Operations with the Potential for Draining the Reactor Vessel (OPDRVs)

Problem Statement

What constitutes "operations with a potential for draining the reactor vessel (OPDRVs)"?

Background

The term "operations with a potential for draining the reactor vessel (OPDRVs)" appears many times in the BWR Improved Standard Technical Specifications (ISTS):

NUREG-1433 (BWR/4)

LCO 3.3.6.2,	Secondary Containment Isolation Instrumentation, Table 3.3.6.2-1, Note (a)
LCO 3.3.7.1,	[MCREC] System Instrumentation, Table 3.3.7.1-1, Note (a)
LCO 3.5.2,	ECCS - Shutdown, Required Action B.1, C.1, SR 3.5.2.2
LCO 3.6.1.3,	PCIVs, Condition H, Required Action H.1
LCO 3.6.4.1,	[Secondary] Containment, Applicability, Condition C, Required Action C.2
LCO 3.6.4.2,	SCIVs, Applicability, Condition D, Required Action D.2
LCO 3.6.4.3,	SGT System, Applicability, Condition C, Required Action C.2.2, Condition E, Required Action E.2
LCO 3.7.4,	[MCREC] System, Applicability, Condition D, Required Action D.2.2, Condition F, Required Action F.2
LCO 3.7.5,	[Control Room AC] System, Applicability, Condition C, Required Action C.2.2, Condition E, Required Action E.2
LCO 3.8.2,	AC Sources - Shutdown, Required Action A.2.3, B.3
LCO 3.8.5,	DC Sources - Shutdown, Required Action B.2.3
LCO 3.8.8,	Inverters - Shutdown, Required Action A.2.3
LCO 3.8.10,	Distribution Systems - Shutdown, Required Action A.2.3

NUREG-1434 (BWR/6)

LCO 3.3.6.1,	Primary Containment Isolation Instrumentation, Required Action K.2.2, Table 3.3.6.1-1, Note (b)
LCO 3.3.6.2,	Secondary Containment Isolation Instrumentation, Table 3.3.6.2-1, Note (a)
LCO 3.3.7.1,	[CRFA] System Instrumentation, Table 3.3.7.1-1, Note (a)
LCO 3.5.2,	ECCS - Shutdown, Required Action B.1, C.1
LCO 3.6.1.3,	PCIVs, Condition H, Required Action H.1
LCO 3.6.4.1,	[Secondary Containment], Applicability, Condition C, Required Action C.2
LCO 3.6.4.2,	SCIVs, Applicability, Condition D, Required Action D.2
LCO 3.6.4.3,	SGT System, Applicability, Condition C, Required Action C.2.2, Condition E, Required Action E.2
LCO 3.7.3,	[CRFA] System, Applicability, Condition D, Required Action D.2.2, Condition F, Required Action F.2
LCO 3.7.4,	[Control Room AC] System, Applicability, Condition C, Required Action C.2.2, Condition E, Required Action E.2
LCO 3.8.2,	AC Sources - Shutdown, Required Action A.2.3, B.3
LCO 3.8.5,	DC Sources - Shutdown, Required Action B.2.3
LCO 3.8.8,	Inverters - Shutdown, Required Action A.2.3
LCO 3.8.10,	Distribution Systems - Shutdown, Required Action A.2.3

Operations with the Potential for Draining the Reactor Vessel (OPDRVs)

The term is not a defined term in Section 1.1 of the ISTS. The phrase and acronym appear many times in the ISTS Bases, but it is never defined nor its scope discussed.

An unplanned draining of the reactor vessel is not an analyzed accident in Chapter 15 of NUREG-0800, "Standard Review Plan." It is not a Loss of Coolant Accident (LOCA), which is defined in NUREG-0800, Section 15.6.4 as postulated accidents that would result from the loss of reactor coolant, at a rate in excess of the capability of the normal reactor coolant makeup system, <u>from piping breaks in the reactor coolant pressure boundary</u>. (emphasis added)" Despite the lack of an identified analysis, some Bases statements equate draining the reactor vessel to an analyzed accident:

> "Maintaining the [system] OPERABLE is not required in MODE 4 or 5, except for the following <u>situations under which significant radioactive releases can be postulated</u>:
>
> a. During operations with a potential for draining the reactor vessel (OPDRVs) and
>
> b. During movement of [recently] irradiated fuel assemblies in the [secondary] containment" (emphasis added).

