Vehicle Factors Group Chairman's Factual Report
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National Transportation Safety Board
Office of Highway Safety
Investigations Division
Washington, DC 20954

Vehicle Factors Group Chairman's Factual Report **HWY-00-F-H001**

A. Accident File Information

Investigation No.	: HWY-00-F-H001
Accident Type	: School Bus Collision with Tandem Axle Dump Truck
Accident Location	: Central Bridge, New York
Date and Time	: October 21, 1999, 10:30 a.m. EDT
Ambient Conditions	: Clear, Dry
Vehicle #1	: 1997 AmTran, 66 Passenger School Bus
Vehicle #2	: 1987 Mack Tandem Axle Dump Truck in combination with a 1988 InterState Tri-Axle Utility Trailer

B. Vehicle Group Members / Participants

Group Chairman: Christopher C Voeglie, Investigator/Heavy Vehicle Specialist
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C. Accident Summary

On Thursday, October 21, 1999, at about 10:30 a.m. EDT a 1997 International AmTran school bus, operated by Kinnicutt Bus Company (Kinnicutt), was northbound on State Route 30A (SR-30A/Zicha Road). The bus, occupied by the driver, 44 students (ages 5 to 9), and six adults was en-route to an Albany City School field activity. The bus drove past the flashing red lights and stop sign at the intersection of SR-30A and State Route 7 (SR-7) into the path of an oncoming westbound 1987 Mack dump truck towing a utility trailer, operated by MVF Construction Company.

Two students received critical injuries, three students and two adults were seriously injured, about 30 students, one adult, and both drivers sustained minor injuries, and nine students and three adults were uninjured.

D. Vehicle Information

School Bus

Year	: 1997
Make	: AmTran
Mode:	: CS3102-66
VIN	: 1HVBBABN7VH514240
Registration	: BE4338- NY
Seating Capacity	: 66 Children, 44 Adult, 13 Standees
Owner	: Kinnicutt Bus Incorporated
Fleet Unit No.	: 57
Wheel Base	: 254 inches
Engine Model	: Navistar, T444E, B190
Axle Ratio	: 4.78:1
Transmission	: Allison AT 545, 4 Speed Automatic
GVWR	: 29,000 lbs.
Front GAWR	: 10,000 lbs.
Drive GAWR	: 19,000 lbs.

Mack Dump Truck

Year	: 1987
Make	: Mack
Model	: RD 690S
VIN	: 1M2P198C7HA001114
Registration	: DH1720 - NY
Owner	: MVF Construction Co.
Engine	: Mack
Axle Ratio	: 5.73:1

Mack Cont.

Transmission: Mack 6 Speed Manual

Trans. Model	: T2060
GVWR	: 54,480 lbs.
Front GAWR	: 12,080 lbs.
1st Drive GAWR	: 21,200 lbs.
2nd Drive GAWR	: 21,200 lbs.

Utility Trailer

Year	: 1988
Make	: Interstate
Model	: 44DA
VIN No.	: 1JK0DA339JA220001
Registration	: 51727R - NY
Owner	: MVF Construction Co.
GVWR	: 46,000 lbs.
Overall Length	: 33'8"

E. Vehicle Inspections

General and mechanical inspections were performed by the vehicle group from October 21, through October 25, 1999, at the New York Department of Transportation maintenance facility on Mineral Springs Road in Schoharie, New York.

AmTran School Bus

The American Transportation (AmTran) Corporation located in Conway, Arkansas, manufactured the school bus on June 3, 1997. The bus body, model number CS3102-66, serial number 80720, was rated by the manufacturer to seat 66 children or 44 adults and 13 standees. The bus was configured with an International 3800, 254 inch wheel-base chassis, which was manufactured on May 16, 1997 and assigned vehicle identification number 1HVBBABN7H514240. The vehicle odometer reading at the time of inspection indicated 44,291 miles. At the time of the accident,

the bus was owned and operated by Kinnicutt Bus Incorporated of Menands, New York and had been subject to two separate recalls issued by AmTran the manufacturer. The first recall number 98509, was regarding the replacement of fuel supply lines on the engine and corrective action had been completed in August of 1999. The second recall number 99303, was issued regarding the flip seat assembly at the emergency exit on the left side of the vehicle. The recall addressed the location of the seat's hinge assembly as the two halves of the hinge pass near each other creating a scissors action and a potential injury mechanism. According to Kinnicutt officials, the repairs were completed on September 8, 1999.

