

UNITED STATES COAST GUARD
80 Lafayette Street
New York, N. Y.

Address Reply to
3rd Coast Guard District
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30 June 1950
628-09904

From: Marine Board of Investigation; South Amboy Explosion
To: Commandant (MVI)

Subj: Report of Investigation of explosion at South Amboy, New Jersey
19 May 1950.

Findings of Fact

1. An explosion of munitions and dynamite occurred at South Amboy, New Jersey at approximately 1826 EST on 19 May 1950. The explosion occurred while munitions were being transferred from railway cars to lighters at the pier known locally as the "powder pier" belonging to the Pennsylvania Railroad and extending from the Pennsylvania Railroad coal yard at South Amboy, N.J. to a point approximately 460 yards, 237° true from lighted beacon RARITAN RIVER 4. The explosion caused extensive damage to structures and dwellings in the nearby area, extending to Woodbridge and Perth Amboy, N. J. and Staten Island. As a result of the explosion 5 persons were killed and have been definitely identified, 26 persons are missing and presumed to have lost their lives, 52 persons were admitted for in-patient treatment at several local hospitals and 150 persons received emergency first aid treatment for injuries sustained.

(a) The identified dead are:

1. Walter Sullivan, 203 Madison St., Hoboken, N. J.
2. Robert Whitcomb, 473 No. Warren Ave., Brockton, Mass.
3. Syvert Hagen, 214 Carrol St., Brooklyn, N.Y.
4. Henry Jacobosky, 196 Broadway, Brooklyn, N.Y.
5. Dade White, 116 East 108th St., New York, N.Y.

(b) The persons missing and presumed dead are:

1. Joseph C. Santon, 80 Harriet Ave., Bergenfield, N.J.
2. Michael Walla, 250 Van Pelt St., Staten Island, N.Y.
3. Vincent Raducha, 99 Nicholas Ave., Staten Island, N.Y.
4. William Healing, 340 Herrick Ave., Teaneck, N.J.
5. Frank Healing, 166 Clendenny Ave., Jersey City, N.J.
6. George Ackerley, 427 Jersey Ave., Jersey City, N.J.
7. William Colyer, 56 Pearl St., Oceanside, L.I., N.Y.
8. Hugh O'Neill, 233 East 176th St., Bronx, N.Y.
9. Bjarno Hausvik, 727 57th St., Brooklyn, N.Y.
10. James Hart, Leroy Pl. & Scudder Ave., Copiague, L.I., N.Y.
11. Frank Boncek, 276 Sumpter St., Brooklyn, N.Y.
12. Harold Craig, 272 91st St., Brooklyn, N. Y.
13. Benjamin Walling, 346 40th St., Brooklyn, N.Y.
14. Edward Havlicok, 44-01 69th St., Woodside, L.I., N.Y.
15. John Rinn, 313 Ninth St., Jersey City, N.J.
16. Eugene F. Healing, 2600 Hudson Blvd., Jersey City, N.J.

17. Frank J. Rinn, 243 Grand St., Jersey City, N.J.
18. James Rilcy, 15 Baldwin Ave., Jersey City, N.J.
19. Charles Lynch, 308 Freeman Ave., Jersey City, N.J.
20. Frank Cinelli, 3 Warner Ave., Jersey City, N.J.
21. Chester Campbell, 2554 Hudson Blvd., Jersey City, N.J.
22. William Harrison, 300 Montgomery St., Jersey City, N.J.
23. John Krenitsky, 260 Duncan Ave., Jersey City, N.J.
24. Maxim Forbes, 822 Jewett St., Staten Island, N.Y.
25. Raymond Ackerley, 90 Bright St., Jersey City, N.J.
26. James Burnes, residence on the ROBERT HEDGER, Anthony O'Boyle Company

2. The lighters involved were: EUGENE F. HEALING, GEORGE J. HEALING, JAMES HEALING and KENNETH E. HEALING all of which were completely destroyed in the explosion.

(a) The EUGENE F. HEALING, official number 211477, was a wooden hulled, single screw, diesel propelled inspected lighter of 97 gross tons, owned by Healing & Sons and operated by the James Healing Company of 75 Montgomery Street, Jersey City, N.J. The vessel was built in 1913 at Paulsboro, N.J. and was rebuilt in 1942 at Brooklyn, N.Y., and was powered with a General Motors, Cleveland, Ohio Model D-233-A diesel engine and was last inspected at New York, N.Y. on 7 June 1948. On the date of the casualty Bjarne Hausvik of 727 57th Street, Brooklyn, N.Y. was master and pilot. Mr. Hausvik held U.S. Coast Guard license, serial number 78253, issued at New York, N.Y. 12 July 1949, as master of freight and towing vessels of not over 750 gross tons on bays, sounds and rivers and as first class pilot for vessels of the same class and tonnage on New York Bay and Harbor to Yonkers, East River to Stepping Stones, Staten Island Sound to Perth Amboy, Newark Bay and tributaries, Raritan Bay, Rockaway Inlet and Jamaica Bay. James Hart of Leroy Place and Scudder Avenue, Copiague, L.I., N.Y. was chief engineer on the date of the casualty. Mr. Hart held U.S. Coast Guard license, serial number 94082, issued at New York, N.Y. on 22 November 1949, as chief engineer of motor vessels of not over 1,000 horsepower. Other crew members of the vessel on the date of the casualty were: Frank Boncek, 276 Sumpter Street, and Harold Craig, 272 91st Street, both of Brooklyn, N.Y. The vessel was certificated for the waters of the Harbor of New York inside Rockaway Point and Sandy Hook Lighthouse to Eatons Point and Pecks Ledge, and tributaries thereto; a river route and, therefore, unlicensed crew members on board her were not required to hold seamens' documents issued by the Coast Guard.

(b) The GEORGE J. HEALING, official number 225039, was a wooden hulled, single screw, semi-diesel propelled inspected lighter of 123 gross tons, owned by Healing & Sons and operated by the James Healing Company, of 75 Montgomery Street, Jersey City, N.J. The vessel was built in 1925 at Havre de Grace, Maryland, and was rebuilt in 1931 at Savannah, Georgia, and was powered with a Fairbanks Morse diesel engine and was last inspected at New York, N.Y. on 31 October 1949. On the date of the casualty George Ackerley of 427 Jersey Avenue, Jersey City, N.J. was master and pilot. Mr. Ackerley held U.S. Coast Guard license, serial number 14102, issued at New York, N.Y. on 13 August 1948, as first class pilot of freight and towing, steam and motor vessels of 500 gross tons on New York Bay and Harbor to Yonkers, East River to Stepping Stones, Staten Island Sound to South Amboy and Princess Bay. William C. Colyer of 56 Pearl Street, Oceanside, N.Y. was chief engineer of the vessel on the date of the casualty. Mr. Colyer held U.S. Coast Guard license, serial number 77687, issued at New York, N.Y. on 8 June 1948, as

chief engineer of motor vessels of not over 500 horsepower without steam auxiliaries. Other crew members on the date of the casualty were; Raymond Ackerley, 90 Bright Street, Jersey City, N.J. and Hugh O'Neill, 233 East 176th Street, Bronx, N.Y. As the GEORGE J. HEALING was certificated for the waters of New York Harbor inside Rockaway Point and Sandy Hook Lighthouse to Eatons Point and Pecks Iedge, and tributaries thereto, a river route, her unlicensed crew members were not required to hold seamen's papers issued by the U.S. Coast Guard.

(c) The JAMES HEALING, official number 201349, was a wooden hulled, single screw, semi-diesel propelled inspected lighter of 40 gross tons, owned by Healing & Sons and operated by the James Healing Company of 75 Montgomery Street, Jersey City, N.J. The vessel was built in 1904 at Tottenville, N.Y., was powered with a Fairbanks Morse semi-diesel engine and was last inspected at New York, N.Y. on 6 September, 1949. On the date of the casualty Benjamin Walling, Jr. of 346 40th Street, Brooklyn, N.Y. was master and pilot. Mr. Walling held U.S. Coast Guard license, serial number 11139, issued at New York, N.Y. on 13 February, 1948 as master, steam and motor vessels of any gross tons on bays, sounds and rivers and first class pilot of vessels of the same class and tonnage on New York Bay and Harbor to Yonkers, East River, Long Island Sound and Harbors to Little Gull Island, Shelter Island Sound, Gardiners and Peconic Bays. On the date of the casualty Edward Havlicek of 44-01 69th Street, Woodside, N.Y. was chief engineer of the vessel. Mr. Havlicek held U.S. Coast Guard license, serial number 93909, issued at New York, N.Y. on 26 October 1949, as chief engineer of motor vessels of not over 500 horsepower. Other crew members on the date of the casualty were; John Rinn, 313 Ninth Street, Jersey City, N.J. The JAMES HEALING was certificated for the waters of the Harbor of New York inside Rockaway Point and Sandy Hook Lighthouse to Eatons Point and Pecks Iedge, and tributaries thereto, a river route and, therefore, the unlicensed crew members in her crew were not required to hold seamens' papers issued by the U.S. Coast Guard.

