COVINGTON & BURLING
888 SIXTEENTH STREET, N.W.
WASHINGTON, D.C. 20006

TELEPHONE
(202) 452-6000

WRITER'S DIRECT DIAL NUMBER

(202) 452-6412
(202) 452-6484

TWX: 710-822-0005
TELEX: 89-593
CABLE: COVLING

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DOCKET NUMBER
PROPOSED RULE PR 20
45 FR 26072

Secretary of the Commission
Nuclear Regulatory Commission
Washington, D.C. 20555

Attn: Docketing and Service Branch

Re: Proposed Amendments to 10 C.F.R. Part 20

Gentlemen:

These comments, filed on behalf of Kerr-McGee Nuclear Corporation, United Nuclear Corporation, United Nuclear-Homestake Partners, Union Carbide Corporation, Anaconda Copper Company, Gulf Oil Corporation, and Western Nuclear, Inc., are in reference to the amendments proposed by the Nuclear Regulatory Commission (NRC) to 10 C.F.R. Part 20 on April 17, 1980. The proposed amendments appear at 45 Fed. Reg. 26072-73. The amendments, if adopted, would "incorporate the existing requirements for certain uranium fuel cycle licensees to comply with the Environmental Protection Agency's 'Environmental Radiation Protection Standards for Nuclear Power Operations' (40 C.F.R. Part 190) . . . ." 45 Fed. Reg. 26072.[1/]

1/ The notice of proposed rulemaking indicates that comments on the proposed rulemaking were due by June 16. The commenters request, however, that these comments be accepted for filing even though transmitted subsequent to that date. NRC's rules authorize acceptance of comments beyond

(footnote cont'd)

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Interest of Commenters

Kerr-McGee Nuclear Corporation ("Kerr-McGee"), United Nuclear Corporation ("United Nuclear"), Union Carbide Corporation ("Union Carbide"), Gulf Oil Corporation ("Gulf"), and Western Nuclear, Inc. ("Western Nuclear") are domestic corporations. United Nuclear-Homestake Partners ("United Nuclear-Homestake") is a partnership comprised of United Nuclear and Homestake Mining Company. Anaconda Copper Company ("Anaconda") is a division of the Anaconda Company, a

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(footnote cont'd)

the time specified in the notice. See 10 C.F.R. § 2.805(a). It is appropriate to accept these comments under the circumstances presented here. First, these comments raise serious questions concerning the validity of Part 190 as applied to uranium milling. Accordingly, they undercut NRC's rationale for adopting Part 190 into 10 C.F.R. Part 20 and should be carefully considered by the agency. Second, there have been important developments which undermine the basis for Part 190 which have not become manifest until subsequent to the June 16 date specified for comments on NRC's proposed rulemaking. For example, the agency's new MILDOS code (designed to assist mill licensees in ascertaining compliance) and revised Reg. Guide 4.14 (specifying monitoring programs) have not been available a sufficient time for milling companies fully to understand the impact of Part 190 prior to June 16. Third, NRC recently published a proposed statement of policy which suggests that the agency intends to require Agreement States to enforce the Part 190 radiation standards, as incorporated in Part 20, upon state licensees. See 45 Fed. Reg. 65726 (October 3, 1980). This materially alters the impact of NRC's proposed amendments at issue here. Finally, NRC has in the past recommended that EPA defer application of Part 190 to uranium mills, and the comments tendered herewith provide additional relevant information supportive of that position.

In the event that NRC determines not to accept these comments, the commenters request that this letter be treated as a petition to rescind any regulation adopted by NRC which imposes 40 C.F.R. Part 190 requirements upon uranium mill licensees in contravention of these comments. See 10 C.F.R. § 2.802(a).

domestic corporation. Kerr-McGee, Anaconda, and United Nuclear (separately and through United Nuclear-Homestake) own and/or operate uranium mills in New Mexico. Gulf intends to construct and thereafter to operate a uranium mill in New Mexico. Union Carbide owns and/or operates uranium mills or in situ extraction operations in Wyoming, Colorado and Texas. Western Nuclear owns and operates uranium mills in Wyoming and Washington. The commenters would be adversely affected if the amendments proposed by NRC were adopted as final regulations.

Summary

The commenters oppose adoption of the proposed amendments to 10 C.F.R. Part 20. NRC offers no ground justifying adoption of the proposed amendments other than the Environmental Protection Agency's (EPA's) promulgation of 40 C.F.R. Part 190. However, as shown in more detail below, since EPA lacked authority to promulgate 40 C.F.R. Part 190 and since that regulation in any event is unlawful, NRC may not rely on it to justify the proposed amendments. Because NRC offers no independent basis for the proposed amendments, they may not lawfully be promulgated by NRC.

Assuming that NRC nevertheless proceeds to adopt the proposed amendments, the commenters urge the agency to defer their application to uranium mills until the mills have had sufficient time (a) to ascertain whether they are in compliance,

and (b) to implement changes in equipment and operations so as to come into compliance (if compliance is possible) or to shut down operations in an orderly fashion (if compliance is not economically or technically feasible). Similarly, the commenters urge NRC to coordinate imposition of Part 190 upon the milling industry with imposition of UMTRC Act requirements in order to avoid expenditures to comply with Part 190 which will be supplanted by further expenditures to comply with differing requirements imposed under UMTRC Act. Finally, the commenters are opposed to the reporting requirements contained in the proposed amendments as unauthorized, unnecessary, impractical, and unduly expensive.

I. Part 190 Is Unlawful

There is no basis in the record for the proposed amendments to 10 C.F.R. Part 20 aside from 40 C.F.R. Part 190. As noted, Part 190 is unlawful. The commenters have in fact recently filed a lawsuit in the United States District Court for the District of New Mexico challenging the lawfulness of 40 C.F.R. Part 190 as applied to uranium mills. Kerr-McGee Nuclear Corporation, et al. v. United States Environmental Protection Agency, U.S.D.C. N. Mex. Civil No. 80-0203C.[2/] Plaintiffs' motion for partial summary judgment is currently

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2/ United Nuclear is not a plaintiff in the lawsuit although United Nuclear-Homestake Partners, in which United Nuclear is a partner, is.

pending in that proceeding. In their motion for partial summary judgment, plaintiffs demonstrated that 40 C.F.R. Part 190 is unlawful on a variety of grounds. For example, plaintiffs showed that EPA and the EPA Administrator were not authorized to promulgate 40 C.F.R. Part 190 because Reorganization Plan No. 3 of 1970, which purportedly transferred the pertinent authority, was unlawful under 5 U.S.C. § 905(a)(4). Plaintiffs also demonstrated that even if the transfer of authority was valid, 40 C.F.R. Part 190 was nevertheless unlawful because, among other things, it was devised under an unreasonably narrow interpretation of EPA's authority as transferred by the Reorganization Plan; it did not reflect the NRC's findings with respect to practicability; and it unlawfully purported to be applicable to emissions from mill tailings. Moreover, plaintiffs showed that 40 C.F.R. Part 190 is in any event not applicable to uranium milling activities in states which have entered into agreements with the AEC or NRC discontinuing federal regulatory authority within those states pursuant to 42 U.S.C. § 2021, and accordingly should not be imposed in such states. These and other deficiencies with Part 190 are explained in more detail in the Memorandum in Support of Plaintiffs' Motion for Partial Summary Judgment which is incorporated herein.[3/]

3/ A copy of this Memorandum is attached to these comments. A copy of the Statement of Material Facts filed in the New Mexico lawsuit is also hereby incorporated in these comments and is attached hereto.

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Besides the issues specifically raised by plaintiffs in their Motion for Partial Summary Judgment, EPA's 40 CFR Part 190 is unlawful with respect to uranium mills because it is not supported by the evidentiary record. As applied to uranium milling, Part 190 is based upon an underestimate of the difficulties of mills in complying with the limits it imposes and upon an unduly optimistic estimate of the ease with which existing mills could bring themselves into compliance.4/

It must also be recognized that, as applied to mills and contrary to EPA's unsupported assertions, Part 190 is not cost effective. Instead, it is arbitrary and capricious

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At the very least, NRC should defer any action on implementing Part 190 with respect to uranium mills, either through the proposed amendments to 10 C.F.R. Part 20 or otherwise, until after final disposition of the New Mexico litigation.

4/ For example, in formulating Part 190, EPA failed to consider actual mills in determining the possible exposures which mills might cause. Instead, EPA "assumed" a hypothetical model mill which failed to reflect the reality faced by existing mills. The model mill overlooked possible sources of exposure (e.g., the haul roads and ore storage areas). Moreover, EPA's new AIRDOS-EPA computer program indicates that a much more stringent level of controls would be required to meet the 25 mrem limitation specified in Part 190, even assuming the model mill originally employed by EPA.

NRC's proposal to incorporate Part 190 into 10 CFR Part 190 is also defective because, if adopted, it would impose requirements upon uranium mills which are unduly and unconstitutionally vague. For example, the proposal fails to address the question of how Part 190 would be applied to two or more uranium mills which are operating in close proximity or which are otherwise producing a cumulative impact over a particular area. Given the geographic proximity of certain mills, such a situation may reasonably be expected to exist, at least in New Mexico.

and otherwise unlawful. The standards which Part 190 imposes are unnecessary to protect the public or the general environment. There is no evidence that the low levels of exposure which may result from milling operations pose any significant health risks. In addition, there are increasing reasons to question the validity of the so-called linear non-threshold assumption on which rests the projection of health effects employed by EPA in formulating in Part 190. Under the circumstances, there has been no showing that any additional radiation limitations should be imposed upon uranium mills on a cost-effectiveness basis.

Assuming arguendo that the linear non-threshold assumption is an appropriate basis on which to impose additional limitations, EPA's Part 190 standards are nevertheless not cost effective. Information now available both to EPA and to NRC indicates that mills would face significant problems in complying with Part 190.[5/] This new information shows that the cost of controls is greater and the risk and degree of non-compliance which the mills must address if Part 190 becomes

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5/ See, e.g., note 4 supra (the AIRDOS-EPA conclusions). These new developments support NRC's earlier advice to EPA that the "proposed EPA standard has been established too near or beyond the projected capabilities of uranium fuel cycle technology" in certain specific areas. One of the specific areas was "the inclusion of the blowing of tailings piles near operating uranium mills." Letter from Lee V. Gossick (NRC) to Russell Train (EPA) dated February 25, 1975, attached to the Statement of Material Facts as Exhibit H.

effective are more significant than EPA estimated when it published Part 190. In particular, Kerr-McGee estimates that if current operations in fact are not in compliance with Part 190, the company would be required to expend, as a minimum, $200,000 to $300,000 in start-up costs and an additional $500,000 per year to achieve compliance. It is entirely possible that Kerr-McGee's costs will be much greater. United Nuclear-Homestake Partners estimates that it may have to expend millions of dollars in order to comply with Part 190. Similarly, Union Carbide has found that it must install scrubbers and other controls which may cost in excess of a million dollars in order to attempt to meet Part 190 requirements.[6/] The high costs of compliance bear no reasonable relation to the adverse health effects which would be averted if the commenters and other uranium millers were required to comply with Part 190. Certainly the high cost of compliance renders the regulations anything but cost effective.

EPA indicated that an acceptable cost to impose upon regulated industry in order to avert an adverse health effect was in the $250,000-$500,000 range. But the American Mining Congress, based upon an industry survey, has estimated that 40 CFR Part 190 would require mills to spend from 19 million to over one billion dollars per hypothetical health effect averted. This high range is attributable to the minuscule

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6/ These facts are matters of record in affidavits filed in Kerr-McGee Nuclear Corporation, et al. v. EPA, supra.

risks associated with milling activities even as hypothesized under the linear non-threshold assumption and to the very substantial cost of instituting controls to meet the stringent Part 190 Standards. Nothing in the Part 190 record, and nothing before the NRC here, controverts this estimate.

It is no answer to claim that Part 190 is justified or cost effective because other components of the fuel cycle can more readily or with far less disruption or cost comply with its provisions. Part 190 arbitrarily lumps uranium mills together with other fuel cycle operations even though significant differences[7/] exist between uranium milling operations and other components of the nuclear fuel cycle. Such arbitrary categorization is plainly unlawful. Compare United States v. Nova Scotia Food Products Corp., 568 F.2d 240, 252 (2d Cir. 1977) (agency may not impose similar standards upon conceptually different factual situations without "articulat[ing] rationally why the rule should apply to a large and diverse class"); Michigan Wisconsin Pipeline Co. v.

7/ For example, mills ordinarily operate in remote and unpopulated western areas. Other fuel cycle components, such as reactors, are often in more populated regions. The incremental radiation exposure which mills may possibly cause to a member of the public is inevitably low in level (less than background radiation), and attributable to naturally occurring concentrations of radioactive materials. Nuclear reactors on the other hand have the potential of releasing very high levels of radioactive waste. Finally, although most releases of radioactive material by mills are regarded as "planned" and thus covered by Part 190, most releases by other fuel cycle components (such as reactors) are regarded as "unplanned" and thus not covered by Part 190.

FPC, 520 F.2d 84, 89 (D.C. Cir. 1975); Mobil Oil Corp. v. FPC, 570 F.2d 1021, 1027 (D.C. Cir. 1978).

The futility of the new regulations is further illustrated by the fact that existing NRC requirements in 10 C.F.R. Part 20 were found in Crowther v. Seaborg, 312 F. Supp. 1205, 1230-34 (D. Colo. 1970) to afford adequate protection to health and safety despite arguments that they should be lowered by a factor of ten -- much less by a factor of twenty as suggested by EPA in Part 190. See also Crowther v. Seaborg, 415 F.2d 437, 439 (10th Cir. 1969) (existing nuclear safety regulations "prevent any possible damage to life, property and natural resources"). 40 CFR Part 190 represents a drastic, unreasonable, and unexplained departure from previous regulatory practices. As such, it is unlawful. Compare The Baltimore and Annapolis Railroad Co. v. Washington Metropolitan Area Transit Commission, ___ U.S. App. D.C. ____, ___ F.2d ___ (Oct. 1, 1980) (agency "cannot abandon a rule established by its precedent without first stating its reasons for doing so").

It is clear that NRC cannot adopt the proposed amendments to 10 C.F.R. Part 20 with respect to uranium mills without compiling, independent of EPA, a record which would sustain the stringent limitations contained in the proposed amendments. This is especially true in light of new information and research undercutting the dated and now superceded

assumptions on which EPA purportedly based the Part 190 limitations as applied to uranium mills.

II. In Any Event, Application of Part 190 to Mills Should be Deferred.

Assuming arguendo that NRC nevertheless proceeds with the proposed amendments, the commenters urge that their application to uranium milling operations be deferred by at least until December 1, 1982. For a number of reasons, it is extremely difficult to determine if a uranium mill is in actual compliance with EPA's 40 C.F.R. Part 190 requirements. For one thing, Part 190 would restrict permissible annual whole-body dosage to a member of the public to only 25 mrem per year, a level far below background in the areas where the commenters currently mill or expect to mill uranium. Because of the extremely low levels of radiation involved, it is very difficult or even impossible to measure compliance directly.

Recognizing this problem, NRC has recently made available its MILDOS computer code for use by mills in determining their compliance. Kerr-McGee has not had sufficient time to determine if its operations will comply with Part 190 as calculated by means of the MILDOS code. However, there are indications that current operations may not result in compliance as determined by MILDOS. If Kerr-McGee turns out not to be in compliance with Part 190, the company's license will be in jeopardy and, moreover, the company will have to expend

substantial sums to modify operations in order to achieve compliance. Kerr-McGee estimates that it will require no less than two years to determine whether it is in compliance with Part 190, and, if it is not in compliance, to identify and to take such steps as are required to achieve compliance, if compliance is possible, or to shut down operations. Union Carbide has retained consultants (NUS Corporation) to evaluate its compliance with Part 190 at its mill at Uravan, Colorado. After an extensive study costing in excess of $100,000, NUS has advised Union Carbide that it must implement extensive new controls to comply with the new regulation. The earliest that Union Carbide can complete installation of the new controls at its Uravan facility is in late 1982.[8/]

There is no compelling reason to make the Part 190 standards effective with respect to uranium mills prior to December 1, 1982. Congress has never legislated a date by which radiation standards must be in place. EPA has not evinced any particular haste in issuing the Part 190 standards. And NRC itself has recommended to EPA that implementation of Part 190 as applied to uranium mills be deferred.[9/] The public will be fully protected from radiation hazards, real or imaginary, by existing regulations in 10 C.F.R. Part 20 during any

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8/ See note 6 supra.

9/ See Letter from Robert B. Minogue (NRC) to Alvin A. Alm (EPA) dated October 1, 1976 at pp. 2 and 3 (exhibit G to Statement of Material Facts).

deferral of implementation of 40 C.F.R. Part 190 as applied to uranium mills. Under these circumstances, deferral of implementation of Part 190 with respect to the milling industry would be entirely reasonable and failure to defer the regulations would be arbitrary and capricious.

III. The Proposed Amendments Should Be Coordinated With UMTRC Act Regulations.

NRC is in the process of imposing regulations upon uranium mills which purport to be pursuant to the Uranium Mill Tailings Radiation Control Act (UMTRC Act). See 45 Fed. Reg. 65521 (Oct. 3, 1980). It is wasteful of resources to require regulated industry to comply first with Part 190 and then with the in many ways more stringent requirements being imposed under the UMTRC Act. The commenters and other companies will be forced to expend resources to take remedial action to comply with Part 190 on December 1, 1980, but will be compelled to supplant their remedial actions with different actions in order to comply with UMTRC Act regulations. At the very least, imposition of Part 190 and UMTRC Act requirements upon the milling industry should be coordinated to minimize remedial expenditures. This may be accomplished by coordinating effective dates such that the milling companies are not required to comply first with Part 190 and then with the UMTRC Act regulations.

IV. The Proposed Reporting Requirements Are Unauthorized, Unnecessary, Impracticable, and Unduly Expensive

NRC proposes to amend 10 C.F.R. § 20.405 to require licensees to report exposures in excess of the limits contained in 40 C.F.R. Part 190 within 30 days of the overexposure. If adopted, this requirement in effect would compel uranium mills to report exposures to members of the public in excess of 25 mrem per year within one month of detecting the overexposure. As suggested by Regulatory Guide 4.14,[10/] constant monitoring will presumably be required in order to comply with the reporting requirement. The commenters oppose the proposed reporting requirement.

NRC lacks authority to impose the proposed reporting requirement, even assuming arguendo that Part 190 is lawful. 40 C.F.R. Part 190 only requires that covered

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10/ Regulatory Guide 4.14, as revised in April 1980, describes a variety of programs for ascertaining compliance by uranium mills with, among other things, 10 CFR Part 20 dose limits and the requirements of 40 CFR Part 190. As the Regulatory Guide expressly states, however, the various programs are not requirements. The Regulatory Guide nevertheless is suggestive as to how the proposed reporting requirement under discussion would be applied if it were finally adopted. Among other things, the Guide requires extensive operational monitoring of uranium mills, with results to be summarized quarterly and submitted to NRC semiannually. Reg. Guide 4.14, ¶ C.2. Stack, air, water, vegetation, food, fish, soil, and sediment samples are required, as well as measurements of direct radiation. According to the Guide, air particulate samples "should be collected continuously" at numerous locations, including "at least one residence or occupiable structure where predicted doses exceed 5 percent of the standards in 40 CFR Part 190...." Reg. Guide 4.14, ¶ C.2.1.2.

operations "be conducted in such a manner as to provide reasonable assurance that" the limitations set forth in Part 190 are satisfied. Since NRC has for years been able to provide reasonable assurance of compliance with its other radiation standards without the need for reporting requirements such as that proposed, it follows that the Commission has no basis for imposing the proposed requirement in the case of the Part 190 limitations.

This conclusion is further supported by comparing the proposed requirement with existing reporting requirements. Such a comparison discloses that the proposed reporting requirement is a drastic departure from the existing requirements set forth in 10 C.F.R. Part 20. Under the existing regulations, licensees need to file 30 day reports only if exposures in unrestricted areas exceed ten times the limitations presently specified in Part 20. 10 C.F.R. § 20.405(a)(5). Since the lowest comparable limitation in Part 20 is currently 500 mrem (10 C.F.R. § 20.105(a)), licensees are currently required only to report annual exposures exceeding 5 rem. The NRC proposal in effect would require 30 day reports for exposures 1/200 (one-two hundredth) of this amount. Clearly the agency may not so sharply alter its regulations without some reasonable explanation. See The Baltimore and Annapolis Railroad Co. v. Washington Metropolitan Area Transit Commission, supra. There is nothing in the record either before NRC or

before EPA which indicates that such a dramatic reduction is necessary to fulfill any of the purposes of the Atomic Energy Act.

Currently existing reporting requirements are designed to apprise the Commission of possible hazards to the public health and safety. They serve the useful purpose of identifying problem areas requiring immediate or expeditious attention. 40 C.F.R. Part 190, however, is not a safety standard but an environmental standard. There is no need for NRC to be apprised of an infraction of such a standard on a current basis. The NRC proposal would simply not serve the traditional purposes of the reporting requirements otherwise imposed in 10 C.F.R. Part 20. Periodic checks of licensees' records and inspections of licensees' operations are fully sufficient to maintain compliance with Part 190, just as such checks and inspections are sufficient to maintain compliance with other existing exposure limitations in the NRC regulations.

Even if NRC had authority to impose the proposed reporting requirement and even if the traditional purposes of reporting requirements might somehow be served by the Commission's proposal, NRC nevertheless should not impose that requirement under the circumstances presented here. As shown below, the record contains no indication that a reporting requirement designed to apprise NRC of radiation exposures in

excess of 25 mrem per year is either practical or cost effective. The 25 mrem limitation specified in Part 190 is a small fraction of ordinary background levels of radiation in the areas where uranium is milled, and well within the range of fluctuation which characterizes milling regions. It is extremely difficult, if not impossible, to detect incremental exposures in amounts as low as 25 mrem in uranium milling areas where uranium is milled. Regular monitoring for such low levels of incremental exposure will be very expensive to undertake.[11/] Kerr-McGee estimates that the incremental monitoring cost attributable to Part 190 for a mill would be in excess of $40,000 per year as a minimum. Assuming approximately 20 operating mills in the United States, this indicates that the incremental cost of the proposed reporting requirement for mills alone would be about $800,000 per year. Annual incremental costs could very easily be several times that amount. Union Carbide has paid an outside consulting firm in excess of $100,000 to monitor increased exposures attributable to its Uravan facility in order to ascertain compliance with 40 C.F.R. Part 190 and to determine the causes of excessive exposures. Apart from the cost of the monitoring, it is simply infeasible within the 30 day period proposed by NRC to

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11/ Modeling techniques have not yet been shown to be reliable substitutes for actual monitoring. In particular, there has been no demonstration that existing models properly take into account all variables which actually reduce levels of exposure incident to milling activities.

comply with other aspects of NRC's proposed reporting requirement. That proposal calls for far more than the detection of incremental exposures of approximately 25 mrem. It also calls for the licensee to ascertain the extent of exposure of individuals, the levels of radiation and concentration of radioactive materials involved, and the cause of the exposure, and to plan or to implement a course of corrective action "to assure against a recurrence." More time is required for a mill to take all these actions. The experience in the milling industry is that several years are required as a minimum for existing mills to ascertain compliance or non-compliance and to plan -- much less implement -- remedial action.

There is nothing in the record to indicate that the benefits which would be derived from the proposed reporting requirement would even approach the substantial costs, indicated above, which such a requirement would impose, even if the proposed requirement were feasible. Indeed, the record does not reflect any benefit from the proposed reporting requirement at all. The proposed reporting requirement as applied to mills should be deleted.

Conclusion

Under the circumstances, it is clear that NRC may not adopt Part 190 by way of amendments to 10 C.F.R. Part 20 with respect to uranium milling activities. Any action by NRC to the contrary would contravene the strictures of governing

statutes, would be unsupported in the record, and would be arbitrary and capricious. The commenters accordingly request that the amendments to 10 C.F.R. Part 20 proposed at 45 Fed. Reg. 26072 (April 17, 1980) not be adopted. At the very least, implementation of the amendments should be deferred two years for uranium mills, and should be coordinated with differing requirements imposed under the UMTRC Act. Moreover, the proposed reporting requirement should be deleted.

Respectfully submitted,

Peter J. Nickles
Charles H. Montange
888 Sixteenth Street, N.W.
Washington, D.C. 20006

Attorneys for
Kerr-McGee Nuclear Corporation,
United Nuclear Corporation,
United Nuclear-Homestake Partners,
Union Carbide Corporation,
Anaconda Copper Company,
Gulf Oil Corporation and
Western Nuclear, Inc.

Exhibit A

PART ____

ENVIRONMENTAL RADIATION PROTECTION STANDARDS FOR
NORMAL OPERATIONS OF ACTIVITIES IN THE URANIUM FUEL CYCLE

A new Part ____ is proposed to be added to Chapter ____, Title 40, Code of Federal Regulations as follows:

Subpart A - General Provisions

Sec.

-.01 Applicability

-.02 Definitions

-.03 Address

-.04 Availability of Information

-.05 Effective Date

Subpart B - General Standards for Normal Uranium Fuel Cycle Operations

-.10 Applicability

-.11 Environmental Standards

Subpart C - Specific Standards for Planned Controlled Discharges From Light-Water-Cooled Power Reactors

-.20 Applicability

-.21 Environmental Standards

-.22 Variances

Subpart D - Specific Standards for Planned Controlled Discharges From Uranium Fuel Reprocessing

-.30 Applicability

-.31 Environmental Standards

-.32 Effective Date

SUBPART A - GENERAL PROVISIONS

-.01 Applicability

The provisions of this Part apply to persons owning or operating facilities which are part of the Uranium Fuel Cycle.

