



"RENO"  
1872-1912  
VIRGINIA & TRUCKEE RAILROAD NO. 11  
BUILT APRIL, 1872 BY M. B. BIRD & COMPANY, PHILADELPHIA, PENNSYLVANIA  
OPERATED BY RAILROAD NO. 11  
OPERATED BY RAILROAD NO. 11  
OPERATED BY RAILROAD NO. 11  
OPERATED BY RAILROAD NO. 11

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Acquisition Considerations of the  
Virginia & Truckee Locomotive #11 *Reno*  
Prepared for the Nevada Board of Museums  
and History  
The Nevada State Railroad Museum  
June 11, 2019

## **Summary:**

The Nevada State Railroad Museum requests that the Nevada Board of Museums and History (hereafter the 'Board') authorize the trade of locomotive #8 for the locomotive Virginia and Truckee #11 *Reno*. The Collections Management Committee of the Nevada State Railroad Museum has endorsed this project.

This report will provide the Board the condition analysis, and is all the available information on hand. We will go into depth of the two known trade conditions, why they are found to be minimal, and how we can accommodate them.

In addition, the report will discuss the impact on the interpretation program of the Nevada State Railroad Museum.

This report will discuss the restoration potential of the *Reno*, the decisions of that proposed restoration and anticipated costs.

Finally, this report will discuss potential funding sources.

## **The situation today:**

After many years, and several attempts the Nevada State railroad Museum is once again negotiating to acquire the last privately held Virginia and Truckee Railroad locomotive, The V&T #11, *Reno*, from Old Tucson Corporation (hereafter OTC) studios, Tucson, Arizona. Through the effort of the staff at NSRM, and Dan Markoff of Las Vegas, an agreement is pending which would allow NSRM to go to Old Tucson and retrieve the *Reno*.

OTC has provided NSRM an intent to trade the locomotive *Reno* for locomotive #8. Locomotive #8 is in better visual condition in relation to *Reno* and will meet the needs of OTC's program. OTC has recognized the historic significance of the *Reno* and is desirable to get the locomotive to an institution that can take better care of and, hopefully, restore the locomotive. This altruistic motive is the primary driver for OTC.

NSRM desires to obtain the *Reno* for several reasons. First, the *Reno* is the last remaining piece of V&T equipment in private hands. NSRM interprets the rich history of Nevada railroading primarily through the significant V&T collection. Second, the *Reno* appears to be a candidate for a complete and robust restoration. This will be discussed below. It is intended that this locomotive be brought to modern standards and used in our steam operation as a scheduled locomotive.

Finally, this trade allows Nevada to return a very beloved and storied artifact to the public trust. This is what we do.

At this point in the negotiations with OTC, there are two conditions. The Administrator of the Division of Museums and History has determined that the Board has the authority to accept conditions it deems appropriate.

**The conditions of the trade are: The restored locomotive will return to OTC for a visit. The second condition is that the Museum provides near-real time digital imagery of the restoration.**

The first condition, returning to OTC for a visit, can be met by including Tucson in an aggressive marketing for the Department of Tourism and the Division of Museums and History on behalf of the State of Nevada. This locomotive can be used as a flagship and is within NRS 381.0063, 2.(j) provisions to display property at world's fairs or expositions. The large artifacts of NSRM's collections are durable and can be a significant anchor in outreach throughout the region and North America. This is a great opportunity to tell Nevada's story.

The second condition, providing imagery, is within NSRM's online interpretation goals. Not only will NSRM provide an ongoing digital record of the *Reno* to Old Tucson, we will provide it to the world.

This is a great opportunity to obtain the last V&T locomotive available. We should act on it.

### **Background of the *Reno*:**

The V&T #11, *Reno*, is an 1872 American type locomotive with a long and storied history. From pulling the first scheduled passenger train from Reno to Virginia City in September of 1872 to starring in many Hollywood movies it has had an exciting life. The locomotive has fallen on hard times. It is no longer operational and in 1995 it was involved in a fire that destroyed all the wood and paint on the locomotive. A cosmetic repair was made following the fire rendering it to some semblance of its former self however it is in desperate need of a better appearance.



