Oregon Historic Site Record

LOCATION AND PROPERTY NAME

address:	2250 SE Water Ave Portland, Multnomah County	**historic name:**	Spokane, Portland & Seattle Railway Steam Locomotive
		current/other names:	SP&S 700
assoc addresses:	UPRR Brooklyn Yard Roundhouse	**block/lot/tax lot:**	
location descr:	Roundhouse, Uprrs Brooklyn Yard, SE (previous address)	**twnshp/rng/sect/qtr sect:**	1S 1E 11

PROPERTY CHARACTERISTICS

resource type:	Structure	**height (stories):**	**total elig resources:**	1	**total inelig resources:**
elig evaluation:	eligible/significant		**NR Status:**	Individually Listed	
prim constr date:	1938	**second date:**	**date indiv listed:**	01/25/2006	

primary orig use:	Rail Related	**orig use comments:**	
second orig use:			
primary style:	Other / Undefined	**prim style comments:**	
secondary style:		**sec style comments:**	
primary siding:		**siding comments:**	
secondary siding:			
plan type:		**architect:**	Baldwin Locomotive Works
		builder:	

comments/notes:

Moving June 2012 to new location. Location amended 9/12 to reflect new location. DJP - 9-6-2012 Move approved by National Park Service 10/24/2012. DJP - 11/7/2012

GROUPINGS / ASSOCIATIONS

Not associated with any surveys or groupings.

SHPO INFORMATION FOR THIS PROPERTY

NR date listed:	01/25/2006	**106 Project(s):**	None
ILS survey date:		**Special Assess Project(s):**	None
RLS survey date:		**Federal Tax Project(s):**	None

ARCHITECTURAL / PROPERTY DESCRIPTION

(Includes expanded description of the building/property, setting, significant landscape features, outbuildings and alterations)