-.02 Definitions

a) "Uranium fuel cycle" includes the operations of milling of uranium ore, conversion of uranium, enrichment of uranium, fabrication of enriched uranium, generation of electricity by a light-water-cooled nuclear power plant, reprocessing of spent reactor fuel, and transportation of any radioactive material in support of these operations, to the extent that these support commercial electrical power production, but excludes the reuse of recovered non-uranium fissile products produced in the cycle.

b) "General environment" means the total terrestrial, atmospheric and aquatic environments outside the boundaries of locations under the control of persons processing or using radioactive material.

c) "Radiation" means any or all of the following: alpha rays, beta rays, gamma rays, x rays, neutrons, high-speed electrons, high-speed protons, and other atomic particles; but not sound or radio waves, or visible, infrared, or ultraviolet light.

d) "Radioactive material" includes any material which emits radiation.

e) "Uranium ore" is any ore which contains by weight one-twentieth of one percent (0.05%) or more of uranium.

f) "Curie (Ci) of Radioactive material" is equal to that amount of material that produces 37 billion nuclear transformations per second. One "millicurie" of radioactive material produces 37 million nuclear transformations per second.

g) "Dose equivalent" means the product of absorbed dose and appropriate factors to account for differences in biological effectiveness due to the quality of the radiation and its spatial distribution in the body. The unit of dose equivalent is the "rem." (One millirem (mrem) = 0.001 rem.)

h) "Organ" means any human organ within the body exclusive of the dermis, the epidermis, or the cornea of the eye.

i) "Year" means any calendar year.

j) "Person" means (i) any individual, corporation, partnership, firm, association, trust, estate, public or private institution, group, Government agency, any State, any foreign government, any political subdivision of any such government or nations, or other entity and (ii) any legal successor, representative, agent, or agency of the foregoing.

k) "Individual" means any human being.

l) "Member of the public" means any real individual that can receive a radiation dose in the general environment whether

he may or may not also be exposed to radiation in an occupation associated with the uranium fuel cycle.

m) "Facility" means any structure or combination of structures in which any operation as defined in paragraph -.02 a) as part of the uranium fuel cycle is conducted.

n) "Site" means any location under the exclusive control of a person wherein one or more operations or activities within the uranium fuel cycle are conducted.

o) "Site boundary" means the line inside of which the ingress or egress of members of the general public is controlled by the person conducting activities on the site.

p) "Power emergency" shall mean the occurrence or imminent occurrence as determined by the responsible power dispatcher of a power system in any part of the interconnected systems of a utility or utilities of abnormally low voltage, abnormally high or low frequency, or overload of tielines or generating equipment of such magnitude as seriously to threaten the continuity of operations or the safety of equipment of electric utility systems or their customers.

q) "Responsible power dispatcher" means the employee of the electric utility owner, (or of the Power Pool in which the electric utility is a participant) on duty at any given time at the Power Control Center of the electric utility (or of the Power Pool) then having immediate operating responsibility for analysis of operations and the security

of the electric utility power system (or of the integrated power systems of the Pool participants).

r) "Regulatory agency" means the government agency responsible for issuing regulations governing the use of sources of radiation or radioactive materials or emissions therefrom and carrying out inspection and enforcement activities to assure compliance with such regulations.

-.03 Address

All requests, reports, submittals, and other communications to the Environmental Protection Agency should be addressed to the Director, Criteria and Standards Division, Office of Radiation Programs, Environmental Protection Agency, 4th & M Streets, S.W., Washington, D.C. 20460.

-.04 Availability of Information

Emission data provided to, or otherwise obtained by, the Administrator in accordance with the provisions of this part shall be available to the public.

Any records, reports, or information, other than emission data, provided to, or otherwise obtained by, the Administrator in accordance with the provisions of this part shall be available to the public, except that upon a showing satisfactory to the Administrator by any person that such records, reports, or information, or particular part thereof (other than emission data), if made public, would divulge methods or processes entitled to protection as trade secrets of such person, the

Administrator will consider such records, reports, or information, or particular part thereof, confidential in accordance with the purposes of section 1905 of title 18 of the United States Code, except that such records, reports, or information or particular part thereof, may be disclosed to other officers, employees, or authorized representatives of the United States concerned with carrying out the provisions of the standards or when relevant in any proceeding pursuant to the standards.

-.05 Effective Date

These standards shall be effective 12 months from the promulgation date of this rule, except as otherwise provided in the applicable Subpart.

SUBPART B - GENERAL STANDARDS FOR NORMAL URANIUM FUEL CYCLE OPERATIONS

-.10 Applicability

The provisions of this Subpart apply to all planned controlled discharges of radioactive material to the general environment and radiation doses received in the general environment by members of the public from any site containing any facility or operation which is part of the uranium fuel cycle.

-.11 Environmental Standards

a) For any site, the total quantity of uranium and its daughter products, except radon-222 and its daughters, entering the general environment shall be less than one curie per year for each separate facility at the site.

b) For any site containing only operations other than light-water-cooled reactors, regardless of the number of facilities located thereon, the annual dose equivalent to the whole body or any organ of any exposed individual who is a member of the public shall be less than 15 millirems.

c) For any site containing one or more light-water-cooled reactors in addition to other operations of the uranium fuel cycle, regardless of the number of facilities located thereon, the annual dose equivalent to the whole body or any organ of any exposed individual who is a member of the public shall be less than 15 millirems, or the amounts permitted by a variance pursuant to Section ___.22, Subsection C, whichever is higher.

SUBPART C - SPECIFIC STANDARDS FOR PLANNED CONTROLLED DISCHARGES FROM LIGHT-WATER-COOLED NUCLEAR POWER REACTORS

-.20 Applicability

The provisions of this Subpart apply to planned, controlled discharges of radioactivity to the general environment and radiation doses received in the general environment by members of the public from single sites containing light-water-cooled nuclear power plants.

-.21 Environmental Standards

For any site covered by this Subpart regardless of the number of facilities located thereon:

a) The annual dose equivalent to the total body or any organ, excepting the thyroid, of any exposed individual who is a member of the public shall be less than 5 millirems.

b) The annual dose equivalent to the thyroid of any exposed individual who is a member of the public shall be less than 15 millirems.

c) The total quantity of all radionuclides, excepting tritium and dissolved noble gases, discharged to the general aquatic environment from a site shall be less than 5 curies per year for each 1000 megawatts of nuclear electrical generating capacity at the site.

d) The total quantity of tritium discharged from the site shall be less than 600 curies per year for each 1000 megawatts of nuclear electrical generating capacity at a site.

-.22 Variances

When persons subject to this Subpart (or Subpart B) cannot meet the standards for light-water-cooled reactors and any portion of the power which could be generated by such a reactor is required to prevent a power emergency, a variance may be granted by the regulatory agency subject to the following conditions:

a) Releases of radioactive materials are kept as low as possible.

b) The site to which the variance is applied utilizes it only so long as is deemed necessary by the regulatory agency to meet the power emergency,

c) All power available from inside or outside the system has been utilized and/or purchased and appropriate load shedding has occurred,

d) The annual organ and whole body dose equivalent limits specified in Section ___.21 a) and b) for individuals who are members of the public do not exceed 15 millirems for the whole body or any organ, excepting the thyroid, and 45 millirems to the thyroid.

e) Information upon which the variance is based be made a matter of public record concurrent with the granting of the variance.

SUBPART D - SPECIFIC STANDARDS FOR PLANNED CONTROLLED DISCHARGES FROM URANIUM FUEL REPROCESSING PLANTS

-.30 Applicability

The provisions of this Subpart apply to planned controlled discharges of radioactivity to the general environment and radiation doses received in the general environment by members of the public from sites containing fuel reprocessing plants.

-.31 Environmental Standards

For any site covered by this Subpart

a) The total discharge to the general environment of radioactive material for each 1,500 metric tons of uranium fuel processed shall be less than 25 millicuries combined of plutonium-239 and other alpha emitting transuranic isotopes with half-lifes greater than one year, and 0.1 curies of iodine-129.

b) The total quantity of krypton-85 discharged to the general environment shall be less than one percent of the total inventory of krypton-85 in the fuel received for reprocessing.

c) The annual dose equivalent to the whole body or any organ of any exposed individual who is a member of the public shall be less than 15 millirems.

-.32 Effective Date

a) The standards for all sites containing operations covered by this Subpart, excepting those for krypton-85, shall be effective 24 months from the promulgation date of this rule.

b) The effective date of removal of 99 percent of the krypton-85 in the inventory received for reprocessing shall

be 48 months from the effective date of this rulemaking for all plants exclusive of those of 300 tons per year capacity or less which commenced operation prior to January 1, 1970. If such plants are modified to increase the processing capacity to more than 450 tons per year, the standard of 99 percent removal of krypton-85 shall apply when the modification is completed or 48 months from the effective date of this rulemaking, whichever is later.

Exhibit B

September 11, 1973

ENVIRONMENTAL PROTECTION AGENCY

40-CFR Part -

ENVIRONMENTAL RADIATION PROTECTION REQUIREMENTS FOR NORMAL OPERATIONS OF ACTIVITIES IN THE URANIUM FUEL CYCLE

Notice of Proposed Rulemaking

Reorganization Plan No. 3, which became effective on December 2, 1970, transferred certain functions from the Atomic Energy Commission to the Environmental Protection Agency "...to the extent that such functions of the Commission consist of establishing generally applicable environmental standards for the protection of the general environment from radioactive material. As used herein, standards mean limits on radiation exposures or levels, or concentrations or quantities of radioactive material, in the general environment outside the boundaries of locations under the control of persons possessing or using radioactive material." The Environmental Protection Agency proposes to issue standards under this authority to assure protection of the general public from radioactive effluents resulting from the normal operations of the uranium fuel cycle* which support the generation of electricity by light-water-cooled power reactors fueled with enriched uranium. Nuclear power generation based on recycled plutonium fuel, plutonium fuel, or thorium fuel are excluded from this consideration, as are mining operations, but

*As used herein the uranium fuel cycle means all facilities or operations, including transportation, that are involved in the processing, fissioning, and reprocessing of uranium for the production of electrical power from the time uranium ore leaves the mine through the reprocessing of uranium after burnup in reactors and its eventual recycle back into fuel supply.

future consideration of these activities is contemplated when appropriate.

A major national effort has been underway for more than a decade to develop light-water-cooled nuclear reactors using enriched uranium for fuel for the generation of electrical power. The current rapid growth of this energy source also mandates increases in associated activities and operations of the uranium fuel cycle. Increases are expected in the processing of uranium ore to supply fuel for the increasing generation of electricity by light-water-cooled nuclear power reactors. Similar increases will also be necessary in fuel reprocessing, waste disposal, and transportation requirements. The Agency believes that current radiation protection guides and regulations are not entirely adequate to control the impacts associated with these expanded activities for three principal reasons: 1) The concept of "as low as practicable" as enunciated by current guidance does not give adequate consideration to population dose, 2) the basis for exposure determinations should be expanded to include the long-term total population impact of the release of long-lived nuclides to the environment, and 3) a recent study by the National Academy of Sciences - National Research Council* concluded that current Federal guides for exposure of members of the general population as they apply to the nuclear power industry are "unnecessarily high."

The standards proposed in this rulemaking are expected to provide environmental and public health protection from the potential effects of normal radioactive effluents from all operations within the total uranium

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*Report of the Committee on Biological Effects of Ionizing Radiation entitled "The Effects on Populations of Exposures to Low Levels of Ionizing Radiation" National Academy of Sciences, Washington, D.C. (November, 1972).

fuel cycle which support the generation of electricity by light-water-cooled reactors fueled with enriched uranium. The standards under consideration have two principal objectives: 1) to provide standards specifically applicable to light-water-cooled nuclear power reactors and fuel reprocessing plants and 2) to provide standards to be achieved by all other components and operations in the balance of the uranium fuel cycle. Each of these standards is based, to the extent information is available, on an examination of the particular health risks, the technology available to mitigate these risks, and the costs of applying such technology to the operations involved.

It is the intention of the Agency, as recommended by its Environmental Radiation Exposure Advisory Committee, to review these standards periodically, in at least five-year intervals, and to revise them up or down as appropriate based on information that develops in the interval.

INTERAGENCY RELATIONSHIPS. Reorganization Plan No. 3 transferred to the Environmental Protection Agency the responsibility for establishing generally applicable environmental radiation standards for the protection of the general environment from radioactive materials. The responsibility for the implementation and enforcement of the Agency's generally applicable standards remained with the Atomic Energy Commission. The standards proposed herein recognize this division of responsibilities by stating maximum exposure levels and quantities of radioactive materials that categories of activities should satisfy in the general environment outside the site boundaries of sources; the implementation of these standards through the issuance and enforcement of

licenses for individual facilities, including technical specifications at effluent points, is expected to be carried out by the Atomic Energy Commission. The regulatory activities which have been effectively carried out by the Atomic Energy Commission in the past are expected to be equally as effective in assuring that these standards are met.

The implementation of the standards proposed is not intended to alter the programs carried out by the States under agreements with the Atomic Energy Commission. Implementation of these standards is compatible with the program activities the Atomic Energy Commission has developed with its "Agreement States" insofar as these activities pertain to the various operations associated with the uranium fuel cycle.

Appropriate monitoring and inspection activities should be conducted to determine actual radiation exposures and discharges of radioactive materials. Sufficient reporting of these data through public channels should also take place to allow determination that normal, planned, controlled operations within the uranium fuel cycle have satisfied these standards.

BASIC STANDARDS APPROACH. Radiation protection standards for the nuclear power industry to date have been based primarily on the limitation of risk to the most exposed individual, rather than to the total population exposed. Furthermore, the current and proposed expanded development of the nuclear power industry, with its planned and potential releases of long-lived radionuclides, requires the development of a broader environmental assessment that encompasses the entire radiological impact of these pollutants. Assessments of the potential impact represented by industries such as the nuclear power industry require projection of the

migration of each radionuclide through the environment over long periods of time, and a determination of the potential dose to populations (measured in person-rems*) delivered and the associated health effects** expected to occur throughout this migration. These assessments must include all individual exposures, however small, so that all of the impact on society is assessed, and must be cognizant of the exposure of future generations implied by the essentially irreversible environmental commitments that result from the discharge of long-lived radioactive materials into the general environment.

The most prudent basis for relating radiation dose to its impact on public health continues to be that health effects due to exposure to ionizing radiation occur at all levels of exposure down to zero and that the number of these effects induced is directly proportional to the dose of radiation received (a linear, non-threshold cause-effect relationship). Although it is recognized that data are not available to either prove or disprove this assumption, the Agency believes that it provides the only sound basis for developing standards to protect public health. Within this framework, the only totally risk-free level of radiation exposure is zero; a standard set at any other level must be justified on the basis that the activity producing the radiation exposure provides sufficient offsetting benefits. The use of this radiation protection perspective for man is believed to provide also for the protection of the overall ecosystem since there is no present evidence

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*Person-rem is the unit of total integrated radiation dose to all individuals exposed. For example, a dose to 100 persons of 1 rem is 100 person-rems and a dose to 1,000 persons of 0.1 rem is also 100 person-rems. For such a dose concept, dilution of the effluent does not change the potential health effects if the increase in population exposed is inversely proportional to the dilution factor.

**Health effect means lethal cancers, other non-lethal cancers, or serious

that there is any biological species whose sensitivity is sufficiently high to warrant a greater level of protection than that adequate for man. This perspective and others on the risks due to exposures to ionizing radiation were recently analyzed quantitatively by the Committee on Biological Effects of Ionizing Radiation formed by the National Academy of Sciences - National Research Council. This study was conducted under joint sponsorship of the Environmental Protection Agency and the Department of Health, Education, and Welfare, and provided an important input to the development of these proposed standards.

The Agency believes that the first principle to be satisfied by activities producing radioactive effluents is that benefits should accrue to society from the activity in sufficient amounts to offset both the short- and long-term radiation risks involved. Although these risks can be quantified within reasonable limits of scientific uncertainty, benefits, whether described in social, health or economic terms, are very difficult to quantify and must usually be evaluated using somewhat arbitiary value judgments. With respect to electric power generated by the uranium fuel cycle, the Agency has concluded that the social, health, and economic benefits realized far outweigh the health risks presented by effluents resulting from the normal operations of this industry controlled at the levels proposed by these standards. This determination was reached after first assessing the total population risk incurred, by determining, for all radioactive materials from the fuel cycle entering the general environment, the population dose (in person-rems) delivered with consideration also given to the time the material persists in the environment.

The second major perspective used by EPA in setting the proposed environmental radiation standards was to consider in some detail the effectiveness and associated costs of effluent control for each class of activity. Such an examination allowed the standards to be set at a level of radiation risk consistent with the capabilities of control technology and at a cost acceptable to the public and reasonable for the risk reduction achieved. The standards assume that the most cost-effective control technology available will be employed for each effluent stream. In order to bring about orderly achievement of the standards at reasonable cost, appropriate lead times are also given to those affected by the standards for changing processes and activities, or applying the control technology required to meet the standards.

After population protection has been assured by such consideration of risks and costs, a third requirement that must be satisfied is to assure that protection is provided to those individuals in the public who may receive unjustifiably high radiation doses close to the site boundaries of nuclear facilities. Such an occurrence is possible in a few situations in the uranium fuel cycle, such as doses due to releases of short-lived radioiodines and from shipments of radioactive materials. The risk to an individual from such doses is, in most cases, quite small, but it is still basically unfair to impose doses on specific individuals substantially higher than those received by the average member of the population. It is believed that such doses should be limited where technology and other procedures are available for such exposure reduction and the cost can be justified.

CONSIDERATIONS FOR THE TOTAL URANIUM FUEL CYCLE. It has been projected that well over 300,000 MW(e) of generating capacity based on the uranium fuel economy will exist within the next 20 years. As indicated above, the perspective for radiation protection of the public from this growth should consider the effects of the chronic exposure of large populations. The major population exposures due to operations of the uranium fuel cycle are associated with: 1) near-term low-level radiation exposures resulting directly from effluents from the various operations of the uranium fuel cycle, and 2) increasing low-level radiation exposure which occurs as a result of the long-term accumulation of long-lived radioactive materials as general environmental contaminants.

Analysis of the environmental impact of the uranium fuel cycle indicates that a number of long-lived radionuclides are discharged as a result of planned operations within the cycle, with consequent buildup of environmental levels and commitments for population dose that may persist for tens, hundreds, or thousands of years. The extent of population doses which may occur as a result of such commitments are related to the physical half-life of the radionuclide, the extent of its dispersion through envrionmental media, and the period over which it remains available in the environment so that it can interact with and expose humans and other species through air and water directly, by direct radiation, or by accumulation in and transferral through food chains. The population dose resulting from the dispersion of such long-lived materials into the environment can be termed an "environmental dose commitment." The Agency believes it is important to recognize this perspective of radiation risk in addition to that of annual exposures to

individuals, which are principally due to shorter-lived radionuclides, and to implement appropriate controls to minimize such long-term dose commitments. For this reason, the environmental analyses of the various operations in the fuel cycle have considered the potential for health effects due to long-lived radionuclides after their introduction into the general environment to the extent that present knowledge permits.

Because of the potential dose commitments involved, and in the interest of minimizing the degradation of the quality of environmental resources, it is important to keep the environmental burden of long-lived radionuclides at the lowest levels consistent with technical and economic feasibility. The Agency has, therefore, proposed environmental standards for the long-lived radionuclides of concern in the form of limits on the quantities discharged per year into the general environment.

In addition to constraints on quantity released for protection against environmental buildup, standards are also proposed to limit doses to the whole body or organs of the individual due to short-lived radioactive effluents. The standards proposed are consistent with limiting such doses through the application of technology at an acceptable cost.

Whereas the Agency has attempted to minimize the total effect of radioactive discharges on populations in its development of these proposed standards, it has not attempted to specify siting constraints, even though siting is an important factor which also affects the population impact of all operations in the fuel cycle. It is expected that good siting practices will continue to be promoted and that facility planners will take advantage of the benefits of remote sites in their

designs. In this regard, the Atomic Energy Commission's policy of low population density siting as practiced in the past should be continued.

Total population impact, particularly with reference to health effects, is best considered in terms of the total person-rem commitment over the entire population affected. The standards were based principally on a determination of the population impact of all operations in the uranium fuel cycle, even though actual limits are expressed in terms of quantities discharged and whole body or organ doses to individuals. Person-rem limits have not been specified in the standards because the implementation of such a requirement is difficult. The proposed standards are expressed as limits on quantities of radioactive material and individual doses outside the boundaries of classes of activity so as to facilitate their translation into regulatory controls.

It is the viewpoint of the Agency that adherance to the proposed standards by the nuclear power industry will insure levels of risk due to normal operations that are environmentally acceptable and that are worthy of public acceptance. In this context, these standards are responsive to the President's energy messages of June 4, 1971, and April 18, 1973, which challenged the Nation to develop sufficient new energy resources and at the same time to provide adequate protection for public health and the environment.

CONSIDERATIONS FOR FUEL SUPPLY OPERATIONS. The principal activities involved in converting uranium ore into enriched uranium fuel for use in power reactors are milling, conversion, enrichment, fabrication, and transportation. With the exception of transportation, each of these operations involves environmental discharges of naturally-occurring

uranium and daughter products which can result in radiation exposures of individual organs and the skeleton. The primary environmental radiation exposure from transportation operations is direct gamma radiation. Since the discharges, environmental pathways, and control techniques for uranium and its daughter products are common to all aspects of fuel supply operations except transportation, standards covering these operations as a group are proposed to limit the quantities of these materials discharged to the general environment and to minimize doses to individuals. Through the application of cost-effective control technology, doses to actual individuals or organs can be kept below 15 millirems per year and quantities discharged to the environment can be maintained below one curie per year, exclusive of radon-222.

Although radiation doses to individuals from transportation activities are small, on the average, instances where a few individuals may receive fairly high doses can easily be postulated. Exposures of individuals due to transportation of radioactive materials are difficult to regulate because as shipments move in general commerce between sites the exposed population is constantly changing. Transportation activities should be conducted with every effort made to maintain doses to individuals as low as possible consistent with technical and economic feasibility. In no case should doses to individuals due to shipments of radioactive materials exceed the general standard of 15 millirems per year. The Agency will continue to examine transportation with a view to further action in this area.

CONSIDERATIONS FOR LIGHT-WATER-COOLED POWER REACTORS. On June 9, 1971, the Atomic Energy Commission proposed (36 F. R. 1113) an Appendix I to 10

CFR Part 50 setting forth new design and operation guides for light-water-cooled power reactors. After a careful examination of current waste treatment technology for such plants, EPA concluded that the proposed design guides could be implemented so that design doses to individuals offsite would routinely be limited to less than 5 millirems per year, and that operational control measures could be taken to limit doses to the maximum exposed individual to within a range of 20-40 millirems per year under all conditions of normal operation. Under these circumstances, the Agency decided for the time being not to exercise its authority to establish generally applicable environmental radiation standards for light-water-cooled nuclear power reactors. This decision was publicly stated by the Agency on February 23, 1972, at the rulemaking hearing on proposed Appendix I conducted by the Atomic Energy Commission. Continuing review of the environmental factors involved in the design and operation of light-water-cooled nuclear reactors, coupled with the need for comprehensive standards for the entire uranium-based fuel cycle, as well as specific standards for each component within the cycle, has led us to conclude that numerical standards for reactors should be included in this rulemaking.

As a result of our current analysis, we have concluded that nuclear power reactors can be designed and operated under most conditions at the design levels proposed by the AEC in Appendix I to 10 CFR 50. Accordingly, the Agency has specified a proposed annual dose limit for individuals in the general public of 5 millirems to the whole body and 15 millirems to the thyroid due to normal operations at a reactor site. The standard for annual discharges to the general aquatic environment for

each 1000 megawatts of electrical generating capacity at the site is 5 curies of all radionuclides, except tritium and dissolved noble gases.

With respect to light-water-cooled nuclear power reactors it is important: 1) to set standards which will result in radiation doses to the public which are at the lowest levels consistent with technical and economic feasibility, and 2) to maintain the benefit of a continuous uninterrupted supply of electric power to society during power energy crises, even though standards for normal situations might be exceeded. Such a two-fold objective raises the question whether to impose strict standards at the expense of possible shutdowns which are not justified on a risk-benefit basis during power shortages or to establish liberal standards which would minimize the possibility of such shutdowns. The Agency has attempted to strike a balance between these two goals in the standards proposed by providing for operational variances which satisfy specified criteria in order to avoid closing down power reactors during periods when the orderly delivery of power justifies their operation above the normal limits. The approach of granting operational variances depends to a large degree upon judgments concerning necessary power reserves, overall plant safety, and public health. The Agency anticipates that its proposal in this area will be explored in detail during public hearings on these proposed standards.

An increase to three times the annual dose limit for normal operations is proposed provided a specified emergency demand situation exists and the reactor is otherwise safe to operate. Demand conditions satisfying these variance conditions are expected to occur only rarely, and then only for short periods once or twice annually. The variance is

available only when the utility is unable to satisfy demand conditions through the purchase of other power and when normal AEC safety and occupational regulations are met, and then only to the extent that a demonstrable need for operations at such higher emission levels exists. When the variance is used a report is required through normal public channels to the Federal agency which regulates the utility. These reports should document the rate and cause of the abnormal emissions, the power demand and reserve conditions which justified the operation, and the actions taken to minimize any increased doses to individuals in the general environment.

The Agency also considered whether it would be appropriate to propose a variance to allow power reactors to operate during periods when no emergency demand situation obtains, but an unusual operating difficulty, or siting situation exists. The data available indicate that such operating flexibility does not appear to be required. On the basis of the lack of contrary information, the Agency has determined not to propose a variance for abnormal operations under such conditions. Public comments on the need for such a variance are invited and the Agency will give these comments careful consideration in making a final determination on this issue.

CONSIDERATIONS FOR FUEL REPROCESSING PLANTS. Although most radioactive products produced during fission are retained within reactor fuel elements, the processing of fuel elements destroys these barriers and a variety of radionuclides become available for release in potentially large amounts at fuel reprocessing sites. Krypton-85, tritium, plutonium, iodine-129, and possibly other long-lived radionuclides are of

particular significance in that they have the potential to enter the general atmospheric and hydrological environments and expose large populations over long periods of time. Exposure due to releases of krypton-85 and tritium can be worldwide. Even though all of these radionuclides are amenable to control at plant sites so that individual exposures are small, the total population dose in person-rems can be large because of their persistence in environmental pathways, for many decades in the case of krypton-85 and tritium, and possibly for hundreds of thousands of years for plutonium and the actinides, and millions of years for iodine-129.

