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November 22, 1978

Dr. B. Snyder Assistant Director for Policy Review U.S. Nuclear Regulatory Commission 1717 H Street, N.W. Room 1015 Washington, D.C. 20555

Dear Dr. Snyder:

The Nuclear Regulatory Commission announced in March 1978 that it was considering two actions. First it planned to develop a more explicit overall policy for nuclear facility decommissioning and second, amend its regulations to include more specific guidance on decommissioning criteria. In September three regional workshops were held to obtain the views of the States on the proposed plans and in October the NRC staff presented the policy issues which are involved. The proposed plan is now available for public inspection.

The commission's current activities appear to be prompted by a petition submitted jointly by a number of "public interest" groups. While the petition deals only with nuclear power plants, the proposed rulemaking will deal with a number of facilities:

- reactors
- uranium mills
- fuel fabrication plants
- low level waste burial grounds
- reprocessing plants
- UF₆ facilities

Nuclear Assurance Corporation believes the imposition of the proposed requirements to be excessive and not in keeping with public interest. The enclosed Position Paper presents our views on this very critical issue. A limited number of extra copies are available.

If you have any comments regarding the Paper, please let us hear from you.



Sincerely,

NUCLEAR ASSURANCE CORPORATION

Andrew J. Frankel Senior Nuclear Fuel Analyst Fuel-Trac®

Enclosure

DECOMMISSIONING OF NUCLEAR POWER PLANTS

November 1978





NUCLEAR ASSURANCE CORPORATION

DECOMMISSIONING OF NUCLEAR POWER PLANTS

fuel-trac® November 1978

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DECOMMISSIONING OF NUCLEAR POWER PLANTS

by Andrew J. Frankel Nuclear Assurance Corporation

The decommissioning of nuclear reactors is not a new or novel concept. From a regulatory point of view, the objective of decommissioning a reactor is to place it in a non-operating condition with adequate protection for the public health and safety. From past experience, it would seem that this objective is achievable; indeed it has been achieved numerous times under current regulations. In the United States alone, Incit some sixty-five experimental and demonstration reactors have been decom- of the missioned in accordance with existing regulations. This experience is di ectly applicable to the decommissioning of power reactors. Neverticiess, the Nuclear Regulatory Commission is presently considering utility land Sol amending its regulations to include yet more specific guidance on decommissioning. Questions are being raised concerning further assurance of the licensee's financial capability to decommission a facility by posting surety bonds, requirements for detailed decommissioning plans to be approved prior to issuance of an operating license, and whether decommissioning regulations should require returning the entire plant site to its "natural" state.

The present decommissioning regulations are contained in Sections 50.33(f) and 50.82 of 10CFR Part 50. Present NRC guidance regarding acceptable procedures for the retirement of nuclear reactors is contained in Regulatory Guide 1.86, "Termination of Operating Licenses for Nuclear Reactors," which describes methods acceptable to the NRC for satisfying the requirements of Section 50.82. This guide defines and specifies four alternative methods for the retirement of nuclear reactor facilities:

- Mothballing;
- In-place entombment;
- Removal of radioactive components and dismantling;
- Conversion to a new nuclear system or a fossil fuel system.

Is the NRC's action reasonable? Are reasonable conclusions emerging? What are the realities?

The Commission's current activities in the decommissioning area appear to be prompted principally by a petition for rulemaking submitted jointly by the Public Interest Research Group, Community Action Research Group, Critical Mass Energy Project, Environmental Action Foundation, Environmental Action, Inc., and the New York Public Interest Research Group. The petition asks the Commission:

"to initiate rulemaking to promulgate regulations for nuclear power plant decommissioning, which would require plant operators to post bonds, to be held in escrow, prior to each plant's operation, and would insure that funds will be available for proper and adequate isolation of radioactive material upon each plant's decommissioning... The proposed regulations would insure that the power companies which operate reactors, and not future generations, bear the cost of decommissioning. The regulations should also require that nuclear power plants already in operation establish plans and immediately post bonds, to be held in escrow, to insure proper decommissioning."

