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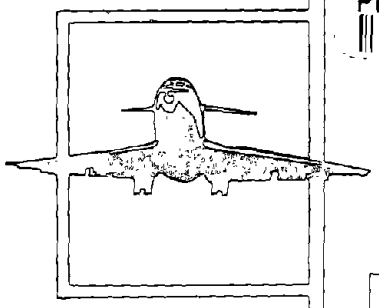

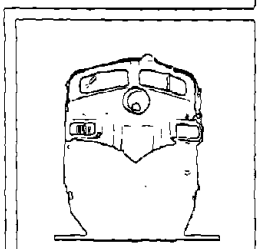

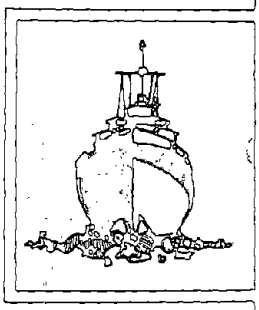

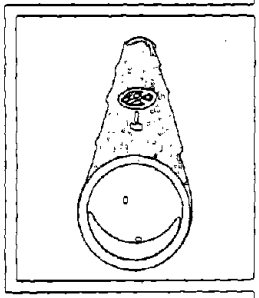

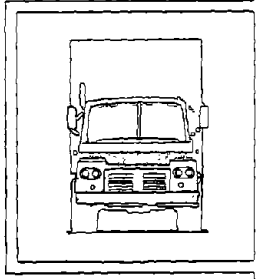

NATIONAL TRANSPORTATION SAFETY BOARD

PB82-917001

WASHINGTON, D.C. 20594

RAILROAD/HIGHWAY ACCIDENT REPORT

MILLER TRANSPORTERS INC., TRACTOR CARGO TANK-SEMITRAILER/SOUTHERN RAILWAY SYSTEM FREIGHT TRAIN COLLISION AND FIRE
HUNTSVILLE, ALABAMA
SEPTEMBER 15, 1981

NTSB-TSR-RHR-82-1

UNITED STATES GOVERNMENT

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15. Supplementary Notes

16. Abstract

At 9:00 a.m. e.d.t., on September 15, 1981, a northbound truck tractor-cargo tank semitrailer loaded with 8,986 gallons of gasoline was struck by a westbound freight train at a railroad/highway grade crossing on Jordan Lane in Huntsville, Alabama. The gasoline cargo escaping from the ruptured cargo tank splashed over the locomotive and four passenger cars, that had stopped north of the track to await the train's passage, and ignited. At the time, the crossing warning red lights were flashing and the bell was ringing; the train lights were illuminated, its bell was ringing, and its whistle was sounding. Five persons were killed, two persons died later as a result of their injuries, and four of five train crewmembers were injured.

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the truckdriver to comply with the activated crossing warning signal and Federal regulations and company rules that require hazardous materials carriers to stop at all nonexempt railroad crossings to determine if it is safe before crossing the tracks. Contributing to the severity of this accident and loss of life was the rupture of the cargo tank and the rapid spread of the burning gasoline around the victims' cars which were stopped directly in the path of the spreading gasoline.

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NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C. 20594

RAILROAD/HIGHWAY ACCIDENT REPORT

Adopted: March 9, 1982

MILLER TRANSPORTERS, INC., TRACTOR, CARGO TANK SEMITRAILER/SOUTHERN RAILWAY SYSTEM FREIGHT TRAIN COLLISION AND FIRE HUNTSVILLE, ALABAMA SEPTEMBER 15, 1981

SYNOPSIS

At 9:00 a.m. c.d.t., on September 15, 1981, a northbound truck tractor-cargo tank semitrailer loaded with 8,986 gallons of gasoline was struck by a westbound freight train at a railroad/highway grade crossing on Jordan Lane in Huntsville, Alabama. The gasoline cargo escaping from the ruptured cargo tank splashed over the locomotive and four passenger cars, that had stopped north of the track to await the train's passage, and ignited. At the time, the crossing warning red lights were flashing and the bell was ringing; the train's lights were illuminated, its bell was ringing, and its whistle was sounding. Five persons were killed, two persons died later as a result of their injuries, and four of five train crewmembers were injured.

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INVESTIGATION

The Accident

At 6:58 a.m. c.d.t., 1/ on September 15, 1981, a 1973 International Harvester truck tractor, towing a 1980 Fruehauf cargo tank semitrailer 2/ loaded with 8,986 gallons of gasoline, departed the Marathon Oil Company, bulk petroleum storage facility in Birmingham, Alabama, en route to Boone Oil Service Station No. 7 in Huntsville, Alabama. Shortly before 9:00 a.m., witnesses saw the gasoline truck 3/ traveling east on Governor's Drive (Joe Wheeler Highway) in Huntsville. At the time, the sky was overcast, a light rain was falling, and the road was wet. As the gasoline truck arrived at the intersection of Governor's Drive and Jordan Lane, it turned left onto Jordan Lane, proceeded north in the right (curb) lane, and approached the Southern Railway System (SRS) crossing. (See figures 1 and 2.) According to witnesses, at the time, the railroad

1/ All times are central daylight time.
2/ To be referred to as trailer in the report.
3/ Combination of tractor and trailer to be referred to as gasoline truck hereinafter in the report.

crossing warning lights were flashing, the overhead steady red light was illuminated, the crossing warning bell was ringing, and the train whistle could be heard.

A witness in an automobile westbound on Governor's Drive which was stopped by the traffic light at Jordan Lane stated that he saw the gasoline truck approaching the crossing in the right lane and the truck's taillights were on. However, another witness northbound on Jordan Lane said that he did not see the truck stoplights go on, or any apparent slowing of the truck. The witness also said that he believed the driver of the truck was trying to beat the train to the crossing.

The driver of a garbage truck southbound on Jordan Lane stopped at the crossing because the crossing warning lights were flashing and the bell was ringing. He stated that the train was far enough away that he did not believe it to be a hazard, and he proceeded to cross the track. While he was driving southbound between the track and Governor's Drive, the garbage truckdriver noticed the gasoline truck in the northbound curb lane. He said that the driver of the gasoline truck was not slowing but was still accelerating at an estimated speed between 15 and 25 mph and shifting gears, as he passed. The garbage truckdriver said that at the time, the driver of the gasoline truck was looking to the left rear in the direction of the garbage truck as the gasoline truck approached within 10 to 15 feet of the crossing, "and then he didn't have time to stop." Two men standing on the rear of the garbage truck described similar impressions of the movement of the gasoline truck but believed its speed to have been between 35 and 40 mph.

Shortly after 7:00 a.m. at Scottsboro, Alabama, on September 15, 1981, the locomotive engineer and fireman of train No. 81 with a consist of two locomotive units, 23 cars, and a caboose inspected the locomotive units and with other crewmembers made a satisfactory brake test on the train. The train then departed at 7:40 a.m. toward Huntsville. The fireman, operated the train for about 1 mile and then the locomotive engineer took over. According to the traincrew, they operated without problems or unwanted delays.

On arrival at Huntsville, milepost 339, train No. 81 set out one car on a siding and picked up six cars including a hazardous materials car containing liquefied petroleum gas (LPG) which was located 13 cars behind the locomotives in compliance with hazardous materials regulations for car placement. 4/ Shortly before 9:00 a.m., train No. 81 departed milepost 339.

Shortly thereafter, train No. 81 approached Jordan Lane (milepost 341.3-A) from the east. The engineer stated that he was maintaining a speed of about 30 mph. The fireman and brakeman who were in the cab of the locomotive stated they became aware that a gasoline truck, which was about 75 feet south of the crossing, was not going to stop when the locomotive was about 200 feet from the roadway. They shouted a warning to the engineer who was on the opposite side of the cab, and he applied the brakes in the emergency mode. However at 9:00 a.m., the lead locomotive unit struck the right side of the gasoline trailer in front of the trailer's wheels. The lead locomotive unit was derailed as the rear of the gasoline trailer bounced into the air, across the roadway; the locomotive then rerailed. Upon impact, escaping gasoline from the trailer burst into flames. (See appendix C for maps 1 and 2 which show the spread of the burning gasoline within the first minute.)

4/ 49 CFR 174.91

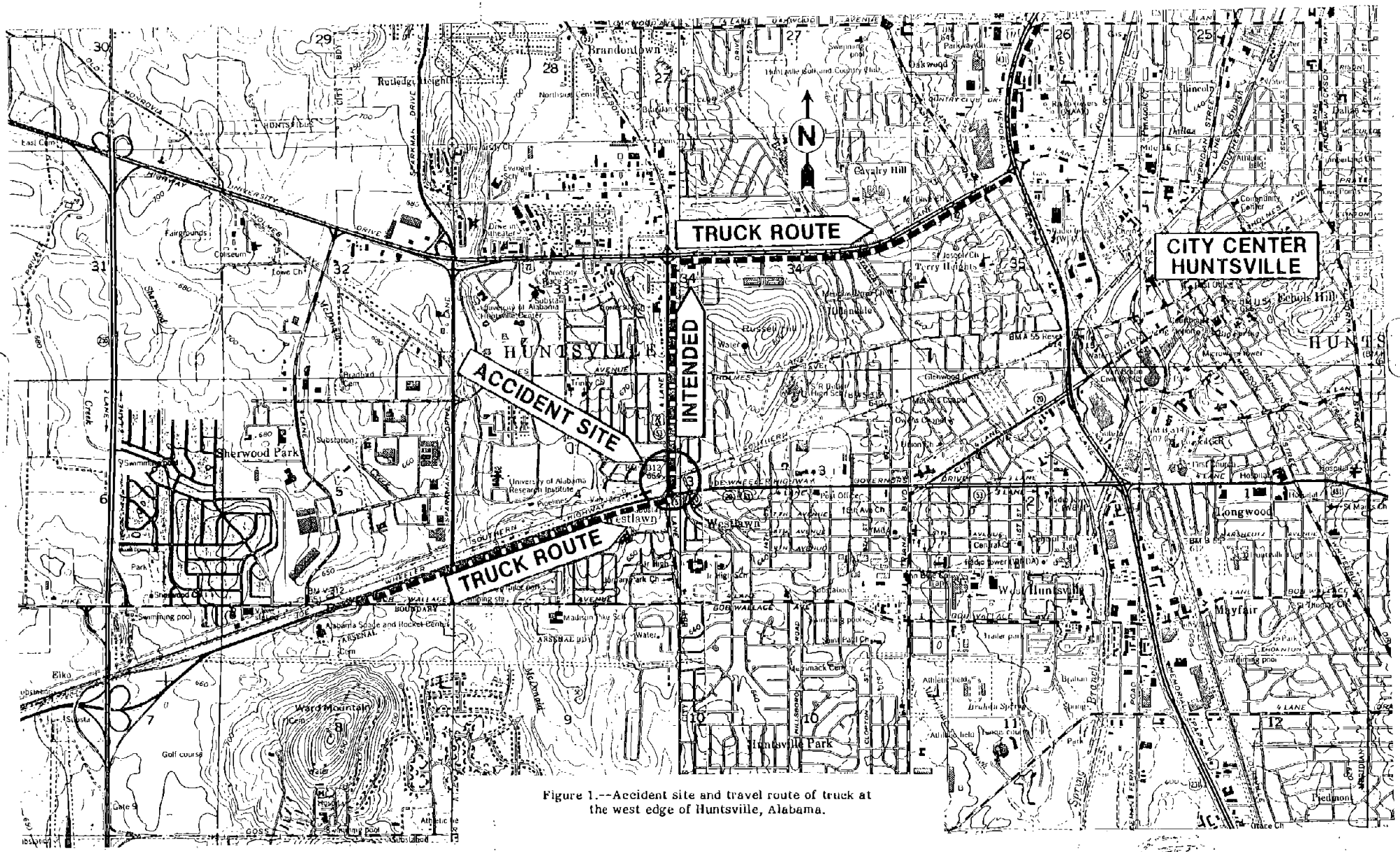


Figure 1.--Accident site and travel route of truck at the west edge of Huntsville, Alabama.

