



REPLY TO  
ATTENTION OF

**DEPARTMENT OF THE ARMY**

NATIONAL GUARD BUREAU  
111 SOUTH GEORGE MASON DRIVE  
ARLINGTON VA 22204-1373

ARNG-ILE Cleanup

4 February 2014

MEMORANDUM FOR Nancy Zikmanis Environmental Supervisor, Ohio Environmental Protection Agency (Ohio EPA), DERR-NEDO, Northeast District Office, 2110 East Aurora Road, Twinsburg, Ohio 44087

SUBJECT: FINAL TECHNICAL MEMORANDUM: Land Uses and Revised Risk Assessment Process for the Ravenna Army Ammunition Plant (RVAAP) Installation Restoration Program, Portage/Trumbull Counties, Ohio

1. Purpose: This Memorandum is to amend the current risk assessment process in place to address the changes occurring as part of the RVAAP restoration program. The update to the risk assessment and remedy selection process is the inclusion of a fulltime/occupational exposure represented by USEPA's Industrial Regional Screening Levels (RSLs).

2. Current Risk Assessment Guidance Documents: The following documents contain the basic risk assessment techniques and general risk assessment methods for RVAAP restoration risk assessments. Based on the changes outlined below, portions of these documents may no longer be applicable:

a. United States Army Corps of Engineers (USACE). 2005. Ravenna Army Ammunition Plant Facility-Wide Human Health Risk Assessor Manual (FWHHRAM), Amendment 1. Prepared by the USACE, Louisville District, November 2005. This document contains the following:

- (1) Risk assessment methods,
- (2) Exposure Parameters, and
- (3) Risk Assessment Exposure Scenarios.

b. Science Applications International Corporation (SAIC)/USACE. 2010. (FWCUG Report). Facility-wide Human Health Remediation Goals, Ravenna Army Ammunition Plant, Ravenna, Ohio Facility-wide Human Health Remediation Goals, Ravenna Army Ammunition Plant, Ravenna, Ohio, April 2010. This document contains:

ARNG-ILE Cleanup

SUBJECT: FINAL TECHNICAL MEMORANDUM: Land Uses and Revised Risk Assessment Process for the Ravenna Army Ammunition Plant (RVAAP) Installation Restoration Program, Portage/Trumbull Counties, Ohio.

(1) Risk assessment methods, toxicity information, exposure parameters, and site-specific information,

(2) FWCUGs (cancer and non-cancer levels for all receptors), and

(3) Introduction of two new receptors and their exposure parameters.

c. USACE. 2012. Ravenna Army Ammunition Plant (RVAAP) Position Paper for the Application and Use of Facility-Wide Human Health Cleanup Goals (FWCUG Position Paper), Revised January 2012. This document contains the following:

(1) Process of "How to Use the FWCUGs", and

(2) Detailed information on screening process.

d. USEPA Risk Assessment Guidance for Superfund (RAGS) Parts A, B, C, D, E, and F. 1989 through 2009. These documents contain risk assessment methods followed under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

3. Refer to the documents in Paragraph 2 for specific issues not modified by this Memorandum.

4. Land Uses:

a. Three Land Uses for the RVAAP restoration program will be considered during Remedial Investigations (RIs): Unrestricted (Residential), Military Training and a Commercial/Industrial Land Use. Representative Receptors are listed below for each of the three Land Uses:

(1) Unrestricted (Residential) Land Use – Resident Receptor (Adult and Child) (formerly called Resident Farmer).

(2) Military Training Land Use – National Guard Trainee.

(3) Commercial/Industrial Land Use – Industrial Receptor (USEPA's Composite Worker).

ARNG-ILE Cleanup

SUBJECT: FINAL TECHNICAL MEMORANDUM: Land Uses and Revised Risk Assessment Process for the Ravenna Army Ammunition Plant (RVAAP) Installation Restoration Program, Portage/Trumbull Counties, Ohio.

b. Note that Land Use Controls (LUCs) for each Area of Concern (AOC) or Munitions Response Site (MRS) should be evaluated appropriately during the Feasibility Study (FS) process to determine if controls will be needed, such as engineering controls, media use, indoor air issues, residual contamination at depth, or other issues related to the specific AOC/MRS.

