NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C. 20594

Fire Factual
December 2, 2003

A. Accident Information

Date:	May 25, 2003
Time:	Approximately 06:37 EST
Vessel:	S/S *Norway*
Operator:	Norwegian Cruise Lines
Investigator:	Nancy B. McAtee
	Fire and Explosion Specialist
Incident:	Explosion

B. Accident Summary

The aft boiler room is located on Deck 1 (Tanktop). The boiler room runs vertical up 2 decks and the boiler casings continues up the vertical length of the ship to the stack. In this location, there are four boilers that provided steam for the ship's propulsion- Boilers #21, 22, 23, and 24. At the time of the incident, Boiler #21 was offline for maintenance.

C. Fire Damage

The damaged boiler (#23) sustained mechanical damage. In areas adjacent to Boiler #23, there was presence of fuel oil on vertical surfaces near Boiler #23. There was a black dirty residue on most of the horizontal surfaces through out the entire space including areas unaffected by the event. There was no evidence of sooting or smoke in the space outside the boiler casing. In addition, there was no evidence of mechanical damage in the space outside the boiler and the boiler casing[1].

Decks 4 (Caribbean) and 5 (Biscayne), between Frames 97-174, were examined. These areas were directly adjacent to the boiler casing. On the bulkheads, ceilings and decks, there was a deposit of material similar to the black dirty residue that was found on horizontal surfaces in the boiler room. There was no other evidence of smoke or soot in these areas.

On the starboard sides of Deck 4 and 5, there was significant physical damage to bulkheads, doors and doorframes. Crew cabins C-1085, C-1157 and C-1175, located on

[1] For the damage assessment to Boiler #23, see the Engineering Group Factual Report.

Deck 4, sustain severe damage to the inboard (passageway) bulkheads, door and doorframes. The cabin doors were blown out of the frames and the frames were twisted and separated from the wall. The wall dividing C-1085 and C-1157 was separated from the passageway bulkhead. The black residue consistent with the material from the boiler room was deposited on exposed surfaces. On Deck 5, the fire door located at Frame 128 was bowed outwards into the passageway. It was covered with the same residue. The cabins adjacent to this fire door were severely damaged. The doors were blown off the frames in B-1007, B-1079, and B-1081. The inboard wall of B-1079 had been knocked down completely. All exposed surface areas had been covered with the residue found in the passageways. There was no damage found on the port side of the ship Decks 4 (Caribbean) and 5 (Biscayne), between Frames 97-174.

The area known as the Roman Spa is located between Frames 156-174. This area is 17 frames forward of the forward bulkhead of the aft boiler room. The aft bulkhead of the space (Frame 156) showed no damage to the floor tiling and walls including no buckling, bulging or cracks. There was no evidence of soot or steam damage.

D. Fire Detection System

The fire detection system onboard the S/S *Norway* was an Autronica system. It was installed in 1990. Inspection of the system is included in the quarterly CVE and the annual CVE. The last annual CVE was May 15, 2003.

The system is separated into 4 quadrants. The engine/boiler area has its own quadrant. Within a quadrant, there is a further separation into loops. There are 99 detectors to a loop. There are two types of smoke detectors onboard the ship: rate of rise detectors (ionic) and photodiode detectors. Ionic/rate of rise detectors were located in the machinery spaces and galley spaces. This type of detector activates if the analog reading increases over a certain amount of time. Photodiode detectors are located in all other required spaces. This type of detector has a photocell that measures the amount of light reaching the cell. If this amount is decreased, the detector actuates. A “prewarning” alert is given on the control panel at the first actuation of the detector. If the analog reading does not decrease, then a “Fire” alert is given on the panel. At this time, the watch-tender-in-charge (either security or the fire chief) investigates the location of the detector to verify the alarm.

E. Alarm History for the Engine Spaces

Here is a listing of all the alarms in the engine and boiler spaces for the 18 hours prior to the explosion. According to the engineering staff, there were no actual fire events. Engine/boiler operation or repair caused the alarms prior to the 06:31 alarm.

Date	Time	Alarm No.	Location	Type of Alarm
5/24/03	12:39	0230	Aft. Aux. Engine Rm.	Prewarning
5/24/03	14:08	0340	Fwd. Stab. Rm.	Prewarning
5/24/03	14:08	0340	Fwd. Stab. Rm.	Fire
5/24/03	17:53	RESET[2]		
5/24/03	18:11	0327	Fwd. Engine Rm.	Prewarning
5/24/03	20:15	0327	Fwd. Engine Rm.	Fire
5/24/03	20:33	0230	Aft Boiler Rm.	Prewarning
5/24/03	20:33	0230	Aft Boiler Rm.	Fire
5/24/03	22:43	0124	Aft Eng. Rm.	Prewarning
5/25/03	03:12	0130	Aft. Eng. Rm.	Prewarning
5/25/03	06:31	0206	Aft Boiler Rm.	Fire

[2] "Reset" indicates a reset of the fire alarm system. It is done when several alarms have actuated, have been verified that an actual fire event is not occurring and have not cleared the system. In this case, according to the chief engineer, the system was reset because several alarms were set off as a result of the ship powering up to leave port.