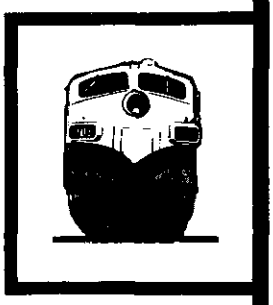
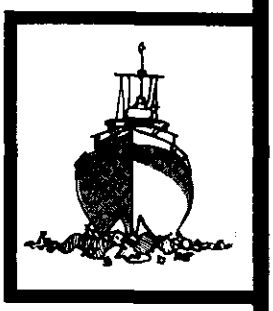
PB85-916302

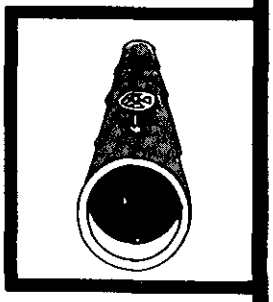
# NATIONAL TRANSPORTATION SAFETY BOARD



WASHINGTON, D.C. 20594

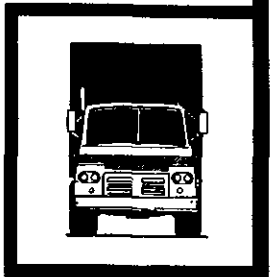


## RAILROAD ACCIDENT REPORT



REAR END COLLISION
BETWEEN CONRAIL TRAINS
OIPI-6 AND ENPI-6X
NEAR SALTSBURG, PENNSYLVANIA
FEBRUARY 26, 1984

NTSB/RAR-85/02.



UNITED STATES GOVERNMENT

TECHNICAL REPORT DOCUMENTATION PAGE

| 1. Report No. NTSB/RAR-85/02 | 2. Government Accession No. PB85-916302 | 3. Recipient's Catalog No. |
|---|---|---|
| 4. Title and Subtitle Railroad Accident Report — Rear End Collision Between Conrail Trains OIPI-6 and ENPI-6X, near Saltsburg Pennsylvania, February 26, 1984. | | 5. Report Date January 8, 1985<br>6. Performing Organization Code |
| 7. Author(s) | | 8. Performing Organization Report No. |
| 9. Performing Organization Name and Address<br>National Transportation Safety Board<br>Bureau of Accident Investigation<br>Washington, D.C. 20594 | | 10. Work Unit No. 4080<br>11. Contract or Grant No.<br>13. Type of Report and Period Covered Railroad Accident Report February 26, 1984 |
| 12. Sponsoring Agency Name and Address<br>NATIONAL TRANSPORTATION SAFETY BOARD<br>Washington, D. C. 20594 | | 14. Sponsoring Agency Code |
| 15. Supplementary Notes | | |



16. Abstract

About 3:35 p.m. on February 26, 1984, westbound Consolidated Rail Corporation (Conrail) Train ENPI-6X, moving about 27 mph, struck the rear of standing Conrail Train OIPI-6 at Control Point (CP) Salts on the No. 2 track near Saltsburg, Pennsylvania. Derailed cars from train OIPI-6 were struck by eastbound Conrail train TV-12M which was moving about 38 mph on the No. 1 track. When the collision occurred, the derailment of a car in train TV-12M caused its brakes to apply in emergency. Two cars and a caboose derailed in train OIPI-6, 1 locomotive unit derailed in train ENPI-6X, and 1 car derailed in train TV-12M. A fire ensued and severely damaged or destroyed 19 "piggy-back" truck semi-trailers carried by train TV-12M. Two crewmen on train ENPI-6X and 1 crewman on OIPI-6 were injured. Conrail estimated the damage at $784,719.

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the engineer and the conductor to operate and stop train ENPI-6X in compliance with the restricted speed rule.

| 17. Key Words | 18. Distribution Statement |
|---|---|
| Cab Signal Operation Rear End collision code change points, Rule 229, Rule 559 Traffic Control System Control Point - Rule 99. Medium Speed. Restricted speed. Radio communication | This document is available through the National Transportation Technical Information Service, Springfield, Virginia, 22161 |

| 19. Security Classification (of this report) | 20. Security Classification (of this page) | 21. No. of Pages | 22. Price |
|---|---|---|---|
| UNCLASSIFIED | UNCLASSIFIED | 33 | |

NTSB Form 1765.2 (Rev. 9/74)

CONTENTS

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C. 20594

RAILROAD ACCIDENT REPORT

Adopted: January 8, 1985

# REAR-END COLLISION BETWEEN CONRAIL TRAINS OIPI-6 AND ENPI-6X NEAR SALTSBURG, PENNSYLVANIA FEBRUARY 26, 1984

## SYNOPSIS

About 3:35 p.m. on February 26, 1984, westbound Consolidated Rail Corporation (Conrail) Train ENPI-6X, moving about 27 mph, struck the rear of standing Conrail Train OIPI-6 at Control Point (CP) Salts on the No. 2 track near Saltsburg, Pennsylvania. Derailed cars from train OIPI-6 were struck by eastbound Conrail train TV-12M which was moving about 38 mph on the No. 1 track. When the collision occurred, the derailment of a car in train TV-12M caused its brakes to apply in emergency. Two cars and a caboose derailed in train OIPI-6, one locomotive unit derailed in train ENPI-6X, and one car derailed in train TV-12M. A fire which ensued severely damaged or destroyed 19 "piggy-back" truck semi-trailers carried by train TV-12M. Two crewmen on train ENPI-6X and 1 crewman on OIPI-6 were injured. Conrail estimated the damage at $784,719.

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the engineer and the conductor to operate and stop train ENPI-6X in compliance with the restricted speed rule.

## INVESTIGATION

### The Accident

Train OIPI-6.—Following a satisfactory brake check, Consolidated Rail Corporation (Conrail) train OIPI-6 1/ with 3 locomotive units and 129 cars (see appendix C) departed Harrisburg, Pennsylvania, at milepost (MP) 104.6, at 8:30 a.m., on February 26, 1984. En route to Control Point (CP) 2/ Salts, the train brakes operated satisfactorily. At 2:23 p.m., train OIPI-6 entered onto the No. 2 track of the Conemaugh Line at Conpit interlocking, near Johnstown, Pennsylvania. The train proceeded on the No. 2 track to CP Salts where the engineer stopped the train at 3:05 p.m. in compliance with the requirements of an absolute stop signal aspect (two horizontal red lights with no number plate on the signal mast). The rear of train OIPI-6 was standing on an 82-foot length of tangent track between a 3° right curve and a 5° left curve. (See figure 1.)

1/ O Oak I- Island, New Jersey to PI - Pittsburgh, the sixth train of the month of that category.
2/ A remotely controlled point where switches and signals are installed to facilitate the movement of train.

Figure 1.--No. 2 track on the right approaching the point of impact from the west. Point of impact is on short length of tangent track between curves.

The Pittsburgh Division train dispatcher had directed the traffic control system (TCS) operator to display a stop signal at CP Salts to hold train OIPI-6 at that location to await the arrival of three eastbound trains that were being operated on the No. 1 track for 14.4 miles between CP Apollo and CP Salts. The No. 2 main track was not available for use between CP Salts and CP Apollo because freight cars were stored on the No. 2 main track.

Train ENPI-6X.--Conrail train ENPI-6X 3/ with 2 locomotive units and 71 cars departed Enola, Pennsylvania, MP 104.6 at 8:45 a.m., on February 26, 1984, following a satisfactory brake test. (See appendix C.) When the locomotive cab signal failed to display an aspect at MP 116 that corresponded to that of the wayside signal, the engineer contacted the TCS operator, who, in turn informed the train dispatcher for the Allegheny Division who was located at Altoona, Pennsylvania. The engineer said that the train dispatcher instructed him to proceed to Conpit interlocking on the authority of operating rule No. 554. (See appendix D.)

At Conpit interlocking, train ENPI-6X was routed onto the No. 1 track of the Conemaugh Line at 2:44 p.m., and the control of the train movement was transferred from the train dispatcher at Altoona to the Pittsburgh dispatcher (actually located at Greentree, Pennsylvania). The train dispatcher at Altoona advised the Pittsburgh dispatcher that the cab signals on the locomotive of train ENPI-6X were inoperative and that the train was being operated on the authority of rule No. 554. Because the Conemaugh Line is not equipped with automatic block signals and Rule No. 554 is not applicable over that line, the Pittsburgh dispatcher authorized the engineer of train ENPI-6X to proceed governed by the requirements of operating rule No. 559 in conjunction with the aspects of CP interlocking home signals and a lunar "C" light, rule No. 299. (See appendix D.) A flashing lunar "C" light indicates that the block ahead is free of unsafe conditions and that there are no trains in the block. An engineer, with inoperative cab signals, may proceed on proper CP home signal indication.

At Conpit, Train ENPI-6X received a proceed signal aspect. At CP's Toms (MP 5.9) and Alum (MP 7.5), illuminated "C" lights and proceed signal aspects were displayed. At 3:05:43 p.m., train ENPI-6X approached CP Blair (MP 10.0) near Blairsville, Pennsylvania. The train dispatcher contacted the conductor on the locomotive of train ENPI-6X and said "Alright sir, OK, what I got, I'm holding a westbound down at Salts. I am going to have to give you the signal at Blair, ah, 1 to 2 to go down behind him at restricted speed. I got 3 eastbounds coming, the last ones coming by Leech now. Soon as they get out of there, I'm gonna cut that westbound loose at Salts that's ahead of you. I'll wait 'til he gets by Apollo and then we'll give you the "C" light out at Salts, over." At 3:06:09, p.m., the conductor on the locomotive of ENPI-6X responded "That's a roger main line dispatcher, sir, Conemaugh dispatcher, over."

The engineer and conductor on the locomotive of train ENPI-6X reported that a medium clear signal aspect (two horizontal red lights over three vertical amber lights) was displayed for the train at CP Blair, but the "C" light was not illuminated. Train ENPI-6X crossed over from the No. 1 track to the No. 2 track and departed CP Blair westbound on the No. 2 track at 3:17 p.m.