Power Train - The bus was equipped with an International Navistar, 7.3 liter, electronically controlled diesel engine. Although the engine was electronically controlled, the electronic control module was not capable of recording, or storing engine or vehicle operational data. The engine was not equipped with an engine or exhaust brake. The bus was equipped with an Allison AT545 4-speed automatic transmission and an International N-190 19,000-pound gross axle weight rated 4.78:1 ratio drive axle.

Tire & Wheel Assemblies - The two-axle bus had six tires; two on the first axle (steering axle), and four tires on the second axle (drive axle). Tire makes, models, tread depths and air pressures were obtained. All tires were mounted on 22.5-inch by 7.5-inch steel wheel assemblies. Axle weights were obtained in conjunction with the New York State Police, Commercial Vehicle Enforcement Unit. Examination of the tire and wheel assemblies was unremarkable. The following is a table of the obtained information:

SCHOOL BUS TIRE INSPECTIONS						
AXLE	**Make**	**Model**	**Size**	**PSI**	**Rolling Radius**	**Tread**
1-R	Good Year	G159	10R 22.5	90	18.3"	11/32
1-L	Good Year	G159	10R 22.5	92	18.3"	8/32
2-R-I	Good Year	G124	10R 22.5	88	---	2-8/32
2-R-O	Good Year	G124	10R 22.5	82	19.25"	7-11/32
2-L-I	Good Year	G124	10R 22.5	82	---	4-7/32
2-L-O	Good Year	G124	10R 22.5	82	19.25	4-7/32
Front Tires Were G Load Rated and Rear Tires Were F Load Rated						

SCHOOL BUS AXLE WEIGHTS			
	Axle No. 1	**Axle No. 2**	**Total**
Left Side Weight	3,700 lbs.	4,700 lbs.	8,400 lbs.
Right Side Weight	3,150 lbs.	6,000 lbs.	9,150 lbs.
Total Axle	6,850 lbs.	10,700 lbs.	17,550 lbs.

Brakes - The bus was equipped with an S-cam air actuated mechanical brake system. The air supply system consisted of a Bendix TU-FLO 550 air compressor, with a Bendix AD-9 air dryer, which supplied a single, three compartment, steel reservoir air tank. The steering axle was configured with "clamp type-16" brake chambers, 5.5-inch Rockwell automatic slack adjusters, and 15 inch by 4 inch S-cam air mechanical brakes. The drive axle was configured with "clamp type-30" service and spring brake chambers, 5.5-inch Rockwell automatic slack adjusters and 16.5-inch by 7-inch S-cam air mechanical brakes. Inspection of the brake system and associated components was conducted utilizing 90 psi of system supplied air and was unremarkable.

SCHOOL BUS BRAKE SYSTEM COMPONENT INSPECTION					
Axle	**Wheel**	**Chamber Type**	**Slack Adjuster**	**Measured Stroke**	**Lining Thickness**
1	**Right**	16	5.5" Auto	1-7/16"	See attachment 1
1	**Left**	16	5.5" Auto	1"	See attachment 1
2	**Right**	30/30	5.5" Auto	1-9/16"	See attachment 1
2	**Left**	30/30	5.5" Auto	1-9/16"	See attachment 1

