Bureau of State Laboratory Services
Office of Laboratory Licensure, Certification & Training

1740 West Adams
Phoenix, Arizona 85007
(602) 364-0720
(602) 364-0758 FAX
Technical Support Hot-Line 1-800-952-0374
E-mail: prabha.acharya@azdhs.gov

JANE DEE HULL, GOVERNOR
CATHERINE R. EDEN , DIRECTOR

DATE:	March 2, 2001
TO:	Laboratory Director and QA Manager
FROM:	Wesley B. Press, Bureau Chief
SUBJECT:	Information Update #65
NOTE:	If any problems occur with this web site, please call (602) 364-0720. Thank you.

1. The Office of Laboratory Licensure has moved. Our new address is:

   Arizona Department of Health Services
   Office of Laboratory Licensure, Certification and Training
   1740 W. Adams
   Phoenix, Arizona 85007

   Our new Phone numbers are:

   Steve Baker, Office Chief (602) 364-0735
   Kim Kozup, Administrative Assistant (602) 364-0720

   Environmental Laboratory Licensure Program
   Manager (vacant)
   Marilyn Lancelot, Administrative Assistant (602) 364-0746
   Mona Alvarez, Clerk Typist (602) 364-0747
   Fax (602) 364-0759

   Training and Technical Resources
   Prabha Acharya, Program Manager, (602) 364-0734
   David Winters, Laboratory Licensure Consultant (602) 364-0732
   Fax (602) 364-0758

2. The next quarterly ELAC (Environmental Laboratory Advisory Committee) meeting will be held in Casa Grande on Wednesday, April 11, 2001. ELAC is an advisory committee to the Director of the Arizona Department of Health Services. If you are interested in attending, please call Kim Kozup at (602) 364-0720 for registration.

3. The following methods have now been approved in Arizona for compliance testing:

314.0	Determination of Perchlorate in Drinking Water
515.3	Determination of Chlorinated Acids in Drinking Water
526	Determination of Selected Semivolatile Organic Compounds in Drinking Water
528	Determination of Phenols in Drinking Water
532	Determination of Phenylurea Compounds in Drinking Water

4. Laboratories analyzing samples for Perchlorate by method 314.0 for compliance testing in Arizona must be licensed by the Arizona Department of Health Services. This includes any laboratories which have already been approved by EPA for this analysis.

5. As of 12/15/00 the holding time for nitrates has been extended to 14 days. This holding time applies to chlorinated unacidified drinking water samples stored at 4 deg. C.

6. In Method 525.2 (rev. 2.0, March 1994) section 8.2 the last sentence states:

   > "This is the same pH used in the extraction, and is required to support the recovery of acidic compounds like pentachlorophenol."

   Our office was recently asked if this means that only the acidic compounds need to be acid preserved. After contacting EPA we are requiring that all the compounds except three be preserved with HCL. The three compounds that are not to be preserved with acid are cyanizine, atraton and prometon. These exceptions are found in sections 8.2.1 and 8.2.2 in the method.

7. If you have any questions regarding the Updates, or if you have any technical questions that need clarification, please call or send e-mail to Prabha Acharya, Program Manager, Technical Resources and Training at the Laboratory Licensure.

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JANE DEE HULL, GOVERNOR
CATHERINE R. EDEN , DIRECTOR

DATE:	May 14, 2001
TO:	Laboratory Director and QA Manager
FROM:	Wesley B. Press, Bureau Chief
SUBJECT:	Information Update #66
NOTE:	If any problems occur with this web site, please call (602) 364-0720. Thank you.

1. Effective April 23, 2001, Mr. Gary Shipley was appointed as Program Manager for both the Environmental Laboratory Licensure and Blood Alcohol programs within the Office of Laboratory Licensure, Certification and Training (OLLCT). Mr. Shipley has a B. S. degree in Physical Science from the University of Nebraska - Kearney. He has most recently been working as a Laboratory Consultant at OLLCT primarily responsible for Quality Assurance at the State Health Laboratory Chemistry section. Mr. Shipley has over 15 years of experience in environmental and industrial laboratories in both private as well as governmental facilities. Data review and QA requirements relative to compliance with many environmental methods including military and corporate specifications are his specialties.

   He has operated and established training programs for many scientific instruments such as: atomic absorption (flame, furnace, & vapor generation), gas chromatography, mass spectroscopy, electron microscopy, x-ray analysis (EDX & XRF), thermal analysis (DSC), ion chromatography, etc. In his previous employment Mr. Shipley gained extensive experience in fulfilling the requirements of the following audits: environmental audits (EPA, DEQ, & Lab Licensure), military audits (Army, Navy, DOD) and customer audits (contract compliance).

2. In the past the Arizona Department of Health Services' (ADHS) rules required that environmental compliance testing be performed by methods which:
   A. were specifically listed in our rules,
   B. had received director approval or,
   C. had been specifically required by the Environmental Protection Agency (EPA) or the Arizona Department of Environmental Quality (ADEQ).

As an example, item "c" above allowed laboratory licensure to accept modifications required by EPA in their "Technical Notes on Drinking Water Methods" dated October 1994. Method modifications or method revisions which are required by specific programs within ADEQ, the use of capillary columns instead of packed columns are other examples.

In our current rules item "c" above has been removed. Therefore, our office, working with Arizona's Environmental Laboratory Advisory Committee (ELAC) has been compiling a list of these method revisions and method modifications. Once this list is complete, our office will get a blanket approval from our Director. If you would like to see the draft list that was distributed at the last ELAC meeting, or if your laboratory is aware of any such modifications you would like us to include please e-mail Prabha Acharya at: **prabha.acharya@azdhs.gov**

3. The March 2001 Labcert Bulletin from EPA's Office of Ground Water and Drinking Water (OGWDW) contained the following information:
   A. "NELAC VI voted to allow a laboratory to use a single PT ampule for multiple methods. It is the opinion of OGWDW that if a laboratory has two methods running for a single contaminant, it is more scientifically correct to analyze one ampule by one method in the first half of the year and a second ampule by the second method in the second half of the year."

      Our office requires laboratories that are running two methods for a single analyte to successfully analyze separate PT's for each licensed method. This applies to methods used to report compliance data. It does not apply to methods which are used only for confirmatory purposes.

   2. Confusion Regarding the 80% Rule

      Controlling 21 VOCs (volatile organic compounds) and successfully analyzing a PT (proficiency test) sample containing all VOC analytes annually is difficult. Realizing this, OGWDW allows the laboratory leeway in the analysis of the VOC PT samples. Excluding vinyl chloride, if the laboratory passes 80% of the VOC analytes, it can be certified for all of the VOCs. The 80% rule for VOCs has recently been made more difficult to interpret since some PT providers may include THMs (trihalomethanes) in the same vial as the VOCs. The 80% Rule does not apply to the THMs if they are present in the VOC ampule. Currently they must be passed as Total THMs.

      In the M/DBP (microbial and disinfectants/ disinfection byproducts) rule, to become effective in January 2002, the 80% rule applies to the DBP contaminants by class. It was the intent of the rule writers that all THMs, HAA5 (haloacetic acids, 5), bromate and chlorite be successfully analyzed each year and the 80% rule would apply to each class. Since there are four THMs, missing one would mean that only 75% of the contaminants were passed, so the 80% rule cannot apply. The anions must all be successfully analyzed as they are individual contaminants. Therefore, the 80% Rule can only apply to the HAAs and four of the five HAA5s must be successfully analyzed to be certified for all of the HAA5s.