The Collision.--Eastbound train TV-12M with 3 locomotive units and 60 cars (see appendix C) passed CP Apollo (MP 24.3) on the No. 1 track at 3:09 p.m. At 3:30 p.m., TV-12M train passed CP Salts. About 3:35 p.m., while moving westbound about 27 mph

3/ Enola, Pennsylvania to Pittsburgh, Pennsylvania, 6th train extra.

a 5° left curve and on a 0.3 percent downgrade westbound, train ENPI-6X struck the rear of standing train OIPI-6 near CP Salts. At the time, train ENPI-6X was moving westward in the the 5° curve on the No. 2 track while train TV-12M was moving eastward in the same curve. (See figure 2.) The engineer and conductor of train ENPI-6X said that because of the track curvature an eastbound train (TV-12M) obscured their view on their approach to the caboose of train OIPI-6.

Just before the collision, the conductor of train OIPI-6 was standing on the rear platform of the caboose when he saw train ENPI-6X approaching from the rear. He ran inside the caboose, radioed a warning on his portable radio, grabbed a fuse and left the caboose. He then started climbing the bank on his right to escape the impending collision. He said that when train ENPI-6X struck train OIPI-6, the caboose of train OIPI-6 and the lead locomotive unit of ENPI-6X rose upward and the caboose fell on top of cars of the eastbound train. He said that at that time there was an explosion, but that he was not sure if it was the oil stove on the caboose or a tank car loaded with ethylene glycol monoethyl ether located just ahead of the caboose in train OIPI-6. The tank car later was found to have been punctured in the derailment. After the impact, the lead locomotive unit of train ENPI-6X overturned onto its right side. The next two cars ahead of the caboose in train OIPI-6 derailed. Train TV-12M was stopped by a train initiated emergency brake application which was caused when the 31st car in train TV-12M was derailed by contact with a derailed car from train OIPI-6 which had moved into the side of train TV-12M causing it to derail. Nineteen "piggyback" highway semi-trailers were dislodged and fell off the flat cars over an embankment as a result of the impact forces. The flat cars were not derailed..

Fire erupted around the locomotive of ENPI-6X. The conductor of train ENPI-6X, who had left the operating compartment of the locomotive to effect his escape, reached the running board on the right side. When the locomotive overturned, the running board protected him from the engine compartment, but his right foot was pinned between the side railing on the locomotive and the ground, and he could not free himself; he was rescued later by emergency response personnel. The engineer, to the best of his remembrance, escaped the wreckage within minutes after the collision by climbing through the side window which was over his head.

## Injuries to Persons

| | Crewmembers | | | |
|---|---|---|---|---|
| Injuries | Train ENPI-6X | Train OIPI-6 | Train TV-12M | Total |
| Fatal | 0 | 0 | 0 | 0 |
| Nonfatal | 2 | 1 | 0 | 0 |
| None | 1 | 2 | 3 | 6 |
| Total | 3 | 3 | 3 | 9 |

## Damage

When the lead engine unit No. 3317 of train ENPI-6X overturned on its right side, some crush damage occurred to the unit. (See figure 3.) The left side panels of the operating compartment were pushed inward, caused either by heat from the fire or from impact damage. (See figure 4.) The fire following the accident burned and destroyed the interior of the operating compartment. The origin of the fire was not determined, but

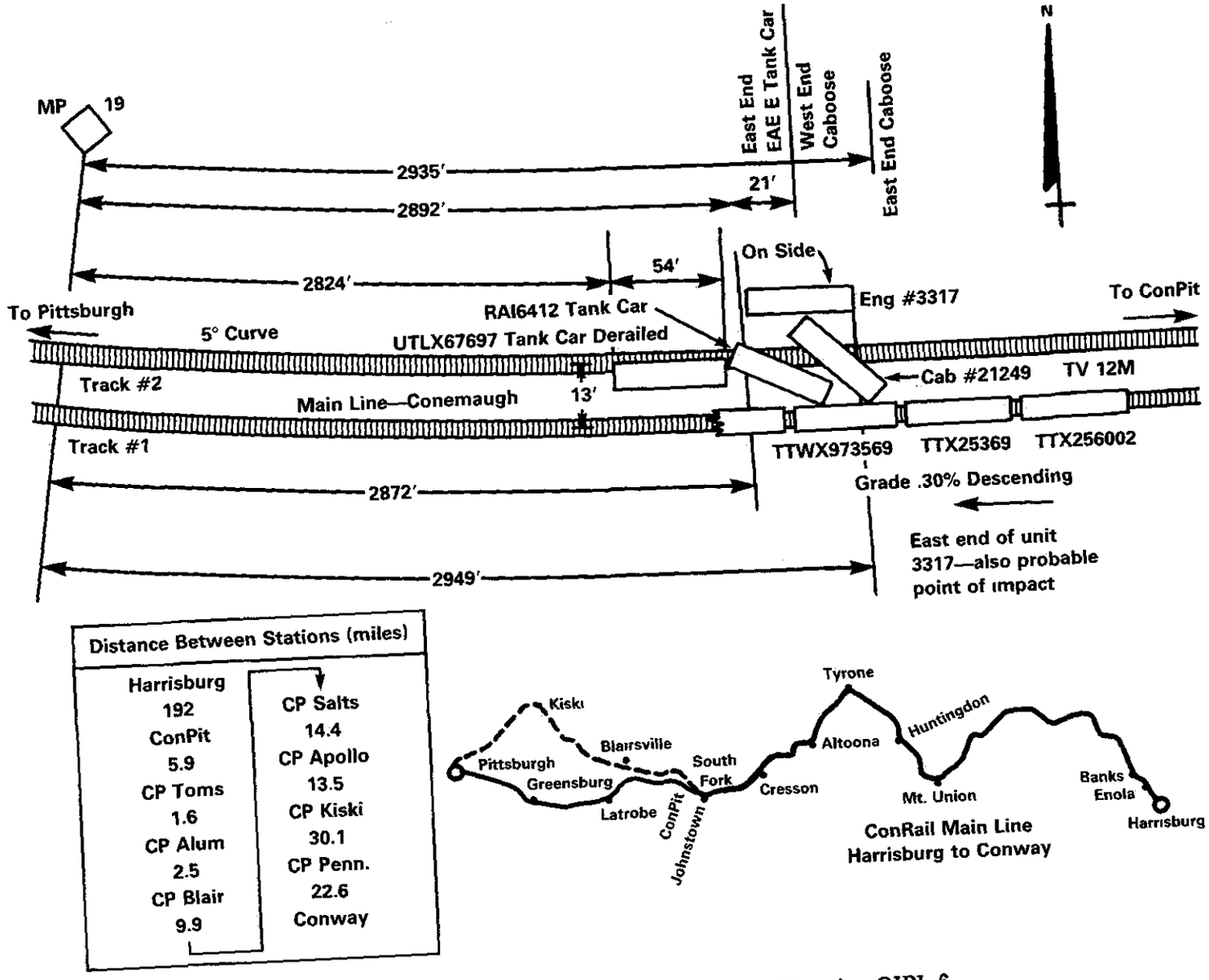



Figure 2.—Rear-end collision of Conrail trains OIPI-6 and ENPI-6X and involving train TV-12M at CP Salts.

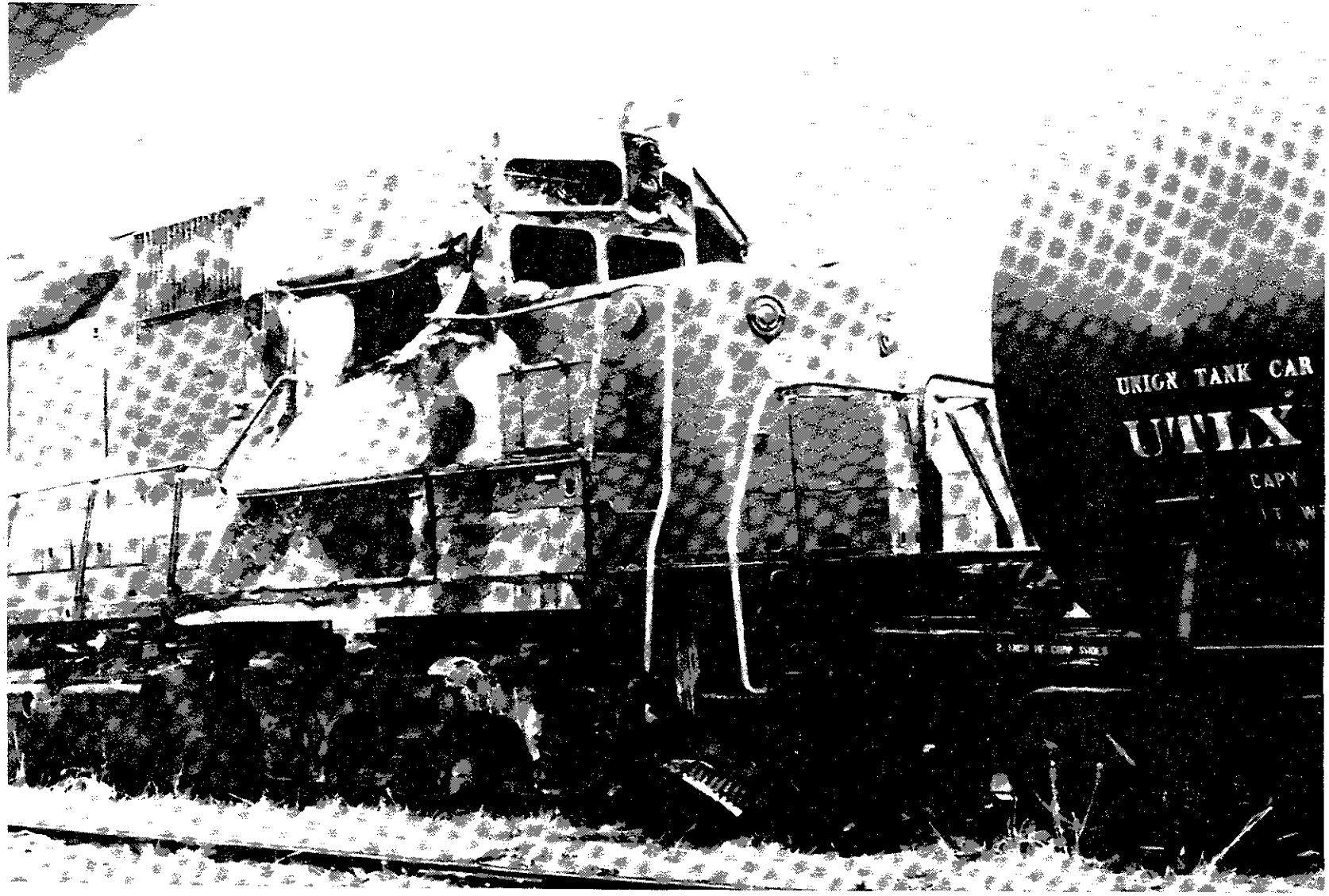



Figure 3.—Right side of locomotive unit 3317 of train ENPI-6X.

