

## Restoration Planning for

# Ex-Oahu Railway and Land Company Locomotive No. 85



Hawaiian Railway Society Collection

### **Purpose:**

This document is a planning guide for the restoration of ex-Oahu Railway and Land Company (OR&L) locomotive No. 85 for static display and as such issues with the boiler will not be addressed. It includes mechanical, structural and cosmetic restoration only. Because the eventual goal of the Hawaiian Railway Society (HRS) is to return No. 85 to full operation all work accomplished must be with operation in mind. This plan is a “living” document and will be revised as required to reflect new information as it is obtained.

### **Background:**

OR&L No. 85 was built by the American Locomotive Company (ALCO) in October 1910 at the Cooke Works in Patterson, New Jersey. No. 85 has a 4-6-0 wheel arrangement and is ALCO construction No. 48585. No. 85 was used primarily in passenger service although she was assigned to yard duties at various points in her career. During World War Two No. 85 was the primary commuter locomotive assigned between Honolulu and Barbers Point. She served on the OR&L until 1953 when she was donated to the Southern California Chapter of the Railway and Locomotive Historical Society and immediately transferred to the City of Los Angeles Travel Town Museum where she operated under steam until 1961 when due to boiler deterioration No. 85 was placed on static display. Acquired by the Lahina, Kaanapali & Pacific (LK&P) by an equipment trade with Travel Town in 1993 No. 85 was shipped to Maui where she was disassembled in preparation for complete restoration to steam operation. Due to significant problems with the replacement boiler this restoration was never completed and No. 85 remained in pieces until acquired by HRS in mid 2010. No. 85 was partially reassembled and transported to the HRS yard in Ewa arriving on 11 November 2010.

### **Significance:**

OR&L No. 85 is one of only three remaining OR&L steam locomotives and the only remaining “road” locomotive.

### **Assessment:**

The following work is known to have been accomplished:

#### **Travel Town –**

1. November 1955, overhaul air pump, installation of “dead man” control, installation of independent brake.
2. February 1956, twenty (20) boiler tubes replaced, clean and scale boiler, asbestos removed, steel boiler jacket replaced.
3. June 1956, repair boiler, repair mud ring.
4. September 1956, replace some boiler tubes, re-drive leaking stay bolts, clean boiler, re-brick fire box and install arch above burner.
5. February 1958, Boiler Inspection.
6. September 1958, replaced dry pipe and 130 boiler tubes.
7. December 1958, repairs to crown sheet, tighten and caulk stay bolts.
8. July 1961, weld repair to cracked side sheet.
9. August 1961, welded stay bolts.
10. August 1961, Boiler Inspection, No. 85 retired from service and placed on static display.

#### **LK&P –**

1. Complete disassembly for restoration.
2. New welded steel cab fabricated using original riveted cab as pattern. Original grabs and hand rails were re-used
3. New welded steel tender water tank and oil tank fabricated using original riveted tender tanks as pattern. Water valves removed and not replaced, two eight (8) inch domed, vented, quick acting caps installed in lieu of water valve operators in water tank and one twenty (20) inch manhole with three cam closure installed in oil tank. Original grabs and hand rails were re-used.
4. New drive axle bearings were fabricated and installed.
5. New driver tires were fabricated and installed.
6. New lead truck tires were fabricated and installed.

*Other work on No. 85 was likely accomplished but documentation is lacking. At some point after receiving the new and defective replacement boiler for No. 85 two inspection holes were cut in the original boiler rendering it totally useless.*

## HRS –

Prior to purchase HRS personnel visited the LK&P in April 2010 to inspect No. 85. The locomotive was found disassembled with the exception that the driving wheels, lead truck, cylinders, cross heads and guides being assembled to the frame. The remaining parts were scattered about on pallets, on the ground covered with vegetation, or in storage containers. The following parts were noted to be missing:

- Air Pump, Westinghouse, 9½ inch
- Lubricator, Nathan #9
- Injectors, two Nathan Monitors, #6 (two other injectors supplied by LK&P)
- Safety Valves
- Whistle
- Throttle Handle
- Sight Glass
- Blow Down Valve
- Blow Down Cocks
- Steam Gauge
- Air Gauge
- Burner Control
- Train Air Brake, Westinghouse G-6
- Sand Dome Lid
- Draw Bar
- Number Plate
- Builder's Plates

The following incorrect replacement parts were noted:

- Headlight
- Bell

Following purchase of the locomotive HRS contracted with Mr. David Ranger to reassemble No. 85 for transport to the HRS yard at Ewa. Mr. Ranger with the help of Mr. Michael Dolan reassembled the locomotive and tender sufficiently to allow safe transportation and labeled all loose parts. On 11 November 2010 No. 85 arrived along with her tender and a 20 foot container of loose parts and was replaced on her home rails for the first time in 57 years.

It must be noted that significant assistance was provided by Young-Brothers/Hawaii Tug and Barge who transported No. 85 from Maui to Oahu at no charge and Project Transport, T. Sniffin and Sons Trucking, Maui Crane, Don's Makiki Service and Hawaiian Crane and Rigging who provided services at greatly reduced rates.

### **Restoration Philosophy:**

OR&L No. 85 will be cosmetically restored to its ca. 1945 configuration. During the restoration, every effort will be made to replace missing or broken parts with original parts. In the event that original parts cannot be located suitable substitutes may be used following as close as possible the original form fit and function. Under no circumstances will changes be made that make it impossible to install an original part should one become available in the future. All substitutions

must be approved by the restoration committee and the Director of Restoration. All mechanical work proposed and accomplished, with the exception of the boiler, must be suitable for future operation and not require remedial actions.

### **Restoration Plan:**

There are two main areas for restoration, mechanical and structural.

**Mechanical** – Mechanical restoration addresses the “moving” parts of the locomotive and includes but is not limited to wheels and axles, brakes including brake cylinder and operating mechanisms, springs, cylinders, cross heads, cross head guides, side rods, main rods, blow down cocks and linkages, reversing linkages and eccentrics etc. All these parts must be restored to operational status. Mechanical parts attached to the boiler need not be made operational at this time although it is desirable.

**Structural** – Structural restoration has been mostly accomplished by the LK&P in fabricating a new cab, tender water tank and oil tank. The single significant item remaining is replacement of the cab floor. The existing boiler will require preservation and painting.

**Other** – This category includes but is not limited to fabrication of a new boiler jacket and mounting of piping and accessory equipment.

### **Action –**

The immediate goal of HRS is to make No. 85 a presentable display piece and to preserve and maintain all work already accomplished by the LK&P. To this end maintenance is the highest priority. No. 85 must be movable, kept lubricated and exercised at regular intervals.

#### Locomotive –

1. Repair and install springs and spring rigging. *Repairs in progress by Weaver Springs*
2. Open, inspect, clean and lubricate cylinders.
3. Open, inspect, clean and lubricate all bearing surfaces.
4. Inspect and lubricate all linkages.
5. Preserve and paint frame.
6. Preserve and paint boiler.
7. Fabricate and install new cab floor.
8. Mount pilot.
9. Mount coupler.
10. Mount cab.
11. Fabricate and install new boiler jacket.
12. Fabricate and install new drawbar.
13. Mount all accessories and piping.
14. Paint and letter.

#### Tender –

1. Clean, preserve and paint frame.

2. Open, inspect, clean and lubricate trucks.
3. Replace and preserve wood decking.
4. Install water and oil tanks.
5. Restore, test and install air tanks.
6. Replace front and rear wood buffer beams.
7. Mount all accessories and piping.
8. Mount coupler.
9. Paint and letter

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