

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-409/OL-8602

Docket(s) No. 50-409

License No(s). DPR-45

Licensee: Dairyland Power Cooperative

Facility Name: LaCrosse Boiling Water Reactor

Examination Administered At: Genoa, Wisconsin

Examination Conducted: SRO and RO Requalification Written and Oral.

Examiner(s): J. Hanek

*T. Burdick for*

1-8-87  
Date

*T. Burdick for*  
J. McGee

1-8-87  
Date

Approved By: T. M. Burdick, Chief  
Operator Licensing Section

*T. Burdick*

1-8-87  
Date

Examination Summary

Requalification Examination administered on December 9-11, 1986  
(Report No. 86-02)

Examinations were administered to four senior reactor operators and four reactor operators.

Results: Written and oral exams were administered to four senior reactor operators and four reactor operators. All individuals passed all portions with the exception of one reactor operator who failed the written exam.

## REPORT DETAILS

### 1. Examiners

J. Hanek

J. McGee

### 2. Examination Review Meeting

An exam review meeting was held at the conclusion of the site visit. Facility reviewers offered the examiners their comments and the examiner took the written comments for consideration. The comments and their resolution are attached.

### 3. Exit Meeting

An exit meeting was held between facility representatives and the examiners. T. Burdick, Region III, Operator Licensing Section Chief was also present.

During the exit meeting the examiners stated that individuals who do not use their licenses to operate the facility are clearly less proficient than those who do as evidenced by the oral exams. The licensee acknowledged this comment. The examiners noted that if the facility has errors in its references they are advised to remedy them or alert the examiners to the errors.

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REACTOR OPERATOR REQUALIFICATION EXAMINATION  
DECEMBER 9, 1986**

**1.02.c. Facility Comment:**

Not covered specifically in Training Manual. (See Reference 1)

**Resolution:**

While it is true that the fuel temperature change is not specifically covered in the training manual, the change in the resonance escape probability and change in Doppler is discussed on page 54 (paragraph 3) and page 56. The candidate should be able to apply his knowledge of the Doppler effect to conclude that the resonance escape probability decreases with increasing fuel temperature (due to increased resonance absorption). The decrease in resonance escape probability will be amplified by the undermoderated condition of the core making  $k_{\text{eff}}$  more negative. The answer key will not be changed.

**1.03 Facility Comment:**

Wording of this question regarding "limiting condition (cause of failure)" is confusing. For example, for MCPR, the actual failure is also cladding temperature too high due to boiling transition occurring and cladding temperature increasing.

Question whether bases knowledge required for RO. (See References 2 and 3).

**Resolution:**

Reactor Operators are expected to be able to respond to questions on heat transfer and heat generation, fluid flow and thermodynamics fundamentals and items which test their ability to apply those fundamentals to operational transients and to recognize and mitigate the consequences of core damage. Understanding which operational transients or possible accidents most closely approach thermal limits which are designed to prevent core damage is a necessary part of reactor operation. The most limiting transient for MCPR is specifically addressed on page C-19 of the LACBWR training manual.

Although APLHGR is not addressed in the LACBWR training manual, the examiners made the assumption that since the Tech Spec does exist, some training had been performed on this limit. In addition, while there is no specific detail concerning the DBA LOCA in the training manual, the examiners must assume the reactor operators have received some training on this subject. The outline on page J-59 makes reference to heat transfer limits and peaking factors, but no further explanation is provided.



Due to the confusion demonstrated during the examination by the "cause of failure" portion of the question and the proctors inability to alleviate that confusion by rewording the question in an attempt to clarify the apparent terminology problem, this portion of the question has been deleted from the examination and the point value of the question changed to 1.0. Section and exam totals are adjusted accordingly.

**1.07 Facility Comment:**

Same as last test. Since this questions is a repeat, some people may have put down NRC answer. However, LACBWR training is as follows:

Disagree with b. Natural circulation negligible compared to Forced Circulation. Also, as increase temp during heatup, water becomes less dense. With pumps at constant speed, flow decreases. For a. - Answer is theoretically correct, but based on operating experience negligible effect. Reference on J-53 is strictly for natural circulating mode, not when have forced circulation. (See Reference 4)

**Resolution:**

- a. The candidate is not expected to volunteer a nominal value for flow increase, but to explain what does "theoretically" occur. This portion of the question and answer will remain unmodified.
- b. The facility comment is valid even though the reference material is misleading. Since the question is an exam bank question and some candidates responses may have been influenced by previous exposure, this portion of the question will be deleted from the examination rather than modifying the required response. The point will be deducted from the section total and exam percentages adjusted accordingly.