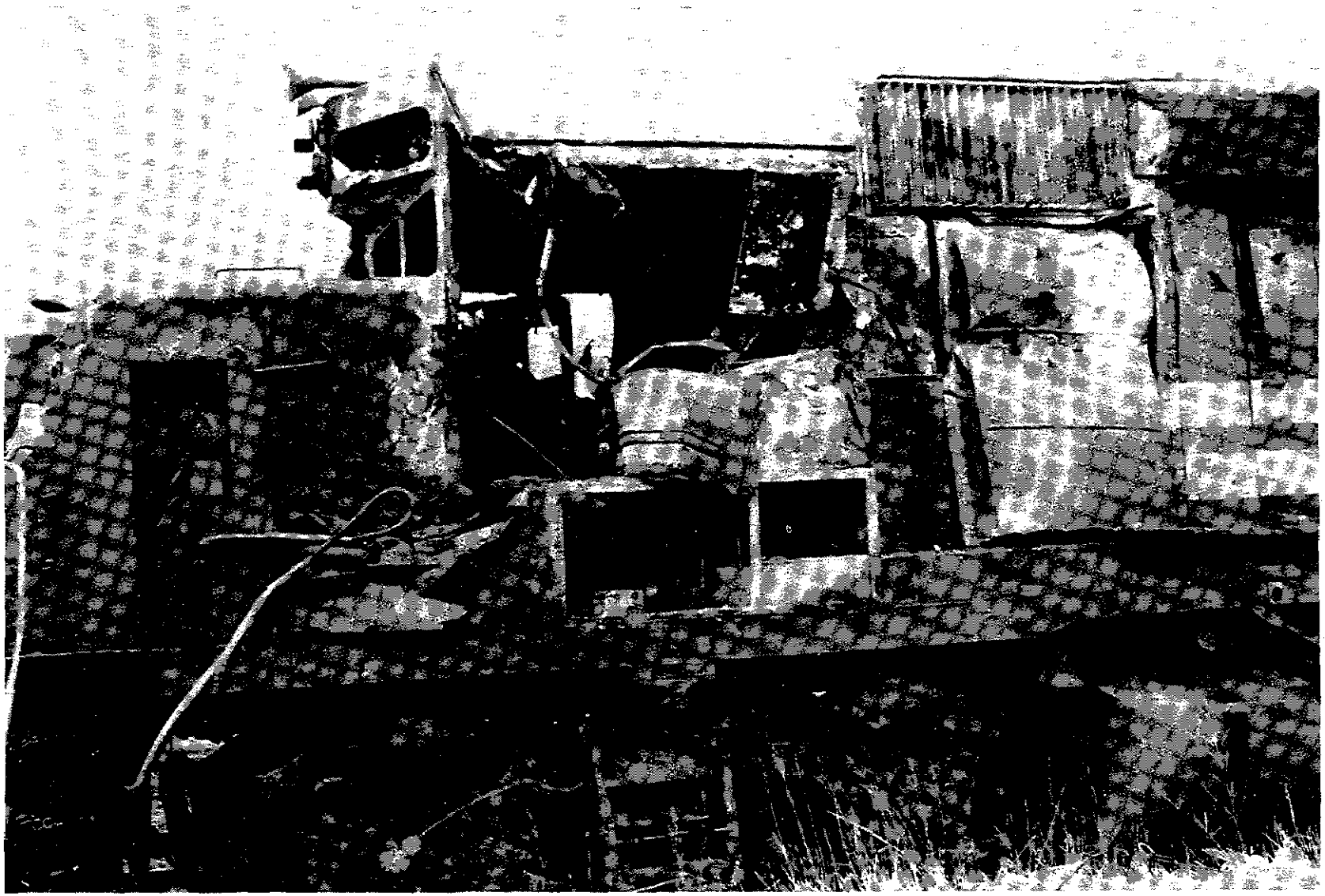


Figure 4.— Left side of locomotive unit 3317 of train ENPI-6X.

it was fueled by diesel fuel and the flammable contents of the punctured tank car in train OIPI-6. (See figures 3 and 4.) The side panels and railing along the long nose of the lead locomotive unit on both sides and the undercarriage of the locomotive were damaged, and there was a small puncture to the fuel tank; there was only slight damage to the forward end of unit No. 3317. Unit No. 2730 did not overturn or derail. The primary damage to that unit was caused by the post-collision fire.

The caboose of train OIPI-6 and two of the derailed cars were severely damaged; one car was only slightly damaged. Nineteen "piggy-back" truck semi-trailers on flat cars were either severely damaged or destroyed as a result of the impact and fire.

Track damage was minimal. Conrail estimated the damage to be:

| | |
|---|---|
| Equipment | $412,777 |
| Track and Roadbed | 2,000 |
| Estimated Lading Damage | 363,000 |
| Clearing Wreck | 6,942 |
| Total | $784,719 |

## Crewmember Information

The crewmembers of ENPI-6X had the hours of rest required by the Federal Hours of Service Law 49 CFR Part 228.

On February 23, the engineer of train ENPI-6X had marked off duty at 3 a.m. He remained off duty until 10 a.m. on February 25 when he was called for a tour of duty which ended at 9:50 p.m. He was off duty until 6:40 a.m. on February 26, 1984. He said that, at the time he reported to operate train ENPI-6X, he was well rested and that he was not taking any medication.

The conductor was relieved from a tour of duty at 8 a.m. on February 24; he returned to duty at 6:40 a.m. on February 26, 1984. He said that he was well rested and that he was not taking any medication.

Statements and Testimony from the Engineer, Train ENPI-6X.--On June 26, 1984, the engineer of train ENPI-6X testified that just before his train arrived at CP Blair, he asked the conductor to come to the operating position in the locomotive operating compartment and hold the deadman control pedal depressed while he used the toilet facilities located in the nose of the locomotive. The engineer said that before he returned to the operating position that he overheard a radio communication between the train dispatcher and conductor, but that he did not understand the message. When the engineer returned to the controls, the conductor told him that "they" had called him about the proposed move at CP Blair and that he had acknowledged the message which he relayed in substance to the engineer. The engineer said that the conductor then returned to the fireman's seat. At the time, ENPI-6X was approaching CP Blair. The conductor called a medium clear aspect on the home signal at CP Blair to which the engineer responded. The engineer said he did not see the "C" light illuminated and that he observed the restricted speed rule, not exceeding 15 mph, in the block between CP Blair and CP Salts. He testified he remained in the locomotive after he saw the caboose of OIPI-6 because he thought his train was going to stop before striking the caboose.

On March 6, 1984, the engineer of train ENPI-6X was interviewed by an accident investigator for the Federal Railroad Administration (FRA). The engineer's statement at that time about the events of the accident was the same as his testimony before Safety Board investigators when he was deposed by them under oath on June 26, 1984. However, in his statement on March 19, 1984, during a second interview with the same FRA investigator, the engineer of ENPI-6X said that when he returned to the operating compartment he took a seat on the fireman's side and that the conductor remained at the control console and continued to operate the locomotive until the train collided with OIPI-6. He said that was the reason the conductor escaped from the operating compartment through the door behind the engineer's control stand.

The engineer of train ENPI-6X also told the FRA investigator that he had operated over the Conemaugh Line only three times since rule No. 299 had been in effect. He said that the day of the accident was the first time he had operated over the Conemaugh Line with inoperative cab signals. He said that he believed the medium clear signal aspect displayed for train ENPI-6X at CP Blair authorized him to operate at 30 mph between CP Blair and CP Salts and that he believed many fellow employees were confused about the meaning and application of rule No. 559.

The engineer said that he had never made qualifying trips over the Conemaugh Line with a qualified engineer for the specific purpose of learning the road as was the accepted practice, but that he had made about five trips in an eastward direction only with a "pilot" 4/ engineer. He estimated that he qualified on the Conemaugh Line in October 1983. The company records indicated that the engineer qualified on the Conemaugh Line in 1946.

Testimony from the Conductor, Train ENPI-6X.--The conductor testified in a deposition under oath to Safety Board investigators on June 26, 1984, that as train ENPI-6X entered onto the Conemaugh Line, before it arrived at CP Alum, the engineer asked him to watch the controls for a minute while he refreshed himself. He said that he moved to the control position and placed his foot on the deadman control. He stated that the Conemaugh dispatcher called by radio and told the engine crew that ENPI-6X should be operated by "rule No. 559." He said he repeated these instructions to the dispatcher almost verbatim and that he relayed the directions to the engineer, who returned to the compartment about 2 to 3 minutes later. The conductor said that the train was moving only at 12 to 15 miles per hour the entire distance between Conpit and CP Salts. He said that he did not exercise any supervisory authority over the engineer because he believed the speed of the train was within the requirement of the rules.

Later, when the conductor was asked by Safety Board investigators about the statement the engineer gave in his second interview by the FRA investigator, he said that when the engineer returned to the operating compartment he remained standing at the control console and was joined by the engineer. Both men remained in that position until the accident occurred. He said that he did not operate the locomotive control, that neither he nor the engineer depressed the deadman control pedal because it was blocked out, and that he wondered why he had been asked initially to hold down the deadman control.

4/ A person qualified on the characteristics of a section of railroad who is assigned to accompany a person who is not so qualified.

The engineer and the conductor seemed confused about the correct application of rule No. 559 in conjunction with the lunar "C" light, rule No. 299. The engineer said that rule No. 559 had never been discussed in a rules class. Both the engineer and the conductor knew that the lighted "C" light permitted the engineer to operate the train when the cab signals were inoperative and the significance of the absence of the displayed "C" light, but they were vague in describing its application in respect to allowable speed.

The conductor especially was vague in describing the authority conveyed by the signal aspect displayed at a CP. For example, he indicated that if a medium clear signal aspect were displayed at CP Alum, along with a "C" light, the train's speed was to be held to medium speed to CP Blair, the next interlocking.

