



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION III
2443 WARRENVILLE ROAD, SUITE 210
LISLE, ILLINOIS 60532-4352

April 11, 2018

Mr. Keith Polson, Senior VP
and Chief Nuclear Officer
DTE Energy Company
Fermi 2 – 260 TAC
6400 North Dixie Highway
Newport, MI 48166

SUBJECT: FERMI POWER PLANT, UNIT 2—NRC INITIAL LICENSE EXAMINATION
REPORT 05000341/2018301

Dear Mr. Polson:

On March 13, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed the initial operator licensing examination process for license applicants employed at your Fermi Power Plant, Unit 2. The enclosed report documents the results of those examinations. Preliminary observations noted during the examination process were discussed on March 2, 2018, with yourself and other members of your staff. An exit meeting was conducted by telephone on March 15, 2018, with members of your staff, and Mr. C. Zoia, Chief Operator Licensing Examiner, to review the proposed final grading of the written examination for the license applicants. During the telephone conversation, the final grading of the written examination for the license applicants was discussed.

The NRC examiners administered an initial license examination operating test during the week of February 26, 2018. The written examination was administered by Fermi Power Plant, Unit 2, training department personnel on March 2, 2018. Two Senior Reactor Operator and two Reactor Operator applicants were administered license examinations. The results of the examinations were finalized on March 13, 2018. Four applicants passed all sections of their respective examinations; two applicants were issued senior operator licenses and two applicants were issued operator licenses.

The administered written examination and operating test, as well as documents related to the development and review (outlines, review comments and resolutions, etc.) of the examination will be withheld from public disclosure until March 2, 2020.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC Public Document Room in accordance with Title 10 of the *Code of Federal Regulations* 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Robert J. Orlikowski, Chief
Operations Branch
Division of Reactor Safety

Docket No. 50-341
License No. NPF-43

Enclosures:

1. OL Examination Report 05000341/2018301
2. Post-Examination Comments, Evaluation,
and Resolutions
3. Simulation Facility Fidelity Report

cc: Distribution via LISTSERV®
A. Pullam, Training Manager,
Fermi Power Plant, Unit 2

Letter to Keith Polson from Robert Orlikowski dated April 11, 2018

SUBJECT: FERMI POWER PLANT, UNIT 2—NRC INITIAL LICENSE EXAMINATION
REPORT 05000341/2018301

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REGION III

Docket No: 50-341

License No: NPF-43

Report No: 05000341/2018301

Licensee: DTE Energy Company

Facility: Fermi Power Plant, Unit 2

Location: Newport, MI

Dates: February 26, 2018, through March 13, 2018

Examiners: C. Zoia, Senior Operations Engineer – Chief Examiner
D. Reeser, Operations Engineer – Examiner

Approved by: R. Orlikowski, Chief
Operations Branch
Division of Reactor Safety

SUMMARY

Examination Report 05000341/2018301; 02/26/2018–03/14/2018; DTE Energy Company, Fermi Power Plant, Unit 2; Initial License Examination Report.

The announced initial operator licensing examination was conducted by regional Nuclear Regulatory Commission examiners in accordance with the guidance of NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 11.

Examination Summary

Four of four applicants passed all sections of their respective examinations. Two applicants were issued senior operator licenses and two applicants were issued operator licenses. (Section 4OA5.1).

REPORT DETAILS

40A5 Other Activities

.1 Initial Licensing Examinations

a. Examination Scope

The U.S. Nuclear Regulatory Commission (NRC) examiners and members of the facility licensee's staff used the guidance prescribed in NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 11, to develop, validate, administer, and grade the written examination and operating test. The written examination outlines were prepared by the NRC staff and were transmitted to the facility licensee's staff. Members of the facility licensee's staff prepared the operating test outlines and developed the written examination and operating test. The NRC examiners validated the proposed examination during the week of January 29, 2018, with the assistance of members of the facility licensee's staff. During the on-site validation week, the examiners audited two license applications for accuracy. The NRC examiners, with the assistance of members of the facility licensee's staff, administered the operating test, consisting of job performance measures and dynamic simulator scenarios, during the period of February 26, 2018, through March 1, 2018. The facility licensee administered the written examination on March 2, 2018.

b. Findings

(1) Written Examination

The NRC examiners determined that the written examination, as proposed by the licensee, was within the range of acceptability expected for a proposed examination. Less than 20 percent of the proposed examination questions were determined to be unsatisfactory and required modification or replacement.

