

# Western Development Museum

## Antique Steam Program Operations Policy and Procedures

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### Acknowledgements

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### Introduction

This document contains the operational rules and regulations that govern the Western Development Museum's antique steam program operations. The rules in this document are based on the practical experience gained from years of antique steam equipment operation from several individuals as well as regulations found in the Saskatchewan Boiler and Pressure Vessel Act and the Saskatchewan Boiler and Pressure Vessel Regulations. It is the duty of each operator to read, understand and follow these rules.

The WDM's primary goal in regard to antique steam operation is safety. Steam is second only to nuclear energy in terms of expansive force. A steam molecule under pressure will expand instantly to 1,600 times its original volume when exposed to normal atmospheric pressure. Unless the operator has a thorough understanding of how to run the equipment, is trained to deal with emergency situations, and follows the rules, the potential for disaster is enormous. The best way we can prevent a serious accident from occurring is to make a commitment to safety by:

- Ensuring our operators are all licensed, thoroughly trained, know the rules and follow them.
- Ensuring that our equipment is maintained to the highest standard and meets or exceed current code requirements.
- Maintaining a strong and progressive working relationship with the Provincial boiler branch.
- Communicate with each other.

It should be noted that this is a working document – as new situations arise and as the Provincial regulations change, this policy will be updated and distributed to everyone involved with the WDM antique steam program.

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# Section 1 General Operating Rules

## 1.0 - General Operating Rules

### 1.1 – Authority to Operate

- 1.) All WDM steam operations are supervised by the Chief Engineer and are conducted in compliance with WDM policy as outlined in this document and the rules and regulations enforced by TSASK as outlined in the Saskatchewan Boiler and Pressure Vessel Act and the Saskatchewan Boiler and Pressure Vessel Regulations.
- 2.) All operators are required to have a valid TSASK Limited Power Engineer (Traction) license. Un-licensed operation of WDM steam powered equipment is strictly prohibited. \* Note: See section 1.5 - Training for special instructions.
- 3.) Out of province equivalents of the TSASK traction license are not approved for operation at the WDM.
- 4.) All equipment must be directly supervised at all times by a licensed operator while a fire is lit.
- 5.) All operators are required to check in with the appropriate staff members and inform them of their intent to operate the equipment.

### 1.2 - Start up

- 1.) Operators must first ensure there is a minimum of  $\frac{1}{4}$  of a gauge glass of water level in the boiler prior to start up by means of comparing the gauge glass and tri-cocks. If there is less than  $\frac{1}{4}$  of a gauge glass of water visible, the equipment is not to be fired until the level is brought up.
- 2.) Operators must review the logbooks prior to light up to ensure that there are no outstanding issues with the equipment.
- 3.) Operators must perform a thorough visual walk around inspection of the equipment prior to light up.
- 4.) Operators must perform a thorough visual inspection of the firebox and crown sheet prior to building a fire.
- 5.) Operators must ensure that the connections to the gauge glass and water column are open.
- 6.) Light-up time is to be recorded in the logbook.

7.) The use of gasoline or any other highly volatile liquids as a light-up accelerator is strictly prohibited.

### 1.3 - Operation

1.) While in operation, the equipment is to be manned by a minimum of two (2) licensed operators at all times.

\* Note: See section 1.13 - Calliope for special instructions.

2.) Water delivery systems must be tested as soon as practicable, prior to moving the equipment.

3.) The gauge glass and water column must be tested as soon as practicable, prior to moving the equipment.

4.) Water level must be diligently observed at all times.

5.) There must be a minimum of two (2) functioning independent means of regulating the water. If one (1) of the systems becomes in-operable, the equipment must be moved to a safe location and if the problem cannot be fixed, the equipment must be shut down. If both water delivery systems become inoperable, the equipment must be shut down immediately, the incident noted in the logbook, the appropriate staff members notified, and the Chief Engineer notified.

