

**NUCLEAR REGULATORY COMMISSION  
FINDING OF NO SIGNIFICANT IMPACT RELATED TO  
APPROVAL OF THE MALLINCKRODT C-T PHASE 2 DECOMMISSIONING PLAN  
MALLINCKRODT, INC.  
ST. LOUIS, MISSOURI  
LICENSE NO. STB-401, DOCKET NO. 40-6563  
[NRC-201-0241]**

The U.S. Nuclear Regulatory Commission (NRC) is considering approval of the Mallinckrodt Inc. (Mallinckrodt or the licensee) columbium-tantalum (C-T) Phase 2 Decommissioning Plan (DP), Revision 2, originally submitted to NRC in May 2003, and resubmitted on October 14, 2008 (ML083150652) with revisions on June 3, 2010 (ML101620140). In the DP, Mallinckrodt is proposing to decommission grade-level and below-grade building slabs, paved surfaces, and subsurface materials affected by former C-T operations, at its St. Louis site. If properly implemented, the DP will lead to the successful remediation of the C-T areas, their release for unrestricted use, and the termination of License STB-401.

Below is a summary of the Environmental Assessment (EA) prepared by the staff to support approval of Mallinckrodt's Phase 2 DP. The complete EA is available through NRC's Agencywide Documents Access and Management System (ADAMS), Accession No. ML091960322.

**ENVIRONMENTAL ASSESSMENT**

Introduction

Mallinckrodt has been operating at the St. Louis Plant since 1867 producing various products including metallic oxides and salts, ammonia, and organic chemicals. From 1942 to 1957, Mallinckrodt was under contract with the Manhattan Engineering District and the Atomic Energy Commission (MED-AEC) to process uranium ore to produce uranium for development of

atomic weapons. In 1961, pursuant to 10 CFR Part 40, Mallinckrodt was issued a source material license (License No. STB-401) authorizing the possession and use of materials containing uranium and thorium isotopes. Under this license, from 1961 to 1987, Mallinckrodt extracted C-T from natural uranium ores and tin slags, and purchased and processed materials for C-T production.

Radiological contamination at the site resulted from MED-AEC and C-T processing activities. MED-AEC contamination is being remediated by the U.S. Army Corps of Engineers (USACE) under the Formerly Utilized Sites Remedial Action Program (FUSRAP). USACE developed a preferred cleanup approach for the MED-AEC contamination, based on the data and findings presented in four documents: (1) Remedial Investigation Report; (2) Baseline Risk Assessment; (3) Initial Screening of Alternatives, and (4) Feasibility Study.

#### Purpose and Need for the Proposed Action

Mallinckrodt has requested that NRC approve the Phase 2 DP, to support the eventual termination of License No. STB-401. Before the license can be terminated, NRC must be assured that the areas of the Mallinckrodt facility associated with the C-T project meet NRC's release criteria stated in 10 CFR Part 20.1402.

Mallinckrodt elected to decommission the C-T project areas of the site in two phases. In Phase 1, Mallinckrodt decommissioned the buildings and equipment to the extent necessary, to meet NRC's criteria for unrestricted release. Phase 1 of the decommissioning project was completed in February 2007. Phase 2 will include the remediation of the building slabs and foundations, paved surfaces, and all subsurface materials to the extent necessary, to meet NRC's unrestricted release criteria.

#### Proposed Action

The ultimate goal of the C-T project decommissioning is to remediate those areas of the site associated with C-T production, to the extent necessary, to terminate License STB-401.

Phase 2 decommissioning activities will include the remediation of the building slabs and foundations, paved surfaces, and all subsurface materials. Most of the decommissioning activities will take place in Plant 5. However, the wastewater neutralization basins in Plant 7W will also be decommissioned.

Mallinckrodt will conduct its non-NRC licensed activities while decontamination and remediation are performed. Mallinckrodt selected the following decommissioning strategy: (1) remediate remaining floor slabs and subsurface soils and systems by decontamination or excavation and disposal followed by a final status survey (FSS); (2) remediate former wastewater neutralization basins by decontamination or demolition and disposal followed by FSS where appropriate; and (3) remediate sewer systems affected by the C-T operations. Mallinckrodt has committed to conducting a FSS consistent with the approach presented in the Multi – Agency Radiation Survey and Site Investigation Manual, to the extent possible.

Mallinckrodt will determine whether decontamination and FSS of individual materials in place is preferred over excavation and offsite disposal. The Phase 2 DP is based on the following preferences: (1) excavation or demolition and disposal when it is cost-effective; (2) decontamination when it is judged to be cost-effective compared to disposal; and (3) decontamination or removal of selected contaminated areas of pavement and subsurface material to site specific derived concentration guideline levels (DCGLs), to reduce the volume of waste and therefore minimize the cost of disposal.

