

**NUCLEAR REGULATORY COMMISSION**

**DOCKET NO. 030-10716**

**NOTICE OF ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT  
IMPACT RELATED TO THE ISSUANCE OF A LICENSE AMENDMENT TO BYPRODUCT**

**MATERIAL LICENSE NO. 24-16273-01, FOR THE  
SIGMA-ALDRICH COMPANY, ST. LOUIS, MISSOURI**

**[NRC-2008-0662]**

**AGENCY: Nuclear Regulatory Commission.**

**ACTION:** Issuance of Environmental Assessment and Finding of No Significant Impact for License Amendment.

**FOR FURTHER INFORMATION CONTACT:** Mike McCann, Senior Health Physicist, Materials Control, ISFSI, and Decommissioning Branch, Division of Nuclear Materials Safety, Region III, U.S. Nuclear Regulatory Commission, 2443 Warrenville Road, Lisle, Illinois 60532; telephone: (630) 829-9856.

**SUPPLEMENTARY INFORMATION:**

**I. Introduction**

The U.S. Nuclear Regulatory Commission (NRC) is considering the issuance of an amendment to amend NRC Byproduct Materials License No. 24-16273-01, which is held by The Sigma-Aldrich Company (licensee). The issuance of the amendment would approve the licensee's decommissioning plan (DP) (ML083010187), which describes decommissioning activities that will be performed at the licensee's Fort Mims Facility located at 11542 Fort Mims Drive, City of Maryland Heights, Missouri (the Facility).

The NRC has prepared an Environmental Assessment (EA) in support of this proposed action in accordance with the requirements of Title 10, Code of Federal Regulations (CFR),

Part 51 (10 CFR Part 51). Based on the EA, the NRC has concluded that a Finding of No Significant Impact (FONSI) is appropriate with respect to the proposed action. The amendment will be issued to the licensee following the publication of this FONSI and EA in the Federal Register.

## **II. Environmental Assessment**

### **Identification of Proposed Action**

On October 22, 2008, the licensee notified the NRC that it had permanently ceased operating activities at the Facility, and provided a decommissioning plan (DP) (ML083010187) for NRC approval to authorize decommissioning activities in accordance with the requirements of 10 CFR 30.36 (g). The NRC issued a Federal Register Notice (FRN), announcing Sigma-Aldrich Company's license amendment request, and providing opportunity to request a hearing. 73 FR 79520 (Dec. 29, 2008). No hearing requests were submitted.

On December 10, 2008, and March 11, 2009, after review of the licensee's DP, the NRC staff requested additional information (ML090150318 and ML090770368, respectively), which resulted in revisions to the DP, (ML090500166, ML083510270, and ML090850311, respectively). The licensee proposes to decommission the Fort Mims Facility to permit the release of the site for unrestricted use, as governed by the License Termination Rule (LTR), Subpart E of Title 10 of the Code of Federal Regulations (CFR) Part 20.1402 "Radiological Criteria for Unrestricted Use."

The NRC approved the licensee's Fort Mims Facility as an approved location of use on November 11, 1974. The NRC issued license no. 24-16273-01 to Pathfinder Laboratories authorizing the possession of carbon-14 and hydrogen-3 for synthesis of labeled compounds for commercial distribution at the Fort Mims Facility. On July 22, 1987, the NRC issued Amendment No. 08 to License 24-16273-01, changing the licensee name and ownership of the Fort Mims Facility from Pathfinder Laboratories to Sigma Chemical Company. NRC License Amendment 15, dated March 13, 2002, changed the name from Sigma Chemical Company to

Sigma-Aldrich Company. The licensee is currently operating under Radioactive Materials License Amendment No.16, with an expiration date of March 31, 2012.

The Fort Mims Facility is approximately 3.3 miles east southeast and 16 miles west of the city center of the city of St. Louis, Missouri. The population of the cities of Maryland Heights and St. Louis are approximately 26,000 and 356,000, respectively. The Facility is bordered by Interstates 70 to the north, 270 to the west, 170 to the east, and 44 to the south. The current land use in the area is primarily industrial and urban components. Residential use of the Sigma-Aldrich site in the near future is considered unlikely due to local zoning restrictions. The facility was constructed in two phases beginning in the late 1960s. The Sigma-Aldrich Company expanded the original Pathfinder building in 1981 to its current configuration. The only effluent discharge points were via a facility exhaust stack, and a septic tank, which was buried under subsequent building additions. The use of the septic system stopped in July 1981 when the facility was connected to the Saint Louis Metropolitan Sewer district.

