SWEPI LP

Shell Exploration & Production Company
190 Thorn Hill Road
Warrendale, PA 15086

Wednesday, May 25, 2011

Via E-mail and Overnight Delivery
Ms. Jacqueline Morrison (3LC00)
Land and Chemicals Division
United States Environmental Protection Agency, Region III
1650 Arch Street
Philadelphia, Pennsylvania 19103
morrison.jacqueline@epa.gov

Re: Request for Information on Marcellus Shale Flowback Water, May 12, 2011

Dear Ms. Morrison:

This letter responds to the May 12, 2011 request for information ("RFI") of the United States Environmental Protection Agency, Region III ("EPA") to SWEPI LP ("SWEPI") with regard to disposal and recycling activities and intentions with regard to wastewater generated by our gas exploration, extraction and production activities in the Marcellus Shale in Region III. Subject to both the general and specific objections noted below, and without waiving these or other available objections or privileges, SWEPI submits the following in response to the RFI.

In responding to the RFI, SWEPI has undertaken a diligent and good faith search for, and review of, documents and information in its possession, custody or control and that are relevant to this matter. However, the RFI purports to seek a great deal of information that we assert EPA does not have the authority to request under the authorities cited in the RFI.

If you have any questions regarding these responses, please contact Jim Sewell at 724-778-9153. For questions of a legal nature, please contact Roberta Lewis at 713-241-7188.

OBJECTIONS TO DEFINITIONS

1. The RFI defines "Gas Extraction Wastewater" as "all fluids generated during gas well drilling, hydraulic fracturing, and production of any shale formation, including but not limited to drilling fluid, flowback fluid and produced fluid." The RFI cover letter notes that EPA is purporting to only be requesting information relating to Marcellus Shale Flowback Water. To the extent that SWEPI is providing information that fits the definition of Gas Extraction Wastewater, as EPA has defined it in the RFI, SWEPI objects to the RFI as going beyond the stated scope of EPA's inquiry. We understand that

EPA has orally confirmed to Atlas Energy L.P., which also received this information request, that EPA's inquiry is limited to such fluids generated at Wells in the Marcellus Shale, and SWEPI will respond accordingly.

2. Also, certain RFI requests also seek information regarding releases "of any substances" from facilities that contain wells that are owned and operated by SWEPI. EPA does not have authority under any of the authorities cited in the RFI to request information related to "any substances" if such substances are not regulated under the Clean Water Act (CWA), the Resource Conservation and Recovery Act (RCRA) or the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). Thus SWEPI has limited its review of documents and information, and its response to substances regulated under those statutes.

GENERAL OBJECTIONS

SWEPI asserts the following general privileges, protections and objections with respect to the RFI and each information request therein.

1. SWEPI asserts all privileges and protections it has in regard to the documents and other information sought by EPA, including the attorney-client privilege, the attorney work product doctrine, all privileges and protections related to materials generated in anticipation of litigation, the settlement communication protection, the confidential business information ("CBI") and trade secret protections, and any other privilege or protection available to it under law. In the event that a privileged or protected document has been inadvertently included among the documents produced in response to the RFI, SWEPI asks that any such document be returned to SWEPI immediately and here states for the record that it is not thereby waiving any available privilege or protection as to any such document.

2. In the event that a document containing CBI or trade secrets has been inadvertently included among the numerous documents provided in response to the RFI, SWEPI asks that any such documents be returned to SWEPI immediately so that SWEPI may resubmit the document in accordance with the applicable requirements for the submission of Confidential Information.

3. SWEPI objects to any requirement to produce documents or information already in the possession of a government agency, including but not limited to the Pennsylvania Department of Environmental Protection (PADEP), or already in the public domain. Notwithstanding this objection, and without waiving it, SWEPI may produce certain information or documents in its possession, custody, or control that it previously provided to or obtained from government agencies that contain information responsive to the RFI.

4. SWEPI objects to the definition of "you" because the term is overbroad and it is not possible for SWEPI to answer questions on behalf of all the persons and entities identified therein. Notwithstanding this objection, and without waiving it, SWEPI has undertaken a diligent and good faith effort to locate and furnish documents and information in its possession, custody, and control that are responsive to the RFI.

5. SWEPI objects to the RFI to the extent that it exceeds the authority granted to the EPA under Section 104(e) of the Comprehensive Environmental Response, Compensation and Liability Act

("CERCLA"), 42 U.S.C. §9604(e); Section 308 of the Federal Clean Water Act ("CWA"), 33 U.S.C. §1318;, and Section 3007(a) of the Resource Conservation and Recovery Act (""RCRA"), 42 U.S.C. §6927(a). The "authority of [Section 104(e)] may be exercised *only* for the purposes of determining the need for response, or choosing or taking any response action *under this subchapter [CERCLA]*, or otherwise *enforcing the provisions of this subchapter.*" Therefore, in order for EPA to assert its authority to request information under Section 104(e) there must be a release or threatened release of hazardous substances, or pollutants or contaminants subject to CERCLA enforcement authority. [1] EPA's information request, which seeks information concerning all "Wells that you own or operate in EPA Region III" exceeds the agency's CERCLA Section 104(e) authority, as EPA has provided no information indicating that there has been any release or threatened release of hazardous substances, or of pollutants or contaminants to the environment at those wells. Moreover, the "subchapter" referred to in Section104(e)(1) is Subchapter 1 of 42 U.S.C. Chapter 103, relating to the response to releases and threatened releases. Section 104(e) cannot be used by EPA for other purposes, such as investigating potential compliance with other environmental laws or regulations.

Section 308 of the CWA also does not authorize EPA to request the information sought in the RFI from SWEPI. Section 308 authorizes requests for certain information directed to the "owner or operator of any point source ..." 33 U.S.C. §1318(a)(A). The RFI does not assert or provide any indication that the Wells owned or operated by SWEPI are a "point source" subject to regulation under the CWA. With limited exceptions (none of which appear to be applicable), Section 402(l)(2) exempts from regulation under the CWA discharges of stormwater from oil and gas exploration, production, processing, or treatment operations or transmission facilities. Absent evidence that specific Well facilities are point sources within the meaning of the CWA, Section 308 of the CWA does not authorize the RFI.

Section 3007 of RCRA authorizes a request for information directed to a person "who generates, stores, treats, transports, disposes of, or handles hazardous waste" for purposes of developing or assisting in the development of a regulation or enforcing the provisions of 42 U.S.C. Ch. 82 . 42 U.S.C. §6927(a). As part of the Beville Amendments to RCRA, Section 3001(b)(2)(A) provides that "drilling fluids, produced waters, and other wastes associated with the exploration, development, or production of crude oil or natural gas shall be subject only to existing State and Federal regulatory programs in lieu of [regulation under Subchapter C of RCRA]" until certain findings are made and regulations are adopted. EPA has reexamined this exemption and concluded that waste produced in connection with natural gas exploration, development and production should continue to be exempt from regulation as hazardous waste under RCRA. 53 Fed. Reg. 25,226 (July 6, 1988). To the extent that the RFI seeks information regarding waste that is not subject to regulation as a hazardous waste under RCRA, RCRA §3007 does not authorize the EPA Information Request.

6. As we previously discussed with counsel for EPA in several telephone conversations and e-mails, the RFI is unreasonable in that it requested an unreasonably short timeframe for response. SWEPI received the request on May 12, and was given until May 25, less than 10 full business days,

[1] In addition, the term "hazardous substance" is defined under CERCLA to exclude petroleum, including crude oil and any fraction thereof, which is not otherwise specifically listed or designated as a hazardous substance under 42 U.S.C. §9601(15)(A)-(F), and to all natural gas and natural gas liquids. 42 U.S.C. §9601(14).

to respond. The data requested covers numerous Wells, and in order to respond to the RFI had to be compiled in a format in which it is not ordinarily kept.

RESPONSES TO MAY 12, 2011 EPA INFORMATION REQUESTS

1. Provide a list identifying each state permitted Well that you own or operate in EPA Region III and include the latitude and longitude for each Well and identify whether each well is actively being drilled, is completed, or is producing natural gas.

Response:
In addition to the objections set forth above, SWEPI objects to Request No. 1 to the extent that the definition of "Well" is overly broad. This could include thousands of natural gas exploration and production wells that do not relate to the stated purpose of the RFI - "Information on Marcellus Shale Flowback Water." SWEPI acknowledges, and has relied upon, an oral clarification received by Atlas Energy L.P. from EPA's counsel, which was communicated to counsel for SWEPI, that the term "Well" is to be interpreted as limited to Wells that have been permitted by a state agency for the exploration and production of natural gas from the Marcellus Shale formation.

Subject to the above objections, SWEPI responds as follows:

Exhibit 1 is a list of Marcellus Shale wells in Pennsylvania in which SWEPI has an ownership interest, and the Exhibit indicates the operator of each Well, including the latitude and longitude for each well, well status (e.g. Active, Completed, or Producing) as of May 12, 2011. For Wells not operated by SWEPI, the operator is identified on Exhibit 1.

2. Provide all Pennsylvania "26R" forms completed and submitted to the Commonwealth of Pennsylvania for all Gas Extraction Wastewaters associated with your Wells for the calendar year 2010, including complete Chemical Analysis Attachments associated with each.

Response:
Subject to the objections set forth above, Exhibits 2a and 2b on the enclosed CD are Pennsylvania 26R forms submitted in 2010 for East Resources, Inc. for the period of January 1, 2010 to July 28, 2010 (Exhibit 2a) and East Resources Management, LLC (SWEPI) for the period of July 29, 2010 to year end (Exhibit 2b). The Pennsylvania 26R submittals include the chemical Analysis attachments.

3. For the period of April 19, 2011 to present, identify your Gas Extraction Wastewater management activities, including disposal, reuse, treatment, recycling, and reclamation for your Wells. In so doing, provide the following:

Response:
Subject to the objections set forth above, as the RFI did not define the term "present," the information submitted in response to items 3. a. to 3. g. is being submitted for the period April

19, 2011 to May 12, 2011, the date of the information request letter for EPA. Additionally, all volumes are reported in U.S. gallons. In response to Request No. 3, SWEPI is providing information relating to Wells operated by SWEPI. Some Wells in which SWEPI has an ownership interest are operated by Talisman, which SWEPI believes would have information responsive to Request No. 3 for those Wells.

a. For each Well, the actual or estimated amount of Gas Extraction Wastewater generated;

Response:
Subject to the objections set forth above, **Exhibit 3a** provides estimated Gas Extraction Wastewater generated per well operated by SWEPI. Note: some Gas Extraction Wastewater is tracked by location and may not be specific to a well on a multiple well pad (example: produced water going to common tank battery). In this case, Gas Extraction Wastewater volumes have been allocated back to all wells on location.

b. For each facility that has received your Gas Extraction Wastewater, including but not limited to, underground injection wells, wastewater treatment plants, and recycling facilities, provide the name and address for each such facility, the name and address of any entity that transported your Gas Extraction Wastewater to each facility, and the volume (in gallons) of such Gas Extraction Wastewater sent to each such facility;

Response:
Subject to the objections set forth above, **Exhibit 3b** provides the names and addresses of facilities that received Gas Extraction Wastewater, volumes received, and related transporters.

c. The total volume (in gallons) of Gas Extraction wastewater that you treated and recycled or caused to be treated or recycled for all your Well sites;

Response:
Subject to the objections set forth above, **Exhibit 3c** lists volumes of Gas Extraction Wastewater that were treated and/or recycled.

d. A description of the method or methods by which you or any third party recyclers recycled such Gas Extraction Wastewater; and

Response:
Subject to the objections set forth above, SWEPI responds to Request 3d. as follows:

During the period April 19, 2011 to May 12, 2011, SWEPI LP caused Gas Extraction Wastewater to be treated and/or recycled via drill cutting liquid dewatering technologies and beneficial re-use of produced brine via blending/dilution with fresh water sources.

e. All modified disposal plans and you submitted after April 19, 2011 to the Commonwealth pursuant to the Pennsylvania Code Title 52 Section 78.55.

Response:
Subject to the objections set forth above, SWEPI has not submitted any modified disposal plans after April 19, 2011 to the Commonwealth.

f. Describe your use of pits, lagoons, impoundments or other land-based units for the storage or disposal of such Gas Extraction Wastewater associated with your gas extraction activities.

Response:
In addition to the objections set forth above, SWEPI objects to Request No. 3f. as ambiguous in that the term "other land-based units" is vague and undefined. Notwithstanding and subject to all objections stated herein, SWEPI stores Gas Extraction Wastewater in mobile steel storage tanks (frac tanks, typically 21,000 gallons/500 barrels storage) and/or poly waste water tanks (typically 9,000 to 10,000 gallons storage), all of which maintain secondary containment.

g. Provide the latitude and longitude for all pits, lagoons, impoundments, or other land-based units used for the storage of Gas Extraction Wastewater associated with your gas extraction activities.

Response:
In addition to the objections set forth above, SWEPI objects to Request No. 3g. as ambiguous in that the term "other land-based units" is vague and undefined. Notwithstanding and subject to all objections stated herein, all well locations listed in Exhibit 1 that maintain a "producing status" have mobile steel storage tanks (frac tanks) and/or poly waste water tanks with secondary containment, used for the storage of Gas Extraction Wastewater.

The following two locations also maintain temporary storage units:

1. 41°51'08.42" -77°17'38.73"
2. 41°44'19.77" -77°13'00.27"

4. Identify your intentions for disposal, reuse, treatment, recycling, and reclamation of Gas Extraction Wastewater after May 19, 2011, including your expected methods and location for disposal, treatment, or recycling during calendar year 2011. Provide the expected percentage of your Gas Extraction Wastewater by disposal, treatment, or recycling method.

Response:
In addition to the objections set forth above, SWEPI objects to Request No. 4 to the extent that it requests information regarding expected future plans and actions. The RFI purports to be authorized by CERCLA Section 104(e), CWA Section 308, and RCRA Section 3007, which are limited to past or current conditions or activities, and do not authorize EPA to request information about potential or expected future activities or plans. Notwithstanding these objections, SWEPI states that its current

plans, which are subject to revision, are either to treat and recycle Gas Extraction Wastewater for beneficial re-use or, secondarily, to dispose of it at authorized facilities, and as per PA DEP guidance.

Locations for treatment, processing, recycling and/or beneficial reuse during calendar year 2011 may include all producing well locations, well locations scheduled for drilling and completions, and/or a permitted project site in Covington Township, Tioga County, PA. Locations for disposal have not been determined at this time.

The expected percentage of Gas Extraction Wastewater during the remainder of calendar year 2011 by disposal, treatment, and/or recycling methods follows:

Approximately 90+% treatment/recycling
Approximately 10% disposal

5. **Submit quarterly reports to EPA on your waste disposal and recycling practices commencing on July 1, 2011 and continuing on a quarterly basis thereafter until June 30, 2012 for a total of four (4) reports. Such quarterly reports shall include the following information for the prior quarter:**

Response:

In addition to the objections set forth above, SWEPI objects to Request No. 5 as vague, unreasonable and unduly burdensome. First, the request fails to define the term "quarterly" and which dates a particular quarterly report is expected to cover. To the extent that EPA intends to refer to calendar quarters, then it is impossible to comply with Request No. 5 as written, in that the request would appear to require submission of data regarding wastewater management in the calendar quarter as of the first day after the end of the quarter (*i.e.*, that the data for April-June 2011 be submitted on July 1, 2011), providing no time for the collection, verification, and collation of that information in a form that responds to EPA's request. Reporting requirement of this type normally provide an appropriate time frame following the end of the covered reporting period in which to collect and collate data into reportable form; and the failure by EPA to provide such a reasonable time frame is arbitrary, capricious and unreasonable.

SWEPI LP intends to cooperate with EPA and will respond to reasonable requests to provide information on a periodic basis concerning Gas Extraction Wastewater management activities. However, a reasonable amount of time must be provided following the close of each reporting period to allow for the collection, quality review, and collation of the required data. SWEPI LP would also request that EPA coordinate its requests with the reporting programs and protocols already established by the Pennsylvania Department of Environmental Protection, to avoid duplication and undue burdens. SWEPI LP would propose a period of at least 30 days following each calendar quarter to allow for collection and reporting of the type of data referenced in Request No. 5a. through 5f. Hence, SWEPI proposes to provide reports on or before the following dates to attempt to comply with Request No. 5:

- October 31, 2011 (providing data for July, August and September 2011)
- January 31, 2012 (providing data for October, November and December 2011)
- April 30, 2012 (providing data for January, February and March 2012)
- July 31, 2012 (providing data for April, May and June 2012)

This response is intended to cover all subparts of Request No. 5.

a. For each Well, the actual or estimated volume (in gallons) of Gas Extraction Wastewater generated;

b. For each facility that has received your Gas Extraction Wastewater, including but not limited to, underground injection wells, wastewater treatment plants, and recycling facilities, provide the name and address for each such facility, the name and address of any entity that transported your Gas Extraction Wastewater sent to each such facility, and the volume (in gallons) of such Gas Extraction Wastewater sent to each such facility.

c. The total volume (in gallons) of Gas Extraction wastewater that you or any third parties treated and recycled or caused to be treated or recycled for all your Well sites;

d. A description of the method or methods by which you or any third party recyclers recycled such Gas Extraction Wastewater; and

e. Describe your use of pits, lagoons, impoundments or other land-based units for the storage or disposal of such Gas Extraction Wastewater for your gas extraction activities.

f. Provide the latitude and longitude for all pits, lagoons, impoundments or other land based units used for the storage of Gas Extraction Wastewater associated with your gas extraction activities.

6. Identify any and all discharges or releases of any substances, wastes, and/or Gas Extraction Wastewater from facilities that contain Wells that you own or operate and all media (air, water, or land) that were affected by such discharges or releases and the estimated quantities of all substances discharged or released for the past five (5) years.

Response:

In addition to the objections set forth above, SWEPI objects to Request No. 6 to the extent that it is vague, overbroad in scope, unauthorized by law, and unduly burdensome. The request uses a series of undefined and ambiguous terms, such as "discharge", "release", "any substances", and "all media." Request No. 6 could be read to require the disclosure of the release of anything (*e.g.*, fresh water, stormwater runoff), anywhere at the Well facility (*e.g.*, steam and water evaporation), for the last five years. In referring to "any substances," Request No. 6 exceeds the authority of EPA under CERCLA, the CWA and RCRA, which respectively refer only to hazardous substances, pollutants, and hazardous waste. As such, Request No. 6 is beyond the scope of EPA's authority to seek information related to the actual and/or threatened release of hazardous substances or the release of contaminants or pollutants that may pose an imminent hazard, information related to point sources, or information related to hazardous waste activities.

On July 29, 2010, Shell US E&P Investments LLC acquired East Resources Management, LLC ("ERM"). Prior to such acquisition, East Resources Inc., a company unrelated to Shell US E&P Investments LLC or SWEPI, transferred certain of its assets, including Pennsylvania Marcellus shale wells, into ERM. Effective January 1, 2011, ERM was merged into SWEPI, LP a Delaware limited partnership, which holds the majority of Shell's onshore natural gas assets in the United States. SWEPI is in the process of reviewing information from the date that ERM became affiliated with Shell and intends to provide information for that timeframe by June 9, 2011.

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this letter and the Exhibits to this letter, and that based on my inquiry of those individuals responsible for obtaining the information, I believe that the submitted information is true, accurate and complete.

H. James Sewell
Appalachia Environmental & Regulatory Team Lead
Shell Exploration & Production Company
on behalf of SWEPI LP

Signature

5/25/11
Date Signed

cc: Humane Zia (via e-mail to zia.humane@epa.gov)
Roberta S. Lewis

SWEPI LP

Shell Exploration & Production Company
190 Thorn Hill Road
Warrendale, PA 15086
H. James Sewell
724-778-9153
jim.sewell@shell.com

Via E-mail and Overnight Delivery
Ms. Jacqueline Morrison (3LC00)
Land and Chemicals Division
United States Environmental Protection Agency, Region III
1650 Arch Street
Philadelphia, Pennsylvania 19103
morrison.jacqueline@epa.gov

Re: First Supplemental Response to Request for Information on Marcellus Shale Flowback Water, May 12, 2011

Dear Ms. Morrison:

This letter provides additional information in response to the May 12, 2011 request for information ("RFI") of the United States Environmental Protection Agency, Region III ("EPA") to SWEPI LP ("SWEPI") with regard to disposal and recycling activities and intentions with regard to wastewater generated by our gas exploration, extraction and production activities in the Marcellus Shale in Region III. Subject to the general and specific objections in SWEPI's Response dated May 25, 2011, SWEPI provides the attached additional information in response to Request No. 6. However, SWEPI is specifically not claiming that any information provided in this First Supplemental Response is subject to treatment as Confidential Business Information (CBI).

If you have any questions regarding this First Supplemental Response, please contact Jim Sewell at 724-778-9153. For questions of a legal nature, please contact Roberta Lewis at 713-241-7188.

FIRST SUPPLEMENTAL RESPONSE TO MAY 12, 2011 EPA INFORMATION REQUESTS

6. Identify any and all discharges or releases of any substances, wastes, and/or Gas Extraction Wastewater from facilities that contain Wells that you own or operate and all media (air, water, or land) that were affected by such discharges or releases and the estimated quantities of all substances discharged or released for the past five (5) years.

Supplemental Response:

In its Response dated May 25, 2011, SWEPI said that it intended to provide information from the date East Resources Management, LLC ("ERM") became affiliated with Shell (July 29, 2010) by June 9, 2011. After reviewing available information, SWEPI determined that the first date that ERM had performed any drilling activities in the Marcellus Shale was in or about April 2008. Therefore, subject to the objections and limitations set forth herein and in SWEPI's Response dated May 25, 2011, Exhibit 4 provides information responsive to this request from that time to the present.

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this letter and the Exhibit to this letter, and that based on my inquiry of those individuals responsible for obtaining the information, I believe that the submitted information is true, accurate and complete.

H. James Sewell
Appalachia Environmental & Regulatory Team Lead
Shell Exploration & Production Company
on behalf of SWEPI LP

Signature

6/9/11
Date Signed

cc: Humane Zia (via e-mail to zia.humane@epa.gov)
Roberta S. Lewis

DATE	WELL NAME	WELL NUMBER	EROSION/ EMISSIONS OR SPILL	MEDIA	MATERIAL RELEASED	ESTIMATED RELEASE QUANTITY
05/12/11	[redacted]	290 2H	Erosion	Land/Water	Sediment	Unknown
04/30/11	[redacted]	523	Spill	Land	Sediment	Unknown
04/29/11	[redacted]	482	Spill	Land	Chemical (solvent)	100 gallons
04/25/11	[redacted]	500	Spill	Land	Oil	4 gallons
04/22/11	[redacted]	723 3H	Spill	Land	Mud	210 gallons
04/21/11	[redacted]	824	Spill	Land	Frac fluids	50 gallons
04/18/11	[redacted]	824	Spill	Land	Fuel	2 gallons
04/15/11	[redacted]	823	Spill	Land	Frac fluids	40-60 gallons
04/12/11	[redacted]	824	Spill	Land	Frac fluids	30 gallons
04/05/11	[redacted] Pipeline Project		Spill	Land	Sediment	Unknown
04/03/11	[redacted]	147	Spill	Land	Frac fluids	5 gallons
03/29/11	[redacted]	290	Spill	Land	Brine	4-4.5 gallons
03/25/11	[redacted]	147 1H	Spill	Land	Mud	2-3 gallons
03/15/11	[redacted]	290 2H	Spill	Land/Water	Sediment	Unknown
03/10/11	[redacted]	3711	Spill	Land	Frac fluids	400 gallons
03/10/11	[redacted]		Spill	Land	Fuel	3 to 5 gallons
03/10/11	[redacted]	824	Spill	Land	Frac fluids	10 gallons
03/07/11	[redacted]	885 1V, 1H, 2H & 3H	Erosion	Land/Water	Sediment	Unknown
02/11/11	[redacted]	419 1H	Spill	Land/Water	Frac fluids	Unknown
02/10/11	[redacted]	284 2H	Spill	Land	Frac fluids	Unknown
12/22/10	[redacted]	589 1V	Spill	Land	Stray gas	Unknown
12/18/10	[redacted]	501 6H	Spill	Land	Flowback	50 gallons
10/28/10	[redacted] (Truck Rollover)	503	Spill	Land	Drill cuttings	Unknown
09/30/10	[redacted] 736	1H	Spill	Water		Unknown
09/29/10	[redacted] Mountain Road (Truck Rollover)		Spill	Land	Drill cuttings/ diesel fuel	Unknown
08/24/10	[redacted]	461	Spill	Land	Fill material	Unknown
08/10/10	[redacted]	402 1H	Spill	Land	Frac fluids	Unknown
08/05/10	[redacted]	438 1V	Spill	Land	gas venting	Unknown
07/12/10	[redacted]	235A 3H	Spill	Land	Frac fluids	1,000 gallons
07/12/10	[redacted]	431 1V	Spill	Land	Frac fluids	Unknown
06/23/10	[redacted]	261 5H	Spill	Land	Flowback	Unknown
06/17/10	[redacted] Mountain	736 1H	Spill	Land	Fuel/Oil	less than 5 gallons
06/10/10	WT 3154 PLP ([redacted] Water Supply)	Well No. T-2	Spill	Land/Water	Brine	Unknown
06/08/10	[redacted]	480 5H	Spill	Water	Flowback	Unknown
06/04/10	[redacted] Mountain	736 1H	Spill	Land	Cement returns/Fuel	Unknown

DATE	WELL NAME	WELL NUMBER	EROSION/ EMISSIONS OR SPILL	MEDIA	MATERIAL RELEASED	RELEASE QUANTITY
06/03/10	[redacted]	290 1H	Spill	Land	Fuel	Unknown
05/10/10	[redacted]	480 5H	Spill	Land	Flowback	8,000 gallons
05/04/10	[redacted]	435 1H	Spill	Land	Flowback	Unknown
04/09/10	[redacted] Water Supply (PLP III WT3154 Lease)	T-2	Spill	Water	Frac fluids	Unknown
04/02/10	[redacted]	261 5H	Spill	Land	Drilling mud/ Cement	Unknown
04/01/10	[redacted]	900 2H B	Spill	Land/W ater	Frac fluids	Unknown
03/16/10	[redacted]	1-11	Spill	Land	Oil	Unknown
02/24/10	[redacted]	1	Spill	Land	Methanol/ Antifreeze	Unknown
01/15/10	[redacted]	419 1H	Spill	Land	Mud	850 gallons
01/15/10	[redacted]	435 1H	Spill	Land	Mud	1,700 gallons
01/15/10	[redacted]	420 1H	Spill	Land	Mud	4,200 gallons
01/12/10	[redacted]	115 1H	Spill	Land	Brine	Unknown
12/23/09	[redacted]	457 1H	Spill	Land	Drilling fluids	Unknown
12/22/09	[redacted]	262 1H	Spill	Land	Produced fluids	Unknown
12/14/09	[redacted]	299 5H	Spill	Land	Recylced frac water	5 bbls
12/04/09	Wellsboro Pipeline		Erosion	Water	Sediment	Unknown
12/03/09	[redacted]	RE#1	Erosion	Water	Sediment	Unknown
10/02/09	Wetland, Tributary to Elk Run		Erosion	Water	Sediment	Unknown
10/02/09	Wetland, Tributary to Corey Creek		Erosion	Water	Sediment	Unknown
08/25/09	[redacted]	236 2H	Emissions	Air	Plant trash	Unknown
08/25/09	[redacted]	236 1H	Emissions	Air	Plant trash	Unknown
08/21/09	[redacted]	2	Spill	Water	Sediment	Unknown
08/18/09	[redacted] 134	1H	Spill	Land	Brine	200 gallons
07/23/09	[redacted] 255	2H	Spill	Land	Drilling fluids	500 gallons
07/23/09	[redacted] 255	1H	Spill	Land	Drilling fluids	500 gallons
07/02/09	[redacted] A 212	1H	Spill	Land	Flowback	Unknown
07/02/09	[redacted] A 212	2H	Spill	Land	Flowback	Unknown
06/03/09	[redacted] 212	2H	Spill	Land	Flowback	Unknown
06/03/09	[redacted] 212	1H	Spill	Land	Flowback	Unknown
06/03/09	[redacted] 235A	2H	Spill	Land	Flowback	Unknown
06/03/09	[redacted] r 235A	1H	Spill	Land	Flowback	Unknown
03/20/09	[redacted]	1	Spill	Land/W ater	Pit water/drill cuttings	150 bbls
04/14/08	[redacted]	2366	Spill	Land/W ater	Brine	Unknown

SWEP1

EXHIBIT 1

Exhibit 1

WELL NAME	WELL NUMBER	LATITUDE	LONGITUDE	OPERATOR	WELL STATUS
[redacted]	1	41.8717833641335	-77.9163027691296	SWEPI	Producing
	264-1H	41.9912492356921	-76.9564052784543	SWEPI	Producing
	212-1H	41.7868249680838	-77.1848674973813	SWEPI	Producing
	212-2H	41.7867766690923	-77.1848352687875	SWEPI	Producing
	128D	41.75335882251	-77.3382837328476	SWEPI	Completed
	130D	41.7919126911376	-77.1178306367017	SWEPI	Producing
	833	41.8646056583569	-77.3723751270965	SWEPI	Completed
	492-1V	41.7977914387628	-77.0127862113278	SWEPI	Completed
	425-1H	41.688644491141	-77.4084885514974	SWEPI	Active
	508-5H	41.8505397315618	-76.9184842466053	SWEPI	Producing
	457-1H	41.9306436818763	-76.9445379029206	SWEPI	Active
	127D	41.7550638838214	-77.368402382866	SWEPI	Completed
	443-1V	41.7580191855351	-77.4105481708177	SWEPI	Completed
	113 D	41.6243803749581	-76.8255738167986	SWEPI	Producing
	237-1H	41.8082856799475	-76.9337036753664	SWEPI	Producing
	237-2H	41.8083637264677	-76.9336703536307	SWEPI	Producing
	237-3H	41.8084407842025	-76.9336361419031	SWEPI	Producing
	237-4H	41.8082454928547	-76.9337230322875	SWEPI	Producing
	237-5H	41.8083239632675	-76.9336871632205	SWEPI	Producing
	237-6H	41.8084021678079	-76.9336532892296	SWEPI	Producing
	722-6H	41.5869032413716	-76.8599494905242	SWEPI	Active
	236-1H	41.8053879012538	-76.953908884399	SWEPI	Producing
	236-2H	41.8054139202685	-76.9539650517582	SWEPI	Producing
	236-4H	41.8054287004463	-76.9541029699624	SWEPI	Producing
	236-5H	41.8054057668115	-76.9540684424423	SWEPI	Producing
	464-5H	41.713649178361	-77.2913142636079	SWEPI	Active
	400-1H	41.9327908195205	-77.0662850044224	SWEPI	Completed
	129-1H	41.775998192521	-77.1452577004808	SWEPI	Producing
	129-2H	41.775957848781	-77.1452587917643	SWEPI	Producing
	255-1H	41.7917186959767	-77.15542924947	SWEPI	Producing
	255-2H	41.7917219501175	-77.1554750589244	SWEPI	Producing
	823-1H	41.8957028678971	-77.379742518756	SWEPI	Producing

Exhibit 1

WELL NAME	WELL NUMBER	LATITUDE	LONGITUDE	OPERATOR	WELL STATUS
[redacted]	823-2H	41.895643816385	-77.3796666055603	SWEPI	Producing
	823-3H	41.8955870815374	-77.3795857207222	SWEPI	Producing
	823-4H	41.895672915625	-77.3797041972833	SWEPI	Producing
	823-5H	41.8956148740385	-77.3796265888068	SWEPI	Producing
	823-6H	41.8955596736775	-77.3795449973896	SWEPI	Producing
	512-1V	41.8567834841403	-76.98207500068998	SWEPI	Completed
	482-2H	41.812505601444	-76.911780273559	SWEPI	Completed
	482-3H	41.81252124414 64	-76.91167409091 07	SWEPI	Completed
	482-5H	41.8125136060003	-76.91172595095 49	SWEPI	Completed
	482-6H	41.8125291689847	-76.911620136152	SWEPI	Completed
	235A-3H	41.7967797218275	-76.9766878475666	SWEPI	Producing
	235A-4H	41.7967634921401	-76.9766288112667	SWEPI	Producing
	235A-1H	41.7968419400763	-76.9766101978169	SWEPI	Producing
	235A-2H	41.7968510755588	-76.9766630840948	SWEPI	Producing
	601-1V	41.7728435449719	-76.901681128727	SWEPI	Completed
	235-1H	41.800104773391	-76.9681550075997	SWEPI	Producing
	448	41.6792366666468	-77.3877434828837	SWEPI	Active
	115-1H	41.6018592347375	-76.8945698254371	SWEPI	Completed
	721-5H	41.5904059498703	-76.8494016522879	SWEPI	Active
	427	41.5343944921311	-77.0044750238217	SWEPI	Completed
	720	41.6107559537474	-76.8411576444344	SWEPI	Active
	143D	41.6994608907709	-77.295652512827	SWEPI	Active
	424-1V	41.7024854606624	-77.404045148067	SWEPI	Completed
	702	41.6111359871339	-76.980256866062	SWEPI	Active
	748-1V	41.5588806891606	-77.2154526778004	SWEPI	Completed
	472-1V	41.7182860682204	-77.2704920286068	SWEPI	Completed
	433-1H	41.7255855697784	-77.4057368017839	SWEPI	Active
	458-1H	41.9188463260835	-76.923189771743	SWEPI	Completed
	523	41.8896653952493	-76.9656102369428	SWEPI	Active
	435-1H	41.7338830086815	-77.3996533326474	SWEPI	Completed
	819-1V	41.8586195396741	-77.4061138458777	SWEPI	Completed
	137D	41.7348786614877	-77.3740376487104	SWEPI	Completed

Exhibit 1

WELL NAME	WELL NUMBER	LATITUDE	LONGITUDE	OPERATOR	WELL STATUS
[redacted]	374	41.6275890684949	-76.9275905012824	SWEPI	Active
	303	41.7484491514451	-77.1888602964359	SWEPI	Active
	529	41.8324555735741	-77.0734332475416	SWEPI	Active
	824-5H	41.897125968198	-77.3681344663465	SWEPI	Completed
	824-6H	41.8971632425	-77.3681534197972	SWEPI	Producing
	116	41.6190704218957	-76.9359176481976	SWEPI	Completed
	456-2H	41.9260973436655	-76.9542190942091	SWEPI	Active
	554	41.8467888772187	-77.2654223173606	SWEPI	Completed
	134-1H	41.7810923530293	-77.1300648253279	SWEPI	Producing
	134D	41.7810248258755	-77.13004555075	SWEPI	Producing
	509-5H	41.875569397745	-76.9346901702811	SWEPI	Completed
	412-1H	41.957538051602	-76.9369153680564	SWEPI	Active
	112	41.6280293943683	-76.8540510337268	SWEPI	Producing
	515-2H	41.842623526 17	-77.0064989493831	SWEPI	Completed
	749	41.6108306589285	-76.7913471786331	SWEPI	Completed
	284-1H	41.7879855233075	-77.2153308056062	SWEPI	Producing
	284-2H	41.7879910810784	-77.215167581960 2	SWEPI	Producing
	284-3H	41.7879963287762	-77.2150560643767	SWEPI	Producing
	284-4H	41.7879891381683	-77.2152222350518	SWEPI	Producing
	284-5H	41.7879908217832	-77.215111480271	SWEPI	Producing
	284-6H	41.7879980056586	-77.215003246927 9	SWEPI	Producing
	#2013-1HM	40.8928584334895	-80.4114224202611	SWEPI	Active
	#2013-1HU	40.8930417612758	-80.411544556652	SWEPI	Active
	507-5H	41.8475584055119	-76.9237421175499	SWEPI	Producing
	504-5H	41.8436702097951	-76.9583464250884	SWEPI	Producing
	736-1H	41.5369764763684	-76.9934130997836	SWEPI	Active
	1H	41.984210241887	-77.026361339634 4	SWEPI	Completed
	147-1H	41.7896200846877	-77.2048069370315	SWEPI	Producing
	147-2H	41.7895809058729	-77.2048208345101	SWEPI	Producing
	147-4H	41.7895916622027	-77.2048904172316	SWEPI	Active
	147-6H	41.7895519310738	-77.2049035858969	SWEPI	Active
	147	41.7896200846877	-77.2048069370315	SWEPI	Producing

Exhibit 1

WELL NAME	WELL NUMBER	LATITUDE	LONGITUDE	OPERATOR	WELL STATUS
[redacted]	376	41.6036337528364	-76.9175655375705	SWEPI	Active
	259-2H	41.9883769174422	-77.0150662845001	SWEPI	Producing
	259-3H	41.9883768588543	-77.0150136847503	SWEPI	Producing
	259-4H	41.9883714367244	-77.01511085488	SWEPI	Producing
	259-5H	41.9883743114713	-77.0151748254842	SWEPI	Completed
	259-6H	41.988382579005	-77.0149635941075	SWEPI	Producing
	703	41.6015064139089	-76.9927202616785	SWEPI	Completed
	234-1H	41.7886226784861	-77.0188298733278	SWEPI	Producing
	234-2H	41.7885691107594	-77.0188477162122	SWEPI	Producing
	234-3H	41.7885571250596	-77.0187924098935	SWEPI	Producing
	234-4H	41.7885791223647	-77.0188968072319	SWEPI	Producing
	234-5H	41.7885885603682	-77.0189485046472	SWEPI	Producing
	234-6H	41.7885462475385	-77.0187365850453	SWEPI	Producing
	253-1H	41.7852840133942	-76.9873392357019	SWEPI	Producing
	501-1H	41.8263465769781	-76.9841533600343	SWEPI	Producing
	501-2H	41.8263011939416	-76.9841339730416	SWEPI	Producing
	501-4H	41.8262119686372	-76.9841123892524	SWEPI	Producing
	501-6H	41.8261714517039	-76.9841025946635	SWEPI	Producing
	501-3H	41.8262524581275	-76.984122184178	SWEPI	Producing
	501-5H	41.8262753122224	-76.9840548050841	SWEPI	Producing
	729	41.5927115706748	-77.0937812683261	SWEPI	Completed
	1106	41.9431584976303	-77.3564527808945	SWEPI	Completed
	460-1H	41.765009271076	-77.0941148188124	SWEPI	Producing
	461-1H	41.7634549537471	-77.1160636273326	SWEPI	Producing
	420-1H	41.676208542471 1	-77.3460406192022	SWEPI	Active
	525-1V	41.8893661269122	-76.9366498239822	SWEPI	Completed
	142D	41.7002210779972	-77.3128165207415	SWEPI	Active
	144D	41.7718945561722	-77.3192148139311	SWEPI	Completed
	885	41.955100114451 1	-77.2742554621707	SWEPI	Completed
	290-2H	41.7971669186895	-77.244474997126	SWEPI	Active
	290-3H	41.7971969166766	-77.2443750090313	SWEPI	Active
	290-5H	41.7971818291743	-77.2444267274726	SWEPI	Active

Exhibit 1

WELL NAME	WELL NUMBER	LATITUDE	LONGITUDE	OPERATOR	WELL STATUS
[redacted]	290-6H	41.7972113728183	-77.2443232588176	SWEPI	Active
	290-4H	41.7971526657884	-77.2445293128841	SWEPI	Active
	614	41.6580304723264	-77.3776499862137	SWEPI	Completed
	299-5H	41.7713160587139	-77.1558209136673	SWEPI	Producing
	723-1H	41.6190869267022	-76.8849989365004	SWEPI	Active
	419-1H	41.694399770525	-77.3603563740923	SWEPI	Active
	513-1V	41.855409054512	-76.9912721144538	SWEPI	Completed
WT 3124	1003-3H	41.7091834980707	-78.7330916614996	SWEPI	Active
WT 3781 #1401-2H	#1401-2H	41.5850612006213	-78.9395473775609	SWEPI	Producing
[redacted]	480-5H	41.8107785843045	-76.9457285713881	SWEPI	Producing
	307-1H	41.7463732144632	-77.2012775833857	SWEPI	Producing
	410-5H	41.9524326455903	-76.9540995201374	Talisman	Completed
	404-1H	41.9362796859719	-77.0194385070302	Talisman	Completed
	408-1H	41.9470047449046	-76.9772792842643	Talisman	Completed
	406-1H	41.9315298257063	-76.9929816804702	Talisman	Completed
	402-1H	41.929935261115	-77.0414783504867	Talisman	Completed
	1	41.8956411866325	-76.4097058240691	Talisman	Completed
	257-1H	41.9880380121623	-77.0516069416013	Talisman	Producing
	261-1H	41.9885435959049	-76.9908180799941	Talisman	Producing
	261-2H	41.9886104413963	-76.9908846088074	Talisman	Producing
	261-3H	41.988621472802	-76.9908929394627	Talisman	Producing
	261-4H	41.9885213643159	-76.9908595389274	Talisman	Producing
	261-5H	41.9885881402585	-76.9908734678629	Talisman	Producing
	261-6H	41.9885658776027	-76.9908682118666	Talisman	Producing
	271-1H	41.9635519343547	-77.000087766948	Talisman	Producing
	259-1H	41.9884075441573	-77.0151358248398	Talisman	Producing
	269-1H	41.9684576061563	-77.0262446321908	Talisman	Producing
	268-1H	41.9667601436541	-77.038289642411	Talisman	Producing
	262-1H	41.9893241781472	-76.9795897404705	Talisman	Producing

SWEPI Exh 2A
as redacted

2540-PM-BWM0347 Rev. 1/2011

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

FORM 26R
CHEMICAL ANALYSIS OF RESIDUAL WASTE
ANNUAL REPORT BY THE GENERATOR

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 26R, reference the item number and identify the date prepared. The date on attached sheets needs to match the date noted below.

General Reference 287.54

Date Prepared/Revised February 2011

DEP USE ONLY
Date Received & General Notes

SECTION A. CLIENT (GENERATOR OF THE WASTE) INFORMATION

Company Name
East Resources, Inc

If a Subsidiary, Name of Parent Company
NA

EPA Generator ID#

Company Mailing Address Line 1
190 Thorn Hill Road

Company Mailing Address Line 2

Company Address Last Line – City	State	Zip+4	Phone	Ext
Warrendale	PA	15086	724-772-8600	

Company Contact Last Name	First Name	MI	Suffix
Blauvelt	Scott	C	

Municipality	County
Cranberry Township	Butler

Contact Phone	Ext	Contact Email Address
724-772-8600		scott.blauvelt@shell.com

Is the waste generated at the Company Mailing Address (noted above)? ☐ Yes ☒ No

If 'No', describe location of waste generation and storage. Waste generated at gas well locations in DEP Northcentral Region

Municipality Various County Various State PA

SECTION B. WASTE DESCRIPTION

Residual Waste Code	Residual Waste Code Description	Amount	Unit of Measure	Time Frame
801	Drilling Fluids	50,960	☐ cu yd ☒ gal ☐ lb ☐ ton	☐ One Time

1. GENERAL PROPERTIES

a. pH Range 5.2 to 6.8 (based on analyses or knowledge)

b. Physical State
- ☒ Liquid Waste (EPA Method 9095)
- ☐ Solid (EPA Method 9095)
- ☐ Gas (ambient temperature & pressure)

c. Physical Appearance
Color clear/black Odor various
Number of Solid or Liquid Phases of Separation NA
Describe each phase of separation.

2. CHEMICAL ANALYSIS ATTACHMENTS

a.	The results of a detailed chemical characterization of the waste, as described in the instructions, is attached.	☒ Yes	☐ No	
b.	A detailed description of the waste sampling method is attached.	☒ Yes	☐ No	
c.	The quality assurance/quality control procedures employed by the laboratory(ies) is attached.	☒ Yes	☐ No	
d.	The results of the hazardous waste determination is attached.	☒ Yes	☐ No	
e.	If applicable, a detailed explanation supporting use of generator knowledge in lieu of actual chemical analysis is attached.	☐ Yes	☐ No	☒ N/A

3. Process Description & Schematic Attachments

a.	A detailed description of the manufacturing and/or pollution control processes producing the waste, as specified in the instructions, is attached.	☒ Yes	☐ No	
b.	A schematic of the manufacturing and/or pollution control processes producing the waste, as specified in the instructions, is attached.	☒ Yes	☐ No	
c.	If portions of the information submitted are confidential, the substantiation for a confidentiality claim, as described in the instructions, is attached.	☐ Yes	☐ No	☒ N/A

SECTION C. MANAGEMENT OF RESIDUAL WASTE

1. Processing or Disposal Facility(ies)

The area below (a.-d.) will accommodate the identification of two facilities. Attach additional sheets if necessary.

a. Solid waste permit number(s) for processing or disposal facility being utilized.
PA0101508

b.
Facility Name: Pennsylvania Brine Treatment, Inc.
Address Line 1: 5148 US Route 322
Address Line 1:
Address City State ZIP: Franklin PA 16323
Municipality: Cranberry Township County: Venago

c.
Facility Contact Name: Elton DeLong
Title: Opeations Manager
Phone: 814-437-3593 Email Address: info@pabrine.com

d. Volume of waste shipped to processing or disposal facility in the previous year.
50,960 ☐ cu yd ☒ gal ☐ lb ☐ ton (check one)

a. Solid waste permit number(s) for processing or disposal facility being utilized.

b.
Facility Name
Address Line 1
Address Line 1
Address City State ZIP
Municipality County

c.
Facility Contact Name
Title
Phone Email Address

d. Volume of waste shipped to processing or disposal facility in the previous year.
☐ cu yd ☐ gal ☐ lb ☐ ton (check one)

2. Beneficial Use

a.	Has the waste been approved for beneficial use? If "Yes", list the general permit number or approval number.	☐ Yes	☒ No
b.	Volume of waste beneficially used in the previous year. ☐ cu yd ☐ gal ☐ lb ☐ ton (check one)		

SECTION D. CERTIFICATION

I certify, under penalty of law, that I have personally examined and am familiar with the information submitted in this Annual Report and all attached documents and that based upon my inquiry of those individuals immediately responsible for obtaining the information, I verify that the submitted information is true, accurate and complete to the best of my knowledge. I understand that the submission of false information herein is made subject to the penalties of 18 Pa. C.S. §4904, relating to unsworn falsification to authorities, which include fine and imprisonment.

Check the following, if applicable:

☐ I certify the information required in Section B-1, General Properties was supplied to the Department for the year _____ and has not changed.

Form Submitted: ☐ Form 26R

☐ Other (specify) _____

Date Submitted: _____

☐ I certify the information required in Section B-2, Chemical Analysis was supplied to the Department for the year _____ and has not changed.

Form Submitted: ☐ Form 26R

☐ Other (specify) _____

Date Submitted: _____

☐ I certify the information required in Section B-3, Process Description and Schematic, was supplied to the Department for the year _____ and has not changed.

Form Submitted: ☐ Form 26R

☐ Other (specify) _____

Date Submitted: _____

Name of Responsible Official _____ Title ENVIRONMENTAL & REGULATORY LEAD

Signature _____ Date 02/22/11

Attachments

2A

Microbac Laboratories, Inc.
100 MARSHALL DRIVE
WARRENDALE, PA 15086
(724) 772-0610 FAX (724) 772-1686
TOM ZIERENBERG, MANAGING DIRECTOR
http://www.microbac.com

State Laboratory Certification Numbers:
PADEP: 02-00257, NC: 42703, WVDEP: 215, 9951 CM KY: 90136

CHEMISTRY · MICROBIOLOGY · FOOD SAFETY · CONSUMER PRODUCTS
WATER · AIR · WASTES · FOOD · PHARMACEUTICALS · NUTRACEUTICALS

CERTIFICATE OF ANALYSIS

PENN ENVIRONMENTAL & REM., INC
MR. CHRIS HUNSTCKER
359 NORTHGATE DRIVE
STE 400
WARRENDALE, PA 15086

Date Reported: 8/31/2009
Date Received: 8/8/2009
Order Number: 0908-00536
Invoice No.: 55937
Cust #: P071
Sample Date: 8/6/2009
Sample Time: 11:00
Sampler/Temp:

Permit No.:
Cust P.O.:

SUBJECT: Wastewater Samples for Analysis

TEST	METHOD	RESULT	UNITS	DATE	TECH
001 Set 1 Collected 8/6/09 @ 11:00	Drilling Pit Fluid				
Acidity (as CaCO3)	SM 2310-B	<1	mg/L	08/18/09	SFS
Alkalinity (as CaCO3)	SM20 2320-B	497	mg/L	08/18/09	SFS
[illegible]nia, Distilled	SM 4500-NH3 B/D	1.95	mg/L	08/12/09	RDP
[illegible]	SM 5210-B	467	mg/L	08/10/09	SFS
Bromide	ASTM D 1246-95-C	205	mg/L	08/11/09	RDP
COD	SM 5220-D	947	mg/L	08/13/09	RDP
Chloride	SM 4500-Cl-E(Discrete)	17,500	mg/L	08/17/09	NAH
Nitrate-Nitrite as Nitrogen	SM 4500-NO3-F(Discrete)	0.15	mg/L	08/13/09	NAH
Oil & Grease	EPA 1664A	<5	mg/L	08/18/09	ADS
pH	SM 4500 H+B	6.8	su	08/10/09	EAS
Phenolics	EPA 420.2(Discrete)	<0.010	mg/L	08/24/09	NAH
Conductivity	SM 2510-B	52,600	umhos/cm	08/11/09	LLS
Sulfate	EPA 375.4	663	mg/L	08/20/09	SFS
Surfactants	SM 5540-C	0.084	mg/L	08/11/09	NAH
Total Dissolved Solids	SM 2540-C	36,100	mg/L	08/13/09	ADS
Total Kjeldahl Nitrogen	SM20 4500-Norg-B+NH3-D	5.66	mg/L	08/17/09	RDP
Total Suspended Solids	SM 2540-D	168	mg/L	08/11/09	LAM
Aluminum	EPA 200.7	3.83	mg/L	08/13/09	CMG
Arsenic	EPA 200.7	<0.10	mg/L	08/13/09	CMG
Barium	EPA 200.7	20.9	mg/L	08/15/09	CMG
Beryllium	EPA 200.7	<0.005	mg/L	08/13/09	CMG
Boron	EPA 200.7	0.46	mg/L	08/13/09	CMG
Cadmium	EPA 200.7	<0.005	mg/L	08/13/09	CMG
Calcium	EPA 200.7	516	mg/L	08/15/09	CMG
Chromium	EPA 200.7	0.01	mg/L	08/13/09	CMG
Cobalt	EPA 200.7	<0.01	mg/L	08/13/09	CMG
Copper	EPA 200.7	0.04	mg/L	08/13/09	CMG
Hardness by Calculation	SM 2340-B	1,400	mg CaCO3/L	08/15/09	CMG
Iron	EPA 200.7	4.24	mg/L	08/13/09	CMG
[illegible]ssolved	EPA 200.7	0.53	mg/L	08/13/09	CMG
Lead	EPA 200.7	0.13	mg/L	08/13/09	CMG
Lithium	EPA 200.7	1.21	mg/L	08/13/09	CMG

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PENN ENVIRONMENTAL & REM., INC
MR. CHRIS HUNSTCKER
359 NORTHGATE DRIVE
STE 400
WARRENDALE, PA 15086

Date Reported: 8/31/2009
Date Received: 8/8/2009
Order Number: 0908-00536
Invoice No.: 55937
Cust #: P071
Sample Date: 8/6/2009
Sample Time: 11:00
Sampler/Temp:

Permit No.:
Cust P.O.:

SUBJECT: Wastewater Samples for Analysis

TEST	METHOD	RESULT	UNITS	DATE	TECH
001 Set 1					
Collected 8/6/09 @ 11:00					
.....continued					
Magnesium	EPA 200.7	27.6	mg/L	08/13/09	CMG
[illegible]nganese	EPA 200.7	3.11	mg/L	08/13/09	CMG
[illegible]ury	EPA 245.1	<0.0004	mg/L	08/14/09	CMG
Molybdenum	EPA 200.7	<0.10	mg/L	08/13/09	CMG
Nickel	EPA 200.7	0.03	mg/L	08/13/09	CMG
Selenium	EPA 200.7	<0.10	mg/L	08/13/09	CMG
Silver	EPA 200.7	<0.01	mg/L	08/13/09	CMG
Sodium	EPA 200.7	12,200	mg/L	08/21/09	CMG
Strontium	EPA 200.7	20.8	mg/L	08/13/09	CMG
Zinc	EPA 200.7	0.04	mg/L	08/13/09	CMG
Total Volatiles	EPA 624			08/11/09	LAM
Benzene		<5	ug/L	08/11/09	LAM
Toluene		<5	ug/L	08/11/09	LAM
Glycols	SW-846 8015B			08/28/09	MSM
Ethylene Glycol		<500	mg/L	08/28/09	MSM
002 Set 2					
Collected 8/6/09 @ 11:30	Flowback				
Acidity (as CaCO3)	SM 2310-B	77	mg/L	08/18/09	SFS
Alkalinity (as CaCO3)	SM20 2320-B	<1	mg/L	08/18/09	SFS
Ammonia, Distilled	SM 4500-NH3 B/D	126	mg/L	08/12/09	RDP
BOD5	SM 5210-B	<2	mg/L	08/10/09	SFS
Bromide	ASTM D 1246-95-C	517	mg/L	08/11/09	RDP
COD	SM 5220-D	202	mg/L	08/13/09	RDP
Chloride	SM 4500-Cl-E(Discrete)	44,700	mg/L	08/17/09	NAH
Nitrate-Nitrite as Nitrogen	SM 4500-NO3-F(Discrete)	0.23	mg/L	08/13/09	NAH
[illegible]rease	EPA 1664A	7	mg/L	08/18/09	ADS
pH	SM 4500 H+B	5.4	su	08/10/09	EAS
Phenolics	EPA 420.2(Discrete)	<0.010	mg/L	08/24/09	NAH

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002 Set 2
Collected 8/6/09 @ 11:30
.....continued

Flowback

TEST	METHOD	RESULT	UNITS	DATE	TECH
Conductivity	SM 2510-B	98,400	umhos/cm	08/11/09	LLS
[illegible]ate	EPA 375.4	<1	mg/L	08/20/09	SFS
[illegible]actants	SM 5540-C	0.207	mg/L	08/11/09	NAH
Total Dissolved Solids	SM 2540-C	86,500	mg/L	08/13/09	ADS
Total Kjeldahl Nitrogen	SM20 4500-Norg-B+NH3-D	144	mg/L	08/17/09	RDP
Total Suspended Solids	SM 2540-D	148	mg/L	08/11/09	LAM
Aluminum	EPA 200.7	0.61	mg/L	08/13/09	CMG
Arsenic	EPA 200.7	<0.10	mg/L	08/13/09	CMG
Barium	EPA 200.7	2,270	mg/L	08/15/09	CMG
Beryllium	EPA 200.7	<0.005	mg/L	08/13/09	CMG
Boron	EPA 200.7	2.28	mg/L	08/13/09	CMG
Cadmium	EPA 200.7	<0.005	mg/L	08/13/09	CMG
Calcium	EPA 200.7	6,140	mg/L	08/15/09	CMG
Chromium	EPA 200.7	<0.01	mg/L	08/13/09	CMG
Cobalt	EPA 200.7	<0.01	mg/L	08/13/09	CMG
Copper	EPA 200.7	<0.01	mg/L	08/13/09	CMG
Hardness by Calculation	SM 2340-B	16,900	mg CaCO3/L	08/15/09	CMG
Iron	EPA 200.7	35.2	mg/L	08/13/09	CMG
Iron, Dissolved	EPA 200.7	27.6	mg/L	08/13/09	CMG
Lead	EPA 200.7	<0.10	mg/L	08/13/09	CMG
Lithium	EPA 200.7	53.6	mg/L	08/13/09	CMG
Magnesium	EPA 200.7	384	mg/L	08/15/09	CMG
Manganese	EPA 200.7	2.81	mg/L	08/13/09	CMG
Mercury	EPA 245.1	<0.0004	mg/L	08/14/09	CMG
Molybdenum	EPA 200.7	<0.10	mg/L	08/13/09	CMG
Nickel	EPA 200.7	<0.01	mg/L	08/13/09	CMG
Selenium	EPA 200.7	<0.10	mg/L	08/13/09	CMG
Silver	EPA 200.7	<0.01	mg/L	08/13/09	CMG
[illegible]n	EPA 200.7	18,400	mg/L	08/15/09	CMG
Strontium	EPA 200.7	1,330	mg/L	08/13/09	CMG
Zinc	EPA 200.7	0.09	mg/L	08/13/09	CMG

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SUBJECT: Wastewater Samples for Analysis

TEST	METHOD	RESULT	UNITS	DATE	TECH
002 Set 2					
Collected 8/6/09 @ 11:30					
.....continued					
Total Volatiles	EPA 624			08/11/09	LAM
'zene		<5	ug/L	08/11/09	LAM
,ene		<5	ug/L	08/11/09	LAM
Glycols	SW-846 8015B			08/28/09	MSM
Ethylene Glycol		<500	mg/L	08/28/09	MSM
003 Set 3					
Collected 8/6/09 @ 11:40	Flowback				
Acidity (as CaCO3)	SM 2310-B	143	mg/L	08/18/09	SFS
Alkalinity (as CaCO3)	SM20 2320-B	<1	mg/L	08/18/09	SFS
Ammonia, Distilled	SM 4500-NH3 B/D	166	mg/L	08/12/09	RDP
BOD5-	SM 5210-B	5	mg/L	08/10/09	SFS
Bromide	ASTM D 1246-95-C	857	mg/L	08/11/09	RDP
COD	SM 5220-D	3,020	mg/L	08/13/09	RDP
Chloride	SM 4500-Cl-E(Discrete)	60,500	mg/L	08/17/09	NAH
Nitrate-Nitrite as Nitrogen	SM 4500-NO3-F(Discrete)	0.14	mg/L	08/13/09	NAH
Oil & Grease	EPA 1664A	<5	mg/L	08/18/09	ADS
pH	SM 4500 H+B	5.2	su	08/10/09	EAS
Phenolics	EPA 420.2(Discrete)	<0.010	mg/L	08/24/09	NAH
Conductivity	SM 2510-B	139,000	umhos/cm	08/11/09	LLS
Sulfate	EPA 375.4	<1	mg/L	08/20/09	SFS
Surfactants	SM 5540-C	0.216	mg/L	08/11/09	NAH
Total Dissolved Solids	SM 2540-C	135,000	mg/L	08/13/09	ADS
Total Kjeldahl Nitrogen	SM20 4500-Norg-B+NH3-D	223	mg/L	08/17/09	RDP
Total Suspended Solids	SM 2540-D	113	mg/L	08/11/09	LAM
Aluminum	EPA 200.7	<0.10	mg/L	08/13/09	CMG
'c	EPA 200.7	<0.10	mg/L	08/13/09	CMG
Barium	EPA 200.7	9,360	mg/L	08/21/09	CMG
Beryllium	EPA 200.7	<0.005	mg/L	08/13/09	CMG

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SUBJECT: Wastewater Samples for Analysis

TEST	METHOD	RESULT	UNITS	DATE	TECH
003 Set 3 Collected 8/6/09 @ 11:40 .....continued Flowback					
Boron	EPA 200.7	4.36	mg/L	08/15/09	CMG
[illegible]mium	EPA 200.7	<0.005	mg/L	08/13/09	CMG
[illegible]um	EPA 200.7	16,600	mg/L	08/15/09	CMG
Chromium	EPA 200.7	<0.01	mg/L	08/13/09	CMG
Cobalt	EPA 200.7	<0.01	mg/L	08/13/09	CMG
Copper	EPA 200.7	<0.01	mg/L	08/13/09	CMG
Hardness by Calculation	SM 2340-B	46,000	mg CaCO3/L	08/15/09	CMG
Iron	EPA 200.7	77.2	mg/L	08/13/09	CMG
Iron, Dissolved	EPA 200.7	74.5	mg/L	08/13/09	CMG
Lead	EPA 200.7	<0.10	mg/L	08/13/09	CMG
Lithium	EPA 200.7	115	mg/L	08/13/09	CMG
Magnesium	EPA 200.7	1,100	mg/L	08/15/09	CMG
Manganese	EPA 200.7	8.19	mg/L	08/15/09	CMG
Mercury	EPA 245.1	<0.0004	mg/L	08/14/09	CMG
Molybdenum	EPA 200.7	<0.10	mg/L	08/13/09	CMG
Nickel	EPA 200.7	<0.01	mg/L	08/13/09	CMG
Selenium	EPA 200.7	<0.10	mg/L	08/13/09	CMG
Silver	EPA 200.7	<0.01	mg/L	08/13/09	CMG
Sodium	EPA 200.7	74,900	mg/L	08/21/09	CMG
Strontium	EPA 200.7	3,410	mg/L	08/13/09	CMG
Zinc	EPA 200.7	0.12	mg/L	08/13/09	CMG
Total Volatiles	EPA 624			08/11/09	LAM
Benzene		<5	ug/L	08/11/09	LAM
Toluene		<5	ug/L	08/11/09	LAM
Glycols	SW-846 8015B			08/28/09	MSM
Ethylene Glycol		<500	mg/L	08/28/09	MSM
0r Set 4 Collected 8/6/09 @ 11:50 Flowback					

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Order Number: 0908-00536
Invoice No.: 55937
Cust #: P071
Sample Date: 8/6/2009
Sample Time: 11:00
Sampler/Temp:

Permit No.:
Cust P.O.:

SUBJECT: Wastewater Samples for Analysis

TEST	METHOD	RESULT	UNITS	DATE	TECH
004 Set 4					
Collected 8/6/09 @ 11:50	Flowback				
.....continued					
Acidity (as CaCO3)	SM 2310-B	73	mg/L	08/18/09	SFS
Alkalinity (as CaCO3)	SM20 2320-B	1	mg/L	08/18/09	SFS
Ammonia, Distilled	SM 4500-NH3 B/D	95	mg/L	08/12/09	RDP
BOD5	SM 5210-B	9	mg/L	08/10/09	SFS
Bromide	ASTM D 1246-95-C	461	mg/L	08/11/09	RDP
COD	SM 5220-D	1,170	mg/L	08/13/09	RDP
Chloride	SM 4500-Cl-E(Discrete)	37,100	mg/L	08/17/09	NAH
Nitrate-Nitrite as Nitrogen	SM 4500-NO3-F(Discrete)	0.19	mg/L	08/13/09	NAH
Oil & Grease	EPA 1664A	63	mg/L	08/18/09	ADS
pH	SM 4500 H+B	5.4	su	08/10/09	EAS
Phenolics	EPA 420.2(Discrete)	0.015	mg/L	08/24/09	NAH
Conductivity	SM 2510-B	84,900	umhos/cm	08/11/09	LLS
Sulfate	EPA 375.4	<1	mg/L	08/20/09	SFS
Surfactants	SM 5540-C	0.290	mg/L	08/11/09	NAH
Total Dissolved Solids	SM 2540-C	74,600	mg/L	08/13/09	ADS
Total Kjeldahl Nitrogen	SM20 4500-Norg-B+NH3-D	123	mg/L	08/17/09	RDP
Total Suspended Solids	SM 2540-D	142	mg/L	08/11/09	LAM
Aluminum	EPA 200.7	<0.10	mg/L	08/13/09	CMG
Arsenic	EPA 200.7	<0.10	mg/L	08/13/09	CMG
Barium	EPA 200.7	2,660	mg/L	08/15/09	CMG
Beryllium	EPA 200.7	<0.005	mg/L	08/13/09	CMG
Boron	EPA 200.7	2.37	mg/L	08/13/09	CMG
Cadmium	EPA 200.7	<0.005	mg/L	08/13/09	CMG
Calcium	EPA 200.7	7,630	mg/L	08/15/09	CMG
Chromium	EPA 200.7	<0.01	mg/L	08/13/09	CMG
Cobalt	EPA 200.7	<0.01	mg/L	08/13/09	CMG
Copper	EPA 200.7	<0.01	mg/L	08/13/09	CMG
Hardness by Calculation	SM 2340-B	20,900	mg CaCO3/L	08/15/09	CMG
[illegible]	EPA 200.7	43.2	mg/L	08/13/09	CMG
Iron, Dissolved	EPA 200.7	30.7	mg/L	08/13/09	CMG
Lead	EPA 200.7	<0.10	mg/L	08/13/09	CMG

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TEST	METHOD	RESULT	UNITS	DATE	TECH
004 Set 4					
Collected 8/6/09 @ 11:50	Flowback				
.....continued					
Lithium	EPA 200.7	65.2	mg/L	08/13/09	CMG
Magnesium	EPA 200.7	453	mg/L	08/15/09	CMG
anese	EPA 200.7	2.89	mg/L	08/13/09	CMG
Mercury	EPA 245.1	<0.0004	mg/L	08/14/09	CMG
Molybdenum	EPA 200.7	<0.10	mg/L	08/13/09	CMG
Nickel	EPA 200.7	<0.01	mg/L	08/13/09	CMG
Selenium	EPA 200.7	<0.10	mg/L	08/13/09	CMG
Silver	EPA 200.7	<0.01	mg/L	08/13/09	CMG
Sodium	EPA 200.7	18,300	mg/L	08/15/09	CMG
Strontium	EPA 200.7	1,670	mg/L	08/13/09	CMG
Zinc	EPA 200.7	0.08	mg/L	08/13/09	CMG
Total Volatiles	EPA 624			08/11/09	LAM
Benzene		<5	ug/L	08/11/09	LAM
Toluene		<5	ug/L	08/11/09	LAM
Glycols	SW-846 8015B			08/28/09	MSM
Ethylene Glycol		<500	mg/L	08/28/09	MSM

**Due to laboratory accident, the BOD5 and MBAS were analyzed outside of holding time.

Report authorized by Tom Zierenberg (Managing Director: Pittsburgh Division)
Technical review performed by Project Manager (signature on file)

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

February 17, 2010

Mr. Joe Harrick
Penn Enviornmental & Remediation
359 Northgate Drive
Warrendale, PA 15086

RE: Project: PA4499-02
Pace Project No.: 3020330

Dear Mr. Harrick:
Enclosed are the analytical results for sample(s) received by the laboratory on December 22, 2009. The results relate only to the samples included in this report. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jacquelyn Collins

jacquelyn.collins@pacelabs.com
Project Manager

Enclosures

cc: Mr. Ronald Doumont, Penn E&R

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

CERTIFICATIONS

Project: PA4499-02
Pace Project No.: 3020330

Pennsylvania Certification IDs
1638 Roseytown Road Suites 2,3&4 Greensburg, PA .15601
Wyoming Certification #: 8TMS-Q
Wisconsin/PADEP Certification
West Virginia Certification #: 143
Washington Certification #: C1941
Virginia Certification #: 00112
Virgin Island/PADEP Certification
Utah/NELAC Certification #: ANTE
Texas/NELAC Certification #: T104704188-09 TX
Tennessee Certification #: TN2867
South Dakota Certification
Puerto Rico Certification #: PA01457
Pennsylvania/NELAC Certification #: 65-282
Oregon/NELAC Certification #: PA200002
North Carolina Certification #: 42706
New York/NELAC Certification #: 10888
New Mexico Certification
New Jersey/NELAC Certification #: PA 051
New Hampshire/NELAC Certification #: 2976
Nevada Certification
Montana Certification #: Cert 0082
Missouri Certification #: 235
Michigan/PADEP Certification
Massachusetts Certification #: M-PA1457
Maryland Certification #: 308
Maine Certification #: PA0091
Louisiana/NELAC Certification #: LA080002
Louisiana/NELAC Certification #: 4086
Kentucky Certification #: 90133
Kansas/NELAC Certification #: E-10358
Iowa Certification #: 391
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Georgia Certification #: 968
Florida/NELAC Certification #: E87683
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Connecticut Certification #: PH 0694
Colorado Certification
California/NELAC Certification #: 04222CA
Arkansas Certification
Arizona Certification #: AZ0734
Alabama Certification #: 41590

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(724)850-5600

SAMPLE SUMMARY

Project: PA4499-02
Pace Project No.: 3020330

Lab ID	Sample ID	Matrix	Date Collected	Date Received
3020330001	[redacted]H Prod. FL. (Filter)	Water	12/21/09 14:30	12/22/09 11:50
3020330002	[redacted]H Prod. FL. (Solid)	Solid	12/21/09 14:30	12/22/09 11:50
3020330003	[redacted]1H PROD. FL. (Filter)	Water	12/21/09 14:30	12/22/09 11:50
3020330004	[redacted]1H PROD. FL. (Solid)	Solid	12/21/09 14:30	12/22/09 11:50

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE ANALYTE COUNT

Project: PA4499-02
Pace Project No.: 3020330

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
3020330001	[redacted]2H Prod. FL. (Filter)	SM 7110C	CMS	1	PASI-PA
		EPA 900.0m	CMS	1	PASI-PA
		EPA 903.1	RMD	1	PASI-PA
		EPA 904.0	MBT	1	PASI-PA
		HSL-300m	JAL	6	PASI-PA
3020330002	[redacted]2H Prod. FL. (Solid)	EPA 901.1m	TTF	17	PASI-PA
		HSL-300m	JAL	6	PASI-PA
3020330003	[redacted]134 1H PROD. FL. (Filter)	SM 7110C	CMS	1	PASI-PA
		EPA 900.0m	CMS	1	PASI-PA
		EPA 903.1	RMD	1	PASI-PA
		EPA 904.0	MBT	1	PASI-PA
		HSL-300m	JAL	6	PASI-PA
3020330004	[redacted]34 1H PROD. FL. (Solid)	EPA 901.1m	TTF	17	PASI-PA
		HSL-300m	JAL	6	PASI-PA

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PROJECT NARRATIVE

Project: PA4499-02
Pace Project No.: 3020330

Method: SM 7110C
Description: 7110C Gross Alpha
Client: Penn E & R
Date: February 17, 2010

General Information:
2 samples were analyzed for SM 7110C. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Workorder Comments:

Upon filtration of sample labeled [redacted]2H, 1332.8 mg of residue were recovered from filtering 15.14 L of sample.