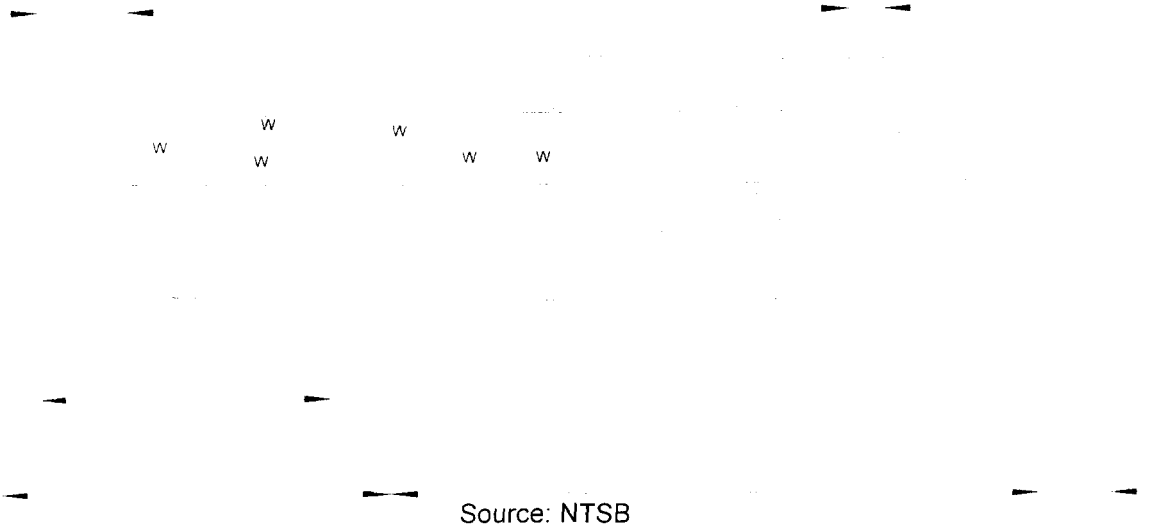
Steering - Inspection of the king pins, drag link, pitman arm and tie rod assemblies were examined under load and exhibited no signs of abnormal movement or excessive play or wear. Steering wheel lash was examined and found to be within acceptable limits. The system's full range of motion was accomplished without resistance or binding of the system. No defects or deficiencies were observed during this portion of the inspection.

Suspension - The bus was equipped with a 10,000-pound GAWR front axle with a tapered multi-leaf spring suspension, which utilized shock absorbers. The drive axle was configured utilizing a 19,000-pound GAWR, 4.78:1 ratio, drive axle with a tapered multi-leaf spring suspension, which utilized shock absorbers. The rear axle leaf springs, which were located at the area of impact, were shifted leftward. No defects or deficiencies, other than in the area of impact, were noted during inspection.

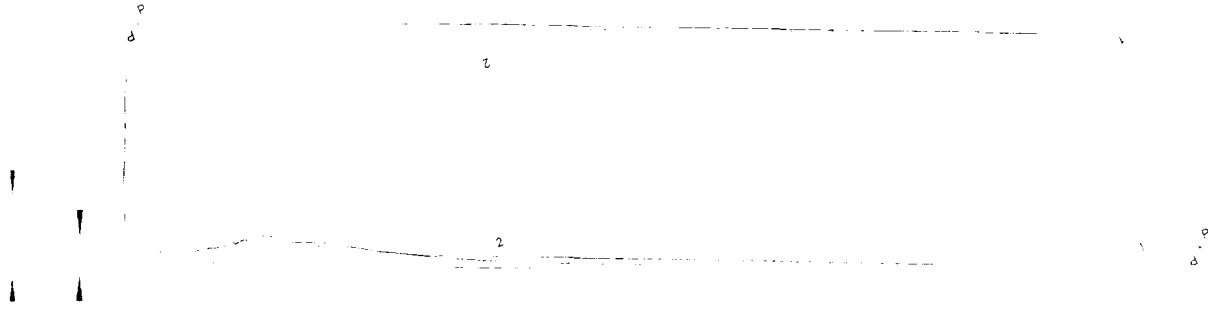
Damage[1] – Damage to the vehicle chassis, body, suspension and power train components were documented.

Chassis -The vehicle's fiberglass hood assembly was damaged and displaced at the forward hinge. The engine's frame mounting as well as the transmission's bell housing were fractured causing the engine and transmission to sag downward. The chassis' main frame rails were deformed leftward from the cross member aft of the transmission rearward with maximum deformation measured at 5.75 inches from its longitudinal axis. Frame rail cross members and rear bumper supports were also damaged. The rear axle leaf springs were displaced leftward.

Body – There was extensive body damage on the right side aft of the drive axle with 15.29 inches of intrusion. In addition to contact damage, the vehicle body received induced damage to side posts, roof bows, corner reinforcements, window frames, glass, the rear emergency exit door and frame, interior and exterior sheet metal and reinforcements, and the entrance door step well and frame area. Body to chassis mounting clips were separated in the areas of mail frame rail and floor panel deformation.



