



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

RELEASED TO THE PDR
2/24/94
date initials

February 9, 1994

OFFICE OF THE
SECRETARY

MEMORANDUM FOR: James M. Taylor, Executive Director
for Operations
FROM: *C. Bate* Samuel J. Chilk, Secretary
SUBJECT: SECY-94-005 - DISPOSAL OF RADIOACTIVE
MATERIAL BY RELEASE INTO SANITARY SEWER
SYSTEMS

This is to advise you that the Commission (with all Commissioners agreeing) has approved publication of the ANPR subject to the attached modification.

Although not mentioned in the SECY paper, the Commission assumes that the staff will follow its normal procedures to obtain early and substantial input from the Agreement States.

Attachment:
As stated

cc: The Chairman
Commissioner Rogers
Commissioner Remick
Commissioner de Planque
OGC
OCA
OIG
Office Directors , regions, ACRS, ACNW, ASLBP (via E-mail)

SECY NOTE:
THIS SRM, SECY-94-005, AND THE VOTE SHEETS OF ALL COMMISSIONERS WILL BE MADE PUBLICLY AVAILABLE 10 WORKING DAYS FROM THE DATE OF THIS SRM.

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pathways of exposure and radiation doses that could result from releases into sanitary sewers, particularly in light of new sewerage treatment systems that further concentrate solids and are used by large municipalities. The NRC is publishing this advance notice to obtain public comment on a number of issues associated with the release of radioactive material to sewer systems. This information will be used in evaluating what additional changes to the requirements in 10 CFR Part 20 may be necessary. This information will also be used in assessing the impacts of the various options that may be available for imposing any necessary additional requirements.

Discussion

There are approximately 15,000 sewer treatment plants (STPs) in the United States and 23,000 ^{specifically} licensed users of radioactive materials. It is not uncommon for several licensed radioactive materials users to discharge radioactive waste materials into the same sewerage system. Sewage treatment plants (STP) vary in size (capacity) from less than 1 million gallons per day (gpd) to over 1 billion gpd. A capacity of 1 million gpd would serve about 5000 people and a few small commercial users. A 1 billion gpd facility would accommodate a population of about 5 million people and a substantial industrial base. The sewage treatment process, the size of the sewage treatment facility, and the amount, as well as the physical and chemical form, of the radioactive materials released to the sewer system can have a significant effect on the fate of the radioactive materials in the process and the final concentrations of materials in the sewer sludge or ash.

A number of incidents of radioactive material contamination and reconcentration have occurred. A description of some of these cases is included at the end of this notice. It should be noted that each of these cases occurred prior to implementation of the revised Part 20 limits for releases of radioactive material to sewer systems, ~~and such cases of reconcentration would not be expected to occur under the new Part 20 limits.~~

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~~While these incidents have not posed significant hazards to the public health and safety or the environment, the presence of these materials raises concerns about the possibility of incidents occurring which could significantly affect the public health and safety.~~

speculative

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In 1989, the NRC contracted with Battelle, Pacific Northwest Laboratories, (PNL) to study situations where radioactivity has been reported in sewer systems or sewer treatment sludge. The results of the PNL study were published in May 1992 as NUREG/CR-5814, "Evaluation of Exposure Pathways to Man from Disposal of Radioactive Materials Into Sanitary Sewer Systems." NUREG/CR-5814 includes information on sewage treatment and disposal practices, and exposure pathways and scenario analysis, based on case studies of situations where radioactive contamination has been reported in sewer systems or in sewer treatment sludges.

The PNL study performed theoretical modeling of most types of licensee radioactive discharges, except for excreta from individuals undergoing medical diagnostic or therapeutic administrations of radioactive material, which are exempt from regulation under § 20.2003. Modeling scenarios estimated the exposure to individuals at the sewer treatment facility and as a result of various uses of sewage sludges resulting from treatment. The results of the study predicted doses of 0.2 to 93 mrem/yr total effective dose equivalent

disposal of tissue samples over incineration. As a result, the May 21, 1991, final rule allows readily dispersible biological material to be released but prohibits the release of any non-biological insoluble material.

The Commission recognizes that new technologies for sewer treatment are currently under development, such as the emerging mesocosm-based treatments which use bioprocessors to neutralize sludge. These bioprocessors can be selected with unique abilities to selectively reconcentrate specific heavy metals and organics. In the consideration of new requirements, the Commission invites comments on to what extent and how the regulations should take into account the technologies for processing sewage *including advanced technologies such as bio processing or ion-exchange.*

Coincident with publication of this advance notice, the Commission has initiated contract support to analyze typical water treatment processes, which includes determining how the solubility of materials in influent to a treatment plant may be changed in a way that affects the potential dose to members of the public. One possible outcome of this analysis could result in modified restrictions regarding the forms of materials suitable for disposal. Comments on the potential impacts on licensee's operations associated with any additional restrictions regarding the forms of materials suitable for dispersal are solicited.

(2) **Total Quantity of Material.**

In the May 21, 1991, final rule, the Commission did not change the total quantity of radioactive materials which could be released into sanitary sewers. In brief, the limits are 185 GBq (5 Ci) of ^3H , 37 GBq (1 Ci) of ^{14}C , and 37 GBq (1 Ci) of all other radioactive materials combined to be released into a sanitary sewer by a licensed nuclear facility in a year provided the

contamination in sewage sludges, as has been the case in contamination incidents?

Second, should the Commission consider limitation using a dose limit approach, and provide total quantity and concentration values in a Regulatory Guide to facilitate compliance with the dose limit?

(4) Exemption of Patient Excreta.

The present requirements exclude from sewer release limits the contribution of patient excreta which may contain radioactive materials as a result of nuclear medicine diagnosis or treatment. In general, the radioactive materials used in these types of procedures have short half-lives and decay rapidly after their production, use and subsequent release into the sanitary sewer. Thus, doses to individuals from this source are expected to be far below the NRC's dose limit for members of the public. The Commission currently believes that the present regulation is adequate but recognizes that radionuclides used in nuclear medicine have been detected ^{in very low concentrations} on occasion at treatment facilities. Therefore, the Commission invites comments regarding the appropriateness of continuing the exemption for patient excreta.

The preliminary views expressed in this notice may change in light of comments received. In any case, there will be an opportunity later for additional public comment in connection with any proposed rule that may be developed by the Commission.