**1.08.a. Facility Comment:**

We do not use term "condensate depression." Some people did not know what it means.

**Resolution:**

During the administration of the examination, none of the candidates asked for clarification of the term "condensate depression." The candidates were specifically cautioned during the briefing to be alert for terminology which they did not understand or were not familiar with and to ask the proctors for clarification. The question will not be modified.

**1.10 Facility Comment:**

2. Have changed to  $\geq 50$  gpm vs.  $> 49$  gpm as correct answer. (See Reference 5)

**Resolution:**

The answer key has been revised to reflect this change.

**2.03 Facility Comment:**

Operating Manual section quoted is misworded. A typographical error was made in the latest revision.

Valves would be used to vent the reactor vessel to the reactor building in the event it becomes necessary to flood the reactor building due to a large below core leak and/or to decrease reactor pressure to allow LPCS or ACS to commence flowing e.g. 7.5 minutes after low water level scram alarm during LOCA if HPCS doesn't work (per LOCA procedure). Venting would permit water level in the building to equalize with that of vessel. (See References 6 and 7)

**Resolution:**

Answer key has been revised to include this comment.

**2.04 Facility Comment:**

Question is strangely worded. These are necessary conditions prior to shutting down seal inject, not considered actions. (See Reference 8)

**Resolution:**

Conditions which must be met prior to shutting down the system become actions which must be performed if the seal inject system must be shutdown. No change will be made to answer key or question.

**2.08 Facility Comment:**

Note failure to start also called overcrank. Also, causes listed are only for 1A EDG.

For 1B EDG other possibilities are:

phase differential	low water temperature
overvoltage	low low fuel level
overcurrent	low diesel battery voltage
ground	

(See References 9 and 10)

**Resolution:**

Overcrank will be accepted for failure to start. Answer key has been revised to include the seven additional correct responses listed in the comment. The question will be modified to be Diesel 1A specific before addition to the exam bank.

**2.10 Facility Comment:**

Equals missing: 5 psig, 60 psig, 5 psig, 12 in.

**Resolution:**

Answer key has been revised to reflect the additor of equals signs.

- 3.0.2** 4. Normally, there is no scram if one Forced Circulation Pump trips. However, if remaining Forced Circ flow is below the low flow setpoint, there will be a full scram. (See Reference 11)

**Resolution:**

Answer key has been revised to reflect the following as an additional acceptable answer to 4.: "Full scram" if the following assumption is noted on the answer sheet; flow drops below low flow setpoint.

**3.0.5 Facility Comment:**

Some people may put down Tech Spec values vs. nominal operating values or 80% of scale instead of numbers on each scale. (See References 12 and 13)

**Resolution:**

Answer key has been revised to accept Tech Spec values for instrument setpoints and 80% of full scale for channel values, in addition to values listed on the answer key.

**3.0.6 Facility Comment:**

There are 4 reactor pressure instruments:

PT 50-35-301 is involved in Low Pressure Core Spray

PT 64-35-301 is Safety Channel Pressure 1 - is involved in Scram, Shutdown Condenser operation, Containment isolation and ATWS.

PT 64-35-302 is Safety Channel Pressure 2 - is involved in Alarm, Scram, Shutdown Condenser operation, Containment isolation and ATWS.

PT 64-35-307 is involved in ATWS trip, in operation of Main Steam Bypass Valve (15 psi) and Low Pressure Alarm (1200 psig).



Therefore, this question would be difficult to answer as worded.  
(See References 14-17)

**Resolution:**

Answer key has been revised to indicate six possible correct answers and credit will be given for any four dispersed in the following manner: 0.25 pts. for setpoint and 0.25 pts. for signal action. In addition, the question will be revised to remove confusion before the question is added to the exam bank.

**4.0.2 Facility Comment:**

Should be 100,000 not 10,000. (See Reference 18)

**Resolution:**

Answer key has been revised to indicate correct value.

**4.04 Facility Comment:**

Another response based on observations during other similar incidents would be that there is an indicated flux spike (more neutrons reach the detector) and possible scram on high power, especially if wide range NI's were near mid-point of scale prior to incident or on a low range scale.