(d) the KENNETH E. HEALING, official number 227047, was a wooden hulled twin screw semi-diesel propelled inspected lighter of 180 gross tons owned by Healing & Sons and operated by the James Healing Company of 75 Montgomery Street, Jersey City, N.J. The vessel was built in 1927 at Newburgh, N.Y., was powered with two semi-diesel Kalenberg Bros. crude oil engines and was last inspected at New York, N.Y. on 27 April 1950. On the date of the casualty Joseph Santon of 80 Harriet Avenue, Bergenfield, New Jersey was master and pilot. Mr. Santon held U.S. Coast Guard license, serial number 93667, issued at New York, N.Y. on 3 November 1949, as first class pilot of freight or towing steam and motor vessels of not over 250 gross tons on New York Bay and Harbor to Yonkers, East River to Stepping Stones, Staten Island Sound, Newark Bay and tributaries, Raritan Bay and River. On the date of the casualty Michael Walla of 250 Van Pelt Street, Staten Island, N.Y. was chief engineer of the vessel. Mr. Walla held U.S. Coast Guard license, serial number A-28820, issued at New York, N.Y. on 29 May 1945, as chief engineer of motor vessels of not over 200 gross tons. Other crew members on the date of the casualty were; William Healing, 340 Herrick Avenue, Teaneck, N.J., Frank Healing, 166 Clendenny Avenue, Jersey City, N.J., Otto J. Ludvigsen, 402 Halstead Street, East Orange, N.J., and Vincent Raducha, 99 Nicholas Avenue, Port Richmond, Staten Island, N.Y. The KENNETH E. HEALING was certificated for the waters of

the Harbor of New York inside Rockaway Point and Sandy Hook Lighthouse to Eatons Point and Pecks Lodge, and tributaries thereto, a river route and, therefore, the unlicensed crew members in her crew were not required to hold seamens' papers issued by the U.S. Coast Guard.

3. Other vessels moored at piers in the vicinity and damaged in the explosion were:

(a) The CAPE DENNIS, official number 251264, a non-inspected steel hull barge of 885 gross tons, built in 1946, owned and operated by M & J Tracy, Inc., 1 Broadway, New York, N.Y., of which Harry Amundson, c/o owners, was master. This barge, laden with a cargo of coal, was badly damaged by the explosion.

(b) The G.F. MC CAFFREY, official number 167208, a non-inspected wood hull barge of 505 gross tons, built in 1918, owned and operated by Anthony O'Boyle, Inc., 15 Moore Street, New York, N.Y., of which Charles Fensin, 25 South Street, New York, N.Y. was master. This barge, without cargo, was abandoned as a total loss.

(c) The Bruns Bros. Coal Barge No. 82, official number 174059, a non-inspected wood hull barge of 227 gross tons, year of build unknown, owned and operated by Bruns Bros., 11 West 42nd Street, New York, N.Y.. Eade M. White, 116 East 108th Street, New York, N.Y. was master and lost his life in the casualty. This barge, laden with a cargo of coal, was abandoned as a total loss.

(d) The SHARPSHOOTER, official number 167002, a non-inspected wood hull barge, 525 gross tons, built 1917, owned and operated by Anthony O'Boyle, Inc., 15 Moore Street, New York, N.Y., of which Jack Kank, 217 West 66th Street, New York, N.Y. was master. This barge, without cargo, was abandoned as a total loss.

(e) The ROBERT HEDGER, official number 170175, a non-inspected wood hull barge, 523 gross tons, built 1928, owned and operated by Anthony O'Boyle, Inc., 15 Moore Street, New York, N.Y., of which James Burns, same address, was master. This barge, without cargo, is reported extensively damaged by explosion, fire and sinking.

(f) The WILLIAM F. MC CORMACK, official number 174248, a non-inspected wood hull barge, 476 gross tons, built 1920, owned and operated by the Red Star Barge Line, 32 Tudor Lane, Scarsdale, N.Y., of which Carl A. Martinson, 14 Central Avenue, Milford, Conn. was master. This barge, laden with a cargo of coal, is reported a total loss.

(g) The JAMES O'DONNELL, official number 168024, a non-inspected wood hull barge, 502 gross tons, built 1920, owned by Louis O'Donnell, and operated by O'Donnell Transportation Co., Inc., both of 44 Whitehall Street, New York, N.Y., of which Robert Cooke, c/o O'Donnell Transportation Co., Inc. was master. This barge, without cargo, was extensively damaged by the explosion and sinking.

(h) The CHARLES H. BAXTER, official number 170636, a non-inspected wood hull barge, 523 gross tons, built 1930, owned and operated by Anthony O'Boyle, Inc., 15 Moore Street, New York, N.Y., of which Clyde Wilson, 286 21st Street, Brooklyn, N.Y. was master. This barge, without cargo, was abandoned as a total loss.

(i) The FRED MUNSTER, official number 170249, a non-inspected wood hull barge, 523 gross tons, built 1929, owned and operated by Anthony O'Boyle, Inc., 15 Moore Street, New York, N.Y., of which Edward Clark, 88 East 3rd Street, New York, N. Y. was master. This barge, without cargo, was extensively damaged by explosion, fire and sinking.

(j) The CAPE RACE, official number 171812, a non-inspected wood hull barge, 559 gross tons, year of build unknown, owned and operated by M & J Tracy, Inc., 1 Broadway, New York, N.Y., of which Carl Peterson, c/o owners, was master. This barge, without cargo, was abandoned as a total loss.

(k) The CAPE SMITH, official number 172120, a non-inspected wood hull barge, 582 gross tons, year of build unknown, owned and operated by M & J Tracy, Inc., 1 Broadway, New York, N.Y., of which Michael Byrne, c/o owners, was master. This barge, without cargo, was badly damaged by explosion.

(l) The CAPE HANLEY, official number 256326, a non-inspected steel hull barge, 885 gross tons, built 1948, owned and operated by M & J Tracy, Inc., 1 Broadway, New York, of which Henry Jacks, c/o owners, was master. This barge, laden with a cargo of coal, was badly damaged by the explosion.

(m) The CAPE BONLIN, official number 257321, a non-inspected steel hull barge, 885 gross tons, built 1949, owned and operated by M & J Tracy, Inc., 1 Broadway, New York, N.Y. Syvert Hagen, 214 Carrol St., Brooklyn, N.Y. was master and lost his life in the casualty. This barge, without cargo, was badly damaged by the explosion.

(n) The CAPE NORTH, official number 172024, a non-inspected wood hull barge, 641 gross tons, built 1935, owned and operated by M & J Tracy, Inc., 1 Broadway, New York, N.Y. Robert Whitcomb, 473 No. Warren Ave., Brockton, Mass. was master and lost his life in the casualty. This barge, without cargo, was sunk and abandoned as a total loss.

The above described non-inspected inland barges carried only the master and did not require U.S. Coast Guard licensed or certificated personnel.

No Report of Casualty (Form 2692) has been received on damage caused by subject casualty to any other vessels.

4. The munitions involved in the South Amboy disaster were manufactured by the Kilgore Manufacturing Company, Westerville, Ohio, under a contract with the Pakistan Embassy. In the shipment of the munitions manufactured under the aforementioned contract the Judson-Sheldon Division of the National Car Loading Corporation acted as forwarding agent for the Pakistan Embassy. The Isbrandtsen Steamship Company was the ocean carrier via which the munitions produced under the contract were to be exported. The lightrage services involved in transfer of the munitions from railroad cars to the Isbrandtsen steamship were to be performed by the James Healing Company under a contract with the Judson-Sheldon

Captain Andrew Crinkley, Far Eastern Representative, Isbrandtsen Steamship Company, asked the Commanding Officer, U.S. Naval Ammunition Depot, Earle, N.J. to advise them as soon as the decision was reached.

7. While the decision of the Navy Department concerning the availability of the U.S. Naval facilities at Earle, N.J. was awaited, Mr. Diamond of the Judson-Sheldon Division of the National Car Loading Corporation was being pressed by the Kilgore Manufacturing Company concerning the shipment because of the fact that the cars were already loaded and Kilgore Company wanted to send the shipment out. Mr. Diamond, thinking that the Naval facilities at Earle, N.J. might be available, arranged with the Kilgore Company to start the shipment consigned to the James Healing Company, care of U.S. Navy, Leonardo, N.J.. With the shipment so consigned no railroad permit was required and none was obtained. Mr. Diamond testified that when he arranged for the shipment to be started by the Kilgore Manufacturing Company it was his intention to stop the cars enroute if the U.S. Navy facilities at Earle, N.J. were not made available.

8. It is clear that at the time Mr. Diamond started shipment by Kilgore Company, the Judson-Sheldon Division of the National Car Loading Corporation had no assurance that the shipment could be transshipped at the destination to which it was consigned. It is likewise clear that neither the Isbrandtsen Steamship Company nor the James Healing Company had any such assurance. Moreover, at that time all three of the aforementioned parties were aware that the order of the Commander, Third Coast Guard District blocked this transshipment elsewhere in the New York Harbor area.