The phrase "operations which have the potential for draining the reactor vessel" appears in the initial BWR Standard Technical Specifications, NUREG-0123, Revision 0, October, 1976. The term appeared in the original Monticello and Vermont Yankee Technical Specifications, issued circa 1971. The industry was unable to discover any documents that define the term or describe its basis.

The scope of OPDRVs has been discussed by the NRC and the industry for some time. At the June 28, 1993 meeting between the ITS conversion lead plants and the NRC, there was a discussion of a BWR interpretation issue. The summary of the issue states:

> "On June 1, [1993] the resident inspectors at WNP-2 questioned the licensee's plans to drain the reactor cavity to 6 inches below the RV flange, by draining through the RHR system, without first establishing secondary containment. The licensee's position was that, since two independent suction valves (with independent auto-isolation circuitry) are available and would isolate at +13 inches (13+ feet above the top of the fuel), draining through the RHR system did not present a potential for draining the reactor vessel.
>
> Region personnel contacted Grand Gulf, LaSalle, and Susquehanna who all agreed with WNP-2. The BWR licensees do not consider drain down through the RHR system as a potential for draining the reactor vessel, if either the shutdown cooling suction isolation valves (and associated isolation circuitry) are operable. The NRC staff considers that operation of any system connected directly to the reactor coolant system causes a potential for draining the vessel irrespective of whether the isolation valves are operable, because of the potential for a single failure (part of the design basis) or other system malfunctions."

At the September 27, 1993 meeting between the ITS conversion lead plants and the NRC, the discussion continued. The BWRs provided a summary of the BWROG position on OPDRVs. The BWR chairman stated that none of the utilities he had spoken with had a written definition for an OPDRV. The meeting summary and BWROG position paper are attached.

The highlights are:

- The BWROG has not generated a definition for OPDRV so that each member utility may retain the flexibility of applying the OPDRV concepts to its specific administrative control arrangement.

- General agreement does exist, however, on the concept of what constitutes an OPDRV. The principal criteria have to do with the size and location of the potential pathway, and the types of barriers that exist to prevent the draining of the vessel.

- In order to be considered an OPDRV, the line (or equivalent cross-sectional area) in question should exceed a certain minimum size, perhaps 1" (but probably plant specific) and should be located below normal operating water level (also probably plant specific)

- Temporary measures such as freeze seals, inflatable bladders, etc. are not generally considered to be adequate isolation boundaries to consider an activity as not constituting an OPDRV.

The TSB Branch Chief disagreed with the industry position and stated he would try to get the technical branches write down a position on the issue. However, there is no record of such a position ever being provided by the NRC technical staff.

Revision 0 of the ISTS PWR NUREGs (NUREG-1430, -1431, and -1432) included Required Actions to suspend OPDRVs in Section 3.8, "Electrical Power Systems." Traveler BWOG-06, which was submitted on 8/26/1993 and approved by the NRC on 6/2/1994, removed the Required Actions. The justification stated only that the Required Actions were included in the PWR ISTS NUREGs in error and the Technical Specification Branch Chief and the NRC SRXB agreed with the removal. The Required Actions were removed in Revision 1 of the PWR ISTS NUREGs.

Bulletin 93-03 addressed OPDRVs and NRC directed licensees to take actions in their TS. In response to an NRC request, the BWROG submitted a report, "Supplementary Information Regarding RPV Water Level Errors due to Noncondensible Gas in Cold Reference Legs of BWRs," to the NRC on May 20, 1993. The BWROG determined that the most limiting drain-down event is an RPV drain-down to the suppression pool through the low-pressure coolant injection suction flow path. The BWROG report indicated that, for this event, the core could reach 1100°C [2000°F] in as little as 16 minutes if there is no makeup to the coolant system. Automatic isolation signals based on low RPV level are normally credited for terminating these events. However, automatic isolation of the RHR system, and other systems, will not occur if there are large level errors in multiple instruments. In response to the bulletin, licensees modified their procedures or additional restrictions and controls for valve alignments and maintenance that have a potential to drain the RPV during Mode 3, and implemented hardware modifications necessary to ensure the level instrumentation system design is of high functional reliability.