All changes made to the proposed written examination, were made in accordance with NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," and documented on Form ES-401-9, "Written Examination Review Worksheet."

On March 8, 2018, the licensee submitted documentation noting that there was one post-examination comment for consideration by the NRC examiners when grading the written examination. The post-examination comment and the NRC resolution for the post-examination comment is included as Enclosure 2 to the report.

The written examination outlines and worksheets, the proposed written examination, as well as the final as-administered examination and answer key, will be available in 24 months, electronically in the NRC Public Document Room or from the Publicly Available Records component of NRC's Agencywide Document Access and Management System (ADAMS Accession Number ML17164A400).

The NRC examiners graded the written examination on March 13, 2018, and conducted a review of each missed question to determine the accuracy and validity of the examination questions.

(2) Operating Test

The NRC examiners determined that the operating test, as originally proposed by the licensee, was within the range of acceptability expected for a proposed examination. Following the review and validation of the operating test, minor modifications were made to several Job Performance Measures (JPMs), and some minor modifications were made to the dynamic simulator scenarios.

During administration of the operating test, one Simulator Control Room JPM was replaced after it was found to be flawed. Specifically, critical steps would be met automatically if corrective actions were delayed beyond their nominally expected time. This flaw was not identified until after the JPM had been administered to several applicants. Thus, another bank JPM was selected, significantly modified, validated, and administered to all applicants.

In addition, one Senior Reactor Operator (SRO) Administrative JPM required several changes to enhance its clarity and accuracy during exam administration. All changes and related explanatory notes were documented as mark-ups to the as-administered JPM file.

Also, a Simulator Control Room JPM assigned to only the Reactor Operator (RO) applicants was administered to both RO and SRO applicants. The administration error was corrected by reassigning an approved JPM originally assigned to be given to all applicants, and administering it only to the RO applicants. The revised SRO JPM set was verified to meet all required criteria.

Finally, a training building-wide power outage occurred during the administration of a scenario, resulting in an approximately 1-hour delay because all building lighting and simulator power were lost. The scenario was just started, so there was minimal impact on the exam. All applicants were sequestered until power was restored, hardware impacts were addressed, and the simulator was reset to that point in the scenario when the power loss occurred. A Condition Assessment Resolution Document 18-21907 was written to document the power loss, and three power losses that subsequently occurred when no NRC simulator exam was in-progress.

All changes made to the operating test were made in accordance with NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," and were documented on Form ES-301-7, "Operating Test Review Worksheet." The Form ES-301-7, the operating test outlines (ES-301-1, ES-301-2, and ES-D-1s), and both the proposed and final operating tests, will be available, in 24 months, electronically in the NRC Public Document Room or from the Publicly Available Records component of NRC's Agencywide Document Access and Management System (ADAMS Accession Numbers ML17164A403 and ML17164A400, respectively).

The NRC examiners completed the operating test grading on March 13, 2018.

(3) Examination Results

Two applicants at the SRO level and two applicants at the RO level were administered written examinations and operating tests.

- Four applicants passed all portions of their examinations and were issued their respective operating licenses on March 13, 2018.

.2 Examination Security

a. Scope

The NRC examiners reviewed and observed the licensee's implementation of examination security requirements during the examination validation and administration to assure compliance with Title 10 of the *Code of Federal Regulations*, Part 55.49, "Integrity of Examinations and Tests." The examiners used the guidelines provided in NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," to determine acceptability of the licensee's examination security activities.

b. Findings

None.

