

**DEATH AND INJURY INCIDENCE REPORTS ASSOCIATED WITH CARBON DIOXIDE TOTAL
FLOODING FIRE EXTINGUISHING SYSTEMS**

	Name/Site	Date	Location	Use Category	Number Killed	Number Injured	Summary
UNITED STATES AND CANADA¹							
1	Test Reactor Area, Idaho National Engineering and Environment Lab	July 28, 1998	Idaho	Government-Owned Test Facility	1	13	The CO ₂ system in an electrical Engineering Test Reactor Build actuated during routine prevent electrical system.
2	Consolidated Edison Co.	February 15, 1996	New York	Commercial	1	0	A false fire trip of the system o generate electricity. The victim working to reset a CO ₂ distribu controlling the switch for the ve
3	University of Iowa Hazardous Waste Storage Facility	June 16, 1994	Iowa City, IA	State	0	2	A fire suppression system test r the release, a door was blown o adjacent area.
4	Murray Ohio Manufacturing Company	December 31, 1993	Lawrenceburg, TN	Commercial	0	2	A total flooding CO ₂ system acc installation of a new piece of du paint spray booth (located near
5	M/V Cape Diamond/Norshipco	March 3, 1993	Norfolk, VA	Military	2	6	The injuries and fatalities occur ship's low pressure CO ₂ fire sup indicated that personnel had not engine room during the test, and was not closed completely, rele; anticipated.
6	Navy Aircraft Carrier	January 16, 1993	In Port, U.S.	Military	0	3	A CO ₂ fire suppression system routine maintenance.
7	Navy Ship USS Sumter/Little Creek Naval Amphibious Base	July 30, 1992	Norfolk, VA	Military	2	1	Three sailors were performing p system in a paint locker when th were asphyxiated and two died. the four preliminary steps on th Card.
8	Muscle Shoals Construction Site	September 26, 1991	Muscle Shoals, Alabama	Commercial	1	2	An employee was performing c filtration building when the CO activated in response to a fire. T died from asphyxia. The CO ₂ se another building where two oth The two employees regained co
9	Autoridad Energia Electrica-Planta Daguao	April 3, 1991	San Juan, PR	State Government	0	2	A fixed extinguishing system w during installation of CO ₂ cylin untrained and failed to follow p of the control head on the cylin
10	Preserver Warship	January 14, 1991	Quebec City, Canada	Commercial	1	5	The fatality was due to an accid extinguishing system.

¹ North American incidents are listed in reverse chronological order.

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11	Ravenswood Aluminum Corporation	June 18, 1990	Ravenswood, WV	Commercial	2	0	The CO ₂ system was triggered in a rolling mill. Two security guards were in the basement underneath the mill to check the system. There was a known concentration of CO ₂ in the self-contained breathing apparatus in the guards' vehicle. The guards reached the bottom of the stairs where they died.
12	Lukens Steel Company	July 14, 1988	Conshohocken, PA	Commercial	1	0	The fire suppression system was released, allowing CO ₂ into the cellar. The cellar door did not close and the employee was found where the employee was found.
13	Oiler Kalamazoo	1987	Kalamazoo, MI	Military	1	0	Sailors changing a light bulb in a switch by accident.
14	Meredith/Burda Corporation	December 3, 1987	Casa Grande, AZ	Commercial	0	15	A false alarm resulted in the release of the extinguishing system in a press room. The room was opened to ventilate the room by manual shut-off valve. The CO ₂ entered the room across the hall from the source of the gas.
15	Navy Replenishment Oiler	January, 1987	At Sea, U.S.	Military	1	0	During maintenance on the overboard valve, the sailor lost his footing and accidentally fell overboard.
16	Surry Nuclear Power Station	December 9, 1986	Richmond, VA	Commercial	4	4	An accidental discharge of both CO ₂ extinguishing systems was caused by a pipe break in the feedwater system. Four employees were injured in a fire associated with the release of the gas. It is not clear if the release of the gas systems were responsible for the fire.
17	Stevens Technical Services Inc.	March 5, 1986	Bronx, NY	Commercial	1	0	The CO ₂ cylinders for a fire suppression system discharged into the chamber in a test cell. When entering the chamber, the employee was injured.
18	A.O. Smith Automotive Products Company	November 29, 1985	Milwaukee, WI	Commercial	1	0	During a test discharge of the CO ₂ system, the gas entered a larger space than intended, resulting in the death of one employee conducting the test without a respirator.
19	Hope Creek Generating Station	September 4, 1985	Hancocks Bridge, NJ	Commercial Nuclear Power Reactor	0	23	Carbon dioxide (10 tons) was released from a diesel generator fuel storage area. A beacon light did not operate and the corridor walls outside of the air/water guns under pressure were damaged. The discharge was determined to be from the CO ₂ control panel through open inadequately installed protective control panel circuitry. The majority of the injuries originated from the workers clearing the area.
20	Automated Fire Suppression Systems Ford Motor Company	October 13, 1984	Hapeville, GA	Commercial	1	1	During work on the CO ₂ suppression system, the gas fill at the end of the line was not secured and 6 75-lb bottles of the gas were released. One employee was trapped in the room and passed out in an attempt to rescue the other employee.
21	Navy Repair Ship	April 29, 1982	At Sea, U.S.	Military	0	1	A CO ₂ fire suppression system was released during routine maintenance.

