

A2-1: December 15, 2011: Excelchem Laboratories review of Peer review comments



## Excelchem Environmental Labs

1135 W Sunset Boulevard Suite A  
Rocklin, CA 95765  
Phone # 916-543-4445  
Fax # 916-543-4449

12/15/11

Re: Technical Consultation on Scientific Peer Review Comments for Pacific Gas and Electric Company's 2007 Groundwater Chromium Background Study

To Whom It May Concern:

The peer reviewer noted that there were a large number of CCV failures for Cr(VI). I agree with the peer reviewer that there are an excessive number of CCV failures. EPA Method 7199, Section 7.3.2 clearly states that if the CCV is not within 10% the instrument must be recalibrated and the samples must be re-analyzed. If the CCV fails after recalibration, the analysis should be terminated until the source of the problem is identified and corrected (EPA Method 7199, Section 7.3.1). Sample results associated with failing CCVs are unacceptable, not legally defensible, and of questionable accuracy and usefulness.

The Cr(IV) analysis performed by the laboratory seems to be out of control. The laboratory reported data associated with failing CCVs on April 24, July 26, July 27, September 26, October 23, and November 14, 2006. There is an ongoing problem with the analysis that the laboratory failed to correct. The laboratory is blatantly ignoring EPA Method 7199 criteria by reporting data with failing CCVs and is providing its customers with data that is useless. The laboratory should explain the CCV failures and why they did not follow the method and recalibrate and re-analyze the samples.

The laboratory flagged Cr(IV) results as estimated due to failing CCV recoveries. The method has no provision to accommodate this practice and therefore the laboratory is not adhering to EPA Method 7199. Consequently they are not truly running EPA Method 7199. For CCVs that failed high, the analytical results would most likely be reduced. For Cr(IV) results flagged as estimated due to low CCV recoveries, the analytical results would most likely be increased. Data reported as ND may actually have detectable Cr(IV) if the CCV was low.

For the analysis of Cr (IV), Truesdail stated that the MRCCS is a QCS. They should provide proof that the MRCCS was prepared from a second source standard (certificate of analysis/standard logbook entries). If the MRCCS was prepared from a secondary standard as Truesdail implies then the data is not affected. The purpose of the QCS is to validate the accuracy of the primary standard and the calibration curve. Failure to run a QCS as required by EPA Method 7199, sections 7.3.1 and 8.7 invalidates the calibration curve and the associated results.

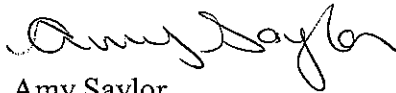
The peer reviewer noted that reporting limit check samples were not analyzed for EPA Methods 7199 and 6010B. A reporting limit check sample is not required for EPA Methods 7199 or 6010B.

The peer reviewer noted that a reporting limit check sample was not analyzed for EPA Method 6020A. The samples were analyzed in 2006. A reporting limit check sample was not required for this method until the 2007 revision.

Truesdail did not specify which calibration curve was used for EPA Method 6010B. This could affect the data if the standard curve was used, but the RL came from the low level curve. Truesdail was unclear about which curve was used so the data is questionable until Truesdail is more specific about which calibration curve was used.

The peer reviewer noted that the MS/MSD spike amounts chosen were too high for EPA Methods 7199, 6010B, and 6020A. The methods do not stipulate spike amounts. No information was given regarding matrix spike amounts and recoveries so I cannot comment on whether the amounts were too high.

Sincerely,

A handwritten signature in cursive script that reads "Amy Saylor".

Amy Saylor  
QA/QC Officer  
Excelchem Environmental Labs

A2-2: December 22, 2011: Addendum to December 15, 2011 Excelchem review



## Excelchem Environmental Labs

1135 W Sunset Boulevard Suite A

Rocklin, CA 95765

Phone # 916-543-4445

Fax # 916-543-4449

12/22/11

ADDENDUM TO THE LETTER DATED 12/15/2011: Technical Consultation on Scientific Peer Review Comments for Pacific Gas and Electric Company's 2007 Groundwater Chromium Background Study

To Whom It May Concern:

More information needs to be provided for an accurate determination of the quality of the hexavalent chromium results associated with failing CCVs. If the CCVs were failing by a small amount, then the data is still usable. The raw data needs to be provided for a more accurate evaluation of the hexavalent chromium data.

Sincerely,

A handwritten signature in cursive script that reads "Amy Saylor".

Amy Saylor  
QA/QC Officer  
Excelchem Environmental Labs

A2-3: December 29, 2011: Water Board Investigative Order No. R6V-2011-0105,  
Requiring PG&E to provide Information on Laboratory Quality Control Data



Matthew Rodriguez  
Secretary for  
Environmental Protection

## California Regional Water Quality Control Board Lahontan Region

2501 Lake Tahoe Boulevard, South Lake Tahoe, California 96150  
(530) 542-5400 • FAX (530) 544-2271  
<http://www.waterboards.ca.gov/lahontan>



Edmund G. Brown Jr.  
Governor

December 29, 2011

Tom Wilson  
Director, Remediation Program Office  
Pacific Gas and Electric Company  
3401 Crow Canyon Road  
San Ramon, CA 94105-1814

### INVESTIGATIVE ORDER NO. R6V-2011-0105, REQUEST FOR INFORMATION ON LABORATORY QUALITY CONTROL DATA FOR 2007 GROUNDWATER BACKGROUND STUDY REPORT, PACIFIC GAS AND ELECTRIC COMPANY (PG&E), HINKLEY COMPRESSOR STATION, SAN BERNARDINO COUNTY

This Investigative Order requires PG&E to submit a technical report concerning quality control procedures associated with groundwater sample analyses conducted by Emax Laboratories and Truesdail Laboratories, contracted by PG&E for its 2007 Groundwater Background Study Report. This investigative order is issued pursuant to California Water Code section 13267.

#### Background

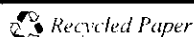
In response to direction by the Lahontan Water Board, PG&E's *2007 Groundwater Background Study Report, Hinkley Compressor Station, Hinkley, California* (hereafter, the 2007 Background Study Report) underwent scientific peer review in the summer of 2011. As a result of that peer review, quality control issues were identified related to the procedures used by Emax Laboratories and Truesdail Laboratories, the two chemistry laboratories that analyzed groundwater samples from the Hinkley Valley for the 2007 Background Study Report. The peer reviewer expressed doubt regarding the validity of the data from the labs due to certain quality control procedural irregularities.

#### Requirement

Pursuant to section 13267 of the Water Code, PG&E is hereby required to submit a technical report to the Water Board by **January 20, 2012** that includes the following items. Responses should include information for all samples analyzed for the 2007 Background Study Report:

- 1) For the continuing calibration verification (CCV) failures for EPA Method SW 7199, discuss what percentage out of range were the CCV recoveries.
- 2) Provide raw data, including calibration curves, CCVs, and quality control (QC) samples, from hexavalent chromium analysis.

*California Environmental Protection Agency*



- 3) Provide information on matrix spike amounts and recoveries for hexavalent chromium.
- 4) A description of how samples were chosen for matrix spiking.
- 5) Provide evidence that Mid-Range Calibration Check Standards (MRCCSs) were prepared from a second source standard. Provide NIST (National Institutes of Standards Traceability) documentation for MRCCSs.
- 6) Verify which calibration curve was used for EPA Method 6010B (was the standard or low level calibration curve used?). Provide documentation showing calibration curve.
- 7) Provide valid Environmental Laboratory Accreditation Program certificates for each lab for total and hexavalent chromium analysis for the calendar year 2006.
- 8) Discuss why EPA Method 6800 was not used for chromium species identification.
- 9) Discuss why EPA Method 6020A was used instead of Method 6010 for total chromium.

The technical report required by this Investigative Order is necessary to determine whether the analytical data from the laboratories in question is valid and reliable for determining background chromium concentrations in the Hinkley Valley. The need for this information outweighs the burden on PG&E to produce the information it already possesses, including the costs to produce the technical reports.

Any failure to furnish the required technical or monitoring reports subjects PG&E up to \$1,000 a day in administrative civil liability for each violation pursuant to Water Code section 13268.

Please contact me at 530-542-5436, or Anne Holden at 530-542-5450 if you have any questions.



LAURI KEMPER  
ASSISTANT EXECUTIVE OFFICER

Enclosure: 13267 Fact Sheet

cc: Kevin Sullivan, Hinkley Remediation Project Manager

ALH/adw/T:Background Study QC information 13267.docx  
File Under: 6B369107001



A2-4: January 20, 2012: PG&E's Response to Investigative Order No. R6V-2011-0105. Includes responses to Dr. Nagourney's peer review comments in attachment A.



**Pacific Gas and  
Electric  
Company**

**Kevin M. Sullivan**  
Hinkley Remediation  
Project Manager  
Shared Services Dept

3401 Crow Canyon Rd  
San Ramon, CA 94583  
(925) 818-9069 (cell)  
[kmsu@pge.com](mailto:kmsu@pge.com)

January 20, 2012

Ms. Lauri Kemper, Assistant Executive Officer  
Ms. Lisa Dernbach, Senior Engineering Geologist  
California Regional Water Quality Control Board, Lahontan Region  
2501 Lake Tahoe Boulevard  
South Lake Tahoe, California 96150

**Subject:** Investigative Order No. R6V-2011-0105, Request For Information On  
Laboratory Quality Control Data For 2007 Background Study Report,  
Pacific Gas And Electric Company, Hinkley Compressor Station, San  
Bernadino County

Dear Ms. Kemper and Ms. Dernbach:

Pacific Gas and Electric Company (PG&E) respectfully submits the enclosed Technical Memorandum, which presents the response to Investigative Order No. R6V-2011-0105, issued by the Regional Water Quality Control Board, Lahontan Region (Water Board) on December 29, 2011. This Order requested responses to nine specific comments related to laboratory quality control data for Hinkley Groundwater Background Study Report (CH2M Hill, 2007) and requested submittal of the raw analytical data, which is provided on a compact disc (CD). In addition, the Technical Memorandum presents responses to comments provided by Dr. Stuart Nagourney in the Peer Review received by the Water Board on October 14, 2011.

Please contact me if you have questions regarding the information provided in the enclosed Technical Memorandum.

Sincerely,

Kevin Sullivan  
Hinkley Remediation Project Manager

**Attachments:**

Technical Memorandum – Response to Investigative Order No. R6V-2011-0105 and Peer Review Comments on Laboratory Quality Control Data for 2007 Groundwater Background Study Report, Hinkley Remediation Project

Compact Disc (CD) – Hexavalent Chromium Analytical Data, Truesdail Laboratories, Inc. and EMAX Laboratories, Hinkley Groundwater Background Study (CH2M HILL, 2007)

## Response to Investigative Order No. R6V-2011-0105 and Peer Review Comments on Laboratory Quality Control Data for 2007 Groundwater Background Study Report, Hinkley Remediation Project

PREPARED FOR: Pacific Gas and Electric Company

COPY TO: Eliana Makhoulouf  
Shawn Duffy

PREPARED BY: CH2M HILL

DATE: January 19, 2012

PROJECT NUMBER: 432629

This technical memorandum presents the response to Investigative Order No. R6V-2011-0105 issued by the California Regional Water Quality Control Board, Lahontan Region (Water Board) (Water Board, 2011), which requested information on laboratory quality control data for the Groundwater Background Study Report (CH2M HILL, 2007), prepared on behalf of Pacific Gas and Electric Company (PG&E) for the Hinkley Remediation Project. In addition, this memorandum presents responses to comments provided by Dr. Nagourney in the Peer Review received by the Water Board on October 14, 2011.

The responses to questions one through nine in Investigative Order R6V-2011-0105 are provided below.

- 1) **Comment:** For the continuing calibration verification (CCV) failures for EPA Method SW 7199, discuss what percentage out of range were the CCV recoveries.

**Response:** During the first Groundwater Background Study sampling event, (January/February 2006) all Method SW 7199 sample analyses were performed by Truesdail Laboratories, Inc. (TLI) and the CCV recoveries for all analyses were within the method criteria of 90 – 110% recovery.

For the three subsequent sampling events, all Method SW7199 sample analyses were performed by EMAX Laboratory (EMAX). Of the 129 sample analyses performed by EMAX, 31 (26 samples and 5 field duplicates) or 24 percent had one or more of the bracketing CCVs with recoveries that were outside the method criteria. CCV recoveries for the out of control sample analyses ranged from a low of 72 percent to a high of 123 percent with 19 results biased low and 12 biased high. In accordance with the PG&E program Quality Assurance Project Plan (QAPP) (CH2M HILL, 2008) that cites USEPA National Functional Guidelines for Inorganic Data Review (2002), the range of the out of control CCV recoveries was not significant enough to warrant data rejection, but did require data qualification by applying “J/UJ” flags to out of control results. Therefore, the results were determined to be of sufficient quality to be used for purposes of the Groundwater Background Study.

- 2) **Comment:** Provide raw data, calibration curves, CCVs, and quality control (QC) samples, from hexavalent chromium analysis.

**Response:** All analytical data for hexavalent chromium are provided on the enclosed CD. The data are organized by sample delivery groups (SDGs) provided to CH2M HILL by the laboratories. There are 17 SDGs from EMAX and four SDGs from TLI. The table below identifies each SDG number associated with hexavalent chromium analysis associated with the Groundwater Background Study.

EMAX SDG Numbers	TLI SDG Numbers
06D180, 06D191, 06D205, 06D215, 06G152, 06G165, 06G182, 06G200, 06I248, 06I262, 06I280, 06J236, 06J257, 06J279, 06K142, 06K156, 06K180	951265, 951327, 951368, 951421

3) **Comment:** Provide information on matrix spike amounts and recoveries for hexavalent chromium.

**Response:** The spike concentration at TLI for hexavalent chromium was 1.0 microgram per liter (µg/L). There were four SDGs of data with three different site specific matrix spike samples in three of the four SDGs. The SDG without the site specific matrix spike has a matrix spike completed on a non-site sample. The recoveries were all in control with 98, 94, and 106 percent recovery. The acceptance limits used by the laboratory were 90 – 110 percent. The concentration of the matrix spike was five times the reporting level and applicable to the majority of sample concentrations determined over the study.

The spike concentration at EMAX Laboratory for hexavalent chromium was 1.0 µg/L. There were 17 SDGs of data with 18 different site specific matrix spike samples in 15 of the 17 SDGs. The SDG without the site specific matrix spike has a matrix spike completed on a non-site sample. The recoveries were predominantly in control ranging from 76 to 115 percent recovery. The acceptance limits used by the laboratory were 85 – 115 percent. Two of the 18 matrix spikes were out of control with a low bias but still provide data that met project data quality objectives for evaluating background hexavalent chromium concentrations. The concentration of the matrix spike was five times the reporting level and applicable to the majority of sample concentrations determined over the study.

4) **Comment:** A description of how samples were chosen for matrix spiking.

**Response:** The matrix spikes were randomly selected by the laboratory as part of the analytical batch control requirements.

5) **Comment:** Provide evidence that Mid-Range Calibration Check Standards (MRCCSs) were prepared from a second source standard. Provide National Institute of Standards Traceability (NIST) documentation for MRCCSs.

**Response:** MRCCSs were prepared from a different lot number source from the initial calibration stock at TLI as well as at EMAX Laboratory as shown in files provided on the attached CD. This same standards traceability documentation is also available in each of the SDGs provided in response to Question Number 2.

6) **Comment:** Verify which calibration curve was used for EPA Method 6010B (was the standard or low level calibration curve used?). Provide documentation showing calibration curve.

**Response:** Method 6010B was not used by either lab for the Hinkley Groundwater Background Study rather Method 6020 was used for total chromium analysis as explained in the response to Question Number 9.

7) **Comment:** Provide valid California Environmental Laboratory Accreditation Program (ELAP) certificates for each lab for total and hexavalent chromium analysis for the calendar year 2006.

**Response:** Both TLI and EMAX were ELAP certified in 2006. Copies of the certifications for 2006 are provided in Attachment A.

8) **Comment:** Discuss why EPA Method 6800 was not used for chromium species identification.

**Response:** The Hinkley Background Study was conducted from January to November 2006 and therefore pre-dated the promulgation of Method 6800, which was posted in February 2007.

9) **Comment:** Discuss why EPA method 6020A was used instead of Method 6010 for total chromium.

**Response:** USEPA method 6020A achieves a lower level of detection for total chromium than that of EPA Method 6010B and therefore was used for the project.

Attachment B to this technical memorandum provides additional responses to comments provided by Dr. Nagourney regarding the quality control procedures used by the laboratory for chromium analysis. In summary, based on a review of the laboratory methods and data obtained for the study, the quality of the laboratory analysis performed for the study was appropriate and met all of the requirements of the USEPA methods employed. The issues raised by the reviewer can be explained by 1) the incomplete answers provided to the reviewer by the laboratories, 2) expectations of the reviewer for quality control measures that were slightly different or beyond the requirements of the USEPA methods, or 3) a misunderstanding on the part of the reviewer about which methods were applied to the data set. As summarized in Attachment B, the data yielded through these analyses are deemed of high quality and the use of these data for the purposes of the background study was appropriate. A detailed response to comments on the laboratory chemistry comments is provided in Attachment B.

## References

CH2M Hill. 2007. *Groundwater Background Study Report, Hinkley Compressor Station, Hinkley, California*. February.

\_\_\_\_\_. 2008. *PG&E Program Quality Assurance Project Plan*. December.

United States Environmental Protection Agency (USEPA). 2002. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review*. July.

