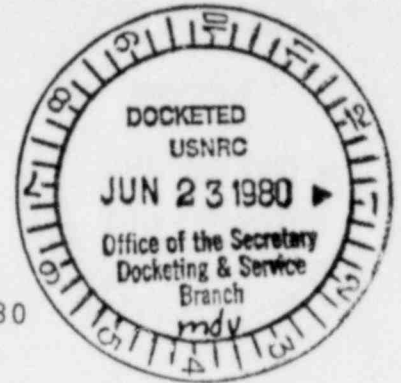




Council on Energy Independence  
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DOCKET NUMBER  
 PETITION RULE PRM -51-6 (10)  
 (45 FR 25557)

June 13, 1980

Mr. Samuel J. Chilk  
 Secretary of the Commission  
 U. S. Nuclear Regulatory Commission  
 Washington, D. C. 20555

Attention: Docket and Service Branch

REFERENCE: Petition for Rulemaking by Ms. Catherine Quigg,  
 Docket No. PRM-51-6

Dear Mr. Chilk:

The Council on Energy Independence respectfully submits the following comments on the subject petition:

I. General Comments

Much of the content of the subject petition is based on a misinterpretation of technical terminology and an apparent lack of knowledge of the large amount of nuclear fuel cycle research which is being conducted in various laboratories throughout the world and which precedes the small scale pilot testing of new designs. Ms. Quigg's concerns are based on the false assumption that somehow the public is being treated as an uninformed body of guinea pigs who are vulnerable to the consequences of dangerous experimentation which is being allowed by the NRC.

II. Specific Comments

- a. The first sentence of Ms. Quigg's petition betrays her lack of accurate information on the current, once-through, nuclear fuel cycle. Her statement that "...the federal government and the utilities want to use more uranium in existing nuclear fuel in lightwater reactors across the country" is completely erroneous. It can be easily shown that extended burnup of nuclear fuel results in the mining of less uranium for a given amount of energy produced: Consequently, the benefits of this program accrue not only to the utilities burning uranium, but also to the nation as a whole through the conservation of a valuable natural resource. The U.S. Department of Energy is well justified in supporting research leading to these national benefits.



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- b. In Ms. Quigg's specific comment number 1., which constitutes the basis for her request, she reveals a misinterpretation of the terminology of the industry pertaining to the diffusion of gaseous fission products from the grains of the oxide fuel pellets into the void space provided in the fuel rod design to receive such gases. This migration is commonly called "fission gas release"\*, but Ms. Quigg refers to it as "...releases from nuclear reactors." The Nuclear Safety document which she cites clearly refers to release from fuel oxide pellets in the context of its impact on internal fill gas pressure and composition and the impact on reactor accident analysis, but not in terms of routine releases limited by reactor operating specifications. In the case at point, the NRC has acted wisely and prudently in determining that any potential added radioactive release to the environs resulting from the pilot irradiation of the four fuel assemblies would not exceed the safe limits incorporated in the Zion-2 reactor technical specifications. There is a great degree of conservatism in the public safeguard provisions which are included in the technical specifications. The democracy and ethics of which Ms. Quigg speaks were fully applied in the open-to-the-public process by which the Zion reactors obtained their operating licenses.
- c. In Ms. Quigg's item No. 2, she employs a series of statements involving "may occur", "may develop", "it is possible", to extrapolate to seemingly disastrous consequences. The subjects of crud buildup, cladding corrosion, rod bowing, pellet clad interaction, irradiation induced metallurgical changes, fuel relocation, ECCS transients, clad strain from power ramps, fission gas release and other topics are being widely and intensively studied.<sup>+</sup> All improvements to nuclear fuel, including

\*see NUREG 75/077 "The Role of Fission Gas Release in Reactor Licensing" page IV.

<sup>+</sup>see "Proceedings of the American Nuclear Society Topical Meeting on Water Reactor Fuel Performance", St. Charles, Illinois, May 9-11, 1977 and at Portland, Oregon, April 29 to May 3, 1979. Also 28 excellent references in the bibliography of "Fission Gas Release from Fuel at High Burnup" Nuclear Safety Vol. 19, No. 6, pages 699-708, Nov.-Dec. 1978.



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reduced fission product release, result from carefully conducted laboratory experiments followed by small pilot tests in commercial reactors. Advance warning of any of the dire results which Ms. Quigg fears can thus be obtained without harm to the public.

- d. Ms. Quigg's concern expressed in her item No. 3 is that current fuel storage experience is limited to spent fuel exposures of 33000 to 36000 MWD/MTU. She seeks to block the acquisition of data on even a pilot basis for spent fuel with exposures up to 55000 MWD/MTU and then demands the destruction of NUREG-0404 because it is based on fuel exposures up to only 36000 MWD/MTU.

Near the end of her item No. 3 Ms. Quigg itemizes a list of technical problems that could arise in high burnup operation and states that the public should be given explanation why such research cannot be carried on in industry and government laboratories. In fact, much of this research is conducted in industry and government laboratories. Large quantities of valuable experimental data have been and continue to be extracted from capsule irradiations in test reactors and laboratory mock ups for studies involving fluid flow, heat transfer, fretting corrosion, and other effects associated with structural integrity preceding the cautious pilot testing of a few assemblies under heavily monitored conditions.

- e. Ms. Quigg's item No. 4 talks about the impact of increased burnup on LOCA analyses and quotes Mr. R. O. Meyer of the U.S. Nuclear Regulatory Commission on the underprediction of fission gas release at high burnup. She fails to note that Mr. Meyer has pointed out in his papers on the subject the well known fact that the inventory of chemically inert Krypton 85 in fuel rods increases with burnup while the more biologically significant short-lived gases such as Iodine 131 reach saturation levels independent of burnup.



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- f. It is curious that Ms. Quigg should bring reprocessing into the discussion, but since she has, it should be pointed out that her numbers are deceptive. The total production of fission products such as Kr 85 and tritium in a reactor (or group of reactors) depends solely on the total energy released (total number of fissions incurred) not on the number of tons of fuel in which they are contained.

CEI appreciates the opportunity to comment and sincerely hopes that our comments are seriously considered in this matter.

Very truly yours,

A handwritten signature in cursive script, reading 'Robert G. Shields', is written above the typed name.

Robert G. Shields, P.E.  
Secretary