      The DBP Rule also means that if a laboratory fails one THM, it cannot be certified for TTHMs. This is a change from current certification practice."

      Currently laboratory licensure requires laboratories to pass all the individual THMs in order to be licensed for Total THMs.

4. If you have any questions regarding the Updates, or if you have any technical questions that need clarification, please call or send e-mail to Prabha Acharya, Program Manager, Technical Resources and Training at the Laboratory Licensure.

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JANE DEE HULL, GOVERNOR
CATHERINE R. EDEN , DIRECTOR

DATE:	May 30, 2001
TO:	Laboratory Director and QA Manager
FROM:	Wesley B. Press, Bureau Chief
SUBJECT:	Information Update #67
NOTE:	If any problems occur with this web site, please call (602) 364-0720. Thank you.

1. The requirements for the successful completion of the Water Pollution (WP) and Discharge Monitoring Report-Quality Assurance (DMR-QA) studies are interchangeable if they are completed within a certain time frame. In the year 2000, many Arizona licensed laboratories had to do duplicate PT analysis since they were not aware of the time frames for ordering the PT samples and for reporting test results. An Arizona licensed laboratory that has successfully completed the DMR-QA study is not required to analyze a WP study. The time frames for the year 2001 are:
   - Order PT samples (either WP or DMR-QA) from a NIST Accredited Provider before June 5, 2001. WP results may be used for DMR-QA if the results have not been published prior to June 5, 2001.
   - Analyze samples before provider's deadline.
   - Mail the completed National Pollution Discharge Elimination System (NPDES) Permittee Data Report Form and Provider data form to the PT provider no later than the date set by the provider and before September 15, 2001.
   - Mail a copy to state or regional NPDES Permit Regulatory Authority.
2. If you have any questions regarding the Information Updates, or if you have any technical questions that need clarification, please call or send e-mail to Prabha Acharya, Program Manager, Technical Resources and Training, at the Laboratory Licensure numbers/address. Copies of the Information Updates can be found at our Internet address: http://www.azdhs.gov/lab/license/resources/updates.htm

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Technical Support Hot-Line 1-800-952-0374
E-mail: prabha.acharya@azdhs.gov

JANE DEE HULL, GOVERNOR
CATHERINE R. EDEN , DIRECTOR

DATE:	October 12, 2001
TO:	Laboratory Director and QA Manager
FROM:	Wesley B. Press, Bureau Chief
SUBJECT:	Information Update #68
NOTE:	If any problems occur with this web site, please call (602) 364-0720. Thank you.

1. Our web site has gone through some major changes. The Environmental Laboratory Licensure home page can be accessed at:

   http://www.azdhs.gov/lab/license/environmental-lab/index.htm

   The Technical Resources and Training home page can be accessed at:

   http://www.azdhs.gov/lab/license/resources/index.htm

   The Information Update page can be accessed at:

   http://www.azdhs.gov/lab/license/resources/updates.htm

   We have added links to the licensure rules and some EPA sites. This page can be accessed at:

   http://www.azdhs.gov/lab/license/environmental-lab/index.htm

2. All environmental laboratories conducting compliance testing for Arizona are required to follow the procedure and all the quality control criteria specified in the method. In the past we have allowed the licensed laboratories to make simple method modifications such as the use of a capillary column vs packed column. On August 29, 2001, the Arizona Department of Health Services' Director approved a list of the permissible method modifications, and is attached to this document.

   The laboratories must assure that all the quality control requirements of the method are met and the results reported are scientifically valid and defensible. An Initial Demonstration of Performance should be performed when

applicable. In addition, where the compliance methods are not precise and are unclear, clarifications and additional quality control criteria have been added to improve the data quality

3. The Proficiency Evaluation (PE) sample protocol for Arizona:

    - At the time of initial application, proof of successfully completed PE samples for all requested methods is required. An exception is if a PE sample is unavailable.

    - On a routine basis the following is required:

        - For laboratories licensed for drinking water: The Water Supply study must be completed for each licensed parameter that is included in the study within a 12 month period. A separate lot is required for different methods used to analyze the same parameter (e.g., arsenic by 200.7 and 200.9 would need to be done on two separate lots). Radiochemistry PE studies are required semiannually. There is no clear requirement yet to participate in the Microbiology Study on a routine basis, but is highly recommended.

        - For laboratories licensed for wastewater: The Water Pollution study must be completed for each licensed parameter that is included in the study within a 12 month period. The same lot can be used for multiple methods analyzed for the same analyte (e.g. arsenic by 200.7 and 200.9 can be done on the same lot vial). Radiochemistry and Microbiology PE studies are not required on a routine basis.

        - For solid, liquid, and hazardous waste sample methods: Only the 8015AZ PE study is required annually. The WP study can be substituted for the equivalent solid waste methods (e.g., completion of a wastewater PE for 1657 would be acceptable for meeting both the 1657 and 8141A requirements). Radiochemistry and Microbiology PE studies are not required on a routine basis.

        - Our program can require a laboratory to participate in additional PE studies if found necessary.

4. The United States Environmental Protection Agency (EPA) ruling eliminates the use of CFC-113 (Freon™) for the oil and grease testing in water beginning January 1, 2002. The EPA has published a final rule in the Federal Register dated March 13, 2001 Volume 66 Number 49. Pursuant to this rule, the use of CFC-113 will no longer be permitted in testing of Oil and Grease and Total Petroleum Hydrocarbon in Water beginning on January 1, 2002. All laboratories should use method 1664A in place of 413.1, 413.2 and 418.1, for the oil and grease testing by January 1, 2002 deadline.

5. Attached please find the letter our office received from the Inspector General of EPA concerning issues of misconduct or unethical practices in analytical laboratories. The open letter dated September 5, 2001 may be accessed at the EPA website. (Acrobat Reader™ is required to view this file)

6. If you have any questions regarding the Information Updates, or if you have any technical questions that need clarification, please call or send e-mail to Prabha Acharya, Program Manager, Technical Resources and Training, at the Laboratory Licensure numbers/address. Copies of the Information

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1 (800) 952-0374

JANE DEE HULL, GOVERNOR
CATHERINE R. EDEN, DIRECTOR

DIRECTOR APPROVED METHOD MODIFICATIONS
8/29/2001

The following method modifications are permissible for the environmental compliance testing in Arizona. The laboratories must assure that all the quality control requirements of the method are met and the results reported are scientifically valid and defensible. An Initial Demonstration of Performance should be performed when applicable. In addition, where the compliance methods are not precise and are unclear, clarifications and additional quality control criteria have been added to improve the data quality.

ORGANICS

1. **Quality control for all the compounds being reported:**

   The quality control testing must be performed on all the compounds being reported unless the method specifies a shortened list.

2. **Holding time for volatile organic compound analysis in water:**

   The holding time for the volatile organic compounds in water will end at midnight on the 14th day from sampling. The desorption of the analytes must be completed and transferred to the chromatography column before midnight. This adds a few extra hours to the holding time of 336 hours (14 days) from the time of sampling.

