Analytical Feasibility Support Document for the Second Six-Year Review of Existing National Primary Drinking Water Regulations

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Executive Summary

The Safe Drinking Water Act (SDWA), as amended in 1996, requires the Environmental Protection Agency (EPA) to review and revise, if appropriate, existing National Primary Drinking Water Regulations (NPDWRs). Review involves consideration of five key elements, as appropriate: health effects, analytical and treatment feasibility, implementation-related issues, occurrence and exposure, and economic impact. This report addresses the analytical feasibility aspect of the review which has been based on the laboratories' analytical performance data generated as part of the EPA's certification program for drinking water laboratories. This analytical feasibility assessment is based jointly on the recent analytical performance data collected during the second six year review as well as on earlier data collected during the first six year review. Efforts are also made to determine if the analytical performance assessments based on the laboratory data are supported by the approval of improved methods or revision of existing methods since the last review. The goal is to create a comprehensive document that addresses all regulated chemical analytes for which data are available.

Analytical Performance Assessment Based on the Laboratories' Analytical Performance Data

The Practical Quantitation Level (PQL) assessments are presented by way of linear regressions that plot laboratory passing rate versus true concentration. The PQL is defined as "the lowest achievable level of analytical quantitation during routine laboratory operating conditions within specified limits of precision and accuracy" (50 FR 46902, November 13, 1985). It has been set at the concentration where 75% of laboratories are predicted to meet acceptance criteria. PQL determination can be a useful tool in assessing whether promulgated PQLs can be reduced as a result of improved laboratory performance over time.

The Six-Year 1 laboratory passing rate data were generated during the EPA-administered Performance Evaluation (PE) Program from the late 1980s through late 1999, at which time, the laboratory performance program became privatized under the direction of the National Environmental Laboratory Accreditation Conference (NELAC; now The NELAC Institute - TNI). The current report includes PQL assessments for all available Six-Year 1 PE data and more recent laboratory passing rate data that were generated under the TNI Proficiency Testing (PT) program. Environmental Resource Associates (ERA) was the only provider of PT samples to the testing laboratories that was willing to share PT data with EPA. ERA estimates that during the period from late 1999 through 2006, they have accounted for approximately 50% of all PT results nationwide.

For non-radionuclides, the ERA dataset encompasses the period from late 1999 through 2004. ERA data for radionuclides were generated from 2002-2006. Note that for the radionuclides, limitations of laboratory performance at low concentrations is generally not an issue, as PQLs can be lowered, if necessary, by increasing sample volume and/or radiological analysis duration. Thus, though the radionuclide PT data are evaluated in this report (see Appendix B) for completeness, no conclusions are drawn regarding changes to PQLs.

The results for the regulated analytes are broken down into two categories based on the limitation of the PQL for setting the Maximum Contaminant Level (MCL) at the time of

promulgation: 1) analytes with MCL equal to the current PQL, and thus the PQL is limiting; or 2) analytes with MCL greater than the current PQL and thus it is technically feasible to reduce an MCL. PQL assessment for this second group of analytes can indicate the potential for MCL reduction beyond the current PQL. Using this as a framework, the PQL assessments based on the PT/PE data were made and are presented in this report for a total of 66 analytes. Four analytes could not be analyzed for the reasons stated: acrylamide, epichlorohydrin, 2,3,7,8-TCDD (dioxin) lacked PE/PT data, and chlorite has no PQL. The recommendations for PQL assessment are as follows:

- For 25 analytes, the PQL is equal to the MCL and hence the PQL is limiting. Of these 25 analytes, PQL assessment indicates that:
  - The PQL can be reduced for 9 analytes: benzene, carbon tetrachloride, chlordane, 1,2-dichloroethane, 1,2-dichloropropane, hexachlorobenzene, tetrachloroethylene, 1,1,2-trichloroethane, and trichloroethylene;
  - The PQL might be considered for reduction for 8 analytes: alachlor, antimony, 1,2-dibromo-3-chloropropane (DBCP), heptachlor, heptachlor epoxide, lindane, toxaphene, and vinyl chloride; and
  - PT data do not support reduction of the PQL or data are inconclusive or insufficient to reach a conclusion for 8 analytes: benzo(a)pyrene, bromate, dichloromethane, di(2-ethylhexyl)phthalate (DEHP), ethylene dibromide (EDB), pentachlorophenol, polychlorinatedbiphenyls (PCBs), and thallium.

- For 41 analytes, the PQL is less than the MCL; hence the MCL can be reduced. For these 41 analytes, PQL assessment indicates that:
  - The PQL can be reduced further (beyond the current PQL) for 11 analytes: barium, 1,4-dichlorobenzene, *cis*-1,2-dichloroethylene, 1,1-dichloroethylene, ethylbenzene, monochlorobenzene, nitrite, styrene, toluene, 1,2,4-trichlorobenzene, and 1,1,1-trichloroethane;
  - The PQL might be considered for further reduction for 6 analytes: atrazine, carbofuran, *trans*-1,2-dichloroethylene, hexachlorocyclopentadiene, methoxychlor, and 2,4,5-TP (Silvex); and
  - PE/PT data do not support further reduction of the PQL or data are inconclusive or insufficient to reach a conclusion for 24 analytes: arsenic, beryllium, cadmium, chromium, copper, cyanide, dalapon, 1,2-dichlorobenzene, 2,4-dichlorophenoxyacetic acid (2,4-D), di(2-ethylhexyl)adipate, dinoseb, diquat, endothall, endrin, fluoride, glyphosate, lead, mercury, nitrate, oxamyl, picloram, selenium, simazine, and xylenes.

Analytical Performance Assessment Based on New Methods Approval/Revision of Existing Methods

For those analytes with new methods, improved analytical performance (and hence, possible reduction of the PQL) may be suggested by lower detection limits from new methods. The existence of new methods with lower detection limits may not directly translate to improved

analytical performance, however. It is possible that only a small number of laboratories will use a new method, or it may take time for the method to be utilized to its full effectiveness.

Improved analytical performance (and hence, possible PQL reduction) may also be supported by the approval and availability of new or revised analytical methods with lower MDLs (note that in some analytical methods, the term DL is used instead of MDL, but these quantities are essentially equivalent). For 15 regulated analytes, new methods have been approved. For 12 of these analytes (bromate, carbofuran, 2,4-D, dalapon, dinoseb, fluoride, mercury, nitrite, oxamyl, pentachlorophenol, picloram and 2,4,5-TP), the MDLs are lower (or their range of MDLs includes values that are lower) than those from earlier-approved methods. In two cases (atrazine and cyanide), the methods are proprietary and are not readily available; hence, MDLs are not known, and comparison cannot be made. Lastly, in one case (nitrate), new or revised methods do not indicate a lower MDL.

Overall, the results show that only for 20 of the 66 analytes evaluated in this report, laboratory performance data was sufficient to qualitatively conclude that the PQL can be lowered. For 14 analytes there were indications for a lower PQL but for the remaining 32 either the data were inconclusive or insufficient to draw a conclusion. Furthermore, for only 3 of the 20 analytes for which PQL could be lowered, the improved analytical performance was supported by new and improved methods approval. For others, there was either no correlation or correlation could not be made due to insufficient data.

Abbreviations and Acronyms

µg/L	Micrograms per liter
mg/L	Milligrams per liter
Der.	Derivatization
ACVT	Automated Cold Vapor Technique
AES	Atomic Emission Spectrometry
APG	Analytical Products Group, Inc.
ASTM	American Society for Testing and Materials
CASRN	Chemical Abstracts Service Registry Number
CBI	Confidential Business Information
CCGC	Capillary Column Gas Chromatography
CUV	Coupled Ultraviolet
CVAAS	Cold Vapor Atomic Absorption Spectrometry
CVAFS	Cold Vapor Atomic Fluorescence Spectrometry
CFR	Code of Federal Regulations
2,4-D	2,4-Dichlorphenoxyacetic acid
DAI	Direct Aqueous Injection
DBCP	1,2-Dibromo-3-chloropropane
DCBP	Decachlorobiphenyl
DEHA	Di(2-ethylhexyl)adipate
DEHP	Di(2-ethylhexyl)phthalate
DL	Detection Limit
ECD	Electron Capture Detection
ECGC	Electron Capture Gas Chromatography
EDB	Ethylene Dibromide (1,2-dibromoethane)
ELCD	Electrolytic Conductivity Detector
EPA	United States Environmental Protection Agency
ERA	Environmental Resource Associates (name changed to ERA - A Waters Company, effective July 10, 2009)
FD	Fluorescence Detection
FR	Federal Register
GC	Gas Chromatography
GFAA	Graphite Furnace Atomic Absorption
HPLC	High Performance Liquid Chromatography
IC	Ion Chromatography
ICP	Inductively Coupled Plasma
ICR	Information Collection Request
I-EE	Ion-Exchange Extraction
I-ELSE	Ion-Exchange Liquid/Solid Extraction
IMDL	Interlaboratory Method Detection Limit
LLE	Liquid/Liquid Extraction
LLED	Liquid/Liquid Extraction and Derivatization
LLMED	Liquid/Liquid Microextraction and Derivatization
L/S	Liquid/Solid
LSE	Liquid/Solid Extraction

MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MDL	Method Detection Limit
ME	Microextraction
ML	Minimum Level
MLPD	Multi-Laboratory Performance Data
MRL	Minimum Reporting Level
MS	Mass Spectrometry
NDWAC	National Drinking Water Advisory Council
NELAC	National Environmental Laboratory Accreditation Conference
NERL	National Exposure Research Laboratory
N-PD	Nitrogen-Phosphorus Detector
NPDWR	National Primary Drinking Water Regulation
OLS	Ordinary Least Squares
PCB	Polychlorinatedbiphenyl
PDAUVD	Photodiode Array Ultraviolet Detector
PE	Performance Evaluation
PID	Photoionization Detector
PQL	Practical Quantitation Level
PT	Proficiency Testing
QA	Quality Assurance
QC	Quality Control
RDL	Regulatory Detection Limit
SD	Standard Deviation(s)
SDWA	Safe Drinking Water Act
TNI	The NELAC Institute
TT	Treatment Technique
2,4,5-TP	2-(2,4,5-Trichlorophenoxy)propionic acid
U.S.C.	United States Code
USEPA	United States Environmental Protection Agency
UVD	Ultraviolet Detection
VOC	Volatile Organic Compound

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1.0 Introduction

The Safe Drinking Water Act (SDWA), as amended in 1996, requires the Environmental Protection Agency (EPA) to review and revise, if appropriate, existing National Primary Drinking Water Regulations (NPDWRs). As part of the review, EPA developed a protocol document (USEPA, 2003a) that describes the process and strategy EPA uses to review existing NPDWRs in order to meet its statutory requirement. The protocol was based on the recommendations from the National Drinking Water Advisory Council (NDWAC), internal Agency deliberations, and discussions with the diverse stakeholders involved in drinking water and its protection. The protocol enables EPA to target those NPDWRs that are the most appropriate candidates for revision and thus efficiently utilize its resources. As part of the review, and where appropriate, EPA reviews the following key technical elements to make decisions regarding regulatory changes: health effects assessments; technology assessments (analytical feasibility and treatment technology); other regulatory revisions (e.g., monitoring and reporting); occurrence and exposure analyses; and available economic information. This document discusses the analytical feasibility aspect of the second Six-Year Review.

Analytical feasibility assessment is one of the key components of regulations review because the analytical feasibility may have been the limiting factor in setting the Maximum Contaminant Level (MCL) for some of the existing NPDWRs or because the health effects reviews may indicate a potential change in the Maximum Contaminant Level Goal (MCLG). This document examines analytical method performance over time by determining if the Practical Quantitation Levels (PQLs) may have changed since promulgation. The PQL is defined as "the lowest achievable level of analytical quantitation during routine laboratory operating conditions within specified limits of precision and accuracy" (50 FR 46902, November 13, 1985) and is derived from the laboratory accreditation studies performed as part of the drinking water laboratory certification program. Data from these studies was referred to as Performance Evaluation (PE) data while the program was under EPA oversight until 1999, and as Proficiency Testing (PT) data when the program was privatized with the National Environmental Laboratory Accreditation Conference (NELAC) providing oversight.

Analytical method performance is also assessed by comparing the Method Detection Limits (MDLs) of the analytical methods which were available at the time of promulgation to those of the currently approved methods. The purpose is to determine if PQL changes based on the PE/PT data are also supported by the approval and availability of new/improved methods to the testing laboratories.

For the first Six-Year Review, EPA performed PQL assessments for 40 analytes that met either of the following two criteria:

- First, for those contaminants where the MCL is currently limited by analytical feasibility (i.e., the MCL is set at the PQL) and the MCLG is still appropriate, EPA evaluated the currently approved methods for those contaminants and available PE data to determine whether it might be possible to lower the PQL and hence set an MCL that is closer to the MCLG.

- The second circumstance under which EPA re-evaluated the PQL was for contaminants identified under the Six-Year health effects technical review as having potential changes to their MCLG. Because the information for the health effects review was not completely available at the time the analytical methods analysis began, EPA took a broad-brush approach and included a number of contaminants that may not have needed a reassessment of their analytical feasibility.

In this document, PQL assessments are presented for all regulated contaminants for which data was available, using both the original data from the first Six-Year Review (all available data for regulated analytes; not just the 40 prioritized for Six-Year 1) and the new data for the second Six-Year Review, and on approval and availability of new and improved methods. The goal is to create a comprehensive document regarding laboratory analytical performance for regulated analytes based on available approaches.

During the course of this study, EPA noted that for the Six Year Review 2 it did not have sufficient data or the data was inconclusive to actually recalculate any PQLs for the reasons discussed later in the report. PE/PT results were either not available below the current PQL, the concentrations of interest, or the results were inconclusive/inadequate regarding a potential to revise PQL. This limited EPA to use the data only to indicate a potential trend (qualitative assessment) for PQL revision. In view of this, EPA explored the use of two other sources of information regarding the potential to revise PQL: the minimum reporting levels (MRLs) in the Six Year Review Information Collection Request (ICR) data set and the MDL multiplier approach. These approaches and their results are discussed in a separate document prepared by EPA entitled: Development of Estimated Quantitation Levels for the Six-Year Review of National Primary Drinking Water Regulations (USEPA, 2009).

2.0 Background

2.1 Relationship Between SDWA Requirements and Analytical Methods

Section 1401(1)(C)(i) of SDWA (as amended in 1996); 42 U.S.C. § 300f(1)(C)(i), states that an MCL for a national primary drinking water regulation is set "if, in the judgment of the Administrator, it is economically and technologically feasible to ascertain the level of such contaminant in water in public water systems." According to SDWA, NPDWRs include "criteria and procedures to assure a supply of drinking water which dependably complies with such maximum contaminant levels; including accepted methods of quality control and testing procedures to insure compliance with such levels" [§1401(1)(D) of SDWA; 42 U.S.C. § 300f(1)(D)]. Except in certain circumstances, EPA is to set the MCL as close to the MCLG as is feasible with the best available technologies (Section 1412 (b)(4)(B)) of SDWA. The MCLs for several SDWA contaminants were set at levels higher than MCLGs due to the limits of the analytical feasibility at that time. Since the promulgation of pre-1996 SDWA NPDWRs, newer analytical methods and updated methods for measuring SDWA contaminants have been approved. The approval of newer analytical techniques may have provided laboratories with the analytical capability to measure some contaminants at lower levels. In addition, some

laboratories may have improved in their ability to measure at lower levels using the same methods that were originally promulgated.

In considering analytical methods for use in compliance monitoring, EPA evaluates the overall sensitivity of the techniques. In previous regulations, EPA has used two measures of analytical capability, the MDL and the PQL.

- The MDL is a measure of method sensitivity. The MDL is defined at 40 CFR Part 136 Appendix B as "the minimum concentration of a substance that can be reported with 99% confidence that the analyte concentration is greater than zero." MDLs can be operator, method, laboratory, and matrix-specific. Due to normal day-to-day and run-to-run analytical variability, MDLs may not be reproducible within a laboratory or between laboratories. The regulatory significance of the MDL is that EPA uses the MDL to determine when a contaminant is considered to be detected and it can be used to calculate a PQL for that contaminant.

- The PQL is defined as "the lowest achievable level of analytical quantitation during routine laboratory operating conditions within specified limits of precision and accuracy" (56 FR 46902, November 13, 1985). The Agency has used the PQL to estimate or evaluate the minimum concentration at which most laboratories can be expected to reliably measure a specific chemical contaminant during day-to-day analyses of drinking water samples. The PQL is a means of integrating information on the performance of the approved analytical methods into the development of a drinking water regulation (52 FR 25690, July 8, 1987). The PQL incorporates the following (50 FR 46880, November 13, 1985; 52 FR 25690, July 8, 1987; 54 FR 22062, May 22, 1989):

  - quantitation,
  - precision and bias,
  - normal operations of a laboratory, and
  - the fundamental need to have a sufficient number of laboratories available to conduct compliance monitoring analyses.

In some cases, the quantitation level for a particular analyte may have been the limiting factor in the determination of the MCL for that analyte. This could be especially true for contaminants with MCLGs of zero. In addition, there are several SDWA contaminants with non-zero MCLGs that have their MCL set at the PQL.

2.2 PQL Determination Methods for the SDWA Contaminants

Historically, EPA has used two main approaches to determine a PQL for SDWA analytes. One approach (and the preferred approach) used data from laboratory Performance Evaluation (PE studies, now called PT or Proficiency Testing studies). Although the primary use of the PE/PT data was for EPA's laboratory certification, the data were also used as a secondary data source for many years to develop PQLs when the spike concentrations were in the appropriate concentration range. The derivation of the PQL involved determining the

concentration of an analyte at which 75% of all participating laboratories achieved results within a specified range around the spike value.

A PQL derived in such a manner is considered a stringent target for routine laboratory performance because:

- PE/PT samples are prepared in reagent water and therefore do not contain the matrix interferences that may occur in field samples.

- Laboratories analyze only a small number of samples for the study and are aware that the samples are for the purposes of performance evaluation (*i.e.*, they are not "blind" samples).

In deriving a PQL from the laboratory performance data, the Agency typically sets a fixed percentage or 2 sigma (2 standard deviation) acceptance window around the known concentration (or spike value) of the samples. While the acceptance limits for inorganics typically range from 15 to 30% (40 CFR §141.23(k)(3)(ii)), the acceptance limits for organics generally range from 20 to 50% (40 CFR §141.24(f)(17)(i) and 40 CFR §141.24(h)(19)(i)). Several SDWA analytes have acceptance limits of 2 sigma (2 standard deviations). The percentage of laboratories achieving results within the specified acceptance window (y-axis) is plotted against the known spike concentration of the PE/PT samples (x-axis). Linear regression or graphical analysis is performed to determine the concentration at which 75% of the participating laboratories achieve acceptable results.

In the absence of PE/PT data, EPA has relied on the MDL multiplier method. In this approach, a PQL is calculated by multiplying the EPA-derived MDL by a factor of 5 or 10. The 5 or 10 multiplier is used to account for the variability and uncertainty that can occur at the MDL. The MDL multiplier method was mostly used in the early years of rule development for NPDWRs when insufficient PE/PT data were available. Once sufficient data became available, most of the PQLs that were developed using the MDL multiplier were validated using PE/PT data.

There are advantages and disadvantages for each of these approaches. Some of the advantages and disadvantages for these PQL derivation approaches are as follows:

(1) PE/PT data to derive a new PQL

Advantages -

- Uses inter-laboratory data collected at concentrations near the MCL.

- More representative of what methods are being used for the analysis of that contaminant.

- May be the preferred approach for contaminants with MCLGs of zero because MCLs for these contaminants are set at the PQL and EPA strives to use their preferred approach in these cases.

Disadvantages -

- The PQL derived for each contaminant is affected by EPA's choice of "an acceptable level of precision." Acceptance criteria are not the same for all methods or contaminants. These levels have been set at ± 10% or more (see Exhibit 2).

- PT data from 1999 and earlier are obtained from varying numbers of laboratories; hence some passing rates may represent dozens of laboratories, while others may represent very few laboratories. Despite this, linear regression treats each national passing rate equally. Further, passing rates of near 100% can influence the regression line in such a manner as to "mask" low passing rates below 75%. For example, if at higher concentrations the passing rates are all at or near 100%, but at lower concentrations near the PQL there are several passing rates well below 75%, the resultant regression line may still predict greater than 75% of laboratories to pass over the entire range of true (or spike) concentrations even though the data near the PQL demonstrate that this may not be the case.

- During Six Year 1, some stakeholders felt that the PQL may be influenced by the set of data used (i.e., using data from all laboratories as opposed to only using data from EPA State and Regional laboratories, which was the case with Six Year 1 data).

- Some stakeholders felt that the laboratory performance may be skewed because PE/PT samples may be treated as special samples that are critical for laboratory certification.

- The derivation of PQLs from laboratory performance data is a resource- and time-intensive process.

- PE/PT data are generated as part of the drinking water laboratory certification program which is designed to test precision and accuracy around the MCL. Therefore, concentrations representing laboratory performance at orders of magnitude below the current MCL are generally not represented.

(2) The MDL-Multiplier Approach

Advantage

- It is a relatively easy and straightforward process

Disadvantages

- A PQL derived from the MDL using a multiplier to account for laboratory variability and uncertainty may not be practical or realistic.

- Several methods with varying MDLs may be approved for the same contaminant and it can be difficult to decide which Method/MDL to select for the PQL calculation.

2.3 Operational Details of the PE/PT Programs

PE studies were an integral part of EPA's certification program for drinking water laboratories for over 20 years (thru 1999). Historically, performance studies were conducted semi-annually by EPA for all current and proposed drinking water contaminants. Although the studies were conducted semi-annually, for certification purposes, laboratories were only required to demonstrate acceptable performance once a year (40 CFR 141.23(k)(3) and 141.24(f)(17)). PE study samples (spike samples) were sent to all laboratories that conduct drinking water analyses, including utility laboratories, commercial laboratories, and State and EPA Regional laboratories. Samples or sample concentrates that were analyzed, contained all SDWA analytes and analytes that were being considered for regulation under the SDWA.

As part of these studies, EPA's National Exposure Research Laboratory (NERL) in Cincinnati, Ohio, sent participating laboratories a set of stable sample concentrates in sealed glass ampules, a data reporting form, and appropriate instructions. Each laboratory produced the study samples by diluting a measured quantity of the specific concentrates to volume with reagent water. The laboratory then analyzed the samples using an EPA-approved method of their choice. The completed reporting form was sent to EPA for evaluation, the data were carefully reviewed per Quality Assurance/Quality Control (QA/QC) procedures, entered into a database, and a fully detailed report was then returned to each laboratory. The responsible State or EPA office contacted those laboratories that demonstrated potential problems.

Performance Evaluation studies are no longer performed by EPA. In December 1999, the PT program was privatized, with NELAC providing oversight to what is now referred to as the PT program. NELAC is a cooperative association of State and Federal agencies and, in 2006, NELAC and the Institute for National Environmental Laboratory Accreditation combined to form The NELAC Institute (TNI). For the purposes of this document, "NELAC" is used to represent both NELAC and TNI. PT data services under the NELAC's program are provided by private companies that prepare and provide PT samples (spiked at concentrations in accordance with NELAC policies) to analytical laboratories as part of maintaining laboratory accreditation. Approximately 10-12 such PT providers (e.g., Environmental Resource Associates – ERA) exist nationwide. PT providers also compile the results of the PT analyses for use by NELAC.

Privatization of the PT program made it harder for the Agency to obtain PT data. As a result, during the second six year review, only one PT provider (ERA) was willing to share national pass/fail rates with EPA (see Section 2.4 for further discussion). ERA provided EPA with general summary statistics and national failure rates; however, no information regarding laboratory identification was shared, thereby maintaining laboratory confidentiality. Depending on the analyte and/or concentration, the PT data from ERA may represent more than 70 laboratories at any single concentration. According to ERA personnel, since December 1999, when the PT process was privatized, ERA has accounted for approximately 50% of all PT results nationwide.

A laboratory either passes or fails for each analyte based upon the Acceptance Limits (NELAC now refers to these as Acceptance Criteria) for each analyte. Acceptance Criteria can be percentage based (*e.g.*, $\pm$ 30% of the spiked, or true value), standard deviation-based (*e.g.*, $\pm$ 2

standard deviations, as described in Section 5.2), or based on average and range of replicate analyses (radionuclides only). In certain cases (*e.g.*, volatile organic compounds - VOCs) the acceptance criteria may differ depending on the concentration (*e.g.*, $\pm$ 40% for spike concentrations <10 μg/L and $\pm$ 20% for concentrations $\geq$ 10 μg/L).

The key differences between EPA's PE program and the current NELAC PT program in terms of the utility of the data for PQL assessment are described in Exhibit 1. For PQL assessment, the most significant implication of the differences between the two programs is that, while more laboratories and more spiking concentrations are represented in the NELAC PT data, fewer analytes have data at or below their PQL. As the PE/PT programs were designed for the purpose of laboratory accreditation, both programs exhibited shortcomings with respect to the use of the data for PQL assessment. As far as the data from the NELAC PT program is concerned, EPA would have benefitted if a) data from all PT providers were available, and b) additional spike concentrations for PT samples were selected below the current PQLs.

Exhibit 1: Summary of Differences Between EPA's PE Program and NELAC's PT Program[1]

Laboratory Accreditation Program Feature	During EPA PE Period	During NELAC PT Period
Number of Laboratories Participating	Wide range but typically 10 - 60 laboratories per concentration	Wide range but typically 10 - 70 laboratories per concentration
Types of Laboratories Participating	EPA Regional and State laboratories - Narrow spectrum of laboratories and relatively uniform in performance	Public Water System, academic and private with some EPA regional and State laboratories - Broad spectrum of laboratories with wide performance range
Number of True (Spike) Concentrations Evaluated/ analyte	Approximately 10 - 30	59 - 60
Number of True (Spike) Concentrations Below the PQL	Of the 66 analytes which had PE data for PQL assessment, 39 analytes had data $\leq$ the current PQL[2]	Of the 66 analytes which had PT data for PQL assessment, 22 analytes had data $\leq$ the current PQL
Amount of Data Available to EPA for PQL Assessment (% of the National PT data)	Percentage unknown	Approximately 50% of the national PT data
Data Broken Down by Analytical Method?	Yes	No

1 Excludes radionuclides

2 Passing rates at or below the PQL could not be calculated for dalapon, DEHA, endothall or simazine because the NELAC regression coefficients that are used to calculate national passing rates (see Section 5.2) are not valid at or below the PQL for these four analytes. As a result only 35 of the 39 analytes have passing rates at or below the PQL

2.4 Efforts Made to Obtain PT Data

The following is a summary of efforts that were made by EPA to obtain nationally-representative PT data from the private firms that now provide PT services and/or directly from NELAC:

EPA first searched the websites of various PT providers to find out if the laboratory performance data was posted on-line. Although, some PT providers (e.g., APG of Belpre, OH) posted various PT statistics online, it did not include the passing/failing rates at each spike concentration which was needed for PQL assessment. At that point, requests for data were sent or discussed with PT Providers, members of the NELAC PT Committee and members of the NELAC PT Board. Only basic information was requested: the contaminant name being tested; the concentration of the PT sample; the number of labs in the PT round (no names or IDs, just the total number); and the number of labs that passed and/or number of labs that failed at each concentration. In all contacts, it was made clear that EPA needed just this basic information and would not require the identity of any individual lab, etc., and would not require the disclosure of what could be considered confidential business information (CBI).

After multiple attempts, it was made clear by NELAC and the PT providers contacted that the data were considered to be CBI and therefore, could not be released. One exception to this was the PT provider ERA of Arvada, Colorado. ERA willingly and quickly sent their failure rates, true concentrations and basic summary statistics to EPA in August 2004. Note that ERA provided summary statistics and national failure rates as cited above, and no information regarding laboratory identification or other CBI was provided by ERA. Although APG also provided to EPA many hundreds of pages of analyzed data from the PT program across the country, it did not include the passing/failing rates at each concentration that were needed for PQL assessment.

3.0 Representativeness of Available PT Data

During the period when the available Six-Year 2/ERA data were generated, there were approximately 10-12 companies that provided PT data services nationwide (a review of the TNI website indicates that that number is smaller in 2009). Only one of these providers, ERA, was willing to provide their pass/fail rates to EPA. According to ERA personnel, since December 1999, when the PT process was privatized, they account for approximately 50% of all PT results nationwide. As described in Section 2.4, substantial efforts were made to obtain additional PT data to no avail. The assessments made in this report are based on PT data that were available, and this limitation is recognized. The refusal of other PT providers/NELAC to provide results raises some questions about the validity of the data set available to EPA. In other words, is the available data set sufficient to perform the assessments herein? The issues can be divided into three broad areas: bias, precision, and the regression model.

3.1 Bias

The refusal of providers other than ERA to provide data introduces potential non-response bias. If ERA procedures and results are different from that of other providers, the data may not be representative. Because no data are available from the other providers, it is difficult to quantify the potential bias. EPA considered options to evaluate the potential bias:

- Compare ERA's data to existing EPA data from the first Six-Year Review. EPA can test whether the percentage of laboratories passing is significantly different for individual analytes. However, because laboratory performance tends to improve over time, the degree of difference between ERA and other providers from Six-Year 1 becomes confounded.

- Collect and compare any available information about the procedures used by ERA and the other providers. This includes the processes used to identify and collect data from laboratories, quality control measures, and analytical approaches. Given the lack of response from other PT providers, this is not likely to be feasible.

EPA could use this information to evaluate the results from ERA. EPA could make subjective judgments about the potential sign and magnitude of the bias, and might also conduct sensitivity analyses to explore the potential impact of the non-response bias on the results.

3.2 Precision

For EPA to determine whether the available data are adequate for its analysis, EPA needed to establish data quality objectives for its analysis. An important data quality objective that is affected by the size of the sample is the precision of the estimates made with the sample. EPA could consider:

- **The margin of error the Agency is willing to tolerate**. The data are used to estimate regression parameters and a predicted regression line. A prediction interval can be estimated for the regression line. EPA could specify the size of this prediction interval, and might also want to consider the size of the confidence interval for each parameter of the regression model.

- **The confidence level the Agency requires for its estimates**. Confidence levels are usually expressed as $1-\alpha$, where α is the probability of a type I error. In other words, the probability that the prediction interval includes the true regression line is $1-\alpha$ percent. It is common to estimate either a 95 percent or 99 percent prediction interval.

Sampling is not the only source of uncertainty in the analysis, as is discussed in the next section. But EPA also considered the impact of the sample size on the regression error. This requires a subjective judgment regarding the level of error EPA is willing to tolerate; the Agency could then consider the impact the margin of error may have on the PQL determination through a sensitivity analysis.

3.3 The Regression Model

The PT data are used to estimate a simple linear regression using ordinary least squares (OLS). The regression of the percentage of laboratories passing at the spiked concentrations of an analyte is used in recalculation of the PQL. The standard results of the theory of linear regression is not entirely suited for sample surveys. The theory assumes the population is infinite, or that the observed finite population is drawn from an infinite superpopulation. This implies that sampling error is not the only source of error in a regression estimate. In fact, the error of the regression estimate consists of three parts, as discussed below.

The use of a sample is one potential source of error. It is useful to think of the regression as an estimate of the conditional mean of the percentage of laboratories passing. The average estimate of the mean across repeated samples will equal the true population mean. But the mean of a specific sample may differ from the population mean. The second source of error is in the estimated parameters of the regression model. The regression is of the form (Weisberg, 1985):

$$(1) \qquad Y_i = \beta_0 + \beta_1 x_i + \varepsilon_i$$

Where:

Y_i = Dependent variable for observation i. (e.g., laboratory passing rate for true concentration i);
β_0 = Intercept or constant which tells us the expected value of Y when X is equal to zero. (e.g., the observed concentration in a sample that has not been spiked);
β_1 = The slope, or the change in Y for a change in x;
x_i = The independent variable for observation i (the true concentration for observation i);
ε_i = Random error, or the difference between the observed passing rate and the model's prediction. It is due to random error or variables excluded from the model. (Which, ideally, are not correlated with the independent variables.)

It is estimated by:

$$(2) \qquad \hat{Y}_i = b_0 + b_1 x$$

Where:

$\hat{Y}_i$ = The fitted value predicted by the model.

The parameters b_0 and b_1 are unbiased estimates of β_0 and β_1 (the true parameters), but they can differ for a particular finite population.

Finally, the error of an individual prediction has a third component, the difference between the observed percentage for a true concentration and the average percentage for that concentration. This is ε_i in equation (1). The parts of the error are independent, so the variance of the prediction error is the sum of the three variances. Even if the regression estimate is based on the entire (finite) population, these last two components of error remain.

4.0 Identification of Regulated Analytes for PQL Assessment

For the first Six-Year analytical feasibility review, EPA focused on assessing whether the PQL had changed since promulgation for a subset of the 68 chemical NPDWRs. EPA identified and performed the analytical feasibility analysis for a total of 40 NPDWRs based on the priorities discussed in Section 1.0.

For the second Six-Year analytical feasibility review, EPA's goal is to create a comprehensive document that includes PQL assessments for all regulated analytes for which PT data are available. Exhibit 2 summarizes these analytes, along with their range of MDLs, current PQL, how the PQL was determined, their MCLG, MCL, and the current acceptance criteria for PT.

Exhibit 2: U.S. EPA National Primary Drinking Water Standards and Related Information[1]

Analyte CASRN	EPA MDL or Range (mg/L)[2]	PQL (mg/L)	How PQL Determined?	MCLG (mg/L)	MCL or TT (mg/L)	Acceptance Criteria
Acrylamide 79-06-1	N/A	N/A	N/A	Zero	TT[3]	N/A
Alachlor 15972-60-8	0.000005 - 0.000225	0.002	IMDL x 10	Zero	0.002	± 45%
Antimony 7440-36-0	0.00002 - 0.0008	0.006	PE Data	0.006	0.006	± 30%
Arsenic 7440-38-2	0.0001 - 0.008	0.003	PE Data	Zero	0.010	± 30%
Atrazine 1912-24-9	0.000003 - 0.0024	0.001	PE Data	0.003	0.003	± 45%
Barium 7440-39-3	0.00004 - 0.001	0.15	PE Data	2	2	± 15%
Benzene 71-43-2	0.00001 - 0.00004	0.005	RDL x 10	Zero	0.005	± 20% or 40%
Benzo[a]pyrene 50-32-8	0.000016 - 0.00023	0.0002	PE Data	Zero	0.0002	Mean ± 2 Std Dev
Beryllium 7440-41-7	0.00002 - 0.0003	0.001	PE Data	0.004	0.004	± 15%
Bromate 15541-45-4	0.00012 - 0.00144	0.01	N/A	Zero	0.01	Mean ± 2 Std Dev (changed to ± 30%, 2007)
Cadmium 7440-43-9	0.00003 - 0.001	0.002	PE Data	0.005	0.005	± 20%
Carbofuran 1563-66-2	0.000043 - 0.00052 (note: lower bound = DL)	0.007	IMDL x 10	0.04	0.04	± 45%
Carbon tetrachloride 56-23-5	0.000002 - 0.00021	0.005	PE Data	Zero	0.005	± 20% or 40%
Chlordane 57-74-9	0.000001 – 0.00022[4]	0.002	IMDL x 10	0.002	0.002	± 45%

Analyte CASRN	EPA MDL or Range (mg/L)[2]	PQL (mg/L)	How PQL Determined?	MCLG (mg/L)	MCL or TT (mg/L)	Acceptance Criteria
Chlorite 7758-19-2	0.00045 - 0.01	N/A	N/A	0.8	1.0	±30%
Chromium (total) Cr III: 16065-83-1 Cr VI: 18540-29-9	0.00008 - 0.004	0.01	PE Data	0.1	0.1	± 15%
Copper 7440-50-8	0.00001 - 0.003	0.05	PE Data	1.3	TT[5] Action level 1.3	± 10%
Cyanide (as free cyanide) 57-12-5	N/A	0.1	PE Data	0.2	0.2	± 25%
Dalapon 75-99-0	0.000024 - 0.0013	0.01	MDL x 10	0.2	0.2	Mean ± 2 Std Dev
1,2-Dibromo-3-chloropropane (DBCP) 96-12-8	0.000006 - 0.00001	0.0002	IMDL x 10	Zero	0.0002	± 40%
1,2-Dichlorobenzene (*o*-Dichlorobenzene) 95-50-1	0.00002 - 0.00005	0.005	MDL survey and PE Data	0.6	0.6	± 20% or 40%
1,4-Dichlorobenzene (*p*-Dichlorobenzene) 106-46-7	0.00001 - 0.00004	0.005	PE Data	0.075	0.075	± 20% or 40%
1,2-Dichloroethane (Ethylene dichloride) 107-06-2	0.00002 - 0.00006	0.005	PE Data	Zero	0.005	± 20% or 40%
1,1-Dichloroethylene 75-35-4	0.00004 - 0.00012	0.005	PE Data	0.007	0.007	± 20% or 40%
cis-1,2-Dichloroethylene 156-59-2	0.00001 - 0.00012	0.005	MDL survey and PE Data	0.07	0.07	± 20% or 40%
trans-1,2-Dichloroethylene 156-60-5	0.00003 - 0.00006	0.005	MDL survey and PE Data	0.1	0.1	± 20% or 40%
Dichloromethane (Methylene chloride) 75-09-2	0.00001 - 0.00009	0.005	PE Data	Zero	0.005	± 20% or 40%
2,4-Dichlorophenoxyacetic acid (2,4-D) 94-75-7	0.000055 - 0.0013	0.005	Raised to near MCL	0.07	0.07	± 50%
1,2-Dichloropropane 78-87-5	0.00001 - 0.00004	0.005	MDL survey and PE Data	Zero	0.005	± 20% or 40%
Di(2-ethylhexyl)adipate (DEHA) 103-23-1	0.00009 - 0.01182	0.006	MDL x 10	0.4	0.4	Mean ± 2 Std Dev
Di(2-ethylhexyl) phthalate (DEHP) 117-81-7	0.00046 - 0.00225	0.006	PE Data	Zero	0.006	Mean ± 2 Std Dev
Dinoseb 88-85-7	0.000081 - 0.0015	0.002	MDL x 10	0.007	0.007	Mean ± 2 Std Dev
Diquat 85-00-7	0.00072	0.004	PE Data	0.02	0.02	Mean ± 2 Std Dev
Endothall 145-73-3	0.0007 - 0.00179	0.09	MDL x 10	0.1	0.1	Mean ± 2 Std Dev

Analyte CASRN	EPA MDL or Range (mg/L)[2]	PQL (mg/L)	How PQL Determined?	MCLG (mg/L)	MCL or TT (mg/L)	Acceptance Criteria
Endrin 72-20-8	0.000002 - 0.00034	0.0001	MDL x 10	0.002	0.002	± 30%
Epichlorohydrin 106-89-8	N/A	N/A	N/A	Zero	TT[3]	N/A
Ethylbenzene 100-41-4	0.00001 - 0.00006	0.005	MDL survey and PE Data	0.7	0.7	± 20% or 40%
Ethylene dibromide (EDB) 106-93-4	0.000007 - 0.000032	0.00005	IMDL x 5	Zero	0.00005	± 40%
Fluoride 16984-48-8	0.009 - 0.01	0.5	PE Data	4	4	± 10%
Glyphosate 1071-83-6	0.00599 - 0.006	0.06	PE Data	0.7	0.7	Mean ± 2 Std Dev
Heptachlor 76-44-8	0.0000015 - 0.00015	0.0004	IMDL x 10	Zero	0.0004	± 45%
Heptachlor epoxide 1024-57-3	0.000001 - 0.000202	0.0002	IMDL x 10	Zero	0.0002	± 45%
Hexachlorobenzene 118-74-1	0.000001 - 0.00013	0.001	PE Data	Zero	0.001	Mean ± 2 Std Dev
Hexachlorocyclopenta-diene 77-47-4	0.000004 - 0.00016	0.001	PE Data	0.05	0.05	Mean ± 2 Std Dev
Lead 7439-92-1	0.00002 - 0.0007	0.005	PE Data	Zero	TT[5], Action level = 0.015	± 30%
Lindane 58-89-9	0.000002 - 0.00015	0.0002	MDL x 10	0.0002	0.0002	± 45%
Mercury (Inorganic) 7439-97-6	0.0000018 - 0.0002	0.0005	PE Data	0.002	0.002	± 30%
Methoxychlor 72-43-5	0.000003 - 0.00096	0.01	Raised to near MCL	0.04	0.04	± 45%
Monochlorobenzene (Chlorobenzene) 108-90-7	0.00001 - 0.00004	0.005	MDL x 10	0.1	0.1	± 20% or 40%
Nitrate (as N) 14797-55-8	0.002 - 0.008	0.4	PE Data	10	10	± 10%
Nitrite (as N) 14797-65-0	0.001 - 0.004	0.4	PQL for nitrate	1	1	± 15%
Oxamyl (Vydate) 23135-22-0	0.000044 - 0.00086	0.02	MDL x 10	0.2	0.2	Mean ± 2 Std Dev
Pentachlorophenol 87-86-5	0.000014 - 0.0016	0.001	PE Data	Zero	0.001	± 50%
Picloram 1918-02-1	Not Recovered - 0.001	0.001	DL x 10	0.5	0.5	Mean ± 2 Std Dev
Polychlorinated biphenyls (PCBs) as Decachlorobiphenyl (DCBP) 1336-36-3	As Decachlorobi-phenyl (DCBP): 0.00008 As Aroclors: 0.000012 - 0.015[6]	0.0005	PE Data	Zero	0.0005	± 100%

Analyte CASRN	EPA MDL or Range (mg/L)[2]	PQL (mg/L)	How PQL Determined?	MCLG (mg/L)	MCL or TT (mg/L)	Acceptance Criteria
Selenium 7782-49-2	0.0005 - 0.0079	0.01	PE Data	0.05	0.05	± 20%
Simazine 122-34-9	0.000008 - 0.0068	0.0007	MDL x 10	0.004	0.004	Mean ± 2 Std Dev
Styrene 100-42-5	0.00001 - 0.0001	0.005	MDL survey and PE Data	0.1	0.1	± 20% or 40%
2,3,7,8-TCDD (Dioxin) 1746-01-6	1.E-8 (note: value is an ML)	3×10^{-8}	MDL x 5	Zero	3×10^{-8}	Mean ± 2 Std Dev
Tetrachloroethylene 127-18-4	0.000002 - 0.00014	0.005	MDL survey and PE Data	Zero	0.005	± 20% or 40%
Thallium 7440-28-0	0.00001 - 0.0007	0.002	PE Data	0.0005	0.002	± 30%
Toluene 108-88-3	0.00001 - 0.00011	0.005	MDL survey and PE Data	1	1	± 20% or 40%
Toxaphene 8001-35-2	0.00013 - 0.0017	0.003	PE Data	Zero	0.003	± 45%
2,4,5-TP (Silvex) 93-72-1	0.000018 - 0.0018	0.005	Raised to near MCL	0.05	0.05	± 50%
1,2,4-Trichlorobenzene 120-82-1	0.00002 - 0.0002	0.005	MDL x 10	0.07	0.07	± 20% or 40%
1,1,1-Trichloroethane 71-55-6	0.000005 - 0.00008	0.005	DL x 10	0.2	0.2	± 20% or 40%
1,1,2-Trichloroethane 79-00-5	0.000012 - 0.0001	0.005	PE Data	0.003	0.005	± 20% or 40%
Trichloroethylene 79-01-6	0.000002 - 0.00019	0.005	PE Data	Zero	0.005	± 20% or 40%
Vinyl chloride 75-01-4	0.00001 - 0.00018	0.002	MLPD	Zero	0.002	± 40%
Xylenes (total) 1330-20-7	0.00001 - 0.00013	0.005	MDL survey and PE Data	10	10	± 20% or 40%

[1] Definitions

Chemical Abstracts Services Registry Number (CASRN)

Maximum Contaminant Level (MCL) – The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to MCLGs as feasible using the best available treatment technology and taking cost into consideration. MCLs are enforceable standards.

Treatment technique (TT) – A required process intended to reduce the level of a contaminant in drinking water.

DL = Detection Limit

IMDL = Interlaboratory Method Detection Limit

MDL = Method Detection Limit

ML = Minimum Level

MLPD = Multi-laboratory Performance Data

PQL = Practical Quantitation Level

RDL = Regulatory Detection Limit

[2] The MDLs and/or ranges were obtained from the individual analytical methods developed by EPA; non-EPA methods are not represented. Therefore, the MDL ranges presented may not represent the entire range of possible values. Methods can be found at the National Environmental Methods Index website (NEMI, 2008).

[3] Each water system must certify, in writing to the state (using third-party or manufacturers certification) that when it uses acrylamide and/or epichlorohydrin to treat water, the combination (or product) of dose and monomer level

does not exceed the levels specified, as follows: Acrylamide = 0.05% dosed at 1 mg/L (or equivalent); Epichlorohydrin = 0.01% dosed at 20 mg/L (or equivalent).

[4] MDL range for chlordane including α– and γ–chlordane and trans-nonachlor.

[5] Lead and copper are regulated by a Treatment Technique that requires systems to control the corrosiveness of their water. If more than 10% of tap water samples exceed the action level, water systems must take additional steps. For copper, the action level is 1.3 mg/L, and for lead is 0.015 mg/L. From 40 CFR Part 140 revised as of July 1, 2003, and EPA 816-F-03-016 June 2003 (USEPA, 2003b).

[6] MDL range for PCBs is from EPA Method 508A only. Other methods (505, 508.1 and 525.2) are screening methods and are not used for comparison to MCLs.

PQL values and the basis for their determination can be found at 50 FR 46880, November 13, 1985; 52 FR 25690. July 8, 1987; 53 FR 31516, August 18, 1988; 54 FR 22062, May 22, 1989; 55 FR 30370, July 25, 1990; 56 FR 3526, January 30, 1991; 57 FR 31776, July 17, 1992; 63 FR 69390, December 16, 1998; and EPA-815-R-00-010: "Analytical Methods Support Document For Arsenic In Drinking Water" (USEPA, 1999).

Acceptance criteria are available at: http://www.nelac-institute.org/ and at 40 CFR 141.24(f)(17)(i), 40 CFR 141.24(h)(19)(i)(B), 40 CFR 141.23(k)(3)(ii), 40 CFR 141.89(a)(1)(ii)(A), 40 CFR 141.89(a)(1)(ii)(B) and 40 CFR 141.131(b)(2)(ii).

5.0 Second Six-Year Review PQL Assessment Methodology

5.1 Data Available for PQL Assessment

Qualitative PQL assessments are based on all available laboratory performance data from Six-Year 1 and from one major PT provider (ERA) that was willing to share PT data with EPA. Exhibit 3 summarizes the availability of Six-Year 1 PE data and Six-Year 2 PT data and whether data are available at or below the PQL for each analyte. Having data below the PQL is considered to be important in concluding whether a PQL could be reduced, regardless of how high passing rates are above the PQL. For non-radionuclides, the ERA dataset encompasses the period from late 1999 through 2004. ERA data for radionuclides were generated from 2002-2006.

A review of new or revised analytical methods that have been approved by EPA for the analysis of regulated analytes was undertaken for the period of 2000 through 2007. The approval and availability of these analytical methods might indicate an improvement in laboratory analytical performance. New and updated methods for the regulated analytes are discussed in each contaminant profile in Section 6. A complete listing of new and updated analytical methods is provided in Appendix A.

Regression plots for radionuclides based on laboratory performance data obtained from ERA (for the period 2002-2006) are presented in Appendix B. Radionuclides were not included in the Six-Year 1 review and therefore, no data are available. Note that for the radionuclides, limitations of laboratory performance at low concentrations is generally not an issue, as PQLs can be lowered, if necessary, by increasing sample volume and/or radiological analysis duration. Thus, though the radionuclide PT data are evaluated in this report for completeness, no conclusions are drawn regarding changes in PQLs.

Exhibit 3: Availability of Six-Year 1 PE Data and Six-Year 2 PT Data for Regulated Analytes

Analyte CASRN	In Six-Year 1 Data?	In Six-Year 2 ERA Data 1999-2004?
Acrylamide 79-06-1	No	No
Alachlor 15972-60-8	Yes, some data ≤ PQL	Yes, no data ≤ PQL
Antimony 7440-36-0	Yes, some data ≤ PQL[1]	Yes, no data ≤ PQL
Arsenic 7440-38-2	Yes, some data ≤ PQL[1]	Yes, no data ≤ PQL
Atrazine 1912-24-9	Yes, some data ≤ PQL[1]	Yes, no data ≤ PQL
Barium 7440-39-3	Yes, some data ≤ PQL[1]	Yes, no data ≤ PQL
Benzene 71-43-2	Yes, some data ≤ PQL	Yes, some data ≤ PQL
Benzo[a]pyrene 50-32-8	Yes, no data ≤ PQL	Yes, no data ≤ PQL
Beryllium 7440-41-7	Yes, some data ≤ PQL	Yes, no data ≤ PQL
Bromate 15541-45-4	Yes, some data ≤ PQL	Yes, some data ≤ PQL
Cadmium 7440-43-9	Yes, no data ≤ PQL	Yes, no data ≤ PQL
Carbofuran 1563-66-2	Yes, some data ≤ PQL	Yes, no data ≤ PQL
Carbon tetrachloride 56-23-5	Yes, some data ≤ PQL	Yes, some data ≤ PQL
Chlordane 57-74-9	Yes, some data ≤ PQL	Yes, no data ≤ PQL
Chlorite 7758-19-2	Yes, but no PQL	Yes, but no PQL
Chromium (total) Cr III: 16065-83-1 Cr VI: 18540-29-9	Yes, no data ≤ PQL	Yes, no data ≤ PQL
Copper 7440-50-8	Yes, some data ≤ PQL[1]	Yes, no data ≤ PQL
Cyanide (as free cyanide) 57-12-5	Yes, only one datum = PQL; no data < PQL	Yes, no data ≤ PQL
Dalapon 75-99-0	Yes, some data ≤ PQL; passing rates below PQL could not be calculated [2]	Yes, no data ≤ PQL
1,2-Dibromo-3-chloropropane (DBCP) 96-12-8	Yes, some data ≤ PQL	Yes, some data ≤ PQL
1,2-Dichlorobenzene (*o*-Dichlorobenzene) 95-50-1	Yes, no data < PQL	Yes, no data ≤ PQL

Analyte CASRN	In Six-Year 1 Data?	In Six-Year 2 ERA Data 1999-2004?
1,4-Dichlorobenzene (*p*-Dichlorobenzene) 106-46-7	Yes, some data ≤ PQL	Yes, some data ≤ PQL
1,2-Dichloroethane (Ethylene dichloride) 107-06-2	Yes, some data ≤ PQL[1]	Yes, some data ≤ PQL
1,1-Dichloroethylene 75-35-4	Yes, no data ≤ PQL	Yes, some data ≤ PQL
cis-1,2-Dichloroethylene 156-59-2	Yes, no data ≤ PQL	Yes, some data ≤ PQL
trans-1,2-Dichloroethylene 156-60-5	Yes, no data ≤ PQL	Yes, some data ≤ PQL
Dichloromethane (Methylene chloride) 75-09-2	Yes, no data ≤ PQL	Yes, no data ≤ PQL
2,4-Dichlorophenoxyacetic acid (2,4-D) 94-75-7	Yes, some data ≤ PQL	Yes, no data ≤ PQL
1,2-Dichloropropane 78-87-5	Yes, no data ≤ PQL	Yes, some data ≤ PQL
Di(2-ethylhexyl)adipate (DEHA) 103-23-1	Yes, some data ≤ PQL; passing rates below PQL could not be calculated [2]	Yes, no data ≤ PQL
Di(2-ethylhexyl) phthalate (DEHP) 117-81-7	Yes, some data ≤ PQL	Yes, no data ≤ PQL
Dinoseb 88-85-7	Yes, no data ≤ PQL	Yes, no data ≤ PQL
Diquat 85-00-7	Yes, no data ≤ PQL	Yes, no data ≤ PQL
Endothall 145-73-3	Yes, some data ≤ PQL; passing rates below PQL could not be calculated [2]	Yes, no data ≤ PQL
Endrin 72-20-8	Yes, no data ≤ PQL[1]	Yes, no data ≤ PQL
Epichlorohydrin 106-89-8	No	No
Ethylbenzene 100-41-4	Yes, no data ≤ PQL	Yes, some data ≤ PQL
Ethylene dibromide (EDB) 106-93-4	Yes, no data ≤ PQL	Yes, no data ≤ PQL
Fluoride 16984-48-8	Yes, some data ≤ PQL	Yes, no data ≤ PQL
Glyphosate 1071-83-6	Yes, no data ≤ PQL	Yes, no data ≤ PQL
Heptachlor 76-44-8	Yes, some data ≤ PQL	Yes, no data ≤ PQL
Heptachlor epoxide 1024-57-3	Yes, some data ≤ PQL	Yes, no data ≤ PQL
Hexachlorobenzene 118-74-1	Yes, some data ≤ PQL	Yes, some data ≤ PQL
Hexachlorocyclopentadiene 77-47-4	Yes, some data ≤ PQL	Yes, no data ≤ PQL

Analyte CASRN	In Six-Year 1 Data?	In Six-Year 2 ERA Data 1999-2004?
Lead 7439-92-1	Yes, some data ≤ PQL[1]	Yes, no data ≤ PQL
Lindane 58-89-9	Yes, some data ≤ PQL[1]	Yes, no data ≤ PQL
Mercury (Inorganic) 7439-97-6	Yes, no data ≤ PQL	Yes, no data ≤ PQL
Methoxychlor 72-43-5	Yes, some data ≤ PQL	Yes, no data ≤ PQL
Monochlorobenzene (Chlorobenzene) 108-90-7	Yes, no data ≤ PQL	Yes, some data ≤ PQL
Nitrate (as N) 14797-55-8	Yes, no data ≤ PQL	Yes, no data ≤ PQL
Nitrite (as N) 14797-65-0	Yes, some data ≤ PQL	Yes, no data ≤ PQL
Oxamyl (Vydate) 23135-22-0	Yes, some data ≤ PQL	Yes, no data ≤ PQL
Pentachlorophenol 87-86-5	Yes, some data ≤ PQL	Yes, no data ≤ PQL
Picloram 1918-02-1	Yes, no data ≤ PQL	Yes, no data ≤ PQL
Polychlorinated biphenyls (PCBs) as Decachlorobiphenyl (DCBP) 1336-36-3	Yes, some data ≤ PQL	Yes, no data ≤ PQL
Selenium 7782-49-2	Yes, some data ≤ PQL[1]	Yes, no data ≤ PQL
Simazine 122-34-9	Yes, some data ≤ PQL; passing rates below PQL could not be calculated [2]	Yes, no data ≤ PQL
Styrene 100-42-5	Yes, no data ≤ PQL	Yes, some data ≤ PQL
2,3,7,8-TCDD (Dioxin) 1746-01-6	No	Yes, no data ≤ PQL; only one spike level
Tetrachloroethylene 127-18-4	Yes, no data ≤ PQL	Yes, some data ≤ PQL
Thallium 7440-28-0	Yes, some data ≤ PQL	Yes, no data ≤ PQL
Toluene 108-88-3	Yes, no data ≤ PQL	Yes, some data ≤ PQL
Toxaphene 8001-35-2	Yes, some data ≤ PQL	Yes, no data ≤ PQL
2,4,5-TP (Silvex) 93-72-1	Yes, some data ≤ PQL[1]	Yes, no data ≤ PQL
1,2,4-Trichlorobenzene 120-82-1	Yes, no data ≤ PQL	Yes, some data ≤ PQL
1,1,1-Trichloroethane 71-55-6	Yes, some data ≤ PQL	Yes, some data ≤ PQL
1,1,2-Trichloroethane 79-00-5	Yes, no data ≤ PQL	Yes, some data ≤ PQL
Trichloroethylene 79-01-6	Yes, no data ≤ PQL	Yes, some data ≤ PQL

Analyte CASRN	In Six-Year 1 Data?	In Six-Year 2 ERA Data 1999-2004?
Vinyl chloride 75-01-4	Yes, no data ≤ PQL	Yes, some data ≤ PQL
Xylenes (total) 1330-20-7	Yes, no data ≤ PQL	Yes, some data ≤ PQL

[1] Means passing rates for Six-Year 1 data were calculated for this report, as these analytes were not evaluated in the March 2003 report, and acceptance criteria are percentage-based, not ± 2 S.D.

[2] Means passing rates for Six-Year 1 data at or below the PQL could not be calculated for this report, as these analytes were not evaluated in the March 2003 report, acceptance criteria are ± 2 S.D., and available regression coefficients are not valid at or below the PQL.

5.2 Calculating National Passing Rates

ERA provided national failure rates that were converted into passing rates by subtracting the percent of laboratories failing from 100%. Six-Year 1 PT data for the 40 analytes that were prioritized for analysis in the March 2003 report had been compiled (and passing rates calculated) in 2003 from original printed output from participating laboratories and EPA archives. In a few cases, some of the original data could not be used because the original hard copies were not legible. For analytes that were evaluated in the March 2003 report, the passing rates and true concentrations were taken directly from the report. In addition, passing rates were calculated for analytes that were not prioritized for the 2003 Six-Year 1 PQL Assessment using the Six-Year 1 data.

The Acceptance Criteria that were set forth in various FR notices during the time of the generation of the Six-Year 1 data were used to calculate the passing rates. However, while this was a relatively straightforward procedure for analytes with percentage-based acceptance criteria (*e.g.*, ± 30%), fourteen analytes have acceptance criteria of ±2 standard deviations (SD) about the estimated mean recovery for each PT study. The mean and acceptance criteria must be calculated by using coefficients that were applicable during the generation of the Six-Year 1 PE data; these coefficients are not available from EPA at this time. The equations are:

- Mean = a*T + b
- SD = c*T + d

Where a, b, c, and d are the coefficients, and T is the true or spiked concentration.