Spokane. Portland & Seattle Railway Steam Locomotive Amendment The purpose of this continuation sheet is to provide evidence regarding the proposed relocation of the individually-listed resource, the Spokane, Portland & Seattle Railway Steam Locomotive 700 (SP&S #700). This locomotive, as well as the Southern Pacific "Daylight" locomotive #4449 and the Oregon Rail and Navigation Company's steam locomotive #197, will be relocated from the roundhouse on Union Pacific Railroad (UP) property in the Brooklyn rail yard in Portland, Multnomah County, Oregon to their new location in a purpose-built building just southeast of the Oregon Museum of Science & Industry (OMSI), adjacent to the UP tracks. The move was made necessary by Union Pacific's plans to demolish the roundhouse. In response, the Oregon Rail Heritage Foundation (ORHF) commissioned the new building, which will be dedicated to the ongoing maintenance, operation, and display of the three locomotives. The property and building will also become a working museum dedicated to promoting awareness and education about the evolution of steam locomotives and the role railroads played in the development of the northwest. As originally listed, the verbal boundary description of the Spokane, Portland & Seattle Railway Steam Locomotive 700 was, "All the area encompassed within the extreme, contiguous length of the locomotive and not including the rails or ground beneath." The resource is not associated with, nor does the boundary include, any specific land form or area, building, rails, or other transportation feature. The proposed location will retain the resource's original setting because it will remain on rails contiguous with the UP mainline rail, but located two miles north of its current location. It will continue to have access to the main line and short line rails for the operation of rail excursions. The proposed relocation does not require resubmission of Section 10 because the Verbal Boundary Description and Boundary Justification remains the same. Physical description June 1938. A brand new locomotive powered the Spokane, Portland and Seattle Railway's passenger trains. (One needn't say "steam locomotive" in 1938; locomotives (with few exceptions) were steam locomotives). Sixty-seven years later, the SP&S 700 steams as strongly as ever--one of a handful of big American steam railroad engines operating in June 2005. One of the three main American locomotive manufacturers (the Baldwin Locomotive Works) constructed the SP&S 700 and tender near Philadelphia in May 1938. It was designed to pull interstate passenger trains on the principal railroads of the nation. It is type known as a "4-8-4" (meaning that it has four wheels on its leading (or "pilot") truck; eight driving wheels; and four wheels on its trailing truck). On the SP&S and many railroads, the 4-8-4 locomotive was known as a "Northern." When built, the 700 incorporated almost all of the proven technology and known effective features of steam railroad engines. All the locomotive and tender axles are on sealed roller bearings. The mechanism for reversing and adjusting the drive cylinder valves is powered. Many moving parts have their own lubrication pumps. The boiler is built with "superheaters" that add additional heat (and energy) to the steam as it goes to the driving cylinders and pistons. Pre-heated water is fed to the boiler with steam injector and feedwater pump. Large driving wheels (77 inch diameter) speak of its potential for speeds over 80 miles per hour. The fire in its cavernous firebox was fed by heavy oil (bunker C), which gave both more heat per pound and less ash and trouble than coal. The 700's attached tender, carries and supplies the locomotive's water and fuel. Its main baffled tank can carry 20,000 gallons of water, and its heated fuel tank can carry 6040 gallons. Fuel and water reach the locomotive via pipes and hoses. The 700's tender's six axles are mounted in roller bearings. Standing almost 17 feet tall, and stretching over 110 feet, the 700 and its tender are big. Fully fueled and watered it weighs over 430 tons. The size of the 700 surprises first-time viewers. It is tall; it would not fit under an overpass on an Interstate Highway. It is long; seven Honda Civics could park alongside the engine and tender with room to spare. Its weight is not easily seen, but watered and fueled, the engine and tender outweigh 350 of those Honda Civics. The trains it pulled were no less massive. The 10 to 15 "heavyweight" baggage and passenger cars it pulled each weighed 80 to 90 tons. The "lightweight" cars that began appearing in its trains during its service were 45 to 50 tons each. The freight trains it moved comfortably late in its career totaled 2,500 to 3,500 tons (Prager, 108.) The 700 is steel--cast steel, plate steel, machined steel, and steel pipe and bar. It is held together with steel rivets, steel bolts and nuts, and some welds. Different grades and thicknesses of steel are used to meet different needs. It is all painted black, save for white trim on the engine wheels and walkways, yellow numbers and markings, and high heat grey paint on the smokebox. Thick firebrick line the sides and bottom of the firebox. Four-inch-thick insulation pads (originally asbestos, now safer mineral wool) wrap the boiler under a sheet steel jacket. Brass, glass, and wood are found in small amounts. The 700's cast steel frame rests on the four axles of the big driving wheels, and on a pair of two-axle trucks, at front and rear, which pivot to follow curves in the track. Driving and trailing axles are mounted under springs and equalizers to accommodate irregularities in the track and the motion of the locomotive. The dominant visual part of the locomotive is the eight-foot-diameter cylinder atop the wheels. It houses the firebox in the back, the boiler, and the smokebox at the front. The hot gas and smoke from the firebox are drawn through the horizontal flues (tubes) in the water-filled boiler (making steam) before going into the smokebox and exiting up the stack. The steam (in the enclosed boiler) builds pressure (up to 260 pounds-per-square-inch) and is ducted through the superheaters and throttle to the big valve and drive cylinders in the front of the engine down by the wheels. There the high pressure steam pushes and pulls the pistons (one on each side) and drive rods to turn the driving wheels and move the locomotive and its train. At the rear of the firebox is the "cab" where the crew sits and operates the locomotive. It takes two people to operate the locomotive. The fireman sits on the left behind fuel and air controls to regulate the fire in the firebox, and has controls to assure proper water supply to the boiler. The engineer sits on the right side, with the

whistle, throttle, other controls for the drive gear, and air brake controls for the locomotive and for the train. The back of the cab is open to the tender (save for a canvas curtain.) There is no air conditioning in the cab, nor any cab heater (though with a huge oil fire raging a few inches a way in the firebox, chilliness in the cab is usually not a concern.) The locomotive has a steam-powered dynamo generating electricity (32 volt, DC). This power is (and was) used only to power the headlight, marker lights, illumination in the cab, and the headlight on the rear of the tender. The 700 has two steam-powered air pumps. The compressed air is stored and used to operate the brakes on the locomotive and tender, some controls on the engine, and most importantly, the air brakes on the train.

