations. The aliquot is adjusted to represent the the amount of sample actually counted.

DER (Normalized Absolute Difference)

$$abs\left(\frac{(SampleActivity - SampleDuplicateActivity)}{\sqrt{(SampleUncertainty)^2 + (SampleDuplicateUncertainty)^2}}\right)$$

As defined by DOE QSAS, Revision 2

DLC

$$\left(\frac{1.645\sqrt{2 \times (CPM_b \times T_s)}}{DEIVTRA}\right) \times UnitCorrectionFactor$$

MDA

$$\left(\left(3.29 \times \frac{\sqrt{\frac{CPMb}{Ts} + \frac{CPMb}{Tb}}}{D \times E \times I \times V \times R \times A}\right) + \frac{2.71}{D \times E \times I \times V \times Ts \times R \times A}\right) \times DilutionFactor \times UnitConversionFactor$$

RER (DOE Alberqueque)

$$abs\left(\frac{(SampleActivity - SampleDuplicateActivity)}{(SampleUncertainty + SampleDuplicateUncertainty)}\right)$$

As Defined by the DOE Alberqueque SOW. This value is determined from 2 sigma propogated uncertainties.

Uncertainty, Count

$$\frac{\sqrt{\frac{C_s}{(T_s)^2} + \frac{C_b}{(T_b)^2}}}{DEIVRA} \times UnitCorrectionFactor \times DilutionFactor \times Sigma$$

Uncertainty, Total Propogated

$$\sqrt{\left(\frac{U_o}{S}\right)^2 + (A \times P)^2} \times S$$

Where:
U_o = Count Uncertainty
S = Sigma
A = Sample Activity
P = PropogatedError Factor

Equation Legend:

C = counts
D = Decay Factor
E = Efficiency
I = Ingrowth Factor
V = Volume (aliquot)
T = Time (count duration)
R = Recovery (carrier/tracer yield)
A = Abundance
P = Propogated Error Factor
s (subscript) = denotes factor is associated with analytical sample
b (subscript) = denotes factor is associated with background sample
x (subscript) = denotes factor is associated with crosstalk correction (Gross alpha/beta only)

NOTE: Some factors listed may not apply to this analysis.

Constants: D=1, I=1, R=1, A=1, P=0.055

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Equations for
Radium, Total Alpha-Emitting

Activity

$$\left(\frac{(SampleCPM - BkgCPM)}{DEIVRA}\right) \times UnitCorrectionFactor$$

DER (Normalized Absolute Difference)

$$abs\left(\frac{(SampleActity - SampleDuplicateActity)}{\sqrt{(SampleUncertainty)^2 + (SampleDuplicateUncertainty)^2}}\right)$$

As defined by DOE QSAS, Revision 2

DLC

$$\left(\frac{1.645\sqrt{2 \times (CPM_b \times T_s)}}{DEIVTRA}\right) \times UnitCorrectionFactor$$

Ingrowth Factor

$$1 + \left(3 \times \left(1 - E^{\left(\frac{-0.6931}{Rn222Halflife}\right) \times \left(\left(CountDateTime + \left(\frac{T_s}{2880}\right)\right) - Ba\,PrecipitationTime\right) \times 1440}\right)\right)$$

Corrects for ingrowth of Ra-222

MDA

$$\left(\left(3.29 \times \sqrt{\frac{\frac{CPMb}{Ts} + \frac{CPMb}{Tb}}{D \times E \times I \times V \times R \times A}}\right) + \frac{2.71}{D \times E \times I \times V \times Ts \times R \times A}\right) \times DilutionFactor \times UnitConversionFactor$$

RER (DOE Alberqueque)

$$abs\left(\frac{(SampleActivity - SampleDuplicateActivity)}{(SampleUncertainty + SampleDuplicateUncertainty)}\right)$$

As Defined by the DOE Alberqueque SOW. This value is determined from 2 sigma propogated uncertainties.

Uncertainty, Count

$$\frac{\sqrt{\frac{C_s}{(T_s)^2} + \frac{C_b}{(T_b)^2}}}{DEIVRA} \times UnitCorrectionFactor \times DilutionFactor \times Sigma$$

Uncertainty, Total Propogated

$$\sqrt{\left(\frac{U_o}{S}\right)^2 + (A \times P)^2} \times S$$

Where:
U_o = Count Uncertainty
S = Sigma
A = Sample Activity
P = PropogatedError Factor

Equation Legend:
C = counts
D = Decay Factor
E = Efficiency
I = Ingrowth Factor
V = Volume (aliquot)
T = Time (count duration)
R = Recovery (carrier/tracer yield)
A = Abundance
P = Propogated Error Factor
s (subscript) = denotes factor is associated with analytical sample
b (subscript) = denotes factor is associated with background sample
x (subscript) = denotes factor is associated with crosstalk correction (Gross alpha/beta only)

NOTE: Some factors listed may not apply to this analysis.

