

Indian Point 2 Emergency Action Levels

**REPLACEMENT PAGES
FOR
EAL GENERATION PACKAGE**

Docket 50-247

9505300273 950512
PDR ADOCK 05000247
F PDR

Category 2.0
Reactor Fuel

2.0 Reactor Fuel

2.1 Coolant Activity

2.1.1 Unusual Event [SU4]

Coolant sample activity $\geq 60/(\text{E bar}) \mu\text{Ci/cc}$

All

2.1.2 Alert [fl]

Coolant activity $> 300 \mu\text{Ci/cc}$ I-131 equivalent

Power operation, hot shutdown

2.1.3 Site Area Emergency [fl, rpl/rl]

Coolant activity $> 300 \mu\text{Ci/cc}$ I-131 equivalent and any of the following:

- RED path on F-0.4, INTEGRITY
- Primary system leakage exceeding capacity ($> 75 \text{ gpm}$) of a single charging pump
- RCS subcooling $<$ SI initiation setpoint due to RCS leakage
- $> 0.17 \mu\text{Ci/cc}$ on R-42 OR $> 66 \mu\text{Ci}$ on R-41 due to RCS leakage

Power operation, hot shutdown

2.0 Reactor Fuel

2.2 Containment Radiation

2.2.1 Alert [rl]

$> 0.17 \mu\text{Ci/cc}$ on R-42 OR $> 66 \mu\text{Ci}$ on R-41 due to RCS leakage

Power operation, hot shutdown

2.2.2 Site Area Emergency [fl, rl]

Containment radiation monitor R-25 or R-26 $> 17 \text{ R/hr}$

Power operation, hot shutdown

2.2.3 General Emergency [fl, rl, cpl]

Containment radiation monitor R-25 or R-26 $> 68 \text{ R/hr}$

Power operation, hot shutdown

2.0 Reactor Fuel 2.1 Coolant Activity**2.1.3 Site Area Emergency**

Coolant activity > 300 $\mu\text{Ci/cc}$ I-131 equivalent and any of the following:

- RED path on F-0.4, INTEGRITY
- Primary system leakage exceeding capacity (> 75 gpm) of a single charging pump
- RCS subcooling < SI initiation setpoint due to RCS leakage
- > 0.17 $\mu\text{Ci/cc}$ on R-42 OR > 66 μCi on R-41 due to RCS leakage

NUMARC IC:

N/A

FPB loss/potential loss:

Fuel clad loss, RCS potential loss/loss

Mode Applicability:

Power operation, hot shutdown

Basis:

This EAL addresses combinations of fuel clad loss with RCS loss and potential loss indicators.

300 $\mu\text{Ci/cc}$ I-131 equivalent coolant activity corresponds to about 2% to 5% fuel clad damage. When reactor coolant activity reaches this level, significant clad heating has occurred and thus the fuel clad barrier is considered lost. This condition in combination with any of the following RCS loss/potential loss indicators warrants declaration of a Site Area Emergency:

RED path on F-0.4, INTEGRITY: RED path indicates an extreme challenge to the safety function derived from appropriate instrument readings, and indicates a potential loss of RCS barrier.

Primary system leakage exceeding capacity (> 75 gpm) of a single charging pump: This EAL is based on the inability to maintain normal liquid inventory within the Reactor Coolant System (RCS) when RCS leakage exceeds the capacity of one charging pump. 75 gpm is the minimum operability flow rate for each charging pump.

RCS subcooling < SI initiation setpoint due to RCS leakage: This loss of RCS addresses conditions where leakage from the RCS is greater than available inventory control capacity such that a loss of subcooling has occurred. The loss of subcooling is the fundamental indication that the inventory control systems are inadequate in maintaining RCS pressure and inventory against the mass loss through the leak.

> 0.17 $\mu\text{Ci}/\text{cc}$ on R-42 OR > 66 μCi on R-41 due to RCS leakage: > 0.17 $\mu\text{Ci}/\text{cc}$ on R-42 OR > 66 μCi on R-41 indicates the release of reactor coolant to the containment. The indication was derived assuming an step increase in RCS leak rate from 1 gpm to 75 gpm measured 1 hour after start and dispersal of the reactor coolant noble gas and iodine inventory associated with FSAR (1% defects) into the containment atmosphere. This EAL is indicative of a RCS leak only.