Source: NTSB



Source: NTSB

Regulatory Oversight – The Kinnicutt Bus Company was classified as a "Contract Service School Transportation Provider" by the New York State Department of Transportation (NYDOT) under Title 17, Part 720(B), of the "Bus and Passenger Vehicle Safety Regulations," of the Official Compilation of Codes, Rules and Regulations of the State of New York. As a school transportation provider, Kinnicutt

[1] *See Survival Factors Factual Report for interior and emergency exit documentation*

was subject to the regulations of the NYDOT Title 17, Parts 720, 721, 722 & 723, and the oversight of the NYDOT.

A review of the applicable Title 17 regulations found that although an intrastate operator, Kinnicutt was subject to similar regulatory guidelines found in the Federal Motor Carrier Safety Regulations applicable to interstate carriers in regard to vehicle inspection and maintenance requirements. Kinnicutt was subject to semi-annual vehicle safety inspections conducted by the NYDOT and were additionally required to maintain a pre-established regular inspection and maintenance program, which according to the regulations must be submitted to, and approved by, the NYDOT.

A review of Kinnicutt's maintenance and inspection records was unremarkable.

Mack Truck

The involved three-axle 1987 Mack dump body truck and the 1988, 33 foot utility trailer were registered to and owned by the MVF Construction Company, of Schoharie, New York. The vehicles in combination weighed 32,650 pounds with an overall length of 58 feet.

Power Train - The truck was equipped with a Mack 6 cylinder mechanically controlled diesel engine, which was equipped with an engine compression brake. The truck was equipped with a Mack, 6 speed dual range manual transmission, in conjunction with a Mack CRDPC-93 5.73:1 gear ratio axle in the #2 axle position and a Mack CRDPC-92 5.73:1 axle in the #3 axle position. The odometer indicated 187,049 miles at the time of inspection.

Tire & Wheel Assemblies - The three-axle truck had ten tires; two on the first axle (steering axle), four tires on the second axle and four tires in the third axle. Tire makes, model, tread depth and air pressures were obtained. All tires were mounted on 22.5 inch steel wheel assemblies. Vehicle axle weights were obtained for the truck with and without the utility trailer coupled. Inspection of the tire and wheel assemblies was unremarkable. The following is a table of the obtained tire information and axle weights:

TRUCK TIRE INSPECTIONS					
AXLE	**Manufacturer**	**Model**	**Size**	**PSI**	**Tread Depth**
1-L	Michelin	XYZ	385/65R 22.5	135	16/32
1-R	Michelin	XYZ	385/65R 22.5	115	18/32
2-L-I	Good Year	G124	11R 22.5	92	6/32
2-L-O	Good Year	G124	11R 22.5	94	16/32
2-R-I	Good Year	G124	11R 22.5	96	15/32
2-R-O	Good Year	G124	11R 22.5	92	0/32
3-L-I	Good Year	G124	11R 22.5	100	2/32
3-L-O	Good Year	G124	11R 22.5	90	9/32
3-R-I	Good Year	G124	11R 22.5	95	14/32
3-R-O	Good Year	G124	11R 22.5	93	15/32

TRUCK AXLE WEIGHTS COUPLED WITH TRAILER				
	Axle No. 1	**Axle No. 2**	**Axle No. 3**	**Total**
Left Side Weight	4,600 lbs.	3,400 lbs.	3,450 lbs.	11,450 lbs.
Right Side Weight	4,550 lbs.	3,500 lbs.	3,450 lbs.	11,500 lbs.
Total Axle	9,150 lbs.	6,900 lbs.	6,900 lbs.	22,950 lbs.

TRUCK AXLE WEIGHTS UNCOUPLED FROM TRAILER				
	Axle No. 1	**Axle No. 2**	**Axle No. 3**	**Total**
Left Side Weight	4,650 lbs.	3,300 lbs.	3,250 lbs.	11,200 lbs.
Right Side Weight	4,600 lbs.	3,350 lbs.	3,300 lbs.	18,100 lbs.
Total Axle	9,250 lbs.	6,650 lbs.	6,550 lbs.	22,450 lbs.

