

A train of brand new Silverliner V's glides over the Delaware River at Yardley, Pa., on August 30, 2012. SEPTA service extends across the river to West Trenton, New Jersey on this former Reading route.

OVERCOMING CHALLENGES AT EVERY TURN

SEPTA at 30

BY PATRICK J. YOUGH/PHOTOS BY THE AUTHOR EXCEPT AS NOTED

COMMUTING IN PHILADELPHIA is a study in contrasts and comparisons. Modern electric trains call at stations that have changed little since the 1950s. SEPTA spent millions to join the former Reading Company and Pennsylvania Railroad systems together, while at the same time routes were being cut back due to deferred maintenance. But despite a series of challenges, a modern transportation system now unites the City of Brotherly Love and its surrounding counties.

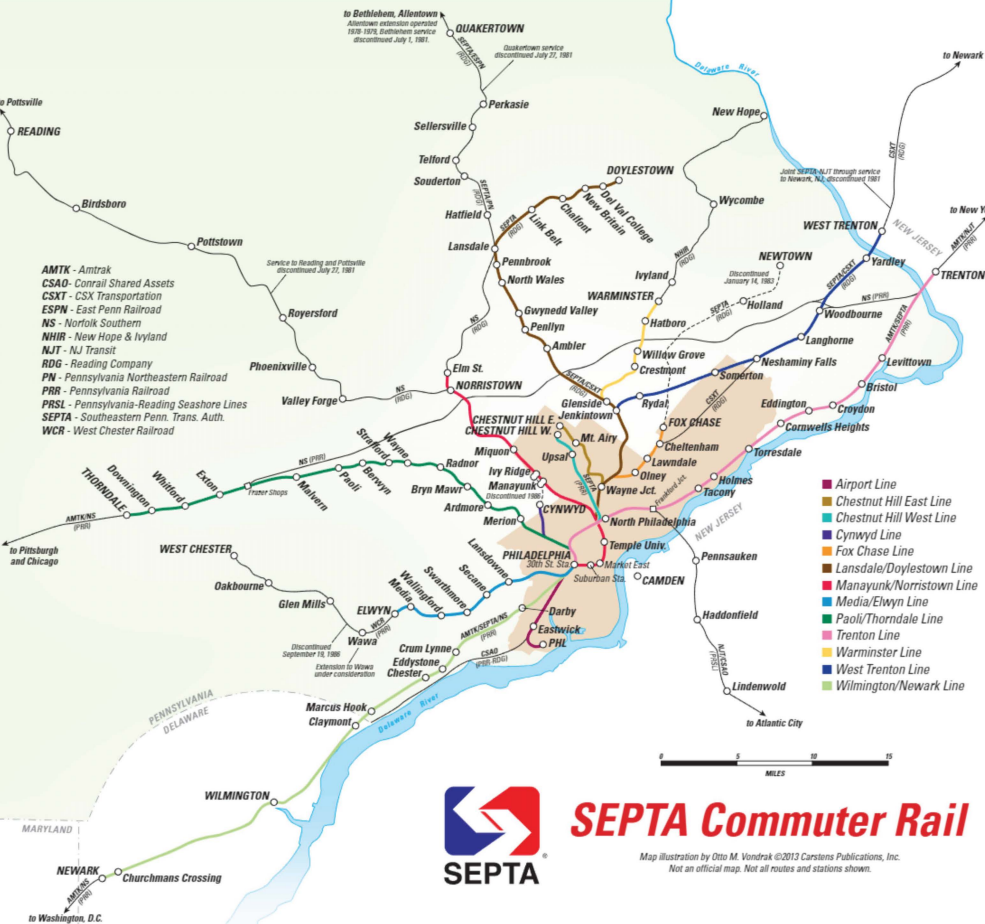
The Southeastern Pennsylvania Transportation Authority is the fifth largest transit system in the nation and sixth in terms of ridership. SEPTA operates a diverse mix of commuter rail, rapid transit subway and elevated lines, light rail and trolleys, motorized

buses, electric trolleybuses, and para-transit services. The service territory includes the city of Philadelphia and surrounding counties of Bucks, Chester, Delaware, and Montgomery counties in Pennsylvania, plus New Castle County in Delaware, and Mercer County in New Jersey. SEPTA provides commuter rail service to Wilmington and Newark, Del., under contract with the Delaware Department of Transportation (DelDOT) and it connects with NJ Transit at Trenton allowing for an economical alternative to Amtrak between New York and Philadelphia.

