



MEMO

TO: Rocky Flats Plant Work Group
FROM: Joe Fitzgerald, SC&A
SUBJECT: Response to NIOSH Regarding the Existence of Mg-Th Alloy at RFP
DATE: September 11, 2014

INTRODUCTION

This is in response to the August 13, 2014, NIOSH Response Paper titled, *Existence of Mg-Th Alloy at RFP Based on Worker Statements*, Rev. 1, by J.S. Bogard and Dan Stemfley of Oak Ridge Associated Universities Team (ORAUT). As noted in this paper, SC&A originally raised the possibility of Mg-Th alloy being received by the Rocky Flats Plant (RFP) in 2006 during the Special Exposure Cohort (SEC) evaluation report review being conducted for Petition SEC-00030, during which SC&A found that “it is clear from NUREG-1717 and the other considerations presented above that knowledge of the approximate quantities, periods, and processing status of the magnesium-thorium alloy is needed before any reliable conclusions can be arrived at regarding Rocky Flats workers from this material” (SC&A 2007a).

During this review, SC&A interviewed a Dow Madison worker who had claimed that shipments of Mg-Th alloy material were being sent to Rocky Flats during a 12-year period from 1963 to about 1975 (SC&A 2007b). The interviewee indicated that four truckloads of Mg-Th alloy were being shipped to RFP per month, and that the same material was being shipped to Los Alamos National Laboratory (LANL). Dow Madison also received scrap returns from the various Atomic Energy Commission (AEC) sites, including RFP, which was clearly labeled on the returns. The interviewee indicated that four Mg-Th alloys were involved: HK31, HK61, HM21, and HM31.

At the Rocky Flats Work Group request, NIOSH subsequently interviewed four site experts from RFP regarding the degree of exchange of Mg-Th between RFP and Dow Madison, if any. As noted in NIOSH’s August 13, 2014, paper (NIOSH 2014), the four experts interviewed did not recall any large quantities of magnesium alloy in use at RFP, and did not recall any shipments of such material between RFP and Dow Madison. As the Work Group took no further action, NIOSH considered this issue closed.

The issue was raised again by the petitioner for the current SEC-00192 via e-mail on May 31, 2013, who indicated that a third party had reported that Mg-Th alloy plates had been brought to RFP, refined in Building 881, and then sent to the MOD center for modification to fit “Semi Trucks” to make them bullet proof (NIOSH 2014). NIOSH has since conducted further records review of the Site Research Database (SRDB) to locate any documentation establishing a link between Mg-Th alloy and RFP, conducted new keyword searches of available RFP documents (e.g., using HK-31 and HK-31A, as key search parameters), performed additional onsite document searches, and interviewed additional former RFP workers, in particular, one who

worked at the MOD center. None of these more recent investigations have surfaced new information which has led NIOSH to change its original conclusions from 2007 that there is no evidence of the use of Mg-Th alloy material at RFP. NIOSH opines that there is likely “confusion between RFP and other Denver-area sites, as well as confusion regarding Mg-Th plates and other similar materials at RFP.”

SC&A REVIEW

Based on its review of past documentation, worker interviews, and NIOSH’s more recent investigation, SC&A finds the following:

1. The Dow Madison worker interviewed by SC&A in 2007 provided a level of clarity and detail in his recollections of the Mg-Th alloy shipments between Dow Madison and RFP, which make it difficult to attribute his identification of RFP as the recipient as merely “confusion” on his part. For example, the interviewee clearly identified that returned scrap was received from all recipient sites, with that of RFP being clearly labeled as such. NIOSH’s conjecture of possible confusion between various federal sites located in the Denver, Colorado, area, is based on an interview conducted with the same worker where the question was posed whether it would be possible that he had mistaken “Rocky Flats Plant” for “Rocky Mountain Arsenal,” to which the worker admitted the possibility. On this basis, however, it is just as “possible” that the worker had it right all along—he had never heard of Rocky Mountain Arsenal before. In such speculative matters, it often depends on how the question is posed.
2. This interviewee identified five Mg-Th alloy specifications that applied to shipments to RFP and other locations: HK-31, HK-31A, HK-61, HM-21, and HM-31. NIOSH only searched against the first two specifications; HK-31 and HK-31A. Without a complete document search of both the SRDB and onsite holdings of LANL (see below) and the Denver Federal Records Center against all of the applicable Mg-Th alloy specifications in historic use, any results may be incomplete.
3. In his October 16, 2013, comments before the full Advisory Board in its meeting in Denver (McKeel 2013), Colorado, Dow co-petitioner Dan McKeel noted that he had made inquiries to the Department of Energy (DOE) via the Freedom of Information Act in May 2013 regarding Mg-Th use and had not yet heard anything. He was also told by DOE that about 400 boxes of records pertaining to RFP are located at LANL, but would need to be searched by hand. He indicated that some of these records are classified and was told any such search would take about 2 years. Without accessing these records, any final conclusions regarding facility use and shipments of Mg-Th would be premature.
4. As part of a search of the DOE’s NMMSS¹ classified inventory, a search was conducted by NIOSH on August 26, 2014, for the presence of thorium at RFP during the years in question. No evidence apparently was found that thorium in any form was present during the time period sampled (a month in 1974). This result, notwithstanding, it should be noted that, as explained by the DOE NMMSS project manager during that site visit, each

