

		PROJECT	Standby SRU & Additional Tanks IOCL Paradip Refinery		
		CLIENT	INDIAN OIL CORPORATION LIMITED		
JOB SPECIFICATION STEAM BLOWING OF PIPELINES AND EQUIPMENT.	Project No. 080557C001	Document No. 080557C-000-JSC-0093-008			Rev. No. 0 Page 1 of 18

## JOB SPECIFICATION FOR STEAM BLOWING OF PIPELINES AND EQUIPMENT

0	04/12/2019	ISSUED FOR IMPLEMENTATION	KMK	TNVS	TNVS	JMC
REV.	DATE	DESCRIPTION	PREPARED	CHECKED	APPROVED	AUTHORIZED



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## 1. Introduction:

**INDIAN OIL CORPORATION LIMITED (IOCL)** has awarded Fax of Acceptance (FOA) dated 29<sup>th</sup> August 2019 to M/s. Technip India Limited (TPIL) for Consultancy services (PMC/EPCM services) for overall project management, FEED Review / FEED, Detailed Engineering, Procurement & expediting services, Tendering & award, Construction Management & Supervision, Assistance in start-up, Commissioning & performance test runs for installation of a Standby SRU of 525 TPD capacity and execution of Additional tanks for Paradip Refinery, Odisha, India.

## 2. Definitions & Abbreviations

<b>Abbreviation</b>	<b>Definition /Expanded form</b>
IOCL/ CLIENT	Indian Oil Corporation Limited
PMC/ CONSULTANT	Technip India Limited
LICENSOR	Party selected by IOCL for process technology ownership for any UNIT
CONTRACTOR	Party whose services are obtained for performing the works specified as part of LSTK / packages.
EPCM	Engineering, Procurement & Construction Management Services.
LSTK	Lump Sum Turn Key portion of the work to be executed by CONTRACTOR
FEED	Front End Engineering Design
AUTHORISED REPRESENTATIVE	IOCL's/ CONSULTANT's representative authorized to act for and on behalf of them.
VENDOR	Any third party supplying the equipment/materials for setting up the Plant
PROJECT	Indicates Standby SRU and Additional tanks Project, Paradip Refinery
UNIT	Indicates any particular portion of the project to be built which can be Process related or Utilities/Offsites related
SRU	Sulphur Recovery Unit

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### 3. **General**

The purpose of steam blowing is to eliminate from lines and vessels foreign matter such as rust, etc. which may otherwise plug pipes, control valves and orifices and cause serious damage to moving parts of equipment.

Experience in plant pre-commissioning indicates that use of steam is the most economical and efficient way to achieve clean piping and vessels

### 4. **Scope**

The scope of this procedure is to establish the guidelines for Steam Blowing for Piping and Equipment which shall be detailed by the LSTK contractor.

Steam blowing has some limitations for use in extensive pipes network designed for low or ambient temperature, or where humidity is not recommended.



### 5. **Reference Documents**

- a) Pre-commissioning Procedures/ Drawings
- b) Piping and Instrumentation Drawings
- c) Process Control Philosophy
- d) Cause and Effect Chart
- e) Vendor's cause and effect chart

### 6. **Preliminary Activities**

Prior to starting steam blowing, several preliminary activities shall be undertaken by the LSTK contractor. These include the following:

- f) Identify pipe circuit and prepare it for cleaning, e.g. determine the possible steam inlets and outlets, install blind disks, temporary connection, etc.;
- g) Check that all items belonging the circuit to be steam blown can withstand high temperatures;
- h) Check that the blow out pipe has been proper installed and supported to avoid any stress on the blown line;
- i) Disconnect pump, turbine, compressor intake and discharge lines and cover casing nozzles to prevent entry of cleaning medium;
- j) Remove orifice plates;
- k) Remove any in-line service strainers; Remove or blank or bypass control valves and safety valves;
- l) Blank and protect instrument connections;
- m) Remove or disconnect filters, special valves and items, relief valves and instrument devices (magnetic control level, pressure indicator, thermo well, etc.);
- n) Open overhead vents on vessels to prevent vacuum effects;
- o) Blank or by-pass steam traps;
- p) Verify if temporary supports are required during blowing operation to eliminate any possibility of damage and risk due to unrestrained forces
- q) Protect equipment near the blowing outlets to prevent damage to electric motors or instruments with steam and condensate;

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- r) Install barricades at the steam blowing out points, the barricade shall be wide enough to allow the steam jet to exhaust its kinetic energy inside the barricaded area;
- s) Block out spring supports, spring hangers, etc. according to manufacturer's instructions;
- t) Convene a meeting with Construction Contractor and CONTRACTOR to finalize all technical and safety aspects prior to starting steam blowing;
- u) Prepare a specific procedure detailing stepwise all the activities to be performed;
- v) Prepare a Job Hazard Analysis for each activity.