9. The Navy Department decided against the use of the Naval facilities at Earle, N.J. for the shipment, but as the decision was received at the end of the week, the Commanding Officer, U.S. Naval Ammunition Depot, Earle, N.J. was unable to contact either Mr. Healing or Captain Crinkley over the weekend 13-14 May 1950, and did not succeed in reaching and informing either of them of the adverse decision of the Navy Department before Monday, 15 May 1950. The Commanding Officer, U.S. Naval Ammunition Depot, Earle, N.J. testified that when advised of the adverse decision of the Navy Department Captain Crinkley of the Isbrandtsen Steamship Company professed to be greatly disturbed because the railway cars were already on the way, a railroad strike was looming and the railroads had already refused on a preliminary approach, as Captain Crinkley stated, to divert the cars and it looked as if he was stuck with the ship and explosives and did not know what to do.

10. On 15 May 1950 Mr. Diamond, of the Judson-Sheldon Division of the National Car Loading Corporation, learned that the U. S. Navy facilities would not be available at Earle, N.J. He also learned that seven of the railroad cars shipped by Kilgore Company had arrived at Rutherford, Pa. on the morning of 15 May 1950, but he was unable to locate the three remaining cars in the shipment. Mr. Diamond instructed the Reading Company to hold the seven cars already arrived at Rutherford, Pa. and also to hold the other three cars at Rutherford, Pa. when they arrived. Following this Mr. Diamond consulted with the Isbrandtsen Steamship Company and thereafter Mr. Diamond, on 15 May 1950 wrote a letter to the Commander, Third Coast Guard District, (Exhibit No. 117) in which he indicated that the Kilgore Company was ordered to defer shipment

until 14 May 1950 but, due to a misunderstanding, some of the cars had been started earlier, that some of the cars might be in New York the following day, 16 May 1950, and requested that the shipment be treated as an emergency shipment and be allowed to move through facilities previously considered satisfactory. This letter referred specifically to a shipment of approximately 356 tons of explosives being forwarded to the Pakistan Government.

11. Mr. Charles Bertrand, freight solicitor for the Isbrandtsen Steamship Company, who had booked the Pakistan shipment of explosives was, because it was his shipment, interested in following it up to see that it got to the vessel. Although the shipment was not in the hands of the Isbrandtsen Steamship Company Mr. Bertrand, because of this interest, acted as liaison man for the forwarding agent, the receiving company, the Pakistan Embassy and others concerned. Mr. Bertrand testified that when the word was received that the U.S. Navy facilities at Earle, N.J. would not be made available intensive effort was made to have Raritan Arsenal handle the shipment, but that also resulted in failure. Mr. Bertrand stated that according to his information Judson-Sheldon ordered the railroad to hold the cars from the Kilgore Manufacturing Company somewhere around Harrisburg, Pa. and through a misunderstanding at Harrisburg 3 of the cars had gone through Harrisburg and were almost in New York. According to Mr. Bertrand this created a problem of what to do with the cars because, he said, they had to be unloaded in about 48 hours and, as they could not "just bob around" or be left standing in railway yards something had to be done. Mr. Bertrand testified that at this time other railroads in this area were in a somewhat chaotic condition because a strike on the Pennsylvania Railroad had placed an abnormally heavy traffic load on them. This, according to Mr. Bertrand, was a possible explanation of the failure of the railroad to stop all of the cars at Harrisburg as instructed.

12. Following the writing of Mr. Diamond's letter of 15 May 1950, Mr. Bertrand telephoned the office of the 3rd Coast Guard District concerning Mr. Diamond's letter and was referred to Coast Guard Headquarters. He telephoned Coast Guard Headquarters in Washington and spoke to someone there whose name he could not recall and read and discussed Mr. Diamond's letter. He was told that Coast Guard Headquarters would take the matter under advisement but was given no decision at that time.

13. On 17 May 1950 Mr. Diamond's letter of 15 May 1950 to the Commander, 3rd Coast Guard District was answered by a letter from the Chief of Staff, 3rd Coast Guard District. The Chief of Staff's reply stated that the office of the 3rd Coast Guard District could not grant an exception to the policy of the Commander, 3rd Coast Guard District, who was absent on account of illness and unable to reply directly, but the matter had been referred to Coast Guard Headquarters by telephone and that office had indicated that it would authorize this one shipment to be handled at South Amboy, N.J., with the clear understanding that the authorization was for one shipment only and did not constitute a precedent on which future requests might be made (Page 172 R.).

14. The one shipment referred to in the aforementioned letter of the Chief of Staff, 3rd Coast Guard District was plainly the shipment described in Mr. Diamond's letter of 15 May 1950 as being already on the road, consigned to the Pakistan government.

15. Following receipt of the letter from the Chief of Staff, 3rd Coast Guard District Mr. Diamond instructed the Reading Railroad to direct the cars in the shipment from the Kilgore Company to the Pennsylvania Railroad for forwarding to South Amboy, N.J. At the same time Mr. Diamond applied to the Pennsylvania Railroad for a special permit and was granted Permit ERX-112 which permitted shipment of the munitions to South Amboy, N.J., from Belmont, Pa., the point at which the cars were to be delivered to the Pennsylvania Railroad. Seven of the cars were routed via Belmont in accordance with Mr. Diamond's instructions but the other 3 cars which had not been stopped at Rutherford, Pa., as directed, were not re-routed until they arrived at Elizabethport, N.J. on 18 May 1950 still headed for their original destination of Leonardo, N.J.

16. While Mr. Diamond was making arrangements for the shipment of the munitions from the Kilgore Company to the Pakistan government, Mr. Thomas N. Curtin, Traffic Manager of another department of Judson Sheldon, was handling the details of a shipment of dynamite to Afghanistan. Mr. Curtin had been informed of the schedule of the SS FLYING CLIPPER early in May 1950, on a date which he testified was prior to the 5th of the month, and at that time discussed with the Isbrandtsen Steamship Company booking a shipment of 45 tons of dynamite on the SS FLYING CLIPPER. Later in the month the booking was made firm. After the booking had been made Mr. Curtin became aware that a Coast Guard order had the effect of banning the shipment. Although Mr. Curtin had at no time been in communication with anyone in the Coast Guard concerning the shipment of dynamite, he stated in his testimony that on the morning of 16 or 17 May 1950 he learned that the shipment was to be permitted. He then telephoned the supplier, the Hercules Powder Company, who, Mr. Curtin said, also knew the restriction was to be lifted, and told the latter to send the shipment of dynamite to South Amboy, N.J.

17. This shipment of dynamite was not part of the shipment of explosives to the Pakistan government described in Mr. Diamond's letter as being already enroute to the New York area, and for which emergency treatment had been requested and granted. There was, in fact, no emergency with regard to this shipment of dynamite. The dynamite was not enroute when the Chief of Staff, 3rd Coast Guard District advised that Coast Guard Headquarters would authorize one shipment only. Thus, the Judson-Sheldon Division of the National Car Loading Corporation, having requested emergency treatment of the shipment to the Pakistan government, which was prematurely started from the Kilgore plant, and having secured Coast Guard authorization for that one shipment at South Amboy, N.J., thereafter added to that specified one shipment, 45 tons of dynamite of an entirely different shipment.

18. Mr. William A. Kenney, Supervisor of Explosives, Eastern Region, Pennsylvania Railroad, after having received an application for a special railroad permit to move 45 tons of dynamite from the Kenvil, N.J. plant of the Hercules Powder Company to South Amboy, N.J., called the Captain of the Port, New York, N.Y. to inquire whether or not a Coast Guard permit would be issued for transshipment of the dynamite at South Amboy, N.J. Mr. Kenney testified that he was told that if the dynamite was intended for shipment on the SS FLYING CLIPPER it was covered by the Coast Guard permit which would be issued. On 17 May 1950 the Isbrandtsen Steamship Company made written

application for a Coast Guard permit to load the shipment on the SS FLYING CLIPPER at Anchorage 49G (Exhibit No. 178). The Isbrandtsen letter listed the munitions from Kilgore Company and the dynamite from the Hercules Powder Company together and, inaccurately, stated that the entire shipment was bound to Pakistan for the account of the Pakistan Embassy.

19. On 18 May 1950 Mr. Philip J. Denning of the James Healing Company called the Captain of the Port, New York, N.Y. and stated that written application was being submitted on that date and requested the issuance of Coast Guard permits authorizing the transshipment of the explosives by the James Healing Company's lighters. Mr. Denning was informed in the telephone conversation that Coast Guard permits for the Healing lighters would be issued. When later received, the Healing Company's written applications described the dynamite from the Hercules Powder Company and the munitions from the Kilgore Company as "cases of explosives", and indicated no destination beyond the SS FLYING CLIPPER.

20. The Coast Guard permits were later issued, actually after the casualty occurred, in confirmation of the telephonic authorization already given. The Coast Guard permits as issued to the Healing Company contained the following statement: "This permit does not waive compliance with applicable regulations issued by cognizant state and/or municipal authorities." The same proviso is contained, in substance, in 46 C.F.R. 146.01-12.