**Resolution:**

Answer key has been revised to include the following as an acceptable response using transient for main steam bypass valve failure (page C-5 of training manual) as reference; "reactor pressure would drop rapidly [0.5]. The pressure drop would cause rapid increase in voids [0.5] and the flux spike due to increased leakage may cause a reactor scram on high power [0.5].

**4.0.6 Facility Comment:**

Note - Stack gas monitor is often referred to as "SPING".

**Resolution:**

Answer key has been modified to reflect SPING as acceptable alternative to Stack Gas.

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**5.0.2 Facility Comment:**

Answer only discussed why decrease occurs, which is what I'd expect question to ask. Question also asks why peak occurs. What is your correct answer?

**Resolution:**

Question was written from wording as stated in Tech. Spec. Bases. "Reactor power will peak at 443 MW, 270% of rated thermal power, shortly thereafter due to the Doppler effect and then decrease further as voids are created." Question was written to test concept of doppler and void coefficient and their affect on transients and only this knowledge will be required for full credit. Question will be clarified prior to loading into exam bank as follows: Provide a brief discussion why power will turn and decrease. (Two reasons required for full credit.)

**5.0.3 Facility Comment:**

Wording of this question regarding "limiting condition (cause of failure)" is confusing. For example, for MCPR, the actual failure is also cladding temperature too high due to boiling transition occurring and cladding temperature increasing. (See Reference 1)

**Resolution:**

Due to the confusion demonstrated during the examination by the "cause of failure" portion of the question and the proctors inability to alleviate that confusion by rewording the question in an attempt to clarify the apparent terminology problem, this portion of the question has been deleted from the examination and the point value of the question changed to 1.0. Section and exam totals are adjusted accordingly.

**5.07.a. Facility Comment:**

We do not use term "condensate depression." Some people did not know what it means.

**Resolution:**

During the administration of the examination NONE of the candidates asked for clarification of the term "condensate depression". The candidates were specifically cautioned during the briefing to be alert for terminology which they did not understand or were not familiar with and to ask the proctor for clarification. The question will not be modified.



**5.09.2 Facility Comment:**

Have changed to  $\geq 50$  gpm vs.  $> 49$  gpm as correct answer. (See Reference 2)

**Resolution:**

The answer key has been revised to reflect this change, in accordance with the facility supplied reference.

**5.10 Facility Comment:**

Same as last test. Since this questions is a repeat, some people may have put down NRC answer. However, LACBWR training is as follows:

Disagree with b. Natural circulation negligible compared to Forced Circulation. Also, as temperature increases during heatup, water becomes less dense. With pumps at constant speed, flow decreases. For part a. Answer is theoretically correct, but based on operating experience negligible effect. Reference on J-53 is strictly for natural circulating mode, not when operating in forced circulation. (See Reference 3)

**Resolution:**

- b. The facility comment is valid even though the reference material is misleading. Since the question is an exam bank question and some candidates responses may have been influenced by previous exposure this portion of the question will be deleted from the examination. One point will be deducted from the section total and the overall percentage will be adjusted accordingly.
- a. The candidate is not expected to volunteer a nominal value for flow increase, but to explain what does "theoretically" occur. This portion of the question and answer will not be modified.

**6.0.2.c. Facility Comment:**

May be called ATWS. (See Reference 4)

**Resolution:**

ATWS was added to the answer key and either answer will be accepted for full credit.

**6.03.a. Facility Comment:**

Turbine Building Main Steam Isolation Valve has no auto closures. (See Reference 5)

**Resolution:**

Facility comment is valid. The system description discussion makes the statement "These two valves" but in fact this is in reference to the Reactor Building Main Steam Isolation Valve and it's associated bypass valve. Question will be revised to be specific to the Reactor Building Main Steam Isolation Valve prior to loading into the exam bank. Answer key was revised to be specific to the Reactor Building Isolation Valve.

**6.0.4.b. Facility Comment:**

Note: The Demineralized Water and HPSW supply valves are not normally called isolation valves. There is no isolation valve in the HPSW makeup to Shutdown Condenser line. The Demineralized Water Valve that closes is in series with the normal supply valve, but is not the same valve. Depending on what people read into this question, you may get "isolates DMW supply" or "no effect." (See Reference 6)

**Resolution:**

Facility comment is not valid. LACWBR operating manual page 5-2 states "In the event the Reactor Emergency flooding vent valves are opened, the Demineralized Water Inlet Isolation Valve 62-25-018 will CLOSE, which is the normal supply to the shell side." Isolates DMW supply will be accepted for full credit. NO EFFECT will not be accepted.