Sample [redacted] 1H was more difficult to filter and the entire sample received could not be filtered. 2867.1 mg of residue was recovered from filtering 2.62 L of sample.

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PROJECT NARRATIVE

Project: PA4499-02
Pace Project No.: 3020330

Method: EPA 900.0m
Description: 900.0 Gross Alpha/Beta
Client: Penn E & R
Date: February 17, 2010

General Information:
2 samples were analyzed for EPA 900.0m. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Workorder Comments:

Upon filtration of sample labeled [redacted]H, 1332.8 mg of residue were recovered from filtering 15.14 L of sample.

Sample [redacted]34 1H was more difficult to filter and the entire sample received could not be filtered. 2867.1 mg of residue was recovered from filtering 2.62 L of sample.

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PROJECT NARRATIVE

Project: PA4499-02
Pace Project No.: 3020330

Method: EPA 901.1m
Description: 901.1 Gamma Spec
Client: Penn E & R
Date: February 17, 2010

General Information:
2 samples were analyzed for EPA 901.1m. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Workorder Comments:

Upon filtration of sample labeled [redacted]2H, 1332.8 mg of residue were recovered from filtering 15.14 L of sample.

Sample [redacted]34 1H was more difficult to filter and the entire sample received could not be filtered. 2867.1 mg of residue was recovered from filtering 2.62 L of sample.

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PROJECT NARRATIVE

Project: PA4499-02
Pace Project No.: 3020330

Method: EPA 903.1
Description: 903.1 Radium 226
Client: Penn E & R
Date: February 17, 2010

General Information:
2 samples were analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Workorder Comments:

Upon filtration of sample labeled [redacted] 2H, 1332.8 mg of residue were recovered from filtering 15.14 L of sample.

Sample [redacted]34 1H was more difficult to filter and the entire sample received could not be filtered. 2867.1 mg of residue was recovered from filtering 2.62 L of sample.

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PROJECT NARRATIVE

Project: PA4499-02
Pace Project No.: 3020330

Method: EPA 904.0
Description: 904.0 Radium 228
Client: Penn E & R
Date: February 17, 2010

General Information:
2 samples were analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Workorder Comments:

Upon filtration of sample labeled [redacted]2H, 1332.8 mg of residue were recovered from filtering 15.14 L of sample.

Sample [redacted]34 1H was more difficult to filter and the entire sample received could not be filtered. 2867.1 mg of residue was recovered from filtering 2.62 L of sample.

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PROJECT NARRATIVE

Project: PA4499-02
Pace Project No.: 3020330

Method: HSL-300m
Description: HSL300(AS) Actinides
Client: Penn E & R
Date: February 17, 2010

General Information:
2 samples were analyzed for HSL-300m. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Workorder Comments:

Upon filtration of sample labeled [redacted]2H, 1332.8 mg of residue were recovered from filtering 15.14 L of sample.

Sample [redacted]34 1H was more difficult to filter and the entire sample received could not be filtered. 2867.1 mg of residue was recovered from filtering 2.62 L of sample.

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PROJECT NARRATIVE

Project: PA4499-02
Pace Project No.: 3020330

Method: HSL-300m
Description: HSL300(AS) Actinides
Client: Penn E & R
Date: February 17, 2010

General Information:
2 samples were analyzed for HSL-300m. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Workorder Comments:

Upon filtration of sample labeled [redacted]H, 1332.8 mg of residue were recovered from filtering 15.14 L of sample.

Sample [redacted]134 1H was more difficult to filter and the entire sample received could not be filtered. 2867.1 mg of residue was recovered from filtering 2.62 L of sample.

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: PA4499-02
Pace Project No.: 3020330

Sample: [redacted]2H Prod. FL. (Filter) Lab ID: 3020330001 Collected: 12/21/09 14:30 Received: 12/22/09 11:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Gross Alpha	SM 7110C	40,880 ± 7,512 (41.9)	pCi/L	01/12/10 15:52	12587-46-1	
Gross Beta	EPA 900.0m	750 ± 732 (1,011)	pCi/L	01/14/10 16:55	12587-47-2	
Radium-226	EPA 903.1	16,920 ± 3,283 (38.7)	pCi/L	01/15/10 12:27	13982-63-3	
Radium-228	EPA 904.0	1,125 ± 227 (79.3)	pCi/L	01/13/10 11:39	15262-20-1	
Thorium-228	HSL-300m	45.9 ± 11.6 (3.72)		01/21/10 17:05	14274-82-9	
Thorium-230	HSL-300m	6.90 ± 3.61 (2.15)		01/21/10 17:05	14269-63-7	
Thorium-232	HSL-300m	0.271 ± 0.85 (1.86)		01/21/10 17:05	7440-29-1	
Uranium-234	HSL-300m	1.26 ± 1.38 (1.52)	pCi/L	01/21/10 17:07	13966-29-5	
Uranium-235	HSL-300m	0.222 ± 0.698 (1.52)	pCi/L	01/21/10 17:07	15117-96-1	
Uranium-238	HSL-300m	0.667 ± 1.21 (1.95)	pCi/L	01/21/10 17:07	7440-61-1	

Sample: [redacted]2H Prod. FL. (Solid) Lab ID: 3020330002 Collected: 12/21/09 14:30 Received: 12/22/09 11:50 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Bismuth-212	EPA 901.1m	407 ± 127 (67.6)	pCi/g	02/12/10 17:22	14913-49-6	
Bismuth-214	EPA 901.1m	-4.790 ± 22.6 (41.7)	pCi/g	02/12/10 17:22	14733-03-0	
Cesium-134	EPA 901.1m	6.64 ± 2.30 (6.30)	pCi/g	02/12/10 17:22	13967-70-9	
Cesium-137	EPA 901.1m	8.66 ± 6.42 (5.30)	pCi/g	02/12/10 17:22	10045-97-3	
Cobalt-60	EPA 901.1m	1.20 ± 3.76 (5.91)	pCi/g	02/12/10 17:22	10198-40-0	
Lead-210	EPA 901.1m	-31.100 ± 90.8 (139)	pCi/g	02/12/10 17:22	14255-04-0	
Lead-212	EPA 901.1m	273 ± 25.0 (8.50)	pCi/g	02/12/10 17:22	15092-94-1	
Lead-214	EPA 901.1m	3.33 ± 8.77 (12.8)	pCi/g	02/12/10 17:22	15067-28-4	
Potassium-40	EPA 901.1m	-10.700 ± 40.1 (67.8)	pCi/g	02/12/10 17:22	13966-00-2	
Protactinium-231	EPA 901.1m	-79.900 ± 178 (300)	pCi/g	02/12/10 17:22	14331-85-2	
Protactinium-234M	EPA 901.1m	-132.000 ± 574 (815)	pCi/g	02/12/10 17:22	15100-28-4	
Radium-223	EPA 901.1m	191 ± 388 (691)	pCi/g	02/12/10 17:22	15623-45-7	
Radium-226	EPA 901.1m	51.1 ± 93.4 (147)	pCi/g	02/12/10 17:22	13982-63-3	
Radium-228	EPA 901.1m	0.855 ± 9.42 (17.0)	pCi/g	02/12/10 17:22	15262-20-1	
Thallium-208	EPA 901.1m	104 ± 10.9 (5.26)	pCi/g	02/12/10 17:22	14913-50-9	
Thorium-234	EPA 901.1m	-13.200 ± 97.2 (156)	pCi/g	02/12/10 17:22	15065-10-8	
Uranium-235	EPA 901.1m	10.7 ± 20.9 (36.1)	pCi/g	02/12/10 17:22	15117-96-1	
Thorium-228	HSL-300m	271 ± 38.0 (0.067)	pCi/g	02/16/10 17:02	14274-82-9	
Thorium-230	HSL-300m	1.18 ± 0.209 (0.049)	pCi/g	02/16/10 17:02	14269-63-7	
Thorium-232	HSL-300m	0.413 ± 0.094 (0.009)	pCi/g	02/16/10 17:02	7440-29-1	
Uranium-234	HSL-300m	0.097 ± 0.042 (0.033)	pCi/g	02/16/10 17:04	13966-29-5	
Uranium-235	HSL-300m	0.004 ± 0.019 (0.039)	pCi/g	02/16/10 17:04	15117-96-1	
Uranium-238	HSL-300m	0.050 ± 0.029 (0.026)	pCi/g	02/16/10 17:04	7440-61-1	

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ANALYTICAL RESULTS

Project: PA4499-02
Pace Project No.: 3020330

Sample: [redacted]34 1H PROD. FL. (Filter) Lab ID: 3020330003 Collected: 12/21/09 14:30 Received: 12/22/09 11:50 Matrix: Water

PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Gross Alpha	SM 7110C	21,960 ± 4,074 (143)	pCi/L	01/12/10 15:52	12587-46-1	
Gross Beta	EPA 900.0m	980 ± 757 (1,084)	pCi/L	01/14/10 16:54	12587-47-2	
Radium-226	EPA 903.1	11,120 ± 2,204 (38.1)	pCi/L	01/15/10 12:39	13982-63-3	
Radium-228	EPA 904.0	1,287 ± 261 (97.6)	pCi/L	01/13/10 11:40	15262-20-1	
Thorium-228	HSL-300m	44.1 ± 11.1 (2.75)		01/21/10 17:05	14274-82-9	
Thorium-230	HSL-300m	2.60 ± 2.20 (2.10)		01/21/10 17:05	14269-63-7	
Thorium-232	HSL-300m	0.265 ± 0.83 (1.81)		01/21/10 17:05	7440-29-1	
Uranium-234	HSL-300m	0.331 ± 0.652 (0.898)	pCi/L	01/21/10 17:07	13966-29-5	
Uranium-235	HSL-300m	-0.119 ± 0.142 (1.45)	pCi/L	01/21/10 17:07	15117-96-1	
Uranium-238	HSL-300m	1.21 ± 1.32 (1.45)	pCi/L	01/21/10 17:07	7440-61-1	

Sample: [redacted]134 1H PROD. FL. (Solid) Lab ID: 3020330004 Collected: 12/21/09 14:30 Received: 12/22/09 11:50 Matrix: Solid

PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Bismuth-212	EPA 901.1m	22.7 ± 21.1 (32.0)	pCi/g	02/12/10 21:24	14913-49-6	
Bismuth-214	EPA 901.1m	16.5 ± 5.24 (20.5)	pCi/g	02/12/10 21:24	14733-03-0	
Cesium-134	EPA 901.1m	1.38 ± 1.17 (2.24)	pCi/g	02/12/10 21:24	13967-70-9	
Cesium-137	EPA 901.1m	-0.527 ± 1.42 (2.40)	pCi/g	02/12/10 21:24	10045-97-3	
Cobalt-60	EPA 901.1m	0.156 ± 1.61 (2.40)	pCi/g	02/12/10 21:24	10198-40-0	
Lead-210	EPA 901.1m	-21,600 ± 37.4 (54.6)	pCi/g	02/12/10 21:24	14255-04-0	
Lead-212	EPA 901.1m	13.5 ± 2.63 (3.44)	pCi/g	02/12/10 21:24	15092-94-1	
Lead-214	EPA 901.1m	11.3 ± 4.43 (4.48)	pCi/g	02/12/10 21:24	15067-28-4	
Potassium-40	EPA 901.1m	-8.810 ± 18.3 (30.2)	pCi/g	02/12/10 21:24	13966-00-2	
Protactinium-231	EPA 901.1m	-25,200 ± 72.5 (123)	pCi/g	02/12/10 21:24	14331-85-2	
Protactinium-234M	EPA 901.1m	45.2 ± 272 (407)	pCi/g	02/12/10 21:24	15100-28-4	
Radium-223	EPA 901.1m	47.1 ± 156 (279)	pCi/g	02/12/10 21:24	15623-45-7	
Radium-226	EPA 901.1m	32.2 ± 40.4 (63.3)	pCi/g	02/12/10 21:24	13982-63-3	
Radium-228	EPA 901.1m	8.87 ± 5.72 (8.72)	pCi/g	02/12/10 21:24	15262-20-1	
Thallium-208	EPA 901.1m	2.54 ± 2.26 (2.23)	pCi/g	02/12/10 21:24	14913-50-9	
Thorium-234	EPA 901.1m	4.82 ± 35.3 (55.9)	pCi/g	02/12/10 21:24	15065-10-8	
Uranium-235	EPA 901.1m	-2.740 ± 8.03 (13.3)	pCi/g	02/12/10 21:24	15117-96-1	
Thorium-228	HSL-300m	12.8 ± 1.83 (0.031)	pCi/g	02/16/10 17:02	14274-82-9	
Thorium-230	HSL-300m	0.091 ± 0.028 (0.005)	pCi/g	02/16/10 17:02	14269-63-7	
Thorium-232	HSL-300m	0.049 ± 0.021 (0.013)	pCi/g	02/16/10 17:02	7440-29-1	
Uranium-234	HSL-300m	0.007 ± 0.008 (0.013)	pCi/g	02/16/10 17:04	13966-29-5	
Uranium-235	HSL-300m	0.001 ± 0.003 (0.004)	pCi/g	02/16/10 17:04	15117-96-1	
Uranium-238	HSL-300m	0.007 ± 0.006 (0.004)	pCi/g	02/16/10 17:04	7440-61-1	

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QUALITY CONTROL DATA

Project: PA4499-02
Pace Project No.: 3020330

QC Batch: RADC/3925 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 3020330001, 3020330003

METHOD BLANK: 128434 Matrix: Water
Associated Lab Samples: 3020330001, 3020330003

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Radium-228	0.401 ± 0.295 (0.568)	pCi/L	01/13/10 11:40	

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QUALITY CONTROL DATA

Project: PA4499-02
Pace Project No.: 3020330

QC Batch: RADC/3927 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 3020330001, 3020330003

METHOD BLANK: 128436 Matrix: Water
Associated Lab Samples: 3020330001, 3020330003

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Radium-226	0.217 ± 0.464 (0.764)	pCi/L	01/15/10 11:56	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: PA4499-02
Pace Project No.: 3020330

QC Batch: RADC/3929 Analysis Method: EPA 901.1m
QC Batch Method: EPA 901.1m Analysis Description: 901.1 Gamma Spec
Associated Lab Samples: 3020330002, 3020330004

METHOD BLANK: 128492 Matrix: Solid
Associated Lab Samples: 3020330002, 3020330004

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Bismuth-212	2.41 ± 32.6 (59.7)	pCi/g	02/13/10 14:46	
Bismuth-214	-23.900 ± 18.6 (31.4)	pCi/g	02/13/10 14:46	
Cesium-134	-0.277 ± 2.73 (4.73)	pCi/g	02/13/10 14:46	
Cesium-137	0.955 ± 2.76 (5.00)	pCi/g	02/13/10 14:46	
Cobalt-60	-0.615 ± 3.29 (4.65)	pCi/g	02/13/10 14:46	
Lead-210	92.9 ± 90.4 (77.2)	pCi/g	02/13/10 14:46	
Lead-212	-0.989 ± 4.52 (7.73)	pCi/g	02/13/10 14:46	
Lead-214	-1.050 ± 7.39 (9.57)	pCi/g	02/13/10 14:46	
Potassium-40	-26.500 ± 38.6 (62.2)	pCi/g	02/13/10 14:46	
Protactinium-231	23.1 ± 143 (253)	pCi/g	02/13/10 14:46	
Protactinium-234M	136 ± 555 (820)	pCi/g	02/13/10 14:46	
Radium-223	-2.230 ± 12.5 (21.8)	pCi/g	02/13/10 14:46	
Radium-226	-46.700 ± 78.8 (115)	pCi/g	02/13/10 14:46	
Radium-228	5.32 ± 9.58 (17.8)	pCi/g	02/13/10 14:46	
Thallium-208	-2.300 ± 3.90 (5.11)	pCi/g	02/13/10 14:46	
Thorium-234	-12.600 ± 68.1 (105)	pCi/g	02/13/10 14:46	
Uranium-235	3.99 ± 14.4 (25.0)	pCi/g	02/13/10 14:46	

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QUALITY CONTROL DATA

Project: PA4499-02
Pace Project No.: 3020330

QC Batch: RADC/3936
QC Batch Method: SM 7110C
Analysis Method: SM 7110C
Analysis Description: 7110C Gross Alpha
Associated Lab Samples: 3020330001, 3020330003

METHOD BLANK: 128554
Matrix: Water
Associated Lab Samples: 3020330001, 3020330003

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Gross Alpha	-0.0682 ± 0.413 (1.31)	pCi/L	01/12/10 15:51	

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QUALITY CONTROL DATA

Project: PA4499-02
Pace Project No.: 3020330

QC Batch: RADC/3938 Analysis Method: EPA 900.0m
QC Batch Method: EPA 900.0m Analysis Description: 900.0 Gross Alpha/Beta
Associated Lab Samples: 3020330001, 3020330003

METHOD BLANK: 128556 Matrix: Water
Associated Lab Samples: 3020330001, 3020330003

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Gross Beta	0.0297 ± 0.133 (0.318)	pCi/L	01/14/10 16:54	

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QUALITY CONTROL DATA

Project: PA4499-02
Pace Project No.: 3020330

QC Batch: RADC/4067 Analysis Method: HSL-300m
QC Batch Method: HSL-300m Analysis Description: HSL300(AS) Actinides
Associated Lab Samples: 3020330001, 3020330003

METHOD BLANK: 132450 Matrix: Water
Associated Lab Samples: 3020330001, 3020330003

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Thorium-228	0.186 ± 0.144 (0.140)	pCi/L	01/21/10 17:05	
Thorium-230	0.122 ± 0.114 (0.118)	pCi/L	01/21/10 17:05	
Thorium-232	0.084 ± 0.092 (0.101)	pCi/L	01/21/10 17:05	
Uranium-234	0.039 ± 0.068 (0.105)	pCi/L	01/21/10 17:07	
Uranium-235	0.024 ± 0.047 (0.065)	pCi/L	01/21/10 17:07	
Uranium-238	0.015 ± 0.048 (0.105)	pCi/L	01/21/10 17:07	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL DATA

Project: PA4499-02
Pace Project No.: 3020330

QC Batch: RADC/4228 Analysis Method: HSL-300m
QC Batch Method: HSL-300m Analysis Description: HSL300(AS) Actinides
Associated Lab Samples: 3020330002, 3020330004

METHOD BLANK: 138983 Matrix: Solid
Associated Lab Samples: 3020330002, 3020330004

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Thorium-228	0.238 ± 0.090 (0.069)	pCi/g	02/16/10 17:01	
Thorium-230	0.160 ± 0.069 (0.047)	pCi/g	02/16/10 17:01	
Thorium-232	0.077 ± 0.045 (0.017)	pCi/g	02/16/10 17:01	
Uranium-234	-0.005 ± 0.028 (0.062)	pCi/g	02/16/10 17:04	
Uranium-235	0.000 ± 0.013 (0.035)	pCi/g	02/16/10 17:04	
Uranium-238	0.000 ± 0.013 (0.035)	pCi/g	02/16/10 17:04	

Pace Analytical®
www.pacelabs.com

CHAIN-OF-CUS. ..DY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

0330

Page: 1 of 1

1231068

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:
Company: PENN E&R	Report To: JOE HARRICK	Attention: JOE HARRICK
Address: 339 NORTHGATE DR	Copy To: RON DEUMONT	Company Name: SAME
WARRENDALE, PA 15086		Address:
Email To: jharrick@penn-er.com	Purchase Order No.:	Pace Quote Reference:
Phone: 724 934-3530 Fax: 3533	Project Name: NORM/TENORM EVAL.	Pace Project Manager:
Requested Due Date/TAT: STND.	Project Number: PA-4499-02	Pace Profile #:

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☒ OTHER

Site Location STATE: PA

Requested Analysis Filtered (Y/N)

ITEM #	Section D Required Client Information — SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	Matrix Codes MATRIX / CODE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Y/N	Analysis Test: Gross Alpha/Beta	Gross Radium	Isotopic Uranium	Isotopic Thorium	Gamma Emitters	Gamma Spec	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	[redacted] 2N PROD. FL.	Drinking Water DW, Water WT, Waste Water WW, Product P, Soil/Solid SL, Oil OL, Wipe WP, Air AR, Tissue TS, Other OT	OT	G	12/21/09	2:30PM				4	X									X	X	X	X	X			001.00
2	[redacted] 134 1H PROD. FL		OT	G	12/21/09	8:30PM				4	X									X	X	X	X	X			002.00
3																												
4																												
5																												
6																												
7																												
8																												
9																												
10																												
11																												
12																												

12/22/09

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
EACH SAMPLE IS IN ITS OWN COOLER!!	[signature]	12/21/09	4:15PM	[signature]	12/22/09	1150	
FILTER SAMPLES ANALYZE BOTH THE FILTERED AQUEOUS SAMPLE AND THE REMOVED SEDIMENT.							

ORIGINAL (FITNAW)

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER: DATE Signed (MM/DD/YY):

Temp In °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALIFIERS

Project: PA4499-02
Pace Project No.: 3020330

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

Pace Analytical is NELAP accredited. Contact your Pace PM for the current list of accredited analytes.

U - Indicates the compound was analyzed for, but not detected.

LABORATORIES

PASI-PA Pace Analytical Services - Greensburg

WORKORDER QUALIFIERS

WO: 3020330

[1] Upon filtration of sample labeled [redacted]2H, 1332.8 mg of residue were recovered from filtering 15.14 L of sample.

[2] Sample [redacted]34 1H was more difficult to filter and the entire sample received could not be filtered. 2867.1 mg of residue was recovered from filtering 2.62 L of sample.

Sample Condition Upon Receipt

Pace Analytical

Client Name: Penn E & R

Project # 3020330

Courier: [X] Fed Ex [ ] UPS [ ] USPS [ ] Client [ ] Commercial [ ] Pace Other _____

Tracking #: _____

Optional: Proj. Due Date: Proj. Name:

Custody Seal on Cooler/Box Present: [ ] yes [X] no Seals Intact: [ ] yes [X] no

Packing Material: [ ] Bubble Wrap [ ] Bubble Bags [X] None [ ] Other _____

Thermometer Used 3 4 Type of Ice: (Wet) Blue None [ ] Samples on ice, cooling process has begun

Cooler Temperature _____ Biological Tissue is Frozen: Yes No

Date and Initials of person examining contents: 12/22/08

Temp should be above freezing to 6°C

		Comments:
Chain of Custody Present:	[X]Yes [ ]No [ ]N/A	1.
Chain of Custody Filled Out:	[X]Yes [ ]No [ ]N/A	2.
Chain of Custody Relinquished:	[X]Yes [ ]No [ ]N/A	3.
Sampler Name & Signature on COC:	[ ]Yes [X]No [ ]N/A	4.
Samples Arrived within Hold Time:	[X]Yes [ ]No [ ]N/A	5.
Short Hold Time Analysis (<72hr):	[ ]Yes [X]No [ ]N/A	6.
Rush Turn Around Time Requested:	[ ]Yes [X]No [ ]N/A	7.
Sufficient Volume:	[X]Yes [ ]No [ ]N/A	8.
Correct Containers Used:	[X]Yes [ ]No [ ]N/A	9..
-Pace Containers Used:	[ ]Yes [X]No [ ]N/A	
Containers Intact:	[X]Yes [ ]No [ ]N/A	10.
Filtered volume received for Dissolved tests	[ ]Yes [ ]No [X]N/A	11.
Sample Labels match COC:	[X]Yes [ ]No [ ]N/A	12.
-Includes date/time/ID/Analysis Matrix: W		
All containers needing preservation have been checked.	[X]Yes [ ]No [ ]N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation.	[X]Yes [ ]No [ ]N/A	
exceptions: VOA, coliform, TOC, O&G, WI-DRO (water)	[ ]Yes [X]No	Initial when completed: MB Lot # of added preservative:
Samples checked for dechlorination:	[ ]Yes [ ]No [X]N/A	14.
Headspace in VOA Vials (>6mm):	[ ]Yes [ ]No [X]N/A	15.
Trip Blank Present:	[ ]Yes [ ]No [X]N/A	16.
Trip Blank Custody Seals Present	[ ]Yes [ ]No [X]N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution: Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: [signature] Date: 12-23-08

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Attachments

2B

Sampling Procedures

On August 4, 2009, Doug Mehan (East Resources, Inc.) requested Penn E&R collect water samples to support completion of East Resources, Inc. "Chemical Analysis of Residual Waste Annual Report by the Generator (Form 26R)". On August 6, 2009, Chris Hunsicker (Penn E&R) met Jack Showers (East Resources, Inc.) to collect water characterization samples from two well locations – the [redacted]129 and [redacted]255. At 1100, water samples (Set 1) were collected from the drilling pit on the [redacted]129 location. At 1130, three samples (Sets 2, 3, and 4) were collected from the flow back pits on the [redacted]255 location. Set 2 was collected from Pit No. 1 (the eastern pit) at 1130; Set 3 was collected from Pit No. 2 (the central pit) at 1140; and Set 4 was collected from Pit No. 3 (the western pit) at 1150.

Sufficient clean and preserved sample containers were obtained from Microbac Laboratories to obtain the required quantity of water to perform the analysis required by the PADEP to satisfy the Form 26R requirements for "Wastewater Produced from the Drilling, Completion and Production of a Marcellus Shale or Other Shale Gas Well" and all water samples were placed directly into the laboratory-supplied containers. The sample containers were labeled and logged on the chain-of-custody document. The sample containers were stored in a cooler on ice for field preservation and the coolers were shipped overnight to Microbac for analysis.

The flowback sampling followed the Penn E&R "Pond Sampling" procedures outlined in their field procedures manual:

Sampling of pond liquids will help to define the nature and concentration of contaminants within the pond. Decisions on how and where to sample must be made on a site-specific basis. For health and safety reasons, shore sampling is more desirable; but, may not be acceptable if representative samples cannot be obtained from the pond periphery.

When collecting liquid samples from the shore, the sampling container can be filled directly (as for surface water samples) or a sampling bucket can be thrown into the pond to collect samples before transfer to the sampling container. The bucket should not be allowed to drag along the bottom and, thus, contaminate the liquid sample with sediment.

On December 21, 2009, representatives from Penn E&R collected samples of produced fluids from East Resources, Inc. Marcellus Wells [redacted]2H and [redacted]134 1H for analysis of radiological parameters gross Alpha, gross Beta, Radium 226, Radium 228, Thorium and Uranium. The subject samples were submitted to Pace Analytical Services for analysis. Samples were collected by Penn E&R using procedures previously outlined.

Attachments

2C

Microbac Laboratories, Inc.
Pittsburgh Division
100 Marshall Drive
Warrendale, PA 15086-7554
Phone: (724) 772-0610
tzierenberg@microbac.com

This Quality Systems Manual is applicable to the analytical testing of the Microbac Laboratories, Inc. and governs all testing performed by the Pittsburgh Division as indicated by the signatures below.

Quality Systems Manual Revision 7, effective March 16, 2009.

This manual is approved by:

Tom Zierenberg — Date: 3/17/09
Managing Director

Marla Kruth — Date: 3/17/09
Technical Director

Heather Ray — Date: 03/17/09
Quality System Manager

Claudia Boerner — Date: 3/17/09
Manager, Food Department

Control No.:_____

Revision Record

The following chart indicates the history of this Quality Manual. The chart records the revision number, date of the revision, person responsible for implementing the revision and a detailed description of the revision.

Please not that updates to Appendices A and B will not require a new revision of the Quality Manual.

Revision No.	Date	Person Responsible	Description
1	4/11/05	MAD	Added a statement to section 4 – current accreditation list is kept in the QA Office. Section 8.9 All PT samples are treated as a routine sample, analyzed in the laboratory and included in the routine batch.
2	4/21/05	MAD	Added compliance/non-compliance with requirements and/or specifications statement to reporting section., Microbac McKnight Quality Manual to references
3	9/29/06	MAD	Added "Internal/External" to section 7.1.;Also Added changes will be indicated in Bold Type Section 7.1; Added Customer Feedback paragraph in Sect. 7.5. Updated Laboratory and Corporate Org Chart Fig.1 & 2 Sect. 7.12, paragraph added to indicate how quality system documents are handled.
4	1/16/07	MAD	Modified SOP references to the SOP Titles. Added Ethics and Data Integrity to section 7, pg. 9-10.
5	8/7/08	MAD	Removed Managing Director and Assist. Lab Manager, replaced with Lab Dir & Tech Dir.;Change ISO ref. From 1999 to 2005;Added to wording to Sect.6.2 3rd para.Added sent to sect.6.3;Added last statement to sect.7.8;Change Attestment to Attestation;Added statement to Sect.8.4 3rd parag;Sect.8.4 modified wording;Added ISO17025 & A2LA to sect.8.10;Sect.8.10 added amended report;Added AOAC guidelines & ISO req. to reference sect.updated org chart.

Control No.:_____

The quality manual distributed as a Controlled Document is printed on ivory paper and is given a Control Number at the bottom of the first page. Copies on any other color paper are considered an uncontrolled copies.

6	11/3/08	MLK	General typographical and punctuation corrections; removed reference to Assistant Lab Director; changed references to the company to "Microbac Laboratories, Inc."; made all references to QAO and QSM consistent: Quality System Manager".
7	03/16/09	HLR	**The changes made in Revision 7 of this document are in response to an A2LA assessment. Added statement to Quality Policy indicating the Company's intention to continually improve the Management and Quality Systems. Added location of Job Descriptions. Updated any referenced SOPs and deleted any reference to corporate SOPs.**

- Annual Review of Quality Manual
- (Performed if document has not been revised in the past 12 months.)
- Quality Manual Training
- (The laboratory staff will receive training and are required to read this manual at the time the manual has been either revised or reviewed through the annual review process. The Quality Manual training form will be kept on file in the Quality Assurance Office.)

The changes made in Revision 7 of this document are in response to an A2LA assessment.

_____ _____ _____

Signature Title Date

(Signature of person responsible for manual review)

Control No.:____

The quality manual distributed as a Controlled Document is printed on ivory paper and is given a Control Number at the bottom of the first page. Copies on any other color paper are considered an uncontrolled copies.

Table of Contents

HJR 05/29/09

Control No.:_____

The quality manual distributed as a Controlled Document is printed on ivory paper and is given a Control Number at the bottom of the first page. Copies on any other color paper are considered an uncontrolled copies.

1 Scope

This Quality Manual (QM) applies to Microbac Laboratories, Inc., Pittsburgh Division. This manual specifies the policy requirements to carry out analytical and sampling activities using standard and non-standard methods within the laboratory. This manual also outlines management's Quality System policies and establishes a requirement that procedures be promulgated and used to accomplish all of the quality assurance elements necessary to fulfill Microbac Laboratories Pittsburgh Division's responsibility to meet or exceed the ISO 17025 requirements, needs of the customers and /or regulatory specifications.

The policies and procedures established in this Quality Manual are intended to ensure that Microbac Pittsburgh has an operating system in place that fulfills the ISO 17025 requirements contained in the 2003 NELAC Standard.

2 Quality Policy

The management of Microbac Laboratories, Inc., Pittsburgh Division is dedicated to providing our customers with technically and legally defensible data, along with the finest in customer service. The quality of our laboratory is achieved through the development and continual monitoring of our quality system in conformance with the **ISO/IEC 17025** standard.

Microbac Laboratories, Inc., Pittsburgh Division's management is committed to continually improving the effectiveness of the management and quality systems through technical improvements, customer feedback, and management review.

The quality policy is communicated to both new hires and current laboratory personnel. It is understood, implemented, and maintained by employees at all levels. Management, through the employee evaluation process, laboratory data, training procedures, internal audit, and document control procedures documents our quality policy.

3 Quality Objective

The objective for the Quality Assurance Program is to ensure that the test results provided through the various analyses are accurate and precise. The goal of this program is to provide test results to the levels of accuracy and precision that the customer requires. The basic means by which this objective is achieved is through quality assurance procedures, which address and assess the handling of samples and analyses by the laboratory. The procedures which are outlined in this manual address not only the quality control steps performed in the analysis of the

particular sample, but also the equipment, personnel, reagents and record keeping of a test.

Specific details of the maintenance and calibration of the various pieces of lab equipment are outlined in the accompanying procedures. Training of laboratory personnel in analysis, sampling and check-in is also critical to quality assurance and is discussed. Like equipment, the quality of reagents is important for obtaining quality test results. Finally, documentation of analytical data and storage of this data and other pertinent records are covered in this program.

All instructions, standards, manuals, and reference data relevant to the work of the laboratory shall be kept up-to-date and be readily available to the staff. This includes items covered in the Quality Manual and all other material listed in the Table of Contents of the manual as in-house references used as supplements to this manual. Each document has specific document control procedures outlined for the issue of updates/revisions.

4 Fields of Testing

The QA Manual covers the following fields of testing. A current list of specific analyte, method and matrix for the following fields of accreditation is located in a binder in the QA Office.

Drinking Water/Wastewater:

Wet Chemical Analysis
Metals Analysis
Organic Analysis
Microbiology

Solid and Hazardous Waste:

Wet Chemical Analysis
Metals Analysis
Hazardous Waste Characterization
Organic Analysis

Food Chemistry / Food Microbiology

5 Introduction to Microbac Laboratories, Incorporated

5.1 Message from our President, J. Trevor Boyce

"At Microbac Laboratories, we talk about taking advantage of opportunity. This is fundamental to the company past and future. For Microbac Laboratories, Quality is an opportunity, and one that will impact the business to its very core.

We have presented to us the opportunity of NELAC and subsequently ISO 17025. The quest for every Microbac Division to meet the NELAC standard is essential in meeting the demands of the marketplace. It is the opportunity to stand up and say, "We are good" but we must never forget to recognize that in achieving NELAC standard, we can still improve.

Quality is the factor that will allow Microbac Laboratories to survive and prosper in the 21st century. This must be recognized at all levels. The message is very clear. Microbac Laboratories must aspire to nothing short of EXCELLENCE."

5.2 Corporate History and Structure

A. Warne Boyce and his wife, Doreen, formed Microbac Laboratories, Inc., in 1969 when they cleaned out their $15,000 in savings to make a down payment on the purchase of a small testing laboratory on Pittsburgh's North Side.

Rapid growth of the Company necessitated a move to a new facility in the North Hills of Pittsburgh in May 1972, subsequently named the McKnight Division. McKnight was primarily a dairy testing laboratory and the Boyces were anxious to grow and expand the capabilities of the Company. In 1970, they bought an existing chemistry laboratory and named it the Schiller Division, entering into the environmental testing field.

Two other major laboratories were purchased within the next six years, providing the foundation for future growth. The acquisition of the Erie Division in Erie, PA and the Kentucky Division in Louisville strengthened Microbac Laboratories Inc.'s environmental and food testing abilities and widened its geographic coverage.

Following the purchase of these major laboratories, Microbac has acquired nearly two dozen food and environmental testing laboratories throughout the United States. Currently, Microbac Laboratories, Inc., is a network of over 24 laboratories coast-to-coast, employing over 400 personnel.

Microbac Laboratories, Inc., is continuously expanding its technical capabilities and geographic coverage, and has firmly established itself as a leading group of food and environmental testing laboratories.

5.3 Pittsburgh Division Acquisitions

In 1995, the Microbac Laboratories, Inc., purchased Pace Analytical Laboratory and moved into their larger 15,000 square foot laboratory in Warrendale, Pa, just north of Pittsburgh. In the year 2000, RECRA Laboratories was purchased, further expanding the Pittsburgh operations and the combined laboratories were named Microbac Laboratories, Inc., Pittsburgh Division.

The original McKnight Division, which had grown from a dairy lab to a full service microbiology and food safety laboratory, continued as a separate laboratory in Pittsburgh until it moved into the Pittsburgh Division's newly remodeled facilities in August, 2003.

The combination of the Schiller Division, Pace, RECRA, and the McKnight Division has formed one of the largest and most diversified divisions within the Company, providing a full spectrum of analytical testing including food, environmental, fuel, and microbiological testing.

6 Pittsburgh Division Management Requirements

6.1 Corporate Identity and Structure

Microbac Laboratories, Inc., 100 Marshall Drive, Warrendale, PA, 15086, is a division (Pittsburgh Division) of Microbac Laboratories, Inc., a Pennsylvania corporation, located at **101 Bellevue Road Suite 301, Pittsburgh, PA 15229.**

The Pittsburgh Division of Microbac Laboratories, Inc. is one of over 24 Divisions of the Corporation. The Microbac Laboratories, Inc., Organizational Chart in Figure 1 of Appendix A defines the Pittsburgh Division's place within the Corporate structure.

6.2 Pittsburgh Division Personnel

The policies included in this Quality Manual (QM) are applicable for activities carried out in the Microbac Laboratories, Inc., Pittsburgh Division's physical facility as well as in the field. These policies are subject to the guidelines included in the Corporate polices to avoid involvement in activities that would diminish confidence, competence, impartiality, judgment or operational integrity.

The Microbac Laboratories, Inc., Pittsburgh Division maintains the management and technical personnel with the authority and resources needed to perform the

responsibilities defined in the Personnel Section. A detailed description of the job descriptions, personnel responsibilities, deputies for key personnel and interrelation between management, supervisory personnel and other employees can be found in the Microbac Laboratories, Inc., Pittsburgh Division Statement of Qualifications (SOQ). This document, along with Section 8.2 of the QM, includes discussion of technical management's overall responsibility for the technical operations, the Quality System Manager's (QSM) responsibility and authority for ensuring that the Quality System defined in this manual is implemented and followed at all times, and the supervision provided to the staff.

The Microbac Laboratories, Inc., Pittsburgh Division Organizational Chart (Figure 2.0 of Appendix A) defines the management structure and its relationships with the quality, technical and support positions.

Duties and responsibilities are as follows:

1. Managing Director: The Managing Director has ultimate responsibility for all aspects of the laboratory's performance and operation. The Managing Director is the direct supervisor of the QA Manager, Technical Director, Project Managers, Food Department Supervisor, and Office Manager, and all Environmental and Microbiological technicians.

The Managing Director has authority to suspend work at any time due to safety and/ or quality reasons.

The Managing Director reviews SOPs, approves QA methodology changes and supports QA activities such as training, demonstration of capability, and audits. The Managing Director will also establish and maintain contact with clients. All contact with clients must be conducted in accordance with Microbac Laboratories' Business Conduct and Ethics and Data Integrity Policies.

2. Technical Director: The Technical Director reports to the Managing Director. This position has no direct reports, but assumes the supervisory role of the Managing Director in his/ her absence. The Technical Director is responsible for bringing new instrumentation and technology to the facility. This is done through method development, examining and qualifying alternative equivalent methodologies and instrumentation, and through the technical training of the analytical laboratory staff.

Additionally, the Technical Director functions as the Safety Director, Chemical Hygiene Officer, and the supervisor of the Waste Management Program.

The Technical Director will also establish and maintain contact with clients. All contact with clients must be conducted in accordance with Microbac Laboratories, Inc., Business Conduct and Ethics and Data Integrity Policies.

The Technical Director has the authority to suspend work at any time due to safety and/ or quality reasons.

The Technical Director writes and reviews SOPs, conducts training, approves methodology changes, and supports QA activities such as training, demonstration of capability and audits.

In the absence of the Quality Systems Manager, the Technical Director will assume the responsibilities of the QSM. Support from Microbac Laboratories' Corporate QA Department may be solicited.

3. Quality System Manager: The Quality System Manager reports to the Managing Director. This position has no direct reports. The QSM manages all QA activities within the laboratory. The QSM has sufficient authority, access to work areas, and organizational freedom to initiate corrective action and to recommend solutions to problems through designated channels.

The QSM evaluates adherence to policies and assures systems are in place to produce results with a defined level of quality. The QSM provides management with routine written reports on the performance, including deficiencies, of the system for review and continuous improvement. The QSM is responsible for coordinating QA/QC and data review procedures; the lab's accreditations; the proficiency test program; the internal audit program; and maintaining the Quality Assurance Manual. Other duties include, but are not limited to, the preparation of SOPs, control chart management, maintenance of training files, and oversight of the corrective action process. The QSM is also the division's point of contact for reporting possible violations of the Ethics and Data Integrity Policy under the open door policy.

The Quality System Manager will also establish and maintain contact with clients. All contact with clients must be conducted in accordance with

Microbac Laboratories' Business Conduct and Ethics and Data Integrity Policies.

The Quality System Manager has the authority to suspend work at any time due to safety and/ or quality reasons.

4. Project Manager/ Client Services Manager: These are equivalent positions at Microbac Laboratories Pittsburgh Divisions, reporting to the Managing Director. These positions are responsible for client contacts, including client inquiries and complaints. The Project Manager/ Client Services Representative is also responsible for communicating with the client on issues of quality, cost, turnaround time, subcontracting and reporting/ permitting. All contact with clients must be conducted in accordance with Microbac Laboratories' Business Conduct and Ethics and Data Integrity Policies.

The Project Manager/ Client Services Manager has the authority to suspend work at any time due to safety and/ or quality reasons.

The Project Manager/ Client Services Manager reviews data for correctness and adherence to Quality Assurance/ Quality Control protocols and reviews chains of custody for completeness and correctness. The Project Manager/ Client Services Representative may make corrections to analytical data through the LIMS System,

5. Food Department Manager: Reporting to the Managing Director, this position has direct supervisory authority over the analysts in the Food Department. The Food Department Manager has responsibility for the maintenance of the in-house QA program (food matricies), as well as for maintaining control charts in the Food Department. Additional responsibilities include production of nutritional labels, resolving customer inquiries and/ or complaints, and scheduling work in the food labs. All contact with clients must be conducted in accordance with Microbac Laboratories' Business Conduct and Ethics and Data Integrity Policies.

The Food Department Manager has the authority to suspend work at any time due to safety and/ or quality reasons.

The Food Department Manager may make corrections to analytical data through the LIMS System, and reviews and approves Food Department SOPs.

6. Service Representative: The Service Representative is responsible for obtaining and maintaining accounts for the Pittsburgh Division of Microbac Laboratories, Inc. Initial and on-going communications with clients are routine activities. All contact with clients must be conducted in accordance with Microbac Laboratories' Business Conduct and Ethics and Data Integrity Policies.

The Service Representative has the authority to suspend work at any time due to safety and/ or quality reasons.

7. Office Manager: The Office Manager reports to the Managing Director and has responsibility for the direct supervision of the office staff, as well as responsibility to manage Accounts Receivable. The Office Manager has contact with clients prior to analysis as well as after final reports and/ or invoices have been issued. All contact with clients must be conducted in accordance with the Microbac Laboratories, Inc., Business Conduct and Ethics and Data Integrity Policies.

The Office Manager has the authority to suspend work at any time due to safety and/ or quality reasons.

8. Chemical and Microbiological Analysts and Technicians: The Chemical and Microbiological Analysts and Technicians are responsible for conducting all of the analytical tests in the laboratories, as well as all data recording into the LIMS system. The Chemical and Microbiological Analysts and Technicians are also responsible for adhering to all quality requirements of the analysis, including the analysis of blanks, control samples, matrix spikes, internal standards, and calibrations.

Chemical and Microbiological Analysts and Technicians often are cited as authors on analytical methods and SOPs. As such, they are responsible for the accuracy of the document, including calculations, references, chemical equations and documentation of QA requirements.

On occasion, Chemical and Microbiological Analysts and Technicians may be in contact with clients, either by email, telephone, or face to face interactions. All contact with clients must be conducted in accordance with Microbac Laboratories' Business Conduct and Ethics and Data Integrity Policies.

The Chemical and Microbiological Analysts and Technicians have the authority to suspend work at any time due to safety and/ or quality reasons.

9. Other Positions: Other positions in the Microbac Laboratories, Inc., Pittsburgh Division include: courier/ sampler, bottle preparation technician, sample log-in clerk, and temporary employees who may work in the laboratory or office. These positions report to either the Managing Directory or Project Manager. Courier/ samplers, bottle preparation technicians, sample log-in clerks, and temporary office employees may have contact with clients in order to conduct their duties.

All contact with clients must be conducted in accordance with Microbac Laboratories' Business Conduct and Ethics and Data Integrity Policies.

All Microbac Laboratories, Inc. associates have the authority to suspend work at any time due to safety and/ or quality reasons.

It is the policy of Microbac Laboratories, Inc., that all operations of the laboratory are handled in a manner to ensure that personnel are free from any work-related commercial, financial or other undue pressures, which might adversely affect the quality of their work. The design of the Quality System is such that it operates independent of the daily production processes of the laboratory, therefore eliminating any undo pressure or conflicts of interest regarding the quality of results. Employees of Microbac Laboratories, Inc., have a responsibility to conduct themselves in a manner that is of mutual benefit to the customer, the Company and the community. All Microbac Laboratories, Inc., Pittsburgh Division personnel, irrespective of other responsibilities, have the authority and resources needed to carry out their duties, including the implementation, maintenance and improvement of the management system, and to identify the occurrence of departures from the management system or from the procedures for performing tests, and to initiate actions to prevent or minimize such departures. The Company encourages its employees to improve their understanding of technical, regulatory and social issues confronting our customers and our company. Microbac Laboratories, Inc., is dependent upon the honesty and integrity of each employee within the Company. Falsification of data or any unethical practice under any circumstances is a violation of Company policy and is subject to disciplinary action, up to and including dismissal. Microbac Laboratories, Inc.'s Corporate Ethics Policy thoroughly details all specific policy guidelines.

6.3 Confidentiality Policy

It is the policy of Microbac Laboratories, Inc., Pittsburgh Division that all information and data relative to any client's business is treated in strictest confidence. In no case will a client's test results, data, circumstances or other information relative to a client's business, be discussed with any person(s) or be

made available in written form to anyone other than the client, unless the client authorizes the release of the information to a third party. Verbal or written authorization for release of data, including electronic transmission, is documented by using the Customer **Request** form and kept on file. The client must specifically note to whom and by what means the information is to be released. Clients who wish to designate another party or parties to whom specified information may be released are requested to complete the Statement of Confidentiality Disclosure Form supplied by Microbac Laboratories Pittsburgh Division. Additional policies and procedures can be found in the Corporate Policy Manual.

7 Quality System

With this Quality Manual, the Microbac Laboratories, Inc., Pittsburgh Division has established and documented a Quality System in compliance with the requirements of the ISO/IEC 17025 Standard and NELAC requirements appropriate to the activities listed in the current Scope of Accreditation.

The Quality Manual documents policies, procedures and instructions to ensure the laboratory's performance meets or exceeds the Corporation's QA requirements, regulatory and certification requirements, and client requirements.

The management of the Pittsburgh Division is committed to the establishment and continual maintenance of this Quality System, not only as a program for laboratory services, but also a philosophy throughout all operations of the Corporation. This philosophy is reflected in the Company's Mission Statement and Vision, which can be found in the SOQ.

In addition to management commitment, the Pittsburgh Division's employees are the key to the Quality System through their support and daily application of the requirements in all their duties. All employees are trained in and understand the requirements of the Quality System. The Quality Manual is readily available to all employees for reference and the Quality System Manager ensures that all employees are kept current on revisions.

Microbac Laboratories, **Inc.**, Pittsburgh Division will provide only those services that are within its qualifications or expertise and fully comply with the criteria of the Quality System. The requirements of this Quality System Manual are consistent, to the extent possible, with the Quality Assurance/Quality Control (QA/QC) requirements of its customers.

Microbac Laboratories, Inc., Pittsburgh Division's Quality System is organized to meet the following objectives:

- To perform those actions that provide confidence that quality is achieved.

- To provide an effective control for the verification of characteristics of all systems, services, processes, and deliverables that produce data of known quality.
- To ensure that those systems, services, processes, and the deliverables meet the rigid quality and reliability standards of the Company.
- To ensure that individual client criteria pursuant to these standards are met.
- To provide a continuous monitoring system for review of operating procedures in order to measure overall effectiveness and evaluate the QA Program
- To provide observations and recommendations for improvement in all areas of laboratory operations where quality may be affected.
- To assure the documents program provides valid records of the control measures applied to all factors bearing on the final results of investigations.
- To assure assessments of results and services and to provide feedback to improve the process.
- To instill a culture of commitment to achieving a rising standard of quality, which demands that the quality for systems, services, processes, deliverables, and the methods utilized to achieve that quality be continuously improved.
- To provide the Company's employees with the proper ethics and data integrity training to enable them to make the proper decisions to ensure accurate and legally defensible results to our customers. Training sessions are included in our procedure for Ethics and Data Integrity, as are monthly internal data audits. Peer reviews are performed daily, along with periodic Performance Testing Studies and Blind Quality Control Samples.
- The system documentation supporting Microbac Laboratories Pittsburgh Division's activities is defined for the following elements:
- Quality Manual (QM)
- Standard Operational Procedures (SOPs)
- Records
- General analytical and quality related documents
- Reference documents
- Microbac Corporate Policies Handbook
- Statement of Qualifications
- Facility Chemical Hygiene Plan
- Client Account Files

Control No.:_____

- Annual Data Integrity Procedures training for all Pittsburgh Division employees is provided every **January** by either the Quality System Manager or Managing Director. This training includes the Corp-Ethics-01 SOP, and the Ethics and Data Integrity Training Guide. All Pittsburgh Division new employees sign an Ethics and Data Integrity Agreement Form. The "Attestation Form" also includes an ethics and data integrity statement for the employee to read and sign. **A training sign-in sheet will service as evidence of the annual training for the laboratory staff.**

- The Corp-Ethics-01 SOP is approved, dated and signed by the Corporate Quality Assurance Officer. The corporate SOP is reviewed annually, and, if needed, updated through our Corporate QA Office. The Corporate Quality Department provides the Ethics and Data Integrity Training to managers in the Corporation.

7.1 Document Control

Microbac Laboratories, Inc., Pittsburgh Division controls all internal and external documents that make up the Quality System following the procedures described in the Admin-Doc Control -01, and the Admin-Electronic Doc Control-02 SOPs. All documents issued to laboratory and management personnel as part of the Quality System are reviewed and approved for use prior to issue as described in these SOPs. A Master SOP List, Master Forms List, and Master Bench Book List of documents are maintained for all SOPs and supporting quality documents identifying the current version. In order to preclude the use of invalid or obsolete versions the Quality System Manager maintains a list of recipients in the **Master Document Control List spreadsheet.**

All Quality System documents are given a unique identifier by the Quality System Manager. All Quality System records such as Internal Audits, Management Reviews, Corrective and/ or Preventive Actions are **tracked on control spreadsheet logs.** The **paper** records are kept in binders in the QA Office. All Quality system documents are retained according to the Admin-Records Retention-01 SOP.

The procedures in place for document control ensure that:

- Authorized editions of appropriate documents are available at all locations and for all qualified personnel where operations essential to the effective functioning of the laboratory are performed (on the bench and in the field).

- Documents are periodically reviewed for suitability and compliance with applicable requirements, and revised as necessary. A schedule is designed to ensure the periodic revision of SOPs.
- Invalid or obsolete documents are promptly removed from all points of issue or use, or otherwise assured against unintended use.
- Obsolete documents retained for either legal or knowledge preservation purposes are suitably marked.

Quality System documents generated by the laboratory are uniquely identified. The format of such documents includes in the header or footer of each page:

- The laboratory/division name
- Document title with current version date
- Page number
- Total number of pages

Changes to documents are reviewed and approved by the same procedure used for original documents. Each person in the review process compares the revisions to the original document and evaluates the changes. Where practical, a revision history is included in each document.

With the exception of titles and subtitles which are always typed in bold text, and minor grammatical corrections, new or altered text to a revised document will be indicated by bold type and a description is added to the history section. Hand written changes may be permissible in certain limited circumstances, provided that the Quality System Manager is notified and can ensure that all copies of the document on the distribution list are amended, the electronic version is amended, and a notation added to each to identify the date of revision. A revised document shall be formally reissued as soon as possible.

Changes to electronic documents are made and controlled according to the Admin-DataBackup – 01 SOP.

7.2 Review of Requests, Tenders and Contracts

It is the policy of Microbac Laboratories, Inc., Pittsburgh Division to use standard analytical methods considered mandatory or most appropriate for all work undertaken, and to review all new requests for services and proposals for feasibility. Where there is no clearly mandated or most appropriate method, every effort will be made to determine an analytical approach which will provide meaningful data at a level of quality acceptable to the client and to the Company's quality standards. Any deviation from, or modification of, a standard analytical

SOP is noted on the raw data and in the client's final report. Data are normally delivered to the client according to a standard turnaround time schedule.

The Admin-Contracts-01 SOP establishes the procedure to review requests, tenders and contracts in order to ensure that:

- The Client Services Manager is responsible for maintaining the records for new work. The records include the review of all **quotes and sales proposals**, which are filed in a secure location.
- The appropriate test methods are selected and capable of meeting client requirements.
- The client is informed if the requested method is inappropriate or out-of-date.
- Microbac Laboratories, Inc., has the capability and capacity to meet contractual requirements.
- Any difference between the request and the contract are resolved before the commencement of work.
- The need for subcontracting is identified and discussed with the client.

Records of review and pertinent discussions with the client relating to the client requirements or the results of the work during the period of execution of the contract are documented into specific customer folders located on the network sever. This review covers any work that is subcontracted.

The Client Services **Manager** is responsible for informing the client of any deviations from the contract and coordinating amendments with the customer and notifying all affected departments of relevant changes. Contract amendments are coordinated, reviewed, approved and communicated according to the Admin-Contracts-01 SOP. The review process for amended contracts is the same as for original contracts.

7.3 Subcontracting of Tests

Occasionally, the laboratory subcontracts work to outside analytical laboratories, consultants, etc. Due to the size and diversity of Microbac Laboratories, Inc., most subcontracting is inter-divisional. **The** Pittsburgh Division ensures, to the extent necessary and/or possible, that subcontract laboratories are able to meet any state and regulatory requirement needs for the analyses and are accredited to ISO 17025 specifications by NELAP, A2LA, or another acceptable and appropriate accrediting body.

The necessity to subcontract is determined by the following:

- The laboratory does not have the proper physical facilities to perform the service.
- The laboratory does not have the ability or technical expertise to perform the service.
- The laboratory does not have the required certification to perform the service.
- The laboratory does not have the resources to perform the service in a timely manner due to workload constraints or equipment limitations.

Microbac Laboratories, Inc., Pittsburgh Division advises the client of subcontracting and gains the approval of the client, preferably in writing.

The laboratory is responsible to the client for the subcontractor's work, except in the case where the client or a regulatory authority specifies which subcontractor is to be used.

The Quality System Manager maintains a Subcontractor Register of all subcontractors and the record of the evidence of compliance with the A2LA/NELAC/ISO 17025 standards for the work in question.

Procedures for the qualification and use of subcontractors are contained in the Admin-Subcontractor-01 SOP.

7.4 Purchasing Services and Supplies

Microbac Laboratories, Inc., Pittsburgh Division has defined procedures for the selection, purchasing, reception, and storage of services and/or supplies. All purchased supplies, reagents and consumables that may affect the quality of tests are not used until they have been inspected or verified as complying with the specifications required in the method. Records of such verification are maintained. All materials used for calibrating instruments or as standards in developing a method should be of primary standard grade or at a minimum, traceable back to NIST. While this is not always available, these chemicals should be of the highest quality available and kept refrigerated, desiccated, and/or otherwise properly stored.

Purchasing documents describing the services or supplies ordered are reviewed and approved for technical content prior to release.

The Quality System Manager maintains a Vendor Register naming all vendors who have been evaluated and approved by the Technical Director or Quality System Manager for the purchase of services and supplies.

Procedures and records pertaining to the purchasing of services and supplies can be found in the following documents:

Admin-Purchasing-01
Admin-STD-01

7.5 Service to the Client

It is the policy of Microbac Laboratories, Inc., Pittsburgh Division that all representatives fully cooperate and assist the client in monitoring the laboratory's performance in relation to the work being performed including providing reasonable access, within the boundaries of client confidentiality, to relevant areas of the laboratory for the witnessing of tests performed for the client. All representatives of the division are expected to inform clients as to the status of their work or whenever delays or complications arise.

Microbac Laboratories, Inc., Pittsburgh Division associates value relationships with our customers and believe in having a strong and open communication in order to understand each customer's specific analytical requirements. To maintain our quality service, the Pittsburgh Division welcomes feedback from the customer. Therefore, the laboratory has established a satisfaction survey to solicit and document feedback annually. The survey data are compiled into a spreadsheet, reviewed by the laboratory management and the customer is contacted in an effort to resolve the complaint. The procedure is defined in the laboratory's **Admin-Customer Feedback-01 Policy**.

7.6 Complaints

Microbac Laboratories, Inc., Pittsburgh Division has specific procedures for the resolution of complaints received from clients or other parties as described in the **Admin-IR&CA-01 SOP and Admin-Customer Feedback-01 Policy**.

The **Incident Report** Form is used to initiate the investigation of any inquiry or complaint, and the findings are documented. If further investigation and corrective action are required, **more detailed analysis is done and documented on** a Corrective Action Form along with the necessary corrective action(s). It is

imperative that all complaints are investigated thoroughly and in a timely matter in order to resolve any problems to the satisfaction of the customer.

Further discussion can be found in Section 7.8, Corrective Actions.

7.7 Control of Nonconforming Work

When any aspect of testing, result generation or reporting does not conform to Microbac Laboratories, Inc., Pittsburgh Division's established procedures or agreed requirements of the client, the procedures detailed in the **Admin-IR&CA-01** SOP are followed as appropriate. The Managing Director has ultimate authority and responsibility for the management of nonconforming work and the appropriate actions to be taken. The Technical Director and/or Quality System Manager have the authority, under their scope of responsibilities, to initiate the necessary procedures. The referenced procedures will ensure that:

- An evaluation of the significance of the nonconforming work is made.
- Corrective Actions are initiated immediately and are continued until completion.
- Where necessary, the client is notified and the work is recalled.