In 2005, the BWROG TSICC surveyed the members on their definition of OPDRVs. There was little consistency between the plants. The responses are attached.

Operations with the Potential for Draining the Reactor Vessel (OPDRVs)

Current Situation

In an inspection report dated August 3, 2010, the NRC cited Exelon's Clinton Power Station for a violation of 10 CFR 50.59 related to the definition of ODPRVs. The violation was based on the NRC's conclusion that the process by which Exelon chose to define OPDRVs is in contrast to the plain language contained in the Clinton licensing basis. The NRC's denial of Exelon's response to the violation states:

> "The term 'OPDRV' was meant to be a plain language definition and nothing more, and 'OPDRV' is not otherwise defined in either the CPS Updated Final Safety Analysis Report or CPS Safety Evaluation documents. ... [W]e concluded that this procedure did, in fact, create a new TS definition of OPDRV ... by defining a specific threshold below which OPDRV does not apply. That definition is inconsistent with the plain language wording of OPDRV, which is intended to address the threat of any reactor coolant inventory loss. The TS wording does not contain a threshold below which OPDRV does not apply; therefore, by defining such a threshold, [the procedure] changes the TS definition. ... Should CPS desire ... to define what it perceives as "non-OPDRV" type evolutions, then CPS is required to follow the process outlined in 10 CFR 50.59 and to submit a license amendment request."

The 2005 survey of OPDRV definitions makes clear that most BWRs apply some limitations to what the NRC considers the "plain language definition" of OPDRVs.

The meaning of the OPDRV limitations was discussed at the May 2011 meeting of the BWROG Licensing Committee. They concluded:

- The apparent event to be mitigated by the OPDRV Applicability is a shutdown loss of coolant accident with one subsystem of mitigating equipment available assuming no single failure. This is based on the LCOs and Applicability statements which utilize the OPDRV concept.
- The concern is damage to the fuel in the reactor vessel due to loss of cooling and preventing the resulting release of radioactivity.
- Industry applications of the OPDRV limits have expanded the phrase to add concepts such as "credible," "to the active fuel," "assuming available equipment without single failure," "with operator actions," and "with fuel in the vessel."

Analysis

Based on the specifications that reference OPDRVs, the key assumptions in the event being protected by TS that reference OPDRVs are:

1. A loss of either onsite or offsite power (AC Sources - Shutdown, DC sources, inverters, distribution systems which require only a single train of AC Sources); and

2. Preventing radioactive release (Secondary containment isolation, control room isolation, primary containment isolation valves, secondary containment isolation valves, standby gas treatment).

The industry is developing a definition based on these findings to be discussed with the NRC on July 27, 2011.

Attachment 1

Meeting Summary and Enclosure for ISTS Lead Plant Meeting

July 26-29, 1993

DRAFT FOR DISCUSSION

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

September 27, 1993

MEMORANDUM FOR: Brian K. Grimes, Director
Division of Operating Reactor Support, NRR

FROM: Christopher I. Grimes, Chief
Technical Specifications Branch
Division of Operating Reactor Support, NRR

SUBJECT: SUMMARY OF OWNERS GROUPS MEETING ON THE IMPROVED STANDARD TECHNICAL SPECIFICATIONS: JULY 28 AND 29, 1993

On July 28 and 29, 1993, the Technical Specifications Branch (OTSB) met with the Owners Groups (OG), to discuss the status of activities to implement the improved standard technical specifications (STS) and related matters. The meeting attendees are listed in Enclosure 1. The agenda for the staff's meeting with the Owners Groups is presented in Enclosure 2.

We discussed the status of the Steam Generator Tube Integrity Program with the OG. The OG provided OTSB with some information outlining the industry's response to the June 25, 1993 letter from W. T. Russell (Enclosure 3). We told the OG that we would forward the information to NRR management to help them prepare for the August 12, 1993 executive meeting.

