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MEETING MINUTES FROM TECHNICAL MEETING TO DETERMINE PRELIMINARY REMEDIATION GOALS FOR FEASIBILITY STUDY AT OPERABLE UNIT 2 (OU 2) WITH ATTACHMENTS NSY PORTSMOUTH ME
2/14/2005
TETRA TECH NUS

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PITT-02-5-027

February 14, 2005

Project Number 6997

Mr. Matthew Audet
Environmental Protection Agency
Region I (Mail Code: HBT)
1 Congress Street, Suite 1100
Boston, Massachusetts 02114-2023

Mr. Iver McLeod
Maine Department of Environmental Protection
State House Station 17
Augusta, Maine 04333-0017

Reference: Contract No. N62472-03-D-0057 (CLEAN)
Contract Task Order No. 015

Subject: Meeting Minutes from the December 2, 2004 Technical Meeting on Determining PRGs and Extent of Remediation for the Feasibility Study for Operable Unit 2
Portsmouth Naval Shipyard (PNS), Kittery, Maine

Dear Mr. Audet/Mr. McLeod:

On behalf of the U.S. Navy, Tetra Tech NUS, Inc. is pleased to provide to the U.S. Environmental Protection Agency Region I (USEPA) and to the Maine Department of Environmental Protection (MEDEP) 2 and 3 copies, respectively, of the subject minutes.

For the Community Restoration Advisory Board (RAB) members; if you have any comments or questions on these issues, they can be provided to the Navy at a RAB meeting, by calling the Public Affairs office at (207) 438-1140 or by writing to:

Portsmouth Naval Shipyard
Code 106.3R Bldg. 44
Attn: Marty Raymond
Portsmouth, NH 03804-5000

If you have any comments or questions, or if additional information is required, please contact Mr. Fred Evans at 610-595-0567 x 159.

Sincerely,

Amardeep Kumar, P.E. for

Deborah J. Cohen. P.E.
Project Manager

DJC/kf
Enclosure

Electronic Copy via E-mail
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Ms. Michele Dionne
Ms. Mary Marshall
Mr. Peter Britz
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Mr. Alan Davis
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Mr. Jack McKenna
Mr. Jeff Clifford
Ms. Carolyn Lepage
J. P. Kumar, Maine P.E., TtNUS, Pittsburgh

TECHNICAL MEETING ON DETERMINING PRGS AND EXTENT OF REMEDIATION
FEASIBILITY STUDY FOR OPERABLE UNIT 2
Comfort Inn, Portsmouth, NH
December 2, 2004
(9:00 am to 3:00 pm)

Attending the meeting were:

- USEPA: Matt Audet (RPM)
- MEDEP: Iver McLeod (RPM), Larry Dearborn (discussion of remediation areas as indicated in minutes), and Denise Messier (for ProUCL discussion as indicated in minutes) (MEDEP participated via telephone)
- EFANE: Fred Evans (RPM), Amanda Kittelson (Remedial Technical Manager), and Jason Speicher (risk assessor)
- PNS: Marty Raymond (IR Manager)
- TtNUS: Debbie Cohen (Facility Coordinator/Project Manager), Ron Kotun (risk assessor), and JP Kumar (project engineer)
- Other: Carolyn Lepage (TAG consultant to SAPL)

INTRODUCTION

Everyone introduced himself or herself. The purpose of the meeting was to present the approach used in the Feasibility Study (FS) for Operable Unit (OU) 2 for the development and implementation of preliminary remediation goals (PRGs). The approach is based on development of soil pickup levels that are being used to determine remediation areas in the OU2 FS.

