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Docket 70-687

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MAY 18 1982

Docket No. 70-687

License No. SNM-639

Union Carbide Corporation  
ATTN: Mr. Marcus Voth, Manager  
Nuclear Operations  
P. O. Box 234  
Tuxedo, NY 10987



Gentlemen:

This letter is in reference to issues raised by Union Carbide on the relationship between Union Carbide Corporation (UCC) as the licensee, the NRC and New York State with respect to the research reactor and irradiated material licensed by the NRC and New York State at the Tuxedo site. The matter was discussed during a visit to your site by NRC staff members in October 1981. Dr. Clark of my staff indicated that we would provide further information regarding our position on this matter.

Three licenses presently exist for the UCC facility: License No. R-81 by NRC's Office of Nuclear Reactor Regulation (NRR) for your operating research reactor pursuant to 10 CFR Part 50; License No. SNM-639 by NRC's Office of Nuclear Material Safety and Safeguards (NMSS) for the possession and use of special nuclear material outside of the reactor pursuant to 10 CFR Part 70; and the Radioactive Materials License issued by New York State for possession and use of other radioactive material including byproduct material outside of the reactor. These three licenses present a situation which we refer to as a "mixed bucket" case, in which irradiated material contains both special nuclear material licensed by NRC and byproduct material licensed by New York State.

The purpose of this letter is to clarify the licensee-authority relationship between Union Carbide, New York State and the NRC with respect to possession and use of byproduct and special nuclear material by Union Carbide and its relationship to the licensed research reactor. In the following paragraphs we discuss this relationship.

(1) Description of licensing responsibilities:

It is clear under the Atomic Energy Act of 1954, as amended, and the Agreement State program that the NRC licenses the reactor and all special nuclear material since it is possessed and used in quantities sufficient to form a critical mass. (Under License No. SNM-639, 235 Union Carbide is authorized to possess and use up to 13 kg of U of which not more than 5 kg can be in the form of unirradiated material). See 10 CFR 150.10 and 150.11. The State, on the other hand, issues

licenses for all byproduct and source material outside of the reactor being processed for further industrial, medical or consumer uses.

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(2) The scope of NRC safety and health reviews:

Although NRC regulation is limited to the reactor and the special nuclear material, the scope of the health and safety review in the process of licensing is not so tightly bounded. For example, 10 CFR 20.1(b) clearly implies that contribution to dose from unlicensed or non-NRC licensed radioactive materials must be considered in assuring compliance with 10 CFR Part 20 exposure limitations for both occupational and public health and safety. The requirements of 10 CFR 20.101, 102, 103, 104, 105, and 106 clearly include all sources of radiation in calculation of concentrations of material and consequent exposures of individuals and public.

Likewise, all radioactive materials are included in the surveys and other precautionary measures required by 10 CFR 20.201, 20.202, and 20.203. Particularly pertinent are the definitions of "radiation area" and "high radiation area" in § 20.202(b) for personnel monitoring. The definitions of these terms include the "mixed bucket" concept and the regulations require the consideration of all sources of radiation ("whole bucket") for compliance, not just the NRC portion.

Thus, the scope of licensing review under 10 CFR Part 70 will legitimately include the health and safety effects of the whole "bucket." In particular, 10 CFR 70.23(a)(3) requires a finding that the applicant's proposed equipment and facilities are adequate to protect health and minimize danger to life and property. When this requirement is taken together with the requirements in Part 20, it should be evident that the NRC review for issuance of the special nuclear material license will include evaluation of the additive effects of the associated byproduct material, even though the latter is not licensed by NRC. In performing the NRC review, due account will be taken of the State licensing reviews and the NRC licensing action will be coordinated with the State's to insure that all health and safety considerations are evaluated by the NRC or the State, and to minimize duplication of effort.

(3) The scope of Environmental Reviews:

The scope of environmental reviews includes all environmental effects resulting from the activities undertaken as a result of issuance of the NRC license. These effects include both radiological and nonradiological environmental consequences. If the licensee's possession and use of State-licensed byproduct material and its environmental effects are in any way dependent upon the NRC special nuclear material license then those effects will be included within the scope of the NRC environmental review. However, NRC may not be able to condition its licenses to mitigate all possible environmental effects. For example, NRC cannot impose conditions that vary the terms of an NPDES permit for the same effluent stream. See Sec. 511(c)(2) of the Federal Water Pollution Control Act Amendments of 1972, 86 Stat. 893, (33 U.S.C. 1371(c)(2)).

