United States General Accounting Office

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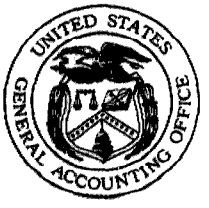
Report to the Honorable Bob Edgar
House of Representatives

January 1986

MASS TRANSIT

Information on SEPTA Commuter Rail Operations



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United States
General Accounting Office
Washington, D.C. 20548

Resources, Community, and
Economic Development Division

B-221081

January 21, 1986

The Honorable Bob Edgar
House of Representatives

Dear Mr. Edgar:

This report is in response to the questions in your February 6, 1985, letter and subsequent agreements with your office regarding commuter rail operations of the Southeastern Pennsylvania Transportation Authority (SEPTA). You asked us to

- compare SEPTA's safety record with other commuter rail systems';
- identify actions SEPTA has taken to ensure the safe operation of its commuter rail service;
- review SEPTA's efforts to integrate the rail operations into its overall transit operations, including the provision of funds; and
- determine the Department of Transportation's (DOT's) Urban Mass Transportation Administration (UMTA) funding provided to SEPTA for training and research and development.

SEPTA provides public transportation service for Philadelphia and four surrounding counties that cover 2,200 square miles and have a population of 3.7 million people. The system includes bus, trolley, and subway lines that transport 1.2 million passengers daily and a commuter rail system that carries about 90,000 passengers daily.

During 1984, six train accidents, some involving passenger injuries, occurred on SEPTA's commuter rail lines. These are more accidents than were experienced by four other commuter rail systems in the Northeast United States although SEPTA carried fewer passengers than three of these commuter rail systems. According to SEPTA data, human error during adverse weather conditions was the most frequent cause of SEPTA train accidents.

SEPTA has taken various actions to improve its commuter rail operations, both on its own initiative and in response to studies undertaken during 1985. SEPTA on its own has

- increased employee training,
- improved the condition of plant and equipment, and
- increased monitoring of train operations to ensure compliance with federal safety requirements.

In addition, SEPTA has reported more non-train injuries such as passengers falling on steps and platforms than the other four commuter rail systems. While SEPTA believes that improvements in these areas are desirable, it considers such improvements to be secondary to track, bridge, and passenger needs.

In early 1985, SEPTA engaged former Secretary of Transportation William T. Coleman, Jr., to perform a comprehensive study of SEPTA's commuter rail operation. His report has been issued and SEPTA has implemented most of the study's safety-related recommendations. Also, DOT's Federal Railroad Administration (FRA) (1) performed a special safety assessment of SEPTA's commuter rail system and (2) reviewed SEPTA's new track switch installations. FRA's October 1985 report made recommendations aimed at improving areas such as training, record keeping, emergency response planning, and facility condition. Some of these recommendations paralleled the Coleman study recommendations. Further, DOT's Office of Inspector General (OIG) was reviewing the safety of the bridges SEPTA acquired with the commuter rail system in 1983; the OIG review was still in process in January 1986.

When it first began operating the commuter rail system in 1983, SEPTA included it as part of its transit division that was responsible for Philadelphia's mass transit service. In June 1984, SEPTA separated the commuter rail service from other mass transit service to provide more direct management.

SEPTA provided $85 million to rehabilitate commuter rail plant and equipment during 1983 and 1984, which was 25 percent of SEPTA's capital spending. In contrast, commuter rail accounts for 16 percent of SEPTA's passenger revenue. SEPTA's proposed budget through 1990 provides $410 million for commuter rail improvements based on its anticipated funding level. This compares to an estimated $1 billion that the SEPTA budget estimates is needed to put commuter rail facilities and equipment in "good" condition.

UMTA provided two training grants totaling about $2 million in 1983 and 1984. These grants were to meet the special training needs for SEPTA engineers and conductors that arose from its takeover of the commuter rail operation. UMTA has not provided SEPTA with research and development funds for commuter rail safety because, according to UMTA officials, such funds have not been requested.

