



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

NAL PDR

OCT 14 1978

Mr. L. N. Carmouche  
General Manager  
Functional Products & Systems  
Dow Chemical Company  
2020 Dow Center  
Midland, Michigan 48640

Dear Mr. Carmouche:

SUBJECT: DOW TOPICAL REPORT NO. DNS-RSS-001-P, "RADIOACTIVE WASTE  
SOLIDIFICATION SYSTEM"

We have completed our initial review of your radwaste topical report and require the additional information detailed in Enclosure 1.

We expect to complete our review of the information submitted by your letter of September 7, 1978 by mid-November 1978. At that time, a meeting between your staff and our reviewers has been suggested by your representative, Mr. Bruce Owen.

Please call us if you have questions.

Sincerely,

*Ralph L. Baer*

Robert L. Baer, Chief  
Light Water Reactors  
Branch No. 2  
Division of Project Management

Enclosure:  
Request for Additional  
Information

cc w/enclosure:  
Mr. J. B. Owen  
Manager, Radioactive Waste  
Nuclear Services  
Dow Chemical Company  
2020 Dow Center  
Midland, Michigan 48640

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ENCLOSURE

REQUEST FOR ADDITIONAL INFORMATION

DOW CHEMICAL COMPANY

DOW TOPICAL REPORT NO.  
DNS-RSS-001-P

RADIOACTIVE WASTE SOLIDIFICATION SYSTEM

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AUXILIARY SYSTEMS BRANCH

FIRE PROTECTION SAFETY EVALUATION  
TOPICAL REPORT, "THE DOW SYSTEM FOR SOLIDIFICATION  
OF LOW-LEVEL RADIOACTIVE WASTE FROM NUCLEAR POWER PLANTS"

The Dow proposal recognizes that their radwaste treatment system has an inherent fire hazard associated. The fire hazard is primarily due to the use of a vinyl ester as a binder material.

- (a) State the basis for adding the binder into the drum before any waste is added and how it is safely controlled.
- (b) The illustrated method (on page 23) of transferring the binder is not acceptable as shown, e.g., the small drum can move and cause the transfer line to break loose. Also, include in your transfer method details, a description of how the vinyl ester is moved from the bulk storage tank outside to the process area inside to assure that fire hazards are minimal.
- (c) Describe the process and area controls and interlocks (including ventilation system controls) that help ensure fire safety throughout the entire process.
- (d) Provide information that demonstrates that inadvertent striking of the 55-gallon drum by the mixing blades will not cause sufficient mechanical energy release to ignite the binder vapor.
- (e) State the basis for sizing the solidification binder storage tank at 5,500 gallons and recommend how it should be located to isolate it from the process area and from safety-related systems.

- 2 -

- (f) Describe the mixing sequence in detail and state the effect of mixing the catalyst and the amine promoter together to assure that uncontrolled reactions do not occur with resultant fire hazards.
- (g) Details are needed to evaluate the process safety involving the use of sulfuric acid, sodium hydroxide, and nitric acid. For example, state how are these chemicals are stored, used, and what will happen if operator error causes improper mixing.
- (h) State the interface parameters, process location restrictions, and other special design considerations that a utility should be aware of to ensure that no deleterious impact on the remainder of the nuclear plant will take place.
- (i) State the conditions necessary to prevent an explosion to occur in the process area and how they will be implemented and maintained.



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310 ACCIDENT ANALYSIS BRANCH

The heating and combustion tests which were performed on the simulated end products indicated that significant amounts of materials could be released to the atmosphere in the event of a fire. Perform a conservative analysis of the off-site radiological consequences following a postulated accidental release of radioactivity from a fire involving the end product. State all the assumptions made and indicate all the parameters used in the analysis. Unless the presence of a combustible material (oil, etc.) to feed the fire can be precluded, a fire involving such material and the end product must be assumed.

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331-1

12.0

RADIOLOGICAL ASSESSMENT BRANCH

331.1

(2.1, p.6)

Identify the part of the plant in which the verification of waste characteristics process will be performed, and procedures and/or design features which will be used to maintain radiation exposures ALARA during the process.

331.2

(3.1, p. 13)

Describe the precautions taken to ensure that the mixer is removed from the emulsion at the end of the 1-1.5 minute mixing period, or before gelation of the radwaste emulsion occurs.

331.3

(4.0, p. 22)

Provide a detailed layout drawing of a typical DOW radwaste solidification system facility showing: low and high radioactive waste storage areas; fill and cap area; radwaste control area; truck loadout area; and waste baler. Include the radiation zone designations for each of these areas.

331.4

(4.0, p. 22)

Based on the specific design features of the DOW radwaste solidification system, provide an estimate of the man-rams associated with each of the following functions: operations, maintenance, and inservice inspection. State the basis, models, and assumptions used to arrive at these values.

331.5

(4.10, p. 32)

Describe what procedures will be followed in the event that the total activity of the filled drum, measured by the monitors at the wipe station, exceeds the allowable DOT regulations.