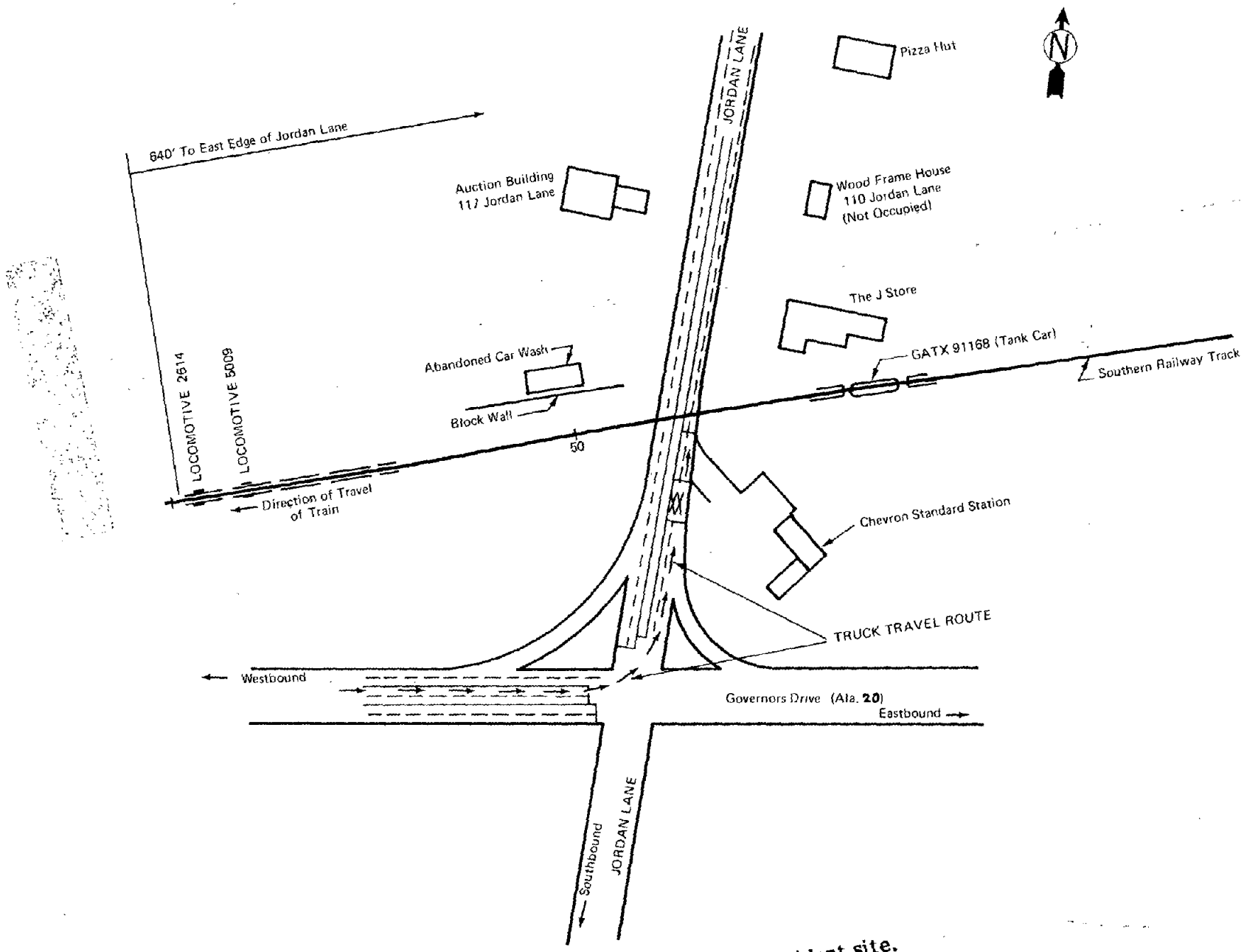


Figure 2.--Accident site.

The tank trailer was torn into two sections. The larger, front, section stayed connected to the truck tractor and came to rest about 80 feet north of the track in the northbound travel lanes of Jordan Lane. The smaller, rear, section was pushed westerly ahead of the locomotive along the track and came to rest at the north side of the track, 140 feet west of the point of impact. The burning gasoline from the ruptured cargo tank spread from the point of impact to the points of rest of the two trailer sections and over the northwest quadrant of the crossing area.

Four southbound passenger cars with six occupants had stopped north of the crossing on Jordan Lane. Two of the cars had stopped in each travel lane within 75 feet of the track in response to the crossing warnings and the approaching westbound train. The escaping gasoline from the trailer sprayed on all four cars and, they were engulfed in flames. All six occupants of the four cars and the gasoline truck driver were able to get out of their vehicles but were engulfed in the fire.

The locomotive was also engulfed in burning gasoline. As the train was slowing down after the impact, the crew jumped from the cab and moved away from the burning locomotive. The locomotive stopped 627.5 feet west of the east edge of Jordan Lane, with the train extending 1,127 feet east of the crossing to the caboose.

Injuries to Persons

Injuries	Drivers	Passengers	Train Crewmembers	Total
Fatal	5	2	0	7
Nonfatal	0	0	4	4
None	0	0	1	1
Total	5	2	5	12

After the fire had been extinguished around the four passenger cars, five of the six vehicle occupants were found a short distance from their respective vehicles. All had suffered fatal burns. An adult female was found at the right rear of the Ford Granada, two adult females were found at the west side of the Chevrolet Citation, an infant was found beside the right door of the Chevrolet Vega, and an adult male was found at the rear of the gasoline truck. The driver of the Chevrolet Vega ran from the fire with his clothing burning and died of burn injuries on September 28, 1981. The truckdriver ran from the fire with his clothing burning and died of burn injuries on September 16, 1981.

The locomotive crew were all injured by the fire or as a result of jumping from the moving train. The engineer required hospitalization for burns to his legs and buttocks. The conductor had burns on his arms and face and required one night's stay in the hospital and additional outpatient treatment. The fireman had several minor burns, and the head brakeman bruised his neck when he jumped from the train. Both the fireman and head brakeman were treated for their injuries and released.

Vehicle Damage

The trailer was crushed and severed as a result of impact with the train locomotive. All combustible materials in the tractor and trailer and most metals with low melting points were consumed by the fire. (See figures 3 and 4.)



Figure 3.--Accident scene north of the crossing looking west, with truck in foreground showing burn damage.



Figure 4.--Southern view of accident site. Damaged passenger cars are at the right and the gasoline truck is at the left edge of the photo.

The remaining portions of the truck were inspected under Safety Board supervision on September 16 and 17 at a local salvage yard. The transmission of the tractor was disassembled and found in the neutral position. The auxiliary transmission was in the neutral position. The tow truckdriver who had moved the remains to the salvage yard stated that he had not manipulated the shift lever.

The steering system components were still properly attached. Rotation of the steering wheel caused appropriate responses at the front wheels.

The tractor's fifth wheel assembly was intact and was equipped with jackknife stop ears on each side. The left ear was twisted downward at the rear. The trailer kingpin was disconnected from the fifth wheel jaws of the tractor but it was still resting on the fifth wheel plate. All 10 tires were burned to various degrees. The top of the left side fuel tank was consumed by fire.

The rear bogie axle type-30 brake chambers were burned but were rebuilt with new pressure plates and diaphragms by the investigation team to facilitate brake adjustment measurements. Slack adjuster travel was tested with 100 psi air pressure; the right side travel was 1 1/2 to 2 1/8 inches, and the left side travel was 2 1/8 inches. (The maximum travel capability is 2 1/2 inches.)

The right rear brake lining was measured and found to be 9/16 to 10/16 inch thick. (A new lining is 3/4 inch.) The remaining linings were similar.

Inspection of the trailer disclosed that more than half of it had been consumed by fire. The forward 20 inches of the right side rear suspension rail was deformed 15 inches toward the left. The left side rail was deformed 5 inches toward the left. Crossmembers between the subframe rails were badly buckled. The forward axle was deformed 12 inches toward the left. The trailer wheels were free of impact damage and all the tires had burned to destruction. It was not possible to determine preimpact adjustment of the trailer brakes because all the brake cam shaft bushings had been consumed by fire.

The fifth wheel upper coupler assembly was still attached to the bottom of the front shell material and the kingpin and jackknife stop pin were in good condition. The lower components of the trailer support legs were deformed approximately 2 to 3 feet toward the right.

Train Damage

When the impact occurred, gasoline from the trailer tank sprayed through the open window on the right side (engineer's side) of the lead locomotive, resulting in a flash fire in the cab. The interior of the cab incurred smoke damage to the paint and engineer's arm rest. The exteriors of both locomotive units were fire damaged and had charred paint on the right side. The lead unit was burned near the battery box on the right side toward the front.

The front end of the lead locomotive sustained impact damage to the left front steps, the pilot (front plate), the front and side grab irons, and the coupler levers, and sheet metal damage to the front hood up to 11.43 feet above the top of the rail which damaged the headlight.

Other Damage

The four passenger cars at the crossing, a 1976 Ford Granada, 4-door sedan; a 1979 Chevrolet, 4-door sedan; a 1981 Chevrolet Citation, 4-door sedan; and a 1974 Chevrolet, Vega 2-door Station Wagon were destroyed by fire.

The asphalt road surface of Jordan Lane was damaged by fire, and several nearby business signs were melted or scorched. A series of gouges and scratches on the road surface north of the crossing began approximately 11 feet north of the track and 12 to 17 feet west of the east edge of Jordan Lane and extended approximately 60 feet north of the track in the northbound lanes, stopping at the area where the tractor and forward section of the trailer came to rest.

Markings on the rail 34 feet east of Jordan Lane indicated that the R-3 and -4 wheels of the lead locomotive unit started to derail within the track, and the rear truck of the locomotive ran on the crossties until it reached the highway crossing timber at the east edge of Jordan Lane, where it rerailed itself on the crossing. The track was kinked and canted outward from gauge.

The railroad warning support post and sign on the northwest corner of the crossing required replacement although the bell continued to ring and a light flashed through the following day. The telephone lines connecting the Huntsville yard to the SRS microwave lines were burned by the fire. Plastic taillight lenses on parked cars were melted, the asphalt surface of a parking lot on the northwest side was damaged, and a pickup truck in the parking lot was partially burned.

Driver Information

The 25-year-old truckdriver held a current Alabama drivers license with no restrictions. He had worked for Miller Transporters, Inc. for 2 years. His personnel file indicated that he had met the requirements of the Federal Motor Carrier physical examination and eye test which were conducted on June 5, 1981. 5/

The company's records indicated that the driver satisfactorily completed a written examination on the Federal Motor Carrier driving regulations on his second attempt on June 6, 1979. On June 26, 1979, after a period of supervised driving for the company, he was given a 100-question written test, in which he answered 90 questions correctly, on company policy and driving regulations. In both tests, the driver correctly answered questions relating to a hazardous materials truck being required to stop at all railroad crossings, the proper stopping distance from the track, and the requirement that a driver shall not shift gears while traversing a railroad crossing. On June 27, 1979, he passed the drivers trainer's check for the proper handling procedures of the truck and product. The driver ordinarily drove the same truck, and he had driven this same route two or three times weekly for the past 2 years.