## 7. **Steam Blowing Methods**

Whenever possible, any effort should be made to have enough steam available to blow pipe and equipment, because with appropriate use all unwanted elements are removed.

Considering that most piping normally handles hydrocarbons that have solvent effect on rust, welding slag, paint, grease, etc., steam may be the only effective cleaning agent at low cost.

Steam can be used, for continuous blowing, and preferably for intermittent blowing (spalling technique).

### 7.1 **Continuous Blowing**

Steam is blown continuously through the selected pipe circuit from a source (steam boiler and/or main header) to carry away foreign matter.

### 7.2 **Intermittent Blowing**

In some cases (i.e. process requirements, steam turbine supply, etc.) where deep and accurate cleaning is required, satisfactory results can be obtained using the intermittent blowing technique.



This consists in heating up the pipe circuit by steam blowing followed by cool down to 60-80°C.

Due to different thermal expansion coefficients, material securely bonded to pipe metal will be loosened and detached by means a high-speed flushing. Intermittent blowing will continue till pipe circuit is cleaned to the acceptable level with target plates.

## 8. **Steam Blowing Operation**

Once the preliminary activities are completed and all safety measures have been taken, steam blowing can start as follows:

- a) Verify steam supply availability; Open the drains in the pipe circuit to remove water completely and close the drains.
- b) Gradually introduce steam into the pipe circuit to allow a steady temperature rise in the piping while carefully checking expansion; confirm that the barricade is wide enough to allow the steam jet to exhaust its energy inside the barricaded area, or provide to adjust the barricade accordingly;
- c) Drain condensate from low points to avoid pipe hammering caused by water slugs which could be propelled at high velocity through the piping;
- d) When condensate is no longer visible at the exit points, increase steam speed to remove loose foreign matter and, if spalling technique is used, heat up metal quickly at a temperature as much as possible near the operating one; then cut off steam flow and let pipe metal temperature drop below 80°C;
- e) Heat up, blow out and cool down shall be repeated several times to obtain satisfactory cleaning of pipe surfaces;

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- f) Steam used for blowing should have characteristics (pressure, temperature, flow rate) as close as possible to the normal operating condition;
- g) Several hours (2-3) shall be allowed between one blowing to the next, to allow the piping to cool down; This shall be used to check the target plate provided for cleanliness.
- h) Each blowing shall take from 15 to 30 minutes depending on steam availability and on pipe circuit extension;
- i) When steam blowing is completed, ensure the piping and equipment are adequately vented to avoid pulling a vacuum during the cool-down period;

After blowing, dirt may have accumulated in corners of valves or nozzles, etc. The only way to clean these areas is by hand and this step should never be omitted.

## 9. Steam Blowing velocity

During blowing, steam velocity should be maintained constant. In any case velocity should not be lower than normal operating one in case of steam lines blowing.

Where required, a more precise determination of the necessary steam velocity can be performed by using the disturbance factor approach. The Disturbance Factor (R) is defined as:

$$R = Q_c \cdot V_c / Q_d \cdot V_d$$

Where:

$Q_c$  = steam mass flow at cleaning conditions (kg/h)

$V_c$  = steam specific volume at cleaning conditions (m<sup>3</sup>/kg)

$Q_d$  = normal fluid mass flow at most severe operating conditions (kg/h)

$V_d$  = normal fluid specific volume at most severe operating conditions (m<sup>3</sup>/kg)

Maintaining the Disturbance Factor above 1 will assure that any debris not removed during blowing operation will not be dislodged during normal operation of the line.

## 10. Cleanliness Criteria

For most process and utilities piping, steam colour at the outlet point is sufficient indication of whether blowing may be considered completed.

In case of special services (e.g. process requirements, steam turbine supply, etc.) where deep and accurate cleaning is required, a target plate (copper, aluminium, stainless steel) should be installed at the steam blowing outlet point and cleanliness acceptability is based on the number and size of marks left by the entrained materials on the plate.



Plate to be used shall be highly polished and installed on the pipe when the exhaust steam appears clean.

Plate shall be fixed to a support which keeps it perpendicular to the pipe axis (see Fig. 1).

