CLINTON
INITIAL LICENSE EXAM

JULY 16 THRU 23, 2001

Copy of the Letter from the Facility Submitting Their Post-Examination Comments

AmerGen

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U-603517
July 31, 2001

Mr. James E. Dyer
Regional Administrator
Region III
U.S. Nuclear Regulatory Commission
801 Warrenville Road
Lisle, Illinois 60632-4351

Clinton Power Station, Unit 1
Facility Operating License No. NPF-62
NRC Docket Number 50-461

Subject: Comments Regarding Reactor Operator License Examination Questions Administered on July 23, 2001

This letter is to request that credit be given for a second answer for questions #48 and #74 from the Reactor Operator License Examination administered on July 23, 2001. Enclosed are the questions and associated documentation that justifies this request.

If you should have any questions concerning this matter you may contact Mr. T. J. Shortell at (217) 937-4001 or Mr. D. R. Clines at (217) 937-4121.

Sincerely,

P. S. Walsh
Training Director

JLP/blf

Enclosure

cc: NRC Senior Resident Inspector – Clinton Power Station

Subject: Question # 48

This question has been evaluated by Operations, Training and Engineering and each organization is in concurrence with the attached justification.

C D Sieckmann Jr / 7-30-01
Operations Date

T. Mattel OTM / 7/30/01
Training Date

N Gerard Thomas / 7/30/2001
Engineering SYSTEM MANAGER Date

Clinton Power Station
2001 ILT Exam

Question:	Exam	System	KA
# **48**	**RO**	**288000**	**A3.01**

Which of the following will result in automatic closure of the Control Room Train 'A' Maximum Outside Air Dampers (0VC48YA and 49YA)?
A. High Radiation levels at the east OR west intake.
B. High Radiation level at the east AND west intake.
C. High smoke concentrations at the east OR west intake.
D. High smoke concentrations at the east AND west intake.

Explanation:
Both outside air intakes must have High Radiation to cause this to occur.

Answer	Reference:	Question Pedigree:
B	LP85447-03	**New**
Objective:	Cognitive Level:	Difficulty:
85447.1.4.1	**2**	**3.8**

Clinton Power Station
2001 ILT Exam

QUESTION #48 - RO EXAM (Record #54)

Discussion

CPS Procedure 3402.01 has the following table that shows the locations of each of the PR009 Monitors:

	MONITOR	LOCATION	INDICATION	LOCATION
DIV 1:	PR009A	AB 781'W	0RI-VC075	P801-66B
	PR009C	CB 825'E	0RI-VC076	P801-66B
DIV 2:	PR009B	AB 781'W	0RI-VC175	P801-67B
	PR009D	CB 825'E	0RI-VC176	P801-67B

Annunciator Procedure 5050.07 Window 7M has the following:

> Operating MCR HVAC Train will realign to High Radiation Isolation mode with the detectors alarming in the following 1/2 twice combinations:
> (PR009A and B) or (PR009A and C) or (PR009C and D) or (PR009B and D)

Realignment to the High Radiation Mode will cause dampers 0VC48YA & 0VC49YA to close. Confirmation of this was determined by the prints. These procedural statements show that 2 monitors are necessary and that combinations frm the same side or opposite sides could cause dampers 0VC48YA & 0VC49YA to close.

Answer Justification

A. High Radiation levels at the east OR west intake.

   CORRECT, high radiation levels at the east or west side will cause the dampers to close, (Example: PR009A & PR009B or PR009C & PR009D).

B. High Radiation level at the east AND west intake.

   CORRECT, high radiation levels at the East and West intakes will cause the dampers to close, (Example: PR009A & PR009C).

C. High smoke concentrations at the eat OR west intake.

   INCORRECT, Dampers 0VC48YA & 0VC49YA do not close on high smoke concentrations.

D. High smoke concentrations at the east AND west intake.

   INCORRECT, Dampers 0VC48YA & 0VC49YA do not close on high smoke concentrations.