Following the example of the New Haven's Connecticut main line, the Pennsylvania Railroad began electrification of the Philadelphia commuter

zone in late 1913 utilizing 11,000 volt a.c. power. The first route selected was between Paoli and Broad Street station, a distance of 20 miles, with service starting on September 12, 1915. A new shop was built at Paoli to maintain the newly converted P54 commuter coaches into the classic owl-eyed MP54 m.u. cars. The PRR eliminated grade crossings on the electrified routes and installed position light signals in place of semaphores. The electrification was quickly extended to the Chestnut Hill branch (1918), to West Chester, via Media (1928), and to Wilmington (1928). The Schuylkill branch was electrified as far as Norristown in 1930.

On December 14, 1927, the Reading Company announced a plan to electrify suburban service from Reading Termi-



SEPTA Commuter Rail

Map illustration by Otto M. Vondrak ©2013 Carsons Publications, Inc. Not an official map. Not all routes and stations shown.

nal to Lansdale, Doylestown, Hatboro, and West Trenton. The Reading contracted with the Harlan & Hollingsworth division of Bethlehem Shipbuilding at Wilmington to build electric m.u. cars for the new suburban service opening on July 26, 1931. Additional routes were quickly added to Norristown and Chestnut Hill and these routes were opened on February 5, 1933. The electric zone on the Reading Company remained static until catenary was extended in 1964 to Fox Chase on the Newtown branch and a two-mile stretch from Hatboro to Warminster was completed in 1966.

Setting the Stage for Public Involvement
In the years following World War II, the railroads were in no shape to make

improvements to infrastructure or equipment even as the suburbs grew and ridership increased. Prewar equipment ruled the rails, and the incredible tax burden coupled with mounting losses from passenger service compounded the issue. In 1958 the city of Philadelphia implemented the Passenger Service Improvement Corporation (PSIC) to provide subsidies to the PRR and the Reading for operation of both Chestnut Hill Branches (located entirely within the city limits). In 1960, PSIC instituted subsidies on all citywide commuter rail lines. The first new equipment financed by PSIC were the Silverliner II cars (38 PRR, 17 Reading) built by the Budd Company in nearby Red Lion.

The PSIC was expanded in 1962 to include surrounding Bucks, Chester,

Delaware, and Montgomery counties and renamed the Southeastern Pennsylvania Transportation Compact (SEPACT). In addition to the city and county of Philadelphia additional subsidies were contributed from the Commonwealth of Pennsylvania.

On February 1, 1968, the Pennsylvania Railroad and the New York Central merged to form the colossal Penn Central. In 1969 the Penn Central was forced to fold the former New Haven Railroad into the mix. This gave the new railroad ownership of the entire "Northeast Corridor" between Boston and Washington along with the responsibility for commuter operations in Boston, New York, New Jersey, and Philadelphia. Due to a number of factors, Penn Central was doomed to fail

and on June 21, 1970, the railroad filed for reorganization in federal bankruptcy court. The Reading Company struggled on a little longer and filed for bankruptcy on November 23, 1971.

With mounting losses and a crisis looming for all Northeastern railroads, the United States government stepped in with passage of the Railroad Revitalization and Regulatory Reform Act of 1976, often referred to as the "4R Act," creating the way for the formation of the Consolidated Rail Corporation (Conrail) on April 1, 1976. The Northeast Corridor including the line from Philadelphia to Harrisburg was transferred to Amtrak with Conrail retaining freight service rights.

The goal of Conrail was to rationalize the Northeastern railroad network and revitalize the freight markets. Commuter services were operated on a contract basis, though Conrail made it clear from the start it wanted nothing to do with passenger trains. Management demanded to renegotiate all contracts for increased subsidy. As Conrail took its first wobbly steps towards profitability, President Ronald Regan signed the Northeast Rail Service Act (NERSA) into law on August 13, 1981, mandating that Conrail exit the commuter rail operations in New York City, New Jersey, and Philadelphia by the end of 1982. At the time, commuter railroading in the Northeast was a very

sorry state of affairs. Decades of neglect were taking its toll on the basic infrastructure including track, signals, bridges, stations, and the electrical propulsion and distribution networks. Because the trains were an essential public service, local governments sought a more permanent solution.