During his 2-year employment, the driver had been involved in three minor accidents with company equipment. Two of the accidents involved minor contact while maneuvering the truck in restricted spaces, and the driver attributed the third to an approaching vehicle on the wrong side of the road, which forced the driver into a bridge rail which damaged his trailer. Miller Transporters, Inc. believed that the driver had been responsible for each of the accidents, and he received company disciplinary action.

5/ 49 CFR 391.41 - 391.49

A review of the files of the Alabama Department of Drivers License disclosed that the driver had a record of a stop sign violation on January 25, 1980, and a speed violation on August 18, 1980. Both violations occurred while the driver was in a private passenger car; however, he had reported them to his employer, as required.

A review of the driver's logs and on duty hours did not disclose any unusual activity or unusual hours worked during the week preceding the accident and that his hours of duty were in compliance with Federal regulations. 6/

On September 14, the day before the accident, the driver had worked 12 3/4 hours, 9 hours of which he spent driving. According to his wife, he had arrived home in the late afternoon. He spent the evening quietly at home and he went to bed early in the evening. She further stated that he slept well and appeared to be rested when he got ready for work the morning of the accident. He was in good health, was not undergoing any medical treatment, and was not taking any medication. His wife stated that there was no family or job stress.

Train Crew Information

The crew had reported for duty about 7:00 a.m. at Scottsboro, Alabama, after having been off duty for 14 hours 30 minutes (which was sufficient to comply with Federal regulations). 7/ When the train crew reported, they assembled the train for departure to Sheffield.

Four train crewmembers were in the lead locomotive cab:

The locomotive engineer, 37, who was employed as a switchman on December 22, 1970, was promoted to fireman on April 14, 1972, yard engineer on June 30, 1972, and road engineer on April 27, 1976. He had attended an operating rules class in 1981. The engineer satisfactorily passed his last physical examination in August 1978, and his last eye examination in July 1979. The only disciplinary action recorded against him occurred on September 15, 1973, as a result of his damaging a main line switch. At the time of the accident, he was operating the locomotive.

The conductor, 27, who was employed as trainman on April 3, 1976, was promoted to conductor on June 26, 1977. He had attended an operating rules class in 1981. At the time of the accident, he was standing in the center of the lead locomotive, near the engineer's control stand.

The fireman, 27, who was employed as a trainman on January 6, 1978, was promoted to engineer and fireman on February 19, 1980. He had attended an operating rules class in 1981. At the time of the accident, he was seated in the left front seat on the south side of the lead locomotive.

The head brakeman, 31, who was employed as a brakeman on July 14, 1972, was promoted to conductor on January 8, 1976, and relinquished his conductor's seniority on June 17, 1977. He had attended an operating rules class in 1981. At the time of the accident, he was seated in the rear left seat on the lead locomotive.

6/ 49 CFR 395.2
7/ 49 CFR 228-107, Appendix A.

The flagman, 25, who was employed as trainman/flagman on April 18, 1976, had attended an operating rules class in 1981. At the time of the accident, he was in the caboose on the rear of the train.

Vehicle Information

The 1973 (F4270) International Harvester truck tractor was owned by Miller Transporters, Inc. of Jackson, Mississippi. It was a conventional 3-axle unit, serial No. 42747DYB10810, equipped with a 8V71 C-55 Detroit Diesel engine, Fuller RT910, 10-speed transmission with a rear axle ratio of 4.44. The tire size was 11x24.5 and the tare weight was 14,720 pounds. The front axle was not equipped with brakes. The rear axles were equipped with air brakes and type-30 chambers with piggyback spring brakes.

The 1980 Fruehauf cargo tank semitrailer was also owned by Miller Transporters Inc. It was a four compartment, 9,500-gallon aluminum cargo tank, Type MC 306AL, serial No. OMT 001507. The tire size was 11x24.5 and the tare weight was 9,560 pounds. At the time of the accident, the cargo consisted of 8,986 gallons of gasoline weighing 55,533 pounds. The total weight of the combination vehicle was 79,813 pounds. (See figure 5.)

Train Information

SRS train No. 81 was 1,755 feet long and consisted of 2 locomotive units, 8 loaded freight cars, 19 empty freight cars, and a caboose totaling 1,542 trailing tons. The two-unit diesel-electric locomotives were designated as unit Nos. 2614 and 5009; they were coupled in multiple unit control. Both locomotive units were manufactured by General Motors Corporation, Electro-Motive Division. Unit No. 2614, built in 1963 was a GP-30 with 2250 horsepower. Unit No. 5009, built in 1972, was a GP-38 with 2000 horsepower.

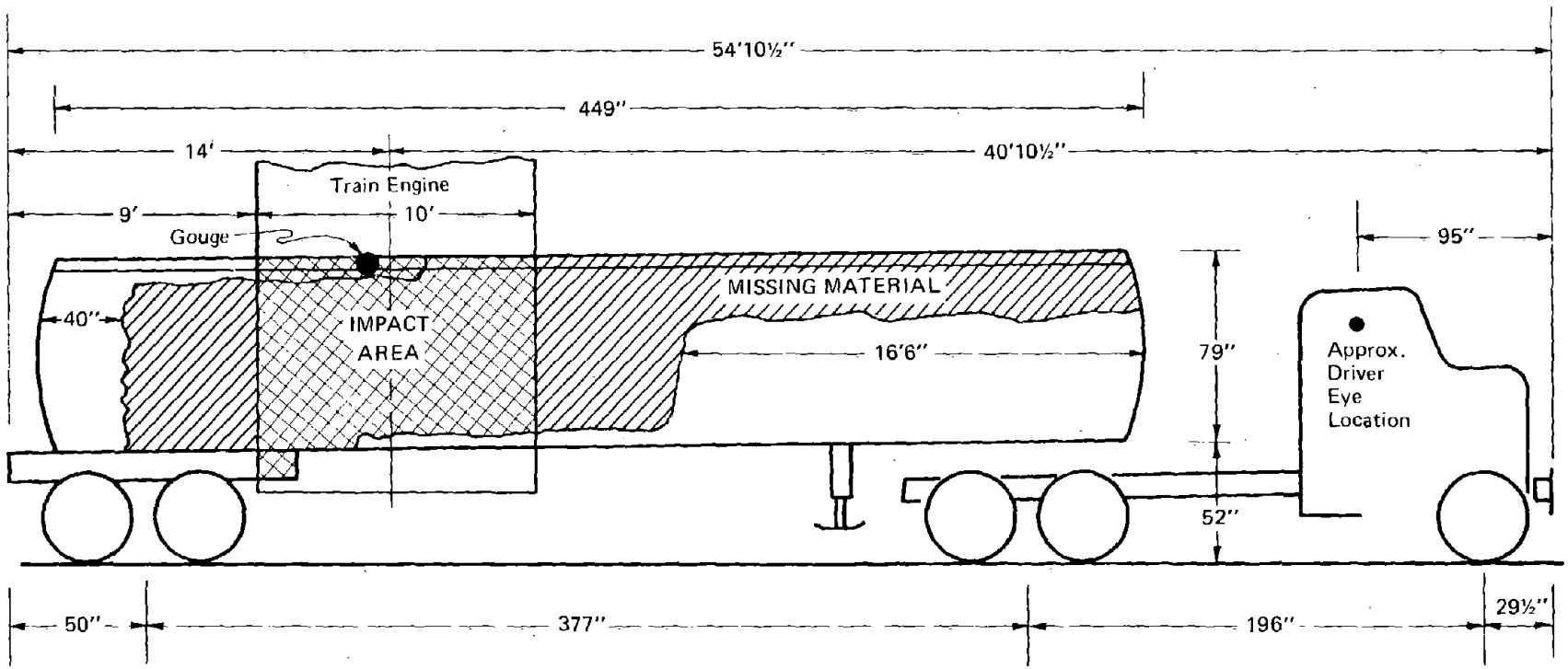
Locomotive unit No. 2614 had a full hood with a split windshield with the short end to the front. It was equipped with 26-L brake equipment, speed indicator, event recorder, bell, air operated whistle, and one set of twin fixed headlights, mounted on the front, top center of the locomotive. (See figure 6.) A "Pulse" Events Recorder Tape, 8/ removed from locomotive unit No. 5009 after the accident, indicated the train was operating at about 28 mph and was placed into emergency braking about 100 feet before the grade crossing intersection.

Highway Information

The accident occurred on Alabama State Route 53 (Jordan Lane) at the Southern Railroad tracks, 308 feet north of Alabama State Route 20 (Governors Drive) on the west side of Huntsville, Alabama. The Association of American Railroads/U.S. Department of Transportation number for this crossing is 731812Y. (See figure 7.)

Jordan Lane is a five-lane roadway with two lanes each, northbound and southbound, and a continuous two-way left turn lane in the center. The highway grade is a positive 0.7 percent on the southbound approach and a positive 0.8 percent on the northbound approach to the crossing. The State of Alabama had completed resurfacing both approaches to the crossing in early July 1981 and the surface was in good condition.

8/ The Events Recorder records the speed, throttle setting, power use, and various brake uses on a visual graph. Pulse Events Recorder on locomotive No. 5009 was tested and certified correct on August 4, 1981, and September 30, 1981, by Southern Railway System shops in Atlanta, Georgia.



Weights		
Tractor Tare	14,720	
Trailer Tare	9,560	
Cargo	55,533	(8986 gal X 6.18)
GCW	79,813	(lbs)

Figure 5.--Tractor and trailer dimensional data and damage area.

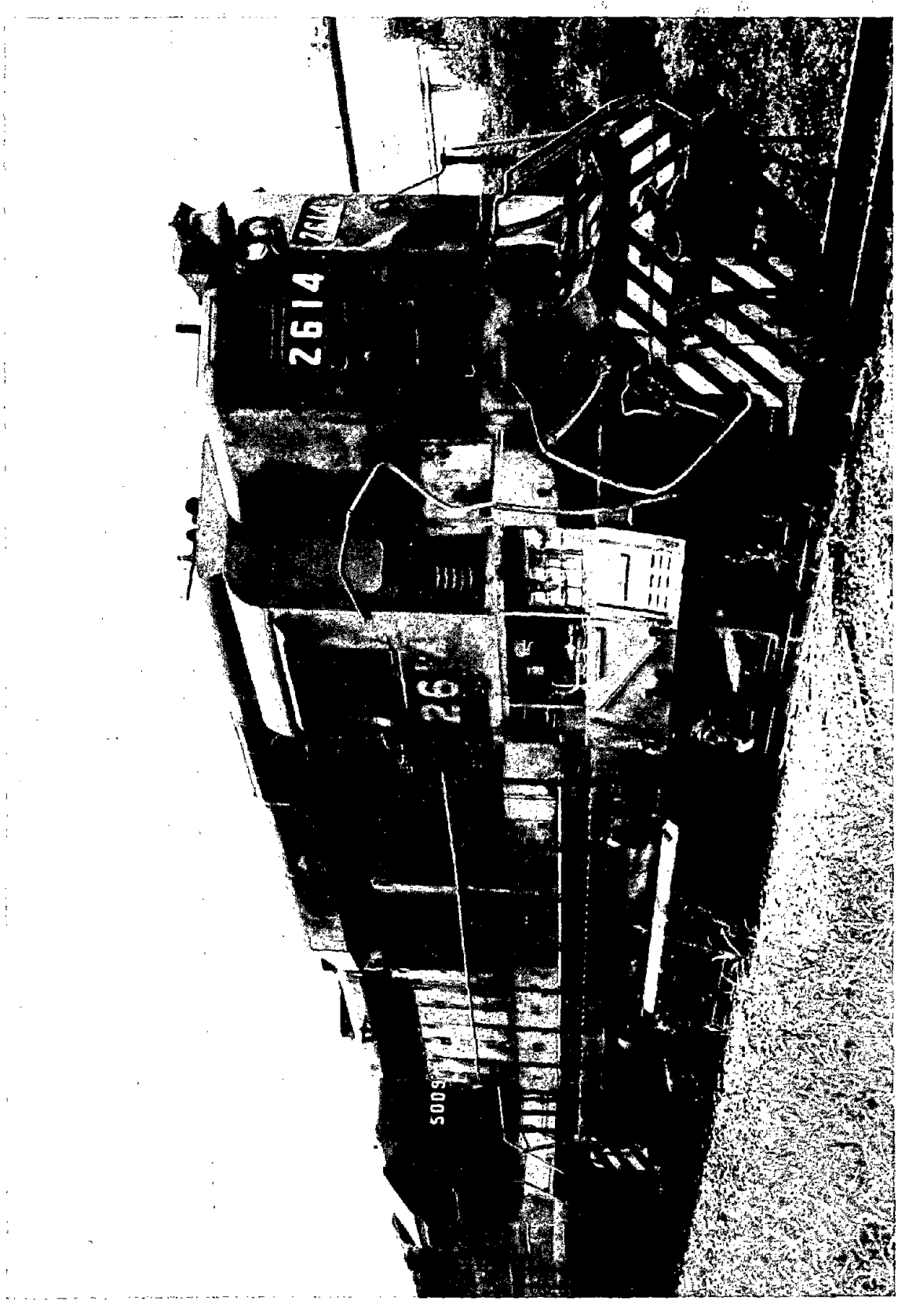


Figure 6.--Damaged locomotive unit No. 2614.