While the rulemaking petition deals only with nuclear power plants, the Commission's proposed rulemaking will deal with reactors, uranium mills, fuel fabrication facilities, UF6 plants, low level waste burial grounds, and reprocessing plants. The Commission has developed a three-year program for the re-evaluation of NRC policy on decommissioning, which includes studies of decommissioning costs, methods, financing, and environmental impacts for all types of nuclear facilities. Power reactor decommissioning is to be dealt with on an accelerated time schedule, with final rulemaking to occur in mid-1979. Preliminary conclusions of the Regulatory staff are beginning to emerge, however, from recently held NRC workshops on decommissioning attended by state officials. The latter have taken the form of background presentations followed ty working sessions in which state officials were asked to provide input or guidance to the NRC staff on the following questions:

- Do the sta s have an acceptable role in the plan (for NRC's re-evaluation of decommissioning policy)?
- Are the technical reports adequate in covering the right facilities, in considering the real alternatives?
- Should the plan be modified? How?
- 4. Should detailed decommissioning plans be required prior to the issuance of license?
- 5. Is delay in decommissioning justified to save money? -- to reduce radiation exposure?
- Is permanent entombment of nuclear facilities an acceptable method of decommissioning?
- 7. Should decommissioning criteria extend to buildings, structures, and components which are not contaminated with radioactive materials?
- 8. Can cleanup criteria be developed by the Federal Government with State advice so that all can endorse and follow them?
- 9. Is a maximum dose rate of 1 mrem/yr to any individual after cleanup an acceptable basis for site release? What other basis would you recommend?

10. Who should pay for decommissioning?

- 11. Should financial responsibility requirements be imposed by Federal or by State authorities? When?
- 12. Should funds be set aside in advance or accumulated during facility life to pay for decommissioning?
- 13. Who should hold the funds if they are accumulated?
- 14. How can uncertainties in cost or contigencies be covered? By extra money in accrual for each facility? - By extra money into a general fund? - State or Federal?

Several of these questions, particularly questions 4-14, appear to imply NRC staff predisposition toward particular regulatory actions. More specifically:

- Requiring detailed decommissioning plans prior to issuance of an operating license;
- Elimination of permanent entombment as an accepted decommissioning practice;
- Requiring dismantlement of entire plant sites;
- Employment of a 1 mrem/yr dose standard for site release;
- Requiring prior accumulation of funds earmarked for dec mmissioning.

With regard to detailed decommissioning plans prior to issuance of an operating license, the wisdom of such a requirement becomes highly questionable when the accelerated pace of technology advancement in recent years and the normal reactor operating license term of 40 years are considered. The periodic updating of these plans to incorprate new technologies or changes in regulatory practice will undoubtedly be required and will impose a tremendous paperwork burden on both the licensees and regulatory agencies. The cost of this non-productive endeavor will be born by the utility and, in turn, the consumer. Preparation of a voluminous, detailed plan for decommissioning a particular plant 40 years

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prior to the event yields no benefit other than a false sense of security that a future matter has been planned for in great detail. It is certain that all of the highly developed engineering detail will have to be changed. A more logical approach would be to require detailed plans much later, prior to approval of an application for operating license termination, as is required in the current regulations. This enables the licensee to avail himself of the latest technology, assure conformance with the then applicable regulations, and do so at minimum cost to the consumer. Con I NEC may a fining that general ile decomissioning is feasible for any properly sight meleor frithe Permanent, in-place entombment consists of sealing all remaining highly radioactive or contaminated components, e.g., the pressure vessel, within d a permanent structure integral with the biological shield. This struc- a ture is designed to isolate the radioactivity from the biosphere and remain intact for as long as the radioactivity contained therein poses a direct contact hazard. For large power reactors which have been in the merid operation for 30-40 years, this method of decommissioning has limitations due to increased production of long-lived Nb-94 and Ni-59 radioactivity in the reactor internals and other large steel components. In this case, the required life of the entomement could exceed that which may be reasonably expected of a man-made structure. However, its application in the case of power plants of smaller size, or which have not been in operation for extended periods of time may be entirely appropriate, and should not be precluded by changes to existing regulations.