6.) Both operators must have a clear understanding of what task is to be done prior to commencing movement.

7.) There must be a clear understanding between the operators as to who the Engineer is and who the Fireman is.

8.) Operators must exercise caution when in the presence of animals by avoiding the unnecessary use of the whistle and preventing the safety valve from lifting.

9.) The whistle is to be sounded appropriately prior to moving and when the equipment has come to a complete stop.

10.) The safety valve must be tested as soon as practicable by raising the boiler pressure in a controlled manner to the steam pressure that the safety valve is set to release. The results must be recorded in the logbook. If the safety valve does not function properly, the equipment must be shut down, the appropriate staff members notified and the Chief Engineer notified.

11.) Operators are prohibited from using cell phones while operating the equipment.

### 1.4 - Shut Down

1.) Operators must anticipate shutting down at the end of the session and fire accordingly. Over-firing at the end of the day is to be avoided.

2.) The water level is required to be at a minimum of 7/8 of the gauge glass prior to shut down.

3.) The fire is to be extinguished by either pulling the fire *or* placing the stack cover on, closing the damper doors and regulating the blower to snuff the fire.

\* Note: See section 2.6 - Emergency Shutdown for special instructions.

4.) Once the fire is extinguished, the firebox and ash pan are to be cleaned of all the remaining ash and un-burned fuel as soon as practicable.

5.) Operators must be diligent to extinguish all cinders and ash prior to leaving the equipment un-attended.

6.) The stack cover must be in place prior to leaving the equipment.

7.) Operators are permitted to crack a tri-cock to vent steam in order to prevent a vacuum in the boiler. The use of the blower for this purpose is prohibited.

8.) Equipment must be left with the clutch dis-engaged, the cut off in neutral, the throttle closed (and pinned if applicable), the cylinder cocks open, the damper doors closed, the fire box door closed, the main steam valve (or turret) closed, and all the appropriate valves and fittings closed (wheels must be chocked where required). **DO NOT CLOSE THE CONNECTIONS TO THE GAUGE GLASS OR WATER COLUMN.**

9.) Shut down time is to be recorded in the logbook. Any mechanical issues must be noted in the logbook and the Chief Engineer notified if necessary.

10.) Operators may leave the equipment un-attended when the fire is extinguished, the engine is properly shut down and the boiler pressure is at 20 psi and falling.

11.) When the equipment is shut down and is to be left un-attended in close proximity to the public, the operators must ensure that;

I.) The public cannot come in contact with the equipment while it is cooling down by securing the area with appropriate barriers.

II.) Signs are placed around the engine warning of hot surfaces.

III.) The logbooks are stored in a secure location and the appropriate staff members informed of their location.

## 1.5 - Training

1.) Un-licensed operators are permitted to operate WDM equipment for the purpose of training only.

2.) All training of un-licensed operators is to be done in a registered WDM course under the supervision of the Chief Engineer.

- 3.) Only the Chief Engineer may authorize the training of un-licensed operators.
- 4.) Minimum age for training or operating WDM steam boilers is 18.

### 1.6 – Rest Breaks

- 1.) When equipment is to be left for the purpose of rest breaks, the equipment is to be supervised by at least one licensed operator per machine at all times.
- 2.) The equipment must not be moved or engaged in any work during rest breaks.
- 3.) The attending operators are to avoid distractions and ensure an adequate water level is maintained. Cell phone use is prohibited.
- 4.) If it is not possible to supervise the equipment during a rest break, it must be shut down.

### 1.7 - Riders

- 1.) Riders are permitted under special circumstances for a limited time period on the Vulcan Locomotive, with the written consent of the WDM Chief Engineer. Riders must retain this written permission for the duration of the trip.
- 2.) The Museum Manager must be made aware and also give permission.
- 3.) Riders are limited one at a time.
- 4.) Riders are not to interfere with the operation of the machine.
- 5.) Rider restrictions do not apply to WDM staff.
- 6.) Operators may refuse to allow riders at their discretion.
- 7.) There are no riders allowed on steam traction engines.

