

Those Listed Below

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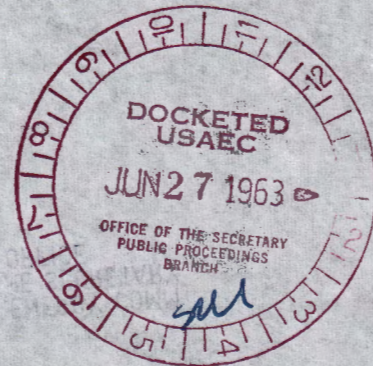
Nathan H. Woodruff, Director  
Division of Operational Safety  
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Nathan H. Woodruff

COMMENTS ON PROPOSED MANUAL CHAPTER AND ON 10 CFR 70, 71, and 72  
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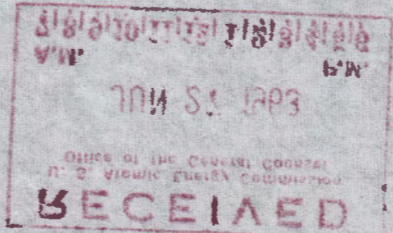
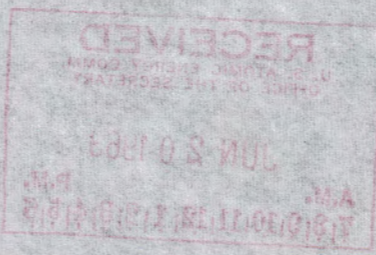
Union Carbide Nuclear Company (UCNC), Oak Ridge, has transmitted through the Oak Ridge Operations Office their comments upon 10 CFR 70, 71, and 72 as requested by the Division of Operational Safety. UCNC has asked that we also pass these comments on to you. Additionally, the manager of the Oak Ridge Operations Office has also requested that we forward copies of their comments to those receiving the UCNC comments. The UCNC and the OR comments are both transmitted herewith.

Attachments  
As Noted Above

Addressees:  
H. L. Price, Director of Regulation  
R. Lowenstein, Director, Division of Licensing & Regulation  
W. B. McCool, Secretary  
E. B. Trammel, Director, Division of Industrial Participation



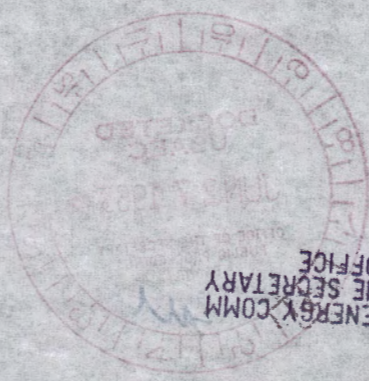
*The extra copies need to make sure comments on a Manual Chapter.*



JUN 1 1963

ORIGINAL SIGNED BY  
HUGH H. WOODRUFF

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U.S. ATOMIC ENERGY COMM  
OFFICE OF THE SECRETARY  
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U. S. Atomic Energy Commission  
Office of the General Counsel  
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OFFICE OF THE SECRETARY  
JUN 20 1963  
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*Handwritten notes in blue ink, including 'RECEIVED' and other illegible text.*

UNITED STATES GOVERNMENT

# Memorandum

TO : Nathan H. Woodruff, Director  
Division of Operational Safety, Headquarters

DATE: June 5, 1963

FROM : S. R. Sapirie, Manager, Oak Ridge Operations

SUBJECT: PROPOSAL FOR A MANUAL CHAPTER

APO:BE

Attached are the comments of Union Carbide Nuclear Company on (1) your proposal for a Manual Chapter and (2) 10 CFR 70. Since the UCNC comments arrived after the official ORO reply had been prepared they are being included verbatim. We are basically in agreement with the general attitudes expressed; however, the following ORO reservations should be noted regarding the contents of this attachment.

1. Although we agree that controls in this area should not be unnecessarily restrictive, we are convinced that a general control program is essential.
2. We disagree with UCNC's comment that dual standards for licensees and contractors are unscientific and somewhat illogical. Despite Carbide's argument to the contrary, it is felt that some potential licensees still lack the technological experience and capability required by the AEC before they can be given the same degree of latitude entrusted to the Commission's prime operating contractors in the handling of these potentially hazardous materials.
3. While it is recognized that the nuclear safety guides do not always contain the latest available nuclear safety data, we do not agree that the technical content of 10 CFR 70 is and must necessarily remain totally obsolete. To the contrary, it appears that the safety criteria contained in this document can and must be kept sufficiently updated to be beneficially useable as guides for the industry.