8.3.3 (Cont'd)

6. **IF** the following dampers do not close, **THEN** the associated breakers may be opened to fail them closed:
   - 0VC03YA, Div I Damper MCC A CUB 1E
   - 0VC03YB, Div II Damper MCC B CUB 1E
   - 0VC05YA, Div I Damper MCC A CUB 5D
   - 0VC05YB, Div I Damper MCC A CUB 5E
   - 0VC48YA, Div II Damper MCC B CUB 5D
   - 0VC48YB, Div II Damper MCC B CUB 5E
   - 0VC49YA, Div I Damper MCC A CUB 5F
   - 0VC49YB, Div I Damper MCC A CUB 6A
   - 0VC81YA, Div II Damper MCC B CUB 5F
   - 0VC81YB, Div II Damper MCC B CUB 6A
   - 0VC115YA, Div II Damper MCC B CUB 2A
   - 0VC115YB, Div I Damper MCC A CUB 2A
   - 0VC69Y, Div I Damper MCC A CUB 1C
   - 0VC70Y, Div II Damper MCC B CUB 1C
7. Verify the following dampers close:
   1) 0VC03YA(B), Cont Rm Trn A Min OS Dmpr.
   2) 0VC05YA(B), MCR Max Intake & Purge Dmpr.
   3) 0VC48YA(B), MCR Max Intake & Purge Dmpr.
   4) 0VC49YA(B), MCR Max Intake & Purge Dmpr.
   5) 0VC81YA(B), MCR Max Intake & Purge Dmpr.
   6) 0VC115YA(B), Cont Rm Trn A Min OS Dmpr.
   7) 0VC69Y, MCR Locker Rm Exhaust Dmpr.
   8) 0VC70Y, MCR Locker Rm Exhaust Dmpr.
   9) 0VC11C, MCR Locker Rm Exhaust Fan is not running

NOTE

Cont Rm Trn A(B) Min Air Dmpr 0VC01YA(B) is located on the east(west) side of the plant.

Use the following table to quickly locate monitors and indicators to aid in completion of the remaining steps in section 8.3.3.

	MONITOR	LOCATION	INDICATION	LOCATION
DIV 1:	PR009A	AB 781'W	0RI-VC075	P801-66B
	PR009C	CB 825'E	0RI-VC076	P801-66B
DIV 2:	PR009B	AB 781'W	0RI-VC175	P801-67B
	PR009D	CB 825'E	0RI-VC176	P801-67B

HI RADIATION
CONT RM HVAC SYS
DIVISION 1

TITLE: HIGH RADIATION CONTROL ROOM HVAC SYSTEM DIVISION 1			5050-7M
DEVICE	NAME	SETPOINT	INDICATION
1RIX-PR009A	Control Room Intake Monitor	10 mR/hr or Downscale	On 1H13-P801: OS AIR INLET RAD MON DIV 1 and DIV 2 RAD LVL indicator
1RIX-PR009C			

POSSIBLE CAUSE

1. High airborne contamination at MCR Outside Air Intake
2. Instrument failure

AUTO ACTIONS

Operating MCR HVAC Train will realign to High Radiation Isolation mode with the detectors alarming in the following 1/2 twice combinations:

(PR009A and B) or (PR009A and C) or (PR009C and D) or (PR009B and D)

OPERATOR ACTIONS

O **IF** Alarm is from a valid high radiation signal,

THEN Within 20 minutes to satisfy MCR dose limits:

Initiate/verify initiated VC High Radiation MODE on the operating VC Train per CPS 3402.01, Control Room HVAC (VC).

☞ The redundant VC Train shall be started if the operating VC Train cannot be placed into High Radiation MODE.

REFERENCES

1. CPS 3402.01, Control Room HVAC (VC)
2. E02-0VC99, Sh. 46
O 3. CR1-98-03-425/Calc C-020 Vol. C (GDC-19/USAR 15.6.5.5.3 dose limits)
4. Data Sheet RD102/4

8.3.3 (Cont'd)

14. **IF** minimum air damper 0VC01YA(B) was closed due to a high radiation condition, **THEN** open 0VC01YA(B).

8.3.4 Smoke Isolation

NOTE

1) The Supply Air Trn will unisolate on detection of smoke or combustion products in the Control Room. This is indicated by annunciator 5050-1J(5052-6C), Smoke VC System on. The Supply Air Train will automatically isolate when the condition clears if Sply Air Fltr Dmprs 0VC09YA/10YA/11YA (0VC09YB/10YB/11YB) control switch is in the BYPASS position.

2) Run time with flow through VC supply filter train 0VC07SA(B) shall be tracked per CPS 9094.01, Cumulative Data Report.

3) In the event of detection of smoke or products of combustion in the areas served by the Control Room HVAC system, the Manual Purge mode may be used to purge smoke from the control room.