Generally applicable environmental standards are proposed for fuel reprocessing plants because several are expected to be in operation during the next several years. However, in view of the environmental risks involved, the Agency is currently evaluating whether future fuel reprocessing ought to be limited until a viable plutonium-based power industry exists. Important factors in this evaluation are: 1) uncertainties in the schedule on which reprocessing to supply plutonium recycled fuels and the plutonium-based fuel cycle are required and justified, 2) the true market value of plutonium, 3) the capability to supply sufficient virgin uranium economically, and 4) the degree to which the costs of dealing with remaining environmental aspects of the industry will affect the desirability of reprocessing fuel to recover uranium.

The Agency has performed a technical analysis of the environmental effects of normal effluents from fuel reprocessing, the efficiency of control technology available for effluent reduction, and the costs of such reduction. Four significant areas in which fuel reprocessing

presents a significant environmental threat were identified. First, there will be worldwide exposure due to the gradual environmental buildup of krypton-85 from the U.S. fuel reprocessing industry. The worldwide impact of this radionuclide is considerably larger than the regional or national impact from this industry. Second, large doses to individuals may occur as a consequence of failure to apply currently available controls and reasonable fuel-cooling times, as a result of discharges of iodine-131 and other short-lived radionuclides. Third, unless currently available controls are rigorously applied, the environmental buildup from long-lived iodine-129, plutonium-239, and several other alpha-emitting transuranic isotopes could become substantial. And finally, there is no control currently available for tritium, the largest potential producer of health effects after krypton-85. The current design practice of eliminating liquid discharges from the main process stream results in tritium being discharged to the atmosphere, rather than to the water pathway. Even though this may avoid release of other radioactive materials, the impact of tritium releases to the atmosphere can, under certain circumstances, result in considerably larger impact than use of the liquid discharge route.

The Agency has proposed environmental radiation standards for fuel reprocessing plants to control each of the four areas identified above. Because of their toxicity and persistence, discharges of plutonium and other particulate alpha-emitting actinides to the general environment should be as low as possible. Fortunately, highly efficient means for the removal of plutonium and other actinides are available at low cost and are well developed. Standards to limit the number of curies of these

nuclides released to the general environment per year are proposed to limit the long-term buildup of these materials which should provide protection against potential health effects over many generations.

Recently developed control techniques offer efficient methods of cost-effective supplementary control for the removal of radioiodines. At the levels of control achievable using these techniques it is possible to maintain annual doses to infant thyroids below 15 millirems. Additional measures available for control of iodine include fuel cooling prior to processing, site selection and access control, careful environmental monitoring, and assuring that critical population groups are not excessively exposed via milk. On the basis of the availability of these and other control techniques and measures, therefore, it is proposed to limit the maximum annual dose to the whole body or any organ of any individual from fuel reprocessing activities to 15 millirems from all radionuclides, including iodine-131.

The removal of krypton-85 from spent fuel reprocessing streams must be considered of high priority in terms of its potential for long-term public health impact over the entire world. A variety of highly efficient techniques can be applied to accomplish this, although no facility has yet installed such control. The Agency proposes that the amount of krypton-85 entering the general environment from fuel reprocessing be limited to less than one percent of the total inventory of krypton-85 in fuel received for processing. In order to allow the industry time to implement this standard, its effective date has been specified as 48 months after the effective date of this rulemaking. In view of the fact that systems have been offered by commercial vendors at

performance levels sufficient to limit discharges to a fraction of a percent of the krypton-85 inventory in fuel received, the Agency will continue to examine the performance of this technology to determine how far below the proposed standard future required levels might be reasonably set. An exclusion from this standard for krypton-85 removal is proposed for plants which went operational prior to 1970, since only one such facility exists and it is of small capacity (1 metric ton of fuel per day processed) and retrofitting would constitute an unreasonable economic burden. If, however, that facility adds to or changes its processing capacity by more than 50 percent of its present capacity, it would be required to satisfy the proposed standard for krypton-85 after such modification.

No limit is proposed now for tritium entering the general environment from fuel reprocessing, since the availability of technology for controlling this discharge and its costs are uncertain at the present time. Since tritium levels in the general environment from fuel reprocessing are expected to become significant by the late 1980's, and tritium will present the largest potential population impact from the uranium fuel cycle after release of krypton-85 has been controlled, the Agency believes that final development and installation of controls to minimize the environmental buildup of tritium due to releases from uranium fuel reprocessing will then become important. A future rulemaking is contemplated dealing with tritium releases from reprocessing plants built after 1978.

Current designs for new reprocessing plants propose no liquid effluents as a result of normal operations. This practice will usually

result in minimum population impact from all radionuclides except, in some circumstances, tritium. This mode of operation is preferred, except in those instances where it can be demonstrated that radionuclide discharges in liquid effluents will result in lower total discharges or radiation doses to surrounding populations than would result if equivalent quantities were discharged via airborne effluents. This consideration is especially important for tritium discharges, since its population impact is governed primarily by the characteristics of sites with respect to population distribution and water use. For example, tritium discharges to the ocean from seacoast sites are expected to result in a lower total impact than atmospheric discharges at such sites.

Pursuant to the Atomic Energy Act of 1954, as amended, notice is hereby given that adoption of the following addition to 40 CFR Part -- is contemplated. All interested persons who wish to submit comments or suggestions in connection with this proposed rulemaking are invited to send them to the Office of Radiation Programs, Environmental Protection Agency, Washington, D.C. 20460, within 60 days after publication of this notice in the Federal Register. Within this same time period, interested parties are also invited to indicate their desire to participate in a public hearing on the proposed rulemaking to be scheduled after the comment period ends. Comments and suggestions received after the 60-day comment period will be considered if it is practical to do so, but such assurance can only be given for comments filed within the period specified. Comments and all technical support documents for this rulemaking may be examined in the Agency's Public Affairs Office, 4th and M Streets, S. W., Washington, D.C. 20460. Single copies of a Statement

of Considerations for the standard and the technical report entitled "Environmental Analysis of the Uranium Fuel Cycle" are also available upon request at this same address.

Russell E. Train
Administrator

Exhibit C

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

October 19, 1973

MEMORANDUM FOR: THE PRESIDENT

FROM: Dixy Lee Ray

SUBJECT: AEC Position on Division of Responsibilities and Authorities Between the Atomic Energy Commission and the Environmental Protection Agency

Summary of AEC Position

AEC and EPA have certain related statutory responsibilities and authorities from the standpoint of radiation control. AEC's basic position with respect to the interface between those responsibilities and authorities is as follows:

a. AEC's and EPA's responsibilities and authorities should be coordinated in the overall public interest and in accordance with the President's direction to: "reduce excessive regulatory and administrative impediments which have delayed or prevented construction of energy-producing facilities; and streamline our governmental procedures for licensing and inspections, reduce overlapping jurisdictions and eliminate confusion generated by the government." Thus, these responsibilities and authorities should be complementary rather than duplicative.

b. EPA, rather than AEC, should establish generally applicable radiation standards for the protection of the general environment outside the boundaries of nuclear facilities or other activities licensed by the AEC under the Atomic Energy Act. Such generally applicable standards should be developed on the basis of a comparative-risk analysis and a general review of technology, should be based on normal conditions of operation rather than accidents, and should be in the nature of ambient standards rather than effluent or discharge limitations which are directly related to "hardware" and which are imposed by AEC as an integral part of its statutorily required and long-established licensing proces

c. AEC, rather than EPA, should specify the legal controls concerning radiation safety aspects of siting and design of nuclear facilities (such as nuclear electric power plants), operating procedures, and the limits on the small amounts of radioactive materials that may be emitted from nuclear facilities (and other

activities licensed by AEC) as a result of normal operations. In imposing such emission limits, AEC will implement and enforce, through its comprehensive program of licensing, standard-setting, inspection and enforcement, such generally applicable standards as are established by EPA in accordance with paragraph b. above.

AEC's position is based upon: (a) the text of Reorganization Plan No. 3; (b) the "legislative history" associated with the Plan; (c) the fact that AEC has already established a comprehensive program of licensing, standard-setting, inspection, and enforcement over nuclear facilities and activities (and must continue to carry out such a program in the exercise of its responsibilities under the Atomic Energy Act); (d) the fact that under that program the safety record of the nuclear industry has been outstanding; (e) AEC's demonstrated scientific competence and existing staff capabilities in the areas in question; and (f) the sound public policy that needless and wasteful duplication of effort should be avoided. The legal and policy support for the AEC position is set out in Attachment "A".

EPA's Proposed Fuel Cycle Standards

For the reasons stated below, the proposed EPA uranium fuel cycle standards (an analysis of which is contained in Attachment "B") are not in accord with the division of responsibilities and authorities described above. Moreover, they are not technically supportable in several respects and represent a wasteful, conflicting and unnecessary duplication of an AEC rulemaking proceeding which was initiated in 1971 and is now nearing completion. This AEC proceeding (which is described in greater detail in Attachment "C") involves a new Appendix I to 10 CFR Part 50 that would set forth design objectives and limiting conditions of operation to keep levels of radioactivity in effluents from light-water-cooled nuclear power reactors as low as practicable. A three-volume NEPA environmental impact statement was issued by AEC in connection with Appendix I. EPA participated in public hearings conducted by AEC on the Appendix. A copy of the testimony of Mr. David Dominick of EPA, supporting the AEC approach, is attached (Attachment "D").

Subpart C of the proposed EPA standards sets forth specific rather than generally applicable standards for planned controlled discharges from light-water-cooled nuclear power reactors. They would impose radionuclide release limits, dose limits and requirements for implementing such limits - matters that are specifically addressed in the AEC licensing and regulatory process.

The proposed EPA standards conflict and are inconsistent with the implementation approach in the AEC's Appendix I. EPA, since February 1972, was on record as supporting this AEC approach. The new standards proposed by EPA constitute a reversal of EPA's prior position. Furtner, the EPA standards include operating requirements related to power emergencies that are unrealistic and probably unworkable. Enforcement of such standards could

result in frequent shutdowns of nuclear power reactors without any significant contribution to the public health and safety or environmental protection. EPA does not propose to issue an environmental impact statement in connection with its proposed standards.

The requirements, in Subpart D of the EPA standards relating to the removal of krypton-85 from uranium fuel reprocessing plants, are beyond the state of the proven, practicable technology and, even if implemented, would reduce the average annual whole body exposure to the U.S. population by only 0.003 millirem by the Year 1980 and by 0.04 millirem by the Year 2000. This may be compared with the average annual exposure of the U.S. population from natural background radiation of about 125 millirems per year. It would be necessary for the industry to mount a heavily accelerated program to attempt to achieve the objectives proposed in the EPA standards within the time period permitted. We do not believe the requirements on krypton-85 removal can be justified on cost-effectiveness and health and safety bases at this time.

Implications of Proceeding with EPA's Proposed Standards

If the proposed EPA standards were adopted, AEC would be required by Reorganization Plan No. 3 to implement and enforce them.* Since they conflict with AEC's Appendix I, the AEC would need to assess the utility of continuing with its current rulemaking proceeding which, of course, would be disrupted by such a course of events. This proceeding has thus far involved several man-years of effort and the environmental impact statement alone is estimated to have cost $325,000.

In addition, there would be an impairment of AEC's ability to achieve the lowest practicable release of radioactive materials through a combination of appropriate siting factors, design requirements and operating procedures. This would be due to the fact that the proposed EPA standards are set at

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* In the Federal Register notice which accompanied publication of proposed Appendix I on June 9, 1971, AEC included the following statement at the request of EPA: "EPA has under consideration generally applicable environmental standards for these types of power reactors. AEC has consulted EPA in the development of the guides on design objectives and limiting conditions for operation set forth below to control radioactivity in effluent releases. If the design objectives and operating limits established herein should prove to be incompatible with any generally applicable environmental standard hereafter established by EPA, the AEC will modify these objectives and limits as necessary."

This statement continues to reflect AEC policy. The disagreement with EPA relates to the type of generally applicable environmental standards that are appropriate for promulgation by EPA - not to AEC's responsibility to implement such standards.

such a level that implementation by AEC which gives credit to specific site characteristics and takes into account the need for reasonable operating flexibility, because of uncertainties in fuel element performance and rad-waste treatment performance, is not possible.

Implementation of the proposed EPA standards would have a significant impact on the nuclear industry. The AEC 1972 data on releases of radioactive material from 25 light-water-cooled operating power reactors indicate that 11 of the reactors, while meeting the AEC's Appendix I with its operating flexibility, would not have met EPA's curie limits for liquid releases which give no credit for site characteristics with respect to exposures. It appears that all of these reactors would have to make some modifications in their waste treatment systems within 12 months after the effective date of the regulation without any meaningful reduction in population doses. Some of these modifications would involve major changes in design of waste treatment systems and interruption of power reactor operation. In five cases the quantity limit on tritium could require replacing the fuel elements in the core of the reactor.

Implications of Not Proceeding with EPA's Proposed Standards

If EPA does not issue standards of the type proposed for the nuclear fuel cycle, AEC will complete its rulemaking proceeding on proposed Appendix I and continue to implement it in order to keep radiation exposures to the public as low as practicable. (As a practical matter, AEC has, since 1971, already implemented Appendix I guides in evaluating nuclear power plants.) Further, AEC has underway extensive studies on the remaining types of plants in the nuclear fuel cycle to develop data on technology, control measures and costs. This will provide a firm basis for rulemaking to assure that exposures from effluents from all plants in the fuel cycle are maintained at levels which are as low as practicable. In connection with such rulemaking, AEC would prepare NEPA environmental statements. EPA would have full opportunity to review such proposed regulations and environmental statements and to provide comments and recommendations to AEC.

We believe that from the standpoint of the nuclear industry - and, more importantly, from the overall public interest - a single Federal standard addressed to the matters dealt with above would avoid confusion and duplication of effort and would achieve the paramount objective of protection of the public health and safety.

From the standpoint of assuring adequate protection of public health and safety and the environment with respect to the operation of nuclear facilities, we do not believe that issuance of the EPA standards will make any significant contribution. AEC has estimated that by the Year 2000 the average whole body exposure to the U.S. population from commercial nuclear power facilities will be about 0.2 millirem per year. Similarly the Advisory Committee on the Biological Effects of Ionizing Radiation of the National Academy of Sciences estimated in the BEIR Report issued in November 1972 that the average whole

body dose to the U.S. population from normal operation of nuclear power reactors in the Year 2000 would be about 0.17 millirem. We are confident that by applying AEC's as low as practicable requirement in the licensing process to all nuclear facilities, the total exposure from such facilities in the Year 2000 will be a small fraction of the exposure from natural background radiation.

AEC Recommendation

EPA would develop generally applicable standards that would specify the annual radiation doses that could be received by a member of the public and the total population as a result of releases of radiation and radioactive materials to the environment from all sources of exposure or from classes of activities such as the entire light-water-cooled nuclear electric power plant fuel cycle, including uranium milling, conversion of uranium, fuel fabrication, generation of electricity, and fuel reprocessing. AEC would, in turn, implement such standards by establishing emission limits for individual activities in the fuel cycle, including operation of nuclear electric power plants. Further explanation of this recommendation is contained in Attachment "E".

Chairman

Attachments:

A - Basis for AEC Position Concerning Division of Responsibilities and Authorities between EPA and AEC

B - September 5, 1973 letter fm Commissioner Doub to Quarles w/ Technical Comments, w/Oct. 12, 1973 letter Rogers to Mills

C - Status of AEC Requirements for Control of Radioactive Materials in Power Reactor Effluents

D - Cy of Transcript of Statement of David D. Dominick, Asst. Admin. Office of Categorical Programs on Behalf of the EPA

E - Summary of AEC Position on Relative Responsibilities of EPA and AEC on Standards to Control Radioactivity in Effluents for Normal Operations w/Annex 1 - AEC Proposed Compromise EPA Generally applicable standard for the Protection of the General Environment for the Uranium Fuel Cycle

ATTACHMENT "A"

BASIS FOR AEC POSITION CONCERNING DIVISION OF
RESPONSIBILITIES AND AUTHORITIES BETWEEN EPA AND AEC

The Atomic Energy Commission (AEC), created by the Atomic Energy Act of 1946 (amended in its entirety by the Atomic Energy Act of 1954), and the Environmental Protection Agency (EPA), created by Reorganization Plan No. 3 of 1970, have certain related statutory responsibilities and authorities under the Act and Plan from the standpoint of radiation control. In addition, both agencies have certain responsibilities and authorities concerning environmental matters under the National Environmental Policy Act of 1969 (NEPA), and EPA is vested with specific responsibilities concerning discharges into the waters of the United States under the Federal Water Pollution Control Act (FWPCA).

a. Authority over Radioactive Emissions from Nuclear Facilities

The peaceful use of atomic energy was the first technology to be subject to Federal control from its inception. Under the Atomic Energy Act, no person may construct or operate a nuclear facility (a facility which utilizes radioactive materials such as a nuclear electric power plant) or possess or use most radioactive materials except pursuant to an AEC permit or license. In addition, the Atomic Energy Act authorized AEC to promulgate regulations specifying design and siting requirements for nuclear facilities to protect against possible radiation hazards, including measures to protect against accidental releases of radioactive materials, and limits on the amounts of radioactive materials that may be released from nuclear

facilities, and other activities involving nuclear materials, as a result of normal operations.

Under the Act, the AEC established a comprehensive program of licensing of nuclear facilities and activities, standard-setting, regular inspections of licensed activities, and enforcement. Detailed regulations concerning siting, design, and other aspects of nuclear facilities and activities have been published in 10 CFR Chapter 1.

The Atomic Energy Act also established the Federal Radiation Council (FRC) whose function was to advise the President on radiation matters affecting health, and to provide recommendations to Federal agencies (including AEC) regarding the formulation of radiation standards. However FRC had no licensing or regulatory authority.

Reorganization Plan No. 3 of 1970 grew out of recommendations of the President's Advisory Committee on Executive Reorganization, chaired by Mr. Roy L. Ash. The philosophy underlying the Plan was that it was not possible to bring together into one Federal agency all executive branch functions dealing with environmental protection and thereby create an environmental "czar". Rather, the central and guiding concept was to consolidate the general standard-setting functions of Federal agencies in the environmental protection field.

This underlying concept was reflected in the division of responsibilities in the radiation protection field. Under the Plan the following functions

with respect to radiation standards were transferred to the new EPA:

> "The functions of the Atomic Energy Commission under the Atomic Energy Act of 1954, as amended, administered through its Division of Radiation Protection Standards, to the extent that such functions of the Commission consist of establishing generally applicable environmental standards for the protection of the general environment from radioactive material. As used herein, standards mean limits on radiation exposures or levels, or concentrations or quantities of radioactive material, in the general environment outside the boundaries of locations under the control of persons possessing or using radioactive material."
>
> "All functions of the Federal Radiation Council...."

At the same time, the President's message transmitting the Plan to the Congress stated that "AEC would retain responsibility for the implementation and enforcement of radiation standards [promulgated by EPA] through its licensing authority".

Since the FRC had no licensing or regulatory authority, the only possible source for EPA responsibility and authority over radioactive materials under the Plan is the single function transferred from AEC. However as the Plan itself and the accompanying statement by the President make clear, the function transferred from AEC was confined to establishing <u>generally applicable</u> standards regarding limits on radiation exposures or levels or concentrations or quantities of radioactive materials <u>in the general environment outside the boundaries of locations under the control of persons possessing or using radioactive material</u> [such as persons licensed by AEC to operate nuclear electric power plants]. Clearly standards which are only applicable to areas beyond the control of persons possessing or using the

radioactive materials, are in the nature of ambient standards, and are not emission standards which would be directly applicable to the persons actually possessing or using the materials and areas within their control. It was specifically contemplated that implementing action would have to be taken to relate the general standards for the general environment to the persons actually operating nuclear facilities and possessing or using radioactive materials. As the President's message makes clear, this was to be the role of AEC.

There was substantial discussion during the House and Senate hearings on the Reorganization Plan regarding the respective functions of AEC and EPA. This "legislative history" confirms what common sense would indicate -- that emission limits on radioactive materials applicable to specific persons possessing or using the materials were regarded as an essential element of AEC's implementing role and not as an element of EPA's general environmental standard-setting function. Indeed establishment of such emission limits is an integral part of the safety review of the overall plant design and siting conducted by AEC. In the words of Mr. Ink of OMB, a principal Administration witness during the hearings, it is AEC which has "the competence and the know-how to see how a reactor is put together, and how it is designed, which, as you can appreciate, is a tremendously complex type of engineering and scientific undertaking. We have not tried to put into [EPA] that kind of scientific competence...."

Following enactment of the Federal Water Pollution Control Act Amendments

of 1972, EPA initially took the position that this legislation vested it with regulatory authority over discharges into United States waters of radioactive materials otherwise subject to regulation by the AEC. Subsequently, however, EPA adopted the position urged by the AEC that the term "pollutant", as used in that legislation, does not include radioactive materials subject to AEC regulation under the Atomic Energy Act.

However, despite the above, EPA proposes to establish specific limits for radioactive materials applicable to certain persons licensed by AEC, including persons licensed to operate nuclear electric power plants.* AEC believes this would go beyond the authority vested in EPA under the Reorganization Plan, and place EPA in an area where AEC rather than EPA has the scientific expertise and where AEC rather than EPA has established a comprehensive licensing and regulatory program.

In the past two years AEC has been conducting extensive rulemaking hearings, seeking in effect to establish more stringent and definitive limitations on the amounts of radioactive materials that may be released as a result of normal operation of individual nuclear electric power plants. The parties to this hearing were accorded full rights to present testimony and to cross-examine AEC expert witnesses and officials as to the basis for AEC's proposal. EPA made a statement at this hearing. EPA's proposal seeks to duplicate this AEC effort and, in the last analysis, supersede it by

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* Proposed "Environmental Radiation Protection Requirements for Normal Operations of Activities in the Uranium Fuel Cycle", transmitted by EPA to AEC for comment on August 16, 1973.

initiating another rulemaking proceeding on the same subject under EPA auspices. Even apart from jurisdictional limitations discussed above, AEC believes that such an effort -- wastefully duplicative at best and, at worst, resulting in conflicting regulatory requirements by two Federal agencies -- would not be in the public interest.

Proposed Resolution

AEC proposes that EPA adopt generally applicable environmental radiation standards that would specify the annual radiation doses that could be received by a member of the public and the total population as a result of releases of radiation and radioactive materials to the environment from all sources of exposure or from classes of activities such as the entire light-water-cooled nuclear electric power plant fuel cycle, including uranium milling, conversion of uranium, fuel fabrication, generation of electricity, and fuel reprocessing. AEC would, in turn, implement such standards by establishing emission limits for individual activities in the fuel cycle, including operation of nuclear electric power plants.

b. Authority over Accident Prevention

In the past EPA has attempted to assert a kind of oversight authority over AEC accident protection functions. This position on the part of EPA is reflected, for example, in its insistence on direct participation in the Reactor Safety Study of accident probabilities and consequences currently being conducted by Professor Rasmussen of MIT under the Commission's auspices.

As indicated above, under the Atomic Energy Act AEC has been vested with broad authority over the design and siting of nuclear facilities to protect against accidental releases of radioactive materials. AEC's existing, comprehensive program for the licensing and regulation of such facilities is, of course, directed in large part to the prevention and control of nuclear accidents. At the time Reorganization Plan No. 3 of 1970 entered into effect, AEC's standard-setting functions in this regard were exercised primarily by its Division of Reactor Standards. The Division of Radiation Protection Standards, cited in the Plan in describing the functions transferred to EPA, exercised no functions in this area. The other entity cited in the Plan, the FRC, had no licensing or regulatory authority regarding protection against accidental releases of radioactive materials.

While AEC and EPA have been unable to agree as to the limits of their respective responsibilities and authorities in this area under Reorganization Plan No. 3, AEC and EPA have agreed upon the text of the radiation accident risk discussion to be included in environmental impact statements prepared by AEC, pursuant to NEPA, for nuclear electric power plants. A copy of this text is attached (Annex 1).

Proposed Resolution

AEC will continue to include the agreed upon discussion of radiation accident risk in its environmental impact statements. However, EPA should recognize that under the Reorganization Plan it has no legal authority concerning design and siting of nuclear facilities to protect against

accidental releases of radioactive materials.

c. Inspection of AEC Licensed Facilities

As indicated above, AEC has established a comprehensive program of regular inspections of persons licensed to possess and use radioactive materials and operate nuclear facilities. In the past there had been some disagreement between AEC and EPA regarding EPA's authority to inspect such licensed facilities. This has now been resolved by execution of a memorandum of understanding between the two agencies. A copy of this memorandum of understanding is attached (Annex 2). This memorandum of understanding recognizes that EPA has no independent legal authority to inspect AEC licensed facilities.

Annex 1 to Attachment "A"

ENVIRONMENTAL IMPACT OF POSTULATED ACCIDENTS

A high degree of protection against the occurrence of postulated accidents in the (NAME OF PLANT) is provided through correct design, manufacture, and operation, and the quality assurance program used to establish the necessary high integrity of the reactor system, as will be considered in the Commission's Safety Evaluation. Deviations that may occur are handled by protective systems to place and hold the plant in a safe condition. Notwithstanding this, the conservative postulate is made that serious accidents might occur, even though they may be extremely unlikely; and engineered safety features are installed to mitigate the consequences of those postulated events which are judged credible.

The probability of occurrence of accidents and the spectrum of their consequences to be considered from an environmental effects standpoint have been analyzed using best estimates of probabilities and realistic fission product release and transport assumptions. For site evaluation in the Commission's safety review, extremely conservative assumptions are used for the purpose of comparing calculated doses resulting from a hypothetical release of fission products from the fuel against the 10 CFR Part 100 siting guidelines. Realistically computed doses that would be received by the population and environment from the accidents which are postulated would be significantly less than those to be presented in the Safety Evaluation.

The Commission issued guidance to applicants on September 1, 1971, requiring the consideration of a spectrum of accidents with assumptions as realistic as the state of knowledge permits. The applicant's response was contained in the (APPLICANT'S ENVIRONMENTAL REPORT).