### 1.8 - Public Interaction

- 1.) The public is permitted to board steam traction engines for the purpose of demonstration at the discretion of the operators, provided;
  - There are no conditions that may endanger the safety of the public.
  - There are two operators present.
  - The equipment is stationary with the clutch disengaged and the throttle pinned (if applicable).
  - The public is assisted on and off the equipment in a safe and orderly manner.
  - The public is kept away from hot surfaces.
  - The boiler pressure and fire are kept under control.

- The water level is checked regularly.

2.) When operating in close proximity to the public, a third volunteer/staff member on the ground is recommended for use as crowd control.

3.) Prior to moving the equipment in close proximity to the public, operators must ensure that it is safe to do so. A third volunteer/staff member on the ground is recommended.

4.) Where visibility is restricted from the operator's platform, a third volunteer/staff member is required on the ground to direct the movement when operating in close proximity to the public.

5.) The public must be kept a safe distance from the equipment at all times while it is under steam.

### **1.9 - Log Books**

1.) Every piece of equipment is required to have a logbook with the appropriate WDM logbook sheets.

\* Note: See section **5 – Forms** for an example of an approved WDM logbook sheet.

2.) The logbook is to be kept on the equipment.

\*Note: See section **1.4 – Shutdown**, Rule 11.) ss III.) for special instructions.

3.) Every operator is required to check the logbooks prior to light up.

4.) The logbook pages must be filled out as soon as practicable and signed by all the operators.

5.) Crew changes and times must be noted in the logbook and signed by the replacement operators.

6.) Any training sessions are to be noted in the logbook.

7.) Any defects found on the equipment must be noted in the logbook. Any un-safe conditions must be reported to the appropriate staff members and the Chief Engineer.

8.) A copy of this policy is to be kept with the logbook.

9.) At the end of the season, all completed logbooks are to be sent to the Chief Engineer for review and filing.

10.) All repairs must be noted in the logbook.

11.) The results of the safety valve test must be recorded in the logbook, including the time the valve was tested, the release pressure and the seating pressure. Any defects must be noted.

12.) The appropriate staff members must know the location of the logbooks.

### **1.10 - Lubricants and Water Treatment**

- 1.) Only approved steam oil and bearing oil are to be used on WDM equipment.
- 2.) Only approved water treatments are to be used on WDM equipment.

### **1.11 - Fuel**

1.) Only approved fuels are to be burned in WDM equipment. Painted wood, pressure treated wood, particle board, chip board, old furniture, creosoted lumber and rubber tires are strictly prohibited from being burned in WDM equipment.

### **1.12 - Belting Up**

- 1.) When belting up to machinery, operators must first establish who the foreman of the operation is.
- 2.) The operators must respond only to instructions from the foreman unless an emergency occurs.
- 3.) The operators must inspect the belt prior to belting up. If the belt is found to be defective, the operators may refuse to use it.
- 4.) Operators must ensure that all persons are clear and kept clear of all equipment and machinery while the belting is being tensioned.
- 5.) Operators must remain at the controls of the equipment at all times during belting operations.
- 6.) Operators must be prepared to stop the operation as quickly as possible.
- 7.) When starting or stopping belting operations the whistle must be sounded appropriately to alert everyone involved.
- 8.) The wheels of the equipment must be chocked.
- 9.) Operators may stop the operation at their discretion if necessary.

### **1.13 - Calliope**

1.) The Calliope may be fired by a single operator, provided another licensed operator is available to provide relief or assistance.

### **1.14 - Repairs**

1.) All repairs beyond routine maintenance involving the boiler, pressure piping or valves must be approved by the Chief Engineer.

### **1.15 - Re-certification**

1.) All operators are required to undergo re-certification on WDM equipment at the discretion of the Chief Engineer or in a period not exceeding every five (5) years. Re-certification is to be done under the supervision of the Chief Engineer.