The responsibility for resumption of work lies with the Managing Director, which is determined on advice from the Technical Director or the Quality System Manager.

Where there is doubt about the compliance of laboratory operations with Pittsburgh Division's policies or procedures or a determination is made that nonconforming work could recur, the Corrective Action procedures described in Section 7.8, Corrective Action, are to be followed.

7.8 Corrective Action

Corrective Action may be required as a result of both analytical and non-analytical events. The purposes of Corrective Action are to provide documentation of the event, to track the frequency that the event occurs and, most importantly, to correct and prevent recurrence of the nonconformance or departure from policies and procedures.

The procedures in the **Admin-IR&CA-01 SOP** ensure the following:

- An investigation is made to determine the root cause(s) of the problem.

- Potential Corrective Actions are identified and the most appropriate are implemented.
- Corrective Actions appropriate to the magnitude of the problem are taken.
- The entire process is properly documented.
- Follow-up is made to monitor and determine the effectiveness of the remedy.

The Quality System Manager will audit the appropriate areas of activity as discussed in Section 7.11. An internal audit will be conducted when a non-conformance casts doubt on the laboratory's compliance with Microbac Laboratories Pittsburgh Division's policies and procedures. If, after the investigation, it has been determined that the non-conformance may have impacted the results of the affected data, a representative of the Pittsburgh Division will initial the notification to our customers within 48 hours.

7.9 Preventive Action

Identification of Preventive Actions is the result of the Company's proactive process to determine opportunities for improvement and prevention of non-conformance. This prudent practice applies to both business management and Quality Systems. Needed improvements and potential sources of non-conformance, whether administrative, technical or quality-related, are identified, selected, implemented, monitored and documented following the **Admin-IR&CA-01 SOP**.

At least monthly, the Quality System Manager reviews the **Incident Report and Corrective Action Log** and the related forms in order to summarize them for inclusion in the monthly Corporate Quality Report. During the annual Management Review, the entire Quality System is reviewed to determine, in part, any Preventive Actions that could be taken to improve the Quality System and/or isolate areas of potential non-conformances.

7.10 Control of Records

Microbac Laboratories, Inc., Pittsburgh Division maintains the Admin-Record Retention-01 SOP and the Admin-Electronic DocControl-02 SOP detailing the procedures for the identification, collection, indexing, access, filing, storage, maintenance and disposal of quality and technical records. Such records include but are not limited to the following:

- Audits

- Management Review
- Corrective Actions
- Preventive Actions
- Calibrations
- Bench Books
- Logbooks
- Control Charts
- Personnel Training Records

The SOPs referenced above detail the procedures in place to ensure compliance with the following NELAC requirements:

- All records must be legible and stored in a manner that prevents damage, deterioration, or loss and ensures they are readily retrievable.
- Retention times for each type of document are established.
- All records are held secure and in confidence.
- Procedures are in place to protect back-up records stored electronically and to prevent unauthorized access or amendment of the records.
- Records of original observations, derived data containing sufficient information to establish an audit trail, calibration records, staff records, and a copy of each test report are retained for defined periods.
- Records are maintained containing sufficient information to facilitate the identification of factors affecting the uncertainty of the test and to enable the test to be repeated under conditions as close as possible to the original.
- The identity of personnel responsible for sampling, analysis, or verification of results shall be included in all records.
- Observations, data and calculations shall be recorded at the time they are made and must be identifiable to the specific task.
- Mistakes in records are to be crossed out, not erased, made illegible or deleted, and the correct value entered alongside. All alterations to records are to be signed or initialed and dated by the person making the correction.
- Procedures are in place for electronically stored records to avoid loss or change of the original data.

7.11 Internal Audits

Microbac Laboratories, Inc., Pittsburgh Division periodically conducts audits in accordance with the predetermined annual Audit Schedule and Corp- System Audits SOP, in order to verify compliance with the requirements of the Quality System and the NELAC Standard. The internal audit is designed to address all elements of the Quality System, as described in detail in the procedure. It is the responsibility of the Quality System Manager to plan and organize the audits and to ensure that trained, qualified personnel, who are, where possible, independent of the activity being audited, carry them out.

The audit findings and Corrective Actions that arise from internal audits are recorded on a Corrective Action Form and Quality System Audit Checklist or the Analytical Method Audit Checklist and addressed in a Quality System Audit Report which is presented to the Managing Director for review. It is the responsibility of the Quality System Manager to notify clients in writing if it is determined that laboratory results may have been affected.

Follow-up audits are performed to verify and record the implementation and effectiveness of any corrective actions taken.

7.12 Management Review

At least annually, and typically coinciding with the end of each business year, the laboratory's Management conducts a review of the Pittsburgh Division's Quality Systems, Business Systems and testing activities according to the Corp-Management Review SOP. The purpose of this review is to ensure the continuing suitability and effectiveness of the systems and to introduce necessary changes or improvements.

The review takes account of:

- The suitability of policies and procedures.
- Reports from managerial and supervisory personnel.
- The outcome of recent internal audits.
- Corrective and preventive actions.
- Assessments by external bodies.
- The results of inter-laboratory comparisons and/or proficiency tests.
- Changes in the volume and type of the work.
- Client feedback.
- Inquiries or complaints.
- Accomplishment of business and personal objectives and goals.
- Other relevant factors, such as QC activities, resources and staff training.

Findings from the Management Reviews and the Corrective Actions that arise from them are recorded into written reports and the results are integrated into the laboratory planning system for the subsequent year.

8.0 TECHNICAL REQUIREMENTS

8.1 General

The accuracy, precision and reliability of the tests performed by Microbac Laboratories, Inc., Pittsburgh Division are determined or influenced by a variety of factors. Section 7 of this Quality Manual details the policies and procedures in place to address, accommodate and control these factors.

8.2 Personnel

Microbac Laboratories, Inc., Pittsburgh Division's management commitment to client satisfaction demands that all personnel responsible for performing tests, operating equipment, evaluating results, and signing Certificates of Analysis are properly trained in accordance with the laboratory's Quality System. Personnel are qualified as competent based on appropriate education, training, experience and/or demonstrated skills. Appropriate supervision by a qualified individual is provided to all staff, staff undergoing training, and personnel contracted by the laboratory. All employees engaged in direct communication with clients are properly trained and competent for the specific tasks required of them.

As a result of the Management Review process, or in order to satisfy recognized needs, the Laboratory Director formulates the goals related to the education, training and skills of the personnel. The Corp-Training SOP describes the procedures for identifying training needs and providing personnel training.

Technical management is the responsibility of the Managing Director along with the Technical Director and the Quality System Manager. The Managing Director ensures that the laboratory has sufficient and appropriately trained personnel for the assigned duties. The Managing Director is responsible for ensuring a comprehensive Quality System is in place. The Quality System Manager is responsible for the development, execution, implementation and daily supervision of the Quality System Program.

At the direction of, or in the absence of the Managing Director, the Technical Director, Quality System Manager or designee has full authority and responsibility for the functions of the Managing Director. In the absence of the

Quality System Manager, the Technical Director will assume all authority and responsibilities of the Quality System Manager.

Each analyst is responsible for all data production, reduction, and documentation for each day's analyses. If any element of the Quality System is approaching or is in an "out-of-control" state, the analyst must bring this to the attention of the Quality System Manager. Every employee is responsible for adhering to and supporting the laboratory's quality system in principle and practice.

General job descriptions presently used are located in **Appendix B of this manual.** The description, at a minimum, includes the specific areas of responsibility and general tasks required of the position, **roles and responsibilities with respect to the support and maintenance of the Quality System,** and specific skills needed to do the job. **Each associate is trained with respect to his/her role and responsibility in the support and maintenance of the Quality System.** Each description includes the employee's immediate supervisor in addition to any other personnel higher on the management chain to whom they are responsible. Job descriptions will be updated when changes occur or new responsibilities are added. A copy of the updated job description will be given to the employees who are affected by the change. The previous job description will be removed from the personnel file and placed in the archive. This record is retained for at least five years.

The Training Attendance Form **is the record of the analysts who have received required training related to a specific** analytical test or SOP. This form, along with relevant educational and professional qualifications, **outside** training, skills and experience of all technical personnel are kept **on file** in the Quality System Manager's **office.** The Admin-Training-01 SOP contains the specific procedures for the authorization of competency.

A Master Signature **Logbook** maintains a record of all employee signatures and initials.

8.3 Accommodation and Environmental Conditions

The Microbac Laboratories, Inc., Pittsburgh Division building was specifically as a laboratory facility. The environmental conditions are continuously monitored to ensure they do not adversely affect the quality of any measurement or invalidate test results. Where applicable, environmental conditions that may affect test results are documented in relevant SOPs along with the specific monitoring, controls and documentation requirements. If environmental conditions exist which would jeopardize a test result or affect the quality of any

measurement, the person responsible for the performance of the test will stop the test and take the necessary Corrective Action.

Incompatible areas are separated in order to prevent cross contamination. The extraction, volatile organics, metals, microbiology, food chemistry, inorganic and field sampling departments are physically isolated in separate rooms. A facility diagram is provided in the Statement of Qualifications.

The access and use of all laboratory areas is controlled. During normal working hours, only authorized personnel are allowed in the laboratory. After hours, the building is locked with a key. Access to the building is restricted by the use of keys. Additionally, passwords for the computer system are strictly controlled.

The Quality System Manager is responsible for ensuring good housekeeping procedures according to Admin-Housekeeping-01 SOP.

8.4 Test Methods and Method Validation

One of the most important elements of the Quality System within Microbac Laboratories, Inc., Pittsburgh Division is the selection, validation and documentation of test methods. To ensure consistent, accurate, reproducible and acceptable results that meet the needs of the client and regulatory requirements, the laboratory uses the most recent approved methods published by a recognized or acceptable authority, which are appropriate to the tests undertaken, unless the client or regulatory authority specifies otherwise. The laboratory will inform the client when the method proposed by the client is considered to be inappropriate or out of date. Prior to the performance of a method for a client, a laboratory analyst must confirm that it can perform the method properly. This is achieved by demonstrating capability per the procedures in the Admin-Training SOP and QA-QualityControl-01SOP. Successful demonstration of a particular capability is documented on a Attestation form.

To meet the above objectives, Standard Operating Procedures (SOPs) are developed for all routine sampling and analytical methods as well as equipment operation and all other standardized procedures and activities. The preparation of SOPs is performed per the procedure in SOP for the Creation, Review, Update and Control of Standard Operating Procedures. All SOPs contain the information established in templates for Analytical SOPs or Administrative SOPs. The Master SOP Index includes all the SOPs currently in use or archived. All SOPs and related documents are kept up to date and made readily available to the appropriate personnel. Deviations from these SOPs may only occur if documented, technically valid, authorized, and accepted by the client.

In certain circumstances, such as the request of the client, it may be necessary to use laboratory-developed or non-standard methods. This is acceptable under the conditions that the client approves the changes, there are clear specifications and requirements, the analysis is assigned to a qualified analyst, the laboratory has adequate resources, a SOP is developed, and the method is properly validated before use.

Non-standard methods, laboratory-developed methods, standard methods used outside of their intended scope, and modifications to standard methods must be validated by the generation of objective evidence that the particular requirements for a specific intended use are fulfilled. The laboratory will record the results obtained in the validation, the procedure used, and a statement as to whether the method is fit for the intended use. The range and accuracy of the values obtained from validated methods, as assessed for the intended use, must be relevant to the client's needs. The procedure for validation process is described in Admin-Method Changes-01 SOP.

Microbac Laboratories, Inc., Pittsburgh Division follows a detailed statistical technique for the Measurement of Uncertainty as described in Admin-Uncertainity-01 SOP and QA-Quality Control-01 SOP. Test and calibration data are analyzed and produced as a result of statistical techniques and are objective evidence that the particular requirements for a specific intended use are fulfilled. The Environmental Chemistry Laboratory is required to annually verify test reporting limits and method detection limits by performing a verification study. The Food Microbiology and Food Chemistry Laboratories are required to monitor and evaluate the daily trend analysis of the In -House QC using control charts. The control charts are used to determine acceptance and uncertainty criteria. Calculations and data transfers are subject to appropriate checks in a systematic manner according to the Admin-Peer Review-01 SOP.

For several analytical tests, the laboratory uses computers and automated equipment for acquisition, processing, recording, reporting, storage or retrieval of data. Any computer software developed by or for Microbac Laboratories, Inc. is validated and documented prior to use. Procedures to ensure the integrity and confidentiality of data entry or collection, data storage, data transmission and data processing are detailed in the Admin-Data Backup-01 SOP. Qualified in-house personnel perform routine computer maintenance and backup. Computer consulting and other support may be provided by qualified outside vendors as needed.

8.5 Equipment

The laboratory furnishes all the sampling, measurement, data collection, and test equipment necessary to produce accurate, reproducible results for the activities for which it performs. Both in-house equipment and any equipment used that is out of our permanent control are subject to the requirements of the Quality System.

All equipment and software must be capable of achieving the accuracy required and must comply with the specifications of the tests performed. Calibration programs are established for key quantities or values of the instruments where these properties have a significant effect on the results. All equipment is inspected and calibrated or checked to establish that it meets the laboratory's specifications before it is placed into service. The calibration or verification of equipment is addressed in the SOPs for each specific instrument and/or the Admin-Equipment-01 SOP (see Section 8.6, Measurement Traceability).

Equipment and software are operated or used only by authorized personnel who have received the appropriate training on the use, maintenance and calibration of the equipment. All SOPs, instructions, or operating manuals for the equipment are readily available to all authorized personnel. (See Section 8.2, Personnel).

All equipment and software used for testing are listed in the Equipment Inventory, which is kept current by the Quality System Manager. The inventory includes, at minimum, the following information:

- Internal ID (as necessary)
- Description or Identity of the equipment or software
- Manufacturer's Name
- Model Number
- Serial Number or other unique identification (Internal ID)
- Verification of compliance with specifications
- Current Location
- Manufacturer Instructions/Operation Manual on file and/or SOP on file
- Date put into service
- Primary use
- Document Control No. of Maintenance Log
- Person responsible for Maintenance Log

Every major piece of equipment has a file that contains its operations manual, if available, and any other information that came with it. These files also contain lists and schedules of all maintenance and calibration required for that particular instrument. All instrument maintenance, calibration, repairs, malfunctions or changes in operation are recorded in the Instrument Maintenance Log along

with an equipment maintenance and calibration schedule. Each piece of equipment is assigned a specific maintenance logbook, which is controlled by a unique control number.

Analytical SOPs include general instrument operation procedures. The Admin-Equipment-01 SOP addresses general guidelines for equipment maintenance and use. For detailed equipment use, specifications, maintenance, and repair, manufacturer manuals are on file, if available.

Any item of equipment that has been subjected to overloading or mishandling, gives suspect results, or has been shown by verification or otherwise to be defective, shall be taken out of service, clearly identified and, wherever possible, stored at a specified place until it has been repaired and shown by calibration, verification (Admin-Equipment-01 SOP) or test, to perform satisfactorily. The specific procedures are detailed in Admin-Equipment-01 SOP. In addition, the Quality System Manager will examine the effect of the defect on previous analyses and shall institute the procedures discussed in Section 7.7, Control of Nonconforming Work.

Wherever possible, all equipment requiring calibration or monitoring is to be labeled or identified to indicate the status of calibration, including the date when last calibrated or checked and the date when calibration is due.

Pieces of equipment requiring routine monitoring or calibration have custom bench books/benchsheets, or the information is stored on the equipment software and raw data. The bench books/ benchsheets are controlled. The analyst is responsible for the return of the completed bench book to the Quality System Manager for archiving. The Quality System Manager is responsible for assigning a new bench book with a unique control number to the analyst. This information includes, but is not limited to oven temperatures; balance calibration, water bath temperature, etc.

Specific calibration schedules for applicable instruments or pieces of equipment are listed in the Instrument or Equipment bench book. All calibration checks are recorded in this bench book. In addition, instruments requiring calibration prior to the determination of sample results (Hach meter, Spec 20, pH meter, etc.) have individual bench books and a written SOP detailing the setup, operation and calibration of the instrument.

For instruments of a more sophisticated nature (GC/MS, HPLC, GC, ICP, AA), calibration information is recorded in conjunction with batch analysis. This information is recorded by the instrument analyst in designated files. This information will include, but not be limited to, bench books, instrument printouts, calculations, and any information required by the specific analysis in regards to calibration. Any maintenance or repair of these instruments will be

noted in the equipment maintenance log and/or equipment file of each instrument. **Incident Report** Forms will be used as needed.

When equipment goes outside the direct control of the laboratory, the function and calibration status shall be verified prior to being returned to service as described in Admin-Equipment-01 SOP.

When intermediate calibration checks, such as daily balance calibrations or continuing calibration verification (CCV) for GC/MS or ICP analysis, are needed to verify the calibration status of a piece of equipment, these are performed according to the corresponding SOP.

Wherever correction factors are to be employed, they shall be clearly labeled on each piece of equipment used. Correction factors may only be utilized on dedicated, nonadjustable measuring devices (i.e., thermometers, fixed-volume pipettes, etc.).

To safeguard equipment from adjustments that would invalidate test results, personnel must be properly trained before performing routine maintenance and/or minor repairs. If maintenance or repair is judged to be extensive, a qualified contractor or a manufacturer's representative will be requested for servicing.

The maintenance of the LIMS system is vital to the integrity of the test data. Therefore, protecting the integrity of the system is essential to the operation of the business. This is done through a variety of procedures which are overseen by the Technical Director. Data integrity protection is accomplished through the use of passwords and backups. All employees are assigned a password, limiting their access in the LIMS system. They are allowed access only to files necessary to complete their daily activities. All other files are blocked for security purposes. The system is set to backup on a daily basis. If a problem should arise, the backup has all the vital information to put the system back on line. It is the responsibility of the Technical Director and his designated personnel to maintain all laboratory computers and related equipment to ensure that they are functioning properly. As needed, qualified contractors may be called in to handle major repairs.

8.6 Measurement Traceability

All measuring and testing equipment and reference materials having a significant effect on the accuracy or validity of the test, calibration, or sampling will be calibrated and/or verified before use.

The laboratory has an established program and procedures for the periodic calibration, and verification of equipment and reference materials.

When using external calibration services, competence, measurement capability and traceability are ensured by using only services accredited by A2LA (Food Microbiology and Food Chemistry Laboratories) and/or those which fulfill the requirements of NELAC/ISO 17025 (Environmental Chemistry Laboratory). The calibration certificates issued by these firms must include measurement of uncertainty and/or a statement of compliance with an identified metrological specification.

Calibrations and measurements made by the laboratory are traceable to the International System of Units (SI). Reference materials, where possible, are traceable to SI units of measurement or to certified reference materials. Calibration certificates or Certificates of Analysis received with the materials are verified by the analyst for suitability and are properly archived.

Where traceability to SI units is not possible, confidence in measurements is established by the use of certified reference materials provided by a competent supplier or compared against a second source standard.

Procedures for the calibration of reference standards, such as reference weights, are detailed in the Admin-Balance Calib-01 SOP and **Admin-Thermometer-01** SOP. Procedures for the safe handling, transport, storage and use of reference standards and reference materials in order to protect their integrity and to prevent contamination or deterioration are found in Admin-Std-01 SOP.

Working calibration standards are prepared by dilutions from stock solutions. An expiration date is assigned to each solution and the solution is not to be used beyond that time. The validity of calibration standards is verified by comparison against an independent standard. Participation in performance evaluation programs provides additional validation of calibration materials and procedures. The type and frequency of calibrations are dictated by the reference methods used and are detailed in individual analytical SOPs.

8.7 Sampling

Admin-SamplingPlan-01 , Admin-SampleRec-01 and FC-Sample Preparation-01 SOPs detail the sampling procedures and related activities necessary to obtain a valid and representative sample. These documents address sampling techniques, equipment, holding times, containers and preservation, recordkeeping requirements, and other information to ensure representative sample collection and maintenance of sample integrity.

Any deviations, additions or exclusions from the documented sampling procedure are recorded in the appropriate sampling records and included in all documents containing test results. Such deviations are also to be communicated

to the Technical Director, Quality System Manager, the client, and any other appropriate personnel.

8.8 Handling of Tests Items

The integrity of the samples is critical to the generation of valid test results and the protection of the interests of Microbac Laboratories and its clients. A procedure detailing the proper collection, transport, receipt, login and documentation, handling and preparation, prevention of deterioration, loss or damage, monitoring of storage conditions, and disposal is found in the Admin-SampleRec.-01and Admin-SampleAcceptance-01 SOP.

The laboratory has a specific and permanent sample identification system that uses a unique 9-digit number (e.g., 9939-00130) to identify each work order. An additional 3-digit number (e.g., 001) uniquely identifies each discrete sample or test unit within each work order.

Any observations of abnormalities or deviations from normal or specified conditions or doubts about the suitability of a test item for analysis, or inconsistencies in the sample documentation are addressed with the client. All such observations and discussions are recorded in detail on the Chain of Custody and/or the Sample Receiving Form.

8.9 Assuring the Quality of Test Results

Quality Control procedures are in place for monitoring the validity of tests. The Quality Control Section included in each method SOP specifies the appropriate control samples to run with each test, as well as the required frequency. The definition of each type of control sample is established in the QA-QualityControl-01 SOP.

Most reference methods define the required frequency of QC samples. For these tests, the QC section in the SOP will be at least as stringent. For all other methods the following general guidelines apply:

- Performance Blank - one per preparatory batch and every 20 samples thereafter.
- Calibration Verification - at the beginning of each batch and every 10 samples thereafter.
- Laboratory Control Sample - one per preparatory batch and every 20 samples thereafter.
- Duplicate - one per preparatory batch and every 20 samples thereafter.

- Matrix Spike - one per preparatory batch per unique matrix type and every 20 samples thereafter.

NOTE: A Matrix Spike Duplicate may be analyzed in place of a Duplicate or a Matrix Spike at the referenced frequency)

Much of the content of a Quality Control System is made up of techniques and methods used to monitor its performance in day-to-day operation. Control charts are used to monitor the analytical system to determine trends and possible out-of –control conditions. Two types of control charts are used, one to plot relative percent difference (precision) and the second, the true value concentration chart used to plot recovery (accuracy).

Where appropriate, data for QC samples are recorded and plotted and reviewed periodically. The Quality System Manager inspects QC data sheets on a routine basis unless a deviation occurs, which requires a more thorough monitoring of QC results. The control charts are used to develop laboratory QC limits for Laboratory Control Samples, Duplicates, Matrix Spikes, Surrogates etc. Detailed procedures for Quality Control and the use of control charts can be found in the QA-QualityControl-01 SOP.

Additional QC measures to ensure the quality of analytical data include:

- The regular use of certified reference materials and secondary reference materials as discussed in Section 8.6, Measurement Traceability and specific method SOPs.
- Routine scheduled participation in inter-laboratory comparisons and proficiency-testing programs. All Proficiency Studies are treated as routine samples and performed within the laboratory as part of the routine analytical batch.
- Blind and double blind Quality Control Samples.
- Continual monitoring of laboratory water per the Water Quality SOP.

8.10 Reporting the Results

The laboratory has several test report or Certificate of Analysis formats in use. All formats are designed to accurately, clearly, unambiguously, and objectively report all information required by the method, required for proper interpretation, and requested by the client. In certain cases, such as internal use or by client request, modified report formats may be used. Regardless of the format used all information required by this section is readily available for review.

Test reports contain at minimum the following:

- The title, "Certificate of Analysis".

- Laboratory name, address, and phone number, or same information for a subcontract laboratory where the analysis was performed, if different from the laboratory.
- Unique Work Order/Certificate of Analysis number on each page.
- Page numbers in the format "page # of #" (i.e., "Page 1 of 4").
- Client name and address.
- Test methods used or unambiguous description of any nonstandard method used.
- Unambiguous sample description/identification.
- Sampling date and time (unless unavailable).
- Sample receipt date time.
- Date(s) of analysis.
- Test results and units.
- Date of report issuance.
- Name title/position of person(s) authorizing the Certificate of Analysis.

The following statement appears on each page of the report: "The data and other information on this, and other accompanying documents, represent only the sample(s) analyzed and is rendered upon condition that it is not to be reproduced **in whole or** in part for advertising or other purposes without approval from the **laboratory.**"

Where relevant, a statement of compliance/non-compliance with requirements and/or specifications, including identification of test results derived from any sample that did not meet the ISO 17025, A2LA and / or NELAC sample acceptance requirements such as improper container, holding time, or temperature will be included on the report.

Where necessary for the interpretation of results, the following information is included in the Certificate of Analysis:

- Any deviations from, additions to, or exclusions from the test method. This includes any other information relevant to a specific test, such as environmental conditions.
- Where necessary, a statement of compliance/non-compliance with requirements or specifications.
- Where relevant to the validity of a result or compliance with a specification limit, or upon a client's request, a statement of the estimated uncertainty of the measurement.
- Opinions and interpretations.
- Any additional information required by the method or requested by client.

- Location of sampling, including diagrams, sketches or photographs.
- Including reference to the Sampling Plan and procedures used, or other sampling specifications.
- Details of environmental conditions during sampling that may affect the interpretation of the test results.
- Deviations, additions or exclusions from the sampling procedure or specifications
- Opinions and interpretations shall be clearly marked as such and shall document the basis upon which the opinions and interpretations have been made.
- All results performed by a subcontractor shall be clearly marked as such.
- All results transmitted electronically shall meet the requirements of this Quality System Manual.

A material amendment to a Certificate of Analysis after issuance is made only in the form of a further document or electronic transfer and includes, "Amended Report", the date of the amendment and initials of person amending the report. Such an amendment shall meet all relevant requirements of the original report. When it is necessary to issue a completely new test report, such reports shall be uniquely identified and shall contain a reference to the original certificate or report that it replaces.

9 References

This manual requires compliance, when applicable, with the applicable elements of the following standards:

- Microbac Laboratories, Inc., Corporate Quality Assurance Program Manual sections titled "Systems Audits", "Training", and "Management System Review".
- National Environmental Laboratory Accreditation Conference (NELAC), July 2003 Standards.
- AOAC International Guidelines for Laboratories Performing Microbiological and Chemical Analyses of Food and Pharmaceuticals, Sept. 2006.
- ISO 17025:2005 Standards
- American Association for Laboratory Accreditation (A2LA), July 2000.

- Microbac Laboratories, Inc., McKnight Division, Quality Manual, Issued 12-6-01.

-END-

Control No.:_____

The quality manual distributed as a Controlled Document is printed on ivory paper and is given a Control Number at the bottom of the first page. Copies on any other color paper are considered an uncontrolled copies.

Appendix A
Definitions

Accuracy – An indication as to how close a measurement is to the 'true', 'known', or 'accepted' value.

Analyte – The specific component measured in a chemical analysis; also called analyte.

Analytical Batch – Composed of prepared samples (extracts, digestates or concentrates) which are analyzed together as a group. An analytical batch can include prepared samples of various matrices and cannot exceed 20 samples.

Bias – Consistent deviation of measured values from the true' value, caused by a systematic error in a procedure.

Blind Sample – A sample submitted for analysis whose composition is known to the submitter but unknown to the analyst. A blind sample is one way to test proficiency of a measurement process.

Calibration Standard – A solution prepared from the primary dilution standard solution or stock standard solutions. **These solutions are used to calibrate the instrument response, and to determine linearity across a working range.**

Certified Reference Material (CRM) – A material with one or more properties whose values are certified by a technically valid procedure, and accompanied by or traceable to a certificate or other documentation which is issued by a certifying body.

Coefficient of Variation – The standard deviation divided by the value of the parameter measured.

Confidence coefficient – the probability, in percent, that a measurement result will fall within the confidence interval **indicated**, or between confidence limits.

Confidence interval – That range of values, calculated from an estimate of the mean and the standard deviation, which is expected to include the population mean with a stated level of confidence. Confidence intervals in the same context may also be calculated for standard deviations, lines, slopes, and points.

Control Chart – A graphical plot of test results with respect to time or sequence of measurement, together with limits within which they are expected to lie when the system is in a state of statistical control.

Control No.:____

Control Limit – The limits shown on a control chart beyond which it is highly improbable that a point could lie while the system remains in a state of statistical control.

Detection Limits – Also known as **'Limits of Detection'. A value below which an analyte cannot be detected with confidence.** Various limits, in increasing order, are:

> **Instrument detection limit (IDL)** – the constituent concentration in reagent water that produces a signal $2(1.645)\sigma$ above the mean of blank analyses, where σ is the standard deviation. This sets both Type I and Type II errors at 5%. Other names for this limit are "detection limit" and "limits of detection". (LOD)
> **Method detection limit (MDL)** – the constituent concentration that, when processed through the complete method, produces a signal with a 99% probability that it is different from the blank. For seven replicates of the sample, the mean must be 3.14σ above the blank where "σ" is the standard deviation of the seven replicates. The MDL will be larger than the LLD because of the few replications and the sample processing steps and may vary with constituent and matrix.

Dissolved Solids/ Metals – Those **constituents in a sample** which will pass through a 0.45 µm membrane filter.

Double Blind – A sample known by the submitter but submitted to an analyst in such a way that neither its composition nor its identification as a check sample are known to the latter.

Field Duplicates – Two separate samples collected at the same time and place under identical circumstances and treated exactly the same throughout field and laboratory procedures. Analysis of the field sample and field sample duplicate give a measure of the precision associated with sample collection, preservative, and storage, as well as with laboratory procedures.

Field Reagent Blank – Reagent water placed in a sample container in the **field** and treated as a sample in all respects, including exposure to sampling site conditions, storage, preservation and all analytical procedures. The purpose of the FRB is to determine if analytes or other interferences are present in the field environment.

Instrument Detection Limit (IDL) – The concentration of an **analyte**, which is equal to three times the standard deviation (σ) of a series of ten replicate measurements of a reagent blank signal **measured by the same analytical method.**

Internal Standard – a pure analyte(s) added to a solution in known amount(s) and used to measure the relative response of other method analytes and surrogates that are components of the same solution. The internal standard must be an analyte that is not a **target** component.

Control No.:_____

Interference Check Sample – A solution containing both interfering and **target compounds** of known concentrations that can be used to verify background and inter-element correction factors.

Laboratory Control Standard (LCS) – a standard, usually certified by an outside agency, used to measure the bias in a procedure. For certain constituents and matrices, use National Institute of Standards and Technology (NIST) Standards and Reference Materials when they are available.

Laboratory Duplicate - Two sample aliquots taken in the analytical laboratory and analyzed separately with identical procedures. Analyses of sample and the duplicate give a measure of the precision **or reproducibility** associated with laboratory procedures, but not with sample collection, preservation, or storage procedures.

Laboratory Fortified Blank – An aliquot of reagent water to which known quantities of **target** analytes are added in the laboratory. The LFB is analyzed exactly like a sample, and its purpose is to determine whether the methodology is in control, and whether the laboratory is capable of making accurate and precise measurements at the required method detection limit.

Laboratory Performance Check Solution (LPC) – A solution of target analytes, surrogate compounds, and internal standards used to evaluate the performance of the instrument system with respect to a defined set of method criteria.

Laboratory Reagent Blank – An aliquot of reagent water that **is prepared in the laboratory, and** treated exactly as a sample including exposure to all glassware, equipment, solvents, reagents, internal standards, and surrogates that are used with other samples. The LRB is used to determine whether method analytes or other interferences are present in the laboratory environment, the reagents, or the apparatus.

Limit of Quantitation (LOQ) – The constituent concentration that produces a signal sufficiently greater than the blank that can be detected within specified limits by a laboratory during routine operating conditions. Typically it is the concentration that produces a signal 10σ above the reagent water blank signal.

Linear Dynamic Range – The concentration range over which the **calibration** curve is linear.

NELAC – National Environmental Laboratory Accreditation Conference.

Precision – Measure of the degree of agreement among replicate analyses of a sample, usually expressed as the standard deviation.

Control No.:____

Preparation Batch – Composed of one to 20 samples of the same NELAC-defined matrix with a maximum time between the start of processing of the first and last sample in the batch to be 24 hours.

Primary Dilution Standard Solution – A solution of several target compounds prepared in the laboratory from stock standard solutions and diluted as needed to prepare calibration solutions.

Quality Assessment – A procedure for determining the quality of laboratory measurements using data from internal and external Quality Control measures.

Quality Assurance – A definitive plan for laboratory operation that specifies the measures used to produce data of known precision and accuracy.

Quality Control – A set of measures within a sample analysis methodology to assure that the analytical process is in control.

QSM – Quality System Manager.

Random Error – The deviation in any step of an analytical procedure that can be identified and/or treated by standard statistical techniques.

Sensitivity – The slope of the analytical curve (i.e., the functional relationship between intensity and concentration).

Stock Standard Solution – A concentrated solution containing a single certified standard that is a target analyte, or a concentrated solution of a single target analyte prepared in the laboratory with an assayed reference compound. Stock standard solutions are used to prepare primary dilution standards.

Surrogate Standard – A pure analyte(s), which is extremely unlikely to be found in a sample which is added to a sample aliquot in known amount(s) before extraction and is measured with the same procedures used to measure other sample components. The purpose of a surrogate analyte is to monitor method performance with each sample.

Suspended Solids/ Metals– Those constituents of a sample which are retained by a 0.45 µm membrane filter.

Total Solids/ Metals – The concentration of solids, metals, or other analytes determined on an unfiltered sample following vigorous digestion, or the sum of the dissolved plus suspended concentrations.

Total Recoverable Metals – The concentration of **metals** determined on an unfiltered sample following treatment with hot, dilute mineral acid.

Traceability – The ability to trace the source of uncertainty of a measurement or measured value **to a process, instrument, reagent, or standard.**

Type 1 Error – Also called alpha error, the probability of deciding a constituent is present when it actually is absent.

Type II Error – Also called beta error, the probability of not detecting a constituent when it actually is present.

Uncertainty – The range of values within which the true value is estimated to lie. It is a best estimate of possible inaccuracy due to both random and systematic error.

Validation – The process by which a sample, measurement method, **instrument**, or a piece of data is deemed useful for analysis.

Microbac Laboratories, Inc.
Position Description

Job Title: *Quality Assurance Officer*
Reports To: *Laboratory Director*

Function: The Quality Assurance Officer plans, manages and assesses the quality program at their laboratory location. Works with counterparts to develop a corporate quality program. Serves as the resource expert on regulations, standards, and certifications at the laboratory.

Education Preferred: BA/BS in chemistry, microbiology or other related science

Qualifications Preferred: Three years non-academic lab experience and training in statistics. Possess general knowledge of the test methods used by the lab and of quality systems as defined by ISO/IEC 17025 and/or NELAC.

Responsibilities: The QAO evaluates adherence to policies and procedures and assures systems are in place at the divisional laboratory to produce the level of quality defined that meets appropriate methods and regulations. Provides management with routine reports on performance, including deficiencies, of the system for review and improvement. To meet the responsibilities of the QAO, the following activities need to be accomplished:

- Train staff, including new employee orientation, in QA practices and ensure training of personnel is kept current by maintaining employee training files which contain necessary documentation that support their job responsibilities;
- Maintain and update the divisional quality assurance documentation.
- Ensure SOPs are current and have the appropriate approvals Specify the need for any new procedure.
- Maintain the document distribution system
- Ensure that routine method quality control checks are performed, and out-of-control situations are corrected. Perform trend analysis.
- Ensure that scheduled calibration checks are performed.
- Review data quality records, control charts, calibration records, documentation of corrective action and other QA/QC data
- Conduct an annual system audit; make recommendations for corrective actions and improvements; coordinate and/or conduct quality problem investigations and use analysis of external check samples to determine analyst/instrument capability to identify and quantify routine analyses
- Prepare monthly reports both to divisional management and the corporate quality assurance director summarizing quality activities of their laboratory.
- Evaluate departures from documented procedures; approve such departures as needed
- Maintain laboratory certifications and approvals, assist in external audits as necessary, review all audit responses and implementation
- Provide an outlet for employees having unresolved quality issues with their supervisor

Authority: The QAO has direct access to the highest level of management and the authority to initiate corrective action, to recommend solutions to problems through designated channels and to control or stop work on samples if problems surface that affect the quality of the data produced.

Supervision: The QAO is directly responsible for the supervision of quality assurance assistants.

This position description is written as a guideline to inform Microbac employees of what is generally expected of them. This description is not intended to be encompassing or limiting in any manner; rather, it is hoped it will add understanding and better reflect work performed within the company. Duties and responsibilities other than those listed may be included as needed within the division or the company as a whole.

Microbac Laboratories, Inc.
Position Description

Job Title: *Laboratory Director*

Reports To: *President*

Function: The laboratory director administratively manages the laboratory to ensure that proper procedures, policies, methodologies, sample flow and continuity are maintained in a timely and cost-effective manner while meeting customer needs. Manages the implementation of the quality system within the division. Is responsible for financial performance of the division. Understands applicable regulatory requirements as well as commercial practice and industrial trends.

Education Preferred: BA/BS in chemistry, microbiology or related field

Qualifications: Five years experience in the commercial lab environment, with at least two years of management experience.

Responsibilities: Directs and adapts the laboratory response to the evolution of the market place. Oversees daily routine business matters as well as proposal writing, marketing and customer relations. Prepares budget; reviews total revenues versus expenditures to maximize profitability. Compiles monthly production, quality assurance and financial reports for management. Interfaces with corporate regarding administrative policies and business planning. Communicates and carries out management policies; assumes responsibility for training (including ethical and legal responsibilities), development, safety and morale of laboratory personnel. To meet the responsibilities of this position, the following activities need to be accomplished:

- Direct hiring, orientation, training, development, safety and morale of laboratory personnel to ensure a technically competent, ethically responsible, commercially aware, customer-oriented team.
- Ensure sufficient numbers of qualified staff supervise and perform the work of the laboratory. Delegate responsibility throughout the lab; designate deputies for critical positions.
- Implement and monitor the QA program; evaluate and approve departures from documented policies and procedures.
- Ensure regulatory compliance of the lab including certification approvals, health and safety and waste management. Handle all correspondence with regulatory agencies.
- Ensure that all sample acceptance criteria are verified and that samples are logged into the sample tracking system and properly labeled and stored.
- Ensure timely service to customers; including response to inquiries and complaints.
- Approve accounts payable; monitor accounts receivable to ensure an age of less than 45 days.
- Update and improve the lab facility, as needed.
- Manage relations with corporate, other Microbac divisions, regulatory agencies and the local community.
- Maintain close professional contact with developments in a broad range of activities by attending symposia, conferences, meetings and training courses.

Authority: The laboratory director has the authority to make appropriate decisions on the specified areas of responsibility under the guidelines of corporate policy.

Supervision: The laboratory director is directly responsible for the supervision of the technical managers, the quality assurance officer, office staff and customer service staff.

This position description is written as a guideline to inform Microbac employees of what is generally expected of them. This description is not intended to be encompassing or limiting in any manner; rather, it is hoped it will add understanding and better reflect the work performed within the company. Duties and

Job Title: *Laboratory Director*

Reports To: *President*

responsibilities other than those listed may be included as needed within the division or the company as a whole.

Microbac Laboratories, Inc.
Position Description

Job Title: *Customer Service Manager*
Reports To: *Managing Director or Laboratory Director*

Function: Serve as interface between customer and laboratory management to achieve customer satisfaction and delivery of analytical results within budget, schedule and requested level of quality.

Education Preferred: BA/BS degree in a biological or physical science.

Qualifications Preferred: Five years experience plus broad technical background in microbiology, food science, life science pharmaceuticals and/or environmental chemistry. Knowledgeable in marketing/sales, and customer/technical service.

Responsibilities: To meet the responsibilities of the customer service manager, the following activities need to be accomplished:

Marketing

- Research and develop new business areas within the capabilities of the divisional laboratory
- Expand current business areas
- Expand and develop advertising and other marketing techniques (e.g., seminars, brochures, trade shows, etc.) to improve sales and public relations

Customer/Technical Service

- Provide necessary assistance to laboratory director and office staff to ensure timely submission of reports, handle technical inquires/complaints, and prepare special reports.
- Respond to customer inquiries for laboratory capabilities, fees and proposals with speed, accuracy and professionalism.
- Assure that the customer has all necessary information and bottles for submittal of samples to the laboratory
- Closely monitor rush requests; obtain initial commitment from laboratory director for completion of rush request; hold analytical staff responsible for following through on commitment
- Coordinate subcontracting of testing services and reporting to ensure customer satisfaction
- Maintain and improve sales and customer satisfaction through written, phone and personal contact
- Communicate with regulatory agencies for informational purposes; keep abreast of regulatory changes that impact analytical procedures

Sales

- Work toward improving sales and profitability through marketing and customer/technical service functions listed above
- Inform management of market trends and specific customer needs. Assist in the constant reshaping of our services to maximize profitability and minimize low margin projects.
- Maintain accurate records of sales calls and quotations
- Establish quarterly goals for acquisition of new customers and/or increasing sales

Authority: The customer services manager has the authority to make all appropriate decisions on the specified areas of responsibility under the guidelines of corporate policy.

Supervision: May supervise sales personnel.

This position description is written as a guideline to inform Microbac employees of what is generally expected of them. This description is not intended to be encompassing or limiting in any manner; rather, it is hoped it will add understanding and better reflect the work performed within the company. Duties and responsibilities other than those listed may be included as needed within the division or the company as a whole.

Microbac Laboratories, Inc.
Position Description

Job Title: *Food Chemistry Manager*

Reports To: *Managing Director*

Function: To manage the Food Chemistry Group at Pittsburgh Laboratory. Growth of this important department will be a key responsibility. Also important will be providing technical support to customers on Food Chemistry items. Important aspects to ensure this growth will be excellent customer service along with development of employees, researching new instrumentation, techniques, services, customers, etc.

Areas of responsibilities

Customer Care

- Identify ways to wow customers
- Take customer calls relating to Food Chemistry
- Provide quotes as needed to new/existing customers
- Monitor current customer care and implement improvements
- Identify future customer needs related to service and provide recommendations
- Work with production team and business development manager to ensure customer satisfaction
- Review over all reports for food chemistry for accuracy in data and invoicing

Training

- Cross train employees on new and changed methods to ensure adequate qualified back-up personnel
- Document employee skill deficiencies and assist management team in scheduling training

Continuous Improvement

- Functioning member of management team to provide ideas, innovations, and solutions for continuous improvement of the division
- Seek new methods, equipment, and practices to help improve efficiency and quality of Food Chemistry
- Provide technical support to managing director

Fiscal Responsibility

- Work with managing director to help achieve corporate benchmarks

Quality Assurance

- Help meet goals of Quality Assurance related to ISO Guide 17025 Guidelines
- Assist in establishment of quality initiative goals and deadlines

This position description is written as a guideline to inform Microbac employees of what is generally expected of them. This description is not intended to be encompassing or limiting in any manner; rather, it is hoped it will add understanding and better reflect work performed within the company. Duties and responsibilities other than those listed may be included as needed within the division or the company as a whole.

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Microbac Laboratories, Inc.
Position Description

Job Title: Technical Manager

Reports To: Managing/Laboratory Director

Function: The technical manager exercises the actual day-to-day supervision of lab operations, including field operations, for the appropriate fields of testing and the reporting of results. Documents that lab personnel demonstrate ability to perform analyses that they are assigned. Acts as the technical resource for the laboratory. Validates new test methods or develops methodology for different matrices. Oversees all non-routine work requested by customers.

Education Preferred: BA/BS in chemistry, microbiology or other related science

Qualifications Preferred: Four years technical experience.

Responsibilities: The technical manager measures and monitors laboratory capacity, including approval for expedited turnaround. Monitors and controls workflow through the lab to ensure compliance to hold times and customer's schedule; monitors QA/QC; monitors the analyses performed and the data generated in the laboratory to assure reliable data. Assists the laboratory director in establishing policy for the laboratory and is responsible for translation of those policies into practice and procedures within the laboratory. To meet the responsibilities of this position, the following activities need to be accomplished:

- Define the minimum level of education, experience and skills necessary for all positions within the laboratory including basic skills such as using a laboratory balance, colony counting, aseptic or quantitative techniques
- Assume responsibility for training, development, safety and morale of lab personnel.
- Understand calibration, test method procedures, objective of the test and assessment of the results; review analytical methods and modifications for their application and appropriateness.
- Maintain equipment under their control so that it is calibrated and functioning properly; schedule repair and routine maintenance.
- Ensure performance audits are performed on an as-needed basis.
- Ensure data are produced in accordance with prescribed methods and standard procedures.
- Ensure that all reported data meet QA/QC and regulatory criteria. Communicate with lab director and QAO concerning quality problems or any potential problem within their lab unit
- Review certificates of analysis for correctness and completeness; sign Certificates of Analysis and designate others to assume this responsibility in his/her absence
- Assist in non-conformance investigations; make corrective action recommendations for audit deviations and out-of-control analyses.
- Approve use of subcontractors for analyses
- Respond to customer inquiries and assist in proposal writing and technical support as directed by the laboratory director.
- Perform testing as required.

Authority: The technical manager has the authority to make all appropriate decisions on the specified areas of responsibility under the guidelines of corporate policy.

Supervision: The technical manager is directly responsible for the supervision of all technical staff, laboratory assistants, sample custodians, sampling and sample pick-up staff

This position description is written as a guideline to inform Microbac employees of what is generally expected of them. This description is not intended to be encompassing or limiting in any manner; rather, it is hoped it will add understanding and better reflect the work performed within the company. Duties and responsibilities other than those listed may be included as needed within the division or the company as a whole.

Microbac Laboratories, Inc.
Position Description

Job Title: Department Supervisor

Reports To: Technical Manager

Function: The Department Supervisor is the principal analyst for their respective analytical area and therefore participates in the planning and scheduling of analytical testing, new method development, and instrument evaluation using his/her technical expertise. Qualified to direct and oversee the activities of technicians and analysts within a department; assumes responsibilities for coordinating the department's activities.

Education and Qualifications Preferred:

Chemical Analyses – BA/BS in chemical, environmental, biological or physical science, engineering with a minimum of 24 college semester hours in chemistry and at least two years experience in analyses. MS or PhD may be substituted for one year's experience.

Wet Chemistry – AS degree in chemical, environmental or physical science, or two years of equivalent and successful college education with a minimum of 16 college semester hours in chemistry and a minimum two years experience performing wet chemistry analyses

Microbiology – Bachelors degree in microbiology, biology or equivalent with a minimum of 16 college semester hours in microbiology and biology and a minimum of two years experience in microbiological analysis. MS or PhD may be substituted for one year's experience.

Radon in Air – AS or two years college study, documentation of a successful completion of formal course work in phase contrast microscopy, and one year's experience, under supervision, in use of the instrument.

Asbestos –

- Polarized light microscope – AS degree or two years college study, documentation of a successful completion of formal course work in polarized light microscopy, and one year's experience, under supervision, in use of the instrument
- Phase contrast microscope – AS degree or two years college study, documentation of a successful completion of formal course work in phase contrast microscopy, and one year's experience, under supervision, in use of the instrument.

Responsibilities: The department supervisor plans, coordinates and directs the operation of an analytical area (e.g., GC, Wet Chemistry, Microbiology) within the laboratory to meet holding times, provide data of appropriate quality and deliver timely analytical results. Reviews work for integrity of data and compliance with quality standards. Acts as a technical resource for staff and customers regarding an individual specialty. To meet the responsibilities of the department supervisor, the following activities need to be accomplished:

- Plan, organize, schedule and supervise group activities to ensure work is completed accurately and timely.
- Proficient in all departmental protocols and related QA/QC requirements
- Responsible for data review within the department
- Develop and conduct training courses for personnel in area of specialization
- Participate preparation of performance appraisals, and recommends staff for advancement
- Participate in evaluation of instrumentation for capital investment
- Enforce safety measures and housekeeping within the department
- Approves test results for department; make recommendations and conclusions to the customer within area of specialty

Job Title: Department Supervisor

Reports To: Technical Manager

- Initiates and/or reviews all purchase requests for supplies necessary to maintain appropriate inventories of supplies, chemicals and reagents.
- Performs duties of laboratory analyst.
- Immediately notify laboratory director of customer complaints.
- Respond to customer inquiries and requests for their department as requested by the laboratory director.

Authority: The department supervisor has the authority to manage the daily operation of their department with the power granted to them through the technical manager. This authority extends to the following operational activities:

1. Require staff to follow appropriate method and QA/QC SOP's
2. Require staff to follow appropriate reporting criteria
3. Require staff to meet analytical goals and objectives
4. Require staff to maintain a clean, safe working environment
5. Schedule equipment utilization
6. Ensure sufficient expendable equipment and supplies are available at all times.

Supervision: The department supervisor is responsible for the supervision of the technical staff assigned to their department.

This position description is written as a guideline to inform Microbac employees of what is generally expected of them. This description is not intended to be encompassing or limiting in any manner; rather, it is hoped it will add understanding and better reflect the work performed within the company. Duties and responsibilities other than those listed may be included as needed within the division or the company as a whole.

Microbac Laboratories, Inc.
Position Description

Job Title: *Laboratory Analyst*

Reports To: *Technical Manager/Department Supervisor*

Function: The laboratory analyst performs laboratory tests that range in sophistication from standard wet chemistry to instrumental techniques. Analysts may be responsible for all phases of instrument maintenance, standardization, calibration and operation. Analysts may be assigned to perform testing using methods that are not standard to the laboratory. Personnel in this classification may perform general supervision or training of technicians or other analysts. Analysts receive basic objectives and technical advice from the responsible supervisor but are responsible for the implementation of specific procedures to obtain results and for ensuring that all results are within quality control acceptance criteria. Work is performed under general supervision until minimum required regulatory experience is attained.

Education and Qualifications Preferred:

Chemistry: High school diploma with applicable science courses and three years experience applicable to the area of assignment, or equivalent,

or

AS or BA/BS degree plus applicable science courses with at least one year prior experience applicable to the area of assignment

Microbiology: AS or BA/BS degree plus applicable science courses with at least one year prior experience

This position can be an entry-level position with assigned duties and responsibilities increasing with experience.

Responsibilities: In addition to those responsibilities listed for a laboratory technician, laboratory analysts must accomplish the following activities:

- Possess knowledge in routine and customer specific protocols pertaining to any analyses performed.
- Document and use any observations made during the performance of an analytical method to determine if the analytical system is in control.
- Set up and validate new test methods as directed by the technical manager.
- Assist with training and development of less experienced staff.
- Operate and maintain specific laboratory equipment; make minor repairs as needed
- Assist in preparation and review of method SOPs as directed by the technical manager.
- May be assigned collateral duties including safety orientation, staff training and committee assignments

Authority: Use guidelines established for the laboratory technician plus:

- Based upon maintenance schedules conduct required maintenance on assigned analytical instrumentation;

Supervision: This is a non-supervisory position.

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Microbac Laboratories, Inc.
Position Description

Job Title: *Laboratory Technician*

Reports To: *Technical Manager/Department Supervisor*

Function: The laboratory technician performs routine laboratory tests using standardized analytical or microbiological test procedures in the analysis of samples. Personnel in these classifications may provide assistance to higher-level technical laboratory personnel. Assignments are received with specific objectives in mind. All analytical work is closely supervised until minimum required regulatory experience is attained.

Education and Qualifications Preferred:

Chemistry: High school diploma with applicable science courses and two years experience applicable to the area of assignment, or equivalent,
or
AS or BA/BS degree plus applicable science courses with no prior experience

Microbiology: High school diploma with applicable science courses and a minimum three months bench experience in water, milk or food microbiology or equivalent,
or
AS or BA/BS degree plus applicable science courses with no prior experience

This position can be an entry-level position with assigned duties and responsibilities increasing with experience.

Responsibilities: Laboratory technicians are responsible for timely sample preparation and analysis, data handling through data review, and the safe and environmentally sound handling of chemicals, samples and wastes. To meet the responsibilities of the laboratory technician, the following activities need to be accomplished:

- Perform sample analysis according to the laboratory SOP manual.
- Perform required tasks in an accurate and timely manner; notify technical manager in advance if analyses will not be completed on schedule or if a hold time may be missed
- Comply with required quality assurance and quality control; complete QA/QC documentation. Inform the technical manager of all QC failures.
- Initiate corrective action process and report to technical manager all out-of-control or warning condition, or any event that may affect the customer's data
- Document data completely and legibly
- Compile records, calculate, analyze and file data in accordance with standard practices
- Maintain adequate supply of reagents, standards, media etc. as work area requires
- Responsible for orderliness, cleanliness, and general up keep of work area and instrumentation
- Comply with safety rules and general conduct requirements.
- Assist in training of new technicians on procedures for which he/she is qualified.
- Perform other job duties not listed above, as required, to meet the overall accountability of the position.

Authority: The laboratory technician has the authority to conduct analytical tasks as assigned them by their supervisor and to use the resources required to complete those tasks under the following guidelines:

- Based on assigned analytical tasks organize their daily work schedule

Job Title: *Laboratory Technician*

Reports To: *Technical Manager/Department Supervisor*

- Based upon quality assurance and quality control criteria take corrective action when methodology shows out-of-control conditions;
- Based upon laboratory criteria complete and submit for review analytical data; enter reviewed data into LIMS system.
- Request required expendable items needed to complete analytical tasks.

Supervision: This is a non-supervisory position.

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Microbac Laboratories, Inc.
Position Description

Job Title: *Field Operations Supervisor*

Reports To: Managing Director/Technical Director

Function: The field supervisor's function is to coordinate with the laboratory director and the customer services manager to schedule field activities in compliance with regulatory requirements and contractual agreements. This includes sample pick-ups, inspections and sampling events.

Education Preferred: BA/BS degree in science

Qualifications Preferred: Three years related experience; neat appearance and professional manner; some physical lifting activities (up to 100 lbs) are required. Familiarity with the geographic region that the laboratory services; good organizational, time-management and interpersonal skills are required..

Responsibilities: To meet the responsibilities of a field operations supervisor, the following activities need to be accomplished:

- Organizes field personnel and directs each day's activities
- Schedules field activities with customers to comply with regulatory or contractual requirements
- Provides technical assistance to customers within capability or refer customer to technical director
- Notifies laboratory director of all customer complaints and/or comments about service or competition.
- Oversees maintenance of field sampling equipment and vehicles
- Prepares and updates sampling SOPs
- Coordinates with technical manager about new jobs or situations involving new techniques or specialized equipment.
- Supervise and train field sampling technicians, inspectors and drivers
- Implements safety plans to protect field personnel
- Requisitions all supplies needed for department
- Assists when driving related pickups need backup support
- Measures all costs such as time and mileage on at least a semi-annual basis; calculates cost/mile, cost/pickup and income/person/hour. Track costs with goal of improvement – schedule all assignments to lower costs or raise income per hour.

Authority: The field operations supervisor has the authority to make all appropriate decisions on the specified areas of responsibility under the guidelines of corporate policy.

Supervision: The field operations supervisor is directly responsible for the supervision of field sampling technicians, certified samplers, inspectors and drivers.

This position description is written as a guideline to inform Microbac employees of what is generally expected of them. This description is not intended to be encompassing or limiting; rather, it is hoped that it will add understanding and better reflect work performed within the company. Duties and responsibilities other than those listed above may be included as needed within the division or the company as a whole.

Microbac Laboratories, Inc.
Position Description

Job Title: *Field Sampling Technician/Certified Sampler*

Reports To: *Field Operations Supervisor/Technical Manager*

Function: The field sampling technician/certified sampler performs sampling in accordance with proper SOPs that conform to appropriate regulatory and contractual requirements.

Education Preferred: High school diploma or equivalent with adequate academic performance.

Qualifications Preferred: Same as a driver plus six months experience in collection and field testing and good organizational and time-management skills. A certified sampler requires knowledge and understanding of general principles of sanitation and proper food handling and storage and ability to successfully complete training and obtain certification.

Responsibilities: To meet the responsibilities of the sampler, the following activities, in addition to those listed for a driver, need to be accomplished:

- Collect samples such as food, drinking water, wastewater, air sample, stack samples, lead based paint, radon, asbestos and other environmental samples according to regulatory and/or contractual guidelines and laboratory standard operating procedures.
- Perform field analysis pertinent to proper sampling protocol such as pH, temperature and flow
- Thoroughly document all sampling activities; labels and identifies samples according to established procedures
- Provide technical assistance to customers within capability; or refer to senior management; immediately report all customer complaints to the laboratory director
- Maintain field sampling equipment

Authority: Assignments are received with specific objectives defined but with some freedom to carry out details.

Supervision: General supervision is required for this position.

This position description is written as a guideline to inform Microbac employees of what is generally expected of them. This description is not intended to be encompassing or limiting; rather, it is hoped that it will add understanding and better reflect work performed within the company. Duties and responsibilities other than those listed may be included as needed within the division or the company as a whole.

Microbac Laboratories, Inc.
Position Description

Job Title: *Driver*

Reports To: *Field Operations Supervisor/Technical Manager*

Function: Coordinate with the customer and the laboratory to provide timely pick-up of samples and delivery of reports/sample bottles.

Education Preferred: High school diploma, or equivalent, with adequate performance.

Qualifications Preferred: A minimum of five years as a licensed driver without traffic violations is the past three years, and an acceptable motor vehicle record is required. Neat appearance and professional manners, some physical lifting/activities (up to 100 lbs) are required. Familiarity with the geographic region that the laboratory services; ability to plan schedules and routes with minimal supervision.are also required

Responsibilities: To meet the responsibilities of the driver, the following activities need to be accomplished:

- Organize, plan and schedule pickup routes in advance with minimal supervision; coordinate with relief driver as necessary.
- Maintain daily communication with senior management regarding samples, schedules, and customer problems or complaints
- Prepare sample bottles for customers
- Document thoroughly all activities performed; maintain accurate records of samples, time and temperature; prepares chain of custody documentation.
- Stores and transports samples from field and pickup sites to the laboratory with proper preservation (including temperature);
- Maintain mechanical condition and cleanliness of company vehicles.
- Perform light maintenance duties at the laboratory;
- Assist laboratory as needed or as requested by the laboratory director.
- Maintain accurate mileage records on company vehicles and expense reports when on the road.
- Observes customer safety requirements and general conduct regulations.
- Represent the laboratory in a professional manner at all times;

Authority: Assignments are received with specific objectives defined and specific procedures designated.

Supervision: Close supervision is required for this position.

This position description is written as a guideline to inform Microbac employees of what is generally expected of them. This description is not intended to be encompassing or limiting in any manner; rather, it is hoped that it will add understanding and better reflect the work performed within the company. Duties and responsibilities other than those listed may be included as needed within the division or the company as a whole.

Microbac Laboratories, Inc.
Position Description

Job Title: *Office Manager*

Reports To: *Managing Director/Laboratory Director*

Function: The office manager's function is to oversee the daily operation of the administrative area, to support corporate finance and administration and laboratory operations and to ensure all office procedures are implemented and maintained at all times.

Education Preferred: AS or vocational training in accounting, bookkeeping, or office skills

Qualifications Preferred: Five years experience in accounting, bookkeeping or secretary with two years supervisory experience; data entry and computer use and operation experience; customer relations experience and good organizational and time management skills.

Responsibilities: To meet the responsibilities of an office manager, the following activities must be accomplished:

- Provide support service to customers, set up new customer accounts; inform laboratory director of any customer complaints
- Screen incoming telephone calls and direct customer inquiries; forward all incoming mail and process all outgoing mail.
- Welcomes and provides assistance to visitors of the facility.
- Serve as divisional contact concerning report and invoice generation, issued invoices, regulatory monitoring reports, accounts payable, and accounts receivable/collections that include customer interaction.
- Ensure corporate reporting deadlines are met, including but not limited to the following: twice per week bank deposits; weekly sales and payable information, monthly (by 4th of following month) cash report, batch sheet, final AP invoices for month; and quarterly allowance reports.
- Bank deposits, balance petty cash and working accounts;
- Tabulate sales figures for commission for sales manager
- Coordinate payroll changes with corporate office; maintain employee attendance records
- Purchase and maintain office and related supplies; operate and maintain office equipment;
- Monitor receipt of subcontracted results;
- Oversee filing and storage of laboratory records;
- Ensures laboratory is secured at the end of the business day;
- Supervise, train, and coordinate workload of office staff
- Assist laboratory director and customer services manager as needed.

Authority: The office manager has the authority to make all appropriate decisions on the specified area of responsibility under the guidelines of corporate policy.

Supervision: The office manager is responsible for the supervision of administrative personnel including the administrative assistants, secretaries, and clerks.

This position description is written as a guideline to inform Microbac employees of what is generally expected of them. This description is not intended to be encompassing or limiting; rather, it is hoped that it will add understanding and better reflect the work performed within the company. Duties and responsibilities other than those listed may be included as needed within the division or the company as a whole.

Microbac Laboratories, Inc.
Position Description

Job Title: ***Sample Custodian***

Reports To: ***Managing Director or Laboratory Director***

Function: The sample custodian reports administratively to the laboratory director; work direction may be received from another designated professional. In this position, the incumbent performs work requiring the application of knowledge in a general area.

Education Preferred: High school diploma

Qualifications Preferred: Ability to type and perform clerical work, or equivalent. Ability to lift 50 –60 lbs.

Responsibilities: Responsible for logging, tracking, storing, distributing and disposing of samples and supplies. To meet the responsibilities of the sample custodian, the following activities need to be accomplished:

- Receive shipments, unpack, and distribute supplies according to established procedure.
- Receive samples and associated documents, review for exceptions, initiate sample control nonconformance as needed and login samples. Assign unique identifier to sample containers.
- Adjust, if necessary, and record pH of all preserved incoming samples.
- Forward sample receipt/control documents internally, as required.
- Store samples. Keep storage areas and refrigerators clean, organized, and working properly. Monitor and record temperatures of storage units twice daily (am and pm).
- Sub-sample and ship in-house samples for subcontracting according to established procedure.
- Remove old samples from refrigerators and dispose according to waste disposal procedures.
- Assist technical manager in any other needs
- Responsible for knowledge of safety rules and general conduct regulations
- Responsible for orderliness, cleanliness and general upkeep of work areas he/she uses.

Authority: Assignments are received with specific objectives defined but with some freedom to plan and carry out details.

Supervision: General supervision is required for this position.