## Locomotive and Train Information

The lead locomotive unit of train ENPI-6X, No. 3317, was an Electro-Motive Division of General Motors, Incorporated Model GP-40-2 rated at 3,000 hp. It was equipped with a deadman control device, a Pulse Electronics Incorporated speed recording device, and an operable 2-channel radio. It was not equipped with an alerting device which would require a deliberate action by a crewmember at least every 20 to 22 seconds to ensure that they were alert. The second locomotive unit, No. 2730 was a General Electric Company Model U23B rated at 2,300 hp. It was equipped similarly to unit 3317. (See appendix C.)

## Method of Operation

The Conemaugh Line, a portion of the Pittsburgh Division, Central Region, extends from Conpit interlocking, MP 3.6 (3.6 miles east of MP-O) to CP Penn at Pittsburgh, MP 77.9. Traffic Control System rules govern train operations over the two main tracks, No. 1 and No. 2, and three controlled sidings. CPs are located at Toms, Alum, Blair, Salts, Apollo, and Kiski. Remotely controlled CPs consist of varying arrangements of switches, crossovers, and signals.

In 1936, cab signals without automatic block signals were installed over the Conemaugh Line. On April 4, 1978, a "clear to the next interlocking" signal, indicated by an "N" light was put into effect. On April 27, 1980 the "N" lights were redesignated as "C" lights and a new rule book was issued.

Trains are operated over the Conemaugh Line between Conpit and CP Kiski by the aspects of cab signals and interlocking home signals. There are no wayside signals except at CPs. The switches and CP signals are controlled by an operator at Pittsburgh under the supervision of the cognizant train dispatcher. The maximum authorized speed for freight trains is 50 mph.

When a train is being operated with inoperative cab signals on the Conemaugh Line, a flashing lunar "C" light (see figure 5) and a proceed signal aspect displayed at a CP, indicates to the engineer that the block to the next CP is clear and that he may proceed operating his train at maximum authorized speed unless the speed is otherwise restricted by operating instructions. Conversely, a proceed signal aspect displayed at a CP without an illuminated "C" light indicates to the engineer that the block to the next CP ahead is not clear or that a track condition exists that requires the train to proceed at restricted speed. Under these circumstances, the train can proceed according to rule No. 299 at restricted speed (see appendix D), not to exceed a maximum of 15 mph.

Figure 5.—Nonilluminated "C" light at CP Salts looking west.
Signal lights are red indicating stop.

The signal system between Conpit and CP Kiski is divided into signal blocks just as if wayside signals were installed. At locations where a wayside signal would normally be located, there is a Code Change Point which separates the signal blocks and is identified as a CS point. Moreover, between CS locations are B Points which are cut sections or repeater points used to extend block lengths. Locomotive cab signal apparatus responds to signals from the track and displays the aspect in the operating compartment to the engineer with the same effect as an automatic wayside signal indicating the block condition.

The cab signal system for the Conemaugh Line is designed on the four-aspect, three block plan. When a clear cab signal aspect is displayed to the engineer of a train, it indicates to him that at least three signal blocks ahead are clear. If a train were standing in the fourth signal block ahead, the cab signal aspects of a train approaching from the rear would indicate progressively clear, approach-medium, approach, restricting, and a second restricting. (See figure 6.)

Using figure 6, signal CS Point No. 1 would have been clear as the second train approached it and the locomotive cab signal would have indicated a clear block to signal CS Point No. 2. It would have meant to the crew of the second train that blocks A, B, and C were not obstructed. The cab signal is not arranged to display a stop aspect. The most restrictive aspect that can be displayed is a restricting aspect. The cab signal aspect displayed in the locomotive will not allow an engineer to determine whether his train is in the first red (restricting) signal block or the second. However, when a code change point is passed and the signal aspect is for a lower speed than the train is traveling, an audible whistle sounds to alert the engineer of the cab signal change. This audible whistle also sounds when the second restrictive signal point is passed.

When a train approaches a CP interlocking, the operator can display a proceed signal aspect, but the aspect will depend on the occupancy condition of the four signal blocks in advance 5/ of the CP interlocking signal.

Operating rules Nos. 559 and 299 are in effect between Conpit and CP Kiski and provide the authority which governs the operation between those locations of a train that is not equipped with a cab signal or one with an inoperative cab signal. When a proceed signal is displayed at a CP for a train not equipped with a cab signal or one with an inoperative cab signal, the signal displayed is valid only through the CP interlocking for that particular CP and that train. Rule No. 299 provides for a flashing lunar "C" light to be illuminated in addition to the interlocking signal aspect if the block between the two CP's in the direction of movement is clear and there are no obstructions. The illuminated "C" light signifies to the engineer that the track is clear to the next CP and it authorizes him to proceed at maximum authorized speed on "fixed signal indication." However, the engineer must approach the next CP interlocking home signal prepared to stop.

If the block between two adjacent CPs is not clear of trains or if there is an obstruction or broken rail, the flashing lunar "C" light cannot be displayed for a train about to enter that block. In such instances, the operator can cause the best proceed signal aspect possible to be displayed on the CP interlocking home signal. The engineer may proceed through the interlocking and continue into the block between CPs, but only at restricted speed according to rule No. 559.

---

5/ In advance of the signal means the backside of the signal.

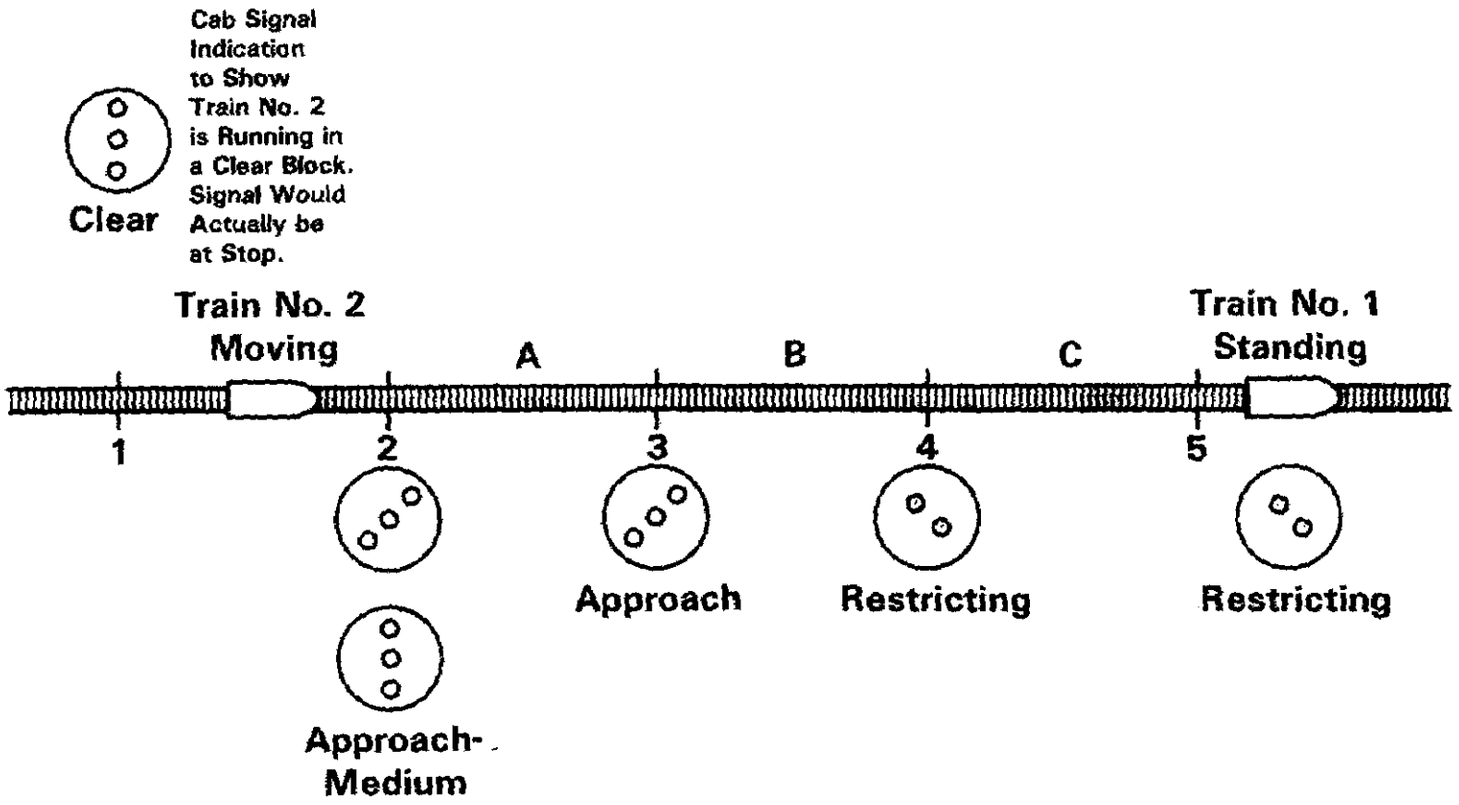



Figure 6.—Four aspect three block cab signalling system - aspects displayed in locomotive operating compartment for condition shown. (Not related to the track/signal conditions between CP Blair and CP Salts.)

Flag protection is not required on the Conemaugh Line based on rule No. 99, which states, "Except in territories where automatic block signal system or traffic control system rules are in effect, and except when the rear of the train is protected by at least two block signals or when operating under manual block signal system rules . . . a crewmember must provide flag protection against following trains on the same main track as follows. . ."

**Meteorological Information**

On the afternoon of February 26, 1984, the weather in the vicinity of CP Salts was sunny and bright. The visibility was good and the temperature was about 50° F; a slight breeze was blowing. At the time of the accident, the sun was at a height above the horizon such that at times a westbound engine crew would be facing directly into it.

**Medical and Toxicological Information**

A tank car loaded with ethylene glycol monoethyl ether was punctured during the accident, and it was ignited from an undetermined source. The burning lading emitted toxic fumes which were hazardous. The conductor and engineer of train ENPI-6X and the conductor of train OIPI-6 suffered from smoke inhalation and the toxic fumes from the burning lading.

