

# NEVADA STATE RAILROAD MUSEUM



## BRAKEMAN'S HANDBOOK

2010

## **Brakeman**

**Description:** Brakemen are volunteers whose primary responsibility is to assist the Conductor in the safe operation of trains. They must be proficient in giving hand signals (day and night) and will operate switches, couple and uncouple cars, make air line and brake tests, and assist the conductor in any way to assure safety in the operation of the train. Brakemen will be familiar with proper equipment operation and assist in the on-going inspection of cars. During the operation of the train they will also act as car attendants whenever possible. They are expected to observe the operations of other members of the train crew in order to prepare for advancement. They are directly responsible to and shall receive directions from the Conductor.

### **Brakeman's duties include:**

1. Attending the daily pre-operation Safety Briefing.
2. Following the instructions in the NSRM Brakeman's Handbook.
3. Being responsible to and taking direction from the Conductor.
4. Assisting in the boarding and detraining of passengers.
5. Operating the wheelchair lift.
6. Monitoring their assigned car to ensure that passengers are riding in a safe manner.
7. Ensuring that passengers remain seated at all times that the train is moving.
8. Communicating with the passengers during the run.
9. Giving clear hand or lantern signals.
10. Operating switches.
11. Coupling and Uncoupling cars.
12. Performing brake-tests.
13. Filling the tender tank with water.
14. Riding the leading car during moves where the locomotive is pushing the train and communicating proceed or stop signals to the engineer.

**Requirements:** Sixteen hours as a Car Attendant, followed by thirty hours as a Brakeman Trainee, recommendation by an active Conductor and successful completion of the Brakeman Qualification Test. This will be followed by a 'practical factors' demonstration with certification of competence by the Road Foreman [Chris DeWitt] (or his designee). A Brakeman must be at least 18 years old.

**All positions require that the Crew Member have passed the NSRM Rule Book / Safety Test. Attendance at the annual Safety Meeting is required to maintain status as a Crew Member.**

## 1.0 INTRODUCTION

This Brakeman's Handbook is intended to provide the basic information needed to perform the duties of a Brakeman.

Appearance is important. Brakeman must be neatly dressed and groomed.

**You should at all times wear your volunteer's name badge.**

It is preferred, but not mandatory, that Brakeman be dressed in the typical NSRM uniform: a museum logo shirt, jeans or overalls, a railroader's cap and jackets or coats when required by the weather. Footwear is an important factor in safety. Wear work boots/shoes with soles and heels firmly attached and heels that are not excessively worn. Suitable footwear around shops, tracks, and moving equipment does NOT include high-heeled boots or shoes, sandals, low quarter slip-on shoes or tennis shoes.

**You should carry your NSRM Rulebook at all times while on duty.**

The Brakeman duties must be learned and followed by all volunteers designated to be brakemen. The Frequently Asked Questions (**FAQ**) section and the descriptions of the equipment used on NSRM Steam Trains are provided in the Car Attendant Handbook as information that might be of general interest to passengers. Brakemen should scan the material provided so that they know what information is available. Brakemen are encouraged to develop other information to share with passengers. Please be sure that all information provided is factual. If you don't know the answer to a question, try to obtain an answer from another member of the crew and be prepared to say, "I don't know" or "I'll try to find out" when necessary.

## 2.0 SUMMARY OF BRAKEMAN'S DUTIES

It is the Brakeman's duty to assist the Conductor and help to provide a safe and pleasant experience for the passengers. This is accomplished by making sure that the environment is safe, that the passengers behave in a safe manner, and that the passengers are reasonably comfortable and informed.

### **Know where the First Aid Kits and Fire Extinguishers are at all times.**

#### 2.1 PRIOR TO FIRST RUN

It is the Brakeman's responsibility to participate in preparing the train for the day's use. Carry a flashlight or lantern to aid in performing these inspections. **If you find any problems with the train, tell the Conductor immediately.** After this preparation, the Brakeman must attend the Safety Briefing scheduled by the Conductor.

- A) All doors through which any portion of the train will pass must be fully open to the maximum of their travel and the operating chain secured with a keeper.
- B) The turntable must be aligned with the track occupied by the locomotive.
- C) Help to turn the turntable to its alignment with the proper track.
- D) Assist in preparing the train for removal from its storage location in the building.
  - 1. Look for any dragging equipment or any debris lodged in the undercarriages.
  - 2. Make sure that all brake lines are properly connected and that angle cocks are in the proper position.
  - 3. Check couplers and verify that all pins are in the locked position.
  - 4. Inspect the brakes and oil the journal boxes as needed.
  - 5. Verify that all wheel chocks and skates have been removed.
  - 6. All brakes except for the rear of the caboose should be released.
- E) Aid in the coupling of the engine to the train.
- F) Assist in making the brake test.
- G) Install the marker lights after the train has been removed from the building.
- H) Be certain that the annex doors are securely closed and the operating chain secured with a keeper.
- I) Operate switches, uncouple and couple the locomotive from and to the train in order to take the train to the depot.
- J) Prepare the train for passengers.