1. **IF** the functionality of the smoke mode isolation mode is in question, **THEN** refer to USAR 9.4.1.4 and CPS 9070.04, Control Room HVAC Smoke Initiation Functional for testing requirements.

2. Verify Supply Air Trn A(B) unisolates as follows:
   1) 0VC09YA(B), Sply Air Trn A(B) Filt Inlet Damper opens.
   2) 0VC10YA(B), Sply Air Trn A(B) Filt Byp Dmpr closes.
   3) 0VC11YA(B), Sply Air Trn A(B) Filt Outlet Dmpr opens.

Subject: Question # 74

This question has been evaluated by Operations, Training and Engineering and each organization is in concurrence with the attached justification.

C. J. Dueckmann Jr. / 7-30-01

Operations Date

T. Skorted OTM / 7/30/01

Training Date

[illegible] / 07/30/01

Engineering SR PE MGR (ACTING) Date

Clinton Power Station
2001 ILT Exam

Question:	Exam	System	KA
# 74	**RO**	**295009**	**AA2.01**

- A Seismic Event has occurred resulting in a DBA LOCA.
- The plant has scrammed.
- The A Recirculation Pump 6.9 kV breakers CB-3, 4 and 5A 125 VDC control power fuses have all blown.

Reactor level quickly lowers and indicates:

Shutdown Range:	1"
Upset Range:	0"
Narrow Range:	3"
Wide Range:	-160"
Fuel Zone:	-178"

Actual vessel level:

A. Can ONLY be determined by the Fuel Zone as it is qualified to function under post-LOCA conditions.

B. Can be determined. ALL instruments are OPERABLE with the Fuel Zone being the only one on scale.

C. Can be determined. ONLY the Shutdown, Upset, and Narrow Range should be used.

D. Can NOT be determined at this time.

Explanation:
The indicating band for the fuel zone of –112 to –312 is good ONLY if NO recirculation pumps are running. With all other instruments below their lower range of indication, level cannot be determined.

Answer	Reference:	Question Pedigree:
D	LP85423-01	**CPS Exam Bank Question #18270**
Objective:	Cognitive Level:	Difficulty:
LP85423 .1.5 & .1.6	**2**	**3.8**

QUESTION #74 – RO EXAM (Record #88)

Discussion

The third bullet in the stem is intended to indicate that "A" Recirc Pump is still running, because the loss of control power to the fast speed breakers has prevented it from tripping from fast speed. If "A" Recirc Pump was still running then Fuel Zone level indication would not be accurate because it is calibrated for no jet pump flow.

If "A" Recirc Pump were to have tripped to slow speed before the control power was lost then it would have tripped to off on a level 2 signal. With no Recirc Pumps running Fuel Zone could then be used because it is reading on scale.

Answer Justification

A. Can ONLY be determined by the Fuel Zone as it is qualified to function under post-LOCA conditions.

   CORRECT, if it is assumed the Recirc Pumps had tripped to off (Level 2) then Fuel Zone instrumentation could be used because it is calibrated for no jet pump flow conditions. The other instruments are below their minimum usable level and therefore can not be used.

B. Can be determined. All instruments are OPERABLE with the Fuel Zone being the only one on scale.

   INCORRECT, level can be determined using Fuel Zone if the assumption is the same as in Answer A, but not all instruments are considered OPERABLE. All the instruments, with the exception of Fuel Zone, are at or below their Minimum Usable Level in accordance with Detail A of the EOPs and should not be used. Because they can not be used at this time, they are not fullfilling their function of indicating level. Since they are not fulfilling this function then they would not be considered Available (see attached definition). If they are not considered Available then they would not be considered Operable (see attached definition).

C. Can be determined. ONLY the Shutdown, Upset, and Narrow Range should be used.

   INCORRECT, Shutdown, Upset, and Narrow Range instruments are at or below their minimum usable level and, therefore, can not be used.

D. Can NOT be determined at this time.

   CORRECT, if it is assumed the "A" Recirc Pump is still running, then Fuel Zone could not be used because there is forced flow in the core which the Fuel Zone is not calibrated for. All other instrument ranges are at or below their minimum usable level. Therefore, level can not be determined.