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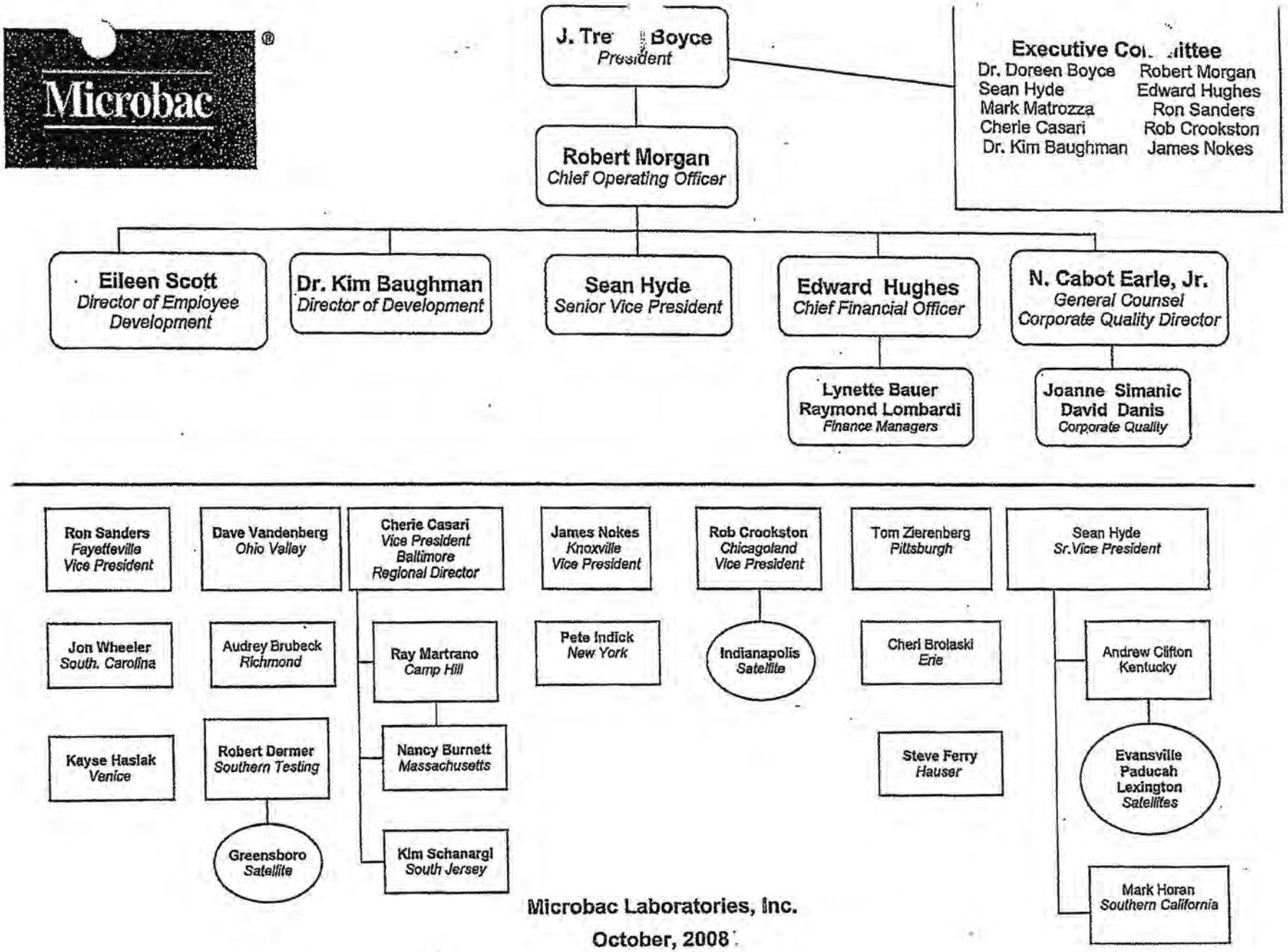
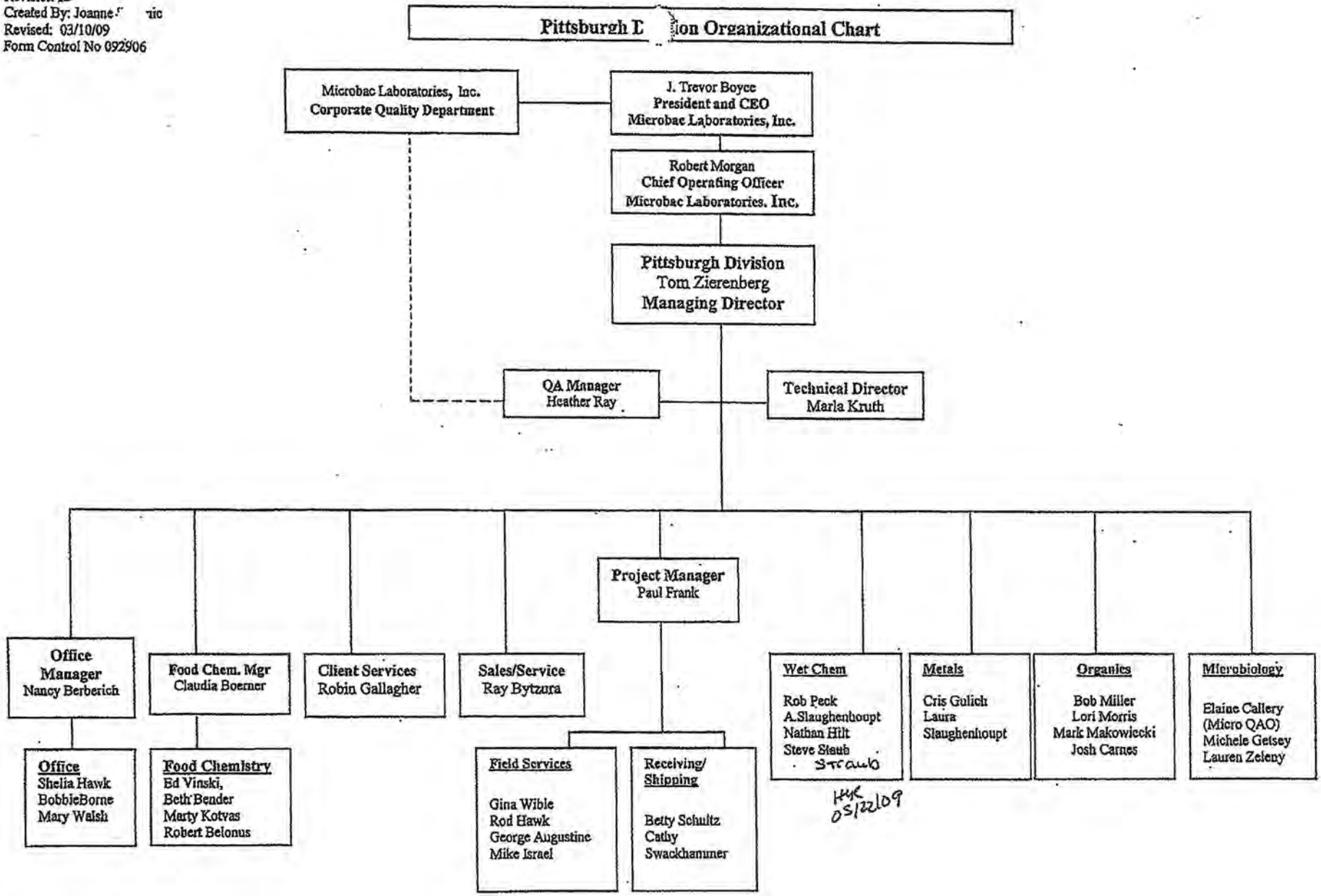


Microbac Laboratories, Inc.

October, 2008

Revision 12
Created By: Joanne [illegible]
Revised: 03/10/09
Form Control No 092906

Pittsburgh D[illegible]ion Organizational Chart



Attachment to Certificate of Accreditation 008, expiration date January 31, 2010. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

State Laboratory ID: 2-00257 **EPA Lab Code: PA00052** **(724) 772-0610**

Microbac Laboratories Inc. Pittsburgh Division
100 Marshall Drive
Warrendale, PA 15086-7554

Program Drinking Water

Method	Analyte	Accreditation Type	Primary	Effective Date
ASTM D516-02	Sulfate	NELAP	PA	1/3/2008
EPA 110.3	Color	NELAP	PA	1/22/2007
EPA 130.2	Total hardness as CaCO3	NELAP	PA	9/24/2008
EPA 200.7	Aluminum	NELAP	PA	6/27/2006
EPA 200.7	Barium	NELAP	PA	10/31/2005
EPA 200.7	Beryllium	NELAP	PA	10/31/2005
EPA 200.7	Cadmium	NELAP	PA	10/31/2005
EPA 200.7	Calcium	NELAP	PA	10/31/2005
EPA 200.7	Chromium	NELAP	PA	10/31/2005
EPA 200.7	Copper	NELAP	PA	10/31/2005
EPA 200.7	Iron	NELAP	PA	12/31/2007
EPA 200.7	Magnesium	NELAP	PA	3/6/2007
EPA 200.7	Manganese	NELAP	PA	6/27/2006
EPA 200.7	Nickel	NELAP	PA	10/31/2005
EPA 200.7	Potassium	NELAP	PA	1/8/2007
EPA 200.7	Silver	NELAP	PA	3/6/2007
EPA 200.7	Sodium	NELAP	PA	11/28/2007
EPA 200.7	Zinc	NELAP	PA	11/7/2006
EPA 200.7	Silica as SiO2	NELAP	PA	1/8/2007
EPA 200.9	Silver	NELAP	PA	4/24/2007
EPA 200.9	Thallium	NELAP	PA	10/31/2005
EPA 245.1	Mercury	NELAP	PA	10/31/2005
EPA 325.2 (discrete)	Chloride	NELAP	PA	3/31/2008
EPA 335.1	Amenable cyanide	NELAP	PA	3/31/2008
EPA 335.2	Total cyanide	NELAP	PA	3/31/2008
EPA 350.1 (discrete)	Ammonia as N	NELAP	PA	1/13/2009
EPA 353.2 (discrete)	Nitrate as N	NELAP	PA	12/3/2008
EPA 353.2 (discrete)	Nitrite	NELAP	PA	12/3/2008
EPA 365.1 (discrete)	Orthophosphate as P	NELAP	PA	3/31/2008
EPA 365.1 (discrete)	Phosphorus, total	NELAP	PA	3/31/2008
EPA 370.1	Silica, dissolved	NELAP	PA	9/24/2008
EPA 375.4	Sulfate	NELAP	PA	3/31/2008
EPA 524.2	1,1,1,2-Tetrachloroethane	NELAP	PA	10/31/2005
EPA 524.2	1,1,1-Trichloroethane	NELAP	PA	10/31/2005
EPA 524.2	1,1,2,2-Tetrachloroethane	NELAP	PA	3/23/2009
EPA 524.2	1,1,2-Trichloroethane	NELAP	PA	10/31/2005

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State Laboratory ID: 2-00257 **EPA Lab Code: PA00052** **(724) 772-0610**

Microbac Laboratories Inc. Pittsburgh Division
100 Marshall Drive
Warrendale, PA 15086-7554

Program Drinking Water

Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 524.2	1,1-Dichloroethane	NELAP	PA	10/31/2005
EPA 524.2	1,1-Dichloroethene (1,1-Dichloroethylene)	NELAP	PA	10/31/2005
EPA 524.2	1,1-Dichloropropene	NELAP	PA	10/31/2005
EPA 524.2	1,2,4-Trichlorobenzene	NELAP	PA	10/31/2005
EPA 524.2	1,2-Dichlorobenzene (o-Dichlorobenzene)	NELAP	PA	10/31/2005
EPA 524.2	1,2-Dichloroethane	NELAP	PA	10/31/2005
EPA 524.2	1,2-Dichloropropane	NELAP	PA	10/31/2005
EPA 524.2	1,3-Dichlorobenzene (m-Dichlorobenzene)	NELAP	PA	10/31/2005
EPA 524.2	1,3-Dichloropropane	NELAP	PA	10/31/2005
EPA 524.2	1,4-Dichlorobenzene (p-Dichlorobenzene)	NELAP	PA	10/31/2005
EPA 524.2	2 2-Dichloropropane	NELAP	PA	10/31/2005
EPA 524.2	Benzene	NELAP	PA	3/23/2009
EPA 524.2	Bromobenzene	NELAP	PA	10/31/2005
EPA 524.2	Bromodichloromethane	NELAP	PA	6/4/2007
EPA 524.2	Bromoform	NELAP	PA	6/4/2007
EPA 524.2	Carbon tetrachloride	NELAP	PA	10/31/2005
EPA 524.2	Chlorobenzene	NELAP	PA	10/31/2005
EPA 524.2	Chloroethane	NELAP	PA	10/31/2005
EPA 524.2	Chloroform	NELAP	PA	6/4/2007
EPA 524.2	Dibromochloromethane	NELAP	PA	6/4/2007
EPA 524.2	Dichloromethane (DCM, Methylene chloride)	NELAP	PA	10/31/2005
EPA 524.2	Ethylbenzene	NELAP	PA	3/23/2009
EPA 524.2	Methyl bromide (Bromomethane)	NELAP	PA	10/31/2005
EPA 524.2	Methyl chloride (Chloromethane)	NELAP	PA	10/31/2005
EPA 524.2	Styrene	NELAP	PA	10/31/2005
EPA 524.2	Tetrachloroethene (PCE, Perchloroethylene)	NELAP	PA	10/31/2005
EPA 524.2	Toluene	NELAP	PA	3/23/2009
EPA 524.2	Total trihalomethanes (TTHMs)	NELAP	PA	6/4/2007
EPA 524.2	Trichloroethene (TCE, Trichloroethylene)	NELAP	PA	10/31/2005
EPA 524.2	Vinyl chloride	NELAP	PA	10/31/2005
EPA 524.2	Xylenes, total	NELAP	PA	3/23/2009
EPA 524.2	cis-1 2-Dichloroethene	NELAP	PA	10/31/2005
EPA 524.2	cis-1 3-Dichloropropene	NELAP	PA	10/31/2005
EPA 524.2	trans-1 2-Dichloroethene	NELAP	PA	10/31/2005
EPA 524.2	trans-1 3-Dichloropropene	NELAP	PA	10/31/2005
SM 2120 B	Color	NELAP	PA	3/30/2007

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State Laboratory ID: 2-00257 **EPA Lab Code: PA00052** **(724) 772-0610**

Microbac Laboratories Inc. Pittsburgh Division
100 Marshall Drive
Warrendale, PA 15086-7554

Program Drinking Water

Method	Analyte	Accreditation Type	Primary	Effective Date
SM 2130 B	Turbidity	NELAP	PA	1/8/2007
SM 2150 B	Odor	NELAP	PA	1/22/2007
SM 2320 B	Alkalinity as CaCO3	NELAP	PA	10/31/2005
SM 2330 B	Corrosivity (langlier index)	NELAP	PA	1/8/2007
SM 2340 B	Total hardness as CaCO3	NELAP	PA	1/8/2007
SM 2510 B	Conductivity	NELAP	PA	1/8/2007
SM 2540 B	Residue-total	NELAP	PA	3/28/2008
SM 2540 C	Residue-filterable (TDS)	NELAP	PA	10/31/2005
SM 2540 D	Residue-nonfilterable (TSS)	NELAP	PA	3/28/2008
SM 2550 B	Temperature, deg. C	NELAP	PA	1/8/2007
SM 3113 B	Antimony	NELAP	PA	10/31/2005
SM 3113 B	Arsenic	NELAP	PA	10/31/2005
SM 3113 B	Lead	NELAP	PA	10/31/2005
SM 3113 B	Selenium	NELAP	PA	10/31/2005
SM 4500-CN- C	Cyanide	NELAP	PA	1/3/2008
SM 4500-CN- E	Cyanide	NELAP	PA	10/31/2005
SM 4500-CN- G	Amenable cyanide	NELAP	PA	7/3/2007
SM 4500-Cl G	Total residual chlorine	NELAP	PA	3/23/2009
SM 4500-Cl- E (discrete)	Chloride	NELAP	PA	3/31/2008
SM 4500-F- C	Fluoride	NELAP	PA	10/31/2005
SM 4500-H+ B	pH	NELAP	PA	10/31/2005
SM 4500-NH3 G (discrete)	Ammonia as N	NELAP	PA	1/13/2009
SM 4500-NO3- F (discrete)	Nitrate	NELAP	PA	12/3/2008
SM 4500-NO3- F (discrete)	Nitrite	NELAP	PA	12/3/2008
SM 4500-P B	Preliminary treatment of phosphate samples	NELAP	PA	10/23/2007
SM 4500-P E	Orthophosphate as P	NELAP	PA	10/23/2007
SM 4500-P E	Phosphorus, total	NELAP	PA	1/3/2008
SM 4500-P F (discrete)	Orthophosphate as P	NELAP	PA	3/31/2008
SM 4500-SO4 E	Sulfate	NELAP	PA	1/3/2008
SM 4500-Si D	Silica, dissolved	NELAP	PA	9/24/2008
SM 4500-SiO2 C (20th ed.)	Silica as SiO2	NELAP	PA	9/24/2008
SM 5310 C	Dissolved organic carbon (DOC)	NELAP	PA	7/3/2007
SM 5310 C	Total organic carbon (TOC)	NELAP	PA	7/3/2007
SM 5540 C	Surfactants - MBAS	NELAP	PA	7/3/2007
SM 6251 B	Bromoacetic acid (Monobromoacetic acid, MBAA)	NELAP	PA	10/31/2005
SM 6251 B	Chloroacetic acid (Monochloroacetic acid, MCAA)	NELAP	PA	10/31/2005

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State Laboratory ID: 2-00257 **EPA Lab Code: PA00052** **(724) 772-0610**

Microbac Laboratories Inc. Pittsburgh Division
100 Marshall Drive
Warrendale, PA 15086-7554

Program Drinking Water

Method	Analyte	Accreditation Type	Primary	Effective Date
SM 6251 B	Dibromoacetic acid (DBAA)	NELAP	PA	10/31/2005
SM 6251 B	Dichloroacetic acid (DCAA)	NELAP	PA	10/31/2005
SM 6251 B	Total haloacetic acids	NELAP	PA	10/31/2005
SM 6251 B	Trichloroacetic acid (TCAA)	NELAP	PA	10/31/2005
SM 9215 B	Heterotrophic plate count	NELAP	PA	8/9/2007
SM 9221 B	Total coliforms (Enumeration)	NELAP	PA	7/3/2007
SM 9221 E	Fecal coliforms (Enumeration)	NELAP	PA	7/3/2007
SM 9222 B	Total coliforms	NELAP	PA	10/31/2005
SM 9222 B	Total coliforms (Enumeration)	NELAP	PA	7/3/2007
SM 9222 D	Fecal coliforms (Enumeration)	NELAP	PA	7/3/2007
SM 9222 G (EC + MUG)	Escherichia coli	NELAP	PA	10/31/2005
SM 9223 B	Total coliforms (Enumeration)	NELAP	PA	7/3/2007

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State Laboratory ID: 2-00257 **EPA Lab Code: PA00052** **(724) 772-0610**

Microbac Laboratories Inc. Pittsburgh Division
100 Marshall Drive
Warrendale, PA 15086-7554

Program Non-Potable Water

Method	Analyte	Accreditation Type	Primary	Effective Date
ASTM 1246-95C	Bromide	NELAP	PA	7/3/2007
ASTM 512-99C	Chloride	NELAP	PA	3/30/2009
ASTM D516-02	Sulfate	NELAP	PA	10/23/2007
EPA 1010	Ignitability	NELAP	PA	7/3/2007
EPA 110.2	Color	NELAP	PA	3/13/2007
EPA 120.1	Conductivity	NELAP	PA	9/7/2007
EPA 130.2	Total hardness as CaCO3	NELAP	PA	9/7/2007
EPA 1311	Toxicity characteristic leaching procedure (TCLP)	NELAP	PA	7/3/2007
EPA 1312	Synthetic precipitation leaching procedure (SPLP)	NELAP	PA	7/3/2007
EPA 150.1	pH	NELAP	PA	9/7/2007
EPA 160.1	Residue-filterable (TDS)	NELAP	PA	3/13/2007
EPA 160.2	Residue-nonfilterable (TSS)	NELAP	PA	7/3/2007
EPA 160.3	Residue-total	NELAP	PA	7/3/2007
EPA 160.4	Residue-volatile	NELAP	PA	9/7/2007
EPA 160.4	Volatile suspended solids	NELAP	PA	7/3/2007
EPA 1664 Rev A	Oil and Grease	NELAP	PA	7/3/2007
EPA 1664 Rev A	Total petroleum hydrocarbons (TPH)	NELAP	PA	9/24/2008
EPA 180.1	Turbidity	NELAP	PA	4/24/2007
EPA 200.2	Metals sample preparation	NELAP	PA	7/3/2007
EPA 200.7	Aluminum	NELAP	PA	3/13/2007
EPA 200.7	Antimony	NELAP	PA	9/7/2007
EPA 200.7	Arsenic	NELAP	PA	3/13/2007
EPA 200.7	Barium	NELAP	PA	3/13/2007
EPA 200.7	Beryllium	NELAP	PA	3/13/2007
EPA 200.7	Boron	NELAP	PA	12/28/2007
EPA 200.7	Cadmium	NELAP	PA	3/13/2007
EPA 200.7	Calcium	NELAP	PA	3/13/2007
EPA 200.7	Chromium	NELAP	PA	3/13/2007
EPA 200.7	Cobalt	NELAP	PA	3/13/2007
EPA 200.7	Copper	NELAP	PA	3/13/2007
EPA 200.7	Iron	NELAP	PA	3/13/2007
EPA 200.7	Lead	NELAP	PA	3/13/2007
EPA 200.7	Lithium	NELAP	PA	3/13/2007
EPA 200.7	Magnesium	NELAP	PA	7/3/2007
EPA 200.7	Manganese	NELAP	PA	3/13/2007
EPA 200.7	Molybdenum	NELAP	PA	12/28/2007

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Microbac Laboratories Inc. Pittsburgh Division
100 Marshall Drive
Warrendale, PA 15086-7554

Program Non-Potable Water

Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 200.7	Nickel	NELAP	PA	3/13/2007
EPA 200.7	Potassium	NELAP	PA	9/7/2007
EPA 200.7	Selenium	NELAP	PA	3/13/2007
EPA 200.7	Silicon	NELAP	PA	3/13/2007
EPA 200.7	Silver	NELAP	PA	3/13/2007
EPA 200.7	Sodium	NELAP	PA	9/7/2007
EPA 200.7	Thallium	NELAP	PA	3/13/2007
EPA 200.7	Tin	NELAP	PA	3/13/2007
EPA 200.7	Titanium	NELAP	PA	3/13/2007
EPA 200.7	Vanadium	NELAP	PA	3/13/2007
EPA 200.7	Zinc	NELAP	PA	3/13/2007
EPA 200.7-Extended	Bismuth	NELAP	PA	3/13/2007
EPA 200.7-Extended	Hafnium	NELAP	PA	3/13/2007
EPA 200.7-Extended	Strontium	NELAP	PA	3/13/2007
EPA 200.7-Extended	Zirconium	NELAP	PA	3/13/2007
EPA 200.9	Thallium	NELAP	PA	3/13/2007
EPA 245.1	Mercury	NELAP	PA	3/13/2007
EPA 3010A	Hot plate acid digestion (HNO3 + HCl)	NELAP	PA	3/13/2007
EPA 305.1	Acidity as CaCO3	NELAP	PA	7/3/2007
EPA 310.1	Alkalinity as CaCO3	NELAP	PA	9/7/2007
EPA 325.2 (discrete)	Chloride	NELAP	PA	3/31/2008
EPA 330.5	Total residual chlorine	NELAP	PA	3/13/2007
EPA 335.1	Amenable cyanide	NELAP	PA	3/31/2008
EPA 335.2	Total cyanide	NELAP	PA	3/13/2007
EPA 340.2	Fluoride	NELAP	PA	3/13/2007
EPA 350.1 (discrete)	Ammonia as N	NELAP	PA	12/22/2008
EPA 350.2	Ammonia as N	NELAP	PA	7/3/2007
EPA 350.3	Ammonia as N	NELAP	PA	7/3/2007
EPA 351.3	Kjeldahl nitrogen, total (TKN)	NELAP	PA	7/3/2007
EPA 3510C	Separatory funnel liquid-liquid extraction	NELAP	PA	7/3/2007
EPA 3520C	Continuous liquid-liquid extraction	NELAP	PA	7/3/2007
EPA 353.2 (discrete)	Nitrate as N	NELAP	PA	9/2/2008
EPA 353.2 (discrete)	Nitrite	NELAP	PA	3/31/2008
EPA 353.2 (discrete)	Total nitrate-nitrite	NELAP	PA	9/2/2008
EPA 360.1	Oxygen (dissolved)	NELAP	PA	7/3/2007
EPA 3620B	Florisil cleanup	NELAP	PA	7/3/2007

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State Laboratory ID: 2-00257 **EPA Lab Code: PA00052** **(724) 772-0610**

Microbac Laboratories Inc. Pittsburgh Division
100 Marshall Drive
Warrendale, PA 15086-7554

Program Non-Potable Water

Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 365.1 (discrete)	Orthophosphate as P	NELAP	PA	3/31/2008
EPA 365.1 (discrete)	Phosphorus, total	NELAP	PA	3/31/2008
EPA 365.2	Orthophosphate as P	NELAP	PA	7/3/2007
EPA 365.2	Phosphorus, total	NELAP	PA	7/3/2007
EPA 3665A	Sulfuric acid/permanganate clean-up	NELAP	PA	7/3/2007
EPA 370.1	Silica, dissolved	NELAP	PA	4/3/2008
EPA 375.4	Sulfate	NELAP	PA	7/3/2007
EPA 377.1	Sulfite-SO3	NELAP	PA	7/3/2007
EPA 405.1	Biochemical oxygen demand (BOD)	NELAP	PA	7/3/2007
EPA 410.4	Chemical oxygen demand (COD)	NELAP	PA	7/3/2007
EPA 415.1	Total organic carbon (TOC)	NELAP	PA	7/3/2007
EPA 420.1	Total phenolics	NELAP	PA	8/29/2008
EPA 420.2	Total phenolics	NELAP	PA	9/7/2007
EPA 420.2 (discrete)	Total phenolics	NELAP	PA	8/29/2008
EPA 420.4	Total phenolics	NELAP	PA	9/7/2007
EPA 5030B	Aqueous-phase purge-and-trap	NELAP	PA	3/13/2007
EPA 6010	Aluminum	NELAP	PA	3/13/2007
EPA 6010	Antimony	NELAP	PA	9/7/2007
EPA 6010	Arsenic	NELAP	PA	3/13/2007
EPA 6010	Barium	NELAP	PA	3/13/2007
EPA 6010	Beryllium	NELAP	PA	3/13/2007
EPA 6010	Boron	NELAP	PA	12/28/2007
EPA 6010	Cadmium	NELAP	PA	3/13/2007
EPA 6010	Calcium	NELAP	PA	3/13/2007
EPA 6010	Chromium	NELAP	PA	3/13/2007
EPA 6010	Cobalt	NELAP	PA	3/13/2007
EPA 6010	Copper	NELAP	PA	3/13/2007
EPA 6010	Iron	NELAP	PA	3/13/2007
EPA 6010	Lead	NELAP	PA	3/13/2007
EPA 6010	Magnesium	NELAP	PA	3/13/2007
EPA 6010	Manganese	NELAP	PA	3/13/2007
EPA 6010	Molybdenum	NELAP	PA	12/28/2007
EPA 6010	Nickel	NELAP	PA	3/13/2007
EPA 6010	Potassium	NELAP	PA	9/7/2007
EPA 6010	Selenium	NELAP	PA	3/13/2007
EPA 6010	Silver	NELAP	PA	3/13/2007

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State Laboratory ID: 2-00257 EPA Lab Code: PA00052 (724) 772-0610

Microbac Laboratories Inc. Pittsburgh Division
100 Marshall Drive
Warrendale, PA 15086-7554

Program Non-Potable Water

Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 6010	Sodium	NELAP	PA	9/7/2007
EPA 6010	Strontium	NELAP	PA	3/13/2007
EPA 6010	Thallium	NELAP	PA	3/13/2007
EPA 6010	Tin	NELAP	PA	3/13/2007
EPA 6010	Titanium	NELAP	PA	3/13/2007
EPA 6010	Vanadium	NELAP	PA	3/13/2007
EPA 6010	Zinc	NELAP	PA	3/13/2007
EPA 6010	Phosphorus, total	NELAP	PA	3/13/2007
EPA 608	Aroclor-1016 (PCB-1016)	NELAP	PA	7/3/2007
EPA 608	Aroclor-1221 (PCB-1221)	NELAP	PA	7/3/2007
EPA 608	Aroclor-1232 (PCB-1232)	NELAP	PA	7/3/2007
EPA 608	Aroclor-1242 (PCB-1242)	NELAP	PA	7/3/2007
EPA 608	Aroclor-1248 (PCB-1248)	NELAP	PA	7/3/2007
EPA 608	Aroclor-1254 (PCB-1254)	NELAP	PA	7/3/2007
EPA 608	Aroclor-1260 (PCB-1260)	NELAP	PA	7/3/2007
EPA 608	4 4'-DDD	NELAP	PA	7/3/2007
EPA 608	4 4'-DDE	NELAP	PA	9/7/2007
EPA 608	4 4'-DDT	NELAP	PA	7/3/2007
EPA 608	Aldrin (HHDN)	NELAP	PA	7/3/2007
EPA 608	Chlordane (tech.)	NELAP	PA	7/3/2007
EPA 608	Dieldrin	NELAP	PA	10/20/2008
EPA 608	Endosulfan I	NELAP	PA	7/3/2007
EPA 608	Endosulfan II	NELAP	PA	7/3/2007
EPA 608	Endosulfan sulfate	NELAP	PA	7/3/2007
EPA 608	Endrin	NELAP	PA	9/7/2007
EPA 608	Endrin aldehyde	NELAP	PA	7/3/2007
EPA 608	Heptachlor	NELAP	PA	7/3/2007
EPA 608	Heptachlor epoxide	NELAP	PA	7/3/2007
EPA 608	Toxaphene (Chlorinated camphene)	NELAP	PA	7/3/2007
EPA 608	alpha-BHC (alpha-Hexachlorocyclohexane)	NELAP	PA	7/3/2007
EPA 608	beta-BHC (beta-Hexachlorocyclohexane)	NELAP	PA	7/3/2007
EPA 608	delta-BHC (delta-Hexachlorocyclohexane)	NELAP	PA	10/20/2008
EPA 608	gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	NELAP	PA	10/20/2008
EPA 608-Extended	Endrin ketone	NELAP	PA	10/20/2008
EPA 608-Extended	alpha-Chlordane	NELAP	PA	10/20/2008
EPA 608-Extended	gamma-Chlordane	NELAP	PA	10/20/2008

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State Laboratory ID: 2-00257 **EPA Lab Code: PA00052** **(724) 772-0610**

Microbac Laboratories Inc. Pittsburgh Division
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Warrendale, PA 15086-7554

Program Non-Potable Water

Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 608.2	Methoxychlor	NELAP	PA	7/3/2007
EPA 610	Acenaphthene	NELAP	PA	11/4/2008
EPA 610	Acenaphthylene	NELAP	PA	7/3/2007
EPA 610	Anthracene	NELAP	PA	7/3/2007
EPA 610	Benzo(a)anthracene	NELAP	PA	7/3/2007
EPA 610	Benzo(a)pyrene	NELAP	PA	11/4/2008
EPA 610	Benzo(b)fluoranthene	NELAP	PA	7/3/2007
EPA 610	Benzo(g h i)perylene	NELAP	PA	7/3/2007
EPA 610	Benzo(k)fluoranthene	NELAP	PA	7/3/2007
EPA 610	Chrysene	NELAP	PA	7/3/2007
EPA 610	Dibenzo(a h)anthracene	NELAP	PA	7/3/2007
EPA 610	Fluoranthene	NELAP	PA	7/3/2007
EPA 610	Fluorene	NELAP	PA	7/3/2007
EPA 610	Indeno(1 2 3-cd)pyrene	NELAP	PA	7/3/2007
EPA 610	Phenanthrene	NELAP	PA	12/1/2008
EPA 610	Pyrene	NELAP	PA	7/3/2007
EPA 610	Naphthalene	NELAP	PA	7/3/2007
EPA 624	1,1,1-Trichloroethane	NELAP	PA	3/13/2007
EPA 624	1,1,2,2-Tetrachloroethane	NELAP	PA	3/13/2007
EPA 624	1,1,2-Trichloroethane	NELAP	PA	3/13/2007
EPA 624	1,1-Dichloroethane	NELAP	PA	3/13/2007
EPA 624	1,1-Dichloroethene (1,1-Dichloroethylene)	NELAP	PA	3/13/2007
EPA 624	1,2-Dichlorobenzene (o-Dichlorobenzene)	NELAP	PA	9/7/2007
EPA 624	1,2-Dichloroethane	NELAP	PA	3/13/2007
EPA 624	1,2-Dichloropropane	NELAP	PA	3/13/2007
EPA 624	1,3-Dichlorobenzene (m-Dichlorobenzene)	NELAP	PA	9/7/2007
EPA 624	1,4-Dichlorobenzene (p-Dichlorobenzene)	NELAP	PA	9/7/2007
EPA 624	2-Chloroethyl vinyl ether	NELAP	PA	3/13/2007
EPA 624	Acrolein (Propenal)	NELAP	PA	3/13/2007
EPA 624	Acrylonitrile	NELAP	PA	3/13/2007
EPA 624	Benzene	NELAP	PA	3/13/2007
EPA 624	Bromodichloromethane	NELAP	PA	3/13/2007
EPA 624	Bromoform	NELAP	PA	3/13/2007
EPA 624	Bromomethane (Methyl bromide)	NELAP	PA	3/13/2007
EPA 624	Carbon tetrachloride	NELAP	PA	3/13/2007
EPA 624	Chlorobenzene	NELAP	PA	3/13/2007

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Microbac Laboratories Inc. Pittsburgh Division
100 Marshall Drive
Warrendale, PA 15086-7554

Program Non-Potable Water

Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 624	Chloroethane	NELAP	PA	3/13/2007
EPA 624	Chloroform	NELAP	PA	3/13/2007
EPA 624	Chloromethane (Methyl chloride)	NELAP	PA	3/13/2007
EPA 624	Dibromochloromethane	NELAP	PA	3/13/2007
EPA 624	Ethylbenzene	NELAP	PA	3/13/2007
EPA 624	Methylene chloride (Dichloromethane)	NELAP	PA	3/13/2007
EPA 624	Tetrachloroethene (PCE, Perchloroethylene)	NELAP	PA	3/13/2007
EPA 624	Toluene	NELAP	PA	3/13/2007
EPA 624	Trichloroethene (TCE, Trichloroethylene)	NELAP	PA	3/13/2007
EPA 624	Trichlorofluoromethane (Freon 11)	NELAP	PA	3/13/2007
EPA 624	Vinyl chloride	NELAP	PA	3/13/2007
EPA 624	Xylenes, total	NELAP	PA	3/13/2007
EPA 624	cis-1 3-Dichloropropene	NELAP	PA	3/13/2007
EPA 624	trans-1 2-Dichloroethene	NELAP	PA	3/13/2007
EPA 624	trans-1 3-Dichloropropene	NELAP	PA	3/13/2007
EPA 624-Extended	Dichlorodifluoromethane (Freon 12)	NELAP	PA	3/13/2007
EPA 624-Extended	Methyl tert-butyl ether (MTBE)	NELAP	PA	3/13/2007
EPA 624-Extended	Styrene	NELAP	PA	3/13/2007
EPA 625	2 4 6-Trichlorophenol	NELAP	PA	7/3/2007
EPA 625	2 4-Dichlorophenol	NELAP	PA	7/3/2007
EPA 625	2 4-Dimethylphenol	NELAP	PA	7/3/2007
EPA 625	2 4-Dinitrophenol	NELAP	PA	7/3/2007
EPA 625	2 4-Dinitrotoluene (2 4-DNT)	NELAP	PA	9/7/2007
EPA 625	2 6-Dinitrotoluene (2 6-DNT)	NELAP	PA	9/7/2007
EPA 625	2-Chloronaphthalene	NELAP	PA	9/7/2007
EPA 625	2-Chlorophenol	NELAP	PA	7/3/2007
EPA 625	2-Methyl-4 6-dinitrophenol (4 6-Dinitro-2-methylphenol)	NELAP	PA	7/3/2007
EPA 625	2-Nitrophenol	NELAP	PA	7/3/2007
EPA 625	3 3'-Dichlorobenzidine	NELAP	PA	9/7/2007
EPA 625	4-Bromophenyl phenyl ether	NELAP	PA	9/7/2007
EPA 625	4-Chloro-3-methylphenol	NELAP	PA	7/3/2007
EPA 625	4-Chlorophenyl phenyl ether	NELAP	PA	9/7/2007
EPA 625	4-Nitrophenol	NELAP	PA	7/3/2007
EPA 625	Acenaphthene	NELAP	PA	7/3/2007
EPA 625	Acenaphthylene	NELAP	PA	7/3/2007
EPA 625	Anthracene	NELAP	PA	7/3/2007

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Microbac Laboratories Inc. Pittsburgh Division
100 Marshall Drive
Warrendale, PA 15086-7554

Program Non-Potable Water

Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 625	Benzidine	NELAP	PA	7/3/2007
EPA 625	Benzo(a)anthracene	NELAP	PA	7/3/2007
EPA 625	Benzo(a)pyrene	NELAP	PA	7/3/2007
EPA 625	Benzo(b)fluoranthene	NELAP	PA	7/3/2007
EPA 625	Benzo(g h i)perylene	NELAP	PA	7/3/2007
EPA 625	Benzo(k)fluoranthene	NELAP	PA	7/3/2007
EPA 625	Butyl benzyl phthalate (Benzyl butyl phthalate)	NELAP	PA	7/3/2007
EPA 625	Chrysene	NELAP	PA	10/23/2007
EPA 625	Di-n-butyl phthalate	NELAP	PA	7/3/2007
EPA 625	Di-n-octyl phthalate	NELAP	PA	7/3/2007
EPA 625	Dibenzo(a h)anthracene	NELAP	PA	7/3/2007
EPA 625	Diethyl phthalate	NELAP	PA	7/3/2007
EPA 625	Dimethyl phthalate	NELAP	PA	9/7/2007
EPA 625	Fluoranthene	NELAP	PA	7/3/2007
EPA 625	Fluorene	NELAP	PA	7/3/2007
EPA 625	Hexachlorobenzene	NELAP	PA	7/3/2007
EPA 625	Hexachlorocyclopentadiene	NELAP	PA	7/3/2007
EPA 625	Indeno(1 2 3-cd)pyrene	NELAP	PA	7/3/2007
EPA 625	Isophorone	NELAP	PA	7/3/2007
EPA 625	N-Nitrosodi-n-propylamine	NELAP	PA	7/3/2007
EPA 625	N-Nitrosodiphenylamine	NELAP	PA	7/3/2007
EPA 625	Pentachlorophenol (PCP)	NELAP	PA	7/3/2007
EPA 625	Phenanthrene	NELAP	PA	7/3/2007
EPA 625	Phenol	NELAP	PA	7/3/2007
EPA 625	Pyrene	NELAP	PA	7/3/2007
EPA 625	bis(2-Chloroethoxy)methane	NELAP	PA	7/3/2007
EPA 625	bis(2-Chloroethyl) ether	NELAP	PA	7/3/2007
EPA 625	bis(2-Chloroisopropyl) ether	NELAP	PA	7/3/2007
EPA 625	bis(2-Ethylhexyl) phthalate (DEHP)	NELAP	PA	7/3/2007
EPA 625	1,2,4-Trichlorobenzene	NELAP	PA	9/7/2007
EPA 625	1,2-Dichlorobenzene (o-Dichlorobenzene)	NELAP	PA	9/7/2007
EPA 625	1,3-Dichlorobenzene (m-Dichlorobenzene)	NELAP	PA	9/7/2007
EPA 625	1,4-Dichlorobenzene (p-Dichlorobenzene)	NELAP	PA	9/7/2007
EPA 625	Hexachlorobutadiene	NELAP	PA	7/3/2007
EPA 625	Hexachloroethane	NELAP	PA	7/3/2007
EPA 625	Naphthalene	NELAP	PA	7/3/2007

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Microbac Laboratories Inc. Pittsburgh Division
100 Marshall Drive
Warrendale, PA 15086-7554

Program Non-Potable Water

Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 625	Nitrobenzene	NELAP	PA	7/3/2007
EPA 7041	Antimony	NELAP	PA	3/13/2007
EPA 7060	Arsenic	NELAP	PA	3/13/2007
EPA 7421	Lead	NELAP	PA	9/7/2007
EPA 7470	Mercury	NELAP	PA	3/13/2007
EPA 7481	Molybdenum	NELAP	PA	3/13/2007
EPA 7740	Selenium	NELAP	PA	3/13/2007
EPA 7761	Silver	NELAP	PA	3/13/2007
EPA 7841	Thallium	NELAP	PA	3/13/2007
EPA 8015	Ethylene glycol	NELAP	PA	7/3/2007
EPA 8015B-Extended	Propylene glycol	NELAP	PA	7/3/2007
EPA 8081	4 4'-DDD	NELAP	PA	7/3/2007
EPA 8081	4 4'-DDE	NELAP	PA	9/7/2007
EPA 8081	4 4'-DDT	NELAP	PA	7/3/2007
EPA 8081	Aldrin (HHDN)	NELAP	PA	7/3/2007
EPA 8081	Chlordane (tech.)	NELAP	PA	7/3/2007
EPA 8081	Dieldrin	NELAP	PA	7/3/2007
EPA 8081	Endosulfan I	NELAP	PA	7/3/2007
EPA 8081	Endosulfan II	NELAP	PA	7/3/2007
EPA 8081	Endosulfan sulfate	NELAP	PA	7/3/2007
EPA 8081	Endrin	NELAP	PA	9/7/2007
EPA 8081	Endrin aldehyde	NELAP	PA	7/3/2007
EPA 8081	Endrin ketone	NELAP	PA	7/3/2007
EPA 8081	Heptachlor	NELAP	PA	7/3/2007
EPA 8081	Heptachlor epoxide	NELAP	PA	7/3/2007
EPA 8081	Methoxychlor	NELAP	PA	11/25/2008
EPA 8081	alpha-BHC (alpha-Hexachlorocyclohexane)	NELAP	PA	7/3/2007
EPA 8081	alpha-Chlordane	NELAP	PA	7/3/2007
EPA 8081	beta-BHC (beta-Hexachlorocyclohexane)	NELAP	PA	7/3/2007
EPA 8081	delta-BHC (delta-Hexachlorocyclohexane)	NELAP	PA	7/3/2007
EPA 8081	gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	NELAP	PA	7/3/2007
EPA 8081	gamma-Chlordane	NELAP	PA	7/3/2007
EPA 8081-Extended	Kepone	NELAP	PA	7/3/2007
EPA 8082	Aroclor-1016 (PCB-1016)	NELAP	PA	7/3/2007
EPA 8082	Aroclor-1221 (PCB-1221)	NELAP	PA	7/3/2007
EPA 8082	Aroclor-1232 (PCB-1232)	NELAP	PA	7/3/2007

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State Laboratory ID: 2-00257 **EPA Lab Code: PA00052** **(724) 772-0610**

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100 Marshall Drive
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Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 8082	Aroclor-1242 (PCB-1242)	NELAP	PA	7/3/2007
EPA 8082	Aroclor-1248 (PCB-1248)	NELAP	PA	7/3/2007
EPA 8082	Aroclor-1254 (PCB-1254)	NELAP	PA	7/3/2007
EPA 8082	Aroclor-1260 (PCB-1260)	NELAP	PA	7/3/2007
EPA 8260	Benzyl chloride	NELAP	PA	3/13/2007
EPA 8260	bis(2-Chloroisopropyl) ether	NELAP	PA	3/13/2007
EPA 8260	1,1,1,2-Tetrachloroethane	NELAP	PA	3/13/2007
EPA 8260	1,1,1-Trichloroethane	NELAP	PA	3/13/2007
EPA 8260	1,1,2,2-Tetrachloroethane	NELAP	PA	3/13/2007
EPA 8260	1,1,2-Trichloroethane	NELAP	PA	3/13/2007
EPA 8260	1,1-Dichloroethane	NELAP	PA	3/13/2007
EPA 8260	1,1-Dichloroethene (1,1-Dichloroethylene)	NELAP	PA	3/13/2007
EPA 8260	1,1-Dichloropropene	NELAP	PA	3/13/2007
EPA 8260	1,2,3-Trichlorobenzene	NELAP	PA	3/13/2007
EPA 8260	1,2,3-Trichloropropane (1,2,3-TCP)	NELAP	PA	3/13/2007
EPA 8260	1,2,4-Trichlorobenzene	NELAP	PA	3/13/2007
EPA 8260	1,2,4-Trimethylbenzene	NELAP	PA	3/13/2007
EPA 8260	1,2-Dibromoethane (EDB, Ethylene dibromide)	NELAP	PA	3/13/2007
EPA 8260	1,2-Dichlorobenzene (o-Dichlorobenzene)	NELAP	PA	9/7/2007
EPA 8260	1,2-Dichloroethane	NELAP	PA	3/13/2007
EPA 8260	1,2-Dichloropropane	NELAP	PA	3/13/2007
EPA 8260	1,3,5-Trimethylbenzene	NELAP	PA	3/13/2007
EPA 8260	1,3-Dichlorobenzene (m-Dichlorobenzene)	NELAP	PA	9/7/2007
EPA 8260	1,3-Dichloropropane	NELAP	PA	3/13/2007
EPA 8260	1,4-Dichlorobenzene (p-Dichlorobenzene)	NELAP	PA	9/7/2007
EPA 8260	1-Propanol (n-Propanol)	NELAP	PA	3/13/2007
EPA 8260	2,2-Dichloropropane	NELAP	PA	3/13/2007
EPA 8260	2-Butanone (Methyl ethyl ketone, MEK)	NELAP	PA	3/13/2007
EPA 8260	2-Chloroethyl vinyl ether	NELAP	PA	3/13/2007
EPA 8260	2-Chlorotoluene	NELAP	PA	3/13/2007
EPA 8260	2-Hexanone	NELAP	PA	9/2/2008
EPA 8260	2-Propanol (Isopropyl alcohol)	NELAP	PA	3/13/2007
EPA 8260	4-Isopropyltoluene (p-Isopropyltoluene)	NELAP	PA	3/13/2007
EPA 8260	4-Methyl-2-pentanone (MIBK)	NELAP	PA	9/2/2008
EPA 8260	Acetone	NELAP	PA	3/13/2007
EPA 8260	Acetonitrile	NELAP	PA	3/13/2007

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Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 8260	Acrolein (Propenal)	NELAP	PA	3/13/2007
EPA 8260	Acrylamide	NELAP	PA	3/13/2007
EPA 8260	Acrylonitrile	NELAP	PA	3/13/2007
EPA 8260	Allyl chloride (3-Chloropropene)	NELAP	PA	3/13/2007
EPA 8260	Benzene	NELAP	PA	3/13/2007
EPA 8260	Bromobenzene	NELAP	PA	3/13/2007
EPA 8260	Bromochloromethane	NELAP	PA	3/13/2007
EPA 8260	Bromodichloromethane	NELAP	PA	3/13/2007
EPA 8260	Bromoform	NELAP	PA	3/13/2007
EPA 8260	Bromomethane (Methyl bromide)	NELAP	PA	3/13/2007
EPA 8260	Carbon disulfide	NELAP	PA	3/13/2007
EPA 8260	Carbon tetrachloride	NELAP	PA	3/13/2007
EPA 8260	Chlorobenzene	NELAP	PA	3/13/2007
EPA 8260	Chloroethane	NELAP	PA	3/13/2007
EPA 8260	Chloroform	NELAP	PA	3/13/2007
EPA 8260	Chloromethane (Methyl chloride)	NELAP	PA	3/13/2007
EPA 8260	Chloroprene (2-Chloro-1 3-butadiene)	NELAP	PA	3/13/2007
EPA 8260	Dibromochloromethane	NELAP	PA	3/13/2007
EPA 8260	Dibromochloropropane (1 2-Dibromo-3-chloropropane, DBCP)	NELAP	PA	3/13/2007
EPA 8260	Dibromomethane	NELAP	PA	3/13/2007
EPA 8260	Dichlorodifluoromethane (Freon 12)	NELAP	PA	3/13/2007
EPA 8260	Diethyl ether	NELAP	PA	3/13/2007
EPA 8260	Ethyl acetate	NELAP	PA	3/13/2007
EPA 8260	Ethylbenzene	NELAP	PA	3/13/2007
EPA 8260	Hexachlorobutadiene	NELAP	PA	7/3/2007
EPA 8260	Hexachloroethane	NELAP	PA	3/13/2007
EPA 8260	Iodomethane (Methyl iodide)	NELAP	PA	3/13/2007
EPA 8260	Isobutyl alcohol (2-Methyl-1-propanol)	NELAP	PA	3/13/2007
EPA 8260	Isopropylbenzene	NELAP	PA	3/13/2007
EPA 8260	Methyl tert-butyl ether (MTBE)	NELAP	PA	3/13/2007
EPA 8260	Methylene chloride (Dichloromethane)	NELAP	PA	3/13/2007
EPA 8260	Methylmethacrylate	NELAP	PA	3/13/2007
EPA 8260	Naphthalene	NELAP	PA	7/3/2007
EPA 8260	Nitrobenzene	NELAP	PA	3/13/2007
EPA 8260	Pentachloroethane	NELAP	PA	3/13/2007
EPA 8260	Styrene	NELAP	PA	3/13/2007

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Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 8260	Tetrachloroethene (PCE, Perchloroethylene)	NELAP	PA	3/13/2007
EPA 8260	Toluene	NELAP	PA	3/13/2007
EPA 8260	Trichloroethene (TCB, Trichloroethylene)	NELAP	PA	3/13/2007
EPA 8260	Trichlorofluoromethane (Freon 11)	NELAP	PA	3/13/2007
EPA 8260	Vinyl acetate	NELAP	PA	3/13/2007
EPA 8260	Vinyl chloride	NELAP	PA	3/13/2007
EPA 8260	Xylenes, total	NELAP	PA	3/13/2007
EPA 8260	cis-1 2-Dichloroethene	NELAP	PA	9/7/2007
EPA 8260	cis-1 3-Dichloropropene	NELAP	PA	3/13/2007
EPA 8260	n-Butyl alcohol (1-Butanol)	NELAP	PA	3/13/2007
EPA 8260	n-Butylbenzene	NELAP	PA	3/13/2007
EPA 8260	n-Propylbenzene	NELAP	PA	3/13/2007
EPA 8260	sec-Butylbenzene	NELAP	PA	3/13/2007
EPA 8260	tert-Butylbenzene	NELAP	PA	3/13/2007
EPA 8260	trans-1 2-Dichloroethene	NELAP	PA	3/13/2007
EPA 8260	trans-1 3-Dichloropropene	NELAP	PA	3/13/2007
EPA 8260	trans-1 4-Dichloro-2-butene	NELAP	PA	3/13/2007
EPA 8260-Extended	Dibromofluoromethane	NELAP	PA	3/13/2007
EPA 8270	1,2,4,5-Tetrachlorobenzene	NELAP	PA	7/3/2007
EPA 8270	1,2-Dinitrobenzene (1,2-DNB)	NELAP	PA	7/3/2007
EPA 8270	1,2-Diphenylhydrazine	NELAP	PA	7/3/2007
EPA 8270	1,3-Dinitrobenzene (1,3-DNB)	NELAP	PA	7/3/2007
EPA 8270	1,4-Dinitrobenzene (1,4-DNB)	NELAP	PA	7/3/2007
EPA 8270	1,4-Naphthoquinone	NELAP	PA	7/3/2007
EPA 8270	1,4-Phenylenediamine	NELAP	PA	7/3/2007
EPA 8270	1-Naphthylamine (alpha-Naphthylamine)	NELAP	PA	7/3/2007
EPA 8270	2 3 4 6-Tetrachlorophenol	NELAP	PA	7/3/2007
EPA 8270	2 4 5-Trimethylaniline	NELAP	PA	7/3/2007
EPA 8270	2 4 6-Trichlorophenol	NELAP	PA	7/3/2007
EPA 8270	2 4-Dichlorophenol	NELAP	PA	7/3/2007
EPA 8270	2 4-Dimethylphenol	NELAP	PA	7/3/2007
EPA 8270	2 4-Dinitrophenol	NELAP	PA	7/3/2007
EPA 8270	2 4-Dinitrotoluene (2 4-DNT)	NELAP	PA	9/7/2007
EPA 8270	2 6-Dichlorophenol	NELAP	PA	7/3/2007
EPA 8270	2 6-Dinitrotoluene (2 6-DNT)	NELAP	PA	9/7/2007
EPA 8270	2-Chloronaphthalene	NELAP	PA	9/7/2007

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Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 8270	2-Chlorophenol	NELAP	PA	7/3/2007
EPA 8270	2-Methyl-4 6-dinitrophenol (4 6-Dinitro-2-methylphenol)	NELAP	PA	7/3/2007
EPA 8270	2-Methylnaphthalene	NELAP	PA	11/25/2008
EPA 8270	2-Naphthylamine (beta-Naphthylamine)	NELAP	PA	7/3/2007
EPA 8270	2-Nitroaniline	NELAP	PA	7/3/2007
EPA 8270	2-Nitrophenol	NELAP	PA	7/3/2007
EPA 8270	3 3'-Dichlorobenzidine	NELAP	PA	9/7/2007
EPA 8270	3-Methylphenol (m-Cresol)	NELAP	PA	7/3/2007
EPA 8270	3-Nitroaniline	NELAP	PA	7/3/2007
EPA 8270	4 4'-Methylenebis(2-chloroaniline)	NELAP	PA	7/3/2007
EPA 8270	4-Bromophenyl phenyl ether	NELAP	PA	9/7/2007
EPA 8270	4-Chloro-3-methylphenol	NELAP	PA	7/3/2007
EPA 8270	4-Chloroaniline	NELAP	PA	7/3/2007
EPA 8270	4-Chlorophenyl phenyl ether	NELAP	PA	9/7/2007
EPA 8270	4-Nitroaniline	NELAP	PA	7/3/2007
EPA 8270	4-Nitrophenol	NELAP	PA	7/3/2007
EPA 8270	Acenaphthene	NELAP	PA	7/3/2007
EPA 8270	Acenaphthylene	NELAP	PA	7/3/2007
EPA 8270	Aniline	NELAP	PA	7/3/2007
EPA 8270	Anthracene	NELAP	PA	7/3/2007
EPA 8270	Benzidine	NELAP	PA	7/3/2007
EPA 8270	Benzo(a)anthracene	NELAP	PA	7/3/2007
EPA 8270	Benzo(a)pyrene	NELAP	PA	7/3/2007
EPA 8270	Benzo(b)fluoranthene	NELAP	PA	7/3/2007
EPA 8270	Benzo(g h i)perylene	NELAP	PA	7/3/2007
EPA 8270	Benzo(k)fluoranthene	NELAP	PA	7/3/2007
EPA 8270	Benzoic acid	NELAP	PA	7/3/2007
EPA 8270	Benzyl alcohol	NELAP	PA	7/3/2007
EPA 8270	Butyl benzyl phthalate (Benzyl butyl phthalate)	NELAP	PA	7/3/2007
EPA 8270	Carbazole	NELAP	PA	7/3/2007
EPA 8270	Chrysene	NELAP	PA	10/23/2007
EPA 8270	Di-n-butyl phthalate	NELAP	PA	7/3/2007
EPA 8270	Di-n-octyl phthalate	NELAP	PA	7/3/2007
EPA 8270	Dibenzo(a h)anthracene	NELAP	PA	7/3/2007
EPA 8270	Diethyl phthalate	NELAP	PA	7/3/2007
EPA 8270	Dimethyl phthalate	NELAP	PA	9/7/2007

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Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 8270	Diphenylamine	NELAP	PA	7/3/2007
EPA 8270	Fluoranthene	NELAP	PA	9/7/2007
EPA 8270	Fluorene	NELAP	PA	7/3/2007
EPA 8270	Hexachlorobenzene	NELAP	PA	7/3/2007
EPA 8270	Hexachlorocyclopentadiene	NELAP	PA	7/3/2007
EPA 8270	Indeno(1 2 3-cd)pyrene	NELAP	PA	7/3/2007
EPA 8270	Isophorone	NELAP	PA	7/3/2007
EPA 8270	N-Nitrosodi-n-propylamine	NELAP	PA	7/3/2007
EPA 8270	N-Nitrosodiethylamine	NELAP	PA	7/3/2007
EPA 8270	N-Nitrosodimethylamine	NELAP	PA	7/3/2007
EPA 8270	N-Nitrosodiphenylamine	NELAP	PA	7/3/2007
EPA 8270	Pentachlorobenzene	NELAP	PA	7/3/2007
EPA 8270	Pentachlorophenol (PCP)	NELAP	PA	7/3/2007
EPA 8270	Phenanthrene	NELAP	PA	7/3/2007
EPA 8270	Phenol	NELAP	PA	7/3/2007
EPA 8270	Pyrene	NELAP	PA	7/3/2007
EPA 8270	bis(2-Chloroethoxy)methane	NELAP	PA	7/3/2007
EPA 8270	bis(2-Chloroethyl) ether	NELAP	PA	7/3/2007
EPA 8270	bis(2-Chloroisopropyl) ether	NELAP	PA	7/3/2007
EPA 8270	bis(2-Ethylhexyl) phthalate (DEHP)	NELAP	PA	7/3/2007
EPA 8270	1,2,4-Trichlorobenzene	NELAP	PA	9/7/2007
EPA 8270	1,2-Dichlorobenzene (o-Dichlorobenzene)	NELAP	PA	9/7/2007
EPA 8270	1,3-Dichlorobenzene (m-Dichlorobenzene)	NELAP	PA	9/7/2007
EPA 8270	1,4-Dichlorobenzene (p-Dichlorobenzene)	NELAP	PA	9/7/2007
EPA 8270	Hexachlorobutadiene	NELAP	PA	7/3/2007
EPA 8270	Hexachloroethane	NELAP	PA	7/3/2007
EPA 8270	N-Nitroso-di-n-butylamine	NELAP	PA	7/3/2007
EPA 8270	Naphthalene	NELAP	PA	7/3/2007
EPA 8270	Nitrobenzene	NELAP	PA	7/3/2007
EPA 8270	Pyridine	NELAP	PA	7/3/2007
EPA 8270	o-Toluidine	NELAP	PA	7/3/2007
EPA 8270-Extended	Dichloramine-T (p-Toluenesulfondichloramide)	NELAP	PA	7/3/2007
EPA 8270-Extended	Indene	NELAP	PA	7/3/2007
EPA 8270-Extended	n-Decane	NELAP	PA	7/3/2007
EPA 8270-Extended	n-Octadecane	NELAP	PA	7/3/2007
EPA 8270-Extended	2-Nitrotoluene	NELAP	PA	7/3/2007

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Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 8270C-Extended	n-Decane	NELAP	PA	7/3/2007
EPA 8270C-Extended	n-Octadecane	NELAP	PA	7/3/2007
EPA 8310	Acenaphthene	NELAP	PA	11/4/2008
EPA 8310	Acenaphthylene	NELAP	PA	7/3/2007
EPA 8310	Anthracene	NELAP	PA	7/3/2007
EPA 8310	Benzo(a)anthracene	NELAP	PA	7/3/2007
EPA 8310	Benzo(a)pyrene	NELAP	PA	11/4/2008
EPA 8310	Benzo(b)fluoranthene	NELAP	PA	7/3/2007
EPA 8310	Benzo(g h i)perylene	NELAP	PA	7/3/2007
EPA 8310	Benzo(k)fluoranthene	NELAP	PA	7/3/2007
EPA 8310	Chrysene	NELAP	PA	7/3/2007
EPA 8310	Fluoranthene	NELAP	PA	7/3/2007
EPA 8310	Fluorene	NELAP	PA	7/3/2007
EPA 8310	Indeno(1 2 3-cd)pyrene	NELAP	PA	7/3/2007
EPA 8310	Phenanthrene	NELAP	PA	4/10/2008
EPA 8310	Pyrene	NELAP	PA	7/3/2007
EPA 8310	Naphthalene	NELAP	PA	7/3/2007
EPA 9010	Total cyanide	NELAP	PA	7/3/2007
EPA 9014	Total cyanide	NELAP	PA	7/3/2007
EPA 9020	Total organic halides (TOX)	NELAP	PA	7/3/2007
EPA 9038	Sulfate	NELAP	PA	7/3/2007
EPA 9040	pH	NELAP	PA	9/7/2007
EPA 9050	Conductivity	NELAP	PA	9/7/2007
EPA 9060	Total organic carbon (TOC)	NELAP	PA	7/3/2007
EPA 9065	Total phenolics	NELAP	PA	9/7/2007
EPA 9070	Oil and Grease	NELAP	PA	7/3/2007
EPA 9071	Oil and Grease	NELAP	PA	7/3/2007
EPA 9095A	Paint filter liquids test	NELAP	PA	7/3/2007
EPA 9211	Bromide	NELAP	PA	7/3/2007
EPA 9214	Fluoride	NELAP	PA	3/13/2007
HACH 8000	Chemical oxygen demand (COD)	NELAP	PA	7/3/2007
SM 2120 B	Color	NELAP	PA	3/30/2007
SM 2120 C	Color	NELAP	PA	3/30/2007
SM 2130 B	Turbidity	NELAP	PA	4/24/2007
SM 2310 B	Acidity as CaCO3	NELAP	PA	7/3/2007
SM 2320 B	Alkalinity as CaCO3	NELAP	PA	9/7/2007

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Method	Analyte	Accreditation Type	Primary	Effective Date
SM 2340 B	Total hardness as CaCO3	NELAP	PA	7/3/2007
SM 2340 C	Total hardness as CaCO3	NELAP	PA	4/10/2008
SM 2510 B	Conductivity	NELAP	PA	9/7/2007
SM 2540 B	Residue-total	NELAP	PA	7/3/2007
SM 2540 C	Residue-filterable (TDS)	NELAP	PA	3/13/2007
SM 2540 D	Residue-nonfilterable (TSS)	NELAP	PA	7/3/2007
SM 2540 E	Residue-volatile	NELAP	PA	9/7/2007
SM 2540 F	Residue-settleable	NELAP	PA	3/30/2009
SM 2540 G	Residue-volatile	NELAP	PA	9/7/2007
SM 2550 B	Temperature, deg. C	NELAP	PA	4/4/2007
SM 3113 B	Antimony	NELAP	PA	3/13/2007
SM 3113 B	Arsenic	NELAP	PA	3/13/2007
SM 3113 B	Lead	NELAP	PA	9/7/2007
SM 3113 B	Molybdenum	NELAP	PA	3/13/2007
SM 3113 B	Selenium	NELAP	PA	3/13/2007
SM 3113 B	Silver	NELAP	PA	3/13/2007
SM 3500-Cr B (20th ed.)	Chromium VI	NELAP	PA	7/3/2007
SM 426 C (15th ed)	Sulfate	NELAP	PA	7/3/2007
SM 4500-CN- C	Cyanide	NELAP	PA	7/3/2007
SM 4500-CN- E	Cyanide	NELAP	PA	3/13/2007
SM 4500-CN- G	Amenable cyanide	NELAP	PA	7/3/2007
SM 4500-CN- G	Amenable cyanide	NELAP	PA	7/3/2007
SM 4500-CN- I	Weak acid dissociable cyanide	NELAP	PA	7/3/2007
SM 4500-Cl G	Total residual chlorine	NELAP	PA	3/13/2007
SM 4500-Cl- E (discrete)	Chloride	NELAP	PA	3/31/2008
SM 4500-F- B	Preliminary distillation of fluoride	NELAP	PA	7/3/2007
SM 4500-F- C	Fluoride	NELAP	PA	3/13/2007
SM 4500-H+ B	pH	NELAP	PA	9/7/2007
SM 4500-NH3 B	Ammonia distillation	NELAP	PA	7/3/2007
SM 4500-NH3 D	Ammonia as N	NELAP	PA	7/3/2007
SM 4500-NH3 D	Kjeldahl nitrogen, total (TKN)	NELAP	PA	1/3/2008
SM 4500-NH3 G (discrete)	Ammonia as N	NELAP	PA	12/22/2008
SM 4500-NO3- F (discrete)	Nitrate	NELAP	PA	9/2/2008
SM 4500-NO3- F (discrete)	Nitrite	NELAP	PA	3/31/2008
SM 4500-NO3- F (discrete)	Total nitrate-nitrite	NELAP	PA	9/2/2008
SM 4500-Norg B	Kjeldahl nitrogen, total (TKN)	NELAP	PA	7/3/2007