Under the Gunn

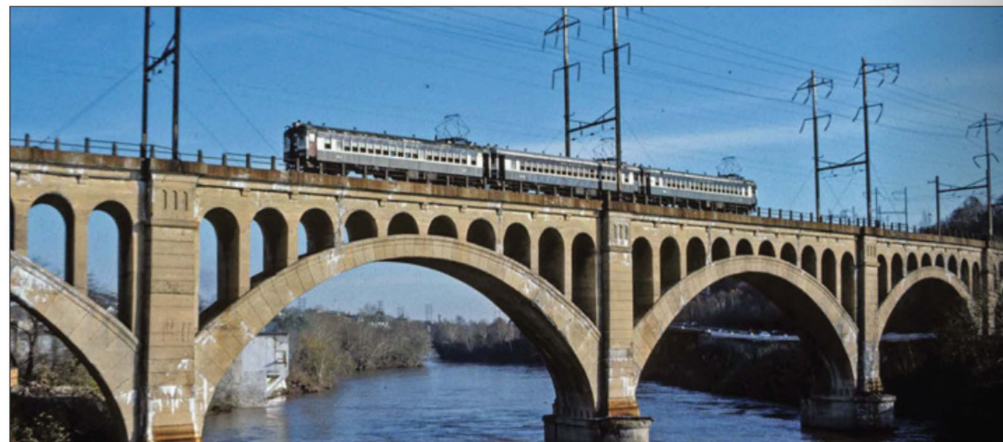
On September 1, 1979, David L. Gunn was hired as the new General Manager and Chief Operations Officer for SEPTA leaving his job as Director of Operations for the Massachusetts Bay Transportation Authority in Boston. While at the MBTA, Gunn oversaw the purchase of the commuter operations of the Boston & Maine and negotiated the new operating contract between the agency and the railroad. Gunn is famous for his "State

of Good Repair" management philosophy and while at SEPTA he cut operating costs nearly 30 per cent while rebuilding the transit system.

One group of people that David Gunn always leaves an impression with is organized labor. As part of his cost-reduction strategy Gunn instituted the "Fox Chase Rapid Transit Line" service on the ex-Reading between Fox Chase and Newtown utilizing Budd Rail Diesel Cars (RDC). Gunn billed this as an experiment to see if SEPTA could run the Regional Rail system on its own. At 8:15 a.m. on October 5, 1981, the first trip left Newtown for Fox Chase with RDC 9151 and one passenger. Gunn also replaced a traditional engineer and conductor with employees of SEPTA's bus division who were paid much less than railway workers and did not pay



RIGHT: Some of the old Reading heavyweights were rebuilt and given new paint jobs. Towards the end of their careers, a fan trip pauses at Downingtown on March 25, 1990. RICHARD O. ADAMS PHOTO BELOW: A set of Blueliners sails across the Manayunk Bridge, which was closed by SEPTA in 1986. STEVE BARRY PHOTO



ABOVE: A SEPTA/Reading Silverliner II m.u. train lays over at Doylestown on March 28, 1973. These were amongst the first cars financed by the PSIC. LEFT: Some cars carried legacy logos into the 1980s. A SEPTA/PRR Silverliner I m.u. visited West Trenton, N.J., on November 14, 1987. RICHARD O. ADAMS PHOTOS



into Railroad Retirement or the railroad version of workers compensation, Federal Employers Liability Act. Well-known passenger train activist Lettie Gay Carson formed the Newtown Area Rail Action Committee to protest the new shuttle operation and to prevent the abandonment of the branch altogether.

Ms. Carson certainly had reason to be alarmed as SEPTA and PennDOT discontinued all diesel-hauled trains to Bethlehem, Reading, and Newtown on June 30, 1981. For a brief period shuttle trains operated between Norristown and Pottstown and between Lansdale and Quakertown. On Friday, July 31, 1981, the last runs of the RDC powered *Crusader* and *Wall Street* took place between Philadelphia and Newark, N.J. Pennsylvania Governor Dick Thornburgh ordered PennDOT to eliminate the train service and cut off funding to

The changeover on January 1, 1983, came and went with no new contract. The unions surprised SEPTA and its passengers by going out on strike on March 15, 1983. The strike lasted 108 days when the last union agreed to a contract with SEPTA. The workers would still be railroad workers and paying into Railroad Retirement, but the pay scale was much lower than the same jobs on Conrail or Amtrak. Many engineers went back to Conrail, leaving SEPTA with no choice but to annual trains that summer due to a lack of qualified train crews. SEPTA began a program to train new workers but this training took time to get the new hires up to speed.

