



Department of Mechanical and Nuclear Engineering
 College of Engineering
 The Pennsylvania State University
 137 Reber Building
 University Park, PA 16802-1412

(814) 865-2519
 Fax: (814) 863-4848

DOCKET NUMBER
PROPOSED RULE 50
 (70FR 67598)

DOCKETED
USNRC

December 19, 2005 (2:49pm)

OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

Dr. Brian W. Sheron
 Associate Director,
 Engineering and Safety Systems
 Office of Nuclear Reactor Regulation
 US Nuclear Regulatory Commission
 11555 Rockville Pike
 Rockville, MD 20852

December 7, 2005

Dear Dr. Sheron:

We have revised the data for pipe breaks and leaks following the suggestions from the NRC staff and have made comparisons to the NRC expert solicitation panel's break spectrum failure frequency plots that were developed in support of the revisions to 10CFR50.46. We had discussion with C.Gary Hammer and other members of the NRC staff on our original comparisons and they suggested that we limit our comparisons to just the class 1 piping for the reactor since that was the class of piping systems that the NRC break spectrum frequency study were originally developed for. Therefore, we eliminated all piping failure, leaks, and cracking data from the mixed data base that we had originally developed such that only the class 1 piping information remained. A CD with the revised data is included with this letter. We also reviewed the class 1 systems with the NRC to make sure that we isolated only those systems which should be compared to the estimated break frequency curves. When comparing the remaining data to the NRC break frequency curves, we used approximately the same break size bins that were used in the NRC study. We also normalized the individual bins of data using the approach recommended by the NRC in which the number of breaks or breaks and leaks were normalized on the numbers of effective full power days.

We have separated out "Breaks" from the total data base as a separate plots for both PWRs and BWRs as shown in Figures 1 and 2. As these figures indicate, there are no large breaks in the class 1 piping. However, for the smaller breaks, the data clearly lies above the estimated break frequencies estimated in the NRC solicitation study. The data is above the 95% percentile as compared to the NRC break frequency plots indicating that even smaller breaks are more frequent as compared to the estimated frequencies from the solicitation study.

We also have combined "Breaks" and "Leaks" together on a separate plots for PWRs and BWRs as seen in Figures 3 and 4. The rationale for this is that leaks are really breaks since the pipe has failed and is leaking. We used the size of the pipe for when combining the leaks with the breaks. This may not be the best method of comparing the data to the break frequency distribution and it may appear to bias the results since there are only leaks for the larger pipes and not breaks. However, it is not clear that, given a set of conditions, a leak in a large pipe could grow to a full pipe size break. Say for example, under a safe shutdown earthquake condition. Also, this grouping could be viewed as being conservative since the original premise is that the pipes should not leak in the first place.

All the data, breaks and leaks, when combined in this form indicate that there is a significant difference between the existing data and the break spectrum failure frequencies from the NRC expert solicitation study. This indicates to me that we should not be revising 10CFR50.46 by introducing a "transitional break size" and reducing the mitigation capabilities of the plant's ECC systems and defense in depth for the larger break sizes. I believe that we need to maintain the full functional capability of the robust ECC systems that we have in the current operating plants for all possible break sizes up to and including the full double-ended break of the reactor coolant piping. The break and leak data for the class 1 piping indicates to me that we need the full functional ECC systems and their supporting systems and they should not be compromised or sacrificed by revising 10CFR50.46.

Therefore, again, I would strongly recommend that we do not change 10CFR50.46. If you have any question on the plots or data file, please feel free to contact me.

Very truly yours,



L.E. Hochreiter
Professor of Nuclear and Mechanical Engineering
The Pennsylvania State University

Figure 1

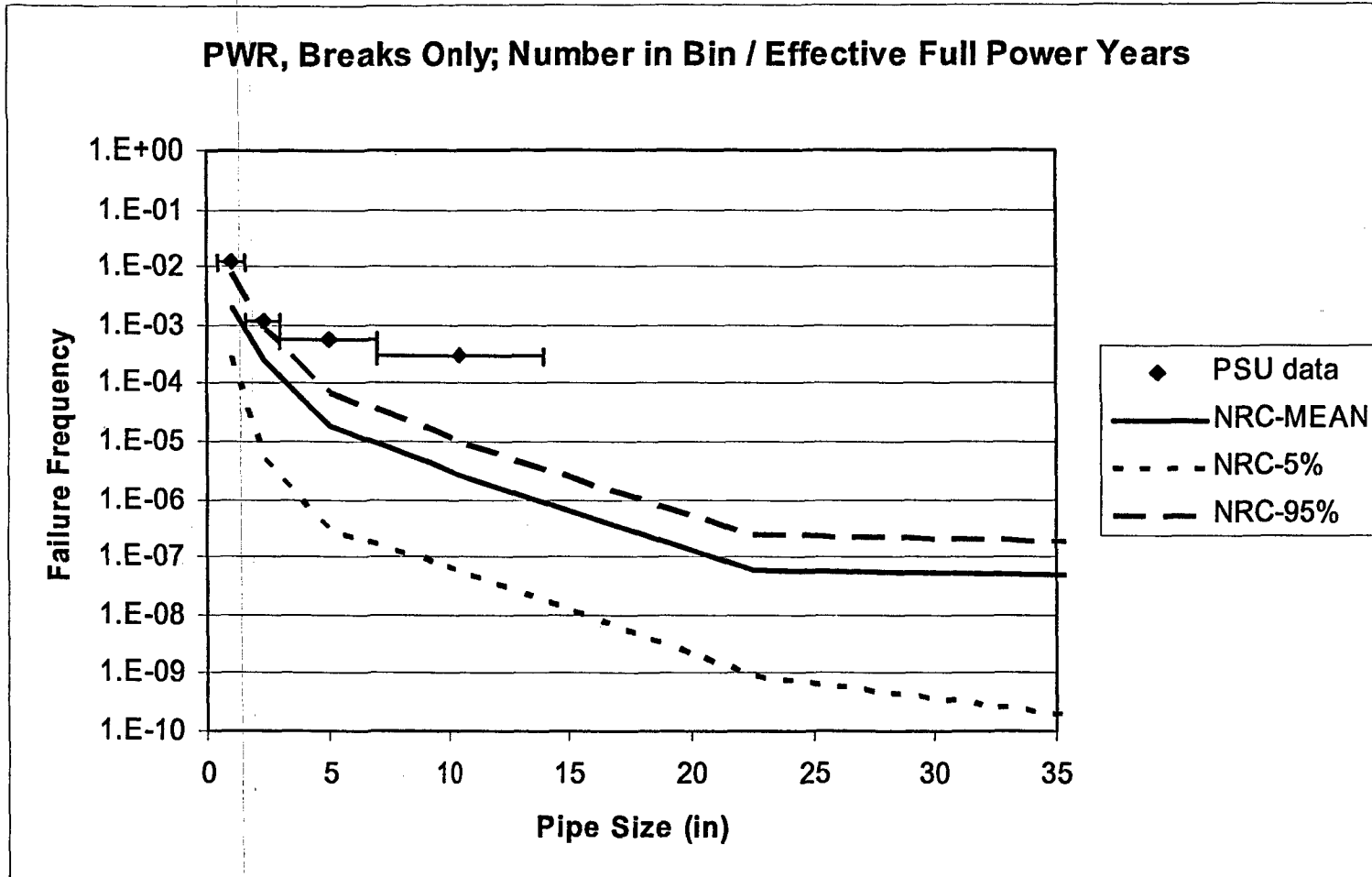


Figure 2

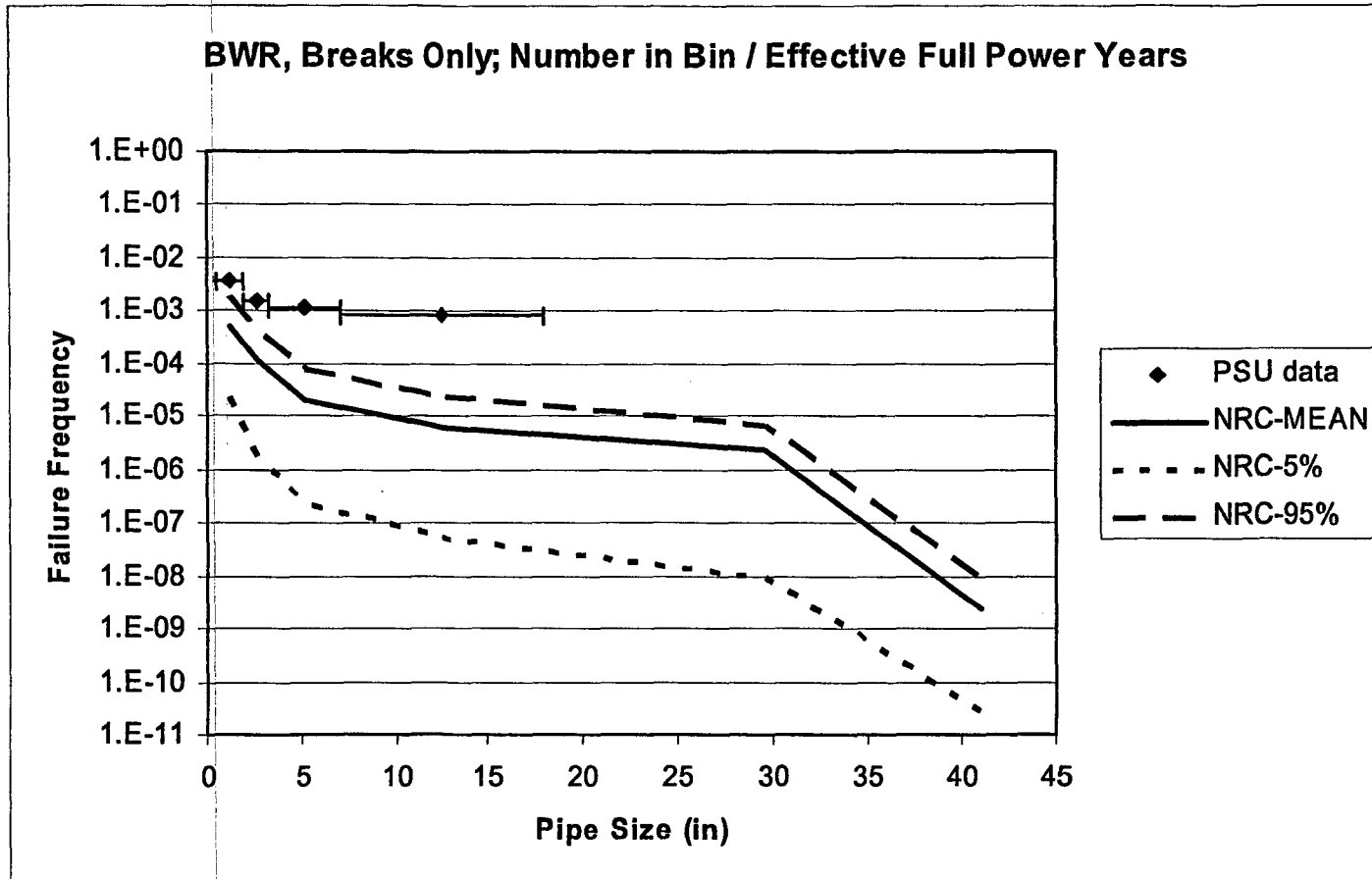


Figure 3

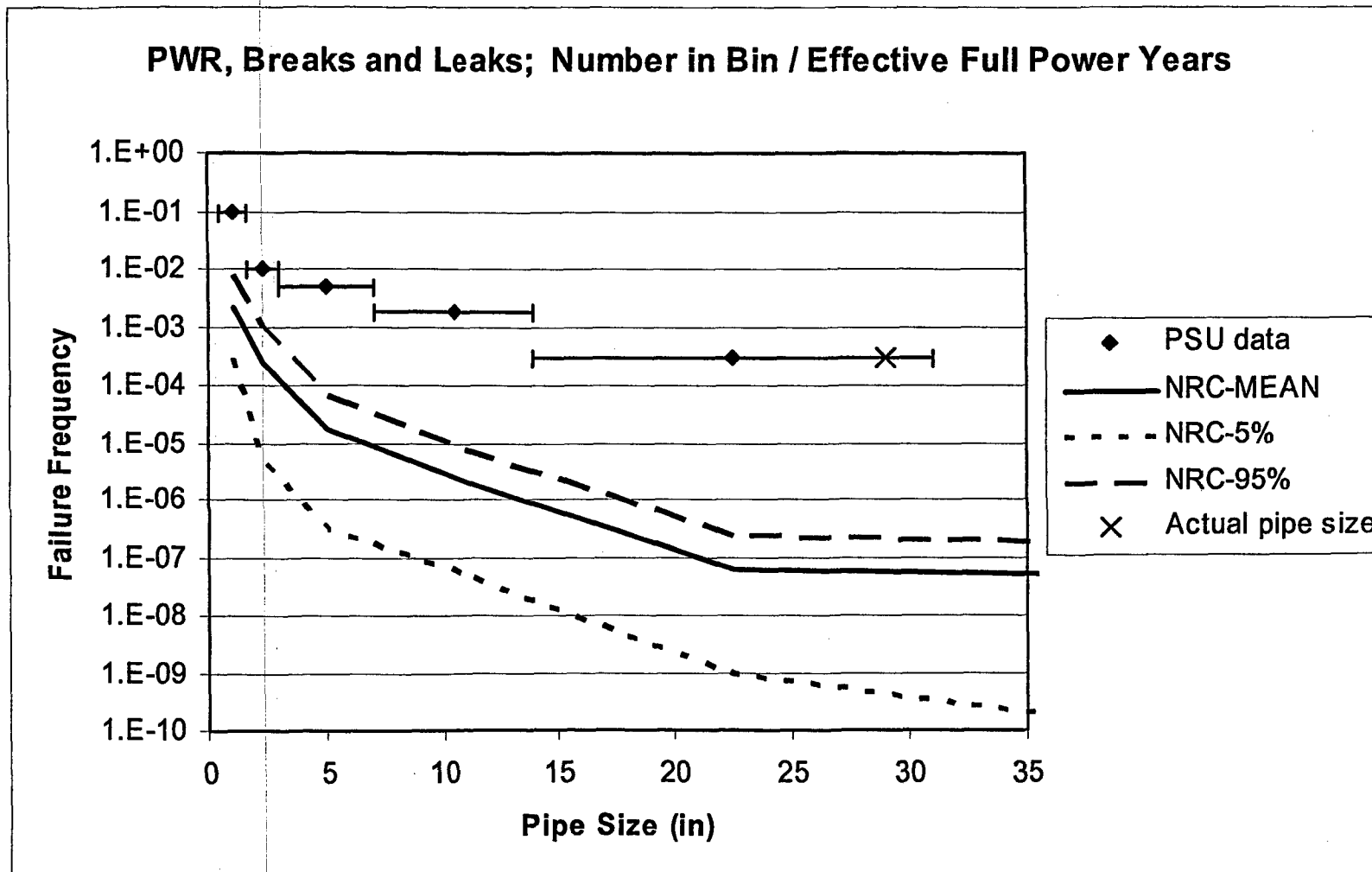
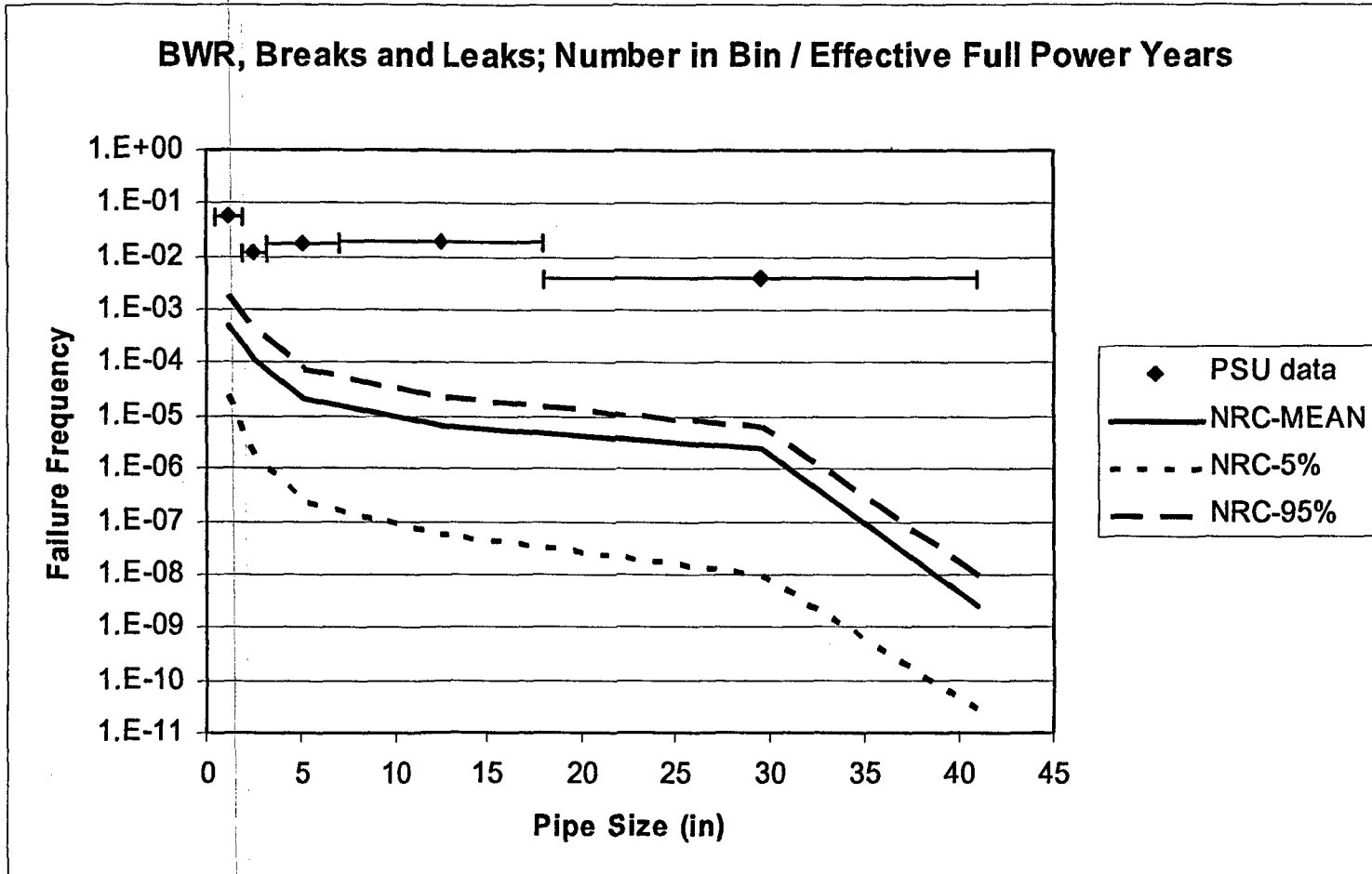