## 2.2 LOADING PASSENGERS

- A) When instructed by the Conductor to begin the boarding, assist passengers onto the step and instruct them to hold the hand rail as they climb the steps.
- B) If a passenger might have difficulty negotiating the stairs, offer to assist them, and offer use of the wheelchair lift for loading.
- C) When needed, assist other crew members in loading passengers requiring the wheelchair lift.
- D) Observe what people are carrying, and if consumables other than water are noted, inform the passengers that only water is allowed to be consumed aboard the train.
- E) Keep approximate count of how many seats remain in your car and do a walk through head count as the car reaches capacity.
- F) Just before the train leaves, make sure that all passengers are seated and in the case of the open car that the car crossover is raised and secured.

## 2.3 DURING THE RUN

- A) Make sure that the passengers keep their arms and heads inside the car.
- B) Make sure that passengers are seated whenever the train is moving.
- C) Punch tickets for each rider. It is OK to offer to let the passenger punch the ticket. Inform the riders that the back of the ticket provides discounts both for Museum entry and for the Museum Store valid on the day it is sold.
- D) **Talk to the passengers! Encourage everyone to visit the Interpretive Center.** Provide the information outlined in Section 4 of the Car Attendant Handbook. If there are any questions you can't answer, see if you can find someone who can answer them.
- E) Make sure that all passengers follow the safety instructions as given in this handbook.

## 2.4 END OF THE RUN

- A) Provide information on any special activities or displays occurring at the museum. Encourage people to join the Friends of the Nevada State Railroad Museum and give them details of the current operating schedule. And be sure to invite everyone to visit the museum and gift shop.
- B) Once the train has stopped and the engineer has blown the whistle to indicate that the brakes have been set, do anything needed to help the passengers safely detrain.
- C) Be at the foot of the stairs to assist passengers down the steps. Remind them to use the hand rails. Offer your hand to anyone who might need it.
- D) When all passengers have disembarked, inspect the car for forgotten items and for cleanliness.
- E) Invite those waiting for the next train to board any car they choose. Let them know that tickets will be punched on board the train.

## 2.5 SWITCHMAN

- A) Maintain an awareness of train movement and assure that switches are properly aligned and secured for routine and safe operation.
- B) Make “roll-by” inspections of the train and signal the Conductor and/or enginemen if any defect is seen.
- C) Make visual inspections of the track in proximity of switches and signal the Conductor and/or enginemen if any problem is seen.
- D) Assure that people are away from the right-of-way and caution them to remain so.

## 2.6 UNCOUPLING THE LOCOMOTIVE (Front Brakeman)

- A) Be certain that the train has stopped and that the engineer has blown the whistle to indicate that the brakes have been set. Only after the whistle has been sounded should you detrain to uncouple the locomotive from the train. **Never step over the end bulkhead of the tunnel car in order to uncouple it from the locomotive until you have heard the whistle!**
- B) With permission from the engineer step into position to close the angle cock on the locomotive. Position yourself so that you are visible to the engineer, lift the cut lever and then signal the engineer to proceed. Once the train has parted you may stop the engine to step aboard to ride to the switch (Switch 6) where you will stop the train and throw that switch so that the locomotive can enter the passing siding.
- C) Once the locomotive has entered the siding you should return the switch to its normal position.
- D) Ride the locomotive to the other end of the siding, stop the locomotive and throw the siding switch (Switch 5) to its normal position. Once the locomotive has passed your position in order to couple to the train you may cross the track to wait by Switch 4. Once the train has departed for the depot you should return Switch 4 to its normal position and then you may proceed to the depot.
- E) As an option you may stop the train beyond Switch 4 in order to ride the train to the depot.

## 2.7 COUPLING THE LOCOMOTIVE TO THE TRAIN (Rear Brakeman)

- A) Be certain that the train has stopped and that the engineer has blown the whistle to indicate that the brakes have been set. Only after the whistle has been sounded should you detrain to throw switches and to couple the locomotive to the train.
- B) Once you have detrained you should throw Switch 5 to permit the locomotive to exit the passing track.
- C) Throw Switch 4 to permit the train to return to the depot.
- D) Return to the train, open the angle cock at the end of the car, and position yourself on the engineer’s side of the train so that you can control the coupling of the locomotive to the train.

