

March 4, 1998

FOR: The Commissioners
FROM: L. Joseph Callan /s/
Executive Director for Operations
SUBJECT: HANFORD TANK WASTE REMEDIATION SYSTEM PRIVATIZATION CO-LOCATED WORKER STANDARDS

PURPOSE:

To inform the Commission of a new issue presented by a difference between the U.S. Department of Energy's (DOE's) contractual requirements for the Hanford tank waste remediation system privatization (TWRS-P), and those approaches in current U.S. Nuclear Regulatory Commission regulations and in the draft revisions to 10 CFR Part 70. The difference concerns specification of accident design values for Co-located Workers (CLWs). The staff requests Commission approval to advise DOE, consistent with the January 29, 1997 Memorandum of Understanding (MOU) between the agencies, that the CLW values currently proposed by the TWRS-P contractors may result in facility design bases that are inconsistent with NRC's regulatory approach, and that NRC would treat CLWs as members of the public if it were to assume regulatory jurisdiction of the TWRS-P facilities.

BACKGROUND:

The term CLW is used by DOE and is generally understood to mean the worker at an adjacent facility within the confines of the DOE site (also called the *ex-facility worker*). Compared to NRC licensee sites, DOE sites can be very large, with large work forces and several nuclear facilities of various types. DOE has issued recent guidance for performing hazard and accident analyses which includes evaluations of accident radiological risks to both plant workers and CLWs, in addition to the traditional approach of evaluating public (off-site) consequences.

CONTACT: Robert J. Lewis, NMSS/FCSS
(301) 415-6215

DOE guidance for worker safety evaluations includes a standard for nonreactor facility Safety Analysis Report (SAR) preparation (DOE-STD-3009-94), an Order specifying acceptable approaches for establishing facility safety design criteria (DOE Order 420.1), and an implementing guide (issued for interim use and comment pending revisions) for that Order (DOE G 420.1-X). DOE contractors can use this information to identify, and set requirements for, *safety class* and *safety significant* structures, systems, and components (SSCs). *Safety Class* is defined as those SSCs whose failure could adversely affect the environment, or the safety or health of the public; *Safety Significant* is defined as SSCs not designated *Safety Class*, but whose preventive or mitigative function is a major contributor to defense in depth and/or worker (including CLW) safety. *Safety Class* is the higher gradation and receives the most stringent requirements, commensurate with its safety function. However, derivation of specific CLW protection criteria for accidents is generally performed at the DOE sites and, further, can vary at each contractor-operated facility within a site.

For TWRS-P facilities, the CLW definition and its use are fairly specific and appear in DOE's top-level standards document (DOE/RL-96-0006), with which the TWRS-P contractors are required to comply. A CLW is defined as "...an individual within the Hanford site, beyond the contractor-controlled area, performing work for or in conjunction with DOE or utilizing other Hanford site facilities." Worker (including CLW) risk goals and dose threshold values are allowed to be higher than the general public risk goals and values (i.e., for events of equal likelihood).

DISCUSSION:

The TWRS-P contractors have committed to complying with DOE regulations in 10 CFR Part 835, which is similar to 10 CFR Part 20, for normal operations. Compliance with Part 835 by the TWRS-P contractors should ensure, for normal operations, that occupational doses and non-occupational doses would also be within Part 20 limits. Although Part 835 does not specifically address CLWs, it has a definition of occupational exposure that is comparable to Part 20 (i.e., an exposure resulting from the individual's work assignment). Therefore, the staff interrupts committing to meet Part 835 implies considering CLWs as members of the general public during normal operations of the facility.

Therefore, NRC and DOE differences with respect to CLWs are significant only with respect to off-normal or accident conditions (i.e., referred to in TWRS-P contracts as anticipated events, unlikely events, and extremely unlikely events), and in how the related accident analyses can affect facility design choices. Extremely unlikely events are defined by DOE, for TWRS-P contracts, in DOE/RL-96-0006, as those occurring with a frequency between 1×10^{-4} per year and 1×10^{-6} per year, and unlikely events are those occurring with a frequency between 1×10^{-2} per year and 1×10^{-4} per year.