A blood sample was taken from the conductor of train ENPI-6X at LaTrobe Hospital, LaTrobe, Pennsylvania, at 0045 hours on February 27, 1984, about 13 hours after the accident, and tested only for alcohol. The result of the test was negative. Although the test was valid, the result is inconclusive, because the body metabolizes alcohol at a rate of 0.015 percent per hour. Thirteen hours before the blood sample was taken, the blood alcohol level could have been nearly 0.2 percent.

A Conrail supervisor at the accident site asked the engineer of train ENPI-6X if he would submit to a blood alcohol test. The engineer said he had not had any alcoholic drink for four days but he agreed to the test. However, no sample was taken for analysis nor were analyses done for the engineer or the other crewmembers. The hospitals would conduct blood alcohol tests only upon request by the State police, and none were requested by them. There was no evidence to cause Safety Board investigators to suspect that alcohol or drugs were involved.

**Survival Aspects**

The conductor of train OIPI-6 was standing on the rear platform of the caboose when he saw train ENPI-6X approaching from the east. He said that sunlight reflecting off a boxcar roof of train ENPI-6X through the trees about 1/2 to 3/4 mile a way attracted his attention. He said also that he made an attempt to flag the on-coming train, but that when he determined the train was not going to stop before striking his caboose he jumped from the caboose and moved away from the rear of his train.

The crash damage to the lead locomotive unit of ENPI-6X was very slight. However, if the conductor and engineer had not departed the operating compartment in a timely manner, the fire that destroyed the locomotive's operating compartment would have killed them. The conductor said he used spilled diesel oil from the punctured fuel tank to help cool him when the fire was burning intensely in the operating compartment above him. The operating compartment walls kept the fire from impinging his body, buthe said that he was quite uncomfortable with the heat. Emergency personnel dug under the

overturned locomotive and used an airbag to raise the side railing sufficiently to free the conductor who then was able to crawl from under the locomotive.

Emergency units from New Alexandria and Saltsburg responded to the accident site which was very inaccessible. Also, a Life Flight Helicopter from Pittsburgh and troopers from the Pennsylvania State Police responded to the emergency. The crewmen were taken to nearby hospitals for treatment.

**Tests and Research**

A sight distance test was performed a few hours after the accident. Using a locomotive unit similar to the lead unit on ENPI-6X and cars standing on the No. 1 track loaded with semi-trailers to simulate train TV-12M, the longest sight distance from the operating compartment of the test locomotive on No. 2 track to standing cars on the No. 1 track simulating the caboose of train OIPI-6 was 483 feet.

Locomotive units Conrail (CR) 6664 and CR 6655 were attached to the remainder of the train of ENPI-6X, which consisted of 72 cars, and the brakes were tested; no faults were disclosed that would have contributed to improperly operating train brakes. The locomotive was found to have a 1-pound leakage, and the train had a 3-pound leakage. One car had excessive piston travel, and the brake was inoperative on one car.

The electronic cab and relay signal equipment from unit No. 3317 were removed at Altoona, Pennsylvania, on March 1, 1984. It could not be tested with the associated equipment in unit 3317 because the wires from the power supply, other wiring, the indicator lights, control stand, and the acknowledging lever were destroyed. The plastic covers on three relays which had been removed were distorted by the heat. However, upon testing, it was found that the distortion did not affect the relay's operation and the relays functioned properly and the operating parameters were within the carrier's specifications.

The speed tape on locomotive unit No. 3317 was destroyed. However, the tape for the Pulse Electronics, Inc. event recorder on the second unit was usable, even though the cassette housing was deformed from heat. The Pulse speed tape was played to obtain a printout. The speed at impact as shown on the reproduced speed tape was 27 mph. It was not possible to calibrate the locomotive (unit 3317) or the event recorder because of damage.

Tests of the wayside signal equipment was completed on February 27, 1984. The rule No. 299 "C" light could not be displayed when a track shunt was applied between CP Blair and CP Salts, which indicated that the equipment was working properly.

## ANALYSIS

The results of the brake tests conducted on ENPI-6X indicated that the brakes were effective and that the train could have been stopped before striking the caboose of train OIPI-6 if the engine crew had been alert and observing the restricted speed rule, not to exceed 15 mph. The 27-mph speed just before impact, which itself was in excess of the allowable speed, indicates the train was proceeding at too great a speed for the train to stop in the 483-foot sight distance. The stopping distance of a train consist like ENPI-6X at 27 mph would have been about 1,000 feet. If the enginecrew of ENPI-6X had observed the restricted speed rule and had not exceeded 15 mph after passing CP Blair, the train traffic pattern at CP Salts would have been different and the accident probably would not have occurred.

The engineer reported that the "C" light at CP Blair was not illuminated. The results of the signal tests indicated that the wayside cab signal system functioned properly. When a track shunt was imposed on the track between CP Blair and CP Salts, the "C" light would not illuminate. Therefore, the signal system was ruled out as being a factor or causally involved. Moreover, the inoperative electronic cab signal equipment on the locomotive of ENPI-6X could not have detected signal block conditions irrespective of the signal system's operating condition.

That the undamaged cab signal equipment tested satisfactorily following the accident is not conclusive that a cab signal failure had not occurred. A failure could have occurred in the cab signal components that were destroyed, or a failure could have self-corrected as a result of the impacts associated with the accident. The engineer would have had no reason to report falsely that a cab signal was inoperative because a failed cab signal would have imposed an operating hardship on him.

Despite the contention by the engineer and conductor that the requirements of the restricted speed rule were observed, the time-distance calculations and the speed tape refute their contention. If train ENPI-6X had traveled at a rate of 15 mph between Conpit and the point of collision, transit time for the approximate 23 miles would have been about 92 minutes. Train ENPI-6X covered the 23 miles in 51 minutes. Similarly, the distance from CP Blair to the point of impact is 8.5 miles. Train ENPI-6X traveled that distance in 18 minutes. At 15 mph, it would take 34 minutes to travel 8.5 miles. Therefore, it is evident that train ENPI-6X was operated at an average speed of about 24 mph between Conpit and the point of collision and not in accordance with the required restricted speed "not to exceed 15 mph."

The sequence of events described by the engineer and conductor, though similar, vary from a time standpoint. The dispatcher's automatically recorded voice tape monitor showed that at 3:05:43 p.m. he advised the crew of ENPI-6X of the move he planned for them at CP Blair. According to the conductor, the dispatcher's transmission was received just west of Conpit, while the engineer said that the dispatcher's transmission was received as the train approached CP Blair. If the speed had been about 30 mph, which is indicated on the speed tape for some distance ahead of the point of impact, it would have taken about 20 minutes to cover the distance of 10 miles from Conpit to Blair, putting train ENPI-6X at CP Blair about 3:04 p.m. Therefore, it seems the engineer's statement more correctly reflects the time the radio transmission was received.

The engineer said he overheard the radio transmission from the dispatcher while he was away from the operating position, but that he could not clearly hear it so as to understand it. Both the conductor and the engineer said that the conductor repeated the substance of the transmission to the engineer when he returned from his break. However, either the conductor or the engineer or both did not understand the restricted speed aspect, or they ignored it between CP Blair and the point of impact. Neither the engineer nor the conductor should have needed instruction to operate the train at restricted speed because it was specified in rule No. 559, which the crew had acknowledged earlier as their operating authority; additionally, the absence of the "C" light at CP Blair required restricted speed operation.

Moreover, the dispatcher had informed the engineer and the conductor of ENPI-6X that he was holding a westbound train on the No. 2 track at CP Salts for three eastbound trains. Train ENPI-6X had met only two eastbound trains and the second of those had been met so near CP Salts that a westbound train could not have departed CP Salts and

have cleared at CP Apollo, 14.4 miles west. Further, the dispatcher had told the conductor of ENPI-6X that he would hold ENPI-6X at CP Salts until OIPI-6 had cleared at CP Apollo so he could display an illuminated "C" light for train ENPI-6X.

The conductor indicated that he stood beside the control stand for most of the distance between Conpit and CP Blair. In his sworn testimony to the Safety Board investigators, the engineer said the conductor returned to the fireman's seat after he returned to the operating position following his break. Although the conductor of train ENPI-6X maintains that he was not operating the locomotive, the Safety Board strongly suspects that he was operating the train as it moved from CP Blair to the point of collision. The engineer's statement that the conductor continued to operate the train during his second interview with the FRA investigator is consistent with this view. Since the engineer had been off duty only 8 hours 50 minutes during which time he had to eat, attend to personal chores, and rest before reporting for duty at 6:40 a.m. on February 26, he may not have had sufficient rest. It is quite possible he may have been relaxing while the conductor continued to operate the train and was inattentive to what was going on. The conductor of train OIPI-6 saw only one man in the operating compartment of train ENPI-6X and that person was in the engineer's seat. If the conductor had been standing beside the control stand as he said originally in his deposition, or if both men had been standing by the control console, they should have been visible to the conductor of train OIPI-6. The conductor of OIPI-6 would probably have had a difficult time seeing a man on the fireman's side because of the track curvature and the presence of the eastbound train. The testimony of the engineer of train ENPI-6X indicates that he was on the fireman's side as he told the FRA investigator during the March 19 interview. This gives credence to the engineer's statement to the FRA investigator and casts suspicion on the conductor's testimony that the two men were standing beside the control stand. As noted earlier, the conductor of train ENPI-6X left the locomotive by the door to the rear of the engineer's position. This would have been logical had he been on that side of the operating compartment and operating the locomotive. The engineer's March 19 statement also corroborated this point.

In the testimonies of the conductor and engineer, they indicated that they believed train ENPI-6X would stop before it struck the standing train. Undoubtedly, the 0.3 percent descending grade caused the inexperienced conductor to misjudge the movement of the train and when he applied the brakes in emergency, the available stopping distance was insufficient.

The Safety Board has investigated four major accidents 6/ in addition to the one at Saltsburg, Pennsylvania, in which an unqualified/unauthorized person was known to be operating the locomotive, or evidence indicated that such an individual was operating the locomotive. Four of the five accidents were rear-end collisions.