21. The City of South Amboy had, on the date of the casualty, only one ordinance in the city records concerning the shipment or storing of explosives within the city limits. This ordinance (Exhibit No. 120) makes it unlawful for any person or corporation to keep or store more than one carload of explosives within the corporate limits of the city without having first obtained a permit to do so from the Mayor and Common Council of the City of South Amboy. The ordinance further provides that all persons, firms or corporations handling or transferring explosives within the city limits shall be held liable for all damage to life or property arising out of and incidental to such transfer. Mr. Philip S. Keegan, Pennsylvania Railroad Coal Agent at South Amboy, testified that the South Amboy ordinance did not apply to the unloading of the 12 railway cars from which explosives were being transferred to lighters on 19 May 1950 and that it was not the practice of the Pennsylvania Railroad to obtain permits from the City of South Amboy for a shipment of explosives being transshipped, as in the case of the shipment being handled on 19 May 1950. In any event, no permits were requested of the City of South Amboy by any person and none were issued.

22. Seven carloads of the munitions in the shipment from the Kilgore Company were started from the point of origin on 13 May 1950. The remaining 3 carloads in the shipment were started on 14 May 1950. At the time of shipment a Uniform Domestic Straight Bill of Lading was prepared by the Kilgore Company for each carload of munitions in the shipment. These documents bore the following certification:

"This is to certify that the above articles are properly described by name and are packed and marked and are in proper condition for transportation, according to the applicable regulations prescribed by the Interstate Commerce Commission and the Secretary of Commerce."

23. None of the shipping papers produced in evidence before the board made any mention of the fact that there were fuses shipped together with the anti-tank mines.
24. The 45 tons of dynamite were shipped in two carloads by the Hercules Powder Company from their Kenvil, N.J. plant on 16 May 1950.
25. Of the four Healing lighters employed in the handling of the explosives at South Amboy, N.J. on 19 May 1950, the KENNETH E. HEALING had never before been used in such an operation. This vessel, formerly the HORNELL, was acquired by Healing & Sons early in 1950 and after purchase had been overhauled in Todd Shipyard at 17th Street, Hoboken, N.J. Late in April 1950 an attempt was made to use the KENNETH E. HEALING in a similar explosive lightering operation at South Amboy, but on the way to the scene the vessel developed a leak and could not be used, and a scow was chartered and used in her place.
26. On about 1 - 3 May 1950 Mr. Joseph Santon discussed with Mr. Charles O. Carlson, owner of the Carlson & Son marine repair ship, Staten Island, repairs to the governors on the semi-diesel engines on the KENNETH E. HEALING. Mr. Carlson advised sending the governors to the manufacturer for overhauling. This was done, and when the governors were returned Mr. Carlson sent a mechanic to assist in the reinstallation. On the morning of 17 May 1950 Mr. Carlson's mechanic, Mr. Maxim Forbes of 822 Jewett Street, Staten Island, N.Y., called Mr. Carlson and advised him that a replacement for a worn out part on the KENNETH E. HEALING'S engines was required to complete the overhauling. The part was ordered to be shipped by air parcel post special delivery but Mr. Joseph Santon, of the Healing Company, informed Mr. Carlson on the afternoon of 18 May 1950 that the part had not arrived.
27. On 17 May 1950 the Eifler Electric Company of 2901 New York Avenue, Union City, N.J. sent a gang of electricians to work on the KENNETH E. HEALING in the installing of a motor generator for charging the starting ignition batteries on the vessel's motors. When this job was started on 17 May 1950 it was understood that it was a rush job but later in the day the electricians were told that there was no hurry as the KENNETH E. HEALING would not sail and the work could be continued the following day. On the following day, 18 May 1950, the electricians were told that the KENNETH E. HEALING would sail and it was necessary to complete the electrical work prior to the vessel's sailing. Later on the electricians were told that the electrical work need be completed only on one motor. The electricians, however, being on the job, carried on with the work and completed it on both motors.
28. While the electricians were on board mechanical repairs were also in progress on the engines of the KENNETH E. HEALING. The work had been completed on the port motor before the electricians left and the motor was being tested. The work on the starboard motor, however, had not been completed. Two of the electricians, Mr. Dante J. Vena, of 34 New Street, Jersey City, N.J., and Mr. Emil Marga, of 423 Avenue E. Bayonne, N.J., who had finished the electrical work on the KENNETH E. HEALING's motors, testified that they saw a man standing on the dock who spoke to them when they were leaving the vessel at about 0100 EST on the morning of 19 May 1950. Mr. Vena stated that this man was a strange looking character who spoke stupidly and did not appear to belong on the vessel

Both of these electricians were shown a recent photograph of William Frayne Amann, merchant seaman Z-678740, later referred to herein, and neither exhibited any signs of recognition of that person.

29. One of the electricians, Mr. Marga, stated that as he was leaving the KENNETH E. HEALING the port motor was being tested and there were sparks coming from her exhaust. He stated that a spark about $\frac{1}{2}$ inch in diameter and somewhat in the form of a snowflake, had landed on his jacket as he was crossing the vessel's deck. The electricians testified also that while they were on board other work on the KENNETH E. HEALING was being performed by carpenters and painters.

30. Mr. Charles O. Carlson, of the Carlson & Son, Staten Island, N.Y., testified that on the afternoon of 20 May 1950 he visited Pier 3, Hoboken, N.J. where the KENNETH E. HEALING was located when Mr. Forbes was on board working on the governor, and that he was told by an unidentified watchman there that the KENNETH E. HEALING had been towed away from Pier 3, Hoboken on the morning of 19 May 1950. No watchman was found by the board who could confirm this statement.

31. On the morning of 19 May 1950 the Healing lighters arrived at the powder pier at South Amboy, N.J., at the following times: The EUGENE F. HEALING at 0615 EST, the JAMES HEALING at 0650EST, and the GEORGE J. HEALING and KENNETH E. HEALING both at 0710 EST. The latter two vessels arrived one alongside the other and, upon reaching the pier, the GEORGE J. HEALING moored to the pier and then the KENNETH E. HEALING backed, under power of at least one engine, into the berth astern of the GEORGE J. HEALING.

32. Ernest R. Stacy, Chief Engineman, USCG, attached to and serving in the office of the Captain of the Port, New York, N.Y., was on the powder pier at South Amboy, N.J., and in the vicinity thereof off and on during the day of 19 May 1950. Stacy's duties in the office of the Captain of the Port, New York, N.Y., included checking magazines on vessels, inspections of loading and handling of explosives and issuance of explosive permits, under the direction of the Captain of the Port. On the morning of 19 May 1950, Stacy, in accordance with orders of the Captain of the Port, proceeded to South Amboy, N.J., to inspect the explosives handling operation on the powder pier in the Pennsylvania Coal Yard.

33. In the last war the Coast Guard, as a part of its wartime port security functions provided complete "Explosive Loading Details" to supervise, control and manage loading or unloading of military explosives. In peacetime supervision and control over commercial shipments of explosives is required to be exercised by persons assigned to that duty by the owner, charterer, agent or master of the vessel concerned as provided in 46 C.F.R. 146.02-17. The Coast Guard administers and enforces the regulations applicable to peacetime commercial shipments of explosives on vessels as provided in 46 C.F.R. 146.01 to 46 C.F.R. 146.28, inclusive. The Coast Guard peacetime enforcement of the aforementioned regulations is accomplished by boardings or inspections of vessels having explosives on board or engaged in loading or unloading explosives. Such Coast Guard boardings or inspections do not relieve the persons designated in 46 C.F.R. 146.02-17 of their responsibilities.

34. In the cases of the explosives which were involved in the disaster at South Amboy, N.J., on 19 May 1950 Mr. Frank Rinn, employed by the James Healing Company, was the person under whose observation and direction the explosives were being loaded on the Healing lighters.

35. Following his arrival on the pier at South Amboy, N.J., at about 0830 EST, 19 May 1950 Ernest R. Stacy, Chief Engineman, USCG, checked the cargo gear to be used in the transfer of the explosives from the railway cars to lighters before the transfer was commenced. He also noted that the conditions of the cases containing the explosives was good, that fire hoses were led out with water on the hoses and that safety precautions regarding smoking were being observed. Stacy boarded the KENNETH E. HEALING because she had recently been acquired by the Healing Company and he had never visited her before. In the course of his boarding of the KENNETH E. HEALING he visited her engine room and saw no work in progress there at that time. However, because the crew of the vessel were all sleeping in at that time, due to having worked the night before, Stacy was unable to say definitely whether Mr. Maxime Forbes who had been working on the engines previously was still on board. He could have been on board and asleep in the crew quarters at the time Stacy was on board. Stacy remained in the vicinity throughout the day and inspected the operation several times during the day. His last visit to the pier was for a few minutes at about 1900 EST after which, at about 1910, he left the scene and started for home.

36. Upon his arrival at the pier in the morning Stacy informed either Mr. Frank Rinn, the Healing Company stevedore boss, or Mr. Eugene Healing, Vice-President of the Healing Company, or both of the aforementioned persons, that, in order to minimize the concentration of explosives, the Captain of the Port desired that not more than two cars be placed on the pier at one time and that loaded lighters be moved away from the pier. Stacy also informed Mr. Philip S. Keegan, Pennsylvania Railroad Coal Agent at South Amboy, in the office of the latter, that only two cars were to be permitted on the pier. Mr. Keegan's testimony on what he was told by Stacy is inconsistent but it is clear that the instructions given by Mr. Keegan to the Assistant Train Master, Mr. William N. Price, did not mention any limit on the number of cars to be placed on the dock. The instructions given to Mr. Price by Mr. Keegan were to the effect that the cars were to be spotted on the pier in accordance with instructions either from the Coast Guard or the Healing Company. Mr. Price testified that the cars were actually spotted on the pier in accordance with the instructions of Mr. Frank Rinn of the Healing Company.

