

7 July 2004

MEMORANDUM FOR RECORD

Subject: Rationale for building/structural cleanup and the derivation of DCGLs at the North St. Louis County Sites

1. This memorandum provides the rationale for "Derivation of Site-Specific Derived Concentration Guideline Levels (DCGLs) for North County Structures" (25 Jun 04 draft) and the proposed removal of contamination above the DCGLs on structures within the North St. Louis County sites under the Formerly Utilized Sites Remedial Action Program (FUSRAP) sites. The purpose of this memorandum is to facilitate public involvement in the selection of a final remedy for the North St. Louis County sites by providing additional information relevant to contamination that may be found on structure surfaces.
2. Although the *Feasibility Study for the St Louis North County Site* (USACE, 2003) (Feasibility Study) addresses the use of applicable or relevant and appropriate requirements (ARARs) to derive DCGLs for structures, it neither included the actual, radionuclide-specific values nor provided the detailed technical basis for the DCGLs. A presentation, open to the public, was made to the Oversight Committee to inform them of the information as it concerned structures and similar information was made available through the newsletter and web site. Notwithstanding these efforts to involve and inform the public, the document in which DCGLs were developed ["Derivation of Site-Specific Derived Concentration Guideline Levels (DCGLs) for North County Structures" (25 Jun 04 draft)] will be released to the public for review and comment as required to assure public involvement in the CERCLA process. The public review and comment period will be thirty (30) days. Upon conclusion of the public review period, public comments will be fully considered, the Derived Concentration Guideline Levels (DCGLs) for the North County Structures will be finalized and appropriate provisions will be incorporated into the Record of Decision consistent with responses to public comments.
3. Contamination of structures commonly occurs coincidental to radiological operations as a direct result of soil contamination that is located adjacent to such structures. Previous investigations, including the Radiological Characterization Report for the Futura Coatings Site (BNI, 1987), the Remedial Investigation Report of the St Louis Site (BNI, 1994) and the Feasibility Study/Environmental Impact Statement for the St Louis Site (DOE, 1994), have assessed the existence of contamination in and on structures within the St. Louis sites for comparison with DOE guidelines. Investigations of structures present within the North St Louis County sites indicate that above background concentrations of radionuclides are present on some portions of structures. Elevated levels of site radiological contaminants were detected: 1) on the roof, roof vents, west wall and bay area of the structure at VP-2L; 2) under portions of the St Denis Bridge; 3) adjacent to and under portions of foundations of Futura buildings and structures; 4) adjacent to footings for the McDonnell Blvd bridge over Coldwater Creek; and 5) on ledges and equipment etc. inside Futura Coatings buildings. Given the known existence of above background

concentrations of radiological COCs on structures within the North St Louis County sites and the lack of CERCLA screening levels for radiological contamination on structures, DCGLs were derived for the residential scenario pursuant to ARARs [Title 10 Code of Federal Regulations (CFR) 40, Appendix A, Criterion 6(6) and 40 CFR 192, Sections 192.12, 192.20 and 192.21]. Specifically, 40 CFR 192 (and 10 CFR 40) establish a limit of 5 and 15 pCi/g above background in each 100 square meter area as the limit for radium-226 in surface and subsurface soil, respectively. 10 CFR Part 40, Appendix A, Criterion 6(6) provides that "Byproduct material containing concentrations of radionuclides other than radium in soil, and surface activity on remaining structures, must not result in a total effective dose equivalent (TEDE) exceeding the dose from cleanup of radium contaminated soil to the above standard (benchmark dose), and must be at levels which are as low as is reasonably achievable." A benchmark dose is the dose that is found to be equivalent to 40 CFR 192 cleanup standards for Ra-226 of 5 picocuries per gram (pCi/g) surface and 15 pCi/g subsurface, using modeling. Given the absence of multiple contaminants and multiple pathways, compliance with these ARARs is considered to be protective of human health and the environment. (40 CFR §300.430).

