Post-examination Comments

(Green Paper)

1. Licensee Submitted Post-examination Comments

VIRGIL C. SUMMER NUCLEAR STATION - EXAM 2002-301

50-395

SEPTEMBER 9 - 17, 2002

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September 20, 2002
RC-02-0168

Mr. L. A. Reyes
Regional Administrator, Region II
U. S. Nuclear Regulatory Commission
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW, Suite 23T85
Atlanta, GA 30303-8931

Dear Mr. Reyes:

Subject: VIRGIL C. SUMMER NUCLEAR STATION
DOCKET NO. 50/395
OPERATING LICENSE NO. NPF-12
POST EXAM COMMENTS FOR THE SRO EXAM ADMINISTERED SEPTEMBER 9 THROUGH SEPTEMBER 17, 2002

Please find attached SCE&G's post exam comments for the SRO exam which was administered at V. C. Summer Nuclear Station September 9 through September 17, 2002. Comments are being submitted for Administrative JPM A.4 and for questions 17 and 24 of the written examination. SCE&G appreciates the opportunity to provide these comments and the NRC's consideration of the information.

If you would like to discuss this information in more detail, please contact Mr. Dan Gatlin of my staff at 803-345-4342.

Very truly yours,

Stephen A. Byrne

ARK/SAB/dr
Attachments (3)

c: Lee Miller
NRC Resident Inspector
File (814.04)
DMS (RC-02-0168)

ATTACHMENT 1

Summer 2002-301 NRC License Exam

Comment on Written Exam Question #17

17. 011K6.04 001

The following conditions exist:

- PZR level is at programmed level of 55% for current stable plant conditions
- ALL systems are operating correctly in automatic
- GP 1 heater is energized.

What is the initial plant response for a PZR level controller malfunction that results in a level reference signal decrease of 5%?

A. GP II PZR backup heaters energize and the proportional heaters are on, the "PZR" LCS DEV HI/LO" annunciator actuates, and charging flow decreases.

B. GP II PZR backup heaters energize and proportional heaters are on, the "PZR LCS DEV HI/LO" annunciators actuates, and the charging flow increases.

C. Charging flow increases to the new program level of 60% and there is no change in PZR heater status (proportional heaters are on the GP I backup heater in on)

D. Charging flow decreases to the new program level of 50% and there is no change in PZR heater status (proportional heaters are on and the GP I backup heater is on).

REF: NEW
IC-3 Pressurizer Pressure and Level Control
ARP-001 XCP-616 PZR LCS DEV HI/LO

Question #17 Comment:

The question concerns the effect on the Pressurizer Level Control System, while at 55% steady state, if the Level Reference Signal suddenly step-decreased by 5%. The result would be a new level setpoint, or L_{ref}, of 50%. The response of the system would basically include two automatic actions: the first would be that Group II pressurizer backup heaters will turn on due to a +5% level error. This action occurs to heat

pressurizer liquid space water because of what is perceived as a rapid insurge of subcooled RCS hot leg water. The second action is that the system now sees actual level at 55% versus reference level at a new value of 50% and will correct the level error by throttling charging flow control valve FCV-122 in the closed direction.

The answer key reflects "B" as the correct answer; the actual correct answer should be "A". This choice includes the correct combination of backup heater Group II energizing and charging flow DECREASING while choice "B" states that charging flow will be increasing.

This question was discussed at our meeting at the Region II offices on August 30 and the facility's comments were incorporated. This appears to be an editorial error.

ACTION REQUESTED: Change correct answer from "B" to "A".

ATTACHMENT 2

Summer 2002-301 NRC License Exam

Comment on Written Exam Question #24

24. 017A1.01 001

An OPEN has developed in a thermocouple used by the Subcooling Monitor. What impact will the failed thermocouple have on the Subcooling Monitor after steady state conditions are reached?

A. The Core subcooling monitor will indicate maximum subcooling.

B. Core subcooling margin monitor will use the other thermocouple assigned in the core quadrant.

C. Core subcooling margin monitor will use the affected thermocouple and will indicate superheat.

D. Core subcooling margin monitor will indicate normal subcooling.

REF: Braidwood Exam 2000
IC-7 Incore Instrumentation System

Distractor A - incorrect, an open would result in a high temperature indication and low indication of subcooling.
Distractor B - incorrect, auctioneered high value for the assigned thermocouples is used.
Answer C - correct, auctioneered high value for the assigned thermocouples is used and the open would result in low indication of subcooling.
Distractor D - incorrect, auctioneered high value for the assigned thermocouples is used.

