UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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| In the Matter of | ) | |
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| DAIRYLAND POWER COOPERATIVE | ) | Docket No. 50-409 |
| | ) | (FTOL Proceeding) |
| (La Crosse Boiling Water Reactor) | ) | |

AFFIDAVIT OF DR. REGINALD L. GOTCHY
REGARDING INTERVENORS' CONTENTION 9

My name is Reginald L. Gotchy. I am a Senior Radiobiologist employed by the Nuclear Regulatory Commission in the Radiological Assessment Branch of the Division of Systems Integration. I have been employed in this position since 1975. My professional qualifications are attached to this affidavit. This affidavit was prepared by me.

The purpose of this affidavit is to present written testimony addressing Contention 9 admitted for litigation in this proceeding.

Contention 9 reads as follows:

> CREC contends that the exposure of the population to the combined and synergistic health effects of the airborne effluents released by LACBWR and the Genoa 3 coal plant is inimical to public health and safety.

Response

Data on combined and synergistic health effects of airborne effluents from coal and nuclear power plants is essentially non-existent. There is some experimental data and theoretical bases to suppose the airborne effluents from the Genoa 3 coal plant and LACBWR will interact.

I have attempted to obtain a copy of the article by Clark Most[1] through our Technical Library, but it is not listed in any of our indexes. The NRC library attempted to contact Delta College but found it was a community college which does not grant degrees above the associate level. It is believed the material quoted is not a published report (it may be a term paper).

One small study at Trombay, India[2] claims to demonstrate a synergistic effect resulting in increased formation of condensation nuclei in air containing sulfur dioxide. It is said to be synergistic in that the total number of nuclei created is greater if irradiation is included. The condensation nuclei were estimated to be about 0.01 to 0.1 mm in size, which are easily transported for long distances. Since the Genoa 3 plant produces an abundance of $SO_2$ (and other oxidizing gases) it is possible the plumes from Genoa 3 and LACBWR will mix under certain meteorological conditions and produce higher atmospheric concentrations of condensation nuclei nearer the LACBWR than might otherwise occur. However, even granting that, there is no evidence that that will have a synergistic effect on the distribution of radiation dose (and therefore health effects) among members of the public. On the other hand, although DPC has not provided the NRC Staff with detailed information on emissions from Genoa 3, it is well known that modern coal-fired plants release tons of fine particulates (typically less than

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[1] The Intervenor referenced an article entitled "Radiation-Chemical Interactions: A Potential Hazard to Modern Man" by Clark Most, Jr., Delta College, University Center, Michigan (1971) as basis to support Contention 9.

[2] K.A. Vohra, "Synergistic Effects of Atmospheric Releases of Radioactive Gases and $SO_2$ in Inducing Nucleation in the Atmosphere," in Combined Effects of Radioactive, Chemical and Thermal Releases to the Environment, pp. 209-221, IAEA, Vienna (1975).

10 mm in size) during normal operation. These fine particulates serve as condensation nuclei for other gases such as volatilized mercury, benzo-a-pyrene, $NO_x$ and $SO_x$. The particles themselves are rich in metals, some of which are caricinogens (e.g.; nickel and chromium) as well as chemical catalysts. These and other metals catalyze formation of sulfates and nitrates from $SO_2$ and $NO_2$ during transport in the plume from coal-fired plants. Recent epidemiological studies strongly implicate sulfates as a major contributor to chronic respiratory and cardiovascular diseases in man (see, for example, L. Lave and Seskin, Air Pollution and Human Health, John Hopkins Univ. Press, 368 p. 1 (1975). In addition, $SO_x$ and $NO_x$ result in damage to agriculture and aquatic life as a result of acid rain. Be that as it may, given the almost infinite numbers of fine particles in the plume from Genoa 3, it is doubtful if an increase in condensation nuclei from the LACBWR releases would have any significant effect on the behavior of the plume from Genoa 3 and its potential impacts on man.

With regard to the extent that chemicals released from Genoa 3 may cause synergistic effects in humans, it should be remembered that all experiments and tests for carcinogenicity and mutagenicity of chemical substances is always carried out in the presence of background radiation. Since background radiation is typically 10 to 100 times higher than doses from a nuclear power plant, the potential health impacts of releases from coal-fired plants include any potential synergistic effects and would not be significantly changed by the low level radiation exposures from a nuclear power plant like LACBWR.

Another point to note, is that naturally occurring radioactive releases from a modern coal-fired plant like Genoa 3 result in radiation doses to the public that are similar to those of nuclear power plants of comparable size and advanced technology (see, for example, J.P. McBride, et al., "Radiological Impact of Airborne Effluents of Coal and Nuclear Plants," Science, Vol 202, No. 4372, pp. 1045-1050 (8 Dec., 1978)). However, although the NRC does not license coal-fired plants, I conclude the joint radiological impacts would be approximately the same if both plants were nuclear plants. Since the FES (pp. 5-14 through 5-16) shows LACBWR meets 10 C.F.R. Part 50, App. I requirements as well as 40 C.F.R. 190 requirements, it is clear that two nuclear power plants (of comparable sizes) at the same site would also be within limits judged to be ALARA.

For the reasons stated above and in the absence of any definitive data to show some as yet unexpected combining of particulates and gases when the two plumes mix, I must conclude that the radiological and toxic impacts would be additive and not synergistic, and would not be "inimical to public health and safety."

I have read the foregoing affidavit and swear that it is true and correct to the best of my knowledge and belief.

Reginald L. Gotchy

Subscribed and sworn to before me
this 5th day of June, 1980.

Notary Public

My Commission Expires: July 1, 1982.

DR. R. L. GOTCHY

Professional Qualifications

My name is Reginald L. Gotchy. I am a Senior Radiobiologist on assignment with the Radiological Assessment Branch in the Office of Nuclear Reactor Regulation. In this capacity, I am responsible for coordinating the technical review and evaluation of the environmental radiological impact of nuclear facility operations.

I received a B.S. in Zoology from the University of Washington in 1958, an M.S. in Radiation Health from the Colorado State University in 1966, a Ph.D. in Radiation Biology from the Colorado State University in 1968, and attended the University of Washington Graduate School 1958-1958 as an AEC Radiological Physics Fellow.

I have 19 years of professional experience in health physics, industrial hygiene, radiation physics, radiation biology, environmental sciences, project coordination of research and development programs, and development of AEC and NRC standards. This experience has included operational and safety responsibilities, and review and coordination of facility operations under contract to the AEC. I have been employed by the Lawrence Radiation Laboratory, the U.S. Public Health Service, Reynolds and Electrical Engineering Company, the AEC Nevada Operations Office, and the NRC Office of Standards Development prior to my assignment in the Office of Nuclear Reactor Regulation in 1975. I was an adjunct professor of Radiation Health Technology at the University of Nevada, Las Vegas (1969-1972).

I am a member of Sigma Xi (Research Society of North America), the American Nuclear Society, the Health Physics Society and the International Radiation Protection Association, and the Radiation Research Society. I am a past member of the American Association for the Advancement of Science and the American Industrial Hygiene Association.

I am certified by the American Board of Health Physics, and served as a member of the Panel of Examiners (1972-1976). I remain active in the development of examination questions and updating my professional standing by periodic post-graduate work and training.