Coefficients that were published by the NELAC in 2002 were available for this assessment; however it is not clear whether these coefficients were in place during the generation of the Six-Year 1 data. Re-calculation of passing rates for several of these analytes using the 2002 NELAC coefficients indicated considerable agreement in passing rates, although values were different in some cases (there was no apparent pattern to the values that were not in agreement). This suggested that the coefficients may not have changed or at least not changed substantially from the 1990s to 2002; however this is uncertain. Since eight of the 14 analytes with acceptance criteria of ± 2 SD were evaluated in the March 2003 report, and acceptance criteria had, apparently, been provided by EPA at that time, the Six-Year 1 regressions for these

eight analytes are taken directly from the data in the March 2003 report. These eight analytes are: benzo(a)pyrene, di(2-ethylhexyl)phthalate, diquat, glyphosate, hexachlorobenzene, hexachlorocyclopentadiene, oxamyl, and picloram. The remaining six of 14 analytes that had not been prioritized for inclusion in the March 2003 report are: bromate, dalapon, di(2-ethylhexyl)adipate, dinoseb, endothall, and simazine. Passing rates for these six analytes were calculated using the 2002 NELAC coefficients. As a result, there is some uncertainty associated with the Six-Year 1 PT data analysis for these six analytes.

It should be noted that for dalapon, di(2-ethylhexyl)adipate, endothall, and simazine, passing rates for data below the PQL were not determined, as the 2002 NELAC criteria are only valid over specific concentration ranges, and the ranges did not extend below the PQLs for these analytes.

5.3 Regression Plots

The PQL assessments are illustrated using linear regressions that plot laboratory passing rate versus true concentration. The PQL often has been set at the concentration where 75% of laboratories are predicted to meet acceptance criteria. The number of laboratories that participated in the Six-Year 1 PT studies for the regulated analytes ranged from approximately 10 to more than 60, with approximately 10 to 30 different concentrations evaluated. The number of laboratories that participated in the ERA PT studies from 1999-2004 for the regulated analytes ranged from approximately 10 to more than 70, with 59-60 different concentrations evaluated.

In cases where the acceptance criteria vary with concentration, the data points that were less than 10 μg/L and those that were greater than or equal to 10 μg/L are plotted as independent data populations, as the variable acceptance criteria tend to result in two "clusters" of data. The following sections present the results of the regressions used in Six-Year 1, the regressions of the 1999-2004 ERA PT data, and any methods that have been approved for these analytes since 2000. The ERA data comprise approximately 50% of the nationwide PT data, while the PT data used in Six-Year 1 was from state and EPA laboratories across the country. Several analytes in Exhibit 1 could not be evaluated in this report for a number of reasons. These include:

- Acrylamide: No PT data available.
- Chlorite: Chlorite has no promulgated PQL.
- Epichlorohydrin: No PT data available.
- 2,3,7,8-Tetrachlorodibenzodioxin (TCDD – dioxin): Only one data point in the ERA data set, and no Six-Year 1 PT data.

6.0 Results of PQL Assessment

EPA used two very different approaches to assess improvements in laboratory analytical performance over time: 1) evaluating data from the laboratory accreditation studies performed as part of the drinking water laboratory certification program (PE/PT data), and 2) comparing performance of the analytical methods available for compliance monitoring at the time of promulgation to those available currently. For analytes with no new methods, analytical performance was measured solely by PE/PT data. For those analytes with new methods, analytical performance was measured by PE/PT data, but may be supported by lower detection limits from new methods. The existence of new methods with lower detection limits may not directly translate to improved analytical performance, however. It is possible that only a small number of laboratories will use a new method, or it may take time for the method to be utilized to its full effectiveness.

Despite of using this two-step approach, EPA had difficulty in making a quantitative assessment of the improvements in laboratory performance over time. There were severe limitations in the laboratory accreditation studies data, i.e. PE/PT results were either not available below the current PQL, the concentrations of interest, or the results were inconclusive/inadequate regarding a potential to revise the PQL. As a result, EPA did not have sufficient data to recalculate any PQLs with certainty. Instead, EPA used the data to indicate potential (qualitative assessment) for PQL revision.

For each analyte, MDLs from EPA-approved methods are compared and a PQL assessment is presented by means of linear regression of both the Six-Year 1 dataset and the ERA dataset from Six-Year 2. Note that MDLs from proprietary methods (i.e., analytical methods not developed by EPA) are not included in the MDL comparison, as they are not readily available. A qualitative conclusion is drawn by presenting a recommendation of whether a PQL might be reduced. The discussion includes an indication of whether an analyte was evaluated in the March 2003 report (e.g., included for discussion, but PE data were not necessarily regressed), whether the Six-Year 1 data were regressed in the March 2003 report (e.g., analyte was included and the PE data were regressed), how the true concentrations relate to the PQL, and how the PE data from Six-Year 1 and the ERA PT data from Six-Year 2 may suggest or not suggest potential changes to the PQL.

The results for the regulated analytes are broken down into two categories based on the limitation of the PQL for setting MCL at the time of promulgation: 1) analytes with Maximum Contaminant Level (MCL) equal to the current PQL, and thus the PQL is limiting; or 2) analytes with MCL greater than the current PQL and thus it is technically feasible to reduce an MCL. PQL assessment for these analytes can indicate the potential for MCL reduction beyond the current PQL. The PQL assessments were made and are presented in this report for a total of 66 analytes. Four analytes could not be analyzed for the reasons stated: acrylamide, epichlorohydrin, 2,3,7,8-TCDD (dioxin) lacked PE/PT data, and chlorite has no PQL.

Using this as a framework, the following sub-categories are used to summarize the results of PQL analysis. These categorizations were made based on a visual inspection of the regressions. In some cases, even though the regression line(s) were above the 75% passing rate,

several factors, including poor performance above the PQL or lack of data below the PQL led to a conclusion that perhaps the PQL should not be reduced. In addition, consideration was given to recent laboratory performance as indicated by the ERA data. For example, if the older Six-Year 1 data indicated that the PQL should not be reduced, and if the more recent ERA data indicated better performance, this was a factor in making the overall determination as to whether or not a PQL could be reduced.

- Analytes with MCL equal to the current PQL, and thus the PQL is limiting

  - PQL assessment supports reduction of the current PQL;
  - PQL assessment may support reduction of the current PQL; and
  - PQL assessment does not support reduction of the current PQL, or data are inconclusive or insufficient to reach a conclusion

- Analytes with MCL greater than the current PQL and thus it is technically feasible to reduce an MCL

  - PQL assessment supports reduction of the current PQL;
  - PQL assessment may support reduction of the current PQL; and
  - PQL assessment does not support reduction of the current PQL, or data are inconclusive or insufficient to reach a conclusion.

Note that the qualitative conclusions presented in this report are not necessarily identical to the conclusions that were documented in the March 2003 report. Rather, a new assessment is made herein considering the advantages and disadvantages of the PQL concept, the availability of PT data in the vicinity of and/or below the PQL, and outliers. The qualitative conclusions are based primarily on data that are in the vicinity of and/or below the PQL (for most of the VOCs, this corresponds to concentrations <10 µg/L). Only the current evaluations of the Six-Year 1 and Six-Year 2/ERA data are presented in this report.

6.1 Analytes with Maximum Contaminant Level (MCL) Equal to the Current PQL and Thus the PQL is limiting

Twenty-five analytes have an MCL that is set at the PQL. As a result, PQL assessment is required to determine whether an MCL might be lowered in the future. These 25 analytes can be further categorized into the three groups mentioned in Section 6.0 depending on whether or not the PT assessments support the reduction of the current PQL.

6.1.1 PQL Assessment Supports Reduction of the Current PQL

Of the 25 analytes mentioned above, nine analytes have an existing PQL that is equal to the MCL and their PE/PT data suggest that the PQL could be lower.

Benzene

Results of the Methods Comparison

Exhibit 4 summarizes the MDLs for benzene as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of benzene in drinking water samples during the years 2000-2007.

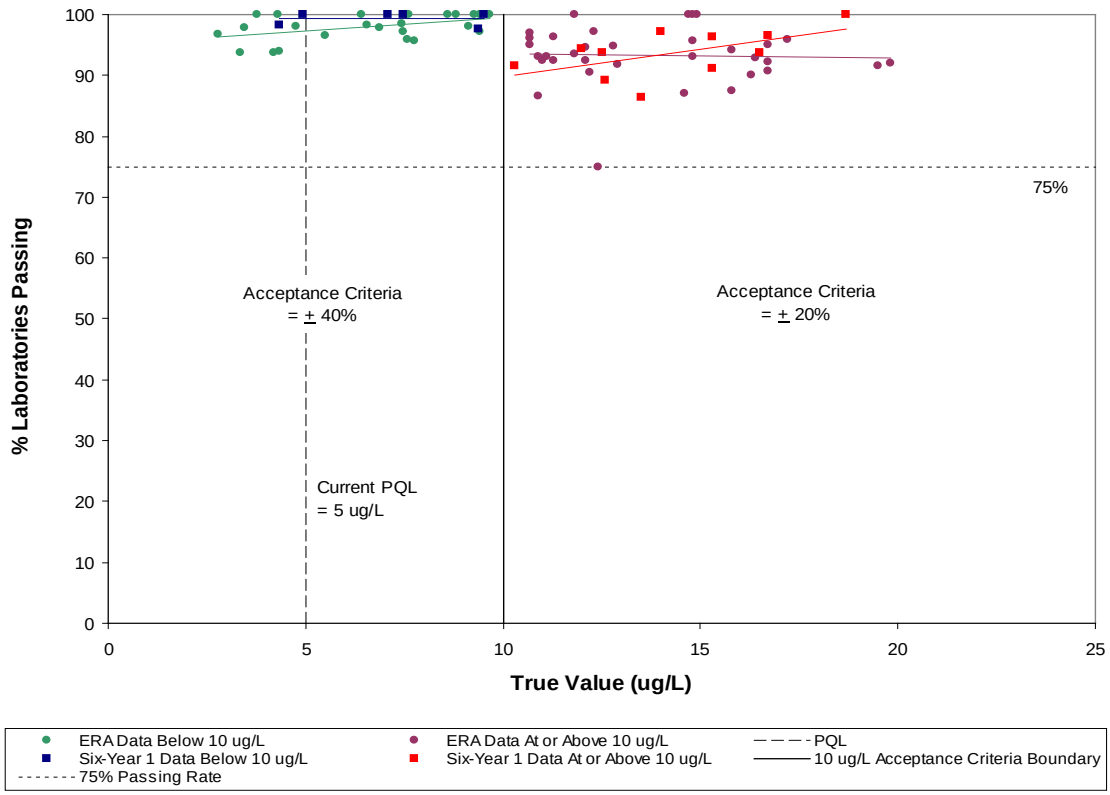
Exhibit 4: Analytical Methods for Benzene

MCL = 0.005 mg/L Current PQL = 0.005 mg/L DL = 0.0005 mg/L Acceptance Criteria = ± 20% or 40%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
502.2	CCGC with PID/ELCD	0.01
524.2	CCGC/MS	0.03 - 0.04
Notes: The regulatory DL for volatile organic compounds is listed at 40 CFR 141.24(k)(17)(ii)(C). Acceptance Criteria for volatile organic compounds are listed at 40 CFR 141.24(f)(17)(i).		

Results of the PQL Analysis

The current PQL for benzene is 5 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 5). The Six-Year 1 PE data for benzene were regressed as part of the March 2003 report. Note that the acceptance criteria are ± 40% at spike concentrations below 10 µg/L and ± 20% at or above 10 µg/L; hence the data are regressed as two independent populations. Two of the 17 spike values from the Six-Year 1 data set are below the current PQL of 5 µg/L. Eight of the 60 spike values from the Six-Year 2/ERA data set are less than the current PQL. All of the passing rates for the Six-Year 1 and Six-Year 2/ERA data sets are at or above 75%.

Exhibit 5: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Benzene



Conclusion for Benzene

The high laboratory passing rates (well above 75%) at concentrations below the current PQL of 5 µg/L for both the Six-Year 1 and Six-Year 2/ERA data sets suggest that the PQL could be lower. Although there are limited Six-Year 1 data below the PQL, laboratory passing rates below and in the vicinity of the PQL are well above 75%, which supports the conclusion that the PQL could be lower. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Carbon Tetrachloride

Results of the Methods Comparison

Exhibit 6 summarizes the MDLs for carbon tetrachloride as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of carbon tetrachloride in drinking water samples during the years 2000-2007.

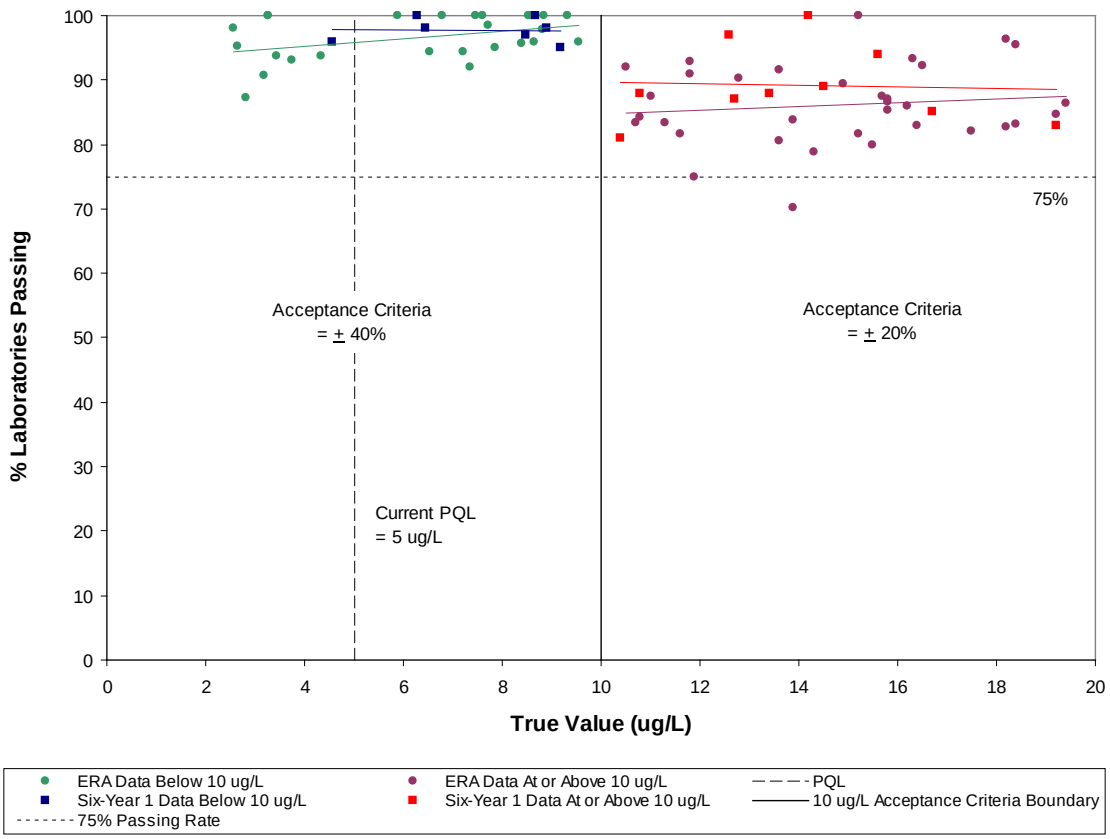
Exhibit 6: Analytical Methods for Carbon Tetrachloride

MCL = 0.005 mg/L Current PQL = 0.005 mg/L DL = 0.0005 mg/L Acceptance Criteria = ± 20% or 40%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
502.2	CCGC with PID/ELCD	0.01 - 0.02
524.2	CCGC/MS	0.08 - 0.21
551.1	LLE/GC w/ ECD	0.002 - 0.050
Notes: The regulatory DL for volatile organic compounds is listed at 40 CFR 141.24(k)(17)(ii)(C). Acceptance Criteria for volatile organic compounds are listed at 40 CFR 141.24(f)(17)(i).		

Results of the PQL Analysis

The current PQL for carbon tetrachloride is 5 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 7). The Six-Year 1 PE data for carbon tetrachloride were evaluated but were not regressed as part of the March 2003 report. Note that the acceptance criteria are ± 40% at spike concentrations below 10 µg/L and ± 20% at or above 10 µg/L; hence the data are regressed as two independent populations. One of the 17 spike values from the Six-Year 1 data set is below the current PQL of 5 µg/L. Nine of the 60 Six-Year 2/ERA spike values are below the current PQL. Nearly all of the passing rates for the Six-Year 1 and Six-Year 2/ERA data sets are above 75% (with the exception of two Six-Year 2/ERA passing rates).

Exhibit 7: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Carbon Tetrachloride



Conclusion for Carbon Tetrachloride

The high laboratory passing rates (well above 75%) at concentrations below the current PQL of 5 µg/L for both the Six-Year 1 and Six-Year 2/ERA data sets suggest that the PQL could be lower. Although there is only one Six-Year 1 datum below the PQL, laboratory passing rates below and in the vicinity of the PQL are well above 75%, which supports the conclusion that the PQL could be lower. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Chlordane

Results of the Methods Comparison

Exhibit 8 summarizes the MDLs for chlordane as documented in EPA-developed analytical methods (note that the MDLs in Exhibit 8 represent ranges for chlordane, α-chlordane, γ-chlordane, *cis*-nonachlor and *trans*-nonachlor). No updated or new analytical methods have been approved for the analysis of chlordane in drinking water samples during the years 2000-2007.

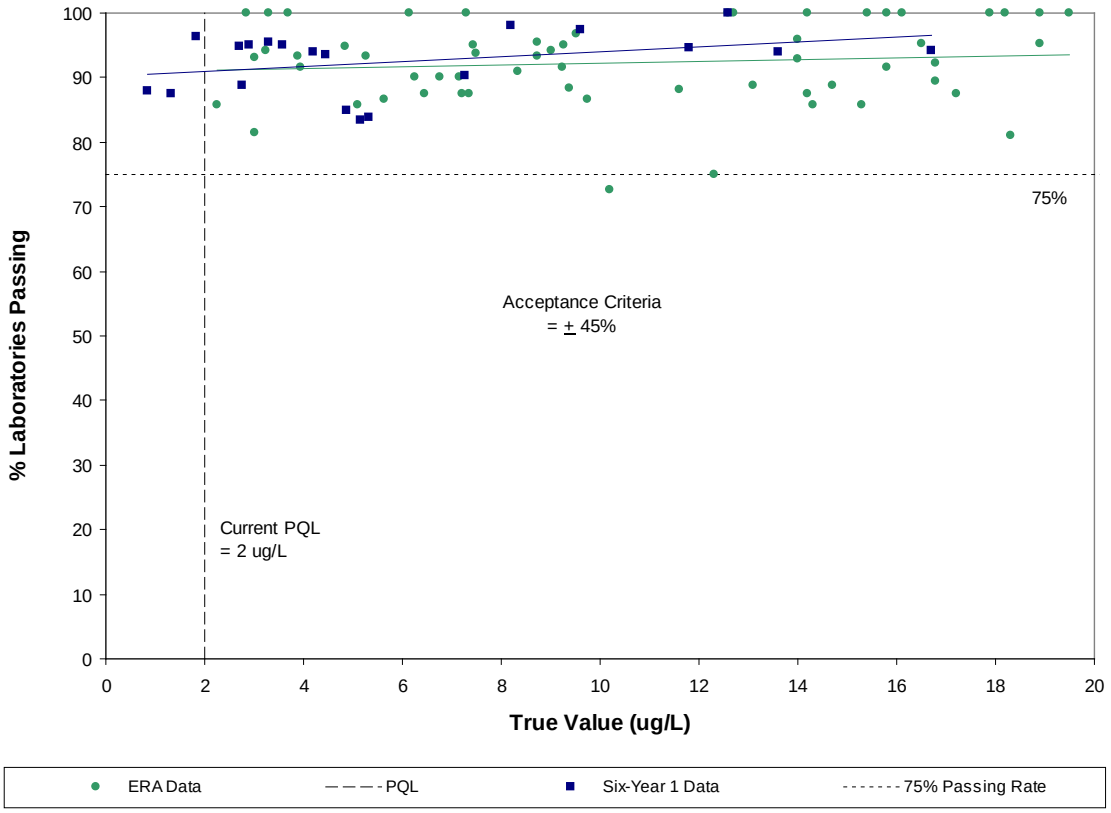
Exhibit 8: Analytical Methods for Chlordane

MCL = 0.002 mg/L Current PQL = 0.002 mg/L DL = 0.0002 mg/L Acceptance Criteria = ± 45%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
505	ME and GC	0.006 - 0.14
508	GC/ECD	0.0016 – 0.0041
508.1	LSE and ECGC	0.001 – 0.004
525.2	LSE and CCGC/MS	0.05 – 0.22
Notes: Regulatory DLs for synthetic organic compounds are listed at 40 CFR 141.24(h)(18). Acceptance Criteria for synthetic organic compounds are listed at 40 CFR 141.24(h)(19)(i)(B).		

Results of the PQL Analysis

The current PQL for chlordane is 2 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 9). The Six-Year 1 PE data for chlordane were evaluated in the March 2003 report; however, these data were not regressed in the report. Three of the 20 spike values from the Six-Year 1 data set are below the current PQL of 2 µg/L. No Six-Year 2/ERA data are below the current PQL. All of the Six-Year 1 passing rates and all but two of the Six-Year 2/ERA passing rates exceed 75%.

Exhibit 9: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Chlordane



Conclusion for Chlordane

The high laboratory passing rates (well above 75%) at concentrations below the current PQL of 5 µg/L for the Six-Year 1 data set suggest that the PQL could be lower. Although there are no Six-Year 2/ERA data below the PQL, laboratory passing rates in the vicinity of the PQL are well above 75% which may support the Six-Year 1 data conclusion that the PQL could be lower. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

1,2-Dichloroethane (Ethylene dichloride)

Results of the Methods Comparison

Exhibit 10 summarizes the MDLs for 1,2-dichloroethane as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of 1,2-dichloroethane in drinking water samples during the years 2000-2007.

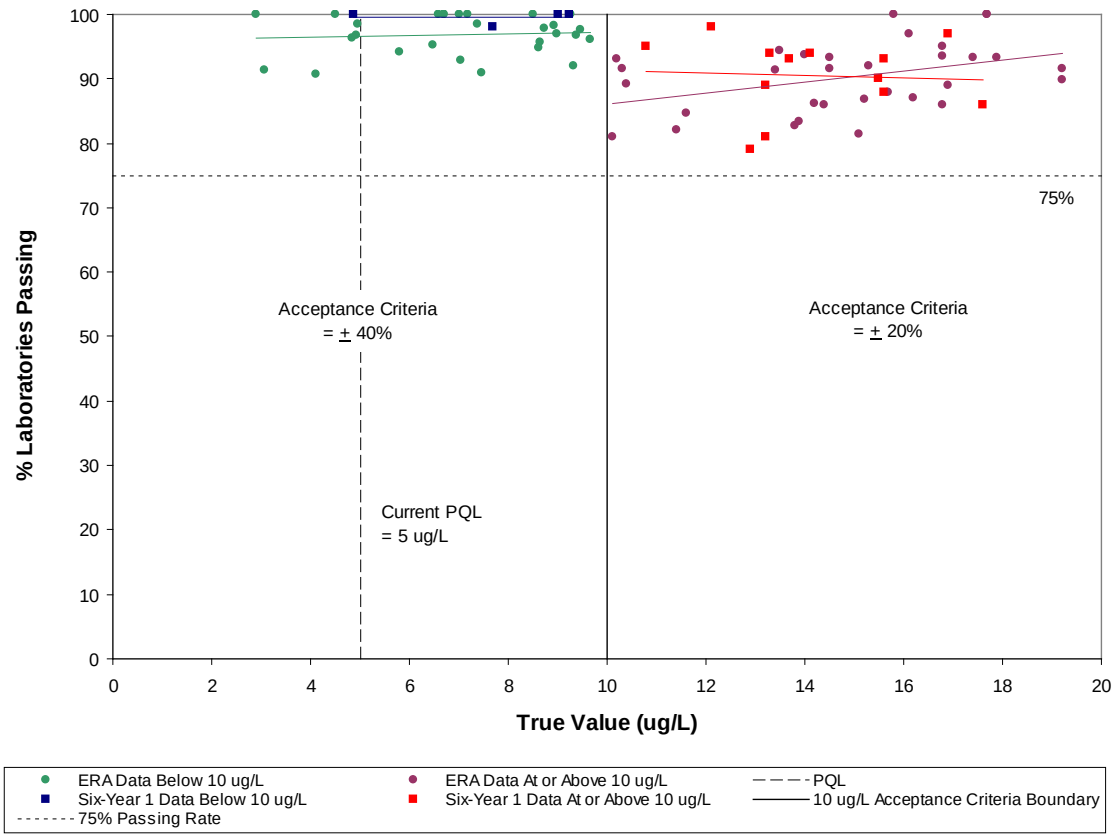
Exhibit 10: Analytical Methods for 1,2-Dichloroethane

MCL = 0.005 mg/L Current PQL = 0.005 mg/L DL = 0.0005 mg/L Acceptance Criteria = ± 20% or 40%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
502.2	CCGC with PID/ ELCD	0.03
524.2	CCGC/MS	0.02 - 0.06
Notes: The regulatory DL for volatile organic compounds is listed at 40 CFR 141.24(k)(17)(ii)(C). Acceptance Criteria for volatile organic compounds are listed at 40 CFR 141.24(f)(17)(i).		

Results of the PQL Analysis

The current PQL for 1,2-dichloroethane is 5 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 11). The Six-Year 1 PE data for 1,2-dichloroethane were evaluated but were not regressed as part of the March 2003 report. Note that the acceptance criteria are ± 40% at spike concentrations below 10 µg/L and ± 20% at or above 10 µg/L; hence the data are regressed as two independent populations. One of the 17 spike values from the Six-Year 1 data set is below the current PQL of 5 µg/L. Seven of the 60 Six-Year 2/ERA spike values are below the current PQL. All of the passing rates for the Six-Year 1 and Six-Year 2/ERA data are above 75%.

Exhibit 11: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – 1,2-Dichloroethane



Conclusion for 1,2-Dichloroethane

The high laboratory passing rates (well above 75%) at concentrations below the current PQL of 5 µg/L for both the Six-Year 1 and Six-Year 2/ERA data sets suggest that the PQL could be lower. Although there is only one Six-Year 1 datum below the PQL, laboratory passing rates below and in the vicinity of the PQL are well above 75%, which supports the conclusion that the PQL could be lower. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

1,2-Dichloropropane

Results of the Methods Comparison

Exhibit 12 summarizes the MDLs for 1,2-dichloropropane as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of 1,2-dichloropropane in drinking water samples during the years 2000-2007.

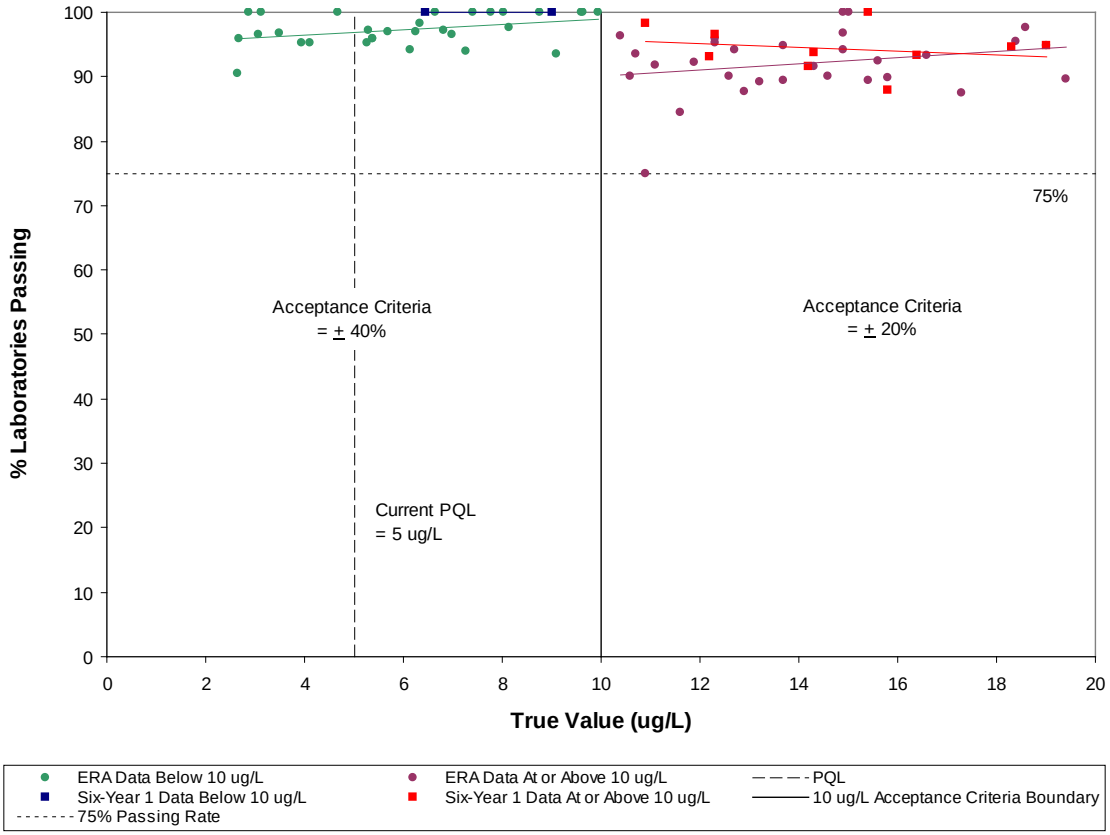
Exhibit 12: Analytical Methods for 1,2-Dichloropropane

MCL = 0.005 mg/L Current PQL = 0.005 mg/L DL = 0.0005 mg/L Acceptance Criteria = ± 20% or 40%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
502.2	CCGC with PID/ ELCD	0.01 - 0.03
524.2	CCGC/MS	0.02 - 0.04
Notes: The regulatory DL for volatile organic compounds is listed at 40 CFR 141.24(k)(17)(ii)(C). Acceptance Criteria for volatile organic compounds are listed at 40 CFR 141.24(f)(17)(i).		

Results of the PQL Analysis

The current PQL for 1,2-dichloropropane is 5 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 13). The Six-Year 1 PE data for 1,2-dichloropropane were evaluated but were not regressed as part of the March 2003 report. Note that the acceptance criteria are ± 40% at spike concentrations below 10 µg/L and ± 20% at or above 10 µg/L; hence the data are regressed as two independent populations. No Six-Year 1 data are available below the current PQL of 5 µg/L. Nine of the 60 spike values in the Six-Year 2/ERA data set are below the current PQL. All of the passing rates are above 75% (with the exception of one passing rate equal to 75%).

Exhibit 13: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – 1,2-Dichloropropane



Conclusion for 1,2-Dichloropropane

The high laboratory passing rates (well above 75%) at concentrations below the current PQL of 5 µg/L for the Six-Year 2/ERA data set suggests that the PQL could be lower. Although there are no Six-Year 1 data below the PQL, laboratory passing rates in the vicinity of the PQL are well above 75% which may support the Six-Year 2/ERA data conclusion that the PQL could be lower. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Hexachlorobenzene

Results of the Methods Comparison

Exhibit 14 summarizes the MDLs for hexachlorobenzene as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of hexachlorobenzene in drinking water samples during the years 2000-2007.

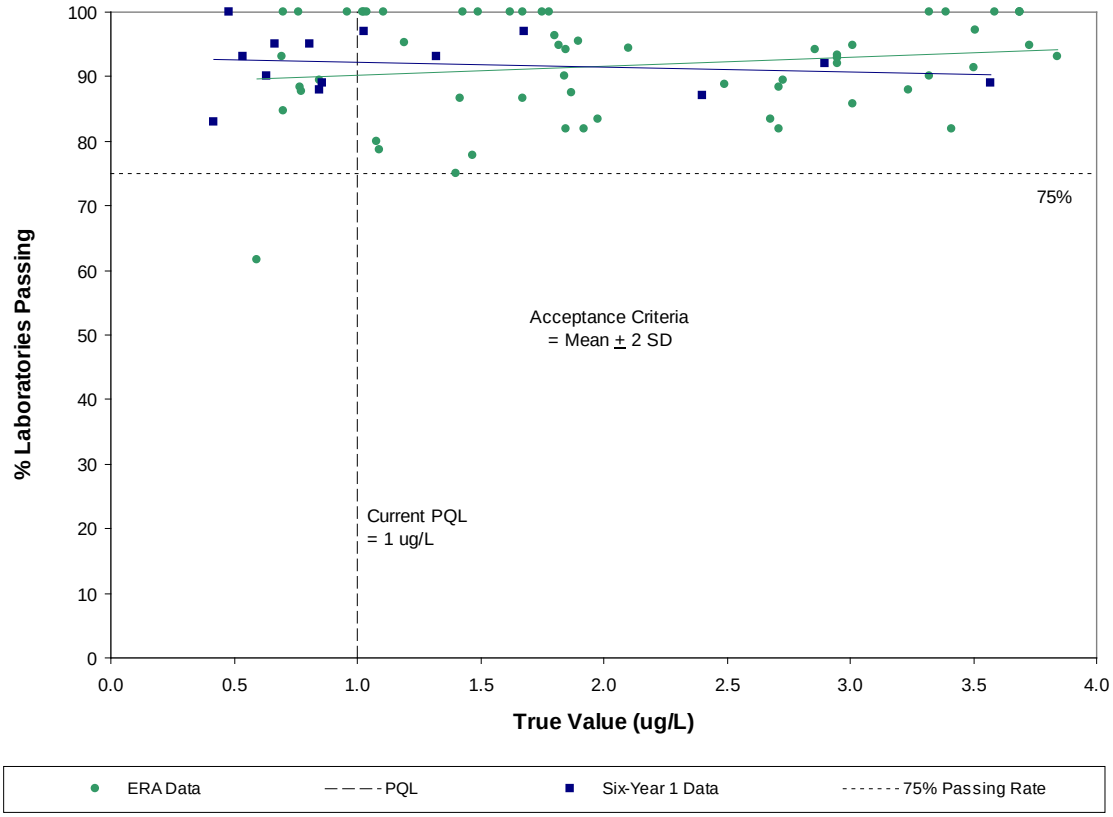
Exhibit 14: Analytical Methods for Hexachlorobenzene

MCL = 0.001 mg/L Current PQL = 0.001 mg/L DL = 0.0001 mg/L Acceptance Criteria = Mean ± 2 Std Dev		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
505	ME and GC	0.002
508	GC/ECD	0.0077
508.1	L/S Extraction and ECGC	0.001
525.2	LSE and CCGC/MS	0.049 - 0.13
551.1	LLE/GC w/ ECD	0.001 - 0.003
Notes: Regulatory DLs for synthetic organic compounds are listed at 40 CFR 141.24(h)(18). Acceptance Criteria for synthetic organic compounds are listed at 40 CFR 141.24(h)(19)(i)(B).		

Results of the PQL Analysis

The current PQL for hexachlorobenzene is 1 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 15). The Six-Year 1 PE data for hexachlorobenzene were evaluated but were not regressed as part of the March 2003 report. Eight of the 14 spike Six-Year 1 values are below the current PQL of 1 µg/L. Nine of the 60 Six-Year 2/ERA spike values are below the current PQL. Nearly all of the passing rates for the Six-Year 1 and Six-Year 2/ERA hexachlorobenzene data are above 75% (with the exception of two Six-Year 2/ERA passing rates).

Exhibit 15: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Hexachlorobenzene



Conclusion for Hexachlorobenzene

The high laboratory passing rates (generally well above 75%) at concentrations below and in the vicinity of the current PQL of 1 µg/L for both the Six-Year 1 and Six-Year 2/ERA data sets suggest that the PQL could be lower. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Tetrachloroethylene

Results of the Methods Comparison

Exhibit 16 summarizes the MDLs for tetrachloroethylene as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of tetrachloroethylene in drinking water samples during the years 2000-2007.

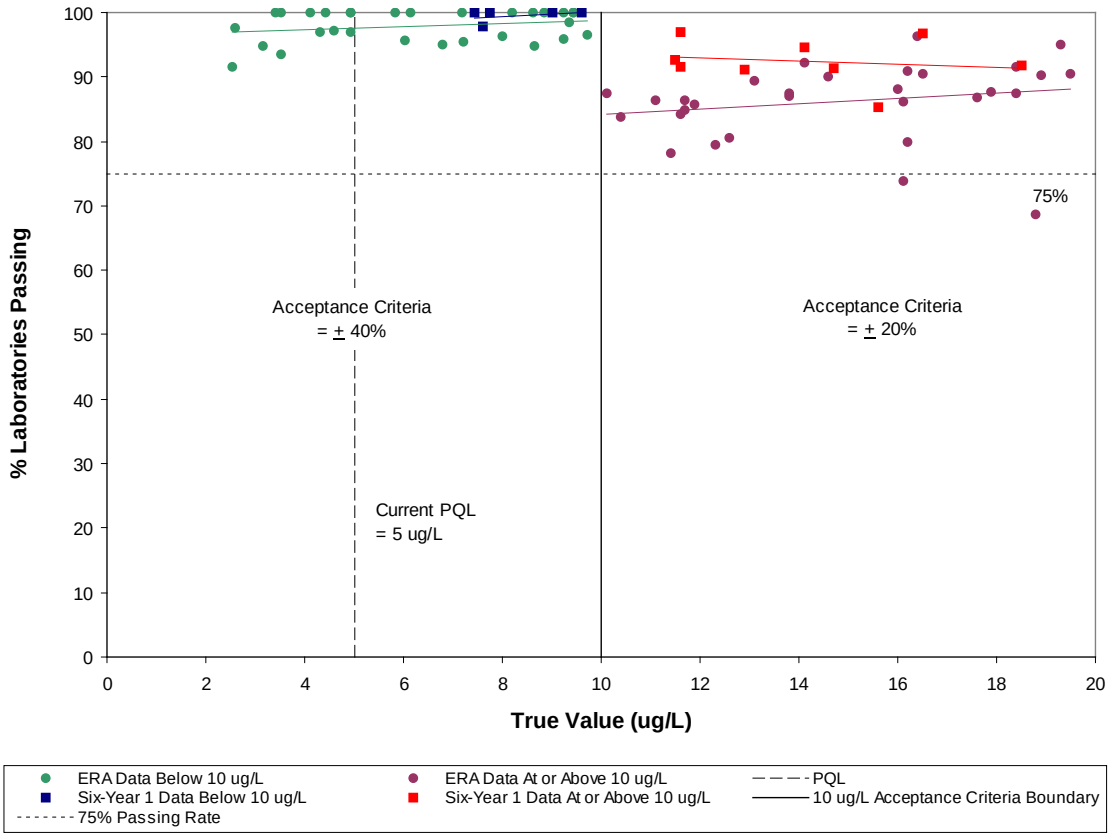
Exhibit 16: Analytical Methods for Tetrachloroethylene

MCL = 0.005 mg/L Current PQL = 0.005 mg/L DL = 0.0005 mg/L Acceptance Criteria = ± 20% or 40%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
502.2	CCGC with PID/ELCD	0.02 - 0.05
524.2	CCGC/MS	0.05 - 0.14
551.1	LLE/GC w/ ECD	0.002 - 0.008
Notes: The regulatory DL for volatile organic compounds is listed at 40 CFR 141.24(k)(17)(ii)(C). Acceptance Criteria for volatile organic compounds are listed at 40 CFR 141.24(f)(17)(i).		

Results of the PQL Analysis

The current PQL for tetrachloroethylene is 5 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 17). The Six-Year 1 PE data for tetrachloroethylene were evaluated but were not regressed as part of the March 2003 report. Note that the acceptance criteria are ± 40% at spike concentrations below 10 µg/L and ± 20% at or above 10 µg/L; hence the data are regressed as two independent populations. No Six-Year 1 data are available below the current PQL of 5 µg/L. Thirteen of the 60 spike values in the Six-Year 2/ERA data set are below the current PQL. All but two of the passing rates are above 75%. Furthermore, the regression lines are also well above 75%.

Exhibit 17: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Tetrachloroethylene



Conclusion for Tetrachloroethylene

The high laboratory passing rates (well above 75%) at concentrations below the current PQL of 5 µg/L for the Six-Year 2/ERA data set suggests that the PQL could be lower. Although there are no Six-Year 1 data below the PQL, laboratory passing rates in the vicinity of the PQL are well above 75% which may support the Six-Year 2/ERA data conclusion that the PQL could be lower. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

1,1,2-Trichloroethane

Results of the Methods Comparison

Exhibit 18 summarizes the MDLs for 1,1,2-trichloroethane as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of 1,1,2-trichloroethane in drinking water samples during the years 2000-2007.

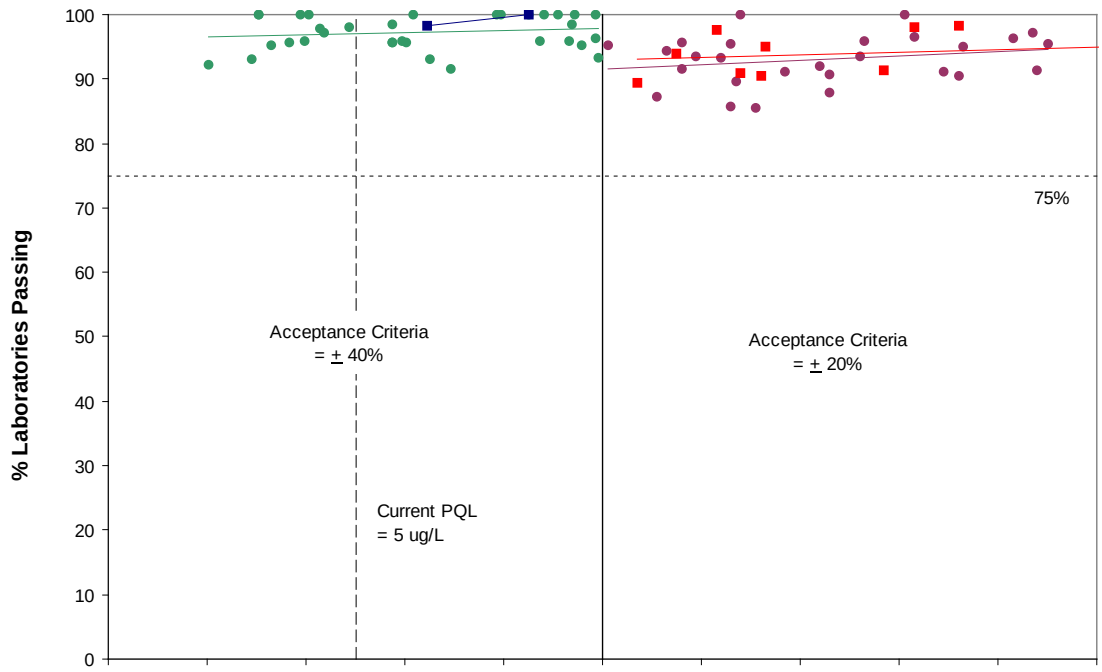
Exhibit 18: Analytical Methods for 1,1,2-Trichloroethane

MCL = 0.005 mg/L Current PQL = 0.005 mg/L DL = 0.0005 mg/L Acceptance Criteria = ± 20% or 40%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
502.2	CCGC with PID/ ELCD	0.04
524.2	CCGC/MS	0.03 - 0.10
551.1	LLE/GC w/ ECD	0.012 - 0.017
Notes: The regulatory DL for volatile organic compounds is listed at 40 CFR 141.24(k)(17)(ii)(C). Acceptance Criteria for volatile organic compounds are listed at 40 CFR 141.24(f)(17)(i).		

Results of the PQL Analysis

The current PQL for 1,1,2-trichloroethane is 5 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 19). The Six-Year 1 PE data for 1,1,2-trichloroethane were evaluated but were not regressed as part of the March 2003 report. Note that the acceptance criteria are ± 40% at spike concentrations below 10 µg/L and ± 20% at or above 10 µg/L; hence the data are regressed as two independent populations. No Six-Year 1 data are available below the current PQL of 5 µg/L. Twelve of the 60 spike values in the Six-Year 2/ERA data are below the current PQL. All of the passing rates are above 75%.

Exhibit 19: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – 1,1,2-Trichloroethane



Conclusion for 1,1,2-Trichloroethane

The high laboratory passing rates (well above 75%) at concentrations below the current PQL of 5 µg/L for the Six-Year 2/ERA data set suggests that the PQL could be lower. Although there are no Six-Year 1 data below the PQL, laboratory passing rates in the vicinity of the PQL are well above 75% which may support the Six-Year 2/ERA data conclusion that the PQL could be lower. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Trichloroethylene

Results of the Methods Comparison

Exhibit 20 summarizes the MDLs for trichloroethylene as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of trichloroethylene in drinking water samples during the years 2000-2007.

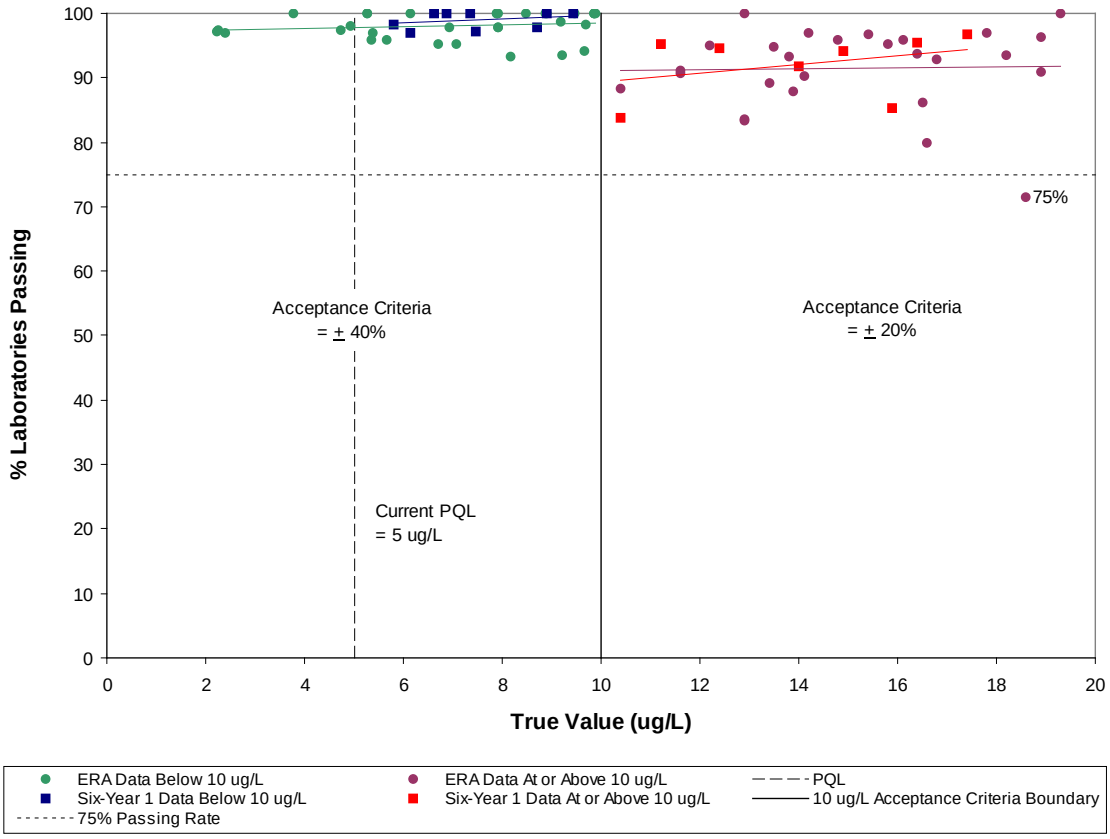
Exhibit 20: Analytical Methods for Trichloroethylene

MCL = 0.005 mg/L Current PQL = 0.005 mg/L DL = 0.0005 mg/L Acceptance Criteria = ± 20% or 40%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
502.2	CCGC with PID/ ELCD	0.01 - 0.06
524.2	CCGC/MS	0.02 - 0.19
551.1	LLE/GC w/ ECD	0.002 - 0.042
Notes: The regulatory DL for volatile organic compounds is listed at 40 CFR 141.24(k)(17)(ii)(C). Acceptance Criteria for volatile organic compounds are listed at 40 CFR 141.24(f)(17)(i).		

Results of the PQL Analysis

The current PQL for trichloroethylene is 5 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 21). The Six-Year 1 PE data for trichloroethylene were evaluated but were not regressed as part of the March 2003 report. Note that the acceptance criteria are ± 40% at spike concentrations below 10 µg/L and ± 20% at or above 10 µg/L; hence the data are regressed as two independent populations. No Six-Year 1 data are below the current PQL of 5 µg/L. Six of the 60 spike values in the Six-Year 2/ERA data are below the current PQL. All but one of the passing rates are above 75%. Furthermore, the regression lines are also well above 75%.

Exhibit 21: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Trichloroethylene



Conclusion for Trichloroethylene

The high laboratory passing rates (well above 75%) at concentrations below the current PQL of 5 µg/L for the Six-Year 2/ERA data set suggests that the PQL could be lower. Although there are no Six-Year 1 data below the PQL, laboratory passing rates in the vicinity of the PQL are well above 75% which may support the Six-Year 2/ERA data conclusion that the PQL could be lower. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

6.1.2 PQL Assessment May Support Reduction of the Current PQL

Of the 25 analytes mentioned in Section 6.1, eight analytes have an existing PQL that is equal to the MCL and their PE/PT data suggest that the PQL could *possibly* be lower.

Alachlor

Results of the Methods Comparison

Exhibit 22 summarizes the MDLs for alachlor as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of alachlor in drinking water samples during the years 2000-2007.

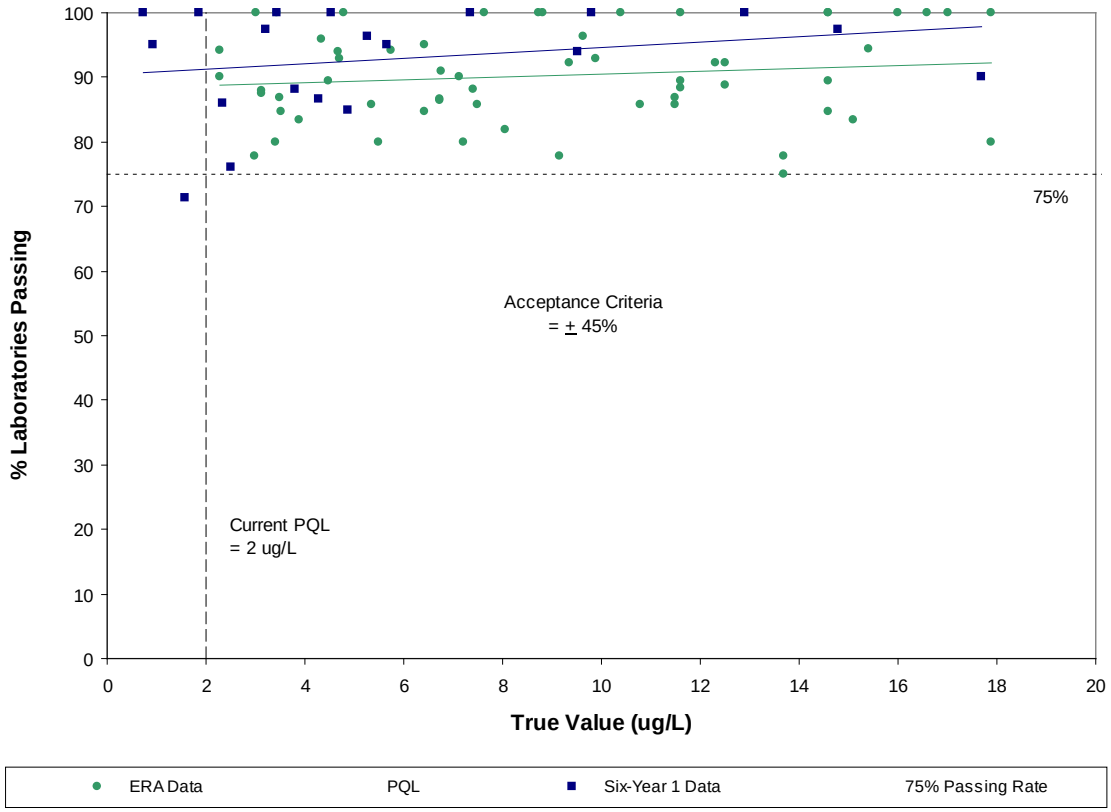
Exhibit 22: Analytical Methods for Alachlor

MCL = 0.002 mg/L Current PQL = 0.002 mg/L DL = 0.0002 mg/L Acceptance Criteria = ± 45%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
505	ME and GC	0.225
507	GC/N-PD	0.14
508.1	LSE and ECGC	0.009
525.2	LSE and CCGC/MS	0.069 - 0.16
551.1	LLE/GC w/ ECD	0.005 - 0.025
Notes: Regulatory DLs for synthetic organic compounds are listed at 40 CFR 141.24(h)(18). Acceptance Criteria for synthetic organic compounds are listed at 40 CFR 141.24(h)(19)(i)(B).		

Results of the PQL Analysis

The current PQL for alachlor is 2 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 23). The Six-Year 1 PE data for alachlor were evaluated in the March 2003 report; however, these data were not regressed in that report. Four of the 20 spike values from the Six-Year 1 data set are below the current PQL of 2 µg/L. However, none of the Six-Year 2/ERA data are below the current PQL. The percentage of laboratories passing is variable, ranging from 71.4% to 100%. The Six-Year 1 passing rates generally exceed 75% (with the exception of one spike value) and all of the Six-Year 2/ERA passing rates are greater than or equal to 75%.

Exhibit 23: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Alachlor



Conclusion for Alachlor

The Six-Year 1 laboratory passing rates below and in the vicinity of the PQL of 2 µg/L are above 75% with one exception. Given the lack of Six-Year 2/ERA data below the PQL, but passing rates above 75% in the vicinity of the PQL, a reduction of the PQL may be considered. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Antimony

Results of the Methods Comparison

Exhibit 24 summarizes the MDLs for antimony as documented in EPA-developed analytical methods. Updates to two methods have been approved for the analysis of antimony in drinking water samples during the years 2000-2007 (see Exhibit A-1). These updates are associated with administrative and technical changes or clarifications that are not expected to improve analytical performance near the PQL.

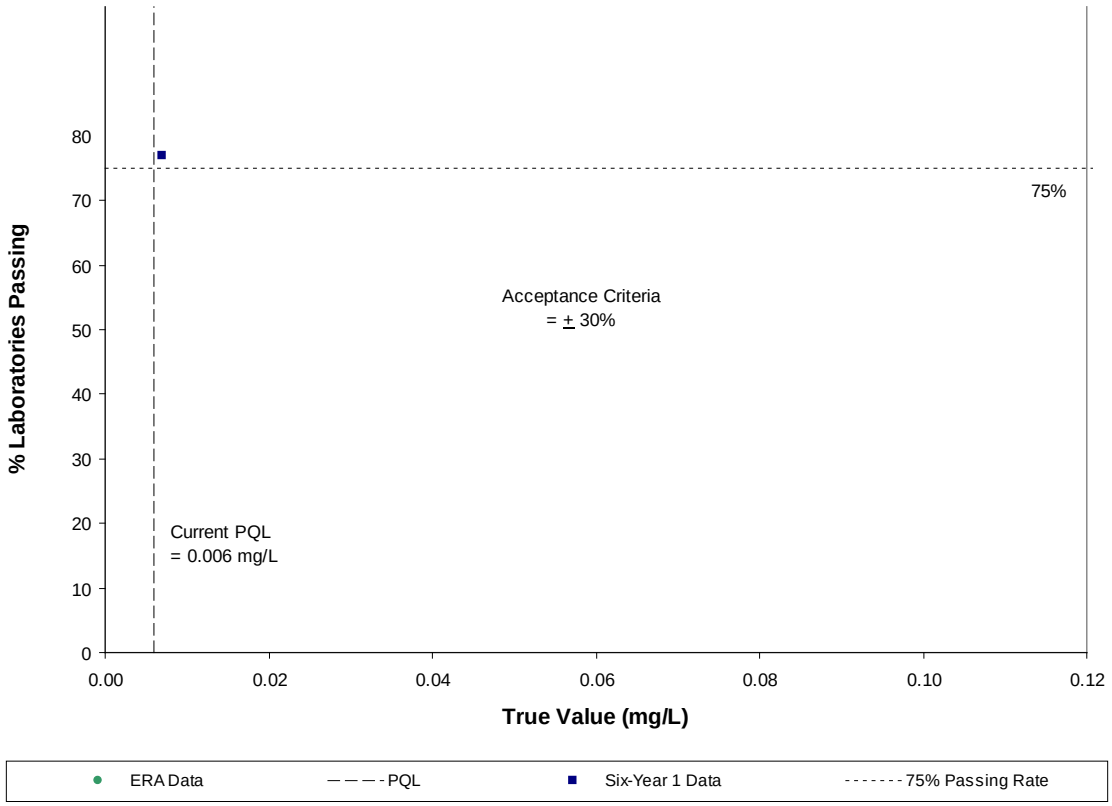
Exhibit 24: Analytical Methods for Antimony

MCL = 0.006 mg/L Current PQL = 0.006 mg/L DL = 0.0004-0.003mg/L Acceptance Criteria = ±30%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL mg/L**
200.8	ICP/MS	0.00002 - 0.0004
200.9	GFAA	0.0008
Notes: Regulatory DLs for inorganic compounds are listed at 40 CFR 141.23(a)(4)(i). Acceptance Criteria for inorganic compounds are listed at 40 CFR 141.23(k)(3)(ii).		

Results of the PQL Analysis

The current PQL for antimony is 0.006 mg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 25). The Six-Year 1 PE data for antimony were not evaluated in the March 2003 report. Two of the 20 spike values from the Six-Year 1 data are below the current PQL of 0.006 mg/L. No Six-Year 2/ERA data are below the current PQL. All of the passing rates in both data sets exceed 75%. The regression lines are also well above 75%.

Exhibit 25: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Antimony



Conclusion for Antimony

Given the availability of limited data below the current PQL of 0.006 mg/L, but relatively high laboratory passing rates (above 75%) just below and in the vicinity of the PQL for the Six-Year 1 data, and above 75% passing rates in the vicinity of the PQL for the Six-Year 2/ERA data, a reduction of the PQL may be considered. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

1,2-Dibromo-3-chloropropane (DBCP)

Results of the Methods Comparison

Exhibit 26 summarizes the MDLs for 1,2-dibromo-3-chloropropane as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of DBCP in drinking water samples during the years 2000-2007.