Plate shall be replaced after each target plate test, and then marked with the blow number, stored and used for comparison with other target plates. By comparing the target surfaces, it is possible to see how the steam quality improves. When the plate surface remains bright, it will be possible to count the number of marks left by dirt or rust particles.

The blowing is finished when the following conditions have been met:

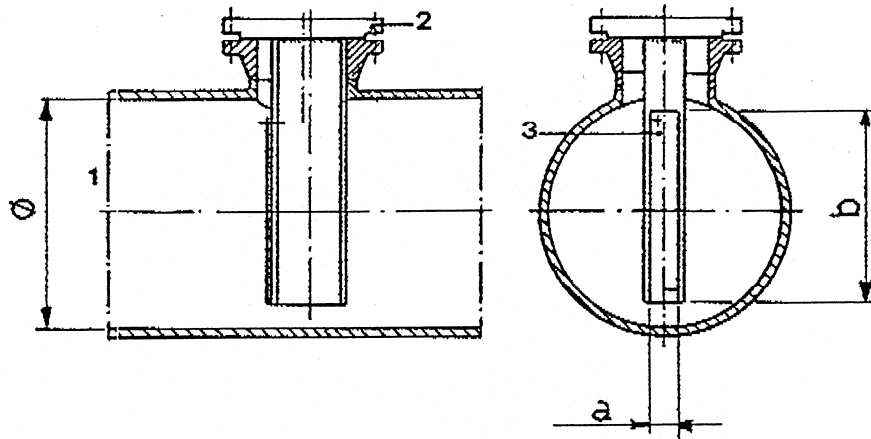
- Two successive target plates show no damage outside the limits prescribed by equipment manufacturers;

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- After 12 hours of pipe circuit cooling down, two further target plates show no damage outside the limits prescribed by equipment manufacturers.
- An example of target plate acceptability could be:
- No marks with a diameter of more than 1.2 mm for copper and aluminium plates, or 1 mm for steel plates;
- Marks exceeding 0.5 mm diameter to number not more than 2 per 25 cm<sup>2</sup> of target plate surface (TPIT criteria);
- Marks exceeding 0.3 mm diameter to number not more than 10 per 25 cm<sup>2</sup> of target plate surface;
- Marks less than 0.3 mm diameter to be well dispersed and nowhere present on concentration.

**FIGURE 1**

**TARGET PLATE INSTALLATION**



1. Pipe to be cleaned
2. Plate support
3. Plate

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## 11. **Quality Control Form**

Test results shall be reported in the relevant Pre-commissioning Quality Control Form (refer to attachment 2) or attachment to it and it shall be integral part of the System Dossier.



## 12. **HSE Precautions**

During steam blowing, proper measures shall be taken to safeguard personnel and prevent environmental pollution. Several risks for personnel, equipment and environment are associated with this operation. First of all it's necessary to consider the temperature and pressure of the steam that will vary depending on the type utilized (LPS, MPS, HPS). If the lines and the equipment involved in this operation are not insulated, they may become very hot and they may cause severe injuries if the workers touch them. Another risk is the steam blow off. If workers are too near to the steam blow off they may be injured both for high temperature and pressure of steam and for the presence of debris in the steam blow. Also, the presence of high noise may cause problems for the personnel involved.

The following represent minimum precautions by the LSTK Contractor:



- OWNER'S HSE policy and practices shall be followed.
- Observe and enforce all local codes and regulations to safeguard plant, personnel and the environment;
- Inspect affected area to avoid conflict with other activities;
- Restrict access into blowing area to authorized personnel only;
- Place warning signs and fence the entire blowing area with colour strips;
- Prevent any persons from entering the exhaust blow area, allowing adequate distance in the direction of the blow and considering possible deflection of the blow;
- Flexible hoses used for steam blowing shall be resistant to the steam supply design pressure and temperature;
- System under blowing shall be properly isolated from connected systems on which other activities may be going on;
- Each valve isolating connecting lines or branches within the system under blowing will be verified to be in the closed position by visually inspecting the valve stem and with the checking of the presence of the blind;
- Ensure that all lines which have disconnected to allow blowing are strongly secured for personnel protection (whip effect);
- Instruct involved personnel to monitor steam blowing operation and to safely stop blowing activity when required.
- Ensure personnel involved in blowing operation to wear appropriate personal protective equipment such as gloves, boots, helmets, ears protection and goggles; Because high noise is expected, the high noise sign must be displayed; Ear protection is mandatory in all noise affected areas and shall consist of two levels; ear plugs and ear muffs.
- Minimize disturbance to persons and to environment by using devices for low noise blowing (silencers);
- Ensure piping insulation is as complete as possible before introducing steam;
- Before introducing steam walk through the system to check its proper alignment and integrity;
- During warm up walk through the system to check for free thermal expansion and no water hammering;



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- During system pressurization check again for its integrity (no major visible leaks);
- Vent should be selected at the highest position and drains at lowest to avoid vacuum and water accumulation in the system. The required position of each valve (open/close) shall be clearly identified with warning signs;
- If possible, request permission for steam blowing at night due to high noise levels.
- All the preventive measures identified in JHA shall be followed.



