

# OAK RIDGE NATIONAL LABORATORY

OPERATED BY  
UNION CARBIDE CORPORATION  
NUCLEAR DIVISION



POST OFFICE BOX X  
OAK RIDGE, TENNESSEE 37830

June 23, 1982

Dr. Carl Feldman  
Chemical Engineering Branch  
Office of Nuclear Regulatory Research  
U. S. Nuclear Regulatory Commission  
5650 Nicholson Lane  
Rockville, Maryland 20852

Dear Carl:

The following information can be added to the analysis of risks associated with recycling of decommissioned materials sent to your office on June 8, 1982.

It has been estimated that recycling of enrichment facility scrap metals will save  $1 \times 10^9$  megajoules ( $9.48 \times 10^{11}$  Btu) of energy.<sup>1</sup> Annual energy outputs for coal-fired and oil-fired 1000 MW(e) power plants have been estimated at  $2.40 \times 10^{13}$  Btu and  $1.64 \times 10^{13}$  Btu, respectively.<sup>2</sup> Therefore, the energy saved by recycling of enrichment facility metals represents 3.9% of the annual output of a 1000 MW(e) coal-fired plant or 5.8% of that from an oil-fired plant.

The National Research Council<sup>3</sup> has reported that the number of fatalities associated with annual operation of 1000 MW(e) power plants and their supporting fuel cycle ranges from 16 to 160 for coal-fired

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<sup>1</sup>USNRC. 1980. *Draft Environmental Statement Concerning Proposed Rulemaking Exemption from Licensing Requirements for Smelting Alloys Containing Residual Technetium-99 and Low-Enriched Uranium*. NUREG-0518.

<sup>2</sup>USDOE. 1980. *Implications of Environmental Regulations for Energy Production and Consumption*, Volume VI. National Academy of Sciences.

<sup>3</sup>NRC/NAS. 1977. *Implications of Environmental Regulations for Energy Production and Consumption*, Volume VI. National Academy of Sciences.

plants and from 2.2 to 110 for oil-fired plants. Thus, recycle of decommissioned enrichment facility metals and the associated energy saving could avoid 0.6 to 6.2 fatalities from coal-produced energy or 0.1 to 6.4 fatalities from oil-produced energy. This certainly would tend to balance the radiological risk (0.4 fatalities) associated with recycling slightly contaminated enrichment facility metals. Moreover, recycling of reactor metals should provide additional energy savings which would balance the 0.2 fatality estimate for a PWR.

Recycling decommissioned scrap metals, therefore, would seem to avert as many or more fatalities from energy production as the number estimated from radiological causes associated with recycle activities.

Sincerely yours,



John P. Witherspoon  
Technology Assessments Section  
Health and Safety Research Division

JPW:wm

7/15/82

NOTE TO: Document Control  
Room 016

FROM: Carl Feldman

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Draft Reg. Guide \_\_\_\_\_  
Reg. Guide \_\_\_\_\_  
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Effective Rule (RM) \_\_\_\_\_  
Federal Register Notice 46 FR 11666  
~~CE~~ ~~SD~~ Task No. 817  
NUREG Report: 0586  
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Subject: Decommissioning - D6E11  
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