The following sections provide additional information on these issues. The information was obtained largely from accident data for SEPTA and four other commuter railroads, analysis of the Coleman and FRA studies, and interviews with SEPTA and UMTA officials. The scope and methodology for this study are explained in detail in appendix I.

Background

Before January 1, 1983, SEPTA subcontracted the commuter rail service operation to the Consolidated Rail Corporation (Conrail). However, with the enactment of the Northeast Rail Services Act of 1981 (NERSA), Public Law 97-35, SEPTA chose to operate the commuter rail system itself. NERSA objectives include (1) replacing Conrail as the operator of commuter rail lines and (2) making commuter rail operations more efficient by encouraging new labor agreements.

According to SEPTA officials, the transferred railroad plant and equipment were in need of major renovations. The condition of the track signal system, stations, and bridges was "fair," "poor," or "bad"; only the passenger cars were in generally "good" condition. SEPTA officials pointed out that its passenger cars are all over 10 years old and should be scheduled for overhauling to check the condition of the cars for needed repairs. They estimated that about 95 percent of the cars are in need of overhauling.

To operate the system, SEPTA set up a new commuter rail entity with new management and new rules concerning the length of the work day. Engineers, conductors, craftsmen, and other employees were hired initially from available Conrail staff. They were allowed to retain the salaries previously paid by Conrail and were given the right to return to Conrail at specified intervals.

Shortly after the takeover, SEPTA faced a labor strike that lasted 108 days. The new collective bargaining agreement rising out of the strike settlement resulted in work rule changes such as splitting the work day into two shifts with an extended unpaid period between peak ridership hours. Because of the work rule changes, the commuter rail operation lost 55 of its 148 train engineers (37 percent) in the first year of operation. These employees either (1) returned to Conrail, (2) exercised early retirement, or (3) took employment with other railroads.

In November 1984, a SEPTA commuter train overshot a station, backed up, and collided with another train, injuring almost 250 people. Also in November, the system's new Center City Commuter Tunnel, which was

to link the former Penn Central and Reading railroad lines and result in an expanded system, was closed shortly after it opened due to serious deterioration in an approach bridge. Another major accident occurred in January 1985 when a commuter train rolled away from operators who had left the train; it continued rolling unattended for about a mile and hit another train, causing several injuries. According to SEPTA, both accidents were caused by the failure of SEPTA employees to comply with the railroad's Book of Operating Rules. The employees involved were former Conrail employees who had had many years of railroad experience before joining SEPTA.

These events and a desire to evaluate the rail system's overall management and operations led SEPTA to commission a comprehensive study of the commuter rail system by former Secretary of Transportation William T. Coleman, Jr., in January 1985. In addition, FRA, which monitors railroad compliance with federal railroad safety rules and regulations by periodic on-site inspections, conducted a special assessment of SEPTA in April 1985. Over 30 FRA inspectors spent 4 weeks in the field making detailed inspections of track, equipment, and signals, as well as numerous tests of operating procedures.

Accident and Injury Comparison

As agreed with your office, we compared the number of SEPTA train accidents involving passengers for 1983 and 1984 with the Boston and Maine, Long Island, Metro North (service between Connecticut and New York City), and New Jersey transit commuter railroads. The comparison, which is detailed in appendixes II, III, and IV, shows that SEPTA had six train accidents during the 2-year period (all in 1984), followed by Metro North, which had four. According to SEPTA, the causes of the SEPTA train accidents varied, but human error during adverse weather conditions was the cause of three accidents. SEPTA said that equipment failure was the cause of only one accident. To provide some perspective on the number of accidents, SEPTA carried about 17 million passengers in 1984 over its 272 route miles. Of the five carriers, SEPTA ranked fourth in numbers of passengers and number of route miles.

Another comparison, included as appendix V, shows that during 1983-84, SEPTA reported 399 non-train-related injuries, of which 294 were the results of falls on steps and platforms. This was almost twice as many as the next highest of the four systems. Of the five other categories for injuries (including the "other" category), SEPTA had the most injuries in three, was second in the "assault" category, and fifth in one category (struck by train).