Regional Water Quality Control Board, Lahontan Region (Water Board), 2011. *Investigative Order R6V-2011-0105, Request for Information on Laboratory Quality Control Data for 2007 Groundwater Background Study Report, Pacific Gas and Electric Company (PG&E), Hinkley Compressor Station, San Bernardino County*. December.

## Attachments

Attachment A	California ELAP Certificates for Truesdail Laboratories, Inc. and EMAX Laboratories
Attachment B	Response to Comments on Laboratory Chemistry and Quality Control Data
Compact Disc (CD)	Hexavalent Chromium Analytical Data, Truesdail Laboratories, Inc. and EMAX Laboratories, Hinkley Groundwater Background Study (CH2M HILL, 2007)

**Attachment A**  
**California ELAP Certificates – Truesdail**  
**Laboratories, Inc. and EMAX Laboratories**

---



STATE OF CALIFORNIA  
DEPARTMENT OF HEALTH SERVICES  
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

**ENVIRONMENTAL LABORATORY CERTIFICATION**

Is hereby granted to

**TRUESDAIL LABORATORIES, INC.**

**14201 FRANKLIN AVENUE**

**TUSTIN, CA 92780**

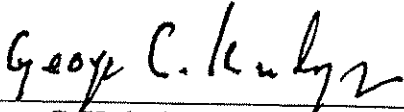
Scope of certification is limited to the  
"Accredited Fields of Testing"  
which accompanies this Certificate.

Continued certification status depends on successful completion of site visit,  
proficiency testing studies, and payment of applicable fees.

This Certificate is granted in accordance with provisions of  
Section 100825, et seq. of the Health and Safety Code.

Certificate No: 1237  
Expiration Date: 07/31/2006  
Effective Date: 07/01/2004

Berkeley, California  
subject to forfeiture or revocation.

  
\_\_\_\_\_  
George C. Kulasingam, Ph.D.  
Program Chief  
Environmental Laboratory Accreditation Program



ARNOLD SCHWARZENEGGER  
Governor

July 1, 2004

Certificate No.: 1237

NORMAN E. HESTER, Ph.D  
TRUESDAIL LABORATORIES, INC.  
14201 FRANKLIN AVENUE  
TUSTIN, CA 92780

Dear NORMAN E. HESTER, Ph.D:

This is to advise you that the laboratory named above continues to be certified as an environmental testing laboratory pursuant to the provisions of the California Environmental Laboratory Improvement Act (Health and Safety Code (HSC), Division 101, Part 1, Chapter 4, Section 100825, et seq.). Certification for all currently certified Fields of Testing that the laboratory has applied for renewal shall remain in effect until **07/31/2006** unless revoked.

**Please note that the renewal application for certification is subject to an on-site visit, and continued use of the certificate is contingent upon:**

- \* **successful completion of the site visit;**
- \* **acceptable performance in the required performance evaluation (PE) studies;**
- \* **timely payment of all fees, including an annual fee due before July 31, 2005;**
- \* **compliance with Environmental Laboratory Accreditation Program (ELAP) statutes (HSC, Section 100825, et seq.) and Regulations (California Code of Regulations (CCR), Title 22, Division 4, Chapter 19).**

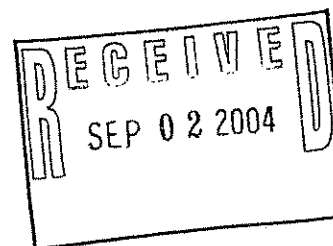
An updated "Approved Fields of Testing" will be issued to the laboratory upon completion of the renewal process. The application for the next renewal must be received 90 days before the expiration of this certificate to remain in force according to the CCR, Section 64801 through 64827.

Please note that the laboratory is required to notify ELAP of any major changes in the laboratory such as the transfer of ownership, change of laboratory director, change in location, or structural alterations which may affect adversely the quality of analyses (HSC, Section 100845(b)(d)). Please include the above certificate number in all your correspondence to ELAP.

If you have any questions, please contact ELAP at (510) 540-2800.

Sincerely,

George C. Kulasingam, Ph.D.  
Program Chief  
Environmental Laboratory Accreditation Program





**CALIFORNIA DEPARTMENT OF HEALTH SERVICES**  
**ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM**  
List of Approved Fields of Testing and Analytes

TRUESDAIL LABORATORIES, INC.  
14201 FRANKLIN AVENUE  
TUSTIN, CA

PHONE No. (714) 730-6239  
COUNTY ORANGE

Certificate No. 1237

**01 Microbiology of Drinking Water and Wastewater**

- 01.01A - Total and Fecal Coliform in Drinking Water by Multiple Tube Fermentation
- 01.02A Total and Fecal Coliform in Drinking Water by Membrane Filtration
- 01.03 Total Coliform and E. coli in Drinking Water by Chromogenic/Fluorogenic Substrate
- 01.04A Total and Fecal Coliform in Drinking Water by Clark's Presence/Absence
- 01.05 Heterotrophic Plate Count
- 01.06 Total Coliform in Wastewater by Multiple Tube Fermentation
- 01.07 Fecal Coliform in Wastewater by Multiple Tube Fermentation
- 01.08 Total Coliform in Wastewater by Membrane Filtration
- 01.09 Fecal Coliform in Wastewater by Membrane Filtration
- 01.10 Fecal Streptococci or Enterococci by Multiple Tube Fermentation
- 01.12 Total Coliform in Source Water by Multiple Tube Fermentation
- 01.13 Fecal Coliform in Source Water by Multiple Tube Fermentation
- 01.14 Total Coliform in Source Water by Membrane Filtration
- 01.16 Total Coliform in Source Water by Chromogenic/Fluorogenic Substrate

**02 Inorganic Chemistry and Physical Properties of Drinking Water**

- 02.01 Alkalinity
- 02.02 Calcium
- 02.03 Chloride
- 02.04 Corrosivity
- 02.05 Fluoride
- 02.06 Hardness
- 02.07 Magnesium
- 02.08 MBAS
- 02.09 Nitrate
- 02.10 Nitrite
- 02.11 Sodium
- 02.12 Sulfate
- 02.13A Total Dissolved Solids
- 02.13B Conductivity
- 02.16 Phosphate, ortho
- 02.17 Silica
- 02.18 Cyanide
- 02.19 Potassium
- 02.24 Perchlorate
- 02.31 UV 254

**03 Analysis of Toxic Chemical Elements in Drinking Water**

- 03.01 Arsenic
- 03.02 Barium
- 03.03 Cadmium
- 03.04 Chromium, total
- 03.05 Copper
- 03.06 Iron
- 03.07 Lead

As of 12/10/2001, this list supersedes all previous lists for this certificate number.

- 03.08 Manganese
- 03.09 Mercury
- 03.10 Selenium
- 03.11 Silver
- 03.12 Zinc
- 03.13 Aluminum
- 03.15 Antimony
- 03.16 Beryllium
- 03.17 Nickel
- 03.18 Thallium
- 03.19 Chromium (VI)
- 04 Organic Chemistry of Drinking Water by GC/MS
  - 04.02 EPA Method 524.2
  - 04.03C EPA Method 525.2 Polynuclear Aromatic Hydrocarbons
  - 04.03D EPA Method 525.2 Adipates
  - 04.03E EPA Method 525.2 Phthalates
  - 04.08 EPA Method 525.2 PAH/Adipates/Phthalates only
- 05 Organic Chemistry of Drinking Water (excluding GC/MS)
  - 05.04 EPA Method 502.2
  - 05.06 EPA Method 504.1 EDB, DBCP
  - 05.07 EPA Method 505
  - 05.09 EPA Method 507 N,P Pesticides
  - 05.10A EPA Method 508
  - 05.10B EPA Method 508.1
  - 05.11 EPA Method 508A PCBs Quantitation
  - 05.13-1 EPA Method 515.1 Chlorophenoxy Herbicides
  - 05.20A-1 EPA Method 551 Chlorinated Hydrocarbons
  - 05.21A EPA Method 552.1 Dalapon
  - 05.26-1 EPA Method 552.2 Haloacetic Acids
  - 05.26-2 Standard Methods 6251B Haloacetic Acids
- 06 Radiochemistry
  - 06.01 Gross Alpha and Beta Radiation in Drinking Water  
EPA Method 900.0
  - 06.02 Total Radium  
EPA Method 903.0
  - 06.03 Radium 226  
EPA Method 903.1  
SM 7500 Ra-B
  - 06.04 Uranium  
EPA Method 908.0
  - 06.05 Radon 222  
EPA Method 913.0
  - 06.09 Tritium  
EPA Method 906.0  
SM 7500<sup>3</sup>H - B
  - 06.10 Gross Alpha by Co-precipitation  
SM 7110C
- 09 Physical Properties Testing of Hazardous Waste
  - 09.01 Ignitability by Flashpoint Determination
  - 09.02 Corrosivity - pH Determination
  - 09.03 Corrosivity - towards steel
  - 09.04 Reactivity
- 10 Inorganic Chemistry and Toxic Chemical Elements of Hazardous Waste
  - 10.01 Antimony
  - 10.02 Arsenic
  - 10.03 Barium

- 10.04 Beryllium
  - 10.05 Cadmium
  - 10.06 Chromium, total
  - 10.07 Cobalt
  - 10.08 Copper
  - 10.09 Lead
  - 10.10 Mercury
  - 10.11 Molybdenum
  - 10.12 Nickel
  - 10.13 Selenium
  - 10.14 Silver
  - 10.15 Thallium
  - 10.16 Vanadium
  - 10.17 Zinc
  - 10.18 Chromium (VI)
  - 10.19 Cyanide
  - 10.20 Fluoride
  - 10.21 Sulfide
- 11 Extraction Tests of Hazardous Waste**
- 11.01 California Waste Extraction Test (WET)
  - 11.02 Extraction Procedure Toxicity
  - 11.03 Toxicity Characteristic Leaching Procedure (TCLP) All Classes
- 12 Organic Chemistry of Hazardous Waste by GC/MS**
- 12.01 EPA Method 8240B Volatile Compounds
  - 12.02 EPA Method 8250A Semi-volatile compounds
  - 12.03A EPA Method 8270C Extractable Organics
  - 12.06A EPA Method 8260B Volatile Compounds
- 13 Organic Chemistry of Hazardous Waste (excluding GC/MS)**
- 13.01 EPA Method 8010B Halogenated Volatiles
  - 13.02A EPA Method 8015B
  - 13.03 EPA Method 8020A Aromatic Volatiles
  - 13.05A EPA Method 8041
  - 13.06C EPA Method 8061A
  - 13.10A EPA Method 8120A Chlorinated Hydrocarbons
  - 13.10B EPA Method 8121 Chlorinated Hydrocarbons
  - 13.11B EPA Method 8141A
  - 13.12A EPA Method 8150B Chlorinated Herbicides
  - 13.12C EPA Method 8151A Chlorinated Herbicides
  - 13.13 EPA Method 8310 Polynuclear Aromatic Hydrocarbons
  - 13.14B EPA Method 8318
  - 13.15 Total Petroleum Hydrocarbons - Gasoline (LUFT)
  - 13.16 Total Petroleum Hydrocarbons - Diesel (LUFT)
  - 13.17 EPA Method 418.1 TRPH - Screening by IR
  - 13.18 EPA Method 8011 EDB and DBCP
  - 13.19A EPA Method 8021B Halogenated Volatiles only
  - 13.19B EPA Method 8021B Aromatic Volatiles only
  - 13.19C EPA Method 8021B BTEX and MTBE only
  - 13.24A EPA Method 8080A PCBs only
  - 13.24C EPA Method 8082 PCBs only

As of 12/10/2001, this list supersedes all previous lists for this certificate number.

- 13.25A EPA Method 8080A Organochlorine Pesticides only
- 13.25C EPA Method 8081A Organochlorine Pesticides only
- 13.26 EPA Method 8031 Acrylonitrile
- 13.27A EPA Method 8032A
- 13.29A EPA Method 8315A
- 14 **Bulk Asbestos Analysis**
  - 14.01 Bulk Asbestos, 1% or greater concentrations (Title 22, CCR, 66261.24(a)(2)(A))
- 16 **Wastewater Inorganic Chemistry, Nutrients and Demand**
  - 16.01 Acidity
  - 16.02 Alkalinity
  - 16.03 Ammonia
  - 16.04 Biochemical Oxygen Demand
  - 16.05 Boron
  - 16.06 Bromide
  - 16.07 Calcium
  - 16.09 Chemical Oxygen Demand
  - 16.10 Chloride
  - 16.11 Chlorine Residual, total
  - 16.12 Cyanide
  - 16.13 Cyanide amenable to Chlorination
  - 16.14 Fluoride
  - 16.15 Hardness
  - 16.16 Kjeldahl Nitrogen
  - 16.17 Magnesium
  - 16.18 Nitrate
  - 16.19 Nitrite
  - 16.20 Oil and Grease
  - 16.21 Organic Carbon
  - 16.22 Oxygen, Dissolved
  - 16.23 pH
  - 16.24 Phenols
  - 16.25 Phosphate, ortho
  - 16.26 Phosphorus, total
  - 16.27 Potassium
  - 16.28 Residue, Total
  - 16.29 Residue, Filterable (Total Dissolved Solids)
  - 16.30 Residue, Nonfilterable (Total Suspended Solids)
  - 16.31 Residue, Settleable (Settleable Solids)
  - 16.32 Residue, Volatile
  - 16.33 Silica
  - 16.34 Sodium
  - 16.35 Specific Conductance
  - 16.36 Sulfate
  - 16.37 Sulfide (includes total & soluble)
  - 16.38 Sulfite
  - 16.39 Surfactants (MBAS)
  - 16.40 Tannin and Lignin
  - 16.41 Turbidity
  - 16.44 Total Recoverable Petroleum Hydrocarbons by IR
  - 16.45 Total Organic Halides

As of 12/10/2001, this list supersedes all previous lists for this certificate number.

- 17 Toxic Chemical Elements in Wastewater
- 17.01 Aluminum
  - 17.02 Antimony
  - 17.03 Arsenic
  - 17.04 Barium
  - 17.05 Beryllium
  - 17.06 Cadmium
  - 17.07 Chromium (VI)
  - 17.08 Chromium, total
  - 17.09 Cobalt
  - 17.10 Copper
  - 17.11 Gold
  - 17.12 Iridium
  - 17.13 Iron
  - 17.14 Lead
  - 17.15 Manganese
  - 17.16 Mercury
  - 17.17 Molybdenum
  - 17.18 Nickel
  - 17.20 Palladium
  - 17.21 Platinum
  - 17.24 Selenium
  - 17.25 Silver
  - 17.27 Thallium
  - 17.28 Tin
  - 17.29 Titanium
  - 17.30 Vanadium
  - 17.31 Zinc
- 18 Organic Chemistry of Wastewater by GC/MS
- 18.01 EPA Method 624
  - 18.02 EPA Method 625
- 19 Organic Chemistry of Wastewater (excluding GC/MS)
- 19.01 EPA Method 601
  - 19.02 EPA Method 602
  - 19.03 EPA Method 603 Acrolein, Acrylonitrile
  - 19.04 EPA Method 604
  - 19.05 EPA Method 605 Benzidine
  - 19.06 EPA Method 606 Phthalate Esters
  - 19.07 EPA Method 607 Nitrosamines
  - 19.08 EPA Method 608
  - 19.09 EPA Method 609 Nitroaromatics and Cyclic Ketones
  - 19.10 EPA Method 610
  - 19.11 EPA Method 611 Haloethers
  - 19.14 EPA Method 612 Chlorinated Hydrocarbons

As of 12/10/2001, this list supersedes all previous lists for this certificate number.

CALIFORNIA DEPARTMENT OF HEALTH SERVICES  
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM  
Accredited Fields of Testing

TRUESDAIL LABORATORIES, INC.  
14201 FRANKLIN AVENUE  
TUSTIN, CA 92780

Lab Phone (714) 730-6239

Certificate No: I-1237

---

Field of Testing: 04 - Organic Chemistry of Drinking Water by GC/MS

---

04.02 355 1,2,3-Trichloropropane

CDHS SRL PT/GCMS

---

As of 12/02/2002, this list supersedes all previous lists for this certificate number.  
Customers: Please verify the current accreditation standing with the State.



STATE OF CALIFORNIA  
DEPARTMENT OF HEALTH SERVICES  
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

NELAP - RECOGNIZED

**ACCREDITATION**

Is hereby granted to

**EMAX LABORATORIES, INC.**

1835 WEST 205th STREET  
TORRANCE, CA 90501

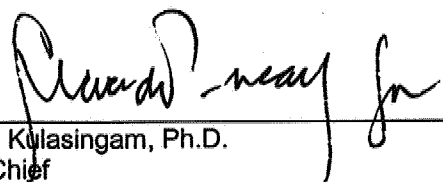
Scope of accreditation is limited to the  
"NELAP Fields of Accreditation"  
which accompanies this Certificate.

Continued accredited status depends on successful  
ongoing participation in the program.

This Certificate is granted in accordance with provisions of  
Section 100825, et seq. of the Health and Safety Code.