Carbide has requested that the following additional officials be forwarded copies of their comments: Robert Lowenstein, Ernest B. Tremmel, Harold L. Price and W. B. McCool. Additional copies of the UCNC comments are being attached if you wish to comply with this request. In the event that you do, you may also wish to forward to these individuals a copy of the official ORO comments transmitted to you earlier.

*S. R. Sapirie*

S. R. Sapirie

Enclosures:

1. UCNC Comments on 10 CFR 70
2. Standards for Oper. with Fissile Matls. Outside Reactors

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U. S. ATOMIC ENERGY COMM.  
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PR 70

UNION CARBIDE NUCLEAR COMPANY • DIVISION OF UNION CARBIDE CORPORATION



POST OFFICE BOX P, OAK RIDGE, TENNESSEE

May 16, 1963

8042

U. S. Atomic Energy Commission  
Post Office Box E  
Oak Ridge, Tennessee

Attention: Mr. S. R. Sapirie

Gentlemen:

Request for Comments on Proposed Manual Chapter  
and on 10 CFR 70

A request from the Division of Operational Safety for comments on the proposed revisions of 10 CFR 70, 71, and 72, relating, respectively, to general practices of licensed users of fissile materials, to the transport of fissile materials, and to the transport of irradiated reactor fuel elements, has been forwarded to the Union Carbide Nuclear Company by the Oak Ridge Operations Office. There is, in addition, a request for discussion of the matter of manual chapters intended to regulate Commission contractors in their operations with fissile materials. By this letter a reply, representative of the several operations under Commission contract with Carbide, is made to these requests.

As you are well aware there are sound reasons to expect an increasingly greater dependence upon nuclear reactions as a source of energy within the United States during the next few decades. It is obviously necessary that the production of energy from this source become the responsibility of industry as have other facets of the country's economic complex. This growth of industry in the nuclear energy community can ensue favorably only with minimal governmental control of practices and methods applied in research, development and production activities. Achievement of this goal through truly free enterprise is difficult to envisage as long as significant segments of operations with fissile materials are regulated in minuscule detail by the contents of documents typified by the proposed revisions of 10 CFR 70, 71 and 72. The need for such control is not at all evident by comparison to operations in other industries, such as mining, chemicals and explosives, which are far more hazardous when measured by accident experience. Although the importance of protection of personnel and property against the consequences of nuclear accidents is obvious, it is prudent to realize that the growth of the nuclear industry will be seriously impaired by unnecessarily demanding costly practices under the guise of safety requirements.

May 16, 1963

Of the subject Federal Regulations there are two major criticisms. One is the unreasonable demands placed upon licensees, and, by implication, upon Commission contractors in the near future, for details of processes, equipment, procedures, etc., which consume effort and resources better expended in advancing technology and getting on with the job.

The second criticism is of the antiquity of the so-called technical content of, particularly, 10 CFR 70. This regulation makes reference to the latest revision of a document entitled NUCLEAR SAFETY GUIDE, designated as TID-7016, which was prepared voluntarily over the past eight years by contractor personnel acting within their contractual authorization but independent of any Commission initiated directive. The GUIDE, by its own description, is intended only as a point of departure in the analysis of problems in nuclear safety and gives recommendations for the most elementary operations. Many of the recommendations include true safety factors and others contain necessary ignorance factors which hopefully can be reduced in the analysis of particular problems by new, supplementary and specialized information. Even so the GUIDE was last issued in May 1961 meaning that the material within it was prepared more than 2-1/2 years ago, a long time in rapidly developing and changing nuclear technology. Not only is the proposed revision of 10 CFR 70 founded upon the content of this document but the quantities recommended by the GUIDE are further severely reduced by factors for which no justification is apparent. It is remarked, parenthetically, that further revision of the GUIDE is presently underway. No recognition in the proposed regulations is made, for example, of the extensive experimental program conducted at the Oak Ridge National Laboratory over the past three years exploring the properties of critical arrays of units of fissile material or of equally significant measurements of the effects of neutron absorbing materials on permissible limits.