Constants: I=1, A=1, P=0.039

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Equations for
Tritium, Cryogenic

Activity

$$\left(\frac{(SampleDPM - BkgDPM)}{DIVRA}\right) \times UnitCorrectionFactor$$

Aliquot, Adjusted

$$SampleAliquot \times \left(\frac{VolumeCounted}{VolumeAdded + (SampleAliquot \times PercentMoisture)}\right)$$

NOTE: This value is used for the V coefficient in other listed equations. The aliquot is adjusted to represent the the amount of sample actually counted.

DER (Normalized Absolute Difference)

$$abs\left(\frac{(SampleActity - SampleDuplicateActity)}{\sqrt{(SampleUncertainty)^2 + (SampleDuplicateUncertainty)^2}}\right)$$

As defined by DOE QSAS, Revision 2

DLC

$$\left(\frac{1.645\sqrt{2 \times (CPM_b \times T_s)}}{DEIVTRA}\right) \times UnitCorrectionFactor$$

MDA

$$\left(\left(3.29 \times \frac{\sqrt{\frac{CPMb}{Ts} + \frac{CPMb}{Tb}}}{D \times E \times I \times V \times R \times A}\right) + \frac{2.71}{D \times E \times I \times V \times Ts \times R \times A}\right) \times DilutionFactor \times UnitConversionFactor$$

RER (DOE Alberqueque)

$$abs\left(\frac{(SampleActivity - SampleDuplicateActivity)}{(SampleUncertainty + SampleDuplicateUncertainty)}\right)$$

As Defined by the DOE Alberqueque SOW. This value is determined from 2 sigma propogated uncertainties.

Uncertainty, Count

$$\frac{\sqrt{\frac{C_s}{(T_s)^2} + \frac{C_b}{(T_b)^2}}}{DEIVRA} \times UnitCorrectionFactor \times DilutionFactor \times Sigma$$

Uncertainty, Total Propogated

$$\sqrt{\left(\frac{U_c}{S}\right)^2 + (A \times P)^2} \times S$$

Where:
U_c = Count Uncertainty
S = Sigma
A = Sample Activity
P = PropogatedError Factor

Equation Legend:

C = counts
D = Decay Factor
E = Efficiency
I = Ingrowth Factor
V = Volume (aliquot)
T = Time (count duration)
R = Recovery (carrier/tracer yield)
A = Abundance
P = Propogated Error Factor
s (subscript) = denotes factor is associated with analytical sample
b (subscript) = denotes factor is associated with background sample
x (subscript) = denotes factor is associated with crosstalk correction (Gross alpha/beta only)

NOTE: Some factors listed may not apply to this analysis.

Constants: D=1, I=1, R=1, A=1, P=0.030

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Equations for
Tritium in Silica Gel, Brookhaven

Activity

$$\left(\frac{(SampleDPM - BkgDPM)}{DIVRA}\right) \times UnitCorrectionFactor$$

DER (Normalized Absolute Difference)

$$abs\left(\frac{(SampleActity - SampleDuplicateActity)}{\sqrt{(SampleUncertainty)^2 + (SampleDuplicateUncertainty)^2}}\right)$$

As defined by DOE QSAS, Revision 2

DLC

$$\left(\frac{1.645\sqrt{2 \times (CPM_b \times T_s)}}{DEIVTRA}\right) \times UnitCorrectionFactor$$

MDA

$$\left(\left(3.29 \times \frac{\sqrt{\frac{CPMb}{Ts} + \frac{CPMb}{Tb}}}{D \times E \times I \times V \times R \times A}\right) + \frac{2.71}{D \times E \times I \times V \times Ts \times R \times A}\right) \times DilutionFactor \times UnitConversionFactor$$

RER (DOE Alberqueque)

$$abs\left(\frac{(SampleActivity - SampleDuplicateActivity)}{(SampleUncertainty + SampleDuplicateUncertainty)}\right)$$

As Defined by the DOE Alberqueque SOW. This value is determined from 2 sigma propogated uncertainties.