Safety-Related Improvements

SEPTA has taken several steps to improve train operations which would also affect overall system safety. These include

- increasing employee training,
- upgrading the condition of plant and equipment, and
- increasing monitoring of train operating rule compliance.

Employee Training

Because SEPTA lost 37 percent of its commuter rail operators in the first year of operations, it had to hire and train replacements. The operator shortage led to reduced train schedules and longer work weeks for the operators. SEPTA established a training program for newly hired train engineers and conductors in April 1984. The program takes over 6 months for engineers to complete and includes extensive classroom instruction as well as on-the-job training. The program was still being provided as of January 1986 and will continue.

A SEPTA official said that a training program was not established sooner because SEPTA expected that enough experienced railroaders would be available from prior layoffs at other railroads to compensate for attrition. According to SEPTA, however, experienced railroaders did not apply for the position openings. According to SEPTA officials, the training program is now providing enough qualified operators to permit a return to a 5-day work week in the near future; currently, the operators work 6 days each week.

In addition to training engineers and conductors, SEPTA increased training for first-level supervisors to ensure that they effectively oversee operators' compliance with operating requirements. For example, SEPTA increased operating rule instruction from 1 to 2 days annually and for the first time provided training in air brake operation and rail equipment operation.

Condition of Plant and Equipment

Gannett Fleming Transportation Engineers inspected SEPTA's plant and equipment as part of the Coleman study and rated the condition on a scale from "excellent" to "bad" (see app. VI). SEPTA's passenger cars received the most favorable rating with 74 percent considered in "good" condition. Track signals were rated "fair," stations and bridges rated mainly from "fair" to "poor," and maintenance facilities ranked lowest with mainly "poor" and "bad" ratings.

SEPTA spent $85 million, 25 percent of its capital budget during 1983-84, to rehabilitate commuter rail plant and equipment. SEPTA's proposed capital budgets through 1990 provide $410 million for commuter rail improvements over the long term. The SEPTA budget shows that $1 billion is needed to upgrade the overall commuter rail condition to "good." SEPTA has ranked funding needs for its entire mass transit system; commuter rail capital improvement needs compete with other transit needs for funding.

To operate the commuter rail system it took over in 1983, SEPTA set up an entirely new organization with new management. Initially, the new organization was integrated into the transit division that has responsibility for Philadelphia's mass transit service, but in June 1984 SEPTA decided to separate commuter rail service from other mass transit service in order to more directly manage the operation. Even though it is a separate operating division, commuter rail still relies on other mass transit divisions for support services. For example, commuter rail track and facilities are managed by other SEPTA divisions.

Capital improvement projects for all of SEPTA are proposed by operating groups such as its commuter rail operation and are submitted to SEPTA's Capital Program Review Committee for approval. For the period 1980-84, commuter rail received $356 million, or 39 percent of the total capital funds. In contrast, commuter rail transported fewer passengers than other divisions and generated 16 percent of SEPTA's revenue. As shown in appendix VII, the funding budget for commuter rail from 1985 through 1990 will be about 33 percent of SEPTA's capital expenditures.

Increased Monitoring

Supervisors monitor employee compliance with railroad operating rules (e.g., train speed and response to train operating signals). SEPTA bolstered this activity in 1985 by increasing the number of supervisors from 10 to 16 and also increasing the number of rule compliance tests the supervisors conduct from an average of 800 tests a month in 1984 to an average of 1,268 a month for the first 9 months of 1985.

The Coleman Study

In January 1985, SEPTA's governing board engaged former Secretary of Transportation William T. Coleman, Jr., to lead a multi-disciplinary team in reviewing the organization, operations, safety, physical condition, employment relationships, and funding sources of SEPTA's commuter rail system. The team's report was issued in May 1985 and concluded that the commuter rail system was not unsafe at that time

and could be operated safely in the future if the employees followed SEPTA's operating rules.