**13. Attachment 1: Job Hazard Analysis(JHA) for Steam Blowing of Piping and Equipment**

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Name of the Job Site:									Date:					
HIRA No:			PCC-03						Assessment Team:					
Name of the Main Activity			Steam Blowing											
Sl. No	Sub Activity	R / NR / E / L	Hazard	Risk	Existing Control Measures (As per company defined procedure)	Risk considering existing control measures			Additional Control Measures to bring Risk to ALARP Level  (A-Elimination, B-Substitution, C-Engineering, D-Signage /Warning/ Administrative, E- PPEs usage )	Residual Risk After applying Additional Control Measures			Action By	
						Impact	Probability	Risk Level		Impact	Probability	Risk Level		
1.	Preparation / Secure Area	R/L	Slips Trips Falls	• Personal Injury	• Area to be cleared of obstructions	3	D	M	• Instruct involved personnel what to do, how to monitor operation, how to safe stop the activity if needed	2	A	L	Site Engineer	
			Falling Objects		• Trained and competent personnel to carry out preparation.	3	D	M	• Housekeeping: keep work area clean • Remove all trip hazards	2	A	L		
			Damaged to energized equipment	• Electrocution & Shock	• Protect electrified equipment near steam blowing outlets to prevent steam or condensate contact with electric motors, instruments, electrical cable, power distribution boards, etc.  • PTW to be obtain and follow the requirements as mentioned.	3	D	M	• Inspect affected area to ensure it does not conflict with other activities.  • Place warning signs and barricade entire blowing area with Black and Yellow tape.	2	A	L		

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			<p>Lack of coordination with the other contractors</p> <ul style="list-style-type: none"> <li>• Injury due to fall of materials</li> <li>• Miss communication and lack of awareness</li> </ul>	<ul style="list-style-type: none"> <li>• Clearly identify steam traps with warning signs</li> <li>• Area shall be restricted only to trained and authorized personnel.</li> <li>• Define suitable area for directing the blowing points without impacting on the surroundings activities/ workers</li> <li>• Area affected from the outlet point shall be chosen in a way to not damage equipment's and or piping insulations</li> <li>• Steam releasing points must be barricade for adequate distance in the direction of the blow. Consider possible deflection of the blow.</li> <li>• Advance Communication and coordination meeting shall be arranged to send alert or other means to all other contractors involved, also to all the supervisors in the activity prior to start.</li> </ul>	2	A	L	<ul style="list-style-type: none"> <li>• Outlet point shall be barricaded with pre-commissioning tape [black/yellow]</li> <li>• Keep non-essential persons clear. Restrict access to authorized personnel only.</li> <li>• Appropriate PPE to be worn at all times (during all the steps of the job).</li> <li>• Foresee which and when steam traps will be opened to avoid damages to the surrounding equipment's and personnel</li> </ul>				
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2	Disconnect / Reinstall lines	R/L	Loose materials	<ul style="list-style-type: none"> <li>Personal Injury</li> </ul>	<ul style="list-style-type: none"> <li>Work allocation only after getting the permit</li> </ul>	4	D	H	<ul style="list-style-type: none"> <li>Correct tools should be selected for job</li> </ul>	2	A	L	Site Engineer
	Install spade /Blinds		Manual Handling	<ul style="list-style-type: none"> <li>Damaged to Property</li> </ul>	<ul style="list-style-type: none"> <li>Conduct Tool Box talk prior to start the work</li> </ul>	4	D	H	<ul style="list-style-type: none"> <li>Mechanical lifting devices are to be used to prevent manual handling injuries</li> </ul>	2	A	L	
	Open / Close Manway		Work at Height	<ul style="list-style-type: none"> <li>Muscle Strains</li> <li>Fall from Height</li> <li>Falling of materials/Tools</li> </ul>	<ul style="list-style-type: none"> <li>Appropriate PPE's must be worn.</li> <li>Correct manual handling techniques is to be used</li> <li>Proper scaffold or platform should be used during working at height.</li> </ul>	3	D	M	<ul style="list-style-type: none"> <li>The use of two people or a team to lift heavy items should also consider</li> </ul>	2	A	L	
						3	D	M	<ul style="list-style-type: none"> <li>Full body harness to be used during working at height</li> </ul>	2	A	L	
						3	C	M	<ul style="list-style-type: none"> <li>Lanyard should be attached to a anchored point.</li> </ul>	2	A	L	
						3	C	M	<ul style="list-style-type: none"> <li>LOTO procedure to be implemented at each isolating valve</li> </ul>	2	A	L	
									<ul style="list-style-type: none"> <li>Positive Isolate system under Blowing from connected systems by</li> </ul>				