The licensee's decommissioning project will transition through four major phases. The first phase involves the remediation of the Fort Mims building, which will include removal of all office and laboratory materials and equipment, and ventilation and waste disposal systems. The second phase involves the demolition of the Fort Mims building down to the building slab, which won't occur until verification that the building meets the NRC's unrestricted use dose limits specified in 10 CFR Part 20, Section 20.1402. The third phase involves the licensee's decommissioning contractor performing soil borings to localize and characterize the nonfunctional septic tank. The contractor will remove the septic tank if characterization data determines that the radiological levels in the soil in and around the septic tank are above the NRC unrestricted use limits specified in NUREG-1757, Vol. 2, Appendix H, "Screening Values pCi/g of Common Radionuclides for Soil Surface Contamination Levels" (ML053260027). The final phase is the conduct of the final status survey. The licensee projects that the total remediation and decommissioning time will require approximately 12 weeks after the licensee's

decommissioning contractor has mobilized to the site.

The licensee's objective for the decommissioning project, as described in the DP, is to remediate residual contamination in affected buildings or any other areas sufficiently to enable unrestricted use, while ensuring exposures to occupational workers and the public during the decommissioning are maintained as low as reasonably achievable (ALARA). The Sigma-Aldrich Company's DP proposes to use Derived Concentration Guideline Levels (DCGLs) that are screening values developed by NRC (65 FR 37186, June 13, 2000) to demonstrate compliance with the radiological criteria for unrestricted use in 10 CFR 20.1402. The 10CFR20.1402 criteria specifies that the Total Effective Dose Equivalent (TEDE) received by an average member of the critical group from residual radioactivity can not exceed 25 mrem per year (mrem/y) and that the residual radioactivity has been reduced to levels that are as low as reasonably achievable (ALARA). Two radionuclides (carbon-14 and hydrogen-3) were identified as relevant to the decontamination activities at the Fort Mims Facility and site. The areas being released under this decommissioning effort will be surveyed in accordance with the guidance contained in the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), NUREG-1575 (ML082470583).

The licensee established in the DP a commitment to use a lower administrative dose limit of 10 mrem/y as the basis for determining the site release criteria for decontamination and decommissioning of the Facility. To achieve this goal, the licensee committed to limiting contamination levels on building surfaces to approximately forty per cent of the NRC default screening values specified in NUREG-1757, Volume 2, Appendix H. The acceptable screening levels for unrestricted release for carbon-14 and hydrogen-3, specified in Appendix H are  $3.7 \text{ E}+6$  and  $1.2\text{E}+8$  disintegrations per minute per 100 centimeters squared (dpm/100 cm<sup>2</sup>), respectively. The licensee's administrative limits for carbon-14 and hydrogen-3 are  $1.48 \text{ E}+6$  and  $4.8 \text{ E}+7$  dpm/100 cm<sup>2</sup>, respectively.

For evaluation and release of surface soils, the licensee provided DCGL values for carbon-14 and hydrogen-3, the only 2 radionuclides identified as potential soil contaminants for the Fort Mims site. Using the screening analysis approach, the DCGLs for carbon-14 and hydrogen-3 were taken directly from Appendix H of NUREG-1757, Vol. 2, Table H.2. The default screening values were 12 and 110 picocuries per gram (pCi/g) for carbon-14 and hydrogen-3, respectively. As with the building surface DCGL values each of the above default surface soil DCGL values represents the activity equivalent to a dose of 25 mrem/year.

### **Need for the Proposed Action**

The purpose of the proposed action is to reduce residual radioactivity at the Sigma-Aldrich Company's Fort Mims Facility and site to a level that permits release of the property for unrestricted use. The NRC is fulfilling its responsibility under the Atomic Energy Act to make a decision on a proposed action for decommissioning that ensures protection of the public health and safety and the environment. The application for license amendment and NRC approval is necessary for the licensee to proceed with the decommissioning activities as required by the timeliness requirements of 10 CFR 30.36(g). A change to the current license is necessary, since no decommissioning activities are presently authorized.

### **Environmental Impacts of the Proposed Action**

The NRC staff has reviewed the decommissioning plan for the Sigma-Aldrich Company's Facility and examined the impacts of decommissioning. Based on its review, the staff has determined that the affected environment and the environmental impacts associated with this decommissioning action are bounded by the impacts evaluated by the "Generic Environmental Impact Statement in Support of Rulemaking on Radiological Criteria for License Termination of NRC-Licensed Nuclear Facilities" (NUREG-1496). Additionally, no non-radiological impacts were identified. The staff also finds that the proposed decommissioning of the Sigma-Aldrich Company's Fort Mims site is in compliance with 10 CFR 20.1402, the radiological criteria for unrestricted use.

Contamination controls will be implemented during decommissioning to prevent airborne and surface contamination from escaping the remediation work areas, and therefore, no release of airborne contamination is anticipated. However, the potential will exist for generating airborne effluents during removal and handling of contaminated materials. If produced, any effluents from the proposed decommissioning activities would be treated to meet the requirements in 10 CFR Part 20. Radioactive waste (e.g., HEPA filters, metals and concrete cuttings, etc.) will be containerized onsite pending shipment to a licensed radioactive waste treatment or disposal facility. No liquid effluents are expected to be generated during decommissioning.