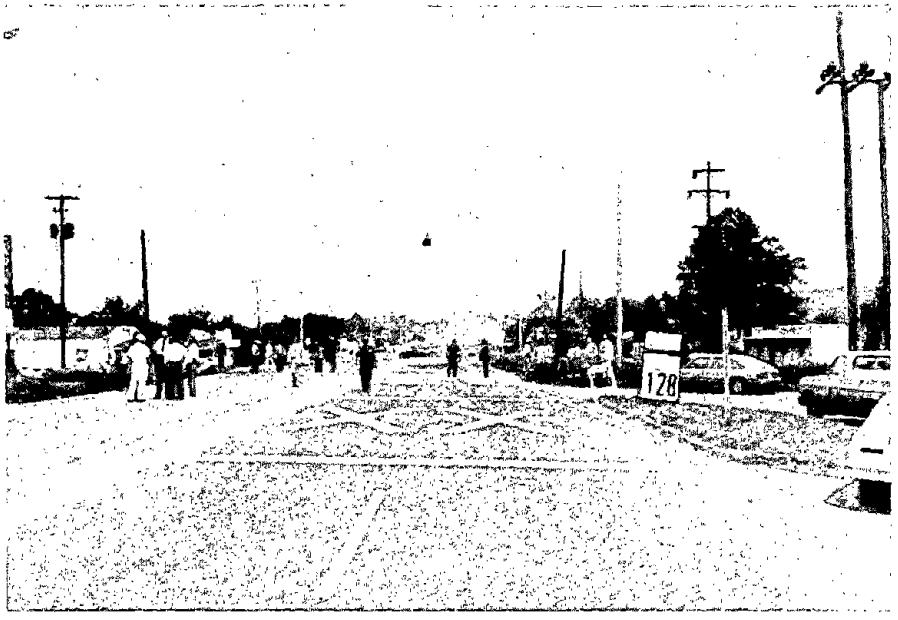


Figure 7.--View of the northbound approach to the Jordan Lane crossing.

The roadway is 52 feet wide at the crossing. The four outside lanes are each 10 feet wide and the center lane is 12 feet wide. The outside edges of the road are marked with a solid white line and the lanes are separated by broken white lines with double yellow lines delineating the center left turn lane. On the northbound approach to the track, stop bars and advance railroad crossing markings are painted 15 feet and 130 feet, respectively, from the track; the condition of the signs, which were repainted on September 9, 1981, was excellent. (See figure 7.) A railroad crossing advance warning sign is located at the side of the road 115 feet from the crossing.

A 5-foot high gasoline station sales price sign was on the right shoulder in front of the crossing. Business buildings and signs beyond the track provided a multicolor background behind the warning signals.

The crossing is protected by flashing lights on both sides of Jordan Lane and a bell that were installed in 1942 and upgraded in 1976. The crossing warning lights are located about 23 feet south of the track and 5 feet east of the roadway, and 25 feet north of the track and 7 feet west of the roadway. (See figure 7.) The railroad whistle post was located 1,540 feet east of Jordan Lane. The flashing lights and bell are controlled by a railroad motion detector approach circuit located 1,700 feet east of the crossing.

The crossing warning system was inspected by the SRS signal maintainer on September 2, 1981, and found to be operating properly. On September 4, 1981, the City of Huntsville repaired a red warning light that hangs over the approach lanes and is activated when the railroad crossing lights are activated. The warning light was operating properly at the time of the accident.

The intersection of Jordan Lane and Governor's Drive is controlled by signal lights. These signals operate in a 6-phase mode and are not interconnected with the railroad grade crossing signals. 9/ The signals were functioning properly and traffic was moving smoothly at the time of the accident.

The City of Huntsville 1981 Traffic volume count indicated 32,200 vehicles use the grade crossing daily. A 1978 survey by the City of Huntsville indicated 10 school buses use the Jordan Lane crossing daily; the city estimated the current schoolbus traffic was similar to the 1978 survey. No further breakdown for types of vehicles using the crossing was available.

Because the City of Huntsville currently does not have a designated hazardous material highway route for gasoline trucks, Miller Transport, Inc., had designated the route used by the gasoline truck in consideration of the widths of the roads and the amount of traffic.

Track Information

Train No. 81 was operating over a single track, with a 0.82 percent ascending grade westbound intersecting Jordan Lane at a 110° angle at the southeast quadrant of the intersection. The track is controlled by a train dispatcher in Knoxville, Tennessee. The track is governed by SRS rules for automatic block signals, timetable, train order and bulletin special instructions. The track has an SRS bulletin special instruction which requires that all trains comply with the Huntsville 30-mph speed ordinance. The bulletin was in response to the long standing city ordinance and was last updated on August 31, 1981. The SRS had six scheduled trains over this track daily, plus approximately two extra trains per day.

The track through the area and in the crossing itself was constructed of 132-pound (1980) continuous welded rail, mixed hardwood crossties placed on 19 1/2 inch centers and granite ballast. The track was maintained to meet or exceed FRA Class 4 track safety standards (which permits 60-mph speeds for freight trains and 80-mph for passenger trains). The last track inspection through the Huntsville area was conducted on Monday, September 14, 1981, with no exceptions taken with the track. The crossing was resurfaced by the railroad in April 1980 and the track was resurfaced to a level uniform profile at that time.

State Highway/Railroad Grade Crossing Improvement Program

In 1974, the State of Alabama established a railroad grade crossing improvement program with the assistance of Federal-aid funds made available by the Federal Highway Safety Act of 1973. Alabama had priority ranked its existing crossings with improvements to be implemented in four phases based on the number and severity of accidents in the past. Local State officials indicate that the Jordan Lane crossing will be considered for inclusion in the fourth phase when the funds become available.

9/ The U.S. DOT's Manual on Uniform Traffic Control Devices for Streets and Highways Part IV-4B-21.

On August 8, 1978, a State diagnostic team reviewed the Jordan Lane crossing and recommended installation of new signals on 24-foot cantilevers. Another State diagnostic team reviewed the crossing on November 15, 1979, and recommended the installation of a prefabricated rubber crossing. At the time of the accident, these recommendations had not been implemented.

After the accident, the Alabama legislature adopted a joint resolution on October 6, 1981, which "strongly urges the highway department to install said overhead warning signals and safety lowering gates on Jordan Lane and warning signals on the said turning lane of Governor's Drive; and, in the absence of such action, that this body receive a full and detailed explanation of why such actions were not taken."

In response to the joint resolution, the State Highway Department formed another diagnostic team consisting of State, City, and railroad officials. This team reviewed the crossing on October 14, 1981, and made the following summarized recommendations:

- o Install back-to-back cantilever and postmounted railroad crossing flashers.
- o Install two warning bells.
- o Install crossing gates.
- o Construct an additional left turn storage lane on north approach (southbound) of Jordan Lane.
- o Install an advance railroad sign and flasher for Governor's Drive east (westbound) approach right turn lane. This signal would flash while the crossing signal is activated.
- o Install active signing for Governor's Drive west approach (eastbound) left turn lane. This sign would prohibit left turns while the crossing signal on Jordan Lane is activated.
- o Install R8-8 signs - "Do not stop on tracks."
- o Install rubberized crossing.
- o Remove vegetation alongside railroad tracks.
- o Install optically programmable signal heads for Jordan Lane north (southbound) approach to reduce visual conflict with the railroad crossing signal.
- o Selective enforcement for crossing violations.
- o Repair damage to pavement and markings at crossings.

The State of Alabama has also been working with the National Safety Council and the railroads to effectively implement the Operation Lifesaver program 10/ to further railroad/highway grade crossing safety by educating and involving the public in grade crossing safety programs.

10/ "Operation Lifesaver" is a nationwide cooperative effort of many organizations, supported by the Safety Board and coordinated by the National Safety Council to increase public awareness of the dangers at crossings and to develop proper driver behavioral patterns for approaching and moving over crossings.

Survival Aspects

At 9:00 a.m., an occupant of a building within 75 feet to the north of the collision area felt the ground shake and noticed the building doors rattling. Postcrash reenactment of his actions indicated he ran to the door within 10 seconds of the collision and saw a person on fire later identified as the driver of the Vega, running northwest. Within 35 seconds of the collision, the occupant, carrying two dry powder fire extinguishers, emerged from the building and saw the front section of the truck cargo tank "erupt in an explosion" and release a fire ball which rose 75 to 150 feet. Immediately following the explosion, he saw the truckdriver, whose clothes were on fire, run northwest toward a vacant lot. Witnesses stated that within 2 minutes after the explosion, other building occupants reached the two victims and extinguished their burning clothing with dry powder extinguishers. Witnesses at the accident scene testified that they overheard the gasoline truckdriver say "there was no flashing light," "I didn't see the flashing lights," and "I tried to make it." "At this time, a wall of flames extended across the roadway, and no one could approach the fire to aid the victims still in or near the cars.

Two officers in a police cruiser 1,000 feet north of the crossing on Jordan Lane heard "a loud explosion and saw black smoke rising from the truck." The officers immediately drove to the scene and assisted in extinguishing the burning clothing of two victims. The officers reported that "the flames were too hot to allow them to approach closer than 100 yards away." The officers requested additional police assistance and began moving on-lookers away from the fire.

At approximately 9:02 a.m., firemen at Fire Engine Company No. 3, located within two blocks of the Jordan Lane grade crossing heard an explosion, which rattled the doors of the fire station, and left immediately to go to the scene. At 9:03 a.m., the fire department dispatcher assigned Engine Companies No. 3 (which was already en route) and No. 12 to the scene. At 9:05 a.m., the fire department dispatcher contacted the Huntsville Emergency Medical Service (EMS) dispatcher.

Engine Company No. 3 arrived at Governor's Drive and Jordan Lane at 9:06 a.m. and radioed for additional help. Because of a concern that a natural gas transmission line adjacent to the railroad right-of-way could have possibly ruptured and ignited, the fire captain requested the fire dispatcher to send public utilities servicemen to the scene.