The BWROG Chairman provided a summary of the BWROG discussions on "operations with a potential for draining the reactor vessel (OPDRVs)," as was requested at the June meeting with the OG. He stated that he had talked to several BWR utilities and all agreed with the WNP-2 interpretation of an OPDRV which was discussed at the June meeting. He also stated, however, that none of the utilities he spoke with had a written definition of an OPDRV, but that all generally agreed that the term only applies in cold shutdown and refueling, and only applies to activities which can drain the vessel level below the top of the active fuel. I told the OG that the staff did consider the WNP-2 situation to be an OPDRV and that I would attempt to have the technical staff write down a position on this issue. The B&WOG Chairman stated that the PWROGs did not believe these issues applied to them and that they would be submitting a traveller for a proposed change to the improved STS to remove the term "OPDRV" from Section 3.8.

I pointed out that there has been a general problem concerning separating shutdown risk issues from other generic issues during staff review of proposed STS changes. I told the OG that OTSB is taking the responsibility to ensure that shutdown risk issues are kept separate since they are to go forward for public comment. I told the OG that the OPDRVs issue may have to be resolved under the shutdown risk program.

We discussed the status of the low power and shutdown (LPS) Technical Specifications and my July 15, 1993 letter to the OG on this subject. We gave the OG copies of the draft LPS Technical Specifications (Enclosure 4) and told them that these Specifications were still undergoing review by OTSB. I told the OG that I wanted the industry's opinion on the role of nonsafety-related

We discussed item #122 concerning the conflicting requirements for the availability of high pressure injection for emergency core cooling and low temperature overpressure protection. We discussed the staff's response to an OG proposal contained in STS change Traveller <<WOG-20>>. We agreed to arrange a meeting with the OG and the Reactor Systems Branch on August 11 or 12, 1993, to discuss this issue.

We discussed item #125 concerning inservice inspection and inservice testing for snubbers. We provided the OG with a staff proposal for a change to the administrative control program under STS Change Traveller <<NRC-08>>. We requested an OG response in time to prepare for the executive meeting on August 12, 1993.

We discussed item #126 concerning the Pressure and Temperature Limits Report (PTLR). The WOG Chairman stated that Westinghouse is drafting a WCAP outlining the methodologies to develop pressure/temperature limits. The OG provided us with an industry response to a staff-proposed change to the PTLR description in the Administrative Control Chapter (Enclosure 8). We requested that the OG provided us with a markup of Chapter 5.0 as they would like to see the description of the PTLR.

We discussed the status of new generic change packages received at the June meeting. This status is reflected in the database printout provided in Enclosure 9. We provided the OG with a copy of a July 23, 1993 memorandum from Carl Berlinger to myself which responded to a question concerning surveillance requirements for battery terminals (Enclosure 10). We informed the OG that this was the staff response to their proposal for a change to the improved STS provided under STS Change Traveller WOG-13-C.5.

We provided the OG a copy of the memorandum dated July 16, 1993, from R. J. Barrett to you concerning the San Onofre containment isolation valve issue discussed at the June meeting (Enclosure 11). The staff concluded that the SONGS proposal was not appropriate for the improved STS.

We discussed a recent OGC memorandum concerning NSAC-125 and that further discussion needed to occur between the staff and NUMARC to resolve issues surrounding NSAC-125.

We discussed whether any changes needed to be made in the generic change process for the improved STS. We all agreed that it was important to set up meetings early on issues that require some discussion, rather than "trading paper." We also agreed that Bases changes should only be proposed if necessary for a corresponding LCO change or if the Bases are technically incorrect. We also discussed the importance of providing adequate justifications for OG-proposed changes that the staff rejects.

We discussed the license amendment screening process and agreed that this process should be discussed at the Technical Specifications Improvement Program workshop in December 1993. I stated that the NRC may be able to bring one or two screening panel members to the workshop for this purpose.

