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Environmental

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Mr. David Cobrain
NMED - Hazardous Waste Bureau
2905 Rodeo Park Dr. East
Building One
Santa Fe, NM 87505

NMED
Hazardous Waste Bureau

RE: Draft Technical Review Comments on the Investigation Report Background Concentrations
        Bloomfield Refinery, Revised, Bloomfield, New Mexico, Dated January 2015

Dear Mr. Cobrain:

Attached please find draft technical review comments on the subject Investigation Report
Background Concentrations Bloomfield Refinery, Revised, Bloomfield, New Mexico, dated
January 2015 (January 2015 Investigation Report). The report was revised in January 2015 to
include the results of the evaluation of background concentrations for site groundwater. NMED
requested a technical review of the revisions to the report.

The included general comment addresses the Bloomfield Refinery's use of Regression on Order
Statistic (ROS) methods to develop replacement values for non-detected results in the
groundwater background data set. At the time Bloomfield Refinery performed the groundwater
Background Threshold Value (BTV) analysis, NMED recommended the ROS methodology for
determining replacement values for non-detects in left censored environmental data sets.
However, NMED prefers USEPA's recommendation that one of the approaches presented in the
subsections of Section 5.3.3, Computing Upper Tolerance Limits (UTLs) for Left-Censored Data
Sets, of the *ProUCL Version 5.0.00 Technical Guide* (ProUCL v5 Technical Guide) be used in
determining Upper Threshold Limits (UTLs) for groundwater background data sets. Thus, the
general comment does not require that the Bloomfield Refinery revise its UTL calculations for
the groundwater background data set. However, the comments encourages the Bloomfield
Refinery to review the calculation of UTLs currently presented in Table 8 of the January 2015
Investigation Report and review the recommendations provided in Section 5.3.3 of the ProUCL
v5 Technical Guide and decide if they wish to use the BTVs for groundwater currently listed in
Table 8. If not, the comment indicates that the evaluation of the UTLs should be repeated
according to Section 5.3.3 of the ProUCL v5 Technical Guide, the BTVs for groundwater
recalculated, and the appropriate text and tables in the January 2015 Investigation Report revised
accordingly.

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Specific comments are provided on the determination of BTVs for the groundwater background concentration data set and the soil background concentration data set. The majority of the comments related to the BTVs for groundwater are intended to improve the clarity and transparency of the Investigation Report. The specific comments on the BTVs for soil share this intention.

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

Enclosure

cc: Leona Tsinnajinnie, NMED (electronic)
        Michael Smith, AQS (electronic)
        Joel Workman, AQS (electronic)

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Draft Technical Review Comments on the
Investigation Report Background Concentrations Bloomfield Refinery, Revised
Bloomfield, New Mexico,
Dated January 2015

GENERAL COMMENTS

1. Section 5.2, second paragraph, Page 24 addresses the use of Regression on Order Statistic (ROS) methodology to develop replacement values for non-detected results in the groundwater background data set. While the substitution and ROS methods are retained in ProUCL Version 5.0.00 (ProUCL v5) for historical reasons and comparison purposes, Section 1.14.2, ProUCL Recommendation about ROS Method and Substitution (DL/2) Method, of the *ProUCL Version 5.0.00 Technical Guide* (ProUCL v5 Technical Guide) indicates that Singh, Maichle and Lee (see *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, March 2006) used an extensive simulation study to demonstrate that the statistically rigorous Kaplan-Meier (KM) method yields accurate estimates of the population mean for data sets with non-detects. Thus, the United States Environmental Protection Agency (USEPA) does not recommend these methods for estimating decision statistics. In the past NMED has recommended the use of ROS methods when determining replacement values for non-detects in left-censored environmental data sets. However, NMED concurs with USEPA's recommendation that one of the approaches presented in the subsections of Section 5.3.3, Computing Upper Tolerance Limits (UTLs) for Left-Censored Data Sets, of the ProUCL v5 Technical Guide be used in determining the 95/95UTLs for groundwater background data sets. As a note, an update to the 2014 NMED Soil Screening Guidance has been issued (March 2015). For example, if the data are believed to be normally distributed, the methodology in Section 5.3.3.1, UTLs Based on KM Estimates when Detected Data are Normally Distributed, should be followed. NMED acknowledges that at the time Bloomfield Refinery performed the groundwater Background Threshold Value (BTV) analysis, the ROS methodology was recommended for determining replacement values for non-detects. Thus, NMED is not requiring Bloomfield Refinery to revise its calculations of the 95/95UTLs for the groundwater background data set. However, NMED encourages the Bloomfield Refinery to review the calculation of UTLs currently presented in Table 8 of the January 2015 Investigation Report and review the recommendations provided in Section 5.3.3 of the ProUCL v5 Technical Guide. Based on the review, Bloomfield Refinery should decide if they wish to use the BTVs for groundwater currently listed in Table 8. If not, the evaluation of 95/95UTLs should be repeated according to Section 5.3.3 of the ProUCL v5 Technical Guide, the BTVs for groundwater recalculated, and the appropriate text and tables in the January 2015 Investigation Report revised accordingly.