37. Stacy at about 1300 EST, 19 May 1950 spoke to Mr. Frank Rinn, the Healing Company stevedore boss who was supervising the operation for the Healing Company, concerning the moving of the two lighters, the JAMES HEALING and the EUGENE F. HEALING, which were then either finished or about to finish loading. Stacy told Mr. Rinn that the Captain of the Port desired that lighters be removed as soon as finished so as to minimize the amount of explosives at the pier. Stacy thought that as a result of this conversation the lighters were to depart from the pier and he later saw them underway near the outer end of the pier but did not know that they had moved only to the end of the pier until he saw them moored there several hours later. At about 1900 EST, just prior to leaving the pier and starting for home, Stacy spoke to Mr. Eugene Healing concerning the

loaded lighters moored at the end of the pier, telling Mr. Healing that they should depart right away. Mr. Healing said that he would see that they departed right away. The two loaded lighters were not moved and were still at the pier when the casualty occurred.

38. Stacy testified that the handling of the explosives at South Amboy, N.J., on the date of the casualty was very carefully performed and that the operation was one of the most safely handled that he had seen.

39. Mr. Austin Stolte, employed by the Pennsylvania Railroad Company as a supervisor of loading and unloading of explosives, arrived at the powder pier at South Amboy, N.J., at about 0600 EST, 19 May 1950. Mr. Stolte's duties were to see that the pier was in proper shape, to see that red flags were placed on the pier, to see that fire hoses with running water were led out, to see that everything was properly and safely handled and to keep records on the loading and the times of arrival and departure of the lighters. Mr. Stolte, although he was a supervisor employed by the Pennsylvania Railroad, indicated that he was under the impression that the Coast Guard was responsible for checking the identity of personnel on the lighters loading explosives at the railroad pier and that either the Coast Guard or the Healing Company employees were responsible for preventing other vessels from mooring to the Pennsylvania Railroad pier at which the explosives were being transferred to the lighters. Mr. Stolte was on or in the vicinity of the powder pier throughout the day up until the time of the casualty. Mr. Stolte testified that when the crew of the KENNETH E. HEALING went to eat on the GEORGE J. HEALING he noticed a stranger among them whom he had not seen before and he was identified to Mr. Stolte as a "machinist", but no further particulars or reason for the man's presence were given to him. Mr. Stolte testified that in transferring the explosives from the railway cars to the lighters, roller conveyors were used in the railway cars and on the deck of the lighters, with wooden chutes used for passing the cases from the door of the railway cars to the decks of the lighters.

40. The Pennsylvania Railroad had a Pennsylvania Railroad Police guard at the approach to the Powder Pier where the explosives were being transferred to the lighters. The function of this police watch was to prevent unauthorized persons going on the pier and to take matches or other unauthorized articles away from persons working the job before being allowed on the pier. This police watch was maintained by Sergeant William J. Crozier, Pennsylvania Railroad Police, from about 0845 EST until about 1500 EST, 19 May 1950, when he was relieved by Patrolman Luke J. Lyons, Pennsylvania Railroad Police, who remained on the scene until the time of the explosion. Both of the aforementioned stood their watch in the vicinity of a shanty located about 175 to 200 feet inside the Pennsylvania Railroad coal yard from the land end of the pier.

41. Smoking was not permitted on this pier or anywhere nearer the pier than the above-mentioned shanty at which the police watch was maintained.

42. Cooking fires were regularly used on the Healing lighters while handling explosives. However, on 19 May 1950, meals were not prepared on the KENNETH E. HEALING as the crew of that vessel ate on the GEORGE J. HEALING on that date. Time was taken for meals for about one hour at noontime and again between about

1700 and 1800 EST. The crews of the vessels ate on board the lighters and other personnel, about eight in number, went ashore for their meals.

43. On the morning of 19 May, 1950, the first five railway cars arrived at 0850 EST. These cars were CN 524683, NP 15515, CB&Q 22739, NKP 5131, and PLE 5326. Two of these cars, CN 524683 containing 500 cases of anti-personnel mines and NP 15515 containing 900 cases of dynamite, were spotted on the powder pier. The other three cars were placed in the "tug pocket" at the next pier south of the powder pier. CN 524683 discharged into the EUGENE HEALING, starting at 0855 EST and finishing at 1000 EST. NP 15515 discharged into the JAMES HEALING starting at 0900 and finishing at 0955. When the first two cars were unloaded the three cars standing in the "tug pocket," at the next pier, were placed on the powder pier. These were cars CB&Q 22739 containing 900 cases of dynamite, NKP 5131 containing 500 cases of anti-personnel mines, and P & LE 5326 containing 1000 cases of anti-tank mines. NKP 5131 discharged into the EUGENE F. HEALING, beginning at 1010 EST and ending at 1215 EST. P & LE 5326 discharged into the GEORGE HEALING, starting at 1130 EST and finishing at 1235 EST. CBQ 22739 between 1010 EST and 1050 EST discharged 400 cases of dynamite into the JAMES HEALING and between 1220 EST and 1250 EST completed discharging the remaining 500 cases of dynamite into the EUGENE F. HEALING. At about 1330 EST the seven remaining cars in the shipment, CNW 86014, CM 526988, ERIE 77953, GMO 26137, WM 29174, ATSF 148703 and CN 521959 arrived and were placed on the pier and the five empty railway cars which had previously been discharged were removed. These last seven cars each contained 1000 cases of anti-tank mines and were discharged as follows: CNW 86014 into the KENNETH HEALING beginning at 1340 EST and ending at 1455 EST, CM 526988 into the GEORGE HEALING beginning at 1345 EST and ending at 1505 EST., ERIE 77953 into the KENNETH HEALING beginning at 1305 EST and ending at 1610 EST., GMO 26137 into the GEORGE HEALING beginning at 1315 EST and ending at 1625 EST, WM 29174 was started into the KENNETH HEALING at 1615 EST but discharge was not completed, ATSF 148703 was started into the GEORGE HEALING at 1635 EST but was not completed. CN 521859 was earmarked for the KENNETH HEALING but its discharge was not started prior to the explosion.

44. The situation about 10 to 15 minutes prior to the explosion was as follows: The weather was overcast, with intermittent light rain and attendant reduced visibility, wind generally northeasterly, force 8 to 10 miles per hour, temperature 48 degrees F. There were moored at the outer and east end of the powder pier, on the south side, the EUGENE F. HEALING and the JAMES HEALING, the EUGENE F. HEALING being moored port side to the pier and the JAMES HEALING moored alongside and outboard of the EUGENE F. HEALING. The two aforementioned lighters had completed loading several hours earlier and their cargos were covered with tarpaulins lashed in place. The JAMES HEALING had a cargo of 1300 cases of dynamite on deck and the EUGENE F. HEALING had 500 cases of dynamite on her forward deck and 1000 cases of anti-personnel mines on her after deck, forward of the deckhouse. On the same side and about the center of the pier there was moored the KENNETH E. HEALING. The exact amount of cargo which was in the latter vessel is not known, but it was all anti-tank mines and all on deck. At the same side and at the inner end of the pier there was moored the GEORGE J. HEALING which also had only anti-tank mines on board, 1000 cases of which were stowed in the hold. On the pier there were seven freight cars, three of which were coupled together and separated by a distance of a few feet from the

other four which were also connected in a string. The three car string was opposite the berth of the GEORGE J. HEALING and the two off-shore cars in the group were empty. The inshore car was partially empty and the anti-tank mines remaining in it were being transferred into the GEORGE J. HEALING. The four car string of cars was opposite the berth of the KENNETH E. HEALING. The two offshore cars in the group of the four were empty. The next car inshore of the two empty cars was partly empty, and the anti-tank mines remaining in it were being transferred to the KENNETH E. HEALING. The car on the inshore end of the four car string was full but the door of it had been opened in preparation of the intended transfer of its contents to the KENNETH E. HEALING.

45. At about 1803 EST, with the situation as described above, Mr. Luke J. Lyons, the Pennsylvania Railroad Police Patrolman on duty at the inshore end of the pier moved his automobile from the position where it was parked, about 100 feet landwards from the shanty where Mr. Lyons was standing his watch. The effect of this move was to place the car at a point somewhat nearer the shanty and, at the same time, to turn it around so that it was headed away from the pier instead of headed toward the pier as it was prior to the move. From the new position of the automobile a complete view of the pier was blocked by the shanty. At about 1805 EST Mr. Lyons, according to his testimony, called to Mr. Stolte, the Pennsylvania Railroad Explosives Supervisor and invited Mr. Stolte to share a sandwich with him in Mr. Lyons's automobile. At this time, Mr. Lyons saw smoke coming from the exhaust of the KENNETH E. HEALING, but, he said, he thought nothing of it and it gave him no cause for alarm. Mr. Stolte and Mr. Lyons entered Mr. Lyons's automobile, a 1937 two-door Chevrolet, and, after eating sandwiches or drinking coffee, remained in the automobile talking, with Mr. Lyons seated on the driver's side of the front seat and Mr. Stolte seated in the right-hand side of the rear seat. In this situation, the previously mentioned shanty was about 25 feet in back of the automobile with the powder pier about 175 to 200 feet farther to the rear. At about 1826 there was a bright flash followed by a single very loud explosion. The area was either inundated or sprayed with water; the area was showered with mud and flying debris, and a heavy mushroom shaped cloud of grayish to black smoke rose from the scene of the blast. Although the automobile in which they were seated was badly damaged, Mr. Lyons and Mr. Stolte survived. When they got out of the automobile and the air had cleared enough to see, there was no sign of the lighters or the railway cars. The pier was demolished and there was no other living person in sight. A summary of the damage to structures is contained in Exhibits Nos. 161, 162, and 163.