PEG Reference:

FC2.1 + RCS1.1, RCS2.1, RCS2.2 and RCS4.1

Basis Reference(s):

1. Letter from D. Gaynor to R. Burns 7/27/93 "EAL Technical Basis 2.1.2"
2. CSFST F-0.4, Integrity
3. Drawing no. 198OM 1085
4. PT-Q33
5. E-0, Reactor Trip Or Safety Injection
6. "R-41 and R-42 Responses Post-Leak Rate Change" D. Smith to B. Kessler dated 2/16/95.

2.0 Reactor Fuel 2.2 Containment Radiation**2.2.1 Alert**

> 0.17 $\mu\text{Ci/cc}$ on R-42 OR > 66 μCi on R-41 due to RCS leakage

NUMARC IC:

N/A

FPB loss/potential loss:

RCS loss

Mode Applicability:

Power operation, hot shutdown

Basis:

> 0.17 $\mu\text{Ci/cc}$ on R-42 OR > 66 μCi on R-41 due to RCS leakage indicates the release of reactor coolant to the containment. The indication was derived assuming an step increase in RCS leak rate from 1 gpm to 75 gpm measured 1 hour after start and dispersal of the reactor coolant noble gas and iodine inventory associated with FSAR (1% defects) into the containment atmosphere. The value of .17 $\mu\text{Ci/cc}$ on R-42 is derived from the sum of the results for KR-87, 88, XE-133, 135 and 138. This EAL is indicative of a RCS leak only. If R-25/R-26 readings increase to that specified by Reactor Fuel EAL 2.2.2, significant fuel damage would also be indicated.

PEG Reference:

RCS4.1

Basis Reference(s):

1. "R-41 and R-42 Responses Post-Leak Rate Change" D. Smith to B. Kessler dated 2/16/95.

Plant Specific EAL Guideline (FPB)

Indian Point Unit 2

PWR FPB IC#: RCS4

Barrier:

Type:

Description: Containment Radiation Monitoring

RCS4.1 Containment radiation monitor reading greater than ~~(site-specific) R/hr~~ $\geq 0.17 \mu\text{Ci/cc}$ on R-42 OR $\geq 66 \mu\text{Ci}$ on R-41 due to RCS leakage

Bases:

~~The (site-specific) reading is a value which indicates the release of reactor coolant to the containment. The reading should be calculated assuming the instantaneous release and dispersal of the reactor coolant noble gas and iodine inventory associated with normal operating concentrations (i. e., within T/S) into the containment atmosphere. The indication was derived assuming an increase in RCS leak rate from 1 gpm to 75 gpm over a one hour period and dispersal of the reactor coolant noble gas and iodine inventory associated with FSAR (1% defects) into the containment atmosphere. The value of $.17 \mu\text{Ci/cc}$ on R-42 is derived from the sum of the results for KR-87, 88, XE-133, 135 and 138. This reading will be less than that specified for fuel clad barrier EAL #5. Thus, this EAL would be indicative of a RCS leak only. If the radiation monitor reading increased to that specified by fuel clad barrier EAL #3, fuel damage would also be indicated.~~

~~However, if the site-specific physical location of the containment radiation monitor is such that radiation from a cloud of released RCS gases could not be distinguished from radiation from nearby piping and components containing elevated reactor coolant activity, this EAL should be omitted and other site-specific indications of RCS leakage substituted.~~

There is no "Potential Loss" EAL associated with this item.

REFERENCE:

1. "R-41 and R-42 Responses Post-Leak Rate Change" D. Smith to B. Kessler dated 2/16/95.

Fission Product Barrier Loss / Potential Loss Matrix

(Those thresholds for which loss or potential is determined to be imminent, classify as though the threshold(s) has been exceeded)

Fuel Cladding

Potential Loss	Loss
ORANGE path in F-0.2, CORE COOLING	RED path in F-0.2, CORE COOLING
RED path in F-0.3, HEAT SINK	Coolant activity > 300 $\mu\text{Ci/cc}$ I-131 equivalent
Core Exit Thermocouple Readings > 700 °F	Core Exit Thermocouple Readings > 1200 °F
RVLIS \leq 39% w/ no RCPs running	Containment radiation monitor R-25 or R-26 > 17 R/hr
Emergency Director Judgment	Emergency Director Judgment

RCS

Potential Loss	Loss
RED path on F-0.4, INTEGRITY	RCS subcooling < SI initiation setpoint due to RCS leakage
RED path on F-0.3, HEAT SINK	Unisolated faulted (outside VC) ruptured steam generator
Primary system leakage exceeding capacity (> 75 gpm) of a single charging pump	> 0.17 $\mu\text{Ci/cc}$ on R-42 OR > 66 μCi on R-41 due to RCS leakage
Emergency Director Judgment	Emergency Director Judgment