Consistent with the TWRS privatization concept, TWRS-P contractors are not required to use the DOE guidance mentioned above to develop graded design classifications and requirements. The contract requires the TWRS-P contractors to develop and propose, for DOE approval: standards for CLWs and facility workers (i.e., occupational radiation workers) in unlikely and extremely unlikely events; associated evaluation methods and locations; and an as-low-as-is-reasonably-achievable strategy. Additional standards (e.g., limits for normal operations and accident standards for members of the public) are prescribed by DOE in DOE/RL-96-0006.

At the end of Phase I, Part A, of the TWRS-P contracts (in spring 1998), DOE is scheduled to approve (if acceptable) the contractor-proposed standards. The TWRS-P contractors will use the approved CLW standards in their accident analyses to identify, and establish design and graded quality assurance (QA) requirements for those SSCs determined to be important to safety. The CLW accident standards will supplement other accident standards or

qualitative analyses for both facility workers (also contractor-proposed) and members of the public (prescribed by DOE), which can identify additional SSCs important to safety. The TWRS-P contractors could also identify additional *Safety Class* or *Safety Significant* SSCs for qualitative reasons, for example, for defense in depth purposes.

The NRC approach for using accident analyses to identify SSCs that are important to safety is to specify dose standards for individuals (members of the public) at or beyond the area controlled by the NRC licensee. Certain NRC regulations, including 10 CFR Parts 60, 72, and 100 include numerical standards for evaluating the impacts of accidents on individual members of the public at the controlled area boundary (or exclusion area, for Part 100). In the draft Part 70 revision, staff is including accident standards for facility workers (not CLWs) and members of the public.

The TWRS-P CLW definition results in an evaluation location for the CLW at or beyond (if more limiting) the *contractor-controlled area* (CCA). The CCA is the boundary of the physical area enclosing the TWRS-P facility by a common perimeter (security fence), and is roughly a few hundred yards wide. Within the CCA the contractor can control access and activities. The CCA is similar in use to the term *controlled area* in NRC regulations (i.e., Part 20). Because DOE's apparent position is that access to the Hanford site, although not normally controlled, could be controlled by DOE in the event of an accident, the evaluation location of members of the public proposed by the TWRS-P contractors is at the Hanford site boundary, about 7 miles away, at its nearest point.

Because the public evaluation location is a minimum of about 7 miles away, the distances alone tend to reduce accident doses and only limited sets of SSCs could be identified as important to safety from a standpoint of protection of public health and safety (equivalent to *Safety Class*). As a result, there are likely to be more SSCs that are the equivalent to the lesser designation, *Safety Significant* (i.e., important to safety for workers and CLWs). If the evaluation location for the public were the CCA boundary (e.g., the NRC approach in which CLWs are treated as the public), many more SSCs would apparently have to meet the more stringent design and QA requirements of *Safety Class* SSCs.

The most analogous prior treatment, by NRC, of the question concerning CLWs was in the "Questions and Answers Based on Revised 10 CFR Part 20" (NUREG/CR-6204). A question was raised (Question 26b) regarding the applicability of the public dose limits to an individual employed by a licensee, working at a two-unit site (one nuclear unit and one fossil unit) in which the individual is permanently employed at the fossil plant that is inside the nuclear plant's controlled area. The individual does not enter any restricted area. The answer given was that the public dose limits apply. This is the interpretation that the staff believes to be correct to apply to the Hanford TWRS-P CLW situation. However, the answer went further to state that if the normal nuclear plant operation causes a construction or fossil plant worker to exceed the dose limits for members of the public, the licensee should consider the individual doses to be occupational doses and should meet the requirements for individuals who receive occupational doses (e.g., training, monitoring, etc.). In this example, the fossil plant worker would be added under the licensee's radiation protection program. The last part of this answer would not be applied to the TWRS-P CLW situation because the CLWs will not be under the licensee's (i.e., the contractor's) radiation protection program (although DOE maintains some controls over CLW activities, e.g., access to the Hanford site could be controlled, and CLWs are covered by the site-wide emergency plan).