1.1 Definitions (continued)

MINIMUM CRITICAL POWER RATIO (MCPR)	The MCPR shall be the smallest critical power ratio (CPR) that exists in the core for each class of fuel. The CPR is that power in the assembly that is calculated by application of the appropriate correlation(s) to cause some point in the assembly to experience boiling transition, divided by the actual assembly operating power.
MODE	A MODE shall correspond to any one inclusive combination of mode switch position, average reactor coolant temperature, and reactor vessel head closure bolt tensioning specified in Table 1.1-1 with fuel in the reactor vessel.
OPERABLE—OPERABILITY	A system, subsystem, division, component, or device shall be OPERABLE or have OPERABILITY when it is capable of performing its specified safety function(s) and when all necessary attendant instrumentation, controls, normal or emergency electrical power, cooling and seal water, lubrication, and other auxiliary equipment that are required for the system, subsystem, division, component, or device to perform its specified safety function(s) are also capable of performing their related support function(s).
RATED THERMAL POWER (RTP)	RTP shall be a total reactor core heat transfer rate to the reactor coolant of 2894 MWt.
REACTOR PROTECTION SYSTEM (RPS) RESPONSE TIME	The RPS RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its RPS trip setpoint at the channel sensor until de-energization of the scram pilot valve solenoids. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured.

(continued)

2.1.3 Both manual schedule review and using a validated software program are methods for evaluating shutdown safety. An acceptable method for assuring shutdown safety is to maintain the Improved Tech Specs/Operational Requirements Manual (ITS/ORM) required systems available plus maintain at least one additional system/method available. This may also be referred to as "n+1" shutdown safety philosophy, where n is the number of Technical Specification required operable systems.

2.2 **Definitions**

2.2.1 AVAILABLE: A term used to describe a System, Structure, or Component (SSC) that is capable of performing its intended function(s). A SSC is available if it meets the following criteria: *«CM-6» «CM-7»*

- Those SSCs that require MANUAL initiation, SHALL be capable of responding when operated in accordance with approved station procedures.
- Those SSCs required to initiate AUTOMATICALLY, SHALL be capable of responding without human action, **OR** SHALL be capable of responding in a timely manner when operated in accordance with approved procedures from the Main Control Room, or shall be capable of responding in a timely manner in accordance with approved procedures, outside the MCR through a single dedicated operator action.

An SSC should be considered available if there is reasonable assurance that it can meet its functional requirements. Later, if this evaluation is proven incorrect, the SSC shall be considered unavailable from the time the condition was first identified.

Availability begins when applicable tagouts are removed and system prerequisites, (line ups, filling, venting, etc.,) have been completed such that the system is capable of performing its intended function(s). In the event of a post maintenance testing (PMT) failure that affects Maintenance Rule availability tracking, the unavailability is continued from the original period. Availability is a specific performance criteria.

Reliance on manual MCR initiation as compensation for temporary loss of automatic initiation capabilities is expected to be used sparingly and only for short duration tasks (less than 1 shift).

Shutdown Range Instrumentation

The shutdown range instrumentation is used for level indication when the reactor plant is shutdown in a cold condition or while flooding the reactor vessel during a shutdown. **[.1.5.4]** The indicating range for the shutdown range detector is from 0 to 400 inches, referenced to instrument zero (520.62").

During refueling outages the reactor vessel head and upper range level condensing chamber are removed. In it's place a temporary standpipe is installed. The standpipe serves as the reference leg during refuel outages.

Due to the height of the condensing chamber (standpipe during refuel outages), the actual maximum shutdown range indication is 343 inches.

[.1.7.4] The condensing chamber connects to a line from the reactor vessel head vent at the 838 inch elevation, while the variable leg tap is shared with a narrow range connection at 509 inches, referenced to vessel zero. The single transmitter provides a signal to level indicator 1B21-R605 on control room panel 1H13-P601. **[.1.6.4]** Shutdown range instrumentation is calibrated for 120°F at 0 psig in the vessel, 80°F in the drywell and 80°F in the containment.

Upset Range Instrumentation

The upset range instrumentation, is used to follow abnormal water level increases during transient conditions. **[.1.6.3]** The instrument is calibrated for saturated steam and water conditions at 1025 psig in the vessel, 135°F in the drywell, and 80°F in the containment. **[.1.5.3]** The indicating range for the upset detector is from 0 to +180 inches, referenced to instrument zero (520.62"). **[.1.7.3]** The condensing chamber and low pressure leg tap are shared with the shutdown range instrument.