HISTORY

(Chronological, descriptive history of the property from its construction through at least the historic period - preferably to the present)

The Spokane, Portland & Seattle Railway steam locomotive 700 is being nominated to the National Register of Historic Places. The nomination is based on the locomotive's regional and statewide significance in transportation under Criterion A. During its years of active service (1938 – 1956) the SP&S 700 and its trains were a crucial link between Portland, Oregon, and the rest of the nation. The nomination is also based on the locomotive's national significance in engineering under Criterion C. The SP&S 700 is one of a few remaining operating examples that demonstrate the peak of the practical design and function achieved when "steam was king" on the nation's railroads. Narrative The SP&S 700 is a robust survivor of a time when railroads dominated inter-state transportation, and steam locomotives dominated rail power. It typifies large steam locomotives as they were at the end of the era of steam-powered mainline railroading. Its appearance and function are virtually unchanged since its manufacture. Its public appearances today, with all the speed, size, noise, heat, smoke and steam of old, are dramatic presentations of the 'way things were' in the mid-20th Century. Criterion A: "That are associated with events that have made a significant contribution to the broad patterns of our history." American history is in large part the history of the movement of people and goods across long distances. The railroads' crucial part in the growth and change in American society and its economy between the middle of the 19th and the 20th centuries is well studied and acknowledged. The SP&S 700 is an icon in steel and steam of that era. Interstate travel in 1938 meant rail travel. Most people traveled by train for business, family visits, or to tour. Highways were narrow, often steep and curvy, and ran through the middle of every town; cars lacked today's comforts. The airlines flew twin-engine aircraft that were noisy, un-pressurized, and vulnerable to weather delays. Travel by train, particularly in a Pullman sleeper car, was the most comfortable, safest, and practical way to get to and from Oregon in the 1930s and 1940s. In the mid-20th century travel to Oregon from the upper mid-West (a principal locus of family ties then) meant travel on one of the rail lines across Montana to Spokane, and then on the SP&S to Portland. Business travel and freight to and from the cities of the upper Mid-West also went on the SP&S. In recognition of the growing importance of Oregon, and to take advantage of the river-level route through the Cascade Mountains for freight, the owners of the SP&S Railway ordered a fleet of new, powerful, locomotives. These replaced the decades-old and hand-me-down engines from the Great Northern and the Northern Pacific that the SP&S had had to use until then. This order included six 4-6-6-4 "Challengers" for freight service, and the three 4-8-4 "Northerns" including the 700 (Drury, 375). From 1938 to 1953, the 700 and the two other 4-8-4s pulled the fastest and most luxurious passenger trains between Portland and Spokane. In Spokane the passenger, baggage, dining, and Pullman cars would be made up to named trains heading east. And reciprocally, Portland-bound cars from trains from the east would be separated in Spokane from cars going to Seattle and go to Portland on the SP&S. In 1953, after 15 years of passenger service, the 700 was bumped by the new Diesels from the more prestigious passenger train service and assigned to duty powering freight trains on the SP&S. Crews report it and the other 4-8-4s performed well. In 1956, it was chosen as the engine to power the "Farewell to Steam" passenger excursion. In recognition of the growing importance of Oregon, and to take advantage of the river-The SP&S was one of four interstate railroads serving Portland and western Oregon, but one of only two with direct links to states to the east. * As such, the SP&S Railway and its steam locomotives (as represented by their sole survivor, the 700) were a key part of the transportation network moving people, goods, and mail between Oregon and the other 47 states. Criterion C: "That embody the distinctive characteristics of a type, period, or method of construction.. . . or that represent a significant and distinguishable entity whose components lack individual distinction" The