UNITED STATES OF AMERICA

Sept. 27, 1983

NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD
Glenn O. Bright
Dr. James H. Carpenter
James L. Kelley, Chairman

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|---|---|
| In the Matter of<br><br>CAROLINA POWER AND LIGHT CO. et al.<br>(Shearon Harris Nuclear Power Plant, Units 1 and 2) | Dockets 50-400 OL<br>50-401 OL<br><br>ASLBP No. 82-468-01 OL |

MOTION FOR LICENSE CONDITION ON SPENT FUEL STORAGE AT SHEARON HARRIS PLANT, by Wells Eddleman

Applicants, in their 9/1/83 Motion for Summary Disposition of Eddleman Contention 64F (safety of spent fuel shipping cask pressure relief valve), assert that they (at an unspecified time) intend to remove the pressure valve in question, as it is not qualified and they are not seeking to re-qualify it or any other relief valve, as safe for spent fuel shipping use. They also assert that they will not use casks containing such a relief valve for spent fuel shipments to Harris, and anticipate only "drxy" (in-air) shipments to Harris for the foreseeable future.

They assert that such are facts about which there is no dispute. Therefore, I am willing to withdraw Eddleman 64F provided the Board will simply hold them to their word and impose the following license conditions on storage and possession of spent fuel from other nuclear plants at Harris:

1. No spent fuel shall be shipped to or from Harris in any cask which uses a pressure relief valve containing Rulon components, such as the Target Rock 73-J,

2. No spent fuel shall be shipped to or from Harris except as a "dry shipment", i.e. one cool enough to travel with no more than 1 $ft^3$

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of water in the spent fuel containing cavity.

The above conditions are reflective of CP&L's asserted intent to only ship dry and not to use the Target Rock valve, and dispose of the material (Rulon) that discovery reveals to be at issue in Eddleman 64F. Since the above safety conditions satisfy the concern admitted into this proceeding in Eddleman 64F, it is appropriate to withdraw the contention if such conditions are both imposed. (This is not at all to say that I believe such spent fuel shipments are safe or adequately safe. But the contention is all I am allowed to use in this proceeding.)

While the above withdrawal would moot Applicants' motion for Summary Disposition on this safety contention, summary disposition should not be granted without such conditions, as they would merely hold Applicants to an enforceable commitment to do what they have said they would in their motion for summary disposition.*

Therefore it is appropriate that the above Motion be granted and the requested license conditions be imposed on CP&L and its co-Applicants in this proceeding.

Wells Eddleman
Wells Eddleman

*While for legal purposes under 10 CFR 2.749 any fact not contradicted with evidence in a motion for summary disposition is deemed to be admitted, it should not be inferred that I admit that anything CP&L asserts is actually a fact. This motion would, if granted, make CP&L's statement of facts, other than those contained in the license condition above, irrelevant to this case. Therefore I have not put extra energy into refuting their other asserted "facts" with evidence, though I believe a good bit exists.

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Radiation Doses from Radioactive Exhaust Air

ADULTS (All values in mrem/yr)

| | whole body | thyroid | kidney | bone |
|---|---|---|---|---|
| noble gas radiation | 31 | 31 | 31 | 31 |
| ground radiation | 15 | 15 | 15 | 15 |
| total of various food-stuffs | 784 | 809 | 10,872 | 4,820 |
| wine | 110 | 96 | 1,383 | 937 |
| Total | 940 | 951 | 12,300 | 5,803 |
| maximum value in accordance with section 45 of the Radiation Protection Law | 30 | 90 | 90 | 180 |

Babies (only iodine-131

| | thyroid |
|---|---|
| cow's milk | 753 |
| goat's milk | 2,204 |
| sheep's milk | 2,501 |
| maximum value in accordance with section 45 of the Radiation Protection Law | 90 |

# Dispersion Characteristics in the Lee of Complex Structures

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**This paper is directed to those concerned with pollutant dispersion in the immediate vicinity of structures. Gas tracer data have been analyzed to assess dispersion characteristics and model performance at two nuclear power plant sites. Regression analysis was used to test sensitivity of ground level concentration to various meteorological parameters and effluent release configurations. Various models and model inputs were evaluated against field measurements. Lidar data provided information on vertical as well as horizontal dispersion. Analysis results indicate that wind speed is a more skillful predictor of ground level concentration than any other parameter available at the two study sites. In general, popular models of dispersion in the lee of structures perform poorly with a distinct trend toward increasing under-prediction with increasing wind speed. The usefulness of stability typing is shown to be questionable in view of a high sensitivity to the scheme used in typing. Site specific studies appear to be indispensible for fairly accurate or even conservative modeling of dispersion in the lee of complex structures.**

Dispersion in the immediate vicinity of buildings and other structures is influenced by a highly complex field of flow generated by the structure as a perturbation to the ambient flow field in the boundary layer. The nature of such flow perturbations has been studied for decades in wind tunnels and in field experiments as outlined in a comprehensive review by Hosker.[1] While the flow structure can be extremely complex, models for practical application have traditionally followed a simple concept. The principal approach to the dispersion process has been the derivation of adjustments to the standard Gaussian plume spread parameters $\sigma_y$ and $\sigma_z$, to reflect enhanced dispersion in the turbulent cavity and wake zones downwind of the structure. While the nature of perturbed dispersion in the wake of structures is still rather poorly understood, the pressures of regulatory requirement have led to the tentative adoption of certain modeling algorithms by regulatory agencies. It is the purpose of this paper to evaluate a number of the more popular approaches to modeling, using data bases from two recent field experiments. It is hoped that this evaluation will aid in the interpretation of results under practical application of the models.