DRAFT FOR DISCUSSION

ENCLOSURE 1

MEETING ATTENDEES
July 28 & 29, 1993

Attendee	Organization
Blair Wunderly	FPC/B&WOG
Lee Bush	Commonwealth Edison/WOG
Donald Hoffman	EXCEL Services Corp.
Jim Andrachek	Westinghouse
Mark Bittman	NUS
Darrell Gardner	TVA
Tom Porter	TVA
Jim Eaton	NUMARC
Ray Baker	Southern Nuclear/BWROG
Sheri Mahoney	Entergy
Brian Woods	SCE/CEOG
Frank Ferri	EXCEL
Brian Mann	BG&E
Jack Stringfellow	Southern Nuclear
Chris Grimes	NRC/OTSB
Ronnie Lo	NRC/OTSB
Jim Miller	NRC/OTSB
Nanette Gilles	NRC/OTSB

OPDRVS

The BWROG has not generated a definition for OPDRV so that each member utility may retain the flexibility of applying the OPDRV concepts to its specific administrative control arrangement. General agreement does exist, however, on the concept of what constitutes an OPDRV. The principal criteria have to do with the size and location of the potential pathway, and the types of barriers that exist to prevent the draining of the vessel.

In order to be considered an OPDRV, the line (or equivalent cross-sectional area) in question should exceed a certain minimum size, perhaps 1" (but probably plant specific) and should be located below normal operating water level (also probably plant specific). Smaller sized lines do not constitute a credible threat to vessel draining because of compensatory measures available to replace the water inventory. Openings above the normal water level do not produce a risk of core uncovery. In addition, to be considered an OPDRV, the pathway should not be isolable by an automatic isolation valve capable of automatic closure on receipt of a low water level signal.

Examples of OPDRVs include CRD removal, and vessel draining through the bottom head drain, because they are not isolated from the RPV by at least one closed manual valve, blind flange or deactivated automatic valve secured in the closed position. Temporary measures such as freeze seals, inflatable bladders, etc. are not generally considered to be adequate isolation boundaries to recategorize the affected activity as not constituting an OPDRV.

The current licensing basis of most, if not all BWRs, does not postulate line break types of accidents in MODES 4 and 5, in part because of the absence of a credible driving force to cause the event. Thus, when evaluating for OPDRVS, no consideration is given to the postulation of a passive failure (line break).

In the example given, operation of the RHR System in the Shutdown Cooling mode would not be considered an OPDRV for the following reasons:

- a passive failure (line break) must be postulated in order to begin draining the vessel when aligned in the normal SDC flow path (the normal flow path for SDC is back to the RPV), or

- a valve must be postulated to be mispositioned in the SDC flow path resulting in diversion of some or all of the return path flow from the RPV,

AND

- the automatic isolation capability of a SDC suction valve must be postulated to fail.

Such a sequence of events is not considered credible and appears to be beyond the licensing basis of the plants.

Attachment 2

2005 BWROG TSICC SURVEY OF OPDRV DEFINITIONS

Brian Mann

From: [redacted]

[redacted]

After our recent Refuel Outage, we are once again looking at our definition for OPDRVs. Consequently, I'd like to get input/feedback from the group to aid in any potential changes in our working definition.

Here is the scenario: In order to take advantage of some new UT techniques, we needed to reshape the crowns on some welds on recirc piping/nozzles. This involved some grinding. These welds were on the vessel side (i.e., unisolable section) of the piping. There was fuel in the RPV during this time period.

Questions:

Would you consider the above activity to constitute an OPDRV?

The philosophical question here is: How far do you take the concept of "Potential" in defining an OPDRV?

In this specific case, would you factor in the "potential" for the worker to grind too deeply into the material, or the "potential" for an undetected flaw to exist that could lead to a leak, in making your call on OPDRVs?

Do you have a "de minimus" value for leakage in saying an activity is NOT an OPDRVs, e.g., maximum possible leakage rate is < X gpm?

thanks in advance,
[redacted]

Brian Mann

[redacted]

Below is our definition of OPDRV. As you can see, there is a certain size penetration below which a leak is not considered an OPDRV. The grinding guy's hole isn't exactly the "pipe" which is referred to in Section 1.2.1, but you could apply the same philosophy; so your grinding guy would not be opening a big enough hole for it to be considered an OPDRV, and any undetected flaws would be much smaller than this "hole size".