SP&S 700 is one of few operable mainline steam locomotives remaining. It is a working example of the peak of proven steam and rail technology at the end of the Era of Steam. As such, it represents the state of the practical design and function when "steam was king." The steam powered railroad locomotive was invented in the early 1800's and had become standardized by mid-century. Pictures of locomotives in Civil War photos and in cowboy movies all show a machine with large driving wheels. These drivers were turned by cranks and rods moved by pistons. The pistons were pushed forward and then pushed back in cylinders mounted near the front of the locomotive. Those pistons were moved by steam under pressure from the boiler. Valves, linked to the drivers, alternately let steam in, and then out of the cylinders. The steam exhausted up the smokestack at the front of the engine, thereby creating a draft to pull the fire from the firebox at the rear of the engine through horizontal tubes in the water-filled boiler. The exhausting steam from the cylinders also created the "chuff-chuff-chuff" or "choo-choo" sound we associate with the steam locomotive. The crew (an engineer and a fireman) rode in a cab behind the firebox. The Southern Pacific ran to California, the Northern Pacific linked Portland to Tacoma and Seattle. The Union Pacific and the SP&S ran east on opposite banks of the Columbia until it left Oregon, where they diverged to the southeast and northeast, respectively. The elements and arrangement of the 1860 locomotive are the same as those of a 1940 locomotive. How did we get from the fragile wood-burning 30-ton antiques of 1860 to the 430-ton, 5,000 horsepower SP&S 700 of 1938? Engineering. Economics. And evolution. In the last 15 years of the 19th Century, the adoption of train air brakes, stronger cars and couplers, and track signals opened the way for longer, heavier, and faster trains. The 20th Century responded with a dramatic evolution in locomotives. Longer, heavier, and faster trains required more power. More power could come from adding locomotives to the train. But each locomotive added made coordinating their actions more difficult, and each locomotive had to have its own crew of two. If locomotives were more powerful, faster, and had more traction, fewer engines (and fewer crews) would be needed. The first four decades of the 20th Century saw many innovations tried, tested, and some adopted as steam locomotives grew in size and capability. The SP&S 700 features are an inventory of those successes of steam locomotive design. Large driving wheels: The larger the driving wheel, the greater distance it can travel with each stroke of the piston. Each revolution of the 700's 77" Boxpok drivers covers over 20 feet of track. These wheels made speeds over 70 miles per hour normal on good track. Four-wheel pilot and trailing trucks: The four smaller wheels at the front of the engine add to its stability as it follows the track--a welcome and necessary feature at high speed. The four-wheel trailing truck carries the weight of the rear of the locomotive, particularly the large firebox. (The trailing truck could have accommodated an auxiliary steam-powered driving engine to add power and traction in starting and other slow speed movement. Called a "booster engine" it could have been added during construction, but the railroad felt that it would not be needed.) Large firebox: The size of the 700's firebox (imagine a low-ceilinged 8' by 13' room) was needed on her Northern Pacific sisters that burned a low-grade coal. The 700 was built to burn oil, which had a much higher heat value per pound and produced no ash and less trouble. The 700 could always produce as much steam as it could use. Superheaters: From early in the 20th Century new locomotives used a boiler innovation that piped steam from the boiler through the hot flue gases to add additional heat to the steam (thus "superheating" it.) This innovation gave locomotives 25 to 30 percent more power for a given quantity of fuel (Drury, 381.) Roller bearings: Not until the 1930s were the axles of production steam locomotives supported in roller bearings. Previous sleeve bearings used up to 8 percent of the engine's power just to overcome their friction and when starting cold, these older bearings could require up to a quarter of the locomotive's peak power to just turn the wheels (Swengel, 234.) Roller bearings imposed negligible drag at speed, and