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Method	Analyte	Accreditation Type	Primary	Effective Date
SM 4500-Norg C	Kjeldahl nitrogen, total (TKN)	NELAP	PA	7/3/2007
SM 4500-O G	Oxygen (dissolved)	NELAP	PA	7/3/2007
SM 4500-P B	Preliminary treatment of phosphate samples	NELAP	PA	10/23/2007
SM 4500-P E	Orthophosphate as P	NELAP	PA	7/3/2007
SM 4500-P E	Phosphorus, total	NELAP	PA	7/3/2007
SM 4500-P F (discrete)	Orthophosphate as P	NELAP	PA	3/31/2008
SM 4500-P F (discrete)	Phosphorus, total	NELAP	PA	5/15/2008
SM 4500-SO3 B	Sulfite-SO3	NELAP	PA	7/3/2007
SM 4500-Si D	Silica, dissolved	NELAP	PA	4/3/2008
SM 4500-SiO2 C (20th ed.)	Silica, dissolved	NELAP	PA	4/3/2008
SM 5210 B	Biochemical oxygen demand (BOD)	NELAP	PA	7/3/2007
SM 5210 B	Carbonaceous BOD (CBOD)	NELAP	PA	7/3/2007
SM 5220 D	Chemical oxygen demand (COD)	NELAP	PA	7/3/2007
SM 5310 C	Dissolved organic carbon (DOC)	NELAP	PA	3/28/2008
SM 5310 C	Total organic carbon (TOC)	NELAP	PA	7/3/2007
SM 5320 B	Total organic halides (TOX)	NELAP	PA	7/3/2007
SM 5520 F	Total petroleum hydrocarbons (TPH)	NELAP	PA	7/3/2007
SM 5540 C	Surfactants - MBAS	NELAP	PA	7/3/2007
SM 9221 B	Total coliforms	NELAP	PA	7/3/2007
SM 9221 B.1/9221 F	Escherichia coli	NELAP	PA	7/3/2007
SM 9221 C/E	Fecal coliforms (Enumeration)	NELAP	PA	7/3/2007
SM 9222 B	Total coliforms	NELAP	PA	7/3/2007
SM 9222 B/9222 G	Escherichia coli	NELAP	PA	7/3/2007
SM 9222 D	Fecal coliforms	NELAP	PA	9/7/2007
SM 9223 B	E. coli (Enumeration)	NELAP	PA	7/3/2007
SM 9230 C	Fecal streptococci	NELAP	PA	7/3/2007

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100 Marshall Drive
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Program Solid and Chemical Materials

Method	Analyte	Accreditation Type	Primary	Effective Date
ASTM D1246-95C	Bromide	NELAP	PA	7/3/2007
ASTM D240-92	Heat of combustion (btu)	NELAP	PA	7/3/2007
ASTM D3987	Water leach	NELAP	PA	7/3/2007
ASTM D512-99C	Chloride	NELAP	PA	4/8/2009
ASTM D808	Total chlorine	NELAP	PA	7/3/2007
EPA 1010	Ignitability	NELAP	PA	7/3/2007
EPA 1030	Ignitability	NELAP	PA	7/3/2007
EPA 1311	Toxicity characteristic leaching procedure (TCLP)	NELAP	PA	7/3/2007
EPA 1312	Synthetic precipitation leaching procedure (SPLP)	NELAP	PA	7/3/2007
EPA 3010A	Hot plate acid digestion (HNO3 + HCl)	NELAP	PA	3/13/2007
EPA 3060A	Alkaline digestion of Cr(VI)	NELAP	PA	7/3/2007
EPA 335.2	Total cyanide	NELAP	PA	3/31/2008
EPA 350.2	Ammonia as N	NELAP	PA	7/3/2007
EPA 350.2	Kjeldahl nitrogen, total (TKN)	NELAP	PA	1/4/2008
EPA 350.3	Ammonia as N	NELAP	PA	1/4/2008
EPA 350.3	Kjeldahl nitrogen, total (TKN)	NELAP	PA	1/4/2008
EPA 353.2 (discrete)	Nitrite	NELAP	PA	3/31/2008
EPA 3550B	Ultrasonic extraction	NELAP	PA	7/3/2007
EPA 3580A	Waste dilution	NELAP	PA	7/3/2007
EPA 3585	Waste dilution for VOCs	NELAP	PA	7/3/2007
EPA 3620B	Florisil cleanup	NELAP	PA	7/3/2007
EPA 365.1 (discrete)	Orthophosphate as P	NELAP	PA	3/31/2008
EPA 365.2	Orthophosphate as P	NELAP	PA	7/3/2007
EPA 3665A	Sulfuric acid/permanganate clean-up	NELAP	PA	7/3/2007
EPA 375.4	Sulfate	NELAP	PA	3/31/2008
EPA 420.2 (discrete)	Total phenolics	NELAP	PA	3/31/2008
EPA 5035	Closed-system purge-and-trap (bisulfate option)	NELAP	PA	4/24/2007
EPA 5035	Closed-system purge-and-trap (methanol option)	NELAP	PA	4/24/2007
EPA 5035	Closed-system purge-and-trap (unpreserved)	NELAP	PA	4/24/2007
EPA 6010	Aluminum	NELAP	PA	4/24/2007
EPA 6010	Antimony	NELAP	PA	3/13/2007
EPA 6010	Arsenic	NELAP	PA	3/13/2007
EPA 6010	Barium	NELAP	PA	3/13/2007
EPA 6010	Beryllium	NELAP	PA	3/13/2007
EPA 6010	Boron	NELAP	PA	3/13/2007
EPA 6010	Cadmium	NELAP	PA	3/13/2007

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Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 6010	Calcium	NELAP	PA	3/13/2007
EPA 6010	Chromium	NELAP	PA	3/13/2007
EPA 6010	Cobalt	NELAP	PA	3/13/2007
EPA 6010	Copper	NELAP	PA	3/13/2007
EPA 6010	Iron	NELAP	PA	3/13/2007
EPA 6010	Lead	NELAP	PA	3/13/2007
EPA 6010	Lithium	NELAP	PA	3/13/2007
EPA 6010	Magnesium	NELAP	PA	3/13/2007
EPA 6010	Manganese	NELAP	PA	3/13/2007
EPA 6010	Molybdenum	NELAP	PA	3/13/2007
EPA 6010	Nickel	NELAP	PA	3/13/2007
EPA 6010	Potassium	NELAP	PA	3/13/2007
EPA 6010	Selenium	NELAP	PA	3/13/2007
EPA 6010	Silver	NELAP	PA	3/13/2007
EPA 6010	Sodium	NELAP	PA	3/13/2007
EPA 6010	Strontium	NELAP	PA	3/13/2007
EPA 6010	Thallium	NELAP	PA	3/13/2007
EPA 6010	Tin	NELAP	PA	3/13/2007
EPA 6010	Titanium	NELAP	PA	3/13/2007
EPA 6010	Vanadium	NELAP	PA	3/13/2007
EPA 6010	Zinc	NELAP	PA	3/13/2007
EPA 6010	Phosphorus, total	NELAP	PA	3/13/2007
EPA 6010	Silica as SiO2	NELAP	PA	3/13/2007
EPA 6010-Extended	Bismuth	NELAP	PA	3/13/2007
EPA 6010-Extended	Cerium	NELAP	PA	3/13/2007
EPA 6010-Extended	Hafnium	NELAP	PA	3/13/2007
EPA 6010-Extended	Zirconium	NELAP	PA	3/13/2007
EPA 7196	Chromium VI	NELAP	PA	7/3/2007
EPA 7470	Mercury	NELAP	PA	3/13/2007
EPA 7471	Mercury	NELAP	PA	3/13/2007
EPA 8081	4 4'-DDD	NELAP	PA	7/3/2007
EPA 8081	4 4'-DDE	NELAP	PA	7/3/2007
EPA 8081	4 4'-DDT	NELAP	PA	7/3/2007
EPA 8081	Aldrin (HHDN)	NELAP	PA	7/3/2007
EPA 8081	Chlordane (tech.)	NELAP	PA	7/3/2007
EPA 8081	Dieldrin	NELAP	PA	7/3/2007

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Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 8081	Endosulfan I	NELAP	PA	4/8/2009
EPA 8081	Endosulfan sulfate	NELAP	PA	7/3/2007
EPA 8081	Endrin	NELAP	PA	4/8/2009
EPA 8081	Endrin aldehyde	NELAP	PA	7/3/2007
EPA 8081	Endrin ketone	NELAP	PA	7/3/2007
EPA 8081	Heptachlor	NELAP	PA	7/3/2007
EPA 8081	Heptachlor epoxide	NELAP	PA	4/8/2009
EPA 8081	Methoxychlor	NELAP	PA	7/3/2007
EPA 8081	Toxaphene (Chlorinated camphene)	NELAP	PA	7/3/2007
EPA 8081	alpha-BHC (alpha-Hexachlorocyclohexane)	NELAP	PA	7/3/2007
EPA 8081	alpha-Chlordane	NELAP	PA	7/3/2007
EPA 8081	beta-BHC (beta-Hexachlorocyclohexane)	NELAP	PA	7/3/2007
EPA 8081	delta-BHC (delta-Hexachlorocyclohexane)	NELAP	PA	7/3/2007
EPA 8081	gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	NELAP	PA	7/3/2007
EPA 8081	gamma-Chlordane	NELAP	PA	7/3/2007
EPA 8082	Aroclor-1016 (PCB-1016)	NELAP	PA	7/3/2007
EPA 8082	Aroclor-1221 (PCB-1221)	NELAP	PA	7/3/2007
EPA 8082	Aroclor-1232 (PCB-1232)	NELAP	PA	7/3/2007
EPA 8082	Aroclor-1242 (PCB-1242)	NELAP	PA	7/3/2007
EPA 8082	Aroclor-1248 (PCB-1248)	NELAP	PA	9/7/2007
EPA 8082	Aroclor-1254 (PCB-1254)	NELAP	PA	7/3/2007
EPA 8082	Aroclor-1260 (PCB-1260)	NELAP	PA	7/3/2007
EPA 8260	1,1,1,2-Tetrachloroethane	NELAP	PA	4/24/2007
EPA 8260	1,1,1-Trichloroethane	NELAP	PA	4/24/2007
EPA 8260	1,1,2,2-Tetrachloroethane	NELAP	PA	4/24/2007
EPA 8260	1,1,2-Trichloroethane	NELAP	PA	4/24/2007
EPA 8260	1,1-Dichloroethane	NELAP	PA	4/24/2007
EPA 8260	1,1-Dichloroethene (1,1-Dichloroethylene)	NELAP	PA	4/24/2007
EPA 8260	1,1-Dichloropropene	NELAP	PA	4/24/2007
EPA 8260	1,2,3-Trichlorobenzene	NELAP	PA	4/24/2007
EPA 8260	1,2,3-Trichloropropane (1,2,3-TCP)	NELAP	PA	4/24/2007
EPA 8260	1,2,4-Trichlorobenzene	NELAP	PA	4/24/2007
EPA 8260	1,2,4-Trimethylbenzene	NELAP	PA	4/24/2007
EPA 8260	1,2-Dibromoethane (EDB, Ethylene dibromide)	NELAP	PA	4/24/2007
EPA 8260	1,2-Dichlorobenzene (o-Dichlorobenzene)	NELAP	PA	4/24/2007
EPA 8260	1,2-Dichloroethane	NELAP	PA	4/24/2007

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Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 8260	1,2-Dichloropropane	NELAP	PA	4/24/2007
EPA 8260	1,3,5-Trimethylbenzene	NELAP	PA	4/24/2007
EPA 8260	1,3-Dichlorobenzene (m-Dichlorobenzene)	NELAP	PA	4/24/2007
EPA 8260	1,3-Dichloropropane	NELAP	PA	4/24/2007
EPA 8260	1,4-Dichlorobenzene (p-Dichlorobenzene)	NELAP	PA	4/24/2007
EPA 8260	1-Propanol (n-Propanol)	NELAP	PA	4/24/2007
EPA 8260	2 2-Dichloropropane	NELAP	PA	4/24/2007
EPA 8260	2-Butanone (Methyl ethyl ketone, MEK)	NELAP	PA	4/24/2007
EPA 8260	2-Chloroethyl vinyl ether	NELAP	PA	4/24/2007
EPA 8260	2-Chlorotoluene	NELAP	PA	4/24/2007
EPA 8260	2-Hexanone	NELAP	PA	4/24/2007
EPA 8260	2-Nitropropane	NELAP	PA	4/24/2007
EPA 8260	2-Propanol (Isopropyl alcohol)	NELAP	PA	4/24/2007
EPA 8260	4-Chlorotoluene	NELAP	PA	4/24/2007
EPA 8260	4-Isopropyltoluene (p-Isopropyltoluene)	NELAP	PA	4/24/2007
EPA 8260	4-Methyl-2-pentanone (MIBK)	NELAP	PA	4/24/2007
EPA 8260	Acetone	NELAP	PA	4/24/2007
EPA 8260	Acetonitrile	NELAP	PA	4/24/2007
EPA 8260	Acrolein (Propenal)	NELAP	PA	4/24/2007
EPA 8260	Acrylonitrile	NELAP	PA	4/24/2007
EPA 8260	Allyl chloride (3-Chloropropene)	NELAP	PA	4/24/2007
EPA 8260	Benzene	NELAP	PA	4/24/2007
EPA 8260	Bromobenzene	NELAP	PA	4/24/2007
EPA 8260	Bromochloromethane	NELAP	PA	4/24/2007
EPA 8260	Bromodichloromethane	NELAP	PA	4/24/2007
EPA 8260	Bromoform	NELAP	PA	4/24/2007
EPA 8260	Bromomethane (Methyl bromide)	NELAP	PA	4/24/2007
EPA 8260	Carbon disulfide	NELAP	PA	4/24/2007
EPA 8260	Carbon tetrachloride	NELAP	PA	4/24/2007
EPA 8260	Chlorobenzene	NELAP	PA	4/24/2007
EPA 8260	Chloroethane	NELAP	PA	4/24/2007
EPA 8260	Chloroform	NELAP	PA	4/24/2007
EPA 8260	Chloromethane (Methyl chloride)	NELAP	PA	4/24/2007
EPA 8260	Dibromochloromethane	NELAP	PA	4/24/2007
EPA 8260	Dibromochloropropane (1 2-Dibromo-3-chloropropane, DBCP)	NELAP	PA	4/24/2007
EPA 8260	Dibromomethane	NELAP	PA	4/24/2007

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Program Solid and Chemical Materials

Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 8260	Dichlorodifluoromethane (Freon 12)	NELAP	PA	4/24/2007
EPA 8260	Diethyl ether	NELAP	PA	4/24/2007
EPA 8260	Ethyl acetate	NELAP	PA	4/24/2007
EPA 8260	Ethylbenzene	NELAP	PA	4/24/2007
EPA 8260	Hexachlorobutadiene	NELAP	PA	4/24/2007
EPA 8260	Hexachloroethane	NELAP	PA	4/24/2007
EPA 8260	Iodomethane (Methyl iodide)	NELAP	PA	4/24/2007
EPA 8260	Isobutyl alcohol (2-Methyl-1-propanol)	NELAP	PA	4/24/2007
EPA 8260	Isopropylbenzene	NELAP	PA	4/24/2007
EPA 8260	Methyl tert-butyl ether (MTBE)	NELAP	PA	4/24/2007
EPA 8260	Methylene chloride (Dichloromethane)	NELAP	PA	4/24/2007
EPA 8260	Methylmethacrylate	NELAP	PA	4/24/2007
EPA 8260	Naphthalene	NELAP	PA	4/24/2007
EPA 8260	Nitrobenzene	NELAP	PA	4/24/2007
EPA 8260	Pentachloroethane	NELAP	PA	4/24/2007
EPA 8260	Styrene	NELAP	PA	4/24/2007
EPA 8260	Tetrachloroethene (PCE, Perchloroethylene)	NELAP	PA	4/24/2007
EPA 8260	Toluene	NELAP	PA	4/24/2007
EPA 8260	Trichloroethene (TCE, Trichloroethylene)	NELAP	PA	4/24/2007
EPA 8260	Trichlorofluoromethane (Freon 11)	NELAP	PA	4/24/2007
EPA 8260	Vinyl acetate	NELAP	PA	4/24/2007
EPA 8260	Vinyl chloride	NELAP	PA	4/24/2007
EPA 8260	Xylenes, total	NELAP	PA	4/24/2007
EPA 8260	cis-1 2-Dichloroethene	NELAP	PA	4/24/2007
EPA 8260	cis-1 3-Dichloropropene	NELAP	PA	4/24/2007
EPA 8260	n-Butyl alcohol (1-Butanol)	NELAP	PA	4/24/2007
EPA 8260	n-Butylbenzene	NELAP	PA	4/24/2007
EPA 8260	n-Propylbenzene	NELAP	PA	4/24/2007
EPA 8260	sec-Butylbenzene	NELAP	PA	4/24/2007
EPA 8260	tert-Butylbenzene	NELAP	PA	4/24/2007
EPA 8260	trans-1 2-Dichloroethene	NELAP	PA	4/24/2007
EPA 8260	trans-1 3-Dichloropropene	NELAP	PA	4/24/2007
EPA 8260	trans-1 4-Dichloro-2-butene	NELAP	PA	4/24/2007
EPA 8260-Extended	1,3-Cyclopentadiene	NELAP	PA	4/24/2007
EPA 8260-Extended	1-Heptanol (n-Heptanol)	NELAP	PA	4/24/2007
EPA 8260-Extended	2-Heptanone	NELAP	PA	4/24/2007

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Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 8260-Extended	2-Methylstyrene	NELAP	PA	4/24/2007
EPA 8260-Extended	Cyclohexanone	NELAP	PA	4/24/2007
EPA 8260-Extended	Dichlorofluoromethane (Freon 21)	NELAP	PA	4/24/2007
EPA 8260-Extended	Heptane	NELAP	PA	4/24/2007
EPA 8260-Extended	Hexane	NELAP	PA	4/24/2007
EPA 8260-Extended	Isopropyl alcohol (2-Propanol)	NELAP	PA	4/24/2007
EPA 8260-Extended	Tetrahydrofuran (THF)	NELAP	PA	4/24/2007
EPA 8260-Extended	Trichlorotrifluoroethane (Freon 113)	NELAP	PA	4/24/2007
EPA 8260-Extended	n-Amyl acetate (n-Pentyl acetate)	NELAP	PA	4/24/2007
EPA 8260B-Extended	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	NELAP	PA	4/24/2007
EPA 8260B-Extended	Chlorodifluoromethane (Freon 22)	NELAP	PA	4/24/2007
EPA 8270	1,2-Dinitrobenzene (1,2-DNB)	NELAP	PA	7/3/2007
EPA 8270	1,2-Diphenylhydrazine	NELAP	PA	7/3/2007
EPA 8270	2 4 5-Trichlorophenol	NELAP	PA	7/3/2007
EPA 8270	2 4 6-Trichlorophenol	NELAP	PA	7/3/2007
EPA 8270	2 4-Dichlorophenol	NELAP	PA	7/3/2007
EPA 8270	2 4-Dimethylphenol	NELAP	PA	7/3/2007
EPA 8270	2 4-Dinitrophenol	NELAP	PA	7/3/2007
EPA 8270	2 4-Dinitrotoluene (2 4-DNT)	NELAP	PA	7/3/2007
EPA 8270	2 6-Dinitrotoluene (2 6-DNT)	NELAP	PA	7/3/2007
EPA 8270	2-Chloronaphthalene	NELAP	PA	7/3/2007
EPA 8270	2-Chlorophenol	NELAP	PA	7/3/2007
EPA 8270	2-Methyl-4 6-dinitrophenol (4 6-Dinitro-2-methylphenol)	NELAP	PA	7/3/2007
EPA 8270	2-Methylnaphthalene	NELAP	PA	7/3/2007
EPA 8270	2-Methylphenol (o-Cresol)	NELAP	PA	7/3/2007
EPA 8270	2-Nitroaniline	NELAP	PA	7/3/2007
EPA 8270	2-Nitrophenol	NELAP	PA	7/3/2007
EPA 8270	3 3'-Dichlorobenzidine	NELAP	PA	7/3/2007
EPA 8270	3-Methylphenol (m-Cresol)	NELAP	PA	7/3/2007
EPA 8270	3-Nitroaniline	NELAP	PA	7/3/2007
EPA 8270	4-Bromophenyl phenyl ether	NELAP	PA	7/3/2007
EPA 8270	4-Chloro-3-methylphenol	NELAP	PA	7/3/2007
EPA 8270	4-Chloroaniline	NELAP	PA	7/3/2007
EPA 8270	4-Chlorophenyl phenyl ether	NELAP	PA	7/3/2007
EPA 8270	4-Methylphenol (p-Cresol)	NELAP	PA	7/3/2007
EPA 8270	4-Nitroaniline	NELAP	PA	7/3/2007

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Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 8270	4-Nitrophenol	NELAP	PA	7/3/2007
EPA 8270	Acenaphthene	NELAP	PA	7/3/2007
EPA 8270	Acenaphthylene	NELAP	PA	7/3/2007
EPA 8270	Aniline	NELAP	PA	7/3/2007
EPA 8270	Anthracene	NELAP	PA	7/3/2007
EPA 8270	Benzidine	NELAP	PA	7/3/2007
EPA 8270	Benzo(a)anthracene	NELAP	PA	7/3/2007
EPA 8270	Benzo(a)pyrene	NELAP	PA	7/3/2007
EPA 8270	Benzo(b)fluoranthene	NELAP	PA	7/3/2007
EPA 8270	Benzo(g h i)perylene	NELAP	PA	7/3/2007
EPA 8270	Benzo(k)fluoranthene	NELAP	PA	7/3/2007
EPA 8270	Benzoic acid	NELAP	PA	7/3/2007
EPA 8270	Benzyl alcohol	NELAP	PA	7/3/2007
EPA 8270	Butyl benzyl phthalate (Benzyl butyl phthalate)	NELAP	PA	7/3/2007
EPA 8270	Carbazole	NELAP	PA	7/3/2007
EPA 8270	Chrysene	NELAP	PA	7/3/2007
EPA 8270	Di-n-butyl phthalate	NELAP	PA	7/3/2007
EPA 8270	Di-n-octyl phthalate	NELAP	PA	7/3/2007
EPA 8270	Dibenzo(a h)anthracene	NELAP	PA	7/3/2007
EPA 8270	Dibenzofuran	NELAP	PA	7/3/2007
EPA 8270	Diethyl phthalate	NELAP	PA	7/3/2007
EPA 8270	Dimethyl phthalate	NELAP	PA	7/3/2007
EPA 8270	Diphenylamine	NELAP	PA	7/3/2007
EPA 8270	Fluoranthene	NELAP	PA	7/3/2007
EPA 8270	Fluorene	NELAP	PA	7/3/2007
EPA 8270	Hexachlorobenzene	NELAP	PA	7/3/2007
EPA 8270	Hexachlorocyclopentadiene	NELAP	PA	7/3/2007
EPA 8270	Indeno(1 2 3-cd)pyrene	NELAP	PA	7/3/2007
EPA 8270	Isophorone	NELAP	PA	7/3/2007
EPA 8270	N-Nitrosodi-n-propylamine	NELAP	PA	7/3/2007
EPA 8270	N-Nitrosodimethylamine	NELAP	PA	7/3/2007
EPA 8270	N-Nitrosodiphenylamine	NELAP	PA	7/3/2007
EPA 8270	Pentachlorophenol (PCP)	NELAP	PA	7/3/2007
EPA 8270	Phenanthrene	NELAP	PA	7/3/2007
EPA 8270	Phenol	NELAP	PA	7/3/2007
EPA 8270	Pyrene	NELAP	PA	7/3/2007

Attachment to Certificate of Accreditation 008, expiration date January 31, 2010. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

State Laboratory ID: 2-00257 **EPA Lab Code: PA00052** **(724) 772-0610**

Microbac Laboratories Inc. Pittsburgh Division
100 Marshall Drive
Warrendale, PA 15086-7554

Program Solid and Chemical Materials

Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 8270	bis(2-Chloroethoxy)methane	NELAP	PA	7/3/2007
EPA 8270	bis(2-Chloroethyl) ether	NELAP	PA	7/3/2007
EPA 8270	bis(2-Chloroisopropyl) ether	NELAP	PA	7/3/2007
EPA 8270	bis(2-Ethylhexyl) phthalate (DEHP)	NELAP	PA	7/3/2007
EPA 8270	1,2,4-Trichlorobenzene	NELAP	PA	7/3/2007
EPA 8270	1,3-Dichlorobenzene (m-Dichlorobenzene)	NELAP	PA	7/3/2007
EPA 8270	1,4-Dichlorobenzene (p-Dichlorobenzene)	NELAP	PA	7/3/2007
EPA 8270	Hexachlorobutadiene	NELAP	PA	7/3/2007
EPA 8270	Hexachloroethane	NELAP	PA	7/3/2007
EPA 8270	Naphthalene	NELAP	PA	7/3/2007
EPA 8270	Nitrobenzene	NELAP	PA	7/3/2007
EPA 8270	Pyridine	NELAP	PA	7/3/2007
EPA 8270-Extended	Dichloramine-T (p-Toluenesulfondichloramide)	NELAP	PA	7/3/2007
EPA 8270-Extended	Indene	NELAP	PA	7/3/2007
EPA 8270-Extended	n-Decane	NELAP	PA	7/3/2007
EPA 8270-Extended	n-Octadecane	NELAP	PA	7/3/2007
EPA 8310	Acenaphthene	NELAP	PA	7/3/2007
EPA 8310	Acenaphthylene	NELAP	PA	11/26/2007
EPA 8310	Anthracene	NELAP	PA	7/3/2007
EPA 8310	Benzo(a)anthracene	NELAP	PA	7/3/2007
EPA 8310	Benzo(a)pyrene	NELAP	PA	7/3/2007
EPA 8310	Benzo(b)fluoranthene	NELAP	PA	7/3/2007
EPA 8310	Benzo(g h i)perylene	NELAP	PA	7/3/2007
EPA 8310	Benzo(k)fluoranthene	NELAP	PA	7/3/2007
EPA 8310	Chrysene	NELAP	PA	7/3/2007
EPA 8310	Dibenzo(a h)anthracene	NELAP	PA	7/3/2007
EPA 8310	Fluoranthene	NELAP	PA	7/3/2007
EPA 8310	Fluorene	NELAP	PA	7/3/2007
EPA 8310	Indeno(1 2 3-cd)pyrene	NELAP	PA	7/3/2007
EPA 8310	Phenanthrene	NELAP	PA	7/3/2007
EPA 8310	Pyrene	NELAP	PA	7/3/2007
EPA 8310	Naphthalene	NELAP	PA	7/3/2007
EPA 9010	Total cyanide	NELAP	PA	3/13/2007
EPA 9014	Total cyanide	NELAP	PA	7/3/2007
EPA 9023	Extractable organic halides (EOX)	NELAP	PA	7/3/2007
EPA 9038	Sulfate	NELAP	PA	7/3/2007

Attachment to Certificate of Accreditation 008, expiration date January 31, 2010. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

State Laboratory ID: 2-00257 **EPA Lab Code: PA00052** **(724) 772-0610**

Microbac Laboratories Inc. Pittsburgh Division
100 Marshall Drive
Warrendale, PA 15086-7554

Program Solid and Chemical Materials

Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 9045	pH	NELAP	PA	3/13/2007
EPA 9065	Total phenolics	NELAP	PA	7/3/2007
EPA 9071	Oil and Grease	NELAP	PA	6/23/2008
EPA 9095A	Paint filter liquids test	NELAP	PA	7/3/2007
EPA 9211	Bromide	NELAP	PA	7/3/2007
EPA 9214	Fluoride	NELAP	PA	3/13/2007
EPA 9251	Chloride	NELAP	PA	7/3/2007
SM 2540 G	Residue-total	NELAP	PA	7/3/2007
SM 2540 G	Residue-volatile	NELAP	PA	7/3/2007
SM 3500-Cr B (20th ed.)	Chromium VI	NELAP	PA	3/31/2008
SM 4500-NO3- F (discrete)	Nitrite	NELAP	PA	3/31/2008
SM 4500-Norg B	Kjeldahl nitrogen, total (TKN)	NELAP	PA	7/3/2007
SM 4500-Norg C	Kjeldahl nitrogen, total (TKN)	NELAP	PA	3/28/2008
SM 4500-P B	Orthophosphate as P	NELAP	PA	7/3/2007
SM 4500-P F (discrete)	Orthophosphate as P	NELAP	PA	3/31/2008
SM 5520 F	Total petroleum hydrocarbons (TPH)	NELAP	PA	7/3/2007
SM 9221 B + EPA 625/R-92/013 Appendix F	Fecal coliforms (Enumeration)	NELAP	PA	7/3/2007
SM 9260 D + EPA 625/R-92/013 Appendix F	Salmonella (Enumeration)	NELAP	PA	7/3/2007

Scott Blauvelt

From: Harrick, Joseph [jharrick@penn-er.com]
Sent: Thursday, February 11, 2010 10:07 AM
To: Scott Blauvelt
Subject: FW: Pace Pittsburgh
Attachments: Pace-Pgh Cert. List.pdf; PA Cert. Enviro & Rad (13) 3-31-2010.pdf; PASI-PGH QAM Rev 12.0 Uncontrolled Copy #45.pdf

Scott,

Attached is Pace Labs QA manual along with additional certification information. Let me know if there is anything else you need. I'll forward final lab reports for the December drill fluid samples as soon as I receive them.

Joe

Joseph M. Harrick

Vice President

Penn E&R

Phone: 724 934-3530

Cell: 304 670-7110

From: Adrinnia Washington [mailto:Adrinnia.Washington@pacelabs.com]
Sent: Thursday, February 11, 2010 9:27 AM
To: Harrick, Joseph
Subject: Pace Pittsburgh

Mr. Harrick
I have attached the information you requested. If you need any additional document let us know.
Thanks

Adrinnia S. Washington
Quality Analyst III

Pace Analytical Services - Pittsburgh
1638 Roseytown Road

Suites 2, 3 & 4
Greensburg, PA 15601
Phone: 724-850-5600
Direct Line: 724-850-5623
Fax: 724-850-5601
www.pacelabs.com
email: Adrinnia.Washington@pacelabs.com

Pace Analytical®
www.pacelabs.com

Pace Analytical Servic , Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

CERTIFICATIONS

Pennsylvania Certification IDs
1638 Roseytown Road Suites 2,3&4 Greensburg, PA 15601
Wyoming Certification #: 8TMS-Q
Wisconsin/PADEP Certification
West Virginia Certification #: 143
Washington Certification #: C1941
Virginia Certification #: 00112
Virgin Island/PADEP Certification
Utah/NELAC Certification #: ANTE
Texas/NELAC Certification #: T104704188-09 TX
Tennessee Certification #: TN2867
South Dakota Certification
Puerto Rico Certification #: PA01457
Pennsylvania/NELAC Certification #: 65-282
Oregon/NELAC Certification #: PA200002
North Carolina Certification #: 42706
New York/NELAC Certification #: 10888
New Mexico Certification
New Jersey/NELAC Certification #: PA 051
New Hampshire/NELAC Certification #: 2976
Nevada Certification
Montana Certification #: Cert 0082
Missouri Certification #: 235
Minnesota Certification #: 042-999-425
Michigan/PADEP Certification
Massachusetts Certification #: M-PA1457
Maryland Certification #: 308
Maine Certification #: PA0091
Louisiana/NELAC Certification #: LA080002
Louisiana/NELAC Certification #: 4086
Kentucky Certification #: 90133
Kansas/NELAC Certification #: E-10358
Iowa Certification #: 391
Indiana/PADEP Certification
Illinois/PADEP Certification
Idaho Certification
Hawaii/PADEP Certification
Guam/PADEP Certification
Georgia Certification #: 968
Florida/NELAC Certification #: E87683
Delaware Certification
Connecticut Certification #: PH 0694
Colorado Certification
California/NELAC Certification #: 04222CA
Arkansas Certification
Arizona Certification #: AZ0734
Alabama Certification #: 41590

Pace Analytical™

Uncontrolled Copy #045

QUALITY ASSURANCE MANUAL

Quality Assurance/Quality Control
Policies and Procedures
Revision 12.0

Pace Analytical Services – Pittsburgh
1638 Roseytown Road
Suites 2, 3 & 4
Greensburg, PA 15601
(724)-850-5600

CORPORATE APPROVAL

Steve A. Vanderboom — Date 1/29/2009
President, CEO
1700 Elm Street SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

Bruce Warden — Date 1/29/09
Director of Quality, Safety, and Training
1700 Elm Street SE, Suite 200
Minneapolis, MN 55414
(612) 607-1700

PACE ANALYTICAL SERVICES – PITTSBURGH
LOCAL APPROVAL

This document has been approved as the Quality Assurance Manual, effective 2/17/09, as indicated by the following signatures:

Harry M. Borg — 2/17/09
Laboratory General Manager — Date
(724)-850-5600

Randal T. Hii — 2/17/09
Laboratory Quality Manager — Date
(724)-850-5600

Valerie B Lambert — 2/13/09
Administrative Business Manager — Date
(724)-850-5600

Penelope J. Westrick — 2/13/09
Client Services Manager — Date
(724)-850-5600

2/13/09
Radiochemistry Department Manager — Date
(724)-850-5600

2/13/09
General Chemistry Department Supervisor — Date
(724)-850-5600

Paul M. Moore — 2/13/2009
Metals Department Supervisor — Date
(724)-850-5600

2-13-2009
Organics Department Supervisor — Date
(724)-850-5600

Table of Contents

1.0 INTRODUCTION AND ORGANIZATIONAL STRUCTURE

"Working together to protect our environment and improve our health"

Pace Analytical Services Inc. - Mission Statement

Introduction to PASI

Pace Analytical Services, Inc. (PASI) is a privately held, full-service analytical testing firm operating a nationwide system of laboratories. PASI offers extensive services beyond standard analytical testing, including: bioassay for aquatic toxicity, air toxics, industrial hygiene testing, explosives, high resolution mass spectroscopy (including dioxins, furans and coplanar PCB's), radiochemical analyses, product testing, pharmaceutical testing, field services and mobile laboratory capabilities. PASI has implemented a consistent Quality System in each of its laboratories and service centers. In addition, the company utilizes an advanced data management system that is highly efficient and allows for flexible data reporting. Together, these systems ensure data reliability and superior on-time performance. This document defines the Quality System and QA/QC protocols.

Our goal is to combine our expertise in laboratory operations with customized solutions to meet the specific needs of our customers.

Statement of Purpose

To meet the business needs of our customers for high quality, cost-effective analytical measurements and services.

Quality Policy Statement and Goals of the Quality System

The PASI management is committed to maintaining the highest possible standard of service for our customers by following a documented quality system. The overall objective of this quality system is to provide reliable data through adherence to rigorous quality assurance policies and quality control procedures as documented in this Quality Assurance Manual.

All personnel within the PASI network are required to be familiar with all facets of the quality system and implement these policies and procedures in their daily work. This daily focus on quality is applied with initial project planning, continued through all field and laboratory activities, and is ultimately included in the final report generation.

PASI management demonstrates its commitment to quality by providing the resources, including facilities, equipment and personnel to ensure the adherence to these documented policies and procedures and to promote the continuous improvement of the quality system. All PASI personnel comply with all current applicable state, federal, and industry standards (such as the NELAC and ISO 17025 standards).

Pace Analytical Services Core Values

- INTEGRITY
- VALUE EMPLOYEES
- KNOW OUR CUSTOMERS
- HONOR COMMITMENTS
- FLEXIBLE RESPONSE TO DEMAND
- PURSUE OPPORTUNITIES
- CONTINUOUSLY IMPROVE

Code of Ethics

PASI's fundamental ethical principles are as follows:

- Each PASI employee is responsible for the propriety and consequences of his or her actions.
- Each PASI employee must conduct all aspects of Company business in an ethical and strictly legal manner, and must obey the laws of the United States and of all localities, states and nations where PASI does business or seeks to do business.
- Each PASI employee must reflect the highest standards of honesty, integrity and fairness on behalf of the Company with customers, suppliers, the public, and one another.

Strict adherence by each PASI employee to this Code of Ethics and to the Standards of Conduct is essential to the continued vitality of PASI.

Failure to comply with the Code of Ethics and Standards of Conduct will result in disciplinary action up to and including termination and referral for civil or criminal prosecution where appropriate. An employee will be notified of an infraction and given an opportunity to explain, as prescribed under current disciplinary procedures.

Standards of Conduct

1.1.1 Data Integrity

The accuracy and integrity of the analytical results produced at PASI are the cornerstones of the company. Lack of data integrity is an assault on our most basic values and puts PASI and its employees at grave financial and legal risk. Therefore, employees are to accurately prepare and maintain all technical records, scientific notebooks, calculations and databases. Employees are prohibited from making false entries or misrepresentations of data (e.g., dates, calculations, results or conclusions).

Managerial staff must make every effort to ensure that personnel are free from any undue pressures that may affect the quality or integrity of their work; including commercial, financial, over-scheduling and working condition pressures.

1.1.2 Confidentiality

PASI employees must not (directly or indirectly) use or disclose confidential or proprietary information except when in connection with their duties at PASI. This is effective over the course of employment and for a period of two years thereafter.

Confidential or proprietary information, belonging to either PASI and/or its customers, includes but is not limited to test results, trade secrets, research and development matters, procedures, methods, processes and standards, company-specific techniques and equipment, marketing and customer information, inventions, materials composition, etc.

1.1.3 Conflict of Interest

PASI employees must avoid situations that might involve a conflict of interest or appear questionable to others. The employee must be careful in two general areas:

- Participation in activities that conflict or appear to conflict with PASI responsibilities.
- Offering or accepting anything that might influence the recipient or cause another person to believe that the recipient may be influenced. This includes bribes, kickbacks or illegal payments.

Employees are not to engage in outside business or economic activity relating to a sale or purchase by the Company. Other questionable activities include service on the Board of Directors of a competing or supplier company, significant ownership in a competing or supplier company, employment for a competing or supplier company or participation in any outside business during the employee's work hours.

1.1.4 Compliance

All employees are required to read, understand and comply with the various components of the standards listed in this document. As confirmation that they understand this responsibility, each employee is required to sign an acknowledgment form (either hardcopy or in electronic database) annually (or as revisions become finalized) that becomes part of the employee's permanent record. Employees will be held accountable for complying with the Quality Systems as summarized in the Quality Assurance Manual.

Laboratory Organization

The PASI Corporate Office centralizes company-wide accounting, business development, financial management, human resources development, information systems, marketing, quality, safety, and training activities. PASI's Director of Quality, Safety & Training is responsible for assisting the development, implementation and monitoring of quality programs for the company. See Attachment IIB for the Corporate Organizational structure.

Each laboratory within the system operates with local management, but all share common systems and receive support from the Corporate Office.

A General Manager (GM) supervises each regional laboratory. Some operations may have an Assistant General Manager (AGM) in situations where the General Manager is responsible for multiple laboratory facilities and is not necessarily in the facility on a regular basis. Quality Managers (QM) at each lab report directly to their General Manager (or Assistant General Manager) but receive guidance and direction from the Director of Quality, Safety & Training.

The General Manager bears the responsibility for the laboratory operations and serves as the final, local authority in all matters. In the absence of the General Manager (and an Assistant General Manager), the Quality Manager serves as the next in command. He or she assumes the responsibilities of the GM until the GM is available to resume the duties of their position. In the absence of the GM and QM, management responsibility of the laboratory is passed to the Technical Director – provided such a position is identified – and then to the most senior department manager until the return of the GM or QM. The most senior department manager in charge may include the Client Services Manager or the Administrative Business Manager at the discretion of the General Manager.

A Technical Director who is absent for a period of time exceeding 15 consecutive calendar days shall designate another full-time staff member meeting the qualifications of the technical director to temporarily perform this function. The laboratory General Manager or Quality Manager has the authority to make this designation in the event the existing Technical Director is unable to do so. If this absence exceeds 65 consecutive calendar days, the primary accrediting authority shall be notified in writing.

The Quality Manager has the responsibility and authority to ensure the Quality System is implemented and followed at all times. In circumstances where a laboratory is not meeting the established level of quality or following the policies set for in this Quality Assurance Manual, the Quality Manager has the authority to halt laboratory operations should he or she deem such an action necessary. The QM will immediately communicate the halting of operations to the GM and keep him or her posted on the progress of corrective actions. In the event the GM and QM are not in agreement as to the need for the suspension, the Chief Operating Officer and Director of Quality, Safety and Training will be called in to mediate the situation.

Under the direction of the General Manager, the technical staff of the laboratory is generally organized into the following functional groups:

- Organic Sample Preparation
- Wet Chemistry Analysis
- Metals Analysis
- Volatiles Analysis
- Semi-volatiles Analysis
- Radiochemical Analysis
- Product Testing
- Equipment Maintenance
- Microbiology

Appropriate support groups are present in each laboratory. The actual organizational structure for PASI – Pittsburgh is listed in Attachment IIA. In the event of a change in General Manager, Quality Manager or Technical Director(s), the laboratory will notify its accrediting authorities and revise the organizational chart in the Quality Assurance Manual (QAM) within 30 days. For changes in Department Managers or Supervisors or other laboratory personnel, no notifications will be sent to the laboratory's accrediting agencies; changes to the organizational chart will be updated during or prior to the annual review process. Changes or additions in these key personnel will also be noted by the additional signatures on the QAM Local Approval page. In any case, the QAM will remain in effect until the next scheduled revision.

Laboratory Job Descriptions

1.1.5 Senior General Manager

1. Oversees all functions of all the operations within their designated region.
2. Oversees the development of local General Managers within their designated region.
3. Oversees and authorizes personnel development including staffing, recruiting, training, workload scheduling, employee retention and motivation.
4. Oversees the preparation of budgets and staffing plans for all operations within their designated region.
5. Ensures compliance with all applicable state, federal and industry standards.

1.1.6 General Manager

1. Oversees all functions of the operations.
2. Authorizes personnel development including staffing, recruiting, training, workload scheduling, employee retention and motivation.
3. Prepares budgets and staffing plans.
4. Monitors the Quality Systems of the laboratory and advises the Quality Manager accordingly.
5. Ensures compliance with all applicable state, federal and industry standards.

1.8.2 Assistant General Manager / Operations Manager

1. In the absence of the GM, performs all duties as listed above for the General Manager.
2. Oversees the daily production and quality activities of the department.
3. Manages department and works with staff to ensure department objectives are met.
4. Works with other departments to ensure capacity and customer expectations are accurately understood and met.
5. Works with General Manager to prepare appropriate budget and staffing plans for the department.

6. Responsible for prioritizing personnel and production activities within the department.
7. Performs formal and informal performance reviews of departmental staff.

1.8.3 Quality Manager

1. Oversees the laboratory Quality Systems while functioning independently from laboratory operations. Reports directly to the General Manager.
2. Monitors Quality Assurance policies and Quality Control procedures to ensure that the laboratory achieves established standards of quality.
3. Maintains records of quality control data and evaluates data quality.
4. Conducts periodic internal audits and coordinates external audits performed by regulatory agencies or customer representatives.
5. Reviews and maintains records of proficiency testing results.
6. Maintains the document control system
7. Assists in development and implementation of appropriate training programs.
8. Provides technical support to laboratory operations regarding methodology and project QA/QC requirements.
9. Maintains certifications from federal and state programs.
10. Ensures compliance with all applicable state, federal and industry standards.
11. Maintains the laboratory training records, including those in the Learning Management System (LMS).

1.8.4 Technical Director

1. Monitors the standards of performance in quality assurance and quality control data
2. Monitors the validity of analyses performed and data generated.
3. Reviews tenders, contracts and QAPPs to ensure the laboratory can meet the data quality objectives for any given project
4. Serves as the general manager of the laboratory in the absence of the GM, AGM and QM.
5. Provides technical guidance in the review, development and validation of new methodologies.

1.8.5 Administrative Business Manager

1. Responsible for financial and administrative management for the entire facility.
2. Provides input relative to tactical and strategic planning activities.
3. Organizes financial information so that the facility is run as a fiscally responsible business.
4. Works with staff to confirm that appropriate processes are put in place to track revenues and expenses.
5. Provide ongoing financial information to the General Manager and the management team so they can better manage their business.
6. Utilizes historical information and trends to accurately forecast future financial positions.
7. Works with management to ensure that key measurements (mileposts) are put in place to be utilized for tread analysis—this will include personnel and supply expenses, and key revenue and expense ratios.
8. Works with General Manager to develop accurate budget and track on an ongoing basis.
9. Works with entire management team to submit complete and justified capital budget requests and to balance requests across departments.
10. Works with project management team and administrative support staff to ensure timely and accurate invoicing.

1.8.6 Client Services Manager

1. Oversees all the day to day activities of the Client Services Department which includes Project Management and, possibly, Sample Control.

2. Responsible for staffing and all personnel management related issues for Client Services.
3. Serves as the primary senior consultant to customers on all project related issues such as set up, initiation, execution and closure.
4. Performs or is capable of performing all duties listed for that of Project Manager.

1.8.7 Project Manager

1. Coordinates daily activities including taking orders, reporting data and analytical results.
2. Serves as the primary technical and administrative liaison between customers and PASI.
3. Communicates with operations staff to update and set project priorities.
4. Provides results to customers in the requested format (verbal, hardcopy, electronic, etc.).
5. Works with customers, laboratory staff, and other appropriate PASI staff to develop project statements of work or resolve problems of data quality.
3. Responsible for solicitation of work requests, assisting with proposal preparation and project initiation with customers and maintain customer records.
4. Mediation of project schedules and scope of work through communication with internal resources and management.
5. Responsible for preparing routine and non-routine quotations, reports and technical papers.
6. Interfaces between customers and management personnel to achieve customer satisfaction.
7. Manages large-scale complex projects.
8. Supervises less experienced project managers and provide guidance on management of complex projects.
6. Arranges bottle orders and shipment of sample kits to customers.
7. Verifies login information relative to project requirements and field sample Chains-of-Custody.

1.8.8 Project Coordinator

1. Responsible for preparation of project specifications and provides technical/project support.
2. Coordinates project needs with other department sections and assists with proposal preparation.
3. Prepares routine proposals and invoicing.
4. Responsible for scanning, copying, assembling and binding final reports.
5. Other duties include filing, maintaining forms, process outgoing mail, maintaining training database and data entry.

1.8.8 Department Manager/Supervisor

1. Oversees the day-to-day production and quality activities of their assign department.
2. Ensures that quality assurance and quality control criteria of analytical methods and projects are satisfied.
3. Assesses data quality and takes corrective action when necessary.
4. Approves and releases technical and data management reports.
5. Ensures compliance with all applicable state, federal and industry standards.

1.8.9 Group Leader/Supervisor

1. Trains analysts in laboratory operations and analytical procedures.
1. Organizes and schedules analyses with consideration for sample holding times.
2. Implements data verification procedures by assigning data verification duties to appropriate personnel.
3. Evaluates instrument performance and supervises instrument calibration and preventive maintenance programs.
4. Reports non-compliance situations to laboratory management including the Quality Manager.

1.8.10 Laboratory Analyst

1. Performs detailed preparation and analysis of samples according to published methods and laboratory procedures.
2. Processes and evaluates raw data obtained from preparation and analysis steps.
3. Generates final results from raw data, performing primary review against method criteria.
4. Monitors quality control data associated with analysis and preparation. This includes examination of raw data such as chromatograms as well as an inspection of reduced data, calibration curves, and laboratory notebooks.
5. Reports data in LIMS, authorizing for release pending secondary approval.
6. Conducts routine and non-routine maintenance of equipment as required.
7. Performs or is capable of performing all duties associated with that of Laboratory Technician.

1.8.11 Laboratory Technician

1. Prepares standards and reagents according to published methods or in house procedures.
2. Performs preparation and analytical steps for basic laboratory methods.
3. Works under the direction of a Laboratory Analyst on complex methodologies.
4. Assists Laboratory Analysts on preparation, analytical or data reduction steps for complex methodologies.
5. Monitors quality control data as required or directed. This includes examination of raw data such as chromatograms as well as an inspection of reduced data, calibration curves, and laboratory notebooks.

1.8.12 Field Technician

1. Prepares and samples according to published methods, PASI Quality Assurance Manual and/or customer directed sampling objectives.
2. Capable of the collection of representative environmental or process related air samples.
3. Use computer software to compile, organize, create tables, create graphics and write test reports.
4. Reviews project documentation for completeness, method compliance and contract fulfillment.
5. Train less experienced environmental technicians and provide guidance on sampling and analysis.
6. Responsible for project initiation and contact follow-up.
7. Develop sampling plans and prepare test plan documents.

1.8.13 Field Analyst

1. Analyzes field samples according to published methods, PASI Quality Assurance Manual and/or customer directed sampling objectives.
2. Capable of the collection and analysis of representative environmental or process related air samples.
3. Proficient in a variety of analytical tests; specifically on-site gas-phase organic and inorganic compounds by extractive fourier transform infrared spectroscopy (FTIR).
4. Train less experienced staff and provide guidance on FTIR sampling and analysis.
5. Assist in reporting tasks and project management responsibilities.
6. Perform back-up support for manager tasks such as reporting needs and customer concerns.

1.8.14 Sample Management Personnel

1. Signs for incoming samples and verifies the data entered on the Chain-of-Custody forms.

2. Enters the sample information into the Laboratory Information Management System (LIMS) for tracking and reporting.
3. Stages samples according to EPA requirements.
4. Assists Project Managers and Coordinators in filling bottle orders and sample shipments.

1.8.15 Systems Administrator or Systems Manager

1. Assists with the creation and maintenance of electronic data deliverables (EDDs).
2. Coordinates the installation and use of all hardware, software and operating systems.
3. Performs troubleshooting on all aforementioned systems.
4. Trains new and existing users on systems and system upgrades.
5. Maintains all system security passwords.
6. Maintains the electronic backups of all computer systems.

1.8.16 Safety/Chemical Hygiene Officer

1. Maintains the laboratory Chemical Hygiene Plan.
2. Plans and implements safety policies and procedures.
3. Maintains safety records.
4. Organizes and/or performs safety training.
5. Performs safety inspections and provides corrective/preventative actions.
6. Assists personnel with safety issues (e.g. personal protective equipment).

1.8.17 Waste Coordinator

1. Evaluates waste streams and helps to select appropriate waste transportation and disposal companies.
2. Maintains complete records of waste disposal including waste manifests and state reports.
3. Assists in training personnel on waste-related issues such as waste handling and storage, waste container labeling, proper satellite accumulation, secondary containment, etc.
4. Conducts a weekly inspection of the waste storage areas of the lab.

1.9 Training and Orientation

Each new employee receives a five part orientation: human resources, ethics and data integrity, safety, Quality Systems, and departmental.

The human resources orientation includes benefits, salary, and company policies. All records are stored with Human Resources.

The ethics and data integrity training covers the obligations of each employee to ensure the defensibility of laboratory data. Employees are provided with general policies related to ethics in the laboratory and specific examples of improper practices that are unacceptable in any PASI facility. The employee is trained to make the right decisions with regards to laboratory practices and where to go for answers in circumstances where they may be unclear as to the correct protocol.

The safety orientation includes an in-depth review of the PASI Chemical Hygiene Plan/Safety Plan, which are consistent with the requirements of OSHA's Hazard Communication Program (29 CFR 1910.1200) and other pertinent regulations.

The Quality Systems orientation provides the new employee with information through an introduction to the Quality Assurance Manual and SOPs, acceptable record keeping practices, and the individual's responsibility to data quality. Quality Systems training is reinforced with the new employee as specific topics are covered during the departmental or analytical method training. Quality Systems training will address policies and practices that ensure the quality and defensibility of the analytical data. These topics include but are not

limited to traceability of measurements, method calibration, calibration verification, accuracy, precision and uncertainty of measurements, corrective actions, documentation and root cause analysis.

The new employee's Department Supervisor provides the employee with a basic understanding of the role of the laboratory within the structure of PASI and the basic elements of that individual's position.

Supervised training uses the following techniques:

- Hands-on training
- Training checklists
- Lectures and training sessions
- Method-specific training
- Conferences and seminars
- Short courses
- Specialized training by instrument manufacturers
- Proficiency testing programs.

Group Supervisors/Leaders are responsible for providing documentation of training and proficiency for each employee under their supervision. The employee's training file indicates what procedures an analyst or a technician is capable of performing, either independently or with supervision. The files also include documentation of continuing capability (see Section 3.4 for details on Demonstration of Capability requirements). Training documentation files for each person are maintained by the Quality Office either in hardcopy format or within the Learning Management System (LMS).

All procedures and training records are maintained and available for review during laboratory audits. These procedures are reviewed/updated periodically by lab management. Additional information can be found in SOPPGH-C-002 Training of Laboratory Personnel or its equivalent revision or replacement.

1.10 Laboratory Safety

It is the policy of PASI to make safety and health an integral part of daily operations and to ensure that all employees are provided with safe working conditions, personal protective equipment, and requisite training to do their work without injury. Each employee is responsible for his/her own safety by complying with established company rules and procedures. These rules and procedures as well as a more detailed description of the employees' responsibilities are contained in the corporate Safety Manual and Chemical Hygiene Plan.

1.11 Security and Confidentiality

Security is maintained by controlled access to laboratory buildings. Exterior doors to laboratory buildings remain either locked or continuously monitored by PASI staff. Posted signs direct visitors to the reception office and mark all other areas as off limits to unauthorized personnel. All visitors to the facility must sign the Visitor's Logbook maintained by the receptionist. A staff member will accompany them during the duration of their stay on the premises unless the GM, QM or TD specify otherwise. In this instance, the staff member will escort the visitor back to the reception area at the end of his/her visit where he/she signs out. The last staff member to leave their department for the day should ensure that all outside access points to that area are secure.

Additional security is provided where necessary, e.g., specific secure areas for sample, data and customer report storage, as requested by customers or cases where national security is of concern. These areas are lockable within the facilities, or are in secure offsite storage. Access is limited to specific individuals or their designees. Security of sample storage areas is the responsibility of the Sample Custodian. Security of samples and data during analysis and data reduction is the responsibility of Group Supervisors. Security of customer

report archives is the responsibility of the Client Services Manager. These secure areas are locked whenever these individuals or their designees are not present in the facility.

Access to designated laboratory sample storage locations is limited to authorized personnel only. Provisions for lock and key access are provided. No samples are to be removed without proper authorization. If requested by customer or contract, samples are not to be removed from secure storage areas without filling out the associated internal Chain-of-Custody records.

Standard business practices of confidentiality are applied to all documents and information regarding customer analyses. Specific protocols for handling confidential documents are described in PASI SOPs. Additional protocols for internal identification of samples and data by number only are implemented as required under contract specific Quality Assurance Project Plans (QAPPs).

All information pertaining to a particular customer, including national security concerns will remain confidential. Data will be released to outside agencies only with written authorization from the customer or where federal or state law requires the company to do so (i.e. federal or state subpoena).

2.0 SAMPLE CUSTODY

2.1 Sampling Support

Each individual PASI laboratory provides shipping containers, sample containers (including applicable chemical preservatives), custody documents, and field quality control samples (e.g., trip blanks) to support field-sampling events. Guidelines for sample container types, preservatives, and holding times for a variety of methods are listed in Attachment VIII. Note that all analyses listed are not necessarily performed at all PASI and there may be additional laboratory analyses performed that are not included in these tables. PASI – Pittsburgh may provide pick-up and delivery services to their customers when needed.

Any sampling activities conducted by laboratory field personnel are conducted with the expectation that they will be made for routine monitoring purposes, unless specifically stated to the contrary prior to the field investigation. Therefore, the use of proper sampling procedures cannot be overemphasized. The collection of representative samples depends upon:

- Ensuring that the samples taken are representative of the material or medium being sampled;
- Using proper sampling, sample handling, preservation, and quality control techniques;
- Properly identifying the collected samples and documenting their collection in field records;
- Maintaining sample chain-of-custody; and
- Protecting the collected samples by properly packing and transporting them to the laboratory for analysis.

2.2 Field Services Division

Pace Analytical has a large Field Services Division which is based in their Minneapolis facility as well as limited field service capabilities in some of the other facilities. Field Services provides comprehensive nationwide service offerings including:

- Stack Testing
- Ambient Air
- CEM Certification Testing
- Air Quality Monitoring
- Onsite Analytical Services- FTIR and GC
- Real-time Process Diagnostic/Optimization Testing
- Wastewater, Groundwater and Drinking Water Monitoring
- Storm water and Surface Water Monitoring
- Soil and Waste Sampling
- Mobile Laboratory Services

The Field Services Division operates under the PASI Corporate Quality System, with applicable and necessary provisions to address the activities, methods, and goals specific to Field Services for a unit specific Quality Program. All procedures and methods used by Field Services are documented in Standard Operating Procedures and Procedure Manuals.

2.3 Project Initiation

Prior to accepting new work, the laboratory reviews performance capability. The laboratory establishes that sufficient resources (personnel, equipment capacity, analytical method capability, etc.) are available

to complete the required work. The customer needs and data quality objectives are defined and appropriate environmental test methods are assured to meet customer's requirements by project managers or sales representative. Project Managers review laboratory certifications. Members of the management staff review current instrument capacity, personnel availability and training, analytical procedures capability and projected sample load. Management then informs the sales and client services personnel whether or not the laboratory can accept the new project via written correspondence, email, and/or daily operations meetings.

The laboratory maintains records of all such reviews, including discussions with customers. Routine analytical project documentation of quotes, notes, dates, initials and/or recordings is maintained in a project folder by project management. Conditions for new and more complex contracts are determined by the General Managers and sales representatives. Quality Management is consulted on technical requirements and operations staff provides input on volume capacities. Evidence of these reviews is maintained in the form of awarded Request for Proposals (RFPs), signed quotes or contracts, and a Customer Relationship Management (CRM) database. If a review identifies a potential mismatch between customer requirements and laboratory capabilities and/or capacities, Pace will specify its level of commitment by listing these exceptions to the requirements within the RFP, quote or contract.

Additional information regarding specific procedures for reviewing new work requests can be found in SOP S-ALL-Q-006 *Review of Analytical Requests* or its equivalent revision or replacement.

2.4 Chain-Of-Custody

A chain-of-custody (COC) (see Attachment VII) document provides the legal documentation of samples from time of collection to completion of analysis. Importance is stressed on completeness of COCs. PASI has implemented Standard Operating Procedures to ensure that sample custody traceability and responsibility objectives are achieved for every project.

Field personnel or client representatives complete a chain-of-custody form for all samples. Samples are received by the laboratory accompanied by these forms.

If sample shipments are not accompanied by the correct documentation, the Sample Receiving department notifies a Project Manager. The Project Manager then obtains the correct documentation/information from the customer in order for analysis of samples to proceed.

The sampler is responsible for providing the following information on the chain-of-custody form:

- Customer project name
- Project location or number
- Field sample number/identification
- Date and time sampled
- Sample type (matrix)
- Preservative
- Requested analyses
- Sampler signature
- Relinquishing signature
- Date and time relinquished
- Sampler remarks (if applicable)
- Custody Seal Number (if applicable)
- Regulatory Program Designation
- The state where the samples were collected to ensure all applicable state requirements are met
- Turnaround time requested
- Purchase order number

The record is filled out completely and legibly with indelible ink. Errors are corrected by drawing a single line through the initial entry and initialing and dating the change. All transfers of samples are recorded on the chain-of-custody in the "relinquished" and "received by" sections. All information except signatures is printed.

Additional information can be found in SOP PGH-C-001 Sample Management or its equivalent revision or replacement.

2.5 Sample Acceptance Policy

In accordance with regulatory guidelines, PASI complies with the following sample acceptance policy for all samples received.

If the samples do not meet the sample receipt acceptance criteria outlined below, the laboratory is required to document all non-compliances, contact the customer, and either reject the samples or fully document any decisions to proceed with analyses of samples which do not meet the criteria. Any results reported from samples not meeting these criteria are appropriately qualified on the final report.

All samples must:

- Have unique customer identification that are clearly marked with durable waterproof labels on the sample containers and that match the chain of custody.
- Have clear documentation on the chain of custody related to the location of the sampling site with the time and date of sample collection.
- Have the sampler's name and signature
- Have the requested analyses clearly marked
- Have clear documentation of any special analysis requirements (data deliverables, etc.);
- Be in appropriate sample containers with clear documentation of the preservatives used.
- Be correctly preserved unless method allows for laboratory preservation.
- Be received within holding time. Any samples with hold times that are exceeded will not be processed without prior customer permission.
- Have sufficient sample volume to proceed with the analytical testing. If insufficient sample volume is received, analysis will not proceed without customer approval.
- Be received within appropriate temperature ranges - not frozen but =6°C (See Note 1), unless program requirements or customer contractual obligations mandate otherwise (see Note 2). The cooler temperature is recorded directly on the COC and the SCUR. Samples that are delivered to the lab immediately after collection are considered acceptable if there is evidence that the chilling process has been started, for example by the arrival of the samples on ice. If samples arrive that are not compliant with these temperature requirements, the customer will be notified. The analysis will NOT proceed unless otherwise directed by the customer. If less than 72 hours remain in the hold time for the analysis, the analysis may be started while the customer is contacted to avoid missing the hold time. Data will be appropriately qualified on the final report.

  Note 1: Temperature will be read and recorded based on the precision of the measuring device. For example, temperatures obtained from a thermometer graduated to 0.1°C will be read and recorded to ±0.1°C. Measurements obtained from a thermometer graduated to 0.5°C will be read to ±0.5°C. Measurements read at the specified precision are not to be rounded down to meet the =6°C limit (i.e. 6.2°C rounded and recorded as 6°C).

  Note 2: Some microbiology methods allow sample receipt temperatures of up to 10°C. Consult the specific method for microbiology samples received above 6°C prior to initiating corrective action for out of temperature preservation conditions.

Upon sample receipt, the following items are also checked and recorded:

- Presence of custody seals or tapes on the shipping containers
- Sample condition: Intact, broken/leaking
- Sample holding time
- Sample pH when required
- Appropriate containers

Samples for drinking water analysis that are improperly preserved, or are received past holding time, are rejected at the time of receipt, with the exception of VOA samples that are tested for pH at the time of analysis.

Additional information can be found in SOPPGH-C-001 **Sample Management** or its equivalent revision or replacement.

2.6 Sample Log-in

After sample inspection, all sample information on the chain-of-custody is entered into the Laboratory Information Management System (LIMS).

This permanent record documents receipt of all sample containers including:

- Customer name and contact
- Customer number
- Pace Analytical project number
- Pace Analytical Project Manager
- Sample descriptions
- Due dates
- List of analyses requested
- Date and time of lab receipt
- Field ID code
- Date and time of collection
- Any comments resulting from inspection for sample rejection

All samples received are logged into the LIMS system within one working day of receipt. Sample login may be delayed due to customer clarification of analysis needed, corrective actions for sample receipt non-conformance, or other unusual circumstances. If the time collected for any sample is unspecified and Pace is unable to obtain this information from the customer, the laboratory will use 08:00 as the time sampled. All hold times will be based on this sampling time and qualified accordingly if exceeded.

The Laboratory Information Management System (EPIC Pro) automatically generates a unique identification number for each sample created in the system. The LIMS sample number follows the general convention of BB-XXXXX-YYY. The BB represents the laboratory identification within Pace's laboratory network. The 5 digit "X" number represents the project number followed by a 3 digit sample number. The project number is a sequential number that is assigned as a new project is created. The sample number corresponds to the number of samples submitted by the client. In addition to the unique sample ID, there is a sample container ID that consists of the sample number, the container type (ex. BP1U), and bottle 1 of Y, where Y represent the total number of containers of that particular type. Together the sample LIMs number and sample container ID number create a unique barcode encryption that can be linked to the sample analysis requested by the client. This unique identification number is placed on the sample container as a durable label and becomes the link between the laboratory's sample management system and the client's field identification; it will be a permanent reference number for all future interactions.

Sample labels are printed from the LIMS system and affixed to each sample container.

Samples with hold times that are near expiration date/time may be sent directly to the laboratory for analysis at the discretion of the Project Manager and/or General Manager.

Additional information can be found in SOP PGH-C-001 Sample Management or its equivalent revision or replacement.

2.7 Sample Storage

2.7.1 Storage Conditions

Samples are stored away from all standards, reagents, or other potential sources of contamination. Samples are stored in a manner that prevents cross-contamination (e.g. volatile samples are stored separate from other samples). All sample fractions, extracts, leachates and other sample preparation products are stored in the same manner as actual samples or as specified by the analytical method.

