



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

June 16, 1995

MEMORANDUM TO: Betty Wright
Division of Non-Proliferation, Exports
& Multilateral Relations
Office of International Programs

FROM: Gary Comfort
Licensing Section 2
Licensing Branch
Division of Fuel Cycle Safety
and Safeguards, NMSS

A.C. G+f.

SUBJECT: REVISION TO MAY 11, 1995, SHIELDALLOY EXPORT PERMIT MEMORANDUM

In my memorandum to you dated May 11, 1995, I provided summary conclusions of my review of Shieldalloy Metallurgical Corporation's (Shieldalloy's) document entitled, "Radiological Impacts From the Use of CANAL - A Slag Fluidizer in Steel Production." The document provided Shieldalloy's evaluation of the radiological effects to workers and the public during steel processing using the CANAL. My May 11 memorandum found the conclusions to be acceptable, although based upon my understanding of the steel mill operation, I reported that the document did not review all reasonable scenarios which may result in the highest exposures.

In a letter to you dated June 1, 1995, from Mr. C. Scott Eves of Shieldalloy regarding the export permit for the sale of CANAL, Shieldalloy provided additional information that changes my interpretation of the operating practices of the steel mill and thus alters my conclusions in my May 11 memorandum as follows:

- (1) Shieldalloy's June 1 letter states that the working conditions in the warehouse where CANAL will be stored are inhospitable to workers, thus limiting durations for worker exposures. Based upon Shieldalloy's description of the storage facility, Shieldalloy's estimate of 263 hours per year used in calculating the exposure is sufficiently conservative. Furthermore, maximum exposures to workers at the Shieldalloy facility, resulting from the storage and processing of pyrochlore which has radionuclide concentrations higher than the CANAL and is stored in continuous proximity to workers, have historically been only slightly higher than the exposures calculated in the report and are below the Nuclear Regulatory Commission's occupational dose limits for adults as stated in 10 CFR 20.1201. Therefore, unless storage practices change at the steel mill, the maximum exposure of 53 millirem per year to workers may be considered as a reasonably conservative estimate.
- (2) Shieldalloy's June 1 letter also clarified the production of CANAL slag as compared to iron ore slag. Based upon Shieldalloy's description of steel production, both slags are produced simultaneously, however, more

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than four times the amount of non-CANAL slag is produced for each quantity of CANAL slag. Because these slags are not intentionally segregated and only a limited amount of CANAL will be used in each production run, Shieldalloy's estimation of the dilution effect of the radionuclides is acceptable, and the calculated exposures resulting from this assumption are reasonable.

- (3) For the fourth scenario presented in my May 11 memorandum discussing the use of slag aggregate in cement, I estimated a maximum exposure of less than 16 millirem per year using the higher concentrations I expected to be present from CANAL slag layering. My purpose of this estimate was to evaluate an end use which may have been overlooked by Shieldalloy. Shieldalloy's June 1 letter estimates the exposure from the use of CANAL slag in cement to less than 1 millirem per year. Shieldalloy's evaluation of this scenario is reasonably conservative.

Shieldalloy's June 1 letter also included a list of International Atomic Energy Agency (IAEA) guidance which Shieldalloy considers applicable to this process. Because I am not knowledgeable in IAEA guidance, I cannot make a determination of the applicability of the guidance to the processes using CANAL. In addition, the second paragraph of my May 11 memorandum discussing IAEA Safety Series 9 should be ignored in its entirety. In a telephone discussion with Shieldalloy's contractor, I misunderstood the contractor to state that Safety Series 9, dated 1982, had been rescinded, when in fact, it was an underlying interim guidance which had been revised. As such, Shieldalloy's footnote in its original evaluation of CANAL regarding total specific activity of less than 14,000 pCi/g should be considered as not applicable to the evaluation.

Overall, based upon the additional information provided in Shieldalloy's submittal dated June 1, 1995, Shieldalloy's report entitled "Radiological Impacts From the Use of CANAL - A Slag Fluidizer in Steel Production," is a reasonable evaluation of the expected impacts of the proposed process. Without changes in storage practices and the intentional segregation of slag resulting from steel production using CANAL, it is unlikely that public and worker exposures to the radionuclides present in the CANAL will be higher than those values presented in Shieldalloy's report.

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cc: Mr. C. Scott Eves
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