



ENTERED

AQS, Inc.  
2112 Deer Run Drive  
South Weber, Utah 84405

(801) 476-1365  
[www.aqsnet.com](http://www.aqsnet.com)

August 10, 2012

DCN: NMED-2012-19

Mr. David Cobrain  
New Mexico Environment Department  
Hazardous Waste Bureau  
2905 Rodeo Park Dr. East  
Building One  
Santa Fe, NM 87505



RE: Evaluation of Western Refinery's *Investigation Report Background Concentrations, Bloomfield Refinery, Western Refining Southwest, Inc.*

Dear Mr. Cobrain:

Attached please find draft technical review comments on the *Investigation Report Background Concentrations, Bloomfield Refinery, Western Refining Southwest, Inc.*, Bloomfield, New Mexico, dated July 2012. In an email dated July 17, 2012, Ms. Leona Tsinnajinnie requested a review of the document.

In the evaluation of responses to notice of disapproval (NOD) comments for the *Investigation Work Plan for Determination of Background Concentrations* dated March 2011, it was suggested that Western Refinery's (Western's) small background sample grid size would not likely capture the natural variation in background conditions over the entire site and that additional sampling locations should be proposed. Western opted to keep their proposed sampling grid in place, and to collect two additional soil samples at the sites of the background monitoring wells. However, one of the monitoring wells appears to be directly adjacent to the background sampling grid. Western claims that lithology and soil type are similar across the entire site; it is still not certain as to whether the background samples are capturing natural variation in background metal concentrations across the site. In addition, the sampling locations may have not yielded independent samples due to their close proximity. Failure to characterize the full extent of variable is conservative from a regulatory standpoint but may ultimately cause Western to retain metals as potential contaminants that may in fact be reflective of natural background. This potential failure to capture the full range of background concentrations should not prevent Western from moving forward with field work and analyses, but rather could result in the need to expand upon the background dataset at some time in the future.

*The contents of this deliverable should not be evaluated as a final work product.*

If you or any of your staff have questions, please contact me at (801) 451-2864 or via email at paigewalton@msn.com.

Thank you, .



Paige Walton  
AQS Senior Scientist and Program Manager

cc: Leona Tsinnajinnie, NMED (electronic)  
Joel Workman, AQS (electronic)  
Sunny McBride, AQS (electronic)

**Draft Technical Review Comments on the Investigation Report Background  
Concentrations, Bloomfield Refinery, New Mexico, May 2012**

**General Comments**

1. The *Investigation Report Background Concentrations* does not include the proposed methodology that will be applied during the site-to-background comparisons. Ensure that the site-to-background comparisons and statistical tests that will be utilized during the site-attribution analyses are consistent with the methodologies outlined in the most current NMED guidance “Risk Assessment Guidance for Site Investigations and Remediation.”

Some non-detect results (e.g., fluoride and arsenic) were replaced with one-half the sample quantitation limit (SQL) as shown in Table 3, and substituted in the 95% upper tolerance limit (UTL) calculations. The report indicates that this methodology is consistent with EPA’s most recent guidance (EPA, 2009, Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities Unified Guidance, EPA/530/R-09-007). However, this is not an acceptable method for processing non-detects. More current USEPA guidance states (EPA 2010):

“It is well known that the detection limit (DL)/2 method (with non-detects replaced by DL/2) does not perform well (e.g., Singh, Maichle, and Lee (EPA 2006)) even when the percentage of non-detects is only 5%-10%. It is strongly suggested to avoid the use of DL/2 method for estimation and hypothesis testing approaches used in various environmental applications.”

Instead of the DL/2 method, it is recommended that regression on order statistics (ROS) are applied, wherein “a regression line is fit to the normal scores of the order statistics for the uncensored observations and then to fill in values extrapolated from the straight line for the observations below the detection limit”. NMED also discourages use of DL/2 for risk assessments. Revise the 95% UTL calculations to utilize ROS methods for censored data.

**References:**

EPA 2010. Singh, A., Maichle, R.W. and N. Armbya. ProUCL Version 4.1 User Guide Statistical Software for Environmental Applications for Data Sets with and without Nondetect Observations. EPA/600/R-07/041.

EPA 2006. Singh, A., Maichle, R.W. and S. Lee 2006. On the Computation of a 95% Upper Confidence Limit of the Unknown Population Mean Based Upon Data Sets with Below Detection Limit Observations. EPA/600/R-06/022.

2. It is noted that ProUCL version 4.0.05 was used to calculate the upper tolerance limits (UTLs). As this background investigation document was published in May 2012, the most current version of ProUCL 4.1 (2010) should have been employed. Version 4.1 has had several updates and additions that may affect the UTL calculations, although it is unlikely that use of the most current version of ProUCL 4.1 would significantly affect the results of the UTL calculations. It is suggested that moving forward, the most currently available version of ProUCL be applied.

3. As a note, the maximum SQL for arsenic (5.0 milligrams per kilogram, mg/kg) is fairly elevated compared to the NMED residential risk-based screening level (3.9 mg/kg). When conducting site sampling, it is suggested that the selected laboratory's methods are reviewed to ensure that the method chosen will be sufficient to detect concentrations below the screening levels.

### **Specific Comments**

1. Table 3. 95% UTLs are higher than maximum detected concentrations for many analytes (e.g., aluminum, arsenic, chromium, cobalt, copper, fluoride, iron, manganese, nickel, vanadium, and zinc). While it is statistically possible for UTLs to be greater than maximum detected concentrations, the values used for background comparison should not be greater than the maximum detected concentrations. In these cases where the statistically-based UTL is greater than the maximum detected concentration, the maximum concentration should be used as the background reference value. Revise accordingly.

Further, a table was not provided in the document summarizing the final background comparison values that will be used for point-by-point comparisons. While Table 3 displays the summary statistics and calculated 95% UTLs, there is no listing of the final values chosen as the background comparison values. Add a table to the document summarizing the final background comparison values that were selected and will be utilized for site-to-background comparisons.

2. Table 3. Summary statistics, including a 95% UTL, were not calculated for chloride. There were eight detected observations greater than the SQL out of eighteen samples collected. There are sufficient numbers of detected observations to calculate a background comparison value. Modify Table 3 and Appendix H to include a 95% UTL for chloride.
3. Table 3. 95% UTLs were not calculated for data sets containing all "J" qualified detections (i.e., mercury and molybdenum). Data which are qualified as "J" simply mean that there is an undetermined bias, and the impact of a "J" validation code has minimal impact on data usability. These estimated values (may be estimated high or low) should be treated for statistical purpose as valid measurements. Modify Table 3 to include 95% UTL calculations for mercury and molybdenum.