3. **Liquid-liquid continuous extraction for EPA organic methods**:

   For EPA Methods 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, which require separatory funnel extraction, it is permissible to substitute it with liquid-liquid continuous extraction as long as all the method quality control criteria can be met.

4. **Capillary columns for packed columns:**

   For EPA Methods 601, 602, 603, 624 which require packed columns, it is permissible to substitute it with capillary columns as long as all the method quality control criteria can be met.

5. **Water bath for Kuderna-Danish apparatus:**

   For EPA Methods 506, 515.1, 625, 1625 which require a Kuderna-Danish apparatus to concentrate the sample extracts, it is permissible to substitute it with a water bath.

6. **Sorbent materials:**

   For EPA Methods 502.2, 524.2, 601, 602, 624, 1624, it is permissible to substitute the sorbent materials in the trap.

7. **Desorb time:**

   For EPA Methods 524.2, 8021B and 8260B, it is permissible to decrease the trap desorb time.

8. **Shelf life of VOCs stock standards:**

   For volatile organic chemical analysis, the shelf life of stock standard solutions of gases and 2-chloro ethylvinyl ether can be extended up to a month when comparison with check standards do not indicate a problem.

9. **Storage of standard solutions:**

   Methanol standard solutions that are required to be stored at - 10^0 C to - 20^0 C can be stored below - 20^0 C if the stability checks indicate equal or better storage stability.

10. **EPA method 508 and 508.1:**

    Quality Control criteria for multi-component pesticides:

    Measures must be taken in order to verify the multi-component detection limits or pattern recognition levels (PRL's) regularly. One of the multi-component analytes is to be run at the PRL daily. Each day of analysis, a different multi-component analyte is to be run in order to verify the detection level of each of these analytes routinely ("Manual for the Certification of Laboratories Analyzing Drinking Water", March 1997, EPA-815-B-97-001, Chapter IV, Section 7.2.4). Additionally, if any of the multi-component analytes is detected in the sample, then a full calibration curve must be generated for quantitation of that analyte.

11. **Filtering technique for EPA Methods 525.2 and 508.1:**

    The methods 525.2 and 508.1 use the technique of solid phase extraction to extract the analytes from the matrix. These methods use a vacuum to filter the sample through the solid phase disk. It is however acceptable to use positive pressure to filter the sample. The laboratory needs to make certain that the sample is not being driven through the filter too fast. Being able to use positive pressure enables the laboratories to take advantage of the automated systems which are becoming available.

12. **EPA Method 608:**

    Quality Control criteria/Multi-component pesticide:

    Initial Calibration: Initially, only one aroclor is required to have a full level calibration, however, all other multi-component analytes must be run at the laboratory reporting level. Additionally, if any of the multi-component analyte is detected in the sample, then a full calibration curve must be generated for quantitation of that analyte.

Continuing Calibration Verification: The aroclor which was used for full calibration must be run at a mid-point concentration and meet CCV requirements. Toxaphene and chlordane must be run at any level for pattern recognition purposes.

QC Check and/or Matrix Spike: Any one of the multi-component analytes that can be quantitated must be spiked at any level.

Permissible modifications:

The use of Pyrex Accelerated One-Step Extractor Concentrator manufactured by Corning.

The use of a different solvent for the calibration standards to match the solvent of the final extracts.

The use of a smaller sample volume to minimize matrix interference.

Section 8.5 states to update accuracy assessment for each parameter on a regular basis (after each 5-10 accuracy measurements). It is permissible to update these limits annually (recommend semi-annually).

13. **EPA method 625:**

An alternate calibration curve and a calibration check other than those specified in the method.

Alternate surrogate and internal standard concentrations other than those specified in the method.

The Pyrex Accelerated One-Step™ Extractor Concentrator manufactured by Corning.

A different solvent for the calibration standards to match the solvent of the final extracts.

A smaller sample volume to minimize matrix interferences.

A combined sample extracts of the base/neutral and acid fractions for analysis, if combining the extracts would not compromise data quality. However, if a sample is encountered that would benefit from separate extracts, (i.e., compounds are not resolved in the combined extract), extracts must not be combined.

Extraction pH sequence may be reversed to better separate acid and neutral components. The initial precision and recovery (IPR) test must be repeated with the reverse extraction and QC acceptance criteria must be met, per Section 8.2 of Method 625.

14. **EPA Method 1613:**

Using the following guidance will substantially decrease the cost of Method 1613, because it eliminates many costly steps that are not required when only TCDD is to be determined. It describes how to make some steps in the method specifically applicable to measurement of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). Guidance is needed because Method 1613 was written to determine many isomers of dioxins and furans, but under the Safe Drinking Water Act, EPA only regulates the 2,3,7,8-TCDD isomer. Also, information to determine if the drinking water sample needs

to be filtered is not clearly provided in Method 1613.

1. Only isotopically labeled compounds which are necessary for calibration and quantitation in addition to the native 2,3,7,8-TCDD are $^{13}C_{12}$ 2,3,7,8-TCDD (the spiking compound), $^{37}Cl_4$ 2,3,7,8-TCDD (the cleanup standard), and $^{13}C_{12}$ 1,2,3,4-TCDD (the internal standard).
2. During calibration, selected ion current profiles of only the compounds in item 1 above need be obtained according to directions in Sect. 7 of the method by monitoring the exact masses specified for these compounds in Table 3 of the method at >10,000 resolving power. The relative abundances must meet the criteria specified in the method. There must be at least baseline resolution in the chromatogram between the 1,2,3,4-TCDD and the 2,3,7,8-TCDD isomers.
3. If the sample is colorless, odorless, has a turbidity of one (1) NTU or less and consists of a single phase, filtration is not required, and the sample may be analyzed according to Sect. 11.1 of the method. Turbidity must be measured with an approved method. Any sample containing multiple phases, or having a turbidity of more than one (>I) NTU must be filtered. The filter particulate must be analyzed according to Sect. 11.2 of the method.
4. Since drinking water samples are relatively free from interferences, the optional clean-up steps described in the method probably will not be needed for most samples.

15. **EPA Method 1657:**

It is permissible to use Mass Selective Detector (MSD) provided all the following criteria are met:

The MDLs in EPA Method 1657 can be achieved.

All the other performance tests required to demonstrate equivalent or superior performance of the modification are performed.

All performance criteria are met. The tests to be performed are given in Section 8 of the Method 1657.

16. **Batching for 8000 series methods:**

Clarification on the issue of the matrix spikes and batching for the 8000 series organic methods (reference; 8000B, Section 8.5).

For volatile water samples, a precision measurement in the form of a duplicate must be done with each 12-hour shift of analysis. This requirement can be met by either doing LCS/LCSD, MS/MSD or sample duplicates. If the lab chooses to do a LCS/LCSD or sample duplicates, then a matrix spike must be done every 20 samples.

For volatile soil samples and other extracted samples (semi-volatiles), a duplicate must be included for the precision measurement with each extraction batch. An extraction batch is defined as a group of 20 samples or less, extracted at the same time. If more than 20 samples are extracted at the same time, then two pairs of duplicates must be extracted.