Uncertainty, Count

$$\frac{\sqrt{\frac{C_s}{(T_s)^2} + \frac{C_b}{(T_b)^2}}}{DEIVRA} \times UnitCorrectionFactor \times DilutionFactor \times Sigma$$

Uncertainty, Total Propogated

$$\sqrt{\left(\frac{U_o}{S}\right)^2 + (A \times P)^2} \times S$$

Where:
U_o = Count Uncertainty
S = Sigma
A = Sample Activity
P = Propogated Error Factor

Equation Legend:

C = counts
D = Decay Factor
E = Efficiency
I = Ingrowth Factor
V = Volume (aliquot)
T = Time (count duration)
R = Recovery (carrier/tracer yield)
A = Abundance
P = Propogated Error Factor
s (subscript) = denotes factor is associated with analytical sample
b (subscript) = denotes factor is associated with background sample
x (subscript) = denotes factor is associated with crosstalk correction (Gross alpha/beta only)

NOTE: Some factors listed may not apply to this analysis.

Constants: D=1, I=1, R=1, A=1, P=0.030

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Equations for
Tritium in Silica Gel, Pantex

Activity

$$\left(\frac{(SampleDPM - BkgDPM)}{DIVRA}\right) \times UnitCorrectionFactor$$

DER (Normalized Absolute Difference)

$$abs\left(\frac{(SampleActity - SampleDuplicateActity)}{\sqrt{(SampleUncertainty)^2 + (SampleDuplicateUncertainty)^2}}\right)$$

As defined by DOE QSAS, Revision 2

DLC

$$\left(\frac{1.645\sqrt{2 \times (CPM_b \times T_s)}}{DEIVTRA}\right) \times UnitCorrectionFactor$$

MDA

$$\left(\left(3.29 \times \frac{\sqrt{\frac{CPMb}{Ts} + \frac{CPMb}{Tb}}}{D \times E \times I \times V \times R \times A}\right) + \frac{2.71}{D \times E \times I \times V \times Ts \times R \times A}\right) \times DilutionFactor \times UnitConversionFactor$$

RER (DOE Alberqueque)

$$abs\left(\frac{(SampleActivity - SampleDuplicateActivity)}{(SampleUncertainty + SampleDuplicateUncertainty)}\right)$$

As Defined by the DOE Alberqueque SOW. This value is determined from 2 sigma propogated uncertainties.

Uncertainty, Count

$$\frac{\sqrt{\frac{C_s}{(T_s)^2} + \frac{C_b}{(T_b)^2}}}{DEIVRA} \times UnitCorrectionFactor \times DilutionFactor \times Sigma$$

Uncertainty, Total Propogated

$$\sqrt{\left(\frac{U_o}{S}\right)^2 + (A \times P)^2} \times S$$

Where:
U_o = Count Uncertainty
S = Sigma
A = Sample Activity
P = PropogatedError Factor

Equation Legend:

C = counts
D = Decay Factor
E = Efficiency
I = Ingrowth Factor
V = Volume (aliquot)
T = Time (count duration)
R = Recovery (carrier/tracer yield)
A = Abundance
P = Propogated Error Factor
s (subscript) = denotes factor is associated with analytical sample
b (subscript) = denotes factor is associated with background sample
x (subscript) = denotes factor is associated with crosstalk correction (Gross alpha/beta only)

NOTE: Some factors listed may not apply to this analysis.

Constants: D=1, I=1, R=1, A=1, P=0.030

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Equations for
Tritium in Soil by LSC

Activity

$$\left(\frac{(SampleDPM - BkgDPM)}{DIVRA}\right) \times UnitCorrectionFactor$$

Aliquot, Adjusted

$$SampleAliquot \times \left(\frac{VolumeCounted}{VolumeAdded + (SampleAliquot \times PercentMoisture)}\right)$$

NOTE: This value is used for the V coefficient in other listed equations. The aliquot is adjusted to represent the the amount of sample actually counted.

DER (Normalized Absolute Difference)

$$abs\left(\frac{(SampleActity - SampleDuplicateActity)}{\sqrt{(SampleUncertainty)^2 + (SampleDuplicateUncertainty)^2}}\right)$$

As defined by DOE QSAS, Revision 2

DLC

$$\left(\frac{1.645\sqrt{2 \times (CPM_b \times T_s)}}{DEIVTRA}\right) \times UnitCorrectionFactor$$

MDA

$$\left(\left(3.29 \times \frac{\sqrt{\frac{CPMb}{Ts} + \frac{CPMb}{Tb}}}{D \times E \times I \times V \times R \times A}\right) + \frac{2.71}{D \times E \times I \times V \times Ts \times R \times A}\right) \times DilutionFactor \times UnitConversionFactor$$

RER (DOE Alberqueque)

$$abs\left(\frac{(SampleActivity - SampleDuplicateActivity)}{(SampleUncertainty + SampleDuplicateUncertainty)}\right)$$

As Defined by the DOE Alberqueque SOW. This value is determined from 2 sigma propogated uncertainties.