2.7.2 Temperature Monitoring

Samples are taken to the appropriate storage location (ambient, refrigerator, freezer) immediately after sample receipt and check-in procedures are completed. All sample storage areas are located in limited access areas and are monitored to ensure sample integrity.

The temperature of each refrigerated storage area is maintained at =6°C unless state or program requirements differ. The temperature of each freezer storage area is maintained at < - 10°C unless state or program requirements differ. The temperature of each storage area is monitored and recorded each workday. If the temperature falls outside the acceptable limits, the following corrective actions are taken and appropriately documented:

- The temperature is rechecked after two hours to verify temperature exceedance. Corrective action is initiated if necessary.
- The Quality Manager and/or laboratory management are notified if the problem persists.
- The samples are relocated to a proper environment if the temperature cannot be maintained after corrective actions are implemented.
- The affected customers are notified.
- Documentation is provided on analytical report.

2.7.3 Hazardous Materials

Pure product or potentially heavily contaminated samples are tagged as "hazardous" or "lab pack" and are stored separately from other samples.

2.7.4 Foreign/Quarantined Soils

Depending on the soil disposal practices of the laboratory, foreign soils and soils from USDA regulated areas are segregated. The USDA requires these samples to be incinerated or sterilized by an approved treatment procedure.

Additional information can be found in SOP PGH-C-001 Sample Management or its equivalent revision or replacement.

2.8 Sample Protection

PASI laboratory facilities are operated under controlled access to ensure sample and data integrity. Visitors must register at the front desk and be properly escorted.

Samples are removed from storage areas by designated personnel and returned to the storage areas, if necessary, immediately after the required sample quantity has been taken.

Upon customer request, additional and more rigorous chain of custody protocols for samples and data can be implemented. For example, some projects may require complete documentation of sample custody within the secure laboratory.

Additional information can be found in SOPPGH-C-001 **Sample Management** or its equivalent revision or replacement.

2.9 Subcontracting Analytical Services

Every effort is made to perform chemical analyses for PASI customers within the laboratory that receives the samples. When subcontracting to a laboratory other than the receiving laboratory (inside or outside the PASI network) becomes necessary, a preliminary verbal communication with an appropriate laboratory is undertaken. Customers are notified in writing of the lab's intention to subcontract any portion of the testing to another laboratory. Work performed under specific protocols may involve special considerations.

Prior to subcontracting samples to a laboratory outside Pace Analytical, the potential sub-contract laboratory will be pre-qualified by verifying that the subcontractor meets the following criteria:

- All certifications required for the proposed subcontract are in effect,
- Sufficient professional liability and other required insurance coverage is in effect, and
- Is not involved in legal action by any federal, state, or local government agency for data integrity issues and has not been convicted in such investigation at any time during the past 5 years.

Additional information can be found in SOP S-ALL-Q-027 **Evaluation & Qualification of Vendors** or its equivalent revision or replacement. The contact and preliminary arrangements are made between the PASI Project Manager and the appropriate subcontract laboratory personnel. The specific terms of the subcontract laboratory agreement include:

- Method of analysis
- Number and type of samples expected
- Project specific QA/QC requirements
- Deliverables required
- Laboratory certification requirement
- Price per analysis
- Turnaround time requirements

Chain-of-custody forms are generated for samples requiring subcontracting to other laboratories. Sample receiving personnel re-package the samples for shipment, create a transfer chain-of-custody form and record the following information:

- Pace Analytical Laboratory Number
- Matrix
- Requested analysis
- Special instructions (quick turn-around, required detection or reporting limits, unusual information known about the samples or analytical procedure).
- Signature in "Relinquished By"

All subcontracted sample data reports are sent to the PASI Project Manager.

Any Pace Analytical work sent to other labs within the PASI network is handled as subcontracted work (also known as inter-regional) and all final reports are labeled clearly with the name of the laboratory performing the work. Any non-NELAC work is clearly identified. PASI will not be responsible for analytical data if the subcontract laboratory was designated by the customer.

Additional information can be found in SOP S-ALL-Q-017 **Subcontracting Samples** or its equivalent revision or replacement.

2.10 Sample Retention and Disposal

Samples (and sample by-products) must be retained by the laboratory for a period of time necessary to protect the integrity of the sample or sample by-product (e.g. method holding time) and to protect the interests of the laboratory and the customer.

Unused portions of samples are retained by each laboratory based on program or customer requirements for sample retention and storage. The sample retention time is a minimum of 45 days from receipt of the samples. Samples requiring storage beyond this time due to special requests or contractual obligations will not be stored under temperature controlled conditions unless the laboratory has sufficient capacity and their presence does not compromise the integrity of other samples.

After this period expires, non-hazardous samples are properly disposed of as non-hazardous waste. The preferred method for disposition of hazardous samples is to return the excess sample to the customer. If it is not feasible to return samples, or the customer requires PASI to dispose of excess samples, PASI will arrange for proper disposal by an approved contractor.

Additional information can be found in PGH-C-017 **Waste Management and Disposal** and PGH-C-001 **Sample Management** or their equivalent revisions or replacements.

3.0 ANALYTICAL CAPABILITIES

3.1 Analytical Method Sources

PASI laboratories are capable of analyzing a full range of environmental samples from a variety of matrices, including air, surface water, wastewater, groundwater, soil, sediment, biota, and other waste products. The latest valid editions of methodologies are applied from regulatory and professional sources including EPA, ASTM, USGS, NIOSH, and State Agencies. Section 11 of this manual is a representative listing of general analytical protocol references. PASI discloses in writing to its customers and regulatory agencies any instances in which modified methods are being used in the analysis of samples.

In the event of a customer-specific need, instrumentation constraint or regulatory requirement, PASI laboratories reserve the right to use valid versions of methods that may not be the most recent edition available.

3.2 Analytical Method Documentation

The primary form of documentation of analytical methods is the Standard Operating Procedure (SOP). SOPs contain pertinent information as to what steps are required by an analyst to successfully perform a procedure. The required contents for the SOPs are specified in the company-wide SOP for Preparation of SOPs (S-ALL-Q-001).

The SOPs may be supplemented by other training materials that further detail how methods are specifically performed. This training material will undergo periodic, documented review along with the other Quality System documentation.

3.3 Analytical Method Validation

In some situations, PASI develops and validates methodologies that may be more applicable to a specific problem or objective. When non-standard methods (e.g. methods other than EPA, NIOSH, ASTM, AOAC, etc.) are required for specific projects or analytes of interest, or when the laboratory develops a method, or modifies a standard method, the laboratory validates the method prior to applying it to customer samples. Method validity is established by meeting criteria for precision and accuracy as established by the data quality objectives specified by the end user of the data. The laboratory records the validation procedure, the results obtained and a statement as to the usability of the method. The minimum requirements for method validation include determination of the limit of detection and limit of quantitation, evaluation of precision and bias, and evaluation of selectivity of each analyte of interest.

3.4 Demonstration of Capability (DOC)

Analysts complete an initial demonstration of capability (IDOC) study prior to performing a method or when there is a change in instrument type, personnel or test method (when a defined 'work cell' is in operation, the entire work cell must meet the criteria). The mean recovery and standard deviation of each analyte, taken from 4 replicates of a quality control standard is calculated and compared to method criteria (if available) or established lab criteria for evaluation of acceptance. Each laboratory maintains copies of all demonstrations of capability and corresponding raw data for future reference and must document the acceptance criteria prior to the analysis of the DOC. Demonstrations of capability are verified on an annual basis.

Alternative demonstration of capability procedures may be used for IDOC for methods that don't lend themselves to the "4 replicate" approach. For methods that only measure precision, the precision of four laboratory duplicate pairs will be assessed. The relative percent differences must be within the method acceptance limits. For procedures like TCLP or SPLP, the analyst will demonstrate making the buffered solution and performing the tumbling process. The trainer or supervisor will sign-off on demonstration of

capability of the tumbling process. Additional demonstration of capability options will be specified in Section 14 – Method Performance of the applicable method SOP.

For Continuing Demonstrations of Capability, the laboratories may use Performance Testing (PT) samples or any of the approaches utilized for IDOCs. For methods or procedures that do not lend themselves to the "4 replicate" approach, the demonstration of capability requirements will be specified in Section 14 – Method Performance of the applicable SOP.

3.5 Regulatory and Method Compliance

PASI understands that expectations of our customers commonly include the assumption that laboratory data will satisfy specific regulatory requirements. Therefore PASI attempts to ascertain, prior to beginning a project, what applicable regulatory jurisdiction, agency, or protocols apply to that project. This information is also required on the Chain-of-Custody submitted with samples.

PASI makes every effort to detect regulatory or project plan inconsistencies, based upon information from the customer, and communicate them immediately to the customer in order to aid in the decision-making process. PASI will not be liable if the customer chooses not to follow PASI recommendations.

It is PASI policy to disclose in a forthright manner any detected noncompliance affecting the usability of data produced by our laboratories. The laboratory will notify customers within 30 days of fully characterizing the nature of the nonconformance, the scope of the nonconformance and the impact it may have on data usability.

4.0 QUALITY CONTROL PROCEDURES

4.1 Data Integrity System

The data integrity system at PASI provides assurances to management that a highly ethical approach is being applied to all planning, training and implementation of methods. Data integrity is crucial to the success of our company and Pace Analytical is committed to providing a culture of quality throughout the organization. To accomplish this goal, PASI has implemented a data integrity system that encompasses the following four requirements:

1. A data integrity training program: Standardized training is given to each new employee and a yearly refresher is presented to all employees. Key topics within this training include:
   - Need for honesty in analytical reporting
   - Process for reporting data integrity issues
   - Specific examples of unethical behavior and improper practices
   - Documentation of non-conforming data that is still useful to the data user
   - Consequences and punishments for unethical behavior
   - Examples of monitoring devices used by management to review data and systems
2. Signed data integrity documentation for all employees: This includes a quiz following the Ethics training session and written agreement to abide by the Code of Ethics and Standards of Conduct explained in the employee manual The quiz along with the employee's electronic signature of agreement are maintained within the Learning Management System.
3. In-depth, periodic monitoring of data integrity: Including peer data review and validation, internal data audits, proficiency testing studies, etc.
4. Documentation of any review or investigation into possible data integrity infractions. This documentation, including any disciplinary actions involved, corrective actions taken, and notifications to customers must be available for review for lab assessors and must be retained for a minimum of five years.

PASI management makes every effort to ensure that personnel are free from any undue pressures that affect the quality of their work including commercial, financial, over-scheduling, and working condition pressures.

Corporate management also provides all PASI facilities a mechanism for confidential reporting of data integrity issues that ensures confidentiality and a receptive environment in which all employees are comfortable discussing items of ethical concern. The anonymous message line is monitored by the Corporate Director of Quality, Safety and Training who will ensure that all concerns are evaluated and, where necessary, brought to the attention of executive management and investigated. The message line voice mail box is available at 612-607-6427.

4.2 Method Blank

A method blank is used to evaluate contamination in the preparation/analysis system. The method blank is processed through all preparation and analytical steps with its associated samples.

A method blank is processed at a minimum frequency of 1 per preparation batch. In the case of a method that has no separate preparation step (e.g. volatiles), a method blank is processed with no more than 20 samples of a specific matrix performed by the same analyst, in the same method, using the same standards or reagents.

The method blank consists of a matrix similar to the associated samples that is known to be free of the analytes of interest. Laboratories will characterize a representative matrix as "clean" if the matrix contains contaminants at less than ½ the laboratory's reporting limit.

Each method blank is evaluated for contamination. The source of any contamination is investigated and documented corrective action is taken when the concentration of any target analyte is detected above the

reporting limit and is greater than 1/10 of the amount of that analyte found in any associated sample. Corrective actions include the re-preparation and re-analysis of all the samples (where possible) along with the full set of required quality control samples. Data qualifiers must be applied to any result reported that is associated with a contaminated method blank.

Deviations made from this policy must be approved by the Quality Manager prior to release of the data.

4.3 Laboratory Control Sample

The Laboratory Control Sample (LCS) is used to evaluate the performance of the entire analytical system including preparation and analysis.

An LCS is processed at a minimum frequency of 1 per preparation batch. In the case of a method that has no separate preparation step (e.g. volatiles), an LCS will be processed with no more than 20 samples of a specific matrix performed by the same analyst, in the same method, using the same standards or reagents.

The LCS consists of a matrix similar to the associated samples that is known to be free of the analytes of interest that is then spiked with known concentrations of target analytes.

The LCS contains all analytes specified by a specific method or by the customer or regulatory agency (which may include full list of target compounds, with certain exceptions. These exceptions may include analyzing only specific Aroclors when PCB analysis is requested or not spiking with all EPA Appendix compounds when a full Appendix list of compounds is requested). In the absence of specified components, the lab will spike with the following compounds:

- For multi-peak analytes (e.g. PCBs, technical chlordane, toxaphene), a representative standard will be processed.
- For methods with long lists of analytes, a representative number of target analytes may be chosen. The following criteria is used to determine the number of LCS compounds used:
  - For methods with 1-10 target compounds, the lab will spike with all compounds
  - For methods with 11-20 target compounds, the lab will spike with at least 10 compounds or 80%, whichever is greater
  - For methods with greater than 20 compounds, the lab will spike with at least 16 compounds.

The LCS is evaluated against the method default or laboratory-derived acceptance criteria. Method default control limits will be used until the laboratory has a minimum of 20 (preferably greater than 30) data points from which to derive internal criteria. Any compound that is outside of these limits is considered to be 'out of control' and must be qualified appropriately. Any associated sample containing an 'out-of-control' compound must either be re-analyzed with a successful LCS or reported with the appropriate data qualifier.

For LCSs containing a large number of analytes, it is statistically likely that a few recoveries will be outside of control limits. This does not necessarily mean that the system is out of control, and therefore no corrective action would be necessary (except for proper documentation). NELAC has allowed for a minimum number of marginal exceedances, defined as recoveries that are beyond the LCS control limits (3X the standard deviation) but less than the marginal exceedance limits (4X the standard deviation). The number of allowable exceedances depends on the number of compounds in the LCS. If more analyte recoveries exceed the LCS control limits than is allowed (see below) or if any one analyte exceeds the marginal exceedance limits, then the LCS is considered non-compliant and corrective actions are necessary. The number of allowable exceedances is as follows:

- >90 analytes in the LCS- 5 analytes
- 71-90 analytes in the LCS- 4 analytes
- 51-70 analytes in the LCS- 3 analytes

- 31-50 analytes in the LCS- 2 analytes
- 11-30 analytes in the LCS- 1 analyte
- <11 analytes in the LCS- no analytes allowed out)

A matrix spike (MS) can be used in place of a non-compliant LCS in a batch as long as the MS passes the LCS acceptance criteria (this is a NELAC allowance). When this happens, full documentation must be made available to the data user. If this is not allowed by a customer or regulatory body, the associated samples must be rerun with a compliant LCS (if possible) or reported with appropriate data qualifiers.

Deviations made from this policy must be approved by the Quality Manager prior to release of the data.

4.4 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

A matrix spike (MS) is used to determine the effect of the sample matrix on compound recovery for a particular method. The information from these spikes is sample or matrix specific and is not used to determine the acceptance of an entire batch (see LCS).

A Matrix Spike/Matrix Spike Duplicate (MS/MSD) set is processed at a frequency specified in a particular method or as determined by a specific customer. This frequency will be specified in the applicable method SOP or customer QAPP. In the absence of such requirements, an MS/MSD set is routinely analyzed once per every 20 samples per general matrix (i.e. soil, water, biota, etc.) per method.

The MS and MSD consist of the sample matrix that is then spiked with known concentrations of target analytes. Lab personnel spike customer samples that are specifically designated as MS/MSD samples or, when no designated samples are present in a batch, randomly select samples to spike that have adequate sample volume or weight. Spiked samples are prepared and analyzed in the same manner as the original samples and are selected from different customers if possible.

The MS and MSD contain all analytes specified by a specific method or by the customer or regulatory agency. In the absence of specified components, the lab will spike with the same number of compounds as previously discussed in the LCS section.

The MS and MSD are evaluated against the method or laboratory-derived criteria. Any compound that is outside of these limits is considered to be 'out of control' and must be qualified appropriately. Batch acceptance, however, is based on method blank and LCS performance, not on MS/MSD recoveries. The spike recoveries give the data user a better understanding of the final results based on their site-specific information.

A matrix spike and sample duplicate will be performed instead of a matrix spike and matrix spike duplicate when specified by the customer or method.

Deviations made from this policy must be approved by the Quality Manager prior to release of the data.

4.5 Surrogates

Surrogates are compounds that reflect the chemistry of target analytes and are typically added to samples for organic analyses to monitor the effect of the sample matrix on compound recovery.

Surrogates are added to each customer sample (for organics), method blank, LCS and MS prior to extraction or analysis. The surrogates are evaluated against the method or laboratory-derived acceptance criteria. Any surrogate compound that is outside of these limits is considered to be 'out of control' and must be qualified appropriately. Samples with surrogate failures are typically re-extracted and/or re-analyzed to confirm that the out-of-control value was caused by the matrix of the sample and not by some other systematic error. An exception to this would be samples that have high surrogate values but no

reportable hits for target compounds. These samples would be reported, with a qualifier, because the implied high bias would not affect the final results.

Deviations made from this policy must be approved by the Quality Manager prior to release of the data.

4.6 Sample Duplicate

A sample duplicate is a second portion of sample that is prepared and analyzed in the laboratory along with the first portion. It is used to measure the precision associated with preparation and analysis. A sample duplicate is processed at a frequency specified by the particular method or as determined by a specific customer.

The sample and duplicate are evaluated against the method or laboratory-derived criteria for relative percent difference (RPD). Any duplicate that is outside of these limits is considered to be 'out of control' and must be qualified appropriately.

Deviations made from this policy must be approved by the Quality Manager prior to release of the data.

4.7 Internal Standards

Internal Standards are method-specific analytes added to every standard, method blank, laboratory control sample, matrix spike, matrix spike duplicate, and sample at a known concentration, prior to analysis for the purpose of adjusting the response factor used in quantifying target analytes. At a minimum, the laboratory will follow method specific guidelines for the treatment of internal standard recoveries as they are related to the reporting of data.

Deviations made from this policy must be approved by the Quality Manager prior to release of the data.

4.8 Field Blanks

Field blanks are blanks prepared at the sampling site in order to monitor for contamination that may be present in the environment where samples are collected. These field quality control samples are often referenced as field blanks, rinseate blanks, or equipment blanks. The lab analyzes these field blanks as normal samples and informs the customer if there are any target compounds detected above the reporting limit.

4.9 Trip Blanks

Trip blanks are blanks that originate from the laboratory as part of the sampling event and are used to monitor for contamination of samples during transport. These blanks accompany the empty sample containers to the field and then accompany the collected samples back to the lab. These blanks are routinely analyzed for volatile methods where ambient background contamination is likely to occur.

4.10 Limit of Detection (LOD)

PASI laboratories are required to use a documented procedure to determine a limit of detection (LOD) for each analyte of concern in each matrix reported. All sample-processing steps of the preparation and analytical methods are included in this determination. For any test that does not have a valid LOD, sample results below the limit of quantitation (LOQ) cannot be reported.

The LOD is initially established for the compounds of interest for each method in a clean matrix with no target analytes present and no interferences at a concentration that would impact the results. The LOD is then determined every time there is a change in the test method that affects how the test is performed or when there has been a change in the instrument that affects the sensitivity. If required by customer, method or accreditation body, the LOD will be re-established annually for all applicable methods.

Unless otherwise noted, the method used by PASI laboratories to determine LODs is based on the Method Detection Limit (MDL) procedure outlined in 40 CFR Part 136, Appendix B. Where required by regulatory program or customer, the above referenced procedure will be followed.

Where specifically stated in the published method, LODs (or MDLs) will be performed at the listed frequency.

The validity of the LOD must be verified by detection (a value greater than zero) of the analytes in a QC sample in each quality system matrix. The QC sample must contain the analyte at no more than 3X the LOD for a single analyte test and 4X the LOD for multiple analyte tests. This verification must be performed on each instrument used for sample analysis and reporting of data. The validity of the LOD must be verified as part of the LOD determination process. This verification must be done prior to the use of the LOD for sample analysis.

An LOD study is not required for any analyte for which spiking solutions or quality control samples are not available (e.g. temperature).

The LOD, if required, shall be verified annually for each quality system matrix, technology and analyte. In lieu of performing full LOD (MDL) studies annually, the lab can verify the LOD (MDL) on an annual basis, providing this verification is fully documented and does not contradict other customer or program requirements that the lab must follow. The requirements of this verification are:

- The spike concentration of the verification must be no more than 3X times the LOD for single analyte tests and 4X the LOD for multiple analyte tests.
- The lab must verify the LOD on each instrument used for the reporting of sample data.
- The lab must be able to qualitatively identify all target analytes in the verification standard (distinguishable from noise).

Additional information can be found in SOP S-ALL-Q-004 **Method Detection Limit Studies** or its equivalent revision or replacement.

4.11 Limit of Quantitation (LOQ)

A limit of quantitation (LOQ) for every analyte of concern must be determined. For PASI laboratories, this LOQ is referred to as the RL, or Reporting Limit. This RL is based on the lowest calibration standard concentration that is used in each initial calibration. Results below this level are not allowed to be reported without qualification since the results would not be substantiated by a calibration standard. For methods with a determined LOD, results can be reported out below the LOQ but above the LOD if they are properly qualified (e.g. J flag).

There must be a sufficient buffer between the LOD and the limit of quantitation (LOQ). The LOQ must be higher than the LOD.

To verify the LOQ, the laboratory will prepare a sample in the same matrix used for the LCS. The sample will be spiked with target analytes at the concentration(s) equivalent to or less than the RL(s). This sample must undergo the routine sample preparation procedure including any routine sample cleanup steps. The sample is then analyzed and the recovery of each target analyte determined. The recovery for each target analyte must meet the laboratories current control limits.

Additional information can be found in SOP S-ALL-Q-004 **Method Detection Limit Studies** or its equivalent revision or replacement.

4.12 Estimate of Uncertainty

PASI laboratories can provide an estimation of uncertainty for results generated by the laboratory. The estimate quantifies the error associated with any given result at a 95% confidence interval. This estimate does not include bias that may be associated with sampling. The laboratory has a procedure in place for making this estimation. In the absence of a regulatory or customer-specific procedure, PASI laboratories base this estimation on the recovery data obtained from the Laboratory Control Spikes. The uncertainty is a function of the standard deviation of the recoveries multiplied by the appropriate Student's t Factor at 95% confidence. Additional information pertaining to the estimation of uncertainty and the exact manner in which it is derived are contained in the SOP PGH-C-021**Measurement of Uncertainty** or its equivalent revision or replacement.

The measurement of uncertainty is provided only on request by the customer, as required by specification or regulation and when the result is used to determine conformance within a specification limit.

4.13 Proficiency Testing (PT) Studies

PASI laboratories participate in the NELAC-defined proficiency testing program. PT samples are obtained from approved providers and analyzed and reported at a minimum of two times per year for the relevant fields of testing per matrix.

The lab initiates an investigation whenever PT results are deemed 'unacceptable' by the PT provider. All findings and corrective actions taken are reported to the Quality Manager. A corrective action plan (including re-analysis of similar samples) is initiated and this report is sent to the appropriate state accreditation agencies for their review.

PT samples are treated as typical customer samples, utilizing the same staff, methods, equipment, facilities, and frequency of analysis. PT samples are included in the laboratory's normal analytical processes and do not receive extraordinary attention due to their nature.

Comparison of analytical results with anyone participating in the same PT study is prohibited prior to the close of the study.

Additional information can be found in SOP S-ALL-Q-010 **PE/PT Program** or its equivalent revision or replacement.

4.14 Rounding and Significant Figures

In general, the PASI laboratories report data to no more than three significant digits. Therefore, all measurements made in the analytical process must reflect this level of precision. In the event that a parameter that contributes to the final result has less than three significant figures of precision, the final result must be reported with no more significant figures than that of the parameter in question. The rounding rules listed below are descriptive of the LIMS and not necessarily of any supporting program (Excel, etc.).

Rounding

PASI-Pittsburgh follows the odd / even guidelines for rounding numbers:

- If the figure following the one to be retained is less than five, that figure is dropped and the retained ones are not changed (with three significant figures, 2.544 is rounded to 2.54).
- If the figure following the ones to be retained is greater than five, that figure is dropped and the last retained one is rounded up (with three significant figures, 2.546 is rounded to 2.55).

- If the figure following the ones to be retained is five and if there are no figures other than zeros beyond that five, then the five is dropped and the last figure retained is unchanged if it is even and rounded up if it is odd (with three significant figures, 2.525 is rounded to 2.52 and 2.535 is rounded to 2.54).

Significant Digits

PASI-Pittsburgh follows the following convention for reporting to a specified number of significant figures. Unless specified by federal, state or local requirements or on specific request by a customer, the laboratory reports:

- Values > 10 – Reported to 3 significant digits
- Values = 10 – Reported to 2 significant digits

5.0 DOCUMENT MANAGEMENT AND CHANGE CONTROL

5.1 Document Management

Additional information can be found in SOP S-ALL-Q-002 **Document Management** or its equivalent revision or replacement.

Pace Analytical Services, Inc. has an established procedure for managing documents that are part of the quality system. The list of managed documents includes, but is not limited to, Standard Operating Procedures, Quality Assurance Manuals, quality policy statements, training documents, work-processing documents, charts, posters, memoranda, notices, forms, software, and any other procedures, tables, plans, etc. that have a direct bearing on the quality system.

A master list of all managed documents is maintained at each facility identifying the current revision status and distribution of the controlled documents. This establishes that there are no invalid or obsolete documents in use in the facility. All documents are reviewed periodically and revised if necessary. Obsolete documents are systematically discarded or archived for audit or knowledge preservation purposes.

Each managed document is uniquely identified to include the date of issue, the revision identification, page numbers, the total number of pages and the issuing authorities. For complete information on document numbering, refer to SOP S-ALL-Q-003 **Document Numbering.**

As an alternative to the hard copy system of controlled documents, secured electronic copies of controlled documents may be maintained on the local or wide-area network (LAN or WAN). These document files must be read-only for all personnel except the Quality Department and system administrator. Other requirements for this system are as follows:

- Electronic documents must be readily accessible to all facility employees.
- Electronic documents (i.e. pdf's) must be locked from printing. All hardcopy SOPs must be obtained from the Quality Department.

5.1.1 Quality Assurance Manual (QAM)

The Quality Assurance Manual is the company-wide document that describes all aspects of the quality system for PASI. The base QAM template is distributed by the Corporate Quality Department to each of the regional Quality Managers. The regional management personnel modify the necessary and permissible sections of the base template and submit those modifications to the Corporate Director of Quality for review. Once approved and signed by both the CEO and the Director of Quality, the General Manager, Quality Manager and Technical Director(s) sign the Quality Assurance Manual. Each regional Quality Manager is then in charge of distribution to employees, external customers or regulatory agencies and maintaining a distribution list of controlled document copies. The Quality Assurance Manual template is reviewed on an annual basis by all of the PASI Quality Managers and revised accordingly by the Director of Quality, Safety and Training.

5.1.2 Standard Operating Procedures (SOPs)

SOPs fall into two categories: company-wide documents (starting with the prefix S-ALL-) and facility-specific documents (starting with the individual facility prefix).

The purpose of the company-wide SOPs is to establish policies and procedure that are common and applicable to all PASI facilities. Company-wide SOPs are document-controlled by the corporate quality office and signed copies are distributed to all of the regional Quality Managers. The regional management personnel sign the company-wide SOPs. The regional Quality

Manager is then in charge of distribution to employees, external customers or regulatory agencies and maintaining a distribution list of controlled document copies.

Regional PASI facilities are responsible for developing facility-specific SOPs applicable to their respective facility. The regional facility develops these facility-specific SOPs based on the corporate-wide SOP template. This template is written to incorporate a set of minimum method requirements and PASI best practice requirements. The regional facilities may add to or modify the corporate-wide SOP template provided there are no contradictions to the minimum method or best practice requirements. Facility-specific SOPs are controlled by the regional Quality Manager according to the corporate document management policies.

SOPs are reviewed every two years at a minimum (a more frequent review may be required by state or federal agencies or customers). A review of the document does not necessarily constitute a re-issue of a new revision. Documentation of this review and any applicable revisions are made in the last section of each SOP. This provides a historical record of all revisions.

All copies of superseded SOPs are removed from general use and the original copy of each SOP is archived for audit or knowledge preservation purposes. This ensures that all PASI employees use the most current version of each SOP and provides the Quality Manager with a historical record of each SOP.

Additional information can be found in SOP S-ALL-Q-001 **Preparation of SOPs** or its equivalent revision or replacement.

5.2 Document Change Control

Changes to managed documents are reviewed and approved in the same manner as the original review. Any revision to a document requires the approval of the applicable signatories. After revisions are approved, a revision number is assigned and the previous version of the document is officially retired. Copies may be kept for audit or knowledge preservation purposes.

All controlled copies of the previous document are replaced with controlled copies of the revised document and the superseded copies are destroyed or archived. All affected personnel are advised that there has been a revision and any necessary training is scheduled.

6.0 EQUIPMENT AND MEASUREMENT TRACEABILITY

Each PASI facility is equipped with sufficient instrumentation and support equipment to perform the relevant analytical testing or field procedures performed by each facility. Support equipment includes chemical standards, thermometers, balances, disposable and mechanical pipettes, etc. This section details some of the procedures necessary to maintain traceability and perform proper calibration of instrumentation and support equipment. See Attachment III for a list of equipment currently used at the PASI-Pittsburgh facility.

6.1 Standards and Traceability

Each PASI facility retains all pertinent information for standards, reagents and chemicals to assure traceability to a national standard. This includes documentation of purchase, receipt, preparation and use.

Upon receipt, all purchased standard reference materials are recorded into a standard logbook or database and assigned a unique identification number. The entries include the facility's unique identification number, the chemical name, manufacturer name, manufacturer's identification numbers, receipt date and expiration date. Vendor's certificates of analysis for all standards, reagents, or chemicals are retained for future reference.

Subsequent preparations of intermediate or working solutions are also documented in a standard logbook or database. These entries include the stock standard name and lot number, the manufacturer name, the solvents used for preparation, the solvent lot number and manufacturer, the preparation steps, preparation date, expiration dates, preparer's initials, and a unique PASI identification number. This number is used in any applicable sample preparation or analysis logbook so the standard can be traced back to the standard preparation record. This process ensures traceability back to the national standard.

All prepared standard or reagent containers include the PASI identification number, the standard or chemical name, the date of preparation, the date of expiration, the concentration with units, and the preparer's initials. This ensures traceability back to the standard preparation logbook.

If a second source standard is required to verify an existing calibration or spiking standard, this standard is purchased from a different supplier. If no second source is available, a second standard from a different lot may be purchased from the same supplier if the lot can be demonstrated as prepared independently from other lots.

Additional information concerning standards and reagent traceability can be found in the SOP S-ALL-Q-025 **Standard and Reagent Preparation and Traceability** or its equivalent revision or replacement.

6.2 General Analytical Instrument Calibration Procedures

All types of support equipment and instrumentation are calibrated or checked before use to ensure proper functioning and verify that the laboratory's requirements are met. All calibrations are performed by, or under the supervision of, an experienced analyst at scheduled intervals against either certified standards traceable to recognized national standards or reference standards whose values have been statistically validated.

Calibration standards for each parameter are chosen to establish the linear range of the instrument and must bracket the concentrations of those parameters measured in the samples. The lowest calibration standard is the lowest concentration for which quantitative data may be reported. Data reported below this level is considered to have less certainty and must be reported using appropriate data qualifiers (e.g. J flag) or explained in a narrative. The highest calibration standard is the highest concentration for which quantitative data may be reported. Data reported above this level is considered to have less certainty and must be reported using appropriate data qualifiers (e.g. E flag) or explained in the narrative. Any specific method requirement for number and type of calibration standards supersedes the general requirement. Instrument and method specific calibration criteria are explained within the specific analytical standard operating procedures for each facility.

Instrumentation or support equipment that cannot be calibrated to specification or is otherwise defective is clearly labeled as out-of-service until it has been repaired and tested to demonstrate it meets the laboratory's specifications. All repair and maintenance activities including service calls are documented in the maintenance log. Equipment sent off-site for calibration testing is packed and transported to prevent breakage and is in accordance with the calibration laboratory's recommendations.

In the event that recalibration of a piece of test equipment indicates the equipment may have been malfunctioning during the course of sample analysis, an investigation is performed. The results of the investigation along with a summary of the information reviewed are documented and maintained by the Quality Manager. If the investigation indicates sample results have been impacted, the customer is notified within 30 days. This allows for sufficient investigation and review of documentation to determine the impact on the analytical results. Instrumentation found to be consistently out of calibration is either repaired and positively verified or replaced.

Raw data records are retained to document equipment performance. Sufficient raw data is retained to reconstruct the instrument calibration and explicitly connect the continuing calibration verification to the initial calibration.

6.2.1 General Organic Calibration Procedures

Calibration standards are prepared at a minimum of five concentrations for organic analyses. Results from all calibration standards must be included in constructing the calibration curve with the following exceptions:

- The lowest level calibration standard may be removed from the calibration as long as the remaining number of concentration levels meets the minimum established by the method and standard operating procedure. For multi-parameter methods, this may be done on an individual analyte basis. The reporting limit must be adjusted to the lowest concentration included in the calibration curve.
- The highest level calibration standard may be removed from the calibration as long as the remaining number of concentration levels meets the minimum established by the method and standard operating procedure. For multi-parameter methods, this may be done an individual analyte basis. The upper limit of quantitation must be adjusted to the highest concentration included in the calibration curve.
- Multiple points from either the high end or the low end of the calibration curve may be excluded as long as the remaining points are contiguous in nature and the minimum number of levels remain as established by method or standard operating procedure. The reporting limit or quantitation range, which is appropriate, must be adjusted accordingly.
- Results from a concentration level between the lowest and highest calibration levels can be excluded from the calibration curve for an acceptable cause with approval from the responsible department supervisor if the results for all analytes are excluded and the point is replaced by re-analysis. Re-analysis must occur within the same 12 hour tune time period for GC/MS methodologies and within 8 hours of the initial analysis for non-GC/MS methodologies. All samples analyzed prior to the re-analyzed calibration curve point must be re-analyzed after the calibration curve is completed.

Initial calibration curves are evaluated against appropriate statistical models as required by the analytical methods. Curves that do not meet the appropriate criteria require corrective action that may include re-running the initial calibration curve. All initial calibrations are verified with a standard obtained from a second manufacturer or second lot from the same manufacturer if the lot can be demonstrated as prepared independently from other lots prior to the analysis of samples. Sample results are quantitated from the initial calibration unless otherwise required by regulation, method, or program.

The calibration curve is periodically verified by the analysis of a mid-level continuing calibration verification (CCV) standard during the course of sample analysis. Calibration verification is performed at the beginning and end of each analytical batch (except if an internal standard is used only one verification at the beginning of the batch is needed), whenever it is expected that the analytical system may be out of calibration, if the time period for calibration has expired, or for analytical systems that contain a calibration verification requirement. This verification standard must meet acceptance criteria in order for sample analysis to proceed.

In the event that the CCV does not meet the acceptance criteria, a second CCV may be injected as part of the diagnostic evaluation and corrective action investigation. If the second CCV is acceptable, the analytical sequence is continued. If both CCVs fail, the analytical sequence is terminated. All samples analyzed since the last compliant CCV are re-analyzed for methodologies utilizing external calibration.

When instruments are operating unattended, the autosamplers may be programmed to inject consecutive CCVs as a preventative measure against CCV failure with no corrective action. In this case, both CCVs must be evaluated to determine potential impact to the results. A summary of the decision tree and necessary documentation are listed below:

- If both CCVs meet the acceptance criteria, the analytical sequence is allowed to continue without corrective action. (The 12 hour clock begins with the injection of the second CCV.)
- If the first CCV does not meet the acceptance criteria and the second CCV is acceptable, the analytical sequence is continued and the results are reported.
- If the first CCV meets the acceptance criteria and the second CCV is out of control, the samples preceded by the out of control CCV must be re-analyzed in a compliant analytical sequence.
- If both CCVs are out of control, all samples since the last acceptable CCV must be re-analyzed in a compliant analytical sequence.

Some analytical methods require that samples be bracketed by passing CCVs analyzed both before and after the samples. This is specific to each method but, as a general rule, all external calibration methods require bracketing CCVs. Most internal standard calibrations do not require bracketing CCVs.

Some analytical methods require verification based on a time interval; some methods require a frequency based on an injection interval. The type and frequency of the calibration verifications is dependent on both the analytical method and possibly on the quality program associated with the samples. The type and frequency of calibration verification will be documented in the method specific SOP employed by each laboratory.

6.2.2 General Inorganic Calibration Procedures

The instrument is initially calibrated with standards at multiple concentrations to establish the linearity of the instrument's response. A calibration blank is also included. Initial calibration curves are evaluated against appropriate statistical models as required by the analytical methods. The number of calibration standards used depends on the specific method criteria or customer project requirements, although normally a minimum of three standards is used.

The ICP and ICP/MS can be standardized with a zero point and a single point calibration if:

- Prior to analysis, the zero point and the single point calibration are analyzed and a linear range is established,
- Zero point and single point calibration standards are analyzed with each batch
- A standard corresponding to the LOQ is analyzed with the batch and meets the established acceptance criteria
- The linearity is verified at the frequency established by the method or manufacturer.

All initial calibrations are verified with a standard obtained from a second manufacturer or second lot from the same manufacturer if the lot can be demonstrated as prepared independently from other lots prior to the analysis of samples. Sample results are quantitated from the initial calibration unless otherwise required by regulation, method, or program.

During the course of analysis, the calibration curve is periodically verified by the analysis of calibration verification standards. A calibration verification standard is analyzed within each analytical batch at method/program specific intervals to verify that the initial calibration is still valid. The CCV is also analyzed at the end of the analytical batch.

A calibration blank is also run with each calibration verification standard to verify the cleanliness of the system. All reported results must be bracketed by acceptable CCVs. Instrument and method specific calibration acceptance criteria are explained within the specific analytical standard operating procedures for each facility.

Interference check standards are also analyzed per method requirements and must meet acceptance criteria for metals analyses.

6.3 Support Equipment Calibration Procedures

All support equipment is calibrated or verified at least annually using NIST traceable references over the entire range of use. The results of calibrations or verifications must be within the specifications required or the equipment will be removed from service until repaired. The laboratory maintains records to demonstrate the correction factors applied to working thermometers.

Prior to use on each working day, balances, ovens, refrigerators, freezers, and water baths are checked in the expected use range with NIST traceable references in order to ensure the equipment meets laboratory specifications.

6.3.1 Analytical Balances

Each analytical balance is checked and (if necessary) calibrated annually by a qualified service technician. The calibration of each balance is checked each day of use with weights traceable to NIST. Calibration weights are ASTM Class 1 (or other class weights that have been calibrated against a NIST standard weight) and are re-certified annually against a NIST traceable reference. Some accrediting agencies may require more frequent checks. If balances are calibrated by an external agency, verification of their weights must be provided. All information pertaining to balance maintenance and calibration is recorded in the individual balance logbook and/or is maintained on file in the Quality department.

6.3.2 Thermometers

Certified, or reference, thermometers are maintained for checking calibration of working thermometers. Reference thermometers are provided with NIST traceability for initial calibration and are re-certified, at a minimum, yearly with equipment directly traceable to NIST.

Working thermometers are compared with the reference thermometers annually according to corporate metrology procedures. Each thermometer is individually numbered and assigned a correction factor based on the NIST reference source. In addition, working thermometers are visually inspected by laboratory personnel prior to use and temperatures are documented.

Laboratory thermometer inventory and calibration data are maintained in the Quality department.

6.3.3 pH/Electrometers

The meter is calibrated before use each day, using fresh buffer solutions.

6.3.4 Spectrophotometers

During use, spectrophotometer performance is checked at established frequencies in analysis sequences against initial calibration verification (ICV) and continuing calibration verification (CCV) standards.

6.3.5 Mechanical Volumetric Dispensing Devices

Mechanical volumetric dispensing devices including bottle top dispensers, pipettes, and burettes, excluding Class A volumetric glassware, are checked for accuracy on a quarterly basis. The accuracy of glass microliter syringes is verified and documented prior to use.

Additional information regarding calibration and maintenance of laboratory support equipment can be found in SOP S-ALL-Q-013 **Support Equipment** or its equivalent revision or replacement.

6.4 Instrument/ Equipment Maintenance

The objectives of the Pace Analytical maintenance program are twofold: to establish a system of instrument care that maintains instrumentation and equipment at required levels of calibration and sensitivity, and to minimize loss of productivity due to repairs.

The Laboratory Operations Manager and department manager/supervisors are responsible for providing technical leadership to evaluate new equipment, solve equipment problems and coordinate instrument repair and maintenance. The analysts have a primary responsibility to perform routine maintenance.

To minimize downtime and interruption of analytical work, preventative maintenance is routinely performed on each analytical instrument. Up-to-date instructions on the use and maintenance of equipment are available to staff in the department where the equipment is used.

Department manager/supervisors are responsible for maintaining an adequate inventory of spare parts required to minimize equipment downtime. This inventory includes parts and supplies that are subject to frequent failure, have limited lifetimes, or cannot be obtained in a timely manner should a failure occur.

All major equipment and instrumentation items are uniquely identified to allow for traceability. Equipment/instrumentation are, unless otherwise stated, identified as a system and not as individual pieces. The laboratory maintains equipment records that include the following:

- The name of the equipment and its software
- The manufacturer's name, type, and serial number
- Approximate date received and date placed into service
- Current location in the laboratory
- Condition when received (new, used, etc.)
- Copy of any manufacturer's manuals or instructions
- Dates and results of calibrations and next scheduled calibration (if known)
- Details of past maintenance activities, both routine and non-routine
- Details of any damage, modification or major repairs

All instrument maintenance is documented in maintenance logbooks that are assigned to each particular instrument or system.

When maintenance is performed to repair an instrument problem, depending on the initial problem, demonstration of return to control may be satisfied by the successful analysis of a reagent blank or continuing calibration standard. The entry must include a summary of the results of that analysis and verification by the analyst that the instrument has been returned to an in-control status. In addition, each entry must include the initials of the analyst making the entry, the dates the maintenance actions were performed, and the date the entry was made in the maintenance logbook, if different from the date(s) of the maintenance.

Any equipment that has been subjected to overloading or mishandling, or that gives suspect results, or has been shown to be defective, is taken out of service and clearly identified. The equipment shall not be used to analyze customer samples until it has been repaired and shown to perform satisfactorily.

7.0 CONTROL OF DATA

Analytical results processing, verification and reporting are procedures employed that result in the delivery of defensible data. These processes include, but are not limited to, calculation of raw data into final concentration values, review of results for accuracy, evaluation of quality control criteria and assembly of technical reports for delivery to the data user.

All analytical data undergo a well-defined, well-documented multi-tier review process prior to being reported to the customer. This section describes procedures used by PASI for translating raw analytical data into accurate, final sample reports and PASI data storage policies.

7.1 Analytical Results Processing

When analytical, field, or product testing data is generated, it is either recorded in a bound laboratory logbook (e.g. Run log or Instrument log) or copies of computer-generated printouts are appropriately labeled and filed. These logbooks and other laboratory records are kept in accordance with each facility's Standard Operating Procedure for documentation storage and archival. If the lab chooses to minimize paper usage, these records can be kept as electronic records. In this case, the laboratory must ensure that there are sufficient redundant electronic copies so no data is lost due to unforeseen computer issues.

The primary analyst is responsible for initial data reduction and review. This includes confirming compliance with required methodology, verifying calculations, evaluating quality control data, noting discrepancies in logbooks and as footnotes or narratives, and uploading analytical results into the LIMS.

The primary analyst then compiles the initial data package for verification. This compilation must include sufficient documentation for data review. It may include standard calibrations, chromatograms, manual integration documentation, electronic printouts, chain-of-custody forms, and logbook copies.

Some agencies or customers require different levels of data reporting. For these special levels, the primary analyst may need to compile additional project information, such as initial calibration data or extensive spectral data, before the data package proceeds to the verification step.

7.2 Data Verification

Data verification is the process of examining data and accepting or rejecting it based on pre-defined criteria. This review step is designed to ensure that reported data are free from calculation and transcription errors, that quality control parameters are evaluated and that any discrepancies are properly documented.

Analysts performing the analysis and subsequent data reduction have primary responsibility for quality of the data produced. The primary analyst initiates the data verification process by reviewing and accepting the data, provided QC criteria have been met for the samples being reported. Data review checklists, either hardcopy or electronic, are used to document the data review process. The primary analyst is responsible for the initial input of the data into the LIMS.

The completed data package is then sent to a designated qualified reviewer (this cannot be the primary analyst). The following criteria have been established to qualify someone as a data reviewer. To perform secondary data reviewer, the reviewer must:

1. Have a current Demonstration of Capability (DOC) study on file and have an SOP acknowledgement form on file for the method/procedure being reviewed; or, See Note
2. Have a DOC on file for a similar method/technology (i.e. GC/MS) and have an SOP acknowledgment form on file for the method/procedure being reviewed; or, See Note
3. Supervise or manage a Department and have an SOP acknowledgment form on file for the method/procedure being reviewed; or,

4. Have significant background in the department/methods being reviewed through education or experience and have an SOP acknowledgment form on file for the method/procedure being reviewed.

Note: Secondary reviewer status must be approved personally by the Quality Manager or General Manager in the event that this person has no prior experience on the specific method or general technology (i.e. GC/MS).

This reviewer provides an independent technical assessment of the data package and technical review for accuracy according to methods employed and laboratory protocols. This assessment involves a quality control review for use of the proper methodology and detection limits, compliance to quality control protocol and criteria, presence and completeness of required deliverables, and accuracy of calculations and data quantitation. The reviewer also validates the data entered into the LIMS.

Once the data have been technically reviewed and approved, authorization for release of the data from the analytical section is indicated by initialing and dating the data review checklist or otherwise initialing and dating the data (or designating the review of data electronically). The Operations or Project Manager examines the report for method appropriateness, detection limits and QC acceptability. Any deviations from the referenced methods are checked for documentation and validity, and QC corrective actions are reviewed for successful resolution.

7.3 Data Reporting

All data segments pertaining to a particular PASI project number are delivered to the Client Services Department (Project Manager) for assembly into the final report. All points mentioned during technical and QC reviews are included in a case narrative if there is potential for data to be impacted.

Final reports are prepared according to the level of reporting required by the customer and can be transmitted to the customer via hardcopy or electronic deliverable. A standard PASI final report consists of the following components:

1. A title which designates the report as "Final Report", "Laboratory Results", "Certificate of Results", etc.
2. Name and address of laboratory (or subcontracted laboratories, if used).
3. Phone number and name of laboratory contact where questions can be referred.
4. A unique number for the report (project number). The pages of the report shall be numbered and a total number of pages shall be indicated (usually in the cover letter).
5. Name and address of customer and name of project (if applicable).
6. Unique identification of samples analyzed (including customer sample numbers).
7. Identification of any sample that did not meet acceptable sampling requirements (from NELAC or other governing agency), such as improper sample containers, holding times missed, sample temperature, etc.
8. Date and time of collection of samples, date of sample receipt by the laboratory, dates of sample preparation and analysis, and times of sample preparation and analysis when the holding time for either is 72 hours or less.
9. Identification of the test methods used.
10. Identification of sampling procedures if sampling was conducted by the laboratory.
11. Deviations from, additions to, or exclusions from the test methods. These can include failed quality control parameters, deviations caused by the matrix of the sample, etc., and can be shown as a case narrative or as defined footnotes to the analytical data.
12. Identification of whether calculations were performed on a dry or wet-weight basis.
13. Reporting limits used.
14. Final results or measurements, supported by appropriate chromatograms, charts, tables, spectra, etc.
15. A signature and title of person accepting responsibility for the content of the report (can be an equivalent electronic identification) and date report was issued.
16. A statement clarifying that the results of the report relate only to the samples tested or to the samples as they were received by the laboratory.
17. If necessary, a statement indicating that the report must not be reproduced except in full, without the written approval of the laboratory.
18. Identification of all test results provided by a subcontracted laboratory or other outside source.

19. Identification of results obtained outside of quantitation levels.

Any changes made to a final report shall be designated as "Revised" or equivalent wording. The laboratory must keep sufficient archived records of all lab reports and revisions. For higher levels of data deliverables, a copy of all applicable raw data is sent to the customer along with a final report of results. When possible, the PASI facility will provide electronic data deliverables (EDD) as required by contracts or upon customer request.

Customer data that requires transmission by telephone, telex, facsimile or other electronic means undergoes appropriate steps to preserve confidentiality.

The following positions are the only approved signatories for PASI final reports:

- Senior General Manager
- General Manager
- Quality Manager
- Client Services Manager
- Project Manager
- Project Coordinator

7.4 Data Security

All data including electronic files, logbooks, extraction/digestion/distillation worksheets, calculations, project files and reports, and other information used to produce the technical report are maintained secured and retrievable by the PASI facility.

7.5 Data Archiving

All records compiled by PASI are maintained legible and retrievable and stored secured in a suitable environment to prevent loss, damage, or deterioration by fire, flood, vermin, theft, and/or environmental deterioration. Records are retained for a minimum of five years unless superseded by federal, state, contractual, and/or accreditation requirements. These records may include, but are not limited to, customer data reports, calibration and maintenance of equipment, raw data from instrumentation, quality control documents, observations, calculations and logbooks. These records are retained in order to provide for possible historical reconstruction including sampling, receipt, preparation, analysis and personnel involved. NELAP-related records will be made readily available to accrediting authorities. Access to archived data is documented and controlled by the Quality Manager or a designated Data Archivist.

Records that are computer-generated have either a hard copy or electronic write-protected backup copy. Hardware and software necessary for the retrieval of electronic data is maintained with the applicable records. Archived electronic records are stored protected against electronic and/or magnetic sources.

In the event of a change in ownership, accountability or liability, reports of analyses performed pertaining to accreditation will be maintained by the acquiring entity for a minimum of five years. In the event of bankruptcy, laboratory reports and/or records will be transferred to the customer and/or the appropriate regulatory entity upon request.

7.6 Data Disposal

Data that has been archived for the facility's required storage time may be disposed of in a secure manner by shredding, returning to customer, or utilizing some other means that does not jeopardize data confidentiality. Records of data disposal will be archived for a minimum of five years unless superseded by federal, contractual, and/or accreditation requirements.

8.0 QUALITY SYSTEM AUDITS AND REVIEWS

8.1 Internal Audits

8.1.1 Responsibilities

The Quality Manager is responsible for designing and/or conducting internal audits in accordance with a predetermined schedule and procedure. Since internal audits represent an independent assessment of laboratory functions, the auditor must be functionally independent from laboratory operations to ensure objectivity. The auditor must be trained, qualified and familiar enough with the objectives, principles, and procedures of laboratory operations to be able to perform a thorough and effective evaluation. The Quality Manger evaluates audit observations and verifies the completion of corrective actions. In addition, a periodic corporate audit will be conducted by the Director of Quality, Safety and Training and/or designee. The corporate audits will focus on the execution of the Quality System as outlined in this manual but may also include other quality programs applicable to each laboratory.

8.1.2 Scope and Frequency of Internal Audits

Internal systems audits are conducted yearly at a minimum. The scope of these audits includes evaluation of specific analytical departments or a specific quality-related system as applied throughout the laboratory.

Examples of system-wide elements that can be audited include:

- Quality Systems documents, such as Standard Operating Procedures, training documents, Quality Assurance Manual and all applicable addenda
- Personnel and training files.
- General laboratory safety protocols.
- Chemical handling practices, such as labeling of reagents, solutions, standards, and associated documentation.
- Documentation concerning equipment and instrumentation, calibration/maintenance records, operating manuals.
- Sample receipt and management practices.
- Analytical documentation, including any discrepancies and corrective actions.
- General procedures for data security, review, documentation, reporting and archiving.
- Data integrity issues such as proper manual integrations.

When the operations of a specific department are evaluated, a number of additional functions are reviewed including:

- Detection limit studies
- Internal chain-of-custody documentation
- Documentation of standard preparations
- Quality Control limits and Control charts

Certain projects may require an internal audit to ensure laboratory conformance to site work plans, sampling and analysis plans, QAPPs, etc.

A representative number of data audits are completed annually. The report format of any discrepancy is similar to that of other internal audits.

The laboratory, as part of their overall internal audit program, ensures that a review is conducted with respect to any evidence of inappropriate actions or vulnerabilities related to data integrity. Discovery and reporting of potential data integrity issues are handled in a confidential manner until

such time as a follow up evaluation, full investigation, or other appropriate actions are completed and the issues clarified. All investigations that result in findings of inappropriate activity are fully documented, including the source of the problem, the samples and customers affected, the impact on the data, the corrective actions taken by the lab and which final reports had to be re-issued. Customers are notified within 30 days when the investigation indicates analytical results are affected.

8.1.3 Internal Audit Reports and Corrective Action Plans

Additional information can be found in SOP S-ALL-Q-011 Audits and Inspections or its equivalent revision or replacement.

A full description of the audit, including the identification of the operation audited, the date(s) on which the audit was conducted, the specific systems examined, and the observations noted are summarized in an internal audit report. Although other personnel may assist with the performance of the audit, the Quality Manager writes and issues the internal audit report identifying which audit observations are deficiencies that require corrective action.

When audit findings cast doubt on the effectiveness of the operations or on the correctness of validity of the laboratory's environmental test results, the laboratory will take timely corrective action and notify the customer in writing within 3 business days, if investigations show that the laboratory results may have been affected.

Once completed, the internal audit report is issued jointly to the Laboratory General Manager and the manager(s)/supervisor(s) of the audited operation at a minimum. The responsible manager(s)/supervisor(s) responds within 14 days with a proposed plan to correct all of the deficiencies cited in the audit report. The Quality Manager may grant additional time for responses to large or complex deficiencies (not to exceed 30 days). Each response must include timetables for completion of all proposed corrective actions.

The Quality Manager reviews the audit responses. If the response is accepted, the Quality Manager uses the action plan and timetable as a guideline for verifying completion of the corrective action(s). If the Quality Manager determines that the audit response does not adequately address the correction of cited deficiencies, the response will be returned for modification.

To complete the audit process, the Quality Manager performs a re-examination of the areas where deficiencies were found to verify that all proposed corrective actions have been implemented. An audit deficiency is considered closed once implementation of the necessary corrective action has been verified. If corrective action cannot be verified, the associated deficiency remains open until that action is completed.

8.2 External Audits

PASI laboratories are audited regularly by regulatory agencies to maintain laboratory certifications, and by customers to maintain appropriate specific protocols.

Audit teams external to the company review the laboratory to assess the existence of systems and degree of technical expertise. The Quality Manager and other QA staff host the audit team and assist in facilitation of the audit process. Generally, the auditors will prepare a formalized audit report listing deficiencies observed and follow-up requirements for the laboratory. In some cases, items of concern are discussed during a debriefing convened at the end of the on-site review process.

The laboratory staff and supervisors develop corrective action plans to address any deficiencies with the guidance of the Quality Manager. The Laboratory General Manager provides the necessary resources for staff to develop and implement the corrective action plans. The Quality Manager collates this information

and provides a written report to the audit team. The report contains the corrective action plan and expected completion dates for each element of the plan. The Quality Manager follows-up with the laboratory staff to ensure corrective actions are implemented.

8.3 Quarterly Quality Reports

The Quality Manager is responsible for preparing a quarterly report to management summarizing the effectiveness of the laboratory Quality Systems. This status report will include:

- Results of internal systems or performance audits
- Corrective action activities
- Discussion of QA issues raised by customers
- Results of third party or external audits
- Status of laboratory certifications
- Proficiency Testing Study Results
- Results of internal laboratory review activities
- Summary of holding time violations
- Method detection limit study status
- Training activity summary
- SOP revision summary
- 3P Implementation summary (internal program)
- Other significant Quality System items

The Corporate Director of Quality, Safety & Technology utilizes the information from each laboratory to make decisions impacting the Quality Systems of the company as a whole. Each General Manager utilizes the quarterly report information to make decisions impacting Quality Systems and operational systems at a local level.

Additional information can be found in SOP S-ALL-Q-014 Quality System Review or its equivalent revision or replacement.

8.4 Annual Managerial Review

A managerial review of Quality Systems is performed on an annual basis at a minimum. This allows for assessing program effectiveness and introducing changes and/or improvements.

The managerial review must include the following topics of discussion:

- Policy and procedure suitability
- Manager/Supervisor reports
- Internal audit results
- Corrective and preventative actions
- External assessment results
- Proficiency testing studies
- Sample capacity and scope of work changes
- Customer feedback, including complaints

This managerial review must be documented for future reference by the Quality Manager and copies of the report are distributed to laboratory staff. The laboratory shall ensure that any actions identified during the review are carried out within an appropriate and agreed timescale.

8.5 Customer Service Reviews

As part of the annual managerial review listed previously, the sales staff is responsible for reporting on customer feedback, including complaints. The acquisition of this information is completed by performing surveys.

The sales staff continually receives customer feedback, both positive and negative, and reports this feedback to the lab management in order for them to evaluate and improve their management system, testing activities and customer service.

In addition, the labs must be willing to cooperate with customers or their representatives to clarify customer requests and to monitor the lab's performance in relation to the work being performed for the customers.

9.0 CORRECTIVE ACTION

Additional information can be found in SOP PGH-C-011 Corrective Actions or its equivalent revision or replacement.

During the process of sample handling, preparation and analysis, certain occurrences may warrant the necessity of corrective actions. These occurrences may take the form of analyst errors, deficiencies in quality control, method deviations, or other unusual circumstances. The Quality System of PASI provides systematic procedures for documentation, monitoring and completion of corrective actions. This can be done using PASI's LabTrack system or other system that lists among other things, the deficiency by issue number, the deficiency source, responsible party, root cause, resolution, due date, and date resolved.

9.1 Corrective Action Documentation

The following items are examples of laboratory deviations or non-conformances that warrant some form of documented corrective action:

- Quality Control data outside of acceptance criteria
- Sample Acceptance Policy deviations
- Missed holding times
- Instrument failures (including calibration failure)
- Sample preparation or analysis errors
- Sample contamination
- Errors in customer reports
- Audit findings (internal and external)
- Proficiency Testing (PT) sample failures
- Customer complaints or inquiries

Documentation of corrective actions may be in the form of a comment or footnote on the final report that explains the deficiency (e.g. matrix spike recoveries outside of acceptance criteria) or it may be a more formal documentation (either paper system or computerized spreadsheet). This depends on the extent of the deficiency, the impact on the data, and the method or customer requirements for documentation.

The person who discovers the deficiency or non-conformance initiates the corrective action documentation on the Non-Conformance Corrective/ Preventative Action report and/or LabTrack. The documentation must include the affected projects and sample numbers, the name of the applicable Project Manager, the customer name and the sample matrix involved. The person initiating the corrective action documentation must also list the known causes of the deficiency or non-conformance as well as any corrective/preventative actions that they have taken. Preventive actions must be taken in order to prevent or minimize the occurrence of the situation.

In the event that the laboratory is unable to determine the cause, laboratory personnel and management staff will start a root cause analysis by going through an investigative process. During this process, the following general steps must be taken into account: defining the non-conformance problem, assigning responsibilities, determining if the condition is significant, and investigating the root cause of the nonconformance problem. General non-conformance investigative techniques follow the path of the sample through the process looking at each individual step in detail. The root cause must be documented on the Corrective/Preventative Action Report.

After all the documentation is completed, the routing of the Corrective/Preventative Action Report will continue from the person initiating the corrective action, to their immediate supervisor or the Project Manager and finally to the Quality Manager, who is responsible for final review and signoff of all formal corrective/preventative actions.

9.2 Corrective Action Completion

9.2.1 Quality Control outside of acceptance criteria

The analyst that is generating or validating Analytical data is responsible for checking the results against established acceptance criteria (quality control limits). The analyst must immediately address any deficiencies discovered. Method blank, LCS or matrix spike failures are evaluated against method, program, and customer requirements and appropriate footnotes are entered into the LIMS system. Some deficiencies may be caused by matrix interferences. Where possible, matrix interferences are confirmed by re-analysis.

Quality control deficiencies must be made known to the customer on the final report for their review of the data for usability. If appropriate, the supervisor is alerted to the QC failure and if necessary a formal corrective action can be initiated. This may involve the input of the Quality Manager or the General Manager.

The department supervisor and/or Operations Manager are responsible for evaluating the source of the deficiency and for returning the analytical system to control. This may involve instrument maintenance, analytical standard or reagent evaluation, or an internal audit of the analytical procedure.

9.2.2 Sample Acceptance Policy deviations

Any deviation from the Sample Acceptance Policy listed in this Manual must be documented on the Chain-of-Custody or other applicable form by the sample receiving personnel or by the Project Manager. Analysts or supervisors that discover such deviations must contact the sample receiving personnel or appropriate Project Manager so they can initiate the proper documentation and customer contact. If a more formalized corrective action must be documented, the Quality Manager is made aware of the situation.

The customer is notified of these deviations as soon as possible so they can make decisions on whether to continue with the sample analysis or re-sample. Copies of this documentation are included in the project file.

9.2.3 Missed holding times

In the event that a holding time requirement has been missed, the analyst or supervisor must complete a formal corrective action form. The Project Manager and the Quality Manager must be made aware of these hold time exceedances.

The Project Manager must contact the customer for appropriate decisions to be made with the resolution documented and included in the customer project file. The Quality Manager includes a list of all missed holding times in their Quarterly Report to the corporate office.

9.2.4 Instrument Failures

In the event of an instrument failure that either causes the necessity for re-analysis or questions the validity of generated results, a formal corrective action must be initiated. The analyst and supervisor evaluate any completed data for validity and usability. They are also responsible for returning the instrument to valid operating condition and for documenting that the system is in control (e.g. acceptable calibration verification).

9.2.5 Sample Preparation or Analysis errors

When there is an error in the preparation or analysis of samples, the analyst evaluates the impact on the usability of the analytical data with the assistance of the supervisor or manager. The affected samples will be re-processed or re-analyzed under acceptable conditions. In the event that no additional sample is available for re-analysis, the customer must be contacted for their decision on how to proceed. Documentation may take the form of footnotes or a formal corrective action form.

9.2.6 Errors in customer reports

When an error on the customer report is discovered, the Project Manager is responsible for initiating a formal corrective action form that describes the failure (e.g. incorrect analysis reported, reporting units are incorrect, reporting limits do not meet objectives). The Project Manager is also responsible for revising the final report if necessary and submitting it to the customer.

9.2.7 Audit findings

The Quality Manager is responsible for documenting all audit findings and their corrective actions. This documentation must include the initial finding, the persons responsible for the corrective action, the due date for reporting back to the auditing body, the root cause of the issue, and the corrective action taken to resolve the findings. The Quality Manager is also responsible for providing any back-up documentation used to prove that a corrective action has been completed.

9.2.8 Proficiency Testing failures

Any PT result returned to the Quality Manager as "not acceptable" requires an investigation and applicable corrective actions. The operational staff is made aware of the PT failures and they are responsible for reviewing the applicable raw data and calibrations and list possible causes for error. The Quality Manager reviews their findings and initiates another external PT sample or an internal PT sample to try and correct the previous failure. Replacement PT results must be monitored by the Quality Manager and reported to the applicable regulatory authorities.

9.2.9 Customer Complaints

Project Managers are responsible for issuing corrective action forms for customer complaints. As with other corrective actions, the possible causes of the problem are listed and the form is passed to the appropriate analyst or supervisor. After the corrective actions have been listed, the Project Manager reviews the corrective action to determine if the customer needs or concerns are being addressed.