Figure 4



Station	Plant Type	Date	System Name	Pipe Size	Break Def	References	Failure Mechanism	Comments	Material
LaSalle 1	BWR	03/20/1983	Main steam	0.5	Leak		Construction Defect/Errors	Construction defect/errors	CS
Monticello	BWR	08/02/1976	Steam	0.5	Leak		Erosion/Corrosion	Erosion/corrosion	CS
Peach Bottom	BWR	06/25/1975	steam	0.5	leak	PNO-79-194	fatigue-vibrational	fatigue-vibration	CS
Dresden 2	BWR	06/03/1983	Main steam	0.75	Leak	83-044	Fatigue-Vibrational	Fatigue-vibration	CS
Dresden 3	BWR	02/08/1975	Feedwater	0.75	Crack/Leak	AO 75-5	Construction Defect/Errors	Construction defect	CS
Dresden 3	BWR	09/20/1974	Feedwater	0.75	Leak	AO 74-28	Fatigue-Vibrational	Fatigue-vibration	CS
Dresden 3	BWR	06/10/1974	Feedwater	0.75	Rupture	Ltr DL; 6/18/74	Fatigue-Vibrational	Fatigue-vibration	CS
Monticello	BWR	08/06/1979	Main steam	0.75	Leak		Erosion/Corrosion	Erosion/Corrosion	CS
Quad Cities 1	BWR	11/18/1975	feedwater	0.75	crack/leak	PNO-II-79-041	fatigue-vibrational	fatigue-vibration	CS
Quad Cities 2	BWR	06/18/1970	feedwater	0.75	leak	AO 74-14	fatigue-vibrational	fatigue-vibrational	CS
Quad Cities 2	BWR	08/30/1971	feedwater	0.75	failed	75-036	fatigue-vibrational	fatigue-vibrational	CS
Dresden 2	BWR	09/05/1983	Steam	0.99	Leak	83-064	Thermal Fatigue	Thermal fatigue	CS
Monticello	BWR	09/29/1976	Feedwater	0.99	Leak		Fatigue-Vibrational	Fatigue-vibration	CS
Dresden 2	BWR	01/01/1983	Feedwater	1	Leak	83-001	Fatigue-Vibrational	Fatigue-vibration	CS
Dresden 2	BWR	12/24/1982	Feedwater	1	Leak	82-057	Fatigue-Vibrational	Fatigue-vibration	CS
Dresden 2	BWR	05/09/1979	Feedwater	1	Leak	79-031	Corrosion/Fatigue	Corrosion/Fatigue of carbon steel	CS
Dresden 3	BWR	11/12/1982	Feedwater	1	Leak	82-046	Thermal Fatigue	IGSCC	CS
Dresden 3	BWR	06/05/1982	Feedwater	1	Leak	82-025	Unknown	Fatigue-vibration	CS
Dresden 3	BWR	11/20/1979	Feedwater	1	Leak	79-032	Stress Corrosion/IGSCC	Corrosion at minimum flow line	CS
Dresden 3	BWR	09/12/1976	Feedwater	1	Leak	76-015	Corrosion/Fatigue	Fatigue-vibration	CS
Dresden 3	BWR	10/07/1975	Feedwater	1	Leak	AO 75-43	Construction Defect/Errors	Poor weld, construction defect	CS
LaSalle 1	BWR	07/18/1983	Feedwater	1	Leak		Construction Defect/Errors	Construction defects/errors	CS

LaSalle 1	BWR	03/20/1983	Steam	1	Leak		Construction Defect/Errors	Construction defects/errors, defective socket weld	CS
Monticello	BWR	07/24/1981	Main steam	1	Leak		Erosion/Corrosion	Erosion/corrosion	CS
Monticello	BWR	08/25/1980	Main steam	1	Leak		Erosion/Corrosion	Erosion/Corrosion	CS
Monticello	BWR	12/20/1979	Main steam	1	Leak		Erosion/Corrosion	Erosion/Corrosion	CS
Monticello	BWR	07/01/1979	Main steam	1	Leak		Erosion/Corrosion	Erosion/Corrosion	CS
Monticello	BWR	04/04/1979	Main steam	1	Leak		Erosion/Corrosion	Erosion/Corrosion	CS
Monticello	BWR	11/24/1978	Main steam	1	Leak		Erosion/Corrosion	Erosion/Corrosion	CS
Monticello	BWR	11/17/1978	Main steam	1	Leak		Construction Defects/Errors	Construction Defects/Errors	CS
Monticello	BWR	07/19/1978	Main steam	1	Leak		Erosion/Corrosion	Erosion/Corrosion	CS
Monticello	BWR	05/08/1978	Main steam	1	Leak		Erosion/Corrosion	Erosion/Corrosion	CS
Monticello	BWR	08/02/1977	Main steam	1	Leak		Erosion/Corrosion	Erosion/Corrosion	CS
Monticello	BWR	08/28/1976	Main steam	1	Leak		Erosion/Corrosion	Erosion/corrosion	CS
Monticello	BWR	01/10/1979	Steam	1	Leak		Erosion/Corrosion	Erosion/Corrosion	CS
Oyster Creek	BWR	12/29/1986	Main steam	1	Leak		Unknown	Unknown cause	CS
Dresden 2	BWR	12/17/1982	Feedwater	1.1	Leak	82-055	Fatigue-Vibrational	Fatigue-vibration	CS
Dresden 2	BWR	05/11/1982	Main steam	1.1	Leak	PNO-III-82-045	Unknown	Unknown cause	CS
Dresden 3	BWR	03/07/1983	Feedwater	1.1	Leak	83-008	Erosion/Corrosion	Erosion/corrosion at the heater shell	CS
Dresden 3	BWR	11/15/1978	Feedwater	1.1	Leak	78-055	Construction Defect/Errors	Construction defect, slag inclusion	CS
Dresden 3	BWR	09/08/1978	Steam	1.1	Leak	78-035	Unknown	Cracked weld on vent line	CS
Grand Gulf	BWR	09/21/1984	Steam	1.1	Leak	PNO II-84-061A	Unknown		CS
Hope Creek	BWR	09/26/1990	Feedwater	1.1	Leak		Construction Defect/Errors	Construction Defect/Errors	CS
Monticello	BWR	09/30/1980	Main steam	1.1	Leak		Erosion/Corrosion	Erosion/Corrosion	CS

Monticello	BWR	06/14/1983	Feedwater	1.25	Leak		Erosion/Corrosion	Erosion/corrosion	CS
Monticello	BWR	04/13/1983	Feedwater	1.25	Leak		Erosion/Corrosion	Erosion/corrosion	CS
Dresden 3	BWR	06/11/1974	Main steam	1.5	Leak	Letter to NRC (6/11/74)	Unknown	Unknown cause	CS
Dresden 2	BWR	07/31/1974	Feedwater	2	Crack/Leak	RO	Unknown	Cracked weld, unknown	CS
Duane Arnold	BWR	01/06/1991	Main steam	2	Rupture	91-001	Fatigue-Vibrational	Fatigue-vibration	CS
LaSalle 1	BWR	02/05/1983	Main steam	2	Leak		Construction Defect/Errors	Construction defect/errors	CS
LaSalle 1	BWR	02/02/1983	Main steam	2	Leak		Construction Defect/Errors	Construction defect/errors	CS
Monticello	BWR	11/21/1978	Main steam	2	Leak		Erosion/Corrosion	Erosion/Corrosion	CS
Vermont Yankee	BWR	01/07/1979	feedwater	2	leak	83-002	unknown	unknown cause	CS
Dresden 3	BWR	11/09/1974	Feedwater	3	Leak	AO 74-33	Erosion/Corrosion	Erosion, turbulent flow	CS
Perry	BWR	04/02/1983	main steam	3	severed	87-027	erosion/corrosion	erosion/corrosion	CS
Brunswick 2	BWR	01/02/1988	Main Steam	4	Leak	88-001	Construction Defect/Error	Many leaks, pipe seating material installed, construction defect	CS
Cooper	BWR	01/16/1980	Main steam	4	Crack/Leak	80-005	Stress Corrosion/IG SCC	IGSCC	CS
Dresden 2	BWR	03/22/1979	Feedwater	4	Crack/Leak	79-019	Corrosion	Corrosion	CS
LaCrosse	BWR	01/20/1972	Main steam	4	Rupture		Construction Defect/Errors	Failed threaded fitting, 7 failures	CS
Monticello	BWR	08/08/1979	Steam	4	Leak		Erosion/Corrosion	Erosion/Corrosion	CS
Pilgrim	BWR	03/06/1982	feedwater	4	leak	86-005	other	pressure surge	CS
Quad Cities 2	BWR	06/09/1970	feedwater	4	rupture	NSIC-122;09044;P ower reactor- Aug.Sept.'75 ; AO 74-14	unknown	valve body failed; 4000-7000 gal; low flow feedwater valve	CS
Quad Cities 2	BWR	07/19/1971	feedwater	4	crack/leak	AO 75-24	stress corrosion/IG SCC	stress corrosion	CS
Quad Cities 2	BWR	10/06/1971	feedwater	4	crack/leak	AO 75-37	unknown	unknown	CS

Brunswick 1	BWR	03/02/1990	Main Steam	6	Rupture	90-003	Erosion/Corrosion	Erosion/Corrosion	CS
Dresden 3	BWR	09/18/1978	Feedwater	6	Leak	78-037	Water Hammer	High flow velocity, Water hammer	CS
Dresden 3	BWR	07/24/1978	Feedwater	6	Leak	78-030	Erosion/Corrosion	Erosion/Corrosion	CS
Dresden 3	BWR	03/06/1978	Feedwater	6	Leak	78-005	Erosion/Corrosion	Erosion/Corrosion	CS
Dresden 3	BWR	06/07/1977	Feedwater	6	Leak	LER?	Erosion/Corrosion	Sch 120, pinhole leak, shutdown	CS
Dresden 3	BWR	12/01/1974	Feedwater	6	Leak	AO 74-36	Erosion/Corrosion	Erosion	CS
Browns Ferry	BWR	09/29/1982	Main Steam	8	Rupture	82-115	Erosion/Corrosion	Erosion/Corrosion	CS
Browns Ferry	BWR	08/24/1982	Main Steam	8	Rupture	AEOD/E4 16	Erosion/Corrosion	Erosion/Corrosion	CS
Dresden 1	BWR	06/01/1979	Steam	8	Leak	NUREG/75-067	Stress Corrosion/IG SCC	IGSCC	CS
Dresden 1	BWR	10/20/1978	Feedwater	10	Leak	78-051	Erosion/Corrosion	Erosion/corrosion	CS
Dresden 2	BWR	08/06/1974	Feedwater	10	Leak	Ltr DL 8/6 74	Fatigue-Vibrational	Fatigue-vibration	CS
Dresden 3	BWR	10/20/1978	Feedwater	10	Leak	78-051	Erosion/Corrosion	Cracked support, Erosion/Corrosion	CS
Dresden 3	BWR	09/27/1975	Feedwater	10	Leak	AO 75-43	Construction Defect/Errors	Construction defect	CS
LaCrosse	BWR	10/01/1969	Feedwater	10	Leak		Stress Corrosion/IG SCC	IGSCC	CS
Fermi 2	BWR	09/17/1993	Feedwater	12	Leak	No LER	Erosion/Corrosion	Erosion/corrosion	CS
Vermont Yankee	BWR	01/24/1978	main steam	12	leak	82-001	erosion/corrosion	erosion/corrosion	CS
Brunswick 1	BWR	06/10/1984	Main Steam	14	Leak	PNO-II-84-034	Thermal Fatigue	Thermal Fatigue	CS
Browns Ferry	BWR	03/01/1979	Feedwater	16	Leak	NPE VI.E 113 (BWR-2, Book-8)	Not Given	Overstressed	CS
Monticello	BWR	11/03/1982	Steam	22	Leak		Stress Corrosion/IG SCC	IGSCC	CS
Monticello	BWR	11/02/1982	Steam	22	Leak		Stress Corrosion/IG SCC	IGSCC	CS
Quad Cities 2	BWR	03/15/1976	steam	22	leak	80-017	stress corrosion/IG SCC	IGSCC	CS

Dresden 3	BWR	11/04/1978	Main steam	24	Leak	78-052	Erosion/Corrosion	Leak at bottom of an elbow in the moisture separator area, Erosion/Corrosion	CS
-----------	-----	------------	------------	----	------	--------	-------------------	--	----

Station	Plant Type	Date	System Name	Pipe Size	Break Def	References	Failure Mechanism	Comments	Material
Big Rock Point	BWR	08/15/1983	Flow Sensor	0.5	Leak	83-008	Construction Defect/Error	Poor weld, Construction defect	SS
Big Rock Point	BWR	08/15/1983	Flow Sensor	0.5	Leak	RO	Unknown	Unknown Cause	SS
Big Rock Point	BWR	10/29/1982	Flow Sensor	0.5	Leak	RO	Unknown	Unknown Cause	SS
Big Rock Point	BWR	12/12/1980	RWCU	0.5	Leak	LER 96-001	IGSCC	Branch connect	SS
Browns Ferry 1	BWR	12/08/1982	Core Spray	0.5	Leak	82-099	Fatigue-Vibrational	Fatigue-Vibrational	SS
Browns Ferry 1	BWR	06/02/1980	Flow Sensor	0.5	Leak	80-048	Corrosion	Corrosion cracking of nipple threading	SS
Browns Ferry 1	BWR	09/20/1974	RHR	0.5	Failed	ROBFAO-7448T	Fatigue-Vibrational		SS
Browns Ferry 2	BWR	09/20/1974	Residual Heat Removal	0.5	Failed	RO BFAO-50260-7448T	Fatigue-Vibrational	Fatigue/vibrational	SS
Duane Arnold	BWR	01/28/1980	High pressure core injection	0.5	Leak	80-003	Unknown	Damaged nipple pipe fitting	SS
Fitzpatrick	BWR	09/17/1991	High pressure core injection	0.5	Leak	91-019 [11-91:52]	Fatigue-Vibrational	Fatigue-vibrational, poor weld	SS
Hatch 1	BWR	01/19/1982	Coolant recirculation	0.5	Leak		Unknown	3 pinhole leaks next to a weld. Sensing line replace, unknown	SS
LaSalle 1	BWR	11/18/1982	Reactor water cleanup	0.5	Leak		Fatigue-Vibrational	Fatigue-vibrational	SS
Limerick 2	BWR	03/15/1994	Instrument line	0.5	Leak		Construction Defects/Errors	Installation error, construction defect	SS
Monticello	BWR	07/09/1979	Instrument line	0.5	Leak		Fatigue-Vibrational	Fatigue-Vibrational	SS
Monticello	BWR	08/26/1975	Reactor water cleanup	0.5	Leak		Construction Defect/Errors	Construction defect	SS
Monticello	BWR	08/18/1975	Reactor water cleanup	0.5	Leak		Fatigue-Vibrational	Fatigue-vibrational	SS
Quad Cities 1	BWR	08/07/1978	residual heat removal	0.5	leak	82-021	fatigue-vibrational	fatigue-vibration	SS