Uncertainty, Count

$$\frac{\sqrt{\frac{C_s}{(T_s)^2} + \frac{C_b}{(T_b)^2}}}{DEIVRA} \times UnitCorrectionFactor \times DilutionFactor \times Sigma$$

Uncertainty, Total Propogated

$$\sqrt{\left(\frac{U_o}{S}\right)^2 + (A \times P)^2} \times S$$

Where:
U_o = Count Uncertainty
S = Sigma
A = Sample Activity
P = PropogatedError Factor

Equation Legend:

C = counts
D = Decay Factor
E = Efficiency
I = Ingrowth Factor
V = Volume (aliquot)
T = Time (count duration)
R = Recovery (carrier/tracer yield)
A = Abundance
P = Propogated Error Factor
s (subscript) = denotes factor is associated with analytical sample
b (subscript) = denotes factor is associated with background sample
x (subscript) = denotes factor is associated with crosstalk correction (Gross alpha/beta only)

NOTE: Some factors listed may not apply to this analysis.

Constants: D=1, I=1, R=1, A=1, P=0.030

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Equations for
Tritium in Liquid by LSC

Activity

$$\left(\frac{(SampleDPM - BkgDPM)}{DIVRA}\right) \times UnitCorrectionFactor$$

DER (Normalized Absolute Difference)

$$abs\left(\frac{(SampleActity - SampleDuplicateActity)}{\sqrt{(SampleUncertainty)^2 + (SampleDuplicateUncertainty)^2}}\right)$$

As defined by DOE QSAS, Revision 2

DLC

$$\left(\frac{1.645\sqrt{2 \times (CPM_b \times T_s)}}{DEIVTRA}\right) \times UnitCorrectionFactor$$

MDA

$$\left(\left(3.29 \times \frac{\sqrt{\frac{CPMb}{Ts} + \frac{CPMb}{Tb}}}{D \times E \times I \times V \times R \times A}\right) + \frac{2.71}{D \times E \times I \times V \times Ts \times R \times A}\right) \times DilutionFactor \times UnitConversionFactor$$

RER (DOE Alberqueque)

$$abs\left(\frac{(SampleActivity - SampleDuplicateActivity)}{(SampleUncertainty + SampleDuplicateUncertainty)}\right)$$

As Defined by the DOE Alberqueque SOW. This value is determined from 2 sigma propogated uncertainties.

Uncertainty, Count

$$\frac{\sqrt{\frac{C_s}{(T_s)^2} + \frac{C_b}{(T_b)^2}}}{DEIVRA} \times UnitCorrectionFactor \times DilutionFactor \times Sigma$$

Uncertainty, Total Propogated

$$\sqrt{\left(\frac{U_o}{S}\right)^2 + (A \times P)^2} \times S$$

Where:
U_o = Count Uncertainty
S = Sigma
A = Sample Activity
P = PropogatedError Factor

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Equation Legend:

C = counts
D = Decay Factor
E = Efficiency
I = Ingrowth Factor
V = Volume (aliquot)
T = Time (count duration)
R = Recovery (carrier/tracer yield)
A = Abundance
P = Propogated Error Factor
s (subscript) = denotes factor is associated with analytical sample
b (subscript) = denotes factor is associated with background sample
x (subscript) = denotes factor is associated with crosstalk correction (Gross alpha/beta only)

NOTE: Some factors listed may not apply to this analysis.

Constants: D=1, I=1, R=1, A=1, P=0.030

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Equations for
Technecium-99 by LSC

Activity

$$\left(\frac{(SampleDPM - BkgDPM)}{DIVRA}\right) \times UnitCorrectionFactor$$

DER (Normalized Absolute Difference)

$$abs\left(\frac{(SampleActity - SampleDuplicateActity)}{\sqrt{(SampleUncertainty)^2 + (SampleDuplicateUncertainty)^2}}\right)$$

As defined by DOE QSAS, Revision 2

DLC

$$\left(\frac{1.645\sqrt{2 \times (CPM_b \times T_s)}}{DEIVTRA}\right) \times UnitCorrectionFactor$$

MDA

$$\left(\left(3.29 \times \sqrt{\frac{CPMb}{Ts} + \frac{CPMb}{Tb}}\right) + \frac{2.71}{D \times E \times I \times V \times R \times A}\right) \times DilutionFactor \times UnitConversionFactor$$

RER (DOE Alberqueque)

$$abs\left(\frac{(SampleActivity - SampleDuplicateActivity)}{(SampleUncertainty + SampleDuplicateUncertainty)}\right)$$

As Defined by the DOE Alberqueque SOW. This value is determined from 2 sigma propogated uncertainties.