The *Reno* in 1938 at Gold Hill, Nevada on an excursion run to Virginia City, Nevada



V&T #11 the *Reno* as it appeared in 1995 following the fire

Upon securing the possession of the locomotive *Reno*, it is the intent of NSRM to examine the possibility of returning the *Reno* to an operating state in accordance with museum policies and practices. NSRM does not plan on targeting any specific time period or specific historic appearance at this time, but rather plans to bestow upon the *Reno* a new period in life while complying with modern safety standards and using modern techniques and materials. NSRM would then operate the locomotive at the museum.



Locomotive #11 as it appears in 2014, photo by and used with the permission of Taylor McCready

The *Reno*, is in “rough restorable” condition. The locomotive will require extensive labor and monies to return to a presentable and functioning state. The work would be on par with the effort made on the locomotive *Glenbrook*. It is the goal of NSRM to return the locomotive to operation with the intention to use it in the interpretative program of operating trains at NSRM.

As the philosophy of preservation of railroad artifacts has matured over the last forty years NSRM has kept abreast of developments in the industry and contributed to that growth. NSRM has advanced from the heroic restorations of the early 1980’s where all material was replaced to today where a finer understanding of the value of large artifacts is realized. We see that in the approach recently taken with the coach #17. Because of the dearth of historic evidence of the #17 during its early years NSRM chose to preserve the existing fabric rather than invent a new appearance.

It would be fair to ask why NSRM wouldn't do the same with the *Reno*. Unfortunately, the *Reno* was engulfed in flame during a fire at Old Tucson in 1995. All the organic material on the locomotive and tender was destroyed. This includes the wood cab, the wood frame of the tender and tender trucks. The wool waste in the journal boxes was also destroyed. Some inorganic fabric was lost as well, such as the glass and soft metal appointments. All the original paint waiting to be discovered by physical researchers was destroyed. What remains is the heavy iron of the frame, boiler, and wheels.

The reality is that there isn't much organic material to preserve. This unfortunate situation offers NSRM the opportunity to bring the locomotive back to a visual appearance of the early 20th century. NSRM has locomotives representing the 19th century appearance and this would be a pleasing balance. It also affords NSRM the opportunity to refit the locomotive with modern safety fittings and new or nearly new mechanicals assuring a long and safe service to the visitors of NSRM. At this time, it is intended that this locomotive will meet all Federal Railroad Administration rules.

While the *Reno* will be a reconstruction with much new material on a core of historic fabric NSRM will be preserving the continuity of essence. It is the locomotive that once was the *Reno* and it shall always be considered the *Reno* in spirit by many.

### **Fiscal Considerations:**

The orchestration of the *Reno* project begs the question of how will this be financed. The several layers that should be considered are:

1. Cost to transport
  - a. Heavy haul of locomotive #8 south and the return of #11
  - b. Rental of equipment in Tucson
2. Per Diem for the state employees that go along to facilitate the move
3. Cost of the feasibility report
4. Cost to remediate asbestos if found
5. Primary restoration work

If and when the *Reno* becomes available it would be in the interest of NSRM to move rapidly to secure possession. To this end potential donors have been contacted and asked for their immediate support when it is time to move. The response has been very positive. There is sufficient commitment to pay for the cost of trucking and rental of machinery at Old Tucson.

The Friends of the Nevada State Railroad Museum, has committed funds to facilitate the cost of transportation above the monies expected from the aforementioned donors.

The FNSRM have received significant donated sums specifically to support the efforts of NSRM to obtain, build, purchase or other means, reliable sturdy locomotive power. These sums are separate from membership fees. The cost to move is expected to approach \$40,000. Upon arrival of the *Reno* at NSRM, they intend to ramp up their capital campaign for the restoration of the locomotive.

The Restoration Feasibility Study cannot begin until the locomotive is in NSRM's hands. The cost is anticipated to be about \$20,000. NSRM will request these funds from our private fund account. We have identified a reliable team of experts that are willing to accept this opportunity.

Asbestos remediation did cost about \$20,000 the last time a locomotive was cleaned at NSRM. This was some time ago. NSRM does not have a current estimation for this project and until we get a bid it is an unknown.