Quad Cities 1	BWR	08/12/1978	residual heat removal	0.5	leak	82-021	fatigue-vibrational	fatigue-vibration	SS
Fermi 2	BWR	05/28/1988	Instrument line	0.625	Leak	PNO-III-88-052	Water Hammer	Water Hammer	SS
Big Rock Point	BWR	02/19/1982	Control Rod Drive	0.75	Crack	82-005	Fatigue-Vibrational	Fatigue-vibration at threaded connection	SS
Big Rock Point	BWR	04/23/1979	Control Rod Drive	0.75	Leak	PNO 79-90	Unknown	Leaked thimble tube weld, unknown cause	SS
Big Rock Point	BWR	12/16/1977	Control Rod Drive	0.75	Leak	RO-77-49	Fatigue-Vibrational		SS
Big Rock Point	BWR	12/08/1977	Control Rod Drive	0.75	Leak	RO 77-49	Fatigue-Vibrational	Fatigue-vibration	SS
Browns Ferry 1	BWR	02/05/1975	Core Spray	0.75	Leak	AO BFAO 50-259-752T	Corrosion/Fatigue	Corrosion/Fatigue	SS
Browns Ferry 1	BWR	03/20/1982	Reactor Water Cleanup	0.75	Leak	82-020	Fatigue-Vibrational	Fatigue-vibration, large leak	SS
Brunswick 2	BWR	03/19/1988	Control Rod Drive	0.75	Leak	88-007	Stress Corrosion/IGS CC	Stress Corrosion	SS
Brunswick 2	BWR	12/28/1979	Coolant Recirculation	0.75	Leak	79-109	Other	Personnel error, weld arc stick on reducing insert	SS
Brunswick 2	BWR	02/14/1977	Coolant Recirculation	0.75	Leak	RO 2-77-2	Unknown	Cracked weld, unknown cause	SS
Cooper	BWR	04/09/1984	Coolant recirculation	0.75	Leak	84-005	Unknown	Circumferential crack in weld joint, unknown cause	SS
Dresden 1	BWR	09/13/1976	Core Spray	0.75	Leak	AO 75-6	Construction Defect/Errors	Construction defect	SS
Dresden 1	BWR	04/12/1975	Core Spray	0.75	Leak	AO 75-6	Construction Defect/Errors	Construction defect, slag inclusion and poor adhesion	SS
Dresden 2	BWR	11/24/1978	Reactor Water Cleanup	0.75	Leak	78-064	Corrosion	Acid corrosion	SS
Dresden 3	BWR	04/02/1974	Control Rod Drive	0.75	Leak	Letter to NRC (6/11/74)	Fatigue-Vibrational	Fatigue-vibration	SS

Dresden 3	BWR	04/17/1982	Core Spray	0.75	Leak	82-019	Fatigue-Vibrational	Cracked weld	SS
Duane Arnold	BWR	05/19/1990	Control Rod Drive	0.75	Leak	90-010	Fatigue-Vibrational	Fatigue-vibration	SS
Duane Arnold	BWR	04/18/1975	High pressure core injection	0.75	Leak	AO 75-21	Fatigue-Vibrational	Fatigue-vibration	SS
Fitzpatrick	BWR	11/04/1983	High pressure core injection	0.75	Leak	83-054	Thermal Fatigue	Thermal fatigue	SS
Fitzpatrick	BWR	09/13/1976	Residual heat removal	0.75	Leak	76-054	Unknown	Unknown cause	SS
Hatch 1	BWR	03/06/1978	Reactor Coolant	0.75	Leak		Stress Corrosion/IGS CC	Stress Corrosion	SS
LaCrosse	BWR	01/23/1974	Core spray	0.75	Leak		Stress Corrosion/IGS CC	Improper fitting at hose	SS
LaSalle 1	BWR	05/21/1986	RHR	0.75	Leak		Weld Defect	Leak 1 of 2	SS
LaSalle 1	BWR	05/21/1986	RHR	0.75	Leak		Weld Defect	Leak 2 of 2	SS
Nine Mile Point 1	BWR	11/10/1983	Core spray	0.75	Crack/Leak		Fatigue-Vibrational	Fatigue-vibration	SS
Nine Mile Point 1	BWR	06/18/1986	Flow sensor	0.75	Leak		Unknown	Unknown cause	SS
Oyster Creek	BWR	12/11/1971	Residual heat removal	0.75	Failed		Fatigue-Vibrational		SS
Peach Bottom 2	BWR	11/08/1971	residual heat removal	0.75	leak	AO 75-72	fatigue-vibrational	fatigue-vibration	SS
Perry	BWR	03/31/1987	coolant recirculation	0.75	leak	PNO-III-91-012	fatigue-vibrational	fatigue-vibration	SS
Pilgrim	BWR	10/07/1978	reactor water cleanup	0.75	leak	82-047	construction defect/errors	construction defects/errors, faulty weld	SS
Quad Cities 1	BWR	02/22/1971	reactor coolant	0.75	leak	AO 75-5	construction defect/errors	poor weld, construction defect	SS
Quad Cities 1	BWR	01/04/1972	reactor coolant	0.75	leak	RO 76-001	fatigue-vibrational	fatigue-vibration	SS
Quad Cities 1	BWR	05/22/1971	reactor water cleanup	0.75	leak	AO	fatigue-vibrational	fatigue-vibration	SS
Quad Cities 2	BWR	02/22/1978	control rod drive	0.75	leak	82-003	erosion/corrosion	pitting of line, 0.25 gpm leak, sch 80	SS

Quad Cities 2	BWR	06/03/1976	high pressure core injection	0.75	leak	80-015	thermal fatigue	thermal fatigue	SS
Quad Cities 2	BWR	05/19/1971	reactor water cleanup	0.75	breakage	AO 75-19	fatigue-vibrational	fatigue-vibrational	SS
Big Rock Point	BWR	06/11/1979	Control Rod Drive	0.99	Leak	PNO 79-151	Unknown	Leaked thimble tube weld, unknown cause	SS
Big Rock Point	BWR	01/28/1982	Coolant Recirculation	0.99	Leak	82-003	Corrosion	Corrosion	SS
Big Rock Point	BWR	09/30/1981	Coolant Recirculation	0.99	Leak	81-024	Erosion/Corrosion	Corrosion in cooling unit coils	SS
Browns Ferry 1	BWR	06/14/1983	Instrument Line	0.99	Leak	83-031	Unknown	Unknown Cause	SS
Browns Ferry 2	BWR	08/01/1977	Reactor Sensor Line	0.99	Leak	IX.E. 1008 (NPE, BWR-2 Book-3)	IGSCC		SS
Browns Ferry 3	BWR	03/12/1985	Reactor Sensor Line	0.99	Leak	IX.E. 1008 (NPE, BWR-2 Book-3)	IGSCC		SS
Browns Ferry 3	BWR	02/13/1985	Reactor Sensor Line	0.99	Leak	IX.E. 1008 (NPE, BWR-2 Book-3)	IGSCC		SS
Browns Ferry 3	BWR	11/20/1984	Reactor Sensor Line	0.99	Leak	IX.E. 1008 (NPE, BWR-2 Book-3)	IGSCC		SS
Browns Ferry 3	BWR	05/01/1981	Reactor Sensor Line	0.99	Leak	IX.E. 1008 (NPE, BWR-2 Book-3)	IGSCC		SS
Browns Ferry 3	BWR	07/01/1981	Residual Heat Removal	0.99	Leak	81-032	Unknown	Unknown Cause	SS
Cooper	BWR	09/15/1984	Control Rod Drive	0.99	Leak	PNO-IV-84-018	Fatigue-Vibrational	Fatigue-vibration	SS
Dresden 2	BWR	12/10/1974	Reactor coolant/LPCI	0.99	Crack/Leak	AO 74-73	Construction Defect/Errors	Construction defects	SS
Dresden 2	BWR	07/28/1980	Reactor Water Cleanup	0.99	Leak	80-029	Thermal Fatigue	Thermal Fatigue Cracking	SS
Dresden 2	BWR	12/19/1977	High pressure core injection	0.99	Leak	RO	Unknown	Steam leak, unknown cause	SS

Fermi 2	BWR	04/24/1990	RHR	0.99	Leak	ACN: 9005160288	Fatigue- Vibrational	Previous leaks found: pump discharge 1987 160 deg. Crack, pump suction nipple 1988, & pump suction pinhole 1989. Previous 135 degree crack in LPCI vent found in 1990.	SS
Fermi 2	BWR	04/10/1987	Instrument line	0.99	Leak	PNO-III-87- 055	Fatigue- Vibrational	Fatigue- vibration	SS
Fermi 2	BWR	01/29/1987	Instrument line	0.99	Leak	PNO-III-87- 016	Fatigue- Vibrational	Fatigue- vibration	SS
Fermi 2	BWR	01/05/1987	Instrument line	0.99	Leak	PNO-III-87- 001A	Fatigue- Vibrational	Fatigue- vibration, 4 pipe lines failed	SS
Fermi 2	BWR	01/02/1987	Instrument line	0.99	Leak	PNO-III-87- 001	Fatigue- Vibrational	Fatigue- vibration, 4 pipe lines failed	SS
Hatch 1	BWR	10/17/1975	High pressure core injection	0.99	Leak		Unknown	Unknown cause	SS
Limerick 1	BWR	08/28/1995	Reactor Coolant	0.99	Leak		Construction Defect/Errors	Misaligned flange, construction defect	SS
Monticello	BWR	07/13/1975	Flow sensor	0.99	Leak		Unknown	Leaked reactor pressure gauge sensor, unknown cause	SS
Oyster Creek	BWR	03/25/1970	Flow sensor	0.99	Leak		Unknown	Fitting failed	SS
Oyster Creek	BWR	06/07/1974	Instrument line	0.99	Leak		Unknown	Unknown cause	SS
Vermont Yankee	BWR	10/13/1976	core spray sparger	0.99	leak	80-33	IGSCC		SS
Big Rock Point	BWR	08/21/1983	Coolant Recirculation	1	Leak	83-010	Construction Defect/Error	Construction Defect/Error	SS

Big Rock Point	BWR	02/21/1979	Reactor Water Cleanup	1	Leak	79-006	Stress Corrosion Cracking, IGSCC	Stress Corrosion	SS
Browns Ferry 1	BWR	09/22/1974	Coolant Recirculation	1	Failed	AO 74-49W	Fatigue-Vibrational	Fatigue-vibrational	SS
Brunswick 1	BWR	05/05/1982	Instrument Line	1	Rupture	82-050	Unknown	Unknown Cause	SS
Brunswick 2	BWR	09/25/1975	High Pressure Core Injection	1	Leak	AO 75-94	Construction Defect/Error	Cross threaded pipe	SS
Brunswick 2	BWR	08/11/1975	High Pressure Core Injection	1	Leak	AO 75-89	Erosion/Corrosion	Erosion	SS
Brunswick 2	BWR	05/20/1975	High Pressure Core Injection	1	Leak	AO 75-46	Unknown	Defective plug	SS
Clinton	BWR	11/22/1989	high pressure core injection	1	leak	89-041	unknown	unknown	SS
Cooper	BWR	02/06/1977	Residual heat removal	1	Leak	77-010	Fatigue-Vibrational	Fatigue-vibration	SS
Dresden 1	BWR	04/21/1972	Reactor Coolant	1	Leak	ORNL-NSIC-109:70038	Fatigue-Vibrational	Fatigue-vibration	SS
Dresden 2	BWR	03/30/1994	Coolant recirculation	1	Leak	94-009	Unknown	Unknow cause	SS
Dresden 2	BWR	07/26/1982	High pressure core injection	1	Leak	82-034	Erosion/Corrosion	Erosion	SS
Dresden 2	BWR	10/22/1974	High pressure core injection	1	Leak	AO 74-54	Construction Defect/Errors	Poor weld joint at gland leak off line, construction defect	SS
Dresden 2	BWR	12/03/1973	High pressure core injection	1	Leak	AO	Erosion/Corrosion	Erosion	SS
Dresden 2	BWR	03/15/1977	Reactor Coolant	1	Leak	77-002-6(B)	Fatigue-Vibrational	Fatigue-vibration	SS
Dresden 2	BWR	03/02/1977	Reactor Coolant	1	Leak	RO 77-10	Construction Defect/Errors	Construction defect	SS
Dresden 2	BWR	09/20/1977	Safety injection	1	Leak	Not Given	Construction Defect/Errors	Construction defect	SS

Duane Arnold	BWR	06/10/1982	Reactor coolant	1	Leak	82-040	Fatigue-Vibrational	Dynamic load and vibration	SS
Duane Arnold	BWR	04/10/1982	Residual heat removal	1	Leak	82-028	Corrosion	Corrosion	SS
Grand Gulf	BWR	11/02/1993	Coolant recirculation	1	Leak	93-014	Fatigue-Vibrational	Fatigue-vibrational (2 events)	SS
Hatch 1	BWR	08/14/1977	Instrument line	1	Leak		Fatigue-Vibrational	Fatigue-Vibrational	SS
Hope Creek	BWR	11/04/1990	Instrument line	1	Leak		Fatigue-Vibrational	Fatigue-Vibrational	SS
Hope Creek	BWR	12/31/1989	Instrument line	1	Leak		Erosion/Corrosion	Erosion/Corrosion	SS
LaSalle 1	BWR	04/14/1983	Instrument line	1	Leak		Construction Defect/Errors	Poor welds, construction defect	SS
LaSalle 1	BWR	12/01/1982	Instrument line RCIC	1	Failed		Unknown	Compression fitting failed	SS
Monticello	BWR	11/01/1975	Core spray	1	Crack/Leak		Fatigue-Vibrational	Fatigue-vibrational	SS
Monticello	BWR	05/05/1978	Reactor coolant	1	Leak		Erosion/Corrosion	Erosion/Corrosion	SS
Monticello	BWR	10/03/1975	Reactor coolant	1	Leak		Unknown	Unknown cause	SS
Monticello	BWR	11/14/1978	Residual heat removal	1	Leak		Erosion/Corrosion	Erosion/Corrosion	SS
Nine Mile Point 1	BWR	11/29/1975	Coolant recirculation	1	Leak		Unknown	Unknown cause	SS
Nine Mile Point 1	BWR	09/13/1975	Coolant recirculation	1	Leak		Unknown	Pump part failed	SS
Oyster Creek	BWR	11/30/1980	Core spray	1	Leak		Unknown	Worn gaskets, open ended conduits	SS
Peach Bottom 2	BWR	11/06/1971	residual heat removal	1	leak	AO 75-71	fatigue-vibrational	fatigue-vibration	SS
Peach Bottom 2	BWR	09/13/1973	residual heat removal	1	leak	77-041	unknown	failed threading	SS
Peach Bottom 2	BWR	02/06/1974	residual heat removal	1	leak	78-012	fatigue-vibrational	fatigue-vibration	SS
Peach Bottom 3	BWR	04/13/1976	residual heat removal	1	leak	80-009	fatigue-vibrational	fatigue-vibration	SS
Pilgrim	BWR	12/06/1980	instrument line	1	leak	IN 85-34	stress corrosion/IGS CC	chloride stress corrosion cracking	SS