Ron Kotun provided the presentation on the PRG Development Approach. Dr. Kotun is a risk assessor and project manager (for another Navy project). He began the presentation with highlights of concepts considered in risk assessments. The risk-based approach considered the following issues:

- Exposure concentration – represented by the average or upper confidence limit (UCL) of the average within a give exposure area. Lead is represented by an average concentration because of the nature of the models used to estimate lead exposure. Other chemicals are represented by UCL of the average because it is recognized that there always will be some amount of uncertainty associated with sampling and analysis.
- Exposure unit – area to which a receptor may be exposed. Some larger sites may need to be subdivided into parcels, depending on the likely exposure area. Site 6 and Site 29 are considered separate exposure units.
- Calculating risk – cancer risk is calculated using slope factors to determine incremental risk and noncancer risk is calculated using reference doses to get a hazard index. The exposure concentration (C) is proportional to the risk, where C is represented by the UCL or average. So, it is expected that site sample concentrations will be both above and below C.
- Deriving the risk-based cleanup levels (i.e., PRGs) – risk equations are used to back calculate a concentration (PRG) that will result in the targeted risk level. Like the calculated site risk, the PRG concentration should represent an average or UCL as appropriate. Again, a site can still meet target risk levels and have concentrations that are above the PRG.

Use of the UCL for chemicals is consistent with MEDEP guidance. Use of an average lead concentration is consistent with the lead exposure models that have been used at PNS IR sites.

Hypothetical site soil data: A chemical has a range of site concentrations between 2 and 30 with an exposure concentration of 12 (average). A PRG of 10 is determined. Cleanup approaches for this site rely on removing high concentrations to reduce the exposure concentration and thereby reducing risks. In a cleanup approach where soil with concentrations greater than the PRG (10) is removed and replaced with clean soil that has a concentration of 2, the exposure concentration can be reduced to 3.7, which is well below the PRG. However, using a cleanup approach where a remediation level (pickup level) is identified (30 for this example) and soil with concentrations greater than 30 are removed and replaced with clean soil that has a concentration of 2, the exposure concentration can still be reduced to less than the PRG. Less soil removal is required to achieve the same amount of protectiveness. The intent of the cleanup approach using pickup levels is to achieve post-remedial site risks for an exposure unit that attains target risk goals while minimizing remediation.

It was noted that in cleanup approach using pickup levels, it is important that the exposure unit has been defined appropriately and the site sampling data adequately characterize the site to ensure that site risks have been reduced to protective levels. Matt Audet indicated that this type of risk reduction method is a good method, but the Navy will need to provide support for the definition of the exposure units for each of the receptors considered (see Action Items). If the hypothetical site data described is for more than one exposure unit and more of the higher concentrations are in one exposure unit and the lower concentrations are in another exposure unit, then the pickup level for the exposure unit with higher concentrations could actually be lower than the 30 given in the example and possibly no removal needed for the other exposure unit.

It was also explained that for development of the remediation levels and development of remediation areas and volumes in the OU2 FS, the Navy recognized that additional data are necessary to characterize distribution of site concentrations. Therefore, the Navy used conservative assumptions in identifying the pickup levels for the FS and consistently applied these assumptions, recognizing that additional data (as part of an investigation before preparing the remedy design) would be necessary to define the pickup levels/areas for the selected remedy.

Dr. Kotun explained that pickup levels have been used at other sites and he will provide information to obtain a document (draft or draft final) the USEPA (Region 4, Dr. Ted Simon) prepared regarding this method (see Action Items).

The following was discussed regarding the definition of exposure units:

- A consistent definition of exposure units for the different receptors at IR sites at PNS may not be possible. The physical conditions and location of a site and the surrounding areas and the uses of the site need to be taken into consideration. However, rationale for the definition of the exposure unit should be provided.
- For example, during the development of the sampling program for Site 32, it was determined that the residential exposure units would be 1 acre. This is because plots along the Piscataqua River in Kittery were found to generally be around 1 acre (typically ranged from about 0.75 to 2 acres). Nearby, but inland, the plots were often smaller.

- In evaluating site risks and concentration distribution at a site (or within an exposure unit), it is important to look at the distribution of the data and the variability of the data. Sites that have acceptable risks because of very low concentrations across most of the site with a hot spot area should be evaluated to determine whether the hot spot area represents a significant area of concern within the site. There are various programs that can be used to look at the distribution of the data and evaluated risks before and after remediation.