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22	Turbo Generator	1981	U.S.	Commercial	0	1	An employee was checking an e protecting a turbo-generator (ur the system accidentally discharg total-flood protected by the sam 1,800 lb of CO ₂ .
23	Dry-Docked SS Lash Atlantico at the Sun Ship, Inc. Yard	June 9, 1981	Chester, PA	Commercial	3	2	The CO ₂ fire suppression syster during welding work in the eng; discharged CO ₂ and automatica doors, trapping the workers in tl
24	Little Creek Naval Amphibious Base	1980	Norfolk, VA	Military	2	0	Similar to the USS Sumter inci #7), the victims ignored prelimi Requirement Card.
25	Carolina Fire Protection	1980	North or South Carolina	Commercial	1	0	An employee of Carolina Fire F system in a bus garage when the discharged.
26	Navy Aircraft Carrier	June 20, 1980	At Sea, U.S.	Military	1	2	During routine maintenance on a worker to fall and accidentally; which the CO ₂ system activatio
27	Bulk Cargo Vessel Cartercliffe Hall	May, 1980	Quebec City, Canada	Commercial	1	0	Accidental discharge during rep
28	Navy Submarine Tender	March 26, 1979	In port under construction at a private shipyard, U.S.	Military	1	2	The ship was not in commissio construction. Civilian shipyard space behind the cage containin worker accidentally pulled the r
29	Airline Constellation	1977	U.S.	Commercial	0	1 or more	Crew members responded to a f compartment by releasing CO ₂ , cockpit and partially incapacita
30	Navy Yard Oil Barge	March 22, 1972	In Port, U.S.	Military	2	0	Maintenance workers were repl accidentally discharged old cyli
31	Ship (Name Unknown)	1970s	Anchorage, AK	Commercial	0	1	The automatic features of the C on the ship during repairs. A pa accidentally hit the trip lever an
32	Navy Fleet Oiler	March 21, 1969	At Sea, U.S.	Military	1	0	A CO ₂ fire suppression system routine maintenance.
33	Navy Aircraft Carrier	November 4, 1966	At Sea, U.S.	Military	8	0	The CO ₂ system tripped in resp in a compartment separate from that the CO ₂ would be released
34	Pan American Pilot Training Center	Late 1960s	Miami, FL	Commercial	0	2	A CO ₂ system was being tested Center. Two pilots were workin unbeknownst to the testers. Wh started, they ignored the flashin illuminated sign.
35	Columbia Geneva Steel Rolling Mill (now USS Posco Industries)	Before 1954	Pittsburg, CA	Industrial	2	0	Two workers were killed by a C

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36	DC-6 Airplane	1948	U.S.	Commercial	43 ²	0	A DC-6 crashed killing all the passengers. The transmission indicated that the engine failed and released in the forward cargo compartment. It is not clear if any of the deaths were due to CO ₂ exposure.
37	Biscayne Fire	N/A	Miami, FL	Commercial	1	0	An employee of Biscayne Fire Company was killed by a CO ₂ system in the engine compartment.
1975 - PRESENT INCIDENT TOTALS		29 Incidents		9 Military 20 Nonmilitary	29 Deaths	88 Injuries	
BEFORE 1975 INCIDENT TOTALS		8 Incidents ³		3 Military 5 Nonmilitary	14 Deaths	3 Injuries	
TOTAL DOMESTIC		37 Incidents		12 Military 25 Nonmilitary	43 Deaths	91 Injuries	

² These deaths are attributed to the plane crash and are not included in the calculations of the total number of deaths from CO₂ exposure.

³ This number includes two incidents for which the date is not specified (references #35 and #37).