40A6 Management Meetings

.1 Debrief

The chief examiner presented the examination team's preliminary observations and findings on March 2, 2018, to Mr. K. Polson, Senior Vice President, and Chief Nuclear Officer, and other staff members of Fermi Power Plant, Unit 2. The examiners asked the licensee whether any of the material used to develop or administer the examination should be considered proprietary. No proprietary or sensitive information was identified during the examination or debrief meeting.

.2 Exit Meeting

The chief examiner conducted an exit meeting on March 15, 2018, with Mr. A. Pullam, Training Manager, and other members of the Fermi Power Plant, Unit 2, staff by telephone. The NRC's final exam results were disclosed during the exit meeting.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

K. Polson, Senior Vice President and Chief Nuclear Officer
L. Bennett, Operations Director
A. Pullam, Training Manager
S. Maglio, Licensing Manager
M. Donigian, Operations Training Lead
J. Vanbrunt, Operations Training
S. Schmus, Operations Training

U.S Nuclear Regulatory Commission

C. Zoia, Chief Examiner
D. Reeser, Examiner
T. Briley, Senior Resident Inspector
P. Smagacz, Resident Inspector

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened, Closed, and Discussed

None

LIST OF ACRONYMS USED

JPM	Job Performance Measures
NRC	U.S. Nuclear Regulatory Commission
RO	Reactor Operator
SRO	Senior Reactor Operator

POST-EXAMINATION COMMENT, EVALUATION, AND RESOLUTION

QUESTION No. 22

The plant has been operating at 100 percent power for 300 consecutive days, when the following events occur:

- A reactor scram causes the crew to place the Mode Switch in Shutdown.
- The MSIVs closed 10 minutes later.
- RPV Pressure is currently 1095 psig.
- The CRLNO has been directed to maintain RPV Pressure 900-1050 psig.

How many SRVs are going to be required to restore and maintain RPV pressure in the desired control band considering heat input by DECAY HEAT GENERATION ONLY?

- A. One SRV opening and closing at its Low-Low Set setpoints.
- B. One open SRV will restore RPV pressure in band, then it can be closed for the duration of the event.
- C. One Low-Low Set SRV will be open continuously, with the second opening and closing at its Low-Low Set setpoints.
- D. Both Low-Low Set SRVs will be open continuously with the CRLNO opening and closing one additional SRV.

Answer: A

Answer Explanation:

The conditions in the stem of the question have caused a High Reactor Pressure. The candidate will have to determine the impact of decay heat generation so as to correct the High Reactor Pressure and control RPV Pressure in the designated control band for the duration of the event. Decay heat produced is at a level dependent on power history. From a scram at 100 percent power, initially the thermal output of the reactor will be about 100 percent power, 7 percent supplied by decay heat. Thermal heat output decreases rapidly to the decay heat level. Eight to ten seconds after the scram, thermal output is due mainly to decay heat and drops to 7 percent of rated thermal output. After approximately 1 minute, thermal output is 3 to 5 percent of rated and drops to about 2 percent after about 10 minutes. One hour after a scram, decay heat is about 1 percent rated thermal output. The information given in the stem of the question indicates that the reactor has been shut down for about 10 minutes, so decay heat generation will be approximately 2 percent. SRV capacity (steam flow) is given in Updated Final Safety Analysis Report Paragraph 5.2.2.3.3.4 as 87E4 lb./hr. (or 870,000 lb./hr.) at 1090 psig, which is approximately where the stem of the question has the plant. Updated Final Safety Analysis Report Section 1.2.2, Plant Description, shows that rated steam flow at Fermi 2 is 14.9 lb./hr., at 991 psia., 2 percent of this value is 298,000 lb./hr., which is within the capacity of one SRV. Therefore, the candidate should determine that one SRV opening and closing at its Low-Low setpoint will be enough to control the steam generated from decay heat approximately 10 minutes after plant shutdown from 100 percent power operation.

