

RATING FACTOR 1.C.: INTERPRETATION/DIAGNOSIS, UNDERSTANDING

1. Examiner comment on 303 form p. 12 of 32, related to Scenario 3, Event 4

A. FACTUAL SEQUENCE OF EVENTS

-During the simulator scenario, at time 11:00:57, event 4 was initiated with pressurizer pressure channel PT-455 failing high (to 2500 psig).

-The applicants performed immediate operator actions, and as SRO, Carla Smith entered procedure 18001-C for an instrument malfunction.

-When the team reached procedure step C2, Carla read the CAUTION statement to [REDACTED]. [REDACTED] did not respond to Carla, and Carla did not ensure that [REDACTED] had received the information regarding the CAUTION.

-At time 11:05:02, Carla directed [REDACTED] to maintain pressurizer pressure within a band of 2220-2250 psig, in accordance with procedure 18001-C.

-At this time [REDACTED] was controlling pressurizer pressure with both heaters and spray valve controllers in manual.

-[REDACTED] informed Carla that he was turning off the [pressurizer] heaters. Carla responded, should they have been? [off]. [REDACTED] then stated, "my meter is at 100 percent." Carla then said, "o.k."

-As the team worked through the procedure steps, at time 11:07:00 Carla directed [REDACTED] to select an unaffected channel on PS-455F in accordance with step C7.

-After this was completed, the next procedure steps are as follows:

C. FAILURE OF PRZR PRESSURE INSTRUMENTATION

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

\_\_C6. Check affected channel selected on PS-455F PRZR PRESS CNTL SELECT.

\_\_C6. Go to Step C8.

\_\_C7. Select unaffected channels on PS-455F:

<u>Failed Channel</u>	<u>Select</u>
P455	CH457 / 456
P456	CH455 / 458
P457	CH455 / 456
P458	CH455 / 456

C8. Perform the following:

\_\_a. Check PRZR pressure - STABLE AT APPROXIMATELY 2235 PSIG.

\_\_a. Adjust PRZR pressure to approximately 2235 psig using PRZR heaters and sprays.

\_\_b. Place PRZR heaters in AUTO.

\_\_c. Place PRZR spray valve controllers in AUTO.

\_\_C9. Place PORVs in AUTO and verify proper operation.

C9. Perform the following:

\_\_a. Close any open PORV.

\_\_b. Return to Step C8.

\_\_C10. Return PRZR pressure Master Controller to AUTO.

\_\_C11. Select same channel on PS-455G PRZR PRESS REC SEL as selected on PS-455F.

- \_\_C12. Check P-11 status light on BPLB indicates correctly for plant condition within one hour.
- \_\_C13. Notify I&C to initiate repairs.
- \_\_C14. Bypass the affected instrument channel using 13509-C, BYPASS TEST INSTRUMENTATION (BTI) PANEL OPERATION, if desired.

-At this point in the event, the failed channel had been removed from the control circuit, and the procedural steps listed above directed the operators to return the pressure control system to automatic.

-At time 11:07:41, the team reached step C8, and [REDACTED] reported pressure was 2248 psig and lowering.

-Carla did not direct the RO to perform step C8.b., which would restore pressurizer pressure heaters to AUTO.

-Instead, at time 11:08:29, Carla stated to [REDACTED] "I do not think heaters are operating properly...taking heaters back to auto may not be what we want."

-At time 11:10:22, Carla directed [REDACTED] to "Go ahead and take pressurizer heaters to on." [REDACTED] replied "I am maintaining pressure," and did not take any action to change the configuration of the pressurizer heaters.

-Shortly afterwards, Carla again stated to [REDACTED] that "now we can take heaters to auto." Without further communications, [REDACTED] then placed B/U group heaters 'A' [and no others] to "ON."

-At time 11:15:47, Carla directed [REDACTED] to return the pressurizer master controller to AUTO, which was performed. At this time, pressurizer heaters were still in manual configuration.

-At time 11:20:16, [REDACTED] informed Carla that CSFST (Critical Safety Function Status Tree) TROUBLE alarm was received. Carla did not acknowledge the communication, and [REDACTED] did not ensure receipt.

-At time 11:26:27, Carla seemingly ended a crew briefing, but did not formally state "end of brief." [REDACTED] asked Carla, "is that the end of the brief?" Carla then stated, yes that's the end of the brief.

During post-scenario follow-up questions, the examiner asked Carla to "walk me through the discussions/concerns about pressurizer heaters?" Carla explained that letdown had been isolated in a previous event, and excess

letdown had been placed in service, and that heaters would be ON due to high pressurizer level. Carla further stated that she was uncomfortable taking heaters to AUTO because pressure was high in the band. She wanted pressure to be lower before placing heaters to AUTO.

## B. EXAMINER EVALUATION AND COMMENTS

The applicant was downgraded in competency 1.c., which related to the applicant's "understanding of how the plant, systems, and components operate and interact (including set points, interlocks, and automatic actions)." The applicant mis-understood that it was in fact advantageous for the pressurizer heaters to be energized when pressurizer level was above program, in order to saturate the colder liquid water. The plant is specifically designed with this interlock to function with control systems in AUTO.