it took less than ½ of 1 percent to start the locomotive rolling (Swengel, 234.) All axles on the 700 and its tender are in sealed roller bearings. Power reverse: The 700's Alco Type G power reverse mechanism lets the engineer, as the name implies, shift from 'forward' to 'reverse', and also lets him finely adjust the valve timing for the steam entering the drive cylinders for greater power and efficiency. Traction: The power of steam locomotives was compared using a calculated figure called "tractive effort" or "tractive power". The 700 is rated at 69,800 pounds. That much power (generating 4,500 horsepower at 50 miles per hour) could cause the drive wheels to spin if it was applied too suddenly, if the rails are wet or slippery, or the locomotive is too light. The 700's driving wheels carry 296,500 pounds, putting it well above the 4:1 ratio of weight to tractive effort sought by designers. The 700, like all locomotives, has a sanding system to put sand on the tracks when needed for traction. Feedwater systems: To force water into the boiler, the 700 has both a steam-powered feedwater pump which takes pre-heated water from a feedwater heater, and a steam driven injector. Walschaerts valve gear: The complex of rods, eccentrics, and cranks that link the motion of the driving wheels to the cylinder valves is known as the valve gear. The valve gear designed by Walschaerts was the most common among North American locomotives (Drury, 411.) Air pumps: The two cross-compound steam-powered air pumps mounted on the fireman's side (right side) of the 700 compress air, which operates the air brakes throughout the train as well as the brakes on the locomotive and tender and some other accessories. "State of the art" may be an over-used phrase, but it surely applied to the 700 as it entered service on the SP&S in 1938. It had everything that the designers, builders, and railroaders thought a top-rate mainline passenger steam locomotive needed. Through its faithful service for 18 years, it proved them out. The 700 was not revolutionary; it is representative. It was, and is, representative of the design and manufacturing accomplishments of the steam era. Many of the locomotives that shared the tracks with the 700 had all these features; many did not. Locomotives were long-lived. For example, the 700's roundhouse-mate, the UP 3203, was built in 1905, re-built by the railroad in 1923, and was still earning money for the company after 1950. Locomotives assigned to yard work (switchers) and to short hauls and short trains were typically older, smaller, and less modern. Steam locomotives showed considerable variation in their features. Railroads considered a whole array of features and options, their costs and advantages, before placing an order for a small number of engines. Thus, the 700's roundhouse-mate, the SP 4449, though built three years after the 700, does not have roller bearings on its driving axles, while it does have a booster engine in its trailing truck. Many passenger train engines of the 1930s were streamlined; the 700 was not. The air resistance of a locomotive was a minor part of the energy required to move 1930s passenger trains; streamlining locomotives was cosmetic The 700 was "state of the art". But bear in mind that "the art" was defined somewhat differently by different railroads; and that many locomotives what were far from that "state" were still productive machines in the right niche on the nation's railroads. The 700's "state of the art" didn't apply only in 1938. Were one to have ordered a new steam locomotive of proven design in 1956 (the 700's last year of service) it would have been substantially like the 700 and her sisters. (No one, of course, did order a new steam locomotive in 1956; Dieselization of the mainline rails was nearing its completion.) While the 700 served, further steam innovations were tested on the nation's rails. Steam-turbine-electric and steam-turbine locomotives were tried; as well as multi-cylindered duplex drive engines. None were successful. The larger articulated engines were variously successful in freight service, but were usually overly powerful and slow for passenger service. Geared and narrow-gauge locomotives found their niche in logging and industrial operations, and in rugged terrain. But the 4-8-4 mainline passenger locomotives (like the 700) were a success throughout their service. "The 4-8-4 was the ultimate development of non-articulated steam power,