POST-EXAMINATION COMMENT, EVALUATION, AND RESOLUTION

Distractor Explanations:

Distractors are incorrect and plausible because:

- B. The candidate could determine that there is no significant decay heat generation 10 minutes after shutdown and, once RPV pressure is lowered back in band by opening an SRV, it will remain in band with no further SRV actuations. This is incorrect because decay heat, in the 2 percent range, exists and will continue to exist at the 1 percent value one hour after shutdown, so further SRV actuation must occur to control RPV pressure.
- C. The candidate could determine that the decay heat generated 10 minutes after shutdown is above the capacity of one, but within the capacity of two Low-Low Set SRVs. This is a common misconception because most candidates readily remember that decay heat drops to 7 percent within several seconds of a plant shutdown, due to the decay of delayed neutrons and they determine that 7 percent is the capacity of about one and a half SRVs. However, as stated above, after approximately 10 minutes, thermal output due to decay heat drops to about 2 percent, which is within the capacity of one Low-Low Set SRV.
- D. The candidate could determine that the decay heat generated 10 minutes after shutdown is above the capacity of both Low-Low Set SRVs, which would require the operator to manually actuate one additional SRV to control RPV pressure in band. This is incorrect, however, as stated above, because after approximately 10 minutes, thermal output due to decay heat drops to about 2 percent, which is within the capacity of one Low-Low Set SRV.

Reference Information:

BR08Sr5 Operational Physics May 2011 - Reactor Operational Physics GFE Student Text, Page 33; description of decay heat generation after shutdown from 100 percent power.

UFSAR Section 1.2.2, Plant Description.

UFSAR Section 5.2.2.3.3.4, Safety/Relief Valve Characteristics.

APPLICANT COMMENT/CONTENTION

The applicant contended that the question was not about what the plant will do.

FACILITY RESPONSE AND PROPOSED RESOLUTION

Based on the stem of the question, actual plant response is not the answer. The question is about the capacity of SRVs, not about a timeline of events in which an SRV opens.

POST-EXAMINATION COMMENT, EVALUATION, AND RESOLUTION

Valid Question. Answer (A) is correct and the distractors are wrong. Distractor (C) was selected by the applicant. The candidate determined that the decay heat generated 10 minutes after shutdown is above the capacity of one, but within the capacity of two Low-Low Set SRVs. This is a common misconception because most candidates readily remember that decay heat drops to 7 percent within several seconds of a plant shutdown, due to the decay of delayed neutrons, and they determine that 7 percent is the capacity of about one and a half SRVs.

NRC EVALUATION/RESOLUTION

Upon reviewing the technical information from the applicant and the facility, the NRC agrees that answer (A) is the correct answer. The decay heat at 10 minutes will be approximately 2 percent of rated thermal output, well within the capacity of one SRV opening and closing at its Low-Low Set setpoints.

The stem of the question asks “How many SRVs are going to be required to restore and maintain RPV pressure in the desired control band considering heat input by DECAY HEAT GENERATION ONLY?”, given several conditions. The applicant and the licensee agree that the question is not about providing plant response. The NRC also agrees that the answer required involves SRV capacity, and not about providing plant response.

CONCLUSION

Based the information provided, the NRC concludes that answer (A) is correct answer, per the original answer key, and the question is considered acceptable as-administered.

SIMULATION FACILITY FIDELITY REPORT

Facility Licensee: Fermi Power Plant, Unit 2

Facility Docket No: 050-341

Operating Tests Administered: February 26, 2018, through March 1, 2018

The following documents observations made by the U.S. Nuclear Regulatory Commission examination team during the initial operator license examination. These observations do not constitute audit or inspection findings and are not, without further verification and review, indicative of non-compliance with Title 10 of the *Code of Federal Regulations* 55.45(b). These observations do not affect U.S. Nuclear Regulatory Commission certification or approval of the simulation facility other than to provide information which may be used in future evaluations. No licensee action is required in response to these observations.

During the conduct of the simulator portion of the operating tests, the following items were observed:

ITEM	DESCRIPTION
None	