On February 1, 1984, Gunn departed SEPTA for the Metropolitan Transportation Authority where he went on to rebuild the crumbling New York City subway system.

The Center City Tunnel Project

The Center City Commuter Connection (CCCC) was opened in November 1984 and connected Philadelphia's two stub-end terminals (PRR's Suburban Station and Reading Terminal) through a new 1.7 mile tunnel.

Philadelphia Mayor Frank L. Rizzo dusted off the 1958 proposal to connect the PRR and the Reading lines by building a tunnel east from Suburban Station and building a new below-grade station to bypass the existing tracks of the Reading at Reading Terminal. Rizzo was convinced that the tunnel could be his legacy to the city, even though there were loud protests from city residents for new buses and subway cars. City residents thought Rizzo's priorities were out of line with their needs, as the tunnel would only benefit suburban commuters and businesspeople. Rizzo pressed on, arguing that buying new buses would keep people in Detroit employed, building the Center City Tunnel would keep Philadelphians employed. The tunnel also would help draw riders to the new route being planned to link Center City with the Philadelphia International Airport (PHL) located south of town. Students would also benefit from the tunnel and airport projects as the new University City station was built to serve both the University of Pennsylvania and Drexel University.

The new four-track tunnel would be extended east from existing tracks in Suburban Station eastward to the new "Market East" station (at 11th and Market Streets) 35 feet below street level. The Market East station was also connected with a new shopping complex named Gallery II. Beyond Market East the tracks then make a 90 degree

any service outside of the original five-county charter area. Thornburgh later fired PennDOT Deputy Secretary Ed Tennyson for refusing to carry out his order. As a result, the areas north and west of Philadelphia are amongst the largest metropolitan areas on the East Coast without any form of rail mass transit. Today U.S. Route 422 is a four-lane congested highway between Pottstown and Philadelphia as is State Route 309 between Philadelphia and Allentown, as well as the Northeast Extension of the Pennsylvania Turnpike. When NERSA was signed into law during the summer 1981 the clock started ticking for SEPTA to find someone other than Conrail to operate its commuter trains when the bell tolled midnight on January 1, 1983. In the NERSA bill was the provision to create the Northeast Commuter Services Corporation to be a wholly owned subsidiary of Amtrak. SEPTA negotiated with both Amtrak and the Boston & Maine Railroad (successful operators of Boston's commuter lines for the MBTA with whom Gunn already had experience).

In the end though, SEPTA chose to operate the trains on its own. Conrail employees in the Philadelphia area had to make a decision — stay with Conrail in freight service, go to work for Amtrak, or go to SEPTA. Under the negotiated union agreements employees had a provision called "flow back" that allowed SEPTA employees a one-way ticket back to Conrail or Amtrak.

bend to the north to rise up and tie in with the old elevated Reading main line near Spring Garden Street. The tunnel presented some unique engineering challenges, as it had to go above the Broad Street Subway and underneath the Ridge Avenue Subway and required additional underpinning to keep the old Reading Terminal trainshed operational during construction.

As part of the tunnel project a new operational plan was developed by Vukan Vuchic, a professor at the University of Pennsylvania and was based on the "S-bahn" suburban trains in Germany. SEPTA printed seven new color coded timetables each based on a PRR-Reading route pair and given a number preceded by an "R" which was later adjusted after the line to Philadelphia International Airport was opened. On July 25, 2010, SEPTA introduced new operating changes and dropped the old R-numbering scheme. The new line segments have a color-coding scheme which applies to the map on page 37.

Due to delays in completing the tunnel, the PRR-side trains started to operate into Market East after the 1984 Labor Day holiday to help struggling merchants recover from a lack of traffic. November 6, 1984, was the final day of 91 years of trains into Reading Terminal. The Philadelphia Chapter of the NRHS ran a "Last Train from Reading Terminal" fan trip at 8:00 p.m. as part of the last day ceremonies. The Terminal was shut down between November 7 and 10 to allow for track and signal cutover to the new tunnel alignment.