The Sigma-Aldrich Company will use a decommissioning subcontractor to perform remediation activities at the Facility. The contractor will perform these activities under the authority of an NRC Agreement State license issued by the State of Massachusetts (Massachusetts Materials License No. 56-0543). The Sigma-Aldrich Company will oversee the activities and will maintain primary responsibility for the decommissioning project. The contractor has developed adequate radiation protection procedures and capabilities and will implement an acceptable program to keep exposure to radioactive materials ALARA. As noted above, Sigma-Aldrich Company has prepared a DP describing the work to be performed, and work activities are not anticipated to result in a dose to workers or the public in excess of the 10 CFR Part 20 limits. NRC's past experience with decommissioning activities at sites similar to the Sigma-Aldrich Company site indicate that public and worker exposure will be far below the limits in 10 CFR Part 20, "Standards for Protection Against Radiation."

### **Environmental Impacts of the Alternatives to the Proposed Action**

The no action alternative would leave the site in its existing condition without decommissioning, which would keep the licensed material onsite, without disposal. This alternative would increase the radiological risk to the local community and the environment. This alternative is not acceptable because it will result in violation of NRC's Timeliness Rule

(10 CFR 30.36), which requires licensees to remove licensed materials onsite during decommissioning of their facilities when licensed activities cease, and to request termination of their radioactive materials license.

### **Conclusion**

The NRC staff has concluded that the proposed action complies with 10 CFR Part 20 “Standards for Protection Against Radiation.” Further, the decommissioning of the Fort Mims Facility and site to the DCGLs proposed for this action reduces the residual contamination levels at the site, enabling release of the site for unrestricted use and will allow the termination of the radioactive materials license. The NRC does not expect any radiologically contaminated effluents to be released during the decommissioning. The occupational doses to decommissioning workers are expected to be low and well within the limits of 10 CFR Part 20. No radiation exposure to any member of the public is expected, and public exposure would therefore, also be less than the applicable public exposure limits of 10 CFR Part 20.

Because the proposed action will not significantly impact the quality of the human environment, the NRC staff concludes that the proposed action is the preferred alternative.

### **Agencies and Persons Consulted**

The NRC staff consulted with the Missouri Department of Health and Senior Services on December 1, 2008, regarding review of the DP, and on April 15, 2009, regarding this Environmental Assessment (EA) for the license amendment to authorize decommissioning activities. The State Department of Health and Senior Services is the State’s Radiation Protection Agency, and has been routinely informed of NRC’s intention to approve the completion of decommissioning at the Sigma-Aldrich Company Site. The State informed the NRC on April 15, 2009, that they had no comments on either the Sigma-Aldrich Company DP or EA.

The NRC staff consulted with the Missouri Department of Conservation, Wildlife Division, Endangered Species, on March 5, 2009, (ML090640890) as required by Section 7 of the

Endangered Species Act. The purpose of the call was to ensure that the licensing action is “not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of the habitat of such species”. The Missouri Wildlife Division staff indicated that based on their review and knowledge of current documents relating to possible endangered species that the decommissioning and release of the Sigma Aldrich Company building located in Maryland Heights, Missouri as discussed would not affect any endangered species.

The NRC staff consulted with the Missouri Department of Natural Resources, as required by Section 106 of the National Historic Preservation Act. The Act requires the NRC to meet certain requirements in the protection of cultural and historical resources. In a March 19, 2009 (ML090860375) letter from the Department of Natural Resource’s State Historic Preservation Office, Director and Deputy State Historic Preservation Officer, the State indicated that “We have reviewed the information provided concerning the above referenced project. Based on this review we concur that the Sigma Aldrich Chemical Company is not eligible for inclusion in the National Register of Historic Places. In our opinion, the property has been extensively disturbed, and there is little potential for the occurrence of archaeological sites. We concur that there will be no historic properties affected and we have no objection to the initiation of project activities.”

### **III. Finding of No Significant Impact**

The NRC staff has prepared this EA in support of the proposed action. On the basis of this EA, the NRC finds that there are no significant environmental impacts from the proposed action, and that preparation of an environmental impact statement is not warranted.

Accordingly, the NRC has determined that a Finding of No Significant Impact is appropriate.

### **IV. Further Information**

Documents related to this action, including the application for license amendment and supporting documentation, are available electronically at the NRC’s Electronic Reading Room at

<http://www.nrc.gov/reading-rm/adams.html>. From this site, you can access the NRC's Agencywide Documents Access and Management System (ADAMS), which provides text and image files of NRC's public documents. The documents related to this action are listed below, along with their ADAMS accession numbers.