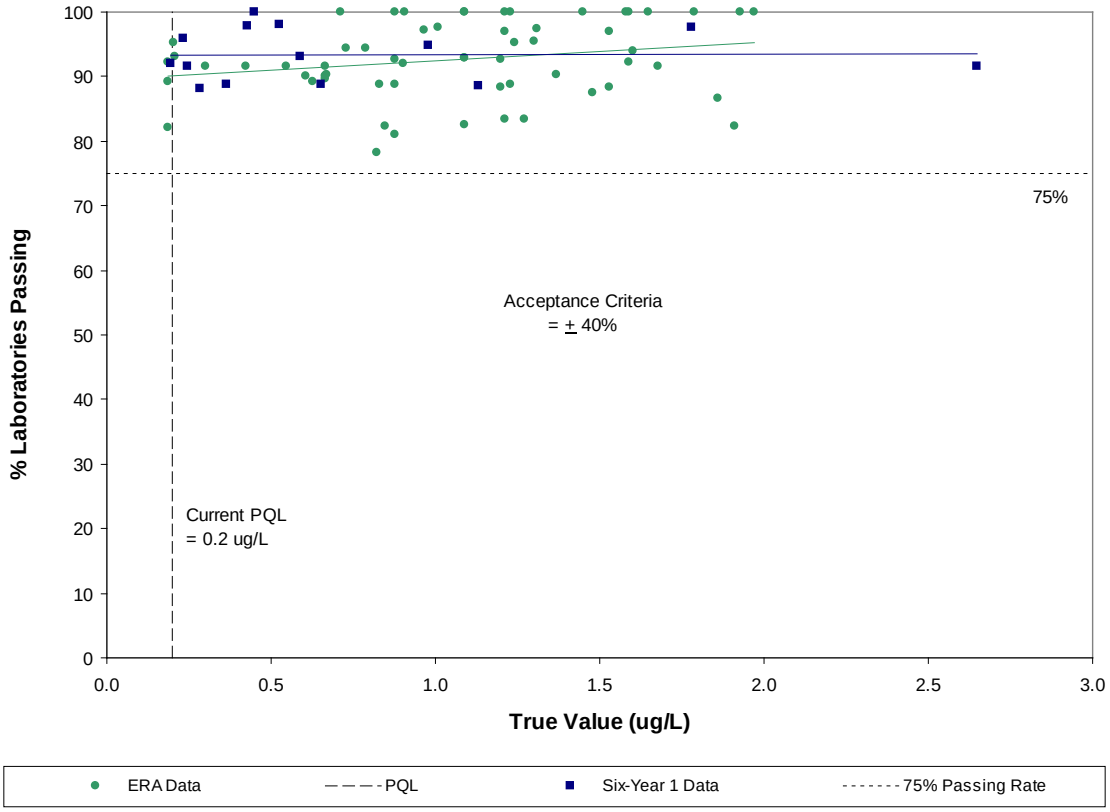
Exhibit 26: Analytical Methods for DBCP

MCL = 0.0002 mg/L Current PQL = 0.0002 mg/L DL = 0.00002 mg/L Acceptance Criteria = ± 40%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
504.1	ME and GC	0.01
551.1	LLE/GC w/ ECD	0.006 - 0.009
Notes: Regulatory DLs for synthetic organic compounds are listed at 40 CFR 141.24(h)(18). Acceptance Criteria for synthetic organic compounds are listed at 40 CFR 141.24(h)(19)(i)(B).		

Results of the PQL Analysis

The current PQL for DBCP is 0.2 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 27). The Six-Year 1 PE data for DBCP were evaluated but were not regressed as part of the March 2003 report. One of the 14 spike values from the Six-Year 1 data is below the current PQL of 0.2 µg/L. Three of the 60 Six-Year 2/ERA spike values are below the current PQL. All of the passing rates for the Six-Year 1 and Six-Year 2/ERA data are above 75%.

Exhibit 27: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – DBCP



Conclusion for 1,2-Dibromo-3-chloropropane

Given the limited data below the current PQL of 0.2 µg/L but high laboratory passing rates (well above 75%) just below and in the vicinity of the PQL for both Six-Year 2/ERA and Six-Year 1 data set, a reduction of the PQL may be considered. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Heptachlor

Results of the Methods Comparison

Exhibit 28 summarizes the MDLs for heptachlor as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of heptachlor in drinking water samples during the years 2000-2007.

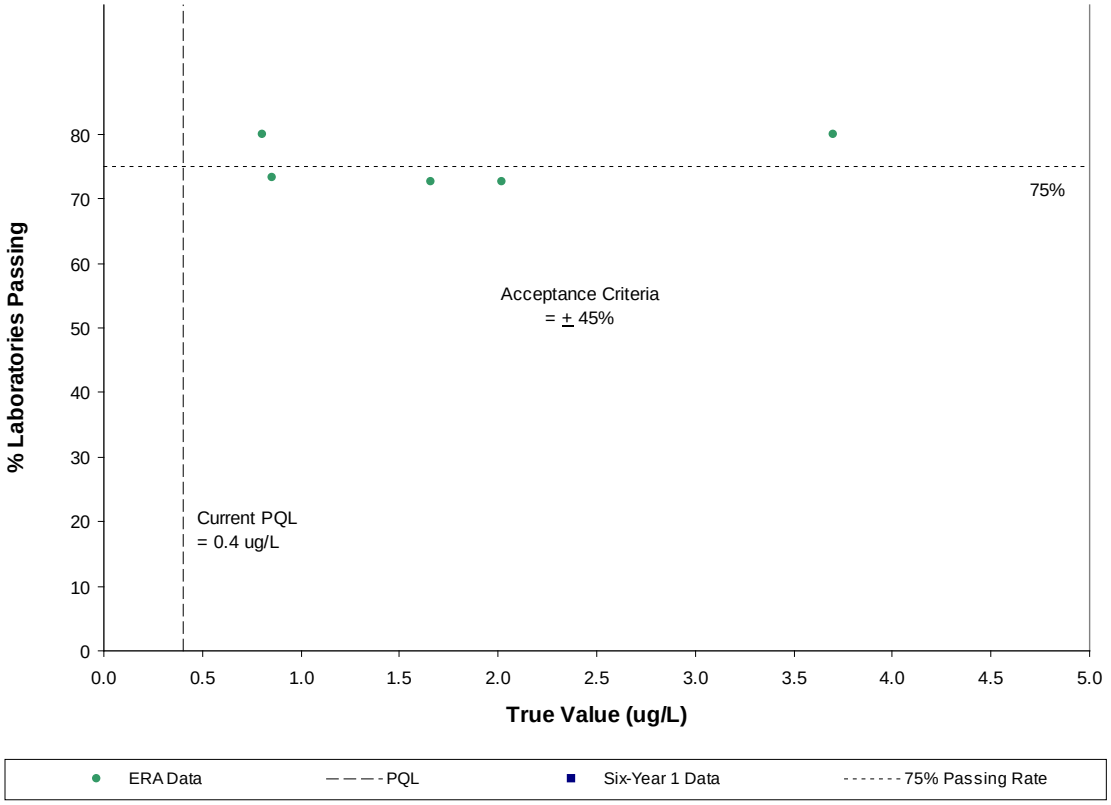
Exhibit 28: Analytical Methods for Heptachlor

MCL = 0.0004 mg/L Current PQL = 0.0004 mg/L DL = 0.00004 mg/L Acceptance Criteria = ± 45%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
505	ME and GC	0.003
508	GC/ECD	0.0015
508.1	LSE and ECGC	0.005
525.2	LSE and CCGC/MS	0.059 - 0.15
551.1	LLE/GC w/ ECD	0.002 - 0.081
Notes: Regulatory DLs for synthetic organic compounds are listed at 40 CFR 141.24(h)(18). Acceptance Criteria for synthetic organic compounds are listed at 40 CFR 141.24(h)(19)(i)(B).		

Results of the PQL Analysis

The current PQL for heptachlor is 0.4 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 29). The Six-Year 1 PE data for heptachlor were evaluated but were not regressed as part of the March 2003 report. Three of the 19 spike values in the Six-Year 1 data set are below the current PQL of 0.4 µg/L. None of the Six-Year 2/ERA data are below the current PQL. Although all of the Six-Year 1 passing rates, along with both regression lines, are well above 75%, the Six-Year 2/ERA passing rates display significant variability. Furthermore, three of the Six-Year 2/ERA passing rates are below 75%.

Exhibit 29: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Heptachlor



Conclusion for Heptachlor

Given the availability of limited data below the current PQL of 0.4 µg/L, but relatively high laboratory passing rates (well above 75%) below and in the vicinity of the PQL for the Six-Year 1 data, and a lack of data below the PQL for the Six-Year 2/ERA data, a reduction of the PQL may be considered. The passing rates in the vicinity of the PQL for the Six-Year 2/ERA data are variable which may not support the Six-Year 1 data conclusion that the PQL might be reduced. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Heptachlor Epoxide

Results of the Methods Comparison

Exhibit 30 summarizes the MDLs for heptachlor epoxide as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of heptachlor epoxide in drinking water samples during the years 2000-2007.

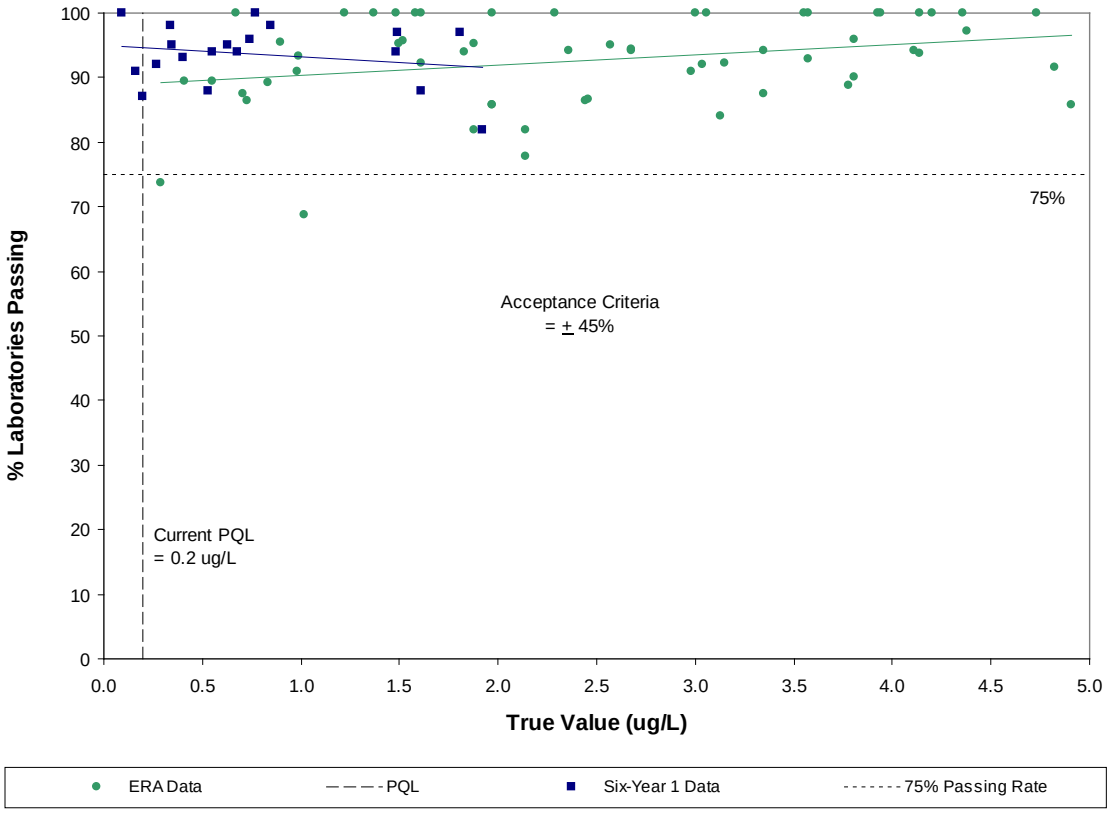
Exhibit 30: Analytical Methods for Heptachlor Epoxide

MCL = 0.0002 mg/L Current PQL = 0.0002 mg/L DL = 0.00002 mg/L Acceptance Criteria = ± 45%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
505	ME and GC	0.004
508	GC/ECD	0.0059
508.1	LSE and ECGC	0.001
525.2	LSE and CCGC/MS	0.048 - 0.13
551.1	LLE/GC w/ ECD	0.002 - 0.202
Notes: Regulatory DLs for synthetic organic compounds are listed at 40 CFR 141.24(h)(18). Acceptance Criteria for synthetic organic compounds are listed at 40 CFR 141.24(h)(19)(i)(B).		

Results of the PQL Analysis

The current PQL for heptachlor epoxide is 0.2 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 31). The Six-Year 1 PE data for heptachlor epoxide were evaluated but were not regressed as part of the March 2003 report. Three of the 19 spike values in the Six-Year 1 data are below the current PQL of 0.2 µg/L. None of the Six-Year 2/ERA data are below the current PQL. Although all of the Six-Year 1 passing rates, along with both regression lines, are well above 75%, the Six-Year 2/ERA passing rates displayed significant variability. Furthermore, two of the Six-Year 2/ERA passing rates near the PQL are below 75%.

Exhibit 31: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Heptachlor Epoxide



Conclusion for Heptachlor Epoxide

Given the availability of limited data below the current PQL of 0.2 µg/L, but relatively high laboratory passing rates (mostly >90%) below and in the vicinity of the PQL for the Six-Year 1 data, and a lack of data below the PQL for the Six-Year 2/ERA data, a reduction of the PQL may be considered. The passing rates in the vicinity of the PQL for the Six-Year 2/ERA data are highly variable which may not support the Six-Year 1 data conclusion that the PQL might be reduced. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Lindane

Results of the Methods Comparison

Exhibit 32 summarizes the MDLs for lindane as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of lindane in drinking water samples during the years 2000-2007.

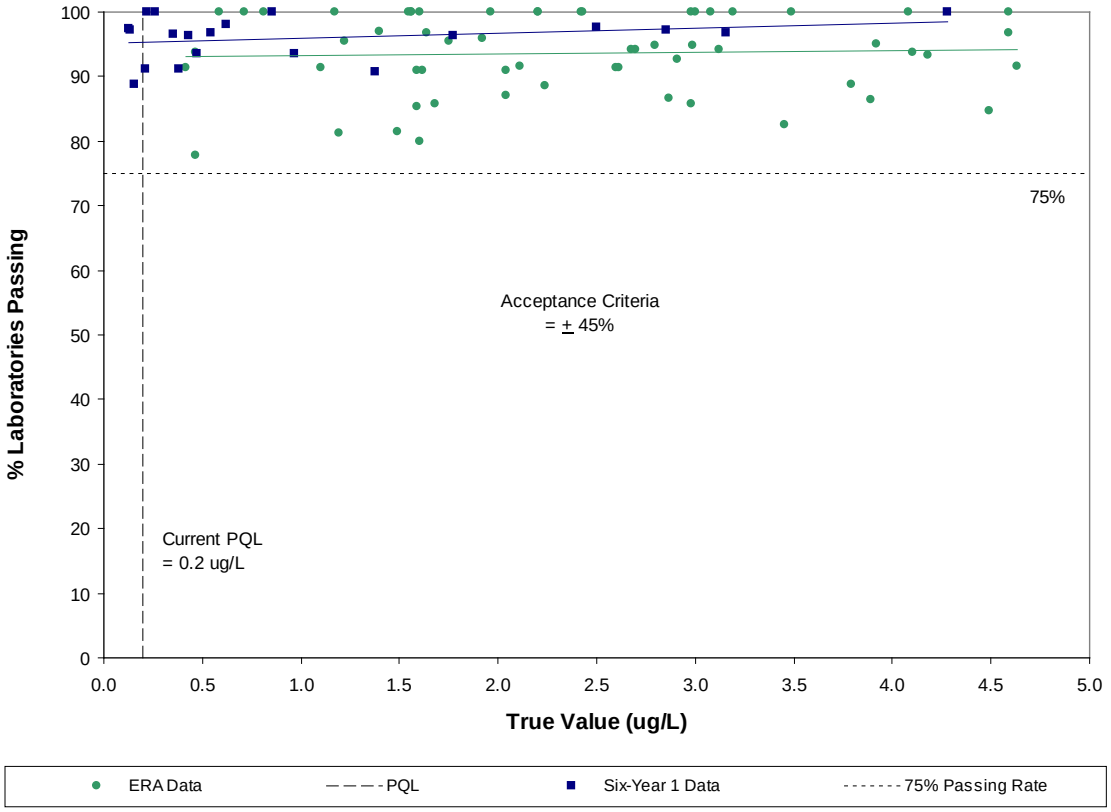
Exhibit 32: Analytical Methods for Lindane

MCL = 0.0002 mg/L Current PQL = 0.0002 mg/L DL = 0.00002 mg/L Acceptance Criteria = ± 45%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
505	ME and GC	0.003
508	GC/ECD	0.006
508.1	LSE and ECGC	0.006
525.2	LSE and CCGC/MS	0.047 - 0.15
551.1	LLE/GC w/ ECD	0.002 - 0.017
Notes: Regulatory DLs for synthetic organic compounds are listed at 40 CFR 141.24(h)(18). Acceptance Criteria for synthetic organic compounds are listed at 40 CFR 141.24(h)(19)(i)(B).		

Results of the PQL Analysis

The current PQL for lindane is 0.2 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 33). The Six-Year 1 PE data for lindane were not evaluated in the March 2003 report. Three of the 20 spike values in the Six-Year 1 data set are less than or equal to the current PQL of 0.2 µg/L. None of the Six-Year 2/ERA data are below the current PQL. All the passing rates in both data sets are above 75%. Furthermore, the regression lines are also well above 75%.

Exhibit 33: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Lindane



Conclusion for Lindane

Given the availability of limited data below the current PQL of 0.2 µg/L, but relatively high laboratory passing rates (well above 75%) below and in the vicinity of the PQL for the Six-Year 1 data, and a lack of data below the PQL for the Six-Year 2/ERA data, a reduction of the PQL may be considered. The passing rates in the vicinity of the PQL for the Six-Year 2/ERA data are somewhat variable, but all above 75%, which may support the Six-Year 1 data conclusion that the PQL might be reduced. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Toxaphene

Results of the Methods Comparison

Exhibit 34 summarizes the MDLs for toxaphene as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of toxaphene in drinking water samples during the years 2000-2007.

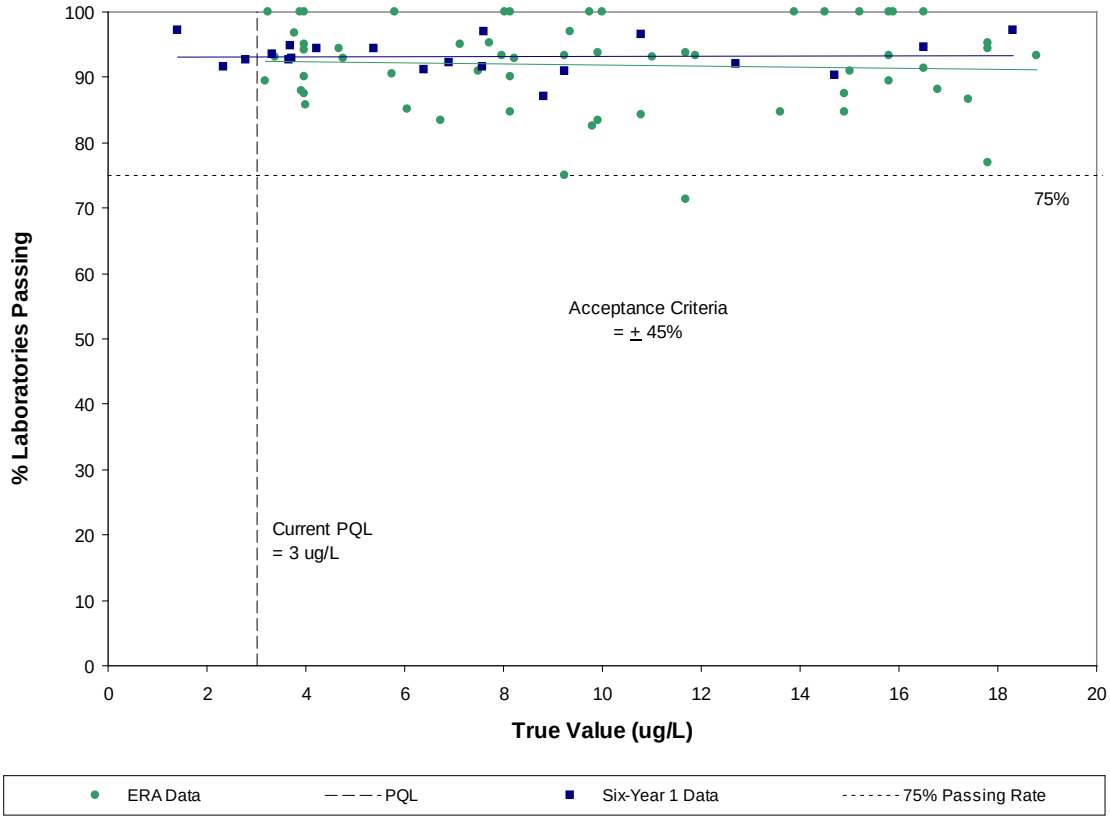
Exhibit 34: Analytical Methods for Toxaphene

MCL = 0.003 mg/L Current PQL = 0.003 mg/L DL = 0.001 mg/L Acceptance Criteria = ± 45%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
505	ME and GC	1.0
508	GC/ECD	Listed in Method; no MDLs determined
508.1	LSE and ECGC	0.13
525.2	LSE and CCGC/MS	1.0 - 1.7
Notes: Regulatory DLs for synthetic organic compounds are listed at 40 CFR 141.24(h)(18). Acceptance Criteria for synthetic organic compounds are listed at 40 CFR 141.24(h)(19)(i)(B).		

Results of the PQL Analysis

The current PQL for toxaphene is 3 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 35). The Six-Year 1 PE data for toxaphene were evaluated but were not regressed in the March 2003 report. Three of the 20 spike values in the Six-Year 1 data set are less than the current PQL of 3 µg/L. None of the Six-Year 2/ERA data are below the current PQL. All of the Six-Year 1 passing rates and regression line are well above 75%. Although the Six-Year 2/ERA data display some variability (and two of the passing rates are below 75%), the regression line is well above the 75% threshold.

Exhibit 35: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Toxaphene



Conclusion for Toxaphene

Given the availability of limited data below the current PQL of 3 µg/L, but relatively high laboratory passing rates (well above 75%) below and in the vicinity of the PQL for the Six-Year 1 data, and a lack of data below the PQL for the Six-Year 2/ERA data, a reduction of the PQL may be considered. The passing rates in the vicinity of the PQL for the Six-Year 2/ERA data are somewhat variable but all above 75%, which may support the Six-Year 1 data conclusion that the PQL might be reduced. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Vinyl Chloride

Results of the Methods Comparison

Exhibit 36 summarizes the MDLs for vinyl chloride as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of vinyl chloride in drinking water samples during the years 2000-2007.

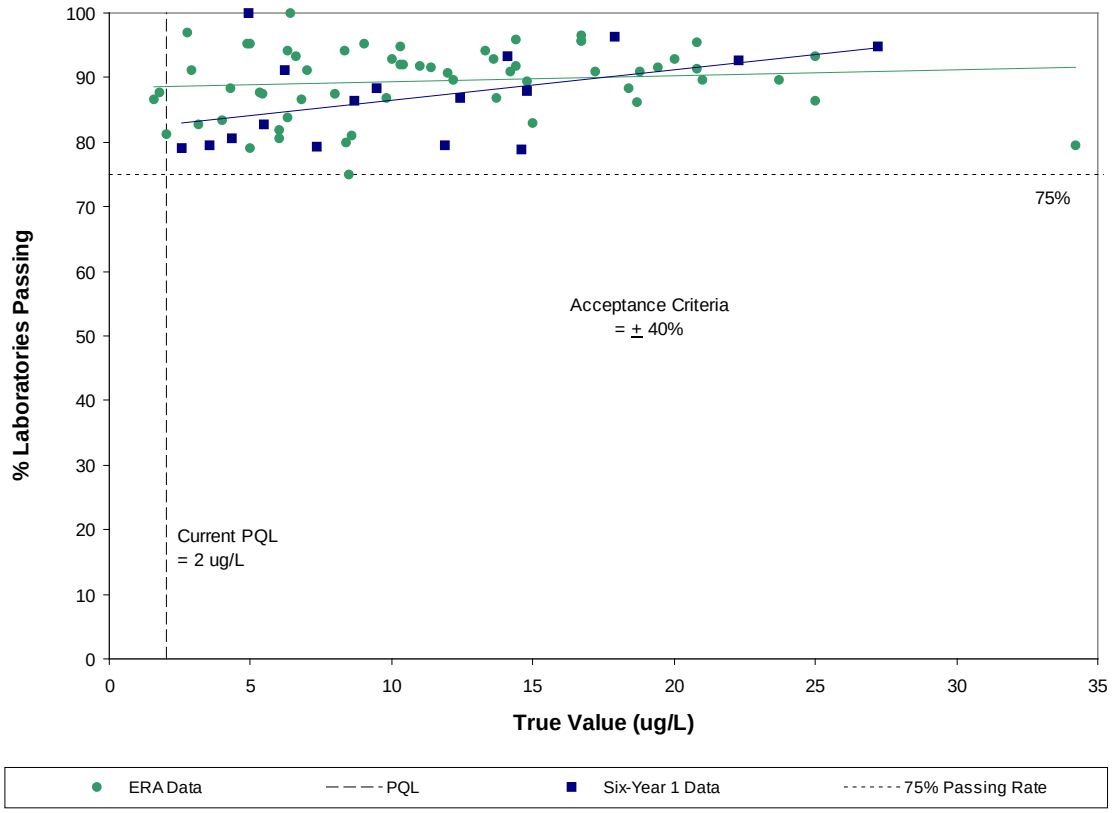
Exhibit 36: Analytical Methods for Vinyl Chloride

MCL = 0.002 mg/L Current PQL = 0.002 mg/L DL = 0.0005 mg/L Acceptance Criteria = ± 40%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
502.2	CCGC with PID/ ELCD	0.01 - 0.18
524.2	CCGC/MS	0.04 - 0.17
Notes: The regulatory DL for volatile organic compounds is listed at 40 CFR 141.24(k)(17)(ii)(C). Acceptance Criteria for volatile organic compounds are listed at 40 CFR 141.24(f)(17)(i).		

Results of the PQL Analysis

The current PQL for vinyl chloride is 5 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 37). The Six-Year 1 PE data for vinyl chloride were evaluated but were not regressed as part of the March 2003 report. No Six-Year 1 data are available below the current PQL of 5 µg/L. Two of the 60 spike values in the Six-Year 2/ERA data are below the current PQL (a third is equal to the PQL). All of the passing rates are above 75% (with the exception of one passing rate that is equal to 75%). Furthermore, the regression lines are well above 75%.

Exhibit 37: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Vinyl Chloride



Conclusion for Vinyl Chloride

Given the availability of limited data below the current PQL of 2 µg/L, but relatively high laboratory passing rates (well above 75%) below and in the vicinity of the PQL for the Six-Year 2/ERA data, and a lack of data below the PQL for the Six-Year 1 data, a reduction of the PQL may be considered. The passing rates in the vicinity of the PQL for the Six-Year 1 data are variable, but all are >75%, which may support the Six-Year 2/ERA data conclusion that the PQL might be reduced. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

6.1.3 PQL Assessment Does Not Support Reduction of the Current PQL or Data are Insufficient to Reach a Conclusion.

Of the 25 analytes mentioned in Section 6.1, eight analytes have an existing PQL that is equal to the MCL and their PE/PT data either indicate that the PQL should not be lower or their PE/PT data are insufficient to reach a conclusion.

Benzo(a)pyrene

Results of the Methods Comparison

Exhibit 38 summarizes the MDLs for benzo(a)pyrene as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of benzo(a)pyrene in drinking water samples during the years 2000-2007.

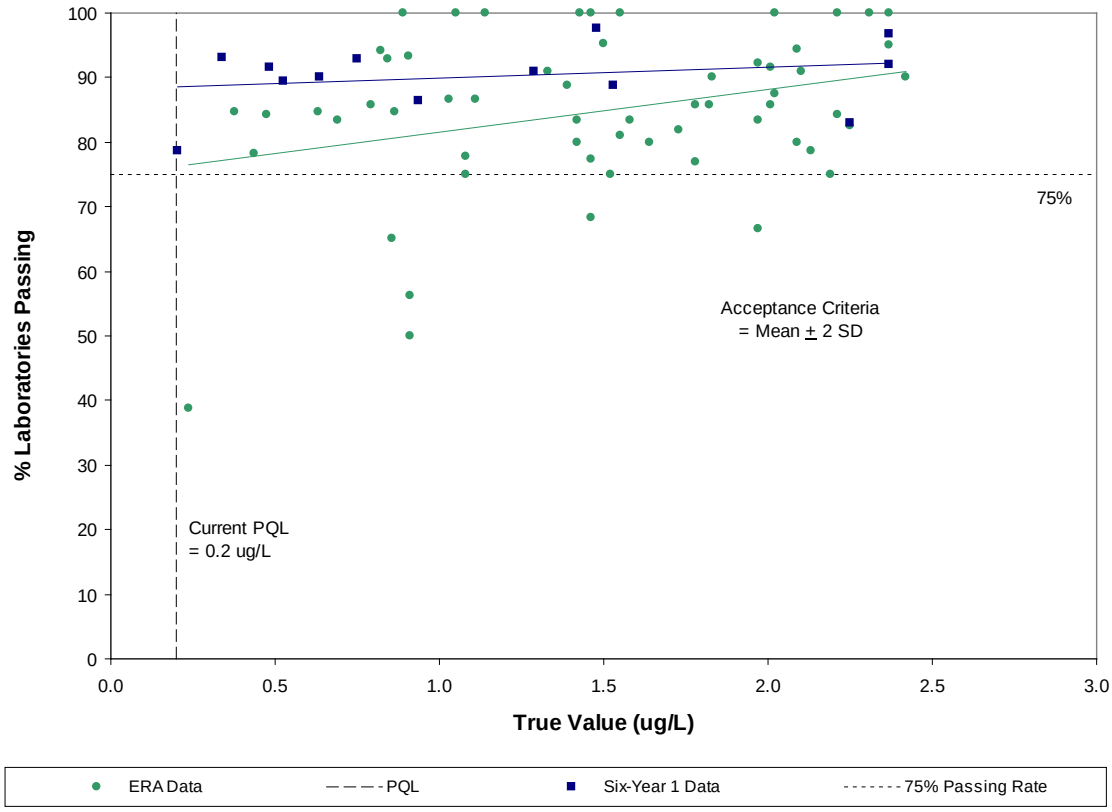
Exhibit 38: Analytical Methods for Benzo(a)pyrene

MCL = 0.0002 mg/L Current PQL = 0.0002 mg/L DL = 0.00002 mg/L Acceptance Criteria = Mean ± 2 Std Dev		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
525.2	LSE and CCGC/MS	0.032 - 0.23
550	LLE/HPLC w/ CUV and FD	0.029
550.1	LSE/HPLC w/ CUV and FD	0.016
Notes: Regulatory DLs for synthetic organic compounds are listed at 40 CFR 141.24(h)(18). Acceptance Criteria for synthetic organic compounds are listed at 40 CFR 141.24(h)(19)(i)(B).		

Results of the PQL Analysis

The current PQL for benzo(a)pyrene is 0.2 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 39). The Six-Year 1 PE data for benzo(a)pyrene were regressed as part of the March 2003 report. None of the Six-Year 1 or the Six-Year 2/ERA data set are below the current PQL of 0.2 µg/L. All of the passing rates in the Six-Year 1 data are above 75% while several passing rates in the Six-Year 2/ERA data are less than or equal to 75%.

Exhibit 39: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Benzo(a)pyrene



Conclusion for Benzo(a)pyrene

Although the laboratory passing rates for the Six-Year 1 data set are above 75%, the passing rates for the Six-Year 2/ERA data set are low in the vicinity of the PQL of 0.2 µg/L. It may not be appropriate to recommend lowering of the PQL due to the lack of data below the current PQL for both data sets and the variability of the Six-Year 2/ERA passing rates. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Bromate

Results of the Methods Comparison

Exhibit 40 summarizes the MDLs for bromate as documented in EPA-developed analytical methods. Four new analytical methods have been approved for the analysis of bromate in drinking water samples during the years 2000-2007 (EPA Methods 317.0 (Rev. 2.0), 321.8, 326.0, and ASTM D6581-00 [Federal Register, Vol. 71, No. 2, p. 388, January 4, 2006; see Exhibit A-1]). The MDLs/DLs for bromate by EPA Methods 317.0, 321.8 and 326.0 are lower than those for EPA Method 300.1, suggesting that laboratory performance at low concentrations may improve through use of Methods 317.0, 321.8 and 326.0. Since the new ASTM method is proprietary, it is uncertain whether new MDLs may be lower than those for other methods. Note that the acceptance criteria for bromate are given as ±2 SD. NELAC changed the acceptance criteria to ±30% in March 2007, but ±2 SD were in place during the generation of the PT data used in this report.

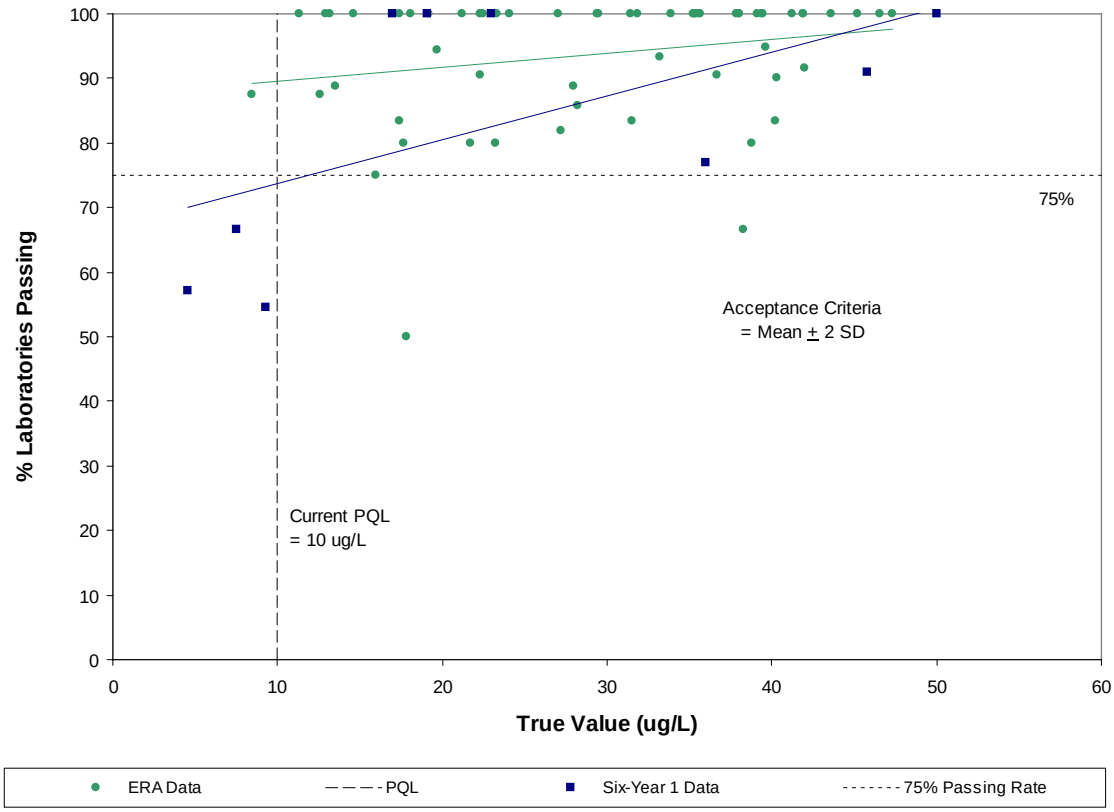
Exhibit 40: Analytical Methods for Bromate

MCL = 0.010 mg/L Current PQL = 0.01 mg/L DL = N/A Acceptance Criteria = Mean ± 2 Std Dev		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL mg/L**
300.1	IC	0.00128 - 0.00144
317.0	IC with postcolumn reagent	0.00012 – 0.00098
321.8	IC/ICP/MS	0.0003 (DL)
326.0	IC with suppressor acidified postcolumn reagent	0.00017 – 0.0012 (DL)
Notes: EPA has not provided a regulatory DL for bromate in the CFR. Acceptance Criteria for disinfection byproducts are listed at 40 CFR 141.131(b)(2)(ii). As of April 1, 2007, the Acceptance Criteria for bromate were changed to ± 30% (71 FR 388 1/4/2006).		

Results of the PQL Analysis

The current PQL for bromate 10 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 41). The Six-Year 1 PE data for bromate were not evaluated in the March 2003 report. Three of the nine spike values in the Six-Year 1 data set are below the current PQL of 10 µg/L. One of the 60 spike values in the Six-Year 2/ERA data set is below the PQL. Three of the Six-Year 1 concentrations and two of the Six-Year 2/ERA concentrations have passing rates of less than 75%.

Exhibit 41: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Bromate



Conclusion for Bromate

Although many of the laboratory passing rates for both the Six-Year 1 and Six-Year 2/ERA data sets are >75%, it may not be appropriate to recommend lowering of the PQL due to the low passing rates below the current PQL of 10 µg/L for the Six-Year 1 data set and the variability of the Six-Year 2/ERA data set in the vicinity of the PQL. However, the approval of EPA Methods 317.0 (Rev. 2.0) and 326.0 for the analysis of bromate provides lower MDLs that were achievable by use of other approved methods. This may lead to an overall improvement in analytical performance in the vicinity of the current PQL and could suggest possible reduction of the PQL.

Dichloromethane (Methylene chloride)

Results of the Methods Comparison

Exhibit 42 summarizes the MDLs for dichloromethane as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of dichloromethane in drinking water samples during the years 2000-2007.

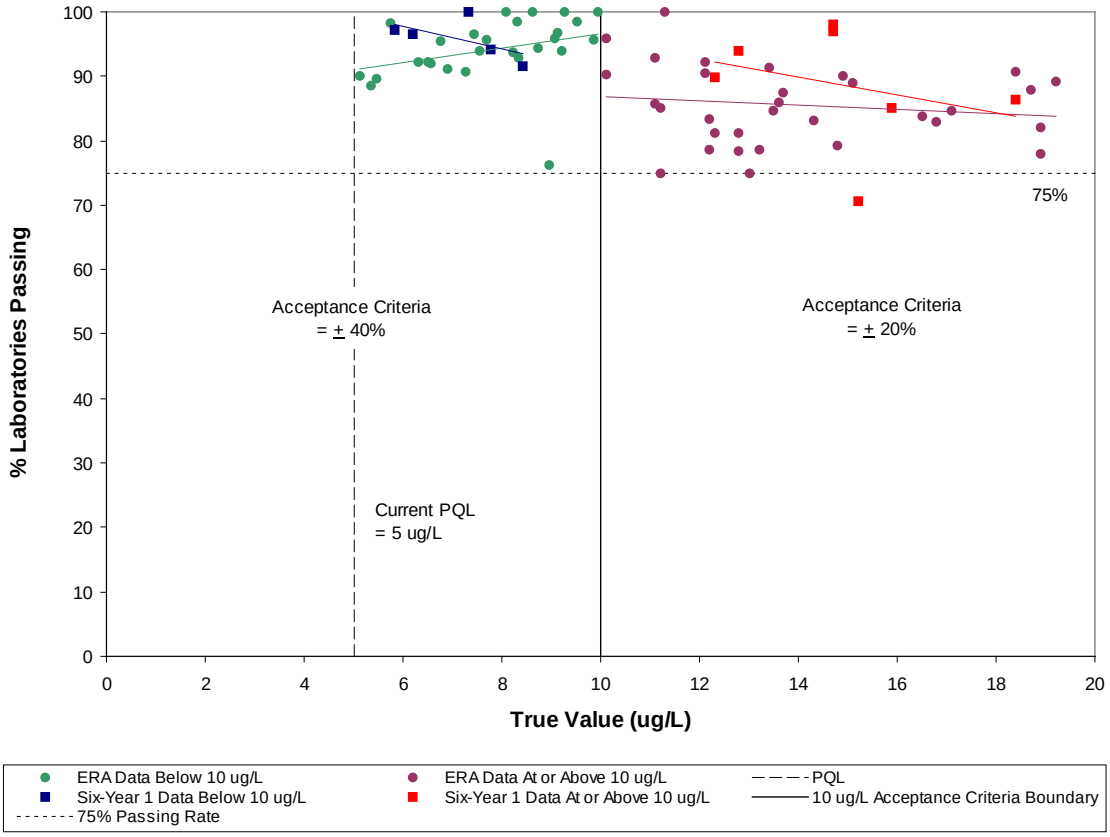
Exhibit 42: Analytical Methods for Dichloromethane

MCL = 0.005 mg/L Current PQL = 0.005 mg/L DL = 0.0005 mg/L Acceptance Criteria = ± 20% or 40%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
502.2	CCGC with PID/ ELCD	0.01 - 0.02
524.2	CCGC/MS	0.03 - 0.09
Notes: The regulatory DL for volatile organic compounds is listed at 40 CFR 141.24(k)(17)(ii)(C). Acceptance Criteria for volatile organic compounds are listed at 40 CFR 141.24(f)(17)(i).		

Results of the PQL Analysis

The current PQL for dichloromethane is 5 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 43). The Six-Year 1 PE data for dichloromethane were evaluated but not regressed in the March 2003 report. Note that the acceptance criteria are ± 40% at spike concentrations below 10 µg/L and ± 20% at or above 10 µg/L; hence the data are regressed as two independent populations. None of the Six-Year 1 or the Six-Year 2/ERA data are below the current PQL of 5 µg/L. All but one of the passing rates in the Six-Year 1 data are above 75%. Two of the passing rates in the Six-Year 2/ERA data are equal to 75%.

Exhibit 43: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Dichloromethane



Conclusion for Dichloromethane

Although most laboratory passing rates for both the Six-Year 1and Six-Year 2/ERA data sets are high (well above 75%) in the vicinity of the current PQL of 5 µg/L, it may not be appropriate to recommend lowering of the PQL due to the lack of data below the current PQL. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Di(2-ethylhexyl)phthalate (DEHP)

Results of the Methods Comparison

Exhibit 44 summarizes the MDLs for di(2-ethylhexyl)phthalate as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of DEHP in drinking water samples during the years 2000-2007.

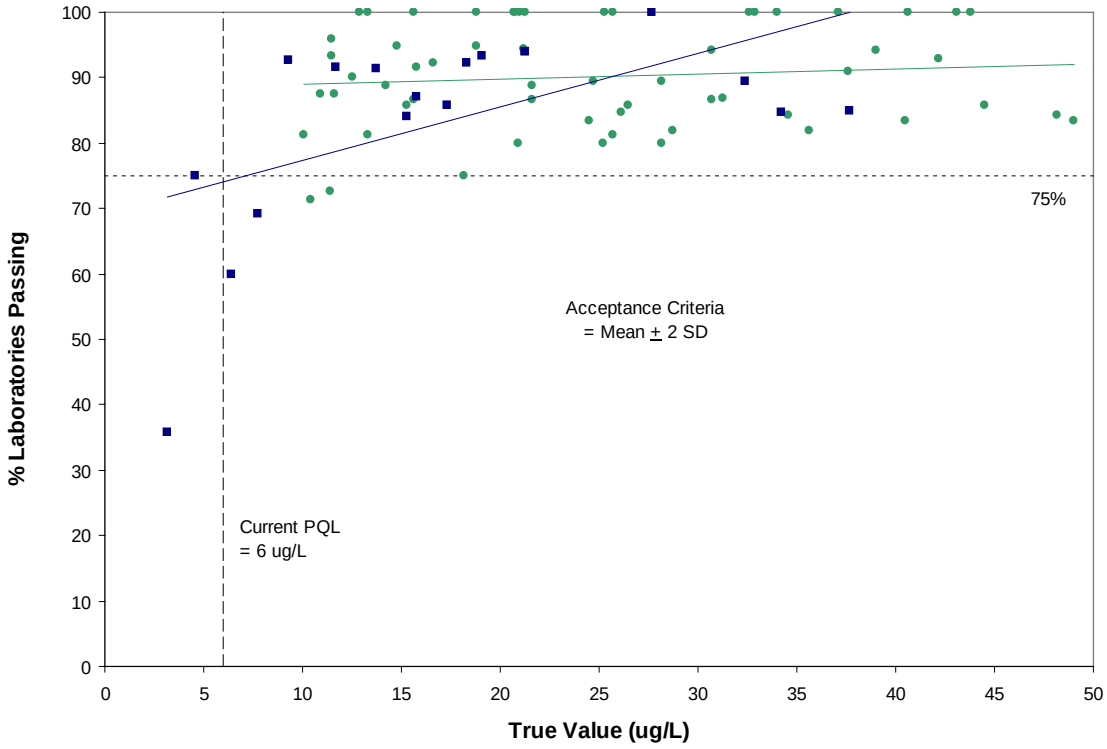
Exhibit 44: Analytical Methods for Di(2-ethylhexyl)phthalate

MCL = 0.006 mg/L Current PQL = 0.006 mg/L DL = 0.0006 mg/L Acceptance Criteria = Mean ± 2 Std Dev		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
506	LLE or LSE and GC/PID	2.25
525.2	LSE and CCGC/MS	0.46 - 1.3
Notes: Regulatory DLs for synthetic organic compounds are listed at 40 CFR 141.24(h)(18). Acceptance Criteria for synthetic organic compounds are listed at 40 CFR 141.24(h)(19)(i)(B).		

Results of the PQL Analysis

The current PQL for DEHP is 6 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 45). The Six-Year 1 PE data for DEHP were regressed as part of the March 2003 report. Two of the 18 spike values in the Six-Year 1 data set are below the current PQL of 6 µg/L. None of the Six-Year 2/ERA data are below the current PQL. Four concentrations from the Six-Year 1 data set (two below the current PQL and two in the vicinity of the current PQL) have passing rates of less than or equal to 75%. Three of the Six-Year 2/ERA passing rates are less than or equal to 75%.

Exhibit 45: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Di(2-ethylhexyl)phthalate



Conclusion for Di(2-ethylhexyl)phthalate

Given the low laboratory passing rates below and in the vicinity of the PQL of 6 µg/L for the Six-Year 1 data set and the lack of data below the PQL and the variability of the Six-Year 2/ERA data set, it is may not be appropriate to recommend lowering of the PQL. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Ethylene dibromide (EDB)

Results of the Methods Comparison

Exhibit 46 summarizes the MDLs for ethylene dibromide as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of EDB in drinking water samples during the years 2000-2007.

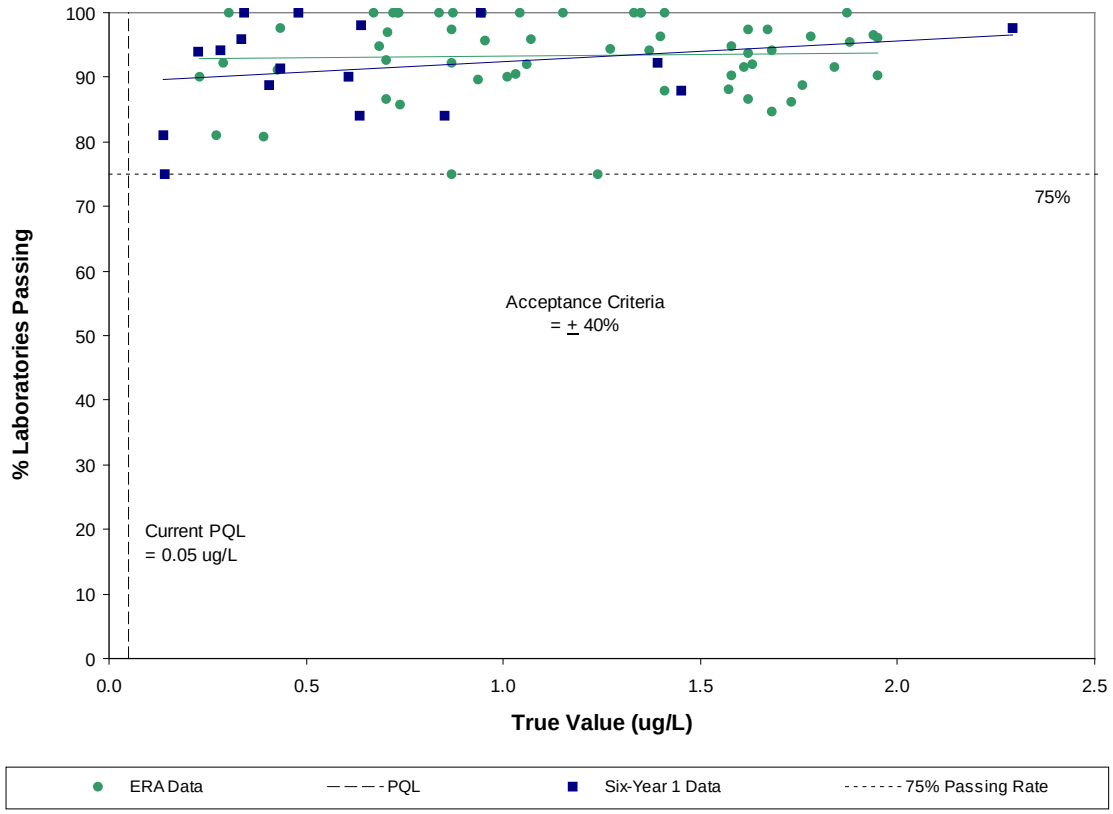
Exhibit 46: Analytical Methods for Ethylene Dibromide

MCL = 0.00005 mg/L Current PQL = 0.00005 mg/L DL = 0.00001 mg/L Acceptance Criteria = ± 40%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
504.1	ME and GC	0.01
551.1	LLE/GC w/ ECD	0.007 - 0.032
Notes: Regulatory DLs for synthetic organic compounds are listed at 40 CFR 141.24(h)(18). Acceptance Criteria for synthetic organic compounds are listed at 40 CFR 141.24(h)(19)(i)(B).		

Results of the PQL Analysis

The current PQL for EDB is 0.05 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 47). The Six-Year 1 PE data for EDB were evaluated but not regressed in the March 2003 report. None of the Six-Year 1 or the Six-Year 2/ERA PT data for EDB are below the current PQL of 0.05 µg/L. Nearly all of the passing rates in the Six-Year 1 and Six-Year 2/ERA data set are above 75% (with the exception of three passing rates equal to 75%).

Exhibit 47: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Ethylene Dibromide



Conclusion for Ethylene Dibromide

Although most passing rate of laboratories for both Six-Year 2/ERA and Six-Year 1 data sets are high (≥ 75%), it may not be appropriate to recommend lowering of the PQL due to the lack of data below or in the vicinity of the current PQL of 0.05 µg/L. The variability in the passing rates for both data sets further supports this recommendation. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Pentachlorophenol

Results of the Methods Comparison

Exhibit 48 summarizes the MDLs for pentachlorophenol as documented in EPA-developed analytical methods. Updates to one method (ASTM D5317-98) have been approved for the analysis of pentachlorophenol in drinking water samples during the years 2000-2007 (see Exhibit A-1). These updates are minor technical revisions that are not anticipated to improve analytical performance near the PQL. In addition, a new method, EPA Method 515.4, was approved (Federal Register, Vol. 67, No. 209, p. 65888, October 29, 2002; see Exhibit A-1). The low end of the MDL range for pentachlorophenol by EPA Method 515.4 is lower than that obtained from other approved methods, which suggests that laboratory performance at low concentrations may be improved through use of Method 515.4.

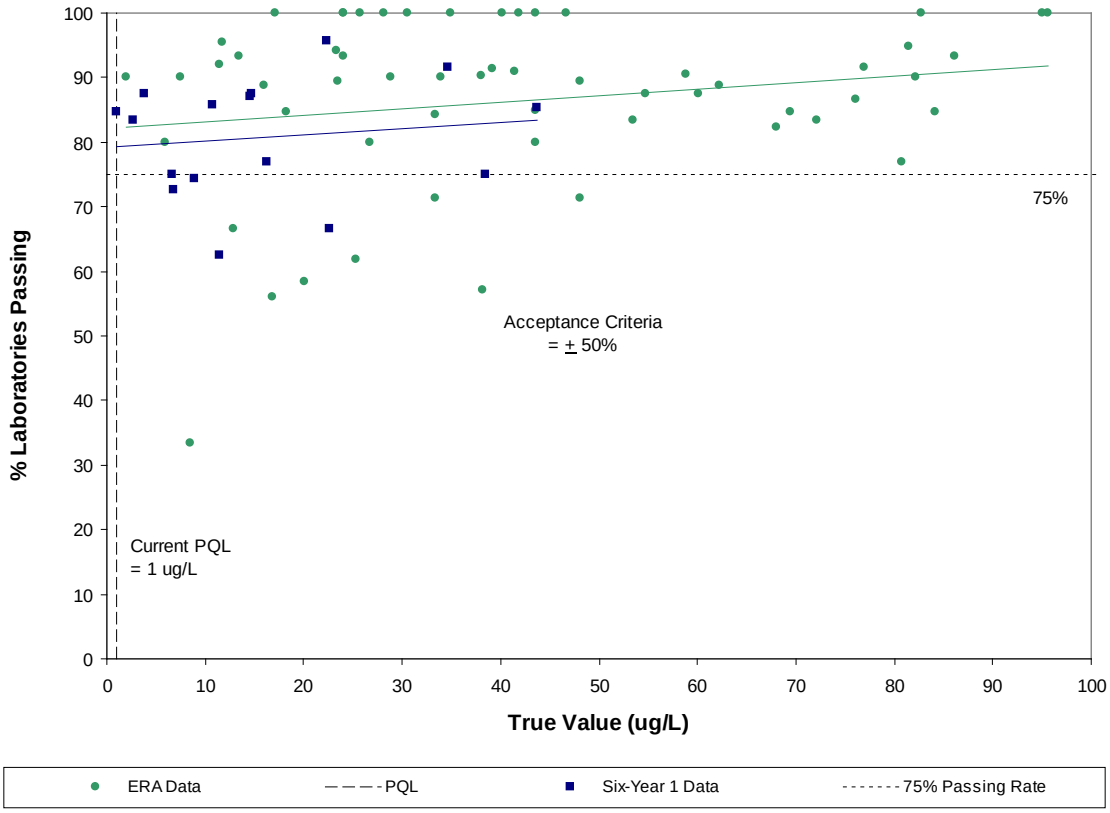
Exhibit 48: Analytical Methods for Pentachlorophenol

MCL = 0.001 mg/L Current PQL = 0.001 mg/L DL = 0.00004 mg/L Acceptance Criteria = ± 50%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
515.1	GC/ECD	0.032
515.2	LSE and GC/ECD	0.16
515.3	LLED and GC/ELCD	0.021 - 0.085
515.4	LLMED and GC/ECD	0.014 – 0.084
525.2	LSE and CCGC/MS	0.72 - 1.0
555	HPLC/PDAUVD	0.15 - 1.6
Notes: Regulatory DLs for synthetic organic compounds are listed at 40 CFR 141.24(h)(18). Acceptance Criteria for synthetic organic compounds are listed at 40 CFR 141.24(h)(19)(i)(B).		

Results of the PQL Analysis

The current PQL for pentachlorophenol is 1 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 49). The Six-Year 1 PE data for pentachlorophenol were regressed as part of the March 2003 report. Only one of the 16 spike values in the Six-Year 1 data set is below the current PQL of 1 µg/L. None of the Six-Year 2/ERA data are below the current PQL. Passing rates for both data sets are highly variable.

Exhibit 49: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Pentachlorophenol



Conclusion for Pentachlorophenol

Given the limited data below the PQL of 1 µg/L (only one Six-Year 1 datum just below the PQL) and the high variability in the passing rates in the vicinity of the PQL for both the Six-Year 1 and the Six-Year 2/ERA data sets, it may not be appropriate to recommend lowering of the PQL. However, the approval of EPA Method 515.4 for the analysis of pentachlorophenol provides a lower MDL than was achievable by use of other approved methods. This may lead to an overall improvement in analytical performance in the vicinity of the current PQL and could suggest possible reduction of the PQL.

Polychlorinatedbiphenyls (PCBs) as Decachlorobiphenyl (DCBP)

Results of the Methods Comparison

Exhibits 50 and 51 summarize the MDLs for polychlorinatedbiphenyls as documented in EPA-developed analytical methods. Note that the PE/PT data and the MCL for PCBs are based on PCBs as decachlorobiphenyl. Performing this analysis involves a perchlorination step that converts mono- to octa-chlorinated biphenyl to the completely chlorinated perchlorobiphenyl or decachlorobiphenyl (see EPA Method 508A below). However, PCBs may also be quantitated as carbon:chlorine mass ratio groups known as aroclors. EPA Method 508A must be used for compliance if aroclor screening (e.g., qualitative identification) indicates the presence of PCBs. Available MDLs for both groups are given in Exhibits 50 and 51. No updated or new analytical methods have been approved for the analysis of PCBs in drinking water samples during the years 2000-2007.

Exhibit 50: Analytical Methods for PCBs: As Decachlorobiphenyl

MCL = 0.0005 mg/L Current PQL = 0.0005 mg/L DL = 0.0001 mg/L Acceptance Criteria = ± 100%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
508A	Perchlorination/GC (2-Chlorobiphenyl as source)	0.08
Notes: Regulatory DLs for synthetic organic compounds are listed at 40 CFR 141.24(h)(18). Acceptance Criteria for synthetic organic compounds are listed at 40 CFR 141.24(h)(19)(i)(B).		