The Coleman study recommended that, to improve safety, SEPTA should

- strictly enforce operating rules,
- expand safety training to include train operations during severe weather conditions,
- upgrade the physical condition of its train stations and maintenance facilities,
- establish an accident investigation team,
- train passenger attendants in the use of emergency equipment and procedures,
- more fully develop an emergency response plan,
- place responsibility for monitoring compliance with FRA regulations in its safety division, and
- develop a comprehensive accident data base to analyze accidents for the purpose of determining what is appropriate action to solve safety problems.

In its May 1985 response to the report, SEPTA classified the recommendations into 15 work steps and agreed to implement 13 of them. To implement the 13 work steps, SEPTA established seven task objectives. As of November 8, 1985, three of the objectives were completed. For example, to enforce operating rules, SEPTA now requires its employees who fail to comply with operating rules to have reinstruction and requalification training. The other four task objectives were in various stages of completion. SEPTA expects to complete them by June 1986. SEPTA did not agree to upgrade the condition of stations in order to reduce injuries from falls on platforms and steps. Although SEPTA believes the station improvements are desirable, it considers them to be secondary to track, bridge, signal, and passenger car needs. As of December 1985, SEPTA was still considering whether it should centralize the handling of all FRA inspection matters in one department.

FRA Monitoring

FRA conducts regular inspections of railroad compliance with federal railroad safety rules and regulations through periodic on-site inspections. FRA increased the frequency of these inspections at SEPTA in January 1983 to help the new commuter rail organization meet federal rail safety compliance requirements.

SEPTA's accident history in 1983, 1984, and the first 3 months of 1985 prompted FRA to conduct a special assessment of the commuter rail operation in April 1985. According to FRA, its special assessment was conducted by over 30 inspectors and focused on SEPTA's operating practices, signal and train control, plant and equipment, and employee training. After the FRA field inspections were completed, another train accident occurred on June 27, 1985, that, according to SEPTA, was caused by a false signal. FRA then conducted another assessment of SEPTA's new signal installations.

A report on both assessments was issued in October 1985. FRA found that SEPTA's operating procedures were improving, but that serious safety problems existed in such areas as employee and supervisory training, records of safety compliance, emergency response plans, and physical condition of facilities.

The report recommendations paralleled the Coleman study in such areas as emergency response planning, employee training, and upgrading of facilities. The report recommended that SEPTA should

- evaluate its personal safety program and demonstrate a positive commitment to safety;
- provide timely safety data to supervisors and safety officers;
- establish local safety committees;
- encourage employees to report unsafe conditions;
- develop an emergency response program;
- ensure that federal recordkeeping requirements are met;
- restore or replace antiquated facilities;
- implement a training program in the application of federal safety regulations;
- retrain experienced engineers who had not had sufficient formal training in commuter rail operations;
- establish formal training for bridge inspectors, train dispatchers, and tower persons; and
- develop precise and detailed test instructions for performing tests of new or restored signal installations.

FRA's report identified corrective actions SEPTA had already taken on safety-related items that FRA believed needed immediate attention, such as improving the temporary signal systems that alert work crews to approaching trains.

In discussing its comments on the FRA study with us, SEPTA said that it identified 111 recommendations requiring its actions. SEPTA has taken action on 27 recommendations and is working to address 36 others. SEPTA said it is evaluating two other recommendations and has reserved judgment pending further consideration. SEPTA believes that 20 FRA recommendations are vague or misleading and therefore plans no action at this time. SEPTA disagrees with 26 FRA recommendations and plans no action at this time.

UMTA Funding

UMTA provided SEPTA additional funding to assist with the training needed when it took over the commuter rail operation and when the Center City Commuter Tunnel opened. The tunnel linked the former Penn Central and Reading railroad lines, and SEPTA engineers and conductors who previously operated on either Penn Central or Reading lines are now required to qualify on both. The additional training funds were provided in two grants:

- The first, in November 1983, provided $850,000 to train existing engineers on lines for which they had not previously operated trains. This was in preparation for the opening of the Center City Commuter Tunnel.
- The second, in November 1984, provided $1.2 million for training newly hired engineers and conductors.