### **Restoration Funding Considerations:**

There has been casual conversation with persons connected with the Wiegand Foundation. The conversations centered on the *Reno*. Given the performance NSRM showed with *Glenbrook* and the significance of the *Reno*, the support is suggested to be strong. This was taken as a good indicator that NSRM might be well positioned to apply for and receive a grant from Wiegand.

There are other foundations that are we feel would support this project.

### **Conclusion:**

This is the last privately owned V&T locomotive. This is an opportunity to acquire a locomotive that could replace the daily operation of artifacts and consumption of



historic fabric. If returned to service, its use wouldn't constitute the consumption of historic fabric because there isn't much original fabric to consume. If we repatriated the *Reno* with Northern Nevada and did nothing with it initially, it would still meet the mission of the NSRM.

The cost of the locomotive is essentially zero. We will trade a historically insignificant (to Nevada) non-operational locomotive, the #8, for a venerated locomotive with much local history. Both are in similar condition mechanically however the appearance of the #8 is better.

In so far as the initial cost to move the locomotive won't be borne by the state the acquisition doesn't consume resources needed otherwise. There is significant interest in the *Reno* across the nation. This is the logical place for it and as an artifact it needs rescuing. Collecting this locomotive is what the museum was conceived for. It meets ours and the public's interests.

We urge the Board to approve this request.

11-Jun-19

Scope of work: #11, boiler

Note: In this spread sheet the word "anticipate" means be prepared to spend money here if we find a deficiency. Until the feasibility study is finished we won't know.

Assuming NSRM can take possession of the Reno we intend to:

28000.00 Transport #11 and tender to NSRM. See note (1). Quote from 2016, requote 8/2018 no change, Cappurro Trucking, Mark Westervelt.

State rate Out of state travel authority for three (maybe four),

800.00 Forklift rental in Old Tucson, United Rentals in Tucson will accept a NV P.O.

25000.00 Write a feasibility study  
Given the effort by Wilke maybe get him to partner with Drew. Then again the paint is relatively simple for the 1938 appearance.

100.00 Be prepared for the issue of asbestos. Remove sample of lagging and send out for identification (3)

25000.00 Be prepared for asbestos abatement. An outside contractor may be necessary if identified.

500.00 Remove jacket, piping, cab, front end accoutrements, ash pan, hand railings, domes, bell, stack, running boards, and appliances. (2)

500.00 Purchase 2019 ASME Boiler and Pressure Vessel Code,  
Section I: Rules for Construction of Power Boilers,  
[https://www.techstreet.com/standards/asme-bpvc-i-2019?product\\_id=2026359](https://www.techstreet.com/standards/asme-bpvc-i-2019?product_id=2026359)

750.00 Purchase, 2019 ASME Boiler and Pressure Vessel Code, Section II: Materials -  
Part A: Ferrous Material Specifications  
[https://www.techstreet.com/standards/asme-bpvc-ii-a-2019?product\\_id=2026360](https://www.techstreet.com/standards/asme-bpvc-ii-a-2019?product_id=2026360)

750.00 Purchase, 2019 ASME Boiler and Pressure Vessel Code, Section II: Materials -

1500.00	Purchase NBIC Code, <a href="http://www.nationalboard.org/Index.aspx?pageID=4&amp;ID=445">http://www.nationalboard.org/Index.aspx?pageID=4&amp;ID=445</a>
500.00	Re-certify UT machine,
25000.00	Establish a relationship with a Professional Engineer with boiler experience, preferably riveted construction background (4)
	Contact boiler inspector for a consult and Contact PE for consult, upon approval to proceed, submit application for re-installation of a boiler
	Cut coupons from the boiler as follows: Front tube sheet First course Second course Transition Throat sheet Throat sheet extension Side sheets, left and right Wrapper Dome Backhead
2500.00	Send all coupons out for chemical and tensile testing, \$250 per coupon. A minimum of 10 coupons. (5)
1500.00	Build a shear test fixture after ASTM B769-11
	Identify material to be replaced with new, predicated upon tensile values, chemical analysis, thickness, crack inspection and detection, general deterioration and condition, and structural design and architecture. Historic documentation indicates original steel shell with steel fire box. Verify this through tests. Historic records indicate a new firebox, steel, 1903.