At 9:07 a.m., Engine Company No. 12 arrived at Jordan Lane north of the fire and saw the truck and passenger cars engulfed in fire. Fire personnel requested the fire department dispatcher to contact the SRS to obtain the train consist information and determine if hazardous materials were in the freight cars. Injuries sustained by the train crew prevented them from providing the information to fire personnel at the time. Contact with the Huntsville SRS agent disclosed that because the accident had caused a power failure which disrupted SRS's Huntsville computer communications, the agent was not able to furnish the information immediately, and had to obtain verbal train consist information over the telephone from the Southern agent in Scottsboro.

At 9:07 a.m., a deputy fire chief and additional Huntsville fire units (Nos. 1-A, E-5A, L-6, and C-11-A) arrived at the accident site and set up a command post. Because the deputy fire chief had not received consist information at this time and he was not able to determine if the train carried hazardous materials, the nature of the materials involved in the fire, or the possible involvement of gas transmission line fire, he recommended that the Huntsville Civil Defense Director immediately evacuate a 3,000-foot area. The evacuation was begun.

At 9:08 a.m., EMS units No. 45 and 46 arrived at Jordan Lane, north of the fire, and immediately started primary burn care. The two burned victims were transported to the University of Alabama Burn Center in Birmingham.

At 9:09 a.m., the flagman on board train No. 81 warned firefighters that an LPG tank car was on the train. About the same time, the Huntsville SRS agent notified the fire department dispatcher that car No. 13 from the head end contained LPG. With this information, the fire officers immediately identified the tank car, which was 196 feet east of the grade crossing. However, because of the intensity of the fire, the fire officers requested SRS railroad crews to remove the LPG tank car.

By 9:15 a.m., the firefighters had extinguished the fires on the burning automobiles.

The Fire Captain of Engine No. L-6 arrived at the lead locomotive about 9:15 a.m., after an ambulance had removed the locomotive crew. According to the captain, he saw a small fire under the locomotive cab above the fuel tanks and he extinguished it with a hand-held extinguisher. Locomotive No. 2599X arrived at the scene at 9:25 a.m. and pulled the LPG tank car rearward from the fire at 9:31 a.m. After the removal of the LPG tank car, the evacuation order was cancelled.

At 10:00 a.m., the gasoline cargo tank fire was extinguished. During this time, Company Engine No. 3 had been fighting what it suspected was a gas transmission line fire. A representative of the gas company recommended the fire be permitted to burn to prevent a gas cloud release. However, by then the fire department had concluded they were fighting the fire caused by the fuel in the rear portion of the cargo trailer and since the natural gas line had not ruptured, they continued to extinguish the fire. After 10:00 a.m., firefighters examined the contents of the rail cars near the flames and found no evidence of fire involvement within the cars or of their contents.

The City Water Authority requested earth diking around the cargo tank to contain the leaking residue fuel. By 11:00 a.m., earth movers had constructed a dike to assist in recovering the remaining fuel in the cargo tank.

Meteorological Information

The weather at Huntsville airport (approximately 10 miles west of the accident site) at 9:00 a.m. on September 15, 1981, consisted of 100 percent cloudcover, rain, and fog with 3 miles visibility. The temperature was 70° F with a 10-mph wind from the south and 97 percent humidity. It had rained .33 inch in the last 24 hours.

When the accident occurred, the train crew and witnesses on Jordan Lane stated that it was drizzling rain and overcast but visibility was good from both the train and roadway.

Other Information

Accident History.--The City of Huntsville has 42 street grade crossings of railroad tracks. Between January 1979 and September 1, 1981, 22 motor vehicle accidents involving trains occurred at the crossings.

Between January 1971 and September 3, 1981, 12 train-involved accidents (3 property damage only and 9 personal injury accidents with no fatalities) occurred at the Jordan Lane crossing. In six of the accidents, between June 1977 and April 1981, five persons were injured and the property damage ranged from $600 to $4,000 per accident.

In five of the accidents, the vehicles were traveling northbound on Jordan Lane. In four of the accidents, the weather was rainy or cloudy. Two of the accidents involved trucks. The Huntsville Police Department reported that this crossing does not have an unusual history of violations of crossing signals by motorists or blocking of the crossing by trains compared to other crossings in the city.

Miller Transporters, Inc.--Miller Transporters, Inc., conducts periodic safety meetings for the truckdrivers. The drivers are not required to attend, but prize and money incentives are offered for attendance. The truck driver involved in this accident had attended 11 of 21 such meetings. One meeting the driver attended on July 13, 1979, was devoted to railroad crossing safety and included a film entitled "Safety Facts about Crossing Tracks," followed by a discussion of DOT rules, company rules, and public safety.

In its drivers manual, the company requires its drivers to operate trucks with the lights on when it is raining or there is a visibility problem during daylight hours. Additionally, drivers of trucks carrying hazardous materials are required to stop at all railroad crossings. 11/

Federal and State Regulations.--Title 49 CFR 39.210 requires all common carrier highway vehicles with hazardous materials cargoes to stop at all nonexempt railroad crossings and proceed only when it is safe to do so. Section 32-51-1-150 of the Alabama Vehicle Code requires all vehicles to stop at a railroad crossing when "A clearly visible electric or mechanical signal device gives warning of the immediate approach of a railroad train."

Tests

Train braking and stopping tests were conducted under Safety Board supervision on September 16, 1981, using train No. 81 to duplicate the accident events. No defects were detected with the braking system. Because the locomotives on train No. 81 were damaged during the accident, two similar locomotives were used for power during the test. At the time of the test, a different train crew was used and the track was dry. The lead locomotive stopped 531 feet beyond the point of impact.

Postaccident sight tests were also conducted, using a similar locomotive and truck. The train was headed west and the truck was headed north on Jordan Lane. Visibility as taken from the southeast quadrant of the crossing was unobstructed from the following distances:

Truck Distance (feet) from Crossing	Train Distance (feet) from Crossing
15	1,136
40	994
50	603
65	622
115	352

(See figure 8.)

11/ Miller Transporters Inc., Drivers Manual, May 1980.

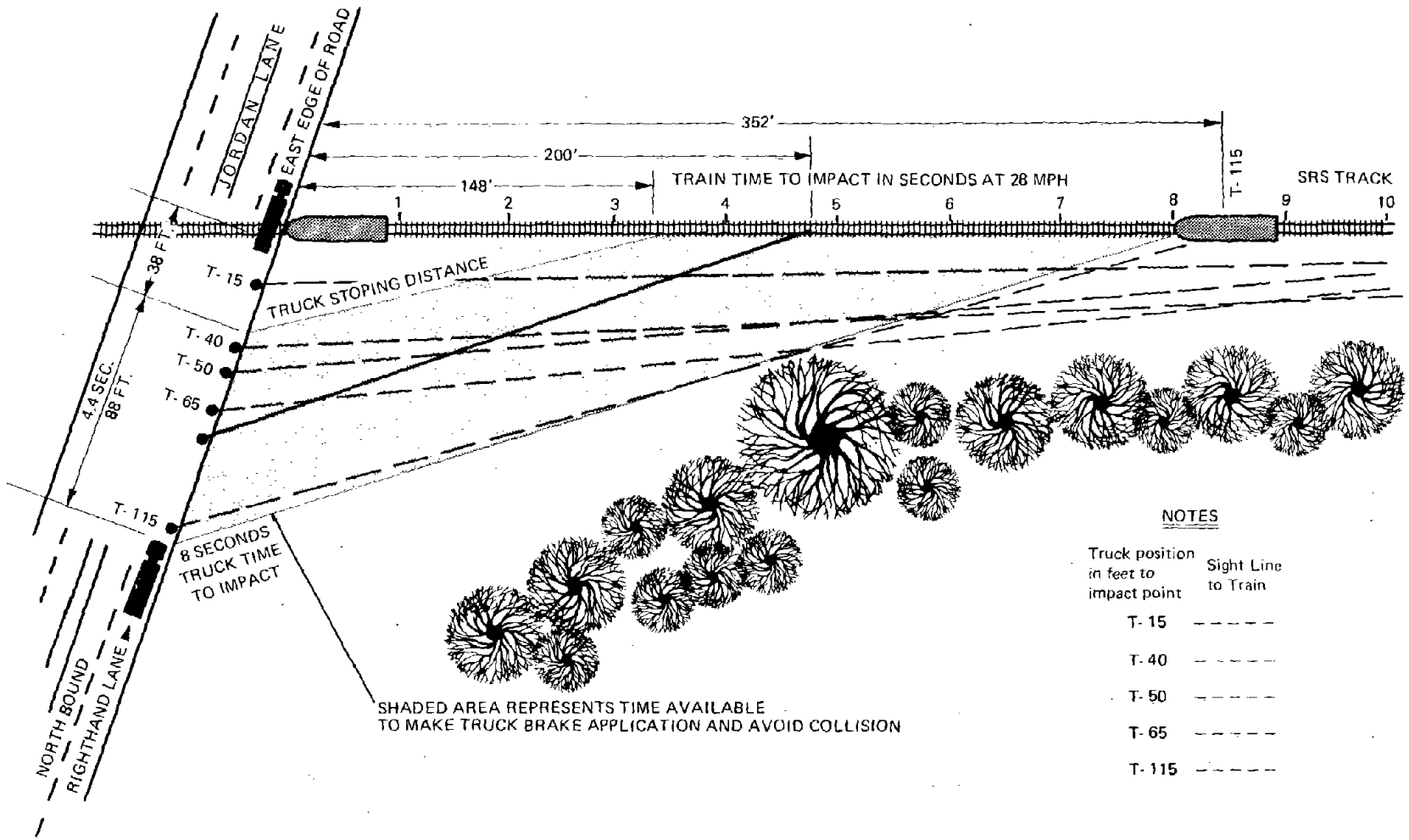


Figure 8.--Relative position of truck and train at various preimpact times.

On September 17, 1981, several test runs were conducted with a loaded tractor/cargo tank semitrailer with different drive line components but somewhat similar to the truck involved in the accident. The purpose of the test runs was to determine a likely speed and duration of travel range from the intersection of Jordan Lane and Governor's Drive to the railroad crossing. In all tests, the driver was told to drive as he normally would.

Results indicated the test truck took 19 to 24 seconds to travel from the intersection to the crossing and the truck speedometer indicated 10 to 20 mph in the fourth or fifth gear, depending on the traffic interference encountered at the intersection.

Based on the vehicle manufacturer's computer performance simulation 12/ the 79,813-pound accident vehicle could accelerate from a probable 3.5-mph speed coming out of the turn from Governor's Drive, up the slight grade, to 16.7 mph at the point of impact in 18.4 seconds. The vehicle manufacturer also advised that the truck's stopping capability on the slippery road surface would be 38 feet based on Federal Motor Vehicle Safety Standard 121 performance requirements on Skid Number 20-30 road surfaces.

Train No. 81's crew (with the exception of the locomotive engineer) was aboard a similar locomotive for line of sight bearing tests conducted on September 18. The fireman stated the view was similar to his observations just before the collision and that the front of the truck was about 75 feet south of the track when the locomotive was about 200 feet from the crossing. (See figures 9 and 10.)

ANALYSIS

The Accident

Jordan Lane was properly marked. Since advance railroad warning signs had been repainted on the road surface the previous week, the signs were in excellent condition. Though a light rain was falling and the surface was wet, visibility of the surface and roadside signs was not a problem. Roadway design, traffic signs and signals, or maintenance did not contribute to this accident.