In our opinion the information in the GUIDE as presently constituted or in any subsequent revision or, for that matter, in any set of quantitative specifications does not warrant the stature accorded it by inclusion in any standard, code of good practices, or regulation. It is impossible to keep such formal documents sufficiently up-to-date to be meaningful and useful in the fullest sense.

In paragraph 70.14 of 10 CFR 70 it is stated that criteria for safety in fissile material operations other than those stipulated may be developed and presented to the Commission by interested parties. This statement purports to allow deviation from the details of 10 CFR 70. That it truly does is doubtful owing to its being overshadowed in a colossal manner by paragraph 70.1(a) describing the purpose of the regulation. Further, if alternatives were encouraged, the GUIDE should be considered an acceptable referenced criteria supporting applications for waivers rather than including copious excerpts from it in the regulation.

May 16, 1963

It is also noted that 10 CFR 71 prescribes in detail a single permissive package, a "Class I Package," for Class I shipments. Historically this design originated in the United Kingdom, was adopted by the International Atomic Energy Agency, was made a part of the Agency's early regulations for the transport of fissile materials in 1961, and has now been abandoned by both the UK and the IAEA as the only approved package. It was abandoned because of the restrictions placed upon shipments by the container itself and upon the initiative of industry by the specified exclusion of any other method of meeting the requirements of Class I shipments. In spite of this history, the nuclear industry in the United States is now being saddled with this regulation.

Our comments thus far have been directed to the Code of Federal Regulations and it seems hardly necessary to elaborate further upon the application of these regulations or the proposed parallel manual chapters to contractor operations. A few examples suffice as illustrations. Present practices in production and fabrication operations would necessarily be severely curtailed or, alternately, most of these operations would require classification as special cases necessitating exceptions by the Commission. The effort to prepare and process the applications for exemptions would be a formidable if not impossible task. It is conservatively estimated, for example, that application of the provisions in the revision of 10 CFR 70 will require doubling the available and presently used storage area for fissile materials in the Y-12 Plant. They would require reducing the capacity of the Paducah Plant shipping cylinders by a factor of 5 to 10. Then, too, the gaseous diffusion cascade equipment could not be operated since allowance is not made in the regulations for the safety of low density gaseous uranium hexafluoride and of unmoderated condensations of  $UF_6$ . To conform to the specifications for alarm systems, the Paducah Plant would have to change the range on present alarms and add approximately 60 detector stations in areas where criticality is impossible at a cost of \$200,000. The regulations do not permit sprinkler systems in buildings in which fissile material is stored safely as moderation-controlled dry masses in leak-tight containers. In this connection it should be recognized that the consequences of fire may be much greater than those of a criticality accident.

✓ On the other hand the existence and practice of dual standards for licensees and contractors is unscientific and somewhat illogical since, after all, the foundations on which licensees' specifications are based are the same as those establishing contractors' practices. The excuse that licensees are less experienced than contractors and must, therefore, be more tightly regulated is, a priori, no longer an acceptable stigma. It seems that a more equitable procedure would be the establishment, to the satisfaction of the Commission prior to the issuance of a license, of the abilities of the licensee to safely carry out his particular operation judged by his experience and the calibre of his personnel. These capabilities having been established the licensee then proceeds utilizing

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existing standards and the full scope of available technical information. The logic of such an evaluation and the resulting recognition of the maturity of responsible corporations is commensurate with the nuclear accident experience, thus far associated not with areas of carefully designed and prescribed operations but rather with unpredictable occurrences, pointing to the need for well trained personnel capable of coping with both the routine operations defined in 10 CFR 70 and those unexpected occurrences which will inevitably arise in practice.