#### Alternatives to the Proposed Action

The remediation approach proposed by Mallinckrodt provides for the systematic remediation of the C-T process areas at the Mallinckrodt site. This approach provides Mallinckrodt the opportunity to remove contaminated subsurface C-T process material from the site, and release C-T process areas for unrestricted use. The “no action” alternative is the only alternative to the proposed action. The “no action” alternative is not acceptable because the C-T

process areas contain residual contamination that presently exceeds NRC's criteria for unrestricted release and these areas must be remediated to protect public health and safety upon ceasing operations under 10 CFR Part 40 requirements.

### Affected Environment

As stated in the Introduction, MED-AEC contamination at Mallinckrodt facility is being removed by USACE under FUSRAP. USACE developed a preferred cleanup approach for the MED-AEC contamination, based on the data and findings presented in four documents: (1) Remedial Investigation Report; (2) Baseline Risk Assessment; (3) Initial Screening of Alternatives, and (4) Feasibility Study.

Section 2.2 of the Feasibility Study provides an evaluation of the affected environment surrounding the Mallinckrodt facility. The findings in Section 2.2 of the Feasibility Study also apply to remediation of the C-T process areas and the Feasibility Study is incorporated by reference. The following issues are addressed in the Feasibility Study: (1) land use and recreational and aesthetic resources; (2) climatology, meteorology, and air quality; (3) geology and soils; (4) water resources; (5) biological resources; (6) threatened and endangered species; (7) wetlands and flood plains; (8) population and socioeconomics, and (9) historical, archeological, and cultural resources.

### Environmental Impacts

Remediation of the C-T process area subsurface material creates a potential for radiological environmental impacts. Radiological environmental impacts that could result from remediation activities include exposure, inhalation, and ingestion hazard to workers and the public. These hazards could occur during the excavation of floor slabs and foundations, soil, and sewerage.

Mallinckrodt has committed to perform work activities in accordance with a Health and Safety Program as described in Section 3 of the DP. The Health and Safety Program will

consist of: (1) an Industrial Safety Program; (2) a Radiation Protection Program, and (3) an Environmental Safety Program. The Radiation Protection Program will contain controls to monitor exposures to workers. Action levels have been established based on 10 CFR 20, Appendix B. If action levels are exceeded, Mallinckrodt will take corrective action, as necessary. The Radiation Protection Program will keep exposures due to ingestion and inhalation as low as is reasonably achievable (ALARA) by controlling and monitoring airborne releases in work areas, and by utilizing respiratory protection, as necessary.

Mallinckrodt will implement an Environmental Safety Program to monitor air and water effluents discharged during decommissioning. Mallinckrodt will routinely collect samples or take measurements at locations on-site, site boundaries, and off-site, to determine the extent of environmental discharges during remediation. Environmental sampling stations will collect continuous samples during demolition and decontamination activities to verify that there are no significant adverse impacts to workers or the public. NRC staff will evaluate implementation of the Environmental Safety Program during routine inspections to ensure that Mallinckrodt is adequately monitoring effluent releases.

Mallinckrodt has committed to minimize the production of contaminated liquids. Phase 2 decommissioning activities will not involve the use of significant chemicals requiring treatment and disposal. Mallinckrodt expects minimal use of water for dust control during soil remediation and demolition of paved surfaces. Mallinckrodt will not generate free water during dust control. The most likely source of potentially contaminated liquids is stormwater from active remediation areas. Stormwater may contain contaminated soil particles. Soil management activities will minimize the exposure of contaminated soils to stormwater. Stormwater in active remediation areas will be collected and stored in temporary, above ground tanks. Collected water will be sampled and filtered, as necessary, to remove the solids, and analyzed to estimate the concentration in the water. The concentration will be compared with 10 CFR Part 20,

concentration limits, and the total inventory discharged will be calculated. All contaminated liquids will be disposed to the Metropolitan St. Louis Sewer District (MSD) following confirmation that MSD specifications for sampling, analysis, and pre-treatment have been met.

Mallinckrodt has also committed to monitor direct radiation using thermoluminescent dosimeters (TLDs). TLDs will be placed at various locations around the perimeter of the restricted area to ensure that direct radiation in unrestricted areas does not exceed the limits specified in 10 CFR 20.1301.

Mallinckrodt has established action levels for air and water effluents based on the levels provided in 10 CFR 20, Appendix B, Tables 2 and 3. The action levels for environmental air, effluent water, and sewage are 0.75, 0.6, and 0.6, of the limits, respectively. If action levels are exceeded, Mallinckrodt will take corrective actions.