- Test for hot shortness following chemical analysis results. This test is to be performed in-house. There is no cost associated with this test. This is an indication of sulfur sequestration at the grain boundaries and the formation of iron sulfide
- Test for cold shortness at room temperature. Use the 180 bend test. This test is to be performed in-house. There is no cost associated with this test. This is an indication of the presence of phosphorus. It may be prudent to freeze the sample to get below the ductile/brittle transition temperature.
- Design the repairs to meet the requirements set forth in NAC 455C.242 and codes under NBIC, ASME, API, and FRA.  
 NAC requires FS=>5 for nonstandard boilers NAC 455c.242, para 8  
 FRA has a more appropriate requirement for boiler controls.
- Spend a lot of time designing the necessary repairs.
- Decision making time. (5.c)
- Is the original material of a quality to proceed?
  - Does the inspector and P.E. approve of the design and plan for repairs?
  - Is the balance of the locomotive in sufficient condition to merit the continued work?
  - Is funding available to continue?
  - Does investment in the Reno meet the mission of NSRM?
  - Does management and the board approve?
- 1200.00 Anticipate a new first course unless UT test, dye penetrant test, chemical composition test, and tensile test prove otherwise (note 5a)  
 The associated cost is for material
- 1250.00 Anticipate a new second course unless UT test, dye penetrant test, chemical composition test, and tensile test prove otherwise (5a)  
 The associated cost is for material
- 1500.00 Anticipate a new transition course unless UT test, dye penetrant test, chemical composition test, and tensile test prove otherwise  
 The associated cost is for material

- 400.00 Anticipate a new throat sheet extension unless UT test, dye penetrant test, chemical composition test, and tensile test prove otherwise  
The associated cost is for material
- 750.00 Anticipate a new front tube sheet, flange only head as per L.A. Boiler, Blackwell, Texas 74631  
The associated cost is for material
- 5500.00 Anticipate a new fire box with radial stays (rigid) except allow girders under the dome opening, anticipate a new rear tube sheet, and send out firebox door sheet and tube sheet for flanging (McCabe) (6)  
The associated cost is for material
- 15000.00 Anticipate contracting with Stathi for a week
- 2000.00 Door sheet, material, shipping, and flanging , 3/8" SA-516-70, 325 lbs
- 4000.00 Tube sheet, material, shipping, and flanging , 1/2" SA-516-70, 450 lbs
- 2500.00 Anticipate material and forming of side sheets and crown sheet, 1125 lbs
- 1375.00 Anticipate application of a dome liner, none originally applied, 5/16" x 225 lbs
- 1125.00 Anticipate a new dome lid, as per ASME Section one PG-11.3. see AutoCAD file #11-radial stays and dome rework.
- 3000.00 Anticipate the possibility of replacing the steam dome ring casting.  
Mudrings can be SA-36 so I suppose the dome rings can be too  
Consider moving the bolt face vertically down making better access to interior of dome.
- 5250.00 Anticipate stay bolt iron. Crown bars burn to dimension (if not converted to radial stay configuration), crown bolts and sling stays, SA-36. Note the ASME code increased value for shear in A-36 if used
- 6800.00 Rivets with material report, total needed for the entire job. See ASME PG-14.1.2

Time to go to work:

3800.00	Remove the boiler from the frame, remove smoke box (see line 24 and 3.a) Contact Industrial Logistics Service, Carson City, NV to pick the boiler off the frame or build an "A" frame and get a chain fall and do it in house
1500.00	Remove dome and re-work the vertical seam to higher efficiency, dbl strap, dbl riveted type seam
200.00	Remove fire box in its entirety. Check carefully for water side throat sheet cracks. As per line 28 the tubes will have been removed. It took Kevin approximately 50 hours to cut out the crown sheet and crown bars out of the #8 Mort had already cut out the side and door sheets, ringing the stay bolts. It took Mort about 30 hours to do so.
2500.00	Sand blast water side of the side sheet, wrapper, barrel, and throat sheet as needed. Consider out source, Peabody Fleet Painting Inc., Sparks NV
1000.00	After sandblasting dye check the throat sheet, dye check back head and brace anchors.  Dye check around boiler checks, bell and dome studs, washout holes  Patch sling stay rivet holes in the wrapper, flush rivets or plug weld  Install dome. Install liner.
8500.00	Install firebox, stay bolts, radials, and crown bars
525.00	Install new palm stays
600.00	Install firebox door ring, welded application as per ASME section I, Figure A-8(I) and PFT-27
1150.00	Install transition course with throat sheet extension and double strap, triple rivet long seam or welded construction
2350.00	Install second and first course