Certificate No.: **02116CA**  
Expiration Date: **08/31/2006**  
Effective Date: **08/31/2005**

Richmond, California  
subject to forfeiture or revocation

  
George C. Kulasingam, Ph.D.  
Program Chief  
Environmental Laboratory Accreditation Program



**CALIFORNIA DEPARTMENT OF HEALTH SERVICES**  
**ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM - NELAP RECOGNIZED**  
 Fields of Accreditation



**EMAX LABORATORIES, INC.**

**Lab Phone (310) 618-8889**

1835 WEST 205th STREET  
 TORRANCE, CA 90501

**Certificate No: 02116CA    Renew Date: 08/31/2006**

**102 - Inorganic Chemistry of Drinking Water**

102.030 001	EPA 300.0	Bromide
102.030 002	EPA 300.0	Chlorate
102.030 003	EPA 300.0	Chloride
102.030 005	EPA 300.0	Fluoride
102.030 006	EPA 300.0	Nitrate
102.030 007	EPA 300.0	Nitrite
102.030 008	EPA 300.0	Phosphate, Ortho
102.030 010	EPA 300.0	Sulfate
102.040 004	EPA 300.1	Bromate
102.045 001	EPA 314.0	Perchlorate
102.100 001	SM2320B	Alkalinity
102.120 001	SM2340B	Hardness
102.121 001	SM2340C	Hardness
102.130 001	SM2510B	Conductivity
102.140 001	SM2540C	Total Dissolved Solids
102.145 001	EPA 160.1	Total Dissolved Solids
102.150 001	SM4110B	Chloride
102.150 002	SM4110B	Fluoride
102.150 003	SM4110B	Nitrate
102.150 004	SM4110B	Nitrite
102.150 005	SM4110B	Phosphate, Ortho
102.150 006	SM4110B	Sulfate
102.200 001	SM4500-F C	Fluoride
102.260 001	SM5310B	Total Organic Carbon
102.261 001	SM5310B	DOC
102.270 001	SM5540C	Surfactants
102.520 001	EPA 200.7	Calcium
102.520 002	EPA 200.7	Magnesium
102.520 003	EPA 200.7	Potassium
102.520 004	EPA 200.7	Silica
102.520 005	EPA 200.7	Sodium

**103 - Toxic Chemical Elements of Drinking Water**

103.130 001	EPA 200.7	Aluminum
103.130 002	EPA 200.7	Arsenic
103.130 003	EPA 200.7	Barium
103.130 004	EPA 200.7	Beryllium
103.130 005	EPA 200.7	Cadmium
103.130 007	EPA 200.7	Chromium
103.130 008	EPA 200.7	Copper

As of 09/13/2005, this list supersedes all previous lists for this certificate number.  
 Customers: Please verify the current accreditation standing with the State.



103.130	009	EPA 200.7	Iron
103.130	011	EPA 200.7	Manganese
103.130	012	EPA 200.7	Nickel
103.130	015	EPA 200.7	Silver
103.130	017	EPA 200.7	Zinc
103.140	001	EPA 200.8	Aluminum
103.140	002	EPA 200.8	Antimony
103.140	003	EPA 200.8	Arsenic
103.140	004	EPA 200.8	Barium
103.140	005	EPA 200.8	Beryllium
103.140	006	EPA 200.8	Cadmium
103.140	007	EPA 200.8	Chromium
103.140	008	EPA 200.8	Copper
103.140	009	EPA 200.8	Lead
103.140	010	EPA 200.8	Manganese
103.140	011	EPA 200.8	Mercury
103.140	012	EPA 200.8	Nickel
103.140	013	EPA 200.8	Selenium
103.140	014	EPA 200.8	Silver
103.140	015	EPA 200.8	Thallium
103.140	016	EPA 200.8	Zinc
103.161	001	EPA 245.2	Mercury
103.310	001	EPA 218.6	Chromium (VI)

**104 - Volatile Organic Chemistry of Drinking Water**

104.030	001	EPA 504.1	1,2-Dibromoethane
104.030	002	EPA 504.1	1,2-Dibromo-3-chloropropane
104.040	001	EPA 524.2	Benzene
104.040	002	EPA 524.2	Bromobenzene
104.040	003	EPA 524.2	Bromochloromethane
104.040	006	EPA 524.2	Bromomethane
104.040	007	EPA 524.2	n-Butylbenzene
104.040	008	EPA 524.2	sec-Butylbenzene
104.040	009	EPA 524.2	tert-Butylbenzene
104.040	010	EPA 524.2	Carbon Tetrachloride
104.040	011	EPA 524.2	Chlorobenzene
104.040	012	EPA 524.2	Chloroethane
104.040	014	EPA 524.2	Chloromethane
104.040	015	EPA 524.2	2-Chlorotoluene
104.040	016	EPA 524.2	4-Chlorotoluene
104.040	018	EPA 524.2	Dibromomethane
104.040	019	EPA 524.2	1,3-Dichlorobenzene
104.040	020	EPA 524.2	1,2-Dichlorobenzene
104.040	021	EPA 524.2	1,4-Dichlorobenzene
104.040	022	EPA 524.2	Dichlorodifluoromethane
104.040	023	EPA 524.2	1,1-Dichloroethane
104.040	024	EPA 524.2	1,2-Dichloroethane
104.040	025	EPA 524.2	1,1-Dichloroethene
104.040	026	EPA 524.2	cis-1,2-Dichloroethene

104.040	027	EPA 524.2	trans-1,2-Dichloroethene
104.040	028	EPA 524.2	Dichloromethane
104.040	029	EPA 524.2	1,2-Dichloropropane
104.040	030	EPA 524.2	1,3-Dichloropropane
104.040	031	EPA 524.2	2,2-Dichloropropane
104.040	032	EPA 524.2	1,1-Dichloropropene
104.040	033	EPA 524.2	cis-1,3-Dichloropropene
104.040	034	EPA 524.2	trans-1,3-Dichloropropene
104.040	035	EPA 524.2	Ethylbenzene
104.040	036	EPA 524.2	Hexachlorobutadiene
104.040	037	EPA 524.2	Isopropylbenzene
104.040	038	EPA 524.2	4-Isopropyltoluene
104.040	039	EPA 524.2	Naphthalene
104.040	040	EPA 524.2	Nitrobenzene
104.040	041	EPA 524.2	N-propylbenzene
104.040	042	EPA 524.2	Styrene
104.040	043	EPA 524.2	1,1,1,2-Tetrachloroethane
104.040	044	EPA 524.2	1,1,2,2-Tetrachloroethane
104.040	045	EPA 524.2	Tetrachloroethene
104.040	046	EPA 524.2	Toluene
104.040	047	EPA 524.2	1,2,3-Trichlorobenzene
104.040	048	EPA 524.2	1,2,4-Trichlorobenzene
104.040	049	EPA 524.2	1,1,1-Trichloroethane
104.040	050	EPA 524.2	1,1,2-Trichloroethane
104.040	051	EPA 524.2	Trichloroethene
104.040	052	EPA 524.2	Trichlorofluoromethane
104.040	053	EPA 524.2	1,2,3-Trichloropropane
104.040	054	EPA 524.2	1,2,4-Trimethylbenzene
104.040	055	EPA 524.2	1,3,5-Trimethylbenzene
104.040	056	EPA 524.2	Vinyl Chloride
104.040	057	EPA 524.2	Xylenes, Total
104.045	001	EPA 524.2	Bromodichloromethane
104.045	002	EPA 524.2	Bromoform
104.045	003	EPA 524.2	Chloroform
104.045	004	EPA 524.2	Dibromochloromethane
104.045	005	EPA 524.2	Trihalomethanes
104.050	002	EPA 524.2	Methyl tert-butyl Ether (MTBE)
104.050	004	EPA 524.2	tert-Amyl Methyl Ether (TAME)
104.050	005	EPA 524.2	Ethyl tert-butyl Ether (ETBE)
104.050	006	EPA 524.2	Trichlorotrifluoroethane

**108 - Inorganic Chemistry of Wastewater**

108.016	001	EPA 110.2	Color
108.020	001	EPA 120.1	Conductivity
108.030	001	EPA 130.1	Hardness
108.040	001	EPA 130.2	Hardness
108.050	001	EPA 150.1	pH
108.060	001	EPA 160.1	Residue, Filterable
108.070	001	EPA 160.2	Residue, Non-filterable

108.080	001	EPA 160.3	Residue, Total
108.090	001	EPA 160.4	Residue, Volatile
108.100	001	EPA 160.5	Residue, Settleable
108.110	001	EPA 180.1	Turbidity
108.112	001	EPA 200.7	Boron
108.112	002	EPA 200.7	Calcium
108.112	004	EPA 200.7	Magnesium
108.112	005	EPA 200.7	Potassium
108.112	006	EPA 200.7	Silica
108.112	007	EPA 200.7	Sodium
108.120	001	EPA 300.0	Bromide
108.120	002	EPA 300.0	Chloride
108.120	003	EPA 300.0	Fluoride
108.120	004	EPA 300.0	Nitrate
108.120	005	EPA 300.0	Nitrite
108.120	006	EPA 300.0	Nitrate-nitrite, Total
108.120	007	EPA 300.0	Phosphate, Ortho
108.120	008	EPA 300.0	Sulfate
108.130	001	EPA 305.1	Acidity
108.140	001	EPA 310.1	Alkalinity
108.172	001	EPA 330.3	Chlorine Residual, Total
108.180	001	EPA 335.1	Cyanide, amenable
108.181	001	EPA 335.2	Cyanide, Total
108.191	001	EPA 340.2	Fluoride
108.201	001	EPA 350.2	Ammonia
108.212	001	EPA 351.3	Kjeldahl Nitrogen
108.234	001	EPA 353.3	Nitrate-nitrite, Total
108.235	001	EPA 353.3	Nitrate calc.
108.262	001	EPA 365.2	Phosphate, Ortho
108.263	001	EPA 365.2	Phosphorus, Total
108.270	001	EPA 370.1	Dissolved Silica
108.290	001	EPA 376.1	Sulfide
108.291	001	EPA 376.2	Sulfide
108.300	001	EPA 377.1	Sulfite
108.310	001	EPA 405.1	Biochemical Oxygen Demand
108.323	001	EPA 410.4	Chemical Oxygen Demand
108.330	001	EPA 413.1	Oil and Grease
108.340	001	EPA 415.1	Total Organic Carbon
108.350	001	EPA 418.1	Total Recoverable Petroleum Hydrocarbons
108.360	001	EPA 420.1	Phenols, Total
108.370	001	EPA 425.1	Surfactants
108.380	001	EPA 1664	Oil and Grease
108.390	001	SM2130B	Turbidity
108.400	001	SM2310B	Acidity
108.410	001	SM2320B	Alkalinity
108.420	001	SM2340B	Hardness (calc.)
108.421	001	SM2340C	Hardness
108.430	001	SM2510B	Conductivity

108.440	001	SM2540B	Residue, Total
108.441	001	SM2540C	Residue, Filterable
108.442	001	SM2540D	Residue, Non-filterable
108.443	001	SM2540F	Residue, Settleable
108.480	001	SM4500-F C	Fluoride
108.490	001	SM4500-H+ B	pH
108.590	001	SM5210B	Biochemical Oxygen Demand
108.602	001	SM5220D	Chemical Oxygen Demand
108.610	001	SM5310B	Total Organic Carbon
108.630	001	SM5520B	Oil and Grease

**109 - Toxic Chemical Elements of Wastewater**

109.010	001	EPA 200.7	Aluminum
109.010	002	EPA 200.7	Antimony
109.010	003	EPA 200.7	Arsenic
109.010	004	EPA 200.7	Barium
109.010	005	EPA 200.7	Beryllium
109.010	007	EPA 200.7	Cadmium
109.010	009	EPA 200.7	Chromium
109.010	010	EPA 200.7	Cobalt
109.010	011	EPA 200.7	Copper
109.010	012	EPA 200.7	Iron
109.010	013	EPA 200.7	Lead
109.010	015	EPA 200.7	Manganese
109.010	016	EPA 200.7	Molybdenum
109.010	017	EPA 200.7	Nickel
109.010	019	EPA 200.7	Selenium
109.010	021	EPA 200.7	Silver
109.010	023	EPA 200.7	Thallium
109.010	024	EPA 200.7	Tin
109.010	025	EPA 200.7	Titanium
109.010	026	EPA 200.7	Vanadium
109.010	027	EPA 200.7	Zinc
109.020	001	EPA 200.8	Aluminum
109.020	002	EPA 200.8	Antimony
109.020	003	EPA 200.8	Arsenic
109.020	004	EPA 200.8	Barium
109.020	005	EPA 200.8	Beryllium
109.020	006	EPA 200.8	Cadmium
109.020	007	EPA 200.8	Chromium
109.020	008	EPA 200.8	Cobalt
109.020	010	EPA 200.8	Lead
109.020	011	EPA 200.8	Manganese
109.020	012	EPA 200.8	Molybdenum
109.020	013	EPA 200.8	Nickel
109.020	014	EPA 200.8	Selenium
109.020	015	EPA 200.8	Silver
109.020	016	EPA 200.8	Thallium
109.020	017	EPA 200.8	Vanadium

109.020	018	EPA 200.8	Zinc
109.104	001	EPA 218.6	Chromium (VI)

**110 - Volatile Organic Chemistry of Wastewater**

110.040	001	EPA 624	Benzene
110.040	002	EPA 624	Bromodichloromethane
110.040	003	EPA 624	Bromoform
110.040	004	EPA 624	Bromomethane
110.040	005	EPA 624	Carbon Tetrachloride
110.040	006	EPA 624	Chlorobenzene
110.040	007	EPA 624	Chloroethane
110.040	008	EPA 624	2-Chloroethyl Vinyl Ether
110.040	009	EPA 624	Chloroform
110.040	010	EPA 624	Chloromethane
110.040	011	EPA 624	Dibromochloromethane
110.040	012	EPA 624	1,2-Dichlorobenzene
110.040	013	EPA 624	1,3-Dichlorobenzene
110.040	014	EPA 624	1,4-Dichlorobenzene
110.040	015	EPA 624	1,1-Dichloroethane
110.040	016	EPA 624	1,2-Dichloroethane
110.040	017	EPA 624	1,1-Dichloroethene
110.040	018	EPA 624	trans-1,2-Dichloroethene
110.040	019	EPA 624	1,2-Dichloropropane
110.040	020	EPA 624	cis-1,3-Dichloropropene
110.040	021	EPA 624	trans-1,3-Dichloropropene
110.040	022	EPA 624	Ethylbenzene
110.040	023	EPA 624	Methylene Chloride
110.040	024	EPA 624	1,1,2,2-Tetrachloroethane
110.040	025	EPA 624	Tetrachloroethene
110.040	026	EPA 624	Toluene
110.040	027	EPA 624	1,1,1-Trichloroethane
110.040	028	EPA 624	1,1,2-Trichloroethane
110.040	029	EPA 624	Trichloroethene
110.040	030	EPA 624	Trichlorofluoromethane
110.040	031	EPA 624	Vinyl Chloride
110.040	042	EPA 624	Oxygenates

**111 - Semi-volatile Organic Chemistry of Wastewater**

111.100	001	EPA 625	Acenaphthene
111.100	002	EPA 625	Acenaphthylene
111.100	003	EPA 625	Anthracene
111.100	004	EPA 625	Benzidine
111.100	005	EPA 625	Benz(a)anthracene
111.100	006	EPA 625	Benzo(b)fluoranthene
111.100	007	EPA 625	Benzo(k)fluoranthene
111.100	008	EPA 625	Benzo(g,h,i)perylene
111.100	009	EPA 625	Benzo(a)pyrene
111.100	010	EPA 625	Benzyl Butyl Phthalate
111.100	011	EPA 625	Bis(2-chloroethoxy)methane
111.100	012	EPA 625	Bis(2-chloroethyl) Ether

111.100	013	EPA 625	Bis(2-chloroisopropyl) Ether
111.100	014	EPA 625	Di(2-ethylhexyl) Phthalate
111.100	015	EPA 625	4-Bromophenyl Phenyl Ether
111.100	016	EPA 625	4-Chloro-3-methylphenol
111.100	017	EPA 625	2-Chloronaphthalene
111.100	018	EPA 625	2-Chlorophenol
111.100	019	EPA 625	4-Chlorophenyl Phenyl Ether
111.100	020	EPA 625	Chrysene
111.100	021	EPA 625	Dibenz(a,h)anthracene
111.100	022	EPA 625	1,2-Dichlorobenzene
111.100	023	EPA 625	1,3-Dichlorobenzene
111.100	024	EPA 625	1,4-Dichlorobenzene
111.100	025	EPA 625	3,3'-Dichlorobenzidine
111.100	026	EPA 625	2,4-Dichlorophenol
111.100	027	EPA 625	Diethyl Phthalate
111.100	028	EPA 625	2,4-Dimethylphenol
111.100	029	EPA 625	Dimethyl Phthalate
111.100	030	EPA 625	Di-n-butyl phthalate
111.100	031	EPA 625	Di-n-octyl phthalate
111.100	032	EPA 625	2,4-Dinitrophenol
111.100	033	EPA 625	2,4-Dinitrotoluene
111.100	034	EPA 625	2,6-Dinitrotoluene
111.100	035	EPA 625	Fluoranthene
111.100	036	EPA 625	Fluorene
111.100	037	EPA 625	Hexachlorobenzene
111.100	038	EPA 625	Hexachlorobutadiene
111.100	039	EPA 625	Hexachlorocyclopentadiene
111.100	040	EPA 625	Hexachloroethane
111.100	041	EPA 625	Indeno(1,2,3-c,d)pyrene
111.100	042	EPA 625	Isophorone
111.100	043	EPA 625	2-Methyl-4,6-dinitrophenol
111.100	044	EPA 625	Naphthalene
111.100	045	EPA 625	Nitrobenzene
111.100	046	EPA 625	2-Nitrophenol
111.100	047	EPA 625	4-Nitrophenol
111.100	048	EPA 625	N-nitrosodimethylamine
111.100	049	EPA 625	N-nitrosodi-n-propylamine
111.100	050	EPA 625	N-nitrosodiphenylamine
111.100	051	EPA 625	Pentachlorophenol
111.100	052	EPA 625	Phenanthrene
111.100	053	EPA 625	Phenol
111.100	054	EPA 625	Pyrene
111.100	055	EPA 625	1,2,4-Trichlorobenzene
111.100	056	EPA 625	2,4,6-Trichlorophenol
111.170	001	EPA 608	Aldrin
111.170	002	EPA 608	a-BHC
111.170	003	EPA 608	b-BHC
111.170	004	EPA 608	d-BHC