Uncertainty, Count

$$\frac{\sqrt{\frac{C_s}{(T_s)^2} + \frac{C_b}{(T_b)^2}}}{DEIVRA} \times UnitCorrectionFactor \times DilutionFactor \times Sigma$$

Uncertainty, Total Propogated

$$\sqrt{\left(\frac{U_o}{S}\right)^2 + (A \times P)^2} \times S$$

Where:
U_o = Count Uncertainty
S = Sigma
A = Sample Activity
P = Propogated Error Factor

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Equation Legend:
- C = counts
- D = Decay Factor
- E = Efficiency
- I = Ingrowth Factor
- V = Volume (aliquot)
- T = Time (count duration)
- R = Recovery (carrier/tracer yield)
- A = Abundance
- P = Propogated Error Factor
- s (subscript) = denotes factor is associated with analytical sample
- b (subscript) = denotes factor is associated with background sample
- x (subscript) = denotes factor is associated with crosstalk correction (Gross alpha/beta only)

NOTE: Some factors listed may not apply to this analysis.

Constants: D=1, I=1, A=1, P=0.042

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Equations for

Thorium, Isotopic by Alpha Spectroscopy

Activity

$$\left(\frac{(SampleCPM - BkgCPM)}{DEIVRA}\right) \times UnitCorrectionFactor$$

DER (Normalized Absolute Difference)

$$abs\left(\frac{(SampleActity - SampleDuplicateActity)}{\sqrt{(SampleUncertainty)^2 + (SampleDuplicateUncertainty)^2}}\right)$$

As defined by DOE QSAS, Revision 2

DLC

$$\left(\frac{1.645\sqrt{2\times(CPM_b \times T_s)}}{DEIVTRA}\right) \times UnitCorrectionFactor$$

MDA

$$\left(\left(3.29\times\frac{\sqrt{\frac{CPMb}{Ts}+\frac{CPMb}{Tb}}}{D\times E\times I\times V\times R\times A}\right)+\frac{2.71}{D\times E\times I\times V\times Ts\times R\times A}\right) \times DilutionFactor \times UnitConversionFactor$$

RER (DOE Alberqueque)

$$abs\left(\frac{(SampleActivity - SampleDuplicateActivity)}{(SampleUncertainty + SampleDuplicateUncertainty)}\right)$$

As Defined by the DOE Alberqueque SOW. This value is determined from 2 sigma propogated uncertainties.

Uncertainty, Count

$$\frac{\sqrt{\frac{C_s}{(T_s)^2}+\frac{C_b}{(T_b)^2}}}{DEIVRA} \times UnitCorrectionFactor \times DilutionFactor \times Sigma$$

Uncertainty, Total Propogated

$$\sqrt{\left(\frac{U_o}{S}\right)^2 + (A\times P)^2} \times S$$

Where:
U_o = Count Uncertainty
S = Sigma
A = Sample Activity
P = PropogatedError Factor

Equation Legend:
C = counts
D = Decay Factor
E = Efficiency
I = Ingrowth Factor
V = Volume (aliquot)
T = Time (count duration)
R = Recovery (carrier/tracer yield)
A = Abundance
P = Propogated Error Factor
s (subscript) = denotes factor is associated with analytical sample
b (subscript) = denotes factor is associated with background sample
x (subscript) = denotes factor is associated with crosstalk correction (Gross alpha/beta only)

NOTE: Some factors listed may not apply to this analysis.