17. **BFB tune for GC/MS volatile methods:**

The BFB tune must be verified before sample analysis. It is not appropriate to monitor the BFB tune by processing the BFB surrogate in the sample injected at the 12th hour through the tune program. Samples are unknowns and may have interferences or matrix effects. The laboratory must monitor the BFB through a separate injection. SW-846 allows BFB to be monitored in the CCV. ADHS has confirmed the technical validity of this interpretation with the EPA's Solid Waste Methods Information Communication and Exchange service.

18. **Preservation of 2-chloroethyl vinyl ether:**

Questions have been posed in the past regarding the appropriate preservation technique for 2-chloroethyl vinyl ether in water samples. Concerns were raised on the effect of acid on this analyte and the recovery of this analyte from acidified samples. The Merck Index says "Even dil(ute) acids produce hydrolysis to acetaldehyde and ethylene chlorohydrin (2-chloroethanol)". EPA's Solid Waste Methods Information Communication and Exchange stand on this issue is as follows:

> "2-chloroethyl vinyl ether has long been known to break down rapidly in an acidified water sample. (SW 846, Chapter 4,) Table 4-1 does not differentiate the preservation techniques based on the specific analytes of interest for a given project. (EPA's) OSW (Office of Solid Waste) views those details as a critical part of the sampling and analysis plan and quality assurance project plan for any given effort. If 2-chloroethyl vinyl ether is, in fact, a target analyte for a given project, then the only way to obtain useful data for that analyte is to collect an unpreserved water sample and analyze it. If other analytes are involved, one generally collects a second aliquot of the sample and acidifies it to preserve the other analytes, thus two analyses are conducted."

To comply with Arizona Regulations (A.A.C. R9-14-617, F3) which require "actual scientifically valid and defensible results" to be reported on compliance testing, this degradation issue will need to be dealt with by each laboratory.

19. **Accelerated One-Step TM for EPA Method 3520:**

"Pyrex Accelerated One-StepTM Extractor Concentrator" manufactured by Corning is approved for EPA Method 3520, the liquid-liquid extraction technique. For pesticides and PCBs the extraction time is reduced from 18 hours to 5.5 hours and for semi-volatiles, the extraction time is reduced from 36 hours to 12 hours. However, the initial demonstration must be done for accuracy and precision to verify that this technique is equivalent to or better than EPA 3520. EPA recommends running seven replicate matrix spikes by both the techniques and calculating % RSD and the spike recoveries for verification.

20. **Matrix spike for EPA Method 8260B:**

It is permissible to prepare the spiking solutions from the same standards as the calibration standards as long as the calibration standard is validated using a secondary source (5.13.2).

INORGANICS/WET CHEMISTRY:

1. **Glass-fiber filter disks for Total Dissolved Solids:**

   It is acceptable to use Environmental Express Pro Weight glass-fiber filter disks for the analysis of Total Dissolved Solids Dried at 180º C (it is listed as an acceptable glass-fiber filter disk in the method 2540C in the Standard Methods, Examination of Water and Wastewater, 20th edition).

2. **Holding time for cyanide in soils:**

   There is no specification given in EPA methods for the holding time requirement for cyanide analysis in non-aqueous samples. In the Revision 0 of SW 846 dated 1986, the Table 2-16 in Chapter 2, *Required Containers, Preservation Technique, and Holding Times,* addresses only the aqueous samples and does not address the non-aqueous samples, according to a telephone conversation with EPA. The EPA method 9013, for non-aqueous samples, allows 14 days before distillation for the properly preserved samples held at 4^0 C. EPA 335.4, for waste water and drinking water, allows 14 days for the analysis of samples which are properly preserved at pH greater than 12. The Arizona Laboratory Licensure Office will therefore, allow 14 days for non-aqueous samples to be distilled and another 14 days after distillation for the completion of analysis.

3. **Turbidimeter calibration:**

   The calibration of the turbidimeter must be made either by the use of a formazin standard as specified in the approved method or with a styrene divinylbenzene polymer standard.

4. **EPA 160.1 (EPA-600/4-/9-020, rev. 3/83) and SM 2540C (Standard Methods 19th edition):**

   Samples can be evaporated to dryness in an oven set at 100ºC instead of on a steam bath.

   It is acceptable to dry samples overnight, with documentation of dates and times, in lieu of having to do repeat weighing to assure a constant weight. There is a concern about loss of weight by overnight drying, i.e., the resulting value would be lower than if repeat weighings had been used. Overnight drying would need to be tested on the sample in question to determine that the same value is obtained.

5. **EPA 160.2, 160.3, (EPA-600/4-/9-020, rev. 3/83) and SM 2540 D, 2540B (Standard Methods 19th ed.):**

   It is acceptable to dry samples overnight, with documentation of dates and times, in lieu of having to do repeat weighing to assure a constant weight. There is a concern about loss of weight by overnight drying, i.e., the resulting value would be lower than if repeat weighings had been used. Overnight drying would need to be tested on the sample in question to determine that the same value is obtained.

6. **EPA 335.1, 335.2, 335.3, 420.1, 420.2 (EPA-600/4-/9-020, rev. 3/83):**

   It is permissible to use the midi-distillation system.

7. **EPA 340.1, 340.2, 340.3, 350.2, 350.3, 350.1 (EPA-600/4-/9-020, rev. 3/83):**

For wastewater analyses of fluoride and ammonia, a manual distillation is not required, when effluent comparability study is available (40 CFR, Part 136.3, Table IB, footnote #6).

8. **EPA 351.2, 351.3, 351.4 (EPA-600/4-/9-020, rev. 3/83):**

   Allow the use of cupric sulfate instead of the mercuric sulfate, which is a less hazardous catalyst. Must show acceptable blank recoveries, precision and accuracy.

9. **EPA Method 300.0:**

   Inclusion of the blank as part of the calibration curve is optional.

   There appears to be a contradiction in the acceptable limits for Laboratory Fortified Sample Matrix (LFM) recoveries in the EPA method 300.0, Revision 2.1, August 1993, between the sections 9.4.2 and 9.4.3. The Arizona Laboratory Licensure Office will enforce the section 9.4.3 which states that the matrix recoveries that fall within 20% for the Method A and 25% for the Method B will be acceptable. If the LFM recoveries fall outside the designated limits (9.4.3) but the Laboratory Fortified Blank is within 10%, the analysis can continue. The sample result must be flagged to indicate a possible matrix interference (9.4.4). The laboratories can determine their own LFM limits but it must be equal to or tighter than the limits in 9.4.3.

   It is permissible to use different concentrations of the eluant mixture if an alternate column is used.

10. **Cyanide analysis by EPA Method 335.2:**

    For cyanide analysis by 335.2, EPA recommends to use the distillation procedure from Standard Method (SM 4500-CN-C) instead of EPA 335.2 because the distillation procedure in EPA 335.2 has problems associated with it. The sodium hydroxide absorber solution final concentration must be adjusted to 0.25N before colorimetric analysis.

11. **Holding time for EPA Method 418.1 for waste water:**

    The Arizona Laboratory Licensure allows 28 days.

12. **SM 5310C:**

    It is permissible to filter the samples through 0.45 um pore diameter filter in place of 0.7 um pore diameter filter.

