



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION I

JOHN F. KENNEDY FEDERAL BUILDING  
BOSTON, MASSACHUSETTS 02203-0001

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October 31, 1996

Mark Evans, Remedial Project Manager  
U.S. Department of the Navy  
Naval Facilities Engineering Command  
Northern Division  
10 Industrial Highway  
Code 1823, Mail Stop 82  
Lester, PA 19113-2090

Re: Consistency among data tables in the Phase II Remedial Investigation ("RI")

Dear Mr. Evans:

Thank you for the data package concerning the Construction Battalion Unit Drum Storage Area ("CBU") human health risk assessment. EPA has reviewed the information that was provided to us on October 2, 1996. The information helped to identify where our misunderstandings lie. As a result, I believe that it is important to clarify EPA's policy for the identification of reasonable maximum exposure ("RME") groundwater exposure point concentrations for use in future human health risk assessments.

Although EPA's comment was particular to the CBU site, we anticipated that any errors in methodology detected for the CBU site would be rectified for other sites evaluated elsewhere in the Phase II Remedial Investigation ("RI"). While EPA recognizes that this will not greatly affect the outcome of the human health risk assessment for the CBU site, we are concerned that there may be larger discrepancies at other sites.

The current Region I approach for identifying an RME groundwater exposure point concentration is summarized on page 2 of the August 1994 "Region I Risk Update" (attached). Region I has stated that use of a 95% upper confidence limit on the mean groundwater concentration is not applicable to the assessment of exposures to groundwater because exposure is not likely to be random across the plume. As a result, the Region I created a policy in which either 1) the maximum detected concentration or 2) the highest average concentration of each contaminant across several rounds in the same well (if there is more than one round of data) *from wells situated in the plume* can be used as the RME concentration from within a plume. EPA did not comment on pages 3-27 and 3-28 of the Phase II RI because they appear to be consistent with the Region I policy and its emphasis on "plume" contamination.

Since only one well location was sampled at the CBU site, use of the guidance intended for characterization of an RME point concentration for *a plume* is not appropriate. Therefore, use of



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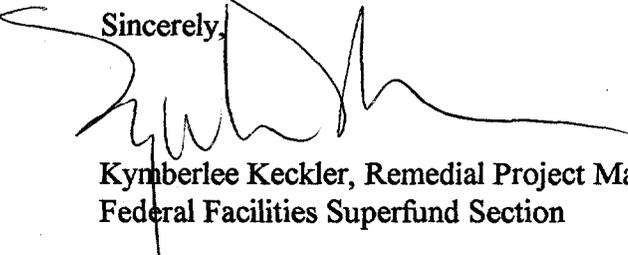
the maximum observed concentration at the CBU site should have been used in the RME risk evaluation because a plume was not defined.

Unfortunately, Region I's guidance does not specify the minimum number of samples needed to define a plume. Clearly, however, delineation of a plume is limited and uncertain when only a few locations have been sampled. Consequently, EPA advocates use of the maximum concentration as input for the RME risk evaluation.

Lastly, in contrast to the fourth line in the second paragraph of Attachment A to the data package, an average maximum concentration of *duplicate samples alone* is not appropriate for use as a groundwater RME point concentration. Duplicate samples should be used only when multiple rounds of sampling data exist.

I hope this letter has clarified issues where needed and look forward to their resolution. Please do not hesitate to contact me at (617) 573-5777 should you have any further questions.

Sincerely,



Kimberlee Keckler, Remedial Project Manager  
Federal Facilities Superfund Section

Attachment

cc: Mark Lewis, CTDEP, Hartford, CT  
Andy Stackpole, NSBNL, Groton, CT  
Sarah Levinson, USEPA, Boston, MA  
Dale Weiss, TRC, Lowell, MA  
Rayomand Bhumgara, Gannett Fleming, Braintree, MA  
Matthew Cochran, Brown & Root, Pittsburgh, PA

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*Handwritten signature/initials*



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**US EPA Region One Waste Management Division**

**RISK UPDATES**

Risk Updates is a periodic newsletter from the Region 1 risk assessors. This publication provides an update to Region 1's Supplemental Guidance for Risk Assessment for the Superfund Program (EPA 901/5-89-001), and new information concerning risk guidance, for contractors supporting Superfund and RCRA. Risk assessment questions can be addressed to the following EPA staff members at area code (617):

**Superfund Human Health Assessment**

- Ann-Marie Burke 223-5528
- Margaret McDonough 573-5714
- Mary Ballew 573-5718
- Maureen McClelland 565-3470
- Jui-Yu Hsieh 565-3607
- Olga Quirin 565-3552

**Superfund Ecological Assessment**

- Susan Svirsky 573-9649
- Patti Tyler 860-4342

**RCRA Ecological Assessment**

- Dave Guest 223-5541
- Ernest Waterman 223-5511

**A CHANGE IN THE APPROACH FOR ESTIMATING THE AVERAGE AND REASONABLE MAXIMUM EXPOSURE SCENARIOS FOR HUMAN HEALTH RISK ASSESSMENTS**

**INTRODUCTION**

The Region 1 Waste Management Division will implement the Deputy Administrator's memo entitled "Guidance on Risk Characterization for Risk Managers and Risk Assessors" dated February, 1992, (1992 Risk Guidance) for all new Remedial Investigations/Feasibility Study (RI/FS) or Remedial Facility Investigation (RFI) starts in which the risk assessment is not substantially underway. The Superfund Program has interpreted this memo to require changes in how the average and reasonable maximum exposure (RME) scenarios are evaluated in the human health risk assessment.

