

U.S. NUCLEAR REGULATORY COMMISSION  
DOCKET NO. 40-2377  
ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT RELATED  
TO THE APPROVAL OF THE ADJACENT LAND REMEDIATION PLAN FOR KAISER  
ALUMINUM & CHEMICAL CORPORATION,  
TULSA, OKLAHOMA  
LICENSE NO. STB-472 (TERMINATED)

The U.S. Nuclear Regulatory Commission (NRC) is considering approval of the Adjacent Land Remediation Plan (ALRP) for Kaiser Aluminum & Chemical corporation (Kaiser), Tulsa, Oklahoma (Kaiser, 1998), submitted to NRC on August 17, 1998. Kaiser is obligated to remediate the offsite property adjacent to their Tulsa, Oklahoma site to meet the release criteria established in the Action Plan to Ensure Timely Remediation of Sites Listed in the Site Decommissioning Management Plan (hereafter known as the SDMP Action Plan) (NRC, 1992).

## ENVIRONMENTAL ASSESSMENT

### Introduction:

On March 7, 1958, NRC issued Source Material License No. C-4012 to Standard Magnesium Corporation (Standard Magnesium), a Division of Kaiser Chemical Company, for possession of magnesium-thorium alloy. Standard Magnesium purchased magnesium-thorium scrap metal for reclaiming purposes. The end product from Standard Magnesium's manufacturing process was magnesium anodes used for cathodic protection on items such as tanks and pipelines. NRC License No. STB-472 superceded License No. C-4012 on November 22, 1961. On June 5, 1968, License No. STB-472 was amended to include the possession of uranium, so that Standard Magnesium could process magnesium slag containing uranium. It does not appear that uranium was ever received or processed on site. On March 16, 1971, License No. STB-472 was terminated at the licensee's request.

In 1991, Oak Ridge National Laboratory (ORNL) was contracted, by NRC, to review and evaluate all nuclear material licenses terminated by NRC or its predecessor agencies since inception of material regulation in the late 1940s. One of the objectives of this review was to identify sites with a potential for meaningful residual contamination, based on information in the license documentation. ORNL identified the Kaiser site as having the potential for residual contamination. On November 17, 1993, an NRC inspector surveyed the Kaiser facility to assess the potential for residual contamination at the site. The inspector found contamination

on the surface, indicating that waste magnesium-thorium slag was improperly disposed of in the past. Off-site residual thorium contamination was first identified during a subsequent NRC inspection conducted on June 29, 1994. The off-site thorium contamination is due to slag dumping in areas to the east and south of the current Kaiser property boundary, on property which belonged to Standard Magnesium during licensed operations. NRC notified Kaiser on August 19, 1994, that the site had been added to the Site Decommissioning Management Plan (SDMP). Kaiser has agreed to conduct remediation activities in accordance with current regulations and release limits, even though it is not currently a licensee because its license was terminated in 1971.

Proposed Action:

Kaiser is proposing to remediate the off-site areas to the east and south of Kaiser's property which contain residual thorium contamination above the unrestricted release limits specified in the SDMP Action Plan (370 Becquerel per kilogram (Bq/kg) (10 picocurie per gram (pCi/g)) total thorium). Kaiser proposes to:

- (1) excavate soil with thorium levels above the maximum average concentration, and transport it directly to the Kaiser storage site, or load the contaminated soil onto trucks for transport to the storage site;
- (2) control the excavation process to assure contamination is not spread during excavation or transport;
- (3) stockpile contaminated soil on Kaiser property within a fenced location. It is estimated that 4673 cubic meters (m<sup>3</sup>) (165,000 cubic feet (ft<sup>3</sup>)) of contaminated soil will be transported and stored on Kaiser property pending final disposal;
- (4) control stockpiled soil to minimize erosion, airborne dust, and precipitation runoff;
- (5) conduct a final survey of excavated areas and transport routes in accordance with NUREG/CR-5849, "Manual for Conducting Radiological Surveys in Support of License Termination;" and
- (6) backfill excavated areas with unaffected material after receiving NRC acceptance of the final survey report (Kaiser, 1998).