METAL ANALYSIS:

1. **Hot Block digestion system:**

   It is acceptable to use the "Hot Block" digestion system for metal sample digestion for the following methods:

SW-846 methods 3010A, 3020A, 3050B

Standard Methods 3030E and F

Mercury digestion for EPA 245.1; SW-846 methods 7470A and 7471A.

It is permissible to use the block digestor with reduced volume for the digestion of metals, as long as the chemistry has not changed and the lab can meet the method IDC. Sample size reduction is allowed as long as the labs have enough sample digestate to complete all the required quality control. The laboratory should record the temperature of each batch to validate that it is within the acceptable range.

2. **EPA method 200.7, Revision 4.4:**

   Section 11.5 allows the use of internal standard technique in lieu of method of standard additions of samples when the matrix interferences cause enhancement or depression of an analyte signal. Internal standard quantitation is acceptable, as long as the laboratory is adding the internal standard to all standards, QC samples and samples.

   To compensate for the effects of interfering elements, multi variate corrections, also called Multi Component Spectral Fitting (MSF) can be used in lieu of inter-element corrections (Section 4.1). When inter-element corrections are applied, their accuracy must be verified by analyzing spectral interference check solutions as described in section 7.13.

   Initial Instrument Performance Check (IPC) immediately following calibration can be replaced with a Quality Control Sample (QCS), which is a secondary source. The analysis must verify that the instrument is within ± 5% of calibration (Sections 9.3.4 & 9.2.3).

   Concentration levels of all quality control samples can vary slightly from the recommended levels in the method.

   It is acceptable for the Laboratory Reagent Blank (LRB) criteria to be less than the laboratory's reporting level instead of 2.2 times the MDL as per the method (Section 9.3.1).

3. **EPA method 200.8, Revision 5.4:**

   Initial IPC immediately following calibration can be replaced with a QCS, which is a secondary source. The analysis must verify that the instrument is within ± 10 % of calibration (Sections 9.3.4 & 9.2.3).

   Concentration levels of all quality control samples can vary slightly from the recommended levels in the method.

   It is acceptable for the LRB criteria to be less than the laboratory's reporting level instead of 2.2 times the MDL as per the method (Section 9.3.1).

4. **EPA method 200.9, Rev. 2.2:**

Initial IPC immediately following calibration can be replaced with a QCS, which is a secondary source. The analysis must verify that the instrument is within ± 5% of calibration (Sections 9.3.4 & 9.2.3).

Concentration levels of all quality control samples can vary slightly from the recommended levels in the method.

It is acceptable for the LRB criteria to be less than the laboratory's reporting level instead of 2.2 times the MDL as per the method (Section 9.3.1).

5. **EPA method 245.1, Rev. 3.0:**

   It is acceptable to use an automated digestion system, as well as the auto-analyzer (such as Leeman Labs auto-analyzer, or Perkin Elmer FIMS system) instead of a manual system as described in the method (Section 6.0). The chemistry is unchanged, except for volumes. When an instrument designed specifically for the determination of mercury by the cold vapor technique is being utilized the analyst should follow the instructions provided by the manufacturer (Section 10.1).

   It is acceptable to digest the calibration standards also similar to the process used for samples (Section 11.2.2).

   Initial IPC immediately following calibration can be replaced with a QCS, which is a secondary source. The analysis must verify that the instrument is within ± 5% of calibration (Sections 9.3.4 & 9.2.3).

   Concentration levels of all quality control samples can vary slightly from the recommended levels in the method.

   It is acceptable for the LRB criteria to be less than the laboratory's reporting level instead of 2.2 times the MDL as per the method (Section 9.3.1).

6. **SM 3111B:**

   The calibration standards need not be digested.

7. **Safety warning in SM 3114B:**

   An important safety warning when using sample digestion procedures that are described in SM 3114B. Determination of arsenic and selenium by gaseous hydride atomic absorption requires digestion of the sample prior to analysis. SM 3114B describes two digestion procedures. One procedure, referred to as the "total recoverable" preparation uses perchloric acid in the final stage of digestion. **This perchloric acid digestion is not required by EPA, and should be avoided,** because of potential danger when using perchloric acid, and because a special fume hood is required. When using method SM 3114B, the digestion procedure described in paragraph 4.d, Preparation of samples and standards for total arsenic an selenium, that specifies the use of sulfuric acid and potassium persulfate should be utilized. This warning is not applicable to the ASTM gaseous hydride methods for arsenic and selenium, because the methods do not allow use of perchloric acid digestion.

8. **SW-846/ 7470A:**

It is permissible to use an automated digestion system, as well as the auto-analyzer (such as Leeman Labs auto-analyzer, or Perkin Elmer FIMS system) instead of a manual system as described in the method. The chemistry is unchanged, except for volumes.

9. **SW-846 /7471A:**

   It is permissible to use an automated digestion system, as well as the auto-analyzer (such as Leeman Labs auto-analyzer, or Perkin Elmer FIMS system) instead of a manual system as described in the method. The chemistry is unchanged, except for volumes.

   It is not required to digest three separate 0.2 gm aliquots. The digestion of a single 0.6 gm aliquot is sufficient.

10. **SW-846/9010B:**

    It is permissible to use the midi distillation system.

11. **SW-846 /9060:**

    Quadruplicate analysis is not required for aqueous samples. A duplicate analysis is sufficient if the laboratory can demonstrate good reproducibility by generating the in-house acceptance limits for relative percent difference (RPD).

MICROBIOLOGY:

1. **Incubation time for Colisure Test:**

   Minimum incubation time for reading the Colisure Test in drinking water, for determination of total coliforms, is reduced from 28 hours to 24 hours.

2. **Incubator vs water bath**

   For any microbiological testing method which requires the temperature to be maintained at 44.5 ± 0.2^0 C, either a water bath or an incubator can be used, as long as the required temperature range can be maintained and there is no significant moisture loss.

RADIOCHEMISTRY:

1. **EPA methods 900.0 & 00-02:**

   It is alright to filter DW samples for radchem analysis (900.0 and 00-02 methods), if the samples contained sediment, before acidification. Normally the DW samples should not contain sediment especially if it is sampled from a faucet. There is a reference for filtration in the DW manual, 4th

edition, Page V1-9, Table V1-2, Sample handling, Preservation, and Instrumentation, under preservative column. This recommendation was not there in the 3rd edition. Arizona Laboratory Licensure Office requires the final report to be footnoted if the samples were filtered before analysis.

GENERAL:

1. **Certification of reference and working weights:**

   Arizona Laboratory Licensure Office's policy on the frequency of the certification on the reference and "working" weights:

   "S" weights should be certified every 5 years by NIST/NBS. A reference weight should be recertified if it is damaged or corroded.

   "Class 1" weights should be certified every year by ASTM. A reference weight should be recertified if it is damaged or corroded.

   Chemistry "working" weights (non-reference weights used daily, weekly, etc.) checked against certified reference weights at a frequency set per individual laboratory.

   Micro "working" weights checked against certified reference weights every 6 months.