111.170	005	EPA 608	g-BHC (Lindane)
111.170	006	EPA 608	Chlordane
111.170	007	EPA 608	4,4'-DDD
111.170	008	EPA 608	4,4'-DDE
111.170	009	EPA 608	4,4'-DDT
111.170	010	EPA 608	Dieldrin
111.170	011	EPA 608	Endosulfan I
111.170	012	EPA 608	Endosulfan II
111.170	013	EPA 608	Endosulfan Sulfate
111.170	014	EPA 608	Endrin
111.170	015	EPA 608	Endrin Aldehyde
111.170	016	EPA 608	Heptachlor
111.170	017	EPA 608	Heptachlor Epoxide
111.170	018	EPA 608	Toxaphene
111.170	019	EPA 608	PCB-1016
111.170	020	EPA 608	PCB-1221
111.170	021	EPA 608	PCB-1232
111.170	022	EPA 608	PCB-1242
111.170	023	EPA 608	PCB-1248
111.170	024	EPA 608	PCB-1254
111.170	025	EPA 608	PCB-1260
111.170	031	EPA 608	PCBs

**114 - Inorganic Chemistry of Hazardous Waste**

114.010	001	EPA 6010B	Antimony
114.010	002	EPA 6010B	Arsenic
114.010	003	EPA 6010B	Barium
114.010	004	EPA 6010B	Beryllium
114.010	005	EPA 6010B	Cadmium
114.010	006	EPA 6010B	Chromium
114.010	007	EPA 6010B	Cobalt
114.010	008	EPA 6010B	Copper
114.010	009	EPA 6010B	Lead
114.010	010	EPA 6010B	Molybdenum
114.010	011	EPA 6010B	Nickel
114.010	012	EPA 6010B	Selenium
114.010	013	EPA 6010B	Silver
114.010	014	EPA 6010B	Thallium
114.010	015	EPA 6010B	Vanadium
114.010	016	EPA 6010B	Zinc
114.020	001	EPA 6020	Antimony
114.020	002	EPA 6020	Arsenic
114.020	003	EPA 6020	Barium
114.020	004	EPA 6020	Beryllium
114.020	005	EPA 6020	Cadmium
114.020	006	EPA 6020	Chromium
114.020	007	EPA 6020	Cobalt
114.020	008	EPA 6020	Copper
114.020	009	EPA 6020	Lead

114.020	010	EPA 6020	Molybdenum
114.020	011	EPA 6020	Nickel
114.020	012	EPA 6020	Selenium
114.020	013	EPA 6020	Silver
114.020	014	EPA 6020	Thallium
114.020	015	EPA 6020	Vanadium
114.020	016	EPA 6020	Zinc
114.031	001	EPA 7041	Antimony
114.040	001	EPA 7060A	Arsenic
114.081	001	EPA 7131A	Cadmium
114.091	001	EPA 7191	Chromium
114.103	001	EPA 7196A	Chromium (VI)
114.106	001	EPA 7199	Chromium (VI)
114.121	001	EPA 7211	Copper
114.131	001	EPA 7421	Lead
114.140	001	EPA 7470A	Mercury
114.141	001	EPA 7471A	Mercury
114.170	001	EPA 7740	Selenium
114.181	001	EPA 7761	Silver
114.191	001	EPA 7841	Thallium
114.222	001	EPA 9014	Cyanide
114.230	001	EPA 9034	Sulfides, Total
114.240	001	EPA 9040	pH
114.241	001	EPA 9045	pH
114.250	001	EPA 9056	Fluoride

**115 - Extraction Test of Hazardous Waste**

115.020	001	EPA 1311	Toxicity Characteristic Leaching Procedure (TCLP)
115.030	001	CCR Chapter 11, Article 5, Appendix II	Waste Extraction Test (WET)
115.040	001	EPA 1312	Synthetic Precipitation Leaching Procedure (SPLP)

**116 - Volatile Organic Chemistry of Hazardous Waste**

116.010	001	EPA 8011	1,2-Dibromoethane
116.010	002	EPA 8011	Dibromochloropropane
116.020	011	EPA 8015B	Ethylene Glycol
116.030	001	EPA 8015B	Gasoline-range Organics
116.040	002	EPA 8021B	Benzene
116.040	039	EPA 8021B	Ethylbenzene
116.040	041	EPA 8021B	Methyl tert-butyl Ether (MTBE)
116.040	047	EPA 8021B	Toluene
116.040	056	EPA 8021B	Xylenes, Total
116.080	001	EPA 8260B	Acetone
116.080	002	EPA 8260B	Acetonitrile
116.080	003	EPA 8260B	Acrolein
116.080	004	EPA 8260B	Acrylonitrile
116.080	005	EPA 8260B	Allyl Alcohol
116.080	006	EPA 8260B	Allyl Chloride
116.080	007	EPA 8260B	Benzene
116.080	009	EPA 8260B	Bromoacetone
116.080	010	EPA 8260B	Bromochloromethane



116.080	011	EPA 8260B	Bromodichloromethane
116.080	012	EPA 8260B	Bromoform
116.080	013	EPA 8260B	Bromomethane
116.080	014	EPA 8260B	n-Butyl Alcohol
116.080	015	EPA 8260B	Carbon Disulfide
116.080	016	EPA 8260B	Carbon Tetrachloride
116.080	018	EPA 8260B	Chlorobenzene
116.080	019	EPA 8260B	Chloroethane
116.080	020	EPA 8260B	2-Chloroethyl Vinyl Ether
116.080	021	EPA 8260B	Chloroform
116.080	022	EPA 8260B	Chloromethane
116.080	023	EPA 8260B	Chloroprene
116.080	024	EPA 8260B	3-Chloropropionitrile
116.080	025	EPA 8260B	Crotonaldehyde
116.080	026	EPA 8260B	Dibromochloromethane
116.080	027	EPA 8260B	Dibromochloropropane
116.080	028	EPA 8260B	1,2-Dibromoethane
116.080	030	EPA 8260B	Dibromomethane
116.080	031	EPA 8260B	1,2-Dichlorobenzene
116.080	032	EPA 8260B	1,3-Dichlorobenzene
116.080	033	EPA 8260B	1,4-Dichlorobenzene
116.080	034	EPA 8260B	cis-1,4-Dichloro-2-butene
116.080	035	EPA 8260B	trans-1,4-Dichloro-2-butene
116.080	036	EPA 8260B	Dichlorodifluoromethane
116.080	037	EPA 8260B	1,1-Dichloroethane
116.080	038	EPA 8260B	1,2-Dichloroethane
116.080	039	EPA 8260B	1,1-Dichloroethene
116.080	040	EPA 8260B	trans-1,2-Dichloroethene
116.080	041	EPA 8260B	cis-1,2-Dichloroethene
116.080	042	EPA 8260B	1,2-Dichloropropane
116.080	043	EPA 8260B	1,3-Dichloropropane
116.080	044	EPA 8260B	2,2-Dichloropropane
116.080	045	EPA 8260B	1,1-Dichloropropene
116.080	046	EPA 8260B	cis-1,3-Dichloropropene
116.080	047	EPA 8260B	trans-1,3-Dichloropropene
116.080	048	EPA 8260B	1,3-Dichloro-2-propanol
116.080	049	EPA 8260B	1,2,3,4-Diepoxybutane
116.080	050	EPA 8260B	1,4-Dioxane
116.080	053	EPA 8260B	Ethylbenzene
116.080	055	EPA 8260B	Ethyl Methacrylate
116.080	056	EPA 8260B	Hexachlorobutadiene
116.080	058	EPA 8260B	2-Hexanone (MBK)
116.080	059	EPA 8260B	Iodomethane
116.080	060	EPA 8260B	Isobutyl Alcohol
116.080	061	EPA 8260B	Malononitrile
116.080	062	EPA 8260B	Methacrylonitrile
116.080	064	EPA 8260B	Methyl tert-butyl Ether (MTBE)
116.080	065	EPA 8260B	Methylene Chloride

116.080	066	EPA 8260B	Methyl Ethyl Ketone
116.080	067	EPA 8260B	Methyl Methacrylate
116.080	068	EPA 8260B	4-Methyl-2-pentanone (MIBK)
116.080	069	EPA 8260B	Naphthalene
116.080	070	EPA 8260B	Nitrobenzene
116.080	072	EPA 8260B	N-nitrosodi-n-butylamine
116.080	074	EPA 8260B	Pentachloroethane
116.080	075	EPA 8260B	Pentafluorobenzene
116.080	076	EPA 8260B	2-Picoline
116.080	078	EPA 8260B	Propionitrile
116.080	079	EPA 8260B	N-propylamine
116.080	080	EPA 8260B	Pyridine
116.080	081	EPA 8260B	1,1,1,2-Tetrachloroethane
116.080	082	EPA 8260B	1,1,2,2-Tetrachloroethane
116.080	083	EPA 8260B	Tetrachloroethene
116.080	084	EPA 8260B	Toluene
116.080	086	EPA 8260B	1,2,3-Trichlorobenzene
116.080	087	EPA 8260B	1,2,4-Trichlorobenzene
116.080	088	EPA 8260B	1,1,1-Trichloroethane
116.080	089	EPA 8260B	1,1,2-Trichloroethane
116.080	090	EPA 8260B	Trichloroethene
116.080	091	EPA 8260B	Trichlorofluoromethane
116.080	092	EPA 8260B	1,2,3-Trichloropropane
116.080	093	EPA 8260B	Vinyl Acetate
116.080	094	EPA 8260B	Vinyl Chloride
116.080	095	EPA 8260B	Xylenes, Total
116.080	096	EPA 8260B	tert-Amyl Methyl Ether (TAME)
116.080	097	EPA 8260B	tert-Butyl Alcohol (TBA)
116.080	098	EPA 8260B	Ethyl tert-butyl Ether (ETBE)
116.080	099	EPA 8260B	Bromobenzene
116.080	100	EPA 8260B	n-Butylbenzene
116.080	101	EPA 8260B	sec-Butylbenzene
116.080	102	EPA 8260B	tert-Butylbenzene
116.080	103	EPA 8260B	2-Chlorotoluene
116.080	104	EPA 8260B	4-Chlorotoluene
116.080	105	EPA 8260B	Isopropylbenzene
116.080	106	EPA 8260B	N-propylbenzene
116.080	107	EPA 8260B	Styrene
116.080	108	EPA 8260B	1,2,4-Trimethylbenzene
116.080	109	EPA 8260B	1,3,5-Trimethylbenzene
116.100	001	LUFT GC/MS	Total Petroleum Hydrocarbons - Gasoline
116.100	002	LUFT GC/MS	Benzene
116.100	003	LUFT GC/MS	Toluene
116.100	004	LUFT GC/MS	Xylenes
116.100	005	LUFT GC/MS	Methyl tert-butyl Ether (MTBE)
116.110	001	LUFT	Total Petroleum Hydrocarbons - Gasoline

**117 - Semi-volatile Organic Chemistry of Hazardous Waste**

117.010	001	EPA 8015B	Diesel-range Total Petroleum Hydrocarbons
---------	-----	-----------	---

117.015	001	LUFT GC/MS	Diesel-range Total Petroleum Hydrocarbons
117.016	001	LUFT	Diesel-range Total Petroleum Hydrocarbons
117.017	001	EPA 418.1	TRPH Screening
117.110	001	EPA 8270C	Acenaphthene
117.110	002	EPA 8270C	Acenaphthylene
117.110	003	EPA 8270C	Acetophenone
117.110	004	EPA 8270C	2-Acetylaminofluorene
117.110	005	EPA 8270C	1-Acetyl-2-thiourea
117.110	006	EPA 8270C	4-Aminobiphenyl
117.110	007	EPA 8270C	Aniline
117.110	008	EPA 8270C	Anthracene
117.110	010	EPA 8270C	Benzidine
117.110	011	EPA 8270C	Benz(a)anthracene
117.110	012	EPA 8270C	Benzo(b)fluoranthene
117.110	013	EPA 8270C	Benzo(k)fluoranthene
117.110	014	EPA 8270C	Benzo(g,h,i)perylene
117.110	015	EPA 8270C	Benzo(a)pyrene
117.110	016	EPA 8270C	Benzoic Acid
117.110	018	EPA 8270C	Benzyl Alcohol
117.110	019	EPA 8270C	Benzyl Butyl Phthalate
117.110	020	EPA 8270C	Bis(2-chloroethoxy)methane
117.110	021	EPA 8270C	Bis(2-chloroethyl) Ether
117.110	022	EPA 8270C	Bis(2-chloroisopropyl) Ether
117.110	023	EPA 8270C	Di(2-ethylhexyl) Phthalate
117.110	024	EPA 8270C	4-Bromophenyl Phenyl Ether
117.110	025	EPA 8270C	Carbazole
117.110	026	EPA 8270C	4-Chloroaniline
117.110	027	EPA 8270C	4-Chloro-3-methylphenol
117.110	029	EPA 8270C	2-Chloronaphthalene
117.110	030	EPA 8270C	2-Chlorophenol
117.110	031	EPA 8270C	4-Chlorophenyl Phenyl Ether
117.110	032	EPA 8270C	Chrysene
117.110	033	EPA 8270C	2-Cyclohexyl-4,6-dinitrophenol
117.110	034	EPA 8270C	2,4-Diaminotoluene
117.110	036	EPA 8270C	Dibenz(a,h)anthracene
117.110	037	EPA 8270C	Dibenzofuran
117.110	038	EPA 8270C	Dibenzo(a,e)pyrene
117.110	039	EPA 8270C	1,2-Dichlorobenzene
117.110	040	EPA 8270C	1,3-Dichlorobenzene
117.110	041	EPA 8270C	1,4-Dichlorobenzene
117.110	042	EPA 8270C	3,3'-Dichlorobenzidine
117.110	043	EPA 8270C	2,4-Dichlorophenol
117.110	044	EPA 8270C	2,6-Dichlorophenol
117.110	045	EPA 8270C	Diethyl Phthalate
117.110	050	EPA 8270C	p-Dimethylaminoazobenzene
117.110	051	EPA 8270C	7,12-Dimethylbenz(a)anthracene
117.110	052	EPA 8270C	a,a-Dimethylphenethylamine
117.110	053	EPA 8270C	2,4-Dimethylphenol

117.110	054	EPA 8270C	Dimethyl Phthalate
117.110	055	EPA 8270C	Di-n-butyl phthalate
117.110	056	EPA 8270C	Di-n-octyl phthalate
117.110	060	EPA 8270C	2,4-Dinitrophenol
117.110	061	EPA 8270C	2,4-Dinitrotoluene
117.110	062	EPA 8270C	2,6-Dinitrotoluene
117.110	063	EPA 8270C	Diphenylamine
117.110	064	EPA 8270C	1,2-Diphenylhydrazine
117.110	066	EPA 8270C	Ethyl Methanesulfonate
117.110	067	EPA 8270C	Fluoranthene
117.110	068	EPA 8270C	Fluorene
117.110	069	EPA 8270C	Hexachlorobenzene
117.110	070	EPA 8270C	Hexachlorobutadiene
117.110	071	EPA 8270C	Hexachlorocyclopentadiene
117.110	072	EPA 8270C	Hexachloroethane
117.110	073	EPA 8270C	Hexachlorophene
117.110	074	EPA 8270C	Hexachloropropene
117.110	075	EPA 8270C	Indeno(1,2,3-c,d)pyrene
117.110	076	EPA 8270C	Isophorone
117.110	077	EPA 8270C	Isosafrole
117.110	078	EPA 8270C	Maleic Anhydride
117.110	079	EPA 8270C	3-Methylcholanthrene
117.110	080	EPA 8270C	2-Methyl-4,6-dinitrophenol
117.110	082	EPA 8270C	Methyl Methanesulfonate
117.110	083	EPA 8270C	2-Methylnaphthalene
117.110	084	EPA 8270C	2-Methylphenol
117.110	085	EPA 8270C	3-Methylphenol
117.110	086	EPA 8270C	4-Methylphenol
117.110	087	EPA 8270C	Naphthalene
117.110	088	EPA 8270C	1,4-Naphthoquinone
117.110	089	EPA 8270C	1-Naphthylamine
117.110	090	EPA 8270C	2-Naphthylamine
117.110	092	EPA 8270C	2-Nitroaniline
117.110	093	EPA 8270C	3-Nitroaniline
117.110	094	EPA 8270C	4-Nitroaniline
117.110	095	EPA 8270C	Nitrobenzene
117.110	096	EPA 8270C	2-Nitrophenol
117.110	097	EPA 8270C	4-Nitrophenol
117.110	098	EPA 8270C	N-nitrosodi-n-butylamine
117.110	099	EPA 8270C	N-nitrosodiethylamine
117.110	100	EPA 8270C	N-nitrosodimethylamine
117.110	101	EPA 8270C	N-nitrosodi-n-propylamine
117.110	102	EPA 8270C	N-nitrosodiphenylamine
117.110	103	EPA 8270C	N-nitrosomethylethylamine
117.110	104	EPA 8270C	N-nitrosomorpholine
117.110	105	EPA 8270C	N-nitrosopiperidine
117.110	106	EPA 8270C	N-nitrosopyrrolidine
117.110	107	EPA 8270C	5-Nitro-o-toluidine