OVERVIEW OF OU2 FS PRGS AND PICKUP LEVELS

The PRG and pickup level development for the OU2 FS used the exposure assumptions (including exposure units) that were used in the OU2 Risk Assessment (TtNUS, November 2000). Dr. Kotun briefly summarized the risk assessment conclusions and explained the PRG and pickup level approach.

OU2 Risk Assessment: Risks at Site 6 and 29 exceed risk targets, whereas risks are acceptable at DRMO Impact Area. Therefore, PRGs were derived for Sites 6 and 29, whereas the DRMO Impact Area was not evaluated further. The chemicals of concern based on the results of the risk assessment identified for Sites 6 and 29 are lead, antimony, benzo(a)pyrene, Aroclor 1254, and dioxins/furans. The exposure scenarios evaluated were residential, commercial/industrial, recreational, and construction worker. Risks were calculated for Sites 6 and 29 separately.

Defining and Deriving the PRGs:

- Definitions – The PRGs that were developed are site-specific levels, protective of human health, calculated for various exposure scenarios considered in the baseline risk assessment, and are represented by a UCL or average concentration as in risk assessment. The pickup levels (remedial action levels) are not-to-exceed concentrations where remediation above this level in an exposure unit lowers the exposure concentration such that target risk levels are achieved. The post-remediation sample concentrations may not need to be reduced to below the PRG for the target risk levels to be achieved.
- Deriving the PRG – The results of the OU2 risk assessment were used to derive the PRGs for the target receptors. The PRGs were set at concentrations equivalent to an HQ=1 (noncancer risk) or incremental cancer risk (ICR) = 10^{-6} for the individual chemicals to ensure that the cumulative site risks (for all chemicals) would be less than target risk levels. The same exposure assumptions in the risk assessment are used for the PRG derivation; therefore, risks are directly proportional to the exposure concentration. A risk ratio is used to derive the PRG by setting the PRG equal to the exposure concentration in the risk assessment (C_{ra}) multiplied by the ratio of the ICR_{target} divided by the ICR_{ra} for carcinogens and the ratio of the HQ_{target} divided by the HQ_{ra}.
- OU2 PRGs – Examples (see example presentation) were provided for the calculation of the recreational adult PRG for antimony and benzo(a)pyrene. The presentation also provides a table of the PRGs for the cancer and noncancer OU2 COCs. Lead PRG derivation is handled differently than the cancer/noncancer chemicals. For residential and industrial PRGs, standard risk levels were used and lead models were used to derive the recreational and construction worker PRGs. Also, as discussed previously, the lead PRG is based on an average site concentration. Dr. Kotun indicated that for the calculation of the construction worker PRG for lead, there was one change from the OU2

risk assessment; based on recent guidance changes, the soil ingestion rate for construction worker was updated. While he did not update the soil ingestion rate for the other chemicals in the PRG calculation for the construction work, it should be updated for completeness. This change in the construction worker PRG for the other chemicals will not affect the estimation of remediation areas and volumes in the FS because lead is the primary chemical driving these areas/volumes. The new construction worker PRGs and a list of the affected tables will be provided (see Action Item).

- Dioxin/furan PRG - The dioxin/furan PRG for OU2 is based on regulatory guidance for cleanup of sites with dioxins. There was some discussion about the dioxin data for OU2 and concerns regarding dioxins at OU2. Although dioxin/furans were not tested at Site 6, the Site 29 data (including source area data) show that dioxin is not a concern; therefore, it would not be expected to be a concern for Site 6 (particularly based on air borne impact). There was concern expressed for saying conclusively that dioxins/furans are not COCs for Site 6 when this class of chemicals was not evaluated for Site 6 and in light of the information suggesting that soil at Sites 6 and 29 could have been moved around (and therefore Site 6 and/or Site 29 COCs could be present at the other site). The Navy explained that the alternatives that were developed in the FS for Sites 6 and 29 would also address dioxins. The Navy will provide additional text in the FS explaining how dioxins are also remediated by the OU2 alternatives to address potential community concern regarding dioxin (see Action Item).