SPECIFIC COMMENTS

1. **Page 2, Section 2.2.** The last sentence of Section 2.2 states "the southernmost location for a background monitoring well is approximately 700 feet southwest of the [location of a] gas well, which should place it beyond any potential impacts from operations near the

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gas well." The text does not indicate if environmental investigations have been conducted in the vicinity of the gas well. To promote clarity and transparency in the presentation of information regarding the development of background concentrations, it is recommended that the discussion in Section 2.2 be amended to indicate if any environmental investigations have been conducted in the vicinity of the gas well. If so, the results of the investigations should be presented. Revise Section 2.2 of the January 2015 Investigation Report to address this issue.

2. **Page 5, Section 2.3.2.** The discussion at the top of Page 5 indicates that an evaluation of the background constituent concentrations in the subsurface layer comprised of finer grained matrix material rather than the deeper interval comprised of gravel and cobble materials is appropriate because it better represents the potential subsurface exposure medium. No other information is provided regarding the calculation of background concentrations in these layers or the types of exposures expected to occur. Revise the discussion at the top of Page 5 to indicate the type of subsurface exposures that could occur at the site. The revised discussion should support the assertion that development of a background concentration for the layer of finer grained matrix material is more appropriate than developing background concentrations for other layers or multiple layers in the subsurface.

3. **Page 6, Section 2.3.2.** The discussion on Page 6 indicates that Figures 7 and 8 illustrate that impacts to groundwater from historical site operations are downgradient of the locations of the groundwater background monitoring wells. However, wells MW-BCK-1 and MW-BCK-2 are not on Figures 7 and 8. For clarity and transparency in reporting the determination of groundwater background concentrations, it is recommended that Figures 7 and 8 be modified to include wells MW-BCK-1 and MW-BCK-2. Revise the figures to address this issue.

4. **Page 8, Section 3.3.** Section 3.3 indicates that during the installation of soil borings and monitoring wells, the characterization of investigation derived waste was completed using the actual soil sampling results. While the text states that the soil sample results indicate that no evidence was found of impacts from historical operations, Section 3.3 does not address the constituents detected in the soil samples (see Table 3). The second paragraph of Section 3.3 indicates that the soils from investigation derived waste were "clean." To clarify this discussion and provide transparency in the description of the background analysis, it is recommended that a reference be provided to the soil sampling results in Table 3. The discussion should also be amended to indicate that no soil screening levels were exceeded. Revise Section 3.3 to address this issue.

5. **Page 8, Section 3.3.** Section 3.3 addresses the collection and management of investigation derived waste associated with soil borings and monitoring wells. However, the discussion does not address investigation derived waste from groundwater sampling events. Revise the January 2015 Investigation Report to include a discussion of the collection and management of investigation derived waste resulting from groundwater sampling events.

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6. **Page 19, Section 5.1.** Dates for the statistical evaluations performed on the soil data set were not found in the text or Appendix H, Soils Statistical Evaluation, of the January 2015 Investigation Report. Because ProUCL version 4.1.00 (ProUCL v4.1) was used to evaluate soils and ProUCL version 5.0.00 (ProUCL v5)was used to perform the statistical evaluations of the groundwater results, it is recommended that the date(s) of the soil evaluation be added to Section 5.1. Revise Section 5.1 to include the date(s) of the statistical evaluations performed on the background soil data set.