Reconstruction of information concerning the accident and witnesses' statements indicates the truck had been traveling with the average flow of traffic eastbound on Governor's Drive. Based on the truck manufacturer's computer performance simulation, the truck was probably traveling 16 to 17 mph at impact. Witnesses statements and tests conducted with a similar truck after the accident support this speed estimate. The use of the computer simulation figures also indicates a travel time of 18 seconds from the point the truck completed its turn onto Jordan Lane, 260 feet south of the crossing, to the point of impact. When the truck was approximately 126 feet south of the crossing, the truckdriver would have had his first opportunity to see the train. (See figure 8.) At this point, the truckdriver would have a distance of 88 feet to make a brake application to stop safely. The truck would have traveled the 88-foot distance in 4.4 seconds. Even though the truckdriver told witnesses that he did not see the crossing warning lights, he could have avoided the accident if he had looked for and seen the train during this time.

12/ NTSB Public Docket HY-390-81

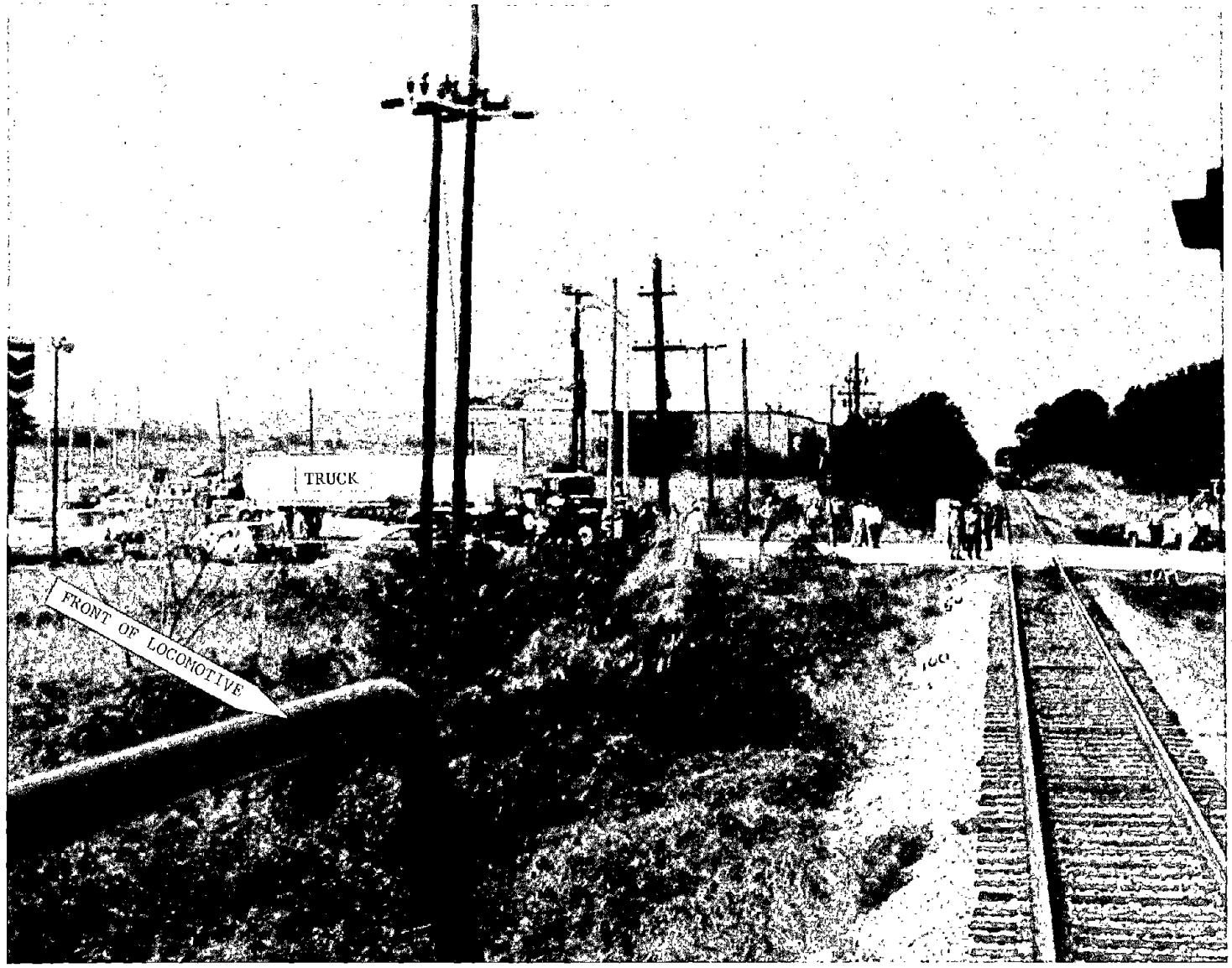


Figure 9.--Truck 75 feet south of track.
Locomotive 200 feet east of Jordan Lane.



Figure 10.--View from truck 115 feet south of track, toward locomotive, in right background, 352 feet east of Jordan Lane.

The postcrash line of sight visibility tests demonstrated that the approaching train was visible from the cab of a similar truck approaching the crossing 88 feet before and at the critical stopping distance of the truck. (See figure 8.) Federal Motor Vehicle Safety Standards stopping distance requirements on slippery roads similar to the accident site indicates the truck could have stopped in 38 feet after brake application.

Witnesses at the scene stated and postcrash testing verified that the crossing warning flashing lights and bell were functioning before the truck turned left onto Jordan Lane and that they continued to operate until the collision. Although a gasoline price sign was on the curb and other business signs cluttered the background behind the crossing warning lights, the truckdriver should have been able to see the warning lights as soon as he turned onto Jordan Lane since there were no obstructions between the truck and the signals.

Although witnesses heard the locomotive whistle and saw its headlights as it approached the crossing, the noise level of the truck engine may have masked the sound of the train whistle in the cab of the truck. Four southbound passenger cars had heeded these warnings and stopped north of the crossing for the approaching train. Four northbound vehicles had stopped in the left northbound lane south of the crossing. Nevertheless the truckdriver proceeded across the track in front of the train. The driver of a southbound garbage truck which had already crossed the tracks saw the truck and concluded that the truckdriver did not intend to stop at the crossing, and stated the gasoline truckdriver was looking to the left rear, toward him, as he approached within 10 to 15 feet of the crossing before he looked forward "and then he didn't have time to stop." The Safety Board could not determine why the gasoline truckdriver was looking at the garbage truck.

This reported misdirected attention could explain the truckdriver's statement to witnesses that "I didn't see the flashing lights." If the driver had been looking toward his left rear and then only saw the train in the last few feet of travel in front of the crossing and decided his only recourse was to attempt to beat the train across the crossing, it could also explain his statement, "I tried to make it." This action would be consistent with witness statements that the gasoline truck did not appear to attempt to stop. There is no other explanation, however, for why the truckdriver failed to respond to the warnings that others saw so readily. He was familiar with the route and, thus, would have been aware of the crossing.

Miller Transporters, Inc., rules state that drivers of hazardous materials trucks shall stop at all railroad crossings. Federal Motor Carrier regulations (49 CFR 392.10) require all hazardous materials carriers to stop at all railroad crossings and proceed only when it is safe to do so. The Alabama Vehicle Code (Sect. 32-5A-150) requires all vehicles to stop at a railroad crossing when "A clearly visible electric or mechanical signal device gives warning of the immediate approach of a railroad train." The driver had previously demonstrated in written tests and in the drivers trainer's check that he was aware of the rules and regulations. Thus, despite the truckdriver's apparent failure to detect the activated crossing warning signals or see the approaching train, his knowledge of the regulations and awareness of the crossing location should have prompted him to prepare to stop as he approached it, rather than shift gears and accelerate as observed by the driver of the garbage truck. If he had complied with the applicable rules and regulations, the accident would have been avoided.

In compliance with an Alabama State Legislative Resolution and in an effort to improve the safety of this crossing, the State of Alabama Highway Department is currently reviewing the recommendations made by the diagnostic team that evaluated the

crossing on October 14, 1981. It is not certain that the recommendations presented by the diagnostic team would have prevented this accident. Because the truckdriver was the only driver in the immediate area who did not react to the activated crossing warning signals and/or train, the warning system would appear to have been adequate for most drivers. The accident history of this crossing indicates that other northbound vehicle drivers may have also had problems seeing the crossing warning signals in the past, particularly during similar inclement weather as existed at the time of the accident. The changes recommended would provide additional overhead lights to improve conspicuity and a physical barrier in the form of crossing gates which would require a driver to make a positive decision and a specific driving maneuver to bypass the activated warning system. The additional improvement recommendations which were to be related primarily to smooth traffic flow and preventing stopped vehicles from being trapped on the crossing during traffic congestion indicates that local authorities believe they can improve the safety and operation of this crossing. In consideration of the September 15, 1981, accident and the previous accident history, the Safety Board commends the State of Alabama and the City of Huntsville for their desire to improve the traffic control at this crossing and recommends that necessary corrective actions be implemented in a timely manner.

Vehicles

Mechanical evaluation of the truck did not disclose any malfunction that could have contributed to the accident. Although much of the braking system was destroyed in the fire, the portions remaining indicate the vehicle was in good condition and the driver would have been able to stop the truck routinely had he chosen to do so in the 16 seconds/215 feet of travel in front of the crossing after completing the turn onto Jordan Lane.

Following impact, the trailer was thrown into the air and tipped to the truck's left side. This action distorted the tractor and trailer subframe. As the trailer rotated about 80° clockwise on a horizontal plane, the antijackknife pin distorted the left ear on the fifth wheel platform and damaged the kingpin locking mechanism to the extent that the kingpin was released and found resting on top of the fifth wheel platform after the fire. Gouges and scratches on the roadway delineated the path of the dragging trailer and the distorted "landing gear" support legs.

Impact damage to the trailer and the locomotive indicates the front center of the locomotive struck the right side of the trailer at a point 14 feet forward of the rear of the vehicle (or 40 feet 10 1/2 inches from the front bumper). Metal abrasion and electrical connections at the front of the locomotive provided potential sources for ignition of the gasoline. The direction of movement of the damaged parts indicates the truck was moving north across the front of the locomotive. This movement was sufficient to carry all parts of the trailer to the north side of the track although the separated rear portion of the trailer was south of the track when it was struck. The movement of the tractor dragging the front portion of the trailer along the roadway north of the track indicates the tractor was in gear and under power until the driver used the brakes and placed the transmission in neutral before he escaped from the cab of the truck. The auxiliary transmission shifting mechanism that was also found in neutral was activated and held in position by air pressure. When the air lines were destroyed by the fire, there was no resisting force and it was possible for the salvage operations to inadvertently move the auxiliary transmission into neutral.

Damage to the front of the locomotive was consistent with the described movement of the tractor and trailer. The short derailment of two wheels of the lead locomotive did not contribute to the cause or severity of the accident. The whistle and bell were functioning properly although the headlight had been broken.

Postcrash examinations, testing, and witnesses' statements indicate there were no failures of the railroad rolling stock, roadway, signal systems, or actions by the traincrew. The fireman and brakeman were alert and gave warning to the engineer as soon as they were aware that the truck did not intend to stop at the crossing, and the engineer immediately placed the train into the emergency stop mode to utilize the only evasive action he controlled. The braking stopping distance was similar to a test conducted the following day wherein the two stops were found to be compatible to a properly maintained train system. The different stopping distances were related to the wet track at the time of the accident, use of different locomotives, and the human reaction variations while attempting to duplicate the actions of a different crew.

The train speed and operating procedures were compatible with railroad rules and Huntsville regulations. The LPG tank car, which was handled as regulations require, was not damaged, and did not contribute to the accident or severity of injury. Even though the SRS communication lines were burned, the use of the telephone permitted the train crew and dispatcher to communicate properly with the emergency teams at the scene and provide all the information and service requested of them during the postcrash emergency. Cooperation and communication between all agencies and units at the scene permitted the firefighting procedure to progress smoothly and prevent further property damage, injury, or loss of life.