The applicant's report has been evaluated, using the standard accident assumptions and guidance issued as a proposed amendment to Appendix D of 10 CFR Part 50 by the Commission on December 1, 1971. Nine classes of postulated accidents and occurrences ranging in severity from trivial to very serious were identified by the Commission. In general, accidents in the high potential consequence end of the spectrum have a low occurrence rate and those on the low potential consequence end have a higher occurrence rate. The examples selected by the applicant for these cases are shown in Table I. The examples selected are reasonably homogeneous in terms of probability within each class.

Commission estimates of the dose which might be received by an assumed individual standing at the site boundary in the downwind direction, using the assumptions in the proposed Annex to Appendix D, are presented in Table II. Estimates of the integrated exposure that might be delivered to the population within 50 miles of the site are also presented in Table II. The man-rem estimate was based on the projected population within 50 miles of the site for the year .

To rigorously establish a realistic annual risk, the calculated doses in Table II would have to be multiplied by estimated probabilities. The events in Classes 1 and 2 represent occurrences which are anticipated during plant operations; and their consequences, which are very small, are considered within the framework of routine effluents from the plant. Except for a limited amount of fuel failures and some steam generator leakage, the events in Classes 3 through 5 are not anticipated during plant operation; but events of this type could occur sometime during the 40 year plant lifetime. Accidents in Classes 6 and 7 and small accidents in Class 8 are of similar or lower probability than accidents in Classes 3 through 5 but are still possible. The probability of occurrence of large Class 8 accidents is very small. Therefore, when the consequences indicated in Table II are weighted by probabilities, the environmental risk is very low. The postulated occurrences in Class 9 involve sequences of successive failures more severe than those required to be considered in the design bases of protection systems and engineered safety features. Their consequences could be severe. However, the probability of their occurrence is judged so small that their environmental risk is extremely low. Defense in depth (multiple physical barriers), quality assurance for design, manufacture and operation, continued surveillance and testing, and conservative design are all applied to provide and maintain a high degree of assurance that potential accidents in this class are, and will remain, sufficiently small in probability that the environmental risk is extremely low.

The AEC is currently performing a study to assess more quantitatively these risks. The initial results of these efforts are expected to be available in early 1974. This study is called the Reactor Safety Study and is an effort to develop realistic data on the probabilities and sequences of accidents in water cooled power reactors, in order to improve the quantification of available knowledge related to nuclear reactor accidents probabilities. The Commission has organized a special group of about 50 specialists under the direction of Professor Norman Rasmussen of MIT to conduct the study. The scope of the study has been discussed with EPA and described in correspondence with EPA which has been placed in the AEC Public Document Room (letter, Doub to Dominick, dated June 5, 1973).

As with all new information developed which might have an effect on the health and safety of the public, the results of these studies will be made public and would be assessed on a timely basis within the regulatory process on generic or specific bases as may be warranted.

Table II indicates that the realistically estimated radiological consequences of the postulated accidents would result in exposures of an assumed individual at the site boundary to concentrations of radioactive materials that are within the Maximum Permissible Concentrations (MPC) of 10 CFR Part 20. The table also shows the estimated integrated exposure of the population within 50 miles of the plant from each postulated accident. Any of these integrated exposures would be much smaller than that from naturally occurring radioactivity. When

considered with the probability of occurrence, the annual potential radiation exposure of the population from all the postulated accidents is an even smaller fraction of the exposure from natural background radiation and, in fact, is well within naturally occurring variations in the natural background. It is concluded from the results of the realistic analysis that the environmental risks due to postulated radiological accidents are exceedingly small and need not be considered further.

Table I. Classification of Postulated Accidents and Occurrences

Class	AEC Description	Applicant's Examples
1.	Trivial incidents	
2.	Small releases outside containment	
3.	Radioactive waste system failure	
4.	Fission products to primary system (BWR)	Not applicable.
5.	Fission products to primary and secondary systems (PWR)	
6.	Refueling accident	
7.	Spent fuel handling accident	
8.	Accident initiation events considered in design-basis evaluation in the Safety Analysis Report	
9.	Hypothetical sequence of failures more severe than Class 8	Not considered.

TABLE II

SUMMARY OF RADIOLOGICAL CONSEQUENCES OF POSTULATED ACCIDENTS[1/]

Class	Event	Estimated Fraction of 10 CFR Part 20 limit at site boundary[2/]	Estimated Dose to Population in 50 mile radius man-rem
1.0	Trivial Incidents	3/	3/
2.0	Small releases outside containment	3/	3/
3.0	Radwaste System failures		
3.1	Equipment leakage or malfunction		
3.2	Release of waste gas Storage tank contents		
3.3	Release of liquid waste storage contents		
4.0	Fission products to primary system (BWR)	N.A.	N.A.

1/ The doses calculated as consequences of the postulated accidents are based on airborne transport of radioactive materials resulting in both a direct and an inhalation dose. Our evaluation of the accident doses assumes that the applicant's environmental monitoring program and appropriate additional monitoring (which could be initiated subsequent to a liquid release incident detected by in-plant monitoring) would detect the presence of radioactivity in the environment in a timely manner such that remedial action could be taken if necessary to limit exposure from other potential pathways to man.

2/ Represents the calculated fraction of a whole body dose of 500 mrem, or the equivalent dose to an organ.

3/ These releases are expected to be in accord with proposed Appendix I for routine effluents (i.e., 5 mrem per year to an individual from either gaseous or liquid effluents).

TABLE II - Continued

Class	Event	Estimated Fraction of 10 CFR Part 20 limit at site boundary[2]	Estimated Dose to population in 50 mile radius, man-re
5.0	Fission products to primary and secondary systems (PWR)		
5.1	Fuel cladding defects and steam generator leaks	[3]	[3]
5.2	Off-design transients that induce fuel failure above those expected and steam generator leak		
5.3	Steam generator tube rupture		
6.0	Refueling accidents		
6.1	Fuel bundle drop		
6.2	Heavy object drop onto fuel in core		
7.0	Spent fuel handling accident		
7.1	Fuel assembly drop in fuel rack		
7.2	Heavy object drop onto fuel rack		
7.3	Fuel cask drop	N.A.	N.A.
8.0	Accident initiation events considered in design basis evaluation in the SAR		
8.1	Loss-of-Coolant Accidents		
	Small Break		
	Large Break		

TABLE II - Continued

Class	Event	Estimated Fraction of 10 CFR Part 20 limit at site boundary[2/]	Estimated Dose to population in 50 mile radius, man-rem
8.1(a)	Break in instrument line from primary system that penetrates the containment	N.A.	N.A.
8.2(a)	Rod ejection accident (PWR)		
8.2(b)	Rod drop accident (BWR)	N.A.	N.A.
8.3(a)	Steamline breaks (PWR's outside containment		
	Small Break		
	Large Break		
8.3(b)	Steamline break (BWR)	N.A.	N.A.

ATOMIC ENERGY COMMISS...

AEC-LICENSED FACILITIES

Memorandum of Understanding

Both the Environmental Protection Agency (EPA) and the Atomic Energy Commission (AEC) have complementary responsibilities in areas of environmental protection and the control of radiation effects. In order to fix an appropriate interface of the respective functions of the two agencies, to further facilitate their useful cooperation, and to avoid unnecessary duplication of regulatory effort, EPA and the AEC have executed a memorandum of understanding with regard to AEC-licensed facilities. The text of the memorandum is set forth below.

Dated at Germantown, Maryland this 6th day of September 1973.

For the Atomic Energy Commission.

GORDON M. GRANT,
Acting Secretary of the Commission.

AEC-EPA MEMORANDUM OF UNDERSTANDING WITH RESPECT TO AEC-LICENSED FACILITIES

Both the Atomic Energy Commission (AEC) and the Environmental Protection Agency (EPA) have complementary responsibilities in areas of environmental protection and the control of radiation effects. Pursuant to Reorganization Plan No. 3 of 1970, "the functions of the Atomic Energy Commission under the Atomic Energy Act of 1954, as amended, administered through its Division of Radiation Protection Standards to the extent that such functions of the Commission consist of establishing generally applicable environmental standards[1] for the protection of the general environment from radioactive material" and all functions of the Federal Radiation Council were transferred to the Administrator of EPA. The President's message to the Congress upon transmitting Reorganization plans to establish EPA and NOAA stated that "AEC would retain responsibility for the implementation and enforcement of radiation standards through its licensing authority." In order to fix an appropriate interface of the respective functions of the two agencies, to further facilitate their useful cooperation, and to avoid unnecessary duplication with regard to AEC-licensed facilities, the AEC and EPA agree as follows:

1. AEC-licensed facilities are subject through AEC licensing authority and requirements to EPA's generally applicable environmental radiation standards, as defined in Reorganization Plan No. 3 of 1970. AEC will take appropriate action to assure that AEC-licensed facilities are operated in such a manner that routi... radioactive discharges therefrom do n... exceed generally applicable environme... tal standards established by EPA, outsi... the site boundary, for the protection ... the general environment from radioac... tive material.

2. The AEC and the EPA will joint... undertake and carry out arrangemen... for special studies for the purpose of o... taining necessary information for esta... lishing generally applicable environme... tal standards for the protection of t... general environment from radioacti... material discharged from AEC-licens... facilities. For example, the AEC will su... ply to EPA AEC data and will use its be... efforts to supply reasonably obtainat... licensee data, relevant to radioactive e... fluents and the generation of pathw... models. The AEC will also participa... and will take appropriate action to a... range for its licensees to participate. ... may be necessary, in providing data ... releases and concurrent meteorologic... data in support of EPA field measur... ments and special studies such as pat... way model verification at typical licens... facilities. The EPA will endeavor to min... mize the number of separate typical f... cilities on which field measurements w... be needed in establishing pathw... models.

3. It is agreed that EPA may accon... pany AEC inspectors on AEC inspectio... of AEC-licensed facilities for the pu... pose of becoming informed on how ... censees conform with generally applic... ble environmental standards. Such a... companiment may, at the discretion ... EPA, be on either announced or una... nounced AEC inspections. It is antic... pated that up to 5 such accompanimen... may be made in FY 1974. EPA will d... termine those inspections on which ... wishes to accompany AEC. The first st... will be for AEC to familiarize the EP... with the scope of AEC inspections.

4. EPA will advise and obtain AE... comments prior to the publication ... data relating to discharges from AE... licensed facilities and the results ... these programs.

5. EPA will furnish technical advi... and assistance to AEC upon request ... discharges to the environment fro... AEC-licensed facilities.

6. Nothing in this Memorandum ... Understanding, or any activities co... ducted hereunder, shall be construed ... precedent for, or as recognizing, a... authority of EPA to duplicate or supe... vise inspection activities of the AEC.

For the United States Atomic Ener... Commission.

WILLIAM O. DOUB,
Commissioner.

AUGUST 27, 1973.

For the United States Environment... Protection Agency.

CHARLES ELKINS,
Acting Assistant Administrator for Hazardous Materials Control.

AUGUST 21, 1973.

[FR Doc.73-19259 Filed 9-7-73;8:45 am]

[1] The word "standards," as used herein, has the same meaning as in Reorganization Plan No. 3 of 1970, as follows: "standards mean limits on radiation exposure or levels, or concentrations or quantities of radioactive material, in the general environment outside the boundaries of locations under the control of persons possessing or using radioactive material."

ATTACHMENT "B"

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

SEP 5 1973

Mr. John Quarles
Acting Administrator
U. S. Environmental Protection Agency
401 M Street, S. W.
Washington, D. C. 20460

Dear Mr. Quarles:

We appreciate the opportunity to review the proposed EPA environmental radiation standards for normal operation of the uranium fuel cycle and your staff analysis report on the same subject, "Proposed Radiation Standards for the Fuel Cycle", which were transmitted with your letter to Chairman Ray on August 16, 1973. We also appreciate the briefing on this material that Dr. William D. Rowe, Deputy Assistant Administrator for Radiation Programs, and his staff have provided to our staff.

Our review of the draft of the proposed rule has identified several important problems. Basically, the proposed rule would impose radionuclide release limits, dose limits, and requirements for implementing such limits applicable to individual nuclear power reactor and fuel cycle facilities which we believe would in some cases be unworkable.

We are particularly concerned about the effect of the proposed EPA standards on the Commission's Appendix I rulemaking proceeding on numerical guides for design objectives and limiting conditions for operation to meet the criterion on "as low as practicable" for radioactive material in light-water-cooled nuclear power reactor effluents. This proposed rule was published in the Federal Register in June 1971 and a rulemaking hearing has been underway during the past two years. EPA testified at this rulemaking hearing. As you know, a detailed Final Environmental Statement was issued on the proposed rule in July 1973.

The EPA proposed specific standards for planned controlled discharges from light-water-cooled nuclear power reactors are significantly different in several respects from the Commission's proposed Appendix I. It appears that, in effect, the proposed Appendix I numerical values for design objectives would be adopted by EPA as upper limits without the operating flexibility included in the proposed Appendix I to take into account variation in fuel element and waste treatment equipment performance. We believe that the variance procedures which EPA has included in Subpart C for power reactors for emergency situations may be unmanageable from the standpoint of administration in a regulatory program. Further, the provision for variance from the very low EPA proposed dose limits only under emergency conditions, implies a public health and safety significance to doses a few times above the EPA dose limits which we do not believe is justified.

Our second major concern deals with the proposed requirement that the total quantity of krypton-85 released from fuel reprocessing plants must be less than 1 percent of the total inventory of krypton-85 in the fuel received for reprocessing. We do not believe that the technology has been developed to the extent that this requirement can be met on the time scale set forth in the EPA proposed standards. While work is underway to develop the technology to remove krypton-85 from the fuel reprocessing waste treatment stream, we do not believe the sense of urgency implied in the EPA standard is justified from a public health and safety standpoint. For example, the EPA report on estimates of ionizing radiation doses in the United States 1960-2000 issued in August 1972 indicates that the estimated whole body annual doses to the United States population from krypton-85, assuming the release of all krypton-85 in the world nuclear power program, would be 0.003 millirem in 1980, 0.01 millirem in 1990 and 0.04 millirem in the Year 2000.

We believe that EPA should limit its proposed standards to radiation exposure for levels or quantities of radioactive material in the general environment rather than to impose specific release limits and implementation requirements on individual sites. This approach

would be consistent with Reorganization Plan No. 3. Such standards would fulfill EPA responsibilities while at the same time leave AEC with its implementation and enforcement functions. It is essential that the AEC maintain the authority to achieve the lowest practicable releases of radioactive materials through a combination of appropriate siting factors and the selection of facilities, equipment and procedures to assure operation in the public interest.

The Congress, under the Atomic Energy Act of 1954, has given responsibility to the AEC to license and regulate individual fuel cycle facilities. In this context, it is the responsibility of the AEC to determine siting conditions, design of facilities and equipment and operating procedures. The language of the Reorganization Plan, and the legislative history associated with Congressional consideration of the Plan, make it clear that EPA's authority would not include these areas of licensing and regulation. Rather, the standards with respect to the general environment would be set by EPA, and AEC would implement these standards through its licensing and regulatory process. EPA's proposed rules would intrude upon this area of AEC licensing and regulation and, in effect, purport to vest EPA with the implementation function reserved to AEC under Reorganization Plan No. 3.

We would be pleased to work with EPA in developing general environmental standards that would be compatible with EPA and AEC relative responsibilities and that would serve the public interest by avoiding duplicatory or conflicting regulatory requirements by the two Federal agencies.

Attached are additional technical comments on the proposed standards.

I suggest that we meet promptly to discuss these matters further.

Sincerely,

/s/ William O. Doub

William O. Doub
Commissioner

Attachment:
Technical Comments

TECHNICAL COMMENTS ON EPA'S PROPOSED RULE ON ENVIRONMENTAL RADIATION PROTECTION STANDARDS FOR NORMAL OPERATIONS OF ACTIVITIES IN THE URANIUM FUEL CYCLE

The Environmental Protection Agency (EPA) has not provided a detailed technical justification on a cost-effectiveness basis for the specific curie and radiation dose limitations set forth in the proposed standard. The Atomic Energy Commission (AEC) staff has had preliminary discussions with EPA staff and the EPA staff has provided some additional information and has indicated that a more detailed report is in preparation. The more detailed report is required in order to critically evaluate the basis for the proposed rule. The following technical comments are made in light of the lack of adequate data to fully evaluate the impact of the proposed rule.

I. Page 6 - Subpart B - General Standards for Normal Uranium Fuel Cycle Operations

a. -.10 Applicability

The relationship between Subpart B and Subparts C and D is not clear. Subpart B appears to apply to all facilities covered by the rule. For example, Section -.12 indicates that the standard for all activities covered by the Subpart shall take effect 12 months from the effective date of the rulemaking. Subpart D, however, contains different effective dates of 24 months for certain specified activities, 48 months for other activities and other effective dates for still other types of activities. It is not clear whether the effective dates in Subpart B or Subparts C and D govern.

b. -.11 Environmental Standards

Subsection a)

1. As written, this section would limit the total quantity of uranium and its daughter products, except radon-222, entering the general environment from uranium mills and their tailings ponds to less than 1 curie per year for each separate facility. It is highly questionable that this limit can be met with respect to wind erosion from the banks of tailings ponds.

2. In the second sentence, an exception on the 1 curie quantity limit is provided for radon-222. An exception is not provided for the daughter products of radon-222. It is our understanding from discussions with the EPA staff that it was intended to include these daughters, but if it does not, this again would make it extremely difficult to comply with the 1 curie limit.

Subsection b)

1. This section is ambiguous in that it would appear to permit an annual dose of up to 15 millirems if a uranium mill, a uranium conversion plant, an enrichment plant or a uranium fabrication plant were located on a site. If, however, a light-water-cooled nuclear power reactor were added to that same site, and there was a combination of the power reactor and a fuel fabrication plant, the limit would drop to 5 millirems rather than 15 millirems. On the other hand, the section would appear to establish a limit of 15 millirems if both a fuel reprocessing plant and a nuclear power reactor were located on the same site. We assume that the intent would be to permit the higher dose limit in all cases where there are mixed facilities and that the ambiguity could be corrected by appropriate wording.

2. The definition of "uranium fuel cycle" under Subpart A-.02 includes the transportation of any radioactive material in support of these operations. As written, the annual dose limits in this Subpart include not only exposures resulting from release of radioactive material from the site but exposures in the transportation cycle. If the exposure limitations are intended to apply to transport workers, the standards cannot be met using current technology in the transport cycle. Further, it is ambiguous as to whether the limit of 5 millirems per year or 15 millirems per year would apply to transport of irradiated fuel elements from a nuclear power reactor to a chemical reprocessing plant.

II. Page 7 - Subpart C - Specific Standards for Planned Controlled Discharges from Light-Water-Cooled Nuclear Power Reactors

The EPA staff has provided the AEC staff with some of the assumptions used in defining effluent control capabilities of reactor radwaste systems. The AEC staff has concluded that the EPA analyses are based primarily on assumptions defined by ORNL which were used in the AEC's Draft Environmental Statement on ALAP for light-water-cooled nuclear power reactors. The AEC considers the analytical techniques used in the draft statement to be out moded and has completely reanalyzed the radwaste systems which are included in the Final Environmental Statement (WASH-1258) issued in July 1973. Thus, the EPA analyses do not properly represent the status of current technology. Additional comments on this Subpart are as follows:

a. Subpart C - .21 Environmental Standards

1. This section proposes annual dose limits of 5 millirems to the total body or any organ, except the thyroid and 15 millirems to the thyroid from the combined radionuclides released in liquid and gaseous effluents released from light-water-cooled nuclear power reactors. The standards proposed by EPA are substantially more restrictive than the AEC's proposed Appendix I, 10 CFR Part 50, in the following respects:

   a) The proposed Appendix I design objectives are 5 millirems to the total body or any organ from radionuclides in liquid releases and 5 millirems from gaseous releases. The EPA dose limit is 5 millirems to the total body and any organ except the thyroid and 15 millirems for the thyroid from the combined liquid and gaseous releases. This means that for some cases the EPA dose limits are numerically just one-half the AEC proposed design objectives.

   b) In the EPA rule, the 5 millirems and 15 millirems are expressed as upper dose limits. In the proposed Appendix I the 5 millirems to the whole body or any organ is expressed as a design objective with provisions for substantial operating flexibility. Similarily, AEC Regulatory Guide 1.42 on interim policy on iodine releases expresses the 15 millirem number as a design objective for the thyroid with substantial operating flexibility. While EPA provides for variances to "prevent a power emergency", there is nothing comparable to the Appendix I provision for operating flexibility in the proposed EPA rule. The variance of a factor of 3 which EPA has included in Subpart C for power reactors for emergency situations appears to be completely unmanageable from the standpoint of administering it in a regulatory sense. The provision for variance from the very low EPA proposed dose limits only under emergency conditions implies a public health and safety significance to doses a few times above the EPA proposed dose limits which we do not believe is justified. Based on AEC's Final Environmental Statement concerning the proposed Rulemaking Action on Appendix I issued in July 1973, we do not believe that elimination of operating flexibility provisions similar to those provided in the proposed Appendix I can be justified on a cost-effectiveness basis.

Subsection c)

1. The quantity limit of 5 curies per year for all radionuclides, except tritium, should exclude dissolved noble gases in liquids. While the proposed Appendix I as presently drafted does not provide an exception for dissolved noble gases, it is expected that such a modification will be made before the rule is made effective.

2. There is provision in the proposed Appendix I to propose quantity values higher than 5 curies per year if it can be demonstrated that such higher quantities will not result in exposures in excess of the design objective of 5 millirems per year. There is no such provision in the proposed EPA rule. If the basic objective of the standards is to limit individual or population exposures, such a provision should be included.

Subsection d)

1. The proposed 600 curie annual release limit for tritium is exceeded by a factor of 10 by several of the presently operating pressurized water reactors. It would be necessary for these reactors to replace stainless steel clad fuel elements with zirconium clad fuel elements or possibly take other corrective measures in order to meet this limit. As previously stated, we do not have the EPA basis for this curie limit. We question the need for a curie limit on tritium for power reactors for purposes of control of individual or population dose since the dose from all tritium released at a power reactor is a small fraction of a millirem to an individual and the population dose is extremely small.

b. Subpart C - .23 Effective Date

It is highly questionable that it would be possible for all presently operating reactors to make modifications and backfit to meet the proposed EPA standards within the 12 months provided.

III. Page 9 - Subpart D - Specific Standards for Planned Controlled Discharges from Uranium Fuel Reprocessing Plants

As previously indicated, EPA has not provided the detailed data and assumptions on the state of technology, cost and operating experience on which cost-effectiveness evaluations have been made as a basis for the standards. From the limited information provided and oral discussions with the EPA staff, it appears that some of the assumptions have been based on experience in processing low burnup fuel. Since there is essentially no operating experience in processing high burnup fuels, some of the assumptions may not be valid. Some of the major problems with this section are as follows:

a. We do not believe the requirements on krypton-85 removal can be justified on a cost-effectiveness basis. Effective ^{85}Kr separation systems are not yet available. Estimates used are related to R&D units and not actual demonstrated production systems. Experimental work to date has been done at laboratories utilizing "clean" gases whereas in actual operations the offgas consists of a gas mixture of NO_x, H_2, etc. Cost data made available did not account for the complete system requirements for ^{85}Kr removal and isolation from the atmosphere. Items such as the following must be included:

   1. Consideration for storage of pressurized containers;

   2. Methods for transportation, disposal and long term care;

   3. Protection of operating personnel from radiation and explosive hazards.

b. In order to justify the cost-effectiveness evaluations, EPA arbitrarily related incremental cost increases to the total nuclear energy economy. This method of cost distribution over a very broad base, results in increment cost increases that are erroneously low. A more realistic approach would be to apply an incremental of cost increase to the applicable cost of the affected component of the fuel cycle.

c. Figures 1 and 2, in "EPA Proposed Radiation Standards for U Fuel Cycle", which are used to demonstrate cost effectiveness of improved effluent treatment systems are plotted indicating a high degree of certainty to the cost values used. In actuality, many of the cost numbers are subject to a wide margin of variations. Proper accounting for the uncertainty in the cost numbers could significantly change the analysis that is derived from the curve.

d. Cost data did not consider decommissioning of fuel recycle facilities.

e. AEC staff could not evaluate cost-benefit considerations without complete documentation including appendices and backup data for all assumptions and calculations.

IV. Comments on EPA's Statement of Considerations for the Proposed Rule

a. The Statement of Considerations is presented in a manner which we believe implies an urgency in the need for setting of EPA standards for the uranium fuel cycle which is not justified. The AEC's application of the "as low as practicable" philosophy within the currently available standards as implemented in AEC regulations and license conditions has and will continue to assure that growth in fuel cycle operations will be without

undue hazard including full consideration of the release of long-lived radionuclides. There are several statements in the Statement of Considerations that imply that existing standards do not give appropriate consideration to controlling population dose and potential exposures from long-lived radionuclides. We believe these implications are in error. For example, on page 2 EPA indicates the present guidelines are not adequate because 1) "... as low as practicable ... does not give adequate consideration to population dose" and 2) "... exposure determinations should include long-term population impact from long-lived nuclides ...".