The upset instrument consists of a single level transmitter that supplies a level signal to recorder 1C34-R608 on main control room panel 1H13-P678. This recorder is a dual pen recorder which also receives a narrow range level instrument signal.

Fuel Zone Range Instrumentation

The fuel zone range instrumentation, which consists of 2 level transmitters, monitors water level during a loss-of-coolant accident (LOCA). **[.1.6.5]** The instruments are calibrated for saturated water and steam conditions at zero psig in the reactor vessel and drywell with no jet pump drive flow, and 80°F in the containment. **[.1.5.5]** The indicating band for the fuel zone range detectors extends from -150 to +50 inches, referenced to the top of the active fuel (359 inches above reactor vessel zero) or -112 to -312 referenced to instrument zero (with TAF being -162). Normally all discussions of vessel level are referenced to instrument zero unless otherwise stated. **[.1.7.5]** The level instruments have no condensing chambers, they use the Narrow Range variable leg tap located at elevation 509" as a reference leg, while the variable leg uses one of the two calibrated jet pump diffuser taps (jet pumps #5 and #15). 4

This trip to slow speed becomes increasingly important with core age due to rod density, flux profile and a decrease in delayed neutron fraction towards the end of core life. Tripping the pumps to slow speed effectively decreases the amount of time it takes to turn power during a scram.

The RPT is bypassed by four keylock switches at P680. **[.1.8.5]** The RPT is actuated and bypassed by the same RPS logic that initiates and bypasses a reactor scram on control or stop valve closure, when power is less than the turbine trip bypass power level of 40% as sensed by turbine 1st stage pressure.

Anticipated Transient Without Scram (ATWS)

[.1.1.2][.1.10.3] An ATWS signal initiates a trip of the recirculation pumps from their high and low speed power sources any time reactor pressure reaches 1127 PSIG or vessel level drops to Level 2 (-45.5"). In the event that RPS fails to scram the reactor, tripping the recirculation pumps will insert negative reactivity by increasing the void content of the core, thereby limiting high power excursions and pressure transients.

Recirculation Pump Start, Trip and Transfer

[.1.3.1] The Reactor Recirculation Pumps are always started in fast speed from the 6.9 KV (CB5) power supply, since the LFMG sets do not supply sufficient power to unseat the bearings and overcome breakaway torque. If conditions are correct for high speed operation and all the permissives have been met, the pump will accelerate to 100% speed and remain there subject to any trips or transfers. If conditions are unacceptable for high speed operation but acceptable for low speed operation, the pumps will accelerate to approximately 95% speed on the 6.9 kV power source while the LFMG sets are brought up to speed. At approximately 95% speed the 6.9 kV output breaker (CB5) will trip open, deenergizing the pump motor and allowing it to coastdown. When pump motor speed is in the 20-26% range, the LFMG set output breakers (CB2) will close and energize the pump motor, maintaining pump speed at approximately 25%.

Incomplete start sequence relays will actuate in the event the pump fails to start in either the slow or fast speeds. On a low speed start, the incomplete sequence relay will trip the 6.9 kV power source breaker (CB5) and the LFMG set supply breaker (CB1), and reset the start signal if the pump is not running between 20 to 26% speed or the LFMG set output breaker is not closed within 40 seconds. If the pump motor is not at 100% speed within 40 seconds on a fast speed start, the incomplete sequence relay will actuate and trip the CB5 and CB1 breakers also. If at any time during either start sequence, control power is lost, the incomplete sequence relays will actuate and trip the pumps as described above.

G. Detail A

"Detail A" (Figure 12-7) defines conditions under which RPV water level indications may be unreliable or must be considered invalid due to the effects of RPV pressure, drywell temperature, and containment temperature.

The Clinton RPV water level instruments sense level by measuring the differential pressure (ΔP) between a reference leg water column and a variable leg water column (Figure 12-8). The reference leg is kept full of water by a condensing pot; the variable leg height depends upon RPV water level. When the actual RPV water level decreases, the variable leg height also decreases, causing the sensed ΔP to increase. The higher ΔP results in a lower indicated level. Conversely, when the actual RPV water level rises, the variable leg height increases, ΔP decreases, and the indicated level increases.