Quad Cities 1	BWR	10/11/1970	instrument line	1	leak	AO 74-33	construction defect/errors	poor weld, construction defect	SS
Quad Cities 1	BWR	10/21/1970	instrument line	1	leak	Ltr DL 10/22/74	fatigue-vibrational	fatigue-vibration	SS
Quad Cities 1	BWR	06/16/1981	residual heat removal	1	rupture	85-001; 008	fatigue-vibrational	fatigue-vibration	SS
Vermont Yankee	BWR	08/25/1971	instrument line	1	leak	75-017	fatigue-vibrational	fatigue-vibration	SS
Vermont Yankee	BWR	05/31/1972	instrument line	1	leak	AO 75-17	corrosion	corrosion cracking	SS
Vermont Yankee	BWR	05/06/1977	reactor water cleanup	1	leak	81-011	stress corrosion/IGS CC	IGSCC	SS
Vermont Yankee	BWR	06/21/1977	reactor water cleanup	1	leak	81-016	stress corrosion/IGS CC	IGSCC	SS
Big Rock Point	BWR	04/20/1979	Control Rod Drive	1.1	Leak	79-018	Construction Defect/Error	Bad weld, construction defect	SS
Brunswick 2	BWR	02/24/1981	Core Aux Cooling	1.1	Rupture	81-42	Unknown		SS
Big Rock Point	BWR	05/05/1977	Residual Heat Removal	1.1	Leak	RO 77-16	Construction Defect/Error	Leaked hose, personnel error	SS
Browns Ferry 2	BWR	11/04/1974	High Pressure Core Injection	1.1	Leak	RO 74-24T	Unknown	Leaked gasket, unknown cause	SS
Browns Ferry 2	BWR	10/07/1974	High Pressure Core Injection	1.1	Leak	RO 74-17T	Unknown	Leaked gasket, unknown cause	SS
Browns Ferry 2	BWR	09/24/1974	High Pressure Core Injection	1.1	Leak	RO 74-16T	Unknown	Leaked gasket, unknown cause	SS
Brunswick 2	BWR	12/06/1982	Core Aux Cooling	1.1	Rupture	82-127	Unknown		SS
Brunswick 2	BWR	10/29/1982	Residual Heat Removal	1.1	Leak	82-130	Unknown	Cracked weld, unknown cause	SS
Cooper	BWR	03/29/1980	Emergency core cooling	1.1	Leak	80-009	Stress Corrosion/IGS CC	IGSCC	SS
Dresden 1	BWR	11/25/1974	Core Spray	1.1	Leak	Ltr DL 11/25/74	Erosion/Corrosion	Erosion/corrosion	SS
Dresden 1	BWR	05/08/1994	Reactor Water Cleanup	1.1	Leak	PNO-III-94-036	Unknown	Unknown pipe leak, unknown cause	SS

Dresden 1	BWR	05/18/1979	Reactor Water Cleanup	1.1	Leak	79-001	Unknown	Underground aluminum pipe leak, unknown cause	SS
Dresden 2	BWR	10/03/1994	High pressure core injection	1.1	Leak	Special Report	Erosion/Corrosion	Leaked in ground cathodic protection system, Corrosion	SS
Dresden 3	BWR	09/01/1982	Reactor Water Cleanup	1.1	Leak	82-021	Stress Corrosion/IGS CC	Cracked weld	SS
Dresden 3	BWR	05/03/1979	Reactor Water Cleanup	1.1	Leak	79-008	Erosion/Corrosion	Erosion, cavitation	SS
Duane Arnold	BWR	11/20/1988	Control Rod Drive	1.1	Leak	88-019	Stress Corrosion/IGS CC	Transgranular stress corrosion	SS
Duane Arnold	BWR	04/13/1981	Recirc	1.1	Leak	PNO-III-81-046	Not Given		SS
Fermi 2	BWR	06/19/1982	Core spray	1.1	Leak	Not Given	Not given	Overpressure damaged expansion joint	SS
Hatch 1	BWR	01/01/1977	Recirculation	1.1	Leak		Not Given	Indications of leak	SS
Hatch 2	BWR	04/13/1980	RHR	1.1	Leak		Not Given	Bellows leak	SS
Hope Creek	BWR	11/08/1988	Recirculation	1.1	Leak		Fatigue-Vibrational		SS
Hope Creek	BWR	11/04/1988	Recirculation	1.1	Leak		Fatigue-Vibrational		SS
LaCrosse	BWR	03/29/1982	Emergency core cooling	1.1	Leak		Construction Defect/Errors	Brittle gasket caused leak, gasket replaced	SS
LaSalle 2	BWR	09/06/1984	High pressure core spray	1.1	Leak		Not Given	Bellows seal failed	SS
Oyster Creek	BWR	08/01/1979	Control rod drive	1.1	Leak		Not Given		SS
Oyster Creek	BWR	09/05/1980	Core spray	1.1	Leak		other	Personnel errors	SS
Susquehanna 2	BWR	10/12/1982	residual heat removal	1.1	leak	86-015	water hammer	water hammer	SS
Vermont Yankee	BWR	03/08/1969	high pressure core injection	1.1	leak	AO 73-07	unknown	unknown cause	SS
Humboldt Bay 3	BWR	07/17/1970	Instrument line	1.5	Leak		SCC	SCC	SS
Humboldt Bay 3	BWR	06/15/1970	Instrument line	1.5	Leak		Stress Corrosion/IGS CC	IGSCC	SS

Big Rock Point	BWR	12/06/1980	Control Rod Drive	2	Leak	80-042	Erosion/Corrosion	Erosion/Corrosion	SS
Big Rock Point	BWR	09/06/1981	Coolant Recirculation	2	Leak	81-020	Corrosion	Corrosion	SS
Browns Ferry 1	BWR	05/23/1973	Residual Heat Removal	2	Rupture	Ltr DL; 7/9/73	Water Hammer	Water Hammer	SS
Browns Ferry 2	BWR	10/16/1974	Coolant Recirculation	2	Leak	AO 74-19W	Fatigue-Vibrational	Fatigue-vibrational	SS
Cooper	BWR	11/04/1976	Reactor Coolant	2	Leak	RO 76-44	Construction Defect/Errors	Construction defect/error	SS
Dresden 1	BWR	10/25/1974	Core Spray	2	Leak	Letter to NRC (11/25/74)	Erosion/Corrosion	Erosion and cavitation	SS
Dresden 2	BWR	08/07/1978	Reactor Coolant	2	Leak	78-046	Construction Defect/Errors	Construction defects/errors	SS
Dresden 2	BWR	12/26/1982	Reactor Water Cleanup	2	Leak	82-058	Stress Corrosion/IGS CC	Stress corrosion	SS
Dresden 3	BWR	10/04/1983	Coolant recirculation	2	Leak	83-035	Construction Defect/Errors	Construction defect	SS
Dresden 3	BWR	11/15/1983	Reactor Water Cleanup	2	Leak	83-039	Stress Corrosion/IGS CC	Stress corrosion	SS
Dresden 3	BWR	01/05/1983	Reactor Water Cleanup	2	Leak	83-003	Stress Corrosion/IGS CC	IGSCC	SS
Fitzpatrick	BWR	06/07/1983	Control Rod Drive	2	Leak	83-023	Stress Corrosion/IGS CC	IGSCC	SS
Hope Creek	BWR	02/11/1987	Coolant recirculation	2	Failed		Fatigue-Vibrational	Fatigue-Vibrational	SS
Humboldt Bay 3	BWR	03/16/1976	Reactor water cleanup	2	Leak		Unknown	Unknown cause	SS
Humboldt Bay 3	BWR	03/16/1976	Reactor water cleanup	2	Leak		Unknown	Unknown cause	SS
Monticello	BWR	11/25/1987	Coolant recirculation	2	Leak		Fatigue-Vibrational	Fatigue-vibrational	SS
Monticello	BWR	10/10/1977	Residual heat removal	2	Leak		Fatigue-Vibrational	Fatigue-Vibrational	SS
Oyster Creek	BWR	05/29/1974	Reactor coolant	2	Leak		Unknown	Unknown cause	SS
Peach Bottom 2	BWR	06/06/1980	instrument line	2	leak	84-010	stress corrosion/IGS CC	IGSCC	SS

Pilgrim	BWR	10/31/1976	reactor water cleanup	2	rupture	NPE; BWR-2; 72	fatigue-vibrational	socket weld failed, fatigue-vibration	SS
Quad Cities 1	BWR	05/19/1979	residual heat removal	2	leak	83-021	construction defect/errors	construction defects/errors	SS
Quad Cities 2	BWR	03/04/1974	reactor coolant	2	leak	78-013	unknown	unknown cause	SS
Susquehanna 2	BWR	12/15/1987	high pressure core injection	2	leak	91-015 [2-92:307]	erosion/corrosion	erosion/corrosion	SS
Dresden 2	BWR	04/26/1981	Core Spray	2.5	Leak	81-020	Stress Corrosion/IGS CC	IGSCC	SS
Big Rock Point	BWR	07/22/1990	Reactor Water Cleanup	3	Leak	90-003	Thermal Fatigue	Thermal fatigue	SS
Dresden 2	BWR	04/27/1974	Reactor Water Cleanup	3	Crack/Leak	AO, NPE-XII-22	Corrosion	External corrosion	SS
Grand Gulf	BWR	04/30/1984	Residual heat removal	3	Crack/Leak	84-024, PNO-II-84-31	Design-Dynamic Load	Design-dynamic loads, support failure	SS
Limerick 1	BWR	06/23/1989	HPCI/ESW	3	Leak		Microbiologically induced corrosion	Sch 40, 75% power	SS
Peach Bottom 2	BWR	06/17/1982	RHR	3	leak	86-014	corrosion	pitting, sch 40	SS
Pilgrim	BWR	07/09/1975	control rod drive	3	leak	79-021	unknown	unknown	SS
Vermont Yankee	BWR	05/02/1970	control rod drive	3	leak	DL No. 116	unknown	unknown cause	SS
Browns Ferry 1	BWR	12/11/1992	Coolant Recirculation	4	Leak	92-005	Construction Defect/Error	Construction/Defect errors	SS
Browns Ferry 1	BWR	12/08/1982	Coolant Recirculation	4	Leak	82-100	Unknown	Failed thread sealant	SS
Dresden 1	BWR	11/01/1970	Coolant recirculation	4	Leak	Ltr DL 4/22/71	Stress Corrosion/IGS CC	IGSCC	SS
Dresden 1	BWR	11/02/1974	Reactor Water Cleanup	4	Leak	AO 74-16	Corrosion	Corrosion	SS
Dresden 1	BWR	02/01/1966	Reactor Water Cleanup	4	Leak	NUREG/75-067	Stress Corrosion/IGS CC	IGSCC	SS
Dresden 2	BWR	12/13/1974	Coolant recirculation	4	Crack/Leak	AO 74-77	Stress Corrosion/IGS CC	IGSCC	SS

Dresden 2	BWR	09/15/1974	Coolant recirculation	4	Leak	NUREG/75-067	Stress Corrosion/IGS CC	IGSCC	SS
Dresden 2	BWR	09/13/1974	Coolant recirculation	4	Leak	NUREG/75-067, AO 74-M26	Stress Corrosion/IGS CC	IGSCC	SS
Duane Arnold	BWR	03/26/1979	Reactor Water Cleanup	4	Leak	79-008	Stress Corrosion/IGS CC	Stress corrosion	SS
Duane Arnold	BWR	03/25/1978	Reactor Water Cleanup	4	Leak	78-017	Stress Corrosion/IGS CC		SS
Hatch 1	BWR	04/12/1977	Recirculation	4	Leak		Not Given	Indications of leak	SS
Monticello	BWR	06/17/1981	Reactor water cleanup	4	Leak		Construction Defects/Errors	Construction Defects/Errors	SS
Nine Mile Point 1	BWR	03/27/1984	Control rod drive	4	Leak		Stress Corrosion/IGS CC	IGSCC	SS
Oyster Creek	BWR	10/01/1967	Control rod drive	4	Leak		Stress Corrosion/IGS CC	IGSCC prior to operation	SS
Pilgrim	BWR	09/04/1972	reactor water cleanup	4	leak	76-021	stress corrosion/IGS CC	IGSCC	SS
Quad Cities 1	BWR	01/09/1971	coolant recirculation	4	leak	NUREG/75-067, AO-75-3	stress corrosion/IGS CC	IGSCC, 3 cracks	SS
Quad Cities 1	BWR	01/07/1972	coolant recirculation	4	leak	RO 76-04	stress corrosion/IGS CC	IGSCC	SS
Quad Cities 1	BWR	05/25/1974	reactor water cleanup	4	leak	No LER	erosion/corrosion	erosion/corrosion	SS
Quad Cities 2	BWR	09/15/1970	coolant recirculation	4	crack/leak	AO 74-25	stress corrosion/IGS CC		SS
Quad Cities 2	BWR	12/22/1970	core spray	4	leak	NUREG/75-067	stress corrosion/IGS CC	IGSCC	SS
Quad Cities 2	BWR	05/21/1974	reactor water cleanup	4	leak	78-023	stress corrosion/IGS CC	IGSCC	SS
Quad Cities 2	BWR	04/04/1975	reactor water cleanup	4	leak	79-007	erosion/corrosion	erosion/corrosion	SS
Quad Cities 2	BWR	04/26/1975	reactor water cleanup	4	leak	no LER	erosion/corrosion	erosion/corrosion	SS
River Bend	BWR	10/09/1990	control rod drive	4	leak	94-027	stress corrosion/IGS CC	stress corrosion	SS
Vermont Yankee	BWR	10/26/1976	reactor water cleanup	4	leak	80-037	stress corrosion/IGS CC	IGSCC in 5 of 13 welds	SS

Vermont Yankee	BWR	12/28/1976	reactor water cleanup	4	leak	80-041	stress corrosion/IGS CC	IGSCC	SS
Browns Ferry 3	BWR	04/01/1978	High Pressure Core Injection	6	Failed	NPE VII	Fatigue-Vibrational	Fatigue-vibrational	SS
Browns Ferry 3	BWR	11/01/1977	High Pressure Core Injection	6	Leak	NPE VII	Unknown	Failed at welded joint. 80000gallon leak.	SS
Brunswick 2	BWR	05/25/1982	Reactor Water Cleanup	6	Leak	82-080, PNO-II-82-060	Construction Defect/Error	Construction defects/errors	SS
Cooper	BWR	06/29/1983	Reactor Water Cleanup	6	Leak	83-009	Stress Corrosion/IGS CC	IGSCC	SS
Dresden 1	BWR	12/01/1965	Coolant recirculation	6	Leak	NUREG/75-067	Stress Corrosion/IGS CC	IGSCC	SS
Dresden 2	BWR	02/23/1996	Core Spray	6	Crack/Leak	ACN:960228 0278	Unknown		SS
Dresden 2	BWR	03/26/1979	Reactor coolant	6	Leak	79-016	Construction Defect/Errors	Construction defects/errors	SS
Dresden 2	BWR	09/12/1974	Reactor coolant	6	Leak	AO 50-23774-46	Erosion/Corrosion	Erosion of pump minimum flow line	SS
Dresden 2	BWR	08/23/1974	Reactor coolant	6	Leak	AO 50-23774-41	Erosion/Corrosion	Erosion of pump minimum flow line	SS
Dresden 3	BWR	09/01/1981	Reactor Water Cleanup	6	Leak	81-021	Stress Corrosion/IGS CC	Stress corrosion	SS
Hatch 1	BWR	07/06/1980	Reactor water cleanup	6	Leak		Stress Corrosion/IGS CC	Stress Corrosion	SS
Hatch 1	BWR	05/10/1978	Reactor water cleanup	6	Leak		Unknown	Unknown cause	SS
Hatch 1	BWR	03/29/1978	Reactor water cleanup	6	Leak		Erosion/Corrosion	Erosion/Corrosion	SS
Monticello	BWR	08/22/1990	Reactor water cleanup	6	Leak		Fatigue-Vibrational	Fatigue-Vibrational cracking	SS
Nine Mile Point 1	BWR	03/22/1976	Reactor water cleanup	6	Leak		Stress Corrosion/IGS CC	IGSCC	SS
Nine Mile Point 1	BWR	03/19/1976	Reactor water cleanup	6	Leak		Stress Corrosion/IGS CC	IGSCC	SS

Oyster Creek	BWR	02/05/1993	Core spray	6	Leak		IGSCC	Questionable failure mechanism	SS
Peach Bottom 2	BWR	07/02/1975	reactor water cleanup	6	leak	no LER	erosion/corrosion	erosion/corrosion	SS
Quad Cities 2	BWR	05/03/1984	reactor water cleanup	6	leak	88-008	stress corrosion/IGSCC	IGSCC	SS
Quad Cities 2	BWR	01/14/1978	reactor water cleanup	6	leak	82-001	stress corrosion/IGSCC		SS
Dresden 1	BWR	01/10/1974	Core Spray	8	Leak	Letter to NRC (2/8/74)	Stress Corrosion/IGSCC	IGSCC, Leaked minimum flow line of core spray pump, erosion	SS
Hatch 1	BWR	12/15/1974	Residual heat removal	8	Leak		Stress Corrosion/IGSCC	IGSCC, Weld failure	SS
LaCrosse	BWR	07/18/1986	Residual heat removal	8	Leak		Unknown	Unknown cause	SS
LaSalle 1	BWR	06/09/1982	RHR	8	Leak		Thermal Fatigue		SS
Cooper	BWR	07/10/1983	Core Spray	10	Crack/Leak	83-011	Stress Corrosion/IGSCC	IGSCC, Leak welds discovered during weld grinding	SS
Dresden 2	BWR	01/27/1975	Core Spray	10	Leak	NUREG/75-067, AO-75-11A	Stress Corrosion/IGSCC	IGSCC, 2 leaks	SS
Duane Arnold	BWR	06/17/1978	Coolant recirculation	10	Leak	78-030, NUREG-0531	Stress Corrosion/IGSCC	IGSCC, 360 degree crack	SS
Duane Arnold	BWR	11/06/1981	Reactor Water Cleanup	10	Leak	81-041	Stress Corrosion/IGSCC	Stress corrosion	SS
Duane Arnold	BWR	03/13/1985	Recirc	10	Leak	PNO-III-85-022	IGSCC		SS
LaSalle 2	BWR	05/27/1985	Core spray	10	Failed		Erosion/Corrosion	Erosion/Corrosion	SS
Limerick 1	BWR	02/25/1986	Recirc. Pipe elbow	10	Leak		Erosion/Corrosion	Sch 80, full power	SS
Limerick 1	BWR	02/14/1986	Recirc. Pipe elbow	10	Leak		Erosion/Corrosion	Sch 80, full power	SS
Quad Cities 1	BWR	09/01/1976	core spray	10	leak	PNO-III-80-164	stress corrosion/IGSCC	IGSCC	SS
Quad Cities 2	BWR	02/29/1976	core spray	10	leak	NPE VII.C.88 (BWR-2, Book-2)	IGSCC	several cracks too	SS
Browns Ferry 2	BWR	02/21/1985	Recirc Riser	12	Leak	LER 85-001	IGSCC		SS