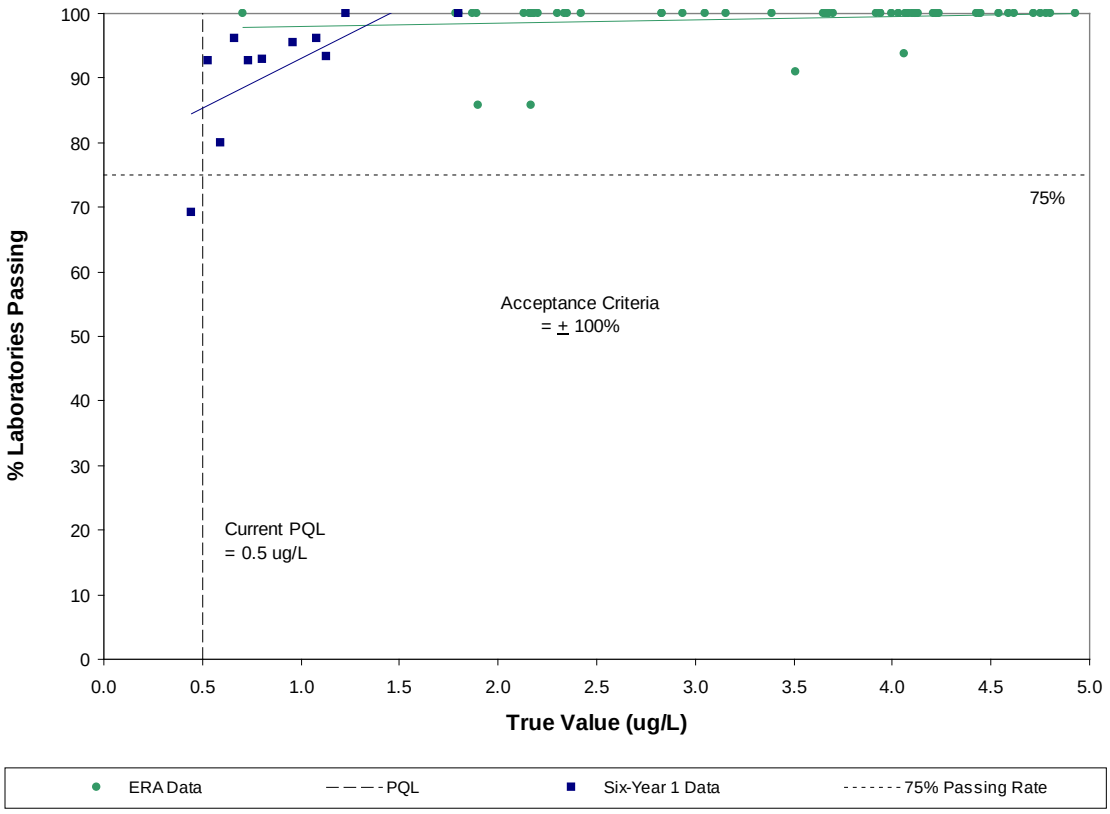
Exhibit 51: Analytical Methods for PCBs: As Aroclors

MCL = 0.0005 mg/L Current PQL = 0.0005 mg/L DL = 0.00008-0.02 mg/L Acceptance Criteria = ± 100%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
505	ME and GC	0.08 - 15.0
508	GC/ECD	No MDLs
508.1	LSE and ECGC	0.012 - 0.044
525.2	LSE and CCGC/MS	0.018 - 0.56
Notes: Regulatory DLs for PCBs as Aroclors are listed at 40 CFR 141.24(h)(13)(2). Acceptance Criteria for synthetic organic compounds are listed at 40 CFR 141.24(h)(19)(i)(B). Note that use of these methods is only permitted for screening of drinking water samples. Demonstration of compliance with the MCL if Aroclors are detected must be performed in accordance with EPA Method 508A (see Exhibit 50).		

Results of the PQL Analysis

The current PQL for PCBs is 0.5 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 52). The Six-Year 1 PE data for PCBs were evaluated but were not regressed as part of the March 2003 report. Only one of the 11 spike values in the Six-Year 1 data set is below the current PQL of 0.5 µg/L. None of the Six-Year 2/ERA data are below the current PQL. Passing rates in the vicinity of the current PQL are highly variable.

Exhibit 52: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – PCBs



Conclusion for Polychlorinatedbiphenyls

Although the Six-Year 2/ERA laboratory passing rates are high (well above 75%), given the low laboratory passing rates and decreasing trend in laboratory passing rates below and in the vicinity of the PQL of 0.5 µg/L for the Six-Year 1 data set and the lack of data below the PQL for the Six-Year 2/ERA data set, it may not be appropriate to recommend lowering of the PQL. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Thallium

Results of the Methods Comparison

Exhibit 53 summarizes the MDLs for thallium as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of thallium in drinking water samples during the years 2000-2007.

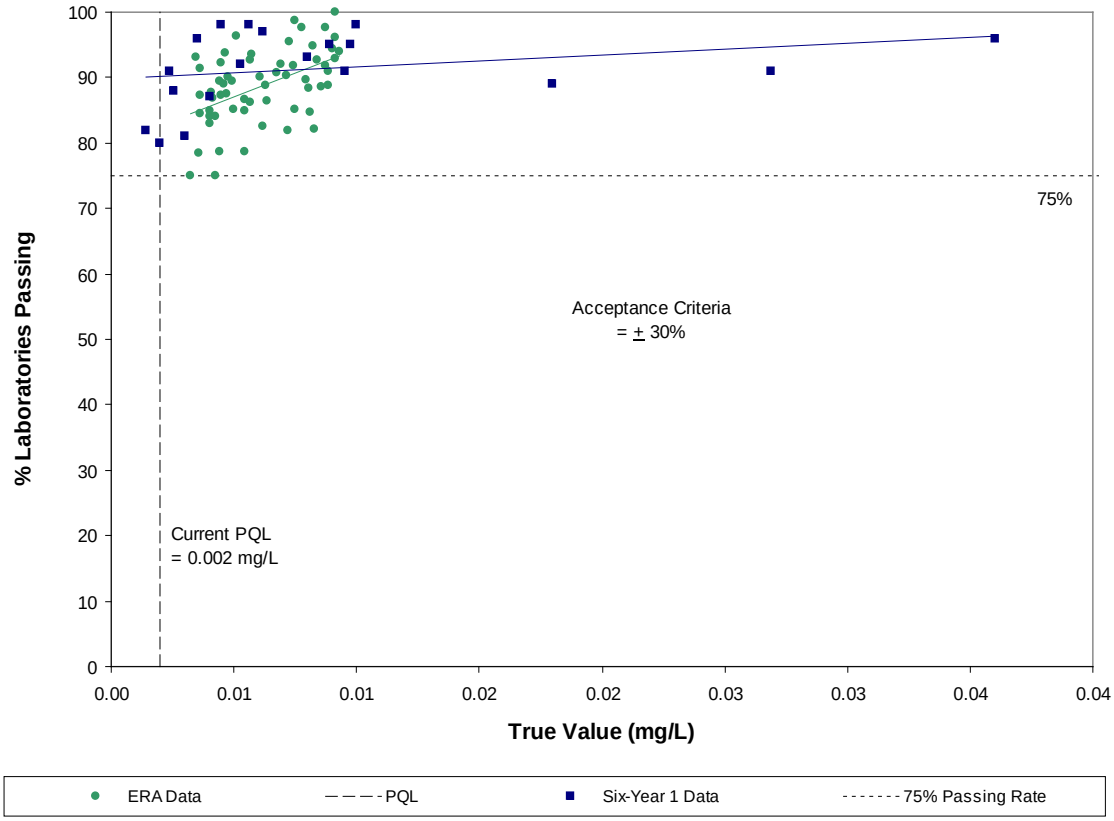
Exhibit 53: Analytical Methods for Thallium

MCL = 0.002 mg/L Current PQL = 0.002 mg/L DL = 0.0003-0.001 mg/L Acceptance Criteria = ± 30%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL mg/L**
200.8	ICP/MS	0.00001 - 0.0003
200.9	GFAA	0.0007
Notes: Regulatory DLs for inorganic compounds are listed at 40 CFR 141.23(a)(4)(i). Acceptance Criteria for inorganic compounds are listed at 40 CFR 141.23(k)(3)(ii).		

Results of the PQL Analysis

The current PQL for thallium is 0.002 mg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 54). The Six-Year 1 PE data for thallium were evaluated but were not regressed in the March 2003 report. Only one of the 19 spike values in the Six-Year 1 data set is less than the current PQL of 0.002 mg/L. None of the Six-Year 2/ERA data are below the current PQL. Nearly all of the passing rates in both data sets are above 75% (with the exception of two passing rates in the Six-Year 2/ERA data that are equal to 75%). In addition, both regression lines are well above 75%.

Exhibit 54: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Thallium



Conclusion for Thallium

Although the Six-Year 1 laboratory passing rates are high (above 75%) below and in the vicinity of the PQL of 0.002 mg/L, given the lack of data below the PQL and the lower laboratory passing rates in the vicinity of the PQL for the Six-Year 2/ERA data set, it may not be appropriate to recommend lowering of the PQL. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

6.2 Analytes with Maximum Contaminant Level (MCL) Greater Than the Current PQL and Thus it is Technically Feasible to Reduce an MCL

The analytes in this category have an existing PQL that is less than the MCL. If new health information were to become available for any of these analytes, causing EPA to consider reducing the MCL, the existing PQL would not hinder reduction of the MCL (to the level of the current PQL). Forty-one analytes fit into this category. These 41 analytes can be further categorized into the three groups mentioned in Section 6.0 depending on whether or not the PE/PT assessments support the further reduction of the current PQL.

6.2.1 PQL Assessment Supports Reduction of the Current PQL

Of the 41 analytes mentioned above, 11 analytes have an existing PQL that is less than the MCL and their PE/PT data suggest that the PQL could be lower.

Barium

Results of the Methods Comparison

Exhibit 55 summarizes the MDLs for barium as documented in EPA-developed analytical methods. Updates to three methods have been approved for the analysis of barium in drinking water samples during the years 2000-2007 (see Exhibit A-1). These updates are associated with administrative and technical changes or clarifications that are not expected to improve analytical performance near the PQL. The updated methods are proprietary and are not listed in Exhibit 55.

Exhibit 55: Analytical Methods for Barium

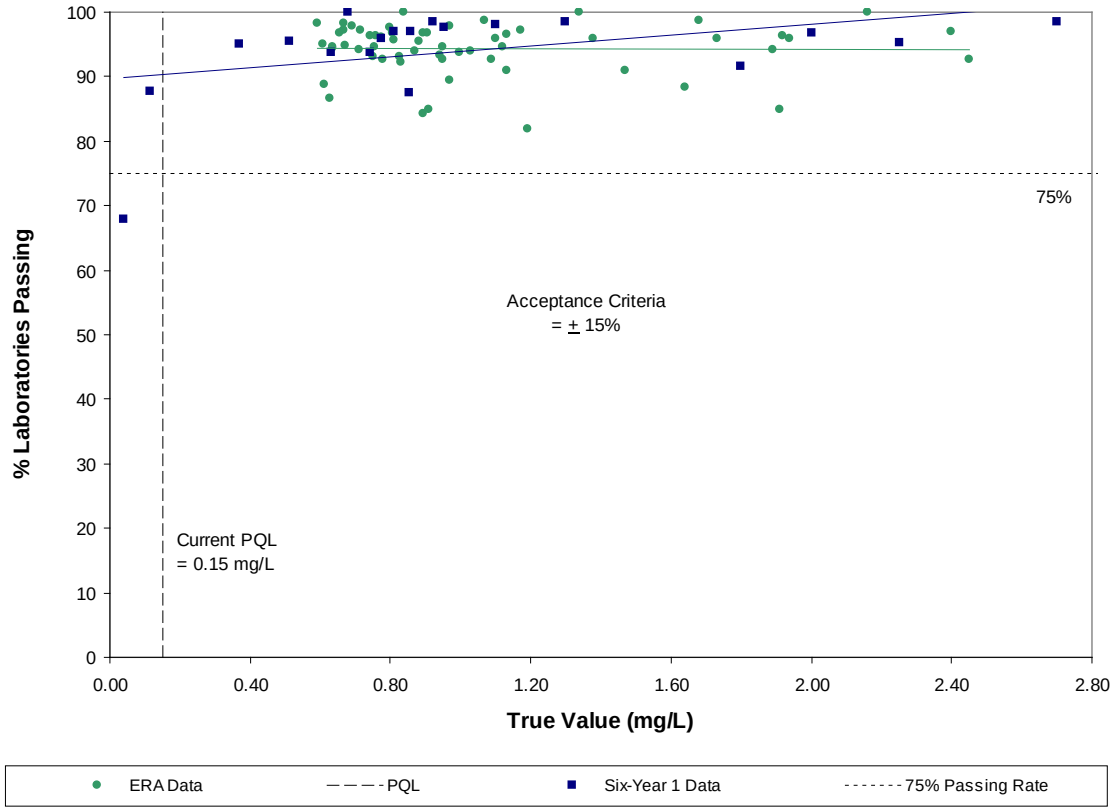
MCL = 2 mg/L Current PQL = 0.15 mg/L DL = 0.002-0.1 mg/L Acceptance Criteria = ± 15%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL mg/L**
200.7	ICP-AES	0.001
200.8	ICP/MS	0.00004 - 0.0008
Notes: Regulatory DLs for inorganic compounds are listed at 40 CFR 141.23(a)(4)(i). Acceptance Criteria for inorganic compounds are listed at 40 CFR 141.23(k)(3)(ii).		

Results of the PQL Analysis

The current PQL for barium is 0.15 mg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 56). The Six-Year 1 PE data for barium were not evaluated in the March 2003 report. Two of the 19 spike values in the Six-Year 1 data set are below the current PQL of 0.15 mg/L. No Six-Year 2/ERA data are below the current PQL. With the

exception of one spike value in the Six-Year 1 data, all of the passing rates exceed 75%. Both the Six-Year 1 and ERA regression lines are well above 75%.

Exhibit 56: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Barium



Conclusion for Barium

The high laboratory passing rates (well above 75%) at just below and in the vicinity of the current PQL of 15 mg/L for the Six-Year 1 data set suggest that the PQL could be lower; however any reduction might be small due to the lower passing rate at the lowest spike concentration. Although there are no Six-Year 2/ERA data below the PQL, laboratory passing rates in the vicinity of the PQL are also high, which may support the Six-Year 1 data conclusion that the PQL could be lower. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

1,4-Dichlorobenzene

Results of the Methods Comparison

Exhibit 57 summarizes the MDLs for 1,4-dichlorobenzene as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of 1,4-dichlorobenzene in drinking water samples during the years 2000-2007.

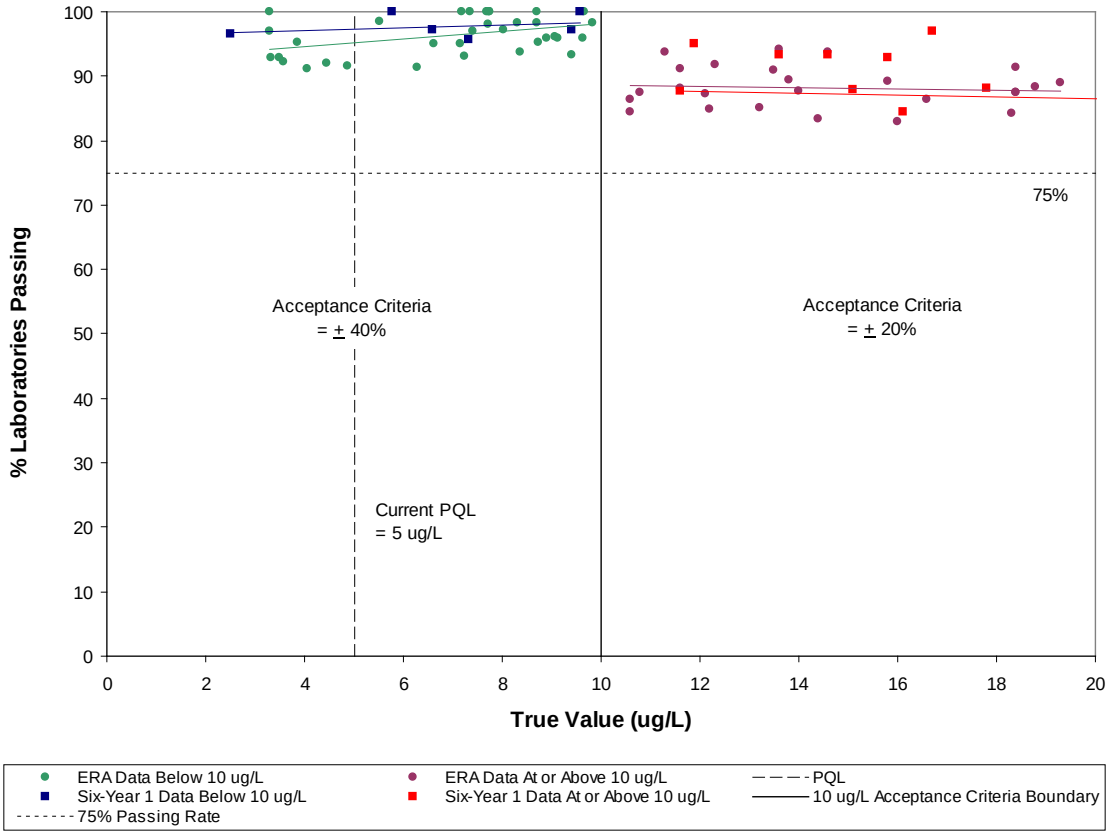
Exhibit 57: Analytical Methods for 1,4-Dichlorobenzene

MCL = 0.075 mg/L Current PQL = 0.005 mg/L DL = 0.0005 mg/L Acceptance Criteria = ± 20% or 40%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
502.2	CCGC with PID/ ELCD	0.01 - 0.04
524.2	CCGC/MS	0.03 - 0.04
Notes: The regulatory DL for volatile organic compounds is listed at 40 CFR 141.24(k)(17)(ii)(C). Acceptance Criteria for volatile organic compounds are listed at 40 CFR 141.24(f)(17)(i).		

Results of the PQL Analysis

The current PQL for 1,4-dichlorobenzene is 5 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 58). The Six-Year 1 PE data for 1,4-dichlorobenzene were evaluated but were not regressed as part of the March 2003 report. Note that the acceptance criteria are ± 40% at spike concentrations below 10 µg/L and ± 20% at or above 10 µg/L; hence the data are regressed as two independent populations. One of the 17 spike values from the Six-Year 1 data is below the current PQL of 5 µg/L. Nine of the 60 Six-Year 2/ERA spike values are at or below the current PQL. All of the passing rates for the Six-Year 1 and Six-Year 2/ERA data are well above 75%.

Exhibit 58: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – 1,4-Dichlorobenzene



Conclusion for 1,4-Dichlorobenzene

The high laboratory passing rates (well above 75%) at concentrations below the current PQL of 5 µg/L for both the Six-Year 1 and Six-Year 2/ERA data sets suggest that the PQL could be lower. Although there is only one Six-Year 1 datum below the PQL, laboratory passing rates below and in the vicinity of the PQL are well above 75%, which supports the Six-Year 2/ERA data conclusion that the PQL could be lower. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

cis-1,2-Dichloroethylene

Results of the Methods Comparison

Exhibit 59 summarizes the MDLs for *cis*-1,2-dichloroethylene as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of *cis*-1,2-dichloroethylene in drinking water samples during the years 2000-2007.

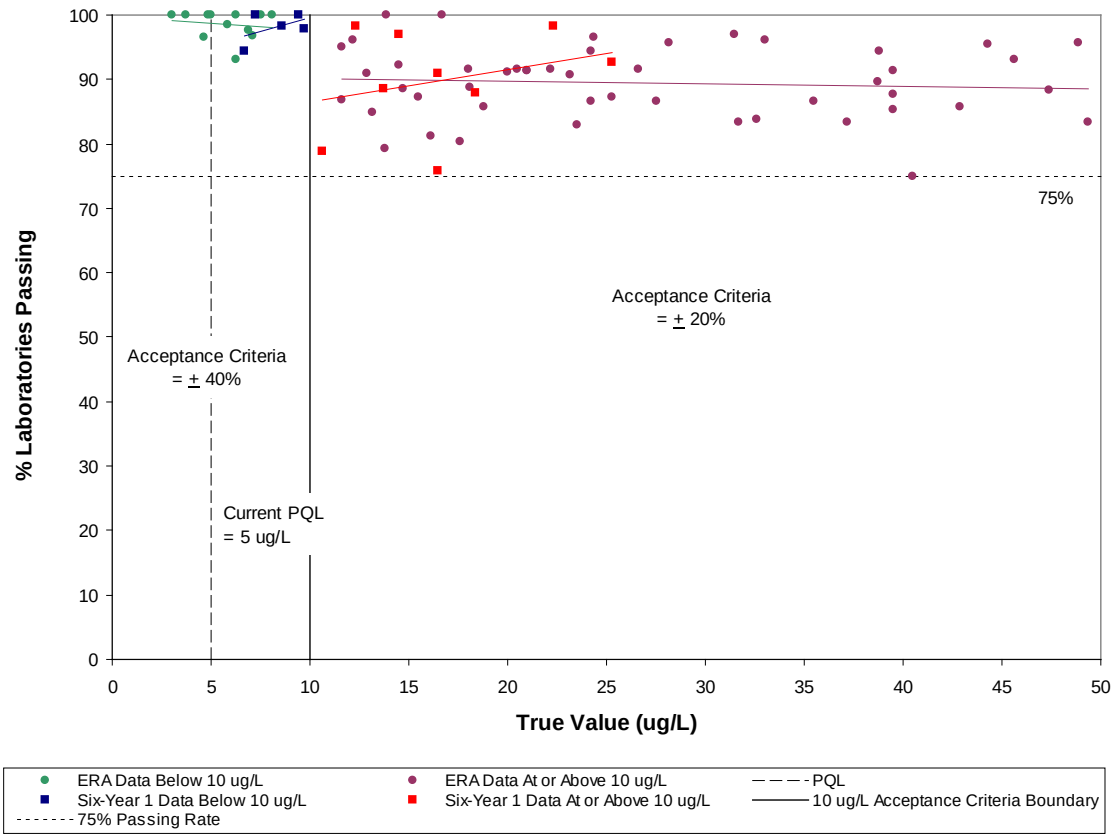
Exhibit 59: Analytical Methods for *cis*-1,2-Dichloroethylene

MCL = 0.07 mg/L Current PQL = 0.005 mg/L DL = 0.0005 mg/L Acceptance Criteria = ± 20% or 40%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
502.2	CCGC with PID/ ELCD	0.01 - 0.05
524.2	CCGC/MS	0.06 - 0.12
Notes: The regulatory DL for volatile organic compounds is listed at 40 CFR 141.24(k)(17)(ii)(C). Acceptance Criteria for volatile organic compounds are listed at 40 CFR 141.24(f)(17)(i).		

Results of the PQL Analysis

The current PQL for *cis*-1,2-dichloroethylene is 5 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 60). The Six-Year 1 PE data for *cis*-1,2-dichloroethylene were not evaluated as part of the March 2003 report. Note that the acceptance criteria are ± 40% at spike concentrations below 10 µg/L and ± 20% at or above 10 µg/L; hence the data are regressed as two independent populations. No Six-Year 1 data are available below the current PQL of 5 µg/L. Five of the 60 spike values in the Six-Year 2/ERA data are below the current PQL. All of the passing rates are above 75% (with the exception of one passing rate equal to 75%).

Exhibit 60: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – *cis*-1,2-Dichloroethylene



Conclusion for *cis*-1,2-Dichloroethylene

The high laboratory passing rates (well above 75%) at concentrations below the current PQL of 5 µg/L for the Six-Year 2/ERA data set suggest that the PQL could be lower. Although there are no Six-Year 1 data below the PQL, laboratory passing rates in the vicinity of the PQL are also high, which may support the Six-Year 2/ERA data conclusion that the PQL could be lower. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

1,1-Dichloroethylene

Results of the Methods Comparison

Exhibit 61 summarizes the MDLs for 1,1-dichloroethylene as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of 1,1-dichloroethylene in drinking water samples during the years 2000-2007.

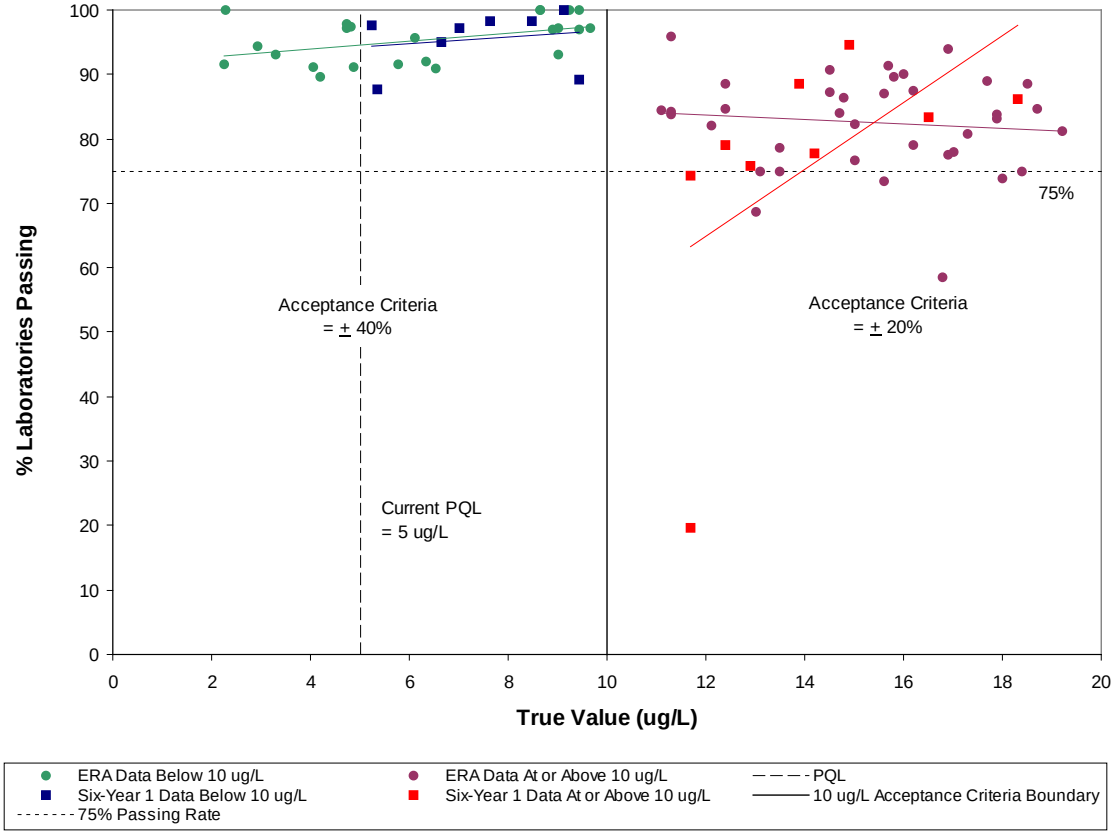
Exhibit 61: Analytical Methods for 1,1-Dichloroethylene

MCL = 0.007 mg/L Current PQL = 0.005 mg/L DL = 0.0005 mg/L Acceptance Criteria = ± 20% or 40%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
502.2	CCGC with PID/ ELCD	0.04 - 0.1
524.2	CCGC/MS	0.05 - 0.12
Notes: The regulatory DL for volatile organic compounds is listed at 40 CFR 141.24(k)(17)(ii)(C). Acceptance Criteria for volatile organic compounds are listed at 40 CFR 141.24(f)(17)(i).		

Results of the PQL Analysis

The current PQL for 1,1-dichloroethylene is 5 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 62). The Six-Year 1 PE data for 1,1-dichloroethylene were evaluated but were not regressed as part of the March 2003 report. Note that the acceptance criteria are ± 40% at spike concentrations below 10 µg/L and ± 20% at or above 10 µg/L; hence the data are regressed as two independent populations. No Six-Year 1 data are available below the current PQL of 5 µg/L. Ten of the 60 spike values in the Six-Year 2/ERA data are below the current PQL. While three of the four regression lines are above the 75% passing rate threshold, a few passing rates (all above the current PQL) are below 75%. One of the Six-Year 1 spike values (equal to 11.7 µg/L) has a passing rate of just under 20%. This causes the Six-Year 1 regression line to cross below the 75% threshold. This potential outlier represents 56 laboratories, of which 45 failed. It is possible (but uncertain) that this low passing rate is not due to poor laboratory performance but rather to an erroneous PE sample or other aberration, since low "national" passing rates around 20% are very uncommon. The more recent Six-Year 2/ERA data support generally high laboratory performance.

Exhibit 62: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – 1,1-Dichloroethylene



Conclusion for 1,1-Dichloroethylene

The high laboratory passing rates (well above 75%) at concentrations below the current PQL of 5 µg/L for the Six-Year 2/ERA data set suggest that the PQL could be lower. Although there are no Six-Year 1 data below the PQL, laboratory passing rates in the vicinity of the PQL are also high, which may support the Six-Year 2/ERA data conclusion that the PQL could be lower. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Ethylbenzene

Results of the Methods Comparison

Exhibit 63 summarizes the MDLs for ethylbenzene as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of ethylbenzene in drinking water samples during the years 2000-2007.

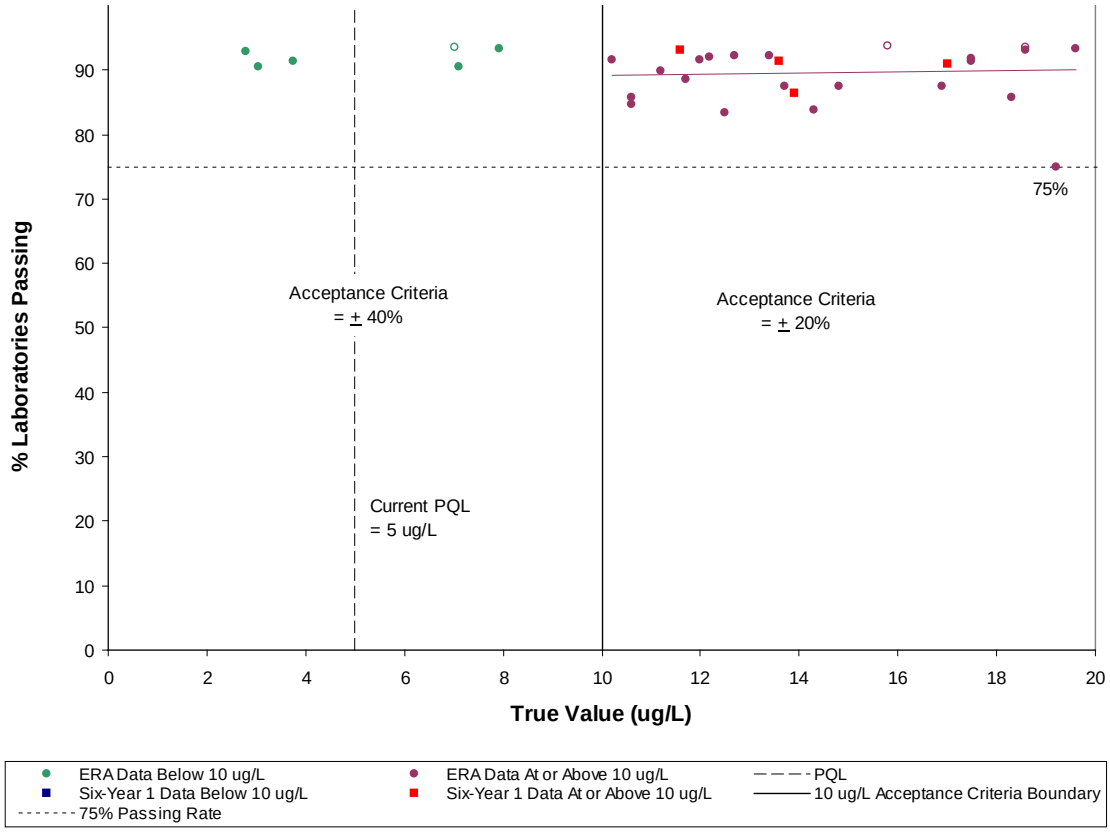
Exhibit 63: Analytical Methods for Ethylbenzene

MCL = 0.7 mg/L Current PQL = 0.005 mg/L DL = 0.0005 mg/L Acceptance Criteria = ± 20% or 40%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
502.2	CCGC with PID/ ELCD	0.01 - 0.04
524.2	CCGC/MS	0.03 - 0.06
Notes: The regulatory DL for volatile organic compounds is listed at 40 CFR 141.24(k)(17)(ii)(C). Acceptance Criteria for volatile organic compounds are listed at 40 CFR 141.24(f)(17)(i).		

Results of the PQL Analysis

The current PQL for ethylbenzene is 5 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 64). The Six-Year 1 PE data for ethylbenzene were not evaluated as part of the March 2003 report. Note that the acceptance criteria are ± 40% at spike concentrations below 10 µg/L and ± 20% at or above 10 µg/L; hence the data are regressed as two independent populations. No Six-Year 1 data are available below the current PQL of 5 µg/L. Eighteen of the 60 spike values in the Six-Year 2/ERA data are below the current PQL. All of the passing rates are above 75% (with the exception of one passing rate equal to 75%).

Exhibit 64: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Ethylbenzene



Conclusion for Ethylbenzene

The high laboratory passing rates (well above 75%) at concentrations below the current PQL of 5 µg/L for the Six-Year 2/ERA data set suggest that the PQL could be lower. Although there are no Six-Year 1 data below the PQL, laboratory passing rates in the vicinity of the PQL are also high, which may support the Six-Year 2/ERA data conclusion that the PQL could be lower. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Monochlorobenzene (Chlorobenzene)

Results of the Methods Comparison

Exhibit 65 summarizes the MDLs for monochlorobenzene as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of monochlorobenzene in drinking water samples during the years 2000-2007.

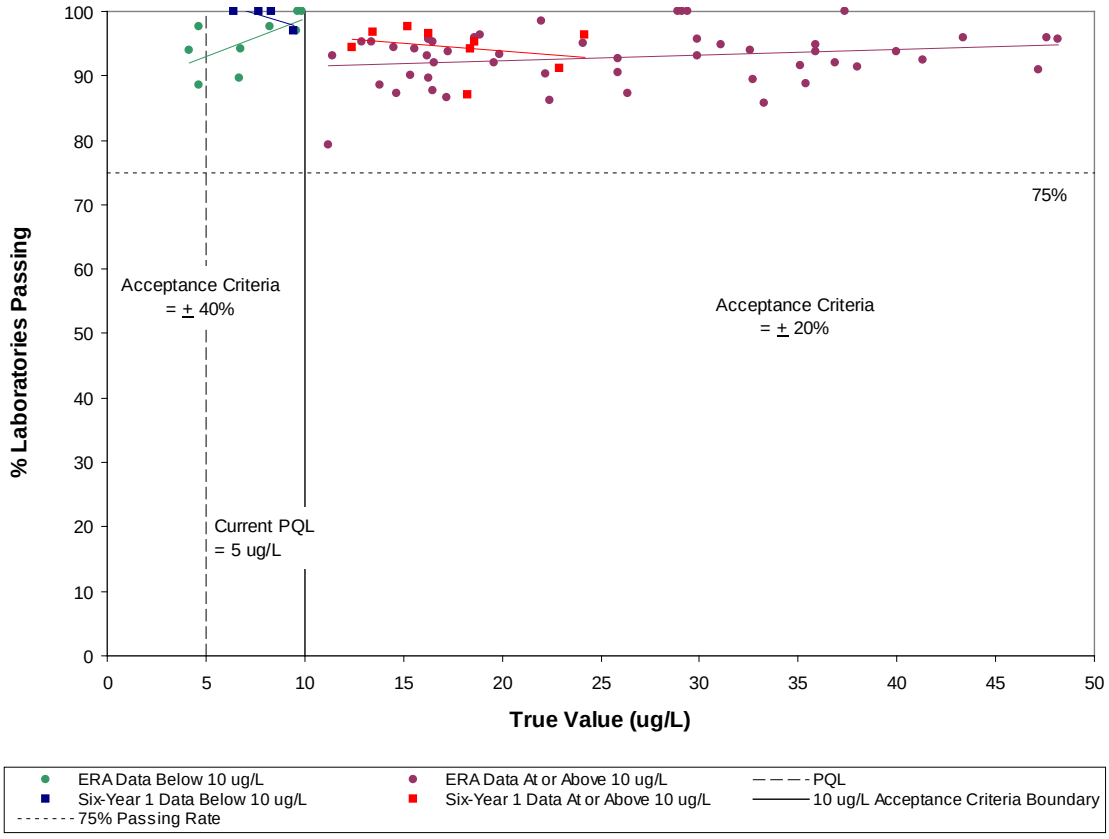
Exhibit 65: Analytical Methods for Monochlorobenzene

MCL = 0.1 mg/L Current PQL = 0.005 mg/L DL = 0.0005 mg/L Acceptance Criteria = ± 20% or 40%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
502.2	CCGC with PID/ELCD	0.01 - 0.02
524.2	CCGC/MS	0.03 - 0.04
Notes: The regulatory DL for volatile organic compounds is listed at 40 CFR 141.24(k)(17)(ii)(C). Acceptance Criteria for volatile organic compounds are listed at 40 CFR 141.24(f)(17)(i).		

Results of the PQL Analysis

The current PQL for monochlorobenzene is 5 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 66). The Six-Year 1 PE data for monochlorobenzene were not evaluated as part of the March 2003 report. Note that the acceptance criteria are ± 40% at spike concentrations below 10 µg/L and ± 20% at or above 10 µg/L; hence the data are regressed as two independent populations. No Six-Year 1 data are available below the current PQL of 5 µg/L. Three of the 60 spike values in the Six-Year 2/ERA data set are below the current PQL. All of the passing rates are above 75%, and all four regression lines are well above 75%.

Exhibit 66: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Monochlorobenzene



Conclusion for Monochlorobenzene

The high laboratory passing rates (well above 75%) at concentrations below the current PQL of 5 µg/L for the Six-Year 2/ERA data set suggest that the PQL could be lower. Although there are no Six-Year 1 data below the PQL, laboratory passing rates in the vicinity of the PQL are also high, which may support the Six-Year 2/ERA data conclusion that the PQL could be lower. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Nitrite (as N)

Results of the Methods Comparison

Exhibit 67 summarizes the MDLs for nitrite as documented in EPA-developed analytical methods. Updates to eleven methods and two new methods (EPA Method 300.1 and ASTM D6508, rev. 2) have been approved for the analysis of nitrite in drinking water samples during the years 2000-2007 (Federal Register, Vol. 67, No. 205, p. 65220, October 23, 2002; Federal Register, Vol. 72, No. 47, p. 11200, March 12, 2007; see Exhibit A-1). The updates to methods are associated with administrative and technical changes or clarifications that are not expected to improve analytical performance near the PQL. The MDL for EPA Method 300.1 is lower than that for EPA Method 300.0 which suggests that laboratory performance at low concentrations may be improved through use of Method 300.1. Since the new ASTM method is proprietary, it is uncertain whether new MDLs may be lower than those for other methods; in addition, the updated methods are proprietary and are not listed in Exhibit 67.

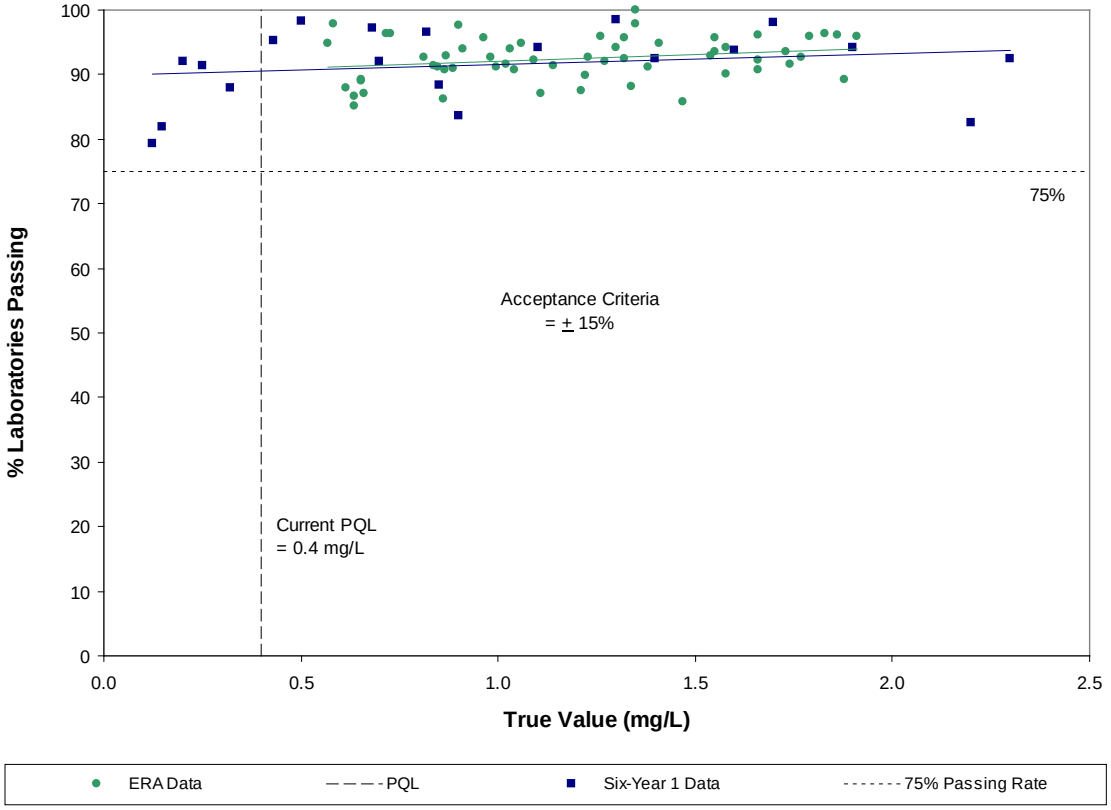
Exhibit 67: Analytical Methods for Nitrite (as N)

MCL = 1 mg/L Current PQL = 0.4 mg/L DL = 0.004-0.103 mg/L Acceptance Criteria = ± 15%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL mg/L**
300.0	IC	0.004
300.1	IC	0.001
353.2	Auto Colorimetry	No MDL
Notes: Regulatory DLs for inorganic compounds are listed at 40 CFR 141.23(a)(4)(i). Acceptance Criteria for inorganic compounds are listed at 40 CFR 141.23(k)(3)(ii).		

Results of the PQL Analysis

The current PQL for nitrite is 0.4 mg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 68). The Six-Year 1 PE data for nitrite were not evaluated in the March 2003 report. Five of the 20 spike values in the Six-Year 1 data set are less than the current PQL of 0.4 mg/L. No Six-Year 2/ERA data are below the current PQL. All of the passing rates are above 75% and both regression lines are also well above 75%.

Exhibit 68: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Nitrite



Conclusion for Nitrite

The high laboratory passing rates (above 75%) at concentrations below the current PQL of 5 µg/L for the Six-Year 1 data set suggest that the PQL could be lower. Although there are no Six-Year 2/ERA data below the PQL, laboratory passing rates in the vicinity of the PQL are also high, which may support the Six-Year 1 data conclusion that the PQL could be lower. In addition, the approval of EPA Method 300.1 for the analysis of nitrite provides a lower MDL than was achievable by use of EPA Method 300.0. This may lead to an overall improvement in analytical performance in the vicinity of the current PQL and could suggest possible reduction of the PQL.

Styrene

Results of the Methods Comparison

Exhibit 69 summarizes the MDLs for styrene as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of styrene in drinking water samples during the years 2000-2007.

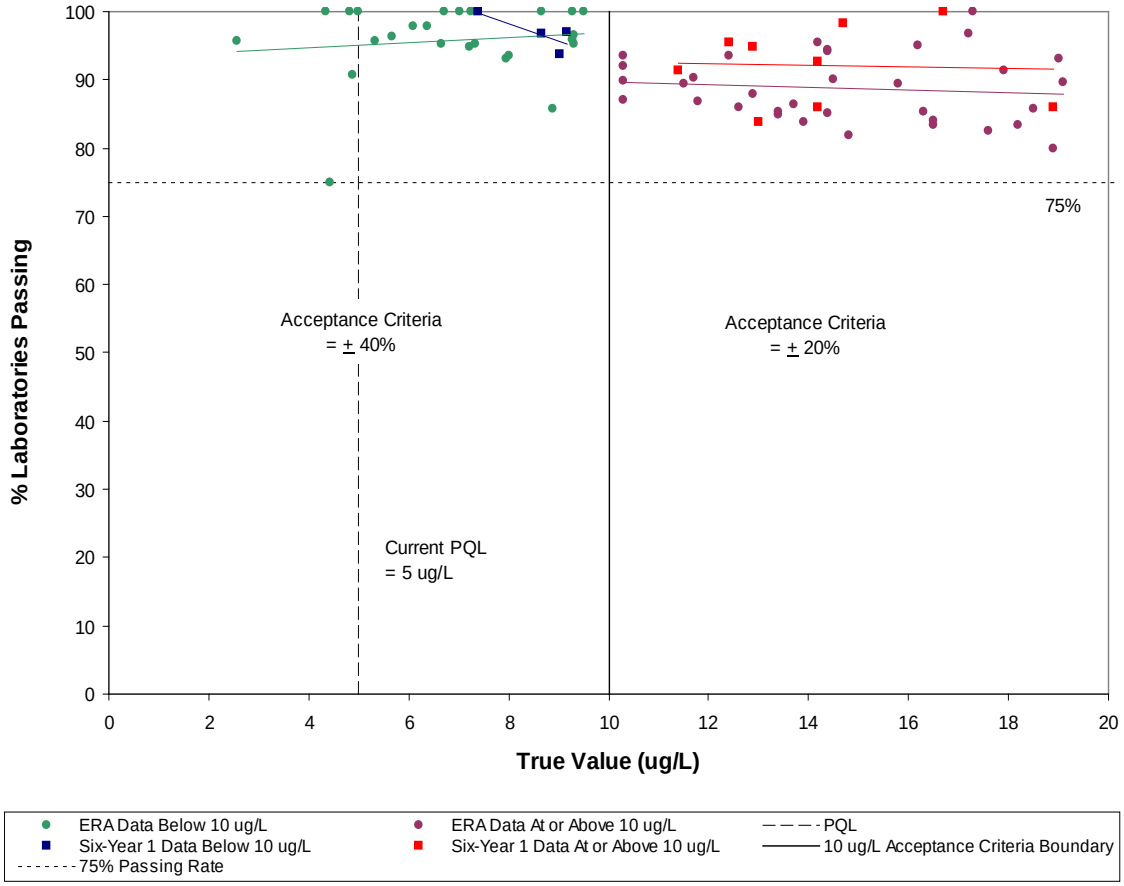
Exhibit 69: Analytical Methods for Styrene

MCL = 0.1 mg/L Current PQL = 0.005 mg/L DL = 0.0005 mg/L Acceptance Criteria = ± 20% or 40%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
502.2	CCGC with PID/ELCD	0.01 - 0.1
524.2	CCGC/MS	0.04 - 0.06
Notes: The regulatory DL for volatile organic compounds is listed at 40 CFR 141.24(k)(17)(ii)(C). Acceptance Criteria for volatile organic compounds are listed at 40 CFR 141.24(f)(17)(i).		

Results of the PQL Analysis

The current PQL for styrene is 5 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 70). The Six-Year 1 PE data for styrene were not evaluated as part of the March 2003 report. Note that the acceptance criteria are ± 40% at spike concentrations below 10 µg/L and ± 20% at or above 10 µg/L; hence the data are regressed as two independent populations. No Six-Year 1 data are available below the current PQL of 5 µg/L. Six of the 60 spike values in the Six-Year 2/ERA data are below the current PQL. All of the passing rates are above 75% (with the exception of one passing rate equal to 75%). Furthermore, the regression lines are well above 75%.

Exhibit 70: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Styrene



Conclusion for Styrene

The high laboratory passing rates (75% or above) at concentrations below the current PQL of 5 µg/L for the Six-Year 2/ERA data set suggest that the PQL could be lower. Although there are no Six-Year 1 data below the PQL, laboratory passing rates in the vicinity of the PQL are also high, which may support the Six-Year 1 data conclusion that the PQL could be lower. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Toluene

Results of the Methods Comparison

Exhibit 71 summarizes the MDLs for toluene as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of toluene in drinking water samples during the years 2000-2007.

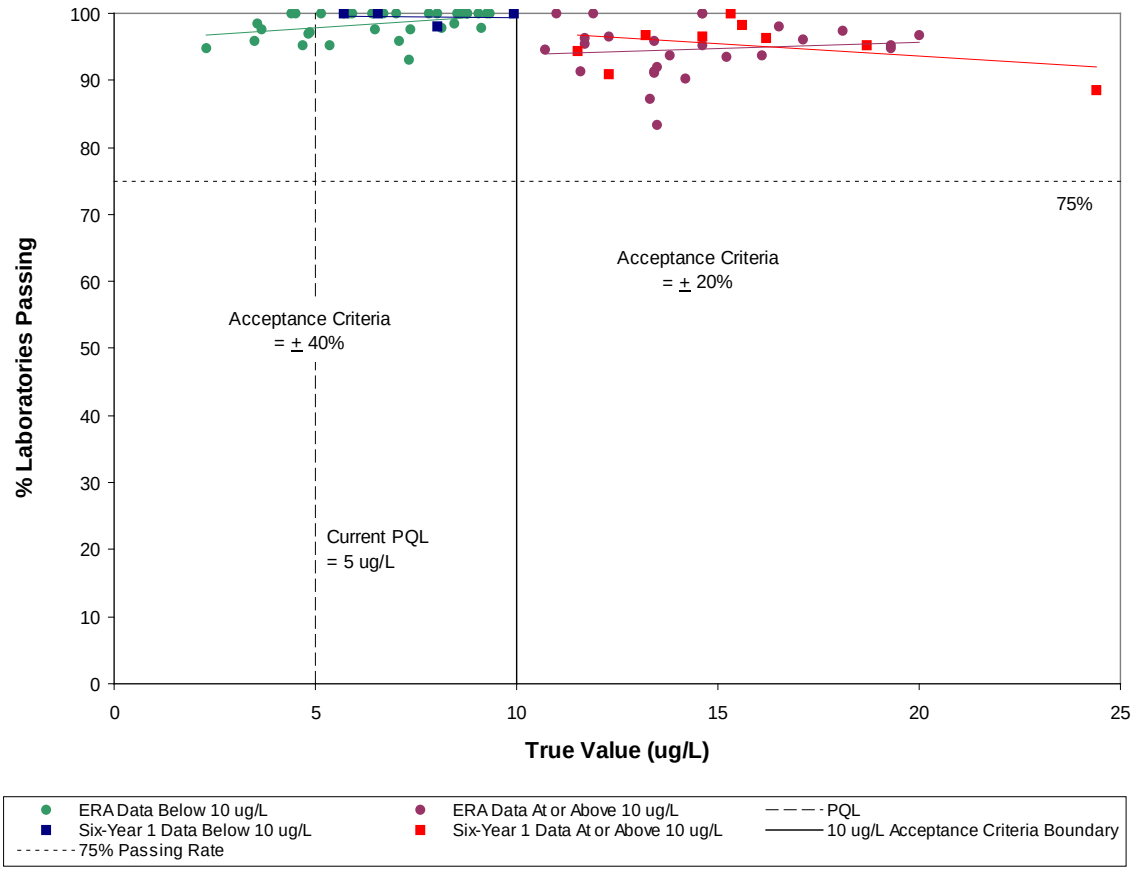
Exhibit 71: Analytical Methods for Toluene

MCL = 1 mg/L Current PQL = 0.005 mg/L DL = 0.0005 mg/L Acceptance Criteria = ± 20% or 40%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
502.2	CCGC with PID/ELCD	0.01 - 0.02
524.2	CCGC/MS	0.08 - 0.11
Notes: The regulatory DL for volatile organic compounds is listed at 40 CFR 141.24(k)(17)(ii)(C). Acceptance Criteria for volatile organic compounds are listed at 40 CFR 141.24(f)(17)(i).		

Results of the PQL Analysis

The current PQL for toluene is 5 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 72). The Six-Year 1 PE data for toluene were evaluated but were not regressed as part of the March 2003 report. Note that the acceptance criteria are ± 40% at spike concentrations below 10 µg/L and ± 20% at or above 10 µg/L; hence the data are regressed as two independent populations. No Six-Year 1 data are available below the current PQL of 5 µg/L. Nine of the 60 spike values in the Six-Year 2/ERA data are below the current PQL. All of the passing rates and all four regression lines are above 75%.

Exhibit 72: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Toluene



Conclusion for Toluene

The high laboratory passing rates (well above 75%) at concentrations below the current PQL of 5 µg/L for the Six-Year 2/ERA data set suggest that the PQL could be lower. Although there are no Six-Year 1 data below the PQL, laboratory passing rates in the vicinity of the PQL are also high, which may support the Six-Year 2/ERA data conclusion that the PQL could be lower. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

1,2,4-Trichlorobenzene

Results of the Methods Comparison

Exhibit 73 summarizes the MDLs for 1,2,4-trichlorobenzene as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of 1,2,4-trichlorobenzene in drinking water samples during the years 2000-2007.

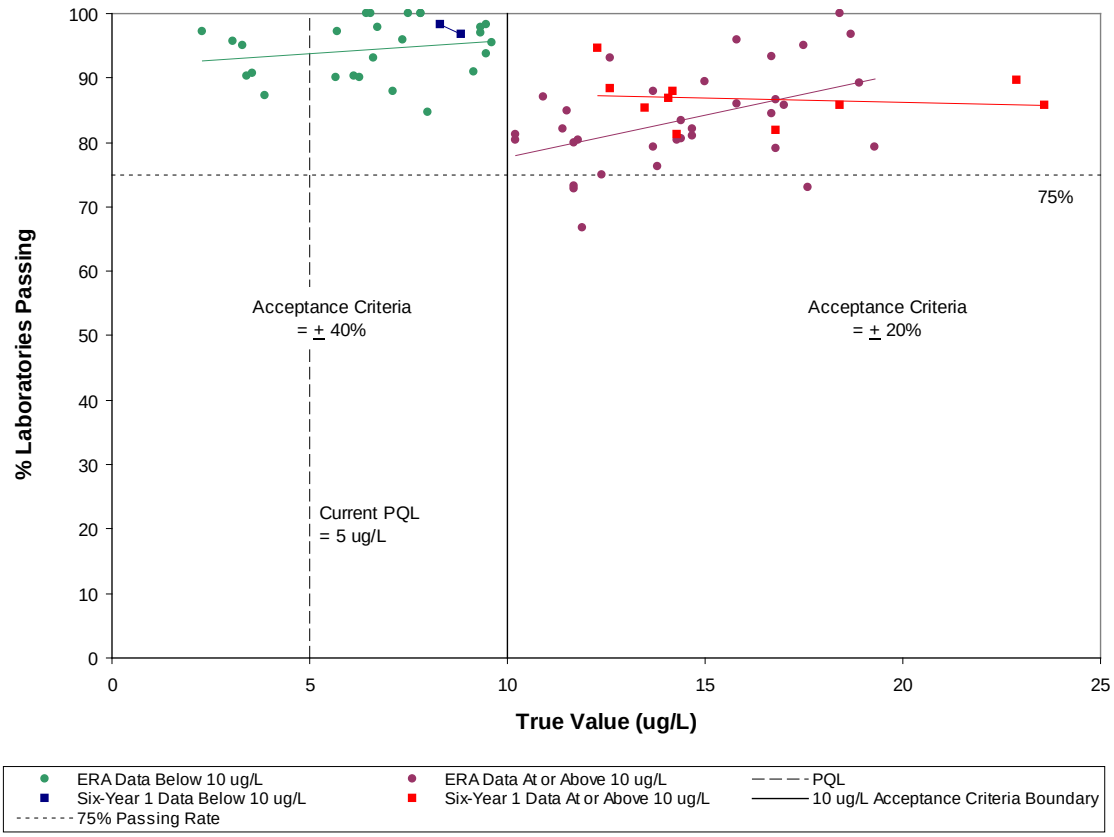
Exhibit 73: Analytical Methods for 1,2,4-Trichlorobenzene

MCL = 0.07 mg/L Current PQL = 0.005 mg/L DL = 0.0005 mg/L Acceptance Criteria = ± 20% or 40%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
502.2	CCGC with PID/ELCD	0.02 - 0.08
524.2	CCGC/MS	0.04 - 0.20
Notes: The regulatory DL for volatile organic compounds is listed at 40 CFR 141.24(k)(17)(ii)(C). Acceptance Criteria for volatile organic compounds are listed at 40 CFR 141.24(f)(17)(i).		

Results of the PQL Analysis

The current PQL for 1,2,4-trichlorobenzene is 5 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 74). The Six-Year 1 PE data for 1,2,4-trichlorobenzene were not evaluated as part of the March 2003 report. Note that the acceptance criteria are ± 40% at spike concentrations below 10 µg/L and ± 20% at or above 10 µg/L; hence the data are regressed as two independent populations. No Six-Year 1 data are available below the current PQL 5 µg/L. Six of the 60 spike values in the Six-Year 2/ERA data are below the current PQL. All but four of the Six-Year 2/ERA passing rates are above 75%. Furthermore, the four regression lines are well above 75%.

Exhibit 74: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – 1,2,4-Trichlorobenzene



Conclusion for 1,2,4-Trichlorobenzene

The high laboratory passing rates (>80%) at concentrations below the current PQL of 5 µg/L for the Six-Year 2/ERA data set suggest that the PQL could be lower. Although there are no Six-Year 1 data below the PQL, laboratory passing rates in the vicinity of the PQL are also high, which may support the Six-Year 2/ERA data conclusion that the PQL could be lower. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

1,1,1-Trichloroethane

Results of the Methods Comparison

Exhibit 75 summarizes the MDLs for 1,1,1-trichloroethane as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of 1,1,1-trichloroethane in drinking water samples during the years 2000-2007.