7. **Page 19, Section 5.1.** The discussion on Page 19 indicates that ProUCL v4.1 was used to determine the distribution of the soil background data set. According to the discussion, all soil data subjected to statistical evaluation were normally distributed with the exception of barium, chloride, and fluoride, which were log normally distributed. For clarity and transparency, this discussion should be amended to list all distributions that were considered in the statistical determination of the data distribution. Revise the discussion on Page 19 to indicate if statistical tests were performed to determine if the soil background data fit a gamma distribution.

8. **Page 23, Section 5.2.** The second paragraph on Page 23 indicates that arsenic is among the constituents detected in the groundwater background wells that was not subjected to statistical evaluation due to "very few detections such as to make it impossible to calculate reliable BTVs." This assertion is referenced to the ProUCL v5 Technical Guide; however, the page number provided in the reference presents information on the Dixon and Rosner tests for outliers and does not appear applicable to the discussion in the second paragraph of Page 23. Sections 1.7 and 1.12, of the ProUCL v5 Technical Guide address sample size and the minimum number of detections required for reliable results (generally, 10 observations with 4 detections among the observations). Total arsenic was detected in 4 of 9 samples at MW-BCK-1 and one of the detections exceeded the applicable screening level. Total arsenic was detected once at MW-BCK-2; however, 3 of the samples at MW-BCK-2 had sample quantitation limits equal to or greater than the screening level. No constituents other than total arsenic were found in Table 4 that exceeded the applicable screening level but were not subjected to statistical evaluation. Thus, it is not clear why total arsenic was not included in the UTL analysis. Revise the discussion on Page 23 to include additional information supporting the exclusion of total arsenic from statistical evaluation.

9. **Page 23, Section 5.2.** The third paragraph on Page 23 indicates that the groundwater concentrations of some constituents were significantly less than the groundwater screening levels making the calculation of background threshold values for these constituents irrelevant (this information is also presented on Page ES-2 of the Executive Summary). The discussion on Page 23 does not include a comparison of the groundwater concentrations for these constituents to their screening levels. However, the information is provided in Table 4, Groundwater Analytical Results Summary Western Refining Southwest, Inc. - Bloomfield Refinery. To promote clarity and transparency in the presentation of information related to the development of background concentration values, it is recommended that the discussion in the third paragraph on Page 23 be amended to include a reference to Table 4. This reference should also be added to the

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similar discussion on Page ES-2 of the Executive Summary. Revise the January 2015 Investigation Report to address this issue.

10. **Page 24, Section 5.2.** It is not clear that the statistically determined values of the UTLs with 95 percent confidence and 95 percent coverage (95/95 UTL) were determined in accordance with NMED recommendations. The discussion in Section 5.2, first paragraph, Page 24 indicates that the background groundwater concentration data set was evaluated using Q-Q plots to determine if the constituents fit a normal or lognormal distribution. The text states that all data subject to statistical analysis were determined to be normally distributed. However, this discussion does not indicate if all recommendations provided in Chapter 5, Computing Upper Limits to Estimate Background Threshold Values Based Upon Data Sets Consisting of Nondetect (ND) Observations, of the ProUCL v5 Technical Guide) were followed in performing the statistical evaluations of the background groundwater concentration data. For example, Section 5.1, Introduction, of the ProUCL v5 Technical Guide indicates that the use of Student's t-statistic (and percentile bootstrap method) based UTLs are difficult to defend for moderately skewed to highly skewed data sets with standard deviations of the log-transformed data exceeding 0.75-1.0. Examination of the ProUCL v5 output files provided in Appendix K, Groundwater Statistical Evaluation, indicates that the skewness for a number of constituents exceeds 1.0 (e.g., total Boron). Revise Section 5.2 to provide additional information supporting the UTL values listed in Table 8 for those background constituents with data sets that exhibit skewness greater than an absolute value of 1.0 ($|1|$).

11. **Pages 1 and 2 of 2, Table 4, column heading.** The far left column of Table 4 lists the constituents for which analytical results are presented. The next column appears to list the groundwater screening level for the constituent; however, the column does not include a title headers. Revise Table 4 to include a title header for this column.

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