	Leave the front tube sheet out for the time being
1735.00	Anticipate a man hole under the sand dome. The dollar figure reflects the purchase not the installation to be done in house
7125.00	Anticipate new tubes (1585 feet x 2" x 11 gauge @ SA178). includes shipping
900.00	Anticipate ferrules (144 @) includes shipping
1220.00	Anticipate replacement of dry pipe (original indicated as iron). SA106, includes shipping.
1800.00	If the dry pipe is missing cast new ends, 2 patterns, one casting each, copper rivets
3800.00	Anticipate lagging
1800.00	If the barrel is reusable design diamond reinforcing plate with riveted construction
	<b>Boiler appliances, piping, firing, backhead fittings</b>
8525.00	Anticipate new throttle body, throttle stand, throttle rod, and linkage (see note 9)
2200.00	Patterns (2) Make new or borrow
1875.00	Castings, malleable iron. Machining of castings
720.00	Anticipate new ash pan with castable refractory lining Material, Steel
1600.00	Refractory, castable including shipping
500.00	Anticipate new Von Boden burner, burner is to be placed in the rear of the boiler, firing forward into a brick arch
	Firebox door appears to be intact (Also NSRM might have one)
	Consider all brass pressure fitting to be of suspect integrity due to being in a fire. Replace as indicated.
1325.00	Anticipate delivery lines to be replaced with 1-1/4" CPS (note 8)

6000.00 Anticipate new boiler stop checks, re-work Glenbrook pattern to accept stop valve bonnets or make new pattern for "coffee can" style

7500.00 Anticipate replacement of all pipe and tubing

Set up back head per FRA standards

2150.00 Anticipate two new reflex sight glasses, gauge cocks not used

1625.00 Anticipate new steam gauges and air gauges

Apply hydrostatic lubricator from NSRM #8

1225.00 Anticipate new firing manifold (consider using the manifold from NSRM #8)

735.00 Anticipate firing handle and valve

Re use cab lamps from #8

1350.00 Anticipate new safety valves, two each Kunkle series 6182 or 6186

880.00 Anticipate new blow down valve (the valve on the Reno might be rebuildable)

Whistle, it is proposed that the NSRM#8 whistle be applied to this locomotive

See air section for air valves

### **Mechanical**

Frame and machinery:

1400.00 Clean frame, saddle. Material only cost estimate

250.00 With the boiler off, check frame for straight and square, check frame for cracks.

21000.00 Check saddle for cracks, condition of cylinders, slide valve surface for flat and pits,



	Anticipate power lapping the flat valves
10000.00	Anticipate boring and sleeving the cylinders, estimated liner at 17" x 34" (10)
1200.00	Inspect the balance valves, repair as needed
	Apply drifting valves, in house, perhaps. Not evident in 1938 photos
	Consider applying saddle drains
10000.00	Inspect driving boxes, anticipate new brass crown brasses and hub liners, 4 crown brasses, 4 hub liners
4000.00	Inspect shoes and wedges, anticipate new wedges and shoes, total 8 pieces
	Inspect chairs for wear and cracks. Repair as indicated
11000.00	Inspect springs for cracks and shape (arc)
	Inspect equalizers for cracks and wear and straightness. Repair as needed
2000.00	Inspect valve linkage, repair as needed and check spring assist for temper Anticipate pins and bushings
8000.00	Replace or repair piston rods and valve rods. Hard chrome piston rods. Electronic Chrome and Grinding, Santa Fe Springs, CA, possible vendor.
9600.00	Inspect guides and cross head, regrind or replace, heat treat if new, 8 bars total (2" x 3" x 48", 800 lbs prehardened 4140)
1200.00	Replace as needed rod cups, crosshead cups and miscellaneous cups
600.00	Sanders, repair as indicated