Brakes – At the time of inspection the truck was equipped with an S-cam air actuated mechanical brake system with manual slack adjusters. The truck's steering axle was configured with 16.5-inch by 5-inch S-cam air mechanical brakes, with "clamp type-20" service brake chambers and 5.5-inch manual slack adjusters. The tandem drive axles were both configured with 16.5 inch by 7- inch S-cam air mechanical brakes with "clamp type-24" 2.5" stroke service and "type-24" spring brake chambers with 6-inch manual slack adjusters. Visual inspection of the brake drums revealed no signs of

cracking or contamination. Visual inspection of the brake lining materials revealed that all brake linings were in compliance with required 49 CFR 393.47 regulations.

In addition to the brake pedal, the truck was also equipped with a hand brake on the steering column which when activated, supplied air to the drive axles and to the trailer brakes. Prior to inspecting the brake system, several leaks within the air system in the area of impact were repaired and the system was charged utilizing shop supplied and regulated air. The air supply was plumbed directly into the system within the compressor's discharge line. Due to pressure limitations within the shop's air compressor, governor cut out could not be achieved or documented. Inspection of the low air warning device revealed proper operation. The audible low air-warning buzzer activated at 60 psi and the parking/emergency brakes applied at 45 psi. Air reservoir tanks were drained to ensure proper check valve operation and to determine the presence of contaminants. No defects were observed in the operation of reservoir check valves however approximately one quart of black, oily water was drained from the reservoirs.

Inspection brake applications were made utilizing one hundred (100) pounds of air pressure per square inch of system air. Air pressures were monitored utilizing the truck's in-dash air pressure gauges, as well as an external in line regulator and pressure gauge.

Defects - Inspections revealed a failure in the brake light system of the truck and trailer which was identified as a defective brake light switch on the truck, and the absence of a tractor protection valve or device[2]. Both conditions were considered out-of-service violations of the Commercial Vehicle Safety Alliance's, North American Standard Out-Of-Service Criteria.

Tractor Protection - The Commercial Vehicle Safety Alliance's North American Uniform Out-of-Service Inspection Criteria, the Federal Motor Carrier Safety Regulation's Minimum Periodic Inspection Standards, the Federal Motor Vehicle Safety

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[2] *The tractor protection valve is designed to protect the towing vehicle's air supply during a trailer breakaway and or when a severe air leak developed with either vehicle. The valve is routinely utilized to control the trailer service and supply lines before disconnecting the trailer from the towing vehicle. The valve is typically located near the rear of the towing vehicle and operates in conjunction with a dash mounted control valve.*

Standard 121 S5.1.3, and 49 CFR 393.43 all address the requirement of a tractor protection device or system on the accident truck. This system, or device is most commonly referred to as a "Tractor Protection Valve" (TPV), which protects the towing vehicle or tractor, from the effects of a loss of air pressure in the towed vehicle or breakaway.

Safety Board vehicle inspections revealed that the "Glad Hands"[3] on the rear of the accident truck had been plumbed into the existing air brake lines from the truck's third axle assembly. The trailer supply Glad Hand had been plumbed into the parking brake circuit of the third axle, and the trailer service Glad Hand had been plumbed into the service delivery line after the third axle's relay valve. Both of the Glad Hands were additionally equipped with a manual shut off valve.

In this configuration, and with the manual shut off valves in the open position, an attached trailer would be provided with an air supply source whenever the truck's parking brakes were released. Because the truck's parking brakes were held in the released position by air pressure, the trailer supply system would be charged whenever the driver released the truck's parking brakes by supplying system air pressure to the parking brake circuit.

Because the trailer service line was plumbed directly into the truck's third axle relay valve delivery line, the trailer would receive a proportional air application signal whenever the truck's foot valve or hand operated brake valve was activated.