Region 1 will adopt the use of the 95% upper confidence limit (the 95% UCL) of the arithmetic mean for the concentration term where appropriate and the use of central tendency and high end exposure parameters in human health risk assessments.

**DISCUSSION**

Region 1's approach to date for characterizing the range of potential human health risks at hazardous

waste sites has been to combine the average and maximum contaminant concentration with reasonable maximum exposure parameters. The risks associated with the average and maximum concentration terms were considered to represent a central tendency and a high end (or reasonable maximum) exposure, respectively. Region 1's new approach is to adopt the 95% UCL as the concentration term in exposure calculations. The Supplemental Guidance to RAGS: Calculating the Concentration Term (OSWER Publication No. 9285.7-081, May 1992, Attachment 1) discusses reasons for using the 95% UCL and presents the equations to be used for this calculation when data is normally or lognormally distributed. The 95% UCL replaces Region 1's use of the average and maximum values for the concentration term.

The use of one concentration term, the 95% UCL, requires a change in the way central tendency and reasonable maximum risks are calculated. Central tendency exposure estimates will now be calculated by combining the 95% UCL with the draft central tendency exposure parameters (see Attachment 2). For the RME estimate, the 95%UCL should be combined with the draft high end exposure parameters presented in Attachment 3. These draft exposure parameters were developed by a national EPA workgroup and are derived from the best available scientific information at this time. These values are currently undergoing review by EPA's Exposure Assessment Group and may change in the future. If exposure parameters are not listed for a particular pathway, consult a Region 1 risk assessor.

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### When the 95% UCL is Greater than the Maximum Concentration

In many cases the number of samples available to calculate the 95% UCL will be insufficient for estimating the mean and thus, the 95% UCL concentration will be greater than the maximum measured concentration. In this situation the maximum concentration detected should be used in calculating the RME and the arithmetic average concentration for the central tendency exposure.

### Exposure Areas

The exposure area is the area of soil, sediment, etc., which an individual may come in contact with. To the extent that the data from different exposure areas are homogeneous the data may be combined to calculate the 95% UCL.

At many sites contamination is unevenly distributed and concentrates in "hot spots." Where hot spots are identified, a separate risk assessment must be calculated if the hot spot is assumed to be visited more frequently than other areas in the same medium. For example, at a large site at which future residential exposure is assumed, soil data over an area the size of a residential backyard should be evaluated for this pathway.

There will not always be a sufficient number of samples to calculate the 95% UCL for each hot spot. In this case the average and maximum site concentrations should be used, with the high end exposure parameters, to estimate high end and central tendency exposures.

### Groundwater

Future residential use of groundwater has always been based on the assumption that a single private well can be placed anywhere in the contaminated plume. Therefore, the concept of random exposure across a plume, and the use of the 95% UCL is not applicable to the assessment of exposure to groundwater. At present, Region I will continue to use the maximum detected concentration

of each contaminant in any well, or the highest average concentration of each contaminant across several rounds in the same well, if there is more than one round of data, in calculating the RME exposure. Region I will use the average plume concentration in calculating the central tendency exposure. A national EPA workgroup consisting of hydrogeologists and risk assessors is currently attempting to develop a better approach for assessing exposure to groundwater.

### Implementation

This new approach should be applied to all new RI/FS and RIF starts in which the risk assessment is not substantially underway or in situations where the EPA remedial project manager decides to re-evaluate risk with this approach after the risk assessment is final. This guidance is effective as of August, 1994.

carcinogenic PAH to an equivalent concentration of benzo(a)pyrene.

### Compound Relative Potency Value

benzo(a)anthracene	0.1
benzo(b)fluoranthene	0.1
benzo(k)fluoranthene	0.01
benzo(a)pyrene	1.0
chrysene	0.001
dibenzo(a,h)anthracene	1.0
indeno(1,2,3-cd)pyrene	0.1

This approach applies to all new RI/FS starts in which the risk assessment is not substantially underway or in situations where the EPA remedial project manager decides to re-evaluate risk with this new approach.

### AWQC AND CLEAN-UP LEVELS FOR HUMAN HEALTH IN SURFACE WATER AT SUPERFUND SITES

### RELATIVE POTENCY VALUES FOR CARCINOGENIC PAHS

At present, the USEPA does not have a national standard or policy for assigning cancer potency values to different polycyclic aromatic hydrocarbons (PAHs). Until a national, peer-reviewed policy is adopted by EPA, Region I will adopt an interim policy based on the recommendation of EPA's Environmental Criteria and Assessment Office (ECAO) as discussed in the Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons, EPA/600/R-93/089. The EPA regions conducted a review of the scientific issues concerning the carcinogenic potency of PAHs and concluded that relative potency values as developed by ECAO were the most appropriate to use in risk assessments. ECAO further recommended rounding the relative potency to the nearest power of ten, which is consistent with the uncertainty in risk assessment. The following values should be applied in Region I risk assessments to convert the measured concentrations of each

The purpose of this article is to clarify the proper use of AWQC in developing cleanup levels for surface water and discharges to surface water at Superfund sites.

### ARARs

The first step in developing cleanup levels is to identify applicable or relevant and appropriate requirements (ARARs). Applicable requirements are defined as "cleanup standards, standards of control, and other substantive environmental protection requirements, criteria or limitations promulgated under Federal or State law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site." Relevant and appropriate requirements are defined as "substantive environmental protection requirements...promulgated under Federal or State law that, while not "applicable,"... address problems or situations sufficiently similar to those encountered at the CERCLA site that