117.110	108	EPA 8270C	Pentachlorobenzene
117.110	109	EPA 8270C	Pentachloronitrobenzene
117.110	110	EPA 8270C	Pentachlorophenol
117.110	111	EPA 8270C	Phenacetin
117.110	112	EPA 8270C	Phenanthrene
117.110	113	EPA 8270C	Phenol
117.110	116	EPA 8270C	2-Picoline
117.110	119	EPA 8270C	Pyrene
117.110	120	EPA 8270C	Pyridine
117.110	122	EPA 8270C	Safrole
117.110	124	EPA 8270C	1,2,4,5-Tetrachlorobenzene
117.110	125	EPA 8270C	2,3,4,6-Tetrachlorophenol
117.110	128	EPA 8270C	o-Toluidine
117.110	129	EPA 8270C	1,2,4-Trichlorobenzene
117.110	130	EPA 8270C	2,4,5-Trichlorophenol
117.110	131	EPA 8270C	2,4,6-Trichlorophenol
117.110	132	EPA 8270C	1,3,5-Trinitrobenzene
117.111	025	EPA 8270C	Dimethoate
117.111	026	EPA 8270C	Dinoseb
117.111	036	EPA 8270C	Famphur
117.111	039	EPA 8270C	Isodrin
117.111	040	EPA 8270C	Kepone
117.111	054	EPA 8270C	Parathion Ethyl
117.111	055	EPA 8270C	Parathion Methyl
117.111	056	EPA 8270C	Phorate
117.111	058	EPA 8270C	Sulfotepp
117.111	061	EPA 8270C	O,O,O-triethyl Phosphorothioate
117.140	001	EPA 8310	Acenaphthene
117.140	002	EPA 8310	Acenaphthylene
117.140	003	EPA 8310	Anthracene
117.140	004	EPA 8310	Benz(a)anthracene
117.140	005	EPA 8310	Benzo(a)pyrene
117.140	006	EPA 8310	Benzo(b)fluoranthene
117.140	007	EPA 8310	Benzo(k)fluoranthene
117.140	008	EPA 8310	Benzo(g,h,i)perylene
117.140	009	EPA 8310	Chrysene
117.140	010	EPA 8310	Dibenz(a,h)anthracene
117.140	011	EPA 8310	Fluoranthene
117.140	012	EPA 8310	Fluorene
117.140	013	EPA 8310	Indeno(1,2,3-c,d)pyrene
117.140	014	EPA 8310	Naphthalene
117.140	015	EPA 8310	Phenanthrene
117.140	016	EPA 8310	Pyrene
117.170	001	EPA 8330	4-Amino-2,6-dinitrotoluene
117.170	002	EPA 8330	2-Amino-4,6-dinitrotoluene
117.170	003	EPA 8330	1,3-Dinitrobenzene
117.170	004	EPA 8330	2,4-Dinitrotoluene
117.170	005	EPA 8330	2,6-Dinitrotoluene

117.170	006	EPA 8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)
117.170	007	EPA 8330	Methyl-2,4,6-trinitrophenylnitramine
117.170	008	EPA 8330	Nitrobenzene
117.170	009	EPA 8330	2-Nitrotoluene
117.170	010	EPA 8330	3-Nitrotoluene
117.170	011	EPA 8330	4-Nitrotoluene
117.170	012	EPA 8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
117.170	013	EPA 8330	1,3,5-Trinitrobenzene
117.170	014	EPA 8330	2,4,6-Trinitrotoluene
117.190	001	EPA 8332	Nitroglycerine
117.210	001	EPA 8081A	Aldrin
117.210	002	EPA 8081A	a-BHC
117.210	003	EPA 8081A	b-BHC
117.210	004	EPA 8081A	d-BHC
117.210	005	EPA 8081A	g-BHC (Lindane)
117.210	007	EPA 8081A	a-Chlordane
117.210	008	EPA 8081A	g-Chlordane
117.210	009	EPA 8081A	Chlordane (tech.)
117.210	010	EPA 8081A	Chlorobenzilate
117.210	011	EPA 8081A	Chloroneb
117.210	012	EPA 8081A	Chlorothalonil
117.210	013	EPA 8081A	4,4'-DDD
117.210	014	EPA 8081A	4,4'-DDE
117.210	015	EPA 8081A	4,4'-DDT
117.210	016	EPA 8081A	Diallate
117.210	020	EPA 8081A	Dieldrin
117.210	021	EPA 8081A	Endosulfan I
117.210	022	EPA 8081A	Endosulfan II
117.210	023	EPA 8081A	Endosulfan Sulfate
117.210	024	EPA 8081A	Endrin
117.210	025	EPA 8081A	Endrin Aldehyde
117.210	026	EPA 8081A	Endrin Ketone
117.210	027	EPA 8081A	Heptachlor
117.210	028	EPA 8081A	Heptachlor Epoxide
117.210	029	EPA 8081A	Hexachlorobenzene
117.210	033	EPA 8081A	Methoxychlor
117.210	039	EPA 8081A	Toxaphene
117.220	001	EPA 8082	PCB-1016
117.220	002	EPA 8082	PCB-1221
117.220	003	EPA 8082	PCB-1232
117.220	004	EPA 8082	PCB-1242
117.220	005	EPA 8082	PCB-1248
117.220	006	EPA 8082	PCB-1254
117.220	007	EPA 8082	PCB-1260
117.220	008	EPA 8082	2-Chlorobiphenyl
117.220	009	EPA 8082	2,3-Dichlorobiphenyl
117.220	010	EPA 8082	2,2',5-Trichlorobiphenyl
117.220	011	EPA 8082	2,4',5-Trichlorobiphenyl

117.220	012	EPA 8082	2,2',3,5'-Tetrachlorobiphenyl
117.220	013	EPA 8082	2,2',5,5'-Tetrachlorobiphenyl
117.220	014	EPA 8082	2,3',4,4'-Tetrachlorobiphenyl
117.220	015	EPA 8082	2,2',3,4,5'-Pentachlorobiphenyl
117.220	016	EPA 8082	2,2',4,5,5'-Pentachlorobiphenyl
117.220	017	EPA 8082	2,3,3',4',6-Pentachlorobiphenyl
117.220	018	EPA 8082	2,2',3,4,4',5'-Hexachlorobiphenyl
117.220	019	EPA 8082	2,2',3,4,5,5'-Hexachlorobiphenyl
117.220	020	EPA 8082	2,2',3,5,5',6-Hexachlorobiphenyl
117.220	021	EPA 8082	2,2',4,4',5,5'-Hexachlorobiphenyl
117.220	022	EPA 8082	2,2',3,3',4,4',5-Heptachlorobiphenyl
117.220	023	EPA 8082	2,2',3,4,4',5,5'-Heptachlorobiphenyl
117.220	024	EPA 8082	2,2',3,4,4',5',6-Heptachlorobiphenyl
117.220	025	EPA 8082	2,2',3,4',5,5',6-Heptachlorobiphenyl
117.220	026	EPA 8082	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl
117.240	001	EPA 8141A	Atrazine
117.240	002	EPA 8141A	Azinphos Methyl
117.240	004	EPA 8141A	Chlorfenvinphos
117.240	005	EPA 8141A	Chlorpyrifos
117.240	006	EPA 8141A	Chlorpyrifos Methyl
117.240	007	EPA 8141A	Demeton-O
117.240	008	EPA 8141A	Demeton-S
117.240	009	EPA 8141A	Diazinon
117.240	010	EPA 8141A	Dimethoate
117.240	012	EPA 8141A	EPN
117.240	013	EPA 8141A	Ethion
117.240	014	EPA 8141A	Famphur
117.240	015	EPA 8141A	Malathion
117.240	016	EPA 8141A	Mevinphos
117.240	017	EPA 8141A	Naled
117.240	018	EPA 8141A	Parathion Ethyl
117.240	019	EPA 8141A	Parathion Methyl
117.240	020	EPA 8141A	Phorate
117.240	022	EPA 8141A	Ronnel
117.240	024	EPA 8141A	Sulfotepp
117.240	026	EPA 8141A	Thionazin
117.250	001	EPA 8151A	2,4-D
117.250	002	EPA 8151A	2,4-DB
117.250	003	EPA 8151A	2,4,5-T
117.250	004	EPA 8151A	2,4,5-TP
117.250	006	EPA 8151A	Dalapon
117.250	007	EPA 8151A	Dichlorprop
117.250	008	EPA 8151A	Dinoseb
117.250	009	EPA 8151A	MCPA
117.250	010	EPA 8151A	MCPP
117.250	011	EPA 8151A	4-Nitrophenol
117.250	012	EPA 8151A	Pentachlorophenol
117.250	013	EPA 8151A	Picloram

117.250	014	EPA 8151A	Dicamba
117.250	015	EPA 8151A	3,5-Dichlorobenzoic Acid
117.250	016	EPA 8151A	Acifluorfen
117.250	017	EPA 8151A	Bentazon
117.250	018	EPA 8151A	Chloramben
117.250	019	EPA 8151A	DCPA

**120 - Physical Properties of Hazardous Waste**

120.010	001	EPA 1010	Ignitability
120.040	001	Section 7.3 SW-846	Reactive Cyanide
120.050	001	Section 7.3 SW-846	Reactive Sulfide
120.070	001	EPA 9040B	Corrosivity - pH Determination
120.080	001	EPA 9045C	Corrosivity - pH Determination





STATE OF CALIFORNIA  
DEPARTMENT OF HEALTH SERVICES  
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

NELAP - RECOGNIZED

**ACCREDITATION**

Is hereby granted to

**EMAX LABORATORIES, INC.**

1835 WEST 205th STREET  
TORRANCE, CA 90501

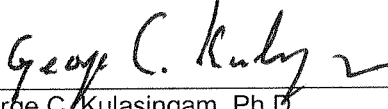
Scope of accreditation is limited to the  
"NELAP Fields of Accreditation"  
which accompanies this Certificate.

Continued accredited status depends on successful  
ongoing participation in the program.

This Certificate is granted in accordance with provisions of  
Section 100825, et seq. of the Health and Safety Code.

Certificate No.: **02116CA**  
Expiration Date: **08/31/2007**  
Effective Date: **08/31/2006**

Richmond, California  
subject to forfeiture or revocation

  
\_\_\_\_\_  
George C. Kulasingam, Ph.D.  
Program Chief  
Environmental Laboratory Accreditation Program



**CALIFORNIA DEPARTMENT OF HEALTH SERVICES**  
**ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM - NELAP RECOGNIZED**  
 Fields of Accreditation



**EMAX LABORATORIES, INC.**

**Lab Phone (310) 618-8889**

1835 WEST 205th STREET  
 TORRANCE, CA 90501

**Certificate No: 02116CA    Renew Date: 08/31/2007**

**102 - Inorganic Chemistry of Drinking Water**

102.030	001	EPA 300.0	Bromide
102.030	002	EPA 300.0	Chlorate
102.030	003	EPA 300.0	Chloride
102.030	005	EPA 300.0	Fluoride
102.030	006	EPA 300.0	Nitrate
102.030	007	EPA 300.0	Nitrite
102.030	008	EPA 300.0	Phosphate, Ortho
102.030	010	EPA 300.0	Sulfate
102.040	004	EPA 300.1	Bromate
102.045	001	EPA 314.0	Perchlorate
102.100	001	SM2320B	Alkalinity
102.120	001	SM2340B	Hardness
102.121	001	SM2340C	Hardness
102.130	001	SM2510B	Conductivity
102.140	001	SM2540C	Total Dissolved Solids
102.145	001	EPA 160.1	Total Dissolved Solids
102.150	001	SM4110B	Chloride
102.150	002	SM4110B	Fluoride
102.150	003	SM4110B	Nitrate
102.150	004	SM4110B	Nitrite
102.150	005	SM4110B	Phosphate, Ortho
102.150	006	SM4110B	Sulfate
102.200	001	SM4500-F C	Fluoride
102.260	001	SM5310B	Total Organic Carbon
102.261	001	SM5310B	DOC
102.270	001	SM5540C	Surfactants
102.520	001	EPA 200.7	Calcium
102.520	002	EPA 200.7	Magnesium
102.520	003	EPA 200.7	Potassium
102.520	004	EPA 200.7	Silica
102.520	005	EPA 200.7	Sodium

**103 - Toxic Chemical Elements of Drinking Water**

103.130	001	EPA 200.7	Aluminum
---------	-----	-----------	----------

As of 09/20/2006, this list supersedes all previous lists for this certificate number.  
 Customers: Please verify the current accreditation standing with the State.

103.130	003	EPA 200.7	Barium
103.130	004	EPA 200.7	Beryllium
103.130	005	EPA 200.7	Cadmium
103.130	007	EPA 200.7	Chromium
103.130	008	EPA 200.7	Copper
103.130	009	EPA 200.7	Iron
103.130	011	EPA 200.7	Manganese
103.130	012	EPA 200.7	Nickel
103.130	015	EPA 200.7	Silver
103.130	017	EPA 200.7	Zinc
103.140	001	EPA 200.8	Aluminum
103.140	002	EPA 200.8	Antimony
103.140	003	EPA 200.8	Arsenic
103.140	004	EPA 200.8	Barium
103.140	005	EPA 200.8	Beryllium
103.140	006	EPA 200.8	Cadmium
103.140	007	EPA 200.8	Chromium
103.140	008	EPA 200.8	Copper
103.140	009	EPA 200.8	Lead
103.140	010	EPA 200.8	Manganese
103.140	011	EPA 200.8	Mercury
103.140	012	EPA 200.8	Nickel
103.140	013	EPA 200.8	Selenium
103.140	014	EPA 200.8	Silver
103.140	015	EPA 200.8	Thallium
103.140	016	EPA 200.8	Zinc
103.161	001	EPA 245.2	Mercury

**104 - Volatile Organic Chemistry of Drinking Water**

104.030	001	EPA 504.1	1,2-Dibromoethane
104.030	002	EPA 504.1	1,2-Dibromo-3-chloropropane
104.040	000	EPA 524.2	Volatile Organic Compounds
104.040	001	EPA 524.2	Benzene
104.040	002	EPA 524.2	Bromobenzene
104.040	003	EPA 524.2	Bromochloromethane
104.040	006	EPA 524.2	Bromomethane
104.040	007	EPA 524.2	n-Butylbenzene
104.040	008	EPA 524.2	sec-Butylbenzene
104.040	009	EPA 524.2	tert-Butylbenzene
104.040	010	EPA 524.2	Carbon Tetrachloride
104.040	011	EPA 524.2	Chlorobenzene
104.040	012	EPA 524.2	Chloroethane

104.040	014	EPA 524.2	Chloromethane
104.040	015	EPA 524.2	2-Chlorotoluene
104.040	016	EPA 524.2	4-Chlorotoluene
104.040	018	EPA 524.2	Dibromomethane
104.040	019	EPA 524.2	1,3-Dichlorobenzene
104.040	020	EPA 524.2	1,2-Dichlorobenzene
104.040	021	EPA 524.2	1,4-Dichlorobenzene
104.040	022	EPA 524.2	Dichlorodifluoromethane
104.040	023	EPA 524.2	1,1-Dichloroethane
104.040	024	EPA 524.2	1,2-Dichloroethane
104.040	025	EPA 524.2	1,1-Dichloroethene
104.040	026	EPA 524.2	cis-1,2-Dichloroethene
104.040	027	EPA 524.2	trans-1,2-Dichloroethene
104.040	028	EPA 524.2	Dichloromethane
104.040	029	EPA 524.2	1,2-Dichloropropane
104.040	030	EPA 524.2	1,3-Dichloropropane
104.040	031	EPA 524.2	2,2-Dichloropropane
104.040	032	EPA 524.2	1,1-Dichloropropene
104.040	033	EPA 524.2	cis-1,3-Dichloropropene
104.040	034	EPA 524.2	trans-1,3-Dichloropropene
104.040	035	EPA 524.2	Ethylbenzene
104.040	036	EPA 524.2	Hexachlorobutadiene
104.040	037	EPA 524.2	Isopropylbenzene
104.040	038	EPA 524.2	4-Isopropyltoluene
104.040	039	EPA 524.2	Naphthalene
104.040	040	EPA 524.2	Nitrobenzene
104.040	041	EPA 524.2	N-propylbenzene
104.040	042	EPA 524.2	Styrene
104.040	043	EPA 524.2	1,1,1,2-Tetrachloroethane
104.040	044	EPA 524.2	1,1,1,2,2-Tetrachloroethane
104.040	045	EPA 524.2	Tetrachloroethene
104.040	046	EPA 524.2	Toluene
104.040	047	EPA 524.2	1,2,3-Trichlorobenzene
104.040	048	EPA 524.2	1,2,4-Trichlorobenzene
104.040	049	EPA 524.2	1,1,1-Trichloroethane
104.040	050	EPA 524.2	1,1,2-Trichloroethane
104.040	051	EPA 524.2	Trichloroethene
104.040	052	EPA 524.2	Trichlorofluoromethane
104.040	053	EPA 524.2	1,2,3-Trichloropropane
104.040	054	EPA 524.2	1,2,4-Trimethylbenzene
104.040	055	EPA 524.2	1,3,5-Trimethylbenzene