Current vehicle inspection procedures regarding tractor protection valve and trailer bleed back inspections require the inspector to instruct the driver to release the vehicle's emergency or parking brakes by pushing in the driver accessible dash mounted control valve(s) and then to exit the vehicle. The driver is then asked to disconnect both air lines from the towing vehicle. After both of the lines are disconnected, the inspector is to immediately check the trailer Glad Hands for escaping air. Although a brief and small amount of air discharge is normal, a steady or continual

[3] *Glad Hands are defined within the fourth edition of the Motor Truck Engineering Handbook as "a separable mechanical connector used to join air line hoses when combination vehicles are coupled together."*

escape of air would be indicative of a defective emergency relay valve on the trailer. Additionally, when the air lines are disconnected air will begin exhausting from the towing vehicle's supply Glad Hand and may shut off quickly, around 60-70 p.s.i.

In the event that air continues to escape below 20 p.s.i. of system air, the tractor protection valve should be considered defective and an Out-of-Service condition would exist. When air stops exhausting from the supply line, the driver should be asked to return to the tractor and make a service brake application. Should air exhaust from the service Glad Hand during the service brake application, the tractor protection valve should also be considered defective and an Out-of Service condition would exist.

Safety Board investigators found that removing both the trailer air lines did not result in any unusual bleed back from the trailer emergency relay valve, and that air ceased exhausting from the supply Glad Hand on the truck at approximately 45 p.s.i. of system air. An additional inspection step revealed that upon a service brake application, the truck's remaining system air would be rapidly exhausted out of the service Glad Hand indicating a defective TPV. Further inspection revealed that the truck was in fact not equipped with a TPV, but because of the manner in which the Glad Hands had been plumbed into the truck's original air system, would produce a false indication that a TPV existed and was operating properly should an inspector fail to conduct the additional service brake application.

The following is a table of air brake chamber type and size slack adjuster type and length and measured push rod strokes found during inspection at each wheel:

TRUCK BRAKE SYSYTEM COMPONENT INSPECTION					
Axle – Wheel		**Chamber Type**	**Slack Adjuster**	**Stroke**	**Lining Thickness**
1	**Right**	20	5.5" Manual	5/8"	In excess of requirements
1	**Left**	20	5.5" Manual	1-1/4"	In excess of requirements
2	**Right**	24/24	6" Manual	1-1/4"	In excess of requirements
2	**Left**	24/24	6" Manual	2" **	In excess of requirements
3	**Right**	24/24	6" Manual	1-1/2"	In excess of requirements
3	**Left**	24/24	6" Manual	1- ¾	In excess of requirements
** Denotes a brake assembly found to be at its re-adjustment limit however is not considered a violation or OOS condition.					

Steering - Inspections revealed no indications of excessive wear or play within the steering system linkages. The steering column was bent in the area of impact.

Suspension - The front axle had a gross axle weight rating of 12,080 pounds. The axle was configured with a taper leaf spring and shock absorber suspension. The front axle had been shifted rightward and the axle U-bolts on the right side were loose and the centering pin was sheared.

The rear suspension was configured with tandem drive axles with a gross axle weight rating of 21,200 pounds per axle configured with a Mack "Camelback" leaf spring suspension.

Defects - Inspections revealed a CVSA Out-Of-Service equipment violation of a spring to axle fastening device of the left #3 axle[4]. One of the four axle clamp bolts was found loose with no evidence of axle movement or shifting was found. Vehicle maintenance records indicated that on June 7, 1999, the left rear axle spring was replaced.

[4] *Appendix A, Part II section 9a(1) of the CVSA OOS criteria defines "any U-bolt(s) or other spring to axle clamp bolt(s) cracked, broken, loose, or missing. 393.207(a)*

Coupling Devices - The truck and trailer were coupled utilizing a pintle hook assembly. The post crash inspection of the pintle hook components of both the trailer and the truck revealed no defects or violations.

Source: NTSB

Damage – The truck sustained a frontal impact destroying the front cowling which encompassed the front fenders and engine cover including headlight and signal assemblies. The hood, radiator and battery boxes were also damaged. The windshield in the area of the driver was fractured. The post accident wheelbase on the right side was measured at 202.5 inches and the left side was measured at 212.9 inches. Both frame rails in the engine compartment had been deformed rightward a maximum of 11.5 inches.