46. The anti-personnel mines on the EUGENE F. HEALING did not detonate en masse in the explosion. A great many of them, some practically intact and others broken in varying extent, were blown in a direction over the port quarter of the EUGENE F. HEALING and toward the American Agricultural Chemical Plant into a fairly well defined sector to the northwest.

47. The main parts of a Winton diesel, identically the same as that known to have been on the EUGENE F. HEALING, were found in the same area after the casualty. The crankcase and number one cylinder of this engine bore some signs of breakage from within. This engine was viewed by the Board and testimony on the

possibility of a crankcase explosion having occurred in it was heard from several witnesses. After considering the evidence very carefully the Board finds no indication of internal damage to the engine that could not have been caused by the explosion of the dynamite around it and which drove the crankcase a distance of about 400 yards into the yard of the American Agricultural Chemical Plant.

48. Also found in the same general area in which the anti-personnel mines and the engine parts were found were two "Propane" cooking gas tanks which were delivered to the EUGENE F. HEALING on 15 December, 1949. One of these tanks showed indication of having been ruptured from within but there was no evidence to show whether or not this occurred before or after the explosion of the dynamite and munitions.

49. After the casualty an underwater exploration was made by U. S. Navy divers upon request of the Board. The results of this survey, which did not discover anything of particular significance, are shown in Exhibit No. 143, appended to the record of the investigation.

50. The anti-tank and anti-personnel mines involved in the disaster were manufactured by the Kilgore Manufacturing Company in accordance with specifications supplied by the Pakistan Embassy. These specifications were described by Mr. Dan H. Robinson, Works Manager of the Kilgore Company, as U. S. Army specifications dated either 1942 or 1944. By arrangement with the Department of the Army the services of Mr. C. J. Bain, Chemical Engineer, Picatinny Arsenal, were secured and the latter was directed by the Board to proceed to the Kilgore Manufacturing Company's plant where the munitions were manufactured and there to inspect samples of the anti-tank and anti-personnel mines being manufactured under the contract with the Pakistan Embassy; to examine the materials used in their manufacture; to inspect the methods of packing of the munitions; to observe the practices and procedures followed at the plant and to return and report his findings to the Board. Mr. Bain visited the Kilgore plant and upon completion of his inspection appeared as a witness before the Board. Mr. Bain stated that insofar as the raw materials used in the manufacture of the mines were concerned, they were of good quality and were obtained from reliable sources. He testified, however, that during his visit to the Kilgore plant he observed what he considered questionable practices. With regard to the anti-personnel mines he stated that the threads were not very well cleaned before the detonator booster delay element was screwed into place and that he had noted metal bodies or projector cases of the mines bearing marks of inspectors' approval which were rusty. The points involved being that the film of explosive between the threads on the detonator booster delay element could be hazardous because of possible pinching of the explosive between the metal surfaces and the possibility of rust in the mine cases becoming dislodged as scale cutting into and causing friction in the black powder propelling charge enclosed in the silk bag below the projectile. With regard to the anti-tank mines, designated by the Kilgore Company as "ML1A1" mines, Mr. Bain stated that these were not ML1A1 mines according to U. S. Army nomenclature. He stated that the anti-tank mines produced by the Kilgore Company were more like U. S. Army "M1" mines than any other but because of a difference in the assembly of the detonator were not exactly the same as U. S. Army "M1" mines. The M1 mine as manufactured by the

U. S. Army had substantially the same type of case as the Kilgore mines and, as assembled, contained only the T.N.T. explosive charge with a cavity for the insertion of the fuse. These mines were packed five to a six-compartment box with five of the compartments containing one mine each and the sixth compartment containing the five fuses for the mines. The fuses had three main parts; a mechanical striker assembly, a primer or detonator about the size of a .32 caliber revolver cartridge, and a booster charge of approximately 65 grams of tetryl. Thus, if a fuse lacked shear pins or if a detonator were overly sensitive and were actuated by shock in handling, the tetryl booster would be certain to fire and most probably would fire the remaining four detonators and booster charges in the same compartment. As the fuses were packed with the explosive pointed toward the outer end of the box and away from the mines in the same box, the effect of firing all five detonators and boosters in one box would mainly be registered outside of the box and could very possibly detonate mines in an adjacent box.

51. About the first of July, 1942, the Army had three carloads of this type of M1 mines explode at the Elwood Ordnance Plant. The cause of the explosion was not determined but it was established that just prior to the explosion the last box was being driven into the third car to wedge it tight. After the aforementioned casualty the U. S. Army redesigned the M1 mines and removed the tetryl booster from the fuse assembly and placed it in the cavity in the mines. The effect of this change was to place both the T.N.T. main explosive charge and the tetryl booster in the mine case and to reduce the fuse to the striker assembly and the small primer or detonator and thus materially reduced the quantity of explosives likely to be detonated if a defective primer or detonator fired prematurely. The mine thus modified was designated as the M1A1.

52. The Kilgore mines, although designated as M1A1 had the booster charge assembled together with the detonator fuse as in the U. S. Army M1 mine. There was, however, a significant difference in the assembly of the primer or detonator of the Kilgore mine as compared with the U. S. Army M1 mine which the Kilgore mine otherwise resembled.

53. The detonator of the U. S. Army M1 mine was formed by telescoping, one within the other, two metal cups both containing explosive. The outer and lower of the two cups was slightly larger than the inner and upper cup which fitted into it, the open end of the inner and upper cup being pressed into the open end of the lower and outer cup in a close fit. At the time of bringing the two cups together the lower cup contained a small quantity of tetryl which had been formed into a pellet of the proper size and then pressed into place. The upper cup had at the top of the closed end a primer compound, below that a small quantity of lead azide and at the open end of the cup a small quantity of tetryl. Thus when the upper cup was inserted into the lower cup the tetryl at the open end of the upper cup was brought into proximity with the tetryl in the lower cup. Due to the fact that the tetryl in the lower cup was inserted in the form of a pellet there was reduced likelihood of any of the tetryl being left lodged on the inner surfaces of the cup and because the inner surfaces were cleaned prior to joining the cups the possibility of explosive being lodged between the side surfaces of the cups was further reduced. In any event if any explosive did remain between the surfaces of the cups that explosive would be tetryl and not lead azide, a more sensitive explosive.

54. In the Kilgore assembly the lower cup was loaded with tetryl and also lead azide, the latter being toward the open end of the cup. This combination was then pressed into the cup with 10,000 lbs. psi pressure. As the tetryl in the Kilgore product was not formed in a pellet prior to insertion in the lower cup the effect of the pressure was to reduce the volume of the explosive in the cup. As the lead azide toward the open end of the cup had its level reduced in the pressing of the explosive into the bottom of the lower cup, the inner wall of the cup was very likely to have lead azide left deposited on it between the original level and the final level. As the inner wall of the lower cup was not cleaned prior to inserting the upper cup there was a distinct possibility that a thin film of lead azide could remain between the outer wall of the inner cup and the inner wall of the outer cup. In this respect the detonator of the Kilgore mine differed from the U. S. Army type M1 mine. In other respects the Kilgore mine designated "M1A1" was similar to the discontinued U. S. Army M1 type mine, which was not made by the U. S. Army after 1942.

55. The Kilgore fuses were packed in the sixth compartment of a six-compartment case with the longitudinal axis of the fuse parallel to the long dimension of the box and with the explosive charge toward the end of the box, away from the mines in the same box. The fuses were fitted with safety forks and encased in a cardboard tube similar to, but less rigid than, the common form of mailing tube. These cardboard tubes were a feature of the packing supplied by Kilgore and were not called for in the packing specifications. The tubes were not a close fit and each fuse had an air gap of approximately 1/4 inch all around it within the tube. The fuses were placed within their compartment so that each fuse had approximately 1/2 inch end-play between the end of the wooden box and the partition separating the fuse compartment from the adjacent compartment containing a mine. The fuses were packed in two tiers one over the other. As the width of the box was such that each tier could hold three fuses and only five fuses were packed in a box, three fuses in one tier and two fuses in the other, the sixth space was filled with an empty cardboard tube of the same type as those in which the fuses were enclosed. As the cardboard tubes were of relatively light construction there was a definite possibility of the empty tube collapsing in handling with the result that added void space would be available within which the fuses could shift. Also, the partitions dividing the wooden box into six compartments were of 9 x 8 1/4 x 3/16 inch cardboard. Mr. Bain stated that he considered the boxes of anti-tank mines, as packed by the Kilgore Company unsafe for shipment. Mr. Bain stated also that he considered that the booster charge should be removed from the fuse as was done in the U. S. Army modified M1 mine.