The currently applicable radiation protection guidance as reflected in Federal Radiation Council, National Council on Radiation Protection and Measurements and International Commission on Radiological Protection publications is clear and definitive on controlling population dose as well as individual doses. (For example, see pages 30 and 37 of FRC Report No. 1.) Any implications that the "as low as practicable" concept does not give adequate consideration to population dose completely fails to recognize and understand the explicit recommendation of FRC, NCRP and ICRP in this regard. As a matter of fact, the as low as practicable concept as related to maintaining population doses at very low levels is emphasized in these reports. The AEC proposed Appendix I to 10 CFR Part 50 does not include specific population dose design objectives, but earlier drafts did. They were removed because of an EPA request. The analysis in the Final Environmental Statement on the proposed Appendix I (WASH-1258) clearly establishes that population dose is effectively controlled by the control on the doses to individuals near the site boundary. The projected dose to the population of the United States from light-water-cooled nuclear power reactors even in the Year 2000 is only a fraction of a millirem. It is also noted that the proposed EPA dose limits and quantity limitations for nuclear power reactors introduce no new concepts with respect to population dose control that is not already included in the AEC's proposed Appendix I.

b. On page 9 the EPA draft indicates that present practice effectively considers only the short-lived radionuclides in controlling population dose. This is in error. AEC's dose model includes the buildup of long-lived materials in the environment and this is demonstrated in WASH-1258. Similar considerations are included in present studies being carried out by AEC to develop a firm technical bases for establishing as low as practicable design objectives and limiting conditions of operation for other facilities in the fuel cycle. It is also noted that the AEC's report WASH-1209 entitled "The Potential

Radiological Implications of Nuclear Facilities in the Upper Mississippi River Basin in the Year 2000" dated January 1973 contains a detailed analysis of total projected exposures from both short and long lived materials projected to be released from the entire fuel cycle in the central study region through the Year 2000. This analysis shows that the average 50-year whole body dose commitment to the population in that region would be a small fraction of a millirem.

c. On page 15 EPA states that because of environmental risks involved it is considering whether future fuel reprocessing ought to be limited until a viable plutonium base power industry exists, and then indicates that various scheduling and economic considerations would be involved in making the decision. The AEC believes that whatever the relative economic considerations are the risks associated with the reprocessing of nuclear reactor fuel are adequately controllable and the fuel reprocessing plants will be built only when there is a clearly evident need for them.

d. On page 17 EPA indicates the thyroid dose control can be augmented by "active control of exposures to milk". We believe that such active control of iodine exposures is appropriate in emergency situations but that such a method should not be depended upon and encouraged for the regulation of routine releases from nuclear facilities.

UNITED STATES
OMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

OCT 1 2 1973

Dr. William A. Mills
Criteria and Standards Division
Office of Radiation Programs
U. S. Environmental Protection Agency
Room 635
Waterside Mall East
401 M Street, S. W.
Washington, D. C. 20460

Dear Dr. Mills:

We have reviewed the revised version of the proposed EPA rule on environmental radiation standards for the uranium fuel cycle transmitted by your letter of October 1, 1973, to Mr. Muntzing. Our conclusion is that only very minor changes have been made and the major problems that were identified in Commissioner Doub's letter and attached detailed technical comments of September 5, 1973, have not been addressed and resolved by EPA.

Pending a resolution of these major issues, we do not feel the proposed EPA rule should go forward. We will be glad to work with EPA to reach an understanding on the proposed generally applicable EPA environmental radiation standards for the nuclear fuel cycle, and their relationship to AEC effluent standards, that is compatible and consistent with our respective responsibilities.

Sincerely,

Lester Rogers

Lester Rogers
Director of Regulatory Standards

ATTACHMENT "C"

Status of AEC Requirements for Control of Radioactive Materials in Power Reactor Effluents

AEC regulations, in addition to prescribing limits on radiation exposure since 1959, have by implication required that exposures to the public be kept as low as practicable. The term "as low as practicable" means "as low as is practicably achievable taking into account the state of technology and the economics of improvement in relation to the utilization of atomic energy in the public interest."

Current reviews of reactor licensing applications include reviews of provisions to limit and control radioactive effluents from nuclear plants. Experience has shown that licensees have generally kept exposures to radiation and release of radioactivity in effluents to levels well below the AEC limits. As a result of advances in reactor technology within the last few years, the AEC feels that further reduction of these releases could be achieved. This is attributable, in part, to steps to assure the integrity of the nuclear fuel, to improvements in design of waste treatment systems to control and contain radioactivity and to procedures and methods to limit releases of radioactive material in effluent water and air.

In January 1971, the AEC adopted certain amendments to its regulations to state more explicitly the "as low as practicable" practice. These amendments require that reasonable efforts be made by all Commission licensees to continue to keep exposures to radiation and releases of

radioactivity in effluents as far below the AEC limits as practicable. The amendments also require that the design and operating requirements to minimize the quantities of radioactivity released from nuclear power plants be specified. One of these amendments requires a description of the equipment and procedures for the control of effluents. It also requires a description of the maintenance and use of equipment installed in radioactive waste treatment systems. The amendment further requires that the licensee submit a semiannual report to the AEC. This report must specify the quantity of each of the principal radionuclides released to unrestricted areas in liquid and airborne effluents. It must also give other information sufficient to estimate annual potential radiation doses to the public resulting from effluent releases. These amendments will further help to control radioactive releases and to assure that such releases from nuclear power reactors will generally not exceed small percentages of the annual maximum limits specified in Part 20.

In June 1971, the AEC published a proposed additional amendment which would add a new Appendix I to Part 50. This appendix would provide numerical guidance to keep radioactivity in effluents from water-cooled power reactors as low as practicable.

A public hearing that began in January 1972 on proposed numerical guidance for "as low as practicable" levels of radioactivity in effluents from light-water-cooled nuclear power reactors adjourned

in May 1972 pending the completion of an Environmental Statement under NEPA. A Final Environmental Statement on the proposed Appendix I was issued in July of this year. The hearing will reconvene in November 1973 to deal with the Final Environmental Statement and final positions of the participants. The record will then be forwarded to the Commission for their consideration.

The expected result of this proposed numerical guidance is that (a) total body doses to individuals living near the site boundary of nuclear power stations due to radioactive material in effluents from those facilities will generally be less than about 5 millirems per year (about 5 percent of doses from natural background radiation which are typically 100-125 millirems per year); (b) annual average doses to the U. S. population from radioactive material released in effluents from all nuclear power reactors on all sites in the United States through the year 2000 will be less than about 0.2 millirem per year (about 0.2 percent of doses from natural background radiation); and (c) there will be no demonstrable biological effects to aquatic or terrestrial organisms from exposures to the radioactive material in the effluents from light-water-cooled nuclear power reactors.

As a practical matter AEC has used the proposed Appendix I since its publication as guidance in reviewing new applications for construction permits.

Title 10—ATOMIC ENERGY

Chapter I—Atomic Energy Commission

PART 20—STANDARDS FOR PROTECTION AGAINST RADIATION

PART 50—LICENSING OF PRODUCTION AND UTILIZATION FACILITIES

Control of Releases of Radioactivity to the Environment

Statement of considerations. On April 1, 1970, the Atomic Energy Commission published in the FEDERAL REGISTER (35 F.R. 5414) proposed amendments to 10 CFR Parts 20 and 50 of its

regulations which would: (a) Improve the framework in Part 20 for assuring that reasonable efforts are made by all Commission licensees to continue to keep exposures to radiation, and releases of radioactivity in effluents as low as practicable, and (b) specify in Part 50 design and operating requirements to minimize quantities of radioactivity released in gaseous and liquid effluents from light-water-cooled nuclear power reactors. Interested persons were invited to submit written comments and suggestions for consideration within 60 days after publication of the notice of proposed rule making in the FEDERAL REGISTER. After consideration of the comments and other factors involved, the Commission has adopted the proposed amendments with certain modifications discussed below.

The scope of the amendments to Part 50 has been expanded to include all nuclear power reactors rather than light-water-cooled power reactors only. The Commission is giving further consideration to appropriate amendments to its regulations to specify design and operating requirements to minimize radiation exposures from radioactivity released in effluents from other types of production and utilization facilities such as fuel reprocessing plants.

Several comments noted that at the time the application for a permit to construct a nuclear power reactor is submitted design has not progressed to the point where specific equipment to be installed for control of gaseous and liquid effluents can be described in detail. Accordingly, proposed § 50.34a (a) and (b) have been modified to require only a description of the preliminary design of equipment to be installed.

Some comments suggested that "curie quantities of radionuclides" required to be estimated in the application for a construction permit in proposed § 50.34a (b)(2) could be construed to mean either the total quantity of each potential radionuclide or the total number of curies of all radionuclides combined. This provision has been modified to require that an estimate of the quantity of each of the principal radionuclides expected to be released annually to unrestricted areas be included in each application for a permit to construct a nuclear power reactor. Section 50.34a(c) has been changed to require a description of the equipment and procedures for the control of effluents and for the maintenance and use of equipment installed in radioactive waste treatment systems, and revised estimates of the releases and exposures which would be expected if significantly different from those given in the application for a construction permit.

Section 50.36a(a)(2) has been revised to allow 60 days, rather than the proposed 30 days, after January 1 and July 1 of each year for filing reports by power reactor licensees on releases of radioactive materials in effluents. The provision of the proposed subparagraph that, if quantities of radioactive materials released during the reporting period are unusual for normal reactor operations, including expected operational occurrences, the report shall cover this specifically, has been modified to substitute the words "significantly above design objectives" for "unusual for normal reactor operations". A number of comments suggested that this subparagraph be more specific with respect to the information that will be required by the Commission to enable it to estimate exposures to the public resulting from effluent releases. The Commission has developed and will publish in the near future specific details as to the information that must be included in the 6-month reports, required by the technical specifications in power reactor licenses, including the format for reporting the information. This information, including estimates of exposures to the public resulting from releases of radioactive materials in effluents from nuclear powerplants, will be published by the Commission on a systematic basis so that it will be readily available to all interested persons.

A substantial number of comments were received regarding the interpretation of various terms used in the proposed amendments such as "every reasonable effort" and "as low as practicable" and suggesting that the Commission develop more definitive criteria for keeping releases of radioactivity in nuclear power reactor effluents as low as practicable. Definition of factors that will be taken into account in determining that radioactivity in effluents is "as low as practicable" has been added to the amendments. The Commission recognizes the desirability of developing more definitive guidance in connection with these amendments, and is initiating discussions with the nuclear power industry and other competent groups to achieve this goal.

Basis for AEC standards. Releases of radioactive materials in effluents by Commission licensees are regulated under the provisions of 10 CFR 20.106 which apply to all uses of byproduct, source, and special nuclear material licensed by the Commission. These provisions are based on radiation protection guides recommended by the Federal Radiation Council (FRC) and approved by the President. The Commission maintains close consultation, and will continue to consult, with the National Council on Radiation Protection and Measurements, and the International Commission on Radiological Protection.

Since 1959 official guidance for control of exposures to radiation has been provided to Federal agencies through recommendations of the FRC, approved by the President. The FRC was established in 1959 by Executive order and by an amendment to the Atomic Energy Act of 1954 (42 U.S.C. 2021(h)). The FRC is directed to advise the President "• • • with respect to radiation matters, directly or indirectly affecting health, including guidance for all Federal agencies in the formulation of radiation standards and in the establishment and execution of programs of cooperation with States." The basic recommendations of the FRC are generally consistent with those of the National Council on Radiation Protection and Measurements (NCRP) and the International Commission on Radiological Protection (ICRP). The FRC recommendations include a radiation protection guide for the genetic exposure of the entire population at a level not quite twice the average natural background radiation level and for a whole body exposure of individuals in the population at a level about five times the average natural background radiation. The guides are set well below the level at which detectable biological effects from exposure to radiation are expected to occur. The FRC states in Report No. 1 dated May 13, 1960, that the guides give appropriate consideration to the requirements of health protection and the beneficial uses of radiation and atomic energy.

Guidance on low radiation doses. The FRC added to the numerical guidance on maximum limits the further guidance that "every effort should be made to encourage the maintenance of radiation doses (or dose commitments) as far below this guide as practicable". Similar statements are also included in NCRP and ICRP recommendations.

The Commission has always subscribed to the general principle that within radiation protection guides, radiation exposures to the public should be kept as low as practicable. This general principle has been a central one in the field of radiation protection for many years. Current reviews of reactor licensing applications include reviews of provisions to limit and control radioactive effluents from the plants.

Experience has shown that licensees have generally kept exposures to radiation and releases of radioactivity in effluents to levels well below the Part 20 limits. Specifically, experience with licensed nuclear power reactors to date shows that radioactivity in water and air effluents has been kept at low levels—for the most part small percentages of the limits specified in 10 CFR Part 20. Resultant exposures to the public living in the immediate vicinity of operating power reactors have usually been small percentages of FRC guides. The Commission believes that, in general, the releases of radioactivity in effluents from the nuclear power reactors now in operation have been within ranges that may be considered "as low as practicable." The Commission also believes that, as a result of advances in reactor technology, further reduction of those releases can be achieved. The results to date are attributable, in part, to steps to assure the integrity of the nuclear fuel, to the design of waste treatment systems to control and contain radioactivity, and to procedures and methods to limit releases of radioactive material to unrestricted areas in effluent water and air. The AEC's total regulatory program includes not only the standards and limits in 10 CFR Part 20, but other regulations as well, various restrictions on plant design and restrictions on operation included in individual operating licenses.

Control of exposures from several different sources. The Commission expects that releases of radioactive material in

effluents from nuclear power reactors under the present system of regulation will continue to be low. At the same time, the Commission recognizes that there will be a marked increase in the number and size of nuclear power reactors in operation in the future, and that other activities that contribute radiation exposure to the public can be expected to increase.

Design objectives for nuclear power reactors. The amendments to Part 50 set out below are intended to give appropriate regulatory effect, with respect to radioactivity in effluents from nuclear power reactors, to the guidance of the FRC that radiation doses should be kept as far below the radiation protection guides as practicable. As in the past, an application for a permit to construct a nuclear power reactor will be required to include a description of the preliminary design of equipment to be installed to maintain control over radioactive materials in effluents during normal reactor operations, including expected operational occurrences. In addition, in the case of an application filed on or after the effective date of the amendments, the application will be required to identify the design objectives, and the means to be employed, for keeping levels of radioactive material released in effluents as low as practicable. As in current practice the Commission will review the proposed design of the reactor, including the waste treatment equipment and the description of procedures for the maintenance and use of the equipment, to determine whether the required design objectives are met.

Each license authorizing operation of a nuclear power reactor will include technical specifications which require adherence to operating procedures for control of effluents and the maintenance and use of equipment installed in the waste treatment system, and the submission of semiannual reports containing information on quantities of radioactive material released. If quantities released during the reporting period are significantly above design objectives, the licensee will be required to cover this specifically in its report. The effluent release data submitted by licensees will be compiled by the Commission and made available to the public. The Commission will review in its inspection and enforcement program the effectiveness of the maintenance and operating procedures used by licensees in meeting the objective of minimizing, to the extent practicable, the quantities of radioactivity released in air and water effluents.

On the basis of existing technology and past operating experience the Commission expects that nuclear power reactor waste treatment systems designed and operated in accordance with the requirements set forth in the following amendments to Part 50 will help to assure that releases from nuclear power reactors will generally not exceed small percentages of the annual maximum limits specified in Part 20 and in license conditions, and that radiation exposures to the public resulting from the normal operations of nuclear power reactors will not exceed small percentages of exposures from natural background radiation.

Need for flexibility of operation. It is necessary that nuclear power reactors designed for generation of electricity have a very high degree of reliability. Operating flexibility is necessary to take into account some variation in the small quantities of radioactivity as a result of expected operational occurrences, which may temporarily result in levels of radioactive effluents in excess of the low levels normally released, but still within the limits specified in § 20.106 of Part 20 and the operating license.

Monitoring. The Commission will continue to evaluate exposures to the public from releases of radioactivity in effluents from nuclear power reactors. Reactor licensees are presently required to carry out monitoring programs designed not only to determine levels of radioactivity in effluents released from the plant but also to detect significant increases in levels of radioactivity in the environment. The licensee is required to report these data to the Commission on a periodic basis. In addition, the Commission, the U.S. Public Health Service and several States carry out environmental surveillance programs. These programs are designed to detect and evaluate increases in environmental levels that may be significant to human exposure. The Atomic Energy Commission in cooperation with other participating agencies as appropriate will systematically publish these data so that they will be available to all interested persons.

Pursuant to the Atomic Energy Act of 1954, as amended, and sections 552 and 553 of title 5 of the United States Code, the following amendments to Title 10, Chapter I, Code of Federal Regulations, Parts 20 and 50, are published as a document subject to codification, to be effective thirty (30) days after publication in the FEDERAL REGISTER. The Commission invites all interested persons who desire to submit written comments or suggestions in connection with the amendments to send them to the Secretary of the Commission, U.S. Atomic Energy Commission, Washington, D.C. 20545, Attention: Chief, Public Proceedings Branch, within 60 days after publication of this notice in the FEDERAL REGISTER. Consideration will be given such submission with the view to possible further amendments. Copies of comments received may be examined at the Commission's Public Document Room at 1717 H Street NW., Washington, DC.

1. A new paragraph (c) is added to § 20.1 of 10 CFR Part 20 to read as follows:

§ 20.1 Purpose.

* * * * *

(c) In accordance with recommendations of the Federal Radiation Council, approved by the President, persons engaged in activities under licenses issued by the Atomic Energy Commission pursuant to the Atomic Energy Act of 1954, as amended, should, in addition to complying with the requirements set forth in this part, make every reasonable effort to maintain radiation exposures, and releases of radioactive materials in effluents to unrestricted areas, as far below the limits specified in this part as practicable. The term "as far below the limits specified in this part as practicable" means as low as is practicably achievable taking into account the state of technology, and the economics of improvements in relation to benefits to the public health and safety and in relation to the utilization of atomic energy in the public interest.

2. A new § 50.34a is added to 10 CFR Part 50 to read as follows:

§ 50.34a Design objectives for equipment to control releases of radioactive material in effluents—nuclear power reactors.

(a) An application for a permit to construct a nuclear power reactor shall include a description of the preliminary design of equipment to be installed to maintain control over radioactive materials in gaseous and liquid effluents produced during normal reactor operations, including expected operational occurrences. In the case of an application filed on or after January 2, 1971, the application shall also identify the design objectives, and the means to be employed, for keeping levels of radioactive material in effluents to unrestricted areas as low as practicable. The term "as low as practicable" as used in this part means as low as is practicably achievable taking into account the state of technology, and the economics of improvements in relation to benefits to the public health and safety and in relation to the utilization of atomic energy in the public interest.

(b) Each application for a permit to construct a nuclear power reactor shall include:

(1) A description of the preliminary design of equipment to be installed pursuant to paragraph (a) of this section;

(2) An estimate of:

(i) The quantity of each of the principal radio-nuclides expected to be released annually to unrestricted areas in liquid effluents produced during normal reactor operations; and

(ii) The quantity of each of the principal radio-nuclides of the gases, halides, and particulates expected to be released annually to unrestricted areas in gaseous effluents produced during normal reactor operations.

(3) A general description of the provisions for packaging, storage, and shipment offsite of solid waste containing radioactive materials resulting from treatment of gaseous and liquid effluents and from other sources.

(c) Each application for a license to operate a nuclear power reactor shall include (1) a description of the equipment and procedures for the control of gaseous and liquid effluents and for the maintenance and use of equipment installed in radioactive waste systems, pursuant to paragraph (a) of this section; and (2) a revised estimate of the information required in paragraph (b)(2) of this section if the expected releases and exposures differ significantly from the

estimates submitted in the application for a construction permit.

3. A new § 50.36a is added to 10 CFR Part 50 to read as follows:

§ 50.36a Technical specifications on effluents from nuclear power reactors.

(a) In order to keep releases of radioactive materials to unrestricted areas during normal reactor operations, including expected operational occurrences, as low as practicable, each license authorizing operation of a nuclear power reactor will include technical specifications that, in addition to requiring compliance with applicable provisions of § 20.106 of this chapter, require:

(1) That operating procedures developed pursuant to § 50.34a(c) for the control of effluents be established and followed and that equipment installed in the radioactive waste system, pursuant to § 50.34a(a) be maintained and used.

(2) The submission of a report to the Commission within 60 days after July 1 of 1971, and within 60 days after January 1 and July 1 of each year thereafter, specifying the quantity of each of the principal radionuclides released to unrestricted areas in liquid and in gaseous effluents during the previous 6 months of operation, and such other information as may be required by the Commission to estimate maximum potential annual radiation doses to the public resulting from effluent releases. If quantities of radioactive materials released during the reporting period are significantly above design objectives, the report shall cover this specifically. On the basis of such reports and any additional information the Commission may obtain from the licensee or others, the Commission may from time to time require the licensee to take such action as the Commission deems appropriate.

(b) In establishing and implementing the operating procedures described in paragraph (a) of this section, the licensee shall be guided by the following considerations: Experience with the design, construction and operation of nuclear power reactors indicates that compliance with the technical specifications described in this section will keep average annual releases of radioactive material in effluents at small percentages of the limits specified in § 20.106 of this chapter and in the operating license. At the same time, the licensee is permitted the flexibility of operation, compatible with considerations of health and safety, to assure that the public is provided a dependable source of power even under unusual operating conditions which may temporarily result in releases higher than such small percentages, but still within the limits specified in § 20.106 of this chapter and the operating license. It is expected that in using this operational flexibility under unusual operating conditions, the licensee will exert his best efforts to keep levels of radioactive material in effluents as low as practicable.

(Sec. 161, 68 Stat. 948; 42 U.S.C. 2201)

Dated at Washington, D.C., this 27th day of November 1970.

For the Atomic Energy Commission.

W. B. McCool,
Secretary of the Commission.

[F.R. Doc. 70-16213; Filed, Dec. 2, 1970; 8:49 a.m.]

ATOMIC ENERGY COMMISSION

[10 CFR Part 50]

LICENSING OF PRODUCTION AND UTILIZATION FACILITIES

Light-Water-Cooled Nuclear Power Reactors

The Atomic Energy Commission has under consideration amendments to its regulation, 10 CFR Part 50, "Licensing of Production and Utilization Facilities," which would supplement the regulation with a new Appendix I to that part to provide numerical guides for design objectives and technical specification requirements for limiting conditions for operation for light-water-cooled nuclear power reactors to keep radioactivity in effluents as low as practicable.

On December 3, 1970, the Atomic Energy Commission published in the FEDERAL REGISTER (35 F.R. 18385) amendments to 10 CFR Part 50 that specified design and operating requirements for nuclear power reactors to keep levels of radioactivity in effluents to unrestricted areas as low as practicable. The amendments provided qualitative guidance, but not numerical criteria, for determining when design objectives and operations meet the requirements for keeping levels of radioactivity in effluents as low as practicable.

The Commission noted in the Statement of Considerations published with the amendments the desirability of developing more definitive guidance in connection with the amendments and that it was initiating discussions with the nuclear power industry and other competent groups to achieve that goal.

The Commission considers that the proposed numerical guides for design objectives and technical specification requirements for limiting conditions for operation for light-water-cooled nuclear power reactors set out below would meet the criterion "as low as practicable" for radioactive material in effluents released to unrestricted areas. The guidance would be specifically applicable only to light-water-cooled nuclear power reactors and would not necessarily be appropriate for other types of nuclear power reactors and other kinds of nuclear facilities.

As noted in the Statement of Considerations accompanying the amendments to Part 50 published in the FEDERAL REGISTER on December 3, 1970, the Commission has always subscribed to the general principle that, within established radiation protection guides, radiation exposures to the public should be kept as low as practicable. This general principle has been a central one in the field of radiation protection for many years. Operating licenses include provisions to limit and control radioactive effluents from the plants. Experience has shown that licensees have generally kept exposures to radiation and releases of radioactivity in effluents to levels well below the limits specified in 10 CFR Part 20. Specifically, experience with licensed light-water-cooled nuclear power reactors to date shows that radioactivity in water and air effluents has been kept at low levels—for the most part small percentages of the Part 20 limits. Resultant exposures to the public living in the immediate vicinity of operating power reactors have been small percentages of Federal radiation protection guides.

The Commission also noted that, in general, the release of radioactivity in effluents from nuclear power reactors now in operation have been within ranges that may be considered "as low as practicable," and that, as a result of advances in reactor technology, further reduction of those releases can be achieved. The amendments to Part 50 published on December 3, 1970, were intended to give appropriate regulatory effect, with respect to radioactivity in effluents from nuclear power reactors, to the qualitative guidance of the Federal Radiation Council that radiation doses should be kept "as low as practicable". The proposed guides set out below are intended to provide quantitative guidance to that end for light-water-cooled nuclear power reactors.

The proposed numerical guides are based on present light-water-cooled nuclear power reactor operating experience and state of technology (including recent improvements). In developing the guides the Commission has taken into account comments and suggestions by representatives of power reactor suppliers, electrical utilities, architect-engineering firms, environmental and conservation groups and States in which nuclear power reactors are located on the general subject of definitive guidance for nuclear power reactors. Meetings were held by the Commission with these groups in January and February 1971. The participants in these meetings were provided an opportunity to express their views on the need for more definitive guidance for design objectives for light-water-cooled nuclear power reactors to keep radioactivity in effluents as low as practicable; whether the guidance should be expressed in terms of waste treatment equipment requirements and performance specifications or numerical criteria on quantities and concentrations released to the environment; and to suggest what equipment or numerical criteria would be appropriate at this time.

Generally, the participants favored numerical criteria. Views were expressed that the criteria should be derived from potential doses to people or in the form of quantities and concentrations of radioactive material emitted to the environment. Some opinions were expressed that present technology (including recent improvements) is such that light-water-cooled nuclear power reactors can be designed to keep exposures to the public in the offsite environment within a few percent of exposures from natural background radiation.

The participants also stressed the importance of operating flexibility to take into account unusual conditions of operation which may, on a temporary basis, result in exposures higher than the few percent of natural background radiation, but well within radiation protection guides. Recognition of the need for this operating flexibility is currently stated in § 50.36a(b).

The Commission believes that the proposed guides for design objectives and limiting conditions for operation for light-water-cooled nuclear power reactors set out below provide a reasonable basis at the present time for implementing the principle that radioactive material in effluents released to unrestricted areas should be kept "as low as practicable." As noted in the amendments to Part 50 published on December 3, 1970, "The term 'as low as practicable' as used in this part means as low as is practicably achievable taking into account the state of technology, and the economics of improvements in relation to benefits to the public health and safety and in relation to the utilization of atomic energy in the public interest." The Commission will continue to evaluate the appropriateness of these guides for light-water-cooled nuclear power reactors in light of further operating experience.

Under the President's Reorganization Plan No. 3 of 1970, the Environmental Protection Agency (EPA) is responsible for establishing generally applicable environmental radiation standards for the protection of the general environment from radioactive materials. The AEC is responsible for the implementation and enforcement of EPA's generally applicable environmental standards.