- E) As the locomotive approaches the train you should signal a stop to the engineer at approximately 15 feet from the train. This is to prevent the locomotive from gaining too much momentum before it couples to the train. Then signal so that the locomotive will couple to the end car of the train. Once the train is coupled do a pin check to ensure that the locomotive is securely coupled to the train.
- F) With permission from the engineer step into a position to connect the air brake line. Once the air brake line is securely connected you can slowly open the angle cock on the locomotive.
- G) Signal the return of operational control to the Conductor and assist him with the brake test. You may then board the train.

## **2.8 FILLING THE TENDER TANK WITH WATER**

- A) Signal the Engineer to stop so that the spout on the water tank can be lowered directly over the tender's water hatch. Open the tender hatch.
- B) Pull down the spout and position it securely over the water discharge pipe on the water tower.
- C) While holding the spout securely in place so that the force of the water will not push the spout away from the water discharge pipe, gently pull on the valve handle. (If there is any likelihood of there being an obstruction [such as a bird nest] in the pipe, permit water to flow away from the hatch for a moment before discharging water into the tender tank.)
- D) When the tender has been filled, close the valve and return the spout to its retracted position. Close the tender hatch.

## **2.9 OPERATING THE WHEELCHAIR LIFT**

- A) The wheelchair lift is stored behind the door at the top of the ramp on the south end of the Wabuska Depot. The door can be opened from inside the depot.
- B) When the lift is needed, roll it down the ramp and position it opposite the side door of the tunnel car. (Alternatively, the lift may be used at the side door of the caboose.)
- C) Follow the directions printed on the lift itself. Be sure that the lift is located as closely as possible to the center of the opening on the car.
- D) Call on other crew members to aid the passenger safely onto and off the lift. Remember that the lift will be used to help the passenger to detrain as well.
- E) During the operating day, the wheelchair lift may be stored on the depot platform.

## 2.10 AFTER THE LAST RUN

- A) One Brakeman will be assigned to ensure that the wheelchair lift is put away and that all doors and windows at the depot are securely fastened before the train is returned to storage.
- B) Once all the passengers have detrained following the last run, the train will be pushed to the passing siding at the end of track. Two brakemen will be assigned to ride the rear of the train as it is moved. They must stand on the lower rear step of the caboose, clearly visible to the enginemen, and will signal to proceed or stop as appropriate. They must be sure that the grade crossing is safe to enter and cross. Brakemen must also be especially aware of the positions of all track switches and must not permit the train to pass through any switch that is not correctly aligned. Communicate the positions of switches to other crew members as they are observed.
- C) The locomotive will be moved to the rear of the train and will push the train up the hill and into the building for overnight storage. Two brakemen will be assigned to ride the front car of the train, clearly visible to the enginemen, and will signal to proceed or stop as appropriate. They must be especially aware of the positions of all track switches and must not permit the train to pass through any switch that is not correctly aligned. Communicate the positions of switches to other crew members as they are observed.
- D) As the train is pushed up the hill an assigned crew member, under the direction of the engine crew, will sand the flues.
- E) Any door through which any portion of the train will pass must be fully open to the maximum of its travel and the operating chain secured with a keeper.
- F) Marker lamps must be removed from the rear of the caboose before the train is moved into the building.
- G) Signal the engineer as the train is pushed into its place in the building. The rear of the train must clear the back door and the front of the train should be clear of the gate that separates the public areas from the non-public areas within the building so that the gate can be securely closed and latched.
- H) Assist in preparing the train after its return to its storage position in the building. All brakes should be tightly secured and passenger car (and caboose) doors should be closed to prevent animals from entering the cars.
- I) Be certain that all building doors are fully closed and the operating chain secured with a keeper once the train is in its storage location. This includes checking the 'people door' at the back of the building.
- J) Help to turn the turntable to its alignment with the proper track.
- K) The Conductor will assign a Brakeman to move the switcher onto and off the turntable in order to push the locomotive into its parking stall. Because the locomotive is considered to be 'blue-flagged' once it is on the stall track, this movement shall be made only after the engine crew indicates that it is safe to do so.
- L) Aid in wiping the locomotive clean after the day's activities.
- M) Record your volunteer hours for the museum's records.

## 2.11 OPERATING THE SWITCHING LOCOMOTIVE (DINKY)

The Brakeman is expected to learn to operate the Diesel-Hydraulic Switching Locomotive (usually called the Dinky). The Dinky is used to move the Steam Locomotive from inside the Annex Building and to move train cars when the Steam Locomotive is not available for use.