2. **MDLs in soils:**

   After discussing the requirement of performing MDL studies for metals in both water and soils with the EPA, it has been agreed, that MDLs for metals on solid matrices is not required. The MDLs are to be reflective of the best case scenario, and that as long as a laboratory has aqueous MDLs as well as performing the required QC in the method, one should be able to get enough information of the laboratory's sensitivity. EPA’s Methods Information and Communication Exchange informed us that soil matrix MDLs are not normally done due to the background contamination problem, and that the laboratory can just extrapolate soil MDLs from their water MDLs.

3. **Current MDLs:**

   Laboratories are required to have current MDLs for each analyte they report (A.A.C. R9-14-613, section B6). This includes each and every aroclor the lab reports out. Typically these are 1016, 1260, 1221, 1232, 1242, 1248 and 1254. The MDLs must be repeated at the method specified frequency. If the method does not specify a frequency, an MDL is considered current if no changes have been made to (1) extraction or analytical procedure, (2) type of columns used, (3) the instrument has not been moved (i.e. to a new lab facility) and (4) other modifications of this type. Once the laboratory has done an initial MDL study, if all parameters remain constant, a laboratory might be able to go two or three years before doing another MDL study. To verify that the MDL study is still current, the laboratory may choose to periodically analyze an LCS at the reporting limit.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, DC 20460

September 5, 2001

THE INSPECTOR GENERAL

Open letter to the environmental analytical laboratory community:

This letter is intended to draw your attention to issues of misconduct or unethical practices in analytical laboratories, related to inappropriate manipulation of laboratory data, that may also constitute laboratory fraud.

The EPA Office of Inspector General (EPA-OIG) has seen an increase in the number of allegations that environmental laboratories inappropriately manipulate laboratory data. This has been defined by my Office as: "The intentional falsification of analytical and quality assurance results." The falsification of environmental data undermines the ability of federal, state, tribal, and local governments, and the regulated community, to make environmental decisions necessary to protect the health and safety of the general public.

In a continuing effort to deter these practices, the EPA-OIG is working closely with EPA's Criminal Investigations Division, other federal investigative organizations, and the Department of Justice to investigate and, as appropriate, prosecute all allegations of laboratory fraud. These efforts to date have resulted in substantial fines, penalties, incarcerations, federal suspension and debarment actions, and laboratory closures.

Of particular concern is the fraudulent practice of using improper manual integrations by chromatographic analysts to falsify test results in initial calibrations, continuing calibrations, and surrogate recoveries, to make the control samples appear to meet quality control requirements. The routine practice of laboratory management spot checking a percentage of manual integrations performed in your laboratories would send a strong message to your laboratory staff that you are committed to ensuring that they follow proper laboratory procedures, identify improprieties, and correct them immediately. All too often, EPA-OIG's laboratory fraud investigations involve significant data manipulations conducted by multiple analysts using many analytical methods over several years. These investigations can raise questions about the reliability of all the data from a laboratory.

A laboratory's best protection against fraudulent activity is the effective implementation of strong, proactive, and independent ethical practices and Quality Systems. The Quality System should clearly establish and identify acceptable and unacceptable analytical practices. In addition,

data authenticity checks should be incorporated into laboratory peer reviews, data verification, and/or Quality Assurance Officer's reviews to assure product integrity and to limit liability and exposure to "rogue analysts."

There are many factors that can contribute to misconduct: poor training, ineffective ethics programs, shrinking markets for analytical services, and greater economic incentives for laboratories to implement cost-cutting measures. Nevertheless, laboratory management is responsible for maintaining effective operations. To better ensure proper conduct, management can:

- Create a corporate environment conducive to quality operations, ethical standards, personal integrity, and accountability. This environment contributes to effective fraud prevention beyond anything industry standards and government oversight can accomplish.

- Plan for routine "down-time" to perform instrument maintenance and repairs to meet method quality control requirements. These efforts can be marketed as a hallmark of quality assurance and technical ability.

- Acknowledge that improving quality promotes profits and an *increase* in business because a reputable laboratory *attracts* business.

I encourage you to evaluate your Quality System, with particular attention to the detection and prevention of improper laboratory activities. OIG staff are available to work with the environmental laboratory community and other stakeholders to encourage ethical laboratory operations and to prevent fraud. Any inquiries or comments regarding laboratory fraud should be directed to Emmett Dashiell, Acting Assistant Inspector General for Investigations, at (202) 260-3404.

Sincerely,

/s/

Nikki L. Tinsley

Bureau of State Laboratory Services
Office of Laboratory Licensure, Certification & Training

1740 West Adams Room 203
Phoenix, Arizona 85007
(602) 364-0720
(602) 364-0758 FAX
Technical Support Hot-Line 1-800-952-0374
E-mail: prabha.acharya@azdhs.gov

JANE DEE HULL, GOVERNOR
CATHERINE R. EDEN , DIRECTOR

DATE: November 21, 2001

TO: Laboratory Director and QA Manager

FROM: Wesley B. Press, Bureau Chief

SUBJECT: Information Update #69

NOTE: If any problems occur with this web site, please call (602) 364-0720. Thank you.

1. Item #4 from Information Update #68 discussed EPA's plan to eliminate the use of CFC-113 (Freon™) for oil and grease testing in water beginning January 1, 2002. Our Office received the following clarifications from the United States Environmental Protection Agency:

   A. Laboratories can continue to use Freon for EPA Methods 413.1, 413.2 and 418.1 until the laboratory use exemption expires in 2005. The Freon must have been either produced or imported prior to January 1, 2002.

   B. Permit holders and dischargers should make sure that after December 31, 2001 that their lab is using Freon produced or imported prior to January 1, 2002 for testing oil and grease and/ or TPH in water. Permit holders will be subject to fines if the laboratory doing the analysis is using Freon produced or imported after the January 1, 2002 deadline.

2. On December 11, 2000 the Arizona Environmental Laboratory Advisory Committee's technical subcommittee finalized a standardized set of data qualifiers designed to assist ADEQ project managers in assessing data quality (see Information Updates #63 and #64). These data qualifiers titled, Arizona Data Qualifiers (12/11/2000), can be found attached to this document.

   Currently the Technical sub-committee is in the process of reviewing this list for possible additional data qualifiers. If you have any additional qualifiers you would like the committee to consider e-mail them to Prabha Acharya at: prabha.acharya@azdhs.gov

3. At the last Arizona Environmental Laboratory Advisory Committee (ELAC) meeting John Calkins,

Supervisor, Drinking Water Compliance and Enforcement, Arizona Department of Environmental Quality (ADEQ) announced that ADEQ's Drinking Water Section has approved a short list of data qualifiers for the purposes of reporting compliance drinking water analytical results. This set of AZ Drinking Water Data Qualifiers (10/23/2001) is attached to this document, along with a memo from John Calkins.

4. If you have any questions regarding the Information Updates, or if you have any technical questions that need clarification, please call or send an e-mail to Prabha Acharya, Program Manager, Technical Resources and Training, at the Laboratory Licensure numbers/address. Copies of the Information Updates can now be found at our internet address: http://www.azdhs.gov/lab/license/resources/updates.htm

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This message is available in alternative format by contacting Wesley Press at (602) 542-1198
The Arizona Department of Health Services does not discriminate on the basis of disability in administration of its programs and services as prescribed by Title II of the Americans with Disability Act of 1990 and Section 504 of the Rehabilitation Act of 1973.