---

6/ Railroad Accident Report--"Rear End Collision of Consolidated Rail Corporation Freight Trains ALPG-2 and API-2, near Royersford, Pennsylvania, October 1, 1979" (NTSB-RAR-80-2); Railroad Accident Report--"Rear End Collision of Louisville and Nashville Railroad Company Trains No. 586 and Extra 8072 North, near New Johnsonville, Tennessee, December 28, 1981" NTSB-RAR-82-4); Railroad Accident Report--"Derailment of Central Gulf Railroad Freight Train Extra 9629 East (GS-2-28) and Release of Hazardous Materials at Livingston, Louisiana, September 28, 1982" (NTSB-RAR-83/05); and Railroad Accident Report--"Rear End Collision of Seaboard System Railroad Freight Trains Extras 8051 North and Extra 1751 North, Sullivan, Indiana, September 14, 1983" (NTSB-RAR-84/02).

When a crewmember other than the locomotive engineer rides the front end of a train regularly, there is the temptation that because of familiarity with the operation of the locomotive that person believes he is qualified to relieve the engineer at times. However, the operating responsibility of a locomotive engineer cannot be safely placed in the hands of inexperienced crewmembers.

The Safety Board believes it is hazardous for unqualified/unauthorized persons to operate locomotives/trains. The railroad industry needs to resolve the problem of providing competent relief for engineers while they attend to personal needs or if they become incapacitated. This lack of a qualified relief person for the engineer has been compounded since firemen were eliminated from the enginecrew. Therefore, as a result of previous investigations involving operation of locomotives by unauthorized persons the Safety Board will be researching this problem more extensively and, if necessary, make appropriate recommendations concerning the problem.

The Safety Board recognizes the right of railroad management to interpret operating rules definitively as they apply to a particular property. A Conrail Supervisor of Operating Rules in testimony to Safety Board investigators said that train OIPI-6 was not required to provide flag protection because rule No. 99 provided for an exception. He indicated that since the rear of train OIPI-6 was protected by at least two automatic block signals (the interlocking home signals at CP Alum and CP Blair) flagging was not required. The Safety Board questions, however, whether his interpretation is consistent with the intent of rule No. 99 or whether it is a postaccident rationalization. Based on the Conrail Supervisor's interpretation, if the cab signals on a locomotive are operative then the CS points provide the two automatic block signal protection. However, if the locomotive cab signals are inoperative or a locomotive is not equipped then the last two CP home signals become the two automatic block signals called for in rule No. 99. Since the CP interlocking home signals are merely the authority to pass through the interlocking, it does not seem reasonable to establish home signals several miles apart as adjacent wayside signals for flagging purposes.

According to the interpretation of the rules by the Supervisor of Operating Rules, when cab signals are inoperative or in the case of a nonequipped locomotive, the CP interlocking home signal should be treated as a wayside block signal. In actuality, however, the railroad between CPs is subdivided into blocks by the CS locations which simulate wayside signal locations. An engine crew, without the benefit of wayside block signals placed at normal stopping intervals or operative cab signals, is at a disadvantage in approaching a standing train, even though the train should be moving prepared to stop. Such an interpretation could be confusing to operating personnel as it was to this traincrew. Conrail should take action to clarify the confusion.

As an alternate move to the one that was made, the Safety Board believes that the train dispatcher could have held train ENPI-6X at CP Blair since he proposed to hold train ENPI-6X at CP Salts anyway until a "C" light could be displayed at that location. Also, the train ahead could have been notified that the following train had inoperative cab signals and, in such an instance, the conductor of train OIPI-6 could have provided flag protection as prescribed by rule No. 99 even though it was not required. The Safety Board is aware that train ENPI-6X was on the No. 1 track approaching CP Blair which may have presented a problem, but the eastbound trains could have been diverted to the No. 2 track, or ENPI-6X could have crossed over onto the No. 2 track and then stopped by radio command.

Even though the dispatcher had advised the enginecrew of train ENPI-6X of the planned move, there still was an accident. The operating problem on the main line, which required the diversion of traffic onto the Conemaugh Line, apparently compounded the problem of moving trains between CP Apollo and CP Blair while the No. 2 track was blocked between those two locations with stored cars. Fundamentally, the practice of temporarily storing cars on a main track when it is otherwise available for service, is not a good operating practice. Had the track been removed from service, a general order would have been issued to operating crews to advise them of such a change and they would not have expected the track to be available. However, in this instance, the stored cars on the No. 2 track created a situation which may have contributed to the accident. If the No. 2 track had not been blocked, the impediment to traffic movement would not have developed and the circumstances for the accident would not have been present. A person reacts spontaneously to emergencies but differently to unusual moves caused by controlled circumstances; storing cars on the No. 2 track was a condition that occurred only occasionally and, thus, created an unusual situation for the traincrews and dispatcher. On the Conemaugh Line this becomes especially significant because the same crews do not operate over the Conemaugh Line on a daily basis.

The Safety Board has reservations concerning the operation of trains by rule No. 299. It believes that the provision of rule No. 299 that allows a train with inoperative cab signals or a train that is not equipped with cab signals to move past a CP home signal when the "C" light cannot be displayed because a train is in the block ahead does not provide an adequate margin of safety. Under these circumstances, a following train receives no indication of the location of a train until it is in sight. The Safety Board also takes exception to displaying a signal for a higher speed through the interlocking than is permissible beyond the interlocking and between CP locations. The engineer said that he understood the indication of the medium clear signal displayed for his train at CP Blair, which allowed him to move at medium speed (30 mph) through the interlocking, but he also believed it was the authorized speed between the CP locations. This belief is consistent with the speed at which the train was operated between CP Blair and the point of impact.

The Safety Board is aware that since the accident at CP Salts, Conrail has changed its operating procedures for moving a train with an inoperative cab signal past a CP when the "C" light cannot be given so as to eliminate a proceed signal and to require positive action by the engine crew in order to proceed. However, at the time of the accident, the medium clear signal aspect that was displayed for train ENPI-6X at CP Blair was intended to be good only through the interlocking. However, it allowed the train to proceed at medium speed (not exceeding 30 mph through the interlocking) beyond the interlocking because it did not indicate that the speed had to be reduced to restricted speed (not exceeding 15 mph) once the train was through the interlocking. The procedure previously in effect was confusing, as discussed earlier, because it could be interpreted by the crew that they could operate at medium speed to the next CP, as, in fact, was done in this instance according to the engineer.

With the recent change in operating procedures, the signal is not changed to proceed when the "C" light cannot be displayed. The signal is maintained at stop and Conrail Form CT-401 (see appendix E) must be issued to the traincrew to give the engineer permission to pass a signal displaying a stop aspect. Accordingly, the train must be brought to a stop before it can move past the stop signal. The CT-401 also informs the engineer that he must operate at restricted speed. Further, the restricted speed rule has been changed so

that now the train must be operated at a speed so as to enable the engineer to stop within one-half the range of vision but not exceeding 15 mph. The Safety Board is pleased to learn of these changes in rule No. 299 and the restricted speed rule.

The Safety Board believes that the operation of trains over the Conemaugh Line is somewhat unique because there are no wayside signals, and that more emphasis should be placed on rules Nos. 559 and 299 in training and rules classes. Operating personnel who do not operate over the Conemaugh Line frequently need to be more familiar with these pertinent rules and their application in operating procedures on the Conemaugh Line. There is a need for management to have more positive assurance that employees are familiar with the territories over which they operate, and any operating procedures peculiar to that territory. This becomes especially important with operating personnel transferring onto new seniority districts because of realignments resulting from railroad company mergers or reorganization within a company. These employees need to be familiar with the rules and their application on their new districts. A special qualifying class should be given to transferred people before they are considered as qualified over the Conemaugh Line. During its investigation of other railroad accidents, 9/ the Safety Board has found that railroad employees who can pass an operating rules examination with a good grade, still may not know the meaning of the rules in their application. Railroad management needs to check on the aspect of training and rules examinations to evaluate whether or not that operating personnel know how to apply the rules to operating requirements.

## CONCLUSIONS

### Findings

1. The wayside cab signal signalling equipment was not a factor in the accident.

2. The failure of the cab signal equipment was not proved conclusively in the postaccident tests; since, however, train ENPI-6X was being operated under procedures applicable when there is a cab signal failure on a locomotive (or the locomotive is not equipped with cab signals) a failure would not have been a factor in the accident.

3. The brakes of train ENPI-6X were not defective and if the train had been moving at restricted speed, it could have been stopped short of a collision.

4. The preponderance of the evidence indicates that the conductor was operating the train at the time of the collision.

5. The conductor and engineer were not sure of the requirements of the operating rules pertaining to operation over the Conemaugh Line with inoperative cab signals.

6. According to the speed tape, the train was operated between Conpit and Salts in excess of the 15-mph maximum speed authorized by the restricted speed rule.

---

9/ Railroad Accident Report--"Head-on Collision of Amtrak Trains Extra 769 East and No. 195, Bristol, Pennsylvania, March 29, 1982" (NTSB-RAR-82-5).

7. Train ENPI-6X was required to be operated by the restricted speed rule between CPs Blair and Salts.

8. Eastbound train TV-12M restricted the view of the engine crew of ENPI-6X to the caboose of train OIPI-6 because of the curvature of the railroad.

9. The accident could have been avoided if train ENPI-6X had been held at CP Blair to await a clear block to CP Salts instead of allowing it to advance to CP Salts in an occupied block.

10. In the absence of operable cab signals, engine crews have no positive means of distinguishing the signal blocks on the Conemaugh Line .

11. If flag protection had been provided by train OIPI-6, the accident would probably have been avoided.

**Probable Cause**

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the engineer and the conductor to operate and stop train ENPI-6X in compliance with the restricted speed rule.

## RECOMMENDATIONS

As a result of its investigation of this accident, the Safety Board recommended that the:

--Consolidated Rail Corporation:

Where rule No. 299 is applicable and the "C" light cannot be displayed, hold trains that are not equipped with cab signals or that have inoperative cab signals at a control point until the intervening block to the next control point is clear, instead of allowing trains to close up. (Class II, Priority Action) (R-85-19)

In locations where rule No. 299 is in effect, inform the crew of the lead train when a following train is not equipped with cab signals or has an inoperative cab signal. (Class II, Priority Action) (R-85-20)

**BY THE NATIONAL TRANSPORTATION SAFETY BOARD**

/s/ JIM BURNETT
Chairman

/s/ PATRICIA A. GOLDMAN
Vice Chairman

/s/ G. H. PATRICK BURSLEY
Member

January 8, 1985

# APPENDIXES

## APPENDIX A

## INVESTIGATION

1. Investigation

The National Transportation Safety Board was notified of the accident by the National Response Center at 5 p.m., on February 26, 1984.