and it became the standard modern American steam locomotive." (Drury, 314-5.) "The 4-8-4's were 'top drawer' power. The type ran in some numbers in every geographical area of the country, in Canada and in Mexico, and in every case these engines lasted right down to the end of the steam era". (Swengel, 230.) Integrity If the ghosts of the engineers, firemen, and hostlers who operated the 700 were to find themselves in the cab, and the machinists, steamfitters, and foremen sensed the 700 in the roundhouse or shops, they would find the 700 much as they had left her. The cab crew might ask about the added railroad radio and the "black box" to control a following Diesel. And the shop crew might note new lube lines and her overall clean and good condition. The 700 is now very much as she was in 1938, despite a million miles of service and 30 years in a park. Its caretakers, the PRPA crew, are proud of the 700's authenticity and its full functionality. Mechanical maintenance and repairs conform to the complete set of constructor's blueprints. Recent appearance choices (as in the re-painting and re-lettering of the tender, and the removal of the number boards from the front of the engine) were made to restore its 1938 look. Rarity More than 1,100 4-8-4 locomotives were built between 1926 and 1950 (Drury, 315.) Of these, only seven (including the 700) can still be operated. (Two of these, the AT&SF 3751 and the SSW 819 are now listed on the National Register of Historic Places.) While perhaps 50 4-8-4s still reside in parks and museums, deterioration and the cost and expense of restoring them to operating status make it unlikely they will run again. (The PRPA has calculated that it has performed over $1 million in repairs to the 700.) Additional Information on Materials and Restoration The SP&S 700 is today very much as it was when manufactured in 1938. All of the features which exemplify the 700's character as "state of the art" (previously identified on continuation sheets 8 – 9 and 8 – 10) were incorporated when it was built. The SP&S Railway found no reason to add to or improve those features during the 700's years of service between 1938 and 1956. All steam locomotives experienced major maintenance and repair throughout their service. A major overhaul was typically completed every five years. During the overhaul, disassembly and rebuild of the boiler, controls, and running gear enabled inspection, replacement of worn parts, and painting. Driving wheels received new steel tires. The repair after the accident in 1947 restored the 700 to service to the condition was in prior to the wreck. There is no documentary or physical evidence to indicate that features or capabilities were added (or deleted.) There are indications that during the 700's last years of service (as the railroad anticipated its replacement by Diesel-electric locomotives) some repair and maintenance was deferred. Deferred repairs, combined with the years of exposure to the elements in Oaks Park, meant that significant restoration efforts were needed to return the 700 to high-speed service as a passenger train engine. The following are the repairs, major maintenance, and restoration work done on the 700 over the last 20 years. 1985 – 1987 (at Oaks Park): Removed asbestos and replaced it with mineral wool and other safer materials; repaired exterior of the boiler; boiler frame and jacketing replaced; wood deck on tender replaced; repaired sheet metal and painted tender; and repaired electrical lines and switches for lights. 1988 – 1994 (at Brooklyn Roundhouse (as was all further work)): Firebox sidesheet and boiler repaired, sheet metal repaired and locomotive painted; drawbars inspected; cab windows, seats, and woodwork replaced; feedwater pump replaced with same model as original; cylinder valves and main pin bored and milled; brass bushings on driving rods inspected and repaired; mineral wool insulation installed on boiler; superheaters tested and repaired; boiler washed out (5 times) and four Federal Railway Administration (FRA) inspections. 1995 – 1999: Radius rod replaced (engineer's side); valve cage re-bored; main springs, equalizer pins, and bushings inspected, some replaced; tender water tank repaired and cleaned; electrical system repaired; and four FRA inspections 2000: Boiler completely rebuilt to comply with the new FRA Form 4 requirements, including: new tubes and flues; ultrasound testing of boiler; sandblasting of boiler, boiler coating; Certified boiler work including welding; and removal and replacement of insulation and jacketing. 2001 – 2002: Rebuilt the power reverser; new valve cages, rings and bull rings in valve cylinders; removed, inspected, and repaired drive pistons and cylinder heads; rebuilt the feedwater pump; all superheater tubes removed, tested, repaired and reinstalled; removed and rebuilt the cylinder cocks and mechanical lubricators; removed three-fourths of firebrick in the firebox and replaced it with new brick and mortar; replaced all wheels and roller bearings on the tender; inspected and machined driving rod connectors; measured and analyzed driving wheels and main suspension; added Multiple-Unit (MU) controls; repaired one of two air pumps; painted locomotive; boiler maintained and washed; various steam valves machined and repacked; draw bars inspected, and inspection by the FRA. 2002 – 2003: Replaced coldwater line to feedwater pump; rebuilt injector, repainted tender and logo; rebuilt and replaced both airpumps; replaced all lubrication lines. 2004 – 2005: Machined to resurface all eight driver wheel tires to original profile; replaced broken suspension spring; cleaned and inspected main suspension, equalizers, and brake rigging; removed lighted number boards (not original) from the top of smokebox. 