The balance of a power plant site, consisting of buildings, structures, and components which are not contaminated with radioactive materials, do

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not presently fall within the scope of NRC responsibility or authority following decommissioning of the reactor itself. To extend decommissioning regulations to require demolition of all structures on the plant site would infringe existing state and local jurisdictions and impose an excessive financial burden on the licensee, with very little - if any benefit to the public health and safety. Appropriate state and local authorities should be permitted to deal with these structures in accordance with local laws, ordinances and policies. In many cases, it may be that these structures will see alternative, valuable uses, once the plant site is released for unrestricted use.

Site release criteria 'nvolving a maximum dose rate of 1 mrem/yr (above natural background', to any individual walking across the former plant site are unrealistic in the sense that it would be virtually impossible to demonstrate compliance. This dose rate is so dimunitive that site-by-site natural background radiation levels before and after construction will need to be considered. In fact, alternative non-nuclear uses of the site could contribute radiation doses in excess of this amount, for example, the burning of coal. A more realistic approach to developing site release crieteria would be to employ the ALARA principle of cost/ benefit analyses.

Lastly, Section 50.33(f) of 10CFR50 requires that an applicant for a reactor operating license:

"shall provide information sufficient to demonstrate to the Commission the financial qualifications of the applicant to carry cut, in accordance with the regulations in this chapter, the activities for which the permit or license is sought...such information shall show that the applicant possesses or has reasonable assurance of obtaining the funds necessary to cover the estimated costs of operation for the period of the license..., plus the estimated costs of permanently shutting the facility down and maintaining it in a safe condition." i.e., of decommissioning the plant. Recently completed NRC studies of decommissioning indicate a cost of between \$42 and \$52 million in 1978 dollars, including a 25% contingency, to decommission a 1,175 MWe pressurized water reactor. ¹ Of this 19% or between \$8 and \$10 million are funds required for completely demolishing all site structures and leveling of the site. ² Subtracting the latter, the actual decommissioning cost of \$34-42 million may be compared to the cost of the final year's fuel loading for the same reactor which is on the order of \$40-50 million, also in 1978 dollars. This comparison indicates that decommissioning costs are of the same nagnitude as a single year's normal plant operating expense. It would seem, then, that current NRC regulations for demonstrating licensee financial capability with regard to decommissioning prior to issuance of an operating license are entirely adequate.

Any further assurance of licensee financial capability by requiring prior accumulation of funds for decommissioning and/or the posting of performance bonds should be an optional matter left to the discretion of appropriate state regulatory agencies. This issue is, in the financial sense, no more pressing or complex than that of recovering annual nuclear fuel costs from utility customers. In any case, when one considers that the sum involved is the equivalent of a single year's fuel costs, this issue seems hardly worthy of the attention and emotional debate it is currently receiving. (See also Nuclear Industry, Vol. 25, No. 10, October 1978, page 16, for further discussion.)

 [&]quot;Technology, Safety and Costs of Decommissioning a Reference Pressurized Water Reactor Power Station," NUREG/CR-0130, June 1978, p. 2-12.

^{2.} Ibid., p. 2-10.

To summarize, the NRC staff is formulating opinions now which, if unmodified, will result in substantial modifications to nuclear power plant licensing procedures and costs. These changes may include:

- Requirements for detailed decommissioning plans prior to the issuance of operating licenses;
- Redefinition and extension of decommissioning criteria such that restoration of the plant site to a pre-construction phase condition becomes the only acceptable method for decommissioning;
- Federal requirements for prefinancing of decommissioning, including the posting of performance bonds prior to the issuance of operating licenses.

NAC feels the imposition of such requirements to be excessive, and not in keeping with the public interest. At best, such actions are inconsistent with the government's announced goals of federal regulatory and nuclear licensing reform.

The first point is clearly detrimental for it imposes additional costs upon society with no resultant benefits. The second point is more complex. It seems evident that demolition of the entire site, including the non-nuclear buildings and structures, is not warranted. On the other hand, there is legitimate concern that entombment alone may not be sufficient for the reactor building. NAC advocates further study in this area, avoiding premature decisions and taking advantage of technology advances over the next 30-40 years. The third point appears essentially moot. While at least one US utility has announced that it will accumulate decommissioning funds over the life of the plant, others apparently will face the requirement when it arises. In either method, the magnitude of the funds required is low enough that it cannot be considered a major regulatory issue.

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