**Wheels and axles**

32000.00	Anticipate driver axle replacement, 2 each
1100.00	Inspect and repair as needed, eccentrics see line 271
18000.00	Inspect driving centers for cracks, if the centers are defect replacement costs can be anticipated as follows: Pattern for centers, convertible for main driver center and following driver center (they might be the same)
20000.00	Castings, 4 each, nodular cast iron
20000.00	Machining of driver centers
8000.00	Inspect tires, anticipate replacement of tires Tires are about \$2000 each
11500.00	Inspect pins, rod brasses and rods; consider re-work of side rod profile for esthetic reasons
1350.00	If axles or driving centers are replaced quartering is required
	<b>Lead truck</b>
16000.00	Anticipate new wheels (26") and axles, two each Estimating \$2000 per wheel and \$2000 per axle. \$6000 per wheel set plus shipping. Balance of \$16K for brasses, babbitt and box repair
12000.00	Inspect springs for cracks and arc profile
1600.00	Inspect equalizers for cracks and wear
200.00	Check frame for square and defects, inspect binders, repair as necessary
1500.00	Inspect center bearing, repair or replace as needed
600.00	Wheel covers, make new, 4 each
	<b>Front end</b>

1550.00	Anticipate new steel pilot beam with pole pockets, 8" high x 10"
875.00	Coupler, Missing: coupler pocket, missing: cut levers, missing, consider dinky coupler
	Pilot apron, Straighten and repair, or replace
2125.00	Anticipate a new pilot, steel or wood as needed
	Pilot braces, inspect and repair
3400.00	Stack, up for discussion, the Reno has the appropriate stack base in situ, may need a stack cap. Copy #25 cap ring, cast in aluminum. Pattern and casting.
1750.00	Smoke box door and ring to be evaluated although they look good in the 2014 photos, repair as necessary
1850.00	Anticipate new branch pipes and rings, NSRM has the blanks for two branch pipes, material to finish is required and bronze seal rings, 4 each
3100.00	Anticipate new manifold, weldment and heat treat if original is missing
1900.00	Anticipate new nozzle casting
550.00	Anticipate new petty coat
	<b>Air brakes</b>
5400.00	Anticipate pump rebuild with chrome piston rod
3125.00	Anticipate Air receiver, replace with code tank
10000.00	Anticipate Piping, make all new
500.00	Air stand, rebuild as necessary. Possible NOS from kloke
800.00	Air valves, rebuild as necessary

3100.00	Cylinder and pistons, inspect, anticipate boring and sleeving, 2 each
200.00	Inspect levers, rods and pins
450.00	Convert engine brakes to composite shoes
	<b>Electrical</b>
1500.00	Inspect dynamo, evaluate following inspection
250.00	All new wiring and switches will be required
	<b>Pretty stuff</b>
25000.00	Cab, Wood, painted, Original was Black Walnut, New cab to be Ash, Glenbrook cab was \$22500 By 1911 the wooden cab had been replaced with a V&T built wooden cab. It is believed to be similar to the V&T built #18 cab in collections.
650.00	Make cab grab irons to be new to comply with FRA
300.00	Bell, rework as necessary and polish
2500.00	Jacket, blued. Brass rivets.
1200.00	Boiler bands, flat, plane brass,
5000.00	Front boiler band, Contact Fred Haberkamp, Columbia spinning, Chicago, IL 60634
600.00	Running boards, Painted ash
1750.00	Running board nosing, Brass
1400.00	Sand dome, wrapper, brass, repair and reuse cast iron components