9.3. Preventive Action Documentation

Pace laboratories can take advantage of several available information sources in order to identify needed improvements in all of their systems (technical, managerial, quality, etc.). These sources may include:

- Management Continuous Improvement Plan (CIP) metrics which are used by all production departments within Pace. When groups compare performance across the company, ways to improve systems are discovered. These improvements can be made within a department or lab-wide.
- Annual managerial reviews- part of this NELAC-required review is to look at all processes and procedures used by the lab over the past year and to determine ways to improve these processes in the future.
- Quality systems reviews- any frequent checks of quality systems (monthly logbook reviews, etc.) can uncover issues that can be corrected or adjusted before they become a larger issue.

When improvement opportunities are identified or if preventive action is required, the lab can develop, implement, and monitor preventive action plans.

10.0 GLOSSARY

3P Program	The Pace Analytical continuous improvement program that focuses on Process, Productivity and Performance. Best Practices are identified that can be used by all PASI labs.
Accuracy	The agreement between an observed value and an accepted reference value. Accuracy includes a combination of random error (precision) and systematic error (bias) components that are due to sampling and analytical operations; a data quality indicator.
Aliquot	A portion of a sample taken for analysis.
Analyte	The specific chemical species or parameter an analysis seeks to determine.
Batch	Environmental samples that are prepared and/or analyzed together with the same process and personnel, using the same lot(s) of reagents. A preparation batch is composed of one to 20 environmental samples of the same NELAC-defined matrix, meeting the above-mentioned criteria and with a maximum time between the start of processing of the first and last sample in the batch to be 24 hours. An analytical batch is composed of prepared environmental samples (extracts, digestates or concentrates) that are analyzed together as a group. An analytical batch can include prepared samples originating from various environmental matrices and can exceed 20 samples.
Blank	A sample that has not been exposed to the analyzed sample stream in order to monitor contamination during sampling, transport, storage or analysis. The blank is subjected to the usual analytical and measurement process to establish a zero baseline or background value and is sometimes used to adjust or correct routine analytical results.
Blind Sample	A sample for submitted for analysis with a composition known to the submitter. The analyst/laboratory may know the identity of the sample but not its composition. It is used to test analyst or laboratory proficiency in the execution of the measurement process.
Calibration	To determine, by measurement or comparison with a standard, the correct value of each scale reading on a meter, instrument, or other device. The levels of the applied calibration standard must bracket the range of planned or expected sample measurements.
Calibration Curve	The graphic representation of known values, such as concentrations for a series of calibration standards and their instrument response.
Chain-of-Custody (COC)	A record that documents the possession of samples from the time of collection to receipt in the laboratory. This record generally includes the number and type of containers, mode of collection, collector, time of collection, preservation, and requested analyses.
Confirmation	Verification of the identity of a component through the use of an alternate scientific approach from the original method. These may include, but are not limited to: • second-column confirmation • alternate wavelength • derivatization derivative • mass spectral interpretation • additional cleanup procedures
Contract Required Detection Limit (CRDL)	Detection limit that is required for EPA Contract Laboratory Program (CLP) contracts.
Contract Required Quantitation Limit (CRQL)	Quantitation limit (reporting limit) that is required for EPA Contract Laboratory Program (CLP) contracts.
Comparability	An assessment of the confidence with which one data set can be compared to another. Comparable data are produced through the use of standardized procedures and techniques.

Completeness	The percent of valid data obtained from a measurement system compared to the amount of valid data expected under normal conditions. The equation for completeness is: % Completeness = (Valid Data Points/Expected Data Points)*100
Calibration Verification	The process of verifying a calibration by analysis of standards and comparing the results with the known amount.
Control Chart	A graphic representation of a series of test results, together with limits within which results are expected when the system is in a state of statistical control (see definition for Control Limit)
Control Limit	A range within which specified measurement results must fall to verify that the analytical system is in control. Control limit exceedances may require corrective action or require investigation and flagging of nonconforming data.
Corrective Action	The action taken to eliminate the causes of a nonconformity, defect, or other undesirable situation in order to prevent recurrence.
Corrective and Preventative Action (CAPA)	The primary management tools for bringing improvements to the quality system, to the management of the quality system's collective processes, and to the products or services delivered which are an output of established systems and processes.
Data Quality Objective (DOQ)	Systematic strategic planning tool based on the scientific method that identifies and defines the type, quality, and quantity of data needed to satisfy a specified use or end user.
Data Reduction	The process of transforming raw data by arithmetic or statistical calculations, standard curves, concentration factors, etc., and collation into a more usable form.
Demonstration of Capability	A procedure to establish the ability of the analyst to generate acceptable accuracy.
Detection Limit (DL)	General term for the lowest concentration or amount of the target analyte that can be identified, measured and reported with confidence that the analyte concentration is not a false positive value. See definitions for Method Detection Limit and Limit of Detection.
Document Control (Management)	Procedures to ensure that documents (and revisions thereto) are proposed, reviewed for accuracy, approved for release by authorized personnel, distributed properly and controlled (managed) to ensure use of the correct version at the location where the prescribed activity is performed.
Dry Weight	The weight after drying in an oven at a specified temperature.
Duplicate or Replicate Analysis	The identically performed measurement on two or more sub-samples of the same sample within a short interval of time
Environmental Sample	A representative sample of any material (aqueous, non-aqueous, or multimedia) collected from any source for which determination of composition or contamination is requested or required. Environmental samples can generally be classified as follows: • Non Potable Water (Includes surface water, ground water, effluents, water treatment chemicals, and TCLP leachates or other extracts) • Drinking Water - Delivered (treated or untreated) water designated as potable water • Water/Wastewater - Raw source waters for public drinking water supplies, ground waters, municipal influents/effluents, and industrial influents/effluents • Sludge - Municipal sludges and industrial sludges. • Soil - Predominately inorganic matter ranging in classification from sands to clays. • Waste - Aqueous and non-aqueous liquid wastes, chemical solids, and industrial liquid and solid wastes
Equipment Blank	A sample of analyte-free media used to rinse common sampling equipment to check effectiveness of decontamination procedures.
Field Blank	A blank sample prepared in the field by filling a clean container with reagent water and appropriate preservative, if any, for the specific sampling activity being undertaken.

Field Measurement	Determination of physical, biological, or radiological properties, or chemical constituents that are measured on-site, close in time and space to the matrices being sampled/measured, following accepted test methods. This testing is performed in the field outside of a fixed-laboratory or outside of an enclosed structure that meets the requirements of a mobile laboratory.
Holding Time	The maximum time that samples may be held prior to preparation and/or analysis as defined by the method.
Homogeneity	The degree to which a property or substance is uniformly distributed throughout a sample.
Initial Calibration (ICAL)	The process of analyzing standards, prepared at specified concentrations, to define the quantitative response relationship of the instrument to the analytes of interest. Initial calibration is performed whenever the results of a calibration verification standard do not conform to the requirements of the method in use or at a frequency specified in the method.
Internal Standards	A known amount of standard added to a test portion of a sample as a reference for evaluating and controlling the precision and bias of the applied analytical method.
Intermediate Standard Solution	Reference solutions prepared by dilution of the stock solutions with an appropriate solvent.
Laboratory Control Sample (LCS)	A blank sample matrix, free from the analytes of interest, spiked with known amounts of analytes or a material containing known amounts of analytes. It is generally used to establish intra-laboratory or analyst-specific precision and bias or to assess the performance of all or a portion of the measurement system. Sometimes referred to as Laboratory Fortified Blank, Spiked Blank or QC Check Sample.
Limit of Detection (LOD)	An estimate of the minimum amount of a substance that an analytical process can reliably detect. An LOD is analyte and matrix specific and may be laboratory-dependent.
Limit of Quantitation (LOQ) .	The minimum levels, concentrations or quantities of a target variable (e.g. target analyte) that can be reported with a specified degree of confidence
Laboratory Information Management System (LIMS)	A computer system that is used to maintain all sample information from sample receipt, through preparation and analysis and including sample report generation.
Learning Management System (LMS)	A web-based database used by the laboratories to track and document training activities. The system is administered by the corporate training department and each lab's learn centers are maintained by a local administrator.
Lot	A quantity of bulk material of similar composition processed or manufactured at the same time.

Matrix	The component or substrate that contains the analyte of interest. For purposes of batch and QC requirement determinations, the following matrix distinctions are used: • **Aqueous or Non-Potable Water:** any aqueous sample excluded from the definition of Drinking Water matrix or Saline/Estuarine source. Includes surface water, groundwater, effluents, and TCLP or other extracts. • **Drinking Water:** any aqueous sample that has been designated a potable or potentially potable water source. • **Saline/Estuarine:** any aqueous sample from an ocean or estuary, or other saltwater source. • **Non-aqueous liquid:** any organic liquid with <15% settleable solids. • **Biological Tissue:** any sample of a biological origin such as fish tissue, shellfish or plant material. Such sample can be grouped according to origin. • **Solid:** includes soils, sediments, sludges, and other matrices with >15% settleable solids. • **Chemical Waste:** a product or by-product or an industrial process that results in a matrix not previously defined • **Air and Emissions:** whole gas or vapor samples including those contained in flexible or rigid wall containers and the extracted concentrated analytes of interest from a gas vapor that are collected with a sorbent tube, impinger solution, filter, or other device.
Matrix Spike (MS)	A sample prepared by adding a known quantity of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. Matrix spikes are used to determine the effect of the matrix on a method's recovery efficiency. (sometimes referred to as Spiked Sample or Fortified Sample)
Matrix Spike Duplicate (MSD)	A second replicate matrix spike prepared in the laboratory and analyzed to obtain a measure of precision of the recovery of each analyte. (sometimes referred to as Spiked Sample Duplicate or Fortified Sample Duplicate)
Method Blank	A sample of a matrix similar to the batch of associated samples (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures: and in which no target analytes or interferences are present at concentrations that impact the analytical results for sample analyses.
Method Detection Limit (MDL)	One way to establish a Limit of Detection (LOD); defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.
Performance Based Measurement System (PBMS)	An analytical system wherein the data quality needs, mandates or limitations of a program or project are specified and serve as criteria for selecting appropriate test methods to meet those needs in a cost-effective manner.
Precision	The degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves. Precision is usually expressed as standard deviation, variance or range, in either absolute or relative terms.
Preservation	Refrigeration and/or reagents added at the time of sample collection (or later) to maintain the chemical and/or biological integrity of the sample.
Proficiency Testing	A means of evaluating a laboratory's performance under controlled conditions relative to a given set of criteria through analysis of unknown samples provided by an external source.
Protocol	A detailed written procedure for field and/or laboratory operation that must be strictly followed.
Quality Assurance Project Plan (QAPP)	A formal document describing the detailed quality control procedures required by a specific project.
Quality Assurance (QA)	An integrated system of activities involving planning, quality control, quality assessment, reporting and quality improvement to ensure that a product or service meets defined standards of quality with a stated level of confidence.

Quality Control (QC)	The overall system of technical activities whose purpose is to measure and control the quality of a product or service so that it meets the needs of users.
Quality Control Sample	A sample used to assess the performance of all or a portion of the measurement system. QC samples may be Certified Reference Materials, a quality system matrix fortified by spiking, or actual samples fortified by spiking.
Quality Assurance Manual	A document stating the management policies, objectives, principles, organizational structure and authority, responsibilities, accountability, and implementation of an agency, organization, or laboratory, to ensure the quality of its product and the utility of its product to its users.
Quality System	A structured and documented management system describing the policies, objectives, principles, organizational authority, responsibilities, accountability, and implementation plan of an organization for ensuring quality in its work processes, products (items), and services. The quality system provides the framework for planning, implementing, and assessing work performed by the organization and for carrying out required QA and QC.
Random Error	The EPA has established that there is a 5% probability that the results obtained for any one analyte will exceed the control limits established for the test due to random error. As the number of compounds measured increases in a given sample, the probability for statistical error also increases.
Raw Data	Any original factual information from a measurement activity or study recorded in a laboratory notebook, worksheets, records, memoranda, notes, or exact copies thereof that are necessary for the reconstruction and evaluation of the report of the activity or study. Raw data may include photography, microfilm or microfiche copies, computer printouts, magnetic media, including dictated observations, and recorded data from automated instruments. If exact copies of raw data have been prepared (e.g. tapes which have been transcribed verbatim, dated and verified accurate by signature), the exact copy or exact transcript may be submitted.
Reagent Grade	Analytical reagent (AR) grade, ACS reagent grade, and reagent grade are synonymous terms for reagents that conform to the current specifications of the Committee on Analytical Reagents of the American Chemical Society.
Reference Standard	A standard, generally of the highest metrological quality available at a given location, from which measurements made at that location are derived.
Reporting Limit (RL)	The level at which method, permit, regulatory and customer-specific objectives are met. The reporting limit may never be lower than the Limit of Detection (i.e. statistically determined MDL). Reporting limits are corrected for sample amounts, including the dry weight of solids, unless otherwise specified. There must be a sufficient buffer between the Reporting Limit and the MDL.
Representativeness	A quality element related to the ability to collect a sample reflecting the characteristics of the part of the environment to be assessed. Sample representativeness is dependent on the sampling techniques specified in the project work plan.
Sample Delivery Group (SDG)	A unit within a single project that is used to identify a group of samples for delivery. An SDG is a group of 20 or fewer field samples within a project, received over a period of up to 14 calendar days. Data from all samples in an SDG are reported concurrently.
Sample Tracking	Procedures employed to record the possession of the samples from the time of sampling until analysis, reporting and archiving. These procedures include the use of a Chain-of-Custody Form that documents the collection, transport, and receipt of compliance samples to the laboratory. In addition, access to the laboratory is limited and controlled to protect the integrity of the samples.
Sensitivity	The capability of a method or instrument to discriminate between measurement responses representing different levels (concentrations) of a variable of interest.
Standard	A substance or material with properties known with sufficient accuracy to permit its use to evaluate the same property in a sample.

Standard Blank	A calibration standard consisting of the same solvent/reagent matrix used to prepare the calibration standards without the analytes. It is used to construct the calibration curve by establishing instrument background.
Standard Operating Procedure (SOP)	A written document which details the method of an operation, analysis, or action whose techniques and procedures are thoroughly prescribed and which is accepted as the method for performing certain routine or repetitive tasks
Stock Standard	A concentrated reference solution containing one or more analytes prepared in the laboratory using an assayed reference compound or purchased from a reputable commercial source.
Surrogate	A substance with properties that mimic the analyte of interest. It is unlikely to be found in environmental samples and is added to them for quality control purposes.
Systems Audit	An on-site inspection or assessment of a laboratory's quality system.
Traceability	The property of a material or measurement result defining its relationship to recognized international or national standards through an unbroken chain of comparisons.
Training Document	A training resource that provides detailed instructions to execute a specific method or job function.
Trip Blank	This blank sample is used to detect sample contamination from the container and preservative during transport and storage of the sample. A cleaned sample container is filled with laboratory reagent water and the blank is stored, shipped, and analyzed with its associated samples.
Uncertainty Measurement	The parameter associated with the result of a measurement that characterized the dispersion of the values that could be reasonably attributed to the measurand (i.e. the concentration of an analyte).

11.0 REFERENCES

- "Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act." Federal Register, 40 CFR Part 136.
- "Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods." SW-846.
- "Methods for Chemical Analysis of Water and Wastes", EPA 600-4-79-020, 1979 Revised 1983, U.S. EPA.
- U.S. EPA Contract Laboratory Program Statement of Work for Organic Analysis
- U.S. EPA Contract Laboratory Program Statement of Work for Inorganic Analysis
- "Standard Methods for the Examination of Water and Wastewater." Current Edition APHA-AWWA-WPCF
- "Annual Book of ASTM Standards", Section 4: Construction, Volume 04.04: Soil and Rock; Building Stones, American Society of Testing and Materials.
- "Annual Book of ASTM Standards", Section 11: Water and Environmental Technology, American Society of Testing and Materials.
- "NIOSH Manual of Analytical Methods", Third Edition, 1984, U.S. Department of Health and Human Services, National Institute for Occupational Safety and Health.
- "Methods for the Determination of Organic Compounds in Finished Drinking Water and Raw Source Water", U.S. EPA, Environmental Monitoring and Support Laboratory – Cincinnati (September 1986).
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- Methods for Non-conventional Pesticides Chemicals Analysis of Industrial and Municipal Wastewater, Test Methods, EPA-440/1-83/079C
- Environmental Measurements Laboratory (EML) Procedures Manual, HASL-300, US DOE, February, 1992.
- Requirements for Quality Control of Analytical Data, HAZWRAP, DOE/HWP-65/R1, July, 1990.
- Requirements for Quality Control of Analytical Data for the Environmental Restoration Program, Martin Marietta, ES/ER/TM-16, December, 1992.
- Quality Assurance Manual for Industrial Hygiene Chemistry, AIHA, 1988
- National Environmental Laboratory Accreditation Conference, Constitution, Bylaws, and Standards. Most recent
- ISO/IEC 17025:2005, General requirements for the competence of testing and calibration laboratories.

12.0 REVISIONS

The PASI Corporate Quality and Safety Manager files both a paper copy and electronic version of a Microsoft Word document with tracked changes detailing all revisions made to the previous version of the Quality Assurance Manual. This document is available upon request. All revisions are summarized in the table below.

Document Number	Reason for Change	Date
Quality Assurance Manual Revision 11.0	Overall conversion to template format. Removed all references to Addenda. Changes required based on conversion are not explicitly noted unless change represents a significant policy change. SECTION 1: • Add comment to address continuous improvement to quality system. • Changed statement of purpose in Section header to "Mission Statement". • Added requirements for appointment when Technical Director absent. • Added requirements for notification to AA's and updates to organizational charts when management changes. • Added Client Services Manager job description. SECTION 2: • Changed temperature requirements to "Not Frozen but =6°C". • Added flexible section concerning default sampling time in absence of customer-specified time. • Added flexible section to address sample and container identification by the LIMS. • Changed sample retention requirement to 45 days from receipt of samples. Added comment allowing for storage outside of temperature controlled conditions. SECTION 3: • Inserted allowance for use of older methods. • Changed references to work processing and training documents to allow for use of LMS and other types of training media. • Inserted allowance for alternative DOCs where spiking not possible. SECTION 4: • Inserted reference to Anonymous Message line. • Inserted reference to the use of default control limits. • Inserted allowance for release of data without corrective action for obvious matrix interferences. • Inserted reference to the treatment of internal standards. • Inserted allowance for use of MDL annual MDL verification in lieu of full 40 CFR Part 136 annual MDL studies. • Inserted general procedure for LOQ verification SECTION 5: • Added general process for approval and use of QAM template. • Removed specific reference of Work Process Manuals. Left flexible section to include all other controlled documentation. SECTION 6: • No changes noted. SECTION 7: • Added qualifications for secondary reviewers. SECTION 8: • Changed frequency listing for Corporate Audits. SECTION 9: • Changed references from QA Track to Lab Track – left flexible to	17Sep2007

Document Number	Reason for Change	Date
	accommodate information still in QA Track. SECTION 10: • No changes noted. SECTION 11: • No changes noted. ATTACHMENTS: • Standardized format for Attachments.	
Quality Assurance Manual Revision 12.0	General: replaced the word 'client' with 'customer', where applicable. SECTION 1: • Section 1.6.4: added language for clarity • Added new section 1.8.1; responsibilities of Senior General Managers. • Section 1.8.3: added reference to LMS. • Added new section 1.8.17: responsibilities of Waste Coordinators. • Section 1.9, last paragraph: changed 'annually' to 'periodically'. Next to last paragraph- added reference to LMS. SECTION 2: • Incorporated optional language into section 2.1 for laboratories with field services staff supervised by the laboratory • Added new section 2.2 entitled Field Services. • Section 2.3: added reference to the new Review of Analytical Requests SOP. • Changed optional text in 2.6 to explain how EpicPro assigns unique ID # to projects and samples including the unique container ID • Section 2.7.2: changed freezer temp requirement to match SOP. SECTION 3: • Section 3.4: Included optional language for performing IDOCs for tests not amenable to spiking using the "4 replicate" approach. SECTION 4: • Section 4.1: expanded language to allow electronic signature and storing of integrity training documentation within the LMS • Section 4.10: revised and added language regarding LOD studies, initial verification and annual verification, where applicable. • Section 4.11: changed PRL to RL. • Section 4.13: added editable line regarding PT study information. Changed wording to say approved PT providers are utilized • Section 4.14: added sentence regarding rounding rules listed applying only to LIMS. SECTION 5: • Section 5.1, last bullet point: changed language to reflect that SOPs must be locked from printing if controlled electronically. SECTION 6: • Section 6.3.1: adjusted language about classes of weights potentially used. • Section 6.3.3: removed customer-specific requirement to re-calibrate every four hours but added space for this to be added back in where applicable. • Added reference to Attachment III in the introductory paragraph to this section. SECTION 7: • Sections 7.1-7.3: added language for those labs that are minimizing or	13Nov2008

Document Number	Reason for Change	Date
	eliminating the need for paper copies. • Section 7.2: clarified language in numbered items so that it does not appear that all 4 criteria must be applicable at one time. • Section 7.3: added list of approved signatories for final reports. SECTION 8: • Section 8.1.2, last paragraph: revised language regarding data integrity issues and added a timeframe to notify customers of affected data. • Added section 8.5 "Customer Service Reviews"- ISO requirement SECTION 9: • Added new section 9.3 regarding Preventive Action. SECTION 10: • No revisions. SECTION 11: • No revisions. Attachments: • Attachment IIb: updated corporate org chart • Attachment VIII: revised to match the current Analytical Guides.	

ATTACHMENT I

Quality Control Calculations

PERCENT RECOVERY (%REC)

$$\%REC = \frac{(MSConc - SampleConc)}{TrueValue} * 100$$

NOTE: The SampleConc is zero (0) for theLCS and Surrogate Calculations

PERCENT DIFFERENCE (%D)

$$\%D = \frac{MeasuredValue - TrueValue}{TrueValue} * 100$$

where:
TrueValue = Amount spiked (can also be the $\overline{CF}$ or $\overline{RF}$ of the ICAL Standards)
Measured Value = Amount measured (can also be the CF or RF of the CCV)

PERCENT DRIFT

$$\%Drift = \frac{CalculatedConcentration - TheoreticalConcentration}{TheoreticalConcentrtion} * 100$$

RELATIVE PERCENT DIFFERENCE (RPD)

$$RPD = \frac{|(R1 - R2)|}{(R1 + R2)/2} * 100$$

where:
R1 = Result Sample 1
R2 = Result Sample 2

CORRELATION COEFFICIENT (R)

$$CorrCoeff = \frac{\sum_{i=1}^{N} W_i * (X_i - \overline{X}) * (Y_i - \overline{Y})}{\sqrt{\left(\sum_{i=1}^{N} W_i * (X_i - \overline{X})^2\right) * \left(\sum_{i=1}^{N} W_i * (Y_i - \overline{Y})^2\right)}}$$

With:	N	Number of standard samples involved in the calibration
	i	Index for standard samples
	Wi	Weight factor of the standard sample no. i
	Xi	X-value of the standard sample no. i
	X(bar)	Average value of all x-values
	Yi	Y-value of the standard sample no. i
	Y(bar)	Average value of all y-values

ATTACHMENT I (CONTINUED)

Quality Control Calculations (continued)

STANDARD DEVIATION (S)

$$S = \sqrt{\sum_{i=1}^{n} \frac{(X_i - \overline{X})^2}{(n-1)}}$$

where:
n = number of data points
X_i = individual data point
$\overline{X}$ = average of all data points

AVERAGE ($\overline{X}$)

$$\overline{X} = \frac{\sum_{n=1}^{i} X_i}{n}$$

where:
n = number of data points
X_i = individual data point

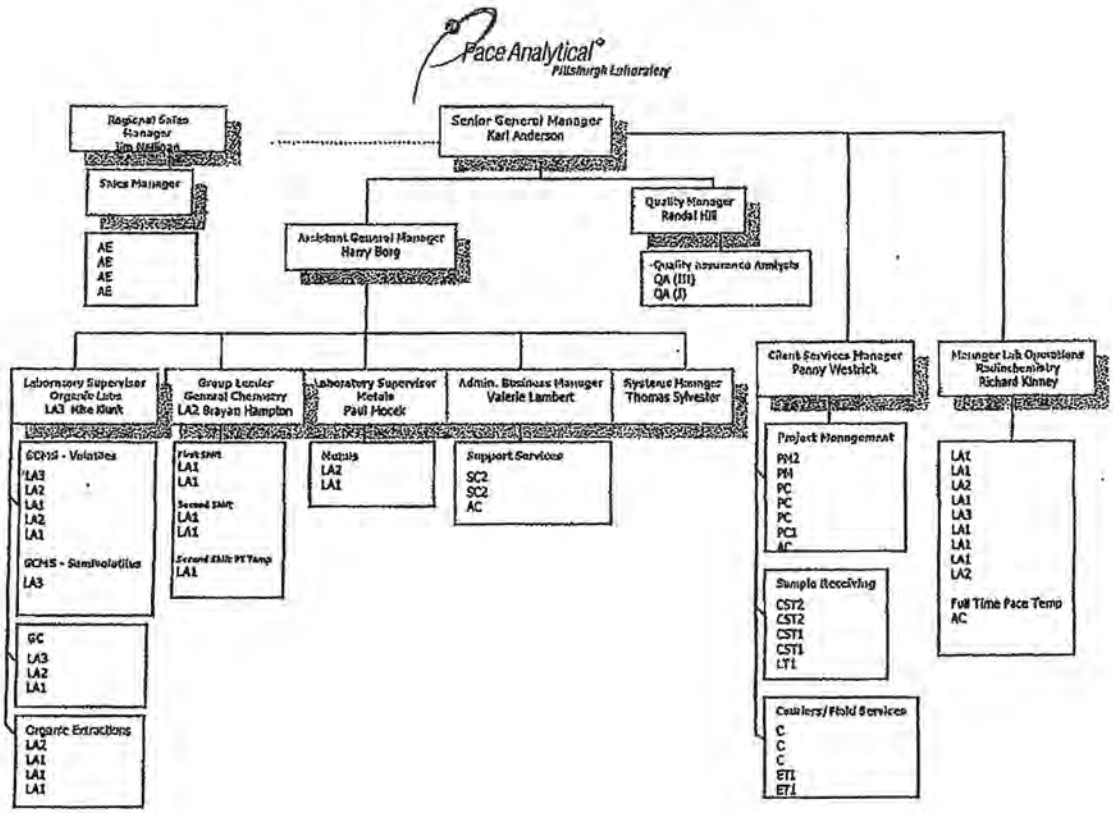
RELATIVE STANDARD DEVIATION (RSD)

$$RSD = \frac{S}{\overline{X}} * 100$$

where:
S = Standard Deviation of the data points
$\overline{X}$ = average of all data points

ATTACHMENT IIA

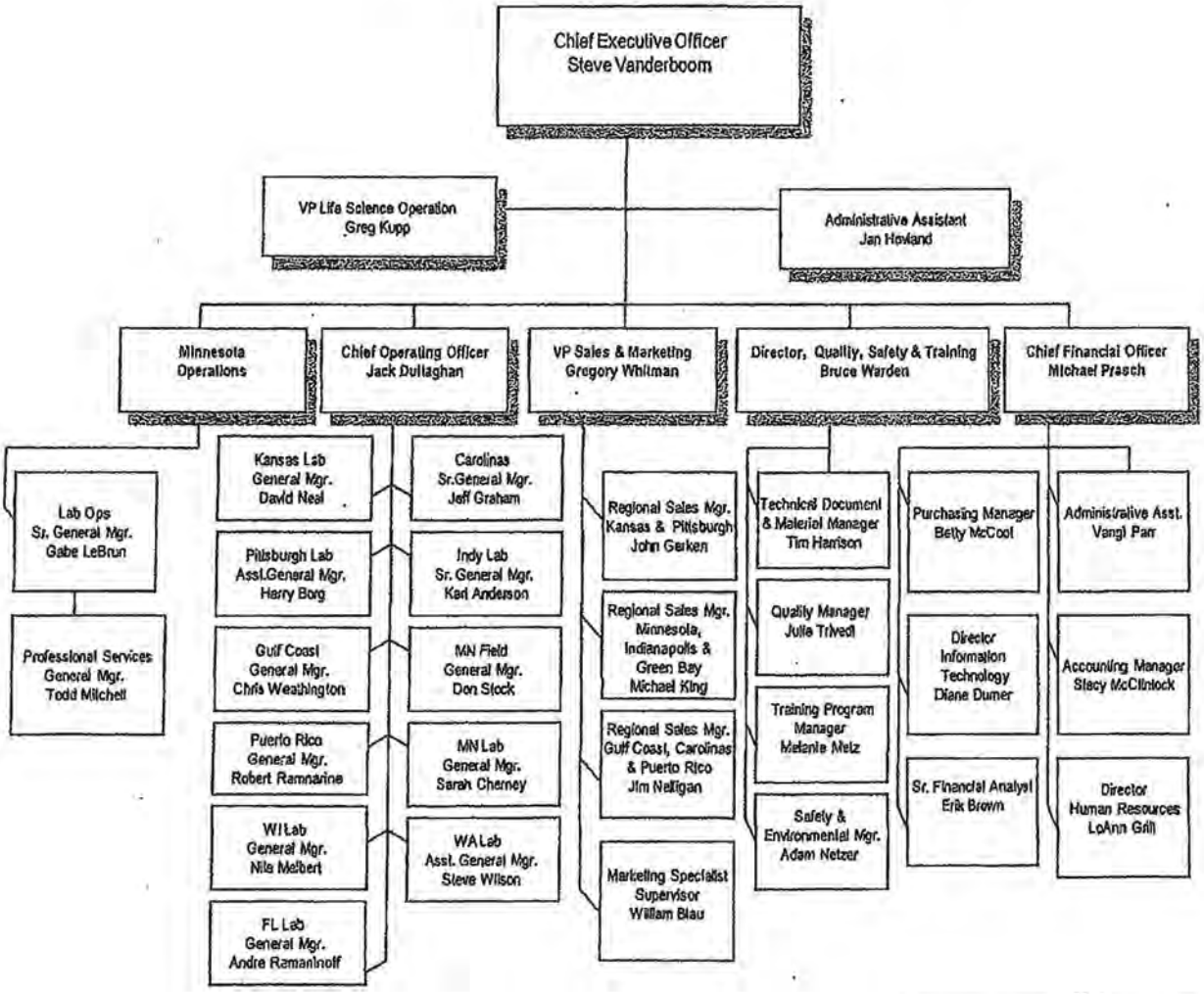
PASI – PITTSBURGH ORGANIZATIONAL CHART



ATTACHMENT IIB

PASI – CORPORATE ORGANIZATIONAL CHART

CORPORATE/MANAGEMENT STRUCTURE



_____ Date _____
Steve Vanderboom, Chief Executive Officer Dec. 2008

ATTACHMENT III

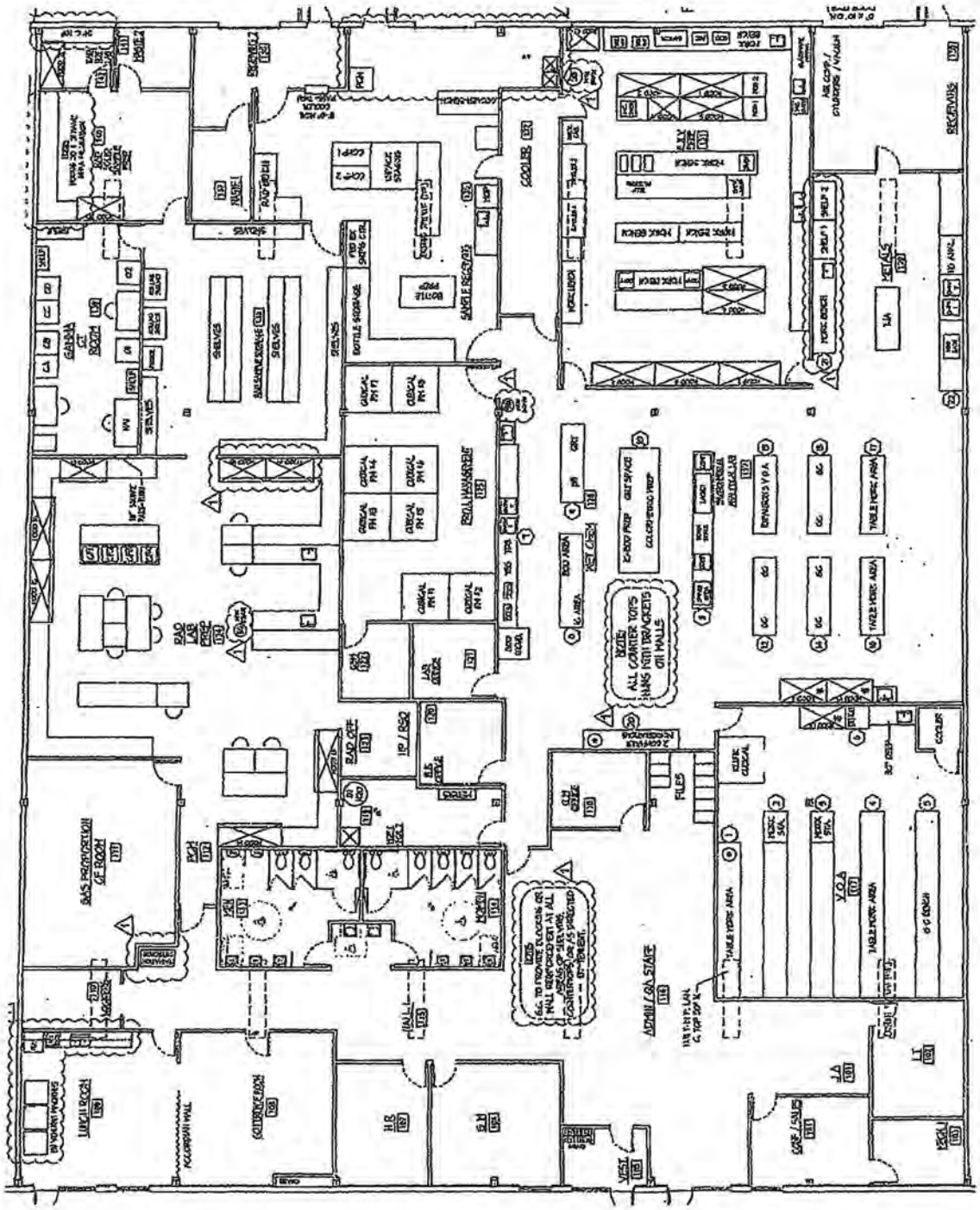
PASI – PITTSBURGH EQUIPMENT LIST

Environmental Lab				
Instrument	Manufacturer	Model No.	Instrument ID	Dept/Test
GC/MS				
	Hewlett-Packard	5973	M5	Semivoa
	Hewlett-Packard	5973	M6	Semivoa
	Hewlett-Packard	5973	M7	Semivoa
	Hewlett-Packard	5973	HP1	Volatiles
	Hewlett-Packard	5973	HP2	Volatiles
	Hewlett-Packard	5973	HP3	Volatiles
	Hewlett-Packard	5973	HP4	Volatiles
GC				
	Hewlett-Packard	5890A	GC A	Pest/PCB
	Hewlett-Packard	5890A	GC D	PCB
	Hewlett-Packard	5890 Series II	GC G	Herbicides
	Hewlett-Packard	5890A	GC C	TPH/DRO
	Hewlett-Packard	5890 Series II	GC P	Glycols/Alcohols
	Hewlett-Packard	5890 Series II	GC K	GRO
ICP				
	Thermo Jerrell Ash	ICAP-61E	ICP 1	Trace Metals
Mercury				
	Leeman	PS-200 II	Hg 1	Mercury
	Cetak	M-6100	Hg-2	Mercury
Automated Spectrophotometers				
	Lachat	QuickChem 8000		Wet Chem
	SmartChem	Discreet Analyzer		Wet Chem
Total Organic Carbon				
	OI Analytical	1030	TOC	Wet Chem
Spectrophotometers				
	Sequoia Turner	SP-850		Wet Chem
	Hach	DR5000		Wet Chem
Infrared Spectrophotometer				
	Perkin Elmer	1310		TPH
Solvent Extractor				
	Dionex	ASE-200		Soil Extraction
Solid Phase Extractor				
	Horizon	SPE-Dex 3000XL		1664A
Microwave Extractor				
	Mars	230/60		Soil Extraction
Ion Chromatograph				
	Dionex	LC20		Anions

Radiochemistry Lab				
Instrument	Instrument	Model No.	Instrument ID	Department
Carbon/Sulfur Analyzer				
	LECO	EC12 755-10D		Carbon - Sulfur
Moisture Analysis				
	Panametrics	Image Series 2		% Mositure
Gamma Spectrometer				
Canberra	HP Ge Detector 10%	IGC-4019	A (15647)	Gamma Spec
Canberra	HP Ge Detector 40%	GX5019	B (15648)	Gamma Spec
Canberra	HP Ge Detector 60%	GC-6022	C (OOS)	Gamma Spec
Canberra	HP Ge Detector 20%	GR-3521	D	Gamma Spec
Ortec	HP Ge Detector 100%	GEM100P4ST	1 (19623)	Gamma Spec
Ortec	HP Ge Detector 150%	GEM100S	2 (19625)	Gamma Spec
Canberra	NaI	Unispec	1-4	Gamma Spec
Gas Flow Proportional Counter				
	Berthold (10 Detectors)	LB770	1-10 (15641)	Radiochem
	Protean (28 Detectors)	MPC-9604	11-38	Radiochem
Liquid Scintillation Coupter				
Parckard	Benchtop LSC	Tri-Carb 2900TR		Radiochem
Alpha Spectrometer				
Canberra	Canberra	Alpha Analyst	1-24 (15645)	Radiochem
Oxford-Tennelec	Tennelec	Alpha Oasis	25-40 (15679)	Radiochem
Alpha Scintillation Counters				
Ludlum	Ludlum	Model 2000 Scaler	A-C	Ra-226
Kinetic Phosphorescence Analyzer				
Chemchek	KPA	KPA-11		Uranium

ATTACHMENT IV

PASI–PITTSBURGH FLOOR PLAN



ATTACHMENT V

PASI – PITTSBURGH SOP LIST

PACB SOP No.	Revision	Document Name
PGH-C-003	2	Review and Verification of Data
PGH-C-001	0	Sample Management
S-ALL-C-002	0	Bottle Order Database
PGH-C-006	3	Assignment of Project Numbers and Sample Identifications
PGH-C-008	1	Subcontracting Analytical Services
PGH-C-009	1	Glassware Washing
PGH-C-012	0	Customer Complaints
PGH-C-016	1	Data Packages
PGH-C-017	1	Waste Management & Disposal
PGH-C-019	A	Hood Face Velocity Measurements
PGH-C-024	0	Cooler Tracking
PGH-C-025	0	PADEP MCL Violation Reporting
PGH-L-001	3	Error Correction Policy
PGH-L-003	0	Incoming Work Policy
PGH-L-004	2	Signature Stamp Policy
PGH-L-005	0	Commercial Dedication of Services and Supplies for Safety Projects
PGH-C-002	1	Training of Laboratory Personnel
S-ALL-Q-001	7	Preparation of Standard Operating Procedures
PGH-C-023	3	Archiving Laboratory Documents
S-ALL-Q-002	2	Document Management
S-ALL-Q-003	2	Document Numbering Procedure
S-ALL-Q-004	4	Method Detection Limit Studies
ALL-PGH-Q-004	0	MDL Addendum
ALL-Q-005	2	Purchase of Laboratory Supplies (& Addendum)
ALL-Q-006	1	Receipt and Storage of Laboratory Supplies (& Addendum)
PGH-C-011	3	Corrective Actions
PGH-C-020	1	Logbook of Logbooks
PGH-C-022	1	Spreadsheet Validation
PGH-C-021	1	Measurement of Uncertainty
S-ALL-Q-009	2	Laboratory Documentation
S-ALL-Q-010	2	PE/PT Program
S-ALL-Q-011	1	Audits and Inspections
S-ALL-Q-013	1	Support Equipment
S-ALL-Q-014	1	Quality System Review
S-ALL-Q-016	3	Manual Integration
S-ALL-Q-018	2	Monitoring Storage Units
S-ALL-Q-021	3	Subsampling (Sample Homogenization)
ALL-Q-022	1	Continuous Process Improvement
S-ALL-Q-025	2	Standard & Reagent Prep & Traceability
ALL-PGH-Q-025	0	Standard & Reagent Prep & Traceability - Addendum
S-ALL-Q-027	0	Evaluation and Qualification of Vendors
S-ALL-Q-028	0	Use and Operations of Lab Track System
S-ALL-Q-029	0	MintMiner Data File Review

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

OFFICE OF FIELD OPERATIONS

BUREAU OF LABORATORIES

Certifies that

65-00282

PACE ANALYTICAL SERVICES INC - PITTSBURGH
1638 ROSEYTOWN ROAD SUITE 2, 3 & 4
GREENSBURG, PA 15601

Having duly met the requirements of
The Act of June 29, 2002 (P.L. 596, No. 90)
dealing with Environmental Laboratory Accreditation
(27 Pa. C.S. §§4101-4113) and the
National Environmental Laboratory Accreditation Conference Standards

is hereby approved as an

Accredited Laboratory

As more fully described in the attached Scope of Accreditation

Expiration Date: 3/31/2010

Certificate Number: 008

Continued accreditation status depends on successful ongoing participation in the Program

Certificate not transferable Surrender upon revocation
To Be Conspicuously Displayed at the Laboratory
Not valid unless accompanied by a valid Scope of Accreditation
Shall not be used to imply endorsement by the Commonwealth of Pennsylvania
Customers are urged to verify the laboratory's current accreditation status
PA DEP is a NELAP recognized accrediting authority

Aarea S. Alger, Chief
Laboratory Accreditation Program
Bureau of Laboratories

Attachment to Certificate of Accreditation 008, expiration date March 31, 2010. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

State Laboratory ID: 65-00282 EPA Lab Code: PA01457 (724) 850-5600

Pace Analytical Services Inc - Pittsburgh
1638 Roseytown Road
Greensburg, PA 15601

Program **Drinking Water**

Method	Analyte	Accreditation Type	Primary	Effective Date
ASTM D5174-97	Uranium, total	NELAP	PA	12/29/2009
EPA 900.0	Gross alpha	NELAP	PA	5/27/2008
EPA 900.0	Gross beta	NELAP	PA	5/27/2008
EPA 901.1	Gamma emitters	NELAP	PA	5/27/2008
EPA 903.0	Total alpha radium	NELAP	PA	5/27/2008
EPA 903.1	Radium-226	NELAP	PA	5/27/2008
EPA 904.0	Radium-228	NELAP	PA	5/27/2008
EPA 905.0	Strontium-89 (calc.)	NELAP	PA	5/27/2008
EPA 905.0	Strontium-90	NELAP	PA	5/27/2008
EPA 906.0	Tritium	NELAP	PA	5/27/2008
EPA 908.0	Uranium, total	NELAP	PA	12/29/2009
N.J.A.C.7:18-6	Gross alpha (including radium & U, excluding radon)	NELAP	PA	5/27/2008
Pace Analytical SOP PGH-R-008-2	Americium-241	NELAP	PA	5/27/2008
Pace Analytical SOP PGH-R-008-2	Plutonium-239	NELAP	PA	5/27/2008
Pace Analytical SOP PGH-R-008-2	Thorium-230	NELAP	PA	5/27/2008
Pace Analytical SOP PGH-R-008-2	Uranium-234	NELAP	PA	5/27/2008
Pace Analytical SOP PGH-R-008-2	Uranium-238	NELAP	PA	5/27/2008
SM 7110 C	Gross alpha	NELAP	PA	9/25/2008
SM 7500-Rn B	Radon-222 in water	NELAP	PA	10/10/2008

Attachment to Certificate of Accreditation 008, expiration date March 31, 2010. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

State Laboratory ID: 65-00282 EPA Lab Code: PA01457 (724) 850-5600

Pace Analytical Services Inc - Pittsburgh
1638 Roseytown Road
Greensburg, PA 15601

Program Non-Potable Water

Method	Analyte	Accreditation Type	Primary	Effective Date
ASTM D516-02	Sulfate	NELAP	PA	5/6/2009
ASTM D516-90	Sulfate	NELAP	PA	5/6/2009
ASTM D5174-97	Uranium, total	NELAP	PA	8/12/2008
EPA 120.1	Conductivity	NELAP	PA	6/1/2007
EPA 1311	Toxicity characteristic leaching procedure (TCLP)	NELAP	PA	3/29/2005
EPA 1312	Synthetic precipitation leaching procedure (SPLP)	NELAP	PA	3/29/2005
EPA 160.4	Residue, volatile	NELAP	PA	7/28/2006
EPA 1664 Rev A	Oil and grease	NELAP	PA	11/1/2006
EPA 1664 Rev A	Total recoverable petroleum hydrocarbons (TRPH)	NELAP	PA	2/5/2007
EPA 180.1	Turbidity	NELAP	PA	7/28/2006
EPA 200.7	Aluminum	NELAP	PA	3/29/2005
EPA 200.7	Antimony	NELAP	PA	3/29/2005
EPA 200.7	Arsenic	NELAP	PA	3/29/2005
EPA 200.7	Barium	NELAP	PA	3/29/2005
EPA 200.7	Beryllium	NELAP	PA	3/29/2005
EPA 200.7	Boron	NELAP	PA	3/29/2005
EPA 200.7	Cadmium	NELAP	PA	3/29/2005
EPA 200.7	Calcium	NELAP	PA	3/29/2005
EPA 200.7	Chromium	NELAP	PA	3/29/2005
EPA 200.7	Cobalt	NELAP	PA	3/29/2005
EPA 200.7	Copper	NELAP	PA	3/29/2005
EPA 200.7	Iron	NELAP	PA	3/29/2005
EPA 200.7	Lead	NELAP	PA	3/29/2005
EPA 200.7	Lithium	NELAP	PA	6/22/2006
EPA 200.7	Magnesium	NELAP	PA	3/29/2005
EPA 200.7	Manganese	NELAP	PA	3/29/2005
EPA 200.7	Molybdenum	NELAP	PA	3/29/2005
EPA 200.7	Nickel	NELAP	PA	3/29/2005
EPA 200.7	Phosphorus, total	NELAP	PA	1/4/2007
EPA 200.7	Potassium	NELAP	PA	3/29/2005
EPA 200.7	Selenium	NELAP	PA	3/29/2005
EPA 200.7	Silica, as SiO2	NELAP	PA	6/22/2006
EPA 200.7	Silicon	NELAP	PA	6/22/2006
EPA 200.7	Silver	NELAP	PA	3/29/2005
EPA 200.7	Sodium	NELAP	PA	3/29/2005
EPA 200.7	Thallium	NELAP	PA	3/29/2005

Attachment to Certificate of Accreditation 008, expiration date March 31, 2010. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

State Laboratory ID: 65-00282 **EPA Lab Code:** PA01457 (724) 850-5600

Pace Analytical Services Inc - Pittsburgh
1638 Roseytown Road
Greensburg, PA 15601

Program Non-Potable Water

Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 200.7	Tin	NELAP	PA	1/4/2007
EPA 200.7	Titanium	NELAP	PA	3/29/2005
EPA 200.7	Vanadium	NELAP	PA	3/29/2005
EPA 200.7	Zinc	NELAP	PA	3/29/2005
EPA 200.7-Extended	Strontium	NELAP	PA	6/22/2006
EPA 200.7-Extended	Zirconium	NELAP	PA	6/22/2006
EPA 245.1	Mercury	NELAP	PA	3/29/2005
EPA 300.0	Bromide	NELAP	PA	5/18/2009
EPA 300.0	Fluoride	NELAP	PA	5/6/2009
EPA 3005A	Preconcentration under acid	NELAP	PA	3/29/2005
EPA 330.5	Total residual chlorine	NELAP	PA	8/25/2006
EPA 335.4	Total cyanide	NELAP	PA	5/6/2009
EPA 350.1	Ammonia as N	NELAP	PA	5/6/2009
EPA 3500B	Organics extraction and sample preparation	NELAP	PA	3/29/2005
EPA 351.2	Kjeldahl nitrogen, total (TKN)	NELAP	PA	5/6/2009
EPA 3510C	Separatory funnel liquid-liquid extraction	NELAP	PA	3/29/2005
EPA 353.2	Nitrate as N	NELAP	PA	5/6/2009
EPA 353.2	Total nitrate-nitrite	NELAP	PA	5/6/2009
EPA 3535	Solid-phase extraction (SPE)	NELAP	PA	3/29/2005
EPA 360.1	Oxygen (dissolved)	NELAP	PA	8/25/2006
EPA 3660B	Sulfur cleanup	NELAP	PA	3/29/2005
EPA 3665A	Sulfuric acid/permanganate clean-up	NELAP	PA	3/29/2005
EPA 410.4	Chemical oxygen demand (COD)	NELAP	PA	5/6/2009
EPA 420.1	Total phenolics	NELAP	PA	5/6/2009
EPA 5030B	Aqueous-phase purge-and-trap	NELAP	PA	3/29/2005
EPA 6010B	Aluminum	NELAP	PA	3/29/2005
EPA 6010B	Antimony	NELAP	PA	3/29/2005
EPA 6010B	Arsenic	NELAP	PA	3/29/2005
EPA 6010B	Barium	NELAP	PA	3/29/2005
EPA 6010B	Beryllium	NELAP	PA	3/29/2005
EPA 6010B	Boron	NELAP	PA	3/29/2005
EPA 6010B	Cadmium	NELAP	PA	3/29/2005
EPA 6010B	Calcium	NELAP	PA	3/29/2005
EPA 6010B	Chromium	NELAP	PA	3/29/2005
EPA 6010B	Cobalt	NELAP	PA	3/29/2005
EPA 6010B	Copper	NELAP	PA	3/29/2005

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State Laboratory ID: 65-00282 EPA Lab Code: PA01457 (724) 850-5600

Pace Analytical Services Inc - Pittsburgh
1638 Roseytown Road
Greensburg, PA 15601

Program Non-Potable Water

Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 6010B	Iron	NELAP	PA	3/29/2005
EPA 6010B	Lead	NELAP	PA	3/29/2005
EPA 6010B	Lithium	NELAP	PA	3/29/2005
EPA 6010B	Magnesium	NELAP	PA	3/29/2005
EPA 6010B	Manganese	NELAP	PA	3/29/2005
EPA 6010B	Molybdenum	NELAP	PA	3/29/2005
EPA 6010B	Nickel	NELAP	PA	3/29/2005
EPA 6010B	Phosphorus, total	NELAP	PA	1/4/2007
EPA 6010B	Potassium	NELAP	PA	3/29/2005
EPA 6010B	Selenium	NELAP	PA	3/29/2005
EPA 6010B	Silica, as SiO2	NELAP	PA	6/22/2006
EPA 6010B	Silver	NELAP	PA	3/29/2005
EPA 6010B	Sodium	NELAP	PA	3/29/2005
EPA 6010B	Strontium	NELAP	PA	3/29/2005
EPA 6010B	Thallium	NELAP	PA	3/29/2005
EPA 6010B	Tin	NELAP	PA	1/4/2007
EPA 6010B	Titanium	NELAP	PA	6/22/2006
EPA 6010B	Vanadium	NELAP	PA	3/29/2005
EPA 6010B	Zinc	NELAP	PA	3/29/2005
EPA 6010B-Extended	Silicon	NELAP	PA	6/22/2006
EPA 6010B-Extended	Zirconium	NELAP	PA	6/22/2006
EPA 608	4,4'-DDD	NELAP	PA	3/29/2005
EPA 608	4,4'-DDE	NELAP	PA	3/29/2005
EPA 608	4,4'-DDT	NELAP	PA	3/29/2005
EPA 608	Aldrin (HHDN)	NELAP	PA	3/29/2005
EPA 608	Aroclor-1016 (PCB-1016)	NELAP	PA	3/29/2005
EPA 608	Aroclor-1221 (PCB-1221)	NELAP	PA	3/29/2005
EPA 608	Aroclor-1232 (PCB-1232)	NELAP	PA	3/29/2005
EPA 608	Aroclor-1242 (PCB-1242)	NELAP	PA	3/29/2005
EPA 608	Aroclor-1248 (PCB-1248)	NELAP	PA	3/29/2005
EPA 608	Aroclor-1254 (PCB-1254)	NELAP	PA	3/29/2005
EPA 608	Aroclor-1260 (PCB-1260)	NELAP	PA	3/29/2005
EPA 608	Chlordane (tech.)	NELAP	PA	3/29/2005
EPA 608	Dieldrin	NELAP	PA	3/29/2005
EPA 608	Endosulfan I	NELAP	PA	3/29/2005
EPA 608	Endosulfan II	NELAP	PA	3/29/2005

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Pace Analytical Services Inc - Pittsburgh
1638 Roseytown Road
Greensburg, PA 15601

Program Non-Potable Water

Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 608	Endosulfan sulfate	NELAP	PA	3/29/2005
EPA 608	Endrin	NELAP	PA	3/29/2005
EPA 608	Endrin aldehyde	NELAP	PA	3/29/2005
EPA 608	Heptachlor	NELAP	PA	3/29/2005
EPA 608	Heptachlor epoxide	NELAP	PA	3/29/2005
EPA 608	Toxaphene (Chlorinated camphene)	NELAP	PA	3/29/2005
EPA 608	alpha-BHC (alpha-Hexachlorocyclohexane)	NELAP	PA	3/29/2005
EPA 608	beta-BHC (beta-Hexachlorocyclohexane)	NELAP	PA	3/29/2005
EPA 608	delta-BHC (delta-Hexachlorocyclohexane)	NELAP	PA	3/29/2005
EPA 608	gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	NELAP	PA	3/29/2005
EPA 608-Extended	Aroclor-1262 (PCB-1262)	NELAP	PA	2/9/2007
EPA 608-Extended	Aroclor-1268 (PCB-1268)	NELAP	PA	2/9/2007
EPA 608-Extended	Endrin ketone	NELAP	PA	2/5/2007
EPA 624	1,1,1,2-Tetrachloroethane	NELAP	PA	6/22/2006
EPA 624	1,1,1-Trichloroethane	NELAP	PA	3/29/2005
EPA 624	1,1,2,2-Tetrachloroethane	NELAP	PA	3/29/2005
EPA 624	1,1,2-Trichloroethane	NELAP	PA	3/29/2005
EPA 624	1,1-Dichloroethane	NELAP	PA	3/29/2005
EPA 624	1,1-Dichloroethene (1,1-Dichloroethylene)	NELAP	PA	3/29/2005
EPA 624	1,2-Dichlorobenzene (o-Dichlorobenzene)	NELAP	PA	3/29/2005
EPA 624	1,2-Dichloroethane	NELAP	PA	3/29/2005
EPA 624	1,2-Dichloropropane	NELAP	PA	3/29/2005
EPA 624	1,3-Dichlorobenzene (m-Dichlorobenzene)	NELAP	PA	3/29/2005
EPA 624	1,4-Dichlorobenzene (p-Dichlorobenzene)	NELAP	PA	3/29/2005
EPA 624	2-Chloroethyl vinyl ether	NELAP	PA	6/22/2006
EPA 624	Acrolein (Propenal)	NELAP	PA	6/22/2006
EPA 624	Acrylonitrile	NELAP	PA	6/22/2006
EPA 624	Benzene	NELAP	PA	3/29/2005
EPA 624	Bromodichloromethane	NELAP	PA	3/29/2005
EPA 624	Bromoform	NELAP	PA	3/29/2005
EPA 624	Carbon tetrachloride	NELAP	PA	3/29/2005
EPA 624	Chlorobenzene	NELAP	PA	3/29/2005
EPA 624	Chloroethane	NELAP	PA	3/29/2005
EPA 624	Chloroform	NELAP	PA	3/29/2005
EPA 624	Dibromochloromethane	NELAP	PA	3/29/2005
EPA 624	Dichlorodifluoromethane (Freon 12)	NELAP	PA	6/22/2006

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Greensburg, PA 15601

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Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 624	Ethylbenzene	NELAP	PA	3/29/2005
EPA 624	Methyl bromide (Bromomethane)	NELAP	PA	3/29/2005
EPA 624	Methyl chloride (Chloromethane)	NELAP	PA	3/29/2005
EPA 624	Methylene chloride (Dichloromethane)	NELAP	PA	3/29/2005
EPA 624	Tetrachloroetheno (PCE, Perchloroethylene)	NELAP	PA	3/29/2005
EPA 624	Toluene	NELAP	PA	3/29/2005
EPA 624	Trichloroethene (TCE, Trichloroethylene)	NELAP	PA	3/29/2005
EPA 624	Trichlorofluoromethane (Freon 11)	NELAP	PA	1/4/2007
EPA 624	Vinyl chloride (Chloroethene)	NELAP	PA	3/29/2005
EPA 624	Xylenes, total	NELAP	PA	3/29/2005
EPA 624	cis-1,3-Dichloropropene	NELAP	PA	3/29/2005
EPA 624	m+p-Xylene	NELAP	PA	6/22/2006
EPA 624	o-Xylene	NELAP	PA	6/22/2006
EPA 624	trans-1,2-Dichloroethene	NELAP	PA	3/29/2005
EPA 624	trans-1,3-Dichloropropene	NELAP	PA	3/29/2005
EPA 624-Extended	1,1-Dichloropropene	NELAP	PA	6/22/2006
EPA 624-Extended	1,2,3-Trichlorobenzene	NELAP	PA	6/22/2006
EPA 624-Extended	1,2,3-Trichloropropane (1,2,3-TCP)	NELAP	PA	6/22/2006
EPA 624-Extended	1,2,4-Trichlorobenzene	NELAP	PA	6/22/2006
EPA 624-Extended	1,2,4-Trimethylbenzene	NELAP	PA	6/22/2006
EPA 624-Extended	1,2-Dibromo-3-chloropropane (DBCP, Dibromochloropropane)	NELAP	PA	6/22/2006
EPA 624-Extended	1,2-Dibromoethane (EDB, Ethylene dibromide)	NELAP	PA	6/22/2006
EPA 624-Extended	1,3,5-Trimethylbenzene	NELAP	PA	6/22/2006
EPA 624-Extended	2,2-Dichloropropane	NELAP	PA	6/22/2006
EPA 624-Extended	2-Butanone (Methyl ethyl ketone, MEK)	NELAP	PA	6/22/2006
EPA 624-Extended	2-Chlorotoluene	NELAP	PA	6/22/2006
EPA 624-Extended	2-Hexanone	NELAP	PA	6/22/2006
EPA 624-Extended	4-Isopropyltoluene (p-Isopropyltoluene)	NELAP	PA	6/22/2006
EPA 624-Extended	4-Methyl-2-pentanone (MIBK)	NELAP	PA	6/22/2006
EPA 624-Extended	Acetone	NELAP	PA	6/22/2006
EPA 624-Extended	Bromobenzene	NELAP	PA	6/22/2006
EPA 624-Extended	Carbon disulfide	NELAP	PA	6/22/2006
EPA 624-Extended	Dibromomethane	NELAP	PA	6/22/2006
EPA 624-Extended	Hexachlorobutadiene (1,3-Hexachlorobutadiene)	NELAP	PA	6/22/2006
EPA 624-Extended	Isopropylbenzene	NELAP	PA	6/22/2006
EPA 624-Extended	Methyl tert-butyl ether (MTBE)	NELAP	PA	6/22/2006

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Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 624-Extended	Naphthalene	NELAP	PA	6/22/2006
EPA 624-Extended	Styrene	NELAP	PA	6/22/2006
EPA 624-Extended	cis-1,2-Dichloroethene	NELAP	PA	6/22/2006
EPA 624-Extended	n-Butylbenzene	NELAP	PA	6/22/2006
EPA 624-Extended	n-Propylbenzene	NELAP	PA	6/22/2006
EPA 624-Extended	sec-Butylbenzene	NELAP	PA	6/22/2006
EPA 624-Extended	tert-Butyl alcohol (2-Methyl-2-propanol)	NELAP	PA	6/22/2006
EPA 625	1,2,4-Trichlorobenzene	NELAP	PA	3/29/2005
EPA 625	1,2-Dichlorobenzene (o-Dichlorobenzene)	NELAP	PA	3/29/2005
EPA 625	1,3-Dichlorobenzene (m-Dichlorobenzene)	NELAP	PA	3/29/2005
EPA 625	1,4-Dichlorobenzene (p-Dichlorobenzene)	NELAP	PA	3/29/2005
EPA 625	2,4,6-Trichlorophenol	NELAP	PA	3/29/2005
EPA 625	2,4-Dichlorophenol	NELAP	PA	3/29/2005
EPA 625	2,4-Dimethylphenol	NELAP	PA	3/29/2005
EPA 625	2,4-Dinitrophenol	NELAP	PA	3/29/2005
EPA 625	2,4-Dinitrotoluene (2,4-DNT)	NELAP	PA	3/29/2005
EPA 625	2,6-Dinitrotoluene (2,6-DNT)	NELAP	PA	3/29/2005
EPA 625	2-Chloronaphthalene	NELAP	PA	3/29/2005
EPA 625	2-Chlorophenol	NELAP	PA	3/29/2005
EPA 625	2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	NELAP	PA	3/29/2005
EPA 625	2-Nitrophenol	NELAP	PA	3/29/2005
EPA 625	3,3'-Dichlorobenzidine	NELAP	PA	3/29/2005
EPA 625	4-Bromophenyl phenyl ether	NELAP	PA	3/29/2005
EPA 625	4-Chloro-3-methylphenol	NELAP	PA	3/29/2005
EPA 625	4-Chlorophenyl phenyl ether	NELAP	PA	3/29/2005
EPA 625	4-Nitrophenol	NELAP	PA	3/29/2005
EPA 625	Acenaphthene	NELAP	PA	3/29/2005
EPA 625	Acenaphthylene	NELAP	PA	3/29/2005
EPA 625	Anthracene	NELAP	PA	3/29/2005
EPA 625	Benzidine	NELAP	PA	3/29/2005
EPA 625	Benzo[a]anthracene	NELAP	PA	3/29/2005
EPA 625	Benzo[a]pyrene	NELAP	PA	3/29/2005
EPA 625	Benzo[b]fluoranthene	NELAP	PA	3/29/2005
EPA 625	Benzo[ghi]perylene	NELAP	PA	3/29/2005
EPA 625	Benzo[k]fluoranthene	NELAP	PA	3/29/2005
EPA 625	Butyl benzyl phthalate (Benzyl butyl phthalate)	NELAP	PA	3/29/2005

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1638 Roseytown Road
Greensburg, PA 15601