**6.0.8 Facility Comment:**

Note: Some "=" signs missing.  $\geq 5$  psig,  $\leq 60$  psig,  $\leq -12$  inches

**Resolution:**

Answer key has been revised to reflect the addition of equals signs.

**6.09 Facility Comment:**

- a. For source range, they may also put period  $\leq 7$  sec in Rod test.  
For power range, there is no scram at  $> 15\%$  POWER (1 of 2 logic).

Some people may put T.S. values vs. nominal values, by wording of question either seem appropriate.

Some "equals" may be added.

- b. If wide and power range aren't listed, would credit be given?  
Should be since question asks to list blocks, not to list which ones do and don't. (See References 7-9)

**Resolution:**

- a. Because rod test is not a normal operating condition the reactor scram at 7 second period is not required for full credit. Credit will not be given or taken if this is discussed in the candidates answer. Power Range Scram Signal of > 15% (1 out of 2 logic) is an error and will be deleted. Point value of question and section will be reduced by 0.2.

Credit will be given for actual plant or Tech. Spec. settings provided that the candidate specifies what is being used as a reference or is consistent in using one or the other.

Equals signs appear to be utilized only in the Tech. Spec. listing of the setpoints. The use of equals signs will not be required for full credit.

- b. Full credit will be given if wide and power range are not listed. Credit will be taken off if they are listed with any value assigned.

**7.0.1.b. Facility Comment:**

Second possible answer listed "backwards". This could cause erroneously low power signal, not prevent.

**Resolution:**

Although "prevent" is used in the operating manual discussion the word "cause" is better suited to the wording of the question. Answer key will be changed accordingly.

**7.0.4 Facility Comment:**

Some personnel may have interpreted this question to be asking the three principles in responding to any off-normal event (transient, emergency and/or departing from normal operating parameters).

Stop nuclear reaction.

Maintain adequate core cooling.

Remove decay heat. (See Reference 10)

**Resolution:**

Question is specific regarding the Emergency Operating Procedures used at LACBWR. The facility supplied alternatives are listed under a general heading of General Operating Characteristics, Safety Level Concepts. The answer key will not be modified to include the additional facility alternatives.

**7.9.5 Facility Comment:**

Note failure to start also called overcrank. Also, causes listed are only for 1A EDG.



For 1B EDG other possibilities are:

phase differential	low water temperature
overvoltage	low low fuel level
overcurrent	low diesel battery voltage
ground	

(See References 11 and 12)

**Resolution:**

Overcrank will be accepted for failure to start. Answer key has been revised to include the seven additional correct responses listed by the facility. The question will be modified to be Deisel 1A Specific before loading in the exam bank.

**7.0.7 Facility Comment:**

Question poorly worded. Question can be answered "none". By procedure, only if radiation exposure above certain levels do the 2 types of reviews have to be conducted. This is not a Shift Supervisor/SRO duty. HP Supv. involved in ALARA reviews. (See Reference 13)

**Resolution:**

Examiner agrees that the question could have been more specific by including a threshold level of 5.0 REM. However, the information given concerning the two (ONLY) types of job related ALARA reviews utilized at LACBWR does not allow credit for "NONE" to be accepted as a correct answer. Section 1.3, RESPONSIBILITIES, of the LACBWR Health Physics procedures states: "It is the responsibility of each individual assigned to the LACBWR plant to be familiar with the contents of this volume." Question and answer key will not be modified.

**7.10 Facility Comment:**

Since this would constitute an ALERT, emergency plan notification to NRC, states and counties is also required immediately and so may be listed. (See References 14 and 15)

**Resolution:**

Emergency plan notifications will be accepted for full credit. The LACBWR Operating Manual should be revised to reference these additional steps required by the Emergency Plan.

**7.11 Facility Comment:**

EPP-2 does say #2 answer. The licensee has interpreted this sentence to mean "bring the plant to a safe shutdown if necessary." Therefore, an alternative acceptable answer should be bring/maintain plant in safe condition. (See Reference 16)

**Resolution:**

Facility supplied alternative answer will be accepted for full credit. To prevent confusion on future examinations administered at LACBWR this interpretation should be included in section 4.1.1 of the Emergency Plan.

- 8.04.b. May mention approximate titles instead of wording in T.S., e.g. Turb Oper, Rx Oper, STA. (See Reference 17)

**Resolution:**

Exact job titles were not required, however, full credit will be given if utilized in place of the general statement used in Tech Specs.