Conclusion

While we have not evaluated the adequacy of SEPTA's specific actions in response to the two recent expert studies, it appears that SEPTA is working to improve system safety. For example, SEPTA has established a separate unit to manage the commuter rail system, is making capital improvements to the system at a rate that exceeds system revenue, and has increased its training of engineers and conductors. In addition, a SEPTA official told us that SEPTA has already made some of the specific improvements recommended by the Coleman study and has taken action on those safety-related items that FRA believed needed immediate attention. Most of the other recommendations by the two studies are either in the process of being implemented by SEPTA or are under consideration by SEPTA's management.

Agency Comments

FRA, UMTA, and SEPTA officials expressed agreement with the information in the report. They provided specific changes to the report which have been incorporated where appropriate.

As agreed with your office, we do not plan further work on this subject at this time. Should you require our assistance at a later date, we will be happy to discuss how we can assist you. As arranged with your office, after 30 days we will send copies of this report to the Secretary of Transportation; the Administrators, FRA and UMTA; and the Chairman, Southeastern Pennsylvania Transportation Authority. We will also make copies available to others upon request.

Sincerely yours,

J. Dexter Peach
Director

Contents

Abbreviations

DOT	Department of Transportation
FRA	Federal Railroad Administration
GAO	General Accounting Office
NERSA	Northeast Rail Services Act
OIG	Office of Inspector General
RCED	Resources, Community, and Economic Development Division
SEPTA	Southeastern Pennsylvania Transportation Authority
UMTA	Urban Mass Transit Administration

Scope and Methodology

We performed our work during the period from February 1985 through July 1985 at SEPTA locations in Philadelphia, Pennsylvania.

We collected and analyzed accident data for the years 1983 and 1984 for SEPTA and four other commuter railroads in the Northeast United States. These were the most recent data available at the time of our review. As agreed with Congressman Edgar's office, the four are: New Jersey Transit, Long Island, Metro North, and Boston and Maine.

In developing accident data for SEPTA and the four other commuter railroads, we included only accidents involving passengers on main-line tracks. We did not include, for example, non-passenger-related accidents occurring in the train yards. Further, in comparing types of injuries, we included only non-train-related passenger incidents for specific causes. We did not include, for example, employee-related accidents.

As we were beginning our work, SEPTA commissioned a comprehensive study of its commuter rail operations by former Secretary of Transportation William T. Coleman, Jr. FRA also started a special assessment of SEPTA in April 1985, and DOT's Office of Inspector General started a bridge study in February 1985. So as not to duplicate their efforts, we reduced the scope of our work and relied on these studies to analyze SEPTA's operations and facilities from a safety perspective. We also discussed with SEPTA the actions it has taken or plans to take as a result of the studies, but did not attempt to evaluate their adequacy.

At SEPTA, we discussed the railroad's organizational structure with various SEPTA officials and actions taken or planned to improve safety. We also collected and categorized capital project funding data for 1980-84, as well as the comparable budgetary data for 1985-90. Moreover, we reviewed the history, content, and objectives of SEPTA's training and safety programs. We also discussed SEPTA's commuter rail system and operations with the project coordinator for the Coleman study, with FRA officials (including members of the special SEPTA assessment team), with UMTA officials, and with the project manager of the bridge study being conducted by DOT's Office of Inspector General.

Our work was performed in accordance with generally accepted government auditing standards. However, we did not assess the accuracy and reliability of the accident and injury data reported to the FRA.

Comparison of Commuter Rail Train Collisions For SEPTA and Other Railroads 1983-84

		Northeast commuter railroads			
Collisions and their causes	**SEPTA**	**Boston and Maine**	**Long Island**	**Metro North**	**New Jersey Transit**
Operator failure	1	0	0	0	0
Inability to control train on icy track	3	0	0	0	0
Brake malfunction, icy track	1	0	0	0	0
Operating rules violation	1	0	0	0	0
Rail equipment on track	0	0	0	2	1
Highway snow plow on track	0	1	0	0	0
Total	**6**	**1**	**0**	**2**	**1**

Note: The number of accidents reported above includes only accidents involving trains on main tracks and carrying passengers.