Program Non-Potable Water

Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 625	Chrysene (Benzo[a]phenanthrene)	NELAP	PA	3/29/2005
EPA 625	Di-n-butyl phthalate	NELAP	PA	3/29/2005
EPA 625	Di-n-octyl phthalate	NELAP	PA	3/29/2005
EPA 625	Dibenzo[a,h]anthracene	NELAP	PA	3/29/2005
EPA 625	Diethyl phthalate	NELAP	PA	3/29/2005
EPA 625	Dimethyl phthalate	NELAP	PA	3/29/2005
EPA 625	Fluoranthene	NELAP	PA	3/29/2005
EPA 625	Fluorene	NELAP	PA	3/29/2005
EPA 625	Hexachlorobenzene	NELAP	PA	3/29/2005
EPA 625	Hexachlorobutadiene (1,3-Hexachlorobutadiene)	NELAP	PA	3/29/2005
EPA 625	Hexachlorocyclopentadiene	NELAP	PA	3/29/2005
EPA 625	Hexachloroethane	NELAP	PA	3/29/2005
EPA 625	Indeno(1,2,3-cd)pyrene	NELAP	PA	3/29/2005
EPA 625	Isophorone	NELAP	PA	3/29/2005
EPA 625	N-Nitroso-di-n-propylamine	NELAP	PA	3/29/2005
EPA 625	N-Nitrosodimethylamine	NELAP	PA	3/29/2005
EPA 625	N-Nitrosodiphenylamine	NELAP	PA	3/29/2005
EPA 625	Naphthalene	NELAP	PA	3/29/2005
EPA 625	Nitrobenzene	NELAP	PA	3/29/2005
EPA 625	Pentachlorophenol (PCP)	NELAP	PA	3/29/2005
EPA 625	Phenanthrene	NELAP	PA	3/29/2005
EPA 625	Phenol	NELAP	PA	3/29/2005
EPA 625	Pyrene	NELAP	PA	3/29/2005
EPA 625	bis(2-Chloroethoxy)methane	NELAP	PA	3/29/2005
EPA 625	bis(2-Chloroethyl) ether	NELAP	PA	3/29/2005
EPA 625	bis(2-Chloroisopropyl) ether	NELAP	PA	3/29/2005
EPA 625	bis(2-Ethylhexyl) phthalate (DEHP)	NELAP	PA	3/29/2005
EPA 625-Extended	1,2-Diphenylhydrazine	NELAP	PA	6/22/2006
EPA 625-Extended	2,4,5-Trichlorophenol	NELAP	PA	6/22/2006
EPA 7.3.3.2	Reactive cyanide	NELAP	PA	3/29/2005
EPA 7.3.4.2	Reactive sulfide	NELAP	PA	3/29/2005
EPA 7196A	Chromium VI	NELAP	PA	5/6/2009
EPA 7470A	Mercury	NELAP	PA	3/29/2005
EPA 8011	1,2-Dibromo-3-chloropropane (DBCP, Dibromochloropropane)	NELAP	PA	6/22/2006
EPA 8011	1,2-Dibromoethane (EDB, Ethylene dibromide)	NELAP	PA	6/22/2006
EPA 8015B	Diesel-range organics (DRO)	NELAP	PA	8/25/2006

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State Laboratory ID: 65-00282 **EPA Lab Code: PA01457** **(724) 850-5600**

Pace Analytical Services Inc - Pittsburgh
1638 Roseytown Road
Greensburg, PA 15601

Program Non-Potable Water

Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 8015B	Gasoline-range organics (GRO)	NELAP	PA	8/25/2006
EPA 8081A	4,4'-DDD	NELAP	PA	3/29/2005
EPA 8081A	4,4'-DDE	NELAP	PA	3/29/2005
EPA 8081A	4,4'-DDT	NELAP	PA	3/29/2005
EPA 8081A	Aldrin (HHDN)	NELAP	PA	3/29/2005
EPA 8081A	Chlordane (tech.)	NELAP	PA	3/29/2005
EPA 8081A	Dieldrin	NELAP	PA	3/29/2005
EPA 8081A	Endosulfan I	NELAP	PA	3/29/2005
EPA 8081A	Endosulfan II	NELAP	PA	3/29/2005
EPA 8081A	Endosulfan sulfate	NELAP	PA	3/29/2005
EPA 8081A	Endrin	NELAP	PA	3/29/2005
EPA 8081A	Endrin aldehyde	NELAP	PA	3/29/2005
EPA 8081A	Endrin ketone	NELAP	PA	3/29/2005
EPA 8081A	Heptachlor	NELAP	PA	3/29/2005
EPA 8081A	Heptachlor epoxide	NELAP	PA	3/29/2005
EPA 8081A	Methoxychlor	NELAP	PA	3/29/2005
EPA 8081A	Toxaphene (Chlorinated camphene)	NELAP	PA	3/29/2005
EPA 8081A	alpha-BHC (alpha-Hexachlorocyclohexane)	NELAP	PA	3/29/2005
EPA 8081A	alpha-Chlordane	NELAP	PA	3/29/2005
EPA 8081A	beta-BHC (beta-Hexachlorocyclohexane)	NELAP	PA	3/29/2005
EPA 8081A	delta-BHC (delta-Hexachlorocyclohexane)	NELAP	PA	3/29/2005
EPA 8081A	gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	NELAP	PA	3/29/2005
EPA 8081A	gamma-Chlordane	NELAP	PA	3/29/2005
EPA 8082	Aroclor-1016 (PCB-1016)	NELAP	PA	3/29/2005
EPA 8082	Aroclor-1221 (PCB-1221)	NELAP	PA	3/29/2005
EPA 8082	Aroclor-1232 (PCB-1232)	NELAP	PA	3/29/2005
EPA 8082	Aroclor-1242 (PCB-1242)	NELAP	PA	3/29/2005
EPA 8082	Aroclor-1248 (PCB-1248)	NELAP	PA	3/29/2005
EPA 8082	Aroclor-1254 (PCB-1254)	NELAP	PA	3/29/2005
EPA 8082	Aroclor-1260 (PCB-1260)	NELAP	PA	3/29/2005
EPA 8082-Extended	Aroclor-1262 (PCB-1262)	NELAP	PA	2/9/2007
EPA 8082-Extended	Aroclor-1268 (PCB-1268)	NELAP	PA	2/9/2007
EPA 8151A	2,4,5-T	NELAP	PA	3/29/2005
EPA 8151A	2,4,5-TP (Silvex)	NELAP	PA	3/29/2005
EPA 8151A	2,4-D	NELAP	PA	3/29/2005
EPA 8260 SIM	Vinyl chloride (Chloroethene)	NELAP	PA	11/1/2006

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Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 8260B	1,1,1,2-Tetrachloroethane	NELAP	PA	6/22/2006
EPA 8260B	1,1,1-Trichloroethane	NELAP	PA	3/29/2005
EPA 8260B	1,1,2,2-Tetrachloroethane	NELAP	PA	3/29/2005
EPA 8260B	1,1,2-Trichloroethane	NELAP	PA	3/29/2005
EPA 8260B	1,1-Dichloroethane	NELAP	PA	3/29/2005
EPA 8260B	1,1-Dichloroethene (1,1-Dichloroethylene)	NELAP	PA	3/29/2005
EPA 8260B	1,1-Dichloropropene	NELAP	PA	6/22/2006
EPA 8260B	1,2,3-Trichlorobenzene	NELAP	PA	6/22/2006
EPA 8260B	1,2,3-Trichloropropane (1,2,3-TCP)	NELAP	PA	6/22/2006
EPA 8260B	1,2,4-Trichlorobenzene	NELAP	PA	6/22/2006
EPA 8260B	1,2,4-Trimethylbenzene	NELAP	PA	6/22/2006
EPA 8260B	1,2-Dibromo-3-chloropropane (DBCP, Dibromochloropropane)	NELAP	PA	6/22/2006
EPA 8260B	1,2-Dibromoethane (EDB, Ethylene dibromide)	NELAP	PA	6/22/2006
EPA 8260B	1,2-Dichlorobenzene (o-Dichlorobenzene)	NELAP	PA	3/29/2005
EPA 8260B	1,2-Dichloroethane	NELAP	PA	3/29/2005
EPA 8260B	1,2-Dichloropropane	NELAP	PA	3/29/2005
EPA 8260B	1,3,5-Trimethylbenzene	NELAP	PA	6/22/2006
EPA 8260B	1,3-Dichlorobenzene (m-Dichlorobenzene)	NELAP	PA	3/29/2005
EPA 8260B	1,3-Dichloropropane	NELAP	PA	6/22/2006
EPA 8260B	1,4-Dichlorobenzene (p-Dichlorobenzene)	NELAP	PA	3/29/2005
EPA 8260B	1,4-Dioxane (1,4-Diethyleneoxide)	NELAP	PA	2/7/2008
EPA 8260B	2,2-Dichloropropane	NELAP	PA	6/22/2006
EPA 8260B	2-Butanone (Methyl ethyl ketone, MEK)	NELAP	PA	3/29/2005
EPA 8260B	2-Chloroethyl vinyl ether	NELAP	PA	6/22/2006
EPA 8260B	2-Chlorotoluene	NELAP	PA	6/22/2006
EPA 8260B	2-Hexanone	NELAP	PA	3/29/2005
EPA 8260B	2-Nitropropane	NELAP	PA	6/22/2006
EPA 8260B	4-Chlorotoluene	NELAP	PA	6/22/2006
EPA 8260B	4-Isopropyltoluene (p-Isopropyltoluene)	NELAP	PA	6/22/2006
EPA 8260B	4-Methyl-2-pentanone (MIBK)	NELAP	PA	3/29/2005
EPA 8260B	Acetone	NELAP	PA	3/29/2005
EPA 8260B	Acetonitrile	NELAP	PA	6/22/2006
EPA 8260B	Acrolein (Propenal)	NELAP	PA	6/22/2006
EPA 8260B	Acrylonitrile	NELAP	PA	6/22/2006
EPA 8260B	Allyl chloride (3-Chloropropene)	NELAP	PA	6/22/2006
EPA 8260B	Benzene	NELAP	PA	3/29/2005

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State Laboratory ID: 65-00282 EPA Lab Code: PA01457 (724) 850-5600

Pace Analytical Services Inc - Pittsburgh
1638 Roseytown Road
Greensburg, PA 15601

Program Non-Potable Water

Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 8260B	Bromobenzene	NELAP	PA	6/22/2006
EPA 8260B	Bromochloromethane	NELAP	PA	3/29/2005
EPA 8260B	Bromodichloromethane	NELAP	PA	3/29/2005
EPA 8260B	Bromoform	NELAP	PA	3/29/2005
EPA 8260B	Bromomethane (Methyl bromide)	NELAP	PA	3/29/2005
EPA 8260B	Carbon disulfide	NELAP	PA	3/29/2005
EPA 8260B	Carbon tetrachloride	NELAP	PA	3/29/2005
EPA 8260B	Chlorobenzene	NELAP	PA	3/29/2005
EPA 8260B	Chloroethane	NELAP	PA	3/29/2005
EPA 8260B	Chloroform	NELAP	PA	3/29/2005
EPA 8260B	Chloromethane (Methyl chloride)	NELAP	PA	3/29/2005
EPA 8260B	Chloroprene (2-Chloro-1,3-butadiene)	NELAP	PA	6/22/2006
EPA 8260B	Dibromochloromethane	NELAP	PA	3/29/2005
EPA 8260B	Dibromomethane	NELAP	PA	6/22/2006
EPA 8260B	Dichlorodifluoromethane (Freon 12)	NELAP	PA	6/22/2006
EPA 8260B	Diethyl ether (Ethyl ether)	NELAP	PA	6/22/2006
EPA 8260B	Ethyl acetate	NELAP	PA	6/22/2006
EPA 8260B	Ethyl methacrylate	NELAP	PA	6/22/2006
EPA 8260B	Ethylbenzene	NELAP	PA	3/29/2005
EPA 8260B	Hexachlorobutadiene (1,3-Hexachlorobutadiene)	NELAP	PA	6/22/2006
EPA 8260B	Iodomethane (Methyl iodide)	NELAP	PA	6/22/2006
EPA 8260B	Isobutyl alcohol (2-Methyl-1-propanol)	NELAP	PA	6/22/2006
EPA 8260B	Isopropylbenzene	NELAP	PA	3/29/2005
EPA 8260B	Methacrylonitrile	NELAP	PA	6/22/2006
EPA 8260B	Methyl tert-butyl ether (MTBE)	NELAP	PA	3/29/2005
EPA 8260B	Methylacrylate	NELAP	PA	6/22/2006
EPA 8260B	Methylene chloride (Dichloromethane)	NELAP	PA	3/29/2005
EPA 8260B	Naphthalene	NELAP	PA	3/29/2005
EPA 8260B	Propionitrile (Ethyl cyanide)	NELAP	PA	6/22/2006
EPA 8260B	Styrene	NELAP	PA	3/29/2005
EPA 8260B	Tetrachloroethene (PCE, Perchloroethylene)	NELAP	PA	3/29/2005
EPA 8260B	Toluene	NELAP	PA	3/29/2005
EPA 8260B	Trichloroethene (TCE, Trichloroethylene)	NELAP	PA	3/29/2005
EPA 8260B	Trichlorofluoromethane (Freon 11)	NELAP	PA	1/4/2007
EPA 8260B	Vinyl acetate	NELAP	PA	6/22/2006
EPA 8260B	Vinyl chloride (Chloroethene)	NELAP	PA	3/29/2005

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Pace Analytical Services Inc - Pittsburgh
1638 Roseytown Road
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Program Non-Potable Water

Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 8260B	Xylenes, total	NELAP	PA	3/29/2005
EPA 8260B	cis-1,2-Dichloroethene	NELAP	PA	3/29/2005
EPA 8260B	cis-1,3-Dichloropropene	NELAP	PA	3/29/2005
EPA 8260B	m+p-Xylene	NELAP	PA	6/22/2006
EPA 8260B	n-Butylbenzene	NELAP	PA	6/22/2006
EPA 8260B	n-Propylbenzene	NELAP	PA	6/22/2006
EPA 8260B	o-Xylene	NELAP	PA	6/22/2006
EPA 8260B	sec-Butylbenzene	NELAP	PA	6/22/2006
EPA 8260B	tert-Butyl alcohol (2-Methyl-2-propanol)	NELAP	PA	6/22/2006
EPA 8260B	tert-Butylbenzene	NELAP	PA	6/22/2006
EPA 8260B	trans-1,2-Dichloroethene	NELAP	PA	3/29/2005
EPA 8260B	trans-1,3-Dichloropropene	NELAP	PA	3/29/2005
EPA 8260B	trans-1,4-Dichloro-2-butene	NELAP	PA	6/22/2006
EPA 8260B-Extended	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	NELAP	PA	6/22/2006
EPA 8260B-Extended	Cyclohexane	NELAP	PA	6/22/2006
EPA 8260B-Extended	Cyclohexanone	NELAP	PA	6/22/2006
EPA 8260B-Extended	Ethyl tert-butyl ether (ETBE)	NELAP	PA	6/22/2006
EPA 8260B-Extended	Hexane	NELAP	PA	6/22/2006
EPA 8260B-Extended	Isopropyl ether	NELAP	PA	6/22/2006
EPA 8260B-Extended	Methyl acetate	NELAP	PA	6/22/2006
EPA 8260B-Extended	Methylcyclohexane	NELAP	PA	6/22/2006
EPA 8260B-Extended	Tetrahydrofuran (THF)	NELAP	PA	6/22/2006
EPA 8260B-Extended	tert-Amyl ethyl ether (TAEE)	NELAP	PA	6/22/2006
EPA 8270C	1,2,4-Trichlorobenzene	NELAP	PA	3/29/2005
EPA 8270C	1,2-Dichlorobenzene (o-Dichlorobenzene)	NELAP	PA	3/29/2005
EPA 8270C	1,2-Diphenylhydrazine	NELAP	PA	6/22/2006
EPA 8270C	1,3-Dichlorobenzene (m-Dichlorobenzene)	NELAP	PA	3/29/2005
EPA 8270C	1,4-Dichlorobenzene (p-Dichlorobenzene)	NELAP	PA	3/29/2005
EPA 8270C	2,4,5-Trichlorophenol	NELAP	PA	3/29/2005
EPA 8270C	2,4,6-Trichlorophenol	NELAP	PA	3/29/2005
EPA 8270C	2,4-Dichlorophenol	NELAP	PA	3/29/2005
EPA 8270C	2,4-Dimethylphenol	NELAP	PA	3/29/2005
EPA 8270C	2,4-Dinitrophenol	NELAP	PA	3/29/2005
EPA 8270C	2,4-Dinitrotoluene (2,4-DNT)	NELAP	PA	3/29/2005
EPA 8270C	2,6-Dinitrotoluene (2,6-DNT)	NELAP	PA	3/29/2005
EPA 8270C	2-Chloronaphthalene	NELAP	PA	3/29/2005

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Pace Analytical Services Inc - Pittsburgh
1638 Roseytown Road
Greensburg, PA 15601

Program Non-Potable Water

Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 8270C	2-Chlorophenol	NELAP	PA	3/29/2005
EPA 8270C	2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	NELAP	PA	3/29/2005
EPA 8270C	2-Methylnaphthalene	NELAP	PA	3/29/2005
EPA 8270C	2-Methylphenol (o-Cresol)	NELAP	PA	3/29/2005
EPA 8270C	2-Nitroaniline	NELAP	PA	3/29/2005
EPA 8270C	2-Nitrophenol	NELAP	PA	3/29/2005
EPA 8270C	3,3'-Dichlorobenzidine	NELAP	PA	3/29/2005
EPA 8270C	3-Methylphenol (m-Cresol)	NELAP	PA	3/29/2005
EPA 8270C	3-Nitroaniline	NELAP	PA	3/29/2005
EPA 8270C	4-Bromophenyl phenyl ether	NELAP	PA	3/29/2005
EPA 8270C	4-Chloro-3-methylphenol	NELAP	PA	3/29/2005
EPA 8270C	4-Chloroaniline	NELAP	PA	3/29/2005
EPA 8270C	4-Chlorophenyl phenyl ether	NELAP	PA	3/29/2005
EPA 8270C	4-Methylphenol (p-Cresol)	NELAP	PA	3/29/2005
EPA 8270C	4-Nitroaniline	NELAP	PA	3/29/2005
EPA 8270C	4-Nitrophenol	NELAP	PA	3/29/2005
EPA 8270C	Acenaphthene	NELAP	PA	3/29/2005
EPA 8270C	Acenaphthylene	NELAP	PA	3/29/2005
EPA 8270C	Acetophenone	NELAP	PA	3/29/2005
EPA 8270C	Aniline	NELAP	PA	3/29/2005
EPA 8270C	Anthracene	NELAP	PA	3/29/2005
EPA 8270C	Benzidine	NELAP	PA	6/22/2006
EPA 8270C	Benzo[a]anthracene	NELAP	PA	3/29/2005
EPA 8270C	Benzo[a]pyrene	NELAP	PA	3/29/2005
EPA 8270C	Benzo[b]fluoranthene	NELAP	PA	3/29/2005
EPA 8270C	Benzo[ghi]perylene	NELAP	PA	3/29/2005
EPA 8270C	Benzo[k]fluoranthene	NELAP	PA	3/29/2005
EPA 8270C	Benzoic acid	NELAP	PA	6/22/2006
EPA 8270C	Benzyl alcohol	NELAP	PA	6/22/2006
EPA 8270C	Butyl benzyl phthalate (Benzyl butyl phthalate)	NELAP	PA	3/29/2005
EPA 8270C	Chrysene (Benzo[a]phenanthrene)	NELAP	PA	3/29/2005
EPA 8270C	Di-n-butyl phthalate	NELAP	PA	3/29/2005
EPA 8270C	Di-n-octyl phthalate	NELAP	PA	3/29/2005
EPA 8270C	Dibenzo[a,h]anthracene	NELAP	PA	3/29/2005
EPA 8270C	Dibenzofuran	NELAP	PA	3/29/2005
EPA 8270C	Diethyl phthalate	NELAP	PA	3/29/2005

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Program Non-Potable Water

Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 8270C	Dimethyl phthalate	NELAP	PA	3/29/2005
EPA 8270C	Fluoranthene	NELAP	PA	3/29/2005
EPA 8270C	Fluorene	NELAP	PA	3/29/2005
EPA 8270C	Hexachlorobenzene	NELAP	PA	3/29/2005
EPA 8270C	Hexachlorobutadiene (1,3-Hexachlorobutadiene)	NELAP	PA	3/29/2005
EPA 8270C	Hexachlorocyclopentadiene	NELAP	PA	3/29/2005
EPA 8270C	Hexachloroethane	NELAP	PA	3/29/2005
EPA 8270C	Indeno(1,2,3-cd)pyrene	NELAP	PA	3/29/2005
EPA 8270C	Isophorone	NELAP	PA	1/30/2006
EPA 8270C	N-Nitrosodi-n-propylamine	NELAP	PA	3/29/2005
EPA 8270C	N-Nitrosodimethylamine	NELAP	PA	6/22/2006
EPA 8270C	N-Nitrosodiphenylamine	NELAP	PA	3/29/2005
EPA 8270C	Naphthalene	NELAP	PA	1/30/2006
EPA 8270C	Nitrobenzene	NELAP	PA	3/29/2005
EPA 8270C	Pentachlorophenol (PCP)	NELAP	PA	3/29/2005
EPA 8270C	Phenanthrene	NELAP	PA	3/29/2005
EPA 8270C	Phenol	NELAP	PA	3/29/2005
EPA 8270C	Pyrene	NELAP	PA	3/29/2005
EPA 8270C	Pyridine	NELAP	PA	3/29/2005
EPA 8270C	bis(2-Chloroethoxy)methane	NELAP	PA	3/29/2005
EPA 8270C	bis(2-Chloroethyl) ether	NELAP	PA	3/29/2005
EPA 8270C	bis(2-Chloroisopropyl) ether	NELAP	PA	3/29/2005
EPA 8270C	bis(2-Ethylhexyl) phthalate (DEHP)	NELAP	PA	3/29/2005
EPA 8270C-Extended	1,1'-Biphenyl (Biphenyl, Lemonene)	NELAP	PA	6/22/2006
EPA 8270C-Extended	1,4-Dioxane (1,4-Diethyleneoxide)	NELAP	PA	2/7/2008
EPA 8270C-Extended	8-Hydroxyquinoline	NELAP	PA	6/22/2006
EPA 8270C-Extended	Atrazine	NELAP	PA	6/22/2006
EPA 8270C-Extended	Benzaldehyde	NELAP	PA	6/22/2006
EPA 8270C-Extended	Caprolactam	NELAP	PA	6/22/2006
EPA 8270C-Extended	Carbazole	NELAP	PA	3/29/2005
EPA 8270C-Extended	Tributyl phosphate	NELAP	PA	6/22/2006
EPA 8270C-SIM	Acenaphthene	NELAP	PA	8/12/2008
EPA 8270C-SIM	Acenaphthylene	NELAP	PA	8/12/2008
EPA 8270C-SIM	Anthracene	NELAP	PA	8/12/2008
EPA 8270C-SIM	Benzo[a]anthracene	NELAP	PA	8/12/2008
EPA 8270C-SIM	Benzo[a]pyrene	NELAP	PA	8/12/2008

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Greensburg, PA 15601

Program Non-Potable Water

Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 8270C-SIM	Benzo[b]fluoranthene	NELAP	PA	8/12/2008
EPA 8270C-SIM	Benzo[ghi]perylene	NELAP	PA	8/12/2008
EPA 8270C-SIM	Benzo[k]fluoranthene	NELAP	PA	8/12/2008
EPA 8270C-SIM	Chrysene (Benzo[a]phenanthrene)	NELAP	PA	8/12/2008
EPA 8270C-SIM	Dibenzo[a,h]anthracene	NELAP	PA	8/12/2008
EPA 8270C-SIM	Fluoranthene	NELAP	PA	8/12/2008
EPA 8270C-SIM	Fluorene	NELAP	PA	8/12/2008
EPA 8270C-SIM	Indeno(1,2,3-cd)pyrene	NELAP	PA	8/12/2008
EPA 8270C-SIM	Naphthalene	NELAP	PA	8/12/2008
EPA 8270C-SIM	Phenanthrene	NELAP	PA	8/12/2008
EPA 8270C-SIM	Pyrene	NELAP	PA	8/12/2008
EPA 900.0	Gross alpha	NELAP	PA	5/27/2008
EPA 900.0	Gross beta	NELAP	PA	5/27/2008
EPA 901.1	Gamma emitters	NELAP	PA	8/12/2008
EPA 9010C	Amenable cyanide	NELAP	PA	8/31/2006
EPA 9010C	Total cyanide	NELAP	PA	8/31/2006
EPA 9012B	Total cyanide	NELAP	PA	8/31/2006
EPA 9014	Amenable cyanide	NELAP	PA	6/22/2006
EPA 9014	Cyanide	NELAP	PA	6/22/2006
EPA 9014	Total cyanide	NELAP	PA	6/22/2006
EPA 903.0	Total alpha radium	NELAP	PA	5/27/2008
EPA 903.1	Radium-226	NELAP	PA	5/27/2008
EPA 9034	Total sulfides	NELAP	PA	3/29/2005
EPA 9038	Sulfate	NELAP	PA	5/6/2009
EPA 904.0	Radium-228	NELAP	PA	8/12/2008
EPA 9040B	pH	NELAP	PA	3/29/2005
EPA 905.0	Strontium-89 (calc.)	NELAP	PA	8/12/2008
EPA 905.0	Strontium-90	NELAP	PA	8/12/2008
EPA 9050A	Conductivity	NELAP	PA	6/1/2007
EPA 906.0	Tritium	NELAP	PA	8/12/2008
EPA 9060	Total organic carbon (TOC)	NELAP	PA	2/3/2009
EPA 9065	Total phenolics	NELAP	PA	5/6/2009
EPA 908.0	Uranium, total	NELAP	PA	9/25/2008
EPA 9251	Chloride	NELAP	PA	5/6/2009
EPA 9310	Gross alpha	NELAP	PA	5/27/2008
EPA 9310	Gross beta	NELAP	PA	5/27/2008

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Program Non-Potable Water

Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 9315	Total radium	NELAP	PA	5/27/2008
EPA 9320	Radium-228	NELAP	PA	5/27/2008
HACH 8146	Ferrous iron	NELAP	PA	5/6/2009
SM 2120 B	Color	NELAP	PA	4/10/2007
SM 2310 B	Acidity as CaCO3	NELAP	PA	4/10/2007
SM 2320 B	Alkalinity as CaCO3	NELAP	PA	1/4/2007
SM 2340 B	Total hardness as CaCO3	NELAP	PA	2/7/2008
SM 2540 B	Residue, total	NELAP	PA	4/10/2007
SM 2540 C	Residue, filterable (TDS)	NELAP	PA	4/10/2007
SM 2540 D	Residue, nonfilterable (TSS)	NELAP	PA	4/10/2007
SM 2540 F	Residue, settleable	NELAP	PA	4/10/2007
SM 2550 B	Temperature, deg. C	NELAP	PA	4/10/2007
SM 3500-Cr D	Chromium VI	NELAP	PA	5/6/2009
SM 4500-CN- C	Cyanide distillation	NELAP	PA	4/10/2007
SM 4500-CN- E	Total cyanide	NELAP	PA	4/10/2007
SM 4500-CN- G	Amenable cyanide	NELAP	PA	4/10/2007
SM 4500-CN- I	Weak acid dissociable cyanide	NELAP	PA	5/6/2009
SM 4500-CN- M	Thiocyanate	NELAP	PA	5/6/2009
SM 4500-Cl G	Total residual chlorine	NELAP	PA	4/10/2007
SM 4500-Cl- E	Chloride	NELAP	PA	5/6/2009
SM 4500-F- B	Preliminary distillation of fluoride	NELAP	PA	5/6/2009
SM 4500-F- C	Fluoride	NELAP	PA	5/6/2009
SM 4500-H+ B	pH	NELAP	PA	4/10/2007
SM 4500-NO3- F	Nitrate-nitrite	NELAP	PA	5/6/2009
SM 4500-NO3- F	Nitrite as N	NELAP	PA	5/6/2009
SM 4500-O G	Oxygen (dissolved)	NELAP	PA	4/10/2007
SM 4500-P B	Preliminary treatment of phosphate samples	NELAP	PA	5/6/2009
SM 4500-P E	Orthophosphate as P	NELAP	PA	5/6/2009
SM 4500-P E	Phosphorus, total	NELAP	PA	5/6/2009
SM 4500-S F	Sulfide	NELAP	PA	4/10/2007
SM 4500-SO3 B	Sulfite, SO3	NELAP	PA	4/10/2007
SM 5210 B	Biochemical oxygen demand (BOD)	NELAP	PA	5/6/2009
SM 5210 B	Carbonaceous BOD (CBOD)	NELAP	PA	5/6/2009
SM 5310 C	Total organic carbon (TOC)	NELAP	PA	4/25/2008
SM 5540 C	Surfactants as MBAS	NELAP	PA	5/6/2009
SM 7110 C-00	Gross alpha	NELAP	PA	5/27/2008

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Program Non-Potable Water

Method	Analyte	Accreditation Type	Primary	Effective Date
SM 9222 B	Total coliform (Enumeration)	NELAP	PA	12/7/2009
SM 9222 D	Fecal coliform (Enumeration)	NELAP	PA	12/7/2009

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Pace Analytical Services Inc - Pittsburgh
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Program Solid and Chemical Materials

Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 1010	Ignitability	NELAP	PA	3/29/2005
EPA 1311	Toxicity characteristic leaching procedure (TCLP)	NELAP	PA	3/29/2005
EPA 1312	Synthetic precipitation leaching procedure (SPLP)	NELAP	PA	3/29/2005
EPA 3005A	Preconcentration under acid	NELAP	PA	3/29/2005
EPA 3050B	Acid digestion of solids	NELAP	PA	3/29/2005
EPA 3051	Microwave digestion of solids (HNO3 only)	NELAP	PA	5/6/2009
EPA 3060	Alkaline digestion of Cr(VI)	NELAP	PA	5/6/2009
EPA 3545	Pressurized fluid extraction (PFE)	NELAP	PA	3/29/2005
EPA 3546	Microwave extraction	NELAP	PA	4/20/2009
EPA 3550B	Ultrasonic extraction	NELAP	PA	3/29/2005
EPA 3560	Supercritical fluid extraction (SFE) of TRPH	NELAP	PA	5/6/2009
EPA 3580A	Waste dilution	NELAP	PA	3/29/2005
EPA 3660B	Sulfur cleanup	NELAP	PA	3/29/2005
EPA 3665A	Sulfuric acid/permanganate clean-up	NELAP	PA	3/29/2005
EPA 5035A	Closed-system purge-and-trap (bisulfate option)	NELAP	PA	10/29/2009
EPA 5035A	Closed-system purge-and-trap (methanol option)	NELAP	PA	10/29/2009
EPA 5035A	Closed-system purge-and-trap (unpreserved)	NELAP	PA	10/29/2009
EPA 6010B	Aluminum	NELAP	PA	3/29/2005
EPA 6010B	Antimony	NELAP	PA	3/29/2005
EPA 6010B	Arsenic	NELAP	PA	3/29/2005
EPA 6010B	Barium	NELAP	PA	3/29/2005
EPA 6010B	Beryllium	NELAP	PA	3/29/2005
EPA 6010B	Boron	NELAP	PA	3/29/2005
EPA 6010B	Cadmium	NELAP	PA	3/29/2005
EPA 6010B	Calcium	NELAP	PA	3/29/2005
EPA 6010B	Chromium	NELAP	PA	3/29/2005
EPA 6010B	Cobalt	NELAP	PA	3/29/2005
EPA 6010B	Copper	NELAP	PA	3/29/2005
EPA 6010B	Iron	NELAP	PA	3/29/2005
EPA 6010B	Lead	NELAP	PA	3/29/2005
EPA 6010B	Lithium	NELAP	PA	3/29/2005
EPA 6010B	Magnesium	NELAP	PA	3/29/2005
EPA 6010B	Manganese	NELAP	PA	3/29/2005
EPA 6010B	Molybdenum	NELAP	PA	3/29/2005
EPA 6010B	Nickel	NELAP	PA	3/29/2005
EPA 6010B	Phosphorus, total	NELAP	PA	10/9/2008

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Program Solid and Chemical Materials

Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 6010B	Potassium	NELAP	PA	3/29/2005
EPA 6010B	Selenium	NELAP	PA	3/29/2005
EPA 6010B	Silica, as SiO2	NELAP	PA	4/22/2008
EPA 6010B	Silver	NELAP	PA	3/29/2005
EPA 6010B	Sodium	NELAP	PA	3/29/2005
EPA 6010B	Strontium	NELAP	PA	3/29/2005
EPA 6010B	Thallium	NELAP	PA	3/29/2005
EPA 6010B	Tin	NELAP	PA	4/22/2008
EPA 6010B	Titanium	NELAP	PA	6/22/2006
EPA 6010B	Vanadium	NELAP	PA	3/29/2005
EPA 6010B	Zinc	NELAP	PA	3/29/2005
EPA 6010B-Extended	Zirconium	NELAP	PA	6/22/2006
EPA 7.3.3.2	Reactive cyanide	NELAP	PA	3/29/2005
EPA 7.3.4.2	Reactive sulfide	NELAP	PA	3/29/2005
EPA 7196A	Chromium VI	NELAP	PA	5/6/2009
EPA 7470A	Mercury	NELAP	PA	3/29/2005
EPA 7471A	Mercury	NELAP	PA	3/29/2005
EPA 8015B	Diesel-range organics (DRO)	NELAP	PA	7/28/2006
EPA 8015B	Gasoline-range organics (GRO)	NELAP	PA	7/28/2006
EPA 8081A	4,4'-DDD	NELAP	PA	3/29/2005
EPA 8081A	4,4'-DDE	NELAP	PA	3/29/2005
EPA 8081A	4,4'-DDT	NELAP	PA	3/29/2005
EPA 8081A	Aldrin (HHDN)	NELAP	PA	3/29/2005
EPA 8081A	Chlordane (tech.)	NELAP	PA	3/29/2005
EPA 8081A	Dieldrin	NELAP	PA	3/29/2005
EPA 8081A	Endosulfan I	NELAP	PA	3/29/2005
EPA 8081A	Endosulfan II	NELAP	PA	3/29/2005
EPA 8081A	Endosulfan sulfate	NELAP	PA	3/29/2005
EPA 8081A	Endrin	NELAP	PA	3/29/2005
EPA 8081A	Endrin aldehyde	NELAP	PA	3/29/2005
EPA 8081A	Endrin ketone	NELAP	PA	2/5/2007
EPA 8081A	Heptachlor	NELAP	PA	3/29/2005
EPA 8081A	Heptachlor epoxide	NELAP	PA	3/29/2005
EPA 8081A	Methoxychlor	NELAP	PA	3/29/2005
EPA 8081A	Toxaphene (Chlorinated camphene)	NELAP	PA	3/29/2005
EPA 8081A	alpha-BHC (alpha-Hexachlorocyclohexane)	NELAP	PA	3/29/2005

Attachment to Certificate of Accreditation 008, expiration date March 31, 2010. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

State Laboratory ID: 65-00282 EPA Lab Code: PA01457 (724) 850-5600

Pace Analytical Services Inc - Pittsburgh
1638 Roseytown Road
Greensburg, PA 15601

Program Solid and Chemical Materials

Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 8081A	alpha-Chlordane	NELAP	PA	3/29/2005
EPA 8081A	beta-BHC (beta-Hexachlorocyclohexane)	NELAP	PA	3/29/2005
EPA 8081A	delta-BHC (delta-Hexachlorocyclohexane)	NELAP	PA	3/29/2005
EPA 8081A	gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	NELAP	PA	3/29/2005
EPA 8081A	gamma-Chlordane	NELAP	PA	3/29/2005
EPA 8082	Aroclor-1016 (PCB-1016)	NELAP	PA	3/29/2005
EPA 8082	Aroclor-1221 (PCB-1221)	NELAP	PA	3/29/2005
EPA 8082	Aroclor-1232 (PCB-1232)	NELAP	PA	3/29/2005
EPA 8082	Aroclor-1242 (PCB-1242)	NELAP	PA	3/29/2005
EPA 8082	Aroclor-1248 (PCB-1248)	NELAP	PA	3/29/2005
EPA 8082	Aroclor-1254 (PCB-1254)	NELAP	PA	3/29/2005
EPA 8082	Aroclor-1260 (PCB-1260)	NELAP	PA	3/29/2005
EPA 8082-Extended	Aroclor-1262 (PCB-1262)	NELAP	PA	2/9/2007
EPA 8082-Extended	Aroclor-1268 (PCB-1268)	NELAP	PA	2/9/2007
EPA 8151A	2,4,5-T	NELAP	PA	3/29/2005
EPA 8151A	2,4,5-TP (Silvex)	NELAP	PA	3/29/2005
EPA 8151A	2,4-D	NELAP	PA	3/29/2005
EPA 8260B	1,1,1,2-Tetrachloroethane	NELAP	PA	4/22/2008
EPA 8260B	1,1,1-Trichloroethane	NELAP	PA	5/26/2009
EPA 8260B	1,1,2,2-Tetrachloroethane	NELAP	PA	3/29/2005
EPA 8260B	1,1,2-Trichloroethane	NELAP	PA	3/29/2005
EPA 8260B	1,1-Dichloroethane	NELAP	PA	3/29/2005
EPA 8260B	1,1-Dichloroethene (1,1-Dichloroethylene)	NELAP	PA	3/29/2005
EPA 8260B	1,1-Dichloropropene	NELAP	PA	6/22/2006
EPA 8260B	1,2,3-Trichlorobenzene	NELAP	PA	6/22/2006
EPA 8260B	1,2,3-Trichloropropane (1,2,3-TCP)	NELAP	PA	6/22/2006
EPA 8260B	1,2,4-Trichlorobenzene	NELAP	PA	6/22/2006
EPA 8260B	1,2,4-Trimethylbenzene	NELAP	PA	6/22/2006
EPA 8260B	1,2-Dibromo-3-chloropropane (DBCP, Dibromochloropropane)	NELAP	PA	6/22/2006
EPA 8260B	1,2-Dibromoethane (EDB, Ethylene dibromide)	NELAP	PA	6/22/2006
EPA 8260B	1,2-Dichlorobenzene (o-Dichlorobenzene)	NELAP	PA	3/29/2005
EPA 8260B	1,2-Dichloroethane	NELAP	PA	3/29/2005
EPA 8260B	1,2-Dichloropropane	NELAP	PA	3/29/2005
EPA 8260B	1,3,5-Trimethylbenzene	NELAP	PA	6/22/2006
EPA 8260B	1,3-Dichlorobenzene (m-Dichlorobenzene)	NELAP	PA	3/29/2005

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Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 8260B	1,4-Dichlorobenzene (p-Dichlorobenzene)	NELAP	PA	3/29/2005
EPA 8260B	1,4-Dioxane (1,4-Diethyleneoxide)	NELAP	PA	2/7/2008
EPA 8260B	2,2-Dichloropropane	NELAP	PA	6/22/2006
EPA 8260B	2-Butanone (Methyl ethyl ketone, MEK)	NELAP	PA	3/29/2005
EPA 8260B	2-Chloroethyl vinyl ether	NELAP	PA	6/22/2006
EPA 8260B	2-Chlorotoluene	NELAP	PA	6/22/2006
EPA 8260B	2-Hexanone	NELAP	PA	3/29/2005
EPA 8260B	4-Chlorotoluene	NELAP	PA	6/22/2006
EPA 8260B	4-Isopropyltoluene (p-Isopropyltoluene)	NELAP	PA	6/22/2006
EPA 8260B	4-Methyl-2-pentanone (MIBK)	NELAP	PA	3/29/2005
EPA 8260B	Acetone	NELAP	PA	3/29/2005
EPA 8260B	Acrolein (Propenal)	NELAP	PA	6/22/2006
EPA 8260B	Acrylonitrile	NELAP	PA	6/22/2006
EPA 8260B	Benzene	NELAP	PA	3/29/2005
EPA 8260B	Bromobenzene	NELAP	PA	6/22/2006
EPA 8260B	Bromochloromethane	NELAP	PA	3/29/2005
EPA 8260B	Bromodichloromethane	NELAP	PA	3/29/2005
EPA 8260B	Bromoform	NELAP	PA	3/29/2005
EPA 8260B	Bromomethane (Methyl bromide)	NELAP	PA	3/29/2005
EPA 8260B	Carbon disulfide	NELAP	PA	3/29/2005
EPA 8260B	Carbon tetrachloride	NELAP	PA	5/26/2009
EPA 8260B	Chlorobenzene	NELAP	PA	3/29/2005
EPA 8260B	Chloroethane	NELAP	PA	3/29/2005
EPA 8260B	Chloroform	NELAP	PA	3/29/2005
EPA 8260B	Chloromethane (Methyl chloride)	NELAP	PA	3/29/2005
EPA 8260B	Dibromochloromethane	NELAP	PA	3/29/2005
EPA 8260B	Dibromomethane	NELAP	PA	6/22/2006
EPA 8260B	Dichlorodifluoromethane (Freon 12)	NELAP	PA	6/22/2006
EPA 8260B	Dichloromethane (DCM, Methylene chloride)	NELAP	PA	3/29/2005
EPA 8260B	Ethylbenzene	NELAP	PA	3/29/2005
EPA 8260B	Hexachlorobutadiene (1,3-Hexachlorobutadiene)	NELAP	PA	6/22/2006
EPA 8260B	Isopropylbenzene	NELAP	PA	3/29/2005
EPA 8260B	Methyl tert-butyl ether (MTBE)	NELAP	PA	3/29/2005
EPA 8260B	Naphthalene	NELAP	PA	3/29/2005
EPA 8260B	Styrene	NELAP	PA	3/29/2005
EPA 8260B	Tetrachloroethene (PCE, Perchloroethylene)	NELAP	PA	3/29/2005

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Program Solid and Chemical Materials

Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 8260B	Toluene	NELAP	PA	3/29/2005
EPA 8260B	Trichloroethene (TCE, Trichloroethylene)	NELAP	PA	3/29/2005
EPA 8260B	Trichlorofluoromethane (Freon 11)	NELAP	PA	6/22/2006
EPA 8260B	Vinyl acetate	NELAP	PA	6/22/2006
EPA 8260B	Vinyl chloride (Chloroethene)	NELAP	PA	3/29/2005
EPA 8260B	Xylenes, total	NELAP	PA	3/29/2005
EPA 8260B	cis-1,2-Dichloroethene	NELAP	PA	3/29/2005
EPA 8260B	cis-1,3-Dichloropropene	NELAP	PA	3/29/2005
EPA 8260B	m+p-Xylene	NELAP	PA	6/22/2006
EPA 8260B	n-Butylbenzene	NELAP	PA	6/22/2006
EPA 8260B	n-Propylbenzene	NELAP	PA	6/22/2006
EPA 8260B	o-Xylene	NELAP	PA	6/22/2006
EPA 8260B	sec-Butylbenzene	NELAP	PA	6/22/2006
EPA 8260B	tert-Butyl alcohol (2-Methyl-2-propanol)	NELAP	PA	6/22/2006
EPA 8260B	tert-Butylbenzene	NELAP	PA	6/22/2006
EPA 8260B	trans-1,2-Dichloroethene	NELAP	PA	3/29/2005
EPA 8260B	trans-1,3-Dichloropropene	NELAP	PA	3/29/2005
EPA 8260B-Extended	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	NELAP	PA	6/22/2006
EPA 8260B-Extended	Cyclohexane	NELAP	PA	6/22/2006
EPA 8260B-Extended	Diisopropyl ether (DIPE)	NELAP	PA	6/22/2006
EPA 8260B-Extended	Ethyl tert-butyl ether (ETBE)	NELAP	PA	6/22/2006
EPA 8260B-Extended	Hexane	NELAP	PA	6/22/2006
EPA 8260B-Extended	Methyl acetate	NELAP	PA	6/22/2006
EPA 8260B-Extended	Methylcyclohexane	NELAP	PA	6/22/2006
EPA 8260B-Extended	tert-Amyl methyl ether (TAME)	NELAP	PA	6/22/2006
EPA 8270C	1,2,4-Trichlorobenzene	NELAP	PA	3/29/2005
EPA 8270C	1,2-Dichlorobenzene (o-Dichlorobenzene)	NELAP	PA	3/29/2005
EPA 8270C	1,2-Diphenylhydrazine	NELAP	PA	6/22/2006
EPA 8270C	1,3-Dichlorobenzene (m-Dichlorobenzene)	NELAP	PA	3/29/2005
EPA 8270C	1,4-Dichlorobenzene (p-Dichlorobenzene)	NELAP	PA	3/29/2005
EPA 8270C	2,4,5-Trichlorophenol	NELAP	PA	3/29/2005
EPA 8270C	2,4,6-Trichlorophenol	NELAP	PA	3/29/2005
EPA 8270C	2,4-Dichlorophenol	NELAP	PA	3/29/2005
EPA 8270C	2,4-Dimethylphenol	NELAP	PA	3/29/2005
EPA 8270C	2,4-Dinitrophenol	NELAP	PA	3/29/2005
EPA 8270C	2,4-Dinitrotoluene (2,4-DNT)	NELAP	PA	3/29/2005

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Pace Analytical Services Inc - Pittsburgh
1638 Roseytown Road
Greensburg, PA 15601

Program Solid and Chemical Materials

Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 8270C	2,6-Dinitrotoluene (2,6-DNT)	NELAP	PA	3/29/2005
EPA 8270C	2-Chloronaphthalene	NELAP	PA	3/29/2005
EPA 8270C	2-Chlorophenol	NELAP	PA	3/29/2005
EPA 8270C	2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	NELAP	PA	3/29/2005
EPA 8270C	2-Methylnaphthalene	NELAP	PA	3/29/2005
EPA 8270C	2-Methylphenol (o-Cresol)	NELAP	PA	3/29/2005
EPA 8270C	2-Nitroaniline	NELAP	PA	3/29/2005
EPA 8270C	2-Nitrophenol	NELAP	PA	3/29/2005
EPA 8270C	3,3'-Dichlorobenzidine	NELAP	PA	3/29/2005
EPA 8270C	3-Methylphenol (m-Cresol)	NELAP	PA	3/29/2005
EPA 8270C	3-Nitroaniline	NELAP	PA	3/29/2005
EPA 8270C	4-Bromophenyl phenyl ether	NELAP	PA	3/29/2005
EPA 8270C	4-Chloro-3-methylphenol	NELAP	PA	3/29/2005
EPA 8270C	4-Chloroaniline	NELAP	PA	3/29/2005
EPA 8270C	4-Chlorophenyl phenyl ether	NELAP	PA	3/29/2005
EPA 8270C	4-Methylphenol (p-Cresol)	NELAP	PA	3/29/2005
EPA 8270C	4-Nitroaniline	NELAP	PA	3/29/2005
EPA 8270C	4-Nitrophenol	NELAP	PA	3/29/2005
EPA 8270C	Acenaphthene	NELAP	PA	3/29/2005
EPA 8270C	Acenaphthylene	NELAP	PA	3/29/2005
EPA 8270C	Acetophenone	NELAP	PA	3/29/2005
EPA 8270C	Aniline	NELAP	PA	3/29/2005
EPA 8270C	Anthracene	NELAP	PA	3/29/2005
EPA 8270C	Benzidine	NELAP	PA	6/22/2006
EPA 8270C	Benzo[a]anthracene	NELAP	PA	3/29/2005
EPA 8270C	Benzo[a]pyrene	NELAP	PA	3/29/2005
EPA 8270C	Benzo[b]fluoranthene	NELAP	PA	3/29/2005
EPA 8270C	Benzo[ghi]perylene	NELAP	PA	3/29/2005
EPA 8270C	Benzo[k]fluoranthene	NELAP	PA	3/29/2005
EPA 8270C	Benzoic acid	NELAP	PA	6/22/2006
EPA 8270C	Benzyl alcohol	NELAP	PA	6/22/2006
EPA 8270C	Butyl benzyl phthalate (Benzyl butyl phthalate)	NELAP	PA	3/29/2005
EPA 8270C	Chrysene (Benzo[a]phenanthrene)	NELAP	PA	3/29/2005
EPA 8270C	Di-n-butyl phthalate	NELAP	PA	3/29/2005
EPA 8270C	Di-n-octyl phthalate	NELAP	PA	3/29/2005
EPA 8270C	Dibenzo[a,h]anthracene	NELAP	PA	3/29/2005

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Greensburg, PA 15601

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Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 8270C	Dibenzofuran	NELAP	PA	3/29/2005
EPA 8270C	Diethyl phthalate	NELAP	PA	3/29/2005
EPA 8270C	Dimethyl phthalate	NELAP	PA	3/29/2005
EPA 8270C	Fluoranthene	NELAP	PA	3/29/2005
EPA 8270C	Fluorene	NELAP	PA	3/29/2005
EPA 8270C	Hexachlorobenzene	NELAP	PA	3/29/2005
EPA 8270C	Hexachlorobutadiene (1,3-Hexachlorobutadiene)	NELAP	PA	3/29/2005
EPA 8270C	Hexachlorocyclopentadiene	NELAP	PA	3/29/2005
EPA 8270C	Hexachloroethane	NELAP	PA	3/29/2005
EPA 8270C	Indeno(1,2,3-cd)pyrene	NELAP	PA	3/29/2005
EPA 8270C	Isophorone	NELAP	PA	3/29/2005
EPA 8270C	N-Nitrosodi-n-propylamine	NELAP	PA	3/29/2005
EPA 8270C	N-Nitrosodimethylamine	NELAP	PA	6/22/2006
EPA 8270C	N-Nitrosodiphenylamine	NELAP	PA	3/29/2005
EPA 8270C	Naphthalene	NELAP	PA	3/29/2005
EPA 8270C	Nitrobenzene	NELAP	PA	3/29/2005
EPA 8270C	Pentachlorophenol (PCP)	NELAP	PA	3/29/2005
EPA 8270C	Phenanthrene	NELAP	PA	3/29/2005
EPA 8270C	Phenol	NELAP	PA	3/29/2005
EPA 8270C	Pyrene	NELAP	PA	3/29/2005
EPA 8270C	Pyridine	NELAP	PA	3/29/2005
EPA 8270C	bis(2-Chloroethoxy)methane	NELAP	PA	3/29/2005
EPA 8270C	bis(2-Chloroethyl) ether	NELAP	PA	3/29/2005
EPA 8270C	bis(2-Chloroisopropyl) ether	NELAP	PA	3/29/2005
EPA 8270C	bis(2-Ethylhexyl) phthalate (DEHP)	NELAP	PA	3/29/2005
EPA 8270C-Extended	1,4-Dioxane (1,4-Diethyleneoxide)	NELAP	PA	2/7/2008
EPA 8270C-Extended	Carbazole	NELAP	PA	3/29/2005
EPA 8270C-SIM	Acenaphthene	NELAP	PA	8/12/2008
EPA 8270C-SIM	Acenaphthylene	NELAP	PA	8/12/2008
EPA 8270C-SIM	Anthracene	NELAP	PA	8/12/2008
EPA 8270C-SIM	Benzo[a]anthracene	NELAP	PA	8/12/2008
EPA 8270C-SIM	Benzo[a]pyrene	NELAP	PA	8/12/2008
EPA 8270C-SIM	Benzo[b]fluoranthene	NELAP	PA	8/12/2008
EPA 8270C-SIM	Benzo[ghi]perylene	NELAP	PA	8/12/2008
EPA 8270C-SIM	Benzo[k]fluoranthene	NELAP	PA	8/12/2008
EPA 8270C-SIM	Chrysene (Benzo[a]phenanthrene)	NELAP	PA	8/12/2008

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Method	Analyte	Accreditation Type	Primary	Effective Date
EPA 8270C-SIM	Dibenzo[a,h]anthracene	NELAP	PA	8/12/2008
EPA 8270C-SIM	Fluoranthene	NELAP	PA	8/12/2008
EPA 8270C-SIM	Fluorene	NELAP	PA	8/12/2008
EPA 8270C-SIM	Indeno(1,2,3-cd)pyrene	NELAP	PA	8/12/2008
EPA 8270C-SIM	Naphthalene	NELAP	PA	8/12/2008
EPA 8270C-SIM	Phenanthrene	NELAP	PA	8/12/2008
EPA 8270C-SIM	Pyrene	NELAP	PA	8/12/2008
EPA 901.1	Gamma emitters	NELAP	PA	8/12/2008
EPA 9012A	Total cyanide	NELAP	PA	2/5/2007
EPA 9013	Cyanide extraction for solids and oils	NELAP	PA	4/22/2008
EPA 9014	Amenable cyanide	NELAP	PA	4/22/2008
EPA 9014	Cyanide	NELAP	PA	4/22/2008
EPA 9014	Total cyanide	NELAP	PA	4/22/2008
EPA 9034	Total sulfides	NELAP	PA	3/29/2005
EPA 9038	Sulfate	NELAP	PA	4/15/2009
EPA 9040B	Corrosivity (pH)	NELAP	PA	6/22/2006
EPA 9040B	pH	NELAP	PA	6/22/2006
EPA 9045C	pH	NELAP	PA	3/29/2005
EPA 905.0 (Modified)	Strontium-89 (calc.)	NELAP	PA	8/12/2008
EPA 905.0 (Modified)	Strontium-90	NELAP	PA	8/12/2008
EPA 906.0 (Modified)	Tritium	NELAP	PA	8/12/2008
EPA 9065	Total phenolics	NELAP	PA	5/6/2009
EPA 9071	Oil and grease	NELAP	PA	10/1/2009
EPA 9095A	Paint filter liquids test	NELAP	PA	3/29/2005
EPA 9310	Gross alpha	NELAP	PA	5/27/2008
EPA 9310	Gross beta	NELAP	PA	5/27/2008
EPA 9315	Total radium	NELAP	PA	5/27/2008
EPA 9320	Radium-228	NELAP	PA	5/27/2008
NJ-OQA-QAM-025, Rev 6	Diesel-range organics (DRO)	NELAP	PA	12/21/2007
SM 4500-P B	Preliminary treatment of phosphate samples	NELAP	PA	9/11/2009
SM 4500-P E	Phosphorus, total	NELAP	PA	9/11/2009

Attachments

2D

Scott Blauvelt

From: Steve Rhoads [srhoads@pogam.org]
Sent: Wednesday, February 10, 2010 12:21 PM
To: Scott Blauvelt
Subject: FW: RCRA
Attachments: og93wp.pdf

Here you go.

From: Steve Rhoads [mailto:srhoads@pogam.org]
Sent: Tuesday, September 15, 2009 2:46 PM
To: Bill Fustos; Bob Long; Bob Metzgar; Bryan Snyder; Burt Waite; Craig Mayer; Dave Mahan; Don Connor; Eddy Grey; Fred Fesenmyer; Greg Kriebel; Jim Wigal; John Sieminski; Mark Williams; Matt Benson; Michael Donovan; Roger Willis; Sam Fragale; Steve Millis; Ted Cranmer; William Rodgers (wr@catalystenergyinc.com)
Subject: FW: RCRA

All:

The Department of Environmental Protection initiated a dialogue with the US Environmental Protection Agency recently to ascertain the RCRA status of oil and gas wastes and the residuals from the processes used to treat such wastes. The query has monumental significance because of the potential for our waste streams to become regulated as a RCRA-listed hazardous waste, if for some reason EPA determined that the RCRA exemption for oil and gas wastes terminated due to a breach of some regulatory threshold.

The email chain below contains EPA's response to DEP. **In short, EPA has determined that the RCRA exemption for oil and gas wastes remains in effect once the waste is generated, regardless of how the waste is treated or managed.**

Ron Furlan suggests that the 1993 clarification of the RCRA exemption that is detailed in the attached document is worth reading to better understand the exemption. Full details on the federal regulatory treatment of oilfield wastes is available on the EPA's Crude Oil & Natural Gas Waste web page.

Furlan also notes that while oilfield wastes in Pennsylvania are not hazardous wastes, they remain under the regulatory control of Pennsylvania's *Solid Waste Management Act* as residual wastes, and that operators may need to comply with §§287.7 (Determination that a material is no longer a waste) and 287.8 (Coproduct determinations).

Steve

Pennsylvania Oil & Gas Association
240 North Third Street
P. O. Box 806
Harrisburg, PA 17108-0806
717-234-4414 (Phone)
717-234-5461 (Fax)
717-468-8877 (Cell)
www.pogam.org

From: Furlan, Ronald [mailto:rfurlan@state.pa.us]
Sent: Tuesday, September 15, 2009 1:47 PM
To: 'srhoads@pogam.org'
Cc: Aunkst, Dana; Socash, Stephen
Subject: RE: RCRA

Here is what we received as a response from EPA. We suggest you review (attached) the EPA exempt in, exempt out rule, March 22, 1993 58 FR 15286. Please note, that while not considered a Hazardous Waste, the residuals in Pennsylvania are still consider Residual Waste. To qualify as a co-product or to receive a determination that once the residual waste is used beneficially it is no longer considered a waste in Pennsylvania, you will need to satisfy the Department's Bureau of Waste Management regulations at 25 Pa Code 287.7 or 287.8.

Ron

-----Original Message-----
From: Heston.Gerald@epamail.epa.gov [mailto:Heston.Gerald@epamail.epa.gov]
Sent: Thursday, August 27, 2009 12:14 PM
To: Furlan, Ronald
Cc: Trulear.Brian@epamail.epa.gov; Zenone.Vincent@epamail.epa.gov
Subject: RE: Road salt application

I heard from Dave Friedman in our RCRA program. He offered the following:

Wastewater produced from produced from the exploration and production of gas well is exempt under 261.4(b)(5). As far as EPA regs. are concerned, once a particular exempt waste is generated, that waste remains exempt regardless of the treatment or disposal method employed (unless it is mixed with certain regulated wastes). EPA does not classify a waste as exempt or not exempt based on the way that a particular waste is managed (e.g., use as a road salt). Any mismanagement of exempt waste is a state regulatory and enforcement issue.

Of course, states programs can be more stringent or broader is scope than the Federal RCRA program.

Hope that helps you.
Jerry

Gerald T. Heston, Chief
Eastern Response Branch (3HS31)
U. S. Environmental Protection Agency - Region 3
1650 Arch Street
Philadelphia, PA 19103

Phone: 215-814-3273
Fax: 215-814-3254

-----Original Message-----
From: Furlan, Ronald
Sent: Friday, August 14, 2009 12:07 PM
To: 'Heston.Gerald@epa.gov'; 'Zenone.Vincent@epa.gov'
Subject: FW: Road salt application

Perhaps you folks can clear this up, does the exempt from HW status as "associated waste" carry through for wastewater produced from the exploration and production of gas wells, to the treatment process and then eventually to the produced residues (salts) from that process? The intention is to beneficially use these residues either as industrial salts or road salt, so it will be re-introduced into the environment not be disposed.

-----Original Message-----
From: Steve Rhoads [mailto:srhoads@pogam.org]
Sent: Tuesday, September 15, 2009 12:57 PM

To: Furlan, Ronald
Subject: RCRA

Ron:

Do you have any formal correspondence from EPA on the RCRA exemption that you can share as we discussed at the convention two weeks ago?

Steve

pogam
Pennsylvania Oil & Gas Association

240 North Third Street
P. O. Box 806
Harrisburg, PA 17108-0806
717-234-4414 (Phone)
717-234-5461 (Fax)
717-468-8877 (Cell)
www.pogam.org

http://www.epa.gov/epawaste/nonhaz/industrial/special/oil/
Last updated on Tuesday, December 30th, 2008.

Wastes - Non-Hazardous Waste - Industrial Waste

You are here: EPA Home Wastes Non-Hazardous Waste Industrial Waste Special Wastes Crude Oil and Natural Gas Waste

- Special Waste Home
- Cement Kiln Dust
- Crude Oil and Gas
- Fossil Fuel Combustion
- Mineral Processing
- Mining

Crude Oil and Natural Gas Waste

Wastes generated during the exploration, development, and production of crude oil, natural gas, and geothermal energy are categorized by EPA as "special wastes" and are exempt from federal hazardous waste regulations under Subtitle C of the Resource Conservation and Recovery Act (RCRA).

This Web page provides an outline of the legislative and regulatory history of this exemption, as well as links to key regulatory and technical documents.

- Legislative and Regulatory Timeline
- Public Docket for Oil and Gas Exploration and Production Waste Exemption
- Supporting Technical Documents
- State Reviews
- Related Programs and Resources
- Spent Oil Shale

Legislative and Regulatory Timeline (Oil and Gas Exploration and Production Waste Exemption, Bentsen Amendment)

You will need Adobe Reader to view some of the files on this page. See EPA's PDF page to learn more.

- **December 2008**— EPA clarifies the regulatory status of spent oil shale generated by above ground retorting or heating of oil shale.
- **October 2002**—EPA issues the publication, Exemption of Oil and Gas Exploration and Production Wastes from Federal Hazardous Waste Regulations (PDF) (40 pp, 913K) | en Español (PDF) (40 pp, 424K). This document provides an understanding of the exemption of certain oil and gas exploration and production (E&P) wastes from regulation as hazardous wastes under RCRA Subtitle C. The document includes background on the E&P exemption, basic rules for determining the exempt or non-exempt status of wastes, examples of exempt and non-exempt wastes, the status of E&P waste mixtures, and clarifications of several misunderstandings about the exemption.
- **March 22, 1993**—EPA issues a Clarification of the Regulatory Determination for Wastes from the Exploration, Development and Production of Crude Oil, Natural Gas and Geothermal Energy, March 22, 1993 (58 FR 15284) (PDF) (11 pp, 21K) | Text Version (text file) (27K) which clarifies the regulatory status of wastes generated by the crude oil reclamation industry, service companies, gas plants and feeder pipelines, and crude oil pipelines. EPA only provides further clarification on the status of these wastes under the exemption and does not alter the scope of the original

exemption in any way.

- **July 6, 1988**—EPA issues its Regulatory Determination for Oil, Gas, and Geothermal Exploration, Development and Production Wastes, July 6, 1988 (53 FR 25466) (PDF) (39 pp, 68 K) | Text Version (text file) which states that EPA believes that regulation of oil and gas exploration and production wastes under RCRA Subtitle C is not warranted. Instead, EPA plans to implement a three-pronged strategy to address the issues posed by these wastes by improving federal programs under existing authorities in Subtitle D of RCRA, the Clean Water Act, and Safe Drinking Water Act; working with states to encourage changes and improvements in their regulations and enforcement; and working with Congress to develop any additional statutory authorities that may be required.
- **December 1987**—EPA submits a three-volume Report to Congress on the Management of Waste from the Exploration, Development, and Production of Crude Oil, Natural Gas, and Geothermal Energy (EPA530-SW-88-003, Volumes 1-3).
- **April 1987**—The deadline for submission is extended to December 31, 1987.
- **August 1985**—The Alaska Center for the Environment sues EPA for its failure to conduct the required study and submit its findings to Congress. EPA enters into a consent order obligating it to complete and submit the Report to Congress by August 31, 1987.
- **October 31, 1982**—EPA misses the statutory deadline for submitting the oil and gas exploration and production wastes Report to Congress.
- **October 12, 1980**—Congress enacts the Solid Waste Disposal Act Amendments of 1980 (Public Law 96-482) which amends RCRA. Among the amendments, Section 3001(b)(2)(A)—frequently referred to as the Bentsen Amendment—temporarily exempts "drilling fluids, produced waters, and other wastes associated with the exploration, development, and production of crude oil or natural gas." At the same time, Section 8002(m) requires EPA to study these wastes and submit a Report to Congress evaluating the status of their management and potential risk to human health and the environment by October 1982. EPA is also required to make a regulatory determination (within six months of the completing the Report to Congress) as to whether these wastes warrant regulation under RCRA Subtitle C or some other set of regulations.
- **December 18, 1978**—EPA publishes the first set of proposed hazardous waste management standards in the Federal Register (43 FR 58946). This FR notice includes a proposal to exempt six categories of "special wastes" from the RCRA Subtitle C regulations until further study can be completed. "Oil and gas drilling muds and oil production brines" are included as one of the six special wastes.
- **October 21, 1976**—Congress passes the Resources Conservation and Recovery Act (RCRA) (Public Law 94-580) which requires EPA to develop regulations governing the identification and management of hazardous waste.

Public Docket for Oil and Gas Exploration and Production Waste Exemption

Dockets contain all publicly available materials used in the development of regulations, such as Federal Register notices and rules, supporting analyses, technical background documents, and comments submitted by the public on Agency reports and rulemakings. EPA dockets are available electronically at Regulations.gov.

To use Regulations.gov:

1. Select Docket Search.
2. Select "Environmental Protection Agency" from the Agency drop-down menu.
3. In the Docket ID Box, type in the DOCKET ID number (EPA-HQ-RCRA-1988-0068 or EPA-HQ-RCRA-1988-0069) and then click the "Submit" button to receive your search results. Be patient; loading the documents can take several minutes.
4. The docket should appear with the docket ID number (e.g., EPA-HQ-RCRA-1988-0068, EPA-HQ-RCRA-1988-0069).