The Mallinckrodt site is located in an area, which is completely developed with no pre-settlement vegetation existing. Land use within a one-mile radius from the site is a mixture of commercial, industrial, and residential. Commercial or industrial properties in the area include McKinley Iron Company, Thomas and Proetz Lumber Company, and several railroad properties. The USACE Feasibility Study states that there is no sign of federal or state designated endangered or threatened species present at the Mallinckrodt facility. The Feasibility Study also states that the Mallinckrodt facility does not contain any historic buildings. Further, available data indicate that there are no archeological sites in the area.

NRC staff previously performed an environmental justice review of the Mallinckrodt site for Phase 1 decommissioning activities. That review concluded that Phase 1 decommissioning activities would result in an insignificant risk to the public health and safety, and the human environment (see ML021230256). Because the scope of Phase 2 decommissioning activities is similar to the Phase 1 activities, no environmental justice impacts are expected from the proposed action.

Air quality and noise impacts will result from excavation and transport of waste. Mallinckrodt will use appropriate dust control measures during excavation. These activities will be sporadic in nature and short in duration, and therefore, will have minimal impact on the surrounding community and environment.

The Mallinckrodt site can be serviced by road, rail, and river barge. Interstate 70 (east and west) can be accessed within one mile from the site. Rail lines from the Chicago, Burlington and Quincy Railroad, the Norfolk and Western Railroad, and the St. Louis Terminal Railroad Association, transect the Mallinckrodt site from north to south. Any waste to be disposed of offsite will be transported from the site by rail. Mallinckrodt estimates that the volume of waste to be transported will be approximately 59,100 ft<sup>3</sup>. This volume of waste will require less than 50 rail cars over an 18-month time period. Therefore, the impact of transporting waste from the site will be insignificant.

#### Agencies and Persons Consulted and Sources Used

Much of the information contained in the EA was taken directly from the Mallinckrodt DP and the USACE Feasibility Study. In preparation of the Feasibility Study, USACE consulted with the U.S. Fish and Wildlife Service and the State Historic Preservation Office. Since Phase 1 decommissioning activities will be occurring at the same site where similar USACE actions are also occurring, but with a much more limited scope, NRC has utilized the input of the U.S. Fish and Wildlife Service and the State Historic Preservation Office by reference to the Feasibility Study. NRC staff provided a draft of the EA to the State of Missouri for review.

#### Conclusion

Radiological exposures to workers and the public will be in accordance with 10 CFR Part 20 limits and will be ALARA. NRC finds that the DP contains sufficient controls to keep potential doses to workers and the public from direct exposure, airborne material, and released effluents, below the 10 CFR Part 20 dose limits. The staff also finds that the remediation alternative

proposed by Mallinckrodt minimizes the potential dose to workers and members of the public, and other environmental impacts.

#### List of References

1. Mallinckrodt Chemical, Inc., Mallinckrodt C-T Decommissioning Project, C-T Phase II Decommissioning Plan, Revision 2, October 14, 2008, (ADAMS No. ML083150652).
2. U.S. Army Corps of Engineers, Proposed Plan for the St. Louis Downtown Site, April 1998.
3. U.S. Army Corps of Engineers, Feasibility Study for the St. Louis Downtown Site, April 1998.
4. NRC, Policy and Guidance Directive FC 83-23, "Termination of Byproduct, Source, and Special Nuclear Material Licenses," November 1983.
5. NRC, 10 CFR Part 20, "Radiological Criteria for License Termination: Final Rule," July 1997.
6. NRC, Environmental Assessment Related to the Approval of the Mallinckrodt C-T Phase 2 Decommissioning Plan, for Mallinckrodt Inc., St. Louis, Missouri, June 2009, (ADAMS No. ML091960322).

#### FINDING OF NO SIGNIFICANT IMPACT

Pursuant to 10 CFR Part 51, NRC has prepared an EA related to the approval of Mallinckrodt's DP. On the basis of that EA, NRC has concluded that the proposed NRC action would not have any significant affect on the quality of the human environment and does not warrant the preparation of an Environmental Impact Statement. Accordingly, it has been determined that a Finding of No Significant Impact is appropriate.

Since the EA finds that the remediation of the C-T project areas of Mallinckrodt's site represents no significant risk to the public health and safety, and the human environment, NRC concludes that there are no environmental justice issues associated with the proposed



remediation activities.

The aforementioned documents related to this proposed action are available for public inspection and copying at NRC's Public Document Room at One White Flint North, 11555 Rockville Pike, Rockville, MD 20852-2738.

FOR FURTHER INFORMATION CONTACT

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Dated at Rockville, Maryland, this 24 day of June 2010.

FOR THE NUCLEAR REGULATORY COMMISSION

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