Source: FRA data base of reported accidents.

Comparison of Commuter Rail Train Derailments For SEPTA and Other Railroads 1983-84

	Northeast commuter railroads				
Derailments - causes	**SEPTA**	**Boston and Maine**	**Long Island**	**Metro North**	**New Jersey Transit**
Misaligned track	0	0	0	1	0
Equipment breakdowns	0	0	0	1	1
Train ran through signal	0	0	2	0	0
Train rocked off track	0	1	0	0	0
Total	**0**	**1**	**2**	**2**	**1**

Note: The number of accidents reported above includes only accidents involving trains on main tracks and carrying passengers.

Source: FRA data base of reported accidents.

Comparison of Commuter Rail Operations for SEPTA and Other Railroads 1983-84

	Northeast commuter railroads				
Comparative characteristics	**SEPTA**	**Boston and Maine**	**Long Island**	**Metro North**	**New Jersey Transit**
Number of passengers - 1984 (millions)	17	11	75	30	31
Number of route miles	272	250	325	327	510
Number of stations	171	83	140	117	153

Comparison of Non-Train Injuries and Causes for SEPTA and Other Commuter Railroads 1983-84

	SEPTA	Boston and Maine	Long Island	Metro North	New Jersey Transit
1. Falls on steps, stairways, platforms, trains or other train-related incidents	294	30	152	38	15
2. Falls on ice or snow	39	0	10	1	0
3. Contact with flying or fixed objects	16	1	6	8	1
4. Assaults	11	1	20	2	0
5. Struck by train	6	25	23	22	51
6. Other	33	7	22	17	12
Total	**399[a]**	**64**	**233**	**88**	**79**

Source: FRA data base of reported accidents.

[a]SEPTA officials attributed the large differences in non-train injuries between SEPTA and the other commuter railroads in part to its "over-reporting" injuries beyond those covered in FRA's reporting threshold requirements. FRA, in its study, pointed out that SEPTA over-reports non-train injuries. FRA and SEPTA do not know to what extent over-reporting occurred.

Condition Rating of SEPTA Plant and Equipment Percentage by Rating Category

Number/category	Excellent	Good	Fair	Poor	Bad	Total
341 Passenger cars	0	74	16	1	9	100
232 Track miles	9	1	90	0	0	100
Signal system	0	0	100	0	0	100
171 Stations	0	5	64	30	1	100
344 Bridges	0	6	63	29	2	100
Maintenance facilities	0	0	2	56	42	100

Source: The Coleman Study.

SEPTA Budget Data

Table VII.1: Comparison of Capital Funding for Commuter Rail and City Transit 1980-84

Dollars in millions

Year	Commuter rail	Percent	City transit	Percent	Total
1980	$ 81	38	$132	62	$213
1981	81	40	122	60	203
1982	84	54	73	46	157
1983	62	32	130	68	192
1984	48	31	107	69	155
Total	**$356**	**39**	**$564**	**61**	**$920**

Table VII.2: Commuter Rail Allocation Between New Construction and Rehabilitation

Dollars in millions

Year	New construction	Percent	Rehabilitation	Percent	Total
1980	$ 81	100	$ •	•	$ 81
1981	70	86	11	14	81
1982	77	92	7	8	84
1983	20	32	42	68	62
1984	5	10	43	90	48
Total	**$253**	**71**	**$103**	**29**	**$356**

Table VII.3: Planned Funding for Commuter Rail and City Transit Capital Projects 1985-90

Dollars in millions

Year	Commuter rail	Percent	City transit	Percent	Total
1985	$105	36	$190	64	$ 295
1986	90	38	148	62	238
1987	54	27	146	73	200
1988	47	26	134	74	181
1989	72	41	102	59	174
1990	42	30	99	70	141
Total	**$410**	**33**	**$819**	**67**	**$1,229**

Source: SEPTA capital budget.

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