Source: NTSB

Regulatory Oversight and Inspection History - MVF Construction Company (MVF) was classified as a "private not for hire intrastate carrier", whose vehicles were subject to the inspection and maintenance regulations stipulated in "Article 5, Part 79", of the New York Vehicle and Traffic Law. These regulations require a minimum of one annual vehicle inspection conducted by an official inspection station, which must be licensed and registered with the New York Department of Motor Vehicles. The inspection criteria to be utilized for the annual inspection of vehicles was additionally set forth in "Article 5, Part 79.27 Heavy Vehicle Inspection", of the New York Vehicle and Traffic Law. This inspection criteria specifically addresses the mandatory presence and proper operation of a "tractor protection valve" at 79.27(o)2. Under the regulations, a valid inspection certificate is required for each vehicle(s) prior to the registering, or re-reregistering of such vehicle(s) for operation within the state of New York.

Because the State of New York adopted portions of 49 CFR 396, MVF was also specifically subject to the requirements of 49 CFR 396.17 regarding annual vehicle inspection requirements as set forth in Appendix G of subpart B which also specifically addresses the mandatory presence and proper operation of a "tractor protection valve" at Appendix G 1(g).

MVF was additionally subject to roadside inspections, which were conducted by the NYDOT and the New York State Police (NYSP) under the Motor Carrier Safety Assistance Program (MCSAP). The roadside inspections being conducted by the NYDOT and NYSP utilized the same 49 CFR regulations and the North American Uniform Out-Of-Service Criteria, utilized during the inspection of commercial vehicles which stipulates the required presence and proper operation of a "tractor protection valve" on towing vehicles.

A carrier inspection profile obtained through the NYDOT, indicated that between January of 1988 and September of 1997, MVF received only one roadside inspection which took place on May 10, 1996. This inspection revealed a minor brake hose violation on the power unit and a load securement violation, which resulted in an out-of-service order on the towed vehicle. Additional roadside inspections were conducted on

the accident truck in April and July of 1998, which resulted in a total of seven (7) equipment violations, none of which were considered out-of-service conditions. None of the conducted roadside inspections identified the absence of the TPV.

Because the State of New York adopted portions of 49 CFR 396[5], MVF was additionally subject to the requirements of 49 CFR 396.3 regarding vehicle inspections, repair and maintenance. A review of the carrier supplied maintenance and inspection records failed to demonstrate the systematic inspection, repair and maintenance documents as required. Repair work and annual vehicle inspections were being conducted by a privately owned and operated repair facility on an as needed basis. The carrier provided no documents, which would indicate the presence of a carrier conducted vehicle inspection, or driver conducted pre-trip inspection program.

A review of the applicable regulations found that although a private not for hire intrastate operator, MVF was subject to similar or like regulatory guidelines found in the Federal Motor Carrier Safety Regulations applicable to interstate carriers in regard to vehicle inspection and maintenance requirements. The state of New York does not require intrastate carriers to register with the NYDOT, nor does the state have in place any method other than the DMV required annual inspection and random roadside inspections of overseeing the operation of these intrastate commercial vehicles.

Utility Trailer

The tri-axle trailer was a 1988, Interstate 33' 8" flat bed roll-on utility trailer. The trailer was owned and registered by the MVF Construction Company of Schoharie, New York.

Brakes - The tri-axle trailer had dual wheel assemblies on all axles (axles 4, 5 and 6) which were equipped with 12.25-inch by 7.5-inch S-cam air actuated mechanical brakes, with 6-inch manual slack adjusters and "type 30" brake chambers. Visual inspection of the brake drums revealed no signs of cracking or contamination on the

[5] *Part 820.13 Chapter VI of New York's Transportation Regulations states in part the adoption of 49 CFR "subdivision (a) of section 396.1, paragraph (2) of subdivision (b) of section 396.1; 396.3;396.5;396.7;396.11;396.13;396.15,396.17;396.19;396.21;396.23;396.25."*

braking surfaces. Brake linings were observed to possess sufficient thickness as required by 49 CFR 393.47 regulations.