1. Starting the Dinky
  - a. Press and hold the oil-pressure override switch.
  - b. Turn on the Starter Key.
  - c. Continue to hold the oil-pressure override switch until the oil pressure rises to 30 psi.
2. Operating the Dinky
  - a. Release the Hand Brake.
  - b. Move the hydraulic Drive Lever forward or back to go in that direction.
  - c. Stop by moving the Hydraulic Drive Lever to its neutral position and applying the Hand Brake.
  - d. Be especially careful when moving onto or off of the Turntable.
  - e. The black Knob next to the gauge panel is the Throttle. Turn clockwise to increase RPM and counterclockwise to decrease it. Increasing the engine's RPM will provide more power but not more speed. Speed is controlled by the position of the Hydraulic Drive Lever.
3. When shutting the Dinky down be sure that you not only turn off the engine but also apply the Hand Brake. Turn the engine off by returning the key to the center (Off) position. If the Key is placed in the left (Auxiliary) position the battery will soon be drained of its charge.

## 2.12 ELECTRONIC DEVICES

The Federal Railroad Administration has issued Emergency Order #26 regarding the use of electronic devices by train operating crews while on duty. Though our operation is not governed under rules of the FRA, adoption of this rule enhances safety of crews and passengers and as such is made part of our operating rules.

- A) These rules are effective when on a moving train, when duty requires any crewmember to be on the ground, when a crewmember is riding rolling equipment during a switching operation and when any other employee of the railroad is assisting with the preparation of the train.
- B) Hearing aids and digital watches are permitted.
- C) Personal electronic/electrical devices must be turned off with any earpiece removed from the ear. This includes, but is not limited to, cell phones, audio players and video players. Any of these devices located in the locomotive cab not only must be turned off but also stored in the engineer's or fireman's seat box.
- D) Exceptions:
  - 1. In the event of an emergency or other problem the Conductor or his designee may use a cell phone to contact Emergency Services or museum staff. This cell phone should remain on but is for duty use only.
  - 2. These devices may be used while on a designated lunch break.
  - 3. As long as it does not interfere with the performance of their other duties crewmembers may take pictures using a digital camera.
  - 4. These devices may be used if all crewmembers have been notified that operations have been suspended.
- E) The Nevada State Railroad Museum does not supply any electronic/electrical devices for use during train operations.
- F) The FRA has provided the attached flow-chart for your information.



# FRA EO 26 – Electronic and Electrical Device Flow Chart

Use of Personal or RR supplied electronic/electrical devices may NOT interfere with RR operating employees performance of safety related duties

Use of RR supplied electronic/electrical devices **PROHIBITED** when:

Personal electronic/electrical devices **MUST BE TURNED OFF** with earpiece removed when: (other than a hearing aid device)

Other RR Operating Employee\*

Locomotive Engineer/ RCO

All RR Operating Employees\*

On a moving train unless:

Authorized for business purpose

A safety briefing is held

Crew agrees it is safe to do so

or

Authorized business purpose within the body of a passenger train or RR business car

Outside the cab unless:

Not fouling a track

No Switching Operation is underway

No other safety related duties

All crew members have been briefed that operations are suspended

On a moving train

or

When a duty requires any crew member to be on the ground

or

When a crew member is riding rolling equipment during a switching operation

and

During any period when another employee of the RR is assisting in preparation of the train

On a moving train

or

When a duty requires any crew member to be on the ground

or

When a crew member is riding rolling equipment during a switching operation

and

During any period when another employee of the RR is assisting in preparation of the train

### Exceptions:

(1) May use digital storage and display function of personal or RR supplied device to refer to RR rule, SI, TT, other directive, if authorized by RR operating rule or instruction:

(2) May use Personal or RR supplied device as necessary to respond to an emergency involving the operation of the RR;

(3) Engineer/RCO may use electronic control systems and information displays presented within locomotive cab or on RCO transmitter including functions associated with controlling switches;

(4) Under authorized conditions of 49 CFR 220, may use a RR supplied/authorized device in lieu of RR radio, to conduct train or switching operations;

(5) May refer to a digital timepiece to ascertain time of day or verify accuracy of speed indicators.

### Note:

**WHILE ON DUTY** use of personal electronic/electrical devices for other than voice communication is prohibited except as noted above

\*Means a person performing duties subject to 49 U.S.C. 21103, "limitation on duty hours of train employees."

## 2.13 STANDARD CLOCK

The Standard Clock is in the Restoration Shop. This railroad runs on Pacific Time. The Standard Clock is set automatically via radio signal several times a day. You should adjust your watch to be within one minute of the Standard Clock. Compare your watch with that of the Conductor. Use of a digital watch is permitted.