Brunswick 1	BWR	01/26/1983	Coolant Recirculation	12	Leak	83-001	Stress Corrosion/IGSCC	IGSCC	SS
Brunswick 1	BWR	05/10/1985	Recirc Pipe Riser	12	Leak	LER -85-026	IGSCC	Sch 80, refuel maintenance mod, leak 1 of 5 leaks in difference locations	SS
Brunswick 1	BWR	05/10/1985	Recirc Pipe Riser	12	Leak	LER -85-026	IGSCC	Sch 80, refuel maintenance mod, leak 2 of 5 leaks in difference locations	SS
Brunswick 1	BWR	05/10/1985	Recirc Pipe Riser	12	Leak	LER -85-026	IGSCC	Sch 80, refuel maintenance mod, leak 3 of 5 leaks in difference locations	SS
Brunswick 1	BWR	05/10/1985	Recirc Pipe Riser	12	Leak	LER -85-026	IGSCC	Sch 80, refuel maintenance mod, leak 4 of 5 leaks in difference locations	SS
Brunswick 1	BWR	05/10/1985	Recirc Pipe Riser	12	Leak	LER -85-026	IGSCC	Sch 80, refuel maintenance mod, leak 5 of 5 leaks in difference locations	SS
Brunswick 1	BWR	07/01/1985	Recirculation	12	Leak	LER 85-026	IGSCC	92 indications in weld 1 out of 23 of 79 welds; pinhole leaks in weld 1 out of 5 welds; 77 axial	SS

Brunswick 1	BWR	07/01/1985	Recirculation	12	Leak	LER 85-026	IGSCC	92 indications in weld 2 out of 23 of 79 welds; pinhole leaks in weld 2 out of 5 welds; 77 axial	SS
Brunswick 1	BWR	07/01/1985	Recirculation	12	Leak	LER 85-026	IGSCC	92 indications in weld 3 out of 23 of 79 welds; pinhole leaks in weld 3 out of 5 welds; 77 axial	SS
Brunswick 1	BWR	07/01/1985	Recirculation	12	Leak	LER 85-026	IGSCC	92 indications in weld 4 out of 23 of 79 welds; pinhole leaks in weld 4 out of 5 welds; 77 axial	SS
Brunswick 1	BWR	07/01/1985	Recirculation	12	Leak	LER 85-026	IGSCC	92 indications in weld 5 out of 23 of 79 welds; pinhole leaks in weld 5 out of 5 welds; 77 axial	SS
Brunswick 2	BWR	10/01/1977	Core Spray	12	Leak	NPE VII.C.74 (BWR-2, Book-2)	IGSCC	Leak 1 of 3 leaks	SS
Brunswick 2	BWR	10/01/1977	Core Spray	12	Leak	NPE VII.C.74 (BWR-2, Book-2)	IGSCC	Leak 2 of 3 leaks	SS
Brunswick 2	BWR	10/01/1977	Core Spray	12	Leak	NPE VII.C.74 (BWR-2, Book-2)	IGSCC	Leak 3 of 3 leaks	SS
Clinton	BWR	03/29/1991	Recirculation piping	12	leak	NPRDS	unknown	Sch 40, 10-20 gpm, 99.9% power	SS

Clinton	BWR	04/12/1990	Recirculation piping	12	leak	NPRDS	Fabrication defect	Sch 40, leak 1 of 3 pinhole leaks, casting defects	SS
Clinton	BWR	04/12/1990	Recirculation piping	12	leak	NPRDS	Fabrication defect	Sch 40, leak 3 of 3 pinhole leaks, casting defects	SS
Dresden 2	BWR	09/05/1976	High pressure core injection	12	Leak	RO 76-060	Stress Corrosion/IGS CC	Chloride stress corrosion	SS
Monticello	BWR	10/20/1982	Coolant recirculation	12	Leak		Stress Corrosion/IGS CC	IGSCC	SS
Nine Mile Point 1	BWR	03/23/1974	Reactor water cleanup	12	Crack/Leak		Construction Defects/Errors	Construction Defects/Errors	SS
Quad Cities 1	BWR	04/13/1980	reactor coolant	12	leak	84-005	stress corrosion/IGS CC	IGSCC, leak 1/4	SS
Quad Cities 1	BWR	04/13/1980	reactor coolant	12	leak	84-005	stress corrosion/IGS CC	IGSCC, leak 2/4	SS
Quad Cities 1	BWR	04/13/1980	reactor coolant	12	leak	84-005	stress corrosion/IGS CC	IGSCC, leak 3/4	SS
Quad Cities 1	BWR	04/13/1980	reactor coolant	12	leak	LER-84-005	stress corrosion/IGS CC	IGSCC, leak 4/4	SS
Quad Cities 1	BWR	04/13/1980	reactor recirculation, E riser pipe to elbow	12	leak	LER-84-005	IGSCC	probable IGSCC, weld 9 (out of 9 welds) leaked out of pinholes or axial cracks (weld #02E-S4)	SS
Quad Cities 1	BWR	04/13/1980	reactor recirculation, G riser elbow to pipe	12	leak	LER-84-005	IGSCC	probable IGSCC, weld 7 (out of 9 welds) leaked out of pinholes or axial cracks (weld #02G-S3)	SS

Quad Cities 1	BWR	04/13/1980	reactor recirculation, H riser pipe to elbow	12	leak	LER-84-005	IGSCC	probable IGSCC, weld 5 (out of 9 welds) leaked out of pinholes or axial cracks (weld #02H-S4)	SS
Quad Cities 1	BWR	04/13/1980	reactor recirculation, H riser to pipe weld	12	leak	LER-84-005	IGSCC	probable IGSCC, weld 6 (out of 9 welds) leaked out of pinholes or axial cracks (weld #02H-S3)	SS
Quad Cities 1	BWR	04/13/1980	reactor recirculation, J riser elbow to pipe	12	leak	LER-84-005	IGSCC	probable IGSCC, weld 8 (out of 9 welds) leaked out of pinholes or axial cracks (weld #02J-S3)	SS
Quad Cities 1	BWR	04/13/1980	reactor recirculation, J riser pipe to elbow	12	leak	LER-84-005	IGSCC	probable IGSCC, weld 1 (out of 9 welds) leaked out of pinholes or axial cracks (weld #02J-S4)	SS
Quad Cities 1	BWR	04/13/1980	reactor recirculation, J riser sweepolet to pipe	12	leak	LER-84-005	IGSCC	probable IGSCC, weld 4 (out of 9 welds) leaked out of pinholes or axial cracks (weld #02J-F6)	SS

Quad Cities 1	BWR	04/13/1980	reactor recirculation, K riser elbow to pipe	12	leak	LER-84-005	IGSCC	probable IGSCC, weld 2 (out of 9 welds) leaked out of pinholes or axial cracks (weld #02K-S3)	SS
Quad Cities 1	BWR	04/13/1980	Reactor recirculation, K riser pipe to elbow	12	leak	LER-84-005	IGSCC	probable IGSCC, weld 3 (out of 9 welds) leaked out of pinholes or axial cracks (weld #02K-S4)	SS
Quad Cities 2	BWR	11/04/1982	reactor coolant	12	leak	86-017	stress corrosion/IGSCC	IGSCC	SS
Quad Cities 2	BWR	03/31/1981	recirculation	12	leak	LER 85-008	IGSCC		SS
Quad Cities 2	BWR	01/27/1986	RHR	12	leak	NPRDS	erosion/corrosion	sch 40	SS
Nine Mile Point 1	BWR	05/07/1984	High pressure core injection	12.75	Leak		Stress Corrosion/IGSCC	IGSCC, chloride contamination	SS
Dresden 2	BWR	09/15/1976	High pressure core injection	14	Leak	76-061	Construction Defect/Errors	Construction defect	SS
Dresden 2	BWR	03/24/1976	High pressure core injection	14	Leak	76-016	Stress Corrosion/IGSCC	IGSCC	SS
Dresden 2	BWR	11/24/1990	Reactor Coolant	16	Leak	93-014	Stress Corrosion/IGSCC	IGSCC	SS
Quad Cities 1	BWR	11/20/1977	residual heat removal	16	breakage	81-020R2	construction defect/errors	construction defects/errors	SS
Hatch 1	BWR	03/09/1978	Residual heat removal	20	Leak		Stress Corrosion/IGSCC	IGSCC, indications of leak	SS
Hatch 1	BWR	10/11/1984	Recirculation	22	Leak		Not Given	15 cracks	SS
Monticello	BWR	09/28/1982	Coolant recirculation	22	Leak		Stress corrosion	Stress Corrosion	SS
Brunswick 1	BWR	01/18/1983	Coolant Recirculation	28	Crack/Leak	83-004	Stress Corrosion/IGSCC	IGSCC (2/2)	SS

Brunswick 1	BWR	01/18/1983	Coolant Recirculation	28	Crack/Leak	83-004	Stress Corrosion/IGS CC	IGSCC (1/2)	SS
Dresden 2	BWR	01/15/1983	Coolant recirculation	28	Leak	83-008	Stress Corrosion/IGS CC	IGSCC	SS
Monticello	BWR	10/09/1982	Recirc.	28	Crack/Leak		IGSCC		SS
Nine Mile Point 1	BWR	03/23/1982	Coolant recirculation	28	Crack/Leak		Stress Corrosion/IGS CC	IGSCC	SS
Dresden 2	BWR	02/25/1983	Coolant recirculation	30	Leak	83-015	Stress Corrosion/IGS CC	Stress corrosion	SS

Station	Plant Type	Date	System Name	Pipe Size	Break Def	References	Failure Mechanism	Comments	Material
ANO1	PWR	05/26/1976	Flow Sensor	0.5	Leak	RO 76-10	Fatigue-Vibrational	Cracked weld due to vibration or improper fit	SS
ANO1	PWR	08/24/1977	Makeup System	0.5	Leak	RO 77-17	Unknown	Unknown Cause	SS
ANO1	PWR	01/23/1975	Makeup System	0.5	Leak	AO 75-02	Construction Defect/Error	Construction Defect/Error	SS
ANO2	PWR	11/03/1980	Flow Sensor	0.5	Leak	80-086	Fatigue-Vibrational	Fatigue-vibration	SS
Calvert Cliffs 1	PWR	05/07/1987	SIS	0.5	Leak	NPE VII.A.552	Fatigue-Vibrational		SS
Calvert Cliffs 2	PWR	10/07/1977	Instrument line	0.5	leak	77-073	Fatigue-vibrational	fatigue-vibration	SS
Calvert Cliffs 2	PWR	05/01/1977	instrument line	0.5	leak	77-030	fatigue-vibrational	cracked weld	SS
Calvert Cliffs 2	PWR	05/11/1977	safety injection	0.5	leak	77-035	fatigue-vibrational	fatigue-vibration	SS
Catawba 1	PWR	10/10/1985	Reactor Coolant	0.5	leak	85-059	Construction defect/errors	Leaked compression tube fitting on flow sensor, untightened fitting, error	SS
Ginna	PWR	06/17/1975	Instrument line	0.5	Failed	AO	Water Hammer	Water Hammer	SS
Millstone 3	PWR	12/02/1995	RHR	0.5	Leak		Not Given	Leak at valve stem leak off pipe	SS
Salem 2	PWR	06/22/1977	chemical and volume control	0.5	leak	81-038	fatigue-vibrational	fatigue-vibrational	SS
Three Mile Island 2	PWR	03/23/1974	residual heat removal	0.5	leak	78-017	fatigue-vibrational	fatigue-vibrational	SS
Trojan	PWR	01/21/1987	instrument line	0.5	leak	91-002 [10-91:294]	fatigue-vibrational	thimble tube leakage due to vibration	SS
Turkey Point 4	PWR	10/14/1970	reactor coolant	0.5	leak	AO 74-14	construction defect/errors	missing connection plug on drywell penetration, personnel error	SS
ANO1	PWR	10/03/1976	Makeup System	0.75	Leak	RO 76-29	Fatigue-Vibrational	Fatigue-vibration	SS
ANO1	PWR	07/01/1975	Makeup System	0.75	Leak	NPE VIII.A 90	Weld Defect		SS

ANO1	PWR	09/06/1983	Reactor Coolant	0.75	Leak	83-019	Fatigue-Vibrational	Fatigue-vibration	SS
ANO1	PWR	12/03/1977	Residual Heat Removal	0.75	Leak	77-027	Fatigue-Vibrational	Fatigue-vibration	SS
ANO2	PWR	08/01/1978	LPSI	0.75	Leak	NPE VII.A.192	Fatigue-Vibrational		SS
Beaver Valley 1	PWR	01/22/1981	Residual heat removal	0.75	leak	PNO-I-81-027	Fatigue-Vibrational	Fatigue-vibration	SS
Beaver Valley 1	PWR	06/08/1975	Safety Injection	0.75	Leak		Fatigue-Vibrational	Fatigue-vibration	SS
Braidwood 1	PWR	08/30/1990	Residual Heat Removal	0.75	Leak	90-012	Unknown	Unknown	SS
Calvert Cliffs 1	PWR	11/01/1982	Charging	0.75	Leak	NPE VIII.A.647	Fatigue-Vibrational		SS
Calvert Cliffs 1	PWR	09/23/1977	Charging	0.75	Leak	NPE VIII.A.238	Fatigue-Vibrational		SS
Calvert Cliffs 1	PWR	11/01/1976	Charging	0.75	Leak	NPE VIII.A.238	Fatigue-Vibrational		SS
Calvert Cliffs 1	PWR	12/07/1982	Chemical and Volume Control	0.75	Leak	82-074	Fatigue-Vibrational		SS
Calvert Cliffs 1	PWR	01/07/1978	Reactor Coolant	0.75	Leak	RO 78-22/3L	Fatigue-Vibrational	Fatigue-vibration	SS
Calvert Cliffs 1	PWR	08/25/1977	Reactor Coolant	0.75	Leak	77-077	Fatigue-Vibrational		SS
Calvert Cliffs 2	PWR	01/03/1977	Reactor Coolant	0.75	crack/leak	77-010	fatigue-vibrational	fatigue-vibration	SS
Calvert Cliffs 2	PWR	07/11/1994	Safety Injection	0.75	Leak	94-003	Fatigue-Vibrational	Crack from fatigue-vibration	SS
Comanche Peak	PWR	03/10/1996	safety injection	0.75	leak	LER 96-005	fatigue-vibrational	Leaking cracked weld at piping flange socket weld for valve, replaced 3/4 in. pipe	SS
Diablo Canyon 1	PWR	07/26/1990	Chemical and volume control	0.75	Leak	90-010	Fatigue-Vibrational	Fatigue-vibration	SS
Diablo Canyon 2	PWR	03/28/1994	Reactor Coolant	0.75	Leak	PNO-V-94-7,94-001	Fatigue-Vibrational	Fatigue-vibration	SS
Fort Calhoun	PWR	04/15/1974	Flow sensor	0.75	Severed	NSIC-122;090422	Fatigue-Vibrational	Fatigue-Vibrational	SS
Ginna	PWR	04/18/1974	Chemical and volume control	0.75	Leak	AO 74-5	Stress Corrosion/IGS CC	Stress corrosion	SS
Ginna	PWR	01/11/1978	Pressurizer	0.75	Leak	78-001	Fatigue-Vibrational	Fatigue-vibration	SS
Ginna	PWR	09/20/1977	Pressurizer	0.75	Leak	RO 75-11 and 75-12	Construction Defect/Errors	Construction defect, lack of weld fusion	SS