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(4) Conditions affecting byproduct material in NRC licenses:

The fact that NRC may include within the scope of its safety and environmental reviews the effects and consequences of related State licensed activities does not generally mean that the NRC license must be conditioned to protect the public health, safety, and the environment from the consequences of the State licensed activities. To the contrary, the Agreement State program authorized by Section 274 of the Atomic Energy Act of 1954, as amended, clearly requires an independent state licensing and regulatory structure responsible for protecting public health and safety with respect to source, byproduct, and subcritical quantities of special nuclear material within the State. To the extent possible, it is the intent to draw clear lines between matters of State regulatory responsibility and NRC regulatory responsibility.

In "mixed bucket" cases, however, the facts may warrant a larger NRC role in certain instances. In such cases special nuclear material (SNM) and byproduct material (products of the fissioning of the special nuclear material) are, at times, co-mingled for the purposes of processing or storage. At the point where the byproduct material is essentially completely separated from special nuclear material, processing it should continue under the regulatory control of the Agreement State. Other byproduct material, not as well separated, which continues in process or storage co-mingled with licensed special nuclear material will be considered to be subject to NRC regulatory authority on the grounds that safety of handling of the special nuclear material requires NRC control of the co-mingled byproduct material at these phases of the process. However, NRC will closely coordinate its activities with those of the State.

The activity which seems to create the most difficult problem is that of effluent treatment. Very little special nuclear material may be released as an effluent by the various process activities, but the process involving special nuclear material may cause the release of byproduct material to an effluent treatment system. Additional byproduct material from separately licensed activities may combine with the effluents to form a mixture attributable to both activities. We consider that the effluent byproduct material is "cleanly" separated. Since its regulation by a state agency would not affect the safe handling of the special nuclear material, it is considered for purpose of NRC evaluation primarily state regulated material. The review procedure for the special nuclear material may suggest the appropriate controls to be applied for these releases. This would also apply to operation of the research reactor.

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(5) Reactor related:

Byproduct material ultimately licensed by the State is created in the NRC licensed reactor, either by fission in  $U^{235}$  targets or activation of elements in targets composed of non-regulated material. The irradiated targets are moved to the hot cells for further processing and separation of isotopes either through a transfer canal and interlock or by removal from the reactor pool and transfer to the hot cells in a shielded container. The canal is considered contiguous with the reactor pool, and canal water is continuously mixed with (or an intergral part of) of the reactor cooling system.

Consistent with paragraph 4 of this letter, the handling of irradiated  $U^{235}$  targets is covered in the appropriate NRC license. The byproduct material in the irradiated  $U^{235}$  targets in the canal or in shielded containers prior to processing has not been cleanly separated. A further consideration is that the presence of the irradiated targets in the canal, reactor pool, or in containers in the reactor building is significant from the point of view of health and safety of personnel in reactor operations and potentially significant to reactor safety when in the canal or pool--areas clearly under NRC jurisdiction.

Targets composed of non-regulated material include byproduct material after irradiation. As with  $U^{235}$  targets, the health and safety of reactor operating personnel and reactor safety may be affected by the manner of handling these targets within the reactor pool, canal, and containment. Accordingly, under Section 161(i)(3) of the Atomic Energy Act, the NRC reactor operating license can be conditioned as necessary to protect health and to minimize danger to life or property with respect to operations in these areas. (For the same reasons the conditions of handling and storage of byproduct and/or special nuclear material in waste temporarily stored within the reactor pool or canal can also be included in the reactor operating or the special nuclear material license.)

New York State has reviewed the principles of this analysis of our regulatory responsibilities and has no objections. If you have any questions regarding this matter, please contact Dr. A. T. Clark of my staff.

Sincerely,

Original signed by  
Leland C. Rouse

Leland C. Rouse, Chief  
Advanced Fuel and Spent Fuel  
Licensing Branch  
Division of Fuel Cycle and  
Material Safety

cc: Attached list

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cc: Dr. Frank J. Bradley  
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