## 2.14 EXCEPTIONS

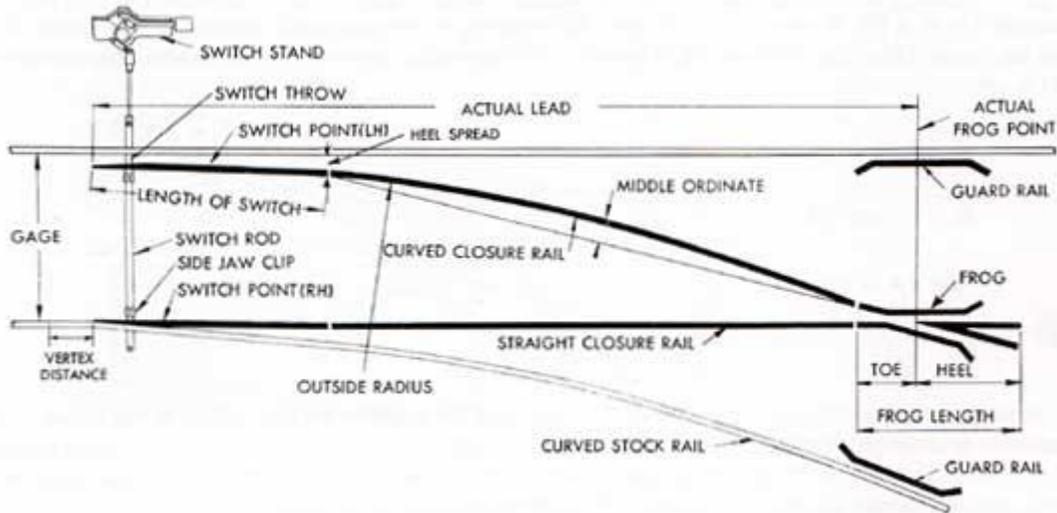
All of the above describe the regular activities of an ordinary day's operation. **There is never an ordinary day's operation.** Be prepared for changes in your work necessitated by safety concerns, a different routine (such as Santa Train or night operation), differing equipment or the needs of the museum.

**BE FLEXIBLE**

**BE SAFE**

### 3.0 TRACK SWITCHES

#### 3.1 STANDARD COMPLETE TRACK SWITCH



#### Definitions:

**FACING POINT MOVE:** To proceed through a switch from the point end toward one of the connecting tracks.

**TRAILING POINT MOVE:** To proceed through a switch from the frog end toward the points of the switch.

**PICK A POINT:** To have a wheel flange run into a switch point when making a facing point move.

**RUN THROUGH A SWITCH:** To make a trailing point move when the switch is thrown for the other track route.

A train approaching from the *left* side of this diagram is making a 'facing point' move over this switch. A train coming from either of the *right* side approaches is making a 'trailing point' move over this switch.

If the switch is thrown for the curve and a gap is present between the switch point on the outside of the curve and the straight stock rail, the flange of an engine or car wheel can 'pick the point' of the switch as the train approaches the switch from the facing point. A metal casting can be applied to the rail in front of the switch point in an attempt to prevent the picking of the switch point. Switch Point Protectors increase the service life of switch points by absorbing the impact of passing car wheels. The protector momentarily deflects the wheel flange so it misses the tip of the switch point. The protector is bolted to the inside of the straight stock rail leading into the switch. At NSRM Switch # 1 and Switch # 8 are good examples of this in practice.

If the switch is thrown to permit a train to pass through from one of the two trailing point directions and the train approaches from the other of those directions it will 'run through' the switch. In the illustration above, with the switch thrown as is indicated, a train approaching from the curved (lower) leg of the switch would 'run through' the switch. Often running through a switch will result in the derailment of all or part of the train. It may also damage the Switch Stand.