2. Depositions

The Federal Railroad Administration and Conrail were dsesignated as parties to the investigation and cooperated in the investigation. The Safety Board staff took sworn testimony from four witnesses on June 26, 1984.

## APPENDIX B

## TRAIN CREW INFORMATION

Engineer of Train ENPI-6X

James W. Lang, 61, was first employed by the Pennsylvania Railroad on July 20, 1942, as a locomotive fireman. He was promoted to engineer on September 14, 1945. He is qualified on the Conrail Rules of the Transportation Department as required by the company. He passed his last operating rules and airbrake examination on February 26, 1982. His last medical examination was on March 25, 1982. His service record indicated only a minor violation relating to handling of a steam locomotive in which he was censored for excessive smoke.

Conductor - Train ENPI-6X

Charles H. Hazlett, 52, was first employed by the Pennsylvania Railroad on October 2, 1952, as a brakeman. He was promoted to freight conductor in August 1977. He is qualified on the Conrail Rules of the Transportation Department as required by the company. He passed his last operating rules examination during 1983, his last airbrake equipment examination on February 14, 1982, and his last medical examination on November 31, 1982.

Conductor - Train OIPI-6

Donald N. Monnin, 46, first was employed by the former Erie Lackawanna as a trainman on June 6, 1959. He was promoted to conductor during 1966. He is qualified on the Conrail Rules of the Transportation Department as required by the company. He passed his last operating rules examination on September 9, 1983, his last air brake examination on December 4, 1980, and his last medical examination on December 4, 1980.

## APPENDIX C

## TRAIN CONSIST INFORMATION

Train No. OIPI-6

Locomotive Units: 6311, 6241, and 6510
Cars: 44 loaded cars, 85 empty cars
Tonnage: 6,054 tons
Crew: one engineer and one head brakeman on locomotive;
one conductor on Caboose
On Duty 7:30 a.m., February 26, 1984
Hazardous Materials: 13 cars properly spaced; none involved in the derailment, except tank car RAIX 6412 which was loaded with a flammable liquid

Train No. ENPI-6X

Locomotive Units: 3317 and 2730
Cars: 15 loaded cars, 56 empty cars
Tonnage: 2,974 tons
Crew: one engineer and one conductor on locomotive;
one rear brakeman on caboose
On Duty 6:40 a.m., February 26, 1984
Hazardous Materials: None

Train No. TV-12-M

Locomotive Units: 6255, 6265, and 6305
Cars: 59 loaded cars, and 1 empty car
Tonnage: 4,200 tons
Crew: one engineer and one head brakeman on locomotive;
one conductor on caboose
On Duty 11:30 a.m., February 26, 1984
Hazardous Materials: 3 cars properly spaced; none involved in the derailment. However, a trailer involved in the fire contained methylene chloride UN 1593, and flammable printing ink UN 1210.

# APPENDIX D

## OPERATING RULES

DEFINITIONS

### PILOT

PILOT: A qualified employee assigned to a train or other on-track equipment when the engineer, conductor or driver is not qualified on the physical characteristics or rules of the portion of the railroad over which movement is to be made

### SIGNALS

FIXED SIGNAL: A signal of fixed location including such signals as switch, train order, block, block-limit, interlocking, speed signs, stop signs, yard limit signs, or other means for indicating a condition affecting the movement of a train or engine

ASPECT: The appearance of a fixed signal conveying an indication viewed from the direction of an approaching train; the appearance of a cab signal conveying an indication viewed by an observer in the engine control compartment

INDICATION: The information conveyed by the aspect of a signal

SIGNAL MAST: The upright supporting a signal

BRACKET POST: An upright with a crosspiece, on top of which is placed one or more masts

REAR OF A SIGNAL: The side of the signal from which the aspect is viewed

ADVANCE OF A SIGNAL: The side of the signal opposite from which the aspect is viewed

BLOCK SIGNAL A fixed signal, or hand signal in the absence of a fixed signal, at the entrance of a block to govern use of that block

### SPEEDS

NORMAL SPEED The maximum speed authorized by Timetable

LIMITED SPEED: Not exceeding 40 miles per hour

MEDIUM SPEED Not exceeding 30 miles per hour

SLOW SPEED Not exceeding 15 miles per hour

RESTRICTED SPEED A speed which will result in stopping short of train, obstruction, or switch improperly lined, looking out for broken rail and not exceeding 15 miles per hour

REVISED RESTRICTED SPEED RULE

**CONSOLIDATED RAIL CORPORATION**

**CENTRAL REGION**

**Pittsburgh, Pa , June 11, 1984**

**GENERAL ORDER NO. 244**

**Effective 12 01 A M., Sunday, June 24, 1984**

**Applies in All Divisions**

**(a) RULES OF THE TRANSPORTATION DEPARTMENT**

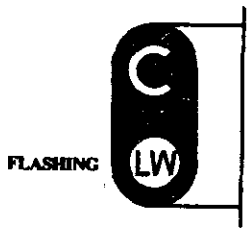
**Definition of Restricted Speed revised as follows:**

**RESTRICTED SPEED: A speed which will permit stopping within one-half the range of vision, which will result in stopping short of train, obstruction or switch improperly lined, looking out for broken rail and not exceeding 15 miles per hour**

← Restricted Speed Rule in effect on February 26, 1984 (Effective September 26, 1982)

APPENDIX D

**Rule 299**




**INDICATION: Trains or engines without operative cab signals must proceed on fixed signal indication, not exceeding 79 MPH, and approach next interlocking signal prepared to stop.**

**NAME: Clear to Next Interlocking**

**NOTE: LW indicates Lunar White**

**99.** Except in territories where automatic block signal system or traffic control system rules are in effect, and except when the rear of the train is protected by at least two block signals or when operating under manual block signal system rules or when the rear of the train is within interlocking or yard limits a crew member must provide flag protection against following trains on the same main track as follows:

When flag protection must be provided, a crew member with flagman's signals must immediately proceed in the proper direction, at least the distance prescribed, and place two torpedoes on the rail of the track to be protected, not less than 100 feet apart and display one lighted fusee Flagman may then return one half the distance to his train where he must remain until a following train has been stopped or until he has been recalled

Crew members must provide flag protection in the proper direction as determined by the maximum authorized speed for the track to be protected, (within the distance required for protection, including slow order limits) as shown in the Table beow:

| MAXIMUM AUTHORIZED SPEED (MPH) | MINIMUM DISTANCE IN YARDS REQUIRED FOR PROTECTION |
|---|---|
| 70 to 110 | 4,200 |
| 60 | 3,600 |
| 50 | 2,600 |
| 40 | 1,700 |
| 30 | 1,000 |
| 20 | 500 |
| 15 | 350 |
| 10 | 250 |

When a train is seen or heard approaching before the flagman has reached the prescribed distance, he must immediately place two torpedoes on the rail, display one lighted fusee and continue toward the approaching train giving Stop Signals

When recalled, flagman must leave one lighted fusee, and while returning to his train he must also place single lighted fusees at intervals not exceeding the burning time of the fusee

When the train departs a crew member must leave one lighted fusee, and until the train attains a speed not less than one half the maximum authorized speed (including slow order limits) for that territory, he must drop off single lighted fusees at intervals not exceeding the burning time of the fusee.

Crew members providing flag protection must not permit other duties to interfere with the protection of their train The conductor and engineer are responsible for protection of their train

REVISED RULE 559

**CONSOLIDATED RAIL CORPORATION**

**CENTRAL REGION**

**Pittsburgh, Pa , April 16, 1984**

**GENERAL ORDER NO. 242**

**Effective 12 01 A M., Sunday, April 29, 1984**

**Applies in All Divisions**

**Applies in Pittsburgh Division**

(d) **CAB SIGNALS**
***CONEMAUGH LINE***
**RIVER BRANCH**

In territory where Rule 559 is in effect the movement of trains and engines not equipped with Cab Signal apparatus or equipped with Cab Signals but not in operative condition must not be made except:

(1) When authorized by fixed wayside signal displaying Rule 299 "Clear to Next Interlocking" signal, train may proceed on signal indication to next interlocking signal

(2) When authorized by train order and fixed wayside signal, train may proceed at Normal Speed, not exceeding 79 miles per hour, prepared to stop at all interlocking signals

(3) By permission of the train dispatcher, or operator when authorized by the train dispatcher, as prescribed by Rule 706 or 723, for the movement to be made at Restricted Speed The Cab Signal apparatus must be de-energized The train dispatcher or operator must not display a signal for movement to the track specified in the CT 401

Special Instruction 1559-A2 addded Page 208, revised

# CAB SIGNAL SYSTEM

NOTE: Rules 550 to 561 inclusive will be effective in territory designated by Timetable Special Instructions

**550.** The Cab Signal System apparatus on the engine must be tested at least once in each 24 hour period except when a single trip exceeds 24 hours, in which case the original test shall be valid for the entire trip The test must be made prior to departure of an engine from its initial terminal to determine if apparatus is in service and functioning properly When Cab Signal apparatus is cut-out or deenergized after departure test has been made, it must be tested again prior to entering equipped territory

When test of the Cab Signal System apparatus is made by an employee other than the engineer, the prescribed form stating that engine has been tested must be filled out in its entirety and accompany engine to its final terminal The engineer, when taking charge, must assure himself that Cab Signal System apparatus is energized and that the audible indicator will sound when acknowledging device is operated If the Cab Signal System has been deenergized or audible indicator fails to sound when the acknowledging device is operated, the engineer must inform the train dispatcher and must not enter equipped territory

When departure test cannot be made due to failure of test equipment, engine may be dispatched, provided the inbound operating test indicated that Cab Signals were functioning properly, and that defects which existed, if any, have been corrected and the proper record made The prescribed form will then be used and signed by the enginehouse foreman or his representative who must also notify the outbound engineer of the complete details

A departure test of the Cab Signal System apparatus is required as follows:

(a) On single unit engine equipped for operation in both directions, test must be made for operation in each direction

(b) On engine consisting of two or more units, test must be made from front end of leading unit and rear end of trailing unit

(c) When test equipment is not available at a point where an intermediate unit will be required to become a lead unit, such unit must be tested at the initial terminal and the prescribed form completed by an authorized employee and placed on the engine

When circumstances make it necessary to operate an equipped unit from an end that had not been given a departure test, the Cab Signals must be considered as not in operation, and Rule 554 must be observed

**551.** The Cab Signal System is interconnected with the block signal system so that the Cab Signal must conform with the fixed signal indication within eight seconds after the engine passes fixed signal governing the entrance into the block in the direction for which the track and engine are equipped Engineer will be governed as follows:

(a) When Cab Signal and fixed signal indications conform when entering the block and conditions affecting movement of train in the block change, the Cab Signal will govern

(b) When Cab Signal indication changes to Restricting, the engineer must take immediate action to operate train at Restricted Speed

(c) When Cab Signal indication changes from Restricting to a more favorable indication, speed must not be increased until train has moved a distance equal to its length

(d) If Cab Signal indication authorizes a speed different from that authorized by the fixed signal when the train entered the block, the lower speed will govern The engineer must notify the train dispatcher or operator by radio or by message as soon as possible without delaying the train, giving location and track on which nonconformity occurred

(e) When Cab Signal indication "flips" (momentarily changing indication and then returning to original indication), engineer will by radio, or as soon as possible without delaying the train, forward a message in the following form to the train dispatcher

> Cab Signal flipped from (*state indication*) to (*state indication*) on No ____ track at (*signal or MP No* ); or, between (*designate points if multiple occurrence*).