If you do not have access to ADAMS, or if there are problems in accessing the documents located in ADAMS, contact the NRC Public Document Room (PDR) Reference staff at 1-800-397-4209, 301-415-4737, or by email to [pdr.resource@nrc.gov](mailto:pdr.resource@nrc.gov). These documents may also be viewed electronically on the public computers located at the NRC's PDR, O 1 F21, One White Flint North, 11555 Rockville Pike, Rockville, MD 20852. The PDR reproduction contractor will copy documents for a fee.

1. U.S. NRC, "Consolidated NMSS Decommissioning Guidance, Decommissioning Process for Materials Licensees," NUREG-1757:
  - Volume 1, Decommissioning Process for Materials Licensees (ML063000243)
  - Volume 2, Characterization, Survey, and Determination of Radiological Criteria (ML053260027)
  - Volume 3, Financial Assurance, Record Keeping, and Timeliness (ML032471471)
2. U.S. NRC, "Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)," NUREG-1575, Revision 1, August 2000 (ML082470583)
3. October 22, 2008, Letter from Sigma-Aldrich Company to NRC Region III, "Subject: Timely Notification of Cessation of Licensed Activities and Submittal of Decontamination and Decommissioning Plan" (ML083010187)
4. October 22, 2008, Document from Sigma-Aldrich Company to NRC Region III, "Subject: Sigma-Aldrich - Health Physics and Instrument Operations Procedures - Table of Contents" (ML083010203)

5. October 22, 2008, Document from Sigma-Aldrich Company to NRC Region III, "Subject: Sigma-Aldrich, Decommissioning Plan Checklist" (ML083010210)
6. October 23, 2008, NRC Region III Inspection Report for Sigma-Aldrich Company, "Subject: Form 591M IR 03010716-08-001 on 10/22-24/2008, Sigma-Aldrich Company" (ML083080152)
7. November 24, 2008, NRC Region III letter to Sigma-Aldrich Company, "Subject: Acknowledgement of Receipt of DP for the Fort Mims Facility and Acceptance for Technical Review for Amendment to License, Control No. 317645" (ML083450660)
8. December 10, 2008, NRC Region III Trip Report and Request for Additional Information (RAI) regarding Sigma-Aldrich Company, "Subject: December 10, 2008, Decommissioning Plan License Meeting and NRC RAI" (ML090150318)
9. December 15, 2008, Sigma-Aldrich Company letter to NRC Region III, "Subject: Request to NRC for Permission to Proceed with the Open Land Soil Sampling and Analysis Plan" (ML083510259)
10. December 15, 2008, Sigma-Aldrich Company letter to NRC Region III, "Subject: Notification of Revised Decommissioning Plan to Incorporate Phased Remediation" (ML083510270)
11. December 16, 2008, NRC Region III Inspection Report for Sigma-Aldrich Company, "Subject: Form 591M IR-03017016-08-002 on 12/10/08 & 12/11/08, Sigma-Aldrich Company" (ML083530478)
12. December 19, 2008, NRC Region III issued Federal Register Notice, "Subject: Notice of Amendment Request for Decommissioning of the Sigma-Aldrich Chemical Company's Fort Mims Facility, Maryland Heights, Missouri and Opportunity to Request a Hearing" (ML083430580)

13. January 23, 2009, NRC Region III letter to Sigma-Aldrich Company, "Subject: Approval for Sigma-Aldrich Fort Mims facility to proceed with Soil Sampling and Analysis Plan under authority of Philotechnics license" (ML090270093)
14. February 6, 2009, Sigma-Aldrich Company letter to NRC Region III, "Subject: Response to Request for Additional Information Regarding Staff Review of Decommissioning Plan Dated October 22, 2008" (ML090500166)
15. March 5, 2009, NRC Region III Telephone Conversation Record with State of Missouri Department of Conservation, "Subject: Consultation with State of Missouri Department of Conservation, Regarding Endangered Species" (ML090640890)
16. March 6 & 11, 2009, NRC Region III Telephone Conversation Record with Sigma-Aldrich Company, "Subject: Discussion Regarding Request for Additional Information Responses from Sigma-Aldrich for Review of Decommissioning Plan" (ML090770368)
17. March 19, 2009, State of Missouri Department of Natural Resources letter to NRC Region III, "Subject: Completion of the Section 106 Review for Sigma-Aldrich Decommissioning Project by the State Historic Preservation Office with No Findings of Historic Properties Affected" (ML090860375)

Dated at Lisle, Illinois, this 28<sup>TH</sup> day of April, 2009.

For the Nuclear Regulatory Commission,

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William G. Snell, Acting Chief  
Materials Control, ISFSI, and Decommissioning Branch  
Division of Nuclear Materials Safety  
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