There has been an active Operation Lifesaver program, directed at the general public, in the State of Alabama for several years. The SRS has made an active contribution to this program which is sponsored by the National Safety Council. To promote a more specialized application toward the trucking industry, the SRS, in cooperation with law enforcement agencies, implemented a pilot program in Alabama in May 1980 involving the following actions:

1. Identification of hazardous crossing locations for upgrading and enforcement concentration.

2. Holding educational meetings with trucking firms.

3. Providing personal contact and information for the drivers.

4. Notifying trucking firms of incidents discovered by the SRS near-collision report program.

Trucking firms, including Miller Transporters, Inc., stated they were aware of and supported the program and are interested in increasing their involvement to aid in educating and motivating their drivers to be safety conscious. The Safety Board believes that the State should build on this program to cover all rail crossings in Alabama.

Hazardous Materials and Fire Extinguishment

The hazardous material (gasoline) was released immediately upon impact when the tank ruptured. The splash and flow pattern of the cargo followed the natural contours of the ground; no basis for recommending changes in drainage paths was identified. The documentation of time elements in the rescue and firefighting procedures demonstrated

that the emergency agencies involved in this accident responded in a timely manner and did their work well; however, the rapid development of events in this type of emergency does not permit rescue efforts to be developed by emergency units, but is dependent on the efforts of the victims themselves with possible help from bystanders immediately available. Within 7 seconds, the spill area had extended at least 75 feet away from the track. Within 35 seconds, the intensity of the exploding fireball probably overcame the victims who had escaped from their cars and were attempting to flee from the scene. Within 2 minutes after the collision, trained emergency personnel on the scene stated there was nothing they could do except move people farther from the scene to prevent further injury.

It was possible for this load of gasoline to have been delivered over other routes that would not have required the truck to travel over the rail crossing. Other routes would have affected the distance traveled, required travel over different width roads, and involved travel routes that used overpasses to traverse some of the railroad crossings. However, these routes would have resulted in exposure to additional highway traffic and intersections and would have required thorough evaluation of the safety aspects of each route. Neither the State of Alabama nor the City of Huntsville has designated specific routes for hazardous materials carriers at this time. The Safety Board believes an evaluation of the possible and practical routes through the city should be made to determine if utilization of designated travel routes might increase the safety of the carriers and all traffic that might be exposed to them.

Other Information

In 1981, the Safety Board published a special study 13/ concerning railroad/highway grade crossing accidents and transportation of hazardous materials involving trucks transporting bulk hazardous materials. The September 15, 1981, accident exemplifies the problems treated in the special study, which cited several accidents similar to this accident. Inasmuch as the special study has just recently been published, all of the agencies addressed have not yet responded to the recommendations. The Safety Board has received favorable responses from the National Safety Council, the Association of American Railroads, the National Tank Truck Carriers, Inc., the American Petroleum Institute, and the Brotherhood of Locomotive Engineers. As a matter of information, special study recommendations H-81-72 through -81; I-81-8 through -10; and R-81-96 are set forth in appendix B.

CONCLUSIONS

Findings

1. There was no evidence that the tractor and trailer were mechanically defective.

2. The tractor and trailer had sufficient braking capability to stop before the impact.

3. The truckdriver's visual opportunity of the train was unimpeded from a point 126 feet south of the track.

13/ Special Study—"Railroad/Highway Grade Crossing Accidents Involving Trucks Transporting Bulk Hazardous Materials," September 24, 1981 (NTSB-HZM-81-2).

4. The truckdriver's visual opportunity of the activated crossing warning signals was not obscured.

5. The truckdriver was looking rearward as he approached the crossing and did not have sufficient stopping distance when he directed his attention ahead to the crossing.

6. The truckdriver did not heed the crossing warning signals on the approach to the track.

7. The truckdriver had received instruction on safety rules and regulations that required vehicles transporting hazardous materials to stop before crossing railroad/highway grade crossings.

8. The only evasive action available to the train engineer was activation of the emergency braking system; however, sufficient stopping distance was not available to stop the train before it struck the gasoline trailer.

9. The train crew was aware of carrier rules and regulations relating to accidents and operated in accordance with the rules by reporting to the emergency agencies to provide help and information.

10. The train crew complied with all requirements relative to work hours, train assembly, and testing during its assigned run.

11. The railroad personnel acted quickly to remove the hazardous materials tank car away from the fire.

12. The crossing warning system of lights and a bell was functioning before and at the time of the collision.

13. The locomotive headlights, bell, and whistle were operating as it approached the crossing.

14. Motorists who approached the crossing stopped in the area designated by the highway pavement markings to wait for the train to pass.

15. The rapid spread and ignition of the released gasoline entrapped motorists stopped at the crossing and the victims had no chance for survival.

16. It would have been necessary for the nearest motorists north of the track to be approximately 75 feet from the track to have avoided the fire.

17. The roadway was well constructed and well maintained.

18. Other travel routes available for delivery of the gasoline cargo would have provided overpass crossing of the railroad tracks, but would have resulted in added exposure to highway traffic and at intersections.

19. The City of Huntsville had not designated specific highway routes to be traveled by hazardous material carriers.

Probable Cause

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the truckdriver to comply with the activated crossing warning signal and Federal regulations and company rules that require hazardous materials carriers to stop at all nonexempt railroad crossings to determine if it is safe before crossing the tracks. Contributing to the severity of this accident and loss of life was the rupture of the cargo tank, and the rapid spread of the burning gasoline around the victims' cars which were stopped directly in the path of the spreading gasoline.

RECOMMENDATIONS

As a result of its investigation, the National Transportation Safety Board made the following recommendations:

--to the State of Alabama:

Emphasize and expand the existing Operation Lifesaver Program to more fully involve municipalities and to build on the Southern Railway System pilot program in order to address the problems specifically associated with trucks carrying bulk hazardous materials over grade crossings. (Class II, Priority Action) (H-82-1)

Study the routes available for travel by carriers of bulk hazardous materials on State highways in congested areas, particularly relative to exposure to railroad crossings, for the purpose of restricting travel to designated routes involving the fewest safety hazards and assist counties and cities in conducting similar evaluations of county and city roadways. (Class II, Priority Action) (H-82-2)

Complete the review of the recommendations of the diagnostic team that examined the Southern Railway System, Jordan Lane crossing on October 14, 1981, and develop appropriate corrective action at an early date. (Class II, Priority Action) (H-82-3)

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

/s/ JAMES E. BURNETT, JR.
Chairman

/s/ PATRICIA A. GOLDMAN
Member

/s/ G. H. PATRICK BURSLEY
Member

FRANCIS A. McADAMS, Member, did not participate.

March 9, 1982

APPENDIXES

APPENDIX A

INVESTIGATION AND HEARING

1. Investigation

The National Transportation Safety Board was notified of this accident by the Southern Railroad System at 10:30 a.m. c.d.t. on September 15, 1981. An investigation team member from the Safety Board's Atlanta, Georgia, office arrived on the scene at 3:30 p.m. A Member of the Safety Board, an investigator-in-charge and additional team members were dispatched from Washington, D.C., and arrived on the scene at 9:30 p.m.

Investigative groups were formed for human/injury causative factors, highway/environment factors, vehicle factors, railroad factors, and hazardous materials factors.

Other agencies participating in the investigation were the Federal Railroad Administration, the Southern Railway System, Miller Transporters, Inc. the City of Huntsville Police and Fire Departments, and the State of Alabama Department of Transportation.

2. Depositions and Hearings

Depositions were not taken and a hearing was not held in this investigation.

APPENDIX B

SPECIAL STUDY RECOMMENDATIONS H-81-72 THROUGH -81; I-81-8 THROUGH -10; AND R-81-96

As a result of Special Study NTSB-HZM-81-2 the National Transportation Safety Board made these recommendations:

—to the Federal Highway Administration:

Encourage States to identify crossings with passive warning devices used by trucks transporting bulk hazardous materials and to designate specific routes, which have grade separations or crossings with active warning devices, for trucks carrying bulk hazardous materials to use near hazardous materials terminals and depots. (Class II, Priority Action) (H-81-72)

Establish a method which, through a cooperative effort of hazardous materials carriers and the railroads, will identify to the States crossings that are frequently used by bulk hazardous materials trucks and that need improved warning devices. (Class II, Priority Action) (H-81-73)

Issue an "On Guard" Bulletin to shippers and carriers of bulk hazardous materials alerting drivers of trucks carrying bulk hazardous materials to the dangers of crossings. The bulletin should encourage drivers to use routes with grade separations or crossings with active warning devices and to report to their supervisors the locations of crossings with passive warning devices that must be used. (Class II, Priority Action) (H-81-74)

Modify the informational document "Criteria to Designate Routes for Transporting Hazardous Materials" to specifically address the hazards of crossings. (Class III, Longer-Term Action) (H-81-75)

Study the feasibility of requiring drivers to have an additional national or State license or endorsement to drive trucks used to transport bulk hazardous materials. The study should establish criteria for prior driving record and training in handling hazardous materials and in emergency procedures. (Class III, Longer-Term Action) (H-81-76)

Amend 49 CFR 392.10 to require trucks carrying bulk hazardous materials to stop at crossings with active warning devices only when the devices are activated to warn drivers of an approaching train, so that it will be consistent with the Uniform Vehicle Code. (Class II, Priority Action) (H-81-77)

--to the Secretary of Transportation:

Include the National Highway Traffic Safety Administration as a member of the task force for the Hazardous Materials Information System which will determine hazardous materials data needs for accident reports. (Class II, Priority Action) (I-81-8)

Consider the development of uniform short supplemental accident data forms to supplement existing Federal Highway Administration, Federal Railroad Administration, and National Highway Traffic Safety Administration accident report forms. (Class III, Longer-Term Action) (I-81-9)

Put into effect methodology to cross-reference accidents compiled by Department of Transportation administrations to periodically assess the validity of the data and the completeness of the data files, and to prepare detailed case analyses. (Class III, Longer-Term Action) (I-81-10)

—to the Research and Special Programs Administration:

Include in the hazardous materials enforcement courses offered through the Transportation Safety Institute instructions concerning driver responsibilities at crossings when transporting bulk hazardous materials. (Class III, Longer-Term Action) (H-81-78)

--to the National Safety Council:

Expand the existing Operation Lifesaver program to include a specific program which addresses the problems with trucks carrying bulk hazardous materials, especially petroleum products, over crossings. (Class II, Priority Action) (H-81-79)

—to the International Association of Chiefs of Police; American Trucking Associations, Inc.; National Tank Truck Carriers Association; the American Petroleum Institute; Brotherhood of Locomotive Engineers; United Transportation Union; Association of American Railroads; and Governors of all States:

Assist the National Safety Council in its program to reduce accidents involving trucks carrying bulk hazardous materials across crossings. (Class II, Priority Action) (H-81-80)

--to the Association of American Railroads:

Encourage railroads to develop programs for train crewmembers to report: (1) truck carriers identified as transporters of bulk hazardous materials, (2) crossings with passive warning devices which are used frequently by bulk hazardous materials trucks, and (3) bulk hazardous materials trucks which are involved in near-collisions. (Class II, Priority Action) (R-81-96)

—to all States:

Review State laws and regulations regarding the transportation of bulk hazardous materials by trucks across crossings and modify them to conform with the Uniform Vehicle Code. (Class III, Longer-Term Action) (H-81-81)