Constants: D=1, I=1, A=1, P=0.042

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Equations for
Uranium, Total by KPA

DER (Normalized Absolute Difference)

$$\text{abs}\left(\frac{(\text{SampleActivity}-\text{SampleDuplicateActivity})}{\sqrt{(\text{SampleUncertainty})^2+(\text{SampleDuplicateUncertainty})^2}}\right)$$

As defined by DOE QSAS, Revision 2

DLC

$$\left(\frac{1.645\sqrt{2\times(CPM_b\times T_s)}}{DEIVTRA}\right)\times \text{UnitCorrectionFactor}$$

MDA

$$\left(\left(3.29\times\frac{\sqrt{\frac{CPMb}{Ts}+\frac{CPMb}{Tb}}}{D\times E\times I\times V\times R\times A}\right)+\frac{271}{D\times E\times I\times V\times Ts\times R\times A}\right)\times \text{DilutionFactor}\times\text{UnitConversionFactor}$$

RER (DOE Alberqueque)

$$\text{abs}\left(\frac{(\text{SampleActivity}-\text{SampleDuplicateActivity})}{(\text{SampleUncertainty}+\text{SampleDuplicateUncertainty})}\right)$$

As Defined by the DOE Alberqueque SOW. This value is determined from 2 sigma propogated uncertainties.

Result

$$\left(\frac{(\text{InstrumentConc}_{(ug/L)}\times\text{InstrumentDilution}\times\text{DigestionVolume})}{\text{Aliquot}\times 1000}\right)\times\text{UnitCorrectionFactor}$$

Uncertainty, Count

$$\text{Result}\times\text{Sigma}\times\frac{\text{InstrumentUncertainty}}{\text{InstrumentConc}}$$

Uncertainty, Count

$$\frac{\sqrt{\frac{C_s}{(T_s)^2}+\frac{C_b}{(T_b)^2}}}{DEIVRA}\times\text{UnitCorrectionFactor}\times\text{DilutionFactor}\times\text{Sigma}$$

Uncertainty, Total

$$\text{Result}\times\text{Sigma}\times\sqrt{\left(\frac{\text{InstrumentUncertainty}}{\text{InstrumentConc}}\right)^2+0.025}$$

Uncertainty, Total Propogated

$$\sqrt{\left(\frac{U_c}{S}\right)^2+(A\times P)^2}\times S$$

Where:
U_c = Count Uncertainty
S = Sigma
A = Sample Activity

Equation Legend:
C = counts
D = Decay Factor
E = Efficiency
I = Ingrowth Factor
V = Volume (aliquot)
T = Time (count duration)
R = Recovery (carrier/tracer yield)
A = Abundance
P = Propogated Error Factor
s (subscript) = denotes factor is associated with analytical sample
b (subscript) = denotes factor is associated with background sample
x (subscript) = denotes factor is associated with crosstalk correction (Gross alpha/beta only)

NOTE: Some factors listed may not apply to this analysis.

Appendix 7

TestAmerica SOP List

Dept	SOP Number	SOP Title
GC/HPLC	ST-GC-0005	Extractable Total Petroleum Hydrocarbons
GC/HPLC	ST-GC-0013	Extraction and analysis of Phenols
GC/HPLC	ST-GC-0014	Aromatic Volatiles and Volatile Petroleum Hydrocarbons
GC/HPLC	ST-GC-0015	PCB GC Analysis
GC/HPLC	ST-GC-0016	Pesticide GC Analysis
GC/HPLC	ST-GC-0017	Herbicide GC Analysis
GC/HPLC	ST-GC-0018	Analysis of Water Miscible Non-Halogenated Organic Compounds
Health and Safety	ST-HS-0001	Waste Minimization Plan
Health and Safety	ST-HS-0002	Facility Addendum to Corporate Safety Manual
Health and Safety	ST-HS-0003	St. Louis Facility Contingency Plan
Health and Safety	ST-HS-0004	Hazardous Waste Management Plan
Health and Safety	ST-HS-0005	Laboratory Security Systems
Health and Safety	ST-HS-0006	Quarantine Soils Procedure
Health and Safety	ST-HS-0007	Fume Hood Calibration
Inorganic Prep	ST-IP-0001	Reactive Cyanide & Sulfide
Inorganic Prep	ST-IP-0002	Acid Digestion of soil
Inorganic Prep	ST-IP-0013	Acid Digestion of Aqueous Samples & Extracts
Inorganic Prep	ST-IP-0014	Alkaline Digestion of Hexavalent Chromium
Inorganic Prep	ST-IP-0015	Filtration Procedure for Dissolved Metals Analysis
Inorganic Prep	ST-IP-0016	TCLP/SPLP and CWET Procedures
Inorganic Prep	ST-IP-0018	Kd Leaching Procedure
Inorganic Prep	ST-IP-0019	Sulfide Distillation
Information Technology	ST-IS-0001	Software Change Management
Information Technology	ST-IS-0002	Software Testing, Validation & Verification
Information Technology	ST-IS-0003	Information Systems
GC/HPLC	ST-LC-0001	HPLC Analysis of PAH/PNA
GC/HPLC	ST-LC-0002	Analysis of Nitroaromatic & Nitroamine Explosives
GC/HPLC	ST-LC-0004	Analysis of Perchlorates by LC/MS/MS
GC/HPLC	ST-LC-0005	Analysis of Nitroaromatics by LC/MS/MS
GCMS	ST-MS-0001	GC/MS Analysis based on 8270C and 625
GCMS	ST-MS-0002	Volatile Organics by GCMS
Metals	ST-MT-0001	Metals by ICP/MS
Metals	ST-MT-0003	Metals by ICP-AES
Metals	ST-MT-0005	Mercury in Aqueous Samples by CVAA
Metals	ST-MT-0007	Mercury in Solid Samples by CVAA
Metals	ST-MT-0008	Total Uranium by KPA