When the "flip" holds indication for a duration which required Cab Signals be acknowledged, engineer must so state when reporting occurrence

(f) The Cab Signal apparatus will be considered as having failed when:

(1) The audible indicator fails to sound when the Cab Signals change to a more restrictive indication

(2) The audible indicator continues to sound although the Cab Signal change was acknowledged and speed of train has been reduced to speed required by the Cab Signal indication

(3) The Cab Signal fails to conform at two fixed signal locations in succession

(4) The Cab Signal displays "Restricting" while approaching a fixed signal displaying "Approach" or more favorable aspect, and the Cab Signal fails to conform after passing fixed signal

(5) Damage or fault occurs to any part of the Cab Signal apparatus

When Cab Signal apparatus has failed, or has authorized a speed greater than authorized by the fixed signal, the train will proceed governed by Rule 554 The engineer must notify the train dispatcher or operator by radio; when unable to report by radio, details must be rendered at first point of communication where stop can be made without excessive delay Upon arrival at the engine terminal, the engineer must advise the foreman or his representative and make written report on the prescribed form

When the Cab Signal apparatus has failed, the audible indicator may be cut-out if it continues sounding after being acknowledged

(g) Cab Signals will not indicate conditions ahead when engine is

(1) Moving against the current of traffic except as provided in the Timetable Special Instructions

(2) Pushing cars

(3) Not equipped with Cab Signal apparatus for backward movements and is running backward

**552.** When the Cab Signal portion of the wayside signal system is inoperative, the train dispatcher or operator when authorized by the train dispatcher must so notify the engineer and designate the limits of the area affected The Cab Signal apparatus of the engine must not be deenergized or cut-out during movement through designated limits Movement shall be governed by fixed signal indications, but not exceeding 40 miles per hour, unless authorized to proceed as provided in Rule 556.

Normal operation may be resumed only after engineer has ascertained that Cab Signals have conformed to two fixed wayside signals in succession immediately beyond the designated limits specified If the Cab Signals do not conform to the first two wayside signals immediately beyond the designated area, they must be considered to have failed, and Rule 554 must be observed

**553.** When a train from another division or a connecting railroad has been given authority to operate non-equipped, the engineer must advise the train dispatcher or operator who controls movements before that train enters a new division

**554.** The movement of a train equipped with Cab Signals not in operative condition for direction of movement is prohibited, except when Cab Signal failure occurs after leaving initial terminal The train may then operate at a speed not exceeding 40 miles per hour, governed by fixed signal indications The train dispatcher must be advised as soon as practicable

When instructed by the train dispatcher, or operator when authorized by the train dispatcher, as prescribed by Rule 706 or 723, the train will proceed as provided in Rule 556

**555.** The movement of a train not equipped with Cab Signals is prohibited except at locations listed in Timetable Special Instructions.

The movement of a train not equipped with Cab Signals may be made at a speed that will permit stopping short of another train or obstruction, but not exceeding 20 miles per hour, and must be governed by fixed signal indications When instructed by the train dispatcher, or operator when authorized by the train dispatcher, as prescribed by Rule 706 or 723, the train may proceed as provided in Rule 556.

**556.** As prescribed in Rule 554 or 555, when instructed by the train dispatcher, or operator when authorized by the train dispatcher, as prescribed by Rule 706 or 723, a train may proceed at Normal Speed, not exceeding 79 miles per hour, and governed by fixed signal indications Before authorization can be granted, the train dispatcher must know that the route is clear to the next interlocking and that no train has been given permission or a signal to enter or foul that track Absolute block must be established in advance of the train between each interlocking or open block station

**557.** When the Cab Signal System apparatus has failed, the apparatus shall be considered inoperative until repaired Authority given to an engineer by the train dispatcher for movement of his train by either Rule 554 or 556 will remain in effect for the entire trip. Train dispatcher must notify dispatchers of adjacent territories, divisions or other railroads of such orders issued to a train.

**558.** Train dispatcher must record on the record of train movements, the movement of trains with inoperative Cab Signals and the movement of any train that is not equipped with Cab Signals Where Cab Signal System rules are in effect, operators must make a record of all such moves on the station record of train movements and indicate those movements given authority to operate as provided in Rule 556

In the application of Rule 552, the train dispatcher and operators involved must record the limits of the affected area and indicate those movements authorized to operate as provided in Rule 556

**559.** In territory where Cab Signals are used without fixed automatic block signals, the movement of a train

(1) Not equipped with Cab Signal apparatus,

(2) Equipped with Cab Signal apparatus but not in operative condition, or

(3) Equipped with Cab Signal apparatus which has failed after leaving initial terminal

must be made at Restricted Speed except

(1) When authorized by fixed wayside signal displaying Rule 299 "Clear to Next Interlocking" signal train may proceed on signal indication to next interlocking signal

(2) When authorized by train order and fixed wayside signal, train may proceed at Normal Speed, not exceeding 79 miles per hour, prepared to stop at all interlocking signals

Before permitting a train to pass an interlocking signal when the train has been authorized by train order to proceed at Normal Speed, not exceeding 79 miles per hour, the train dispatcher or operator in control must know by means other than panel board indication lights that the route is clear to the next interlocking and that no train has been given permission or a signal to enter or foul that track

**560** Engineers, in addition to verbally reporting ' flips," failures, nonconformities and other unusual occurrences of Cab Signal System apparatus as required by the rules, must report all such occurrences on the prescribed form

**561.** When the unit from which the train will be controlled is equipped with Cab Signals and not Speed Control or Train Control, the engineer must advise the conductor and other members of the crew before starting trip When the Train Control or Speed Control apparatus fails or is cut-out enroute, the engineer must notify the fireman, conductor and other members of the crew as soon as possible without causing delay to the train The train or engine may proceed governed by Cab Signal and fixed signal indications Engineer must report failure of Train Control or Speed Control to train dispatcher or operator by radio and at the final terminal render written report

When the unit from which the train is being controlled is equipped with Cab Signals but not Speed Control or Train Control, or when the Train Control or Speed Control is known to be inoperative, the members of the crew must immediately communicate with the engineer if the audible indicator sounds for longer than six seconds

APPENDIX D

FORM C

Amtrak

FORM C

AMTRAK—NORTHEAST CORRIDOR
CLEARANCE PERMIT

Station F Date 7-23-84

Train EXTRA Engine No 740

Direction EAST On Track TWO

(For extra train show direction) _____

Track Car No _____ and ____ additional pieces

Direction _____ On Track _____

**Signal cannot be cleared:**

1. (FOR BLOCK SIGNAL)—Proceed into the block, as though _____ signal were displayed

2. (FOR INTERLOCKING SIGNAL)—Proceed from _____ track to _____ track, as though restricting signal were displayed

3. (FOR STOP-SIGNAL, REFERRED TO IN RULE 509)

Proceed at _____, as though Stop-and-proceed signal were displayed

Rosemond Operator

Time Effective 1125 Am

The Train Dispatcher or the Operator, when authorized by the Train Dispatcher, will issue this permit to a train or track car to pass a Stop Signal due to signal failure, when signal cannot be displayed for an engine returning to its train, or as required by rules

Train or track car receiving this permit may proceed as directed by the numbered paragraphs that are properly filled out

Operator when issuing this permit will be governed as follows:

Fill out paragraph 1 when signal is a manual block system signal

Fill out paragraphs 1 and 2 when signal is an interlocking signal and also a manual block signal for movement through the interlocking and into the block

Fill out paragraph 2 when signal is an interlocking signal

Fill out paragraph 3 when signal is a Stop-signal as referred to in Rule 509

Paragraph 1 will be used only when block is clear

*Note—When instructed by the Train Dispatcher, Operator or member of the crew will inspect the route to be used*

# APPENDIX E

## CONRAIL C T. 401

CT 401 Rev. 1-82

### Conrail Radio and Telephone Permission Record

| Date | Train, Engine or TC | Location | Name and Occupation of Employee Receiving | Name and Occupation of Employee Authorizing | Time Repeated Correctly |
|---|---|---|---|---|---|
| | | | | | M |

**PERMISSION IS GRANTED TO:**

1. Occupy _____ Track In _____ Direction(s) Between _____ And _____ Until _____ M. BDA _____ M.

   Information: _____

2. Proceed Through _____ Interlocking On _____ Track. BDA _____ M.

3. Pass Block Limit Station(s) _____

   Do Not Report Clear At _____

4. Pass Stop Signal At _____ On _____ Track In _____ Direction.

5. Pass Stop Sign At _____ On _____ Track In _____ Direction At _____ Speed.

6. Reverse Movement On _____ Track Between _____ And _____ As Prescribed By Rule 262 or 327 BDA _____ M.

7 Proceed With Inoperative Cab Signals Between _____ And _____ As Prescribed By Rule 556.

*U.S. GOVERNMENT PRINTING OFFICE: 1985 0-461-126/10069