4. The DCGLs for structures within the North St. Louis County sites were based on the dose for the residential scenario in Appendix D, Table D-11 of the Feasibility Study. The dose was constrained to 15 mrem per year pursuant to Environmental Protection Agency (EPA) guidance to assure protectiveness of human health and the environment and to facilitate regulator acceptance. The impact of the cost of the overall project due to the DCGLs based on 15 mrem per year is not anticipated to be significant due to the small number of structures likely to be impacted. An evaluation was performed to determine the likely limiting scenario for North St Louis County structures. Four receptors were considered during this evaluation: an industrial worker, a renovation worker, a building resident, and a post-demolition on-site resident. Although the building resident scenario was considered, it was not the limiting scenario in that potentially contaminated commercial buildings would require extensive renovation for conversion into residential properties such that any existing contamination would be removed concurrent with such renovation. Consequently, the Building Occupancy - Industrial Scenario represents the reasonable maximum exposure and is the basis for establishing DCGLs. RESRAD-Build Version 3.1 was used to calculate DCGL concentrations for long-term and full-time employees (industrial worker) by using parameter values primarily from EPA and Nuclear Regulatory Commission (NRC) guidance.

5. Proposed remedial goals (DCGLs) are as follows in units of disintegrations per minute per 100 square centimeters of surface area: Ac-227 - 400; Pa-231 - 231; Ra-226 - 15000; Ra-228 - 7700; Th-230 - 6900; Th-232 - 1300; U-234 - 17000; U-235 - 16000; and U-238 - 19000. Each of the isotopic DCGLs will be considered with sum of the ratios based on the activity fraction of each radionuclide present in a given area. If an area had equal amounts of U-238 and Th-230, the gross alpha DCGL would be calculated by summing half of each of the respective DCGLs for these isotopes. [The equation for use in calculating gross alpha and beta DCGLs is stated in Section 5,

"Derivation of Site-Specific Derived Concentration Guideline Levels (DCGLs) for North County Structures"]

6. Relevant provisions contained within the Feasibility Study for the St Louis North County Site discussing contamination on structure surfaces include:


a. The Feasibility Study addresses these structures when discussing the Applicable or Relevant and Appropriate Requirements (ARARs). The ARARs that apply are 40 CFR 192, Sections 192.12, 192.20 and 192.21 and 10 CFR 40 Appendix A Criterion 6(6). These regulations provide standards for the remediation of uranium and thorium mill tailings sites and are relevant and appropriate for the North St. Louis County Sites.

b. Section 2.2.2 of Appendix D of the Feasibility Study notes that "10 CFR Part 40 Appendix A was developed to provide a clear and consistent regulatory basis for determining the extent to which soils and buildings are to be remediated" (emphasis added). Table D-11 of the Feasibility Study defines the soil concentrations equating to benchmark doses for relevant scenarios and the associated benchmark doses. The Feasibility Study also states "Contamination on building surfaces must be limited to concentrations that would produce the benchmark dose." (FS Section 3.3.2)

c. In Section 3.2.2, the Feasibility Study discusses 10 CFR 40, Appendix A, Criterion 6(6) and notes: "In July of 1999 the NRC amended Criterion 6(6) to include criteria for non-radium radiological contaminants in soils and radiological contaminants in buildings...The benchmark also applies to building surfaces. Contamination on building surfaces must be limited to the concentrations that would produce the benchmark dose."

7. For the purpose of addressing contamination on structures within the North St. Louis County sites, structures include (but are not limited to): buildings and portions of buildings, including roof areas and foundations; footings, retaining walls, and stop logs; piping and ducting; utility poles; bridges and supporting structures; pavement; consolidated material to be left in place, and other similar items where surficial contamination is of concern.

8. Impacted structures within the North St. Louis County sites will be fully investigated using procedures that are compatible with the Multi-Agency Radiation Site Survey and Investigation Manual (MARSSIM) as necessary to document attainment of DCGLs as specified in the Record of Decision and final version of the "Derivation of Site-Specific DCGLs for North County Structures". When required, removal of contamination above DCGLs may consist of any of a variety of methods. Decontamination methods may include, but are not limited to, use of sand, grit, or other media blasting, washing, hydrolazing, scabbling, or removal and disposal of contaminated portions of structures.


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