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INTERNATIONAL⁴							
38	Australian Naval Ship Westralia	April, 1998	Indian Ocean off the coast of Fremantle, Australia	Military	4	5	Four sailors were repairing a fuel tank when the fuel ignited and started a fire and flooded with CO ₂ .
39	Oil Tanker	1994/95?	Angra dos Reis, Brazil	Commercial	11	0	A cleaning team working below deck was killed by a CO ₂ system.
40	Unknown	Before 1963	England	Unknown	20	Unknown	A total of 20 deaths occurred in the use of CO ₂ .
41	French Data Processing Center	December 25, 1986	France	Commercial	1	0	A fatal accident occurred in a data center during developmental stages. The operator was killed by a CO ₂ release while extinguishing manual trigger switch.
42	Dresden Sempgalerie	January 14, 1993	Dresden, Germany	Commercial	2	10	A faulty installation allowed a child to choose the CO ₂ release button. Gas was released in public areas from asphyxiation, 2 later died. Fire suppression system were held at fault.
43	LNG Carrier SNAM Portovenere	October 2, 1996	Genoa, Italy	Commercial	6	3	A technician aboard the carrier was killed by a CO ₂ extinguisher during a fire. The fire was extinguished within 2 minutes. Fire extinguishers were used to fight the fire with hand extinguishers were used.
44	Car Park Building	October 19, 1996	Japan	Commercial	0	4	An inadvertent discharge occurred during maintenance activities.
45	Power Station	May 18, 1996	Japan	Commercial	0	4	An inadvertent discharge occurred during maintenance activities.
46	Car park Building	December 1, 1995	Japan	Commercial	2	1	A child locked in the space pushed the door open. Guards entered the space in response.
47	Building	October 18, 1995	Japan	Commercial	0	3	An inadvertent discharge occurred during maintenance activities.
48	Outdoor pit	November 5, 1993	Japan	Commercial	1	0	CO ₂ was discharged during a test of a fire pit. Personnel entered the pit unaware of the discharge.
49	Underground Power Station	October 12, 1993	Japan	Commercial	1	0	A repair worker accidentally caused a CO ₂ discharge. Personnel entered the area before the discharge.
50	Building	February 5, 1991	Japan	Commercial	0	2	An inadvertent discharge occurred during maintenance activities.
51	Building	November 9, 1987	Japan	Commercial	0	4	A false alarm resulted in a man being killed by a CO ₂ discharge.
52	Building	August 9, 1987	Japan	Commercial	3	0	An inadvertent discharge occurred during maintenance activities.
53	Underground Car Park	June 9, 1987	Japan	Commercial	2	3	An inadvertent discharge occurred during maintenance activities.
54	Building	September 5, 1986	Japan	Commercial	1	0	An inadvertent discharge occurred during maintenance activities.

⁴ International incidents are listed in alphabetical order by country.

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55	Cargo Ship	June 24, 1986	Japan	Commercial	8	5	An inadvertent discharge occurred during activities.
56	Underground Car Park	September 5, 1985	Japan	Commercial	0	3	An inadvertent discharge occurred during activities.
57	Building	January 8, 1982	Japan	Commercial	0	3	Personnel entered the building during activities.
58	Building	January 25, 1978	Japan	Commercial	0	3	An inadvertent discharge occurred during activities.
59	Building	June 16, 1977	Japan	Commercial	1	1	An inadvertent discharge occurred during activities.
60	Building	November 19, 1975	Japan	Commercial	0	3	An inadvertent discharge occurred during activities.
61	Car Park Building	October 29, 1971	Japan	Commercial	1	1	Caused by operator.
62	Norwegian shipyard	1970	Norway	Commercial	12	3	Twelve crew members died in the shipyard while conducting routine assembly and maintenance activities. One was exposed to an undetected CO ₂ leak in the ventilation system.
1975 - PRESENT INCIDENT TOTALS		22 Incidents		1 Military 21 Nonmilitary	43 Deaths	57 Injuries	
BEFORE 1975 INCIDENT TOTALS		3 Incidents		0 Military 2 Non-military 1 Unknown	33 Deaths	4 Injuries	
TOTAL INTERNATIONAL		25 Incidents		1 Military 23 Nonmilitary 1 Unknown	76 Deaths	61 Injuries	
INCIDENT FINAL TOTALS		62 Incidents	37 Domestic 25 International	13 Military 48 Nonmilitary 1 Unknown	119 Deaths	152 Injuries	

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