The level instruments are calibrated to provide accurate indication under expected operating conditions. The indicated level will be inaccurate if drywell temperature, containment temperature, or RPV pressure varies from its assumed value. An elevated drywell or containment temperature, for example, will decrease the density of water in the instrument runs and cause a corresponding change in indicated level. The direction and magnitude of the change depend upon the arrangement of the instrument runs. If the variable leg vertical run in an area is longer than the reference leg vertical run, the indicated level will tend to decrease as temperature in the area rises. Conversely, if the reference leg vertical run is longer, indicated level will tend to increase. The greater the relative difference in the vertical runs, the greater the change in indicated level.

Changes in drywell and containment temperature can produce on-scale readings on some instruments even when the actual level is below their variable leg taps. Since ΔP is not affected by level changes below the variable leg tap, the indicated level would then no longer reflect changes in actual level. Not only would the indicated level be inaccurate in this situation, but the instrument could not even be used to determine the level trend. Figure C of Detail A bounds these conditions.

The "Minimum Usable Level" for an RPV water level instrument is the level that would be indicated, as a function of drywell or containment temperature, with actual RPV water level at the variable leg tap. If the indicated level is above this value, the actual level must be somewhere above the variable leg tap (Figure 12-9). Although the displayed value may be inaccurate, the instrument can at least be used to monitor the level trend. If the indicated level is below the limit, the actual level may be below the variable leg tap and the instrument cannot be used at all.

Minimum Usable Levels have been calculated for each RPV water level instrument for drywell temperatures between 100°F and 558.4°F (saturation temperature for 1103 psig, the lowest SRV lift setpoint) and containment temperatures between 70°F and 350°F. Figure C of Detail A lists the levels in terms of whichever temperature has the greater effect upon indicated level; the temperature having the smaller effect is assumed to be at its most limiting value. Upset Range level, for example, increases as both drywell and containment temperatures rise, but is most sensitive to drywell temperature changes. The Upset Range Minimum Usable Levels are therefore expressed in terms of drywell temperature assuming a containment temperature of 350°F. (The highest containment temperature is most limiting for this instrument since higher containment temperatures produce higher indicated levels.) For drywell temperatures between 100°F and 200°F, the Upset Range instrument cannot be used below an indicated level of 4 in.

Wide Range indicated levels increase as containment temperature rises, decrease as drywell temperature rises, and are most sensitive to containment temperature. The Wide Range levels are therefore expressed in terms of containment temperature assuming a drywell temperature of 100°F. (The lowest drywell temperature is most limiting for the Wide Range instrument since lower drywell temperatures produce higher indicated levels.) For containment temperatures between 100°F and 200°F, the Wide Range instruments cannot be used below an indicated level of -150 in.

Figure C of Detail A shows drywell temperatures only up to 350°F since this is the highest temperature that can be monitored on control room instruments. Higher values are listed as "offscale." Thin arrows, as shown for the Fuel Zone instrument between 60°F and 200°F, signify that the specified level corresponds to the bottom of the indicating range and the limit is therefore of no concern.

Note that the purpose of the Minimum Usable Levels is not to correct for instrument inaccuracies due to variances from calibration conditions. Rather, they define conditions under which neither the displayed value nor the indicated trend of an instrument can be relied upon.

The "RPV Saturation Temperature" (Figure B of Detail A) is a plot of the saturation temperature of water as a function of pressure. If the temperature of the water in an RPV water level instrument run exceeds this temperature, the water may start to boil, resulting in unreliable level indication.

Boiling is of concern in all instrument runs—horizontal and vertical, reference and variable, drywell and containment. Boiloff from the reference leg reduces the height of water in the leg. This decreases the pressure on the reference leg side of the ΔP cell and

increases the indicated level. Boiling in the variable leg (Figure 12-10) increases the pressure on the variable leg side of the ΔP cell, likewise increasing the indicated level. Continued boiling would produce an increasing level trend.

Boiling and loss of valid level indication may not occur immediately when drywell or containment temperature exceeds the RPV Saturation Temperature. As drywell or containment temperature increases, the temperatures in the instrument runs will lag the temperature in the surrounding area. The actual temperature in the instrument run is thus expected to be lower than the monitored temperature in the surrounding area. In addition, the RPV Saturation Temperature has been truncated at the maximum indicated temperature, resulting in a significant loss of operating margin.