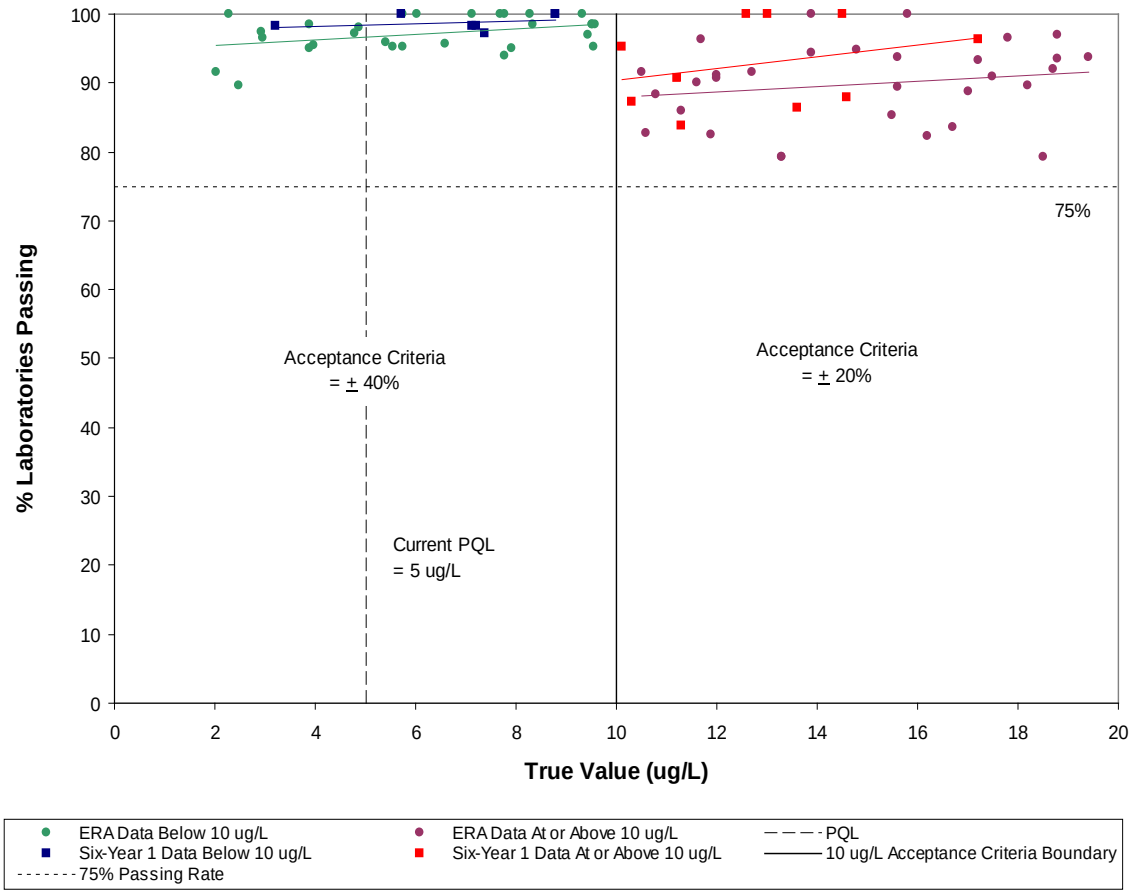
Exhibit 75: Analytical Methods for 1,1,1-Trichloroethane

MCL = 0.07 mg/L Current PQL = 0.005 mg/L DL = 0.0005 mg/L Acceptance Criteria = ± 20% or 40%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
502.2	CCGC with PID/ ELCD	0.01 - 0.03
524.2	CCGC/MS	0.04 - 0.08
551.1	LLE/GC w/ ECD	0.005 - 0.012
Notes: The regulatory DL for volatile organic compounds is listed at 40 CFR 141.24(k)(17)(ii)(C). Acceptance Criteria for volatile organic compounds are listed at 40 CFR 141.24(f)(17)(i).		

Results of the PQL Analysis

The current PQL for 1,1,1-trichloroethane is 5 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 76). The Six-Year 1 PE data for 1,1,1-trichloroethane were evaluated but were not regressed as part of the March 2003 report. Note that the acceptance criteria are ± 40% at spike concentrations below 10 µg/L and ± 20% at or above 10 µg/L; hence the data are regressed as two independent populations. One of the 17 spike values from the Six-Year 1 data is below the current PQL of 5 µg/L. Ten of the 60 Six-Year 2/ERA spike values are below the current PQL. All of the passing rates for the Six-Year 1 and Six-Year 2/ERA data are above 75%.

Exhibit 76: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – 1,1,1-Trichloroethane



Conclusion for 1,1,1-Trichloroethane

The high laboratory passing rates (generally >90%) at concentrations below the current PQL of 5 µg/L for both the Six-Year 1 and Six-Year 2/ERA data sets suggest that the PQL could be lower. Although there is only one Six-Year 1 datum below the PQL, laboratory passing rates below and in the vicinity of the PQL are well above 75%, which supports the conclusion that the PQL could be lower. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

6.2.2 PQL Assessment May Support Reduction of the Current PQL

Of the 41 analytes mentioned in Section 6.2, six analytes have an existing PQL that is less than the MCL and their PE/PT data suggest that the PQL could *possibly* be lower.

Atrazine

Results of the Methods Comparison

Exhibit 77 summarizes the MDLs for atrazine as documented in EPA-developed analytical methods. No updated methods have been approved for the analysis of atrazine in drinking water samples during the years 2000-2007; however, a new method, Syngenta AG-625, was approved (Federal Register, Vol. 67, No. 209, p. 65888, October 29, 2002; see Exhibit A-1). Since the method is proprietary, the MDL/DL for atrazine by Syngenta AG-625 is not known, but the Federal Register notice indicates that this method "meets EPA's criteria for method performance." Thus, it is uncertain whether new MDLs may be lower than those for other methods.

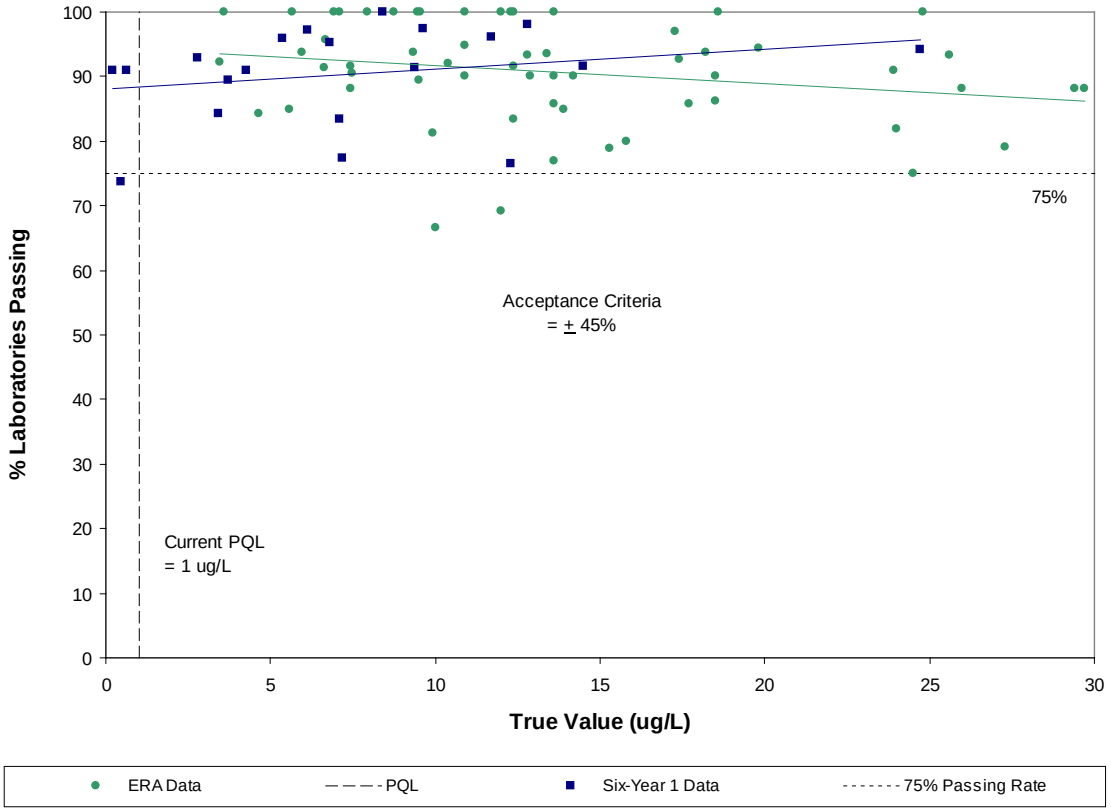
Exhibit 77: Analytical Methods for Atrazine

MCL = 0.003 mg/L Current PQL = 0.001 mg/L DL = 0.0001 mg/L Acceptance Criteria = ± 45%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
505	ME and GC	2.4
507	GC/N-PD	0.015
508.1	LSE and ECGC	0.003
525.2	LSE and CCGC/MS	0.065 - 0.081
551.1	LLE/GC w/ ECD	0.082 - 0.121
Notes: Regulatory DLs for synthetic organic compounds are listed at 40 CFR 141.24(h)(18). Acceptance Criteria for synthetic organic compounds are listed at 40 CFR 141.24(h)(19)(i)(B).		

Results of the PQL Analysis

The current PQL for atrazine is 1 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 78). The Six-Year 1 PE data for atrazine were not evaluated in the March 2003 report. Three of the 20 spike values in the Six-Year 1 data are below the current PQL of 1 µg/L. No Six-Year 2/ERA data are below the current PQL. With the exception of one spike value, all of the Six-Year 1 passing rates exceed 75%, while the Six-Year 2/ERA passing rates are more variable. Both regression lines are well above 75%.

Exhibit 78: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Atrazine



Conclusion for Atrazine

Given the limited data below the current PQL of 1 µg/L but generally high laboratory passing rates (mostly above 75%) below and in the vicinity of the PQL for the Six-Year 1 data set, a reduction of the PQL may be considered. The Six-Year 2/ERA data exhibit some variability, but laboratory passing rates in the vicinity of the PQL are generally >75% and may also support PQL reduction. While a new method, Syngenta AG-625, was approved for the analysis of atrazine in 2002, the method is proprietary and it is not known whether the DLs and/or MDLs from this method could lead to an overall improvement in analytical performance in the vicinity of the current PQL and suggest possible reduction of the PQL.

Carbofuran

Results of the Methods Comparison

Exhibit 79 summarizes the MDLs for carbofuran as documented in EPA-developed analytical methods. No updated methods have been approved for the analysis of carbofuran in drinking water samples during the years 2000-2007; however, a new method, EPA Method 531.2, was approved (Federal Register, Vol. 67, No. 209, p. 65888, October 29, 2002; see Exhibit A-1). The range of DLs/MDLs for carbofuran by EPA Method 531.2 is approximately one order of magnitude less than the MDL from EPA Method 531.1, which suggests that laboratory performance at low concentrations may be improved through use of Method 531.2.

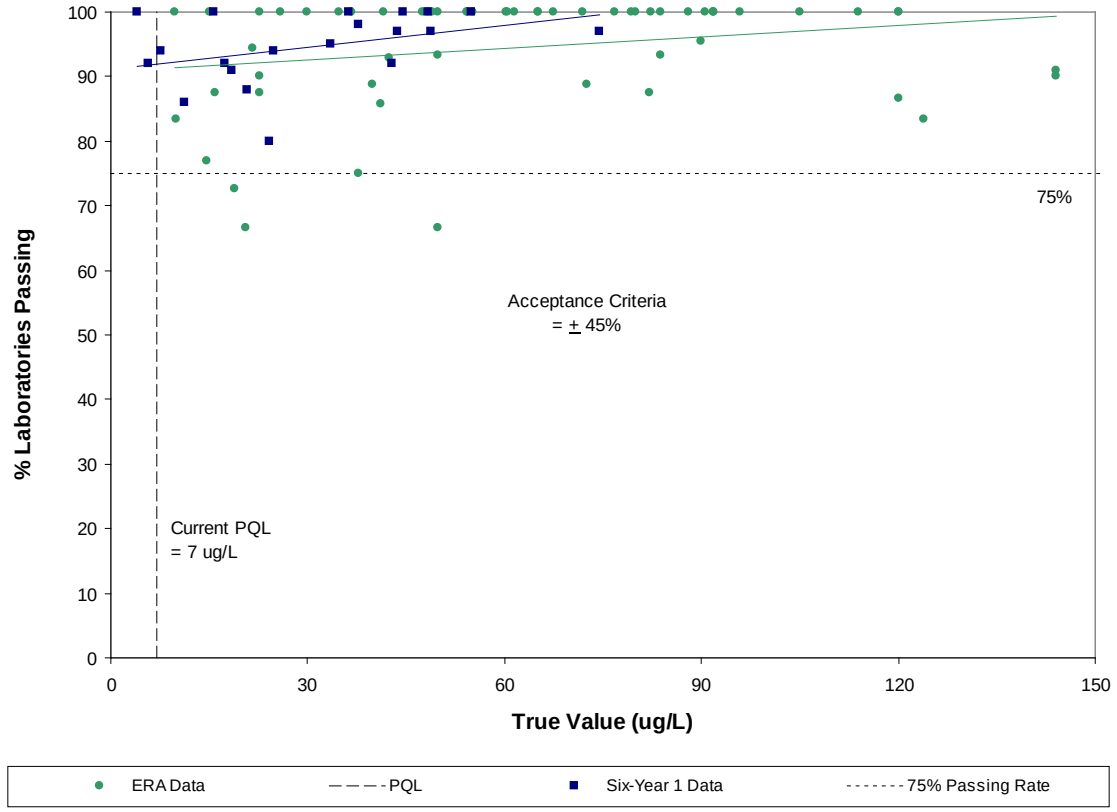
Exhibit 79: Analytical Methods for Carbofuran

MCL = 0.04 mg/L Current PQL = 0.007 mg/L DL = 0.0009 mg/L Acceptance Criteria = ± 45%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
531.1	DAI/HPLC w/ Der.	0.52
531.2	DAI/HPLC w/ Der.	0.043 - 0.058 (DL)
Notes: Regulatory DLs for synthetic organic compounds are listed at 40 CFR 141.24(h)(18). Acceptance Criteria for synthetic organic compounds are listed at 40 CFR 141.24(h)(19)(i)(B).		

Results of the PQL Analysis

The current PQL for carbofuran is 7 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 80). The Six-Year 1 PE data for carbofuran were evaluated in the March 2003 report; however, these data were not regressed in that report. Two of the 20 spike values in the Six-Year 1 data are below the current PQL of 7 µg/L. No Six-Year 2/ERA data are below the current PQL. The Six-Year 1 passing rates were all well above 75%; however the passing rates for the Six-Year 2/ERA data are more variable.

Exhibit 80: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Carbofuran



Conclusion for Carbofuran

Given the limited data below the current PQL of 7 µg/L but generally high laboratory passing rates (above 75%) below and in the vicinity of the PQL for the Six-Year 1 data set, a reduction of the PQL may be considered. The Six-Year 2/ERA data exhibit some variability, with laboratory passing rates in the vicinity of the PQL ranging from less than 70% to 100% which may not support the Six-Year 1 data conclusion that the PQL could be lower. The range of DLs/MDLs for carbofuran by recently-approved EPA Method 531.2 is approximately one order of magnitude lower than the MDL from EPA Method 531.1. This may lead to an overall improvement in analytical performance in the vicinity of the current PQL and could suggest possible reduction of the PQL.

trans-1,2-Dichloroethylene

Results of the Methods Comparison

Exhibit 81 summarizes the MDLs for *trans*-1,2-dichloroethylene as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of *trans*-1,2-dichloroethylene in drinking water samples during the years 2000-2007.

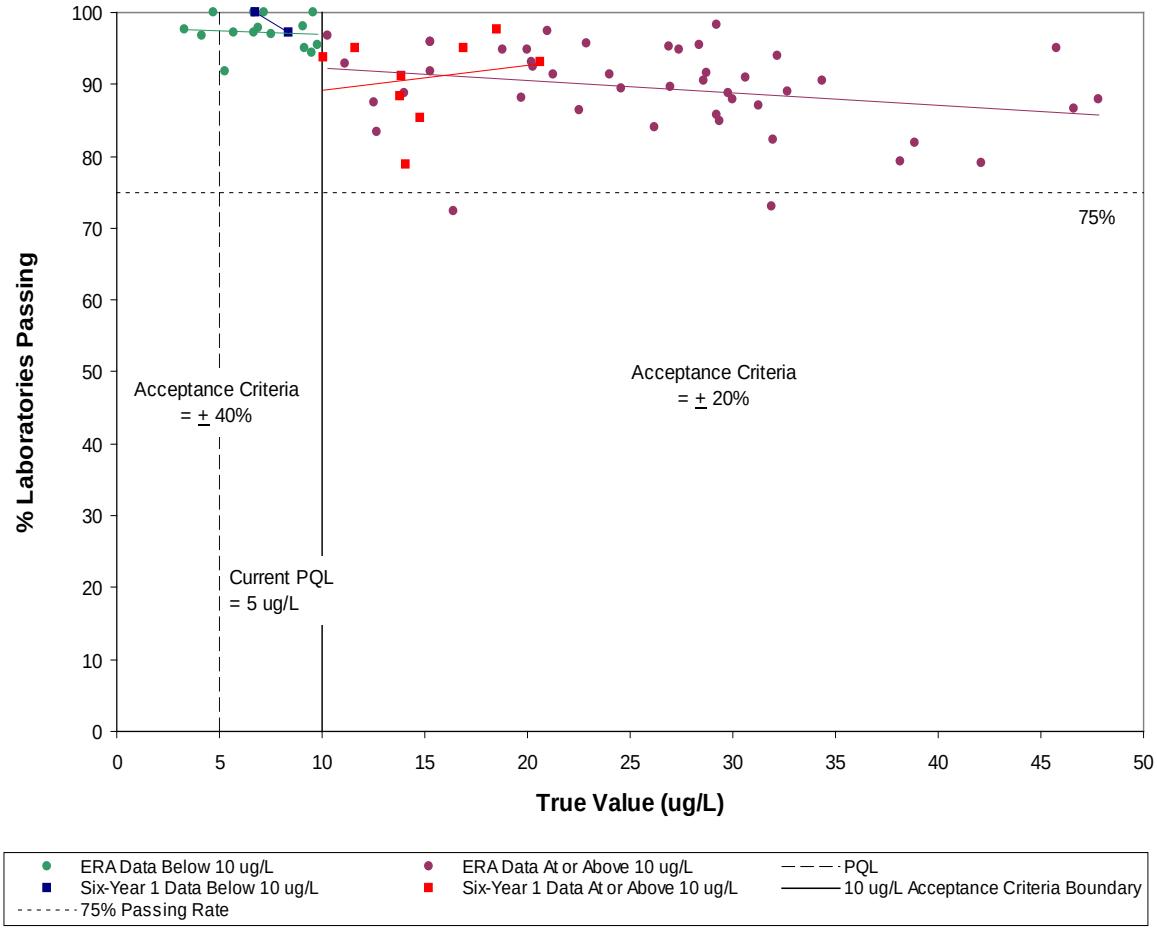
Exhibit 81: Analytical Methods for *trans*-1,2-Dichloroethylene

MCL = 0.1 mg/L Current PQL = 0.005 mg/L DL = 0.0005 mg/L Acceptance Criteria = ± 20% or 40%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
502.2	CCGC with PID/ ELCD	0.03 - 0.06
524.2	CCGC/MS	0.03 - 0.06
Notes: The regulatory DL for volatile organic compounds is listed at 40 CFR 141.24(k)(17)(ii)(C). Acceptance Criteria for volatile organic compounds are listed at 40 CFR 141.24(f)(17)(i).		

Results of the PQL Analysis

The current PQL for *trans*-1,2-dichloroethylene is 5 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 82). The Six-Year 1 PE data for *trans*-1,2-dichloroethylene were not evaluated as part of the March 2003 report. Note that the acceptance criteria are ± 40% at spike concentrations below 10 µg/L and ± 20% at or above 10 µg/L; hence the data are regressed as two independent populations. No Six-Year 1 data are available below the current PQL of 5 µg/L. Three of the 60 spike values in the Six-Year 2/ERA data set are below the current PQL. All but two of the passing rates are above 75%.

Exhibit 82: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – *trans*-1,2-Dichloroethylene



Conclusion for *trans*-1,2-Dichloroethylene

Given the limited data below the current PQL of 5 µg/L but generally high laboratory passing rates (well above 75%) below and in the vicinity of the PQL for the Six-Year 2/ERA data set and in the vicinity of the PQL for the Six-Year 1 data set, a reduction of the PQL may be considered. The Six-Year 2/ERA data exhibit some variability, with laboratory passing rates in the vicinity of the PQL ranging from slightly below 75% to 100%; which may support the Six-Year 1 data conclusion that the PQL could be lower. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Hexachlorocyclopentadiene

Results of the Methods Comparison

Exhibit 83 summarizes the MDLs for hexachlorocyclopentadiene as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of hexachlorocyclopentadiene in drinking water samples during the years 2000-2007.

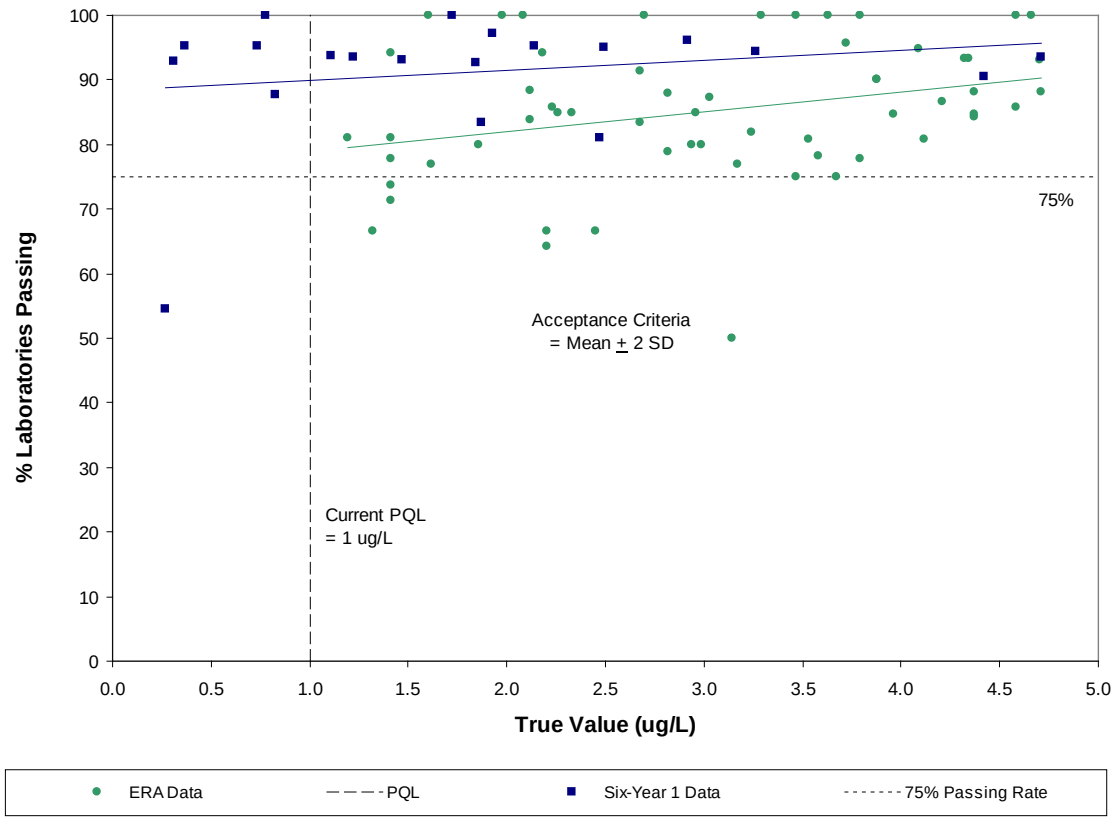
Exhibit 83: Analytical Methods for Hexachlorocyclopentadiene

MCL = 0.05 mg/L Current PQL = 0.001 mg/L DL = 0.0001 mg/L Acceptance Criteria = Mean + 2 Std Dev		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
505	ME and GC	0.13
508	GC/ECD	No MDL
508.1	LSE and ECGC	0.004
525.2	LSE and CCGC/MS	0.072 - 0.16
551.1	LLE/GC w/ ECD	0.016 - 0.018
Notes: Regulatory DLs for synthetic organic compounds are listed at 40 CFR 141.24(h)(18). Acceptance Criteria for synthetic organic compounds are listed at 40 CFR 141.24(h)(19)(i)(B).		

Results of the PQL Analysis

The current PQL for hexachlorocyclopentadiene is 1 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 84). The Six-Year 1 PE data for hexachlorocyclopentadiene were evaluated but were not regressed as part of the March 2003 report. Six of the 20 spike values in the Six-Year 1 data set are below the current PQL of 1 µg/L. No Six-Year 2/ERA data are below the current PQL. All but one of the Six-Year 1 passing rates, along with the Six-Year 1 regression line, are above 75%; however, the Six-Year 2/ERA passing rates are more variable, with several passing rates below 75%.

Exhibit 84: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Hexachlorocyclopentadiene



Conclusion for Hexachlorocyclopentadiene

Given the generally high laboratory passing rates (all but one well above 75%) below and in the vicinity of the current PQL of 1 µg/L for the Six-Year 1 data set, a reduction of the PQL may be considered. The Six-Year 2/ERA data exhibit some variability, with laboratory passing rates in the vicinity of the PQL ranging from less than 70% to 100%, which may not support the Six-Year 1 data conclusion that the PQL could be lower. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Methoxychlor

Results of the Methods Comparison

Exhibit 85 summarizes the MDLs for methoxychlor as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of methoxychlor in drinking water samples during the years 2000-2007.

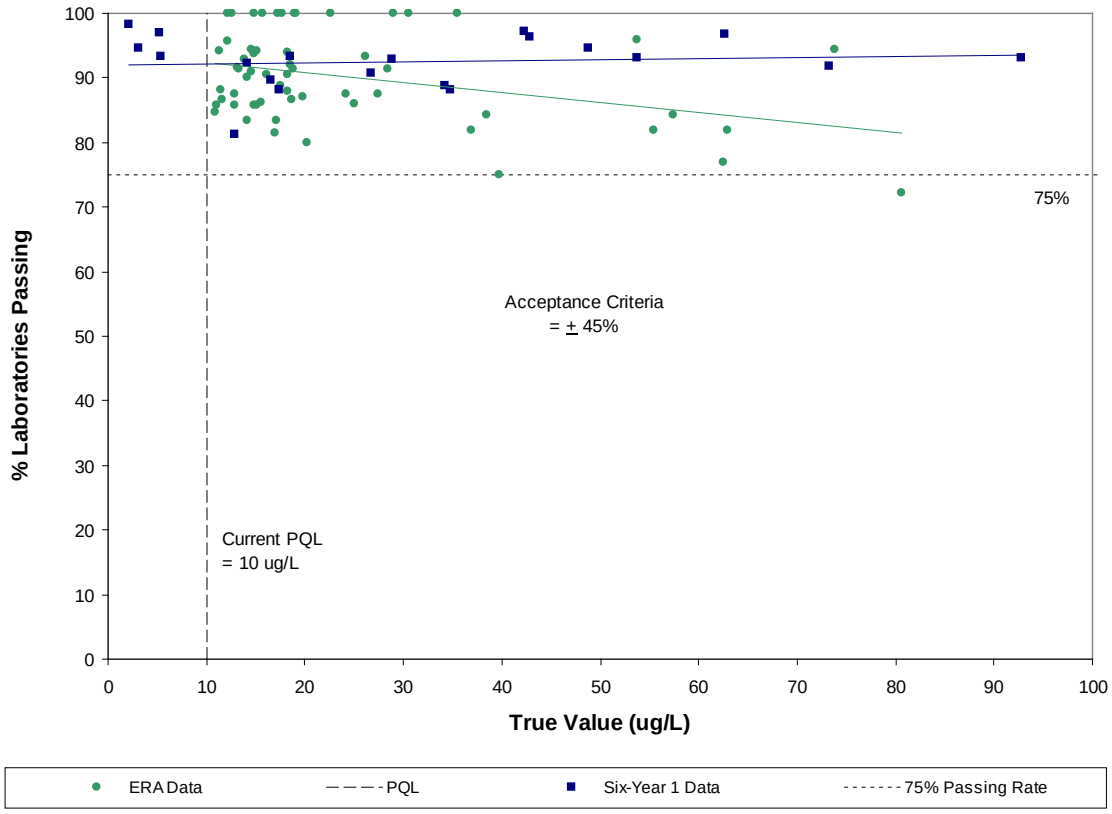
Exhibit 85: Analytical Methods for Methoxychlor

MCL = 0.04 mg/L Current PQL = 0.01 mg/L DL = 0.0001 mg/L Acceptance Criteria = ± 45%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
505	ME and GC	0.96
508	GC/ECD	0.022
508.1	LSE and ECGC	0.003
525.2	LSE and CCGC/MS	0.033 - 0.13
551.1	LLE/GC w/ ECD	0.008 - 0.026
Notes: Regulatory DLs for synthetic organic compounds are listed at 40 CFR 141.24(h)(18). Acceptance Criteria for synthetic organic compounds are listed at 40 CFR 141.24(h)(19)(i)(B).		

Results of the PQL Analysis

The current PQL for methoxychlor is 10 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 86). The Six-Year 1 PE data for methoxychlor were evaluated but were not regressed as part of the March 2003 report. Four of the 20 spike values in the Six-Year 1 methoxychlor PE data are below the current PQL of 10 µg/L. All of the passing rates are above 75%. None of the Six-Year 2/ERA values are below the current PQL and the data exhibit more variability. The Six-Year 1 regression line is well above 75%; however, the Six-Year 2/ERA regression line predicts a decrease in passing rates with an increase in spike values.

Exhibit 86: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Methoxychlor



Conclusion for Methoxychlor

Given the generally high laboratory passing rates (well above 75%) below and in the vicinity of the current PQL of 10 µg/L for the Six-Year 1 data set, a reduction of the PQL may be considered. The Six-Year 2/ERA data exhibit some variability, with laboratory passing rates in the vicinity of the PQL generally above 80%; however, there is more variability at higher concentrations and a predicted downward trend at higher concentrations. Overall, the Six-Year 2 data may not support the Six-Year 1 data conclusion that the PQL could be lower. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

2-(2,4,5-Trichlorophenoxy)propanoic acid (2,4,5-TP; Silvex)

Results of the Methods Comparison

Exhibit 87 summarizes the MDLs for 2-(2,4,5-trichlorophenoxy)propanoic acid as documented in EPA-developed analytical methods. Updates to one method have been approved for the analysis of 2,4,5-TP in drinking water samples during the years 2000-2007 (see Exhibit A-1). These updates are minor technical revisions that are not anticipated to improve analytical performance near the PQL. In addition, a new method, EPA Method 515.4 was approved (Federal Register, Vol. 67, No. 209, p. 65888, October 29, 2002; see Exhibit A-1). The MDL for 2,4,5-TP by EPA Method 515.4 is somewhat lower than that obtained from other EPA methods, which suggests that laboratory performance at low concentrations may be improved through use of Method 515.4.

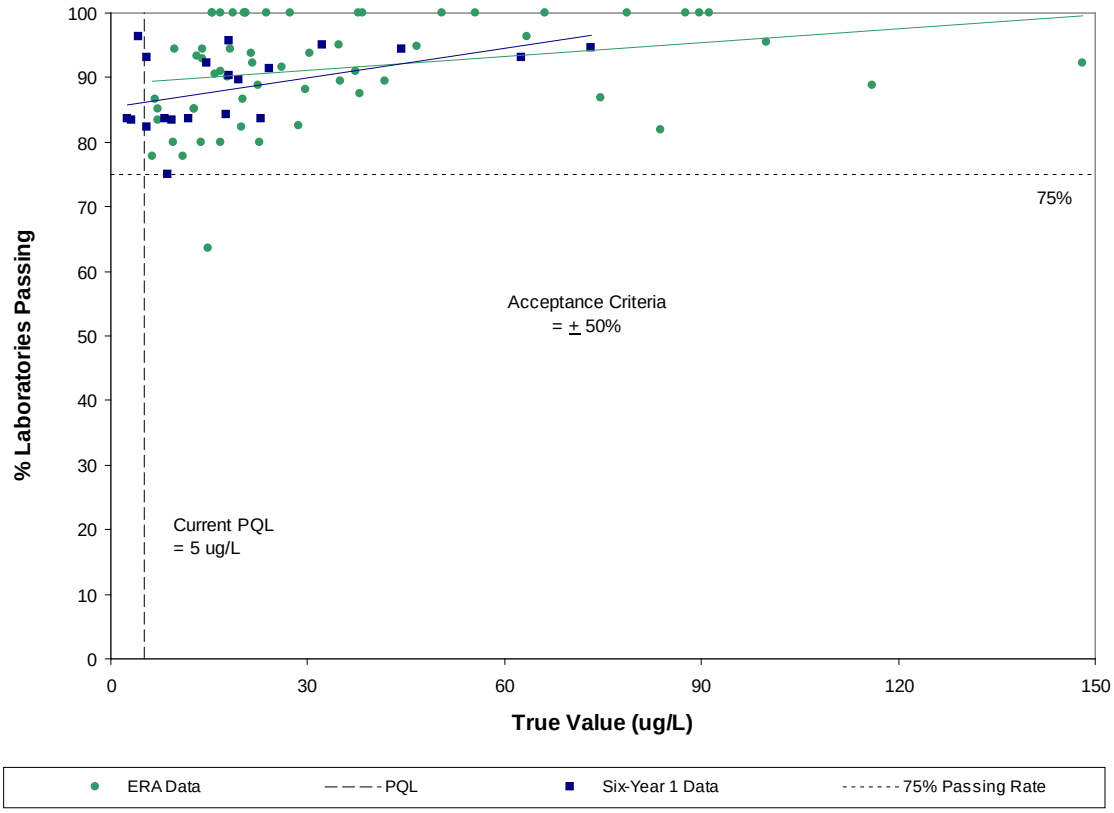
Exhibit 87: Analytical Methods for 2,4,5-TP (Silvex)

MCL = 0.05 mg/L Current PQL = 0.005 mg/L DL = 0.0002 mg/L Acceptance Criteria = ± 50%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
515.1	GC/ECD	0.21
515.2	LSE and GC/ECD	0.16
515.3	LLED and GC/ELCD	0.072 - 0.14
515.4	LLMED and GC/ECD	0.018 – 0.033
555	HPLC/PDAUVD	0.37 - 1.8
Notes: Regulatory DLs for synthetic organic compounds are listed at 40 CFR 141.24(h)(18). Acceptance Criteria for synthetic organic compounds are listed at 40 CFR 141.24(h)(19)(i)(B).		

Results of the PQL Analysis

The current PQL for 2,4,5-TP is 5 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 88). The Six-Year 1 PE data for 2,4,5-TP were not evaluated in the March 2003 report. Three of the 20 spike values in the Six-Year 1 PE data are less than the current PQL of 5 µg/L. No Six-Year 2/ERA data are below the current PQL. While the passing rates for both data sets are fairly variable, all of the Six-Year 1 passing rates are above 75% (with the exception of one passing rate that is equal to 75%). One passing rate in the Six-Year 2/ERA data is below 75%. Both the Six-Year 1 and Six-Year 2/ERA regression lines are above 75%.

Exhibit 88: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – 2,4,5-TP (Silvex)



Conclusion for 2,4,5-TP

Given the limited data below the current PQL of 5 µg/L but generally high laboratory passing rates (well above 75%) below and in the vicinity of the PQL for the Six-Year 1 data set and in the vicinity of the PQL for the Six-Year 2/ERA data, a reduction of the PQL may be considered. The Six-Year 2/ERA data exhibit some variability, with laboratory passing rates in the vicinity of the PQL ranging from less than 70% to 100%; which may not support the Six-Year 1 data conclusion that the PQL could be lower. In addition, EPA Method 515.4 has a lower range of MDLs compared to previously-approved methods. This may lead to an overall improvement in analytical performance in the vicinity of the current PQL and could suggest possible reduction of the PQL.

6.2.3 PQL Assessment Does Not Support Reduction of the Current PQL or Data are Insufficient to Reach a Conclusion

Of the 41 analytes mentioned in Section 6.2, 24 analytes have an existing PQL that is less than the MCL and their PE/PT data either indicate that the PQL should not be lower or their PE/PT data are insufficient to reach a conclusion.

Arsenic

Results of the Methods Comparison

Exhibit 89 summarizes the MDLs for arsenic as documented in EPA-developed analytical methods. Updates to eight methods have been approved for the analysis of arsenic in drinking water samples during the years 2000-2007 (see Exhibit A-1). These updates are associated with administrative and technical changes or clarifications that are not expected to improve analytical performance near the PQL. The updated methods are proprietary and are not listed in Exhibit 89.

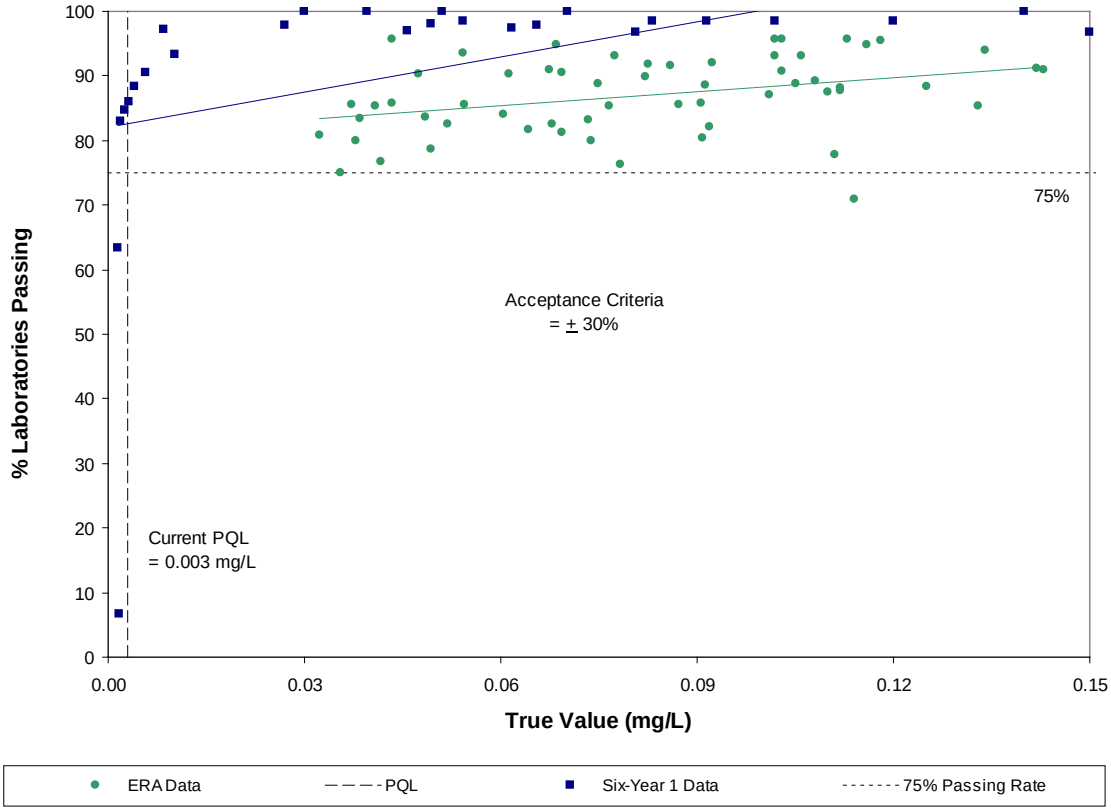
Exhibit 89: Analytical Methods for Arsenic

MCL = 0.010 mg/L Current PQL = 0.003 mg/L DL = 0.005-0.0014 mg/L Acceptance Criteria = ± 30%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL mg/L**
200.7	ICP-AES	0.008
200.8	ICP/MS	0.0001 - 0.0014
200.9	GFAA	0.0005
Notes: Regulatory DLs for inorganic compounds are listed at 40 CFR 141.23(a)(4)(i). Acceptance Criteria for inorganic compounds are listed at 40 CFR 141.23(k)(3)(ii).		

Results of the PQL Analysis

The current PQL for arsenic is 0.003 mg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 90). The Six-Year 1 PE data for arsenic were not evaluated in the March 2003 report. Four of the 26 spike values in the Six-Year 1 data set are below the current PQL of 0.003 mg/L. No Six-Year 2/ERA data are below the current PQL. With the exception of two spike values, all of the Six-Year 1 passing rates exceed 75%. The low passing rate just below the PQL is of concern, however. In general, many of the passing rates around the PQL are highly variable. Furthermore, some of the Six-Year 2/ERA passing rates above the PQL are below 75%.

Exhibit 90: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Arsenic



Conclusion for Arsenic

Given the relative lack of data below the current PQL of 0.003 mg/L, the downward trend in laboratory passing rates below the PQL for the Six-Year 1 data set, and the lack of data in the vicinity of the PQL for the Six-Year 2/ERA dataset, it may not be appropriate to recommend lowering of the PQL. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Beryllium

Results of the Methods Comparison

Exhibit 91 summarizes the MDLs for beryllium as documented in EPA-developed analytical methods. Updates to five methods have been approved for the analysis of beryllium in drinking water samples during the years 2000-2007 (see Exhibit A-1). These updates are associated with administrative and technical changes or clarifications that are not expected to improve analytical performance near the PQL. The updated methods are proprietary and are not listed in Exhibit 91.

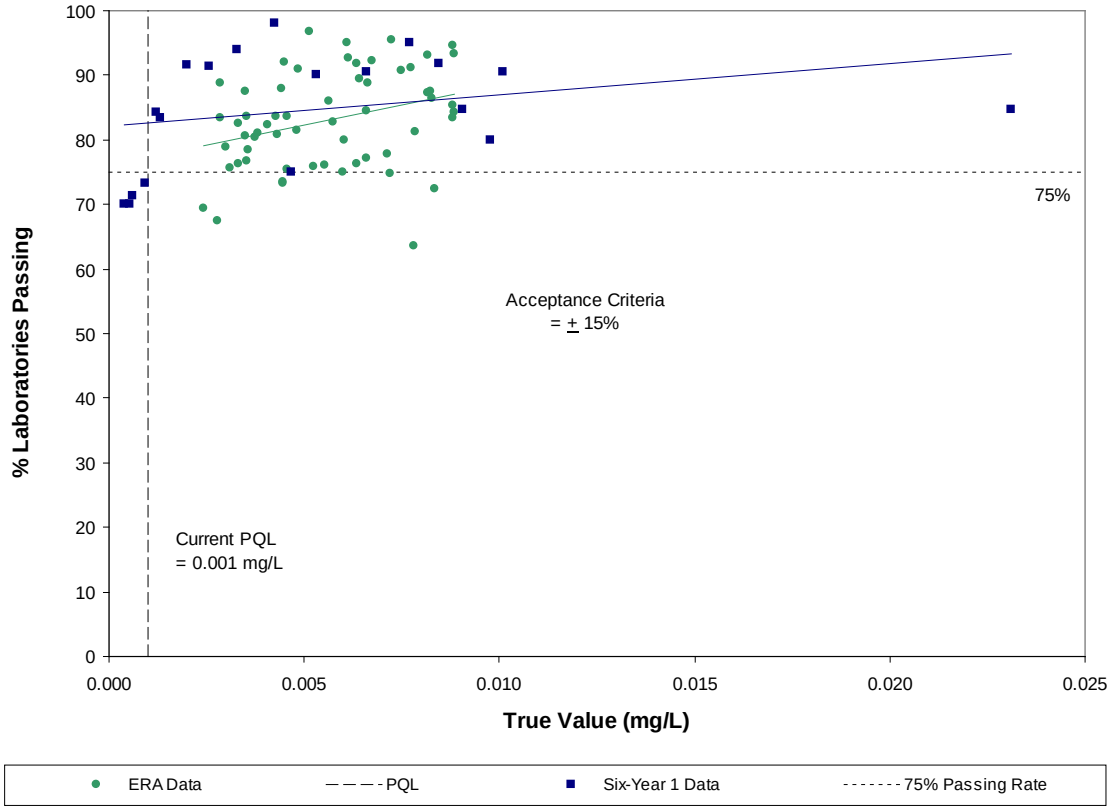
Exhibit 91: Analytical Methods for Beryllium

MCL = 0.004 mg/L Current PQL = 0.001 mg/L DL = 0.00002-0.0003 mg/L Acceptance Criteria = ± 15%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL mg/L**
200.7	ICP-AES	0.0003
200.8	ICP/MS	0.00002 - 0.0003
200.9	GFAA	0.00002
Notes: Regulatory DLs for inorganic compounds are listed at 40 CFR 141.23(a)(4)(i). Acceptance Criteria for inorganic compounds are listed at 40 CFR 141.23(k)(3)(ii).		

Results of the PQL Analysis

The current PQL for beryllium is 0.001 mg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 92). The Six-Year 1 PE data for beryllium were regressed as part of the March 2003 report. Four of the 19 spike values in the Six-Year 1 data set are below the current PQL of 0.001 mg/L. No Six-Year 2/ERA data are below the current PQL of 0.001 mg/L. The four concentration values from the Six-Year 1 data set that are below the current PQL also have passing rates of less than 75%. The Six-Year 2/ERA data in the vicinity of the current PQL have variable passing rates.

Exhibit 92: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Beryllium



Conclusion for Beryllium

Given the relative lack of data and the downward trend in laboratory passing rates below the current PQL of 0.001 mg/L for the Six-Year 1 data set and the lack of data and high variability below the PQL for the Six-Year 2/ERA dataset, it may not be appropriate to recommend lowering of the PQL. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Cadmium

Results of the Methods Comparison

Exhibit 93 summarizes the MDLs for cadmium as documented in EPA-developed analytical methods. Updates to one method have been approved for the analysis of cadmium in drinking water samples during the years 2000-2007 (see Exhibit A-1). These updates are associated with administrative and technical changes or clarifications that are not expected to improve analytical performance near the PQL. The updated method is proprietary and is not listed in Exhibit 93.

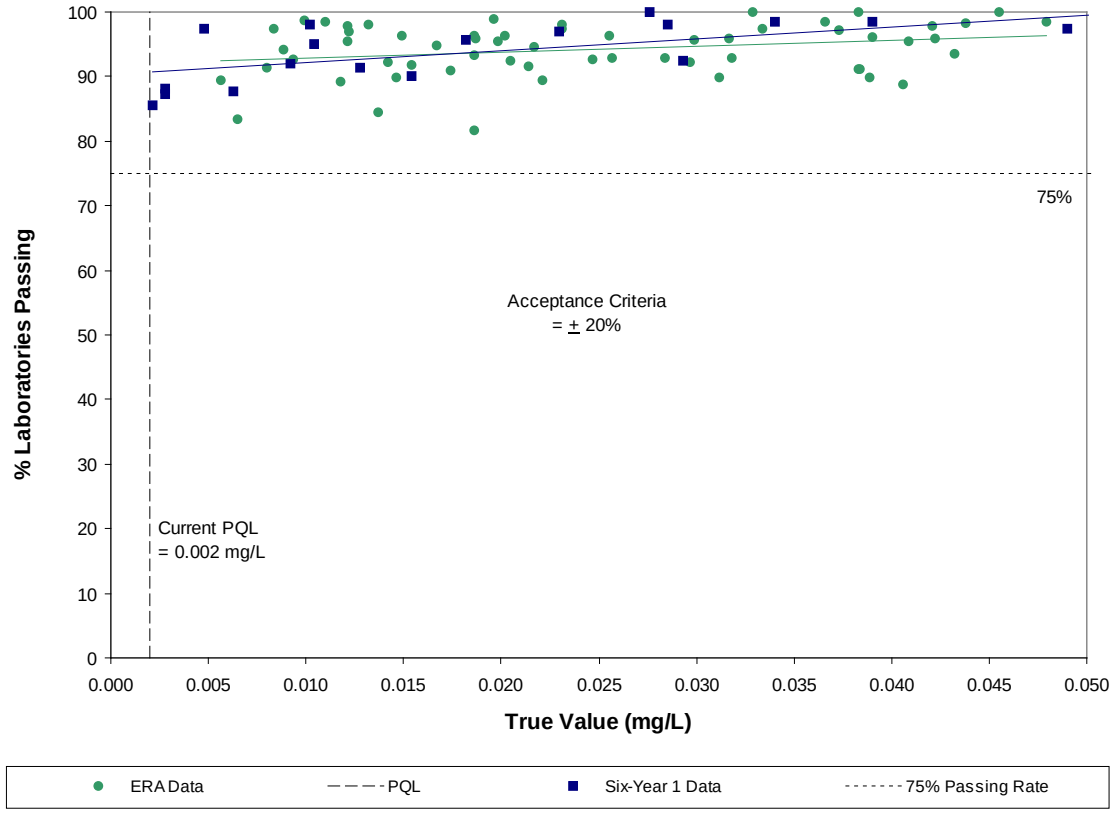
Exhibit 93: Analytical Methods for Cadmium

MCL = 0.005 mg/L Current PQL = 0.002 mg/L DL = 0.0001-0.001 mg/L Acceptance Criteria = ± 20%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL mg/L**
200.7	ICP-AES	0.001
200.8	ICP/MS	0.00003 - 0.0005
200.9	GFAA	0.00005
Notes: Regulatory DLs for inorganic compounds are listed at 40 CFR 141.23(a)(4)(i). Acceptance Criteria for inorganic compounds are listed at 40 CFR 141.23(k)(3)(ii).		

Results of the PQL Analysis

The current PQL for cadmium is 0.002 mg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 94). The Six-Year 1 PE data for cadmium were evaluated but not regressed in the March 2003 report. None of the Six-Year 1 or the Six-Year 2/ERA data are below the current PQL of 0.002 mg/L. However, all of the passing rates, as well as the two regression lines, are well above 75%.

Exhibit 94: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Cadmium



Conclusion for Cadmium

Although laboratory passing rates are high (well above 75%) for the Six-Year 1 and Six-Year 2/ERA data sets, given the lack of data below the current PQL of 0.002 mg/L for both data sets, it may not be appropriate to recommend lowering of the PQL. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Chromium

Results of the Methods Comparison

Exhibit 95 summarizes the MDLs for chromium as documented in EPA-developed analytical methods. Updates to three methods have been approved for the analysis of chromium in drinking water samples during the years 2000-2007 (see Exhibit A-1). These updates are associated with administrative and technical changes or clarifications that are not expected to improve analytical performance near the PQL. The updated methods are proprietary and are not listed in Exhibit 95.

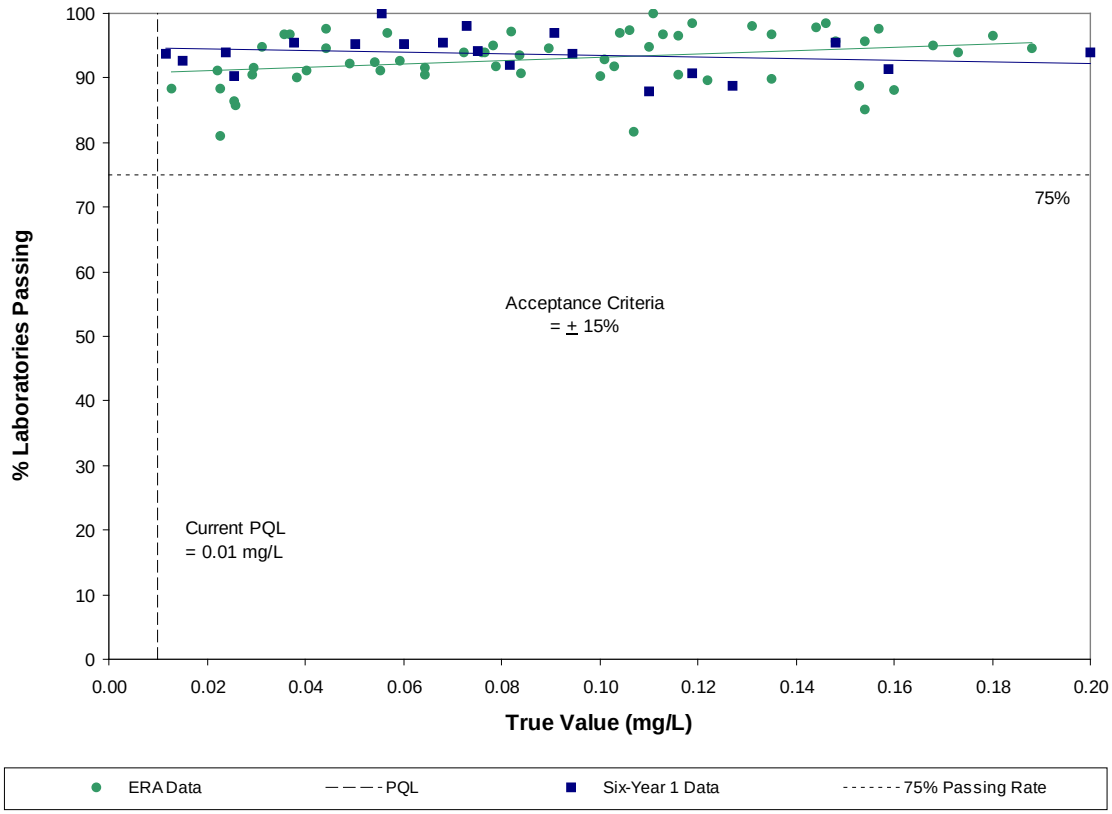
Exhibit 95: Analytical Methods for Chromium

MCL = 0.1 mg/L Current PQL = 0.01 mg/L DL = 0.001-0.007 mg/L Acceptance Criteria = ± 15%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL mg/L**
200.7	ICP-AES	0.004
200.8	ICP/MS	0.00008 - 0.0009
200.9	GFAA	0.0001
Notes: Regulatory DLs for inorganic compounds are listed at 40 CFR 141.23(a)(4)(i). Acceptance Criteria for inorganic compounds are listed at 40 CFR 141.23(k)(3)(ii).		

Results of the PQL Analysis

The current PQL for chromium is 0.01 mg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 96). The Six-Year 1 PE data for chromium were evaluated but not regressed in the March 2003 report. None of the Six-Year 1 or the Six-Year 2/ERA data for chromium are below the current PQL of 0.01 mg/L. However, all of the passing rates, as well as the two regression lines, are well above 75%.

Exhibit 96: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Chromium



Conclusion for Chromium

Although laboratory passing rates are high (well above 75%) for the Six-Year 1 and Six-Year 2/ERA data sets, given the lack of data below the current PQL of 0.01 mg/L for both data sets, it may not be appropriate to recommend lowering of the PQL. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Copper

Results of the Methods Comparison

Exhibit 97 summarizes the MDLs for copper as documented in EPA-developed analytical methods. Updates to six methods have been approved for the analysis of copper in drinking water samples during the years 2000-2007 (see Exhibit A-1). These updates are associated with administrative and technical changes or clarifications that are not expected to improve analytical performance near the PQL. The updated methods are proprietary and are not listed in Exhibit 97.

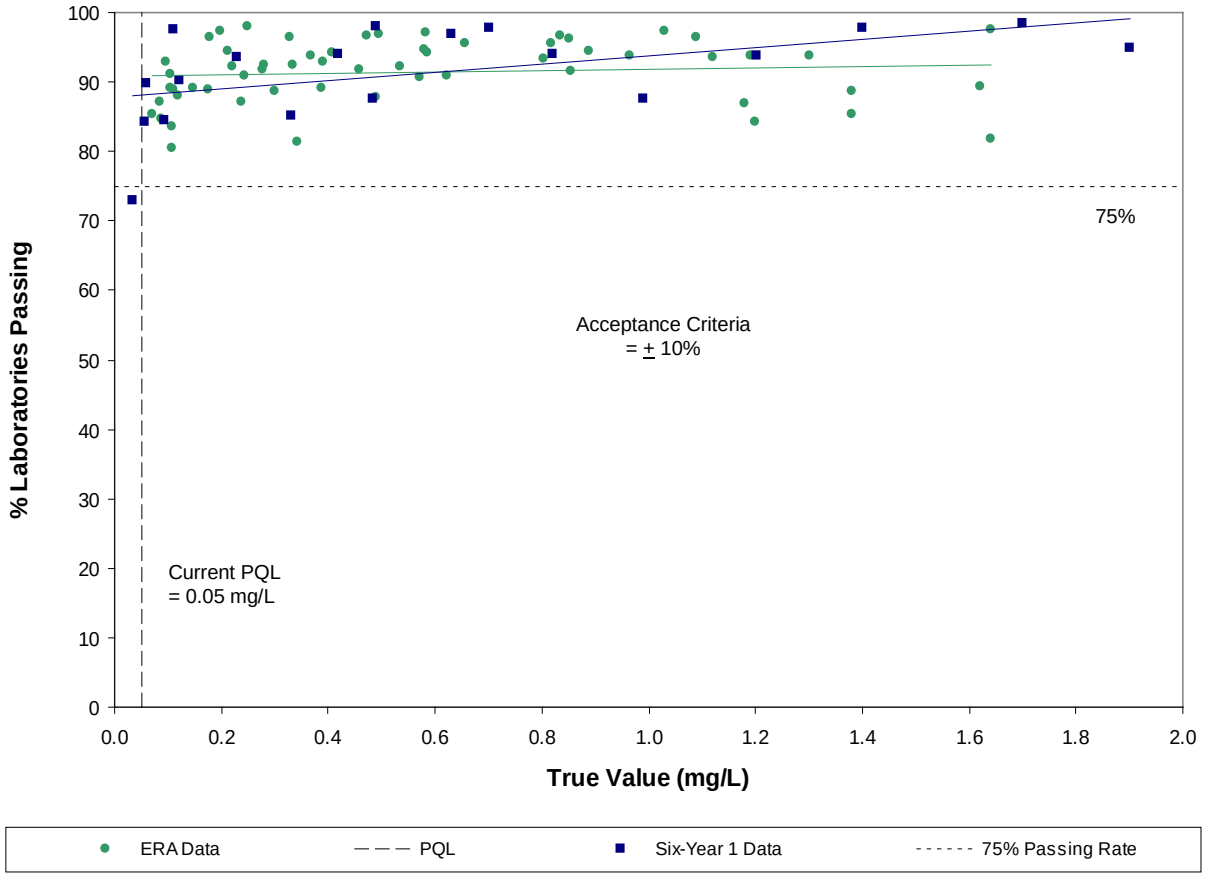
Exhibit 97: Analytical Methods for Copper

Action Level = 1.3 mg/L Current PQL = 0.05 mg/L DL = N/A Acceptance Criteria = ± 10%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL mg/L**
200.7	ICP-AES	0.003
200.8	ICP/MS	0.00001 - 0.0005
200.9	GFAA	0.0007
Notes: EPA has not provided a regulatory DL for copper in the CFR. The Acceptance Criteria for copper are listed at 40 CFR 141.89(a)(1)(ii)(B).		

