50-329-330

DOW

THE DOW CHEMICAL COMPANY

MIDLAND DIVISION
MIDLAND, MICHIGAN 48640

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May 28, 1970

Mr. Harold L. Price
Director of Regulation
United States Atomic Energy Commission
Washington, D. C. 20545

Dear Mr. Price,

Confirming our discussions in Bethesda on Monday and Tuesday, May 25 and 26, with Dr. Beck, Messrs. Mann, Rogers, and Cunningham, and others of your staff, relative to Dow's purchase and use of secondary steam from a nuclear reactor, it is our intent to comply with the provisions of this letter which we understand to be conceptually satisfactory to the A.E.C. staff.

Discussion:

The secondary steam from the Consumers Power Company Nuclear Power Plant will be delivered into the trunklines of The Dow Chemical Company steam distribution system in quantities up to 8,080,000 lbs/hour. This steam will be distributed to several hundred locations within the Dow plant site of approximately 1500 acres.

The steam will principally be used in chemical manufacturing plants for supplying thermal energy to chemical processes by use of heat exchange devices which provide a suitable physical barrier between the steam and the product or its precursors in process. There are about 3,000 of these heat exchange devices in the Dow plant.

The only means by which the secondary steam would be introduced into the product would be through a leak which might occur in the heat exchange device.

The likelihood of steam leaks of sufficient magnitude to result in measurable levels of radioactivity in a product will be very low. To illustrate: The maximum level of long lived radionuclides (excluding Tritium) in the secondary steam will be 3 x 10^{-9} mol/ml gross beta. A steam leak equivalent to one percent by weight of the product, with no subsequent removal of these nuclides in the process would have to occur for these radionuclides to reach a level of 3 x 10^{-9} mol/gm in the product.

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A large percentage of the processes are inherently so sensitive to the presence of water that very small steam leaks will be detected by normal process monitoring devices or routine quality measurements on the product.

For those processes where steam leaks are not self-evident, other methods of testing may be used, such as (1) Periodic testing of the heat exchange device for leaks, or (2) Periodic testing of process intermediates, process wastes, or products. Statistical sampling methods will be used for such periodic testing. The number of heat exchange devices makes continuous on-line monitors for leaks in each individual unit impracticable.

Of the condensate from the secondary steam, up to 1,500,000 lbs. per hour will not be returned to the nuclear steam supply system as feedwater and will be disposed of through the Dow waste treatment system. The reasons for this condensate not being returned are due to its becoming contaminated with chemicals from such sources as steam jets for producing vacuum and to the impracticability of a collection system to recover the condensate from every use point. The unreturned condensate flows into sewers to the Dow waste treatment system. The volume of liquid effluent from the waste treatment system is such that the condensate will be diluted approximately ten times.

Because much of the unreturned condensate is contaminated by chemicals before reaching the waste system, the effluent from the waste system contains such a high level of solids, and the large volume of flow, an ion exchange system for removal of radionuclides is impracticable.

This effluent will comply with regulations of the Michigan Water Resources Commission.

Action:

Dow will apply for a Part 30 specific license to receive, possess, and use secondary steam as a source of thermal or mechanical energy from the nuclear steam supply system of the Consumers Power Company Midland Nuclear Power Plant in accordance with the following conditions:

I. No secondary steam or its condensate will be intentionally introduced into any product unless a specific license or exemption is obtained for such introduction.

II. The isolation of secondary steam from products will be assured by use of heat exchange devices which will provide a suitable physical barrier between the secondary steam and the product.

III. An administrative program will be established to provide for detection of leaks in the heat exchange devices, repair of leaks when detected, and appropriate administrative control of the program.

A. Detection of leaks will be accomplished by such means as:

1. Observance of processes where leaks are self-evident due to effect of presence of small quantities of water.

2. Testing heat exchange devices for leaks on a statistical sampling basis.

3. Other tests on a statistical sampling basis.

B. Leaks will be repaired promptly after detection.

C. The administrative program will include:

1. Direct operating supervisory responsibility for observing or testing for leaks.

2. Coordination and surveillance of the program by a Quality Assurance Group.

3. Auditing by personnel trained in the fields of radiochemistry and health physics.

4. Maintenance of appropriate records of activities carried out in the program.

5. Periodic auditing of the program by management personnel.

IV. No accumulation of by-product materials from the secondary steam will be allowed at any location which will exceed the permissible levels for radiation or radioactivity in unrestricted areas in 10CFR20. The Dow Health Physics Staff will maintain surveillance over this condition.

V. The release of radioactive materials in effluents from Dow will comply with regulations in 10CFR20. The liquid effluents from the Dow waste treatment system are about ten times the volume of condensate which will be disposed of, so the maximum instantaneous concentration of radioactive materials from secondary steam will be about 1/10 of MPC, and the maximum annual average concentration will be about 1/100 MPC.

The annual release of radionuclides from secondary steam (except Tritium) with half life over 16 hours will be approximately 1.6 curies.

We understand that under the conditions described above no license or formal exemption will be required of Dow or its customers with respect to products.

We further understand that the processing of Consumers application for a construction permit for the nuclear reactor to be built in Midland will proceed on schedule, and that every reasonable effort will be made to issue a specific license to Dow at the same time as the construction permit is issued to Consumers.

Sincerely,

Harold Bosscher
General Manager,
Midland Division

cc: R. E. Cunningham
Division of Materials Licensing
United States Atomic Energy Commission

JFM:elh

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FROM:
Dow Chemical Co.
Midland, Mich.
Harold Bosscher

TO:
H.L.Price

CLASSIF: U
POST OFFICE
REG. NO:

DESCRIPTION: (Must Be Unclassified)
Ltr confirming discussion with Reg. Staff ...RE: Dow's purchase & use of secondary steam from Consumers Power Co. (Midland

ENCLOSURES:

REMARKS:
NOTE: 18 cys sent ACRS 6-3-70 by N.Blunt....

PDR; Sent to J. Cook for Disposition.

DATE OF DOCUMENT	DATE RECEIVED	NO.:
5-28-70	6-2-70	1696

LTR.	MEMO:	REPORT:	OTHER:
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ORIG.: 3 signed CC: OTHER:

ACTION NECESSARY ☐ NO ACTION NECESSARY ☐
CONCURRENCE ☐ COMMENT ☐
DATE ANSWERED BY:

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