EPA has under consideration generally applicable environmental standards for these types of power reactors. AEC has consulted EPA in the development of the guides on design objectives and limiting conditions for operation set forth below to control radioactivity in effluent releases. If the design objectives and operating limits established herein should prove to be incompatible with any generally applicable environmental standard hereafter established by EPA, the AEC will modify these objectives and limits as necessary.

The proposed guides for design objectives and limiting conditions for operation for light-water-cooled nuclear power reactors are consistent with the basic radiation protection standards and guides recommended by the International Commission on Radiological Protection (ICRP), the National Council on Radiation Protection and Measurements (NCRP), and the Federal Radiation Council (FRC). (The functions of the FRC were transferred to the Environmental Protection Agency pursuant to Reorganization Plan No. 3 of 1970.) These standards form the basis for the Commission's regulation, 10 CFR Part 20, "Standards for Protection Against Radiation". In this regard, the NCRP announced on January 26, 1971, the release of NCRP Report No. 39, "Basic Radiation Protection Criteria". The NCRP noted that a 10-year study by the

Council has confirmed the validity of most of the basic radiation protection criteria presently used by governmental agencies to regulate the exposure of the population and of radiation workers. The dose limits for individual members of the public remain at 0.5 rem per year and the yearly dose limit of 0.17 rem per person averaged over the population is unchanged. These limits are compatible with the limits and guides recommended by the ICRP and the FRG and apply to exposures from all sources other than medical procedures and natural background.

The NCRP-ICRP-FRC recommended limits and guides give appropriate consideration to the overall requirements of health protection and the beneficial use of radiation and atomic energy. Any biological effects that may occur at the low levels of the limits and guides occur so infrequently that they cannot be detected with existing techniques. The standards setting groups have added to the numerical guidance the general admonition that all radiation exposure should be held to lowest practicable level. This admonition takes into account that generally applicable standards or rules established to cover many situations must necessarily be set at a higher level than may be justified in any given individual situation.

The acceptability of a given level of exposure for a particular activity can be determined only by giving due regard to the reasons for permitting the exposure. This means that, within the basic standards of FRC, NCRP, and ICRP, different limitations on exposure levels are appropriate for various types of activities depending upon the circumstances. A level that is practicable for one type of activity may not be practicable for a different type of activity.

The proposed guides for design objectives and limitations on operations set forth below would be specifically applicable to light-water-cooled nuclear power reactors. Light-water-cooled nuclear power reactors are the only type of power reactors that are being installed in relatively large numbers and on which there is substantial operating experience in the United States. The guides would not necessarily be appropriate for controlling levels of radioactivity in effluents from other types of nuclear power reactors. On the basis of present information on the technology of these other types of reactors, it is expected that releases of radioactivity in effluents can generally be kept within the proposed guides for light-water-cooled nuclear power reactors. The Commission plans to develop numerical guides on levels of radioactivity in effluents that may be considered as low as practicable for other types of nuclear power reactors such as gas cooled and fast breeder reactors as adequate design and operating experience is acquired. In the meantime, design objectives and technical specifications for limiting conditions for operation to carry out the purposes of keeping levels of radioactivity in effluents to unrestricted areas as low as practicable will be specified for other types of nuclear power reactors on a case-by-case basis.

Neither would the guides necessarily be appropriate for controlling levels of radioactivity in effluents from other kinds of nuclear facilities such as fuel reprocessing plants, fuel fabrication plants, or radioisotope processing plants where the design characteristics of the plant and nature of operations involve different considerations. The Commission is giving further consideration to appropriate amendments to its regulations to specify design objectives and limiting conditions for operation to minimize levels of radioactivity released in the operation of other types of licensed facilities such as reactor fuel reprocessing plants.

Expected consequences of guides for design objectives. The proposed guides for design objectives for light-water-cooled nuclear power reactors have been selected primarily on the basis that existing technology makes it feasible to design and operate light-water-cooled nuclear power reactors within the guides. The design objectives are expressed in terms of guides for limiting the number of quantities and for limiting concentrations of radioactive materials in effluents. It is expected that conformance with the guides on design objectives would achieve the following results:

1. Provide reasonable assurance that annual exposures to individuals living near the boundary of a site where one or more light-water-cooled nuclear power reactors are located, from radioactivity released in either liquid or gaseous effluents from all such reactors, will generally be less than about 5 percent of average exposures from natural background radiation.[1] This level of exposure is about 1 percent of Federal radiation protection guides for individual members of the public.

2. Provide reasonable assurance that annual exposures to sizeable population groups from radioactivity released in either liquid or gaseous effluents from all light-water-cooled nuclear power reactors on all sites in the United States for the foreseeable future will generally be less than about 1 percent of exposures from natural background radiation. This level of exposure is also less than 1 percent of Federal radiation protection guides for the average population dose.

These levels of exposure would be indistinguishable from exposures due to variation in natural background radiation, would not be measurable with existing techniques, and would be estimated from effluent data from nuclear power plants by calculational techniques. These levels of exposure are obviously very low in comparison with the much higher exposures incurred by the public from natural background due to cosmic radiation, natural radioactivity in the body and in all materials with which people come into contact, air travel, and from many activities commonly engaged in by the public.

Specific provisions of guides for design objectives. The proposed guides for radioactive materials in liquid effluents would specify limitations on annual total quantities of radioactive material, except tritium, and annual average concentrations of radioactive material in effluent, prior to dilution in a natural body of water, released by each light-water-cooled nuclear power reactor at a site. The release of the concentrations and total quantity of radioactive material from a site at these levels is not likely to result in exposures to the whole body or any organ of an individual in the offsite environment in excess of 5 millirems. In deriving the guides on design objective quantities and concentrations, conservative assumptions have been made on dilution factors, physical, and biological concentration factors in the food chain, dietary intakes and other pertinent factors to relate quantities released to exposures offsite.

The proposed guides for design objectives for radioactive materials in gaseous effluents would limit the total quantity of radioactive material released from a site to the offsite environment so that annual average exposure rates due to noble gases at any location on the boundary of the site or in the offsite environment would not be likely to exceed 10 millirems. Annual average concentrations at any location on the boundary of a site or in the offsite environment from radioactive iodines or radioactive material in particulate form would be limited to specified values.

The proposed guides for design objective concentrations specified for radioactive iodines or radioactive material in particulate form would include a reduction factor of 100,000 for Part 20 concentration values in air that would allow for possible exposures from certain radioactive materials that may be concentrated in the food chain. Resultant exposures to individuals offsite would not be expected to exceed 5 millirems per year. The reduction factor would include a 1,000 factor by which the maximum permissible concentration of radioactive iodine in air should be reduced to allow for the milk exposure pathway. This factor of 1,000 has been derived for radioactive iodine, taking into account the milk pathway. However, it has been arbitrarily applied to radionuclides of iodine and to all radionuclides in particulate form with a half-life greater than 8 days. The factor is not appropriate for iodine where milk is not a pathway of exposure or for other radionuclides under any actual conditions of exposure. The factor is highly conservative for radionuclides other than iodine and is applied only because it appears feasible to meet these very low levels. The specified annual average exposure rates of 10 millirems from noble gases and specified concentrations of radioiodines and particulates at any location on the boundary

[1] Average exposures due to natural background radiation in the United States are in the range of 100–125 millirems per year.

of the site or in the offsite environment provide reasonable assurance that actual annual exposures to the whole body or any organ of an individual member of the public will not exceed 5 millirems.

The proposed guides for design objectives would provide that an applicant for a permit to construct a light-water-cooled nuclear power reactor at a particular site could propose design objective quantities and concentrations in effluents higher than those specified in the guides. The Commission would approve the design objectives if the applicant provided reasonable assurance that, taking into account the environmental characteristics of the site, the concentrations and total quantity of radioactive material released by all light-water-cooled nuclear power reactors at the site in either liquid or gaseous effluents would not result in actual exposures to the whole body or any organ of an individual in the offsite environment in excess of 5 millirems per year.

The proposed guides for design objectives (expressed as quantities and concentrations in effluents) for light-water-cooled nuclear power reactors are sufficiently conservative to provide reasonable assurance that, for most locations having environmental characteristics likely to be considered acceptable by the Commission for a nuclear power reactor site, increases in radiation exposures to individual members of the public living at the site boundary, due to radioactive material in either liquid or gaseous effluents from operation of light-water-cooled nuclear power reactors at the site, will generally be less than 5 millirems per year and average exposures to sizeable population groups will generally be less than 1 millirem per year. Nevertheless, the guides provide that the Commission may specify, as design objectives, quantities and concentrations of radioactive material above background in either liquid or gaseous effluents to be released to unrestricted areas that are lower than the specified quantities and concentrations if it appears that for a particular site the specified quantities and concentrations are likely to result in annual exposures to an individual that would exceed 5 millirems.

Conformance with the proposed guides for design objective quantities and concentrations in effluents would provide reasonable assurance that the resultant whole body dose to the total population exposed would be less than about 400 man-rems [1] per year per 1,000 megawatts electrical installed nuclear generating capacity at a site from radioactive material in liquid and gaseous effluents. Average exposures to large population groups would be less than 1 millirem per year.

Guides on technical specifications limiting conditions for operation. The proposed guidance would include provisions for developing technical specifications with respect to limiting conditions for operation to control radioactivity in effluents from light-water-cooled nuclear power reactors during normal operations. The technical specifications would be included as conditions in operating licenses. These provisions are designed to assure that reasonable efforts are made to keep actual releases of radioactivity in effluents during operation to levels that are within the guides on design objective quantities and concentrations. It is expected that actual levels of radioactivity in effluents will normally be within the design objective levels. It is necessary, however, that nuclear power reactors designed for generating electricity have a high degree of reliability. Operating flexibility is needed to take into account some variation in the small quantities of radioactivity that leak from fuel elements which may, on a transient basis, result in levels of radioactivity in effluents in excess of the design objective quantities and concentrations.

The proposed guidance would provide operating flexibility and at the same time assure a positive system of control, by a graded scale of action by the licensee, to reduce releases of radioactivity if rates of release actually experienced, averaged over any calendar quarter, are such that the quantities or concentrations in effluents would be likely to exceed twice the design objective quantities and concentrations. The proposed Appendix I would provide that the Commission may take appropriate action to assure that release rates are reduced if rates of release of quantities and concentrations in effluents actually experienced, averaged over any calendar quarter, indicate that annual rates of release are likely to exceed a range of 4–8 times the design objective quantities and concentrations. Release rates within this range would be expected to keep the annual exposure rate to individuals offsite within a range of 20–40 mrems per year during the quarterly period. In the proposed guidance on technical specifications, provision would be made for an appropriate period of time for all licensees of light-water-cooled nuclear power reactors to implement the guidance with respect to facility operation.

Pursuant to the Atomic Energy Act of 1954, as amended, and section 553 of title 5 of the United States Code, notice is hereby given that adoption of the following amendment to 10 CFR Part 50 is contemplated. All interested persons who wish to submit comments or suggestions in connection with the proposed amendment should send them to the Secretary of the Commission, U.S. Atomic Energy Commission, Washington, D.C., 20545, Attention: Chief, Public Proceedings Branch, within 60 days after publication of this notice in the FEDERAL REGISTER. Comments and suggestions received after that period will be considered if it is practicable to do so, but assurance of consideration cannot be given except as to comments filed within the period specified. Copies of comments received may be examined in the Commission's Public Document Room at 1717 H Street NW., Washington, D.C.

1. Section 50.34a of 10 CFR Part 50 is amended by adding the following sentence at the end of paragraph (a):

§ 50.34a Design objectives for equipment to control releases of radioactive material in effluents—nuclear power reactors.

(a) * * * The guides set out in Appendix I provide numerical guidance on design objectives for light-water-cooled nuclear power reactors to meet the requirement that radioactive material in effluents released to unrestricted areas be kept "as low as practicable."

* * * * *

2. Section 50.36a of 10 CFR Part 50 is amended by adding the following sentence at the end of paragraph (b):

§ 50.36a Technical specifications on effluents from nuclear power reactors.

* * * * *

(b) * * * The guides set out in Appendix I provide numerical guidance on limiting conditions for operation for light-water-cooled nuclear power reactors to meet the requirement that radioactive materials in effluents released to unrestricted areas be kept "as low as practicable."

3. A new Appendix I is added to read as follows:

APPENDIX I—NUMERICAL GUIDES FOR DESIGN OBJECTIVES AND LIMITING CONDITIONS FOR OPERATION TO MEET THE CRITERION "AS LOW AS PRACTICABLE" FOR RADIOACTIVE MATERIAL IN LIGHT-WATER-COOLED NUCLEAR POWER REACTOR EFFLUENTS

SECTION I. *Introduction.* Section 50.34(a) provides that an application for a permit to construct a nuclear power reactor shall include a description of the preliminary design of equipment to be installed to maintain control over radioactive materials in gaseous and liquid effluents produced during normal reactor operations, including expected operational occurrences. In the case of an application filed on or after January 2, 1971, the application must also identify the design objectives, and the means to be employed, for keeping levels of radioactive material in effluents to unrestricted areas "as low as practicable".

Section 50.36a contains provisions designed to assure that releases of radioactivity from nuclear power reactors to unrestricted areas during normal reactor operations, including expected operational occurrences, are kept "as low as practicable".

This appendix provides numerical guidance on design objectives and limiting conditions for operation to assist applicants for, and holders of, licenses for light-water-cooled nuclear power reactors in meeting the requirement that radioactive material in effluents released from those facilities to unrestricted areas be kept "as low as practicable". This guidance is appropriate only for light-water-cooled nuclear power reactors and not for other types of nuclear facilities.

[1] A useful measure of the total exposure of a large number of persons is the man-rem. The exposure of any group of persons measured in man-rems is the product of the number of persons in the group times the average exposure in rems of the members of the group. Thus, if each member of a population group of 1 million people were exposed to 0.001 rem (1 millirem), the total man-rem exposure would be 1,000 man-rem.

SEC. II. *Guides on design objectives for light-water-cooled nuclear power reactors licensed under 10 CFR Part 50.* The guides for design objectives (expressed as quantities and concentrations of radioactive material in effluents) for light-water-cooled nuclear power reactors specified in paragraphs A and B of this section are sufficiently conservative to provide reasonable assurance that, for most locations having environmental characteristics likely to be considered acceptable by the Commission for a nuclear power reactor site, resultant increases in radiation exposures to individual members of the public living at the site boundary, due to operation of light-water-cooled nuclear power reactors at the site, will generally be less than 5 percent of exposures due to natural background radiation and average exposures to sizeable population groups will generally be less than 1 percent of exposures due to natural background radiation. The guides on design objectives for light-water-cooled nuclear power reactors set forth in paragraphs A and B of this section may be used by an applicant for a permit to construct a light-water-cooled nuclear power reactor as guidance in meeting the requirements of § 50.34a(a) that applications filed after January 2, 1971, identify the design objectives, and the means to be employed, for keeping levels of radioactive material in effluents to unrestricted areas as low as practicable.

A. For radioactive material above background in liquid effluents to be released to unrestricted areas by each light-water-cooled nuclear power reactor at a site:

1. The estimated annual total quantity of radioactive material, except tritium, should not exceed 5 curies; and

2. The estimated annual average concentration of radioactive material prior to dilution in a natural body of water, except tritium, should not exceed 0.00002 microcurie (20 picocuries) per liter; and

3. The estimated annual average concentration of tritium prior to dilution in a natural body of water should not exceed 0.005 microcurie (5,000 picocuries) per liter.

B. For radioactive material above background in gaseous effluents, the estimated total quantities of radioactive material to be released to unrestricted areas by all light-water-cooled nuclear power reactors at a site should not result in:

1. An annual average exposure rate due to noble gases at any location on the boundary of the site or in the offsite environment in excess of 10 millirems,[1] and

* * * * *

2. Annual average concentrations at any location on the boundary of the site or in the offsite environment of radioactive iodines, or radioactive material in particulate form with a half-life greater than 8 days, in excess of the concentrations in air specified in Appendix B, Table II, Column I, of 10 CFR Part 20, divided by 100,000.

C. Notwithstanding the guidance in paragraphs A and B above, design objectives, based on quantities and concentrations of radioactive material above background in effluents to be released to unrestricted areas, higher than those specified in those paragraphs may be deemed to meet the requirement for keeping levels of radioactive material in effluents to unrestricted areas as low as practicable if the applicant provides reasonable assurance that:

1. For radioactive material above background in liquid effluents to be released to unrestricted areas by all light-water-cooled nuclear power reactors at a site, the proposed higher quantities or concentrations will not result in annual exposures to the whole body or any organ of an individual in excess of 5 millirems; [1] and

2. For radioactive noble gases and iodines and radioactive material in particulate form above background in gaseous effluents to be released to unrestricted areas by all light-water-cooled nuclear power reactors at a site, the proposed higher quantities and concentrations will not result in annual exposures to the whole body or any organ of an individual in excess of 5 millirems.

D. Notwithstanding the guidance in paragraphs A, B, and C above, for a particular site the Commission may specify, as guidance on design objectives, lower quantities and concentrations of radioactive material above background in effluents to be released to unrestricted areas if it appears that the use of the design objectives described in those paragraphs is likely to result in releases of total quantities of radioactive material from all light-water-cooled nuclear power reactors at the site that are estimated to cause an annual exposure in excess of 5 millirems to the whole body or any organ of an individual in the offsite environment from radioactive material above background in either liquid or gaseous effluents.

SEC. III. *Guides on technical specifications for limiting conditions for operation for light-water-cooled nuclear power reactors licensed under 10 CFR Part 50.* The guides on limiting conditions for operation for light-water-cooled nuclear power reactors set forth below may be used by an applicant for a license to operate a light-water-cooled nuclear power reactor as guidance in developing technical specifications under § 50.36a(a) to keep levels of radioactive materials in effluents to unrestricted areas as low as practicable.

Section 50.36a(b) provides that licensees shall be guided by certain considerations in establishing and implementing operating procedures that take into account the need for operating flexibility while at the same time assure that the licensee will exert his best effort to keep levels of radioactive material in effluents as low as practicable. The guidance set forth below provides more specific guidance to licensees in this respect.

In using the guides set forth in section IV, it is expected that it should generally be feasible to keep average annual releases of radioactive material in effluents from light-water-cooled nuclear power reactors within the levels set forth as numerical guides for design objectives in section II above. At the same time, the licensee is permitted the flexibility of operation compatible with considerations of health and safety to assure that the public is provided a dependable source of power even under unusual operating conditions which may temporarily result in releases higher than such numerical guides for design objectives, but still within levels that assure that actual exposures to the public are small fractions of natural background radiation. It is expected that in using this operational flexibility under unusual operating conditions, the licensee will exert his best efforts to keep levels of radioactive material in effluents within the numerical guides for design objectives.

SEC. IV. *Guides for limiting conditions for operation for light-water-cooled nuclear power reactors.* A. If rates of release of radioactive materials in effluents from light-water-cooled nuclear power reactors actually experienced, averaged over any calendar quarter, are such that the estimated annual quantities or concentrations of radioactive material in effluents are likely to exceed twice the design objective quantities and concentrations set forth in section II above, the licensee should:

1. make an investigation to identify the causes for such release rates; and

2. define and initiate a program of action to reduce such release rates to the design levels; and

3. report these actions to the Commission on a timely basis.

B. If rates of release of radioactive material in liquid or gaseous effluents actually experienced, averaged over any calendar quarter, are such that estimated annual quantities or concentrations of radioactive material in effluents are likely to exceed a range of 4–8 times the design objective quantities and concentrations set forth in section II above,[2] the Commission will take appropriate action to assure that such release rates are reduced. (Section 50.36a(a)(2) requires the licensee to submit certain reports to the Commission with regard to the quantities of the principal radionuclides released to unrestricted areas. It also provides that, on the basis of such reports and any additional information the Commission may obtain from the licensee and others, the Commission may from time to time require the licensee to take such action as the Commission deems appropriate.)

C. The guides for limiting conditions for operation described in paragraphs A and B of this section are applicable to technical

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[1] An exposure rate such that a hypothetical individual continuously present in the open at any location on the boundary of the site or in the offsite environment would not incur an annual exposure in excess of 5 millirems. This neglects the reduction in the exposures to a real individual that would be afforded by the distance from the site boundary at which the individual is located, shielding provided by living indoors and periods of time the individual is not present in the area.

[1] For purposes of the guides in Appendix I, exposure of members of the public should be estimated from distributions in the environment of radioactive material released in effluents. For estimates of external exposure the rem may be considered equivalent to the rad; and account should be taken of the appropriate physical parameters (energy of radiation, absorption coefficients, etc.). Estimates of internal dose commitment, in terms of the common unit of dose equivalence (rem), should be generally consistent with the conditions or assumptions for calculational purposes most recently published by the International Commission on Radiological Protection which apply directly to intakes of radioactive material from air and water, and those applicable to water may be applied to intakes from food. These conditions or assumptions should be used for calculations of dose equivalence except for exposures due to strontium-89, strontium-90, or radionuclides of iodine. For those radionuclides the biological and physical assumptions of ICRC Report No. 2 should be used. It is assumed that annual average concentrations of radioactive iodine in the environment, as listed in Part 20, Appendix B, Table II, would result in annual doses of 1.5 rems to the thyroid and the concentration of strontium-89 or strontium-90 would result in annual doses of 0.5 rem to the bone. Exposure to the whole body should be assessed as exposure to the gonads or red bone marrow.

[2] Release rates within this range would be expected to keep the annual exposure rate to individuals offsite within a range of 20–40 mrems per year during this quarterly period.

*

ERRATUM - should read "10 millirems".

specifications included in any license authorizing operation of a light-water-cooled nuclear power reactor constructed pursuant to a construction permit for which application was filed on or after January 2, 1971. For light-water-cooled nuclear power reactors constructed pursuant to a construction permit for which application was filed prior to January 2, 1971, appropriate technical specifications should be developed to carry out the purposes of keeping levels of radioactive material in effluents to unrestricted areas as low as practicable. In any event, all holders of licenses authorizing operation of a light-water-cooled nuclear power reactor should, after (36 months from effective date of this guide), develop technical specifications in conformity with the guides of this Section.

(Sec. 161, 68 Stat. 948; 42 U.S.C. 2201)

Dated at Washington, D.C., this 4th day of June 1971.

For the Atomic Energy Commission.

W. B. McCool,
Secretary of the Commission.

[FR Doc.71-8049 Filed 6-8-71;8:51 am]

ATTACHMENT "D"

COPY OF TRANSCRIPT OF

STATEMENT OF

DAVID D. DOMINICK
ASSISTANT ADMINISTRATOR
OFFICE OF CATEGORICAL PROGRAMS

ON BEHALF OF THE ENVIRONMENTAL PROTECTION AGENCY

PRESENTED AT

AEC PUBLIC HEARING ON EFFLUENTS FROM LIGHT-WATER-COOLED NUCLEAR POWER REACTORS

GERMANTOWN, MARYLAND

23 FEBRUARY 1972

DOCKET NO. RM 50-2

PAGES 149-165

Take 2 jw 1

MR. DOMINICK: Thank you, Mr. Chairman.

Is this microphone working.

The Environmental Protection Agency is pleased to have the opportunity to provide its views on the proposed AEC guides for light-water-cooled nuclear power reactors as published in the Federal Register on June 9, 1971.

Before discussing the analysis that EPA has undertaken and the conclusions drawn from this analysis, two observations should be made.

First, we believe that the AEC's effort to provide general quantitative interpretation of the elusive concept that radiation doses should be maintained "as low as practicable" is a step in the right direction. It helps to reduce uncertainty in the minds of the public, environmentalist and the industry concerning the levels of emissions of radioactive materials to which light-water-reactors will be limited.

It also provides a basis for discussion and debate now; in the future, when this guidance is made final, it will provide a basis for limiting exposure of individuals and populations which, hopefully, can receive general concurrance and against which performance can be judged.

Second, a brief comment on EPA's role and authorities with respect to nuclear activities is in order.

When the President created EPA in late 1970 through

Reorganization Plan No. 3, he consolidated in EPA the important standard setting authorities for environmental pollution control which were scattered throughout the Federal establishment.

Thus, EPA has the legal authority to establish a broad range of environmental standards on a systematic basis, taking into account risks, costs and benefits accruing from man's activities in a way that will maximize total environmental protection consistent with the benefits accruing to society from the production of the goods and services.

EPA has authority to set ambient air and water standards to limit concentrations of radioactive materials in these media.

But our authority is not limited to these specific pathways. Reorganization Plan No. 3 also transferred from the AEC to EPA the authority to establish generally applicable environmental radiation standards under the Atomic Energy Act.

This authority encompasses such alternatives as establishment of standards for doses to individuals and for doses to populations in general from sources or classes of sources.

Also transferred were the functions of the former Federal Radiation Council, which advised the President with respect to radiation matters directly or indirectly affecting health, including guidance for all federal agencies in the

dw 3

formulation of radiation standards.

From the Department of Health, Education, and Welfare, EPA assumed responsibilities or surveillance and monitoring of levels and sources of radicactive materials in the environment.

Therefore, EPA has two responsibilities with respect to these proposed AEC guides -- first, to evaluate these guides from technical, economic and risk viewpoints; and second, to determine if it is necessary or beneficial for EPA to exercise its environmental standards authority at this time.

Both questions will be addressed in subsequent parts of this testimony.

There are many possible environmental impacts of nuclear electrical power production -- including routine and accidental releases from such different parts of the fuel cycle as mining, fuel fabrication, power reactors, fuel reprocessing, and final waste disposal.

These proposed guides limit themselves to addressing the problem of routein releases from light-water-cooled power reactors.

The EPA has for some time been actively considering requirements for generally applicable environmental standards for a number of classes of activities.

The AEC in its June 9, 1971, notice of their

dw 4

proposed rule making noted EPA's consideration of such standards for light-water-cooled nuclear power reactors. We have used the information developed from this consideration to assess the guides proposed by the AEC for power reactor design and operation.

There are at least two different ways to articulate limits on human exposure to reactor effluents -- by considering doses to the potentially most exposed individual, and by considering the aggregate dose to the entire affected population.

We will address each of these in turn with a view to assessing whether the proposed guides succeed in providing adequate assurance of public health protection, and whether, in our view, additional action may be required.