Results of the PQL Analysis

The current PQL for copper is 0.05 mg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 98). The Six-Year 1 PE data for copper were not evaluated in the March 2003 report. One of the 19 spike values in the Six-Year 1 data set is below the current PQL of 0.05 mg/L. No Six-Year 2/ERA data are below the PQL. The single concentration value less than the PQL corresponds to a passing rate of less than 75%.

Exhibit 98: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Copper



Conclusion for Copper

Although laboratory passing rates are high (above 75% just above the PQL) for the Six-Year 1 and Six-Year 2/ERA data sets, given the lack of data below the current PQL of 0.05 mg/L for both data sets (with the exception of one laboratory passing rate below 75%), it may not be appropriate to recommend lowering of the PQL. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Cyanide

Results of the Methods Comparison

Exhibit 99 summarizes the MDLs for cyanide as documented in EPA-developed analytical methods. Updates to nine methods and four new methods (Kelada 01, QuikChem 10-204-00-1-X, OIA-1677 and ASTM D6888-04) have been approved for the analysis of cyanide in drinking water samples during the years 2000-2007 (67 FR 65220, October 23, 2002, 67 FR 65888, October 29, 2002, 72 FR 11200, March 12, 2007; see Exhibit A-1). While the updates are associated with administrative and technical changes or clarifications that are not expected to improve analytical performance near the PQL, the new methods may improve analytical performance near the PQL; however, because the newly-approved methods are proprietary, the MDLs/DLs from these methods are not known. In addition, the updated methods are proprietary and are not listed in Exhibit 99.

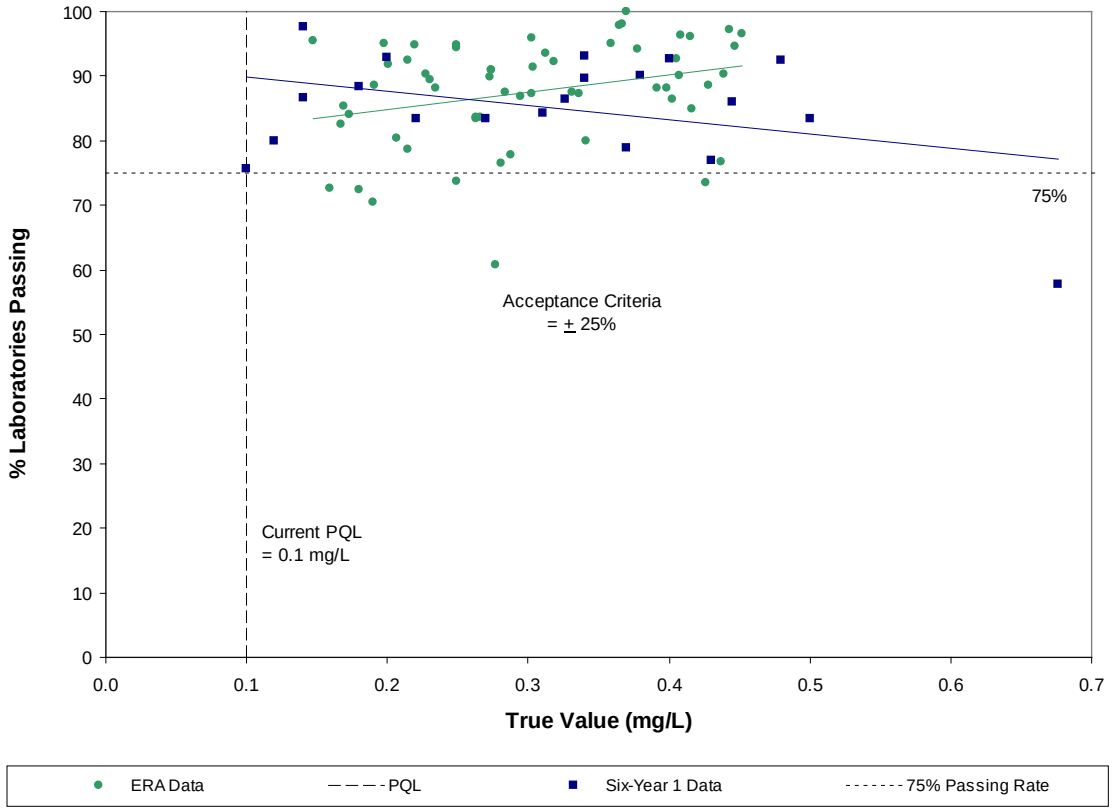
Exhibit 99: Analytical Methods for Cyanide

MCL = 0.2 mg/L Current PQL = 0.1 mg/L DL = 0.0005-0.05 mg/L Acceptance Criteria = ± 25%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL mg/L**
335.4	Semi-Auto Colorimetry	No MDL
Notes: Regulatory DLs for inorganic compounds are listed at 40 CFR 141.23(a)(4)(i). Acceptance Criteria for inorganic compounds are listed at 40 CFR 141.23(k)(3)(ii).		

Results of the PQL Analysis

The current PQL for cyanide is 0.1 mg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 100). The Six-Year 1 PE data for cyanide were not evaluated in the March 2003 report. One of the 20 spike concentrations from the Six-Year 1 data set is equal to the PQL; however, none of these data are below the current PQL of 0.1 mg/L. No Six-Year 2/ERA data are below the current PQL. Several passing rates are below 75%.

Exhibit 100: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Cyanide



Conclusion for Cyanide

Given the variable laboratory passing rates for the Six-Year 1 and Six-Year 2/ERA data sets and the lack of data below the current PQL of 0.1 mg/L for both data sets (with the exception of one laboratory passing rate from the Six-Year 1 data set just above 75% at the PQL), it may not be appropriate to recommend lowering of the PQL. Although four new methods have been approved for the analysis of cyanide, DLs/MDLs are not available for these methods since they are proprietary. Hence it is not known whether use of these newly-approved methods could improve laboratory performance at low concentrations and potentially affect the PQL. While four new methods have been approved for the analysis of cyanide in drinking water, the methods are proprietary and it is not known whether the DLs and/or MDLs from this method could lead to an overall improvement in analytical performance in the vicinity of the current PQL and suggest possible reduction of the PQL.

Dalapon

Results of the Methods Comparison

Exhibit 101 summarizes the MDLs for dalapon as documented in EPA-developed analytical methods. No updated methods have been approved for the analysis of dalapon in drinking water samples during the years 2000-2007; however, two new methods, EPA Method 515.4 and EPA Method 552.3 were approved (Federal Register, Vol. 67, No. 209, p. 65888, October 29, 2002, Federal Register, Vol. 72, No. 47, p. 11200, March 12, 2007; see Exhibit A-1). The ranges of MDLs for dalapon by EPA Method 515.4 and 552.3 are lower than most of the MDLs from other methods, which suggests that laboratory performance at low concentrations may be improved through use of Methods 515.4 and 552.3.

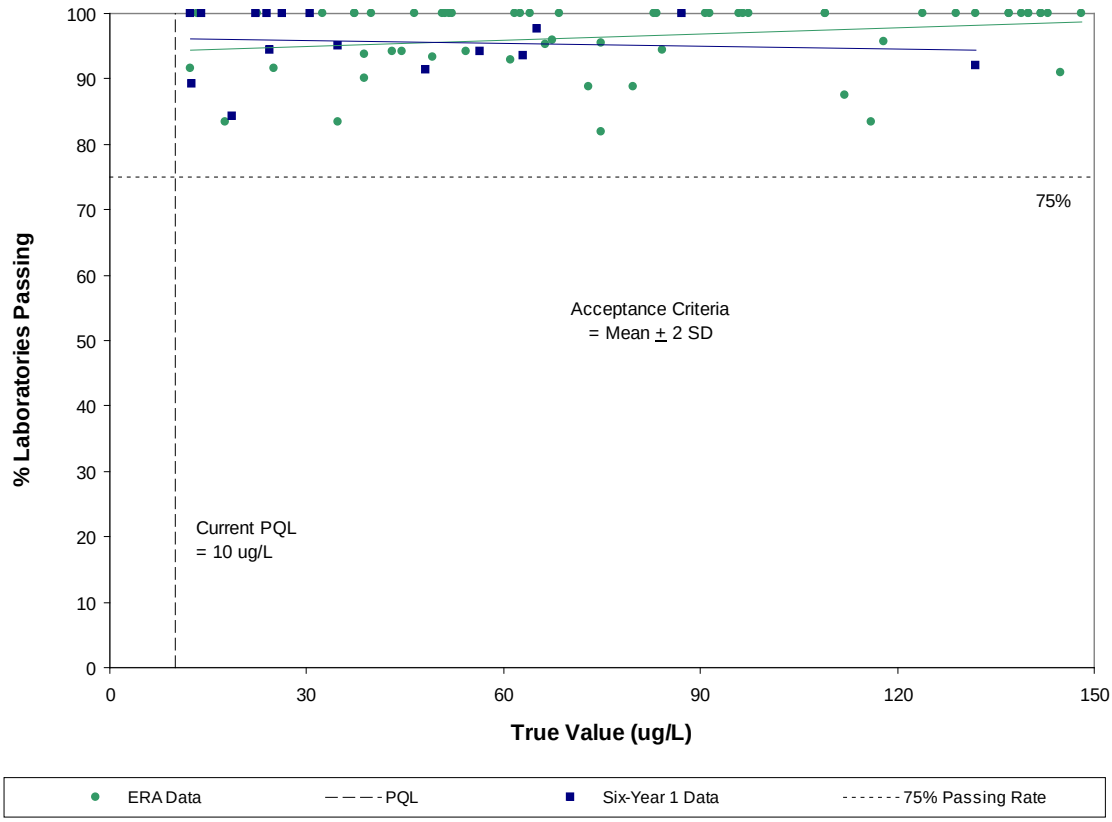
Exhibit 101: Analytical Methods for Dalapon

MCL = 0.2 mg/L Current PQL = 0.01 mg/L DL = 0.001 mg/L Acceptance Criteria = Mean ± 2 Std Dev		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
515.1	GC/ECD	1.3
515.3	LLED and GC/ELCD	0.53 - 0.97
515.4	LLMED and GC/ECD	0.054 – 0.074
552.1	I-ELSE/GC w/ ECD	0.32
552.2	LLED/GC w/ ECD	0.119
552.3	LLMED/GC w/ ECD	0.024 - 0.14
Notes: Regulatory DLs for synthetic organic compounds are listed at 40 CFR 141.24(h)(18). Acceptance Criteria for synthetic organic compounds are listed at 40 CFR 141.24(h)(19)(i)(B).		

Results of the PQL Analysis

The current PQL for dalapon is 10 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 102). The Six-Year 1 PE data for dalapon were not evaluated in the March 2003 report. None of the Six-Year 2/ERA data for dalapon are below the PQL, and passing rates for Six-Year 1 data below the PQL could not be calculated as the NELAC regression coefficients are not valid over that range. However, all of the passing rates, as well as the two regression lines, are well above 75%.

Exhibit 102: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Dalapon



Conclusion for Dalapon

Although laboratory passing rates are high (above 75%) for the Six-Year 1 and Six-Year 2/ERA data sets, given the lack of data below the current PQL of 10 µg/L for both data sets, it may not be appropriate to recommend lowering of the PQL. However, the approval of EPA Methods 515.4 and 552.3 for the analysis of dalapon provides lower MDLs than were achievable by use of other approved methods. This may lead to an overall improvement in analytical performance in the vicinity of the current PQL and could suggest possible reduction of the PQL.

1,2-Dichlorobenzene

Results of the Methods Comparison

Exhibit 103 summarizes the MDLs for 1,2-dichlorobenzene as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of 1,2-dichlorobenzene in drinking water samples during the years 2000-2007.

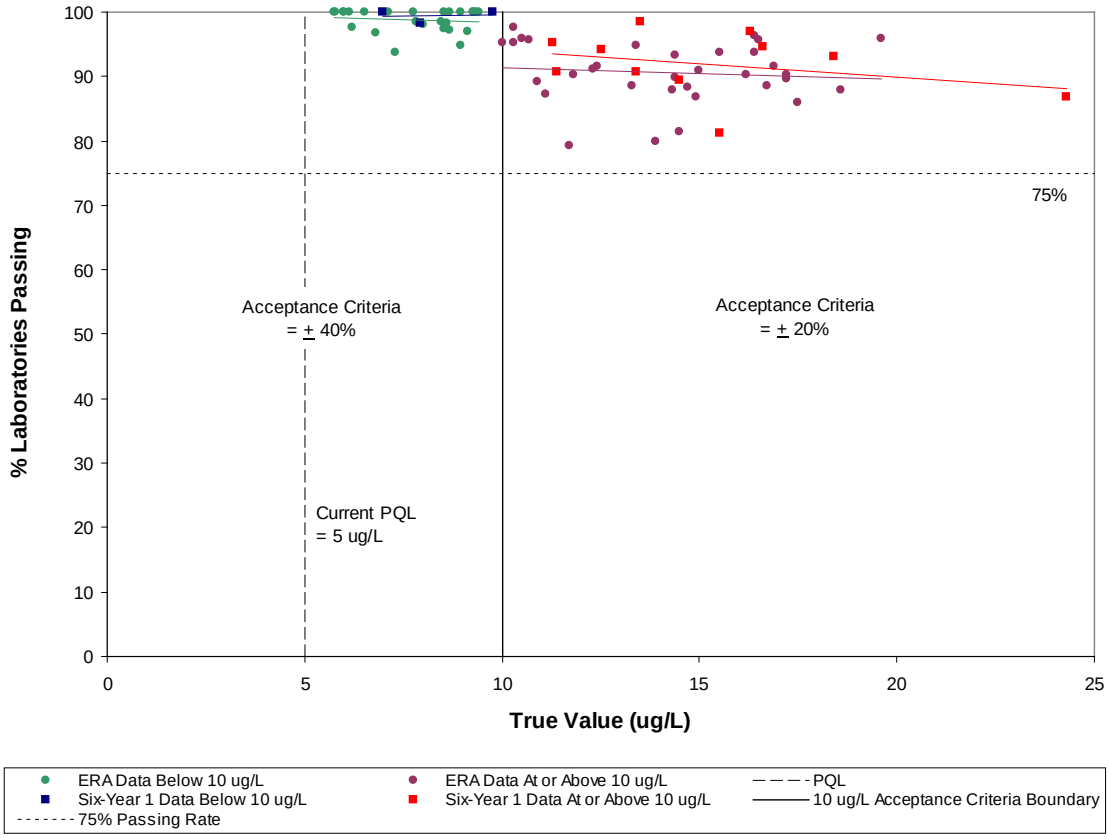
Exhibit 103: Analytical Methods for 1,2-Dichlorobenzene

MCL = 0.6mg/L Current PQL = 0.005 mg/L DL = 0.0005 mg/L Acceptance Criteria = ± 20% or 40%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
502.2	CCGC with PID/ELCD	0.02 - 0.05
524.2	CCGC/MS	0.03 - 0.05
Notes: The regulatory DL for volatile organic compounds is listed at 40 CFR 141.24(k)(17)(ii)(C). Acceptance Criteria for volatile organic compounds are listed at 40 CFR 141.24(f)(17)(i).		

Results of the PQL Analysis

The current PQL for 1,2-dichlorobenzene is 5 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 104). The Six-Year 1 PE data for 1,2-dichlorobenzene were not evaluated in the March 2003 report. Note that the acceptance criteria are ± 40% at spike concentrations below 10 µg/L and ± 20% at or above 10 µg/L; hence the data were regressed as two independent populations. None of the Six-Year 1 or the Six-Year 2/ERA data are below the current PQL of 5 µg/L. However, all of the passing rates for the two data sets are well above 75%.

Exhibit 104: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – 1,2-Dichlorobenzene



Conclusion for 1,2-Dichlorobenzene

Although laboratory passing rates are high (well above 75% in the vicinity of the PQL) for the Six-Year 1 and Six-Year 2/ERA data sets, given the lack of data below the current PQL of 5 µg/L for both data sets, it may not be appropriate to recommend lowering of the PQL. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

2,4-Dichlorophenoxyacetic acid (2,4-D)

Results of the Methods Comparison

Exhibit 105 summarizes the MDLs for 2,4-dichlorophenoxyacetic acid as documented in EPA-developed analytical methods. Updates to one method have been approved for the analysis of 2,4-D in drinking water samples during the years 2000-2007 (see Exhibit A-1). These updates are minor technical revisions that are not anticipated to improve analytical performance near the PQL. In addition, a new method, EPA Method 515.4 was approved (Federal Register, Vol. 67, No. 209, p. 65888, October 29, 2002; see Exhibit A-1). The MDL for 2,4-D by EPA Method 515.4 is somewhat lower than that obtained from other EPA methods, which suggests that laboratory performance at low concentrations may be improved through use of Method 515.4.

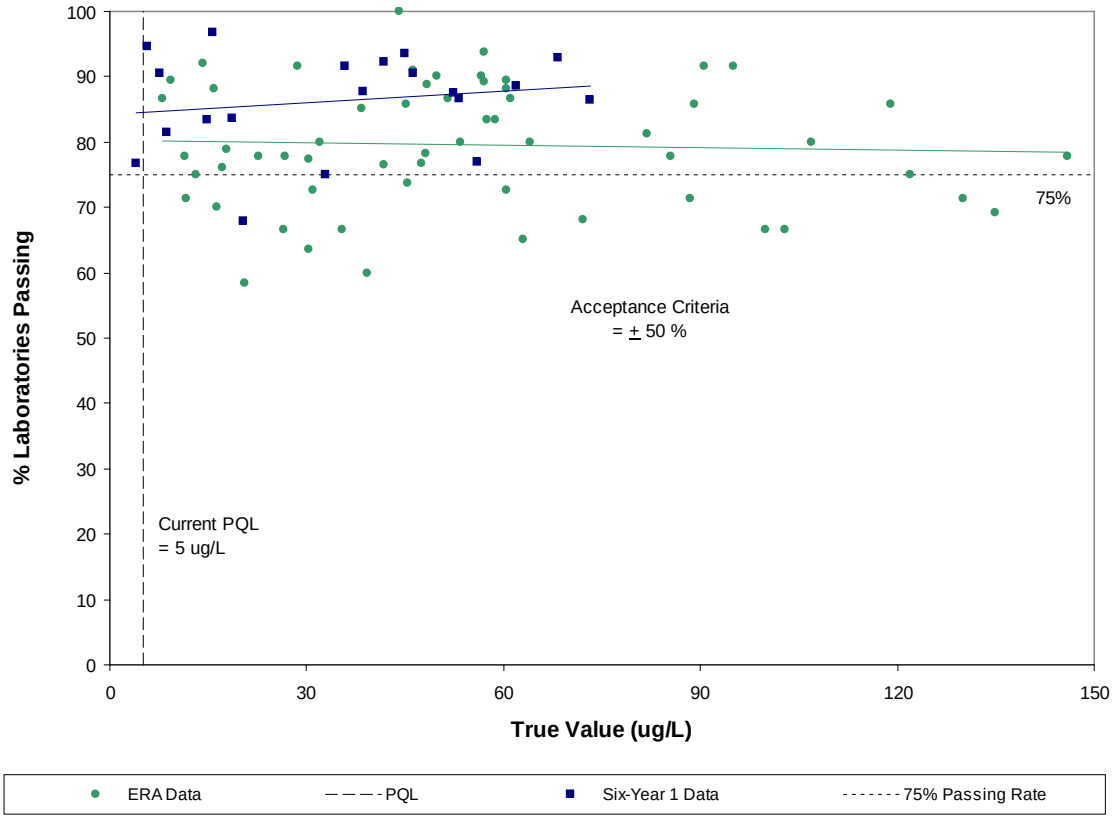
Exhibit 105: Analytical Methods for 2,4-D

MCL = 0.07 mg/L Current PQL = 0.005 mg/L DL = 0.0001 mg/L Acceptance Criteria = ± 50%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
515.1	GC/ECD	0.078
515.2	LSE and GC/ECD	0.28
515.3	LLED and GC/ELCD	0.35 - 0.36
515.4	LLMED and GC/ECD	0.055 - 0.066
555	HPLC/PDAUVD	0.34 - 1.3
Notes: Regulatory DLs for synthetic organic compounds are listed at 40 CFR 141.24(h)(18). Acceptance Criteria for synthetic organic compounds are listed at 40 CFR 141.24(h)(19)(i)(B).		

Results of the PQL Analysis

The current PQL for 2,4-D is 5 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 106). The Six-Year 1 PE data for 2,4-D were not evaluated in the March 2003 report. Only one of the 20 spike values in the Six-Year 1 data set and none of the Six-Year 2/ERA data are below the current PQL of 5 µg/L. Several passing rates are below 75%.

Exhibit 106: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – 2,4-D



Conclusion for 2,4-D

Given the variable laboratory passing rates for the Six-Year 1 and Six-Year 2/ERA data sets and the lack of data below the current PQL of 5 µg/L for both data sets (with the exception of one laboratory passing rate from the Six-Year 1 data set just above 75%), it may not be appropriate to recommend lowering of the PQL. However, the approval of EPA Method 515.4 for the analysis of 2,4-D provides a lower MDL that was achievable by use of other approved methods. This may lead to an overall improvement in analytical performance in the vicinity of the current PQL and could suggest possible reduction of the PQL.

Di(2-ethylhexyl)adipate (DEHA)

Results of the Methods Comparison

Exhibit 107 summarizes the MDLs for di(2-ethylhexyl)adipate as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of DEHA in drinking water samples during the years 2000-2007.

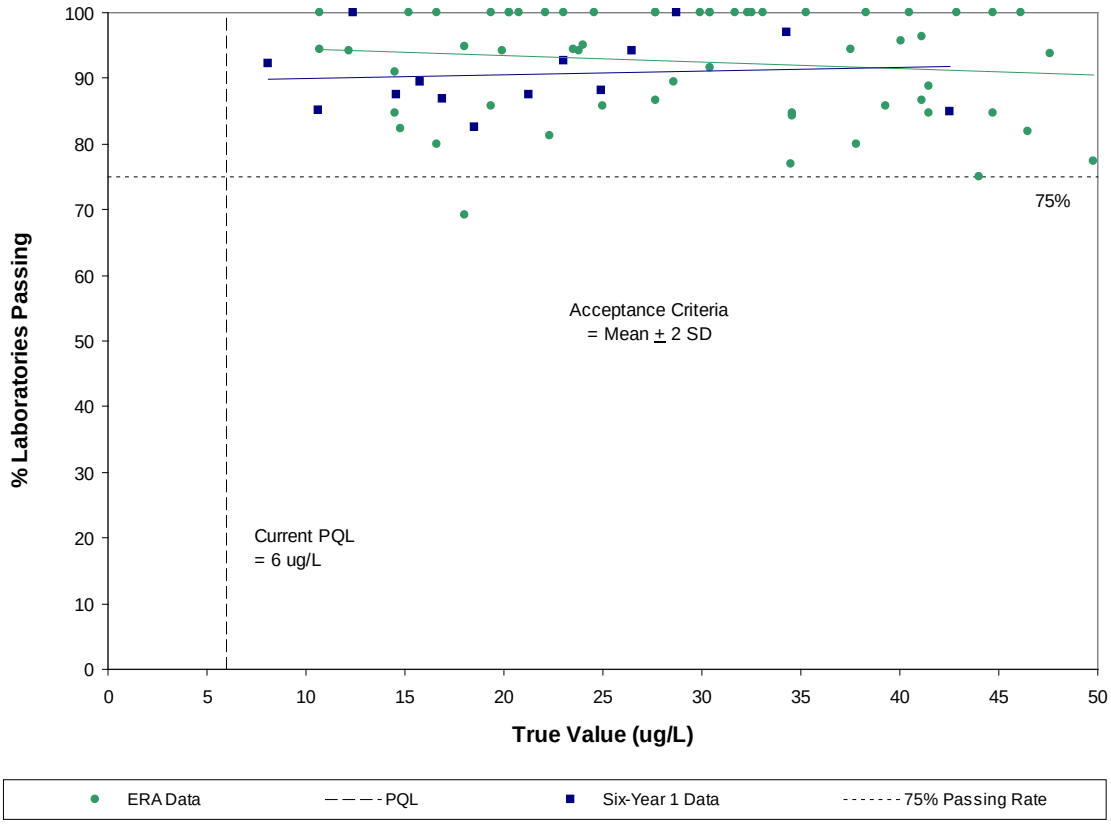
Exhibit 107: Analytical Methods for Di(2-ethylhexyl)adipate

MCL = 0.4 mg/L Current PQL = 0.006 mg/L DL = 0.0006 mg/L Acceptance Criteria = Mean ± 2 Std Dev		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
506	LLE or LSE and GC/PID	11.82
525.2	LSE and CCGC/MS	0.09 - 1.3
Notes: Regulatory DLs for synthetic organic compounds are listed at 40 CFR 141.24(h)(18). Acceptance Criteria for synthetic organic compounds are listed at 40 CFR 141.24(h)(19)(i)(B).		

Results of the PQL Analysis

The current PQL for DEHA is 6 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 108). The Six-Year 1 PE data for DEHA were not evaluated in the March 2003 report. None of the Six-Year 2/ERA data for DEHA are below the current PQL of 6 µg/L and passing rates for Six-Year 1 data below the PQL could not be calculated as the NELAC regression coefficients are not valid over that range. However, all but two of the passing rates for the two data sets are above 75%.

Exhibit 108: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – DEHA



Conclusion for DEHA

Although laboratory passing rates are high (well above 75% in the vicinity of the PQL) for the Six-Year 1 data set, given the variable laboratory passing rates for the Six-Year 2/ERA data set and the lack of data below the current PQL of 6 µg/L for both the Six-Year 1 and Six-Year 2/ERA data sets, it may not be appropriate to recommend lowering of the PQL. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Dinoseb

Results of the Methods Comparison

Exhibit 109 summarizes the MDLs for dinoseb as documented in EPA-developed analytical methods. No updated methods have been approved for the analysis of dinoseb in drinking water samples during the years 2000-2007; however, a new method, EPA Method 515.4 was approved (Federal Register, Vol. 67, No. 209, p. 65888, October 29, 2002; see Exhibit A-1). The MDL range for dinoseb by EPA Method 515.4 is lower than that obtained from other EPA methods, which suggests that laboratory performance at low concentrations may be improved through use of Method 515.4.

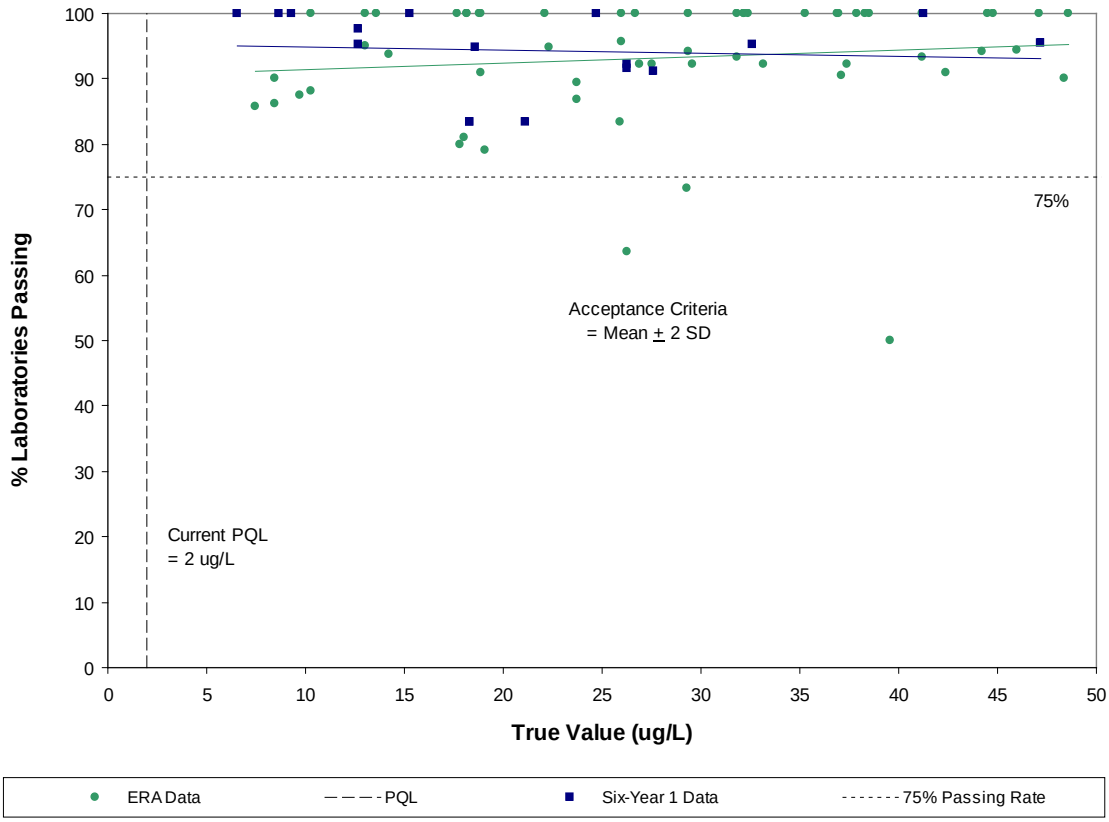
Exhibit 109: Analytical Methods for Dinoseb

MCL = 0.007 mg/L Current PQL = 0.002 mg/L DL = 0.0002 mg/L Acceptance Criteria = Mean ± 2 Std Dev		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
515.1	GC/ECD	0.33
515.2	LSE and GC/ECD	0.28
515.3	LLED and GC/ELCD	0.75 - 0.82
515.4	LLMED and GC/ECD	0.081 – 0.166
555	HPLC/PDAUVD	0.26 - 1.5
Notes: Regulatory DLs for synthetic organic compounds are listed at 40 CFR 141.24(h)(18). Acceptance Criteria for synthetic organic compounds are listed at 40 CFR 141.24(h)(19)(i)(B).		

Results of the PQL Analysis

The current PQL for dinoseb is 2 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 110). The Six-Year 1 PE data for dinoseb were not evaluated in the March 2003 report. None of the Six-Year 1 or the Six-Year 2/ERA data are below the current PQL of 2 µg/L. In general, many of the passing rates around the PQL are highly variable. Although all of the passing rates in the Six-Year 1 data are above 75%, three passing rates in the Six-Year 2/ERA data are below 75%.

Exhibit 110: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Dinoseb



Conclusion for Dinoseb

Although laboratory passing rates are high (well above 75% in the vicinity of the PQL) for the Six-Year 1 data set, given the variable laboratory passing rates for the Six-Year 2/ERA data set and the lack of data below the current PQL of 2 µg/L for both the Six-Year 1 and Six-Year 2/ERA data sets, it may not be appropriate to recommend lowering of the PQL. However, the approval of EPA Method 515.4 for the analysis of dinoseb provides a lower MDL than was achievable by use of other approved methods. This may lead to an overall improvement in analytical performance in the vicinity of the current PQL and could suggest possible reduction of the PQL.

Diquat

Results of the Methods Comparison

Exhibit 111 summarizes the MDLs for diquat as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of diquat in drinking water samples during the years 2000-2007.

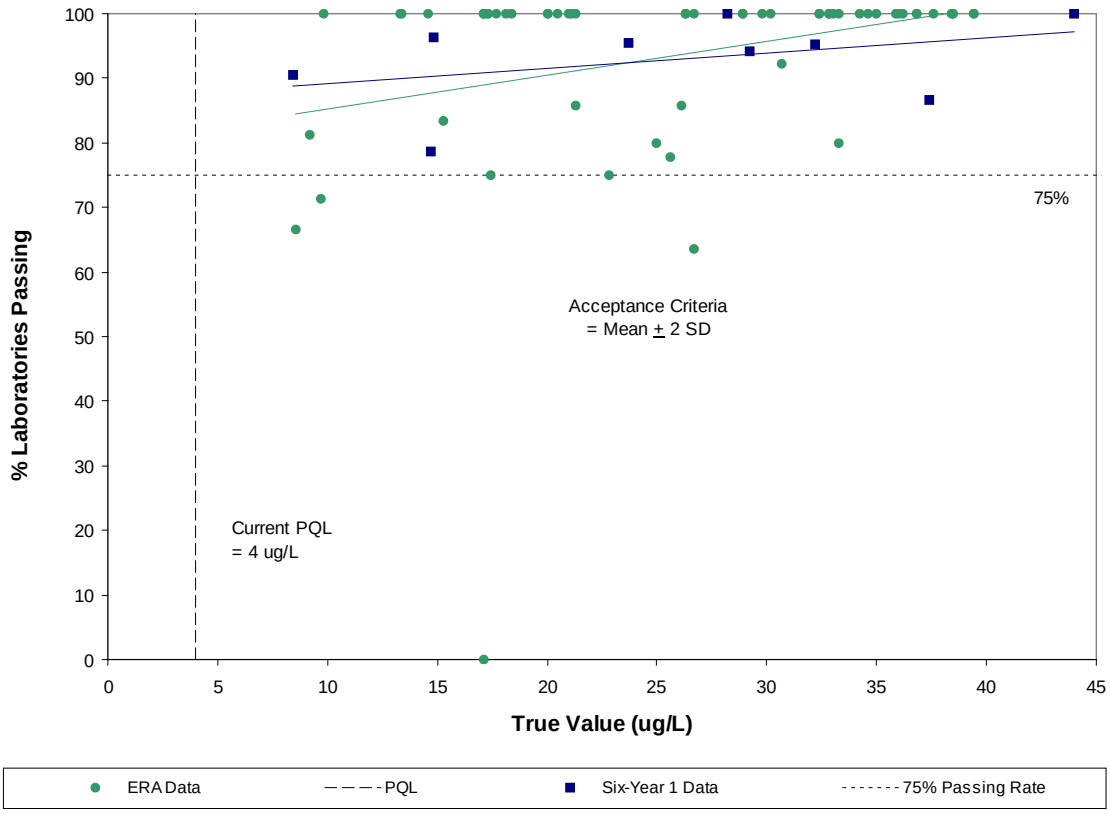
Exhibit 111: Analytical Methods for Diquat

MCL = 0.02 mg/L Current PQL = 0.004 mg/L DL = 0.0004 mg/L Acceptance Criteria = Mean ± 2 Std Dev		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
549.2	LSE/HPLC w/ UVD	0.72
Notes: Regulatory DLs for synthetic organic compounds are listed at 40 CFR 141.24(h)(18). Acceptance Criteria for synthetic organic compounds are listed at 40 CFR 141.24(h)(19)(i)(B).		

Results of the PQL Analysis

The current PQL for diquat is 4 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 112). The Six-Year 1 PE data for diquat were evaluated but were not regressed in the March 2003 report. None of the Six-Year 1 or the Six-Year 2/ERA data are below the current PQL of 2 µg/L. All of the passing rates in the Six-Year 1 data are above 75%; meanwhile, five passing rates in the Six-Year 2/ERA data are less than or equal to 75%.

Exhibit 112: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Diquat



Conclusion for Diquat

Although laboratory passing rates are high (above 75% in the vicinity of the PQL) for the Six-Year 1 data set, given the variable laboratory passing rates for the Six-Year 2/ERA data set and the lack of data below the current PQL of 4 µg/L for both the Six-Year 1 and Six-Year 2/ERA data sets, it may not be appropriate to recommend lowering of the PQL. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Endothall

Results of the Methods Comparison

Exhibit 113 summarizes the MDLs for endothall as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of endothall in drinking water samples during the years 2000-2007.

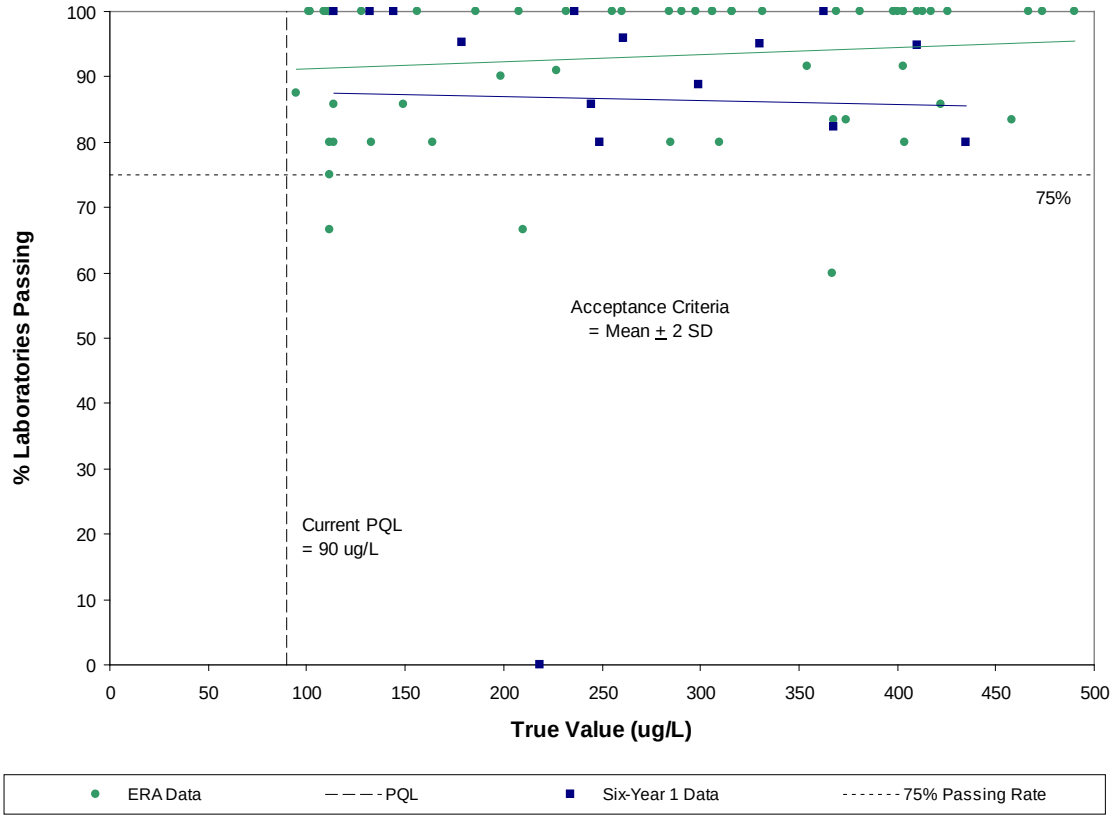
Exhibit 113: Analytical Methods for Endothall

MCL = 0.1 mg/L Current PQL = 0.09 mg/L DL = 0.009 mg/L Acceptance Criteria = Mean ± 2 Std Dev		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
548.1	I-EE/Methylate and GC/MS	0.7 - 1.79
Notes: Regulatory DLs for synthetic organic compounds are listed at 40 CFR 141.24(h)(18). Acceptance Criteria for synthetic organic compounds are listed at 40 CFR 141.24(h)(19)(i)(B).		

Results of the PQL Analysis

The current PQL for endothall is 90 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 114). The Six-Year 1 PE data for endothall were not evaluated in the March 2003 report. None of the Six-Year 2/ERA data for endothall are below the PQL and passing rates for Six-Year 1 data below the PQL could not be calculated as the NELAC regression coefficients are not valid over that range. All but one of the passing rates in the Six-Year 1 data are above 75%; meanwhile, four passing rates in the Six-Year 2/ERA data are less than or equal to 75%. Note that the 0% passing rate near 220 ug/L from the Six-Year 1 data was a study that consisted of only one laboratory.

Exhibit 114: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Endothall



Conclusion for Endothall

Although laboratory passing rates are high (well above 75% in the vicinity of the PQL) for the Six-Year 1 data set, given the variable laboratory passing rates for the Six-Year 2/ERA data set and the lack of data below the current PQL of 90 µg/L for both the Six-Year 1 and Six-Year 2/ERA data sets, it may not be appropriate to recommend lowering of the PQL. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Endrin

Results of the Methods Comparison

Exhibit 115 summarizes the MDLs for endrin as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of endrin in drinking water samples during the years 2000-2007.

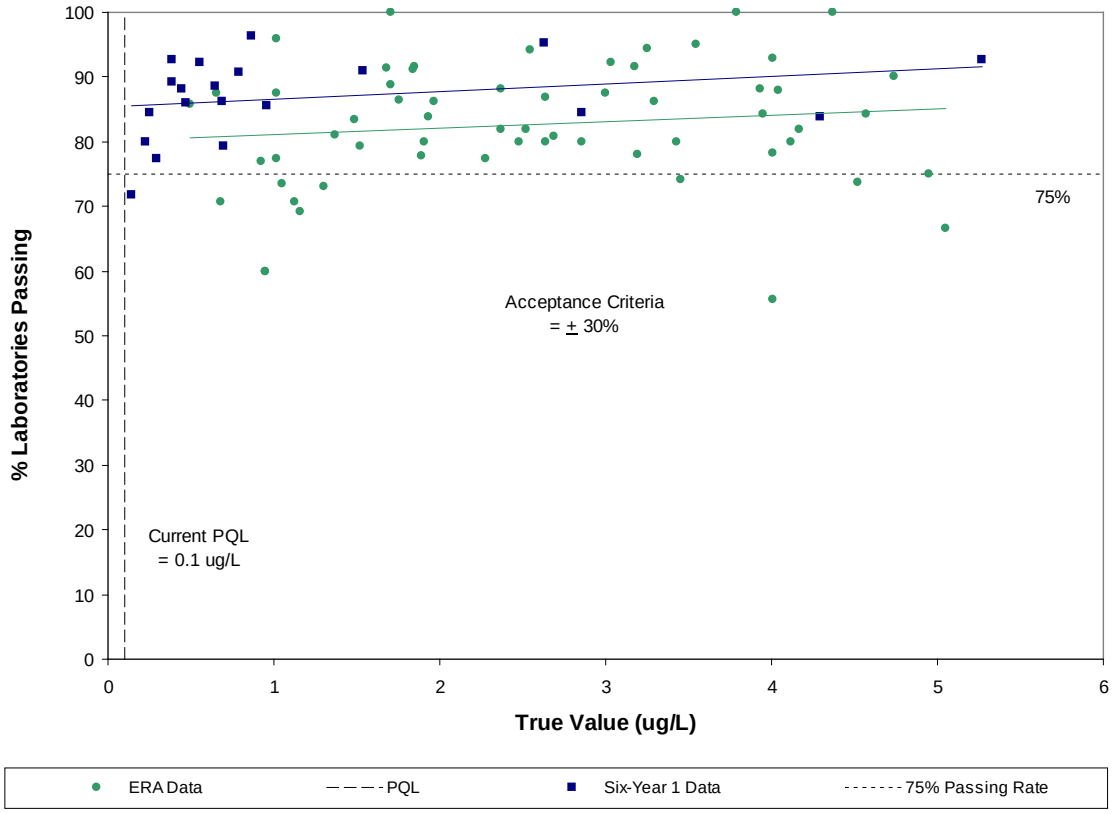
Exhibit 115: Analytical Methods for Endrin

MCL = 0.002 mg/L Current PQL = 0.0001 mg/L DL = 0.00001 mg/L Acceptance Criteria = ± 30%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
505	ME and GC	0.063
508	GC/ECD	0.0062
508.1	LSE and ECGC	0.007
525.2	LSE and CCGC/MS	0.16 - 0.34
551.1	LLE/GC w/ ECD	0.002 - 0.003
Notes: Regulatory DLs for synthetic organic compounds are listed at 40 CFR 141.24(h)(18). Acceptance Criteria for synthetic organic compounds are listed at 40 CFR 141.24(h)(19)(i)(B).		

Results of the PQL Analysis

The current PQL for endrin is 0.1 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 116). The Six-Year 1 PE data for endrin were not evaluated in the March 2003 report. None of the Six-Year 1 or the Six-Year 2/ERA data are below the current PQL of 0.1 µg/L. One passing rate for the Six-Year 1 data is below 75%; however, the Six-Year 2/ERA passing rates are more variable, with several passing rates below 75%.

Exhibit 116: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Endrin



Conclusion for Endrin

Given the variable laboratory passing rates in the vicinity of the current PQL of 0.1 µg/L and the lack of data below the current PQL for both the Six-Year 1 and Six-Year 2/ERA data sets, it may not be appropriate to recommend lowering of the PQL. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Fluoride

Results of the Methods Comparison

Exhibit 117 summarizes the MDLs for fluoride as documented in EPA-developed analytical methods. Updates to eleven methods and two new methods (EPA Method 300.1 and ASTM D6508, rev. 2) have been approved for the analysis of fluoride in drinking water samples during the years 2000-2007 (Federal Register, Vol. 72, No. 47, p. 11200, March 12, 2007; see Exhibit A-1). The updates are associated with administrative and technical changes or clarifications that are not expected to improve analytical performance near the PQL. The updated methods are proprietary and are not listed in Exhibit 117. The MDL for EPA Method 300.1 is slightly lower than that for EPA Method 300.0, which suggests that laboratory performance at low concentrations may be improved through use of Method 300.1. Since the new ASTM method is proprietary, it is uncertain whether new MDLs may be lower than those for other methods.

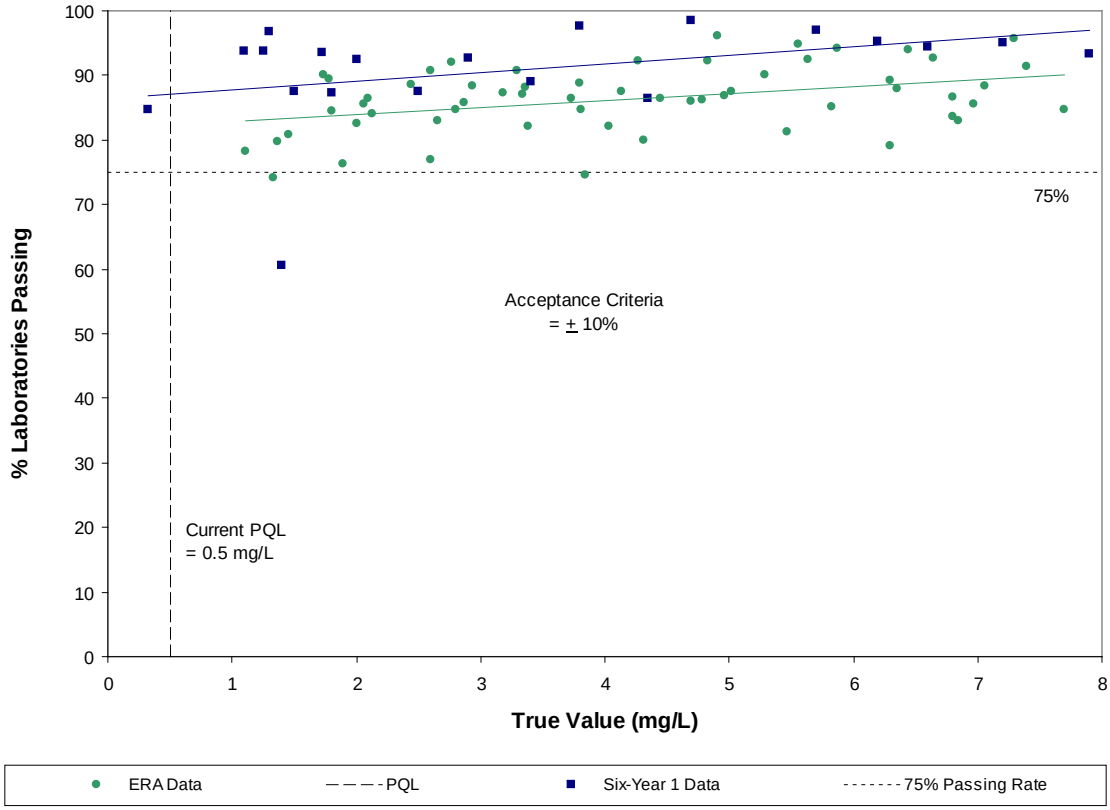
Exhibit 117: Analytical Methods for Fluoride

MCL = 4 mg/L Current PQL = 0.5 mg/L DL = N/A Acceptance Criteria = ± 10%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL mg/L**
300.0	IC	0.01
300.1	IC	0.009
Notes: EPA has not provided a regulatory DL for fluoride in the CFR. Acceptance Criteria for inorganic compounds are listed at 40 CFR 141.23(k)(3)(ii).		

Results of the PQL Analysis

The current PQL for fluoride is 0.5 mg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 118). The Six-Year 1 PE data for fluoride were evaluated but were not regressed as part of the March 2003 report. One of the 20 spike values in the Six-Year 1 data set is below the current PQL of 0.5 mg/L. No Six-Year 2/ERA data are below the current PQL. All but one of the Six-Year 1 passing rates are above 75%. Furthermore, two of the Six-Year 2/ERA passing rates are below 75%.

Exhibit 118: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Fluoride



Conclusion for Fluoride

Given the variable laboratory passing rates for the Six-Year 1 and Six-Year 2/ERA data sets in the vicinity of the current PQL of 0.5 mg/L and the lack of data below the PQL for both data sets (with the exception of one laboratory passing rate from the Six-Year 1 data set slightly below the PQL), it may not be appropriate to recommend lowering of the PQL. However, the approval of EPA Method 300.1 for the analysis of fluoride provides a slightly lower MDL than was achievable by use of other approved methods. This may lead to a slight improvement in analytical performance in the vicinity of the current PQL and could suggest possible reduction of the PQL.

Glyphosate

Results of the Methods Comparison

Exhibit 119 summarizes the MDLs for glyphosate as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of glyphosate in drinking water samples during the years 2000-2007.

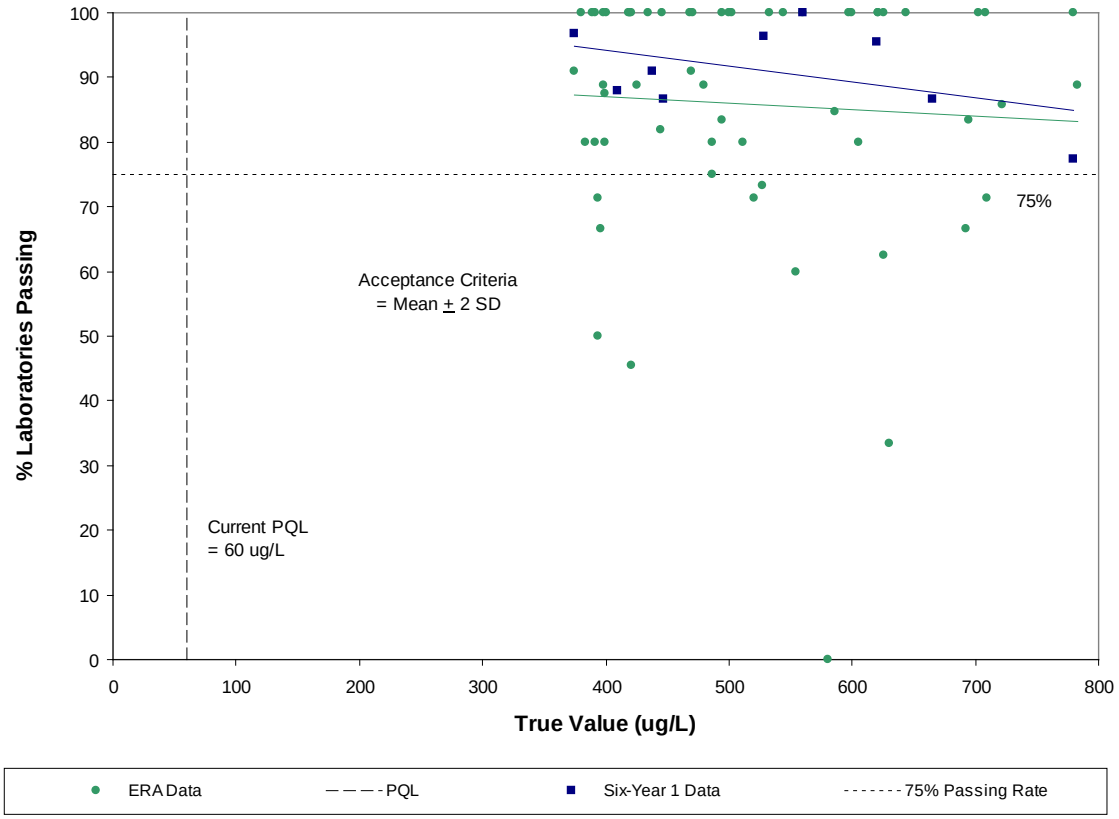
Exhibit 119: Analytical Methods for Glyphosate

MCL = 0.7 mg/L Current PQL = 0.06 mg/L DL = 0.006 mg/L Acceptance Criteria = Mean ± 2 Std Dev		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
547	DAI/HPLC w/ Der. and FD	5.99 - 6.00
Notes: Regulatory DLs for synthetic organic compounds are listed at 40 CFR 141.24(h)(18). Acceptance Criteria for synthetic organic compounds are listed at 40 CFR 141.24(h)(19)(i)(B).		

Results of the PQL Analysis

The current PQL for glyphosate is 60 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 120). The Six-Year 1 PE data for glyphosate were evaluated but not regressed in the March 2003 report. None of the Six-Year 1 or the Six-Year 2/ERA data are below the current PQL of 60 µg/L. All but one of the passing rates in the Six-Year 1 data are above 75%; however, several passing rates in the Six-Year 2/ERA data are less than or equal to 75%.

Exhibit 120: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Glyphosate



Conclusion for Glyphosate

Given the variable laboratory passing rates for the Six-Year 2/ERA data set and the lack of data below or in the vicinity of the current PQL of 60 µg/L for both the Six-Year 1 and Six-Year 2/ERA data sets, it may not be appropriate to recommend lowering of the PQL. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Lead

Results of the Methods Comparison

Exhibit 121 summarizes the MDLs for lead as documented in EPA-developed analytical methods. Updates to three methods have been approved for the analysis of lead in drinking water samples during the years 2000-2007 (see Exhibit A-1). These updates are associated with administrative and technical changes or clarifications that are not expected to improve analytical performance near the PQL. The updated methods are proprietary and are not listed in Exhibit 121.

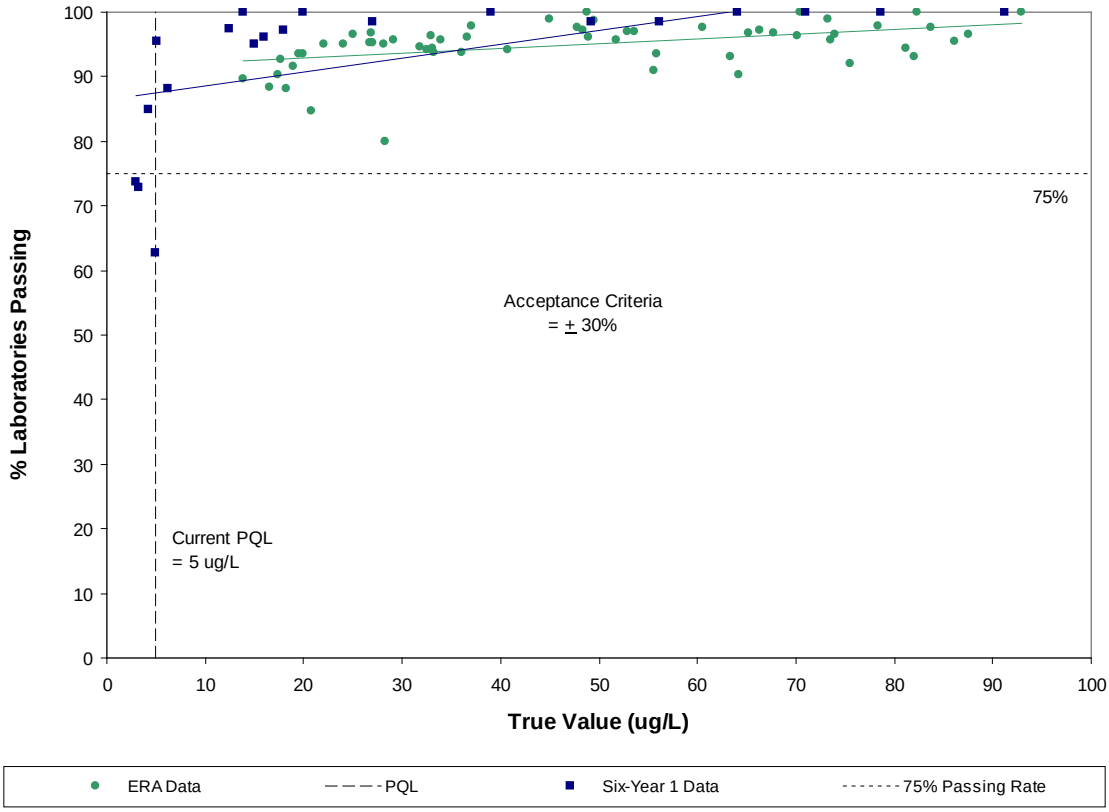
Exhibit 121: Analytical Methods for Lead

Action Level = 0.015 mg/L Current PQL = 0.005 mg/L DL = 0.001 mg/L Acceptance Criteria = ± 30%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL mg/L**
200.8	ICP/MS	0.00002 - 0.0006
200.9	GFAA	0.0007
Notes: The regulatory DL for lead is listed at 40 CFR 141.89(a)(1)(iii). Note that the DL is referred to as the "method detection limit" in the CFR. The Acceptance Criteria for lead are listed at 40 CFR 141.89(a)(1)(ii)(A).		

Results of the PQL Analysis

The current PQL for lead is 5 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 122). The Six-Year 1 PE data for lead were not evaluated in the March 2003 report. Four of the 20 spike values in the Six-Year 1 data set are less than or equal to the current PQL of 5 µg/L. No Six-Year 2/ERA data are below the PQL. Three of the Six-Year 1 concentration values had passing rates of less than 75%.