**Under NO circumstances should a switch be thrown while a train is passing over it.**

### 3.2 A FEW NOTES ABOUT NSRM'S TRACK NOMENCLATURE

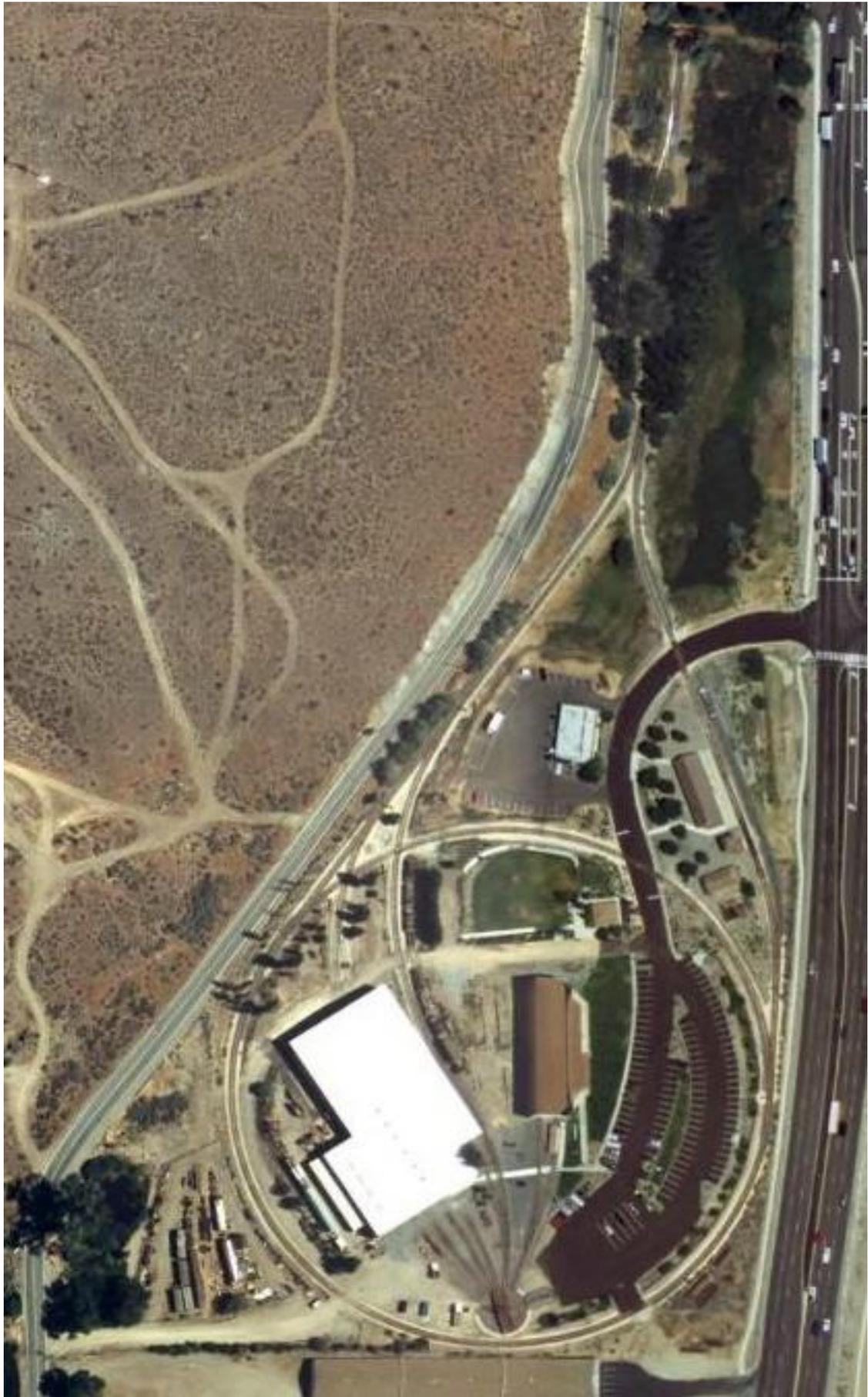
(See the maps on the following pages.)

1. The track between Switch #1 and Switch #4 is 'The Curry Street Line.'
2. The track between Switch #4 and the End of Track is 'The Hole.'  
(Be sure to read and observe the warning on the sign at the end of track.)
3. The circle of track from Switch #1 past Switch #8 and on to Switch #1 is 'The Loop.'
4. The track from Switch #2 into the back of the Annex Building is the 'B Line.'
5. The track between Switch #3 and the Turntable is the 'A Line.'
6. The track between Switch #4 and Switch #8 is the 'Depot (or Station) Track'