104.040	056	EPA 524.2	Vinyl Chloride
104.040	057	EPA 524.2	Xylenes, Total
104.045	001	EPA 524.2	Bromodichloromethane
104.045	002	EPA 524.2	Bromoform
104.045	003	EPA 524.2	Chloroform
104.045	004	EPA 524.2	Dibromochloromethane
104.045	005	EPA 524.2	Trihalomethanes
104.050	002	EPA 524.2	Methyl tert-butyl Ether (MTBE)
104.050	004	EPA 524.2	tert-Amyl Methyl Ether (TAME)
104.050	005	EPA 524.2	Ethyl tert-butyl Ether (ETBE)
104.050	006	EPA 524.2	Trichlorotrifluoroethane

**108 - Inorganic Chemistry of Wastewater**

108.016	001	EPA 110.2	Color
108.020	001	EPA 120.1	Conductivity
108.030	001	EPA 130.1	Hardness
108.040	001	EPA 130.2	Hardness
108.050	001	EPA 150.1	pH
108.060	001	EPA 160.1	Residue, Filterable
108.070	001	EPA 160.2	Residue, Non-filterable
108.080	001	EPA 160.3	Residue, Total
108.090	001	EPA 160.4	Residue, Volatile
108.100	001	EPA 160.5	Residue, Settleable
108.110	001	EPA 180.1	Turbidity
108.112	001	EPA 200.7	Boron
108.112	002	EPA 200.7	Calcium
108.112	004	EPA 200.7	Magnesium
108.112	005	EPA 200.7	Potassium
108.112	006	EPA 200.7	Silica
108.112	007	EPA 200.7	Sodium
108.120	001	EPA 300.0	Bromide
108.120	002	EPA 300.0	Chloride
108.120	003	EPA 300.0	Fluoride
108.120	004	EPA 300.0	Nitrate
108.120	005	EPA 300.0	Nitrite
108.120	006	EPA 300.0	Nitrate-nitrite, Total
108.120	007	EPA 300.0	Phosphate, Ortho
108.120	008	EPA 300.0	Sulfate
108.130	001	EPA 305.1	Acidity
108.140	001	EPA 310.1	Alkalinity
108.172	001	EPA 330.3	Chlorine Residual, Total
108.181	001	EPA 335.2	Cyanide, Total

108.191	001	EPA 340.2	Fluoride
108.201	001	EPA 350.2	Ammonia
108.212	001	EPA 351.3	Kjeldahl Nitrogen
108.234	001	EPA 353.3	Nitrate-nitrite, Total
108.235	001	EPA 353.3	Nitrate calc.
108.262	001	EPA 365.2	Phosphate, Ortho
108.263	001	EPA 365.2	Phosphorus, Total
108.270	001	EPA 370.1	Dissolved Silica
108.290	001	EPA 376.1	Sulfide
108.291	001	EPA 376.2	Sulfide
108.300	001	EPA 377.1	Sulfite
108.310	001	EPA 405.1	Biochemical Oxygen Demand
108.323	001	EPA 410.4	Chemical Oxygen Demand
108.330	001	EPA 413.1	Oil and Grease
108.340	001	EPA 415.1	Total Organic Carbon
108.350	001	EPA 418.1	Total Recoverable Petroleum Hydrocarbons
108.360	001	EPA 420.1	Phenols, Total
108.370	001	EPA 425.1	Surfactants
108.380	001	EPA 1664	Oil and Grease
108.390	001	SM2130B	Turbidity
108.400	001	SM2310B	Acidity
108.410	001	SM2320B	Alkalinity
108.420	001	SM2340B	Hardness (calc.)
108.421	001	SM2340C	Hardness
108.430	001	SM2510B	Conductivity
108.440	001	SM2540B	Residue, Total
108.441	001	SM2540C	Residue, Filterable
108.442	001	SM2540D	Residue, Non-filterable
108.443	001	SM2540F	Residue, Settleable
108.480	001	SM4500-F C	Fluoride
108.490	001	SM4500-H+ B	pH
108.590	001	SM5210B	Biochemical Oxygen Demand
108.602	001	SM5220D	Chemical Oxygen Demand
108.610	001	SM5310B	Total Organic Carbon
108.630	001	SM5520B	Oil and Grease

**109 - Toxic Chemical Elements of Wastewater**

109.010	001	EPA 200.7	Aluminum
109.010	002	EPA 200.7	Antimony
109.010	003	EPA 200.7	Arsenic
109.010	004	EPA 200.7	Barium
109.010	005	EPA 200.7	Beryllium

109.010	007	EPA 200.7	Cadmium
109.010	009	EPA 200.7	Chromium
109.010	010	EPA 200.7	Cobalt
109.010	011	EPA 200.7	Copper
109.010	012	EPA 200.7	Iron
109.010	013	EPA 200.7	Lead
109.010	015	EPA 200.7	Manganese
109.010	016	EPA 200.7	Molybdenum
109.010	017	EPA 200.7	Nickel
109.010	019	EPA 200.7	Selenium
109.010	021	EPA 200.7	Silver
109.010	023	EPA 200.7	Thallium
109.010	024	EPA 200.7	Tin
109.010	025	EPA 200.7	Titanium
109.010	026	EPA 200.7	Vanadium
109.010	027	EPA 200.7	Zinc
109.020	001	EPA 200.8	Aluminum
109.020	002	EPA 200.8	Antimony
109.020	003	EPA 200.8	Arsenic
109.020	004	EPA 200.8	Barium
109.020	005	EPA 200.8	Beryllium
109.020	006	EPA 200.8	Cadmium
109.020	007	EPA 200.8	Chromium
109.020	008	EPA 200.8	Cobalt
109.020	009	EPA 200.8	Copper
109.020	010	EPA 200.8	Lead
109.020	011	EPA 200.8	Manganese
109.020	012	EPA 200.8	Molybdenum
109.020	013	EPA 200.8	Nickel
109.020	014	EPA 200.8	Selenium
109.020	015	EPA 200.8	Silver
109.020	016	EPA 200.8	Thallium
109.020	017	EPA 200.8	Vanadium
109.020	018	EPA 200.8	Zinc
109.104	001	EPA 218.6	Chromium (VI)

**110 - Volatile Organic Chemistry of Wastewater**

110.040	001	EPA 624	Benzene
110.040	002	EPA 624	Bromodichloromethane
110.040	003	EPA 624	Bromoform
110.040	004	EPA 624	Bromomethane
110.040	005	EPA 624	Carbon Tetrachloride

110.040	006	EPA 624	Chlorobenzene
110.040	007	EPA 624	Chloroethane
110.040	008	EPA 624	2-Chloroethyl Vinyl Ether
110.040	009	EPA 624	Chloroform
110.040	010	EPA 624	Chloromethane
110.040	011	EPA 624	Dibromochloromethane
110.040	012	EPA 624	1,2-Dichlorobenzene
110.040	013	EPA 624	1,3-Dichlorobenzene
110.040	014	EPA 624	1,4-Dichlorobenzene
110.040	015	EPA 624	1,1-Dichloroethane
110.040	016	EPA 624	1,2-Dichloroethane
110.040	017	EPA 624	1,1-Dichloroethene
110.040	018	EPA 624	trans-1,2-Dichloroethene
110.040	019	EPA 624	1,2-Dichloropropane
110.040	020	EPA 624	cis-1,3-Dichloropropene
110.040	021	EPA 624	trans-1,3-Dichloropropene
110.040	022	EPA 624	Ethylbenzene
110.040	023	EPA 624	Methylene Chloride
110.040	024	EPA 624	1,1,2,2-Tetrachloroethane
110.040	025	EPA 624	Tetrachloroethene
110.040	026	EPA 624	Toluene
110.040	027	EPA 624	1,1,1-Trichloroethane
110.040	028	EPA 624	1,1,2-Trichloroethane
110.040	029	EPA 624	Trichloroethene
110.040	030	EPA 624	Trichlorofluoromethane
110.040	031	EPA 624	Vinyl Chloride
110.040	042	EPA 624	Oxygenates

---

**111 - Semi-volatile Organic Chemistry of Wastewater**

111.100	001	EPA 625	Acenaphthene
111.100	002	EPA 625	Acenaphthylene
111.100	003	EPA 625	Anthracene
111.100	004	EPA 625	Benzidine
111.100	005	EPA 625	Benz(a)anthracene
111.100	006	EPA 625	Benzo(b)fluoranthene
111.100	007	EPA 625	Benzo(k)fluoranthene
111.100	008	EPA 625	Benzo(g,h,i)perylene
111.100	009	EPA 625	Benzo(a)pyrene
111.100	010	EPA 625	Benzyl Butyl Phthalate
111.100	011	EPA 625	Bis(2-chloroethoxy)methane
111.100	012	EPA 625	Bis(2-chloroethyl) Ether
111.100	013	EPA 625	Bis(2-chloroisopropyl) Ether



111.100	014	EPA 625	Di(2-ethylhexyl) Phthalate
111.100	015	EPA 625	4-Bromophenyl Phenyl Ether
111.100	016	EPA 625	4-Chloro-3-methylphenol
111.100	017	EPA 625	2-Chloronaphthalene
111.100	018	EPA 625	2-Chlorophenol
111.100	019	EPA 625	4-Chlorophenyl Phenyl Ether
111.100	020	EPA 625	Chrysene
111.100	021	EPA 625	Dibenz(a,h)anthracene
111.100	022	EPA 625	1,2-Dichlorobenzene
111.100	023	EPA 625	1,3-Dichlorobenzene
111.100	024	EPA 625	1,4-Dichlorobenzene
111.100	025	EPA 625	3,3'-Dichlorobenzidine
111.100	026	EPA 625	2,4-Dichlorophenol
111.100	027	EPA 625	Diethyl Phthalate
111.100	028	EPA 625	2,4-Dimethylphenol
111.100	029	EPA 625	Dimethyl Phthalate
111.100	030	EPA 625	Di-n-butyl phthalate
111.100	031	EPA 625	Di-n-octyl phthalate
111.100	032	EPA 625	2,4-Dinitrophenol
111.100	033	EPA 625	2,4-Dinitrotoluene
111.100	034	EPA 625	2,6-Dinitrotoluene
111.100	035	EPA 625	Fluoranthene
111.100	036	EPA 625	Fluorene
111.100	037	EPA 625	Hexachlorobenzene
111.100	038	EPA 625	Hexachlorobutadiene
111.100	039	EPA 625	Hexachlorocyclopentadiene
111.100	040	EPA 625	Hexachloroethane
111.100	041	EPA 625	Indeno(1,2,3-c,d)pyrene
111.100	042	EPA 625	Isophorone
111.100	043	EPA 625	2-Methyl-4,6-dinitrophenol
111.100	044	EPA 625	Naphthalene
111.100	045	EPA 625	Nitrobenzene
111.100	046	EPA 625	2-Nitrophenol
111.100	047	EPA 625	4-Nitrophenol
111.100	048	EPA 625	N-nitrosodimethylamine
111.100	049	EPA 625	N-nitrosodi-n-propylamine
111.100	050	EPA 625	N-nitrosodiphenylamine
111.100	051	EPA 625	Pentachlorophenol
111.100	052	EPA 625	Phenanthrene
111.100	053	EPA 625	Phenol
111.100	054	EPA 625	Pyrene

111.100	055	EPA 625	1,2,4-Trichlorobenzene
111.100	056	EPA 625	2,4,6-Trichlorophenol
111.170	001	EPA 608	Aldrin
111.170	002	EPA 608	a-BHC
111.170	003	EPA 608	b-BHC
111.170	004	EPA 608	d-BHC
111.170	005	EPA 608	g-BHC (Lindane)
111.170	006	EPA 608	Chlordane
111.170	007	EPA 608	4,4'-DDD
111.170	008	EPA 608	4,4'-DDE
111.170	009	EPA 608	4,4'-DDT
111.170	010	EPA 608	Dieldrin
111.170	011	EPA 608	Endosulfan I
111.170	012	EPA 608	Endosulfan II
111.170	013	EPA 608	Endosulfan Sulfate
111.170	014	EPA 608	Endrin
111.170	015	EPA 608	Endrin Aldehyde
111.170	016	EPA 608	Heptachlor
111.170	017	EPA 608	Heptachlor Epoxide
111.170	018	EPA 608	Toxaphene
111.170	019	EPA 608	PCB-1016
111.170	020	EPA 608	PCB-1221
111.170	021	EPA 608	PCB-1232
111.170	022	EPA 608	PCB-1242
111.170	023	EPA 608	PCB-1248
111.170	024	EPA 608	PCB-1254
111.170	025	EPA 608	PCB-1260
111.170	031	EPA 608	PCBs

**114 - Inorganic Chemistry of Hazardous Waste**

114.010	001	EPA 6010B	Antimony
114.010	002	EPA 6010B	Arsenic
114.010	003	EPA 6010B	Barium
114.010	004	EPA 6010B	Beryllium
114.010	005	EPA 6010B	Cadmium
114.010	006	EPA 6010B	Chromium
114.010	007	EPA 6010B	Cobalt
114.010	008	EPA 6010B	Copper
114.010	009	EPA 6010B	Lead
114.010	010	EPA 6010B	Molybdenum
114.010	011	EPA 6010B	Nickel
114.010	012	EPA 6010B	Selenium

114.010	013	EPA 6010B	Silver
114.010	014	EPA 6010B	Thallium
114.010	015	EPA 6010B	Vanadium
114.010	016	EPA 6010B	Zinc
114.020	001	EPA 6020	Antimony
114.020	002	EPA 6020	Arsenic
114.020	003	EPA 6020	Barium
114.020	004	EPA 6020	Beryllium
114.020	005	EPA 6020	Cadmium
114.020	006	EPA 6020	Chromium
114.020	007	EPA 6020	Cobalt
114.020	008	EPA 6020	Copper
114.020	009	EPA 6020	Lead
114.020	010	EPA 6020	Molybdenum
114.020	011	EPA 6020	Nickel
114.020	012	EPA 6020	Selenium
114.020	013	EPA 6020	Silver
114.020	014	EPA 6020	Thallium
114.020	015	EPA 6020	Vanadium
114.020	016	EPA 6020	Zinc
114.103	001	EPA 7196A	Chromium (VI)
114.106	001	EPA 7199	Chromium (VI)
114.140	001	EPA 7470A	Mercury
114.141	001	EPA 7471A	Mercury
114.222	001	EPA 9014	Cyanide
114.230	001	EPA 9034	Sulfides, Total
114.240	001	EPA 9040B	Corrosivity - pH Determination
114.241	001	EPA 9045C	Corrosivity - pH Determination
114.250	001	EPA 9056	Fluoride

**115 - Extraction Test of Hazardous Waste**

115.020	001	EPA 1311	Toxicity Characteristic Leaching Procedure (TCLP)
115.030	001	CCR Chapter11, Article 5, Appendix II	Waste Extraction Test (WET)
115.040	001	EPA 1312	Synthetic Precipitation Leaching Procedure (SPLP)

**116 - Volatile Organic Chemistry of Hazardous Waste**

116.010	001	EPA 8011	1,2-Dibromoethane
116.010	002	EPA 8011	Dibromochloropropane
116.020	011	EPA 8015B	Ethylene Glycol
116.030	001	EPA 8015B	Gasoline-range Organics
116.040	002	EPA 8021B	Benzene
116.040	039	EPA 8021B	Ethylbenzene
116.040	041	EPA 8021B	Methyl tert-butyl Ether (MTBE)

116.040	047	EPA 8021B	Toluene
116.040	056	EPA 8021B	Xylenes, Total
116.080	001	EPA 8260B	Acetone
116.080	002	EPA 8260B	Acetonitrile
116.080	003	EPA 8260B	Acrolein
116.080	004	EPA 8260B	Acrylonitrile
116.080	005	EPA 8260B	Allyl Alcohol
116.080	006	EPA 8260B	Allyl Chloride
116.080	007	EPA 8260B	Benzene
116.080	009	EPA 8260B	Bromoacetone
116.080	010	EPA 8260B	Bromochloromethane
116.080	011	EPA 8260B	Bromodichloromethane
116.080	012	EPA 8260B	Bromoform
116.080	013	EPA 8260B	Bromomethane
116.080	014	EPA 8260B	n-Butyl Alcohol
116.080	015	EPA 8260B	Carbon Disulfide
116.080	016	EPA 8260B	Carbon Tetrachloride
116.080	018	EPA 8260B	Chlorobenzene
116.080	019	EPA 8260B	Chloroethane
116.080	020	EPA 8260B	2-Chloroethyl Vinyl Ether
116.080	021	EPA 8260B	Chloroform
116.080	022	EPA 8260B	Chloromethane
116.080	023	EPA 8260B	Chloroprene
116.080	024	EPA 8260B	3-Chloropropionitrile
116.080	025	EPA 8260B	Crotonaldehyde
116.080	026	EPA 8260B	Dibromochloromethane
116.080	027	EPA 8260B	Dibromochloropropane
116.080	028	EPA 8260B	1,2-Dibromoethane
116.080	030	EPA 8260B	Dibromomethane
116.080	031	EPA 8260B	1,2-Dichlorobenzene
116.080	032	EPA 8260B	1,3-Dichlorobenzene
116.080	033	EPA 8260B	1,4-Dichlorobenzene
116.080	034	EPA 8260B	cis-1,4-Dichloro-2-butene
116.080	035	EPA 8260B	trans-1,4-Dichloro-2-butene
116.080	036	EPA 8260B	Dichlorodifluoromethane
116.080	037	EPA 8260B	1,1-Dichloroethane
116.080	038	EPA 8260B	1,2-Dichloroethane
116.080	039	EPA 8260B	1,1-Dichloroethene
116.080	040	EPA 8260B	trans-1,2-Dichloroethene
116.080	041	EPA 8260B	cis-1,2-Dichloroethene
116.080	042	EPA 8260B	1,2-Dichloropropane