[Note, Table B-1 has correct PRGs; however, several other tables in Appendix B that show the PRGs may have some incorrect numbers. These errors in the tables do not affect the pickup level calculation. A list of affected tables will be provided (see Action Item).]

Determining the Pickup Levels considerations:

- Statistical approach – The approach uses iterative truncation where the higher concentrations are removed or "truncated" to reduce the maximum concentration. The higher concentrations are replaced with a surrogate value (replacement value). The process is repeated until the PRG or target risk level is attained. It is particularly applicable to soil cleanup because the spatial variability over time is minimal. The replacement values could be based on treatment levels, background, or detection limits.
- Iterative truncation – This approach is applied to the data within an exposure unit, where the maximum concentration is replaced with the identified replacement value, and the exposure concentration is recalculated. If the exposure concentration is less than the PRG, then the pickup level has been defined. If not, then the maximum concentration in the modified data set is removed and replaced with the replacement value, and a new exposure concentration is calculated and compared with the PRG. The process is continued until the PRG is achieved. The maximum concentration (post-remediation) would be equal or less than the pickup level.
- Pickup levels – When there are several COCs, the process tends to focus on the chemical that is the prevalent contributor to risk, recognizing that when "remediating" one chemical, others may concurrently be remediated. So for the post-remedial calculation, the other chemicals' concentrations will also be replaced with a surrogate value to recalculate post-remedial exposure concentrations and risks. If the other chemicals are not sufficiently remediated based on the one chemical, additional pick-up levels may be needed for the other chemicals such that target risks for the site would be met post-remediation.
- Replacement values – For the purposes of the OU2 FS, assumptions were made for the replacement value and the specific replacement number for the selected alternative

would need to be re-evaluated in the design. For lead, replacement values based on clean fill and on facility background were evaluated. For other chemicals, it was assumed that the replacement value would be a detection limit typically seen in the data set.

Dr. Kotun went over the results of the pickup level development for Sites 6 and 29. For most receptors, using a pickup level for lead will result in adequate remediation of the other chemicals and the site risks would be acceptable. However, for the residential exposure, a pickup level for Aroclor 1254 (for Site 6) and benzo(a)pyrene (Site 29) are also needed to reduce the site risks to acceptable levels. Dr. Kotun explained the table that is in the FS shows the list of data for lead sorted from highest to lowest, and it shows the samples above the pickup level for the specified receptor that would be "removed", replaced with the surrogate value, and then exposure concentration recalculated and site risks reevaluated. Looking at the cumulative cancer risk, for all receptors, using the identified pickup levels would result in site risks less than the target of 10^{-5}. Although the carcinogenic concentrations may be above the PRG (based on a individual cancer risk of 10^{-6}), the post-remedial site risk levels would be acceptable.

Concern was raised that treatment technologies that address inorganic contaminants may not address organic contaminants so assuming that treatment of lead will also address the organic COCs may not hold true for OU2. The Navy explained that because of the mixture of COCs at OU2, the Navy only retained soil washing as a treatment technology for replacement of soil onsite. The Navy is conducting a treatability study (jar test) to determine whether soil washing could work for the mixture of chemicals at OU2.

Construction Worker: Most exposure evaluated at the site is to surface soil (0 to 2 feet below ground surface [bgs]); however, a construction worker could be exposed to surface and subsurface soil (assumed for OU2 to be a maximum of 10 feet bgs). There are limited subsurface soil data for OU2; therefore, for the evaluation of the pickup level for the construction worker, some assumptions were made to determine a weighted-average concentration of lead in subsurface soil at Sites 6 and 29. This approach was used to demonstrate that after using the pickup levels for surface soil for the other receptors, the construction worker exposure concentration/risks would also be acceptable. Therefore, no removal of soil deeper than 2 feet bgs would be needed to protect the construction worker. It was noted for the FS (as discussed later in the technical meeting), other assumptions were made regarding subsurface soil for development of the remediation areas/volumes recognizing the limitations of the subsurface data.