Ginna	PWR	12/11/1973	Pressurizer	0.75	Leak	8th Semiannual Report under shutdown	Construction Defect/Errors	defect weld	SS
Ginna	PWR	05/28/1971	Pressurizer	0.75	Leak	3rd Semiannual Report under shutdown	Stress Corrosion/IGS CC	IGSCC	SS
Ginna	PWR	10/10/1976	Residual heat removal	0.75	Leak	RO 76-25, LER 76-025	Construction Defect/Errors	Construction defect, improper fitup	SS
Indian Point 1	PWR	09/09/1971	Reactor Coolant	0.75	Leak		Fatigue-Vibrational	Fatigue-Vibrational	SS
Indian Point 2	PWR	01/21/1974	Instrumentation	0.75	Leak		Construction Defect/Errors	Construction defects/errors during inspection	SS
Indian Point 2	PWR	10/31/1973	Residual heat removal	0.75	Leak		Fatigue-Vibrational	Fatigue-Vibrational	SS
Indian Point 2	PWR	05/15/1973	Residual heat removal	0.75	Leak		Unknown	Unknown cause	SS
Indian Point 2	PWR	08/06/1983	Safety Injection	0.75	Leak		Erosion/Corrosion	Erosion/Corrosion	SS
Indian Point 3	PWR	01/10/1980	Charging	0.75	Leak		Fabrication Defect		SS
Indian Point 3	PWR	06/04/1983	Reactor Coolant	0.75	Leak		Fatigue-Vibrational	Fatigue-Vibrational	SS
Kewaunee	PWR	01/17/1975	Reactor Coolant	0.75	Leak		Fatigue-Vibrational	Fatigue-Vibration	SS
Maine Yankee 1	PWR	03/31/1977	Reactor Coolant	0.75	Leak		Fatigue-Vibrational	Fatigue-Vibrational	SS
Maine Yankee 1	PWR	12/09/1975	Reactor Coolant	0.75	Leak		Construction Defects/Errors	Weld porosity, construction defect	SS
Maine Yankee 1	PWR	01/31/1980	Safety Injection	0.75	Leak		Unknown	Unknown cause	SS
McGuire 3	PWR	09/10/1993	Reactor Coolant	0.75	Leak		Water hammer	Water hammer	SS
Millstone 2	PWR	11/16/1975	Instrument line	0.75	Leak		Fatigue-Vibrational	Fatigue-vibration	SS
Millstone 2	PWR	07/02/1982	Reactor coolant	0.75	Leak		Erosion/Corrosion	Erosion/corrosion	SS
Millstone 2	PWR	11/29/1975	Reactor coolant	0.75	Leak		Fatigue-Vibrational	Fatigue-vibration	SS
Millstone 3	PWR	04/12/1989	Let down line	0.75	Leak		Fatigue-Vibrational		SS
North Anna 1	PWR	12/28/1985	Chemical and volume control	0.75	Leak		Fatigue-Vibrational	Cracks, fatigue-vibrational	SS

Oconee 1	PWR	03/01/1972	In core instrument nozzle	0.75	Failed		Not Given	Nozzle 1 of 21 nozzles broke off, 14 were cracked	SS
Oconee 1	PWR	03/01/1972	In core instrument nozzle	0.75	Failed		Not Given	Nozzle 1 of 21 nozzles broke off, 14 were cracked	SS
Oconee 1	PWR	03/01/1972	In core instrument nozzle	0.75	Failed		Not Given	Nozzle 1 of 21 nozzles broke off, 14 were cracked	SS
Oconee 1	PWR	03/01/1972	In core instrument nozzle	0.75	Failed		Not Given	Nozzle 1 of 21 nozzles broke off, 14 were cracked	SS
Oconee 1	PWR	03/01/1972	In core instrument nozzle	0.75	Failed		Not Given	Nozzle 1 of 21 nozzles broke off, 14 were cracked	SS
Oconee 1	PWR	03/01/1972	In core instrument nozzle	0.75	Failed		Not Given	Nozzle 1 of 21 nozzles broke off, 14 were cracked	SS
Oconee 1	PWR	03/01/1972	In core instrument nozzle	0.75	Failed		Not Given	Nozzle 1 of 21 nozzles broke off, 14 were cracked	SS
Oconee 1	PWR	03/01/1972	In core instrument nozzle	0.75	Failed		Not Given	Nozzle 1 of 21 nozzles broke off, 14 were cracked	SS
Oconee 1	PWR	03/01/1972	In core instrument nozzle	0.75	Failed		Not Given	Nozzle 1 of 21 nozzles broke off, 14 were cracked	SS
Oconee 1	PWR	03/01/1972	In core instrument nozzle	0.75	Failed		Not Given	Nozzle 1 of 21 nozzles broke off, 14 were cracked	SS
Oconee 1	PWR	03/01/1972	In core instrument nozzle	0.75	Failed		Not Given	Nozzle 1 of 21 nozzles broke off, 14 were cracked	SS
Oconee 2	PWR	05/11/1974	Core spray	0.75	Leak		Fatigue-Vibrational	Fatigue-vibrational	SS
Oconee 3	PWR	11/01/1991	Instrument line	0.75	Leak		Erosion/Corrosion	Erosion/corrosion	SS
Palisades	PWR	08/01/1974	Letdown line	0.75	Leak		Design Error		SS
Palisades	PWR	08/19/1971	Pressurizer	0.75	Leak		Fatigue-Vibrational	Fatigue-Vibrational	SS

Palisades	PWR	09/09/1974	Reactor coolant	0.75	Leak		Fatigue-Vibrational	Fatigue-Vibrational	SS
Point Beach 2	PWR	09/22/1970	reactor coolant	0.75	leak	AO 74-25	fatigue-vibrational	fatigue-vibration	SS
Prairie Island 1	PWR	06/26/1971	residual heat removal	0.75	leak	AO 75-22A	design-dynamic load	improper support of pipe, dynamic load	SS
Prairie Island 2	PWR	05/31/1971	RHR	0.75	leak	NPE VIII.B.73	improper support		SS
Salem 1	PWR	01/02/1973	chemical and volume control	0.75	severed	77-002/3L	fatigue-vibrational		SS
Salem 1	PWR	03/15/1972	residual heat removal	0.75	failed	ORNL-NSIC-138:112141	fatigue-vibrational	fatigue-vibration	SS
Salem 2	PWR	06/08/1977	chemical and volume control	0.75	leak	81-040	fatigue-vibrational	fatigue-vibrational	SS
San Onofre 2	PWR	02/17/1988	Instrument line	0.75	crack/leak	92-004	stress corrosion/IGS CC	IGSCC	SS
San Onofre 3	PWR	02/26/1982	instrument line	0.75	leak	86-003	stress corrosion/IGS CC	IGSCC	SS
San Onofre 3	PWR	07/21/1991	reactor coolant	0.75	leak	95-001	stress corrosion/IGS CC	IGSCC	SS
St. Lucie 2	PWR	02/25/1972	residual heat removal	0.75	leak	NSIC 138	fatigue-vibrational	fatigue-vibrational	SS
Surry 1	PWR	10/30/1985	reactor coolant	0.75	leak	89-042	fatigue-vibrational	fatigue-vibrational	SS
Three Mile Island	PWR	07/10/1971	makeup system	0.75	leak	AO 75-22	fatigue-vibrational	fatigue-vibrational	SS
Trojan	PWR	08/29/1980	chemical and volume control	0.75	leak	PNO-V-84-056	unknown	unknown cause	SS
Turkey Point 3	PWR	04/30/1974	charging	0.75	leak	NPE VIII.A.317	fatigue-vibrational		SS
Turkey Point 4	PWR	10/20/1970	safety injection	0.75	leak	AO 74-7	construction defect/errors	poor fit between pipe and coupling	SS
Turkey Point 4	PWR	11/07/1970	SIS	0.75	leak	AO-74-7	fatigue-vibrational		SS
Vogtle 1	PWR	01/18/1985	reactor coolant	0.75	leak	89-004	fatigue-vibrational	fatigue-vibration	SS
Zion 1	PWR	11/24/1969	charging line	0.75	leak	letter to NRC 11/6/73	construction defect/errors	construction defect	SS
Zion 1	PWR	12/29/1988	flow sensor	0.75	breakage	special report OSR-008-93	unknown	unknown cause	SS

Zion 1	PWR	01/02/1989	flow sensor	0.75	leak	special report OSR-008-93	construction defect/errors	leaked tube due to incorrect seating, construction defect	SS
Zion 1	PWR	12/05/1969	reactor coolant	0.75	leak	Ltr DL 12/6/73	fatigue-vibrational	fatigue-vibration	SS
Zion 2	PWR	09/30/1970	charging line	0.75	leak	NPE VIII.A.64	fatigue-vibrational		SS
Zion 2	PWR	01/16/1970	control rod drive	0.75	leak	letter 6/29/74	stress corrosion/IGS CC	stress corrosion	SS
Zion 2	PWR	10/31/1970	pressurizer	0.75	leak	AO 50-304/74-43	fatigue-vibrational	fatigue-vibration	SS
Zion 2	PWR	11/20/1970	pressurizer	0.75	leak	AO 50-304/74-48	fatigue-vibrational	fatigue-vibration	SS
Zion 2	PWR	06/15/1971	pressurizer	0.75	leak	AO 50-304/75-26	fatigue-vibrational	fatigue-vibrational	SS
Zion 2	PWR	12/30/1970	reactor coolant	0.75	crack/leak	AO 74-56	fatigue-vibrational	fatigue-vibrational	SS
Zion 2	PWR	04/27/1971	reactor coolant	0.75	leak	AO 75-19	fatigue-vibrational	fatigue-vibration	SS
ANO1	PWR	06/22/1976	Makeup System	0.99	Leak	RO 76-12	Fatigue-Vibrational	Fatigue-vibration	SS
ANO1	PWR	08/26/1981	Residual Heat Removal	0.99	Leak	81-013	Fatigue-Vibrational	Fatigue-vibration	SS
ANO1	PWR	08/18/1978	Flow Sensor	0.99	Leak	78-021	Stress Corrosion Cracking, IGSCC	Stress Corrosion Cracking	SS
ANO1	PWR	07/20/1975	Flow Sensor	0.99	Leak	AO 75-3	Fatigue-Vibrational	Fatigue-vibration	SS
ANO2	PWR	04/24/1987	Pressurizer	0.99	Leak	87-003	PWSCC	PWSCC	SS
ANO2	PWR	08/01/1988	Pump Seal Pressure Sensing Line	0.99	Leak	88-015	Fatigue	Failed, 20 gpm, questionable failure mechanism	SS
ANO2	PWR	06/23/1989	Reactor Coolant	0.99	Leak	PNO-IV-89-042	Fatigue-Vibrational	Fatigue-vibration at pressure sensing line sealant	SS
ANO2	PWR	07/06/1987	Reactor Coolant	0.99	Leak	87-006	Construction Defect/Error	Construction defect/error	SS
ANO2	PWR	08/25/1983	Reactor Coolant Pump Pressure Sensing Line	0.99	Leak	83-039	Fatigue-Vibrational		SS
ANO2	PWR	01/01/1981	Charging	0.99	Leak	NPE VIII.A.530	Fabrication Defect		SS

ANO2	PWR	05/04/1988	Chemical and Volume Control	0.99	Leak	88-008	Other	Faulty procedures for connection of threaded fitting for water level transmitter	SS
ANO2	PWR	05/25/1988	Instrument Line	0.99	Leak	88-010	Other	Low water level, in injection tank, error	SS
Beaver Valley 1	PWR	02/21/1981	Reactor Coolant	0.99	Leak	81-014	Corrosion	Corrosion	SS
Beaver Valley 1	PWR	05/19/1981	Instrument Line	0.99	Leak	81-062	Unknown	Pipe threading failure, unknown cause	SS
Calvert Cliffs 1	PWR	09/01/1975	Instrument Line	0.99	Leak	NPE VIII.A.279	Fatigue-Vibrational		SS
Calvert Cliffs 1	PWR	10/10/1983	Instrumentation	0.99	Leak	83-057	Fatigue-Vibrational	Fatigue-vibration	SS
Calvert Cliffs 1	PWR	12/06/1976	Pressurizer	0.99	Crack/Leak	76-055	Thermal Fatigue	Cracked weld, fatigue	SS
Calvert Cliffs 1	PWR	08/20/1982	Reactor Coolant	0.99	Leak	82-055	Unknown	Unknown Cause	SS
Calvert Cliffs 1	PWR	04/17/1978	Reactor Coolant	0.99	Leak	78-022	Fatigue-Vibrational	Fatigue-vibration	SS
Calvert Cliffs 1	PWR	03/17/1975	Reactor Coolant Sensing Line	0.99	Leak	AO 75-25	Fatigue	Weld Failure	SS
Calvert Cliffs 2	PWR	11/15/1978	Reactor Coolant	0.99	leak	78-039	Fatigue-vibrational	fatigue-vibration	SS
Calvert Cliffs 2	PWR	05/23/1978	Reactor Coolant	0.99	leak	78-013	Fatigue-vibrational	fatigue-vibration	SS
Calvert Cliffs 2	PWR	12/01/1976	Chemical and Volume Control	0.99	Leak	LER-76-005/IP	Fatigue-Vibrational		SS
Calvert Cliffs 2	PWR	12/01/1976	Chemical and Volume Control	0.99	Leak	LER-76-006/IP	Fatigue-Vibrational		SS
Calvert Cliffs 2	PWR	05/05/1989	Pressurizer	0.99	Leak	89-007, IN 90-10	Stress Corrosion/IGS CC	Stress Corrosion cracking, 23 or 120 penetrations leaked	SS
Calvert Cliffs 2	PWR	01/15/1977	chemical and volume control	0.99	leak	77-008	fatigue-vibrational	cracked weld	SS
Calvert Cliffs 2	PWR	12/01/1976	chemical and volume control	0.99	crack/leak	76-005	fatigue-vibrational	fatigue-vibration	SS
Calvert Cliffs 2	PWR	12/25/1978	flow sensor	0.99	leak	78-050	corrosion/fatigue	fatigue/corrosion	SS

Calvert Cliffs 2	PWR	04/17/1980	Instrument Line	0.99	leak	80-024	Unknown	Unknown cause, failed part contaminated	SS
Cook 1	PWR	05/27/1975	RHR	0.99	leak	NPE VIII.B.102	fatigue-vibrational		SS
Cook 1	PWR	01/15/1982	Instrument air	0.99	leak	82-005	unknown	broken threaded ripple, unknown cause	SS
Cook 1	PWR	03/15/1976	Instrument line	0.99	leak	RO 76-07	Fatigue-vibrational	fatigue-vibrational	SS
Cook 1	PWR	01/10/1976	Instrument line	0.99	leak	RO 76-07	fatigue-vibrational		SS
Crystal River 3	PWR	12/24/1979	Makeup	0.99	Leak	NPE VIII.A.403	Fatigue-Vibrational		SS
Crystal River 3	PWR	09/29/1979	Makeup	0.99	Leak	NPE VIII.A.403	Fatigue-Vibrational		SS
Crystal River 3	PWR	08/22/1979	Makeup system	0.99	Leak	79-082	Fatigue-Vibrational	Fatigue-vibration	SS
Farley 1	PWR	07/24/1981	Instrument line	0.99	Leak	81-052	Fatigue-Vibrational	Fatigue-vibration	SS
Farley 2	PWR	07/17/1981	Instrumentation	0.99	Failed	81-028	Fatigue-Vibrational	Fatigue-vibration	SS
Fort Calhoun	PWR	10/27/1980	Pressurizer	0.99	Leak	80-025	Fatigue-Vibrational	Fatigue-vibrational	SS
Fort Calhoun	PWR	02/26/1979	Reactor Coolant	0.99	Leak	79-004	Fatigue-Vibrational	Fatigue-vibrational	SS
Fort Calhoun	PWR	03/06/1985	Charging	0.99	Leak	NPE VIII.A.739	Unknown		SS
Fort Calhoun	PWR	01/17/1978	Charging line	0.99	Leak	78-003	Fatigue-Vibrational	Fatigue-vibrational	SS
Fort Calhoun	PWR	09/24/1981	Instrument air	0.99	Leak	81-009	Construction Defect/Errors	Pressurized air leak, stripped threading, construction defect	SS
Indian Point 1	PWR	09/12/1969	RCS	0.99	Leak		Fatigue-Vibrational	Fatigue-Vibrational	SS
Indian Point 1	PWR	08/08/1969	Reactor Coolant	0.99	Leak		Fatigue-Vibrational	Fatigue-Vibrational	SS
Indian Point 2	PWR	06/26/1978	Instrument line	0.99	Leak		Erosion/Corrosion	Erosion/Corrosion	SS
Indian Point 2	PWR	02/13/1978	Instrumentation	0.99	Leak		Fatigue-Vibrational	Fatigue-Vibrational	SS
Indian Point 2	PWR	07/04/1979	Pressurizer	0.99	Leak		Fatigue-Vibrational	Fatigue-Vibrational	SS
Indian Point 2	PWR	03/11/1977	Pressurizer	0.99	Leak		Fatigue-Vibrational	Fatigue-Vibrational	SS
Indian Point 2	PWR	05/31/1989	Reactor Coolant	0.99	Leak		Fatigue-Vibrational	Fatigue-Vibrational	SS
Indian Point 2	PWR	11/16/1978	Reactor Coolant	0.99	Leak		Fatigue-Vibrational	Fatigue-Vibrational	SS
Indian Point 2	PWR	02/13/1978	Reactor Coolant	0.99	Leak		Fatigue-Vibrational	Fatigue-Vibrational	SS