We respectfully make the following recommendations for increasing the effectiveness of the Commission's role in preserving and increasing the safety of operations with fissile materials:

- a) The content of regulations should be limited to what might be termed a code of good practices. As an example we cite a proposed American Standard "Standard for Operations with Fissile Materials Outside Reactors" prepared for the American Standards Association under the auspices of the American Nuclear Society and the American Society of Mechanical Engineers. The existence of this proposed standard was brought to the attention of the Commission as early as July 1961 through Mr. N. Grossman its representative on the ASA Sectional Committee N6, Reactor Safety.
- b) Greater emphasis should be placed by both the Commission and its contractors on the expeditious translation of experimental and calculational results into guides to which reference may be made in standards and regulations.
- c) Continued support by the Commission of experimental and calculational programs to further advance the bases for safety recommendations. It is pointed out parenthetically that funds for experiments supporting nuclear safety were deleted by the Commission from the Oak Ridge National Laboratory budget for FY63 and, though availability through more cumbersome administrative channels did later develop, it has continued to require an inordinate effort on the part of technical personnel to justify retention of the program.

We are prepared to cite many specific items in the proposed regulations, 10 CFR 70, 71 and 72, revised, which we believe to be in error or with which we disagree principally because of the unnecessary demands they impose for descriptions of processes and for the impractical limitations they enforce. There are other items not clearly stated. We further believe that the issue at hand is much more fundamental than could be exemplified by detailing those citations here. We will, however, discuss these specific topics with appropriate representatives of the Commission at their convenience.

U. S. AEC

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May 16, 1963

These views are expressed to the Commission with extensive regard to objectives considered to be in the best interest of the Commission, of the country and of the continuing advancement of applications of nuclear energy.

Very truly yours,

UNION CARBIDE NUCLEAR COMPANY

A handwritten signature in cursive script that reads "C. E. Larson". The signature is written in dark ink and is positioned above the typed name.

C. E. Larson, Vice President

CEL:DC:mlr

cc: A. D. Callihan  
T. E. Lane  
J. P. Murray(4)  
J. A. Swartout(4)

UNITED STATES GOVERNMENT

# Memorandum

W. B. McCool's Copy  
PR-70, 71

**TO :** Nathan H. Woodruff, Director  
Division of Operational Safety, Headquarters

**DATE:** June 5, 1963

**FROM :** S. R. Sapirie, Manager  
Oak Ridge Operations

**SUBJECT:** PROPOSAL FOR A MANUAL CHAPTER (YOUR MEMO DATED MARCH 28, 1963)

APO:JBE

Oak Ridge Operations in conjunction with its contractors has reviewed (1) your proposal for issuing a Manual Chapter to cover safety requirements for handling and using special nuclear material obtained or produced under contractual arrangements with the AEC, and (2) 10 CFR 70, amended, Federal Register, Vol. 28, No. 44, pp 2111-2142.

At the time that these comments were being drafted there had been no comments submitted by Union Carbide Nuclear Company. When these comments are received they will be attached to this memorandum or transmitted separately for your consideration.

I. Proposal for a Manual Chapter.

It is the consensus of Oak Ridge Operations and its prime operating contractors that, although the safety criteria outlined in 10 CFR 70 may be a useful guide in supervising and evaluating the safety performance of licensees, it would be unwise to attempt to adapt these detailed standards and procedures to the safety activities of our contractors.

Any Manual requirement for contractors that includes the detail of this proposed revision would either create substantial costs for compliance or would necessitate approval of the existing practices through an exception route. More important, however, is our conclusion that this action will not significantly increase nuclear safety.

It may be proper to establish standards in broad generalities, but detailed determinations, inflexible procedures, and regulations cannot substitute for professional competency and integrity. Therefore, any effort in this area should recognize that a vast difference exists in the nature of the problem with respect to a licensee versus a contractor.

Technical aspects of the program should not be a part of the basic Manual Chapter. They could instead be included as an Appendix to the Chapter or, better still from the Contractor's point of view, the TID's dealing with nuclear safety could be merely referenced and used as guides rather than strict procedural requirements (see latest revisions to TID's 7016 and 7019 attached).

## II. Application of 10 CFR to Licensees.

It appears that some of the problems anticipated above will also be encountered if detailed technical requirements are incorporated into the Federal Regulations. It would seem more appropriate to set out the technical guides in an appendix to the regulations and require licensees to develop and incorporate their own nuclear safety program into their licenses based upon this appendix.