Arizona Data Qualifiers
12/11/2000

Developed by the Sub-committee of the Arizona Environmental Laboratory Advisory Committee

Disclaimer: This is not the original document, but all efforts have been made to recreate the document. There may be differences between this version and the original version.

Microbiology:

A1 = Too numerous to count.
A2 = Sample incubation period exceeded method requirement.
A3 = Sample incubation period was shorter than method requirement.
A4 = Target organism detected in associated method blank.
A5 = Incubator/water bath temperature was outside method requirements.
A6 = Target organism not detected in associated positive control.
A7 = Micro sample received without adequate headspace.

Method/calibration blank:

B1 = Target analyte detected in method blank at or above the method reporting limit.
B2 = Non-target analyte detected in method blank and sample, producing interference.
B3 = Target analyte detected in calibration blank at or above the method reporting limit.
B4 = Target analyte detected in blank at/above method acceptance criteria.
B5 = Target analyte detected in method blank at or above the method reporting limit, but below trigger level or MCL.
B6 = Target analyte detected in calibration blank at or above the method reporting limit, but below trigger level or MCL.
B7 = Target analyte detected in method blank at or above method reporting limit. Concentration found in the sample was 10 times above the concentration found in the method blank.

Confirmation:

C1 = Confirmatory analysis not performed as required by the method.
C2 = Confirmatory analysis not performed. Confirmation of analyte presence established by site historical data.
C3 = Qualitative confirmation performed. See case narrative.
C4 = Confirmatory analysis was past holding time.
C5 = Confirmatory analysis was past holding time. Original result not confirmed.

Dilution:

D1 = Sample required dilution due to matrix interference. See case narrative.
D2 = Sample required dilution due to high concentration of target analyte.
D3 = Sample dilution required due to insufficient sample.
D4 = Minimum reporting level (MRL) adjusted to reflect sample amount received and analyzed.

Estimated concentration:

E1 = Concentration estimated. Analyte exceeded calibration range. Reanalysis not possible due to insufficient sample.
E2 = Concentration estimated. Analyte exceeded calibration range. Reanalysis not performed due to sample matrix.
E3 = Concentration estimated. Analyte exceeded calibration range. Reanalysis not performed due to holding time requirements.

E4 = Concentration estimated. Analyte was detected below laboratory minimum reporting level (MRL).
E5 = Concentration estimated. Analyte was detected below laboratory minimum reporting level (MRL), but not confirmed by alternate analysis.
E6 = Concentration estimated. Internal standard recoveries did not meet method acceptance criteria.
E7 = Concentration estimated. Internal standard recoveries did not meet laboratory acceptance criteria.

Hold time:

H1 = Sample analysis performed past holding time. See case narrative.
H2 = Initial analysis within holding time. Reanalysis for the required dilution was past holding time.
H3 = Sample was received and analyzed past holding time.
H4 = Sample was extracted past required extraction holding time, but analyzed within analysis holding time. See case narrative.

BOD:

K1 = The sample dilutions set-up for the BOD analysis did not meet the oxygen depletion criteria of at least 2 mg/L. Any reported result is an estimated value.
K2 = The sample dilutions set up for the BOD analysis did not meet the criteria of a residual dissolved oxygen of at least 1 mg/L. Any reported result is an estimated value.
K3 = The seed depletion was outside the method acceptance limits.
K4 = The seed depletion was outside the method and laboratory acceptance limits. The reported result is an estimated value.
K5 = The dilution water D.O. depletion was > 0.2 mg/L.
K6 = Glucose/glutamic acid BOD was below method acceptance criteria.
K7 = A discrepancy between the BOD and COD results has been verified by reanalysis of the sample for COD.
K8= Glucose/glutamic acid BOD was above method acceptance levels.

Laboratory fortified blank/blank spike:

L1 = The associated blank spike recovery was above laboratory acceptance limits. See case narrative.
L2 = The associated blank spike recovery was below laboratory acceptance limits. See case narrative.
L3 = The associated blank spike recovery was above method acceptance limits. See case narrative.
L4 = The associated blank spike recovery was below method acceptance limits. See case narrative.

Note: The L1, L2, L3 & L4 footnotes need to be added to all corresponding analytes for a sample.

Matrix spike:

M1 = Matrix spike recovery was high, the method control sample recovery was acceptable.
M2 = Matrix spike recovery was low, the method control sample recovery was acceptable.
M3 = The accuracy of the spike recovery value is reduced since the analyte concentration in the sample is disproportionate to spike level. The method control sample recovery was acceptable.
M4 = The analysis of the spiked sample required a dilution such that the spike concentration was diluted below the reporting limit. The method control sample recovery was acceptable.

M5 = Analyte concentration was determined by the method of standard addition (MSA).
M6= Matrix spike recovery was high. Data reported per ADEQ policy 0154.000.
M7= Matrix spike recovery was low. Data reported per ADEQ policy 0154.000.

General:

N1 = See case narrative.
N2 = See corrective action report.

Sample quality:

Q1 = Sample integrity was not maintained. See case narrative.
Q2 = Sample received with head space.
Q3 = Sample received with improper chemical preservation.
Q4 = Sample received and analyzed without chemical preservation.
Q5 = Sample received with inadequate chemical preservation, but preserved by the laboratory.
Q6 = Sample was received above recommended temperature.
Q7 = Sample inadequately dechlorinated.
Q8 = Insufficient sample received to meet method QC requirements. QC requirements satisfy ADEQ policies 0154 and 0155.
Q9 = Insufficient sample received to meet method QC requirements.
Q10 = Sample received in inappropriate sample container.
Q11 = Sample is heterogeneous. Sample homogeneity could not be readily achieved using routine laboratory practices.

Duplicates:

R1 = RPD exceeded the method control limit. See case narrative.
R2 = RPD exceeded the laboratory control limit. See case narrative.
R3 = Sample RPD between the primary and confirmatory analysis exceeded 40%. Per EPA Method 8000B, the higher value was reported.
R4 = MS/MSD RPD exceeded the method control limit. Recovery met acceptance criteria.
R5 = MS/MSD RPD exceeded the laboratory control limit. Recovery met acceptance criteria.
R6 = LFB/LFBD RPD exceeded the method control limit. Recovery met acceptance criteria.
R7 = LFB/LFBD RPD exceeded the laboratory control limit. Recovery met acceptance criteria.
R8 = Sample RPD exceeded the method control limit.
R9 = Sample RPD exceeded the laboratory control limit.

Surrogate:

S1 = Surrogate recovery was above laboratory acceptance limits, but within method acceptance limits.
S2 = Surrogate recovery was above laboratory and method acceptance limits.
S3 = Surrogate recovery was above laboratory acceptance limits, but within method acceptance limits. No target analytes were detected in the sample.
S4 = Surrogate recovery was above laboratory and method acceptance limits. No target analytes were detected in the sample.
S5 = Surrogate recovery was below laboratory acceptance limits, but within method acceptance limits.
S6 = Surrogate recovery was below laboratory and method acceptance limits. Reextraction and/or reanalysis confirms low recovery caused by matrix effect.
S7 = Surrogate recovery was below laboratory and method acceptance limits. Unable to confirm matrix effect.