Dioxins: The dioxin/furan data (based on toxicity equivalent quotient or TEQ) was evaluated separately by comparing the data to the regulatory guidelines. Surface soil concentrations were less than 1 ug/kg and subsurface concentrations were less than 5 ug/kg. It was noted that in the 2 to 10 foot bgs soil, there was one sample location that had TEQ values (in two samples) greater than 1 ug/kg (approximately 1.5 and 2.5 ug/kg).

Conclusions:

- Removal of surface soil with lead concentrations greater than approximately 2,000 mg/kg, Aroclor 1254 greater than 43,000 ug/kg, and benzo(a)pyrene greater than 3,500 ug/kg will achieve protection of residential exposure for OU2.
- Removal of surface soil with lead concentrations greater than approximately 3,500 mg/kg achieves protection of industrial/occupational exposure for OU2.
- Removal of surface soil with lead concentrations greater than approximately 11,000 mg/kg will achieve protection of recreational exposure (surface soil only) and construction worker exposure (surface and subsurface).

DEVELOPMENT OF REMEDIATION AREAS IN OU2 FS
(Larry Dearborn joined for this portion of the presentation)

The pickup levels that Dr. Kotun presented (see conclusions) were used for developing the remediation areas and volumes for the alternatives in the OU2 FS. For the construction worker pickup level, a slightly lower number (10,000 mg/kg) for lead was used because of the uncertainties in the available subsurface data set. For consistency, the recreational pickup level was set at the construction worker level.

JP Kumar explained how the alternatives were developed to provide increasing amounts of soil removal/treatment and decreasing amounts of land use controls/institutional controls to achieve the remedial action objective (RAO) for the protection of human health. [Note the RAO for protection of the offshore is met through the use of shoreline erosion controls, which is a component of each alternative besides the No Action alternative.]

List of Alternatives: No Action (Alternative 1) is required as part of all FSs as a comparison to the other alternatives. For OU2, No Action would not meet the RAOs. Mr. Kumar explained how the other alternatives meet the RAO for protection of human health.

- Alternative 2 – Approximately 3 acres would be covered with surface protection (approximate area with lead greater than 3,500 mg/kg) to prevent current users from exposure to soil above the pickup level. Land use controls/institutional controls across the entire Sites 6 and 29 area (approximately 4 acres) would be used to prevent residential development and maintain the surface protection.
- Alternative 3 – Approximately 1 acre of soil in the 0 to 10 feet bgs and 0.5 acre 0 to 2 feet bgs was estimated to have concentrations above 10,000 mg/kg. This soil would be excavated and treated/disposed either onsite (3A) or offsite (3B) to provide protection for a construction worker at OU2. An additional 1 acre of soil with lead concentrations greater than 3,500 mg/kg would be provided with surface protection for current use. Three acres (excludes the 1 acre where soil remediated to 10 feet bgs) would be provided with restrictions on residential use. Maintenance of the surface protection (1 acre) would also be required.
- Alternative 4 – Approximately 1 acre of soil in the 0 to 10 feet bgs and 0.5 acre 0 to 2 feet (same as in Alternative 3) was estimated to have concentrations above 10,000 mg/kg. An additional 1 acre of soil was estimated to have lead concentrations greater than 3,500 mg/kg. The soil would be excavated and treated/disposed either onsite (4A) or offsite (4B) to provide protection to the construction worker and current site users. Three acres (excludes the 1 acre where soil remediated to 10 feet bgs) would be provided with restrictions on residential use. No maintenance of surface protection is required.
- Alternative 5 – The entire site from 0 to 5 feet bgs was estimated to have lead concentrations potentially above 2,000 mg/kg. Of this area, an estimated 1 acre also has soil from 5 to 10 feet bgs greater than 10,000 mg/kg. This soil would be excavated and treated/disposed either onsite (4A) or offsite (4B) to provide protection to the construction worker, current site users, and residential users. For residential, 0 to 5 feet bgs was used rather than 0 to 2 feet bgs because it was recognized that excavation below 2 feet bgs could occur in a residential scenario (although deeper is not likely). No maintenance of surface protection is required; no restrictions of residential use would be required.