The applicant's verbal communications with the operator demonstrate a level of confusion over the status of the pressure control system. The applicant explicitly stated, "I do not think heaters are operating properly..." when, in fact, the only degradation with the pressure control system was the failed instrumentation channel, which had been defeated from the control circuit.

Furthermore, the statements made by the board operators indicate a lack of confidence with the direction they were receiving from the SRO. As detailed above, Carla directed actions to be carried out that were not performed, and were not later corrected by the SRO. This additional aspect of the event demonstrates a deficiency in competency 5, directing shift operations. The examiner considered this aspect during the grading process, but ultimately evaluated that the root cause deficiency was a result of the overall misunderstanding of the condition of the pressure control system during this event.

There are also elements of communications errors inherent in this event. For example, when Carla directed [REDACTED] to place heaters in AUTO, there was no further communication, and the only action taken by [REDACTED] was to place one group of backup heaters to ON. Carla did not ensure a repeat-back from the communication, nor did she ensure [REDACTED] correctly understood her directive. Also, after Carla read a CAUTION statement of 18001-C to [REDACTED], he did not acknowledge the CAUTION and she did not ensure he had correctly heard her. Additionally, after [REDACTED] informed Carla that a CSFST TROUBLE alarm had annunciated, she did not

acknowledge the report and he did not ensure she had correctly heard him. Finally, Carla had to be prompted by [REDACTED] to formally end a crew briefing.

2. Examiner comment on 303 form p. 14 of 32, related to Scenario 6, Event 4

#### A. FACTUAL SEQUENCE OF EVENTS

-During the simulator scenario, at time 08:29:56, event 4 was initiated with pressurizer level channel LT-459 slowly failing low.

-At time 08:31:27, [REDACTED] the Reactor Operator (RO) reported “pressurizer level is lowering ... pressurizer pressure is going up?” (in a questioning voice at the end)

-A few seconds later, Carla Smith, as Senior Reactor Operator (SRO), directed “Perform Immediate Operator Actions—“ when [REDACTED], the Balance-of-Plant (BOP) operator, held up his hand and stated “there are no immediate actions ... it’s an instrument failure.”

-At time 08:33:54, Carla entered AOP-18001-C section D and directed the team to begin monitoring the continuous action page.

-At time 08:36:37, the team placed FIC-121 to MANUAL.

-At time 08:37:44, the team selected an unaffected channel on LS-459D.

-At time 08:41:??, the team reached step D9 to return PRZR level control to AUTO. The team decided to leave FIC-121 in MANUAL.

-At time 08:46:32, Carla began to lead a crew briefing on the LT-459 failure.

-During the briefing, Carla stated, “FIC-121 was in AUTO.” [REDACTED] corrected Carla and informed her that FIC-121 was still in MANUAL.

-During the briefing, Carla discussed the applicable Technical Specifications for this failure, but did not mention all applicable TS. [REDACTED] reminded Carla to review additional TS that she had not discussed during the brief.

-At time 08:53:27, Carla ended the brief.

-At time 08:53:50, the next event failure was initiated (PT-508 slowly failing high).

-At time 08:53:50, [REDACTED] stated, “failure of feedwater pump control, performing immediate operator actions,” and placed feedwater pump speed control to MANUAL.

-At time 08:54:10, [REDACTED] informed Carla that “immediate operator actions are complete.”

-At time 08:54:21, Carla directed [REDACTED] to place FIC-121 to AUTO.

-Placing FIC-121 to AUTO caused the valve to rapidly close, and also caused REGEN HX LTDN HI TEMP, RCP SEAL INJ LO FLOW, and other alarms to annunciate due to the rapidly lowering charging flow.

-At time 08:55:52, [REDACTED] informed Carla that FIC-121 had failed closed.

[REDACTED] returned FIC-121 to MANUAL and began to re-open the valve.

[REDACTED] began to increase seal flow using that controller in manual.

-While both operators were manipulating the control system, there was no guidance from Carla and no communications between the team members.

## B. EXAMINER EVALUATION AND COMMENTS

The examiner classified the root cause deficiency for this event as 1.c. due to Carla's mis-understanding of the effects of "saturation" on the FIC-121 controller. The controller was in MANUAL for approximately 18 minutes with a level deviation signal building in. By giving the direction to return the controller to AUTO, the SRO was evidently satisfied that the saturation issue had been resolved. This demonstrated her mis-understanding of the timing aspects of how the controller functions.

There are also aspects of this event that relate to oversight and directing shift operation, competency 5. A PT-508 failure had just occurred moments before Carla's direction to return FIC-121 to AUTO. Why did the SRO give the direction to return FIC-121 to AUTO even before formally entering the procedure for the PT-508 failure? The mis-timed direction to place FIC-121 to AUTO caused an unnecessary transient on the CVCS system that required the crew's immediate response.

In the applicant's appeal to the examiner comment on page 18 of 32 on the 303 forms, she states:

However applicant could not make adjustment with additional failures in progress as this would result in the SRO addressing simultaneous conditions that could lead to a potential human performance error.

Carla's direction during this event, which caused both board operators to take immediate actions to restore charging and RCP seal flows in a simultaneous fashion, is therefore recognized as creating an error-likely situation.

Additional errors related to this event in communications and Technical Specifications are documented in the 303 forms.