S8 = The analysis of the sample required a dilution such that the surrogate concentration was diluted below the method acceptance criteria The method control sample recovery was acceptable.
S9 = The analysis of the sample required a dilution such that the surrogate concentration was diluted below the laboratory acceptance criteria. The method control sample recovery was acceptable.
S10 = Surrogate recovery was above laboratory and method acceptance limits. See Case narrative.
S11= Surrogate recovery was high. Data reported per ADEQ policy 0154.000.
S12= Surrogate recovery was low. Data reported per ADEQ policy 0154.000.

Method/analyte discrepancies:

T1 = Method promulgated by EPA, but not by ADHS at this time.
T2 = Cited ADHS licensed method does not contain this analyte as part of method compound list.
T3 = Method not promulgated either by EPA or ADHS.
T4 = Tentatively identified compound. Concentration is estimated and based on the closest internal standard.

Calibration verification:

V1 = CCV recovery was above method acceptance limits. This target analyte was not detected in the sample.
V2 = CCV recovery was above method acceptance limits. This target analyte was detected in the sample. The sample could not be reanalyzed due to insufficient sample.
V3 = CCV recovery was above method acceptance limits. This target analyte was detected in the sample, but the sample was not reanalyzed. See case narrative.
V4 = CCV recovery was below method acceptance limits. The sample could not be reanalyzed due to insufficient sample.
V5 = CCV recovery after a group of samples was above acceptance limits. This target analyte was not detected in the sample. Acceptable per EPA Method 8000B.
V6= Data reported from one-point calibration criteria per ADEQ policy 0155.000.
V7= Calibration verification recovery was above the method control limit for this analyte, however the average % difference or % drift for all the analytes met method criteria.
V8= Calibration verification recovery was below the method control limit for this analyte, however the average % difference or % drift for all the analytes met method criteria.

Calibration:

W1= The % RSD for this compound was above 15% The average % RSD for all compounds in the calibration met the 15% criteria as specified in EPA method 8000B.

Jane Dee Hull
Governor

Arizona Department of Environmental Quality

3033 North Central Avenue · Phoenix, Arizona 85012-2809
(602) 207-2300 · www.adeq.state.az.us

Jacqueline E. Shafer
Director

October 23, 2001

Linda Johnson, Chairman
Arizona Environmental Laboratory Advisory Committee
P.O. Box 85072 Mail Station XCT 310
Phoenix, Arizona 85072

Re: Arizona Data Qualifiers for Drinking Water

Dear Ms. Johnson:

Pursuant to multiple meetings between Arizona Department of Environmental Quality (ADEQ) drinking water staff and the Drinking Water Data Qualifier Sub-committee members of the Arizona Environmental Laboratory Advisory Committee, this letter is to delineate agreed upon data qualifiers for the purposes of reporting compliance drinking water analytical results. In general, allowing pre-approved data qualifiers to accompany drinking water data will result in enhanced analytical information as well as facilitate reporting and recording keeping requirements for the participating laboratories. With the exception of the AX@ data qualifier type, all of the below-mentioned approved qualifiers will allow analytical results, for purposes of determining compliance with the Safe Drinking Act, to be accepted as compliance samples, entered into ADEQ=s drinking water data base and maintained in public water systems= facility files as public documents. The approved drinking water data qualifiers are listed in appendix A.

I am certain this use of qualifiers will be beneficial for all laboratories licensed to perform compliance drinking water analyses as well as to ADEQ water quality staff. I, or members of my staff, will continue to work with the Arizona Environmental Laboratory Advisory Committee to address any possible future modifications to the list of approved qualifiers as we fully expect the set to be an evolving document.

If you have any questions, please feel free to contact me directly at 1-800-234-5677, extension 4651. Thank you and all of the sub-committee members for their time and dedication in reaching this agreement.

Sincerely,

John Calkins, Supervisor
Drinking Water Compliance and Enforcement

cc: Mike Traubert, Water Quality Compliance Section Manager, ADEQ
Jeff Stuck, Drinking Water Section Manager, ADEQ
Don Shroyer, Water Quality Data Unit Supervisor, ADEQ

1515 East Cedar Avenue Suite F, Flagstaff AZ 86004 (520) 779-0313
400 West Congress Street Suite 433, Tucson AZ 85701 (520) 628-6733
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APPENDIX A

Method blank:

B5 = Target analyte detected in method blank at or above the method reporting limit, but below trigger level or MCL.

B6 = Target analyte detected in calibration blank at or above the method reporting limit, but below trigger level or MCL.

Dilution:

D1 = Sample required dilution due to matrix interference. See case narrative.

D2 = Sample required dilution due to high concentration of target analyte.

D3 = Sample dilution required due to insufficient sample.

D4 = Minimum reporting level (MRL) adjusted to reflect sample amount received and analyzed.

Laboratory fortified blank/blank spike:

L1 = The associated blank spike recovery was above laboratory acceptance limits. See case narrative.

L2 = The associated blank spike recovery was below laboratory acceptance limits. See case narrative.

Note: The L1 & L2 footnotes need to be added to all corresponding analytes for a sample.

Matrix spike:

M1 = Matrix spike recovery was high, the method control sample recovery was acceptable.

M2 = Matrix spike recovery was low, the method control sample recovery was acceptable.

M3 = The accuracy of the spike recovery value is reduced since the analyte concentration in the sample is disproportionate to spike level. The method control sample recovery was acceptable.

M4 = The analysis of the spiked sample required a dilution such that the spike concentration was diluted below the reporting limit. The method control sample recovery was acceptable.

M5 = Analyte concentration was determined by the method of standard addition (MSA).

M6 = Matrix spike recovery was high. Data reported per ADEQ policy 0154.000.

M7 = Matrix spike recovery was low. Data reported per ADEQ policy 0154.000.

Sample quality:

Q12 = Insufficient sample received to meet method QC requirements. See case narrative.

Duplicates:

R2 = RPD exceeded the laboratory control limit. See case narrative.

R5 = MS/MSD RPD exceeded the laboratory control limit. Recovery met acceptance criteria.

R7 = LFB/LFBD RPD exceeded the laboratory control limit. Recovery met acceptance criteria.

R9 = Sample RPD exceeded the laboratory control limit.

Surrogate:

S1 = Surrogate recovery was above laboratory acceptance limits, but within method acceptance limits.

S3 = Surrogate recovery was above laboratory acceptance limits, but within method acceptance limits. No target analytes were detected in the sample.

S5 = Surrogate recovery was below laboratory acceptance limits, but within method acceptance limits.

S6 = Surrogate recovery was below laboratory and method acceptance limits. Reextraction and/or reanalysis confirms low recovery caused by matrix effect.

S8 = The analysis of the sample required a dilution such that the surrogate concentration was diluted below the method acceptance criteria. The method control sample recovery was acceptable.

S9 = The analysis of the sample required a dilution such that the surrogate concentration was diluted below the laboratory acceptance criteria. The method control sample recovery was acceptable.

S11 = Surrogate recovery was high. Data reported per ADEQ policy 0154.000.

S12 = Surrogate recovery was low. Data reported per ADEQ policy 0154.000.

Calibration verification:

V6 = Data reported from one-point calibration criteria per ADEQ policy 0155.000.

Resampling:

X = Laboratory recommends resampling.