The wording of Detail A permits continued use of a level instrument until boiling is actually observed, avoiding premature transfers to RPV flooding. While the onset of boiling is difficult to predict, it is expected that vapor formation sufficient to affect the validity of the level indication will also be observable. Indications of boiling may vary, depending on the difference from saturation and the extent of the condition. Bulk boiling will likely result in extremely erratic indication accompanied by loss of inventory from the reference leg. Localized vapor formation may result in instrument mismatches and a notching effect similar to degassing.

The RPV Saturation Temperature is plotted from 0 psig to the lowest SRV lift setpoint (Figure 12-11). At Clinton, the curve is truncated at 350°F, the highest indicated drywell and containment temperatures.

Ideally, both the Minimum Usable Levels and the RPV Saturation Temperature would be expressed in terms of the actual water temperatures in the instrument runs. These temperatures cannot be directly monitored at Clinton, however. Average drywell and containment temperatures, the best available indirect indications, must therefore be used instead.

The Fuel Zone instruments are calibrated for an RPV pressure of 0 psig with no jet pump flow. Any flow through the jet pumps, including that caused by SRV actuation, will result in erratic Fuel Zone indication. When both the Fuel Zone and Wide Range instruments are available and on-scale, decisions regarding the control of RPV water level should therefore be based upon the Wide Range indication.

Discussion (continued)

The Minimum Usable Level calculation assumes:

1. The temperatures of all instrument runs in a given space (drywell or containment) are equal.
2. The temperature in the drywell may vary between 100°F and the saturation temperature for the lowest SRV lifting setpoint pressure.
3. The temperature in the containment may vary between 70°F and 350°F.

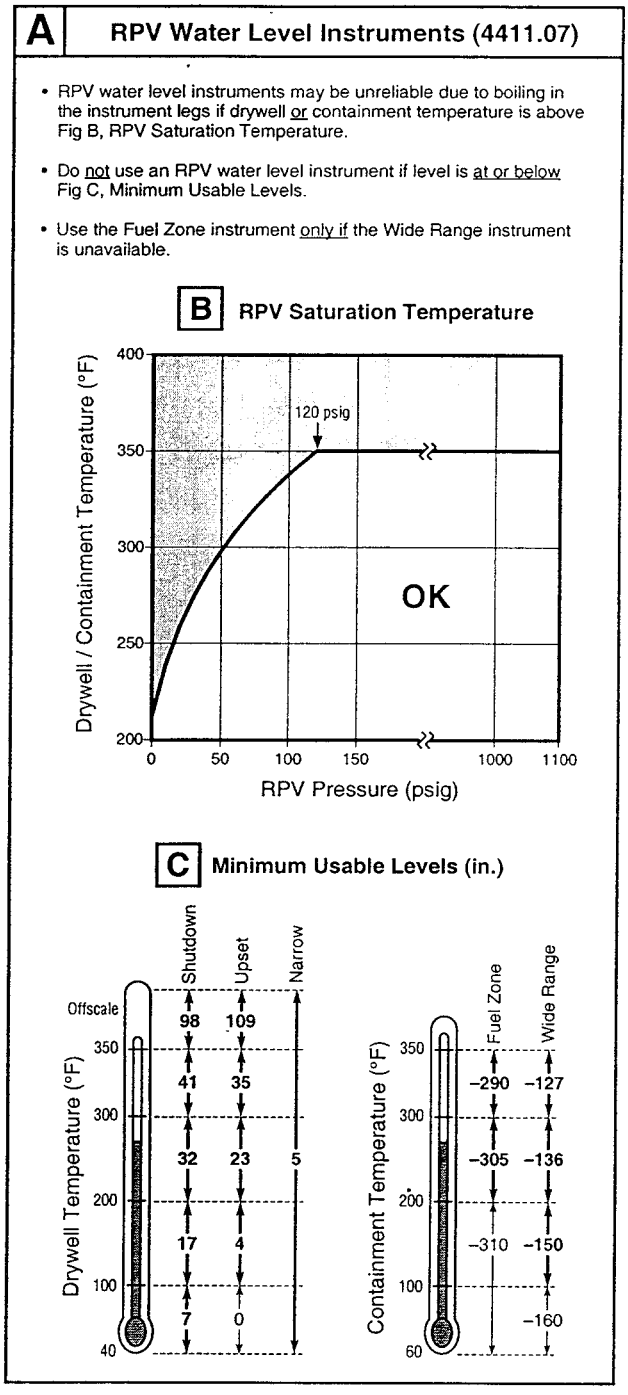

Figure 12-7: Detail A