116.080	043	EPA 8260B	1,3-Dichloropropane
116.080	044	EPA 8260B	2,2-Dichloropropane
116.080	045	EPA 8260B	1,1-Dichloropropene
116.080	046	EPA 8260B	cis-1,3-Dichloropropene
116.080	047	EPA 8260B	trans-1,3-Dichloropropene
116.080	048	EPA 8260B	1,3-Dichloro-2-propanol
116.080	049	EPA 8260B	1,2,3,4-Diepoxybutane
116.080	050	EPA 8260B	1,4-Dioxane
116.080	053	EPA 8260B	Ethylbenzene
116.080	055	EPA 8260B	Ethyl Methacrylate
116.080	056	EPA 8260B	Hexachlorobutadiene
116.080	058	EPA 8260B	2-Hexanone (MBK)
116.080	059	EPA 8260B	Iodomethane
116.080	060	EPA 8260B	Isobutyl Alcohol
116.080	061	EPA 8260B	Malononitrile
116.080	062	EPA 8260B	Methacrylonitrile
116.080	064	EPA 8260B	Methyl tert-butyl Ether (MTBE)
116.080	065	EPA 8260B	Methylene Chloride
116.080	066	EPA 8260B	Methyl Ethyl Ketone
116.080	067	EPA 8260B	Methyl Methacrylate
116.080	068	EPA 8260B	4-Methyl-2-pentanone (MIBK)
116.080	069	EPA 8260B	Naphthalene
116.080	070	EPA 8260B	Nitrobenzene
116.080	072	EPA 8260B	N-nitrosodi-n-butylamine
116.080	074	EPA 8260B	Pentachloroethane
116.080	075	EPA 8260B	Pentafluorobenzene
116.080	076	EPA 8260B	2-Picoline
116.080	078	EPA 8260B	Propionitrile
116.080	079	EPA 8260B	N-propylamine
116.080	080	EPA 8260B	Pyridine
116.080	081	EPA 8260B	1,1,1,2-Tetrachloroethane
116.080	082	EPA 8260B	1,1,2,2-Tetrachloroethane
116.080	083	EPA 8260B	Tetrachloroethene
116.080	084	EPA 8260B	Toluene
116.080	086	EPA 8260B	1,2,3-Trichlorobenzene
116.080	087	EPA 8260B	1,2,4-Trichlorobenzene
116.080	088	EPA 8260B	1,1,1-Trichloroethane
116.080	089	EPA 8260B	1,1,2-Trichloroethane
116.080	090	EPA 8260B	Trichloroethene
116.080	091	EPA 8260B	Trichlorofluoromethane
116.080	092	EPA 8260B	1,2,3-Trichloropropane

116.080	093	EPA 8260B	Vinyl Acetate
116.080	094	EPA 8260B	Vinyl Chloride
116.080	095	EPA 8260B	Xylenes, Total
116.080	096	EPA 8260B	tert-Amyl Methyl Ether (TAME)
116.080	097	EPA 8260B	tert-Butyl Alcohol (TBA)
116.080	098	EPA 8260B	Ethyl tert-butyl Ether (ETBE)
116.080	099	EPA 8260B	Bromobenzene
116.080	100	EPA 8260B	n-Butylbenzene
116.080	101	EPA 8260B	sec-Butylbenzene
116.080	102	EPA 8260B	tert-Butylbenzene
116.080	103	EPA 8260B	2-Chlorotoluene
116.080	104	EPA 8260B	4-Chlorotoluene
116.080	105	EPA 8260B	Isopropylbenzene
116.080	106	EPA 8260B	N-propylbenzene
116.080	107	EPA 8260B	Styrene
116.080	108	EPA 8260B	1,2,4-Trimethylbenzene
116.080	109	EPA 8260B	1,3,5-Trimethylbenzene

**117 - Semi-volatile Organic Chemistry of Hazardous Waste**

117.010	001	EPA 8015B	Diesel-range Total Petroleum Hydrocarbons
117.015	001	LUFT GC/MS	Diesel-range Total Petroleum Hydrocarbons
117.016	001	LUFT	Diesel-range Total Petroleum Hydrocarbons
117.017	001	EPA 418.1	TRPH Screening
117.110	001	EPA 8270C	Acenaphthene
117.110	002	EPA 8270C	Acenaphthylene
117.110	003	EPA 8270C	Acetophenone
117.110	004	EPA 8270C	2-Acetylaminofluorene
117.110	005	EPA 8270C	1-Acetyl-2-thiourea
117.110	006	EPA 8270C	4-Aminobiphenyl
117.110	007	EPA 8270C	Aniline
117.110	008	EPA 8270C	Anthracene
117.110	010	EPA 8270C	Benzidine
117.110	011	EPA 8270C	Benz(a)anthracene
117.110	012	EPA 8270C	Benzo(b)fluoranthene
117.110	013	EPA 8270C	Benzo(k)fluoranthene
117.110	014	EPA 8270C	Benzo(g,h,i)perylene
117.110	015	EPA 8270C	Benzo(a)pyrene
117.110	016	EPA 8270C	Benzoic Acid
117.110	017	EPA 8270C	p-Benzoquinone
117.110	018	EPA 8270C	Benzyl Alcohol
117.110	019	EPA 8270C	Benzyl Butyl Phthalate
117.110	020	EPA 8270C	Bis(2-chloroethoxy)methane

117.110	021	EPA 8270C	Bis(2-chloroethyl) Ether
117.110	022	EPA 8270C	Bis(2-chloroisopropyl) Ether
117.110	023	EPA 8270C	Di(2-ethylhexyl) Phthalate
117.110	024	EPA 8270C	4-Bromophenyl Phenyl Ether
117.110	025	EPA 8270C	Carbazole
117.110	026	EPA 8270C	4-Chloroaniline
117.110	027	EPA 8270C	4-Chloro-3-methylphenol
117.110	029	EPA 8270C	2-Chloronaphthalene
117.110	030	EPA 8270C	2-Chlorophenol
117.110	031	EPA 8270C	4-Chlorophenyl Phenyl Ether
117.110	032	EPA 8270C	Chrysene
117.110	033	EPA 8270C	2-Cyclohexyl-4,6-dinitrophenol
117.110	034	EPA 8270C	2,4-Diaminotoluene
117.110	036	EPA 8270C	Dibenz(a,h)anthracene
117.110	037	EPA 8270C	Dibenzofuran
117.110	038	EPA 8270C	Dibenzo(a,e)pyrene
117.110	039	EPA 8270C	1,2-Dichlorobenzene
117.110	040	EPA 8270C	1,3-Dichlorobenzene
117.110	041	EPA 8270C	1,4-Dichlorobenzene
117.110	042	EPA 8270C	3,3'-Dichlorobenzidine
117.110	043	EPA 8270C	2,4-Dichlorophenol
117.110	044	EPA 8270C	2,6-Dichlorophenol
117.110	045	EPA 8270C	Diethyl Phthalate
117.110	050	EPA 8270C	p-Dimethylaminoazobenzene
117.110	051	EPA 8270C	7,12-Dimethylbenz(a)anthracene
117.110	052	EPA 8270C	a,a-Dimethylphenethylamine
117.110	053	EPA 8270C	2,4-Dimethylphenol
117.110	054	EPA 8270C	Dimethyl Phthalate
117.110	055	EPA 8270C	Di-n-butyl phthalate
117.110	056	EPA 8270C	Di-n-octyl phthalate
117.110	060	EPA 8270C	2,4-Dinitrophenol
117.110	061	EPA 8270C	2,4-Dinitrotoluene
117.110	062	EPA 8270C	2,6-Dinitrotoluene
117.110	063	EPA 8270C	Diphenylamine
117.110	064	EPA 8270C	1,2-Diphenylhydrazine
117.110	066	EPA 8270C	Ethyl Methanesulfonate
117.110	067	EPA 8270C	Fluoranthene
117.110	068	EPA 8270C	Fluorene
117.110	069	EPA 8270C	Hexachlorobenzene
117.110	070	EPA 8270C	Hexachlorobutadiene
117.110	071	EPA 8270C	Hexachlorocyclopentadiene

117.110	072	EPA 8270C	Hexachloroethane
117.110	073	EPA 8270C	Hexachlorophene
117.110	074	EPA 8270C	Hexachloropropene
117.110	075	EPA 8270C	Indeno(1,2,3-c,d)pyrene
117.110	076	EPA 8270C	Isophorone
117.110	077	EPA 8270C	Isosafrole
117.110	078	EPA 8270C	Maleic Anhydride
117.110	079	EPA 8270C	3-Methylcholanthrene
117.110	080	EPA 8270C	2-Methyl-4,6-dinitrophenol
117.110	082	EPA 8270C	Methyl Methanesulfonate
117.110	083	EPA 8270C	2-Methylnaphthalene
117.110	084	EPA 8270C	2-Methylphenol
117.110	085	EPA 8270C	3-Methylphenol
117.110	086	EPA 8270C	4-Methylphenol
117.110	087	EPA 8270C	Naphthalene
117.110	088	EPA 8270C	1,4-Naphthoquinone
117.110	089	EPA 8270C	1-Naphthylamine
117.110	090	EPA 8270C	2-Naphthylamine
117.110	091	EPA 8270C	Nicotine
117.110	092	EPA 8270C	2-Nitroaniline
117.110	093	EPA 8270C	3-Nitroaniline
117.110	094	EPA 8270C	4-Nitroaniline
117.110	095	EPA 8270C	Nitrobenzene
117.110	096	EPA 8270C	2-Nitrophenol
117.110	097	EPA 8270C	4-Nitrophenol
117.110	098	EPA 8270C	N-nitrosodi-n-butylamine
117.110	099	EPA 8270C	N-nitrosodiethylamine
117.110	100	EPA 8270C	N-nitrosodimethylamine
117.110	101	EPA 8270C	N-nitrosodi-n-propylamine
117.110	102	EPA 8270C	N-nitrosodiphenylamine
117.110	103	EPA 8270C	N-nitrosomethylethylamine
117.110	104	EPA 8270C	N-nitrosomorpholine
117.110	105	EPA 8270C	N-nitrosopiperidine
117.110	106	EPA 8270C	N-nitrosopyrrolidine
117.110	107	EPA 8270C	5-Nitro-o-toluidine
117.110	108	EPA 8270C	Pentachlorobenzene
117.110	109	EPA 8270C	Pentachloronitrobenzene
117.110	110	EPA 8270C	Pentachlorophenol
117.110	111	EPA 8270C	Phenacetin
117.110	112	EPA 8270C	Phenanthrene
117.110	113	EPA 8270C	Phenol



117.110	116	EPA 8270C	2-Picoline
117.110	119	EPA 8270C	Pyrene
117.110	120	EPA 8270C	Pyridine
117.110	122	EPA 8270C	Safrole
117.110	124	EPA 8270C	1,2,4,5-Tetrachlorobenzene
117.110	125	EPA 8270C	2,3,4,6-Tetrachlorophenol
117.110	128	EPA 8270C	o-Toluidine
117.110	129	EPA 8270C	1,2,4-Trichlorobenzene
117.110	130	EPA 8270C	2,4,5-Trichlorophenol
117.110	131	EPA 8270C	2,4,6-Trichlorophenol
117.110	132	EPA 8270C	1,3,5-Trinitrobenzene
117.111	025	EPA 8270C	Dimethoate
117.111	026	EPA 8270C	Dinoseb
117.111	036	EPA 8270C	Famphur
117.111	039	EPA 8270C	Isodrin
117.111	040	EPA 8270C	Kepone
117.111	054	EPA 8270C	Parathion Ethyl
117.111	055	EPA 8270C	Parathion Methyl
117.111	056	EPA 8270C	Phorate
117.111	058	EPA 8270C	Sulfotepp
117.111	061	EPA 8270C	O,O,O-triethyl Phosphorothioate
117.140	001	EPA 8310	Acenaphthene
117.140	002	EPA 8310	Acenaphthylene
117.140	003	EPA 8310	Anthracene
117.140	004	EPA 8310	Benz(a)anthracene
117.140	005	EPA 8310	Benzo(a)pyrene
117.140	006	EPA 8310	Benzo(b)fluoranthene
117.140	007	EPA 8310	Benzo(k)fluoranthene
117.140	008	EPA 8310	Benzo(g,h,i)perylene
117.140	009	EPA 8310	Chrysene
117.140	010	EPA 8310	Dibenz(a,h)anthracene
117.140	011	EPA 8310	Fluoranthene
117.140	012	EPA 8310	Fluorene
117.140	013	EPA 8310	Indeno(1,2,3-c,d)pyrene
117.140	014	EPA 8310	Naphthalene
117.140	015	EPA 8310	Phenanthrene
117.140	016	EPA 8310	Pyrene
117.170	001	EPA 8330	4-Amino-2,6-dinitrotoluene
117.170	002	EPA 8330	2-Amino-4,6-dinitrotoluene
117.170	003	EPA 8330	1,3-Dinitrobenzene
117.170	004	EPA 8330	2,4-Dinitrotoluene

117.170	005	EPA 8330	2,6-Dinitrotoluene
117.170	006	EPA 8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)
117.170	007	EPA 8330	Methyl-2,4,6-trinitrophenylnitramine
117.170	008	EPA 8330	Nitrobenzene
117.170	009	EPA 8330	2-Nitrotoluene
117.170	010	EPA 8330	3-Nitrotoluene
117.170	011	EPA 8330	4-Nitrotoluene
117.170	012	EPA 8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
117.170	013	EPA 8330	1,3,5-Trinitrobenzene
117.170	014	EPA 8330	2,4,6-Trinitrotoluene
117.190	001	EPA 8332	Nitroglycerine
117.210	001	EPA 8081A	Aldrin
117.210	002	EPA 8081A	a-BHC
117.210	003	EPA 8081A	b-BHC
117.210	004	EPA 8081A	d-BHC
117.210	005	EPA 8081A	g-BHC (Lindane)
117.210	007	EPA 8081A	a-Chlordane
117.210	008	EPA 8081A	g-Chlordane
117.210	009	EPA 8081A	Chlordane (tech.)
117.210	010	EPA 8081A	Chlorobenzilate
117.210	011	EPA 8081A	Chloroneb
117.210	012	EPA 8081A	Chlorothalonil
117.210	013	EPA 8081A	4,4'-DDD
117.210	014	EPA 8081A	4,4'-DDE
117.210	015	EPA 8081A	4,4'-DDT
117.210	016	EPA 8081A	Diallate
117.210	020	EPA 8081A	Dieldrin
117.210	021	EPA 8081A	Endosulfan I
117.210	022	EPA 8081A	Endosulfan II
117.210	023	EPA 8081A	Endosulfan Sulfate
117.210	024	EPA 8081A	Endrin
117.210	025	EPA 8081A	Endrin Aldehyde
117.210	026	EPA 8081A	Endrin Ketone
117.210	027	EPA 8081A	Heptachlor
117.210	028	EPA 8081A	Heptachlor Epoxide
117.210	029	EPA 8081A	Hexachlorobenzene
117.210	033	EPA 8081A	Methoxychlor
117.210	039	EPA 8081A	Toxaphene
117.220	001	EPA 8082	PCB-1016
117.220	002	EPA 8082	PCB-1221
117.220	003	EPA 8082	PCB-1232

117.220	004	EPA 8082	PCB-1242
117.220	005	EPA 8082	PCB-1248
117.220	006	EPA 8082	PCB-1254
117.220	007	EPA 8082	PCB-1260
117.220	008	EPA 8082	2-Chlorobiphenyl
117.220	009	EPA 8082	2,3-Dichlorobiphenyl
117.220	010	EPA 8082	2,2',5-Trichlorobiphenyl
117.220	011	EPA 8082	2,4',5-Trichlorobiphenyl
117.220	012	EPA 8082	2,2',3,5'-Tetrachlorobiphenyl
117.220	013	EPA 8082	2,2',5,5'-Tetrachlorobiphenyl
117.220	014	EPA 8082	2,3',4,4'-Tetrachlorobiphenyl
117.220	015	EPA 8082	2,2',3,4,5'-Pentachlorobiphenyl
117.220	016	EPA 8082	2,2',4,5,5'-Pentachlorobiphenyl
117.220	017	EPA 8082	2,3,3',4',6-Pentachlorobiphenyl
117.220	018	EPA 8082	2,2',3,4,4',5'-Hexachlorobiphenyl
117.220	019	EPA 8082	2,2',3,4,5,5'-Hexachlorobiphenyl
117.220	020	EPA 8082	2,2',3,5,5',6-Hexachlorobiphenyl
117.220	021	EPA 8082	2,2',4,4',5,5'-Hexachlorobiphenyl
117.220	022	EPA 8082	2,2',3,3',4,4',5-Heptachlorobiphenyl
117.220	023	EPA 8082	2,2',3,4,4',5,5'-Heptachlorobiphenyl
117.220	024	EPA 8082	2,2',3,4,4',5',6-Heptachlorobiphenyl
117.220	025	EPA 8082	2,2',3,4',5,5',6-Heptachlorobiphenyl
117.220	026	EPA 8082	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl
117.240	001	EPA 8141A	Atrazine
117.240	002	EPA 8141A	Azinphos Methyl
117.240	004	EPA 8141A	Chlorfenvinphos
117.240	005	EPA 8141A	Chlorpyrifos
117.240	006	EPA 8141A	Chlorpyrifos Methyl
117.240	007	EPA 8141A	Demeton-O
117.240	008	EPA 8141A	Demeton-S
117.240	009	EPA 8141A	Diazinon
117.240	010	EPA 8141A	Dimethoate
117.240	012	EPA 8141A	EPN
117.240	013	EPA 8141A	Ethion
117.240	014	EPA 8141A	Famphur
117.240	015	EPA 8141A	Malathion
117.240	016	EPA 8141A	Mevinphos
117.240	017	EPA 8141A	Naled
117.240	018	EPA 8141A	Parathion Ethyl
117.240	019	EPA 8141A	Parathion Methyl
117.240	020	EPA 8141A	Phorate

117.240	022	EPA 8141A	Ronnel
117.240	024	EPA 8141A	Sulfotepp
117.240	026	EPA 8141A	Thionazin
117.250	001	EPA 8151A	2,4-D
117.250	002	EPA 8151A	2,4-DB
117.250	003	EPA 8151A	2,4,5-T
117.250	004	EPA 8151A	2,4,5-TP
117.250	006	EPA 8151A	Dalapon
117.250	007	EPA 8151A	Dichlorprop
117.250	008	EPA 8151A	Dinoseb
117.250	009	EPA 8151A	MCPA
117.250	010	EPA 8151A	MCPP
117.250	011	EPA 8151A	4-Nitrophenol
117.250	012	EPA 8151A	Pentachlorophenol
117.250	013	EPA 8151A	Picloram
117.250	014	EPA 8151A	Dicamba
117.250	015	EPA 8151A	3,5-Dichlorobenzoic Acid
117.250	016	EPA 8151A	Acifluorfen
117.250	017	EPA 8151A	Bentazon
117.250	018	EPA 8151A	Chloramben
117.250	019	EPA 8151A	DCPA

**120 - Physical Properties of Hazardous Waste**

120.010	001	EPA 1010	Ignitability
120.040	001	Section 7.3 SW-846	Reactive Cyanide
120.050	001	Section 7.3 SW-846	Reactive Sulfide
120.070	001	EPA 9040B	Corrosivity - pH Determination
120.080	001	EPA 9045C	Corrosivity - pH Determination

**Attachment B**  
**Responses to Comments on Laboratory**  
**Chemistry and Quality Control Data**

---

## Attachment B: Responses to Comments on Laboratory Chemistry and Quality Control Data

CH2M HILL has reviewed the Peer Review comments on the Hinkley Groundwater Background Study (CH2M HILL, 2007) related to laboratory methods and quality control data prepared by Dr. Stuart Nagourney of the College of New Jersey on behalf of the Regional Water Quality Control Board, Lahontan Region (Water Board), dated October 14, 2011. Based on this review, the quality of the laboratory analyses was determined to be appropriate and to meet all of the requirements of the USEPA methods employed.