Organic Prep	ST-OP-0001	Labware Preparation for Organic Analysis
Organic Prep	ST-OP-0002	Extraction & Cleanup of Organic Compounds
Organic Prep	ST-OP-0007	Extraction of Herbicieds - Water & Soil
Organic Prep	ST-OP-0008	Extraction of Nitroaromatics
Project Management	ST-PM-0001	Project Setup and Quote
Project Management	ST-PM-0002	Sample Receipt & Chain of Custody
Project Management	ST-PM-0003	Bottle Kit Preparation
Project Management	ST-PM-0004	Data Review, Verification & Reporting
Quality Assurance	ST-QA-0002	Standard and Reagent Preparation
Quality Assurance	ST-QA-0005	Calbration & Verification Procedure for Thermometers
Quality Assurance	ST-QA-0014	Evaluation of Accuracy and Precision via Control Charts
Quality Assurance	ST-QA-0016	IDL/MDL Determination
Quality Assurance	ST-QA-0021	Internal Surveillance
Quality Assurance	ST-QA-0023	Document Control
Quality Assurance	ST-QA-0024	Preventative Maintenance
Quality Assurance	ST-QA-0028	Water System Maintenance & Monitoring
Quality Assurance	ST-QA-0031	VOA Holding Blank Analysis
Quality Assurance	ST-QA-0035	Preparation and Management of SOPs
Quality Assurance	ST-QA-0036	Non-Conformance Memo Process
Quality Assurance	ST-QA-0037	Procurement of Quality Related Items
Quality Assurance	ST-QA-0038	Procedure for Compositing and Subsampling
Quality Assurance	ST-QA-0039	Sample Transfer Utility
Quality Assurance	ST-QA-0040	Manual Integration Procedure
Rad Prep	ST-RC-0002	Planchet Prep for Radiochemistry
Rad Prep	ST-RC-0003	Drying & Grinding of Soil & Solid Samples
Rad Prep	ST-RC-0004	Prep of Soil, Sludge, Filter, Biota &)/G Samples
Rad Prep	ST-RC-0010	Screening Samples for Presence of Radioactive Materials
Rad Prep	ST-RC-0015	Total Activity Screening Procedure by LSC
Rad Prep	ST-RC-0020	Determination of Gross Alpha/Beta Activity
Rad Prep	ST-RC-0021	Gross Alpha Radiation in Water - Coprecipitation
Rad Prep	ST-RC-0025	Preparation of Samples for Gamma Spectroscopy
Rad Prep	ST-RC-0030	Determination of Tritium in Water, Fluids, Soil
Rad Prep	ST-RC-0031	Tritium Determination by Cryogenic Distillation
Rad Prep	ST-RC-0039	Radium 226 by Alpha Spec
Rad Prep	ST-RC-0040	Total Alpha Emitting Isotopes of Radium
Rad Prep	ST-RC-0041	Radium 228 in Water
Rad Prep	ST-RC-0042	Iodine-129 in Water
Rad Prep	ST-RC-0050	Preparation of Strontium 89 & 90
Rad Prep	ST-RC-0055	Determination of Fe55, Ni59 & Ni63 by LSC
Rad Prep	ST-RC-0056	Carbon-14 by LSC