Before a rational assessment can be made of the degree of control appropriate for any pollutant, a relationship between exposure and potential deleterious effect must be either established or assumed.

In the case of radiation such a relationship must be assumed because the effects, if any, for the exposure levels involved are too few to be observed.

We have a great deal of evidence at much higher exposures that leads us to believe that our assumptions for t doses that result from these low exposure levels are conserva tive in that, if anything, they overstate the risk.

Specifically, EPA utilizes a linear dose-effect relationship, a non-threshold theory, as an appropriate assumption for assessing health effects resulting from low level radiation exposures of large population.

Various alternatives are possible for determining and specifying emission control.

One alternative is to require zero emission.

Another alternative is to adopt best available proven technology to control emission independent of the cost of such technology.

Still another alternative is to balance the health and environmental risk against the cost of reducing this risk.

EPA has carefully examined these alternatives and believes that risk-cost balancing is the preferred method for establishing these levels.

To adopt any others might lead to excessive investment of society's available resources to obtain an extremely small benefit.

We must also recognize that here, as in the case of almost every other human activity, one must make an initial broad judgment as to whether the benefit flowing from an activity -- in this case the benefits from the generation of electricty -- outweigh the risks and other costs incurred in producing the benefit.

The highly complex, lengthy analysis that would

dw 6

logically provide the best basis for such a judgment in this case has not yet been done.

AEC has apparently made the judgment that the benefits justify the risks and other costs associated with the careful operation of nuclear power reactors; EPA does not disagree with this judgment.

FROM EPA's point of view, a very important reason for controlling radioactive emissions from nuclear generating plants is to limit their collective impact on the population at large.

We will address population dose level later in this statement but will first address guides which are the immediate subject of these hearings.

The proposed design guides for routine emissions appear to have been derived though balancing of risks and cost associated with various degrees of control, if we interpret the AEC's statements of January 7, 1972, correctly.

We support use of this method and commend the AEC for endorsing this approach.

The EPA has conducted a careful independent examination of various kinds of control technology currently available for these reactors, of the levels of emission control attainable, and of the associated costs.

We have also made assessments of risks to individuals and to populations from residual effluents at these various

dw 7

levels of control.

Using these assessments, we have examined the costs for risk reduction as a function of the remaining risk at each level.

As a result of this examination we have concluded that the proposed design guides represent an application of control technology compatible with our assessment of our responsibilities for continuing protection of the public health and the environment.

Application of additional emission control equipment beyond that already indicated by these design guides would imply investments at a rate exceeding millions of dollars per projected health effect averted, and we do not feel that such costs are justified.

The second part of this proposed AEC guidance addresses the issue of limits on operating levels of plants constructed in conformance with these design guides.

EPA recognizes the need for some flexibility for operation. The generation of electricity must be reliable, so operating margin is needed so that plants are not required to shut down for minor departures from design values.

The proposed operating guides provide two kinds of flexibility.

First, the time frame for corrective action, taking all actions necessary to correct emission to design levels is

dw 8

not stated in the guides.

Second, the level at which action should be initiated by the plant operator or the AEC varies from two to eight times the design level for any effluent.

Thus, exposures of individuals and populations under this operating guidance will be a function of both response time for correction and the degree to which emissions exceed design levels.

We expect that industry and the AEC will normally maintain plant operations close to or below design levels.

It is necessary to assume how the guides will be implemented because of flexibility indicated above.

As we interpret the AEC's statements and testimony regarding these guides, a most exposed individual for a typical reactor operating in accordance with the design guidelines, might receive annual design doses of 5 millirems from noble gases and particulates; perhaps 1 or 2 millirems from liquids, excluding tritium; no more than 1 millirem from tritium; and perhaps an additional 3 or 4 millirems from other sources, such as direct gamma radiation from turbines or waste holdup systems on-site.

Design levels for these effluents are 10 millirem, 5 millirem and 5 millirem, for gases, liquids, and particulates respectively.

The AEC guides do not specify design levels for

dw 9

direct gamma radiation. At these design dose levels, for example, if a plant operated at three times design levels for two quarters before correcting itself back to, say 1.5 times design levels, such a most exposed individual could receive an annual dose of 20 millirems.

We consider this sort of operation to be an example of reasonable operating flexibility.

On the other hand, if a plant operated at 8 times design levels for the same period, and then returned to 1.5 times design levels, the same individual might receive an annual dose of 50 millirems.

We do not consider such exposures to be necessary -- the technology required by these guidelines should be able to maintain individual doses, even under unusual operating conditions, to values very close to design levels.

The guidelines are not specific in the following respects:

1. The time frame proposed for correction of deviations from the design guides, both in instances when licensee and when Commission action is indicated, is unstated, as are the factors which will determine the time frame.

2. The criteria to be used to determine at what point in the range 4 to 8 times design levels corrective action will be required by the Commission are unspecified.

3. The conditions under which the Commission

dw 10

will actually specify lower numerical design guidance than that specified in this notice of proposed rulemaking are not set forth.

4. The proposed guide for gaseous effluents is expressed as annual exposure rate, while all other guides are expressed as limits on total annual quantity or average annual concentration.

Gaseous effluent has not been similarly expressed. The language for gaseous emissions does not appear to require "as low as practicable" emissions, particularly for pressurized water reactors.

Because of all these elements about which EPA has made considered assumptions in its analysis, final judgment on the extent of public health protection provided by these guides is not possible in the absence of experience with their enforcement.

If prompt corrective action is taken, and departures are limited to less than the upper limit proposed, any numerical standard for maximum doses to individuals that EPA has had under consideration would not increase protection of such individuals to a greater degree than expected from such implementation of the proposed AEC guides.

EPA has, therefore, decided that it is not necessary to promulgate a standard now for maximum individual doses from light-water-cooled nuclear power plants.

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However, if actual practice under these guides should result in maximum individual doses over what can be expected under careful operation with the technology implied by the guidelines, EPA will reexamine this decision.

EPA will continue to maintain a national surveillance and inspection program for monitoring radiation levels in the environment, and we anticipate that timely reports and cooperation will be available from the AEC concerning the performance of its licensees.

Individual facilities need not exceed the guides; indeed, in most cases they will probably operate at levels considerably below the guides.

EPA will continue to review the environmental impact of individual facilities with these considerations in mind.

The best index of total risk resulting from low levels of radioactive emissions to the environment is ultimately their cumulative impact on large populations.

The measurement useful for assessing this impact is the sum of all of the individual doses in the population -- conventionally expressed in units of "man-rems".

Conservative estimates of projected health effects are relatable to (for large populations at low doses) the number of man-rems received by the population.

The International Commission on Radiological

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Protection has made such estimates for a variety of health effects which EPA used in making its preliminary assessment of health risk.

These risks include cancer, major genetic or other long-term health effects, such as life shortening or inhibition of growth or development.

In this connection, it should be noted that the scientific bases for evaluating radiaton effects on human health are currently being examined in depth for EPA by the Committee on Biological Effects of Ionizing Radiation of the National Academy of Sciences.

The findings of that Committee will be carefully reviewed.

EPA has combined its current estimates of risk, population dose and alternative levels of control technology and cost for major waste streams to provide a cost-risk assessment of controlling population doses to levels lower than are expected to obtain for plants meeting the proposed AEC design and operating guides.

On the basis of that analysis EPA has concluded that the costs of risk reduction to levels lower than a few hundred man-rems per 1000 megawatts of electricity produced are not warranged.

It should be noted that EPA limited its detailed examination of cost/risk relations to currently available

dw 13

gaseous emission control technology and did not address relations for fossil fueled plants compared to nuclear, nor broad siting alternatives, in reaching these conclusions.

It should also be stressed that population doses are, like individual doses, dependant upon the way in which AEC implements its proposed guidelines both in terms of design variations and time for correcting operational departures from design levels.

Plant siting with respect to population is, of course, also highly significant to population dose. As a consequence, reactors operating within the limitations of the proposed guidance can be expected to deliver widely varying population doses.

EPA has concluded that it will not propose a population dose limitation at this time.

The actual anticipated dose under AEC guides, based on EPA estimates, is expected to be at such a level that additional expenditures for tighter controls than required to meet the guides would not be warranged.

We will, however, continue to observe population doses from operation under the proposed AEC guidance to see whether the results are consistent with our estimates or what should occur under these guides as we have interpreted them.

We will also review risk estimates, plant siting criteria and future population densities and distributions.

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If, on the basis of any of these activities, we determine a need to provide limits on population dose, we will be prepared to propose such standards.

EPA has broad responsibilities that relate to many aspects of energy production. Recently, an EPA Energy Policy Committee reporting directly to the Administrator of the Agency was formed.

It is EPA's intention to examine in depth the broad problems and tradeoffs of benefits and costs associated with decisions affecting energy production.

EPA is, for example, considering the relative environmental impacts of different fuel cycles, such as the fossil and nuclear fuel cycles.

We are, in this connection, examining the environmental impact of other portions of the nuclear fuel cycle, such as nuclear fuel reprocessing and ultimate waste disposal.

The fact that EPA is considering these broad questions does not mean that it is inappropriate to set standards or guides at this time. On the contrary, decisions as to standards relating to components of energy production must be made before we have in hand relatively complete knowledge of interrelations of energy production and environmental problems.

Thus, it is appropriate to consider regulation of

separate portions of the nuclear fuel cycle's environmental impact now, as the AEC is now doing.

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EPA has taken action in other energy areas by setting standards where the public health risk or the environmental impact has been evidently adverse.

The high degree of control exercised in the nuclear industry in the past, and future expectations, are such that EPA does not find it necessary to set a standard at this time.

At the same time, EPA reiterates its intent to carefully and systematically review actual operating experience under proposed AEC guides on a timely basis.

If, based upon these actions or on our review of risks, technology, siting, and alternative energy sources, EPA believes further limitations on either individual or population dose to be necessary, we will propose such standards.

We believe that these hearings will serve as a very useful basis for all interested parties to develop additional information and to gain further understanding of issues involved. EPA will be following these hearings closely, in order to take advantage of the information that will be developed, and to help us to determine whether further action is required by EPA with respect to any of the problems involved.

end 2

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CHAIRMAN WELLS: Thank you, Mr. Dominick. The Board did not receive copies of your statement. We understand as you read them, we would like to have copies of these.

Is Mr. Richard D. Wilson here now, and if so, does he wish to make an oral statement?

(No response)

Hearing no response, the Board assumes that he does not wish to make an oral statement and the record will so indicate.

Is a representative of National Aeronautics and Space Administration here, and if so, does he wish to make an oral statement?

Is this Mr. Barkley?

MR. BARKLEY: Yes, sir.

CHAIRMAN WELLS: Thank you.

STATEMENT OF H. V. BARKLEY, JR., CHIEF OF THE REACTOR DIVISION OF NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, LOUISVILLE RESEARCH CENTER, A LIMITED PARTICIPANT

MR. BARKLEY: Mr. Chairman, gentlemen, my name is H. V. Barkley, Jr. I am chief of the Reactor Division of NASA's Louisville Research Center, Pembrook Station at Sandusky, Ohio. I am responsible for the design, maintenance of the reactor facility and its experimental program.

I would like to introduce [illegible]

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written testimony that we submitted with our letter of February 11, 1972. Copies of this have been provided to the Board and to all of the participants and limited participants.

CHAIRMAN WELLS: Very well. It is admitted in the record.

(The statement follows.)

ATTACHMENT "E"

SUMMARY OF AEC POSITION ON RELATIVE RESPONSIBILITIES OF EPA AND AEC ON STANDARDS TO CONTROL RADIOACTIVITY IN EFFLUENTS FOR NORMAL OPERATIONS

EPA generally applicable standards for the protection of the general environment should be ambient standards that establish acceptable upper limit environmental risks due to man-made radiation from all sources of exposure or from broad classes of sources of exposure. Such generally applicable standards would normally be in the form of radiation dose and dose commitment limits to individuals and populations. Such limits would be based on an acceptable level of risk taking into account the benefits derived from the nuclear power industry as compared with risks from alternative means of generating electrical power. The limits might also take into account a broad general consideration of the feasibility of meeting the standards based on the availability and cost of technology, uncertainties in the capability of performance of the technology and the need for operating flexibility. This latter consideration would be a generally applicable determination and would not represent a fine tuned cost-effective analysis of the "as low as practicable" level of radioactive materials in effluents from specific types of facilities based on design and operating parameters. Annex 1 is a draft model of a generally applicable standard for the fuel cycle.

The AEC under its authority to implement and enforce generally applicable environmental standards should maintain the authority to assure that generally applicable standards are met and to further achieve the lowest practicable releases of radioactive materials through a

combination of appropriate siting factors, design requirements for facilities and equipment, and operating procedures to assure operation in the public interest and to protect public health and safety. The implementation of the "as low as practicable" concept involves all of the same considerations of evaluation of specific designs of facilities to limit releases of radioactivity that are inherent in the licensing process. In the licensing process the AEC must, in addition to assuring that all plants operate within the generally applicable standards in the Commission's regulation, Part 20, establish "as low as practicable" effluent release limits on new types of facilities on a case-by-case basis. These limits are determined by examining in detail the design of the plant and operating procedures to achieve the objectives of "as low as practicable". This is the procedure that is presently followed for fuel reprocessing plants, fuel fabrication plants and other plants in the fuel cycle. As adequate experience is developed on a case-by-case basis numerical guides such as the AEC proposed Appendix I on design objectives and limiting conditions of operation for light-water-cooled power reactors are developed and issued on a generic basis. The AEC has underway a detailed study being conducted with the assistance of Oak Ridge National Laboratory to develop information on operating experience, the state of technology, cost of technology, and other information that will provide a solid basis for developing guides on "as low as practicable" levels of radioactivity in effluents for fuel cycle plants other than nuclear power reactors that are now covered by the proposed Appendix I.

Annex 1 to Attachment "E"

AEC PROPOSED COMPROMISE EPA GENERALLY APPLICABLE STANDARD FOR THE PROTECTION OF THE GENERAL ENVIRONMENT FOR THE URANIUM FUEL CYCLE

A. The annual dose or dose commitment to a member of the public from radiation or radioactive materials released to the environment from the entire light-water-cooled nuclear power reactor fuel cycle should not exceed X millirems per year to the whole body, X millirems per year to the whole body, X millirems per year to the thyroid, X millirems to the skin, and X millirems to any other organ. (This would represent a dose limit not a design objective.)

B. The total annual population dose or dose commitment from radiation or radioactive materials released to the environment from the entire light-water-cooled nuclear power reactor fuel cycle should not exceed X person rems per year to the whole body. (The purpose of the person rem limit would be to deal with EPA's concern for population dose from both short-and long-lived radionuclides.)

The numerical values finally decided upon in the standards in (a) and (b) would be based on two considerations:

a. An acceptable level of risk taking into account the benefits derived from the nuclear power industry and in comparison with risk from alternative means of generating electrical power; and

b. A general consideration of the feasibility of meeting the numbers based on the technology and cost of technology available.

This latter consideration would be a broad determination and would not represent a fine tune cost-effectiveness analysis of what is "as low as practicable" for individual types of facilities. This would be reserved to AEC in implementing the generally applicable environmental standards. EPA standards would not include requirements on individual sites or facilities or any implementing requirements.

Exhibit D

ACTION

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

October 19, 1973

MEMORANDUM FOR: THE PRESIDENT

FROM: Russell E. Train

SUBJECT: AEC Opposition to EPA Radiation Standards

ISSUE: EPA has proposed standards for environmental releases of radioactivity from the nuclear power industry, based upon the authority transferred from AEC to EPA by Reorganization Plan #3. (TAB A) These standards are based on a balancing of health risks against the capabilities and costs of control technology, and therefore are related to classes of activity (e.g., reactors and fuel reprocessing). AEC objects to EPA's exercising its jurisdiction by issuing such standards and contends that EPA should set ambient standards that apply to the entire nuclear fuel cycle.

AUTHORITY: Reorganization Plan #3 of 1970 transferred to EPA the functions of the AEC to *"...establish generally applicable environmental standards for the protection of the general environment from radioactive material."* The Plan defined these standards to mean *"...limits on radiation exposures or levels, or concentrations or quantities of radioactive material, in the general environment outside the boundaries of locations under the control of persons possessing or using radioactive material."* Your message on the Plan established the EPA-AEC division of responsibilities as follows: *"...The Atomic Energy Commission's authority to set standards for the protection of the general environment from radioactive material would be transferred to the Environmental Protection Agency...AEC would retain responsibility for the implementation and enforcement of radiation standards through its licensing authority."*

There are no criteria for or constraints on *"generally applicable environmental standards"* set forth in Reorganization Plan #3 or in its legislative history.

THE PROPOSED STANDARDS: EPA's goal in developing standards for the nuclear power industry has been to implement your directive to develop our energy resources as rapidly as possible commensurate with a clean environment. EPA has balanced the short and long-term effects of planned releases on health against the costs of control and through these standards can assure, for these releases, that nuclear power is an environmentally acceptable means for achieving national energy goals. The EPA standards are proposed for public radiation exposures and quantities of long-lived radioactive materials in the environment outside AEC-licensed facilities. These kinds of limits are explicitly provided for by the above authority. The standards were determined to be reasonable by considering both the cost and technical feasibility of control technology. EPA cannot and should not set standards without such consideration for two reasons: 1) both agencies agree that it is prudent to assume that there is no threshold level for radiation effects in setting standards, that is, risk is proportional to dose all the way down to zero dose. Since there is no safe level of radiation, there is no logical way to set radiation standards other than to balance risks

against costs of control; and 2) the nuclear industry is too important to the nation's future power supply to ignore cost and technology considerations.

Since effluents, controls, and their costs differ for different classes of activity, EPA's proposed standards necessarily vary for different classes in the fuel cycle. However, the standards do not require the use of specific control mechanisms, types of equipment or siting conditions as is argued by AEC. EPA agrees that these are properly functions associated with implementation of standards. The implementation and enforcement of these standards at particular facilities (e.g., design, operating and monitoring requirements) are the responsibility of AEC. Therefore, EPA does not believe that these standards conflict in any way with AEC's responsibilities, and dual regulation of the industry is avoided.

Nevertheless, AEC argues that the establishment of standards for different classes of activity constitutes an *"implementation and enforcement"* function that only AEC can perform. However, if the AEC establishes standards of the type proposed by EPA, instead of EPA, it is not clear just what the AEC would be *"implementing and enforcing."* Apparently, to avoid this objection and the problems that would be associated with EPA not exercising the authority transferred in Reorganization Plan #3, the AEC recommends that EPA should set ambient standards applicable to the entire uranium fuel cycle. It is, therefore, AEC rather than EPA which is suggesting dual standards for the nuclear power industry. The AEC, not EPA, is suggesting that the nuclear fuel cycle should have to meet both source and ambient standards established by two different agencies.

PRACTICAL IMPLICATIONS OF PROCEEDING AS PROPOSED: Both agencies apparently agree that standards or guides should be set for each class of activity. This single EPA rulemaking would bring six major operations in the nuclear power fuel cycle, including reactors, to cost-effective levels of control comparable to those for reactors. AEC could then avoid its lengthy rulemaking procedures and needless duplication of work already done by EPA for the balance of the fuel cycle.

The AEC argues that EPA should not set these standards since AEC is developing guides for light-water reactors. EPA's standards are compatible with most of these guides. The conflict between EPA standards and AEC guides concerns the degree of operating flexibility available to AEC. EPA has already provided a variance above the standard to assure delivery of power during peak demand periods. AEC should provide information to justify the need for additional operating flexibility for older plants and to provide a margin in the absence of operating experience for large new plants. It should be noted that Appendix I was proposed by AEC after Reorganization Plan #3 and contrary to the advice of EPA. At the time Reorganization Plan #3 was signed, AEC had no standards for specific classes of activity.

Other implications of proceeding as proposed are: 1) control costs to industry are negligible but the benefit of having and meeting EPA standards, in terms of public acceptability, could be large, 2) EPA would carry out its charge under Reorganization Plan #3 for radiation as it does for other pollutants and in so doing, 3) EPA's standards would satisfy the directives of your recent energy messages to expedite the supply of energy while preserving a clean environment.

PRACTICAL IMPLICATIONS OF NOT PROCEEDING AS PROPOSED: If the standards are not issued as proposed: 1) the nuclear industry would be subjected to the uncertainty of not knowing when or what standards EPA might subsequently impose and would also have to wait for completion of the lengthy AEC processes for issuing five separate new regulatory guides for the balance of the fuel cycle; 2) EPA can anticipate increased pressure to establish similar standards under other less satisfactory authorities. EPA has already been challenged in court on its failure to control radioactive effluents under the 1972 Water Act; and 3) AEC's proposal to set ambient standards only is unworkable and would jeopardize EPA's environmental credibility. (TAB B)

ALTERNATIVES FOR RESOLUTION OF JURISDICTIONAL CONFLICT:

A. *Issue the standards as proposed, following normal interagency resolution of technical issues.*

This would resolve the issue in favor of EPA. Implementation at individual facilities or sites; specification of operating procedures, monitoring and reporting requirements; and enforcement of these standards would be vested in AEC.

B. *Modify the standards to specify variances to be exercised at the discretion of AEC in order to facilitate implementation for special reactor operating situations, following normal resolution of technical issues.*

This would give the AEC greater flexibility in establishing and enforcing limits at particular facilities. It will also permit AEC to introduce sufficient flexibility in applying EPA's standards to reactors when, in AEC's judgment, this is required to assure that the AEC's concerns about operational flexibility and alleged conflicts with Appendix I be satisfied. This alternative does, however, make the EPA standards less firm, although EPA would issue upper limits.

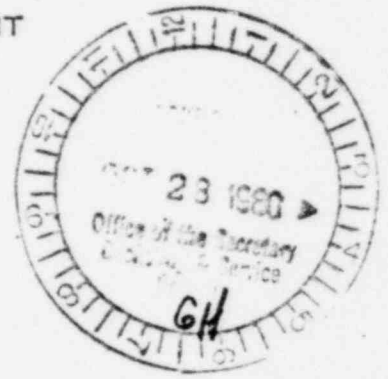
RECOMMENDATION: Alternative A. EPA believes that its proposed standards can be met without the need for additional operating flexibility beyond the variances for power emergencies presently provided in EPA's standards. The proposed standards are entirely within EPA's authority, were developed using the most rational approach available, can be met by industry cost-effectively, and would be beneficial to the rapid development of nuclear power.

_____ Approve _____ Disapprove _____ See Me

Exhibit E

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

DEC 7 1973



MEMORANDUM FOR ADMINISTRATOR TRAIN
CHAIRMAN RAY

SUBJECT: Responsibility for setting radiation protection standards

FROM : Roy L. Ash

Thank you for providing position papers which outline the background and the current difference of views between your two agencies as to which should have the responsibility for issuing standards to define permissible limits on radioactivity that may be emitted from facilities in the nuclear power industry.

It is clear, as your paper indicates, that a decision is needed on this matter so that the nuclear power industry and the general public will know where the responsibility lies for developing (including public participation in development), promulgating and enforcing radiation protection standards for various types of facilities in the nuclear power industry. We must, in the national interest, avoid confusion in this area, particularly since nuclear power is expected to supply a growing share of the Nation's energy requirements; and it must be clear that we are assuring continued full protection of the public health and the environment from radiation hazards.

It is also clear from the information which you provided that:

. the area of responsibility now in controversy is intimately related to the direct regulatory responsibilities and capabilities of the Atomic Energy Commission, responsibilities about which there is no dispute.

. EPA has construed too broadly its responsibilities, as set forth in Reorganization Plan No. 3 of 1970, to set "generally applicable environmental standards for the protection of the general environment from radioactive material."

On behalf of the President, this memorandum is to advise you that the decision is that AEC should proceed with its plans for issuing uranium fuel cycle standards, taking into account the comments received from all sources, including EPA; that EPA should discontinue its preparations for issuing, now or

in the future, any standards for types of facilities; and that EPA should continue, under its current authority, to have responsibility for setting standards for the total amount of radiation in the general environment from all facilities combined in the uranium fuel cycle, i.e., an ambient standard which would have to reflect AEC's findings as to the practicability of emission controls.

EPA can continue to have a major impact upon standards for facilities set by AEC through EPA's review of proposed standards, during which EPA can bring to bear its knowledge and perspective derived from its responsibility for setting ambient radiation standards.

The President expects that AEC and EPA continue to work together to carry out the responsibilities as outlined above.

Exhibit F

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

DEC 18 1974

SUBJECT: Environmental Radiation Standards for the Uranium Fuel Cycle - ACTION MEMORANDUM

FROM: Roger Strelow
Assistant Administrator
for Air and Waste Management (AW-443)

R. Strelow

TO: The Administrator (A-100)

OK John Ramsden 1/10

THRU: AX (A-101)

STATUS

The proposed rulemaking is ready for transmittal to interagency review, including review under NEPA. We have prepared a Draft Environmental Statement which provides for the public an explanation of the proposed standards and their environmental impact.

We have reached substantial agreement with the AEC on most issues after extensive consultation and there are no jurisdictional issues remaining, but two important technical issues are still not resolved:

a) The manner in which EPA sets forth a requirement that environmental releases of the long-lived radionuclides krypton-85 and iodine-129 be curtailed, and

b) How the standard should treat radiation doses received by the general public as the result of transportation of radioactive materials between fuel cycle operations.

The proposed standards satisfy, we believe, the constraints of the memorandum from Mr. Ash of December 7, 1973, and at the same time provide the required protection of public health and the environment.

Attached are a Notice of Proposed Rulemaking for the Federal Register (Tab A), a Draft Environmental Statement (Tab B), and the responses received to our Advance Notice of Proposed Rulemaking together with our comments on these (Tab C).

BACKGROUND

In August of last year you approved a proposed standard for the uranium fuel cycle for transmission to interagency review. The AEC objected to the proposal on jurisdictional (and other) grounds, and following a meeting between you and Chairman Ray both agencies submitted memoranda to the President. This resulted in a memorandum from Mr. Ash (Tab D) which supplied a new interpretation of Reorganization Plan No. 3 with respect to generally applicable environmental standards. The memorandum concluded that EPA should not set standards for separate types of fuel cycle activities, as proposed, but should instead address standards to the uranium fuel cycle taken as a whole, and, in addition, "reflect" AEC's findings as to the practicability of effluent controls. The memorandum concluded with an exhortation for mutual cooperation between the two agencies.