### Description of the Field Studies

The two studies treated herein are gas tracer studies designated to investigate the dispersion of roof vent effluents in the immediate vicinity (within 1 to 1.5 km) of nuclear power plants. Both studies involved tracer releases at different elevations on the structures of operating plants; sampling of tracer concentrations on concentric arc segments downwind and concurrent measurement of meteorological parameters on an upwind tower. The studies were conducted by the same consulting firm, using a similar approach in each case, but differed substantially in the nature of the site, the release configuration and the meteorological conditions involved. Both studies were conducted in relatively flat terrain and together cover a wide range of conditions.

#### Millstone Nuclear Power Station (MNPS)

The first study was conducted during the months of October and November, 1974, at Millstone Nuclear Power Station in Waterford, CT, under sponsorship of the Atomic Industrial Forum.[2] The plant site is on the south shore of the State of Connecticut at the tip of a small peninsula jutting southward into the eastern mouth of Long Island Sound. Both the plant structure and the 137 m meteorological tower southeast of the plant are within 100 m of the water's edge.

A simultaneous dual tracer release was employed at MNPS from release locations on a structure of complex configuration as indicated in Figure 1. Sulfur hexafluoride ($SF_6$) gas was released from a vent atop the reactor building at a height of 44.7 m above grade level (AGL). Freon gas (F-12B2) was released simultaneously from each of three vents on the roof of the turbine building at a height of 27.6 m AGL. Both releases were nonbuoyant but had a finite exit velocity ranging from 5 to 10 m/s. Sequential bag samplers were arrayed on each of 3 arcs centered on the reactor vent at distances of 350 m, 800 m, and 1500 m. Meteorological measurements taken at the 10 m and 43 m levels on the 143 m tower were selected for this analysis. Concentration data were obtained as hourly averages by gas chromatography with a resolution of 1 part per trillion.

#### Duane Arnold Energy Center (DAEC)

The second study was conducted during the month of July, 1978 at the Duane Arnold Energy Center near Cedar Rapids, IA, under sponsorship of the Electric Power Research Institute.[3] The plant site is one-half kilometer west of the Cedar River in eastern Iowa. A 50-m meteorological tower is located just southwest of the plant.

A single tracer ($SF_6$) was employed with nonsimultaneous releases from the reactor vent at 45.7 m AGL, a turbine roof vent at 23.5 m AGL and a release point at grade level as indicated in Figure 1. Like the MNPS structure, the structure at DAEC was complex. Tracer releases were nonbuoyant and, except for the reactor vent releases, were without appreciable momentum. Reactor vent releases were made with exit velocities on the order of 8 to 10 m/s. Zinc oxide smoke was released simultaneously with each release of $SF_6$ at the identical release points to assure complete mixture with the $SF_6$ gas. Se-

Concentrations in PPM (UG/L)     Supplement to discovery response on Eddleman 83/84

Metals Found in Haw River Near Bynum, NC
Source: NC Division of Enviro. Mgt computer records, 5-26-82 printout at page 20 et seq -- copies made avaiable to C.A. Barth NRC who will send a copy to H. Carrow of CP&L

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| Pollutant | DATES of SAMPLES | | | |
|---|---|---|---|---|
| | 6/16/81 | 2/18/81 | 6/11/80 | |
| $NH_3/NH_4$ N TOT | 50 K | 220 | 50 | |
| $No_2/NO_3$ | 1.7 K | 98 | 2.3 | |
| Arsenic | 10 K | 10 K | 10 K | |
| Cadmium | 50 K | 50 K | 50 K | |
| Chromium | 50 K | 50 K | 50 K | |
| Cobalt | 100 K | 100 K | 100 K | |
| Copper | 40 K | 40 K | 40 K | |
| Iron | 1200 | 1000 | 1800 | |
| Lead | 100 K | 50 K | 100 K | (4/11/80) |
| Manganese | 230 | 90 | 120 | " " " |
| Nickel | 100 K | 100 K | . | |
| Zinc | 50 K | -- | 50 K | " " " |
| Mercury | 0.5 K | 0.5K | 0.7 | |

The Haw River feeds the Jordan Lake just above the dam which is some miles above the SHNPP cooling lake outlet into the Cape Fear.

Supplement on Eddleman 83/84 — entire printout + data follow.
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