Exhibit 122: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Lead



Conclusion for Lead

Given the relative lack of data and the downward trend in laboratory passing rates below the current PQL of 5 µg/L for the Six-Year 1 data set and the lack of data below the PQL for the Six-Year 2/ERA dataset, it may not be appropriate to recommend lowering of the PQL. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Mercury

Results of the Methods Comparison

Exhibit 123 summarizes the MDLs for mercury as documented in EPA-developed analytical methods. Updates to three methods have been approved for the analysis of mercury in drinking water samples during the years 2000-2007 (see Exhibit A-1). These updates are associated with administrative and technical changes or clarifications that are not expected to improve analytical performance near the PQL. The updated methods are proprietary and are not listed in Exhibit 123. However, a new method, EPA Method 245.7, rev. 2.0, was approved (Federal Register, Vol. 72, No. 47, p. 11200, March 12, 2007; see Exhibit A-1). The MDL from this method is significantly lower than the MDLs from other methods, suggesting that laboratory performance at low concentrations may improve through use of Method 245.7.

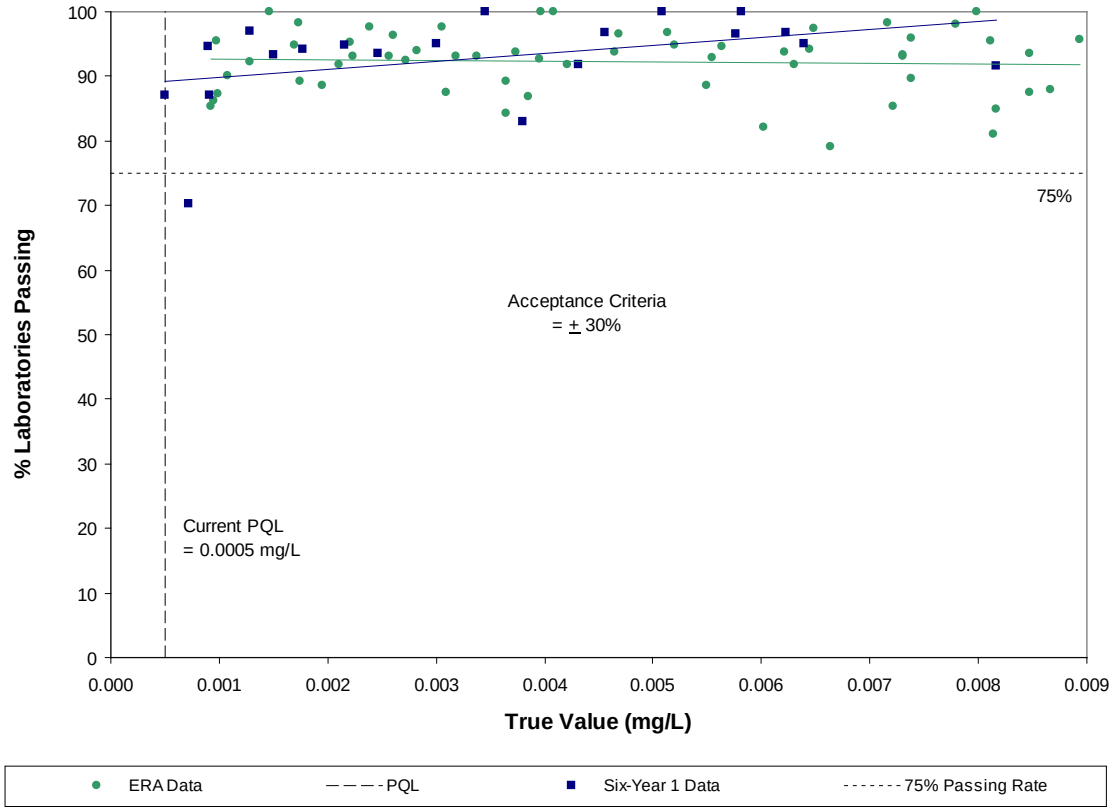
Exhibit 123: Analytical Methods for Mercury

MCL = 0.002 mg/L Current PQL = 0.0005 mg/L DL = 0.0002 mg/L Acceptance Criteria = ± 30%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL mg/L**
200.8	ICP/MS	0.0002
245.1	CVAAS	No MDL
245.2	ACVT	No MDL
245.7	CVAFS	0.0000018
Notes: Regulatory DLs for inorganic compounds are listed at 40 CFR 141.23(a)(4)(i). Acceptance Criteria for inorganic compounds are listed at 40 CFR 141.23(k)(3)(ii).		

Results of the PQL Analysis

The current PQL for mercury is 0.0005 mg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 124). The Six-Year 1 PE data for mercury were evaluated but not regressed in the March 2003 report. None of the Six-Year 1 or the Six-Year 2/ERA data are below the current PQL of 0.0005 mg/L. (One of the Six-Year 1 values is equal to 0.000506 mg/L, just above the PQL.) All but one of the passing rates in the Six-Year 1 data set and all of the passing rates in the Six-Year 2/ERA data set are above 75%.

Exhibit 124: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Mercury



Conclusion for Mercury

Given the variable laboratory passing rates the vicinity of the current PQL of 0.5 mg/L for the Six-Year 1 data set and the lack of data below the PQL for both the Six-Year 1 and Six-Year 2/ERA data sets (with the exception of one laboratory passing rate from the Six-Year 1 data set just below the PQL), it may not be appropriate to recommend lowering of the PQL. However, the approval of EPA Method 245.7 (Rev 2.0) for the analysis of mercury provides a significantly lower MDL than was achievable by use of other approved methods. This may lead to an overall improvement in analytical performance in the vicinity of the current PQL and could suggest possible reduction of the PQL.

Nitrate (as N)

Results of the Methods Comparison

Exhibit 125 summarizes the MDLs for nitrate as documented in EPA-developed analytical methods. Updates to ten methods and two new methods (EPA Method 300.1 and ASTM D6508, rev. 2) have been approved for the analysis of nitrate in drinking water samples during the years 2000-2007 (Federal Register, Vol. 67, No. 205, p. 65220, October 23, 2002; Federal Register, Vol. 72, No. 47, p. 11200, March 12, 2007; see Exhibit A-1). The updates are associated with administrative and technical changes or clarifications that are not expected to improve analytical performance near the PQL. The updated methods are proprietary and are not listed in Exhibit 125. In addition, MDL data for nitrate by EPA Method 300.1 indicate a higher MDL than is obtained from EPA Method 300.0, which does not suggest that laboratory performance at low concentrations may be improved through use of Method 300.1.

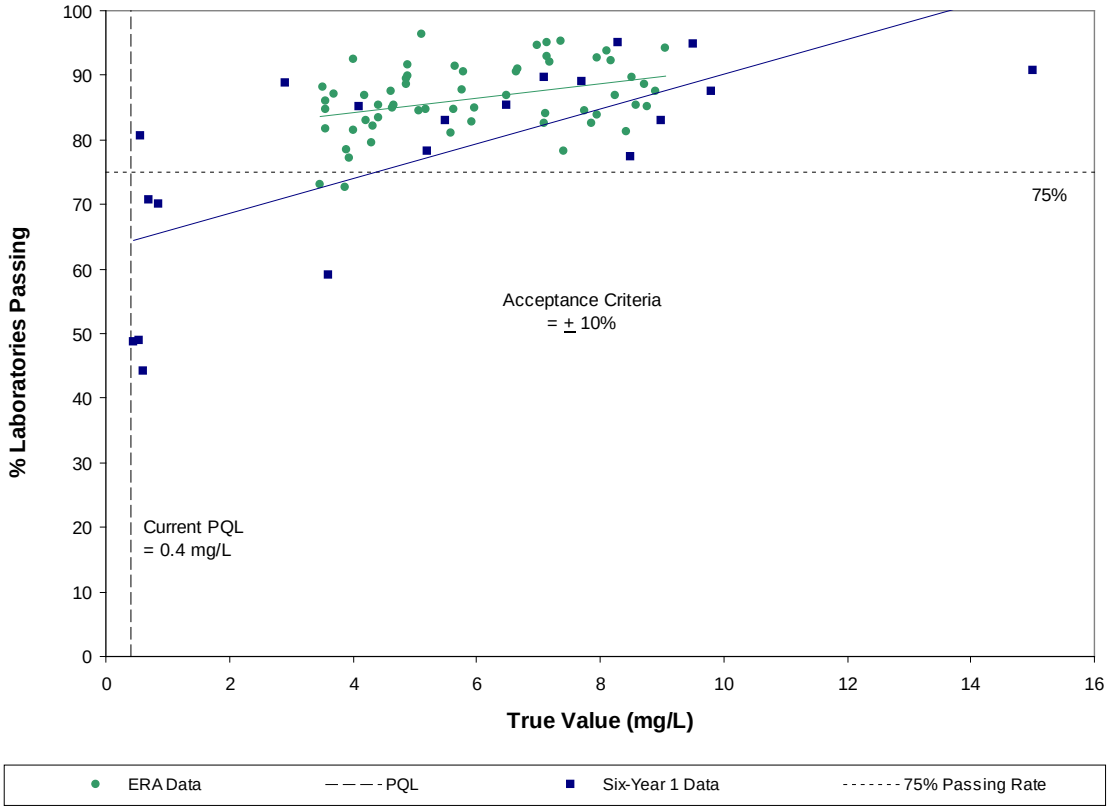
Exhibit 125: Analytical Methods for Nitrate

MCL = 10 mg/L Current PQL = 0.4 mg/L DL = 0.01-1 mg/L Acceptance Criteria = ± 10%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL mg/L**
300.0	IC	0.002
300.1	IC	0.008
353.2	Auto Colorimetry	No MDL
Notes: Regulatory DLs for inorganic compounds are listed at 40 CFR 141.23(a)(4)(i). Acceptance Criteria for inorganic compounds are listed at 40 CFR 141.23(k)(3)(ii).		

Results of the PQL Analysis

The current PQL for nitrate is 0.4 mg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 126). The Six-Year 1 PE data for nitrate were not evaluated in the March 2003 report. None of the Six-Year 1 or the Six-Year 2/ERA data are below the current PQL of 0.4 mg/L, although several of the Six-Year 1 values are just above the PQL. Several of the passing rates (especially in the Six-Year 1 data set) are below 75%.

Exhibit 126: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Nitrate



Conclusion for Nitrate

Given the variable laboratory passing rates for the Six-Year 1 and Six-Year 2/ERA data sets and the lack of data below the current PQL of 0.4 mg/L for both data sets, it may not be appropriate to recommend lowering of the PQL. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Oxamyl (Vydate)

Results of the Methods Comparison

Exhibit 127 summarizes the MDLs for oxamyl as documented in EPA-developed analytical methods. No updated methods have been approved for the analysis of oxamyl in drinking water samples during the years 2000-2007; however, a new method, EPA Method 531.2, was approved (Federal Register, Vol. 67, No. 209, p. 65888, October 29, 2002; see Exhibit A-1). The range of DLs for oxamyl by EPA Method 531.2 are lower than the MDL from EPA Method 531.1, suggesting that laboratory performance at low concentrations may improve through use of Method 531.2.

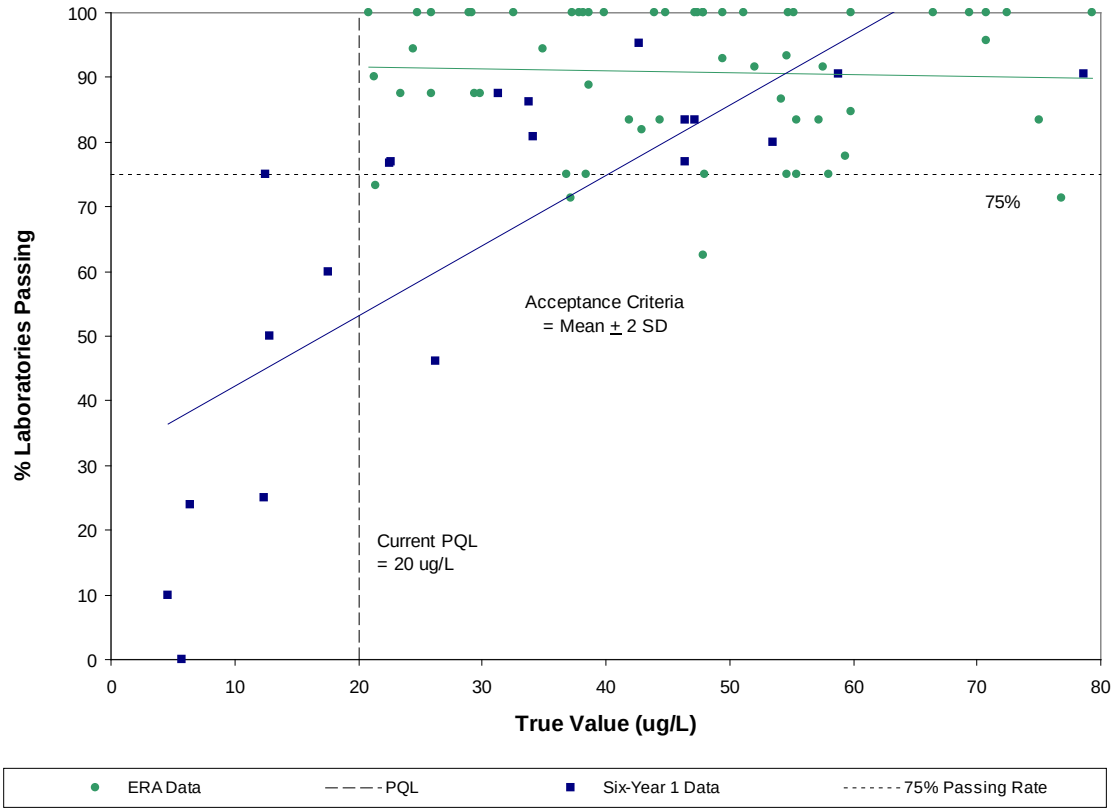
Exhibit 127: Analytical Methods for Oxamyl

MCL = 0.2 mg/L Current PQL = 0.02 mg/L DL = 0.002 mg/L Acceptance Criteria = Mean ± 2 Std Dev		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
531.1	DAI/HPLC w/ Der.	0.86
531.2	DAI/HPLC w/ Der.	0.044 - 0.065 (DL)
Notes: Regulatory DLs for synthetic organic compounds are listed at 40 CFR 141.24(h)(18). Acceptance Criteria for synthetic organic compounds are listed at 40 CFR 141.24(h)(19)(i)(B).		

Results of the PQL Analysis

The current PQL for oxamyl is 20 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 128). The Six-Year 1 PE data for oxamyl were regressed as part of the March 2003 report. Seven of the 20 spike values in the Six-Year 1 data set are below the current PQL of 20 µg/L; however, none of the Six-Year 2/ERA data are below the current PQL. Passing rates, particularly in the Six-Year 1 data, are highly variable.

Exhibit 128: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Oxamyl



Conclusion for Oxamyl

Given the variable laboratory passing rates in the vicinity of the current PQL of 20 µg/L for the Six-Year 1 and Six-Year 2/ERA data sets and the lack of data below the PQL for the Six-Year 2 data set, it may not be appropriate to recommend lowering of the PQL. The approval of EPA Method 531.2 for the analysis of oxamyl provides a lower range of MDLs than was achievable by use of other approved methods. This may lead to an overall improvement in analytical performance in the vicinity of the current PQL and could suggest possible reduction of the PQL.

Picloram

Results of the Methods Comparison

Exhibit 129 summarizes the MDLs for picloram as documented in EPA-developed analytical methods. Updates to one method have been approved for the analysis of picloram in drinking water samples during the years 2000-2007 (see Exhibit A-1). These updates are minor technical revisions that are not anticipated to improve analytical performance near the PQL. In addition, a new method, EPA Method 515.4 was approved (Federal Register, Vol. 67, No. 209, p. 65888, October 29, 2002; see Exhibit A-1). The MDL for picloram by EPA Method 515.4 is lower than those obtained from other approved methods, suggesting that laboratory performance at low concentrations may improve through use of Method 515.4.

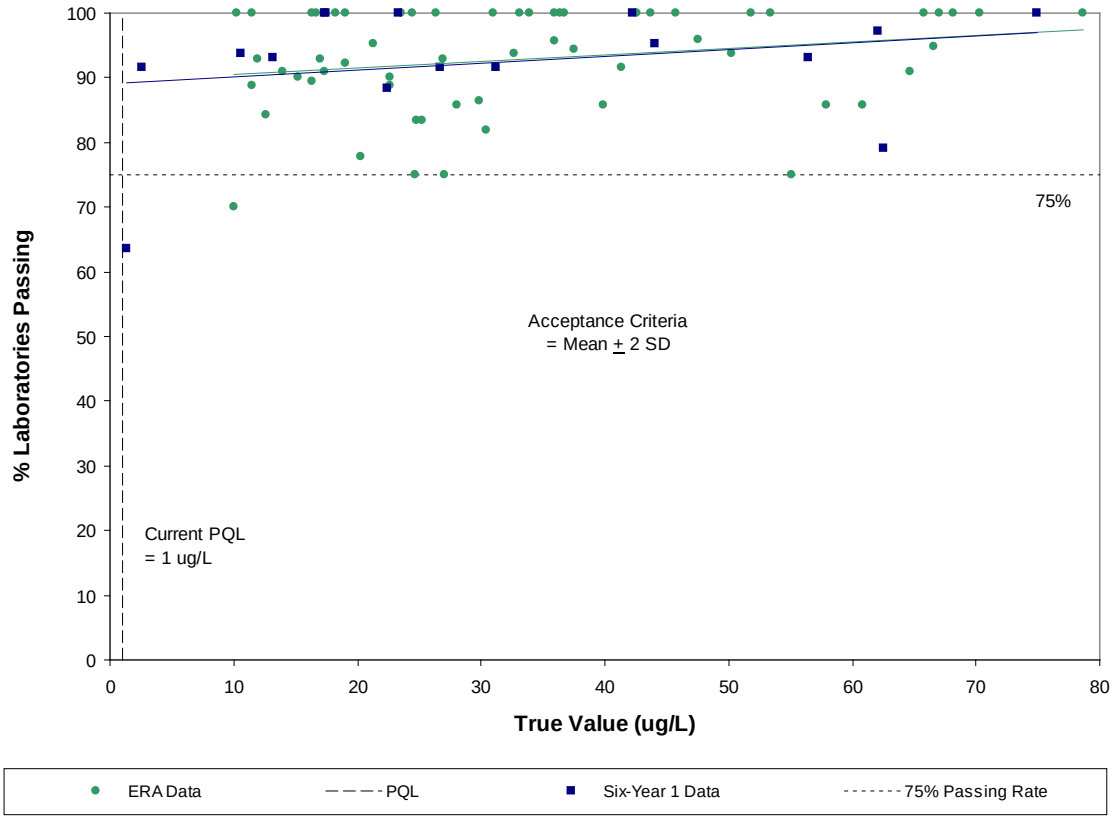
Exhibit 129: Analytical Methods for Picloram

MCL = 0.5 mg/L Current PQL = 0.001 mg/L DL = 0.0001 mg/L Acceptance Criteria = Mean ± 2 Std Dev		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
515.1	GC/ECD	0.15
515.2	LSE and GC/ECD	0.35
515.3	LLED and GC/ELCD	0.47 - 1.0
515.4	LLMED and GC/ECD	0.055 – 0.076
555	HPLC/PDAUVD	Not Recovered - 0.5
Notes: Regulatory DLs for synthetic organic compounds are listed at 40 CFR 141.24(h)(18). Acceptance Criteria for synthetic organic compounds are listed at 40 CFR 141.24(h)(19)(i)(B).		

Results of the PQL Analysis

The current PQL for picloram is 1 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 130). The Six-Year 1 PE data for picloram were evaluated but not regressed in the March 2003 report. None of the Six-Year 1 or the Six-Year 2/ERA data are below the current PQL of 1 µg/L. The passing rates begin to drop below 75% approaching the PQL.

Exhibit 130: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Picloram



Conclusion for Picloram

Although the laboratory passing rates for both the Six-Year 1 and Six-Year 2/ERA data sets are generally high, given the lower laboratory passing rates in the vicinity of the current PQL of 1 µg/L and the lack of data below the PQL for both data sets, it may not be appropriate to recommend lowering of the PQL. However, the approval of EPA Method 515.4 for the analysis of picloram provides a lower MDL than was achievable by use of other approved methods. This may lead to an overall improvement in analytical performance in the vicinity of the current PQL and could suggest possible reduction of the PQL.

Selenium

Results of the Methods Comparison

Exhibit 131 summarizes the MDLs for selenium as documented in EPA-developed analytical methods. Updates to four methods have been approved for the analysis of selenium in drinking water samples during the years 2000-2007 (see Exhibit A-1). These updates are associated with administrative and technical changes or clarifications that are not expected to improve analytical performance near the PQL.

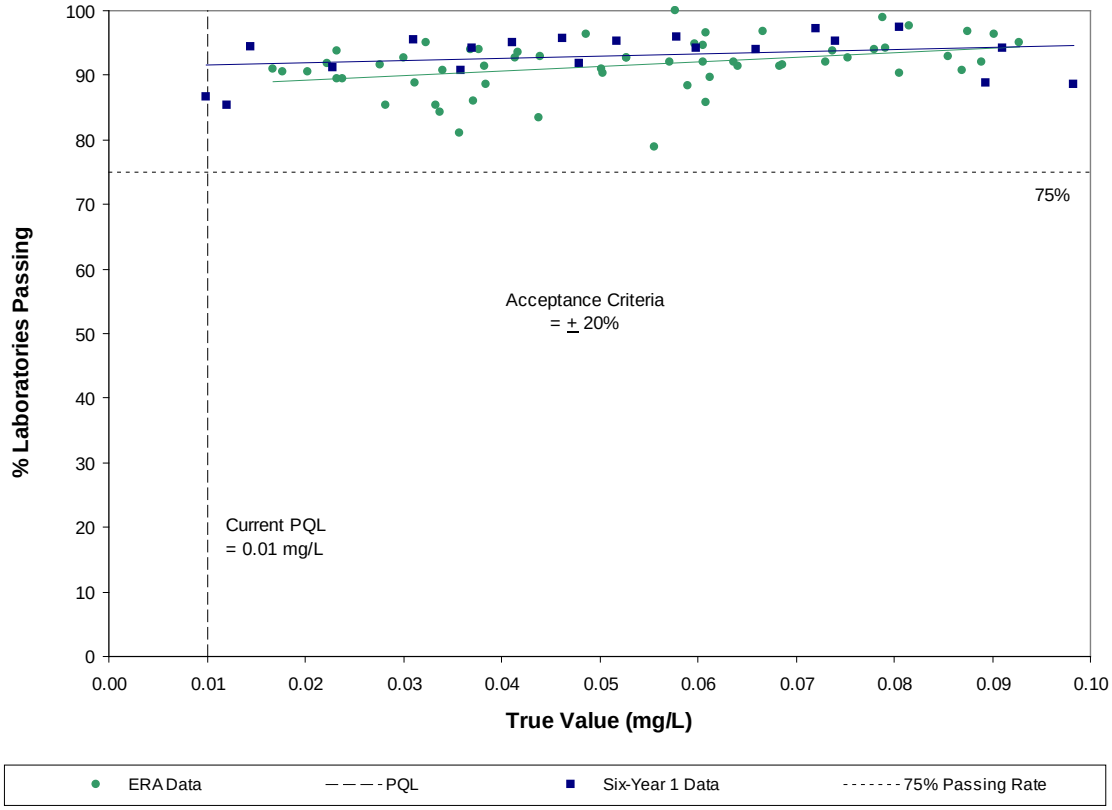
Exhibit 131: Analytical Methods for Selenium

MCL = 0.05 mg/L Current PQL = 0.01 mg/L DL = 0.002 mg/L Acceptance Criteria = ± 20%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL mg/L**
200.8	ICP/MS	0.0005 - 0.0079
200.9	GFAA	0.0006
Notes: Regulatory DLs for inorganic compounds are listed at 40 CFR 141.23(a)(4)(i). Acceptance Criteria for inorganic compounds are listed at 40 CFR 141.23(k)(3)(ii).		

Results of the PQL Analysis

The current PQL for selenium is 0.01 mg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 132). The Six-Year 1 PE data for selenium were not evaluated in the March 2003 report. Only one of the 20 spike values in the Six-Year 1 data set is below the current PQL of 0.01 mg/L. No Six-Year 2/ERA data are below the current PQL. All of the passing rates are well above 75%. Furthermore, both regression lines are also well above 75%.

Exhibit 132: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Selenium



Conclusion for Selenium

Although the laboratory passing rates for both the Six-Year 1 and Six-Year 2/ERA data sets are generally high, given the lack of data below the PQL of 0.01 mg/L for both data sets (with the exception of one value from the Six-Year 1 data set just below the PQL), it may not be appropriate to recommend lowering of the PQL. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Simazine

Results of the Methods Comparison

Exhibit 133 summarizes the MDLs for simazine as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of simazine in drinking water samples during the years 2000-2007.

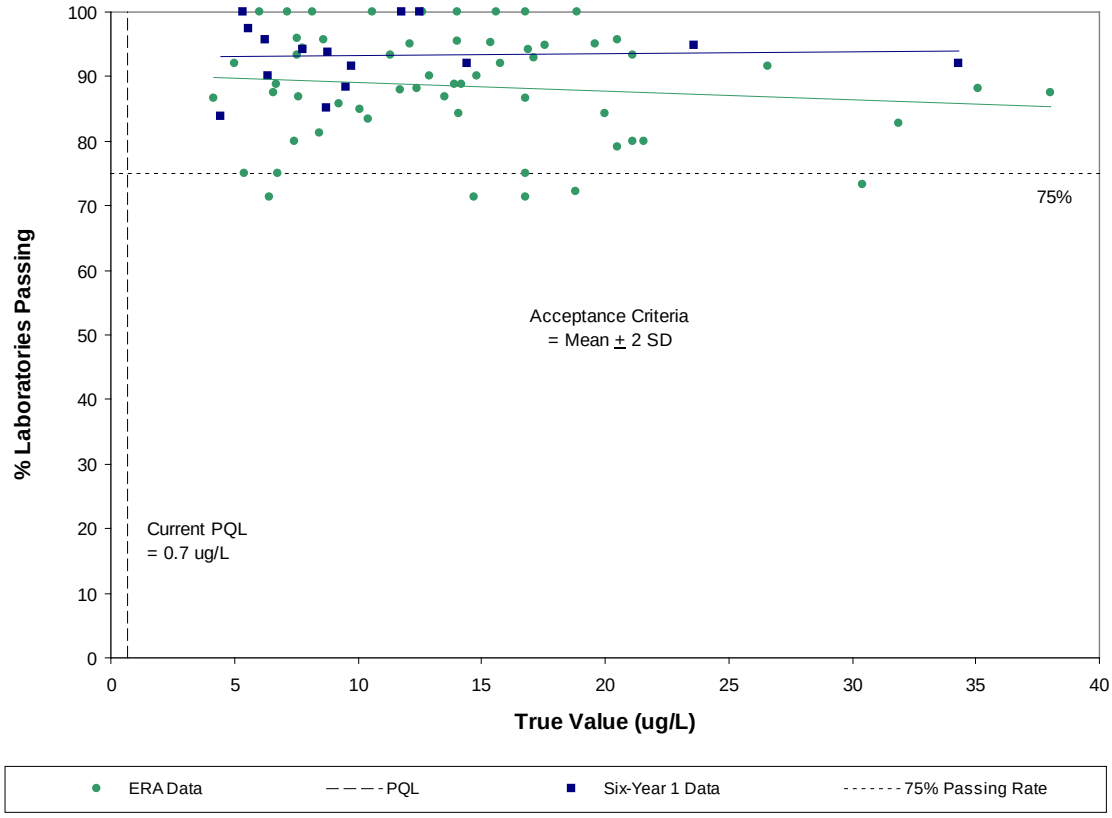
Exhibit 133: Analytical Methods for Simazine

MCL = 0.004 mg/L Current PQL = 0.0007 mg/L DL = 0.00007 mg/L Acceptance Criteria = Mean ± 2 Std Dev		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
505	ME and GC	6.8
507	GC/N-PD	0.014
508.1	LSE and ECGC	0.008
525.2	LSE and CCGC/MS	0.045 - 0.18
551.1	LLE/GC w/ ECD	0.121 - 0.187
Notes: Regulatory DLs for synthetic organic compounds are listed at 40 CFR 141.24(h)(18). Acceptance Criteria for synthetic organic compounds are listed at 40 CFR 141.24(h)(19)(i)(B).		

Results of the PQL Analysis

The current PQL for simazine is 0.7 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 134). The Six-Year 1 PE data for simazine were not evaluated in the March 2003 report. None of the Six-Year 2/ERA data are below the current PQL of 0.7 µg/L and passing rates for Six-Year 1 data below the PQL could not be calculated as the NELAC regression coefficients are not valid over that range. All of the passing rates in the Six-Year 1 data are above 75%; however, several passing rates in the Six-Year 2/ERA data are less than or equal to 75%.

Exhibit 134: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Simazine



Conclusion for Simazine

Although the laboratory passing rates for the Six-Year 1 data set are generally high (well above 75%), given the lack of data below the PQL of 0.7 µg/L for both the Six-Year 1 and Six-Year 2/ERA data sets and the variability in laboratory passing rates in the vicinity of the PQL for the Six-Year 2 data set, it may not be appropriate to recommend lowering of the PQL. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

Xylenes (total)

Results of the Methods Comparison

Exhibit 135 summarizes the MDLs for xylenes as documented in EPA-developed analytical methods. No updated or new analytical methods have been approved for the analysis of xylenes in drinking water samples during the years 2000-2007.

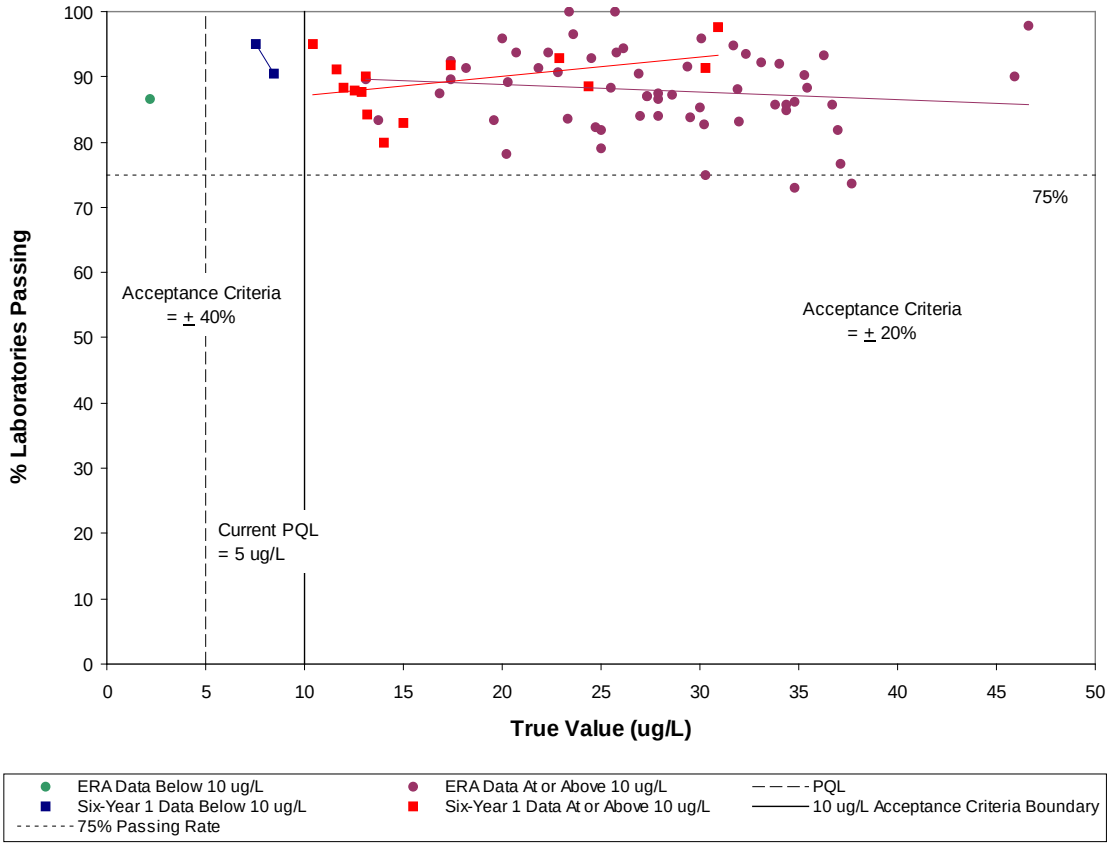
Exhibit 135: Analytical Methods for Xylenes

MCL = 10 mg/L Current PQL = 0.005 mg/L DL = 0.0005 mg/L Acceptance Criteria = ± 20% or 40%		
EPA Methods Approved for the Analysis of Drinking Water		
Method	**Technique**	**MDL µg/L**
502.2	CCGC with PID/ ELCD	0.01 - 0.02
524.2	CCGC/MS	0.03 - 0.13
Notes: The regulatory DL for volatile organic compounds is listed at 40 CFR 141.24(k)(17)(ii)(C). Acceptance Criteria for volatile organic compounds are listed at 40 CFR 141.24(f)(17)(i).		

Results of the PQL Analysis

The current PQL for xylenes is 5 µg/L. The Six-Year 1 and Six-Year 2/ERA data sets are regressed separately (see Exhibit 136). The Six-Year 1 PE data for xylenes were evaluated but were not regressed as part of the March 2003 report. Note that the acceptance criteria are ± 40% at spike concentrations below 10 µg/L and ± 20% at or above 10 µg/L; hence the data are regressed as two independent populations. No Six-Year 1 data are available below the current PQL of 5 µg/L. Only one of the 60 spike values in the Six-Year 2/ERA data set is below the current PQL. All of the passing rates for the Six-Year 1 data set are above 75%; however the passing rates for the Six-Year 2/ERA data set are more variable.

Exhibit 136: Evaluation of Six-Year 1 and Six-Year 2/ERA PT Data – Xylenes



Conclusion for Xylenes

Although the laboratory passing rates for the Six-Year 1 data set are generally high (well above 75%), given the lack of data below the PQL of 5 µg/L for the Six-Year 1 data set and the variability in laboratory passing rates for the Six-Year 2 data set, it may not be appropriate to recommend lowering of the PQL. No new or revised methods that may be expected to improve analytical performance in the vicinity of the current PQL (and hence suggest possible reduction of the PQL) have been approved from 2000-2007.

7.0 Summary

This document examines analytical method performance over time by determining if the Practical Quantitation Levels (PQLs) may have changed since promulgation. PQL assessments are presented by means of linear regression of available Six-Year 1 data and the ERA dataset from Six-Year 2. A qualitative conclusion is drawn by presenting a recommendation of whether a PQL might be reduced. In addition, analytical method performance is also assessed by comparing the Method Detection Limits (MDLs) of the analytical methods which were available at the time of promulgation to those of the currently approved methods.

Exhibit 137 provides summary observations from this review of PE data that were compiled in the first Six-Year Review and of ERA's 1999-2004 PT data. It also includes a notation as to whether any recently-approved analytical methods or updates (*i.e.*, from 2000-2007) are available for these analytes that might indicate improved laboratory performance at low concentrations. Lastly, a recommendation as to whether a PQL can be reduced is provided (these analytes are italicized). Note that the entries in the "Current Evaluation of Six-Year 1 Data" column are not necessarily identical to the conclusions that were documented in the March 2003 report. Rather, a new assessment is made herein considering the advantages and disadvantages of the PQL concept, the availability of PE/PT data in the vicinity of and/or below the PQL, and outliers. The qualitative conclusions are based primarily on data that are in the vicinity of and/or below the PQL (for most of the VOCs, this corresponds to concentrations <10 µg/L). Only the current evaluations of the Six-Year 1 and Six-Year 2/ERA data are presented in this report.

The overall assessment decision presented in the final column of Exhibit 137 consists of the following possible outcomes:

- Regulated Contaminants with Existing PQL Lower than the MCL

  - PQL assessment supports reduction of the current PQL;
  - PQL assessment may support reduction of the current PQL; and
  - PQL assessment does not support reduction of the current PQL, or data are inconclusive or insufficient to reach a conclusion

- Regulated Contaminants for Which the MCL is Set at the PQL, and thus, the PQL is Limiting

  - PQL assessment supports reduction of the current PQL;
  - PQL assessment may support reduction of the current PQL; and
  - PQL assessment does not support reduction of the current PQL, or data are inconclusive or insufficient to reach a conclusion.

The recommendation to not reduce the PQL/MCL (or not to reduce it further in cases where the PQL < MCL) could be related to many factors, since each of the Six-Year 1 and ERA data sets may reflect one or more of the following traits:

- No PE/PT data are available at or below the PQL;

- Laboratory performance is poor near the PQL;

- Laboratory performance is highly variable over the range of concentrations analyzed.

The data sets may suggest entirely opposite recommendations, in that one data set may suggest that the PQL could be reduced while the other may suggest the opposite. Hence there is no simple, succinct way to reflect the reason why a recommendation of "No change to the PQL" was obtained, although a lack of data at or below the PQL for both data sets implies that the data are insufficient to support a reduction in the PQL. However, in a case such as this, laboratory performance across the range of concentrations analyzed is still a contributing factor in the recommendation.

As shown in Exhibit 137, of the 66 analytes that could be analyzed in this report (acrylamide, epichlorohydrin, 2,3,7,8-TCDD (dioxin) could not be analyzed due to a lack of PE/PT data, and chlorite has no PQL), the qualitative recommendations for PQL assessment break down as follows:

- For 25 analytes, the PQL is equal to the MCL and hence PQL is limiting. Of these 25 analytes, PQL assessment indicates that:

  - The PQL can be reduced for 9 analytes: benzene, carbon tetrachloride, chlordane, 1,2-dichloroethane, 1,2-dichloropropane, hexachlorobenzene, tetrachloroethylene, 1,1,2-trichloroethane, and trichloroethylene;
  - The PQL might be considered for reduction for 8 analytes: alachlor, antimony, 1,2-dibromo-3-chloropropane, heptachlor, heptachlor epoxide, lindane, toxaphene, and vinyl chloride; and
  - PE/PT data do not support reduction of the PQL or data are inconclusive or insufficient to reach a conclusion for 8 analytes: benzo(a)pyrene, bromate, dichloromethane, di(2-ethylhexyl)phthalate, ethylene dibromide, pentachlorophenol, polychlorinatedbiphenyls (PCBs), and thallium.

- For 41 analytes, the PQL is less than the MCL; hence the MCL can be reduced. For these 41 analytes, PQL assessment indicates that:

  - The PQL can be reduced further (beyond the current PQL) for 11 analytes: barium, 1,4-dichlorobenzene, *cis*-1,2-dichloroethylene, 1,1-dichloroethylene, ethylbenzene, monochlorobenzene, nitrite, styrene, toluene, 1,2,4-trichlorobenzene, and 1,1,1-trichloroethane;
  - The PQL might be considered for further reduction for 6 analytes: atrazine, carbofuran, *trans*-1,2-dichloroethylene, hexachlorocyclopentadiene, methoxychlor, and 2,4,5-TP (Silvex); and
  - PE/PT data do not support further reduction of the PQL or data are inconclusive or insufficient to reach a conclusion for 24 analytes: arsenic, beryllium, cadmium, chromium, copper, cyanide, dalapon, 1,2-dichlorobenzene, 2,4-dichlorophenoxyacetic acid, di(2-ethylhexyl)adipate, dinoseb, diquat, endothall, endrin, fluoride, glyphosate, lead, mercury, nitrate, oxamyl, picloram, selenium, simazine, and xylenes.

Several factors often require that these assessments be made qualitatively rather than quantitatively. The regression of PE/PT data vs. passing rate can be affected by high passing rates even when there are also passing rates that are well below the 75% threshold (e.g., a large number of passing rates >90% will "offset" passing rates below 75%, resulting in a regression line that is well above 75% across the range of spike concentrations). Thus, even when the regression line is above the 75% passing rate threshold, a few relatively low passing rates, particularly near the PQL, may be considered to be more important than much higher passing rates at other concentrations. In some cases, the recommendation resulting from the Six-Year 1 data set is opposite from that resulting from the ERA data set. In these cases, the more recent ERA data may drive the recommendation. The variable acceptance criteria (based on analyte concentration) for several analytes (most of the VOCs) also confound the issue. In these cases, the passing rates below 10 µg/L are often much higher than those at or above 10 µg/L. Passing rates of less than 75% may occur above 10 µg/L, while much higher passing rates are often observed below 10 µg/L.

Exhibits 137 and 138 summarize the qualitative assessment for potential PQL reduction for the Six-Year 1 and Six-Year 2/ERA datasets individually and include a final qualitative recommendation considering both datasets. These exhibits also include an indication of whether new or updated analytical methods might be expected to improve analytical performance in the vicinity of the current PQL. Exhibit 137 summarizes the PQL assessments for the 25 analytes that have an MCL set at the current PQL, and thus the PQL is limiting. Exhibit 138 summarizes the PQL assessments for the 41 analytes that have an MCL that is greater than the current PQL, and thus it is technically feasible to reduce an MCL. Analytical method performance assessment for these analytes can indicate the potential for MCL reduction beyond the current PQL.

Exhibit 137: Second Six-Year Review Analytical Feasibility Assessment Summary Analytes with MCL Equal to the Current PQL, and thus the PQL is Limiting - 25 Analytes

Analyte	Current PQL (mg/L)	New or Updated Methods?	PQL Assessment Results		
			Current Evaluation of Six-Year 1 Data	Current Evaluation of Six-Year 2 (ERA 1999-2004) Data	Overall Qualitative Recommendation
Alachlor	0.002	No	Data may support lower PQL	No data ≤ current PQL; passing rates high in vicinity of current PQL	Reduction of current PQL may be supported
Antimony	0.006	Yes - not expected to improve analytical performance in vicinity of current PQL	Data may support lower PQL	No data ≤ current PQL; passing rates high in vicinity of current PQL	Slight reduction of current PQL may be supported
Benzene	0.005	No	Data support lower PQL	Data support lower PQL	Reduction of current PQL supported

Analyte	Current PQL (mg/L)	New or Updated Methods?	PQL Assessment Results		
			Current Evaluation of Six-Year 1 Data	Current Evaluation of Six-Year 2 (ERA 1999-2004) Data	Overall Qualitative Recommendation
Benzo(a)pyrene	0.0002	No	No data ≤ current PQL	No data ≤ current PQL	No change to current PQL
Bromate	0.01	Yes – may improve analytical performance in vicinity of current PQL. New methods 317.0 and 326.0 have lower MDLs.	Data indicate no change to current PQL	Data indicate no change to current PQL	No change to current PQL
Carbon tetrachloride	0.005	No	Data support lower PQL	Data support lower PQL	Reduction of current PQL supported
Chlordane	0.002	No	Data support lower PQL	No data ≤ current PQL; passing rates generally high in vicinity of current PQL	Reduction of current PQL supported
1,2-Dibromo-3-chloropropane (DBCP)	0.0002	No	Data may support lower PQL	Data may support lower PQL	Slight reduction of current PQL may be supported
1,2-Dichloroethane (Ethylene dichloride)	0.005	No	Data support lower PQL	Data support lower PQL	Reduction of current PQL supported
Dichloromethane (Methylene Chloride)	0.005	No	No data ≤ current PQL	No data ≤ current PQL	No change to current PQL
1,2-Dichloropropane	0.005	No	No data ≤ PQL; passing rates high in vicinity of current PQL	Data support lower PQL	Reduction of current PQL supported
Di(2-ethylhexyl) phthalate (DEHP)	0.006	No	Data indicate no change to current PQL	No data ≤ current PQL	No change to current PQL
Ethylene Dibromide (EDB)	0.00005	No	No data ≤ current PQL	No data ≤ current PQL	No change to current PQL
Heptachlor	0.0004	No	Data support lower PQL	No data ≤ current PQL; passing rates variable in vicinity of current PQL	Reduction of current PQL may be supported
Heptachlor epoxide	0.0002	No	Data support lower PQL	No data ≤ current PQL; passing rates variable in vicinity of current PQL	Reduction of current PQL may be supported
Hexachlorobenzene	0.001	No	Data support lower PQL	Data support lower PQL	Reduction of current PQL supported
Lindane	0.0002	No	Data may support lower PQL	No data ≤ current PQL; passing rates high in vicinity of current PQL	Reduction of current PQL may be supported

Analyte	Current PQL (mg/L)	New or Updated Methods?	PQL Assessment Results		
			Current Evaluation of Six-Year 1 Data	Current Evaluation of Six-Year 2 (ERA 1999-2004) Data	Overall Qualitative Recommendation
Pentachlorophenol	0.001	Yes - may improve analytical performance in vicinity of current PQL. New method 515.4 has capability of a lower MDL.	Data indicate no change to current PQL	No data ≤ current PQL	No change to current PQL
PCBs as DCBP	0.0005	No	Data indicate no change to current PQL	No data ≤ current PQL	No change to current PQL
Tetrachloroethylene	0.005	No	No data ≤ current PQL; passing rates high in vicinity of current PQL	Data support lower PQL	Reduction of current PQL supported
Thallium	0.002	No	Data may support lower PQL	No data ≤ current PQL	No change to current PQL
Toxaphene	0.003	No	Data support lower PQL	No data ≤ current PQL; passing rates variable in vicinity of current PQL	Reduction of current PQL may be supported
1,1,2-Trichloroethane	0.005	No	No data ≤ current PQL; passing rates high in vicinity of current PQL	Data support lower PQL	Reduction of current PQL supported
Trichloroethylene	0.005	No	No data ≤ current PQL; passing rates high in vicinity of current PQL	Data support lower PQL	Reduction of current PQL supported
Vinyl chloride	0.002	No	No data ≤ current PQL; passing rates high in vicinity of current PQL	Data may support lower PQL	Reduction of current PQL may be supported

Exhibit 138: Second Six-Year Review Analytical Feasibility Assessment Summary Analytes with MCL Greater than the Current PQL and Thus it is Technically Feasible to Reduce the MCL - 41 Analytes

Analyte	Current PQL (mg/L)	New or Updated Methods?	PQL Assessment Results		
			Current Evaluation of Six-Year 1 Data	Current Evaluation of Six-Year 2 (ERA 1999-2004) Data	Overall Qualitative Recommendation
Arsenic	0.003	Yes - not expected to improve analytical performance in vicinity of current PQL	Data indicate no change to current PQL	No data ≤ current PQL	No change to current PQL
Atrazine	0.001	Yes – Effect on performance unknown. DL from new method needed to assess effect on analytical performance in vicinity of current PQL	Data may support lower PQL	No data ≤ current PQL; passing rates variable in vicinity of current PQL	Reduction of current PQL may be supported
Barium	0.15	Yes - not expected to improve analytical performance in vicinity of current PQL	Data support slightly lower PQL	No data ≤ current PQL; passing rates high in vicinity of current PQL	Slight reduction of current PQL supported
Beryllium	0.001	Yes - not expected to improve analytical performance in vicinity of current PQL	Data indicate no change to current PQL	No data ≤ current PQL	No change to current PQL
Cadmium	0.002	Yes - not expected to improve analytical performance in vicinity of current PQL	No data ≤ current PQL	No data ≤ current PQL	No change to current PQL
Carbofuran	0.007	Yes - may improve analytical performance in vicinity of current PQL. New method 531.2 has lower MDL.	Data support lower PQL	No data ≤ current PQL; passing rates variable in vicinity of current PQL	Reduction of current PQL may be supported
Chromium	0.01	Yes - not expected to improve analytical performance in vicinity of current PQL	No data ≤ current PQL	No data ≤ current PQL	No change to current PQL
Copper	0.05	Yes - not expected to improve analytical performance in vicinity of current PQL	Data indicate no change to current PQL	No data ≤ current PQL	No change to current PQL

Analyte	Current PQL (mg/L)	New or Updated Methods?	PQL Assessment Results		
			Current Evaluation of Six-Year 1 Data	Current Evaluation of Six-Year 2 (ERA 1999-2004) Data	Overall Qualitative Recommendation
Cyanide (as free cyanide)	0.1	Yes – effect on performance unknown. DLs from new method(s) needed to assess effect on analytical performance in vicinity of current PQL	No data < current PQL	No data ≤ current PQL	No change to current PQL
Dalapon	0.01	Yes – may improve analytical performance in vicinity of current PQL. MDL from new methods 515.4 and 552.3 are lower than previous MDLs	Cannot determine passing rates for data ≤ current PQL	No data ≤ current PQL	No change to current PQL
1,2-Dichlorobenzene (o-Dichlorobenzene)	0.005	No	No data ≤ current PQL	No data ≤ current PQL	No change to current PQL
1,4-Dichlorobenzene (p-Dichlorobenzene)	0.005	No	Data support lower PQL	Data support lower PQL	Reduction of current PQL supported
1,1-Dichloroethylene	0.005	No	No data ≤ current PQL; passing rates high in vicinity of current PQL	Data support lower PQL	Reduction of current PQL supported
cis-1,2-dichloroethylene	0.005	No	No data ≤ current PQL; passing rates high in vicinity of current PQL	Data support lower PQL	Reduction of current PQL supported
trans-1,2-Dichloroethylene	0.005	No	No data ≤ current PQL; passing rates high in vicinity of current PQL	Data may support lower PQL; passing rates generally high in vicinity of current PQL	Reduction of current PQL may be supported
2,4-Dichlorophenoxy-acetic acid (2,4-D)	0.005	Yes - may improve analytical performance in vicinity of current PQL. New method 515.4 has lower MDL.	Data indicate no change to current PQL	No data ≤ current PQL	No change to current PQL
Di(2-ethylhexyl) adipate (DEHA)	0.006	No	Cannot determine passing rate for data ≤ current PQL	No data ≤ current PQL	No change to current PQL
Dinoseb	0.002	Yes - may improve analytical performance in vicinity of current PQL. New method 515.4 has lower MDL.	No data ≤ current PQL	No data ≤ current PQL	No change to current PQL

Analyte	Current PQL (mg/L)	New or Updated Methods?	PQL Assessment Results		
			Current Evaluation of Six-Year 1 Data	Current Evaluation of Six-Year 2 (ERA 1999-2004) Data	Overall Qualitative Recommendation
Diquat	0.004	No	No data ≤ current PQL	No data ≤ current PQL	No change to current PQL
Endothall	0.09	No	Cannot determine passing rate for data ≤ current PQL	No data ≤ current PQL	No change to current PQL
Endrin	0.0001	No	No data ≤ current PQL	No data ≤ current PQL	No change to current PQL
Ethylbenzene	0.005	No	No data ≤ current PQL; passing rates high in vicinity of current PQL	Data support lower PQL	Reduction of current PQL supported
Fluoride	0.5	Yes – may improve analytical performance in vicinity of current PQL. MDL from new method 300.1 is slightly lower than MDL from 300.0.	Insufficient data ≤ current PQL	No data ≤ current PQL	No change to current PQL
Glyphosate	0.06	No	No data ≤ current PQL	No data ≤ current PQL	No change to current PQL
Hexachlorocyclopenta-diene	0.001	No	Data may support lower PQL	No data ≤ current PQL; passing rates variable in vicinity of current PQL	Reduction of current PQL may be supported
Lead	0.005	Yes - not expected to improve analytical performance in vicinity of current PQL	Data indicate no change to current PQL	No data ≤ current PQL	No change to current PQL
Mercury	0.0005	Yes – may improve analytical performance in vicinity of current PQL. MDL from new method 245.7 is significantly lower than previous MDLs	Data indicate no change to current PQL	No data ≤ current PQL	No change to current PQL
Methoxychlor	0.01	No	Data support lower PQL	No data ≤ current PQL; passing rates variable in vicinity of current PQL	Reduction of current PQL may be supported
Monochlorobenzene (Chlorobenzene)	0.005	No	No data ≤ current PQL; passing rates high in vicinity of current PQL	Data support lower PQL	Slight reduction of current PQL supported

Analyte	Current PQL (mg/L)	New or Updated Methods?	PQL Assessment Results		
			Current Evaluation of Six-Year 1 Data	Current Evaluation of Six-Year 2 (ERA 1999-2004) Data	Overall Qualitative Recommendation
Nitrate (as N)	0.4	Yes - not expected to improve analytical performance in vicinity of current PQL. MDL from new method 300.1 is higher than that from 300.0.	No data ≤ current PQL	No data ≤ current PQL	No change to current PQL
Nitrite (as N)	0.4	Yes - may improve analytical performance in vicinity of current PQL. MDL from new method 300.1 is lower than previous MDLs	Data support lower PQL	No data ≤ current PQL; passing rates high in vicinity of current PQL	Reduction of current PQL supported
Oxamyl (Vydate)	0.02	Yes - may improve analytical performance in vicinity of current PQL. MDL from new method 531.2 is lower than previous MDLs	Data indicate no change to current PQL	No data ≤ current PQL	No change to current PQL
Picloram	0.001	Yes - may improve analytical performance in vicinity of current PQL. New method 515.4 has lower MDL.	No data ≤ current PQL	No data ≤ current PQL	No change to current PQL
Selenium	0.01	Yes - not expected to improve analytical performance in vicinity of current PQL	Insufficient data ≤ current PQL	No data ≤ current PQL	No change to current PQL
Simazine	0.0007	No	Cannot determine passing rate for data ≤ current PQL	No data ≤ current PQL	No change to current PQL
Styrene	0.005	No	No data ≤ current PQL; passing rates high in vicinity of current PQL	Data support lower PQL	Reduction of current PQL supported
Toluene	0.005	No	No data ≤ current PQL; passing rates high in vicinity of current PQL	Data support lower PQL	Reduction of current PQL supported

Analyte	Current PQL (mg/L)	New or Updated Methods?	PQL Assessment Results		
			Current Evaluation of Six-Year 1 Data	Current Evaluation of Six-Year 2 (ERA 1999-2004) Data	Overall Qualitative Recommendation
2,4,5-TP (Silvex)	0.005	Yes - may improve analytical performance in vicinity of current PQL. New method 515.4 has capability of a lower MDL.	Data support lower PQL	No data ≤ PQL; passing rates variable in vicinity of current PQL	Reduction of current PQL may be supported
1,2,4-Trichlorobenzene	0.005	No	No data ≤ current PQL; passing rates high in vicinity of current PQL	Data support lower PQL	Reduction of current PQL supported
1,1,1-Trichloroethane	0.005	No	Data support lower PQL	Data support lower PQL	Reduction of current PQL supported
Xylenes (total)	0.005	No	No data ≤ current PQL	Data indicate no change to current PQL	No change to current PQL

Improved analytical performance (and hence, possible PQL reduction) may also be supported by the approval and availability of new or revised analytical methods with lower MDLs (note that in some analytical methods, the term DL is used instead of MDL, but these quantities are essentially equivalent). For 15 regulated analytes, new methods have been approved. For 12 of these analytes (bromate, carbofuran, 2,4-D, dalapon, dinoseb, fluoride, mercury, nitrite, oxamyl, pentachlorophenol, picloram and 2,4,5-TP), the MDLs are lower (or their range of MDLs includes values that are lower) than those from earlier-approved methods. In two cases (atrazine and cyanide), the methods are proprietary and are not readily available; hence, MDLs are not known, and comparison cannot be made. Lastly, in one case (nitrate), new or revised methods do not indicate a lower MDL.

Overall, the results show that only for 20 of the 66 analytes evaluated in this report, laboratory performance data was sufficient to qualitatively conclude that the PQL can be lowered. For 14 analytes there were indications for a lower PQL but for the remaining 32 either the data were inconclusive or insufficient to draw a conclusion. Furthermore, for only 3 of the 20 analytes for which PQL could be lowered, the improved analytical performance was supported by new and improved methods approval. For others, there was either no correlation or correlation could not be made due to insufficient data.

8.0 References

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Appendix A: Listing of New and Updated Analytical Methods

Exhibit A-1 lists analytical methods that have been developed or revised and approved for the analysis of drinking water during the years 2000 – 2007. In many cases, the new methods or revisions to existing methods are not expected to significantly improve laboratory performance at low concentration (i.e., in the vicinity of the current PQL). Many of the revisions relate to clarifications to technical language, solvent replacements to improve safety, or other administrative changes/clarifications that are not expected to affect analytical performance.

Improved analytical performance (and hence, possible PQL reduction) may also be supported by the approval and availability of new or revised analytical methods with lower MDLs (note that in some analytical methods, the term DL is used instead of MDL, but these quantities are essentially equivalent). For 15 regulated analytes, new methods have been approved. For 12 of these analytes (bromate, carbofuran, 2,4-D, dalapon, dinoseb, fluoride, mercury, nitrite, oxamyl, pentachlorophenol, picloram and 2,4,5-TP), the MDLs are lower (or their range of MDLs includes values that are lower) than those from earlier-approved methods. In two cases (atrazine and cyanide), the methods are proprietary and are not readily available; hence, MDLs are not known, and comparison cannot be made. Lastly, in one case (nitrate), new or revised methods do not indicate a lower MDL.