5. Description of Land Uses:

a. Unrestricted (Residential) Land Use (existing) is considered protective for, and may be applied to, any and all categories of land use on the former RVAAP/Camp Ravenna, without further restriction. Unrestricted Land Use is based on a comparison of chemical concentrations on the AOC/MRS to FWCUGs developed for Residential Receptors (Adult or Child) [or Residential RSLs where a FWCUG is not available.]

b. Military Training Land Use (existing) describes potential exposure for military and civilian personnel (receptors) that would train or work (part-time) on any AOC or MRS within the former RVAAP/Camp Ravenna. This Land Use includes activities that are currently necessary to properly train soldiers and operate/maintain a training base as defined by the Army and activities necessary to support that training objective. This Land Use has specific assumptions that would require a LUC limiting exposure of personnel to the hours assumed for the National Guard Trainee in the FWHHRAM, as well as, any other necessary LUC as defined during the FS process.

c. The Commercial/Industrial Land Use (NEW) represents a full-time occupational receptor at the former RVAAP/Camp Ravenna at AOCs/MRSs. This Land Use includes activities consistent with fulltime employees or career military personnel who are expected to work daily at the facility over their career. Activities can include work that would be conducted in office buildings, schools, maintenance buildings, as well as manufacturing facilities. Activities will also include outdoor work that will be conducted by full-time personnel to maintain military training lands. Commercial/Industrial Land Use or a full-time, occupational, employee usage is likely to be a reasonable assumption where a site is, will be, or may be used for full-time commercial/industrial receptors without land use controls based upon shorter duration time exposures defined in the Military Training exposure assumptions and will provide protectiveness for on-site permanent and repeat users of the AOC/MRS.

ARNG-ILE Cleanup

SUBJECT: FINAL TECHNICAL MEMORANDUM: Land Uses and Revised Risk Assessment Process for the Ravenna Army Ammunition Plant (RVAAP) Installation Restoration Program, Portage/Trumbull Counties, Ohio.

6. Amended Process Information:

a. The Representative Receptors for the Unrestricted Land Use and Military Training Land Use are the Resident Receptor (Adult and Child), formerly called Resident Farmer, and the National Guard Trainee Receptor, respectively. The Representative Receptor for the Commercial/Industrial Land Use is the Composite Worker Receptor on which the USEPA's Industrial RSLs are based. The Composite Worker Receptor will be called the Industrial Receptor and will represent a Fulltime Occupational Exposure Receptor at the former RVAAP/Camp Ravenna.

b. The Exposure Factors and details of how these Exposure Parameters are used in each of the Intake Equations for the FWCUGs are not discussed in this Memorandum but can readily be found in the FWCUG Report or the FWHHRAM. The exposure parameters for the Industrial Receptor from the USEPA's Industrial RSLs can be found here: [http://www.epa.gov/reg3hwmd/risk/human/rb-concentration\\_table/usersguide.htm](http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/usersguide.htm) US EPA's Industrial RSLs can be found here: <http://www.epa.gov/region09/superfund/prg/> and should be the current values at the time the risk assessment is completed. The FWCUGs (FWCUG Report) for the Resident Receptor and the National Guard Trainee should be used for documents currently in preparation at the time this Memorandum is approved. Documents initiated after the approval of this Memorandum should use FWCUGs based on the toxicity values available in the USEPA's Integrated Risk Information System (IRIS) at the time the risk assessment is completed.

c. Chemicals of Potential Concern (COPCs) and Chemicals of Concern (COCs) will be determined using the FWCUGs and USEPA RSLs for the appropriate carcinogenic and non-carcinogenic endpoints (excess lifetime cancer risk and cumulative hazard, respectively). The FWCUGs for the Resident Receptor are used when assessing the Unrestricted (Residential) Land Use. The National Guard Trainee's FWCUGs are used when assessing the Military Training Land Use. The USEPA's Industrial RSLs are used when assessing the Commercial/Industrial Land Use.

(1) COPCs are determined using the carcinogenic risk level of  $1 \times 10^{-6}$ . The USEPA RSLs for excess lifetime cancer risks are reported as Target Risks (TR) for the  $1 \times 10^{-6}$  risk level. The FWCUGs are reported as Cancer Risks (CR) of  $1 \times 10^{-6}$ .

ARNG-I LE Cleanup

SUBJECT: FINAL TECHNICAL MEMORANDUM: Land Uses and Revised Risk Assessment Process for the Ravenna Army Ammunition Plant (RVAAP) Installation Restoration Program, Portage/Trumbull Counties, Ohio.

(2) COPCs for non-carcinogenic effects are determined using the 0.1 hazard quotient (HQ). The FWCUGs are reported as an HQ = 0.1 and the non-carcinogenic risks for USEPA's RSLs are reported as a Target Hazard Quotient (THQ) of 0.1 and 1.0 for non-carcinogenic endpoints. The THQ of 0.1 should be used to determine COPCs.

(3) COCs are determined using the carcinogenic risk level of  $1 \times 10^{-5}$ . The USEPA RSLs for excess lifetime carcinogenic risks are reported as Target Risks (TR) for the  $1 \times 10^{-6}$  risk level. For the  $1 \times 10^{-5}$  level. The FWCUGs are reported as Cancer Risks (CR) of  $1 \times 10^{-6}$  and the determination of COCs using USEPA's RSLs, the ( $1 \times 10^{-6}$ ) TR must be adjusted to the  $1 \times 10^{-5}$ . The CR of  $1 \times 10^{-5}$  should be used to determine COCs. If multiple carcinogenic COCs are identified at an AOC/MRS, then a multiple chemical evaluation (Sum of Ratios approach described in the FWCUG Position Paper) must be made prior to final determination of cumulative risk goals for the AOC/MRS.