## III. Responsibility for Health and Safety.

Responsibility for health and safety in the handling of special nuclear materials is still unclear, especially as it relates to the establishment of nuclear material stations (see the attached teletype, Sapirie to George dated May 14, 1963). Inherent in the process of establishing criteria for health and safety should also be the clarification of responsibility for nuclear safety considerations.

## IV. Specific Comments on 10 CFR 70 and 71.

1. In Section 70.25, the threshold amount of fissile material should be increased to a level where criticality is more nearly possible with an appropriate allowance for enrichment before subsequent sections are applicable.
2. The statement in Section 70.33 (f) (3) that "Such a structure may not be equipped with a sprinkler system" should be changed to indicate that sprinkler systems will not be permitted unless an evaluation indicates that activation of the system will not credibly cause a criticality. Experience to date within ORO, particularly in the gaseous diffusion plants, indicates that the presence of fissile material should not be sufficient justification to prohibit the "planned" use of water for fire control.
3. Section 70.34 (a) (1) could be deleted because the level of response is adequately covered in 70.34 (a) (3) and (5). It is also expected that criticality alarms will be installed in areas where higher radiation levels are normal, for instance, hot cells and vaults during the removal of irradiated materials.

June 5, 1963

4. The detectable number of fissions in Section 70.34 (a) (4) should be reduced to  $10^{15}$ .
5. The requirement in Section 70.34 (a) (5) providing "a sensing device within  $120^\circ$  of every location where special nuclear material is handled, used, or stored" is not practical for some situations. However, other alarm systems will probably exceed all other minimum requirements and are currently considered satisfactory.
6. As an alternative to auxiliary power for alarms, mentioned in Section 70.34 (b) (1), operations should be suspended.
7. The alarm specified in Section 70.34 (c) should be distinguished and separate from all other alarms.
8. In Section 70.35, quarterly evacuation drills for each area and each operating and maintenance shift may be excessive after initial familiarization with the emergency procedures. This requirement could be revised so that all employees are covered over a longer period of time.
9. The recommended safe values of Table I of TID-7016, listed in Section 70.42, should be included under Basic Criteria. For Metallic Uranium, the recommended parameters for mass should include a statement that they are applicable to single pieces with no re-entrant sections. (See TID-7019, Section 3.1.)
10. It should be clearly stated in Sections 70.44 and 70.45 that below 5% U-235 latticed systems require more restrictive limits than do aqueous homogeneous systems.
11. In Section 70.52 (a) (1), the 2 Kg limitation for metallic pieces in an array which is proven safe by solid angle criteria may be unnecessarily restrictive. Interaction studies in progress at ORGDP, in conjunction with current critical experiments with cubic arrays of metallic uranium, indicate that the interaction solid angle approach may be safely used with metallic uranium.
12. Since the interaction solid angle criteria, specified in Sections 70.52 and 70.53, are developed from critical experiments with highly enriched uranium, the criteria are overly conservative for low enrichment material. Therefore, specific spacings for low enrichment should be considered as a guide only. Critical experiments planned at ORNL in early FY 1964 should verify this conservatism. ORGDP studies have developed a neutron leakage factor for low enrichment, which will be checked by the experiments. The length of the 12" diameter cylinder should be 40". (See TID-7019, Table X.)

June 5, 1963

13. It should be pointed out in Section 70.54 (a) that if the mass unit per container is less than the mass limit specified in 70.46, the total number of containers could be increased proportionately.
14. It is important that "open" be inserted between the words "inches" and "between" in Sections 70.54b. and 70.55b.
15. Figure 4 is missing in the CFR document transmitted for comment.
16. For the various classes of shipments outlined in 10 CFR 71, there appears to be no applicable criteria for the shipment of UF6. Thus far, UF6 could be shipped only as Class III as a special case under Section 71.67. Specifications for the shipment of UF6 as Class II should be developed. Specifications should also be developed for the shipment of low enrichment uranium slugs in wooden boxes.
17. In the transition from TID-7016, Rev. 1, to the regulations, the specific limitations for the curves are not always obvious. In all cases, these limitations should be indicated on the curves as well as being included in the text.

  
S. R. Sapirie

Enclosures:  
As stated above

cc: F. P. Baranowski, Director, Division of Production, HQ.