Indian Point 2	PWR	02/01/1977	Reactor Coolant	0.99	Leak		Fatigue-Vibrational	Fatigue-Vibrational	SS
Indian Point 2	PWR	01/29/1975	Reactor Coolant	0.99	Leak		Fatigue-Vibrational	Fatigue-Vibrational	SS
Indian Point 2	PWR	05/11/1981	Residual heat removal	0.99	Leak		Fatigue-Vibrational	Fatigue-Vibrational	SS
Indian Point 3	PWR	03/17/1976	Accumulators	0.99	Crack/Leak		Construction Defect/Errors	Fatigue, poor weld contour, construction defect	SS
Indian Point 3	PWR	09/02/1976	Pressurizer	0.99	Leak		Fatigue-Vibrational	Fatigue-Vibrational	SS
Indian Point 3	PWR	03/30/1976	Reactor Coolant	0.99	Crack/Leak		Fatigue		SS
Kewaunee	PWR	10/28/1983	Charging line	0.99	Leak		Fatigue-Vibrational		SS
McGuire 10	PWR	11/14/1983	Instrument line	0.99	Leak		Unknown	Compression fitting failed	SS
McGuire 11	PWR	10/25/1983	Instrument line	0.99	Leak		Unknown	Compression fitting failed	SS
McGuire 12	PWR	05/21/1983	Flow sensor	0.99	Leak		Unknown	Tube fitting leaked, fitting replace	SS
North Anna 1	PWR	03/22/1978	Residual heat removal	0.99	Leak		Construction Defects/Errors	Construction defect	SS
Palisades	PWR	02/26/1972	Charging	0.99	Leak		Fatigue-Vibrational		SS
Palisades	PWR	03/06/1972	Charging pump line socket weld	0.99	Leak		Fatigue-Vibrational		SS
Palisades	PWR	11/02/1972	Reactor coolant	0.99	Leak		Fatigue-Vibrational	Fatigue-Vibrational	SS
Palo Verde 1	PWR	07/09/1982	Reactor coolant	0.99	Leak		Thermal Fatigue	Thermal Fatigue	SS
Prairie Island 1	PWR	07/06/1971	reactor coolant seal injection line	0.99	leak	ORNL-NSIC-127:104085	fatigue-vibrational		SS
Prairie Island 2	PWR	12/15/1970	pressurizer	0.99	leak	letter to NRC (3/4/75)	other	leaked tube caused by personnel error	SS
Prairie Island 2	PWR	03/03/1971	reactor coolant	0.99	leak	ORNL-NSIC-127:100426	construction defect/errors	construction defect	SS
Salem 1	PWR	05/31/1976	charging	0.99	leak	NPE VIII.A.437	fatigue		SS

Salem 1	PWR	08/14/1979	chemical and volume control	0.99	leak	83-048	erosion/corrosion	leaked tubes, erosion/corrosion	SS
Salem 1	PWR	06/30/1979	flux thimbles	0.99	leak	NPE PWR-2-II-No.43	wear		SS
Salem 1	PWR	08/23/1977	instrument line	0.99	leak	81-080	unknown	leaked flow transmitter, unknown cause	SS
Salem 1	PWR	11/09/1979	reactor coolant	0.99	leak	83-055	unknown	containment fan coil leaks, unknown cause	SS
Salem 1	PWR	03/10/1977	thimble tube	0.99	leak	81-028	unknown	fretting between tubes and nozzle blocks	SS
Salem 1	PWR	07/08/1977	thimble tube	0.99	leak	81-028	unknown	fretting between tubes and nozzle blocks	SS
Salem 1	PWR	11/15/1977	thimble tube	0.99	leak	81-028	fatigue-vibrational	fretting between tubes and nozzle blocks, vibration	SS
San Onofre 1	PWR	08/15/1977	reactor coolant	0.99	leak	81-019	corrosion/fatigue	threaded joint wear, corrosion fatigue, joint tightened	SS
San Onofre 1	PWR	01/23/1973	residual heat removal	0.99	leak	77-003	construction defect/errors	maintenance error	SS
Sequoyah 1	PWR	05/11/1976	flow sensor	0.99	rupture	80-057	unknown	compression fitting failed, unknown cause	SS
Sequoyah 1	PWR	02/03/1979	flow sensor	0.99	rupture	83-035	construction defect/errors	compression fitting failed; construction defect	SS
Sequoyah 2	PWR	02/22/1991	reactor coolant	0.99	leak	PNO-II-95-011	unknown	failed fitting	SS
Three Mile Island	PWR	07/07/1979	flow sensor	0.99	leak	PNO-TMI-83-004	fatigue-vibrational	loose fittings, vibration	SS
Three Mile Island	PWR	06/02/1970	reactor coolant	0.99	leak	AO 74-06	fatigue-vibrational	fatigue-vibrational	SS

Turkey Point 3	PWR	03/27/1975	instrument line	0.99	leak	79-009	unknown	leaked water level indication line, unknown cause	SS
Turkey Point 3	PWR	01/05/1969	reactor coolant	0.99	leak	AO 73-1	unknown	leaked flow transmitter, unknown cause	SS
Turkey Point 3	PWR	01/15/1985	reactor coolant	0.99	leak	89-002	stress corrosion/IGS CC	stress corrosion cracking	SS
Turkey Point 4	PWR	02/28/1974	charging	0.99	leak	NPE VIII-A.288	fatigue-vibrational		SS
Turkey Point 4	PWR	04/10/1981	pressurizer	0.99	leak	85-008	unknown	loose fitting	SS
Turkey Point 4	PWR	07/16/1977	reactor coolant	0.99	leak	81-008	stress corrosion/IGS CC	stress corrosion cracking at nipple	SS
Yankee Rowe	PWR	02/07/1971	flow sensor	0.99	leak	AO 75-1	fatigue-vibrational	fatigue-vibrational	SS
Yankee Rowe	PWR	02/18/1971	flow sensor	0.99	leak	AO 75-3	fatigue-vibrational	fatigue-vibration	SS
Yankee Rowe	PWR	03/20/1971	flow sensor	0.99	leak	AO 75-4	fatigue-vibrational	fatigue-vibration, IGSCC	SS
Yankee Rowe	PWR	08/24/1970	instrumentation	0.99	leak	AO 74-5	unknown	unknown cause	SS
Yankee Rowe	PWR	08/06/1971	reactor coolant	0.99	leak	AO 75-7	fatigue-vibrational	fatigue-vibration at nozzle	SS
Zion 2	PWR	11/10/1977	chemical and volume control	0.99	failed	81-027	unknown	compression fitting failed	SS
ANO1	PWR	09/02/1976	Primary Makeup System	1	Leak	RO 76-26	Construction Defect/Error	Construction defect - socket weld, schedule 40	SS
ANO1	PWR	02/03/1978	Reactor Coolant	1	Leak	78-003	Unknown	Unknown Cause	SS
ANO2	PWR	04/04/1982	Accumulators	1	Leak	82-007	Fatigue-Vibrational	Fatigue-vibration	SS
ANO2	PWR	03/01/1979	LPSI	1	Leak	NPE VII.A.208	Unknown		SS
ANO2	PWR	04/10/1980	Makeup System	1	Leak	80-019	Fatigue-Vibrational	Fatigue-vibration	SS
ANO2	PWR	11/14/1979	Safety Injection	1	Leak	79-087	Fatigue-Vibrational	Fatigue-vibration	SS
Beaver Valley 1	PWR	10/29/1983	Control Rod Drive	1	Severed	83-003	Construction Defect/Error	Errors, maintenance-caused failure	SS
Beaver Valley 1	PWR	07/01/1976	Instrument Line	1	Leak	76-041	Unknown	Swage-lock Failed	SS

Beaver Valley 1	PWR	08/18/1995	Reactor Coolant	1	Leak	95-006	Erosion/Corrosion	Weld leak at seal injection, erosion/corrosion	SS
Byron 1	PWR	11/05/1988	Accumulators	1	Crack/Leak	88-010	Fatigue-Vibrational	Fatigue-vibration	SS
Calvert Cliffs 1	PWR	11/28/1976	Chemical and Volume Control	1	Leak	76-049	Fatigue-Vibrational		SS
Calvert Cliffs 1	PWR	09/13/1979	Reactor Coolant	1	Leak	79-044	Thermal Fatigue	Thermal Fatigue	SS
Calvert Cliffs 1	PWR	05/31/1978	Reactor Coolant	1	Leak	78-031	Fatigue-Vibrational	Fatigue-vibration	SS
Calvert Cliffs 2	PWR	07/25/1986	Reactor Coolant	1	Severed	86-005	Unknown	Compression fitting failed	SS
Calvert Cliffs 2	PWR	02/22/1978	Reactor Coolant	1	leak	78-005	Fatigue-vibrational	fatigue-vibration	SS
Calvert Cliffs 2	PWR	12/22/1976	Reactor coolant	1	leak	76-014	fatigue-vibrational	fatigue-vibration	SS
Cook 1	PWR	06/24/1975	chemical and volume control	1	leak	AO 75-27	Corrosion	Socket weld crack, corrosion	SS
Crystal River 3	PWR	05/10/1982	Makeup system	1	Leak	82-037	Fatigue-Vibrational	Fatigue-vibration	SS
Crystal River 3	PWR	02/28/1982	Makeup system	1	Leak	82-013	Fatigue-Vibrational	Vibration damage weld	SS
Crystal River 3	PWR	10/24/1979	Makeup system	1	Leak	79-103	Fatigue-Vibrational	Fatigue-vibration	SS
Diablo Canyon 1	PWR	10/20/1989	Thimble tube	1	Leak	89-010	Fatigue-Vibrational	Vibration, corrosion/fatigue	SS
Fort Calhoun	PWR	11/18/1984	Pressurizer	1	Leak	84-023	Unknown	unknown	SS
Ginna	PWR	01/17/1975	Pressurizer	1	Breakage	NUREG/CR 2781	Water Hammer	Water Hammer	SS
Ginna	PWR	04/26/1981	Residual heat removal	1	Leak	81-011	Erosion/Corrosion	Worn pump seal fitting threads, erosion	SS
Ginna	PWR	11/25/1980	Residual heat removal	1	Leak	80-010	Construction Defect/Errors	Poor weld, construction defect	SS
Indian Point 1	PWR	08/08/1969	Reactor Coolant	1	Failed		Fatigue-Vibrational	Fatigue-Vibrational	SS
Indian Point 2	PWR	05/13/1977	Pressurizer	1	Leak		Fatigue-Vibrational	Fatigue-Vibrational	SS
Indian Point 2	PWR	03/29/1977	Pressurizer	1	Leak		Fatigue-Vibrational	Fatigue-Vibrational	SS
Indian Point 2	PWR	03/15/1977	Pressurizer	1	Leak		Fatigue-Vibrational	Fatigue-Vibrational	SS
Indian Point 2	PWR	10/24/1989	Reactor Coolant	1	Leak		Stress Corrosion/IGSCC	Stress Corrosion	SS
Indian Point 2	PWR	04/27/1977	Residual heat removal	1	Leak		Fatigue-Vibrational	Fatigue-Vibrational	SS

Indian Point 2	PWR	06/29/1978	Safety Injection	1	Leak		Unknown	Unknown cause	SS
Indian Point 3	PWR	05/12/1983	Residual heat removal	1	Leak		Unknown	Unknown cause	SS
Kewaunee	PWR	12/18/1981	Chemical and volume control	1	Leak		Fatigue-Vibrational	Fatigue-Vibrational, discharge pump relief pipe	SS
McGuire 5	PWR	03/22/1993	Emergency core cooling	1	Leak		Construction Defect/Errors	Construction defects/errors	SS
Millstone 2	PWR	04/20/1977	Instrument line	1	Leak		Fatigue-Vibrational	Fatigue-vibration	SS
Millstone 2	PWR	07/29/1976	Instrument line	1	Leak		Fatigue-Vibrational	Fatigue-vibration	SS
Millstone 2	PWR	09/30/1975	Instrument line	1	Leak		Unknown	Weld failure, unknown cause	SS
Millstone 2	PWR	09/16/1975	Instrument line	1	Leak		Unknown	Weld failure, unknown cause	SS
Millstone 2	PWR	09/01/1975	Instrument line	1	Leak		Porosity		SS
Millstone 2	PWR	12/12/1976	Reactor coolant	1	Leak		Fatigue-Vibrational	Fatigue-vibration	SS
North Anna 2	PWR	06/10/1980	Emergency core cooling	1	Leak		Unknown	Failed fitting, fitting repaired	SS
North Anna 2	PWR	12/18/1980	Reactor coolant	1	Leak		Unknown	Leaked weld, unknown cause	SS
Oconee 1	PWR	02/17/1982	Makeup system	1	Crack/Leak		Construction Defects/Errors	Construction defect/errors	SS
Oconee 2	PWR	04/08/1987	Instrument line	1	Leak		Construction Defect/Errors	Construction Defect/Errors	SS
Oconee 3	PWR	10/05/1975	Core spray	1	Severed		Water hammer	Water hammer	SS
Palisades	PWR	11/02/1972	Control rod drive	1	Leak		Construction Defects/Errors	Maintenance error	SS
Palisades	PWR	08/15/1995	RCS	1	Leak		Not Given	Compression fitting failed	SS
Point Beach 2	PWR	07/27/1978	chemical and volume control	1	leak	82-006	other	welding of nearby restraint, error	SS

Rancho Seco	PWR	11/24/1975	makeup	1	leak	NPE VIII.A.400	fabrication defect		SS
Rancho Seco	PWR	08/04/1972	reactor coolant	1	leak	RO 76-11	fatigue-vibrational	fatigue-vibrational	SS
Robinson 2	PWR	01/28/1977	chemical and volume control	1	rupture	81-005	fatigue-vibrational	cap off drain; valve vibrated open; about 3000 gal.; estimate 100 gpm, fatigue-vibration	SS
Robinson 2	PWR	12/14/1986	RHR	1	leak	NPRDS	erosion/corrosion	sch 40, refueling	SS
Salem 2	PWR	01/16/1986	emergency core cooling	1	leak	90-005	fatigue-vibrational	fatigue-vibration, pipe to cap socket weld joint repaired	SS
Salem 2	PWR	10/18/1986	residual heat removal	1	leak	90-026-04	erosion/corrosion	erosion/corrosion	SS
Salem 2	PWR	08/24/1982	safety injection	1	leak	special report 86-8	corrosion	galvanic corrosion	SS
Sequoyah 1	PWR	12/14/1985	chemical and volume control	1	leak	89-034	unknown	loose threaded fitting, fitting tightened	SS
Sequoyah 1	PWR	06/23/1976	pressurizer	1	failed	80-098	unknown	compression fitting failed	SS
Sequoyah 1	PWR	04/18/1980	thimble tube	1	failed	84-030	unknown	compression fitting; cleaning maintenance; 30 gpm	SS
St. Lucie 1	PWR	09/05/1971	safety injection	1	leak	ORNL-NSIC-127:107985	fatigue-vibrational	fatigue-vibrational	SS
St. Lucie 1	PWR	05/09/1973	safety injection	1	crack/leak	RO 77-29	construction defect/errors	construction defect	SS
St. Lucie 2	PWR	03/01/1989	pressurizer	1	leak	93-004	unknown	cracked nozzles, unknown cause	SS
St. Lucie 2	PWR	05/10/1979	safety injection	1	leak	83-006	unknown	cracked weld, 1 qt/min leaks	SS
Three Mile Island	PWR	08/20/1971	makeup system	1	leak	AO 75-27	fatigue-vibrational	fatigue-vibrational	SS
Three Mile Island	PWR	01/16/1977	reactor coolant	1	leak	81-001	fatigue-vibrational	fatigue-vibration, corrosion	SS
Trojan	PWR	05/11/1983	accumulator fill	1	rupture	LER 87-013	fatigue-vibrational		SS