Question #24 Comment:

The question concerns the effects on the Core Subcooling Monitor display, if an open condition were experienced in a Core Exit Thermocouple. A thermocouple operates on the principle that a voltage is developed when two dissimilar metals are joined and there is a temperature difference between that junction and a reference junction. The voltage difference produces a current, which fails to zero if an open circuit occurs. Thus, an "open" thermocouple will cause the associated temperature to indicate low. (See attached references from training module SB-5, "Detector Principles.")

Since the Core Subcooling Monitor will conservatively select the highest reading thermocouple to compare to pressure for a subcooling calculation, the effects of an open thermocouple will be virtually unnoticed. The monitor will select the highest reading remaining thermocouple via auctioneering-high circuitry. If the open thermocouple happened to be the highest reading prior to the failure, there may be some slight decrease in the displayed value, depending on how much higher the failed T/C was with respect to the second highest T/C.

The answer key reflects "C" as the correct choice; however, it is clear from the answer key comments that it is assumed that an open condition in a thermocouple results in a failed high temperature on the given T/C. Since this is not the case, then either choice "B", or choice "D" becomes a valid selection. The monitor will use the other assigned T/C in the quadrant for calculation, and, since the low failure is auctioneered away, the monitor will indicate normal subcooling.

ACTION REQUESTED: Change correct answer from "C" to either "B" or "D".

1. They are slow to respond, particularly when the capillary tubing is long. If the temperature being measured changes rapidly, the indication will lag behind for some time.

2. The reading may be affected by the ambient temperature through which the capillary tubing runs. These disadvantages may be overcome by keeping the length of capillary short and selecting the correct filling fluid.

Thermocouples - commonly used in plants for many purposes. They are seldom direct indicating devices but are usually connected to multipoint recorders. When the fused junction of two dissimilar metal wires is heated, a voltage is produced. This voltage is quite small and a sensitive meter is required to accurately measure it. Thermocouples are frequently used since they cover a wide temperature range, have fast response, are quite accurate, and are reasonably inexpensive. Thermocouples are excellent for monitoring remote and inaccessible points since the length of the wire has very little effect on the accuracy or speed of response of the unit.

A simplified diagram of a thermocouple is shown in Figure SB5.16. The meter reading is proportional to the difference in temperature between the hot (T_2) and cold (T_1) junction.

The temperature of the cold junction is known and is usually fairly constant so the meter reading indicates the temperature existing at the hot junction. For high accuracy testing, the cold junction is usually placed in an ice bath to ensure that it stays at a known constant temperature. Many different kinds of wire can be used; however, the most commonly used are iron-constantan, chromel-alumel, and copper-constantan.

Resistance Temperature Devices (RTD) - make use of the principle that changes in temperature result in changes in the electrical resistance of the conductor. In these devices, a coil of wire of pure metal, usually platinum, is the temperature detecting unit. The coil has known resistance at a standard temperature. As the temperature

TRAINING LESSON PLAN

Switches

The same basic sensing devices are frequently used to open and close electrical switches. The switches may be used to bring in an alarm or start and stop equipment.

Component/Instrument Failure

Thermocouples

If thermocouple leads are an open circuit, the indicated temperature would be the low end of the indicator scale. If the thermocouple leads are shorted, the short would be a new junction and would become the new sensor input.

Resistance Temperature Detectors (RTD)

If an RTD is opened, the indicating circuit indicates maximum temperature. If an RTD became shorted internally, the location of the short would determine how low the detector would indicate. A short across the entire resistor would cause the indication to be at the lowest value.

If the leads to an RTD were cut (severed) or a connection loose, the indicator would fail in the high direction.

Pressure Detectors

Loss of the pressure detector input from the source will result in the pressure reading low or at the bottom of its scale.

ATTACHMENT 3

Admin JPM A.4 – Classify the Event

The JPM involved a security breach of the plant due to an armed intrusion by terrorists resulting in the explosion of the RWST. During the exam workup week, it was discussed with the NRC examiners that the scenario given was open-ended and, therefore, required some judgment by the candidates. The initiating conditions were unclear, and the detection methods provided enough latitude that it was conceivable that some of the candidates would default to the higher classification with sound justification. The facility review team had the impression that, as long as there was sound justification provided on the part of the candidate, this would be acceptable.