**The Need For Proposed Action:**

The Kaiser property and adjacent land areas to the east and south contain thorium contaminated soil. This property was owned and operated by Kaiser's predecessor, Standard Magnesium. Standard Magnesium extracted magnesium from magnesium thorium alloys. The thorium-bearing slag was disposed of on-site. Some of the slag was dumped onto, what is now, land adjacent to the Kaiser property. Kaiser is proposing to remediate its property and the adjacent land areas as separate actions, with the adjacent land areas being remediated first.

Site characterization studies (Kaiser, 1999) indicate that thorium contamination in the adjacent land areas extends from the Kaiser fence up to 36.6 m (120 ft) from the fence. Observed thorium concentrations on the adjacent property range from background to 13,478 Bq/kg (363.9 pCi/g) of soil. Exposure rate measurements range from background 2.6 nanoCoulomb per kilogram per hour (nC/kg hr) (10microRoentgen per hour (uR/hr)) (background) to 31 nC/kg hr (120 uR/hr). Calculations by Kaiser indicate that soil with thorium concentrations above 111.11 Bq/kg (3.0 pCi/g  $^{232}\text{Th}$ ) of soil will require remediation to meet NRC's unrestricted release limits. Kaiser estimates the volume of contaminated soil in the adjacent land areas to be 4673 m<sup>3</sup> (165,000 ft<sup>3</sup>). Kaiser proposes to excavate, transport, and store the contaminated soil on Kaiser property pending final disposition (Kaiser, 1998).

The proposed action is necessary for Kaiser to regain control of the off-site thorium contaminated soil and to minimize exposures to the public who may be inadvertently exposed to it.

**Alternative To Proposed Action:**

The remediation approach proposed by Kaiser allows them to take control of all contaminated material created by Standard Magnesium and make adjacent land areas acceptable for unrestricted use. Further, the proposed approach allows Kaiser to dispose of all contaminated material at once. There are two alternatives to the proposed action of excavating and storing contaminated soil on Kaiser property; (1) no action, and (2) to excavate and transport the contaminated material directly to a licensed disposal facility. The no-action alternative is not acceptable because soil containing thorium at levels exceeding NRC's limit for unrestricted use is accessible to the public. The second alternative is not considered to be advantageous, because it does not give Kaiser the option of disposing of all material

collectively. This alternative does not preclude Kaiser from sending contaminated soil from adjacent land areas to a low-level radioactive waste disposal facility in the future, if necessary.

Environmental Impacts Of Proposed Action:

Remediation of the adjacent land areas could result in both radiological and non-radiological environmental impacts. Radiological environmental impacts that could result from the remediation of the adjacent land areas include exposure, inhalation, and ingestion hazards to workers and the public. These hazards could occur during excavation, transport, or storage of the contaminated soil.

Potential radiological impacts during excavation include: (1) exposure; (2) inhalation and ingestion to workers; and (3) inhalation and ingestion to the public. Kaiser has committed to perform work activities in accordance with the Radiation Control Plan (RCP) submitted to the NRC as Appendix C of the ALRP. Worker doses due to direct exposure to the contaminated soil are expected to be small. Site characterization revealed that 74 percent of the samples contained less than 370 Bq/kg (10 pCi/g), and 83 percent contained less than 740 Bq/kg (20 pCi/g) (Kaiser, 1999). Since worker exposure time will be short, and thorium concentrations are relatively low, Kaiser estimates that doses due to direct contact with soil will be less than 1 millisievert per year (mSv/yr) (100 millirem per year (mrem/yr)). Inhalation and ingestion impacts will be minimized to the workers and public by controlling airborne material levels. Air sampling will be conducted in work areas, and at work area boundaries to evaluate off-site releases. Action will be taken if radioactivity levels exceed 10 percent of the regulatory limit in work areas and 50 percent of the regulatory limit at the work area boundary. Kaiser's RCP (Kaiser, 1998) includes controls for keeping external and internal radiation exposures to workers, and the public, "as low as reasonably achievable" (ALARA). These controls include implementing: (1) the RCP; (2) radiation worker training; (3) a respiratory protection program; (4) safety work permit procedures; and (5) radioactive material storage and handling procedures.

