UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

NOV 7 1996

Michael B. Sellman, Vice President
Operations - Waterford
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P.O. Box B
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SUBJECT: GENERIC FUNDAMENTALS EXAMINATION RESULTS

This letter forwards the results of the Generic Fundamentals Examination Section (GFES) of the written operator licensing examination that was administered on October 9, 1996, to nominated employees of your facility. We are forwarding the following items:

- the examinations, including answer keys;
- the results for your nominated employees;
- copies of the individual answer sheets completed by your nominated employees; and
- examination comments.

We request that your training department forward the individual answer sheets and results to the appropriate individuals. It should be noted that the examination was administered in two forms, which were identical except for the sequence of questions.

In accordance with the Commission's regulations, 10 CFR 2.790, a copy of this letter and the examination and answer key will be placed in the NRC's Public Document Room (PDR). The individual results and answer sheets are exempt from public disclosure and, therefore, will not be placed in the PDR.

Questions concerning this examination should be directed to Dr. George Usova at (301) 415-1064.

Sincerely,

Kenneth E. Brockman, Acting Director
Division of Reactor Safety

Docket: 50-382
License: NPF-38

Enclosures: As stated

cc: (see next page)

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PDR ADOCK 05000382
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bcc to DCB (IE42)

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DOCUMENT NAME: GFRESULT

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FACILITY COMMENTS AND NRC RESPONSES FOR THE OCTOBER 1996 GFE

FACILITY -- WATERFORD

EXAM -- PWR FORM A/B

QUESTION: 14/42

Refer to the drawing of a gas-filled detector characteristic curve (see figure below).

What is the effect of operating a proportional neutron detector at a voltage near the high end of the proportional region?

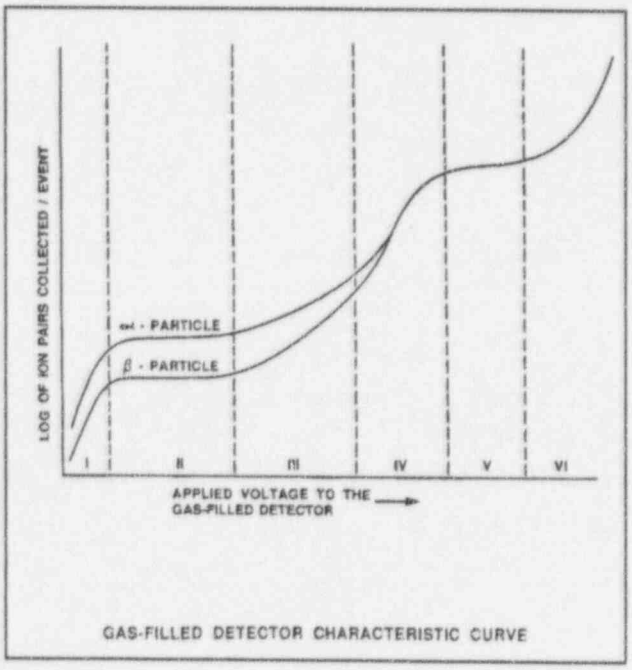
A. Gamma pulses will increase in size while neutron pulses remain essentially the same, causing some gamma pulses to be counted as neutron pulses and yielding a less accurate neutron count rate.

B. A high gamma radiation field will result in multiple small gamma pulses that combine to form larger pulses, which will be counted as neutron pulses, yielding a less accurate neutron count rate.

C. Neutron pulses will become so large that gamma pulse discrimination is no longer needed, yielding a more accurate neutron count rate.

D. The positive space charge effect will increase and prevent collection of both gamma and neutron pulses, causing a less accurate neutron count rate.

ANSWER: B.



GAS-FILLED DETECTOR CHARACTERISTIC CURVE

COMMENT:

Question 14, in our opinion, is testing at a level equivalent to that which would be expected knowledge for a maintenance technician specializing in radiation instrumentation.

RESPONSE:

Do not concur. This question is supported by NRC generic component K/A 191002K118, "Theory and operation of ion chambers,..." According to Westinghouse (Radiation, Chemistry, and Corrosion Considerations for Nuclear Power Plant Application, 1983, p. 5-29), "In a high gamma field with high operating voltage, gamma pulse pile-up results in instrument output indicating a neutron flux much higher than actually exists." This makes option B the correct answer.

Based on the interim answer key, this question was answered correctly by 23/124 examinees and yielded a very small positive discrimination index of +0.02. No answer key change is required.

FACILITY -- WATERFORD

EXAM -- PWR FORM A/B

QUESTION: 88/16

Which one of the following must be present to prevent departure from nucleate boiling from occurring in a reactor core following a pressurizer vapor space instrument line rupture if the leak rate is less than normal makeup capability?

A. Reactor coolant pump flow capability

B. Pressurizer level in the indicating range

C. Emergency core cooling injection capability

D. Steam generator steaming capability

ANSWER: D.

COMMENT:

Question 88, in essence, is asking whether or not the candidate can identify the mitigating strategy for a small break LOCA event. In order to answer this question, the candidate must know the relationship between break flow, injection flow and core cooling during a small break LOCA. Although fundamentals training provides the understanding of the relationship between

pressure, temperature and DNBR, these are only the building blocks needed to advance to further training to understand break flow cooling mechanics. This level of knowledge would not be obtained until the candidate has taken Mitigating Core Damage or Transient and Accident Analysis training.

RESPONSE:

Partially concur. Although the conditions in the question provide an accident situation, an examinee knowledgeable in heat transfer and thermal hydraulics should be able to readily eliminate options B and C. Option B can be eliminated because it does not directly affect heat transfer conditions in the core. Option C can be eliminated because the leak rate is less than the normal makeup capability. Option D is the correct answer. Option A is the only remaining option that directly affects heat transfer in the core. Therefore, options A and D will be accepted.

Based on the interim answer key, this question was answered correctly by 48/124 examinees and yielded a small positive discrimination index of +0.09. The answer key has been changed to accept either A or D for full credit.