EAL classifications are to be made with respect to the Initiating Condition headings, with the Detection Methods provided as guidelines to assist the IED/ED. The plant has recognized a weakness in this EPP-001 Detection Method, which is currently being addressed. A very similar security type scenario had been administered in Licensed Operator Requalification training in the past, which experienced a near equal division between Alert and SAE from the IEDs that the drill was used to evaluate. Additionally, this same JPM was administered (post-exam) to all current and former EDs and they, too, failed to form a consistent opinion, given the same information as the SRO candidates. Most felt that, as a minimum, the criteria for an Alert was met based on Initiating Condition 281 and/or 292, yet approximately half felt it was conservative to enter a SAE based on Initiating Condition 392. Reasons cited for declaration of SAE included the fact that the terrorists had breached the protected area and, therefore, control of the plant clearly had to be questioned. They all had varying degrees of concern in this area, and the JPM did not provide the necessary clarification to allow for consistency in the SRO candidates' comfort level. EPP-001, Attachment III discusses actions to be considered for site specific credible threats. Under this guidance, "a higher initial classification could be made based on the nature and timing of the threat and potential consequences."

Information questioned by our EDs included the fact that there was no information provided on interface with security, the size and capability of the terrorist group, their current location, and opinions from the security shift leader as to intended course of action. The decision had to be made without the benefit of all the facts. Couple this with the fact that the JPM was administered on the eve of the 9-11 anniversary and the potential for a course of conservatism increases even more so. SCE&G's feeling is that the candidate should have evaluated the scenario based on its merits and made an informed decision. That decision could include, but should not be limited to, putting the plant in an Alert condition and then, some discussion of their thought process as to what it would take to get to a SAE, or that the plant should be put into a SAE based on

conservative decision making by the candidate given their comfort level with the "snapshot-in-time" situation which the scenario offered.

In conclusion, the plant is in an Alert as a minimum based on 281 and 292, but it is appropriate to classify the event as a SAE due to concerns based on 392. The premise is similar to that of a fire, where an entire function is affected and therefore escalation to a SAE should be given consideration. Since the loss of the RWST will effectively remove both high and low head injection, as well as RB spray, this loss of broad functionality would lend credence to a more conservative discretionary escalation to the next higher EAL. Accordingly, SCE&G proposes that either the classification of Alert or Site Area Emergency be accepted as long as the candidate stated the proper justification for either.

EMERGENCY ACTION LEVELS

NOTIFICATION OF UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
INITIATING CONDITION (111) **SECURITY THREAT OR ATTEMPTED ENTRY OR ATTEMPTED SABOTAGE** Detection Method: Report to the Control Room by Security or observer. See EPP-001 Attachment III for additional guidance.	**INITIATING CONDITION (281)** **ONGOING SEVERE SECURITY THREAT** Detection Method: Security safeguards contingency event which results in adversaries commandeering an area of the plant, but not impacting shutdown capability. See EPP-001 Attachment III for additional guidance.	**INITIATING CONDITION (381)** **SECURITY THREAT INVOLVING IMMINENT LOSS OF PHYSICAL CONTROL OF THE PLANT** Detection Method: Physical attack on the Plant involving imminent occupancy of EITHER 1 OR 2: 1. Control Room. OR 2. Control Room Evacuation Panel Rooms. See EPP-001 Attachment III for additional guidance.	**INITIATING CONDITION (481)** **SECURITY THREAT RESULTING IN LOSS OF PHYSICAL CONTROL OF THE FACILITY** Detection Method: Physical attack on the Plant has resulted in occupation of EITHER 1 OR 2: 1. Control Room. OR 2. Control Room Evacuation Panel Rooms. See EPP-001 Attachment III for additional guidance. Chg C