### Detailed Response to Comments

The issues raised by Dr. Nagourney fall into three general categories: method calibration, establishment of reporting limits (RLs) and method detection limits (MDLs), and quality control (QC) check procedures. Dr. Nagourney posed six questions to the Truesdail Laboratories, Inc. (TLI) and EMAX Laboratories (EMAX). Based on the responses to these questions, Dr. Nagourney provided additional questions and comments regarding QC procedures, including questions on method calibration, RLs, and MDLs. Presented below are responses to each of the additional questions and comments provided by Dr. Nagourney.

- 1) What calibration ranges were used for Methods 6010B, 6020A and 7199?

**Comment on information provided by TLI:** It is unclear from the response if the low level calibration ranges cited in the response for Methods 6010B and 6020A were used for the analyses in this study. If not, the data for this study for total chromium (Cr(T)) would be questionable.

**Response:**

- Method 6010B was not used by either lab for the Hinkley Groundwater Background Study.
- For Method 6020A, the laboratories used the following calibration ranges:
  - TLI used 0.2 micrograms per liter ( $\mu\text{g/L}$ ) to an upper range of 100, 200 or 500  $\mu\text{g/L}$ .
  - EMAX used 10  $\mu\text{g/L}$  to an upper range of 100  $\mu\text{g/L}$ .
- For Method 7199, the laboratories used the following calibration ranges:
  - TLI used a calibration range of 0.2 to 50  $\mu\text{g/L}$ . As noted here, TLI did use a low concentration standard, 0.2  $\mu\text{g/L}$ , for the low end of the calibration range.
  - EMAX used 0.2  $\mu\text{g/L}$  to an upper range of 5.0  $\mu\text{g/L}$ .

- 2) For Method 6020A, what was the value of the Contract Required Quantitation Limit Check Standard (CRI) and the method control limits?

**Comment on information provided by TLI:** TLI admitted in their response that they failed to perform this quality assurance as required by the method during the time that data for this study were obtained.

**Response:**

- CRI is not a required criterion of 6020A, and as such the failure of TLI to perform this check did not compromise the quality of the data obtained.

- Regarding method control limits, the PG&E Program Quality Assurance Project Plan (QAPP) (CH2M HILL, 2008) requires the following:
    - Laboratory Control Sample (LCS) of 85 – 115% (method requires 80 – 120%). An LCS is a reagent water blank fortified with the compound(s) of interest that is processed through the entire method process just like a sample.
    - Matrix Spike/Matrix Spike Duplicate (MS/MSD) of 75 – 125%
    - The relative percent difference (RPD) or precision between the MS and MSD or sample and sample duplicate 20%RPD
    - Post spike and serial dilution are also required per the method requirements.
- 3) Were reporting limit (RL) check samples analyzed for Methods 7199 and 6010B? If so what are the control limits and what were the actual recoveries?

**Comment on information provided by TLI:** TLI admitted in their response that they failed to analyze a RL check sample during the time that data for this study were obtained.

**Response:**

- 6010B was not used for the Hinkley Groundwater Background Study.
  - RL checks are not required by either method, and as such the failure of TLI to perform this check did not compromise the quality of the data obtained.
- 4) How were RLs established for Methods 6010B, 6020A and 7199? What is the relationship between the method detection limit (MDL) & RL for each method?

**Comment on information provided by TLI:** TLI's response of varying criteria for a quantitative relationship between the MDL and RL is too vague to be acceptable.

**Response:**

- MDL studies are performed annually and are required to meet the 40 CFR Part 136B criteria.
- The California Environmental Laboratory Accreditation Program (ELAP) states the RL must be defensible, be greater than the MDL, and will be specified by the end user of the data.
- The RL is defined by the CDPH as the concentration at which an analyte can be detected in a sample and its concentration can be reported with a reasonable degree of accuracy and precision. The CDPH defined reasonable as  $\pm 20\%$  accuracy and 20% RSD for replicate determinations. The acceptable ranges depend somewhat on the analytical methodology used. The CDPH states that for samples that do not pose a particular matrix problem, the RL is typically about three to five times higher than the MDL.
- The RLs used by the labs for the Hinkley Groundwater Background Study were derived from reporting limits specified in the June 29, 2001 Cleanup and Abatement Order (CAO) (Water Board, 2001), also specified in the QAPP (subsequent Waste Discharge Requirements [WDRs] such as R6V-2004-0034 actually specified a higher RL of 1  $\mu\text{g/L}$  for Cr(VI) and 5  $\mu\text{g/L}$  Cr(T)).
- In accordance with the project QAPP, an RL level low standard is used in the calibration curve.
- No data are reported below the RL. (Non-detects are reported at the RL.)

- 5) What standard reference material (SRM) was used for QC for 7199 as per Section 5.4? This data was apparently not reported.

**Comment on information provided by TLI:** The use of a mid-range check sample is not acceptable as a QC material as per the criteria for quality control specified in Method 7199. This would make the data for this study for Cr(VI) questionable.

**Response:**

- Section 5.4 of the method requires a QCS (quality control sample) defined as “a mid-range standard, prepared from an independent commercial source” (i.e., a secondary source, separate from the initial calibration standards) be used to verify the instruments performance. It does not require Standard Reference Material (SRM), only a standard from a secondary source as defined by the QCS. The procedures used were in keeping with the method and the data obtained is therefore not questionable.
    - TLI uses a second source material for both their LCS and the second source mid-range calibration check standard.
    - EMAX uses a second source for their LCSs.
  - Both laboratories report LCS data in the lab reports.
- 6) Why were the spiking levels for both Cr(T) and Cr(VI) analyses much higher than the expected sample concentrations for all analytical methods?

**Comment on information provided by EMAX and TLI:** This response was not satisfactory. The laboratory should have chosen the concentration level of matrix spikes for both Cr(T) and Cr(VI) to closer to the actual sample levels (usually a multiple of 3-5 the expected value is applied). The choice of much higher spiking levels means that the calculated recoveries have little value in assessing the quality of the actual sample concentrations and the impact to those results from possible matrix interferences.

**Response:**

- Method 6020A specifics – “MS/MSD samples should be spiked at the same level, and with the same spiking material, as the corresponding laboratory control sample that is at the project-specific action level or, when lacking project-specific action levels, at approximately mid-point of the linear dynamic range.” No project specific action level was specified for the background study; therefore, the labs followed the spiking levels specified by the method.
- Both laboratories used 1.0 µg/L as the spike concentration for Method 7199. The concentration of the matrix spike was five times the reporting level and applicable to the majority of sample concentrations determined over the study.



In addition to the initial six questions, Dr. Nagourney noted six additional concerns with analytical data in comments. The following are the concerns and the responses to those concerns.

1. **Comment:** No criteria were provided from either laboratory as to the criteria for data assigned “U” or “J” flags.

**Response:** Laboratory analytical data was reviewed by CH2M HILL’s project chemists to assess data quality and to identify deviations from analytical requirements. The flags provided in the Groundwater Background Study were assigned by the project chemists and the criteria associated to a specific result/flag are listed in Appendix F (Data Requiring Validation Flags).

2. **Comment:** “unusually high percentage of samples failed the quality control criteria for the Continuing Calibration Verification (CCV).”

**Response:** During the first Hinkley Background Study sampling event, (January/February 2006) all Method SW 7199 sample analyses were performed by TLI and the CCV recoveries for all analyses were within the method criteria of 90 – 110% recovery. For the three subsequent sampling events, all Method SW7199 sample analyses were performed by EMAX Laboratory (EMAX). Of the 129 sample analyses performed by EMAX, 31 (26 samples, 5 field duplicates) or 24 percent had one or more of the bracketing CCVs with recoveries that were outside the method criteria. CCV recoveries for the out of control sample analyses ranged from a low of 72 percent to a high of 123 percent with 19 results biased low and 12 biased high. In accordance with the PG&E program Quality Assurance Program Plan (QAPP) (CH2M HILL, 2008) that cites USEPA National Functional Guidelines for Inorganic Data Review (2002), the range of the out of control CCV recoveries was not significant enough to warrant data rejection, but did require data qualification by applying “J/UJ” flags to out of control results. Therefore, the results were determined to be of sufficient quality to be used for purposes of the background study.

3. **Comment:** How were samples chosen for matrix spiking (was this procedure randomized so as to not bias the results?)

**Response:** The matrix spikes were randomly selected by the laboratory.

4. **Comment:** The work plan specifies the use of method 6010 for the analysis of Cr(T); Method 6020A was used instead. This may impact the ability to quantify for Cr(T) at low concentration levels since the RL for Method 6020A is much lower than that for Method 6010.

**Response:** Both methods use an Inductively Coupled Plasma (ICP) however Method 6020A pairs that with a mass spectrometer (measuring mass weight) which allows for lower concentration reporting for most metals. Method SW6020A met the RL objectives for the project.

5. **Comment:** Some data for Cr(VI) in this study were reported by USEPA determinative method 218.6, other data was reported by Method 7196A and still other data was reported by Method 7199. These methods all have different sensitivities and different capabilities to report Cr(VI) without analytical interferences. Why were different methods used to measure Cr(VI)?

**Response:** Only Method 7199 was used during the Hinkley Groundwater Background Study to analyze and report standard Cr(VI) results. There is no reference in the background study to either Method 218.6 or 7196.

6. **Comment:** The authors of the report chose to use a method from the USGS to attempt to define specific Cr species present in samples. This method is not certified by the State or NELAP. Information that was supplied suggests that this USGS method has only been applied to speciation of arsenic. USEPA Method 6800, Elemental and Speciated Isotope Dilution Mass Spectrometry allows the identification of individual Cr species... USEPA Method 6800 is certified by State and NELAP. Why was Method 6800 not used for this application?

**Response:** Method 6800 was posted in February 2007, and the Hinkley Groundwater Background Study samples were collected quarterly from January 2006 to November 2006 and the report was submitted to the Water Board in Feb 2007 and therefore pre-date promulgation of Method 6800.

A2-5: February 23, 2012: Excelchem Laboratories review of PG&E's Response to Investigative Order No. R6V-2011-0105



## Excelchem Environmental Labs

1135 W Sunset Boulevard Suite A

Rocklin, CA 95765

Phone # 916-543-4445

Fax # 916-543-4449

2/23/12

Re: Request for Technical Consultation on Response to Investigative Order No. R6V-2011-0105 and Peer Review Comments on Laboratory Quality Control Data for 2007 Groundwater Chromium Background Study Report, Pacific Gas and Electric Company's (PG&E's) Hinkley Remediation

To Whom It May Concern:

The hexavalent chromium results provided by Truesdail Laboratories follow the QA/QC requirements of EPA Method 7199.

The quality of some of the results provided by EMAX Laboratory is suspect. Sample Delivery Groups 06G182, 06G200, 06I248, 06J236, 06K156, and 06K180 had failing CCVs. EMAX Laboratory analyzed two CCVs every ten samples instead of one. If one of the CCVs passed and the other failed EMAX accepted the data. Section 7.3.2 of EPA Method 7199 states that if a CCV is not within 10% the CCV can be re-analyzed. The intent of the method is to allow the occasional re-analysis of a failing CCV. Routine CCV failures and poor precision are an indication that an incompetent analyst is preparing the calibration check standards or there is an instrument problem that needs to be corrected. It was not the EPA's intention to allow the routine re-analysis of failing CCVs. The precision and accuracy of the analysis is poor in this type of situation.

The CCVs from Sample Delivery Group 06G182 range from 64% recovery to 100% recovery. Eight of the seventeen CCVs are failing. CCVs analyzed back to back have poor precision. CCV18 had a percent recovery of 64%. The re-analysis of CCV18 had a percent recovery of 92%. CCV19 had a percent recovery of 76%. The re-analysis had a percent recovery of 92%. All of the samples were analyzed in duplicate for this sample delivery group and the results have good precision. This leads me to believe that there is something wrong with the preparation of the CCV standards and possibly the calibration standards. If that is the case the data is of uncertain accuracy and it is my opinion that none of the data in Sample Delivery Group 06G182 should be used.

The CCVs for Sample Delivery Group 06I248 range from 0% recovery to 114% recovery. All of the samples were analyzed in duplicate. Poor precision was observed for two of the samples. Sample I248-02 had results of 0.397 ppb, 1.042 ppb, 1.208 ppb, and 1.189 ppb. Sample I248-05 had results of 1.493 ppb and ND (less than 0.2 ppb). Section 7.4 of EPA Method 7199 states that duplicate samples should have a relative standard deviation of less than 20%. The relative standard deviation for sample I248-05 is greater than 150%. The accuracy of the data in Sample Delivery Group 06I248 is highly suspect.

The CCVs for Sample Delivery Group 06K156 and 06K180 range from 80% to 112%. Poor precision was observed for sample K180-08. The results for this sample were less than 0.2 ppb, 2.689 ppb, and 2.580 ppb.

Sample Delivery Group 06J236 had one failing CCV. The CCV was failing by 4%. The CCV was re-analyzed in accordance with EPA Method 7199 and passed. All samples were analyzed in duplicate and the precision was good.

Sample Delivery Group 06G200 had one CCV fail by 9% and one fail by 1%. All samples were analyzed in duplicate and the precision was good. The CCVs were re-analyzed in accordance with EPA Method 7199 and passed.

### **Review of Pacific Gas and Electric Company's Response dated January 19, 2012**

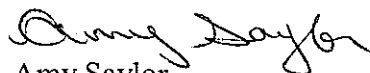
Pacific Gas and Electric Company's response states that the CCV recoveries ranged from 72% to 123%. In actuality the CCVs ranged from 0% to 123%.

PG&E stated that according to the USEPA National Functional Guidelines for Inorganic Data Review (2002) the hexavalent chromium results were of sufficient quality for the background investigation. The USEPA National Functional Guidelines for Inorganic Data Review (2002) discusses data quality for ICP, ICP-MS, mercury, and cyanide. It does not address hexavalent chromium or analyses performed by ion chromatography; therefore I don't believe it is relevant in this case. It is beyond my expertise to determine whether the USEPA National Functional Guidelines for Inorganic Data Review (2002) is appropriate for evaluating data quality. For low CCV recoveries and poor duplicate precision the guidelines are vague and say only to "use professional judgment". Had the QA/QC criteria of EPA Method 7199 been met, the quality of the data would have been much higher. There is no way to know if the results from Sample Delivery Group 06G182 are biased low by more than 36% or if the results accurately represent what is in the samples.

PG&E's response stated that all the hexavalent chromium analytical data was provided on the enclosed CD. The chromatograms for most of the failing CCVs were not on the CD and questionable integrations may be an issue.

PG&E stated that the laboratory analysis performed met all the requirements of the EPA methods employed. Sample Delivery Groups 06G182, 06I248, 06K156, and 06K180 do not meet EPA Method 7199 criteria for acceptable CCV recoveries. The precision of the CCVs and some of the sample duplicates do not meet the precision requirements of EPA Method 7199. Results with much higher accuracy and confidence levels would have been obtained if EPA Method 7199 had been followed.

Sincerely,



Amy Saylor  
QA/QC Officer

Excelchem Environmental Labs