56. No approval was obtained from the Bureau of Explosives for packing and shipment of the fuses together with the anti-tank mines as described above.

57. Mr. William G. McKenna, Chief Chemist, Bureau of Explosives, who also visited the Kilgore works states that he was not favorably impressed with the packaging of the anti-tank mines at that plant. He said that, to his mind, the partitions in the boxes were very unsubstantial and that, in handling, the whole contents of the box could move, which is not good practice for an explosive package.

58. Mr. William G. McKenna also examined samples of dynamite taken from the days' runs at the Kenvil, N. J. plant of the Hercules Powder Company which produced the dynamite involved in the South Amboy, N. J., explosion and he stated that he found the dynamite perfectly normal and safe for transportation under normal conditions.

59. Following the casualty, on or about 20 May, 1950, William Frayne Amann, merchant seaman, Z-678740, arrived on the scene. This individual, dressed in cotton khaki trousers and shirt and uniform cap with merchant officer's insignia, either by misrepresentation or failure to correct mistaken impressions of his identity, permitted himself to be taken for an officer of either the U. S. Navy or Coast Guard. In this guise he acted as an authority on removal of wrecked vessels from the area. When his real identity was discovered he was arrested and sentenced to the Middlesex, N. J., County Workhouse. The Board finds no evidence that he in any way contributed to the casualty. A transcript of his questioning by Middlesex County, N. J., authorities is attached to the record of the investigation as Exhibit No. 115.

60. Mr. Otto J. Ludvigsen, of 402 Halstead Street, East Orange, N. J., who was employed as a deckhand on the KENNETH E. HEALING, was not on board the vessel on the date of the casualty. Mr. Ludvigsen stated that he was not on board because he had overslept on the morning of 19 May, 1950, and did not report to the vessel at 0330 EST, at Pier 3, Hoboken, as he was due to do, and did not go to Pier 3, Hoboken until the morning of 20 May, 1950. He stated that he did not communicate with the Healing Company on 19 May, 1950; that he heard of the explosion late in the night of 19 May, 1950; that he tried to telephone the Healing Company office on the morning of 20 May, 1950, and, as he could not reach the office, he later went there himself. Mr. Ludvigsen stated that there had been a mechanic named "Max" working on board the KENNETH E. HEALING on the evening of 18 May, 1950, when Mr. Ludvigsen went ashore and Mr. Ludvigsen was of the impression at that time that the aforementioned mechanic was staying on board to continue work on the vessel's starboard engine.

61. The board finds that the James Healing Company and its supervisory employees enjoyed an excellent reputation of long standing as being competent and reliable in handling, stevedoring and lightering of explosives.

62. During the proceedings of the Board reference was made to an exhaust stack on the American Agricultural Chemical plant from which flame is continuously emitted. The stack in question is approximately 1162 feet from the outer end of the powder pier and about 700 feet from the land or inner end of the pier. The stack is over an electric furnace in the aforementioned plant in which phosphorus is made in a smelting process. Carbon monoxide remaining from this process is disposed of by being led to the exhaust stack, which is about 70 feet high, where it is ignited and burned. This gas has been burned in this manner almost continuously, on a 24-hour-a-day basis, since 1935. During that time there has been nothing to indicate that the flame from the exhaust constitutes a fire hazard. On the date of the casualty the wind was not blowing toward the powder pier from the stack.

63. The Board finds no evidence of sabotage but does not exclude sabotage as a possible cause of the disaster.

OPINION

Based exclusively on the evidence presented, after full and mature deliberation, and consideration of the many facts developed in the investigation of this case, the Board is of the following Opinion:

1. The actual cause of the explosion is unknown;
2. The most probable cause of the explosion is accidental detonation of a case of anti-tank mines in a freight car, or while being transferred from a freight car into a lighter, or on one of the lighters, due to the cases being sensitive to shock by reason of:
 - (a) The method of assembly of the detonator;
 - (b) The assembly of detonator and booster charge in one unit; and
 - (c) The loose packing of the assembled fuses in the case with the anti-tank mines.
3. Other possible causes of the explosion are:
 - (a) A crankcase explosion in the engine of the EUGENE F. HEALING;
 - (b) An accident resulting from repairs which may have been in progress on the engines of the KENNETH E. HEALING;
 - (c) Fire on one of the lighters.

The Board is not impressed by the evidence adduced respecting these items, and considers such possibilities are too remote to be given much weight as determinative of the cause of disaster.
4. There was no failure of material, other than the possibilities in 3(a) and (b) indicated above, on any of the lighters receiving the cargo.
5. That no act of misconduct, inattention to duty, negligence, unskillfulness or incompetence or willful violation of the law has been discovered on the part of any personnel licensed or certificated by the United States Coast Guard.
6. That no personnel of the United States Coast Guard, nor any representative, officer or employee of the United States in any other agency thereof, caused or contributed to the cause of the casualty under investigation.
7. The flame from the exhaust stack of the American Agricultural Chemical Plant did not constitute a hazard to loading of the explosives at the pier at South Amboy where the casualty occurred; and did not cause or contribute to the cause of the casualty.
8. That the Kilgore Manufacturing Company may have contributed to the cause of the casualty by their erroneous assumption that
 - (a) The plans and specifications under which the anti-tank mines were manufactured and assembled conformed to currently approved United States Army plans and specifications;

- (b) The assembly and packaging of the anti-tank mines and fuses complied with the regulations of the Interstate Commerce Commission.

9. That the Kilgore Manufacturing Company may have further contributed to the casualty by certifying the shipment of anti-tank mines to be in compliance with the Interstate Commerce Commission regulations, when such appears not to have been the fact.

10. The James Healing Company contributed in great measure to the devastating effects of the explosion, by reason of failure of its personnel to remove from the Powder Pier at South Amboy, two completely loaded lighters after having been twice told by a Coast Guard inspector that the loaded lighters should be moved.

11. The lighter KENNETH E. HEALING should not have been used for reception of explosives for transportation from the Powder Pier to a vessel in the explosive anchorage until all repairs of any nature to her engines were fully and finally completed. The Board is of the opinion repairs to the engines of this vessel were not completed and were still in progress; however, material witnesses who might confirm or refute this view are not available for examination.

12. The Judson-Sheldon Division of the National Car Loading Corporation contributed to the devastating effects of the casualty by adding two carloads of dynamite to a shipment for which Coast Guard approval had been granted on the understanding that the shipment approved was one which was already on the railroad bound to New York when the approval was requested, and was a shipment identified by the Judson-Sheldon Division as one to the Pakistan Government.

13. There seems to exist a wide-spread, but erroneous belief that the Coast Guard provides supervisors, overseers or inspectors to control and manage the sequence of operations required to be performed in the loading or discharging of commercial shipments of explosives into or from vessels. The Board is of the opinion that this misunderstanding or concept of Coast Guard authority or responsibility stems from confusing the functions of the Coast Guard during the last war in supervising the loading and unloading of military explosives with the peacetime functions of the Coast Guard with respect to commercial shipments of explosives. The Board is further of the opinion that this misunderstanding is one which could be hazardous to innocent lives and property in that it leads to failure on the part of the persons who, by the express terms of the law and its implementing regulations, are made responsible, fully to appreciate and discharge their responsibility.

RECOMMENDATIONS

L. With a view to extending additional safeguards to life and property from risk of injury or destruction occurring as an incident to the transportation, handling, etc., of explosives, and other similar cargo by vessels subject to provision of 46 United States Code 170 et seq., the Board recommends consideration be given the revision of existing regulations, as contained in Part 146 of Title 46, Code of Federal Regulations, along the lines set forth below:

- (a) To require applications for Coast Guard permits to load or discharge Class A explosives in amounts exceeding 500 pounds, to be presented to the Captain of the Port, or the Coast Guard officer specially designated to issue explosive loading permits, in writing, at least five (5) business or working days prior to the date of the proposed loading or discharging;
- (b) To specify, in detail, the information contained in, and the supporting documents to be submitted with, the application for a Coast Guard permit to load or discharge explosives;
- (c) To describe the text and form of the Coast Guard permit to be issued;
- (d) To require that an applicant for a Coast Guard permit to load or discharge explosives, must deliver an identical copy of the application filed with the Coast Guard, to the responsible official of the municipal or city government having jurisdiction of the point or place of where the terminal facility is located which will be used for the transfer of explosives from the shore to the vessel, or vice versa. In the event that no municipal or city government has jurisdiction over the said terminal facility, an identical copy of the application filed with the Coast Guard shall be delivered to the responsible official of the county or parish having jurisdiction of the point or place where the transfer of explosives from shore to ship, (or vice versa) will occur. An exception with respect to the distribution of such copies of applications may be made where the explosives are not handled at terminal facilities within a city or county, but solely and exclusively within the limits of a duly designated federal explosives anchorage. Depending upon the circumstances of each particular case and situation, it is suggested the copies of application above discussed, may be delivered, for instance, to the chief of the Fire Department, Police Department or County Sheriff, as appropriate.
- (e) To require that an applicant for a Coast Guard permit to load or discharge Class A explosives shall submit with the application, in the case of explosives of domestic manufacture, a certificate from an authorized inspector (as hereinafter defined) showing that the type of explosive moving in the shipment has been inspected and found to be in compliance with all applicable regulations and safe for shipment on board vessels. In the case of military type explosives this certificate should be made by an authorized inspector of the Armed

Forces of the United States. In the case of commercial explosives the certificate should be made by an inspector of the Bureau of Explosives. Such certification would not require an inspection of each individual lot of explosives, but representative lots should be inspected before any explosives of a given type are shipped by any manufacturer; and, in the case of continued manufacture of the same category of explosives at any plant, the inspection should be repeated at least once in every three (3) months, or as much oftener as circumstances may indicate are necessary. In the case of explosives of foreign manufacture being loaded on or discharged from a vessel in a port of the United States, a similar certificate should be required to be executed by a competent inspector designated by the foreign government concerned. Such certificate must be presented to the Captain of the Port (or other designated officer) to whom application is made for a Coast Guard permit for loading or discharging of the explosives, at least five (5) business or working days prior to the proposed loading or discharging date on or from the vessel.