1.2 Operation with a Potential for Draining the Reactor Vessel (OPDRV) - An OPDRV is any operations or maintenance activity that has the potential to uncover irradiated fuel in the reactor pressure vessel (RPV); and

1. Involves piping with an inner diameter of greater than 1.53 inches (or multiple pipes which, when summed, exceed an inner cross sectional area equivalent to a 1.53 inch diameter pipe [1.84 square inches]) unless the piping associated with the activity:
   a. Is protected by at least one isolation valve (and associated functional instrumentation and logic) capable of automatically closing on a low reactor water level signal (Level 1, 2, or 3); or
   b. Is isolated from the RPV by at least one approved device controlled in the required position. Approved devices are closed manual valves, back-seated valve, or a deactivated automatic valve secured in the closed position. Additional devices may be used if evaluated and approved prior to use, or
   c. Has a motor operated valve capable of being operated from the control room; or
   d. Has a valve capable of being closed locally by a dedicated equipment operator or technician, as appropriate, with no concurrent duties who is maintaining communications with the control room; or
2. Involves RHR "A" and "B" System realignments during system operations when the simultaneous opening interlock between 1E12-F004A(B) and 1E12-F006A(B) is not functional; or
3. Involves control rod drive mechanism (CRDM) removal unless:
   a. Prior to complete removal of the CRDM, communications between the under-vessel area and the control room are established and it is verified that the control rod is back-seated against the CRDM guide tube. Following removal of the CRDM (if a CRDM is not immediately placed in the guide tube), a blank flange is placed over the removed CRDM guide tube; and
   b. No control blade shuffle is taking place in the quadrant in which CRDM replacement is taking place.

[redacted]

Brian Mann

[redacted]

[redacted] had this provision;

"When work is in progress which has the potential to drain the vessel, manual initial capability of either 1 Core Spray loop or 1 RHR pump, capable of injecting water into the vessel is required & the associated EDG is required".

So under CTS, you could do OPDRVs of any size as long as you had stated injection capability. Since STS doesn't define OPDRV, we carried this CTS logic forward in the OPDRV procedure by saying as long as the hole size is smaller than make-up capability, then it isn't an OPDRV. In practice, the actual OPDRV proceedure has a hole size versus number of injection pump capabilities table. I'll add, however, our new resident doesn't like this approach & operations has committed to changing the OPDRV procedure.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted] a [redacted]

[redacted]

[redacted]

DRAFT FOR DISCUSSION

Brian Mann

[redacted]

Below is the [redacted] definition of OPDRV. The definition is based upon the premise that operators must have at least 20 minutes to respond to a draindown prior to level dropping to level 1. It is assumed that level is at level 3 prior to the draindown event. For reference, normal water level during operation is + 36 inches, level 3 (the scram setpoint) is +11.4 inches, level 1 (low pressure ECCS initiation) is -150.3 inches, and TAF is -166.7 inches. We have a rather large vessel so draindown will be slower than some others.

[redacted] TRM:
The following are considered operations with a potential for draining the reactor vessel:

a. Operation of the shutdown cooling flow path without a functional interlock with the associated suppression pool suction valves.

b. Any of the following**, associated with a reactor vessel pressure boundary penetration greater than 2.62 inches inside diameter and located below a reactor vessel elevation 30 inches above reactor level 1 (just below the LPCI nozzles). The penetration size may be increased to 3.62 inches inside diameter in operational condition 5.

1. Any operation with the reactor cavity not flooded in accordance with TS 3.5.2 and not protected by at least one isolation valve capable of auto closing on low reactor water level.

2. Any operation (e.g., valve disassembly) that is not isolated from the RPV by at least one closed manual valve, valve backseat, blind flange, or de-activated automatic (nonmanual) valve secured in the closed position. Other temporary plugs (freeze seals, plumber plugs, inflatable bladders, etc.) are not adequate to meet this requirement. Deliberate operator action to lower reactor vessel level or maintain level via draining in accordance with an approved procedure is not considered an OPDRV.