¹ Nuclear Materials Management and Safeguards System

site contributed to this database inventory applying its own judgment of significance and it is likely that RFP would not have considered 2%–3% thorium in Mg-Th alloy to be a reportable quantity for materials accountability purposes, given the other more sizeable and significant radiological inventories of plutonium and uranium.

While the above findings would indicate the need for additional investigation on the issue of Mg-Th receipt and use at RFP, the value of that effort would need to be weighed by the Work Group against the resources required to investigate the remaining records, if they can even be identified at this stage. The reported Mg-Th use period for the AEC weapons complex (1956–1969, SRDB 53615) falls within the current SEC period for RFP (1952–1983) and, therefore, would only influence partial dose reconstructions. While the reported concentration of thorium in the alloy material (2%–3%) is relatively low, the dose contribution to workers, if they were involved with certain, intrusive handling of the material (e.g., grinding, smelting, or fabricating), could potentially be significant, as pointed out by SC&A in its 2007 review of NUREG -1717 and potential worker exposures from 4% thoriated welding rods. (SC&A 2007a).

CONCLUSIONS

As SC&A observed in its June 1, 2007, Second Supplemental Report to the Advisory Board (SC&A 2007c):

Two rather different positions in regard to the thorium-magnesium alloy at Rocky Flats now exist. The first is a scenario based on Rocky Flats site expert statements regarding lack of evidence of receipt of such shipments, and other considerations (e.g., inventory). The second scenario is based on statements by a Dow Madison worker that there were large and regular shipments of thorium magnesium alloy to Rocky Flats.

While NIOSH's more recent investigation has now encompassed additional site expert interviews that address the RFP MOD facility (the subject of the most recent allegation), additional document searches, and onsite data capture at the Denver Federal Records facility, the evidentiary conflict observed above has not changed.

In SC&A's judgment, the receipt and use of Mg-Th alloy material at RFP remains inconclusive, given the incompleteness of document searches and reviews, particularly of the apparent records collection identified at LANL. However, it is within the Work Group's purview to judge whether further investigation is warranted, given the uncertainty of corroborating evidence being uncovered, the subsuming scope of the current SEC period, and the resources that will be required to probe this issue further.

REFERENCES

McKeel 2013. Daniel McKeel, public comments before the Advisory Board on Radiation and Worker Health, Denver, Colorado, October 16, 2013, transcript, page 340 (<http://www.cdc.gov/niosh/ocas/pdfs/abrwh/2013/tr101613.pdf>).

NIOSH 2014. *Existence of Mg-Th Alloy at RFP Based on Worker Statements*, Rev. 1, National Institute for Occupational Safety and Health; Bogard, J.S., and Dan Stemfley, Oak Ridge Associated Universities Team (ORAUT), Cincinnati, Ohio. August 13, 2014.

SC&A 2007a. *Review of the Rocky Flats Plant Special Exposure Cohort Petition, SEC-00030, Volume 1: Main Report*, SC&A, Inc., Vienna, Virginia. April 5, 2007.

SC&A 2007b. *Review of the Rocky Flats Plant Special Exposure Cohort Petition, SEC-00030, Volume 2: Attachments*, SC&A, Inc., Vienna, Virginia. April 27, 2007.

SC&A 2007c. *Review of the Rocky Flats Plant Special Exposure Cohort Petition, SEC-00030, Second Supplemental Report on the Rocky Flats SEC Petition*, SC&A, Inc., Vienna, Virginia. June 1, 2007.