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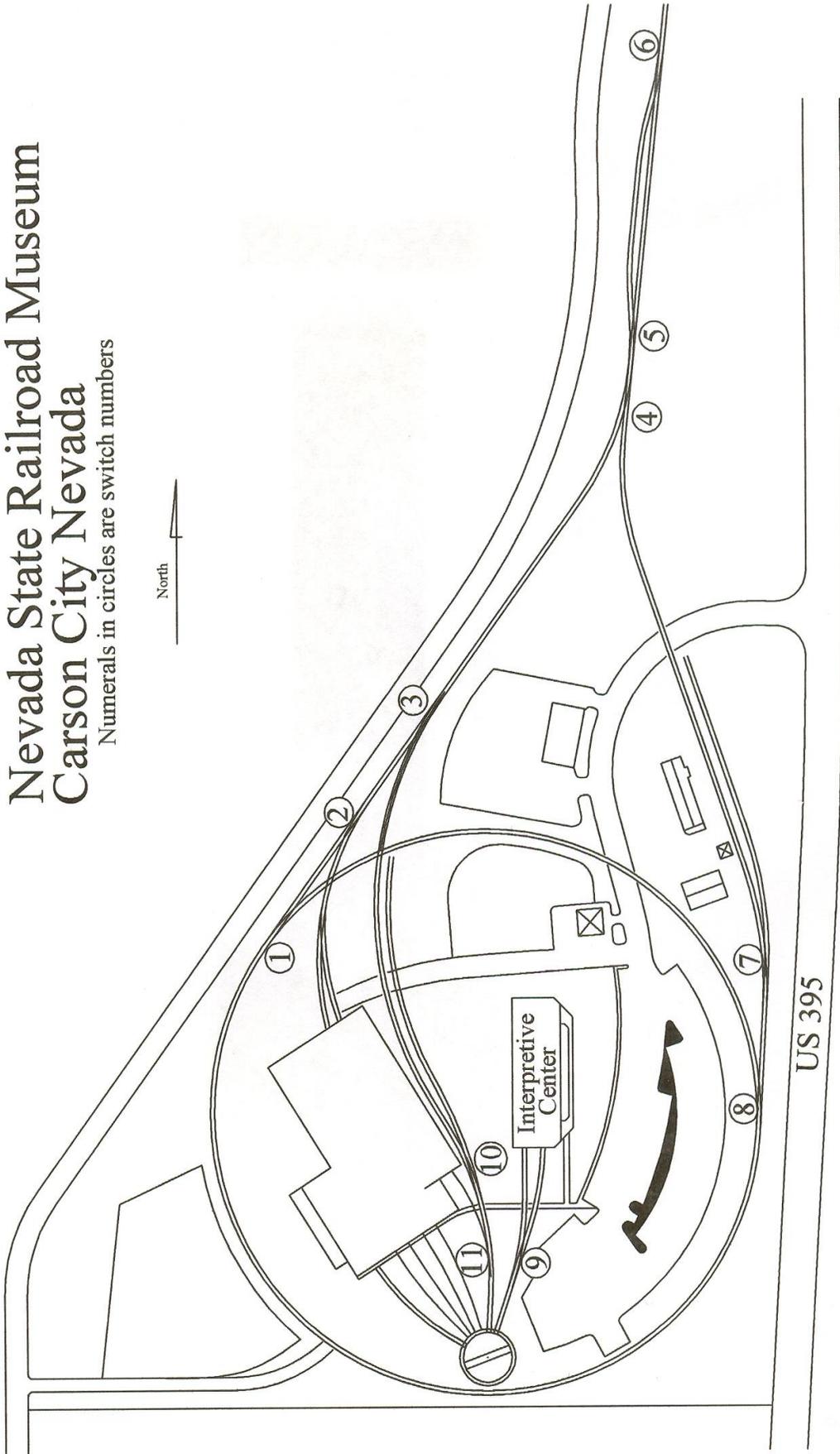
### 3.3 SWITCH NUMBERS AND NAMES

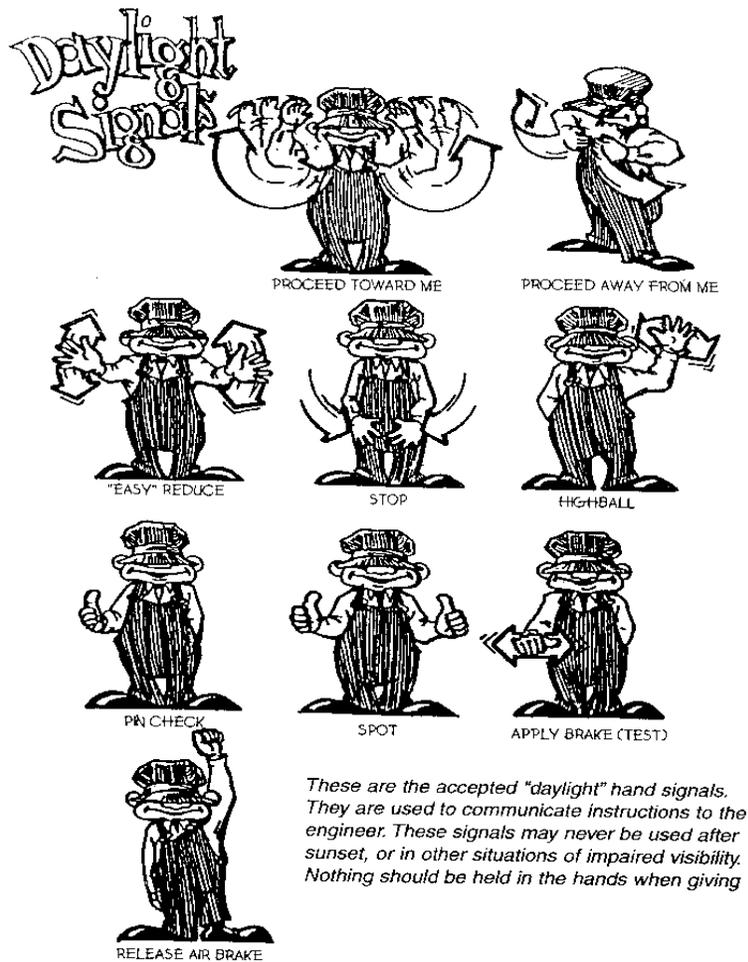
1. Switch #1 is the 'Curry Street Switch.'
2. Switch #2 is the 'B Line Switch.'
3. Switch #3 is the 'A Line Switch.'
4. Switch #4 is the 'Democrat Switch.'
5. Switches #5 & #6 are the 'Passing Siding Switches.'
6. Switch #7 is the 'Station Siding Switch.'
7. Switch #8 is the 'Loop Switch.'
8. Switch #9 is a 'Stub Switch' and uses a 'Harp Switch Stand.' It joins the two tracks into the Interpretive Center.
9. Switch #10 leads to the 'A Line Siding' and is seldom used.
10. Switch #11 is a narrow gauge switch and leads into the narrow gauge storage area. Watch this switch -- if it is thrown incorrectly it will put any standard gauge equipment on the ground.  
**(This is NOT a good thing.)**