Trojan	PWR	05/23/1974	reactor coolant	1	leak	78-019	construction defect/errors	construction defect/errors	SS
Trojan	PWR	09/12/1980	thimble tube	1	failed	84-014	unknown	compression fitting; failed during repair	SS
Turkey Point 3	PWR	01/28/1987	accumulator line	1	leak	NPRDS	fatigue	sch 46, questionable failure mechanism, hydro	SS
Turkey Point 3	PWR	01/24/1988	pressurizer	1	leak	92-014	construction defect/errors	construction defect/errors	SS
Turkey Point 3	PWR	01/14/1989	pressurizer	1	leak	93-002	construction defect/errors SCC?	construction defect/errors/ SCC?	SS
Yankee Rowe	PWR	02/03/1972	reactor coolant	1	leak	RO 76-01	fatigue-vibrational	fatigue-vibrational	SS
Zion 1	PWR	06/28/1977	reactor coolant	1	leak	81-032	fatigue-vibrational	fatigue-vibration	SS
Zion 2	PWR	05/11/1976	reactor coolant	1	leak	PNO-III-80-091	unknown	pipe separated from valve bonnet, unknown cause	SS
ANO1	PWR	11/30/1983	Chemical and Volume Control	1.1	Leak	83-028	Thermal Fatigue	Thermal fatigue, pipe size = or >1	SS
ANO1	PWR	01/28/1977	Reactor Coolant	1.1	Leak	RO 77-5	Unknown	Unknown Cause	SS
ANO2	PWR	08/18/1978	LPSI	1.1	Leak	CAN: 7811070 010	Unknown		SS
Beaver Valley 1	PWR	05/04/1994	Pressurizer	1.1	Leak	94-004	Unknown	2 ft. Section of pipe replaced, unknown cause	SS
Calvert Cliffs 1	PWR	02/28/1979	Chemical and Volume Control	1.1	Leak	79-007	Unknown	Weld Failure	SS
Calvert Cliffs 2	PWR	03/11/1980	chemical and volume control	1.1	leak	80-018	Fatigue-Vibrational		SS
Calvert Cliffs 2	PWR	01/20/1979	flow sensor	1.1	leak	79-003	Fatigue-Vibrational	cracked weld, fatigue-vibrational	SS
Calvert Cliffs 2	PWR	02/19/1980	Reactor Coolant	1.1	leak	80-012	Fatigue-Vibrational		SS

Calvert Cliffs 2	PWR	01/06/1979	Reactor Coolant	1.1	leak	79-001	corrosion/fatigue	Cracked weld, fatigue/corrosion	SS
Calvert Cliffs 2	PWR	07/14/1978	Reactor Coolant	1.1	leak	78-021	unknown	Cracked seal, unknown cause	SS
Calvert Cliffs 2	PWR	04/30/1978	Reactor Coolant	1.1	leak	78-011	Fatigue-vibrational	fatigue-vibration	SS
Catawba 1	PWR	01/31/1993	RHR	1.1	rupture	IR-50-413-93-22	water hammer		SS
Cook 1	PWR	06/30/1975	Residual heat removal	1.1	leak	AO 75-23	fatigue-vibrational	fatigue-vibration	SS
Fort Calhoun	PWR	02/14/1978	Charging line	1.1	Leak	78-005	Fatigue		SS
Fort Calhoun	PWR	11/19/1990	Instrument air	1.1	Leak	90-026	Construction Defect/Errors	Construction defects at pipe header	SS
Haddam Neck 1	PWR	05/31/1978	Reactor Coolant	1.1	Leak		Construction Defect/Errors	Construction Defect	SS
Indian Point 2	PWR	05/01/1974	SIS	1.1	Leak		IGSCC		SS
Kewaunee	PWR	09/18/1978	Reactor Coolant	1.1	Leak		Fatigue-Vibrational	Fatigue-Vibration	SS
Kewaunee	PWR	04/22/1981	RHR	1.1	Leak		Not Given	External damage	SS
Maine Yankee 1	PWR	03/30/1984	Chemical and volume control	1.1	Leak		Thermal Fatigue	Thermal fatigue degrading rubber hose	SS
McGuire 1	PWR	08/25/1981	Charging line	1.1	Leak		Fatigue-Vibrational		SS
Millstone 2	PWR	11/08/1976	Accumulators	1.1	Leak		Stress Corrosion/IGSCC	Leak at base of waste concentrate tank, Stress corrosion cracking	SS
Oconee 3	PWR	03/06/1979	Reactor coolant	1.1	Leak		Unknown	Unknown cause	SS
Palo Verde 1	PWR	08/27/1987	Pressurizer	1.1	Leak		other	Procedure errors	SS
Palo Verde 3	PWR	05/29/1990	pressurizer	1.1	leak	94-004	construction defect/error	defective weld, construction defect/error	SS

Point Beach 1	PWR	06/19/1973	pressurizer	1.1	leak	77-05	fatigue-vibrational	fatigue cracking from unsupported loading	SS
Prairie Island 1	PWR	07/31/1978	pressurizer	1.1	leak	NPE VII.A.686	unknown		SS
Prairie Island 2	PWR	12/13/1969	chemical and volume control	1.1	leak	letter to NRC (2/24/75)	unknown	leaked weld, unknown cause	SS
Prairie Island 2	PWR	02/23/1971	reactor coolant	1.1	leak	ORNL-NSIC-127:100426	unknown	unknown cause	SS
Rancho Seco	PWR	03/17/1972	makeup system	1.1	leak	RO 76-03	construction defect/errors	defective weld, construction defect	SS
Robinson 2	PWR	02/20/1976	chemical and volume control	1.1	leak	80-003	other	personnel error	SS
Salem 1	PWR	06/25/1978	chemical and volume control	1.1	leak	82-041	erosion/corrosion	erosion/corrosion of gear oil cooler	SS
Salem 2	PWR	09/30/1978	charging	1.1	leak	NPE VIII.B.512	erosion		SS
Sequoyah 1	PWR	08/28/1976	control rod drive	1.1	leak	80-141	unknown	unknown cause	SS
Surry 1	PWR	09/28/1982	chemical and volume control	1.1	leak	86-029	unknown	unknown cause	SS
Surry 2	PWR	12/05/1973	accumulator	1.1	leak	fiche 50281-820	not given		SS
Surry 2	PWR	12/31/1971	pressurizer	1.1	leak	fiche 50281-603	not given		SS
Three Mile Island	PWR	09/08/1991	reactor coolant	1.1	leak	95-003	unknown	cracked weld, pipe replaced	SS
Vogtle 1	PWR	07/22/1990	pressurizer	1.1	leak	94-005	construction defect/errors	defective weld, construction defect/error	SS
ANO2	PWR	12/05/1980	Makeup System	1.25	Leak	80-090	Fatigue-Vibrational	Fatigue-vibration	SS
ANO1	PWR	10/01/1974	Cold Leg Drain	1.5	Leak	NPE V.B 8	Fatigue-Vibrational	Leak 1 out of 2 leaks	SS
ANO1	PWR	10/01/1974	Cold Leg Drain	1.5	Leak	NPE V.B 8	Fatigue-Vibrational	Leak 2 out of 2 leaks	SS
ANO1	PWR	10/17/1974	Reactor Coolant	1.5	Leak	AO 74-09	Unknown	Unknown Cause	SS
ANO1	PWR	11/04/1974	Reactor Coolant Drain Line	1.5	Leak	AO 74-10	Fatigue-Vibrational	Second crack same weld	SS
Millstone 2	PWR	06/17/1982	Safety Injection	1.5	Leak		Fatigue-Vibrational	Fatigue-vibrational	SS
Millstone 2	PWR	06/17/1981	SIS	1.5	Leak		Fatigue-Vibrational		SS

Millstone 2	PWR	08/18/1977	SIS	1.5	Leak		Fatigue-Vibrational	Sch 40	SS
Millstone 3	PWR	02/08/1991	SIS	1.5	Leak		Erosion/Corrosion	Sch 40, pinhole leak, Cu-Ni	SS
Millstone 3	PWR	06/16/1989	SIS	1.5	Leak		Erosion/Corrosion	Sch 40, Cu-Ni	SS
Millstone 3	PWR	10/25/1988	SIS	1.5	Leak		Erosion/Corrosion	Sch 40, Cu-Ni, cold shutdown	SS
Oconee 3	PWR	09/03/1974	Reactor coolant	1.5	Leak		Construction Defects/Errors	Construction Defects/Errors	SS
San Onofre 3	PWR	03/11/1981	instrument line	1.5	leak	85-003	unknown	leaked thermowell, unknown cause	SS
Sequoyah 1	PWR	10/04/1976	pressurizer	1.5	leak	80-156	fatigue-vibrational	fatigue-vibrational	SS
ANO1	PWR	04/15/1974	Makeup System	2	Leak	Ltr DL 4/15/74	Fatigue-Vibrational	Fatigue-vibration	SS
ANO2	PWR	04/18/1979	Chemical and Volume Control	2	Leak	79-031	Fatigue-Vibrational	Fatigue-vibration	SS
ANO2	PWR	06/03/1982	Pressurizer	2	Leak	PNO-IV-82	Unknown		SS
Calvert Cliffs 1	PWR	04/12/1978	Reactor Coolant	2	Leak	78-016	Fatigue-Vibrational	Fatigue-vibration	SS
Catawba 1	PWR	06/22/1992	chemical and volume control	2	leak	92-006	thermal fatigue	thermal fatigue	SS
Cook 1	PWR	11/30/1975	RHR	2	leak	NPE VIII.B.102	fatigue-vibrational		SS
Diablo Canyon 1	PWR	06/22/1992	Chemical and volume control	2	Leak	92-009	Thermal Fatigue	Thermal fatigue	SS
Fort Calhoun	PWR	05/20/1978	Chemical and volume control	2	Leak	78-014	Fatigue-Vibrational	Fatigue-vibrational	SS
Fort Calhoun	PWR	10/01/1976	Reactor Coolant	2	Leak	76-0325	Fatigue-Vibrational	Fatigue-Vibrational	SS
Haddam Neck 1	PWR	03/10/1979	Chemical and volume control	2	Crack/Leak		Thermal Fatigue	Thermal Fatigue, stress, corrosion, IGSCC	SS
Haddam Neck 1	PWR	07/20/1976	Flow sensor	2	Leak		other	Worn threaded fitting	SS
Indian Point 2	PWR	03/11/1977	Chemical and volume control	2	Leak		Fatigue-Vibrational	Fatigue-Vibrational	SS
Indian Point 2	PWR	08/11/1982	Residual heat removal	2	Leak		Corrosion	Corrosion of flexible hose, 5 hoses corroded, sch 80	SS

Maine Yankee 1	PWR	06/02/1977	Chemical and volume control	2	Failed		Erosion/Corrosion	Erosion/corrosion	SS
McGuire 9	PWR	08/05/1984	Residual heat removal	2	Severed		Water hammer	Water hammer	SS
Millstone 2	PWR	01/03/1981	Safety Injection	2	Leak		Fatigue-Vibrational		SS
Millstone 2	PWR	07/29/1980	Safety Injection	2	Leak		Fatigue-Vibrational	Fatigue-vibrational	SS
Prairie Island 1	PWR	05/07/1981	instrument air	2	breakage	85-009	unknown	unknown	SS
Prairie Island 2	PWR	01/14/1984	safety injection	2	leak	IN 91-05	stress corrosion/IGSCC	IGSCC	SS
Robinson 2	PWR	12/15/1986	RHR	2	leak	NPRDS	erosion/corrosion	Sch 40, refueling	SS
Robinson 2	PWR	09/30/1986	safety injection	2	leak	IN 91-05	stress corrosion/IGSCC	IGSCC	SS
Salem 2	PWR	06/17/1976	chemical and volume control	2	rupture	80-001	fatigue-vibrational	fatigue-vibration	SS
St. Lucie 1	PWR	10/07/1983	reactor coolant	2	leak	87-014	fatigue-vibrational	fatigue-vibrational	SS
St. Lucie 2	PWR	11/07/1979	chemical and volume control	2	leak	83-071	unknown	unknown	SS
Surry 1	PWR	04/15/1971	chemical and volume control	2	leak	AO 75-011	fatigue-vibrational	fatigue-vibrational	SS
Trojan	PWR	02/28/1973	reactor coolant	2	crack/leak	77-003L	fatigue-vibrational	fatigue-vibrational, SCC? 1/2	SS
Trojan	PWR	02/28/1973	reactor coolant	2	crack/leak	77-003L	fatigue-vibrational	fatigue-vibrational, SCC? 2/2	SS
Turkey Point 3	PWR	01/06/1979	chemical and volume control	2	leak	83-001	fatigue-vibrational	fatigue-vibrational	SS
Crystal River 3	PWR	05/31/1982	Makeup system	2.5	Leak	82-037	Fatigue-Vibrational	Fatigue-vibration	SS
Crystal River 3	PWR	05/21/1982	Makeup system	2.5	Leak	82-037	Fatigue-Vibrational	Fatigue-vibration	SS
Crystal River 3	PWR	02/01/1982	Reactor Coolant	2.5	Leak	IN 82-09	Thermal Fatigue	Thermal fatigue	SS
Crystal River 3	PWR	01/29/1982	Reactor Coolant	2.5	Leak	82-004, PNO II-82-013, IN 82-09	Construction Defect/Errors	Cracked weld, Construction defects/errors	SS
Millstone 3	PWR	05/31/1989	SIS	3	Leak		Erosion/Corrosion	Sch 40, several leaks, Cu-Ni, hydro	SS

Surry 1	PWR	12/28/1988	letdown	3	leak	inspection reports 50-280-91-37 & 50-281-91-37	erosion/corrosion	socket weld	SS
Zion 2	PWR	05/27/1987	letdown line	3	leak	NPRDS	fatigue	sch 40, cold shutdown	SS
ANO1	PWR	06/26/1974	Residual Heat Removal	4	Leak	AO 74-02, NUREG-0691	Construction Defect/Error	Construction defects/errors, SCC	SS
ANO2	PWR	12/01/1980	Charging	4	Leak	NPE VIII.A.530	Fatigue-Vibrational		SS
GINNA	PWR	04/22/1975	Control Rod Drive	4	Leak	AO 75-09	Construction Defect/Errors	Installation error	SS
Millstone 2	PWR	11/13/1979	Chemical and volume control	4	Leak		Stress Corrosion/IGSCC	Cracks due to chloride containment	SS
Millstone 2	PWR	10/14/1976	Chemical and volume control	4	Leak		Design-Dynamic Load	Crack, poor design	SS
Palisades	PWR	06/04/1978	Chemical and volume control	4	Leak		Fatigue-Vibrational	Fatigue-vibrational	SS
Palisades	PWR	09/17/1993	Pressurizer	4	Leak		Stress Corrosion/IGSCC	PWSCC	SS
Salem 1	PWR	12/31/1974	charging	4	failed	NPE VIII.A.393	fatigue-vibrational		SS
Salem 1	PWR	03/30/1972	chemical and volume control	4	failed	ORNL-NSIC-138:112159	fatigue-vibrational	fatigue-vibration	SS
Trojan	PWR	09/22/1973	chemical and volume control	4	leak	77-038	fatigue-vibrational	fatigue-vibrational	SS
Turkey Point 4	PWR	03/14/1975	chemical and volume control	4	leak	79-003/3L	fatigue-vibrational	fatigue-vibrational	SS
Zion 2	PWR	07/17/1968	reactor coolant	4	leak	ORNL-NSIC-109:73235	construction defect/errors	construction defect	SS
Calvert Cliffs 2	PWR	08/02/1978	chemical and volume control	6	leak	78-024/03L	Fatigue-vibrational	fatigue-vibrational	SS
Calvert Cliffs 2	PWR	06/25/1978	chemical and volume control	6	leak	78-18/03L	Fatigue-vibrational	fatigue-vibrational	SS
Cook 2	PWR	08/03/1991	Reactor coolant pump oil cooler	6	leak	NPRDS	IGSCC	Sch 40, outage	SS

North Anna 1	PWR	01/15/1978	Reactor coolant	6	Leak		Construction Defects/Errors	Construction defect	SS
Surry 2	PWR	02/21/1992	RHR	6	leak	LER-96-001	IGSCC	thru-wall leak (small); check LER 94-003, 91-019, 89-042, 89-011	SS
Indian Point 2	PWR	08/30/1978	Residual heat removal	8	Leak		Fatigue-Vibrational	Fatigue-Vibrational	SS
Palisades	PWR	10/09/1993	Pressurizer	8	Leak		Stress Corrosion/IGSCC	Stress corrosion	SS
San Onofre 1	PWR	06/14/1973	safety injection	8	leak	NUREG-0691	stress corrosion/IGSCC	stress corrosion	SS
ANO1	PWR	08/31/1976	Residual Heat Removal	10	Leak	RO 76-25	Stress Corrosion Cracking, IGSCC	IGSCC, pipe section replaced	SS
Oconee 3	PWR	12/15/1991	LPCI	12	Leak		Fatigue-Vibrational		SS
Indian Point 2	PWR	09/20/1978	Residual heat removal	13	Leak		RAC	Cavitation/impingement	SS