EMERGENCY ACTION LEVELS
MANMADE PHENOMENON

NOTIFICATION OF UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
INITIATING CONDITION (113) **OTHER HAZARDS BEING EXPERIENCED OR PROJECTED WHICH HAVE THE POTENTIAL FOR ENDANGERING THE FACILITY:** **1. ONSITE AIRCRAFT CRASH** **2. ONSITE TRAIN DERAILMENT** **3. ONSITE EXPLOSION (EXCLUDING PLANNED ACTIVITIES)** **4. NEAR OR ONSITE TOXIC OR FLAMMABLE GAS RELEASE OF A MAGNITUDE THAT THREATENS PERSONNEL** Detection Method: EITHER 1 OR 2 OR 3 OR 4: 1. For Aircraft Crash: Observation of event. OR 2. For Train Derailment: Observation of event. OR 3. For Onsite Explosion: Observation of explosion or warning from offsite. OR 4. For Onsite Toxic or Flammable Gas Release: Observation of release or warning from offsite.	**INITIATING CONDITION (292)** **OTHER HAZARDS BEING EXPERIENCED OR PROJECTED WHICH HAVE A SIGNIFICANT POTENTIAL FOR AFFECTING PLANT SAFETY:** **1. AIRCRAFT CRASH ON FACILITY** **2. MISSILE IMPACTS ON FACILITY WITH RESULTANT MAJOR DAMAGE** **3. KNOWN EXPLOSION AT FACILITY RESULTING IN MAJOR DAMAGE TO PLANT STRUCTURES OR EQUIPMENT** **4. ENTRY INTO FACILITY ENVIRONS OF TOXIC OR FLAMMABLE GASES IN CONCENTRATION WHICH EXCEED THE LIMITS OF FLAMMABILITY OR TOXICITY** Detection Method: EITHER 1 OR 2 OR 3 OR 4: 1. For Aircraft Crash: Observation of aircraft crash into Plant structures. OR 2. For Missile Impact: Observation of missile impacts on Plant structures or components. OR 3. For Onsite Explosion: Observation of damage by explosion. OR 4. For Onsite Toxic or Flammable Gas Release: Observation or warning from outside the Plant; detection of gasses (using portable instrumentation) which exist in concentrations which exceed the limits of flammability or toxicity.	**INITIATING CONDITION (392)** **OTHER HAZARDS BEING EXPERIENCED OR PROJECTED WITH PLANT NOT IN COLD SHUTDOWN:** **1. AIRCRAFT CRASH INTO VITAL STRUCTURES,** **2. MISSILE OR EXPLOSION IMPACT ON FACILITY RENDERING SEVERE DAMAGE TO SHUTDOWN EQUIPMENT** **3. ENTRY OF TOXIC OR FLAMMABLE GASES INTO VITAL AREA WHICH INVOLVE A SIGNIFICANT DEGRADATION OF PLANT SAFETY** Detection Method: EITHER 1 OR 2 OR 3: 1. Aircraft crash causing damage OR fire in: a) Reactor Building; OR b) Control Room; OR c) Auxiliary Building; OR d) Fuel Handling Building; OR e) DG Building; OR f) Intermediate Building; OR g) SW Intake Structures. OR 2. For Missile or Explosion Impact: Loss of functions needed for hot shutdown (see specific Initiating Condition for this situation). OR 3. Entry of toxic or flammable gases into: a) Control Room; OR b) Cable spreading rooms; OR c) Reactor Building; OR d) Switchgear room; OR e) Control Room Evacuation Panel Rooms; OR f) Emergency Diesel Generator rooms; (as detected by portable instrumentation AND which renders a train of a safety related system inoperable).	

CONSIDERATIONS FOR A SECURITY EMERGENCY

Site-Specific Credible Threat:

> CAUTION
>
> Avoid moving personnel inside or outside the Protected Area without consulting the Security Team Leader as to the safety of the personnel.

____ 1. Declare a Notification of Unusual Event (NOUE), at a minimum, based on Security Threat, EAL #111. A higher initial classification could be made based on the nature and timing of the threat and potential consequences.

____ 2. Implement the Radiation Emergency Plan and Emergency Plan Procedures. State and local governments should be notified as required. Do not activate the Early Warning Siren System unless directed by the government agencies, per our procedures.

____ 3. TSC/OSC staffing and other personnel decisions are made based on the nature of the threat and the timing of the threat. These decisions are independent of the NOUE activities.

Evacuate plant personnel if the information about the threat indicates that time is available. The ERO Duty Team is directed to report to the EOF or Backup EOF as described below. The EOF or Backup EOF is used as a staging area for TSC and OSC personnel. The IED may contact the EOF or Backup EOF to direct specific TSC and OSC personnel to come to the plant site, as necessary. The TSC and OSC should not be fully manned until the threat is resolved.

Chg E