**- With the reactor subcritical for less than 24 hours, an OPDRV should be considered to exist for penetrations below the normal water level and greater than 1 inch in diameter.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

DRAFT FOR DISCUSSION

Brian Mann

[redacted] [redacted]

[redacted] [redacted]

[redacted]

Here is [redacted] OPDRV definition from the TRM although it does not really address your situation.

However, I think this is taking the concept of "potential" way too far.
I would think there is very little chance of grinding into the pipe on a weld prep, particularly on the RCS piping. Maybe on service water but not RCS.

If someone asked me, and noone ever has, I would not call this an OPDRV.

[redacted]

Operations with the Potential to Drain the Reactor Vessel (OPDRV) - This is a self-defined phrase, only applicable with fuel in the reactor vessel. The following activities are examples of OPDRVs. Note that this is not an all inclusive listing.

- Failure to maintain operability of the RHR suction valve interlocks (F004A, B, C, & D and F006A, B, C, & D) while in Operational Condition 4 or 5. An exception is that, while in Condition 4 or 5, the interlocks may be defeated provided that the RPV is isolated from the shutdown cooling suction piping by a manual valve via an approved procedure.

- Failure to maintain operability of Reactor Water Cleanup primary containment isolation valves 2G31-F001 and F004 while in MODE 4 or 5. If one of these valves is in the isolated position, deactivated, and controlled via the clearance procedure, this does not apply.

- Failure to maintain RHR primary containment isolation valves 2E11-F008 and 2E11-F009 OPERABLE per Unit 2 Technical Specifications LCOs 3.3.6.1 and 3.6.1.3 while in MODE 4 or 5. If Required Actions of Unit 2 Technical Specifications LCOs 3.3.6.1 and 3.6.1 are satisfied, this does not apply.

- Opening a greater than 1 inch penetration to the RPV or RPV cavity. Exceptions to this are:

    a. Penetrations that are isolated from the RPV or RPV cavity by at least one closed, deactivated valve, manual valve, or blank flange.

    b. Penetrations that are isolable from the RPV or RPV cavity by a functional isolation system provided RPV water cannot be diverted to other sources.

    c. Penetrations that are isolated from the RPV or RPV cavity by another barrier (such as plugs, freeze seals, etc.) utilized via an approved procedure.

    d. Lines above the Main Steam Line elevation of 196 feet - 10 inches (if no movement of irradiated fuel is in progress).

    e. Any RPV penetration which is at an elevation above the RPV, or RPV cavity, water level.

- Evolutions associated with the following systems/components, if not isolated by at least one boundary: Reactor Water Cleanup, Reactor Recirculation, Residual Heat Removal, Control Rod Drive (removal), Standby Liquid Control, Reactor Coolant Sampling, Main Steam Isolation Valves, Safety Relief Valves, Main Steam, Feedwater, Core Spray, High Pressure Coolant Injection, Reactor Core Isolation Cooling, RPV Instrumentation, and RPV Cavity Drains.

System Functional Test - The injection of an actual or simulated actuation signal, overlapping with a LOGIC SYSTEM FUNCTIONAL TEST as appropriate, to verify that system components perform the system's specified safety function. Where required, Bases provide additional test description.

Brian Mann

[redacted]

[redacted]

I was advised that the example you cite of grinding on a weld COULD be classified as an OPDRV but it is NOT LIKELY.

At [redacted] guidance on what conditions must exist for an OPDRV to exist is provided in procedures. The guidance includes a minimum size for the opening. The following is the guidance:

2.3 An OPDRV will exist when all of following conditions exist:

NOTE - Examples of OPDRVs include CRDM removal, vessel draining through bottom head drain.

2.3.1 There is irradiated fuel in RPV.

2.3.2 A planned activity will breach RPV pressure boundary or non-routine operation will be conducted on a system connected to RPV pressure boundary.

2.3.3 An RPV penetration(s) >/= 0.8 in^2 cumulative cross-sectional area is involved (equivalent to penetration > 1" diameter).

2.3.4 The RPV penetration(s) is located below the feedwater nozzles.

2.3.5 An acceptable isolation barrier does not exist.

[redacted]