Duquesne Light

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June 25, 1985

United States Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Mr. George W. Knighton, Chief
Licensing Branch 3
Office of Nuclear Reactor Regulation

SUBJECT: Beaver Valley Power Station - Unit No. 2
Docket No. 50-412
Illumination Level Backfit

Gentlemen:

In response to Hugh Thompson's informal request, the following information further defines and revises Duquesne Light Company's (DLC) position regarding illumination levels at Beaver Valley Power Station Unit No. 2 (BVPS-2) including the definition of hazards used for design of lighting systems.

The Standard Review Plan (SRP) recognizes that there are no regulations or Regulatory Guides which directly apply to the performance requirements for lighting systems. However, in response to reviewer questions (many informal), DLC has attempted to demonstrate that SRP criteria referencing the IES Handbook, were used in the BVPS-2 design. Information supplied by DLC equals or exceeds that provided by several other recent OL applicants and accepted by NRR as the licensing basis in their SER's.

The BVPS-2 lighting system design is based upon sound lighting design principles applied by experienced lighting designers. This design reflects not only the skill and knowledge of the designers, but also incorporates the inestimable amount of expertise compiled over the years in the IES Handbook. The IES Handbook is routinely used as a guide for design, not only in nuclear facilities, but in all manner of public, commercial, industrial, indoor, and outdoor lighting systems. Lighting system design is an art as well as a science and must be evaluated as such. Illumination levels and the perception of those levels by individuals are greatly influenced by the environment in which the lighting is provided. For that reason, the IES Handbook gives considerable design latitude with regard to illlumination levels. The proof of satisfactory lighting system design is whether individuals can function in the environment created, not whether the illumination level matches some rigidly specified value. The values given in the IES Handbook are target values useful to the designer in achieving an overall acceptable lighting design. An effective design does not require that all locations within an area, or all surfaces of a hazard be illuminated to the levels recommended by the handbook. Therefore, it is not valid to use design illumination values as rigid measuring sticks for a satisfactory design; in fact, the IES Handbook

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states that deviations are expected. The BVPS-2 lighting system design is based on the guidance provided by SRP 9.5.3 and the IES Handbook and provides sufficient illumination for safe shutdown control areas and safe personnel access to those areas.

Table II of IES Transaction: "Nuclear Power Plant Lighting", referenced in Section 9 of the IES Handbook, defines high hazards by example, such as: at rotating machinery, at power distribution equipment, at harsh chemical areas, at radioactive areas, at hot steam piping, and at fuel pools. However DLC does not consider enclosed or protected equipment as high hazards. DLC concurs with the IES Lighting Transaction definition of high hazards as areas that could result in a person becoming incapacitated if that person is in the immediate vicinity of the hazard.

The IES Transaction (paragraphs 3.2.1 and 3.3) discusses general plant pedestrian areas such as stairs, passages, and walkways. DLC interprets clean, straight passages and walkways as being non-hazard areas. When stairs, doors, etc. are present in the pathways used for access to safe shutdown areas, DLC interprets these areas to be slight hazard, general plant pedestrian areas in accordance with the IES Transaction Table II definition and paragraphs 3.2.1 and 3.3.

DLC believes that increasing illumination levels for access to safety related areas by a factor of four, as proposed by the staff, is not required to achieve or maintain an acceptable level of safety. This is particularly evident when any reasonable amount of credit is given for the versatility and effectiveness of portable lighting, which in many cases provides better lighting characteristics than installed lighting.

Battery powered portable lighting will be provided for emergency use by fire brigade and operations personnel required to achieve safe plant shutdown.

This is considered to be an approved method as indicated in paragraph 8.2 of the IES transaction, Section 2 of the Handbook, and reflected in recent SER's. This may prove to provide a better degree of lighting for individuals than a fixed lighting system could. As an example, consider a situation when the person must read a valve ID tag and the fixed lighting is located overhead and behind the person. The person's body would be shielding the light from the seeing task. The use of a hand-held portable lighting device would enable the person to direct the light on the ID tag and at the proper angle to facilitate accurate identification of the valve.

DLC personnel injuries are routinely evaluated for causes and corrective action. No injuries at any DLC facility have been attributed to poor lighting, even under far more severe environmental conditions such as coal dust accumulation in fossil plants.

Dependence of BVPS-2 personnel on illumination levels is not sufficiently unique to justify the use of plant-specific backfitting to implement new requirements. The wide range of lighting criteria/lighting evaluations documented in various FSAR's and SER's issued since the publication of SRP 9.5.3 emphasizes the need for generic review.

In addition, DLC proposes a postponement of the June 27, 1985, appeal meeting to allow your staff time to evaluate this additional information and provide DLC with appropriate feedback for further preparation.

DUQUESNE LIGHT COMPANY

By J. J. Carey
J. J. Carey
Vice President

RJW/wjs

cc: Mr. B. K. Singh, Project Manager
Mr. G. Walton, NRC Resident Inspector

COMMONWEALTH OF PENNSYLVANIA)
) SS:
COUNTY OF BEAVER)

On this 25 day of June, 1985, before me, a Notary Public in and for said Commonwealth and County, personally appeared J. J. Carey, who being duly sworn, deposed and said that (1) he is Vice President of Duquesne Light, (2) he is duly authorized to execute and file the foregoing Submittal on behalf of said Company, and (3) the statements set forth in the Submittal are true and correct to the best of his knowledge.

Sheila M. Fattore
Notary Public

SHEILA M. FATTORE, NOTARY PUBLIC
SHIPPINGPORT BORO, BEAVER COUNTY
MY COMMISSION EXPIRES SEPT. 16, 1985
Member, Pennsylvania Association of Notaries