The new \$338 million Center City Tunnel finally opened on November 10, 1984, with train 1408 on the R6 route to Norristown having the honors of the first revenue train through the tunnel. The first full week of operations in the new tunnel were trying to even veteran commuters, as delays up to 30 minutes were common due to power failures, track work, and equipment problems. Train delays at Roberts Yard added to the problem, as there was only one track connection to the main line for trains arriving and departing. Problems on the Reading side now carried over to the other lines due to the paired line-operating plan. All of these problems seemed to pale in comparison to what happened next.

Avoiding a Crisis with RailWorks

On Friday evening November 16, a SEPTA inspector closed one track over the bridge at Ninth Street and Columbia Avenue in North Philadelphia due to unsafe conditions. Further inspection revealed that the steel supports in the entire four-track bridge were struc-



ABOVE: An eastbound crew familiarity run prepares to depart Newark, Del., the western extremity of SEPTA service offered along the Northeast Corridor. MIKE BURKHART PHOTO RIGHT: New standard signage is appearing throughout the system.



turally unsound and visibly flexed when a train passed overhead. Part of the structural steel was covered over by a ceiling in the R.W. Brown Community Center, which was previously the waiting room for the Columbia Avenue station located underneath the bridge. The deterioration was caused by trapped moisture behind the ceiling. SEPTA immediately terminated all Reading side trains at North Broad Street and passengers had to transfer to the Broad Street Subway for continuation of their journey to center city.

Governor Thornburgh asked the State Legislature for emergency funding for SEPTA to rebuild the Columbia Avenue Bridge and for bridge inspections on the rest of the regional rail network. SEPTA officials discovered that at least 24 other bridges were in serious need of repairs but were not yet deemed unsafe to operate. SEPTA and the city managed to work together and around the clock to rebuild the Columbia Avenue bridge and reopen the tunnel in just 22 days.

While the Center City Tunnel work was underway, a second large capital project extended service from Center City to the Philadelphia International Airport. SEPTA became the first agency to provide direct airport commuter rail service (though Chicago and Cleveland had instituted rapid transit service years previously). A mix of new construction and rebuilding part of the old Reading Chester Branch was required for the new 5.9-mile line; the Chester Branch would still be shared with Conrail freight trains late at night

or in the early morning. A bridge over the Northeast Corridor was built south of "Arsenal" interlocking to avoid congestion with Amtrak and other SEPTA trains. The major landmark of the project however, was the 4000-foot steel and concrete viaduct that curves high above Interstate 95, local roads and the Tinicum marshes. The line opened on Sunday morning April 28, 1985, providing riders with half hourly service seven days a week with trains alternating between Warminster and West Trenton endpoints.

In June 1991 SEPTA formally announced the \$354 million "RailWorks" campaign to address the badly deteriorating bridges between Wayne Junction and CP Brown (near the Center City tunnel portal). The project was a mammoth undertaking of rebuilding four miles of the four-track main line with welded rail, signal system upgrades, replacement of 20 bridges and the rebuilding of five additional bridges. In addition, a new station would be built at 10th and Berk Streets



ABOVE: A train departs Market East Station in Philadelphia. STEVE BARRY PHOTO LEFT: A westbound SEPTA train rolls thru Bryn Mawr with ALP44 2308 in charge on April 30, 2003. These push-pull sets only operate during rush hours.

phase of RailWorks accomplished quite a bit of work with twelve bridges replaced, three bridges rebuilt, a new interlocking constructed at 16th Street, and new stations built at Temple and North Broad.

RailWorks II was the 1993 continuation of the project between May 2 and September 5, 1993. SEPTA operated two diesel-powered round trips each weekday between Doylestown and 30th Street and West Trenton and 30th Street operating over Conrail tracks between Newtown Junction and "Zoo" tower utilizing leased three surplus U34CH locomotives from NJ Transit. The continuation of the bridge replacement and repair continued along with welded rail replacement south of Broad Street Station and completing the new Temple station.