(4) COCs for non-carcinogenic effects are determined using the 1.0 HQ. The FWCUGs are reported as an HQ = 1.0 and the non-carcinogenic risks for USEPA's RSLs are reported as a Target Hazard Quotient (THQ) of 0.1 and 1.0 for non-carcinogenic endpoints. The THQ of 1.0 should be used to determine COCs. If multiple non-carcinogenic COCs are identified at an AOC/MRS, then a multiple chemical evaluation (Sum of Ratios approach described in the FWCUG Position Paper) must be made prior to final determination of cumulative non-carcinogenic hazard goals for the AOC/MRS.

(5) A multiple chemical evaluation is required for all COCs to ensure the cumulative hazard and risk goals are met at the AOC/MRS. Multiple chemical evaluations should be completed following process outline in the USACE's 2012 Position Paper. Cumulative risk and hazard goals for multiple chemical evaluations are based upon the values for the determination of COCs presented in subparagraphs 3 and 4, under Paragraph 6.c.

ARNG-I LE Cleanup

SUBJECT: FINAL TECHNICAL MEMORANDUM: Land Uses and Revised Risk Assessment Process for the Ravenna Army Ammunition Plant (RVAAP) Installation Restoration Program, Portage/Trumbull Counties, Ohio.

d. Exposure Point Concentrations (EPCs) for each AOC/MRS will initially be compared to Residential FWCUGs to determine if No Further Action (NFA) can be identified as a possibility prior to conducting the FS. If an AOC/MRS fails to meet the Unrestricted (Residential) Land Use, then a FS will be completed that evaluates cleanup options for all three land use scenarios (i.e., Residential, Industrial and Military Training). Remedial alternatives for meeting each Land Use are to be evaluated per the current guidelines for selecting a remedy for the AOC/MRS. The preferred remedy is one that would meet Unrestricted Land Use (e.g., residential). Remedial Investigations/Feasibility Studies in progress at the time of this Memorandum's approval will not be revised to include an evaluation of the Commercial/Industrial Land Use as an Alternative, if it achieves NFA (Unrestricted (Residential) Land Use).

e. Remedies other than those based on Unrestricted (Residential) Land Use will require LUCs, operation and maintenance plans and Five Year Reviews. Land use controls (e.g., use restrictions) for Commercial/Industrial Land Use are readily available. Specifics on the land use restrictions for military training have not yet been developed.

f. Note that the former RVAAP/Camp Ravenna AOCs/MRSs have been divided into media-specific areas, therefore; other AOCs/MRSs may need to be considered when developing LUCs and final remedial strategies.

7. Implementation:

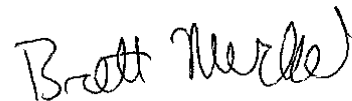
a. The current baseline risk assessment process using the FWCUGs will continue to be followed as described in the US Army's Position Paper (June 2009 and revised version January 2012) for the evaluation of Unrestricted Land Use and Military Training Land Use with the exceptions described in this Memorandum. The evaluation of the additional Commercial/Industrial Land Use using the USEPA's Industrial RSLs will be completed to assess the potential of an AOC or MRS to be used for fulltime occupational activities. The use of USEPA's Industrial RSLs for the Commercial/Industrial Land Use will parallel the process described in the FWCUG Position Paper whenever the Commercial/Industrial Land Use is included in an evaluation. This will be implemented for all current documents to be submitted to the Ohio EPA from the point this Memorandum is approved by Ohio EPA.

ARNG-I LE Cleanup

SUBJECT: FINAL TECHNICAL MEMORANDUM: Land Uses and Revised Risk Assessment Process for the Ravenna Army Ammunition Plant (RVAAP) Installation Restoration Program, Portage/Trumbull Counties, Ohio.

b. For AOCs or MRSs with Record of Decisions (RODs) already in place, the CERCLA Five Year Review will be the appropriate time to evaluate whether the remedy is protective for the applicable receptors.

c. This Memorandum replaces the Army's White Paper on Land Use and supersedes all previous versions (and their associated comments) of the Technical Memorandum.



Brett A. Merkel  
RVAAP Restoration Manager  
Army National Guard Directorate

cc: Rod Beals, Ohio EPA, DERR-NEDO  
Kevin Sedlak, ARNG, Camp Ravenna  
Katie Tait, OHARNG, Camp Ravenna  
Glen Beckham, USACE Louisville  
Gail Harris, Vista Sciences