Exhibit A-1: New or Revised Analytical Methods since 2000; Review of NPDWRs under 40 CFR §§141.23, 141.24, and 141.131

Revised/ New Method	Old Method	NPDWR/Contaminant(s)	Notes
Source: Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act; National Primary Drinking Water Regulations; and National Secondary Drinking Water Regulations; Methods Update; Final Rule. Federal Register, Vol. 67, No. 205, p. 65220, October 23, 2002. Initial rule notices, including direct final rule and proposed rule published January 16, 2001: Federal Register, Vol. 66, p. 3466 and Federal Register, Vol. 66, p. 3526, respectively.[1]			
D2972-97C	D2972-93C	arsenic	Methods updates from *1999 Annual Book of ASTM Standards*, Vols. 11.01 and 11.02; revisions to 141.23(k)(1) inorganic analysis; per FR notice, these do not contain substantive changes in procedures or instrumentation, rather, they focus on safety factors; see §141.23. Examples of minor technical changes are recommendations for the handling of hazardous materials and safer or better ways to conduct certain hazardous or complicated analytical procedures. Some of the ASTM methods have been augmented (cont.)
D2972-97B	D2972-93B		
D3645-97B	D3645-93B	beryllium	
D2036-98A	D2036-91A	cyanide	
D2036-98B	D2036-91B		
D4327-97	D4327-91	fluoride, nitrate, nitrite	
D3559-96D	D3559-95D	lead	
D3223-97	D3223-91	mercury	
D3859-98A	D3859-93A	selenium	

Exhibit A-1: New or Revised Analytical Methods since 2000; Review of NPDWRs under 40 CFR §§141.23, 141.24, and 141.131

Revised/ New Method	Old Method	NPDWR/Contaminant(s)	Notes
D3859-98B	D3859-93B		with additional tables of method performance data." No further method-specific explanations were provided.
3120 B	no name/number change	arsenic, barium, beryllium, chromium, copper	Methods updates from Standard Methods for the Examination of Water and Wastewater, 20th Ed., 1998; revisions to 141.23(k)(1) Inorganic analysis; per FR notice changes are editorial and technical clarifications; see §141.23. More specifically, the initial Federal Register notice (66 FR 3466) explains that : "Of the 71 Standard Methods included in today's rule, 52 methods are unchanged from previous versions. The remaining 19 methods contain minor editorial changes or technical clarifications. Some of these revisions are minor modifications or voluntary but useful options, such as better explanations on conducting a specific step in the method; recommendations for safer handling or disposal of hazardous reagents; and options to use alternative procedures, reagents, or equipment." Only the 13 methods listed to the left apply to this Second Six-Year Review of NPDWRs.
4500-CN- C		cyanide	
4500-CN- G			
4500-CN- E			
4500-CN- F			
4110 B		fluoride, nitrate, nitrite	
4500-F- B,D		fluoride	
4500-F- C			
4500-F- E			
4500-NO_3 - F		nitrate, nitrite	
4500-NO_3 - E			
4500-NO_3 - D		nitrate	
4500-NO_2 - B		nitrite	
Source: Unregulated Contaminant Monitoring Regulation: Approval of Analytical Method for Aeromonas; National Primary and Secondary Drinking Water Regulations: Approval of Analytical Methods for Chemical and Microbiological Contaminants. Federal Register, Vol. 67, No. 209, p. 65888, October 29, 2002. Proposed rule: Federal Register, Vol. 67, p. 10532, March 7, 2002.			
EPA Method 515.4	none	2,4-D (as acid, salts and esters), 2,4,5-TP (Silvex), dinoseb, pentachlorophenol, picloram and dalapon	Available at: http://www.epa.gov/safewater/methods/; see §141.24. New method. Method 515.4 is a Gas Chromatography method that was initially approved for Unregulated Contaminant Monitoring Regulation analyses.
EPA Method 531.2	none	carbofuran and oxamyl	Available at: http://www.epa.gov/safewater/methods/; see §141.24. New method. This method improves sample preservation procedures that are required under EPA Method 531.1 and SM 6610, and updates the method (cont.)

Exhibit A-1: New or Revised Analytical Methods since 2000; Review of NPDWRs under 40 CFR §§141.23, 141.24, and 141.131

Revised/ New Method	Old Method	NPDWR/Contaminant(s)	Notes
			performance tables using data generated with more up to date equipment. Accuracy, precision and detection limit data generated using this method is superior to that generated with either of the currently approved methods.
Syngenta AG-625	none	atrazine	"Atrazine in Drinking Water by Immunoassay", February 2001 available from Syngenta Crop Protection, Inc., 410 Swing Road, Post Office Box 18300, Greensboro, NC 27419, Phone number (336) 632–6000; see §141.24. New method. This is an industry-developed method that meets EPA's criteria for method performance, and is "a satisfactory compliance method for atrazine in drinking water."
Kelada 01	none	cyanide	''Kelada Automated Test Methods for Total Cyanide, Acid Dissociable Cyanide, And Thiocyanate'', Revision 1.2, August 2001, EPA # 821–B–01–009 for cyanide is available from the National Technical Information Service (NTIS), PB 2001–108275, 5285 Port Royal Road, Springfield, VA 22161; 800–553–6847; see § 141.23. New method. Validated in both single and multi-laboratory validation studies, Kelada 01 is "a satisfactory compliance method for total cyanide in drinking water."
QuikChem 10–204–00–1–X	none		''Digestion and distillation of total cyanide in drinking and wastewaters using MICRO DIST and determination of cyanide by flow injection analysis'', Revision 2.1, November 30, 2000 for cyanide is available from Lachat Instruments, 6645 W. Mill Rd., Milwaukee, WI 53218; 414–358–4200; see §141.23. New method. Validated in both single and multi-laboratory validation studies, QuikChem 10-204-00-1-X is "a satisfactory compliance method for total cyanides in drinking water."

Exhibit A-1: New or Revised Analytical Methods since 2000; Review of NPDWRs under 40 CFR §§141.23, 141.24, and 141.131			
Revised/ New Method	**Old Method**	**NPDWR/Contaminant(s)**	**Notes**
Source: National Primary Drinking Water Regulations: Stage 2 Disinfectants and Disinfection Byproducts Rule; Final Rule. Federal Register, Vol. 71, No. 2, p. 388, January 4, 2006. Proposed Rule: Federal Register, Vol. 68, No. 159, p. 49548, August 18, 2003.			
EPA Method 317.0 rev 2.0	300.1	bromate and chlorite	EPA Method 317.0 Revision 2 uses the EPA Method 300.1 technology, but it adds a postcolumn reactor that provides a more sensitive and specific analysis for bromate than is obtained using EPA Method 300.1. Several advantages of this method: (1) Very few ions react with ODA to form compounds that are detected by the UV/Vis detector. This makes the method less susceptible to interferences for bromate. (2) The UV/Vis detector is very sensitive to the chromophore, so lower concentrations of bromate can be detected and quantitated. (Bromate concentrations can be reliably quantitated as low as 1 µg/L using this detector versus 5 µg/L for EPA Method 300.1.) (3) Since the front part of the analysis is the same as EPA Method 300.1, bromate, chlorite, and bromide can be determined in the same analysis.
EPA Method 321.8		bromate	The advantage of this method is that it is very specific and sensitive to bromate. The single laboratory detection limit presented in the method is 0.3 µg/L.
EPA Method 326.0		bromate and chlorite	Method provides higher quality bromate data than the currently approved EPA Method 300.1 when bromate concentrations are below 10 µg/ L. EPA anticipates the number of laboratories using this method will increase as utilities become aware of the method's sensitivity and begin to request it be used for their samples.
EPA Method 327.0 rev 1.1		chlorite (daily monitoring only)	EPA Method 327.0 offers advantages over the currently approved methods in that it is not subject to positive interferences from other chlorine (cont.)

Exhibit A-1: New or Revised Analytical Methods since 2000; Review of NPDWRs under 40 CFR §§141.23, 141.24, and 141.131

Revised/ New Method	Old Method	NPDWR/Contaminant(s)	Notes
			species and it is easier to use. See § 141.131.
SM 4500-ClO_2 E and E-00		chlorite (daily monitoring only)	Standard Methods Section 4500–ClO2 contains the methods for determining chlorine dioxide residuals and chlorite and it includes method 4500–ClO2E. On–Line Version of Standard Methods [were] ... cited in addition to the 19th editions in order to allow flexibility for the water systems performing the analyses.
ASTM D 6581-00		bromate and chlorite	This method uses the same procedures as EPA Method 300.1 (the method promulgated in the Stage 1 DBPR) and thus is considered equivalent to the approved method. The ASTM method includes interlaboratory study data that were not available when EPA Method 300.1 was published. The study data demonstrate good precision and low bias for all analytes.
Source: Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act; National Primary Drinking Water Regulations; and National Secondary Drinking Water Regulations; Analysis and Sampling Procedures; Final Rule. Federal Register, Vol. 72, No. 47, p. 11200, March 12, 2007. Proposed rules: Federal Register, Vol. 68, p. 49548, August 18, 2003 and Federal Register, Vol. 69, p. 18166, April 6, 2004.			
OIA-1677, DW	none for drinking water	cyanide	EPA–821–R–99–013, August 1999 Method OIA–1677, DW ''Available Cyanide by Flow Injection, Ligand Exchange, and Amperometry,'' January 2004 is technically equivalent to Method OIA–1677, which is currently approved for determination of available cyanide in the NPDES program (64 FR 73414; December 30, 1999). Method OIA–1677, DW only differs from OIA– 1677 in having (a) updated contact information, and (b) less method modification flexibility (references to performance-based modifications have been removed). Therefore the validation data on OIA–1677 is applicable to OIA– 1677, DW. See § 141.23.

Exhibit A-1: New or Revised Analytical Methods since 2000; Review of NPDWRs under 40 CFR §§141.23, 141.24, and 141.131

Revised/ New Method	Old Method	NPDWR/Contaminant(s)	Notes
ASTM D6888-04	none		ASTM Method D6888–04 uses a similar technology to Method OIA–1677. ASTM D6888-03 was proposed with OIA–1677, but later refined and proposed as ASTM D6888-04 in 70 FR 7909, February 16, 2005. See § 141.23.
D1179-99(B)	D1179-93(B)	fluoride	ASTM Method updates "incorporate minor technical and/or editorial revisions that improve the methods." See § 141.23.
D1688-02(A)	D1688-95(A)	copper	
D1688-02(B)	D1688-95(B)		
D2972-03(B)	D2972-97(B)	arsenic	
D2972-03(C)	D2972-97(C)		
D3223-02	D3223-97	mercury	
D3559-03(D)	D3559-96(D)	lead	
D3645-03(B)	D3645-97(B)	beryllium	
D3697-02	D3697-92	antimony	
D3859-03(A)	D3859-98(A)	selenium	
D3859-03(B)	D3859-98(B)		
D3867-99(B)	D3867-90(B)	nitrate, nitrite	
D4327-03	D4327-97	fluoride, nitrate, nitrite	
D5317-98 (2003)	D5317-93	2,4-D, 2,4,5-TP, pentachlorophenol, picloram	ASTM Method updates "incorporate minor technical and/or editorial revisions that improve the methods." See § 141.24.
D6508, Rev. 2	none	fluoride, nitrate, nitrite	A new method that employs capillary ion electrophoresis to determine common anions in wastewater and drinking water. "Test Method for Determination of Dissolved Inorganic Anions in Aqueous Matrices Using Capillary Ion Electrophoresis and Chromate Electrolyte" (Method D6508, Rev. 2) appears to provide an acceptable technological alternative to ion chromatography and wet chemical methods in terms of method performance and is equivalent to (cont.)

Exhibit A-1: New or Revised Analytical Methods since 2000; Review of NPDWRs under 40 CFR §§141.23, 141.24, and 141.131

Revised/ New Method	Old Method	NPDWR/Contaminant(s)	Notes
			other approved methods in the working range.
3111 B-99	3111 B [19th]	copper	Standard Methods updates include: "...a number [with]... no changes from previously approved version, some incorporate minor technical and editorial revisions to improve user-friendliness, update references, and correct errors." ." See § 141.23.
3112 B-99	3112 B [19th]	mercury	
3113 B-99	3113 B [19th]	antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, selenium	
3114 B-97	3114 B [19th]	arsenic, selenium	
3120 B-99	3120 B [20th]	arsenic, barium, beryllium, chromium, copper	
4110 B-00	4110 B [20th]	fluoride, nitrate, nitrite	
4500-CN E-99	4500-CN E [20th]	cyanide	
4500-CN F	4500-CN F [20th]		
4500-CN G-99	4500-CN G [20th]		
4500-F-B-97	4500-F-B [20th]	fluoride	
4500-F-C-97	4500-F-C [20th]		
4500-F-D-97	4500-F-D [20th]		
4500-NO_2 B-00	4500-NO_2 B [20th]	nitrite	
4500-NO_3-E-00	4500-NO_{3-} E [20th]	nitrate, nitrite	
4500-NO_3-F-00	4500-NO_3-F [20th]		
EPA Method 245.7 rev 2.0	245.7 revision 1.0	mercury	Reagent and instrumentation changes; MDL is significantly lower than those from other methods.
EPA Method 552.3 rev 1.0	New Method	dalapon	MDL range is lower than MDLs from most other methods.

Exhibit A-1: New or Revised Analytical Methods since 2000; Review of NPDWRs under 40 CFR §§141.23, 141.24, and 141.131

Revised/ New Method	Old Method	NPDWR/Contaminant(s)	Notes
EPA Method 300.1	none	fluoride, nitrate, nitrite	EPA Method 300.1 is extended to use for these NPDWRs, to provide greater flexibility to laboratories and allows them to reduce analytical costs.

1. A proposed and a direct final rule (DFR) for these methods were published simultaneously on January 16, 2001. This was done to ensure that public input requirements were met, and if no public comments were received on the DFR, then a second revised final rule would not have been needed. The details of the rule were contained in the DFR (66 FR 3466), and the required public comment request and explanation of the combined proposal and DFR publication was provided in the proposed rule (66 FR 3526).

Appendix B: Radionuclide Regressions

Radionuclides are a unique group of substances, as their measurement requires a unique analytical technology compared to other analytes. MDLs and PQLs for radionuclides in drinking water are affected by three major factors:

- Type of detector;
- Volume of sample available;
- Duration of analysis

Thus, for the radionuclides, limitations of laboratory performance at low concentrations is generally not an issue, as MDLs and PQLs can be lowered, if necessary, by increasing sample volume and/or radiological analysis duration. The radionuclides for which PT data were available from ERA (2002-2006) are included in this report for completeness; however no conclusions regarding PQL assessment are made (note that Barium-133, Cobalt-60 and Zinc-65 do not have promulgated PQLs per 58 FR, 33050, July 18, 1991 and 65 FR 76752, December 7, 2000). Exhibit B-1 summarizes the regulated radionuclides, along with their current PQL, how the PQL was determined, their MCLG, MCL, and the current acceptance criteria for PT. Acceptance criteria for radionuclides are based on both the average of three analyses and the range of values obtained from three analyses (μ = the assigned value). Exhibit B-2 summarizes the availability of PE and PT data and whether data are available at or below the PQL for each radionuclide.

Exhibit B-1: U.S. EPA National Primary Drinking Water Standards and Related Information – Radionuclides

Analyte	Regulatory Detection Limit (pCi/L)[1]	PQL (pCi/L)	How PQL Determined?	MCLG	MCL	Acceptance Criteria (pCi/L); μ = assigned value[2]
Gross Alpha	3	15	PE data	Zero	15 pCi/L	Average – 3-20 pCi/L: $\mu \pm 8.66$; >20-≤75 pCi/L: $\mu \pm 0.433\mu$ Range - 3-20 pCi/L: 21.8; >20-≤75 pCi/L: 1.09μ
Radium-226	1	5	PE data	Zero	5 pCi/L (Ra-226 and Ra-228)	Average – 1-20 pCi/L: $\mu \pm 0.260\mu$ Range - 1-20 pCi/L: 0.654μ
Radium-228	1	5	PE data	Zero	5 pCi/L (Ra-226 and Ra-228)	Average – 1-20 pCi/L: $\mu \pm 0.433\mu$ Range - 1-20 pCi/L: 1.09μ
Uranium	N/A	5	PE data	Zero	30 ug/L	Average – 2-35 pCi/L: $\mu \pm 5.20$; >35-≤70 pCi/L: $\mu \pm 0.173\mu$ Range – 2-35 pCi/L: 13.1; >35-≤70 pCi/L: 0.436μ
Beta particle and photo emitters	See individual constituents listed below				4 millirem/ year (total)	See below

Analyte	Regulatory Detection Limit (pCi/L) [1]	PQL (pCi/L)	How PQL Determined?	MCLG	MCL	Acceptance Criteria (pCi/L); μ = assigned value [2]
Gross Beta	4	30	PE data	Zero	N/A	Average – 4-50 pCi/L: $\mu \pm 8.66$; >50-≤65 pCi/L: $\mu \pm 17.3$ Range - 4-50 pCi/L: 21.8; >50-≤65 pCi/L: 43.6
Barium-133	N/A	N/A	PE data	Zero	N/A	Average – 9-50 pCi/L: $\mu \pm 8.66$; >50-≤110 pCi/L: $\mu \pm 0.173\mu$ Range - 9-50 pCi/L: 21.8; >50-≤110 pCi/L: 0.436μ
Cesium-134	10	10	PE data	Zero	N/A	Average – 10-96 pCi/L: $\mu \pm 8.66$; Range - 10-96 pCi/L: 21.8
Cesium-137	N/A	10	PE data	Zero	N/A	Average – 20-100 pCi/L: $\mu \pm 8.66$; >100-≤240 pCi/L: $\mu \pm 0.0866\mu$ Range - 20-100 pCi/L: 21.8; >100-≤240 pCi/L: 0.218μ
Cobalt-60	N/A	N/A	PE data	Zero	N/A	Average – 10-100 pCi/L: $\mu \pm 8.66$; >100-≤120 pCi/L: $\mu \pm 0.0866\mu$ Range - 10-100 pCi/L: 21.8; >100-≤120 pCi/L: 0.218μ
Iodine-131	1	20	PE data	Zero	N/A	Average – 1-15 pCi/L: $\mu \pm 3.46$; >15-≤30 pCi/L: $\mu \pm 5.20\mu$ Range - 1-215 pCi/L: 8.72; >15-≤30 pCi/L: 13.1
Strontium-89	10	5	PE data	Zero	N/A	Average – 10-70 pCi/L: $\mu \pm 8.66$; Range - 10-70 pCi/L: 21.8
Strontium-90	2	5	PE data	Zero	N/A	Average – 2-45 pCi/L: $\mu \pm 8.66$; Range – 2-45 pCi/L: 21.8
Tritium	1,000	1,200	PE data	Zero	N/A	Average – 1,000-4,000 pCi/L: $\mu \pm 294\mu^{0.0933}$; >4,000-≤32,000 pCi/L: $\mu \pm 0.173\mu$ Range – 1,000-4,000 pCi/L: $741\mu^{0.0933}$; >4,000-≤32,000 pCi/L: 0.436μ

Analyte	Regulatory Detection Limit (pCi/L) [1]	PQL (pCi/L)	How PQL Determined?	MCLG	MCL	Acceptance Criteria (pCi/L); μ = assigned value[2]
Zinc-65	N/A	N/A	PE data	Zero	N/A	Average – 30-50 pCi/L: μ ± 8.66; >50-≤360 pCi/L: μ ± 0.173μ Range - 30-50 pCi/L: 21.8; >50-≤360 pCi/L: 0.436μ

1 Regulatory Detection Limits for radionuclides can be found at FR 65 76708, December 7, 2000. Corresponding PQLs can be found at: 58 FR, 33050, July 18, 1991. Note that the PQL for Strontium-89 from 1991 is less than the regulatory DL from 2000.
2 Acceptance criteria are available at: http://www.nelac-institute.org and are subject to change over time.

Exhibit B-2: Availability of Six-Year 1 PE Data and Six-Year 2 PE/PT Data for Radionuclides

Analyte	In Six-Year 1 Data?[1]	In Six-year 2 ERA Data 2002-2006?
Gross Alpha	Not available	Yes, some data ≤ PQL
Radium-226	Not available	Yes, some data ≤ PQL
Radium-228	Not available	Yes, some data ≤ PQL
Uranium	Not available	Yes, some data ≤ PQL
Beta particle and photo emitters		
Gross Beta	Not available	Yes, some data ≤ PQL
Barium-133	Not available	Yes; no PQL
Cesium-134	Not available	Yes, no data ≤ PQL
Cesium-137	Not available	Yes, no data ≤ PQL
Cobalt-60	Not available	Yes; no PQL
Iodine-131	Not available	Yes, some data ≤ PQL
Strontium-89	Not available	Yes, no data ≤ PQL
Strontium-90	Not available	Yes, no data ≤ PQL
Tritium	Not available	Yes, no data ≤ PQL
Zinc-65	Not available	Yes; no PQL

1 Radionuclides were not included in the Six-Year 1 Review; therefore, no data are available.

Exhibit B-3: Evaluation of ERA PT Data – Gross Alpha

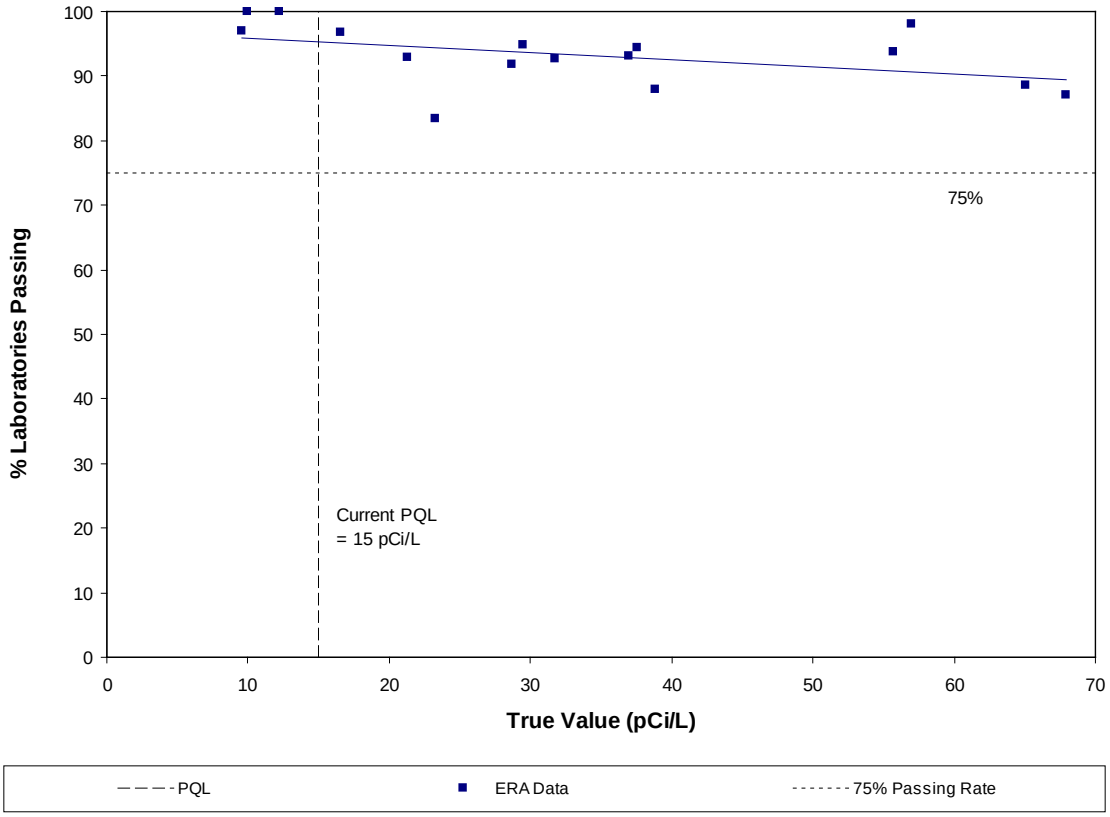

Exhibit B-4: Evaluation of ERA PT Data – Radium-226

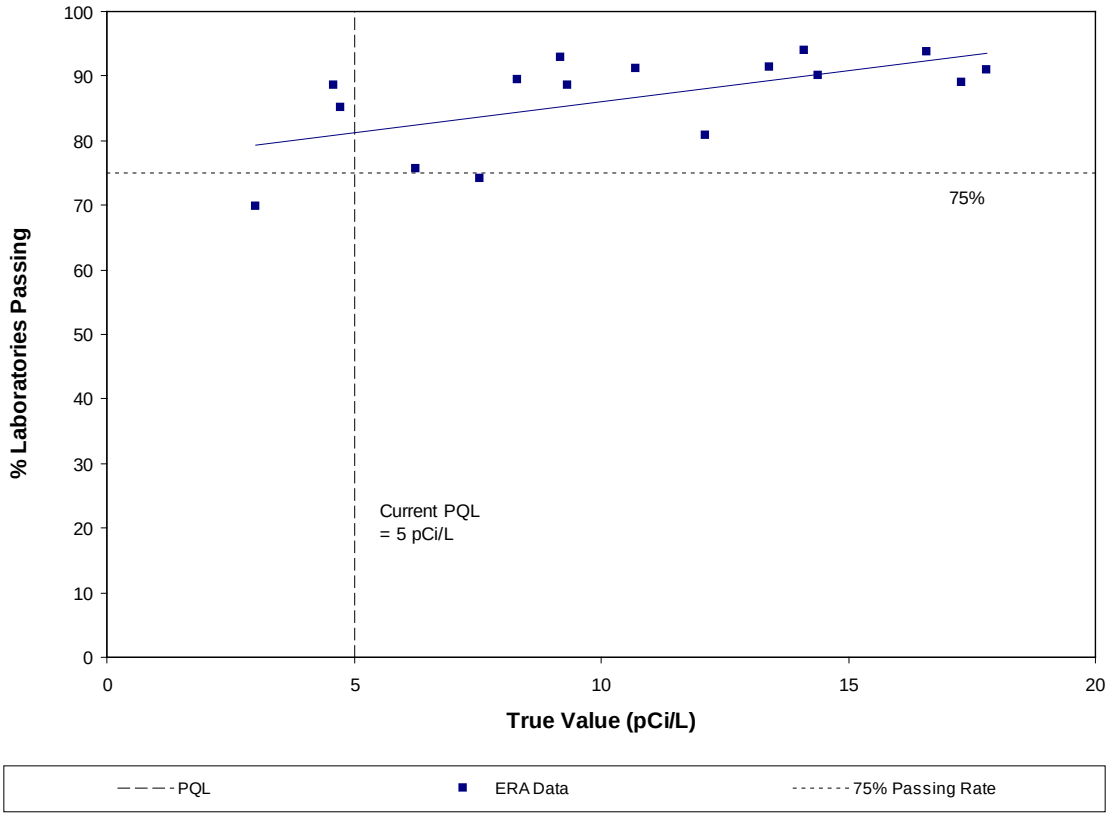

Exhibit B-5: Evaluation of ERA PT Data – Radium-228

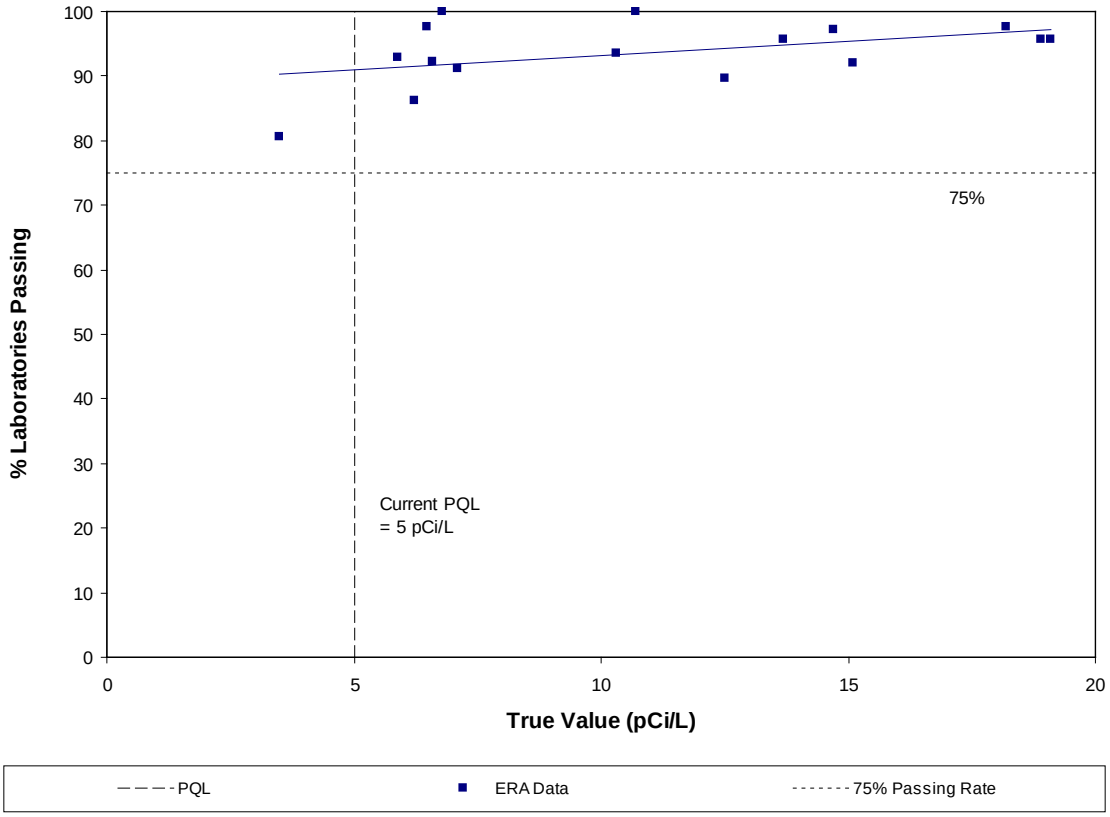

Exhibit B-6: Evaluation of ERA PT Data – Uranium

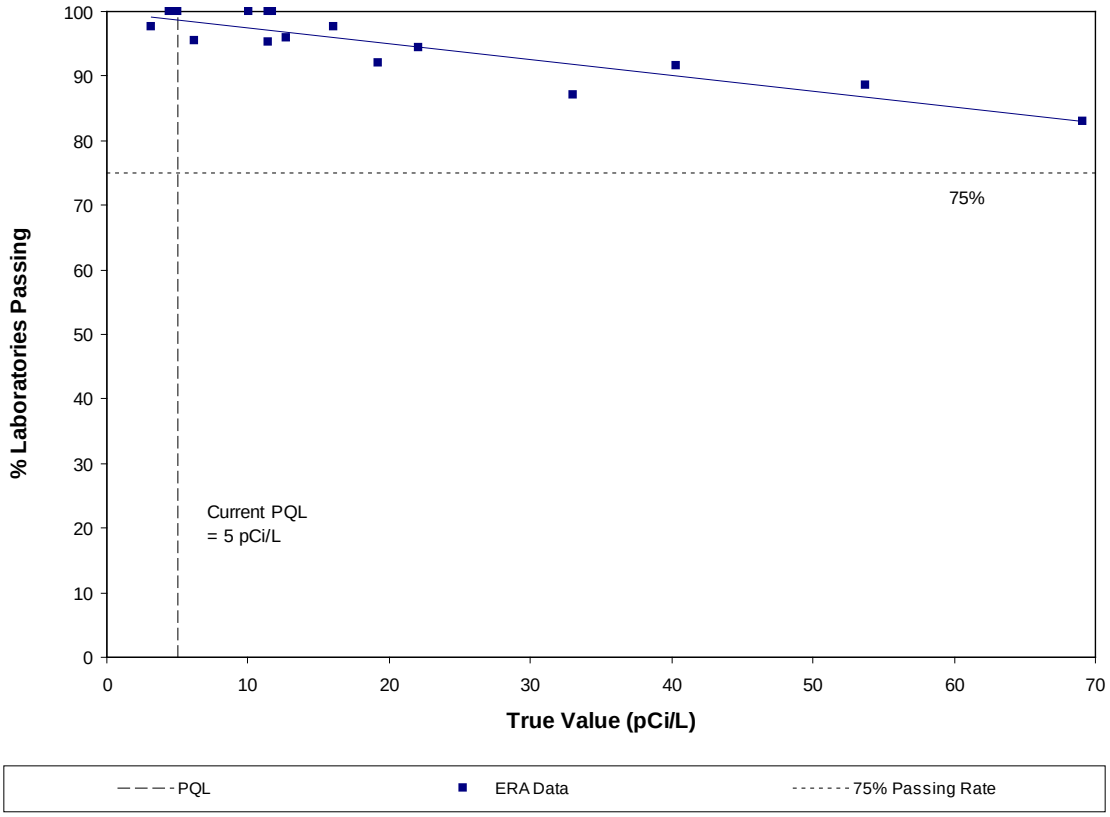

Exhibit B-7: Evaluation of ERA PT Data – Gross Beta

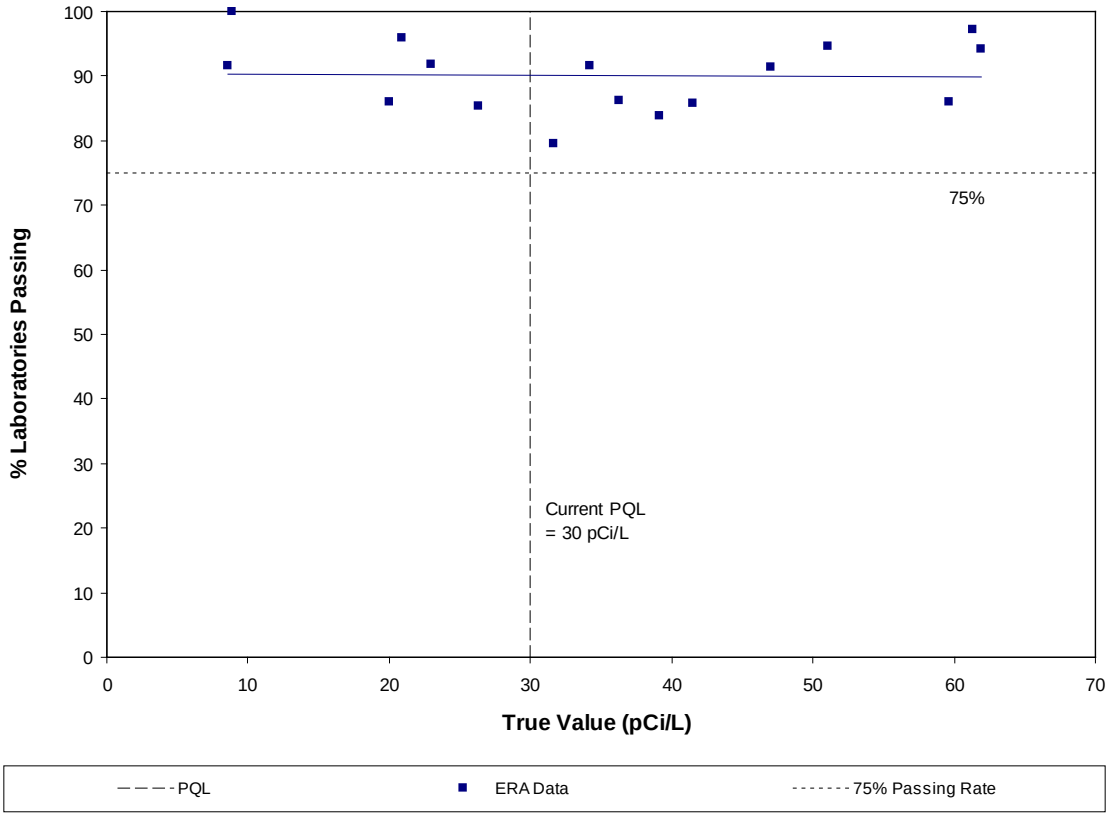

Exhibit B-8: Evaluation of ERA PT Data – Barium-133

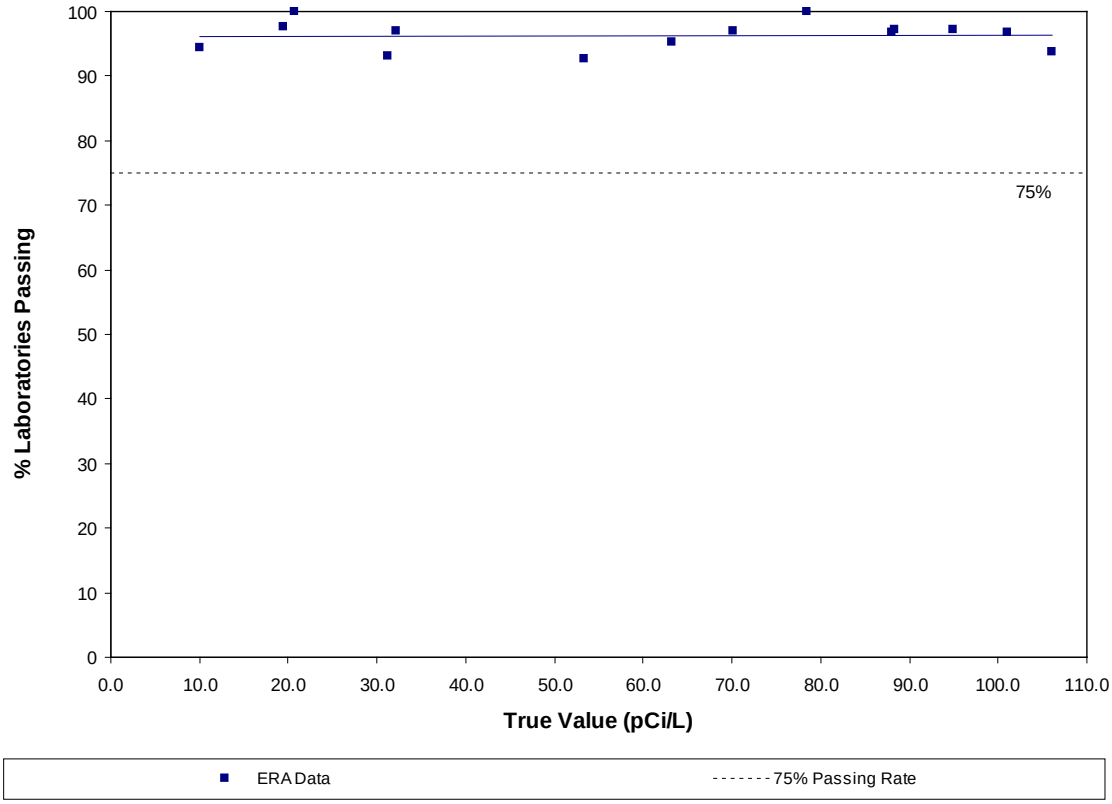

Exhibit B-9: Evaluation of ERA PT Data – Cobalt-60

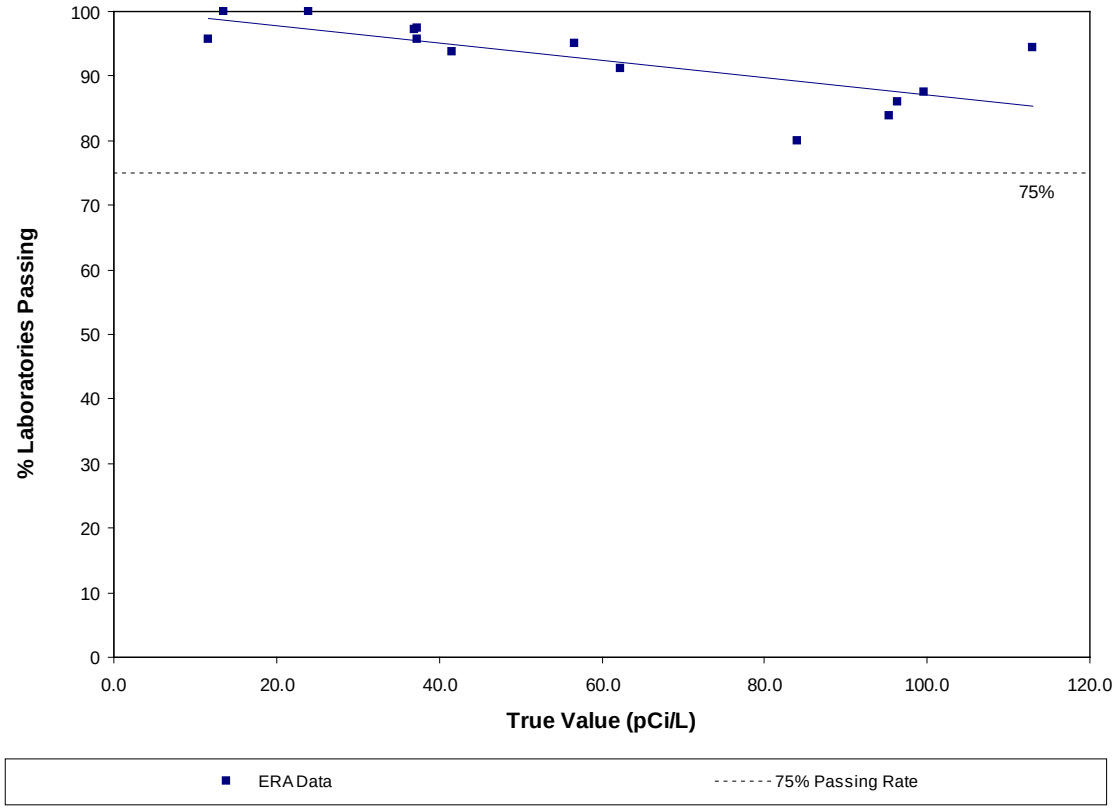

Exhibit B-10: Evaluation of ERA PT Data – Cesium-134

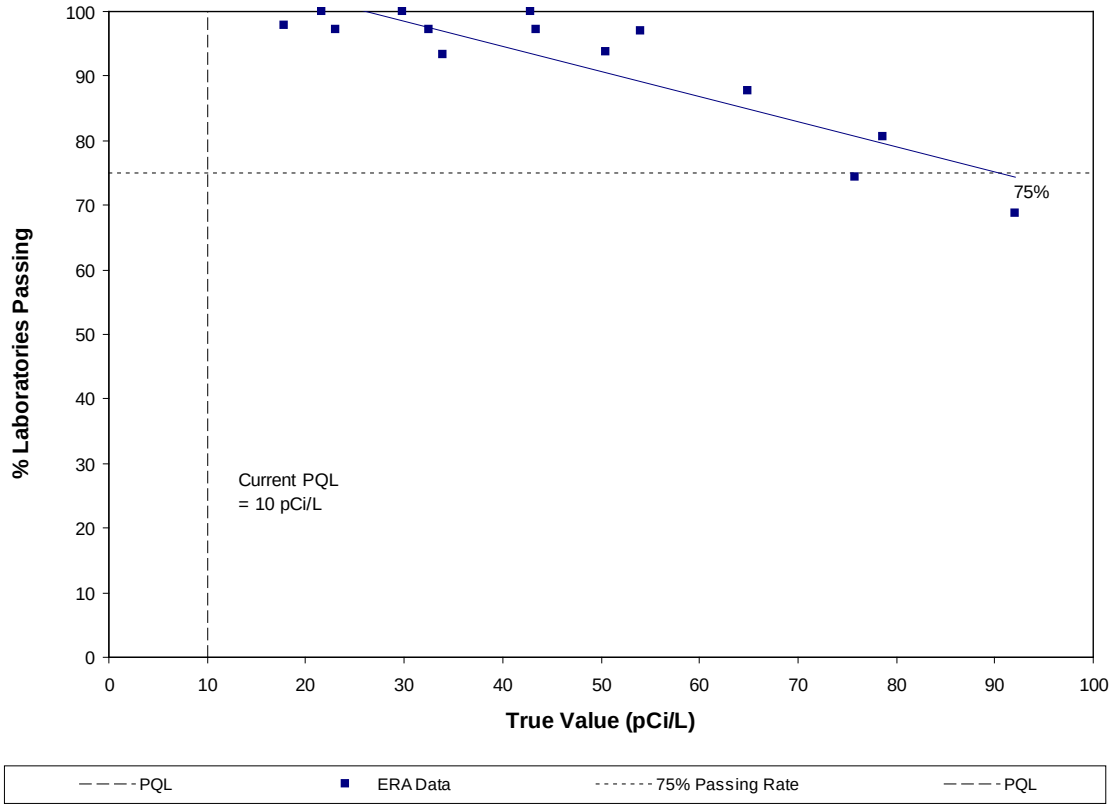

Exhibit B-11: Evaluation of ERA PT Data – Cesium-137

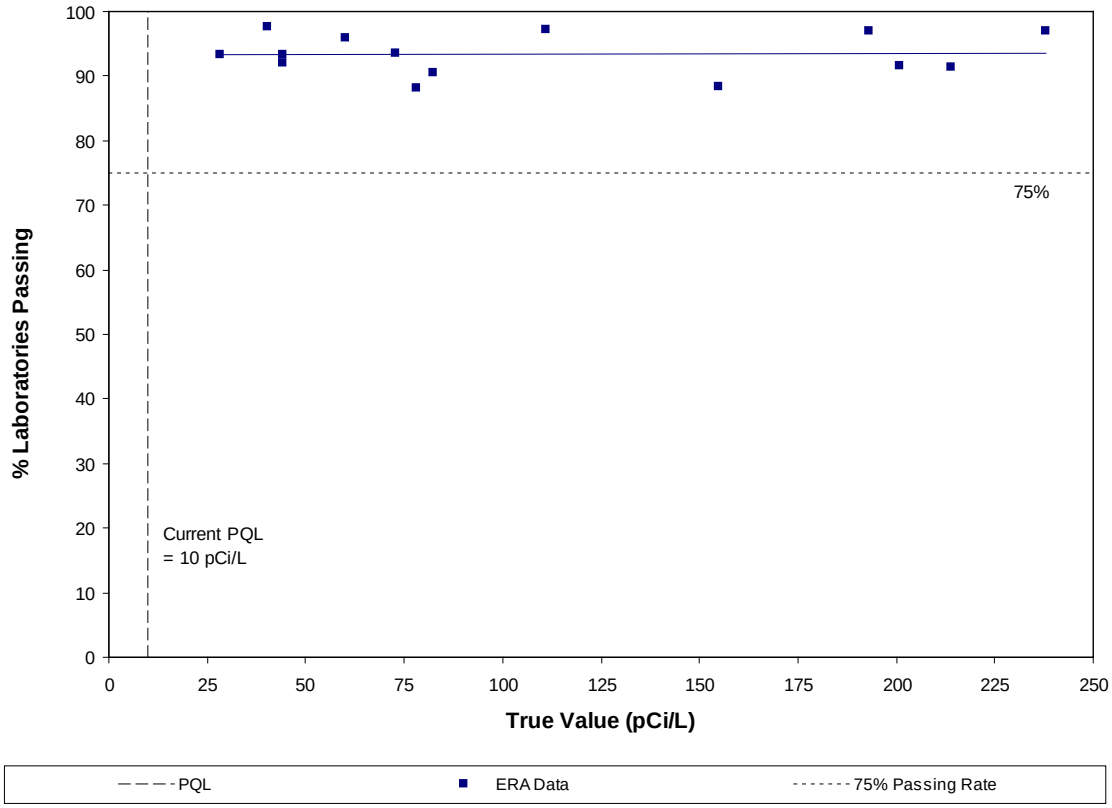

Exhibit B-12: Evaluation of ERA PT Data – Iodine-131

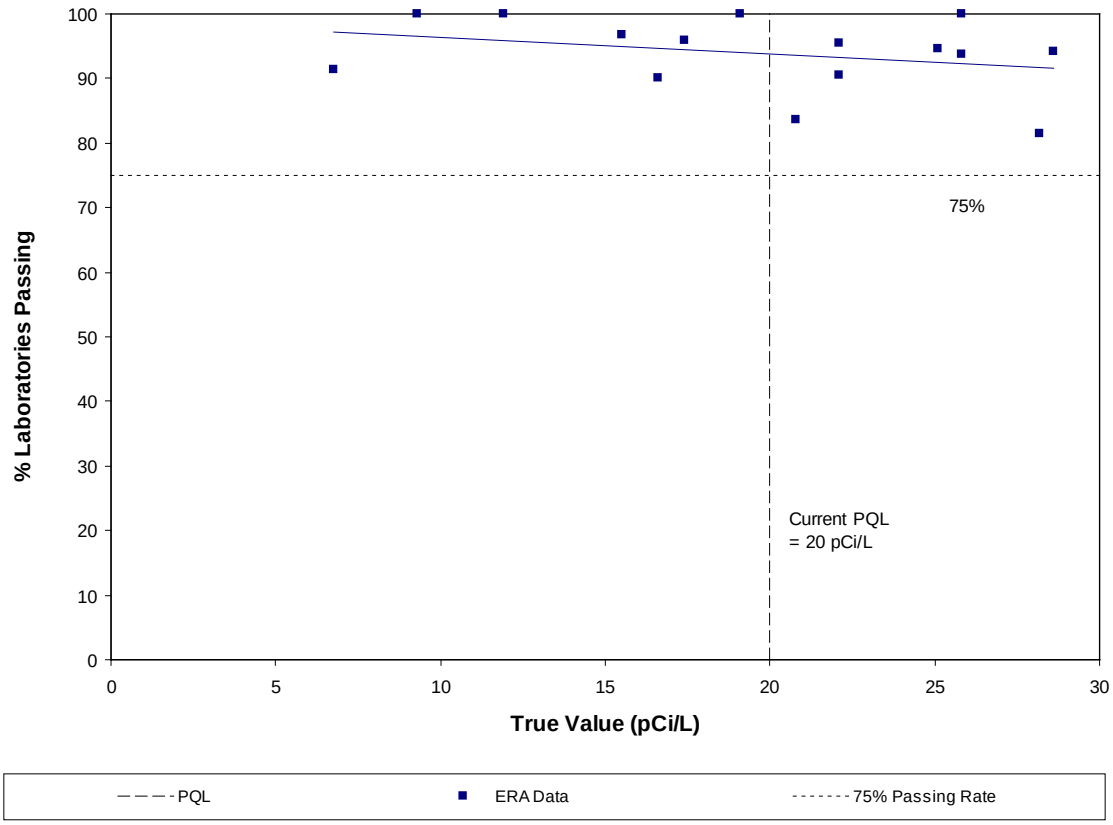

Exhibit B-13: Evaluation of ERA PT Data – Strontium-89

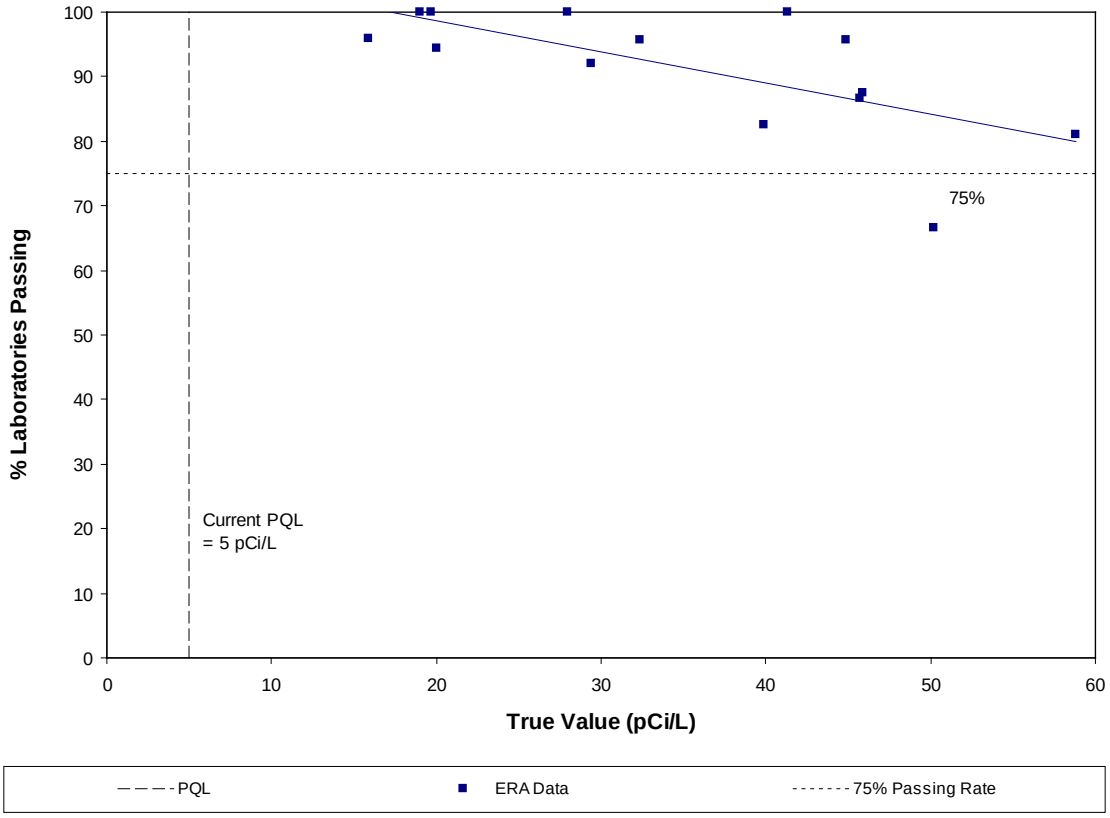

Exhibit B-14: Evaluation of ERA PT Data – Strontium-90

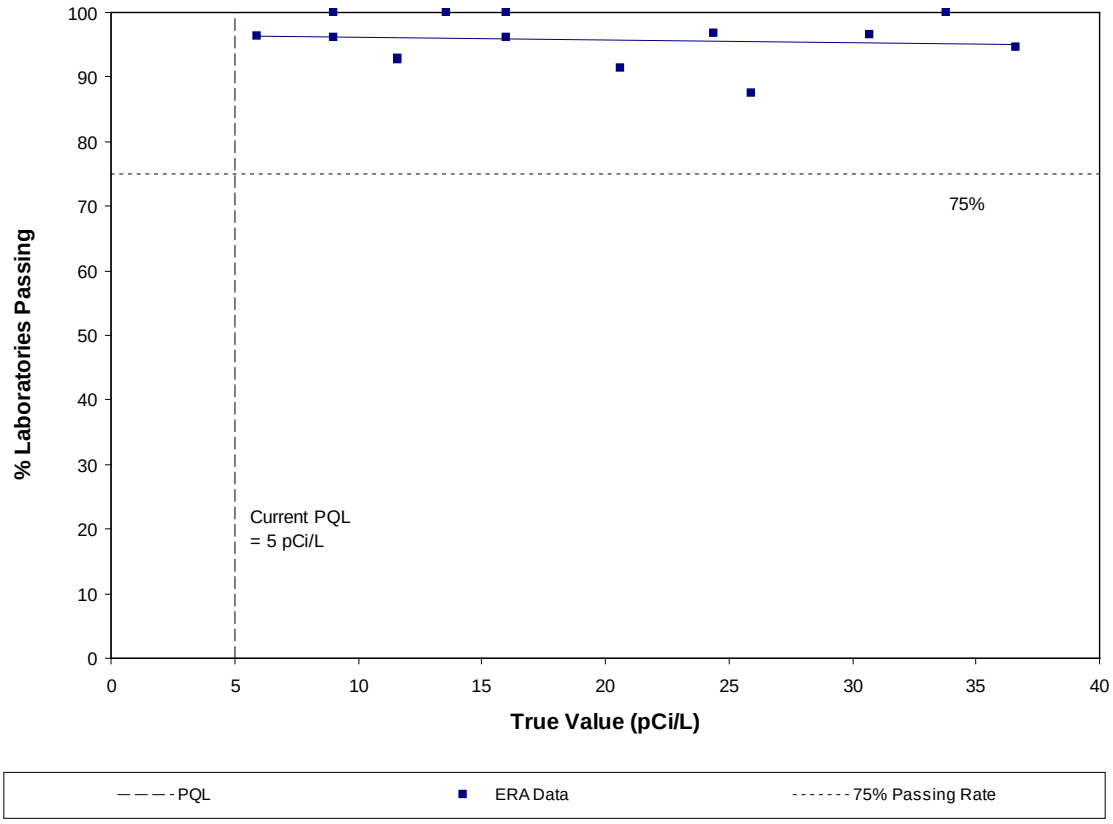

Exhibit B-15: Evaluation of ERA PT Data – Tritium

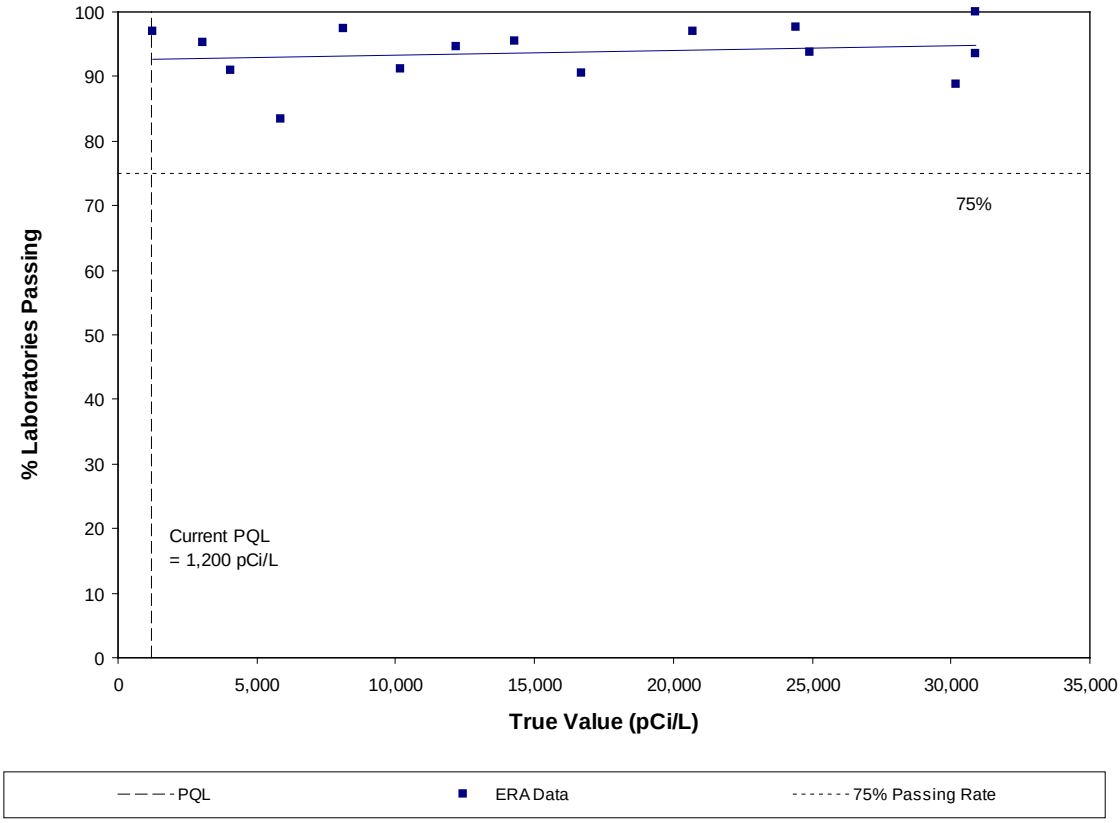

Exhibit B-16: Evaluation of ERA PT Data – Zinc-65