While commuters had to suffer for two summers with lengthened commutes the project managed to be completed on time and well below budget.

to service Temple University (featuring two center island platforms) and a new station at North Broad Street. The project was to take place in two phases in the summer of 1992 and again in the summer of 1993. While the RailWorks construction was underway, service would be suspended and passengers would need to transfer to the Broad Street Subway at Fern Rock to continue to Center City. A new station was opened in March 1992 to facilitate eas-

ier transfer between the subway and rail lines. Trains from the old PRR side would continue to serve Market East station and make reverse moves in the tunnel.

After much prodding from various groups including the Delaware Valley Association of Rail Passengers, SEPTA did manage to provide two round trip diesel-hauled trains between Fox Chase and 30th Street via a non-electrified Conrail trackage. The first

SEPTA managed the money prudently and also attributed cost savings to good weather and "hungry" contractors for a savings of about \$90 million. In addition schedules were changed to reflect decreases in operating times, with time savings throughout the system.

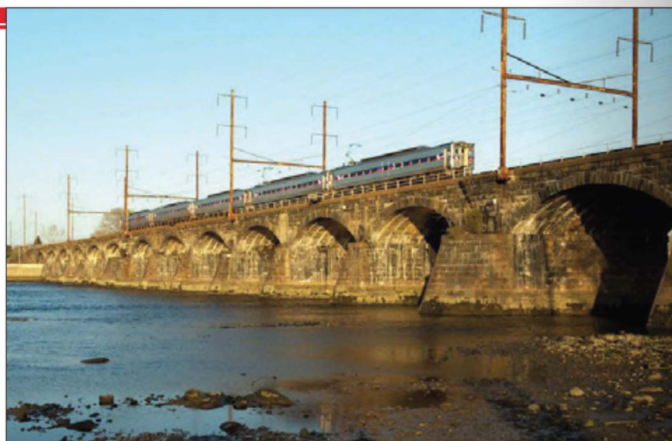
Cutbacks in Service

All diesel services were discontinued prior to SEPTA's takeover in 1983, though insufficient operating funds would lead to further cuts in electrified territory as well. In May 1986, service was cut back from Ivy Ridge to Cynwyd over SEPTA's concerns that the massive Manayunk Bridge was deteriorated to the point of being unsafe. The bridge was rehabilitated in 1999, but service to Ivy Ridge did not resume. Instead the rails were lifted in 2008 and the right of way is now used for a trail. The West Chester Branch was cut back to Elwyn and Media in September 1986 due to poor track conditions (with tourist operator West Chester Railroad eventually operating from its namesake town to Glen Mills). Meanwhile, SEPTA is working on re-extending service from Elwyn to a new park-and-ride facility at Wawa.

Equipment

SEPTA is unique amongst commuter operators as their current fleet is all electric. SEPTA started out on January 1, 1983, with a collection of electric m.u. cars of both PRR and Reading heritages. The five Budd built ex-PRR Pioneer III cars were branded as Silverliner I's, which were the only commuter cars equipped with conventional knuckle couplers at the time. Between 1964-'65 38 of the original heavyweight Reading m.u. cars were rebuilt at the Reading, Penn., shops and repainted from dark green to blue and white. They were dubbed "Blueliners" though some were later rebuilt and repainted into SEPTA's red, white, and blue scheme. The 55 Budd-built Silverliner II cars were the first new cars acquired by PSIC in 1963. The Silverliner II cars were distinguishable from the Pioneer III/Silverliner I cars by their single-arm Faiveley pantograph and lack of knuckle couplers.

The next generation of Silverliner III's were built by St. Louis Car Co. and had the operating controls on the left side of the cab so single car trains could be operated on the PRR main line to Harrisburg. A group of these cars were rebuilt for the newly opened service to the Philadelphia International Airport and had luggage racks installed in the spot formerly occupied by the restrooms. The outside of the cars featured a bright yellow stripe and PHL airport



TOP: Center City bound train 9728 crosses the Delaware River between Trenton, N.J., and Morrisville, Pa., on March 17, 2012. **ABOVE:** Train 3755 to Trenton (on the left) and train 7371 to Media and Elwyn (on the right) have both just crossed the Delaware River and are entering the upper level of 30th Street Station in Philadelphia on May 11, 2012.

decal to indicate dedicated service to the Airport. The Silverliner II's and III's lasted until June 29, 2012, when the last two operational cars, 9010 and 235 (SL II/SL III), finished the day on the Cynwyd Line. The mainstay of today's fleet are the 231 Silverliner IV cars built with Budd carbodies and General Electric propulsion equipment between 1973 and 1976 for both Penn Central and the Reading.