### **1.16 – Operator License Copies**

1.) All operators are required to submit a copy of their TSASK license to the appropriate WDM staff member for record keeping purposes. Operators must carry copies of their licenses on them at all times during operation. Photocopies are permitted.

### **1.17 – Licensed Operator Identification**

1.) All operators are required to wear a WDM issued red ribbon identifying them as licensed steam traction operators. A blue ribbon also identifies operator as a licensed steam locomotive engineer for the Vulcan locomotive.

### **1.18 - Privately Owned Equipment**

1.) Privately owned equipment may be operated on WDM property subject to approval by the Chief Engineer and the museum Manager provided;

I.) The owner can provide proof that the equipment is safe and has active TSASK registration.

II.) The owner must operate the equipment according to WDM Antique Steam Program Operations Policy.

III.) The owner provides proof of adequate liability insurance.

2.) The WDM is not responsible for providing fuel, lubricants or maintenance for the operation of privately-owned equipment unless previously agreed on.

### **1.19 - Pulling Wagons, Threshing Machines or other Machinery**

1.) Operators are permitted to pull wagons, threshing machines or other machinery at their discretion provided;

I.) The operators have inspected the equipment's hitch and deem it safe.

II.) The operators have inspected the machinery to be pulled and deem it safe to move.

III.) The machinery to be pulled will not damage the equipment or place it under any unnecessary strain.

IV.) The equipment is not restricted from pulling any machinery.

- 2.) Passengers may be pulled on a wagon at the discretion of the operators provided;
  - I.) It is approved by the museum Manager and the appropriate staff members are aware.
  - II.) The wagon is safe and appropriate for the purpose of rides.
  - III.) The wagon riders do not interfere with the operation of the equipment.

### 1.20 – Appropriate Clothing

1.) Operators are required to wear appropriate protective clothing while operating the equipment. Gloves, steel toed footwear, pants/coveralls and long sleeve shirts are required. Sleeves may be rolled up. It is recommended that the clothing be period appropriate to the equipment.

## **Section 2 Emergency Situations**

### 2.0 - Emergency Situations

#### 2.1 - Fatality or Catastrophic Event

- 1.) In addition to the normal WDM emergency procedures, the following special instructions apply in the event of a steam related fatality or catastrophic event;
  - I.) Any injuries must immediately be attended to.
  - II.) Emergency services must be contacted (Fire, Police and Ambulance).
  - III.) **The Chief Engineer must be notified immediately. (1-306-934-1400)**
  - IV.) **TSASK must be notified immediately (1-866-530-8599)**
  - V.) The area must be immediately evacuated and secured.
  - VI.) The appropriate staff members must be notified of the accident immediately.
  - VII.) **If possible, the logbooks must be obtained by the Chief Engineer. If the Chief Engineer is unavailable, the museum Manager must obtain them and hold the logbooks in a secure location until the Chief Engineer arrives.**
  - VIII.) If possible, the Chief Engineer or museum Manager must take preliminary statements from any involved operators who are able to do so.

IX.) The equipment is not to be un-necessarily disturbed by anyone other than emergency services and/or TSASK until the Chief Engineer arrives.

2.) In the event of a fatality or catastrophic event **ALL** WDM staff and volunteers are prohibited from speaking to the media unless authorized to do so by the Executive Director.

## 2.2 - Low Water

1.) In the event of a low water situation during operation (the water is no longer visible in the gauge glass, but the fusible plug *has not* melted out), **the fire is to be completely extinguished immediately and the engine shut down according to procedures outlined in section 2.6 – Emergency Shutdown.**

2.) **THE INJECTORS ARE NOT TO BE USED UNDER ANY CIRCUMSTANCES!**

3.) The engine is not to be moved or operated.

4.) The Chief Engineer must be notified immediately, and the operators will be given further instructions.

5.) The appropriate staff members must be notified of the situation.