- (f) To require that the loading or discharging of commercial shipments of explosives on or from vessels be under the control and supervision of an explosive loading detail, having no other duties, to be employed by the applicant for a Coast Guard permit to load or discharge the explosives. The Board recommends that such a detail be composed of the personnel described below:

- (1) The entire operation to be under the direction and control of an explosive supervisor who shall have been examined by the Coast Guard and who holds a certificate reciting that the holder has presented satisfactory evidence warranting the belief that he is competent for assignment to such duty. The qualifications to be established before issuance of such certificate should be (as a minimum);

(1-a) In the case of vessels operating on the rivers, bays, sounds or lakes, including the Great Lakes and waterways of the United States, the candidate shall have had experience in the deck department of similar vessels, or other acceptable experience and service, sufficient to show him to be experienced in handling and stowing cargo on such vessels.

(1-b) In the case of foreign-going, intercoastal or coastwise vessels, a candidate for certification should be required to hold a United States Coast Guard merchant ship deck Officer's license of at least the grade of chief mate for the class of vessel loading or discharging the explosives.

(1-c) The candidate must present satisfactory evidence of good character, and that his habits of life are such as warrant the belief that he can be safely entrusted with the duties of explosive supervisor.

- (1-d) The candidate must demonstrate by passing a written examination that he has a thorough knowledge of:
- (1-d-1) The regulations applicable to explosives and other dangerous articles on board vessels;
 - (1-d-2) Approved methods of fighting fires in explosives or other dangerous substances on board vessels;
 - (1-d-3) Approved procedures in dealing with emergencies resulting from casualties to vessels carrying explosives or engaged in loading or discharging explosives.
- (2-a) A number of assistant explosive supervisors, who have no other duties, to be employed by an applicant for a Coast Guard permit to load or discharge explosives, shall act under the direction of the explosive supervisor, to observe and supervise specific phases of the loading or discharging operations; such as supervising a cargo hatch, the unloading of a single freight car or the work of a single stevedoring gang, to see that the operations are correctly and safely performed.
- (2-b) The number of such assistant explosive supervisors required for cargo hatches, railroad cars or stevedoring gangs to be fixed by regulations or by the Coast Guard officer granting the permit for the loading or discharging of explosives.
- (2-c) Such assistant explosive supervisors shall be examined by the Coast Guard, and a certificate issued, if appropriate, reciting that the candidate has presented satisfactory evidence warranting the belief that he is qualified for assignment to such duty.
- (2-d) The qualifications to be established before issuance of such a certificate should be (as a minimum):
- (2-d-1) Satisfactory evidence of good character and temperate habits;
 - (2-d-2) Knowledge of handling and stowage of cargo, generally;
 - (2-d-3) Knowledge of safety precautions to be observed in handling of explosives;
 - (2-d-4) Knowledge of types of cargo gear permitted to be used in handling of explosives, and the correct methods of using such gear.
- (3) Stevedores employed for loading or discharging of explosives holding certificates issued by the Coast Guard authorizing their employment in such operation. This certificate may be issued to

applicants upon a showing of good character, temperate habits and suitable experience as a stevedore. What constitutes "suitable experience" may be defined by appropriate regulations.

- (4) All the certificates contemplated by this sub-division may be revoked or suspended in proceedings similar to those authorized under R.S. 4450 (46 United States Code 239) as amended, and 46 Code of Federal Regulations 137, et seq., upon proof of negligence, misconduct, inattention to duty, incompetence, unskillfulness, or willful violation of any law or regulation relating to any phase of the handling of explosives and other dangerous cargoes and substances. Action as herein provided may be taken without regard to an individual's employment status, and whether or not the acts or condition under investigation occurred or existed while he was acting under authority of his certificate; or were in connection with any marine casualty or accident.

ED H. SMITH

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Rear Admiral, U. S. Coast Guard
Chairman

BECKWITH JORDAN

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Captain, U. S. Coast Guard

HARRY W. STINCHCOMB

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Captain, U. S. Coast Guard

LEONARD T. JONES

LEONARD T. JONES

Commander, U. S. Coast Guard
Members

JOHN E. LYMAN

JOHN E. LYMAN

Commander, U. S. Coast Guard
Recorder

1 August, 1950

MARINE BOARD OF INVESTIGATION TO INQUIRE
INTO THE CAUSE OF EXPLOSION OF AMMUNITION
LADEN BARGES AT SOUTH AMBOY, NEW JERSEY, ON
19 MAY, 1950, WITH LOSS OF LIFE AND EXTENSIVE
PROPERTY DAMAGE

1. The proceedings, findings of fact, and opinions of the foregoing Marine Board of Investigation are approved, subject to the exceptions and comments set forth below:

- (a) Shippers offering for transportation Class A explosives by common carriers are required, under 49 C.F.R. 73.421, to certify that the articles to be shipped are properly described and named and are packed in proper containers for transportation in accordance with prescribed regulations. The Filgore Company made such a certification in this case. However, the evidence reveals (1) that 49 C.F.R. 73.400(a) was not complied with in that the packages were marked M1-A1 mines when in fact they were M1's, and (2) that 49 C.F.R. 73.57(f)(1) was not complied with in that fuses, boosters and detonators for the mines were included in the same outside package with the mines. By virtue of the provisions of paragraph (7)(A) of R.S. 4472, as amended, and 46 C.F.R. 146.02-18, the Board's Finding of Fact 22 could have been extended to indicate these specific violations.
- (b) Finding of Fact 33 states in effect that the Coast Guard peacetime enforcement of the Dangerous Cargo Act, R.S. 4472, as amended, and regulations thereunder is accomplished by boardings or inspections of vessels having explosives on board or engaged in loading or unloading explosives. The penultimate sentence of the Board's Finding No. 33 is changed to read:

"The Coast Guard peacetime enforcement of the aforementioned regulations is accomplished by 'spot' checks through boardings and examinations of vessels having explosives on board or engaged in loading or unloading explosives; such checks being limited to personnel availability."

In this connection, it must be observed that when the amendment of R.S. 4472 was sponsored in 1939, requirements were provided therein for the inspection, certification, and re-inspection of vessels carrying dangerous cargoes, which inspection and enforcement provisions were not enacted into law. During the Departmental and Congressional Hearings on H. R. 7363, a bill amending R.S. 4472, as amended, at which time all segments of the industry were represented, it was generally understood, after lengthy considerations, that the requirements of the proposed Dangerous Cargo Act and the regulations thereunder would be self-policing and that "spot" checks only would be made for the detection of violations.

- (c) Findings of Fact 36 and 37 in effect indicate that the Coast Guard representative at the powder pier at South Amboy ordered the spotting of only 2 box cars at a time on the pier for unloading purposes and that lighters, upon being loaded, were to depart immediately for the explosive anchorage, with the strong inference that such orders were violated. The evidence is not clear whether these so-called directions were given or considered as orders or mere suggestions.
- (d) The record indicates that the crew members of the lighters were engaged in the repair of the machinery on board the EUGENE F. HEALING up to approximately 0200 on 19 May, 1950, that the 4 lighters got underway at 0430 on that date and proceeded to the powder pier at South Amboy and that loading operations were carried on up to 1826 EST, when the explosion occurred, without

any substantial intervening periods or rest. The fatigued condition of such persons engaged in the loading operations of the explosives may have been a contributing factor to the cause of the explosion.

2. No action is taken at this time on the recommendations of the Board, which will require further study and consideration.

3. A copy of the record of the Board's investigation will be furnished to the Attorney General for consideration and whatever action is deemed proper under 46 U.S.C. 170 (14) and (15) - R.S. 4472, as amended, in connection with the violations of regulations mentioned in paragraph 1 (a) hereof. A copy of such record will also be furnished the Interstate Commerce Commission for its information and such action as that agency may deem necessary and appropriate.

MERLIN O'NEILL
Vice Admiral, U. S. Coast Guard
Commandant