Defects - Inspections revealed several defects. A leaking brake hose, which was split in the area of the forward left brake chamber as well as chaffing of supply and service air lines in the area of the center and rearward axles was observed. An air loss rate test was conducted on the truck and trailer brake system as a combination vehicle. Because the truck's air compressor was damaged in the accident, the truck's air system was charged with 100 psi of shop supplied air and then isolated from the air supply. A full brake application was made and held for two minutes and released. An air system pressure loss of 2 psi was observed over the two-minute application time period. Additionally, while coupled with the truck, the trailer's brake lights were inoperative, however were found to be functional when the truck's brake light switch was bypassed. The following is a table of air brake chamber type and size, slack adjuster type and length, measured push rod strokes found during inspection at each wheel:

UTILITY TRAILER BRAKE SYSTEM COMPONENT INSPECTION			
Axle – Wheel	**Chamber Type**	**Slack Adjuster**	**Measured Travel**
4 Right	Clamp Type 30	6" Manual	1-1/2"
4 Left	Clamp Type 30	6" Manual	1-1/2"
5 Right	Clamp Type 30	6" Manual	1-1/2"
5 Left	Clamp Type 30	6" Manual	1-1/2"
6 Right	Clamp Type 30	6" Manual	2"
6 Left	Clamp Type 30	6" Manual	1-3/4"

Tire & Wheel Assemblies – The dual tires were mounted on 17.5" steel wheel assemblies. Axle weights were obtained for the utility trailer while it was coupled with, as well as un-coupled from the truck. No damage to the tire or wheel assemblies was observed. The following are tables of obtained tire information and axle weights at the time of inspection:

UTILITY TRAILER TIRE INSPECTIONS					
AXLE	**Manufacturer**	**Model**	**Size**	**Rolling Radius**	**Tread Depth**
4-L-I	KUMHO	963T	215/75R 17.5	---	8/32
4-L-O	KUMHO	963T	215/75R 17.5	15.5	9/32
4-R-I	KUMHO	963T	215/75R 17.5	---	10/32
4-R-O	KUMHO	963T	215/75R 17.5	15.5	9/32
5-L-I	Bridgestone	R184	215/75R 17.5		11/32
5-L-O	Bridgestone	R184	215/75R 17.5	15.5	13/32
5-R-I	Bridgestone	R184	215/75R 17.5	---	13/32
5-R-O	Bridgestone	R184	215/75R 17.5	15.5	8/32
6-L-I	Bridgestone	R184	215/75R 17.5	---	9/32
6-L-O	Bridgestone	R184	215/75R 17.5	15.1	9/32
6-R-I	Bridgestone	R184	215/75R 17.5	---	14/32
6-R-O	Bridgestone	R184	215/75R 17.5	15.1	14/32

TRAILER AXLE WEIGHTS WHILE COUPLED				
	Axle No. 4	**Axle No. 5**	**Axle No. 6**	**Total**
Left Side Weight	1,200	1,800	1,700	4,700
Right Side Weight	1,200	2,000	1,800	5,000
Total Axle	2,400	3,800	3,500	9,700

TRAILER AXLE WEIGHTS WHILE UNCOUPLED				
	Axle No. 4	**Axle No. 5**	**Axle No. 6**	**Total**
Left Side Weight	600	1,300	2,500	4,400
Right Side Weight	650	1,500	2,500	4,650
Total Axle	1,250	2800	5000	9,050
Pintle Hook	1,300	---	---	10,350

Suspension - The tri-axle trailer was equipped with a torque rod and leaf spring suspension assembly with adjustable stabilizer arms. The manufacture's Gross Vehicle Weight Rating for the trailer was 46,000 pounds and the Gross Axle Weight Rating was 20,000 pounds for each axle.

Damage – Examination of the trailer for crash damage was unremarkable.

P

F. List Of Attachments

Attachment 1, 2 Pages – School Bus Brake Lining Inspection Diagram

Attachment 2, 3 Pages – NY State Police Vehicle Inspection Report

Attachment 3, 6 Pages – NYDOT Post Accident School Bus Inspection Report

Attachment 4, 6 Pages – NTSB Vehicle Diagrams

Attachment 5, 2 Pages - Photograph Log

Attached, (1) 1.44 MB 3.5" Floppy Disk Containing 4 Color Digital Photographs

Total Pages in This Report Including Attachments-40, Including 4 Photographs, 1 Attached Diskette.

[redacted] 9-6-00

Christopher C. Voeglie — Date
Vehicle Group Chairman