6.) The incident must be noted in the logbook.

## 2.3 – Fusible Plug

1.) In the event of a fusible plug melting out **the fire is to be completely extinguished immediately and the engine shut down according to procedures outlined in section 2.6 – Emergency Shutdown.**

2.) **THE INJECTORS ARE NOT TO BE USED UNDER ANY CIRCUMSTANCES!**

3.) The engine is not to be moved until approved to do so by the Chief Engineer.

4.) The Chief Engineer must be notified immediately.

5.) The appropriate staff members must be notified.

6.) TSASK must be notified as soon as practicable.

7.) The incident must be documented and noted in the logbook.

8.) The equipment is not to be operated until approved to do so by the Chief Engineer under approval of TSASK.

## 2.4 – Serious Injury

- 1.) In the event of a serious injury *that requires emergency medical attention*, the injury must be attended to, and the appropriate staff members notified.
- 2.) The equipment must be shut down.
- 3.) The Chief Engineer must be notified immediately.
- 4.) The incident must be documented and noted in the logbook.
- 5.) TSASK must be notified as soon as practicable.

## 2.5 – Minor Injury

- 1.) In the event of a minor injury that *does not* require emergency medical attention, the injury must be attended to and the appropriate staff members notified.
- 2.) The equipment may be permitted to continue operating provided;
  - I.) It is safe to do so.
  - II.) The appropriate staff member(s) has given approval to continue operating.
  - III.) There are sufficient licensed operators present.
- 3.) The incident must be documented and noted in the logbook.
- 4.) The Chief Engineer is to be notified as soon as practicable.

## 2.6 – Emergency Shutdown

- 1.) In the event that an emergency shut down is required, **the first priority is to extinguish the fire as quickly and safely as possible.**

The following steps must be taken;

- I.) The fire must be extinguished as quickly as possible by smothering it with sand or using an appropriate fire extinguisher, with care not to rapidly cool the crown sheet or side sheets of the firebox. If this is not possible, the fire must be pulled or dumped.
- II.) **DO NOT USE WATER TO PUT OUT THE FIRE IN THE FIREBOX.**

III.) Secure the equipment by disengaging the clutch, centering the cut-off, closing the throttle (and pinning it if applicable) closing the blower and open the cylinder cocks.

IV.) Close the damper doors.

V.) In an emergency shutdown, the main steam valve (or turret), the stack cover and all the appropriate valves and fittings do not have to be closed or in place until the engine has cooled or the emergency situation has passed.

\* Note: The Vulcan locomotive is required to have its wheels chocked.

VI.) Vacate the area and do not approach the engine until it has time to cool sufficiently.

## 2.7 - Obvious or Suspected Mechanical Damage

1.) If the equipment incurs obvious or suspected mechanical damage, it must be withdrawn from service immediately and the operators must;

I.) Inspect the equipment to locate and identify the damage.

II.) Inform the appropriate staff members immediately.

III.) Consult with the appropriate staff members and decide if the equipment is safe to move to a location where it can be repaired. If the equipment is not safe to move under its own power or it *can no longer move under its own power*, it must be shut down in place and towed as soon as practicable to a location where it can be repaired.

IV.) The incident must be recorded in the logbook.

V.) The Chief Engineer must be notified as soon as practicable.

## 2.8 - Towing Equipment

1.) **Traction Engines** - Traction engines may be towed by other equipment provided the towing cables/chains are secured to the frame if applicable, around the back axles or the rear hitch only. An operator must be steering the equipment. It is recommended that a staff member or volunteer be present to act as an observer and watch for any problems. Towing speeds must be kept slow and towing vehicles must avoid jerky movements. **DO NOT ATTACH TOWING CABLES/CHAINS TO THE FRONT AXLE, WHEELS OR CASTLE!**

2.) **Locomotive** - The Vulcan Steam Locomotive may be towed provided the towing cables/chains are secured to the front or rear coupler only. Speeds must be kept slow and towing vehicles must avoid jerky movements. Great care must be taken on curves to avoid rolling the rail and derailling the locomotive. Extreme towing angles must be avoided. Several staff/volunteers must be present to closely observe the movement to ensure the locomotive does not derail or run away. In the event of a runaway, the

locomotive may be stopped by placing wood or chains between the wheel flange and the rail head.