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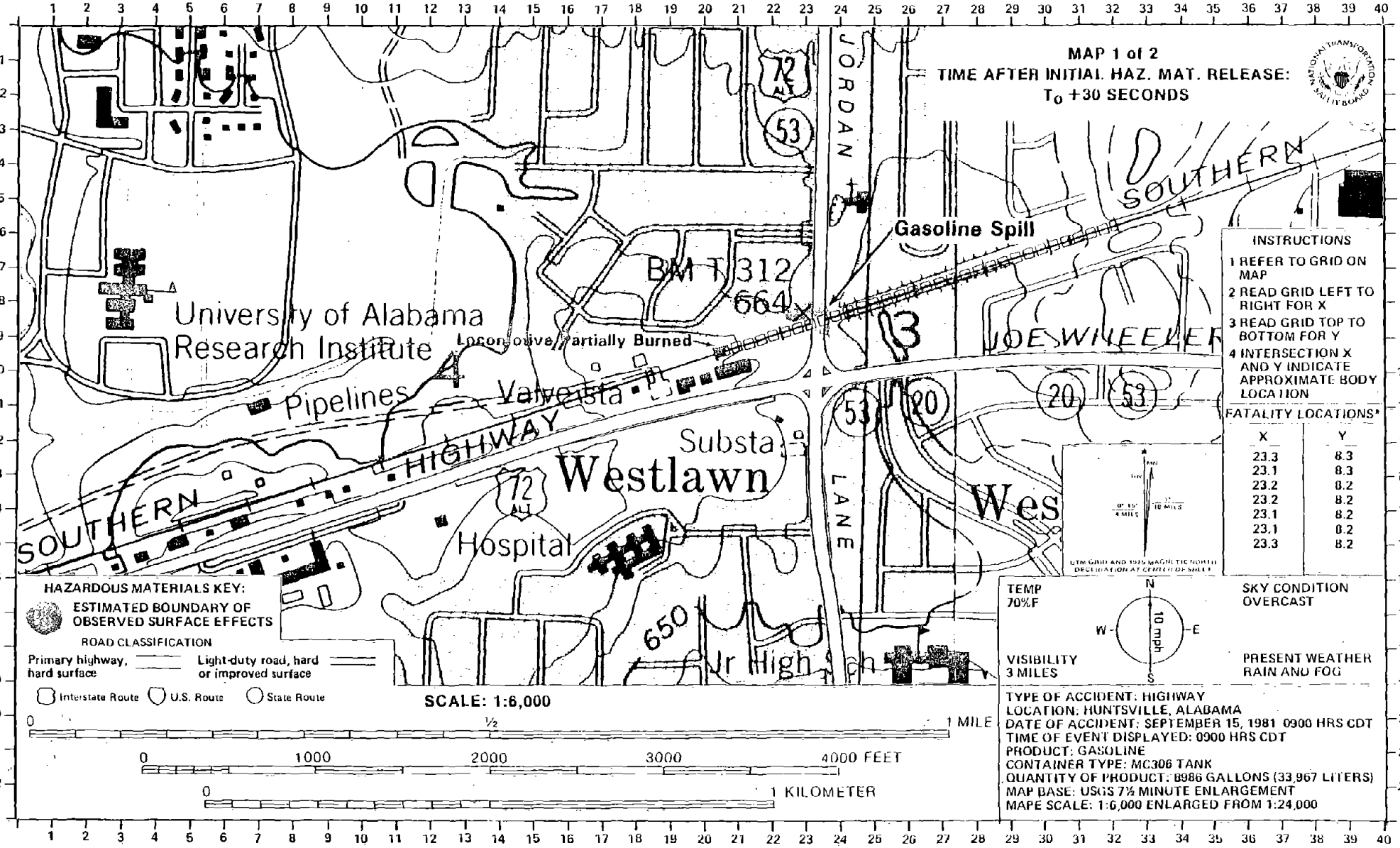
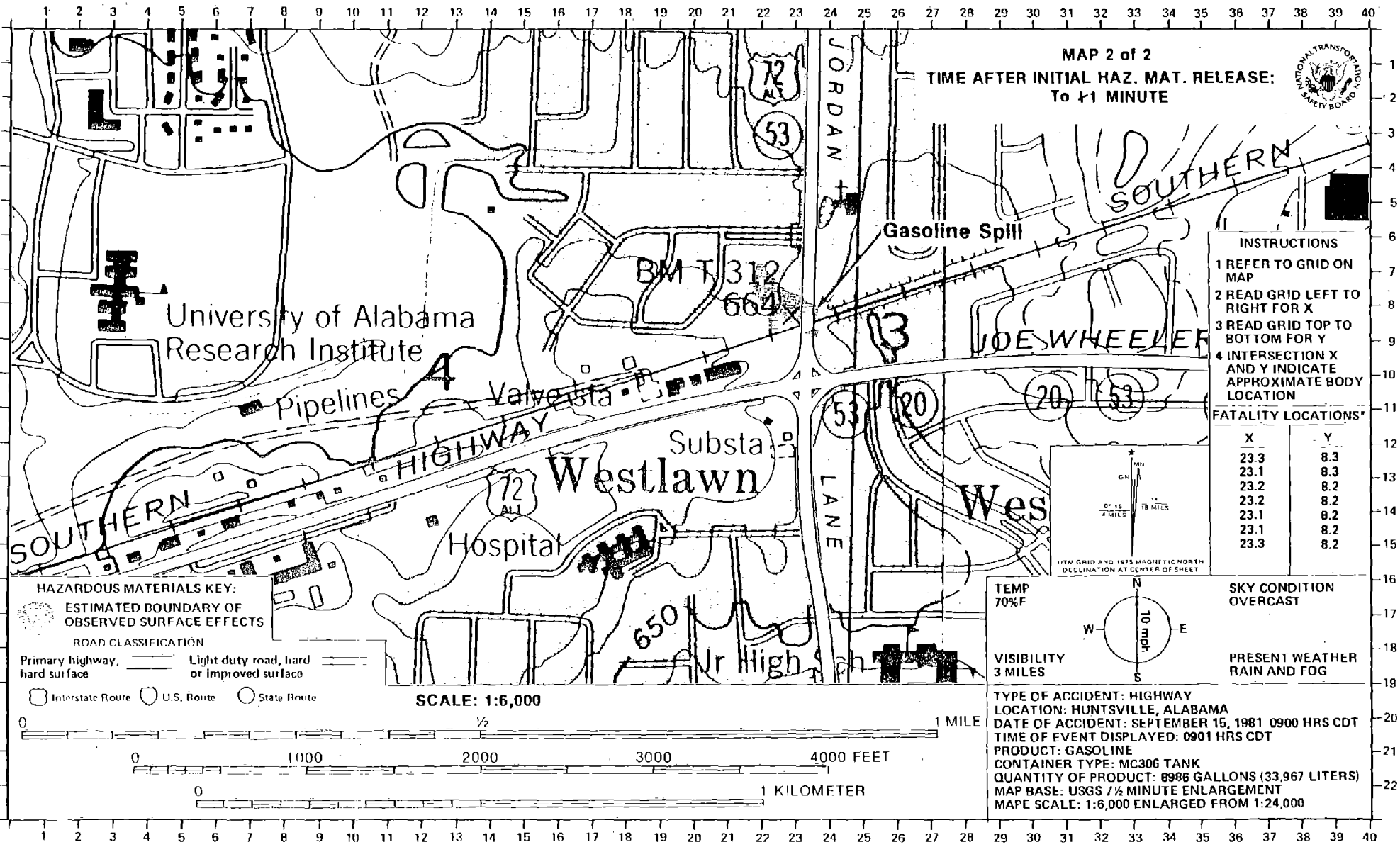

MAP 1 of 2
TIME AFTER INITIAL HAZ. MAT. RELEASE:
T_O +30 SECONDS
Gasoline Spill
University of Alabama
Research Institute
Locomotive, Partially Burned
Pipelines
Valvesta
HIGHWAY
SOUTHERN
Substa
Westlawn
Hospital
JORDAN
LANE
JOE WHEELER
SOUTHERN
BM T 312
664
650
Jr High
INSTRUCTIONS
1 REFER TO GRID ON MAP
2 READ GRID LEFT TO RIGHT FOR X
3 READ GRID TOP TO BOTTOM FOR Y
4 INTERSECTION X AND Y INDICATE APPROXIMATE BODY LOCATION
FATALITY LOCATIONS*
X Y
23.3 8.3
23.1 8.3
23.2 8.2
23.2 8.2
23.1 8.2
23.1 8.2
23.3 8.2
HAZARDOUS MATERIALS KEY:
ESTIMATED BOUNDARY OF OBSERVED SURFACE EFFECTS
ROAD CLASSIFICATION
Primary highway, hard surface
Light-duty road, hard or improved surface
Interstate Route
U.S. Route
State Route
SCALE: 1:6,000
0 ½ 1 MILE
0 1000 2000 3000 4000 FEET
0 1 KILOMETER
TEMP 70°F
SKY CONDITION OVERCAST
N
W
E
S
10 mph
VISIBILITY 3 MILES
PRESENT WEATHER RAIN AND FOG
TYPE OF ACCIDENT: HIGHWAY
LOCATION: HUNTSVILLE, ALABAMA
DATE OF ACCIDENT: SEPTEMBER 15, 1981 0900 HRS CDT
TIME OF EVENT DISPLAYED: 0900 HRS CDT
PRODUCT: GASOLINE
CONTAINER TYPE: MC306 TANK
QUANTITY OF PRODUCT: 8986 GALLONS (33,967 LITERS)
MAP BASE: USGS 7½ MINUTE ENLARGEMENT
MAPE SCALE: 1:6,000 ENLARGED FROM 1:24,000

APPENDIX C


MAP 2 of 2
TIME AFTER INITIAL HAZ. MAT. RELEASE:
To +1 MINUTE
NATIONAL TRANSPORTATION SAFETY BOARD
Gasoline Spill
University of Alabama
Research Institute
Pipelines
Valvesta
Substa
Westlawn
Hospital
Jr High Sch
SOUTHERN HIGHWAY
JORDAN LANE
JOE WHEELER
BM T 312
664
650
72 ALT
53
20
INSTRUCTIONS
1 REFER TO GRID ON MAP
2 READ GRID LEFT TO RIGHT FOR X
3 READ GRID TOP TO BOTTOM FOR Y
4 INTERSECTION X AND Y INDICATE APPROXIMATE BODY LOCATION
FATALITY LOCATIONS*
X Y
23.3 8.3
23.1 8.3
23.2 8.2
23.2 8.2
23.1 8.2
23.1 8.2
23.3 8.2
UTM GRID AND 1975 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET
HAZARDOUS MATERIALS KEY:
ESTIMATED BOUNDARY OF OBSERVED SURFACE EFFECTS
ROAD CLASSIFICATION
Primary highway, hard surface
Light-duty road, hard or improved surface
Interstate Route
U.S. Route
State Route
SCALE: 1:6,000
0 ½ 1 MILE
0 1000 2000 3000 4000 FEET
0 1 KILOMETER
TEMP 70%F
SKY CONDITION OVERCAST
VISIBILITY 3 MILES
PRESENT WEATHER RAIN AND FOG
N W E S
10 mph
TYPE OF ACCIDENT: HIGHWAY
LOCATION: HUNTSVILLE, ALABAMA
DATE OF ACCIDENT: SEPTEMBER 15, 1981 0900 HRS CDT
TIME OF EVENT DISPLAYED: 0901 HRS CDT
PRODUCT: GASOLINE
CONTAINER TYPE: MC306 TANK
QUANTITY OF PRODUCT: 8986 GALLONS (33,967 LITERS)
MAP BASE: USGS 7½ MINUTE ENLARGEMENT
MAPE SCALE: 1:6,000 ENLARGED FROM 1:24,000