# Nevada State Railroad Museum Carson City Nevada

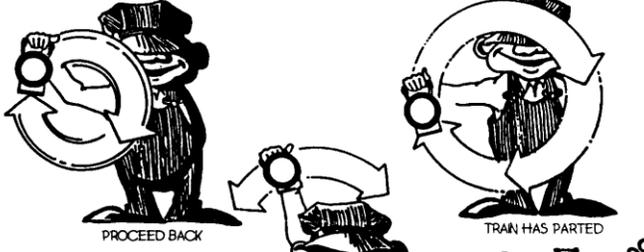
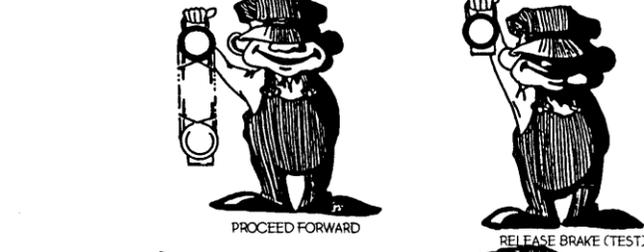
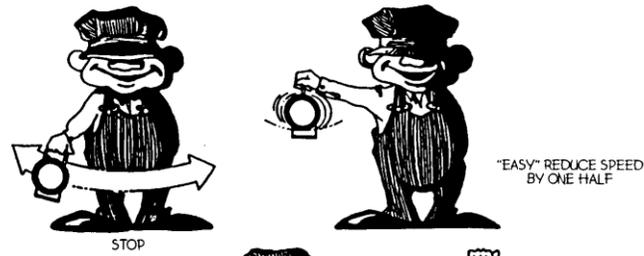
Numerals in circles are switch numbers





## HAND SIGNALS

1. Use **BIG** hand signals. You will often be trying to communicate over the entire length of a train. If possible (and safe!) use both hands to signal.
2. 'Proceed toward me' uses a vertical motion.
3. 'Proceed away from me' uses a horizontal motion.
4. Each time you rock your arms in a 'reduce' motion the engineer will reduce his speed by half.
5. Anyone can give a 'Stop' at any time.
6. Only the conductor can give a 'Highball.'
7. A 'pin check' is done with a motion like a proceed signal (either toward or away).
8. The 'Apply Brake (test)' and the 'Release Air Brake' are used when a brake test is made after assembling a train.



For the purposes of these signals, the front of a train, (for determining forward/backward direction) will be designated as the end of the train to which the engine is coupled, regardless of the orientation of the engine in the consist.



## LANTERN SIGNALS

1. **When working after Sunset you must use a lantern to signal.**
2. **When giving signals you must locate yourself so that signals can be plainly seen.**
3. **Electric lanterns may display only white light.**
4. **A lantern swung at right angles to the track is 'Stop.'**
5. **A lantern raised and lowered vertically is 'Proceed Forward.'**
6. **A lantern swung vertically in a circle at right angles to the track is 'Back.'**
7. **A lantern swung in a slight arc overhead is 'Easy | Slow.'**

**When you are using lantern signals the front of the train is always the end of the train to which the engine is coupled. This determines which is the 'Forward' or 'Back' direction.**

<u>Date:</u>	<b>Description</b>	
8/28/2009	Original release	
9/10/2009	Revised release	Electronic Device
1-31-2010	Revised Release	Standard Clock

**Nevada State Railroad Museum is an Agency of the Nevada Department of Cultural Affairs, Division of Museums & History.**