The potential for radiological impacts during transportation is limited. Spillage during transportation is the only credible scenario for workers receiving a potential dose. Since any spills could be immediately recovered, doses due to direct exposure will be minimal. The potential exists for contaminated material to become airborne during transportation, unloading, or as a result of accidental spills. In the ALRP, Kaiser commits to using load covers, or other

means, as necessary to prevent the spread of contamination during hauling. Potential radiological impacts to workers and the public due to airborne material will be controlled as described above.

Potential radiological impacts resulting from the storage of the contaminated soil on Kaiser property include doses to the public from airborne material and precipitation runoff. In the ALRP, Kaiser commits to minimize the spread of contamination by storing soil on land that is already contaminated. Erosion and dust will be controlled by planting vegetation, covering with sheeting, or covering with clean soil. Precipitation runoff will be controlled with engineering measures to ensure that drainage from the stockpile will be into the retention pond. The RCP also references a radioactive liquid handling procedure.

The potential for groundwater contamination at the site is minimal. Site characterization sampling at the site indicates that the vertical migration of the thorium is limited. Sampling revealed that thorium concentrations dropped quickly in undisturbed soil. Sampling also indicates that the freshwater pond, to the west of the site, controls the groundwater flow in the water table aquifer (Kaiser, 1995). Water samples taken from the freshwater pond had thorium concentrations consistent with background levels.

NRC staff conducted an environmental justice review for the Kaiser site. We have determined that there are no environmental justice issues with the Kaiser site because there are no disproportionately high minority or low-income populations near the site.

#### Agencies And Individuals Consulted:

This Environmental Assessment (EA) was prepared entirely by NRC staff. No other sources were used beyond those referenced in this EA.

NRC staff provided a draft of the EA to Oklahoma Department of Environmental Quality (ODEQ) for review. By facsimile dated July 30, 1999, ODEQ agreed with NRC's conclusion that the proposed action will not have any significant affect on the quality of the human environment.

NRC contacted the Fish and Wildlife Service to ensure that the proposed action will not have an adverse impact on threatened and endangered species. Mr. Ken Frazier informed the NRC by phone on August 2, 1999, that the proposed action will have no impact on threatened and endangered species.

NRC also contacted the Oklahoma Historical Society to determine if the proposed action would have any adverse impacts on sacred or historical properties near the Kaiser site. The Oklahoma Historical Society informed Kaiser, by letter dated August 31, 1999, that there are no historic properties affected by the project.

The Oklahoma Archeological Survey informed NRC, by letter dated August 6, 1999, that no archeological sites are listed as occurring within the project area and no archeological materials are likely to be encountered.

The Creek Nation of Oklahoma informed Kaiser, by letter dated August 5, 1999, that there are no religious or sacred sites within the project area that will be affected by the undertaking of this project.

#### Conclusions:

Radiological exposures to workers and the public will be in accordance with 10 CFR Part 20 limits. Kaiser has committed to perform remediation activities in accordance with an acceptable RCP. NRC staff believes the RCP provides adequate controls to keep potential doses to workers and the public from direct exposure, airborne material, and released effluents, ALARA.

NRC staff also believes that the remediation alternative proposed by Kaiser minimizes the potential dose to members of the public, and other environmental impacts. Potential doses to members of the public will be minimized by removing contaminated soil from public areas and storing on property fenced and controlled by Kaiser. The proposed remediation alternative also minimizes the other potential environmental impacts. The volume of contaminated soil to be excavated and stored on Kaiser property is a small fraction of the total volume of contaminated soil present on Kaiser property requiring remediation. Therefore, the potential environmental impact from the proposed action is insignificant.

#### **FINDING OF NO SIGNIFICANT IMPACT**

Pursuant to 10 CFR Part 51, NRC has prepared this EA related to the approval of Kaiser's ALRP. On the basis of this EA, NRC has concluded that this Federal 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.

**References:**

1. Kaiser Aluminum Specialty Products, "Field Characterization Report," April 18, 1995.
2. Kaiser Aluminum & Chemical Corporation, "Adjacent Land Remediation Plan For Kaiser Aluminum & Chemical Corporation, Tulsa, Oklahoma," Revision 0, August 1998.
3. Kaiser Aluminum and Chemical Corporation, "Adjacent Land Characterization," March 1999.
4. NRC, "Action Plan to Ensure Timely Remediation of Sites Listed in the Site Decommissioning Management Plan," 57 FR 13389, April 16, 1992.