## 2.9 – Pushing equipment

1.) Traction engines may be pushed using the frame where applicable or square against the front smokebox, provided the smoke box door is removed and appropriate blocking is in place to prevent damage to the smokebox ring. **DO NOT PUSH AGAINST THE FRONT AXLE, WHEELS OR CASTLE!**

## **Section 3 Definitions**

**\*Note:** The following definitions apply to the Western Development Museum Antique Steam Program Operations only. For official Provincial definitions, please refer to the Saskatchewan Boiler and Pressure Vessel Act and the Saskatchewan Boiler and Pressure Vessel Regulations. In the case where there is conflict between these definitions and the Provincial definitions as defined by the Act and the Regulations, the Provincial definitions prevail.

**Approved** – Means approved by the WDM Chief Engineer unless otherwise stated.

**Appropriate Staff Member(s)** – Means the WDM Museum Manager, Branch Head of Steam and the Volunteer Coordinator.

**Branch Head of Steam** – The WDM staff member who, in addition to their regular duties, manages the day-to-day operations of the steam program at each museum. The Branch Head of Steam works with the Volunteer Steam Lead Hand to manage the museum’s antique steam program. The Branch Head of Steam works under the direction of the Chief Engineer and Museum Manager. Where a Branch Head of Steam is unavailable, the Museum Manager or Museum Technician will assume the role. The Branch Head of Steam is required to have a valid TSASK Limited Power Engineer (Traction) License.

**Chief Engineer** – The WDM staff member who is responsible for supervising the WDM antique steam program. The Chief Engineer is required to have a valid TSASK Limited Power Engineer (Traction) License.

**Equipment** – Any antique steam powered or steam generating machinery that is owned by the Western Development Museum, or operated on WDM property, that utilizes pressurized steam.

**Engineer** – The licensed operator who is in charge of the equipment.

**Fireman** – The licensed operator who works under the direction of the Engineer to maintain the fire, boiler water level and overall operation of the equipment.

**License** – A valid TSASK Limited Power Engineer (Traction) license.

**Maintenance** – In regards to the Western Development Museum Antique Steam Program Operations Policy and Procedures, maintenance refers to any work involving the boiler, pressure piping or valves. This includes, but is not limited to; re-packing valves, the repair or cleaning of injectors, replacing gauge glasses and gaskets, seasonal removal or re-installation of gauges, valves, hand door gaskets, gauges and whistles. Any work required beyond the scope of this definition must be approved by the Chief Engineer.

**Operator** – Anyone who is directly operating the boiler or assisting in the direct operation of the boiler. Every operator is required to have a valid TSASK power engineering license of the appropriate class.

**TSASK** – The Technical Safety Authority of Saskatchewan.

**Volunteer Steam Lead Hand** – The volunteer elected by their peers who assumes a leadership role amongst the museum’s other licensed steam volunteers. The Volunteer Steam Lead Hand works directly with the Branch Head of Steam, the Chief Engineer, the museum Manager and the Volunteer Coordinator to help manage the museum’s antique steam program. The Volunteer Steam Lead Hand is required to have a valid TSASK Limited Power Engineer (Traction) License.

**Volunteer Coordinator** – The staff member who job is to manage and organize the work of the volunteers at each museum. The Volunteer Coordinator is required to retain copies of each operator’s TSASK license for record keeping purposes and must be able to show them on request.

**Directly Supervised** – Either on the equipment or in the immediate vicinity and in a position that allows an UN-obstructed view of the water level in the gauge glass. During operation, both operators are required to be on the equipment.