On January 19, 1986, SEPTA entered a new era when borrowed Amtrak AEM7 923 and five Blueliner m.u. cars ran a test train to Lansdale and return as part of a contingency plan in case of a transit strike in March. This turned out to be a harbinger of things to come as at the November 3, 1986, monthly

meeting the SEPTA board of directors authorized leasing 25 push-pull coaches and 10 cab control cars from Bombardier, and seven AEM7 electric locomotives to replace the 26 ex-Reading Blueliners. A spare ALP44 was given to SEPTA by builder ABB Traction as part of a contract settlement in 1995 over delay charges for a group of Norristown High Speed line cars.

In 1999, ten additional center-door push-pull coaches were obtained from Bombardier to increase train consists. When New Jersey Transit purchased new bi-level coaches to increase passenger loading on the Northeast Corridor, SEPTA picked up six coaches and two cab control cars. These second-hand cars were originally built for the

Erie Lackawanna in 1970. The push-pull trains are utilized only on weekdays in rush hour service and at press time are mostly found on the former PRR routes although one trainset is in service on the West Trenton line.

In 2006 a \$274 million dollar contract was issued for 120 new Silverliner V cars. Four cars were funded by DELDOT for Wilmington and Newark, Del., service. The contract has been plagued with numerous supply problems and drifted a full two years behind schedule with the last cars being delivered in 2013. The Silverliner V's are a marked improvement with very bright interior lighting, automated announcements and closed circuit TV screens which display destinations (in addition to commercials), improved seats, and cli-

mate control systems. They still lack one very basic necessity in common with the rest of the SEPTA fleet — restrooms.

SEPTA also maintains a small fleet of diesel-electric switchers for the wire trains and work trains, and to tow stranded m.u. cars and trains back to one of the repair shops. Three SW1200 switchers (50-52) inherited from Conrail, were rebuilt by Brookville Equipment, repowered with new Caterpillar engines and obtained a new model designation of BL15. Two RL60 locomotives, 60 and 61, were purchased new from Republic Locomotive in Greenville, S.C., and are equipped with Head End Power (HEP). In 2009 SEPTA's first ultra low emissions diesel locomotive, an N-ViroMotive 2GS14B, was delivered by National Railway Equipment (NRE). Numbered 70, it is the first locomotive in the fleet that uses GenSet technology — multiple diesel engines mounted on easily removable skids with one main generator, reducing emissions by having engines start and stop based on load.

Repair Shops and Yards

The original m.u. shop on the PRR was at Paoli and was opened in 1915 when the suburban service electrification was completed and the first MP54s were introduced on the Paoli local. The old Paoli shop was replaced in 1994 with a new shop in West Philadelphia named the Overbrook Maintenance Facility.

On the Reading side the m.u. cars were maintained at Wayne Junction in

the northeast corner of Philadelphia. Both of the SEPTA wire trains and most of the diesel switchers are normally kept here when not in service. The system maintenance of way equipment shop is located here also. A new storage yard and inspection facility was built at Roberts Avenue next to the Wayne Junction as part of the center city tunnel project to store unneeded trainsets not required in the off peak mid day and weekends along with a car washer.

When the new AEM7 and Bombardier push-pull coaches were ordered a new shop was constructed between the Amtrak main line and the former PRR Trenton Cutoff at Frazer, west of Malvern. This shop allows for maintenance of the entire push-pull consist and was initially staffed with Bombardier supervision and SEPTA workers; later management functions were taken over by SEPTA. This shop also leased space for Bombardier to perform warranty work on the 20 Amtrak *Acela* high-speed trainsets. Minor car repairs are handled at the Powelton Avenue yard just west of 30th Street station.

Looking Ahead

When transit agencies take over operations from multiple railroads, they often leave the systems in their legacy configurations. SEPTA took up the challenge of uniting two operations into one in 1983 and continues to upgrade station facilities and infrastructure. Despite numerous setbacks, SEPTA is constantly striving to best serve the City of Brotherly Love. ■



LEFT: On May 11, 2012, a single ex-Reading Silverliner II stops at Bala, Pa., en route to Cynwyd. **BELOW:** A two-car train of Silverliner IV's pauses at Jenkintown on March 20, 2013.