2006: Certified metallurgical analysis of possible damage from December derailment (clean bill) and in progress: Replace all wheels on pilot truck; inspect and repair pilot truck suspension, attachment, and brake rigging; inspect and repair airbrake control stand. Steam locomotives are "high maintenance." Most of the work on the 700 after the initial restoration efforts is work that accrued through years of the normal wear and tear of operations and deferred maintenance in service. Repair and replacement parts are like those removed (unless higher quality is specified in blueprints.) Repair technologies are usually those in use in the 1930s and 1940s. In some cases, new and better materials have been used, but they are indiscernible to the untrained eye. All mechanical repairs conform to the constructor's drawings (blueprints.) (Except for the installation of the MU controls to let the 700's engineer operate a following Diesel) none of the work has been an improvement or modification to the locomotive's initial design and construction. The 700 is very close to its 1938 appearance when it was accepted by the SP&S. In the early 1940s, lighted number boards were added atop the smokebox. In its final years of freight service the 700 would have been grimy; with new paint, washing and polishing, the engine now looks like the new engine in the 1938 photograph. For the 1956 "Farewell to Steam" excursion, the engine was cleaned, and the smokebox painted silver. In 1990, the smokebox was again silver, the valve and drive cylinder covers were chromed; and new logos were on the tender. Original logos are now on the tender, cylinder covers are in the original black, number boards are removed, and the smokebox is in its original graphite grey. Thus, the 700 today is virtually identical in function, appearance, and capability to the locomotive that was built in 1938. Additional Information on Operability and Historic Value Of the thousands of large steam passenger engines that ran in the 1940s, few still exist, and even fewer can be operated to pull passenger trains on main-line railroads. To illustrate, the web-site www.steamlocomotive.com reports that of the over 1,100 4-8-4 "Northern" locomotives built for North American railroads, fewer than 50 still exist. And of these, although ten are identified as "operational" only five in the United States have operated in 2004 or 2005* The remaining large locomotives are typically in parks and museums; a few are in private ownership. Most are stored outdoors. The previous inventory of work done on the 700 indicates the difficulty of bringing a display engine back to life. Cost and effort aside, almost none could be revived because of fifty years of corrosion, vandalism, or parts "gone missing." The 700 is a member of a small and unique cohort of large steam locomotives that are complete, in good repair, and capable of the kind of work for they were designed. The 700 has been inspected by, and certified by, AMTRAK for use with AMTRAK trains. This level of present-day competence is achieved by a locomotive unmodified since built in the 1930s; it speaks to the strength of its manufacture and the completeness of its design. Though awesome to look at when cold and still, locomotives were meant to move and do work. In that, they gave off heat and noise, steam and smoke. Little of the historical value of a steam locomotive resides in its existence simply as an object; its value is in action and its sensory impact. This is why the operation of the locomotive, as representative of "the age of steam" is so essential to understanding and conveying its full historic meaning. The SP&S 700, a robust survivor, is a significant example of the Nation's achievements in steam and rail engineering, manufacture, and operation. *The currently operating large locomotives are the AT&SF (Santa Fe) 3751, the Milwaukee Road 261, the Southern Pacific 4449, the Union Pacific 844, and the SP&S 700.) To these five, one should add the larger Union Pacific 3985 (a "4-6-6-4".) The two Union Pacific engines are the largest; the SP&S 700 is the third largest operating steam locomotive in the world. Experience Being six years old, I had seen some trains before, So it's hard to figure out what I'm at the depot for. Trains are big 'n' black 'n' smoke 'n' steam, screaming at the wheels. Bigger'n anything there is, 'least that's the way it feels. Trains are big and black and smokin', louder'n July Four. But everybody's acting like this might be something more Than picking up the mail, or the soldiers from the war This is some'n' that old man Wyman never seen before. from "Texas 1947" by Guy Clark Big steam locomotives occupy a special place in American art, lore, and memory. The sensory, even visceral, experience of a large engine under steam and in motion is not forgotten. The ground shakes, the heat radiates, whistle and bell deafen, and smoke and steam flavor the air. When someone has experienced an operating big steam locomotive, the railroad engine's place in his or her pantheon of American images is secure. The 700 is from a time before miniaturization, before electronics and remote control, before systems that worked without direct human input. It is also from a time before climate controlled and ergonomically correct workstations. It is how things got done 60 years ago.

RESEARCH INFORMATION

Title Records	Census Records	Property Tax Records	Local Histories
Sanborn Maps	Biographical Sources	SHPO Files	Interviews
Obituaries	Newspapers	State Archives	Historic Photographs
City Directories	Building Permits	State Library	

Local Library:	**University Library:**
Historical Society:	**Other Respository:**

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