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CURTIS,N.W. Pennsylvania Power & Light Co.
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SCHWENCER,A. Licensing Branch 2

SUBJECT: Forwards revised response to SER Outstanding Issue 1 re transportation of toxic chemicals.

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NORMAN W. CURTIS
Vice President-Engineering & Construction-Nuclear
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June 2, 1981

Mr. A. Schwencer, Chief
Licensing Branch No. 2
Division of Project Management
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SUSQUEHANNA STEAM ELECTRIC STATION
SER OUTSTANDING ISSUE NO. 1
ER 100450 FILE 841-2
PLA-826

Dear Mr. Schwencer:

Attached is a revised response regarding transportation of toxic chemicals. This revises the response submitted previously in PLA-694. We believe this completely addresses your concerns on this issue.

Very truly yours,

N. W. Curtis
Vice President-Engineering & Construction-Nuclear

WEB/mks

Attachment

cc: R. M. Stark - USNRC

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QUESTION 3

In order to determine if the reactor control room for the Susquehanna SES is designed to meet a postulated hazardous/toxic chemical release[1], an analysis of truck accidents within a radius of five miles of the station was undertaken. U.S. Route 11 is the only major highway within the five-mile radius of the station. Both Interstates 80 and 81 are located outside this five-mile radius and were not considered in this analysis. It was assumed that an occurrence of $1 \times 10^{-6}$ was an acceptable risk when using conservative assumptions in performing the analyses[2]. In determining the probability of an accident information on the frequency of hazardous shipments per year along U.S. Route 11, the distance along U.S. Route 11 and the probability of an accident per mile[3] was required in formulating the risk.

In a review of both state and federal highway accident statistics, it was impossible to determine the number of shipments traversing U.S. Route 11 in the vicinity of the Susquehanna SES. In addition, most of the non-local traffic use the interstate system (I-80 and I-81) rather than U.S. Route 11. Therefore, to quantify the transportation data along U.S. Route 11, PP&L surveyed in person the manufacturing industries (approximately 60) along the U.S. Route 11 corridor between the Interstate 80 interchange near Lime Ridge, Pa. and the crossing of the Susquehanna River at West Pittston, Pa. This survey included industries within a one-half mile radius on either side of the highway.

Each of the industries in the surveyed area was questioned as to their use of hazardous and toxic materials, the types, amounts, mode of transport, frequency and route. Of the sixty industries there were seven that used hazardous materials and six of these firms knew that transport of their materials was not along U.S. 11 within the five-mile radius of the plant. The seventh firm received one shipment per month (12 per year) of hazardous materials but was unaware of the route. To be conservative, it was assumed that all 12 shipments passed the plant along U.S. Route 11.

According to a study performed by Arthur D. Little[3], the accident frequency of trucks carrying hazardous materials resulting in a serious breach is approximately $2.7 \times 10^{-8}$ accidents per mile. Therefore, the probability of accident per mile per year using a conservative assumption is:

$$\frac{\text{Trips/yr.}}{1.2 \times 10^{1}} \times \frac{\text{Accident probability/mi.}}{2.7 \times 10^{-8}} = \frac{\text{Probability/mi./yr.}}{3.24 \times 10^{-7}}$$

Shipments of hazardous materials per month from this one firm include 4-6 barrels of naphtha UM and P grades and 4-6 barrels in total of xylene, toluene or Stoddards Solvent. A naphtha spill was not evaluated because it is a solid and is not an inhalation hazard[4]. Xylene, toluene and Stoddards Solvent have comparable toxicities[4]. However, since the toxicity level of xylene is listed in Reg. Guide 1.78[1] it was used as the critical substance in this analysis. The weight for each shipment of hazardous materials is usually about 5000 pounds per shipment. In Pennsylvania, the vehicle weight limit for large semi-trailer trucks is 72,000 pounds. The approximate truck weight is 40,000 pounds and the maximum weight of hazardous materials would then be 32,000 pounds. In this analysis it was conservatively assumed that the total vehicular

weight limit of 72,000 pounds was used for the hazardous materials weight. This weight is used for the calculation for hazardous material accidents instead of the realistic weight of 5,000 pounds. Under the worst case meteorological conditions (Pasquill F-Stability) using Tables C-1 and C-2 of Reg. Guide 1.78[1], the number of pounds of hazardous materials that require consideration in accident analysis of a type B control room at the Susquehanna SES, at a distance of 0.3 and 0.5 miles is approximately 80,000 equivalent pounds of xylene. Since the control room is located a greater distance than 0.3 miles from U.S. Route 11, hazardous chemical accidents need not be considered.

In being conservative we assumed that if the control were located on U.S. Route 11 the probability of a hazardous/toxic struck accident along this route a distance of 0.5 miles in either direction (total of 1.0 mile) is as follows:

$$\frac{\text{Probability/mi./yr.}}{3.24\times10^{-7}} \times \frac{\text{Miles/U.S. Route 11}}{1} = \frac{\text{Prob./yr.}}{3.24\times10^{-7}}$$

The extremely conservative probability of a truck accident along U.S. Route 11, containing hazardous materials, affecting the reactor control room is less probable than $1.0\times10^{-6}$ accidents per year, therefore in accordance with Reg. Guide 1.91[2], these risk estimates are acceptable.

## REFERENCES


(1) "Assumptions for Evaluating the Habitability of a Nuclear Power Plant Control Room During a Postulated Hazardous Chemical Release," Directorate of Regulatory Standards, U.S. Nuclear Regulatory Commission, Regulatory Guide, 1.78, June, 1974.

(2) "Evaluation of Explosions Postulated to Occur on Transportation Routes Near Nuclear Power Plant Sites," Directorate of Regulatory Standards, U.S. Nuclear Regulatory Commission, Regulatory Guide, 1.91, Rev. 1, February, 1978.

(3) Arthur D. Little, Inc., A Model Economic and Safety Analysis of the Transportation of Hazardous Substances in Bulk, report prepared for The U.S. Department of Commerce, Maritime Administration, Office of Domestic Shipping, Washington, D.C., Report No. COM-74-11271, 1974.

(4) Sax, N.I., Dangerous Properties of Industrial Materials, Third Edition, Van Nostrand Reinhold Company, 1968.