Following meetings in January and February between Mr. Muntzing, AEC Director of Regulation, and Dr. Rowe, at which basic agreement was reached on the need for EPA standards and their relation to AEC development of design and operating guidance for specific types of fuel cycle facilities, EPA and AEC simultaneously published in the Federal Register notices of intent to pursue standards for the entire fuel cycle and design and operating guidance for facilities other than reactors, respectively. EPA and AEC staff have consulted frequently during the subsequent development of the proposed standards.

The proposed fuel cycle standards are described in detail at Tabs A and B. They are of two types. The first consists of limits on maximum doses to individuals. These are intended to limit the potential health impact of short-lived radioactive effluents to levels achievable using effluent controls that are presently in commercial use and are judged to be reasonable on the basis of the cost-effectiveness of the health risk reduction achieved through their use. The second type consists of limits on the permissible incremental environmental burdens of certain long-lived radioactive effluents per unit of electrical power produced by the uranium fuel cycle. Standards are proposed in this form so as to permit growth of the industry and at the same time restrict irreversible contamination of the environment to levels achievable through the use of cost-effective effluent controls. In the case of two out of the three standards of this type, the required effluent controls, although in advanced stages of development, are not now in commercial use. The proposed effective date of those standards is 1983.

The standards proposed for maximum individual dose are somewhat higher than those we had previously anticipated proposing (25 mrem/yr instead of 5-15 mrem/yr) in order to permit the AEC greater flexibility for implementation.* The AEC feels strongly that at least this margin of flexibility is necessary, and in informal staff level discussions initially suggested a significantly higher value. The proposed standards would require installation of the same types and levels of effluent control as in our anticipated previous proposal and will result, we are convinced, in the same level of public health protection after implementation by AEC regulations. They are thus not a slackening of control requirements, but do provide a margin in case controls do not perform as well as estimated.

The proposed standards apply to planned environmental releases and exposures only, and therefore the standard provides a variance provision to the AEC for temporary and unusual situations in which continued operation of fuel cycle facilities at higher levels than permitted by the standards is required in order to insure orderly delivery of electrical power. This provision obviates the need for the higher limits which AEC believes would be required (and we agree) if the standard required suspension of operations under such circumstances. Such a shutdown standard would be, in effect, a safety criterion rather than an environmental protection standard.

The AEC has informally concurred in the form of both types of standards. Their acceptance of the second type of standard is of considerable significance, since it provides an important precedent which will provide EPA a viable means for limiting environmental burdens of long-lived radionuclides.

REMAINING TECHNICAL ISSUES BETWEEN EPA AND AEC

A. Krypton-85 and Iodine-129 Control: The standard requires imposition of controls for krypton-85 and improved levels of control of iodine-129 by 1983. A variety of options for both of these control requirements are now in advanced stages of development. In the case of krypton-85, one manufacturer has submitted a bid for a system of guaranteed performance exceeding the proposed standard and another has indicated the ability to do so. The AEC informally indicates that the required systems for both of these long-lived radionuclides can be made available for commercial use by 1983. However, they prefer that EPA indicate in its notice of proposed rulemaking the need for control of these materials and consider setting standards only after the AEC has demonstrated the commercial feasibility of the required controls. They also point out that setting standards would have the effect of establishing an international precedent.

*Note that the currently applicable standard, set by the former Federal Radiation Council, is 500 mrem/yr.

We believe that standards are required now because:

1) EPA's ability to insure necessary environmental protection would be severely circumscribed if we accept the premise that EPA must wait until AEC sees fit to develop controls and certify their practicability prior to proposal of any EPA standard.

2) The development of these systems has been part of AEC's LMFBR program (not their light-water-cooled reactor program), and given anticipated delays of that program and the reorganization of AEC into NRC and ERDA, a standard is required now to insure that these controls will be developed in a timely fashion.

3) The control of krypton-85 is an international, as well as a national, problem because of its global dispersion. An EPA standard now would establish an important precedent encouraging control by other nuclear powers in a timely fashion. West Germany and Japan are currently considering such control.

The expressed AEC concern that they may be faced with a standard they cannot meet, due to some unforeseen difficulty (we consider this extremely unlikely), is addressed by EPA's explicit commitment in the Federal Register notice to review the standards for these materials at least 3 years prior to the effective date with respect to feasibility and cost. Although it is too early to make such a commitment, an additional means of resolving this issue is to provide the NRC a specific clause providing that they can ask for delay in implementation in the same manner as automotive producers have been able to ask for delays under the Clean Air Act.

The alternative of omitting control of these materials from the standard would delete most of its beneficial health impact, and leave only the procedural improvement of issuing an EPA standard which has the effect of legally requiring the levels of control in AEC's proposed Appendix I, which is still not issued, and is not, in any case, a standard.

B. Exposures due to transportation: The proposed standard for maximum whole body dose to individuals (25 mrem/yr) includes doses received as a result of transportation of materials associated with fuel cycle operations. The AEC objects, claiming that such a requirement is too difficult to implement.

The difficulty of implementation arises because the AEC treats public exposure to transported materials in a fundamentally different way than exposure to radiation from facilities. The latter is treated by restricting access to high exposure areas and controlling effluents to uncontrolled areas. The former is treated only by providing shielding of shipping containers, not through limiting access. Economic

limitations on the feasible amount of shielding result in some relatively high dose rates near shipping containers, and the limitation of doses is therefore dependent upon assumptions concerning the movement of members of the public.

Due to the relatively high exposure rates associated with spent fuel shipments and high-level radioactive waste shipments (10 mR/hour at 6 feet from the container), we believe the AEC should institute more positive control of potential exposures of the public. This source of exposure which is intimately associated with fuel cycle operations should not be artificially excluded, and we believe that the AEC, if required to address this potential source of public exposure, will not find it difficult to design procedures for spent fuel and high-level waste shipments to assure compliance with the proposed standard.

The alternatives to inclusion of this mode of exposure in the standard as proposed are to limit our action to an exhortation in the Federal Register notice that such exposures should be minimized or to provide a delay clause similar to the alternative available for krypton-85 and iodine-129.

MATTERS OF WHICH YOU SHOULD BE AWARE

A. Carbon-14: As a result of EPA's examination of the environmental dose commitment due to long-lived radionuclides, we have found that previously neglected normal releases of carbon-14 from reactors and fuel reprocessing facilities appear to constitute the major potential public health impact, relative to all other normal releases, of the uranium fuel cycle. The standards do not address carbon-14 because control methods have not yet been investigated due to the very recent discovery of its importance.

Investigation of control methods for carbon-14 has been initiated with the objective of developing a proposed standard as soon as possible. We do not believe it would be wise to hold up these standards for the results of this study. In any case, promulgation of the proposed standards will establish the precedent required for a future standard for carbon-14.

B. Creation of the NRC: Former AEC Commissioner Anders has been nominated to head the Nuclear Regulatory Commission; it is anticipated that most of the AEC staff with whom we have dealt in the past will remain in similar positions of responsibility in NRC. Proposed Appendix I defining best practicable controls for reactors was forwarded to the Commission for action early last summer and reportedly returned to staff without being acted upon this fall. It is not known what action the new NRC Commission will take. Commissioner Anders, however, was not supportive during the final

public hearing on the matter before the entire Commission late last spring.

Proposed Appendix I would provide a necessary, effective, and appropriate implementation by NRC of the proposed EPA standards with respect to reactors. If the new NRC Commission should substantially alter proposed Appendix I before EPA's standards are publicly proposed this could make it more difficult for EPA to propose these standards. Although it is not possible to predict what the stance of the new NRC Commission will be, it would therefore appear to be wise to proceed without any unnecessary delay.

C. Regional effects vis a vis the proposed standards: The AEC may contend that the proposed limits for maximum individual dose are too low because of the potential additive impact of large numbers of reactors in a region. We have examined this contention carefully, through analysis of all existing and proposed sites in close proximity, as well as through consideration of the possibility of large numbers of facilities in a given geographical area, such as a major river basin, and have concluded that the increase in dose from overlap is insignificant and therefore that the proposed standard is not too low.

MATTERS PREVIOUSLY ADDRESSED

The following matters are addressed only in outline form, since they were addressed in the previously proposed and approved standards, and are not changed by the present proposal.

A. Need for the standard: The contributory factors include 1) significant reduction in public health impact of the industry; 2) positive impact on public acceptance of nuclear power; 3) fulfillment of the mandate of Reorganization Plan No. 3; and 4) clarification of environmental requirements so as to expedite licensing of needed power facilities.

B. Economic Impact of the Standard: The major cost is already required by existing informal implementation of Appendix I by the AEC. This cost is less than 1% of the cost to the public of nuclear electrical power. The EPA-imposed additional cost is a small fraction of this amount. A positive economic impact may result from reduction of costly delay due to interventions.

C. Public Participation: This is provided for in the Notice of Proposed Rulemaking through a request for comments followed by a public hearing. Comments received in response to our Advance Notice of Proposed Rulemaking are attached. No major issues were raised, although there is some indication that some segments of industry may

oppose the standards as unnecessary. In view of the compatibility of the standards with Appendix I this reaction to the standard proposed is considered unlikely.

RECOMMENDATION

I recommend that you approve the proposed rulemaking for transmittal to interagency review as proposed.

Approved Russell E. Train Disapproved _____

JAN 10 1975

IMPLEMENTATION

The proposed standards will be transmitted to AEC for review, followed within about a week by submission to other affected Agencies for their review.

Enclosures

TAB A. Proposed Federal Register and Rule
TAB B. Draft Environmental Statement
TAB C. Response to Advanced Notice of Proposed Rulemaking and EPA Comments
TAB D. Memorandum from Mr. Ash, December 7, 1973

Exhibit G

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

October 1, 1976

Mr. Alvin A. Alm
Assistant Administrator for Planning
and Management
U.S. Environmental Protection Agency
Washington, D.C. 20460

Dear Mr. Alm:

This is in response to your letter of September 10, 1976, requesting identification, by October 1, 1976, of additional major policy questions related to the EPA environmental radiation standards for the uranium fuel cycle. In addition, we plan to supply further comments concerning implementation of the standard by October 18.

Ongoing discussions between members of the NRC staff and representatives of EPA's Office of Radiation Programs have been beneficial in clarifying the standard and possible alternative methods for its implementation, thereby increasing our efficiency in developing implementation procedures and applying them in our licensing actions. These continuing discussions are concentrating upon the detailed wording of the standard and should help to clarify its intent in application and to improve the enforceability of its provisions.

At this stage in our review of implementation, we have identified three major policy issues beyond those contained in our March 8, 1976 testimony and in our comments of September 15, 1975. The issues previously raised by the NRC staff have been considered by EPA in the course of its rulemaking procedures, including the public hearing of March 1976 and the Final Environmental Impact Statement and the responses to comments contained in the interagency review package transmitted by your letter of August 17. We have no further information to offer concerning those issues. Our continuing review of the standard is directed to questions associated with its implementation, with the exception of the following issues:

(1)

(1) The feasibility of enforcing the individual dose limitations of Section 190.10(a) with the inclusion of transportation activities. Our analyses of the dose contribution from road transportation in the recent draft environmental statement on transportation of radioactive material by air and other modes (NUREG-0034) and in the transportation studies of WASH-1238 indicate that the population dose to the general public from routine transport of new and spent fuel and wastes associated with the uranium fuel cycle is small, being about 3 man-rem per year for one light-water reactor. This population dose is only a small fraction of the total population dose which results from uranium fuel cycle activities. The effect of including transportation activities within the scope of the standard is correspondingly small; but the complications which would arise from its inclusion are substantial. The measures suggested by EPA for enforcing the individual dose limitations would require restrictions upon common carriers which are not subject to NRC licensing requirements. The division of regulatory authority which would result between NRC and the Department of Transportation for enforcement of the standard would make the determination of compliance difficult, particularly in view of the need for considering potentially additive contributions from transportation activities and fixed facilities. The control measures suggested by EPA, which include "non-stop" transport or controlled access parking, may not be cost-effective for the shipper and are likely to be costly and impractical for the regulatory agency to enforce. Finally, we note that EPA has made no broad consideration of exposures arising from the transport of other radioactive materials. For these reasons we encourage EPA to eliminate transportation activities from the scope of 40 CFR Part 190 and give consideration instead to the development of guidance to Federal agencies, pursuant to its FRC authority, concerning radiation exposure arising from the transportation of all types of radioactive materials. In this regard, the Final Environmental Statement prepared by NRC on "The Transportation of Radioactive Material By Air and Other Modes" should be useful. 2

(2) Effective date for dose restrictions of §190.10(a) for uranium milling operations. We have stressed previously the need for better information to demonstrate the practicability of control measures for attaining compliance for uranium mill operations and their associated tailings with the dose limits of 40 CFR Part 190. At the present time, we are unable to assess the practicability, effectiveness, and cost of measures which could be taken to accomplish compliance with the standard with respect to wind-borne particulates and the external dose from direct radiation arising from mill tailings. Although methods have been suggested by EPA, no data base actually exists on how effective these methods would be over a long term at operating mills or whether, in reality, these methods could actually be employed.

A number of programs and studies are now in progress or are planned to be implemented in the near future which will provide data and information on the environmental impacts of uranium milling and on alternative strategies for mitigating these impacts, particularly with respect to 3

mill tailings. Such information will allow us to better evaluate the problems and impacts of implementation of the EPA standard. These programs include the following:

(a) Preparation of a Generic Environmental Impact Statement on Uranium Milling which is scheduled to be complete in draft form by the Fall of 1978. Notice of this action was published in the FEDERAL REGISTER on June 3, 1976 (41 FR 22430).

(b) Research studies in support of the Generic Environmental Impact Statement, including

- field studies at operating uranium mills,
- evaluations of alternative mill tailing management strategies.

(c) Phase II of the joint ERDA-EPA study at inactive mill sites.

(d) Preparation of individual environmental impact statements for new uranium mills and also license renewals.

(e) Implementation of new effluent monitoring and reporting requirements as published in the FEDERAL REGISTER on November 17, 1975 (40 FR 53230).

The information from these studies will not be available for several years. We suggest that it would be appropriate that implementation of the standard for uranium mills be deferred for some period of time or that these facilities be exempted until an adequate data base is available for confirmation of the practicality of control measures and for the development of a program for assuring compliance with the standard.

(3) Opportunity for Public Comment on Implementation Procedures. From our experience with developing Appendix I to 10 CFR Part 50, we are aware that the approaches to implementation are as important as the wording of the standard in determining its impact. This is reinforced by public and industry comments to EPA on 40 CFR Part 190. For this reason, we urge further consideration of the need for additional opportunity for public comment on specific approaches that NRC may use in the implementation of 40 CFR Part 190 prior to EPA's issuance of the standard in effective form. Such public comment at an early stage of the development of implementation and regulatory procedures would be desirable to assure that the best approach to satisfying NEPA is attained. Although the development of detailed implementation procedures and their effective incorporation into NRC's regulations and regulatory guidance may take several years, we believe that the basic approaches to be used by NRC to evaluate compliance for specific fuel cycle facilities could be described by the end of this calendar year.

4

We believe that the public comment period on the proposed implementation approaches could begin at about that time, thus leading to final issuance of 40 CFR Part 190 early in 1977. Particularly, we need to coordinate the implementation of this standard with the ongoing assessment and review of our as-low-as-is-reasonably achievable effluent guidelines for operating reactors (Appendix I to 10 CFR Part 50). This review, as it is now scheduled and staffed, will extend past the two-year effective date presently given in 40 CFR Part 190.

We would be pleased to meet at your convenience for further discussion or elaboration of these policy questions. Hopefully they can be resolved in parallel with our continued work with the ORP staff on specific language for the standard to facilitate its implementation. With the exception of possible problems in the wording of the variance section or other problems which may be brought to light in the implementation review, these are the only additional basic policy questions we have identified at this time.

Sincerely,

Robert B Minogue

Robert B. Minogue, Director
Office of Standards Development

cc: J. Tozzi, OMB

Exhibit H

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

FEB 25 1975

Honorable Russell E. Train
Administrator
U. S. Environmental Protection Agency
Washington, D.C. 20460

Dear Mr. Train:

This is in reply to the letter of December 27, 1974, from the EPA Deputy Assistant Administrator for Radiation Programs to the AEC Director of Regulation requesting comments on EPA's proposed generally applicable standards for the uranium fuel cycle.

We note that EPA's Federal Radiation Council radiation protection guidance will remain unchanged. All of the activities licensed by the Nuclear Regulatory Commission are now and will continue to be carried out well within that guidance.

We recommend that before the proposed standards are issued, time be allowed for a decision in the proceeding now pending before the Nuclear Regulatory Commission regarding the staff Proposed Appendix I to 10 CFR Part 50 to define design objectives for effluent control in light water reactors. The Atomic Energy Commission initiated this rulemaking, and an exhaustive proceeding was conducted, including lengthy hearings with significant participation by the public, industry, and government agencies. The NRC will base its decision on the record of the proceeding. The facts that the NRC began operation on January 20, 1975, and that the record of the proceeding is technically complex and voluminous require that further time be allowed for the final decision. We are advised that the Commission has the matter under active consideration with high priority for an expeditious decision.

We are pleased to have the opportunity to comment on the draft standard and explain the importance of the NRC decision. We understand that the principal basis for the numerical limits in the EPA draft standards is the cost effectiveness of effluent controls, rather than the acceptability of a given level of exposure. An orderly conclusion of the NRC rulemaking decision prior to publishing the EPA standards would allow the standards to reflect the NRC's findings as to the practicability of emission controls.

The AEC also stated its intention to issue numerical guidance on ALAP design objectives for other fuel cycle facilities and other types of reactors in the future as operating experience is gained. As of now some types of facilities in the uranium fuel cycle have little or no operating experience on the commercial scale. In these cases, any determination of the practicability

of operating limits is imprecise. Thus, it is inappropriate to establish generally applicable standards near the estimated operating capabilities of the technology and solely on the basis of projected cost effectiveness of emission controls. We also note that the NRC decision on Proposed Appendix I will give definition to the as low as practicable concept and thus influence the further application of the concept to fuel cycle facilities.

The staff has identified several specific areas where in its opinion the proposed EPA standard has been established too near or beyond the projected capabilities of the uranium fuel cycle technology. These are: a) for light water reactors, the adding of the dose contribution from direct and scattered gamma radiation to the exposures from gaseous and liquid effluents; b) the inclusion of the blowing of tailings piles near operating uranium mills, and c) the proposed thyroid standard in the case of the milk exposure pathway from fuel reprocessing plants. In all of these areas the incremental increases in the proposed standard, which would be required to provide for uncertainties in the practicability of emission controls for a developing technology, would be well within existing FRC Radiation Protection Guides. The staff also believes that standards for the capture of Krypton-85 are premature at this time because the cost benefit justification requires the integration of very small individual doses over the entire world population without fully resolving the question of international cooperation in Kr-85 capture.

Sincerely,

Lee V. Gossick
Acting Executive Director
for Operations

cc: James T. Lynn, Director
Office of Management and Budget

Exhibit I

requirements of Appendix B of 10 CFR Part 50, at a time when any needed improvements will have maximum effect, applicants' quality assurance programs are being subjected to regulatory staff review for conformance with Appendix B at the time the construction permit application is filed. If the program is determined not to meet the requirements of Appendix B at that time, the application is returned.

In view of the foregoing, the Commission has concluded that the initiation of the rulemaking proceeding requested by the petitioners is unnecessary and unwarranted. Accordingly, the petition for rulemaking filed by Mapleton Intervenors is denied.

A copy of the petition of rulemaking is available for public inspection at the Commission's Public Document Room at 1717 H Street NW., Washington, D.C.

Dated at Washington, D.C. this 22nd day of April 1974.

For the Atomic Energy Commission.

PAUL C. BENDER,
Secretary of the Commission.

[FR Doc.74-9548 Filed 4-25-74;8:45 am]

NEW MEXICO

Discontinuance of Certain Commission Regulatory Authority and Responsibility Within the State

Notice is hereby given that William O. Doub, Commissioner of the Atomic Energy Commission, and the Honorable Bruce King, Governor of the State of New Mexico, have signed the agreement set forth below for discontinuance by the Commission and assumption by the State of certain Commission regulatory authority. The agreement is published in accordance with the requirements of Public Law 86-373 (section 274 of the Atomic Energy Act of 1954, as amended). The exemptions from the Commission's licensing authority have been published in the FEDERAL REGISTER and codified as Part 150 of the Commission's regulations in Title 10 of the Code of Federal Regulations.

Dated at Germantown, Maryland, this 19th day of April 1974.

For the Atomic Energy Commission.

PAUL C. BENDER,
Secretary of the Commission.

AGREEMENT BETWEEN THE UNITED STATES ATOMIC ENERGY COMMISSION AND THE STATE OF NEW MEXICO FOR DISCONTINUANCE OF CERTAIN COMMISSION REGULATORY AUTHORITY AND RESPONSIBILITY WITHIN THE STATE PURSUANT TO SECTION 274 OF THE ATOMIC ENERGY ACT OF 1954, AS AMENDED

WHEREAS, The United States Atomic Energy Commission (hereinafter referred to as the Commission) is authorized under Section 274 of the Atomic Energy Act of 1954, as amended (hereinafter referred to as the Act), to enter into agreements with the Governor of any State providing for discontinuance of the regulatory authority of the Commission within the State under Chapters 6, 7, and 8, and Section 161 of the Act with respect to byproduct materials, source materials, and special nuclear materials in quantities not sufficient to form a critical mass; and

WHEREAS, The Governor of the State of New Mexico is authorized under Chapter 284, Section 12-3-11, Laws of 1971 to enter into this Agreement with the Commission; and

WHEREAS, The Governor of the State of New Mexico certified on July 2, 1973, that the State of New Mexico (hereinafter referred to as the State) has a program for the control of radiation hazards adequate to protect the public health and safety with respect to the materials within the State covered by this Agreement, and that the State desires to assume regulatory responsibility for such materials; and

WHEREAS, The Commission found on March 28, 1974, that the program of the State for the regulation of the materials covered by this Agreement is compatible with the Commission's program for the regulation of such materials and is adequate to protect the public health and safety; and

WHEREAS, The State and the Commission recognize the desirability and importance of cooperation between the Commission and the State in the formulation of standards for protection against hazards of radiation and in assuring that State and Commission programs for protection against hazards of radiation will be coordinated and compatible; and

WHEREAS, The Commission and the State recognize the desirability of reciprocal recognition of licenses and exemptions from licensing of those materials subject to this Agreement; and

WHEREAS, This Agreement is entered into pursuant to the provisions of the Atomic Energy Act of 1954, as amended:

NOW, THEREFORE, It is hereby agreed between the Commission and the Governor of the State, acting in behalf of the State, as follows:

ARTICLE I

Subject to the exceptions provided in Articles II, III, and IV, the Commission shall discontinue, as of the effective date of this Agreement, the regulatory authority of the Commission in the State under Chapters 6, 7, and 8, and Section 161 of the Act with respect to the following materials:

A. Byproduct materials;

B. Source materials; and

C. Special nuclear materials in quantities not sufficient to form a critical mass.

ARTICLE II

This Agreement does not provide for discontinuance of any authority and the Commission shall retain authority and responsibility with respect to regulation of:

A. The construction and operation of any production or utilization facility;

B. The export from or import into the United States of byproduct, source, or special nuclear material, or of any production or utilization facility;

C. The disposal into the ocean or sea of byproduct, source, or special nuclear waste materials as defined in regulations or orders of the Commission;

D. The disposal of such other byproduct, source, or special nuclear material as the Commission from time determines by regulation or order should, because of the hazards or potential hazards thereof, not be so disposed of without a license from the Commission.

ARTICLE III

Notwithstanding this Agreement, the Commission may from time to time by rule, regulation, or order, require that the manufacturer, processor, or producer of any equipment, device, commodity, or other product containing source, byproduct, or special nuclear material shall not transfer possession or control of such product except pursuant to a license or an exemption from licensing issued by the Commission.

ARTICLE IV

This Agreement shall not affect the authority of the Commission under subsection 161b. or i. of the Act to issue rules, regulations, or orders to protect the common defense and security, to protect restricted data or to guard against the loss or diversion of special nuclear material.

ARTICLE V

The Commission will use its best efforts to cooperate with the State and other agreement States in the formulation of standards and regulatory programs of the State and the Commission for protection against hazards of radiation and to assure that State and Commission programs for protection against hazards of radiation will be coordinated and compatible. The State will use its best efforts to cooperate with the Commission and other agreement States in the formulation of standards and regulatory programs of the State and the Commission for protection against hazards of radiation and to assure that the State's program will continue to be compatible with the program of the Commission for the regulation of like materials. The State and the Commission will use their best efforts to keep each other informed of proposed changes in their respective rules and regulations and licensing, inspection and enforcement policies and criteria, and to obtain the comments and the assistance of the other parts thereon.

ARTICLE VI

The Commission and the State agree that it is desirable to provide for reciprocal recognition of licenses for the materials listed in Article I licensed by the other party or by any agreement State. Accordingly, the Commission and the State agree to use their best efforts to develop appropriate rules, regulations, and procedures by which such reciprocity will be accorded.

ARTICLE VII

The Commission, upon its own initiative after reasonable notice and opportunity for hearing to the State, or upon request of the Governor of the State, may terminate or suspend this Agreement and reassert the licensing and regulatory authority vested in it under the Act if the Commission finds that such termination or suspension is required to protect the public health and safety.

ARTICLE VIII

This Agreement shall become effective on May 1, 1974, and shall remain in effect unless and until such time as it is terminated pursuant to Article VII.

Done at Santa Fe, State of New Mexico, in triplicate, this 3rd day of April, 1974.

For the United States Atomic Energy Commission.

[SEAL] WILLIAM O. DOUB,
Commissioner.

For the State of New Mexico.

[SEAL] BRUCE KING,
Governor.

BETTY FIGUEROA,
Secretary of State.

[FR Doc.74-9547 Filed 4-25-74;8:45 am]