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LETTER AND MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION COMMENTS TO DRAFT REMEDIAL INVESTIGATION REPORT OPERABLE UNIT 9 (OU9) NSY PORTSMOUTH ME
5/2/2012
MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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May 2, 2012

Linda Cole
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Attn: Linda Cole

re: Navy Responses to MEDEP June 17, 2011 comments, Draft Remedial Investigation Report for OU9, Portsmouth Naval Shipyard, Kittery, ME.

Dear Linda,

The Maine Department of Environmental Protection (MEDEP) has reviewed the Navy's responses referenced above. In general, MEDEP believes the responses are satisfactory. However, we have comments regarding the background analysis discussed in the response to MEDEP Comment 24.

The Navy references its Aug. 2004 response to MEDEP Comment 5 on the Draft Site 34 SSI that indicates that the background datasets contained no outliers.

That response states that the background analysis was performed in accordance with the most recent, as of 2004, Navy and EPA background documents. However, these documents state that a possible solution to including non-detect concentrations in a data set is to use one-half the detection limit (dl/2). Since these documents were published use of this approach has been shown to produce an artificial signal in the dataset such that conclusions based on this dataset may be significantly inaccurate.

Current statistical practice for environmental data strongly discourages the use of replacing a fixed value for non-detects (e.g., EPA, 2009; Singh et al, 2010; Helsel 2012) especially for calculating summary statistics. For data that have multiple detection limits, as is the case here, substitution of detection limits for non-detects results in the introduction of unrelated patterns into the data. More robust and accurate methods, such as maximum likelihood estimation (MLE), Kaplan-Meier nonparametric method, or regression on order statistics (ROS) are available and should be used instead of data substitution (fabrication).

We note that the latest user's guide for ProUCL, ProUCL Version 4.0 Technical Guide, EPA states,

> "Note: It should be noted that for data sets with NDs, the DL/2 substitution method has been incorporated in ProUCL 4.0 only for historical reasons and also for its current default use. It is well known that the DL/2 method (with NDs replaced by DL/2) does not perform well (e.g., Singh, Maichle, and Lee (EPA 2006)) even when the percentage of NDs is only 5%-10%. It is strongly

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> suggested to avoid the use of DL/2 method for estimation and hypothesis testing approaches used in various environmental applications. Also, when the % of NDs becomes high (e.g., > 40%-50%), it is suggested to avoid the use of parametric MLE methods. For data sets with high percentage of NDs (e.g., > 40%), the distributional assumptions needed to use parametric methods are hard to verify; and those parametric MLE methods may yield unstable results… The main reason of its common use has been the lack of the availability of other defensible methods and associated programs that can be used to estimate the various environmental parameters of interest. Today, several other methods (e.g., KM method, bootstrap methods) with better performances are available that can be used to compute the various upper limits of interest. Some of those parametric and nonparametric methods are now available in ProUCL 4.0. Even though the DL/2 method (to compute UCLs, UPLs, and for goodness-of-fit test) has also been incorporated in ProUCL 4.0, its use is not recommended due to its poor performance". (USEPA, 2007)

MEDEP has received the Navy's Draft Re-Evaluation of the May 2000 Facility Background Report and have begun to review it. It is our hope that this re-evaluation does not use the ND/2 method, except for comparison, and will provide more accurate information regarding the background data set. Any issues related to the Draft Re-Evaluation will be discussed separately from the OU9 RI Report discussion.

If the re-evaluation of the background data set indicates that additional concentrations of OU9 CoC's are above background than previously thought, MEDEP, USEPA and the Navy will have to determine if further work is needed at the site.

References

Helsel, D. R., 2003. Practical Stats Newsletter, Spring 2003.
http://www.practicalstats.com/news/news/nadanews_files/03Spring_HalfBadIdea.pdf

Singh, A., Maichle, R. and Lee, S. 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, March 2006. http://www.epa.gov/osp/hstl/tsc/Singh2006.pdf

USEPA, 2007. ProUCL Version 4.0 Technical Guide. EPA/600/R-07/041, April 2007.
http://www.epa.gov/osp/hstl/tsc/software.htm

Please feel free to contact me at (207) 287-8010 if you have any questions.

Sincerely,

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