1450.00	Steam dome, Wrapper, Brass, repair and reuse cast iron components
1500.00	Flow bowl, cast and polished brass. Make an extra for the #22, pattern and castings
825.00	Hand rail, Brass
	Head lamp, to be decided at a later date
940.00	Fenders, steel with brass nosing, make new, front main axle fenders intact
1475.00	Cylinder, covers and wrappers (casing), brass, repair or replace as needed
2200.00	Steam chest, covers and wrappers (casing), brass, repair or replace as needed
5000.00	Paint, stripping, and lettering: as per 1911 thru 1919
	<b>Tender</b>
11000.00	Anticipate new frame is required, consider steel structure
800.00	Anticipate decking, wood, 10 quarters Douglas fir, new, moldings and nosing molding
17800.00	Anticipate new tender cistern, Reuse as possible the old sheets, New material to be cold finished coil steel, leveled and sheared.
5000.00	Send the tender tank out for professional painting. Check with Gilman Auto body.
1000.00	Epoxy coat the interior of the new cistern, white
3400.00	Anticipate new fuel tank (NSRM may have an appropriate historic tank)
32000.00	Anticipate new axles, wheels, brasses, etc. Trucks require complete rebuild Estimating \$2000 per wheel and \$2000 per axle. \$6000 per wheel set plus shipping. Balance of \$32K for brasses, babbitt, box repair
10000.00	Inspect and replace as needed the springs

1000.00	Air system is not intact, replace as needed
	Inspect and service rear couple and pocket
800.00	Anticipate nosing, brass
625.00	Anticipate tools boxes, make 2
600.00	Push pole pockets per rendering
800.00	Make new push pole and brackets.
1250.00	Back up lamp, need to find one, perhaps NSRM #8 lamp
1400.00	Anticipate buffer, connections, chain etc.
1200.00	Anticipate new brake beams
200.00	Anticipate brake staff
450.00	Anticipate rear tool box
600.00	Anticipate cab apron
650.50	Anticipate water level indicator as per FRA requirements, apply at the time of reconstruction of cistern
651655.50	This is huge number taken in the light of the Glenbrook restoration however much of the Glenbrook had been previously restored. Except for the paint and a couple of lesser details the tender was previously finished. The engine frame and axle work had been completed as well as the amassing of material for future work. The Reno is starting from the ground. A little over \$250,000 was allocated to Glenbrook through a grant from Wiegand and the Glenbrook was half completed so \$650,000 isn't too far off the mark.

- (1) Several people have pledged support for this move with cash donations.  
Cappurro (Mark Westervelt) quote \$28,000 may increase with time.
- (2) reflects cost of oxygen/acetylene and dump fees
- (3) Due to the public awareness of this project if asbestos is present it must be disposed of as per code. A contract may be necessary with a licensed contractor.  
A sample for testing costs \$45 as per Asbestos TEM Laboratories, Sparks, NV 89431
- (3.a) Remove boiler and have commercially sand blasted by an outside contractor such as Peabody Inc., Reno, NV
- (3.b) This section contains the riveted construction section new to the code.  
This gives us the leverage to have the boiler ticketed.
- (4) Aaron Tippetts P.E.  
4564 West Hacienda Ave  
Las Vegas 89118  
He reviewed the Glenbrook boiler calculations
- (5) Anamet laboratories, 26102 Eden Landing Road, Suite 3, Hayward, CA 94545  
Anamet did the material testing for the Glenbrook and for the #8
- (5a) If the barrel is reusable then cut out the long seam and make a riveted repair otherwise, roll, weld, X-ray, and heat treat new courses to be circumferentially riveted. (7)
- (5.c) We are looking for:  
Integrity. Thickness, Corrosion, cracks  
Chemistry. Carbon content, Sulfur, Phosphorus  
Strength, Tensile, shear  
Design, longitudinal seams, crown bars, dome details
- (6) Moedinger has a McCabe and I am sure someone on the west coast must also  
Stathi Pappas has a McCabe which he is willing to bring to Carson for the flanging  
line 75  
Line 86
- (7) For a quote call:  
Williams and Davis Boiler  
Hutchins, Texas 75141  
Contact Jim Caradine or Steven Rubarts  
Line 71
- (8) Check Sequoia Brass as source  
Line 185

(9) Check with Kloke for throttle pattern used in Leviathan. It may be the pattern drawn by CCdW from the Glenbrook throttle. Not big enough.

line 167

Things to do:

Certify the UT machine

Get new ASME code

(10) For cylinder liner check with, D.W. Clark, 692 North Bedford street, East Bridgewater, MA 02333, 508-378-4014 or Spuncast Inc., PO Box 521 / W6499 Rhine road, Watertown, Wisconsin 53094 920-261-7853, Jim Schwartz <jschwartz@spuncast.com>