- Alternatives 2 through 5 would all have requirements for testing and disposal of any soil brought to the surface from any excavation activities below remediated areas.

Several comments and questions raised:

- A suggestion was made to show the area on Figure 8-7 representing the area for excavation from 0 to 5 feet bgs using a different color than on the other Section 8 figures showing the area for excavation from 0to 2 feet bgs (see Action Items).
- How were the areas determined around the isolated points? For the isolated points, a box around the sample point was used for area and volume calculations. The specific areas for remediation would be determined based on the results of pre-design sampling.
- How was the DRMO Impact Area evaluated for risk exposure? The impact area was addressed as one exposure unit in the OU2 risk assessment. Concern was raised whether there are any discrete areas within the DRMO Impact Area that may have elevated concentrations that may need to be looked at further. Based on the range of lead data at DRMO impact area (they are within the range of facility background), there do not appear to be any discrete areas of concern. However, it was noted that along the Site 6 fence line (south of fence) there are some high lead concentrations at Site 6 and as part of the pre-design sampling, the area north of the fence would also be included.
- Is the area west of DRMO operations included in the area identified for surface protection (as part of Alternative 2 or Alternative 3)? This area has lead concentrations greater than greater than 2,000 mg/kg (pickup level for residential), but less than 3,500 mg/kg (pickup level for industrial/occupational). The surface protection is included for the protection of industrial/occupational users (current users). The areas were defined consistently in the FS; however, the Navy recognizes that pre-design sampling would refine areas so sampling in this area expected.
- Table 9-1 will be corrected (see Action Item) to indicate that all alternatives (including Alternative 5) would have some post-remediation restriction on management of any material excavated from below remediated areas. The restrictions would require testing and proper disposal of this excavated material (the material could not be spread on the ground surface).

DEFINING AND DERIVING THE EXPOSURE CONCENTRATION

(Denise Messier joined for this portion of the presentation)

Dr. Kotun provided a presentation explaining the determination of the exposure concentration and the use of the USEPA ProUCL software. For the determination of the exposure concentration the average concentration is used for lead evaluation and the UCL is used for all other chemicals. The UCL is the 95 percent upper confidence limit of the mean – if a site was repeatedly sampled; the mean is expected to be less than this value 95 percent of the time. As the number of samples at a site increases, the UCL will approach the mean. There are different ways to calculate the UCL based on the distribution of data.

Statistical Distribution: Data with a normal distribution will appear as a bell-shaped curve and most statistical procedures are based on an assumption of normality. Lognormal distribution is data that is positively skewed and the logarithmic values are normally distributed. For lognormal distribution, the UCL is calculated using the Land Method (H-statistic) and typically results in a UCL concentration greater than the maximum concentration. When the UCL is greater than the maximum, the exposure concentration will default to the maximum concentration.

Normal, Lognormal or Neither?: The data are tested to determine normality (e.g., Shapiro Wilk test). Although test provides one conclusion, analyst must be intuitively aware of the nature of the data to assess whether the test is truly accurate. Skewness may be due to biased sampling, multiple populations, or outliers. It is possible that data are not truly normal or lognormal, in practice, normality or lognormality is difficult to justify, especially in environmental applications. Dr. Kotun explained that traditionally biased sampling was conducted to identify a source and the extent of contamination from the source. These biased data were then used to quantify risk. More recently, some type of random sampling of the exposure unit is conducted to get the distribution of the site concentrations from an exposure standpoint.

Parametric or Nonparametric: Parametric approaches assume the distribution of the data is either normal or lognormal and then uses the mean and standard deviation to calculate the UCL. Nonparametric approaches do no require an assumption about the distribution of the data. The approach is computationally complicated, but computer power is available to do this more quickly. Dr. Kotun explained that there are various nonparametric approaches and these approaches are all conducted in the USEPA Pro-UCL program.