In the design basis events rulemaking for Part 60 (61 FR 64257), the Commission adopted a value of 0.05 Sievert (Sv) (5 rem), to the maximally exposed member of the public, at the most limiting location at or beyond the boundary of the repository above-ground operations area (i.e., the controlled area), for events with frequencies less than about $1 \times 10^{-2}/\text{yr}$. The basis for this frequency and dose value was given in the statements of consideration to the final rule (61 FR 64265). This basis, in part, is that a risk represented by this dose and frequency (about 2.5×10^{-5} fatal cancers per year), is consistent with the recommendations of the International Commission on Radiological Protection, which note that a fatal cancer risk in the range of 1×10^{-6} to 1×10^{-5} per year would likely be acceptable to individual members of the public. It is noted that the 0.05 Sv (5 rem) value and its basis is also being recommended by the staff for inclusion into the draft Part 70 revision, under which the TWRS-P facilities would eventually be licensed by NRC, if NRC licenses TWRS-P contractors in the future.

Assuming that NRC regulations will continue to not address CLWs, the staff would treat CLWs as members of the public in future NRC licensing actions. In this case, the standards that have been proposed by the TWRS-P contractors for CLWs do not represent a risk that is consistent with comparable values in current NRC regulations and the planned revision to Part 70. Further, the dose standard for the public for extremely unlikely events (those with frequency between $1 \times 10^{-4}/\text{yr}$ to $1 \times 10^{-6}/\text{yr}$), that is specified by DOE in DOE/RL-96-0006, as 0.25 Sv (25 rem), is also not consistent with the planned revisions to Part 70 of 0.05 Sv (5 rem). (Although the 0.25 Sv (25 rem) is used elsewhere in NRC regulations as a deterministic siting criterion in 10 CFR 100.11, this criterion is for evaluation of reactor sites with respect to "potential reactor accidents of exceedingly low probability of occurrence." The Part 100 accident criterion was not meant for events with probabilities approaching $1 \times 10^{-4}/\text{yr}$ and does not appear justified for TWRS-P.)

Detailed design for the TWRS-P facilities will begin in 1998. If TWRS-P contractors were to propose to continue operation of the test-phase plants under potential future NRC regulation, or propose to include or recycle SSCs from the test-phase plant in the full-scale plant, the requirements applied to the SSCs for protecting CLW may not be adequate, if NRC requires that CLWs be treated as members of the public. On regulatory transition to NRC jurisdiction, design requirements for certain SSCs (those protecting CLW safety) would be replaced by potentially more restrictive design requirements for protecting the public. Two complications could result: (1) *additional* SSCs may be required to meet the more restrictive requirements for protecting public safety, as compared with CLWs, as well as the closer evaluation location; and (2) more restrictive design requirements may become necessary for *existing* SSCs that are important to safety. In either case, the required evaluations or plant modifications may not be trivial.

One goal of NRC and DOE interaction during Phase I (demonstration phase) of the TWRS-P contracts is to facilitate a potential smooth transition of regulatory authority, from DOE to NRC, if NRC were given regulatory authority at the beginning of Phase II (full production phase). This smooth transition would be impaired if NRC were to require, in Phase II licensing, demonstrations of compliance and adequate protection of public health and safety, that are dissimilar to, or beyond, those performed for Phase I. Even if new facilities and processes are proposed, proven and tested designs from Phase I might not be transferrable to the NRC regulatory approach. Delays could result in resolving these issues, and there could be associated impacts

on DOE's ability to meet its Tri-Party Agreement TWRS-P commitments and milestones.

RECOMMENDATION

The staff recommends that the Commission affirm staff's interpretation, that if NRC were to license the TWRS-P facilities, CLWs would be treated as members of the public. Staff proposes to advise DOE, consistent with the January 29, 1997, MOU that: (1) the values and evaluation locations proposed by the TWRS-P contractors or specified by DOE are not consistent with current NRC regulations and the NRC regulatory approach in the proposed revisions to Part 70, for protection of members of the public during accidents, of a dose limit of 0.05 Sv (5 rem) at the licensee controlled area boundary; and (2) insofar as changes in these values and evaluation locations influence design choices and selection of requirements, the facility design may not meet NRC licensing requirements. This position will assist DOE in making an informed decision on the adequacy of the contractor submittals, and on DOE's policy that TWRS-P contractor activities be regulated in a manner consistent with the regulatory concepts and principles of NRC, if possible, during Phase I of the TWRS-P contracts.

COORDINATION:

The Office of the General Counsel has reviewed this paper and has no legal objection to its contents.

L. Joseph Callan
Executive Director for Operations