Rad Prep	ST-RC-0100	Actinide Coprecipitation
Rad Prep	ST-RC-0125	Determination of TC99 using Eichrom Teva Resin
Rad Prep	ST-RC-0210	Determination of Po210 by Alpha Spectrometry
Rad Prep	ST-RC-0211	Determination of Pb210 by LSC
Rad Prep	ST-RC-0232	Isotopic Th/Np in Various Matrices by Eichrom Teva
Rad Prep	ST-RC-0238	Isotopic U by Eichrom UTEVA Reson for Various Matrices
Rad Prep	ST-RC-0240	Isotopic Am/Cu/Pu/Th/U in Various Matrices Eichrom
Rad Prep	ST-RC-0241	Am/Pu/Cu/U in Various Matrices by Eichrom UTEVA
Rad Prep	ST-RC-0242	Isotopic Th/Pu/U in Various Matrices by Eichrom Separation
Rad Prep	ST-RC-0245	Determination of Pu241 by LSC
Rad Prep	ST-RC-0246	Isotopic Am/Cu/U in Various Matrices by Eichrom S
Rad Prep	ST-RC-0247	Promethium247 & Samarium151 Lanthide Resin Separation
Rad Prep	ST-RC-0300	NJ 48 Hour Gross Alpha Testing PWTA
Rad Prep	ST-RC-5006	Decontamination of Lab Glassware, Labware & Equipment
Radiochemistry	ST-RD-0102	Gamma Vision Analysis
Radiochemistry	ST-RD-0210	Alpha spectroscopy
Radiochemistry	ST-RD-0302	Liquid Scintillation Counter Analysis
Radiochemistry	ST-RD-0403	Low Background Gas Flow Proportional Counting
Radiation Protection	ST-RP-0001	Radiation Protection Program
Radiation Protection	ST-RP-0005	ALARA Program
Radiation Protection	ST-RP-0010	Internal Exposure Control
Radiation Protection	ST-RP-0020	External Exposure Control
Radiation Protection	ST-RP-0030	Radiological Contamination
Radiation Protection	ST-RP-0031	Radiation Work Permits
Radiation Protection	ST-RP-0032	Instrumentation and surveillance
Radiation Protection	ST-RP-0033	Radiological Areas and Posting
Radiation Protection	ST-RP-0034	Engineered Controls
Radiation Protection	ST-RP-0042	Handling of Sealed Sources
Radiation Protection	ST-RP-0050	Purchase, Receipt, Handling and ID of Radioactive Material
Radiation Protection	ST-RP-0051	Packaging/Transportation of Radioactive Material
Radiation Protection	ST-RP-0100	Radiation Protection Records
Radiation Protection	ST-RP-0110	Radiation Protection Training
Radiation Protection	ST-RP-0120	Emergency Response & notification
Radiation Protection	ST-RP-0140	Quality Assurance in Radiological Protection
Wet Chemistry	ST-WC-0001	Turbidity
Wet Chemistry	ST-WC-0002	Cyanide Analysis by Technicon TRAACS 800
Wet Chemistry	ST-WC-0003	Hardness
Wet Chemistry	ST-WC-0004	Chemical Oxygen Demand
Wet Chemistry	ST-WC-0005	Percent Solids Determination
Wet Chemistry	ST-WC-0006	Total Organic Halides in Water (TOX) and Soil(EOX)

Wet Chemistry	ST-WC-0009	Oil & Grease (Partition-Gravimetric Method)
Wet Chemistry	ST-WC-0011	Analysis of pH in Water & Soil
Wet Chemistry	ST-WC-0012	Analysis of Sulfide in Water
Wet Chemistry	ST-WC-0013	Phosphorus, all Forms
Wet Chemistry	ST-WC-0014	Analysis of Ammonia as N in Water & Soil
Wet Chemistry	ST-WC-0015	Biochemical Oxygen Demand
Wet Chemistry	ST-WC-0016	Total Organic Carbon
Wet Chemistry	ST-WC-0017	Phenolics, Total Recoverable
Wet Chemistry	ST-WC-0019	Alkalinity in Water & Soil
Wet Chemistry	ST-WC-0023	Nitriate/Nitrite analysis by TRAACS
Wet Chemistry	ST-WC-0025	Conductivty in Water & Soil
Wet Chemistry	ST-WC-0026	Flashpoint by Pensky-Martens Closed Cup
Wet Chemistry	ST-WC-0028	Anions by Ion Chromatography
Wet Chemistry	ST-WC-0031	Paint Filter
Wet Chemistry	ST-WC-0033	Hexavalent Chromium
Wet Chemistry	ST-WC-0034	Heat of Combustion
Wet Chemistry	ST-WC-0036	Determination of Solids in Water and Wastewater
Wet Chemistry	ST-WC-0039	Method 1664, N-Hexane Extractable Material
Wet Chemistry	ST-WC-0042	Chlorophyll-a
Wet Chemistry	ST-WC-0044	Potentiometric Determination of Fluoride ISE
Wet Chemistry	ST-WC-0046	Reactivity to Air, Water, Physcial Properties