Bootstrapping: Bootstrapping reduces the bias of point estimates, does not require an assumption of the statistical distribution of the data, is applicable to a variety of situations, is conceptually simple. The concept is based on multiple sampling of the data set so it requires considerable computer power and is not truly "repeatable" because of the variability of sampling of the data set. Dr. Kotun explained that bootstrapping involves randomly sampling a dataset and calculating an average many times. Then the UCL of these averages is calculated. Therefore, the UCL is independent of the mean or standard distribution. The dataset sampling is sampling with replacement. For example if a dataset has 30 samples, a number would be randomly be pulled from the dataset and replaced in the dataset before pulling the next data point. This would be conducted 30 times and then the 30 numbers are used to calculate an average. The process is repeated until 2,000 averages are calculated.

ProUCL: The development of the software ProUCL, Version 3.0, has been supported by the Office of Superfund Remediation and Technical Information, USEPA, Washington, DC. ProUCL is managed by the Technical Support Center of USEPA in Las Vegas, NV. ProUCL makes recommendations based upon the most appropriate data distribution, associated skewness, and coverage probabilities. ProUCL prints out a message about the data distribution and a recommended UCL to user. However, it is the program user's responsibility to select the most appropriate UCL for the project/site.

UCLs in ProUCL, Version 3.0: The program computes UCLs for normal, lognormal, Gamma models and also for nonparametric data sets. Dr. Kotun recommends using percentile bootstrap because it is not easily influenced by outliers, conducted independent of the distribution of the data, and do not see the erratic nature of changes in UCL when conducting iterative truncation. He explained that in iterative truncation, the removal of the maximum concentration and replacement with the identified replacement value often changes the distribution of the data. Methods for calculation of the UCL would need to be switched based on the data distribution changes, if methods dependent on data distribution are used. Bootstrapping is not dependent on the distribution of the data and therefore can be consistently used for iterative truncation. Also, it was noted that the increase in non-detect values in a data set can skew the distribution. So for the determination of a pickup level, skewing of the data is expected as you replace the dirty (highest) concentrations with clean (often non-detect) concentrations. Dr. Kotun noted that one problem with the USEPA ProUCL program is that it can only calculate the UCL for one chemical at a time. TtNUS modified the program so that TtNUS can run multiple chemicals at the same time.

Dr. Kotun said professionally he prefers bootstrapping for calculating the exposure concentration for risk assessment as well as PRG development because of the randomly sampling from a data set. It was explained that the data set needs to characterize site exposure. If the data set is biased to a source area, then the UCL will likely be biased high. However, it was explained that normal or lognormal statistics are easily reproducible. With bootstrapping you could not reproduce the exact results (because it randomly samples the data set), so is more difficult to verify. For example, one run may give a result of 5,020 and another time it may result in 5,015.

In summary, Dr. Kotun indicated that there are nonparametric tests available that are often better representations of the data than using the standard parametric tests. ProUCL is a useful tool; however, professional judgment should be used along with the results the ProUCL program provides. It is important to look at the data and the site to make sure that the results make sense. He also suggested that the same method of calculating the UCL pre-remediation and post-remediation be used.

It was explained that the ProUCL program is only for UCL calculation and does not provide other statistical calculations. Anita Singh at the USEPA is the contact person for questions about the USEPA program.

Action Items Identified During the Meeting

Action Item	Person Responsible	Due Date
Provide information regarding Ted Simon's document on pickup levels	Ron Kotun	Provided via email from Navy on December 7, 2004
Provide website information on ProUCL	Ron Kotun	Provided via email from Navy on December 7, 2004
Provide rationale regarding definition of exposure units for OU2	Navy	Will be addressed in OU2 FS Responses to Comments
Provide list of Appendix B tables affected by PRG changes (revision to construction worker number)	Navy	Will be addressed in OU2 FS Responses to Comments
Provide discussion on how dioxin concerns are addressed by the remedial alternatives	Navy	Provide with OU2 FS Response to Comments
Change the color of the 0 to 5 feet bgs excavation area in Figure 8-7	Navy	Provide with OU2 FS Response to Comments
Revise text in Table 9-1 (also Table ES-1) regarding land use controls	Navy	Provide with OU2 FS Response to Comments