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Connection Of Temporary steam Hose/Line	Lifting activity	• Slip & Trip	<ul style="list-style-type: none"> <li>Tie off tools policy to be follow and remove/secure all loose materials from height.</li> <li>Proper House keeping to be maintained.</li> </ul>	3	D	M	<ul style="list-style-type: none"> <li>means of double valve and blind or valve plus blind.</li> <li>During connection all valves to be isolated</li> <li>All valves isolated while making connection.</li> </ul>	2	A	L	
		• Personal injuries.	• Before opening pressurized line/vessel, ensure all pressure in line are safely bled all.	3	D	M	• All electrical fittings to be inspected and color coded.	2	A	L	
		• Electrocution	• All mechanical lifting devices should be checked regularly.	3	D	M		2	A	L	
			• Ensure area is free of obstacles.	3	D	M	• PTW system to be obtained.	2	A	L	
			• Only inspected crane with 3 <sup>rd</sup> party certification to be used.	3	C	M	• DTRA/STA to be conducted prior to start the activity.	2	A	L	
		• Overload	• Competent rigger and operator to carry out lifting activity				• No lifting activity during heavy wind.				
		• Unauthorized operation	• Operating area of crane to be barricades and sign posted				• Job specific training to be completed.				
		• Lack of communication									

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3	Introducing steam to system for Blowing and Cleaning of Lines	NR	Communication & Timing (Insufficient or Poor)	<ul style="list-style-type: none"> <li>Personal injury</li> <li>Slip and falls</li> </ul>	<ul style="list-style-type: none"> <li>PTW system to be obtained.</li> <li>DTRA/STA to be conducted</li> </ul>	4	D	H	<ul style="list-style-type: none"> <li>Proper supervision through performing authority</li> </ul>	2	A	L	Site Engineer
			Residue pressure / Water line not depressurized after Hydrotest	<ul style="list-style-type: none"> <li>High Noise</li> </ul>	<ul style="list-style-type: none"> <li>Approved steam blow General and detailed procedure.</li> </ul>	4	D	H	<ul style="list-style-type: none"> <li>Safety sign boards shall be displayed and informed to the concerned parties via tool box talk</li> </ul>	2	A	L	
			Equipment Malfunction	<ul style="list-style-type: none"> <li>Material damage</li> </ul>	<ul style="list-style-type: none"> <li>Provide Ear defenders to those in the adjacent work area if level more than 85dbA outside the barriers</li> </ul>	4	D	H	<ul style="list-style-type: none"> <li>Inform the nearby working crew in order to avoid panic situation.</li> </ul>	2	A	L	
			Simultaneous Activities.		<ul style="list-style-type: none"> <li>Confirm that line is completely depressurized and drained after hydro testing by opening vent &amp; drain points – close afterwards.</li> </ul>	3	C	M	<ul style="list-style-type: none"> <li>Before introducing steam each isolating valve connecting lines or branches within the system shall be verified to be in closed position</li> </ul>	2	A	L	
			Uncontrolled discharge including line movement, Joint failure projectiles at high velocities from blow outlet	<ul style="list-style-type: none"> <li>High Temperature</li> </ul>	<ul style="list-style-type: none"> <li>Ensure pipe insulation as complete as possible before introducing steam.</li> </ul>	4	D	H	<ul style="list-style-type: none"> <li>Operation should be supervised by precommissioning engineer.</li> <li>Ensure that all lines which have disconnected to allow blowing through, are strongly secured with whip arrestor.</li> </ul>	2	A	L	
			Insufficient free space/ people or equipment in line of fire at the blowout point	<ul style="list-style-type: none"> <li>Lack of communication</li> </ul>	<ul style="list-style-type: none"> <li>Area of work shall be barricaded with Signboards.</li> <li>Simultaneous activity shall be stopped temporarily during steam blow</li> </ul>	4	D	H	<ul style="list-style-type: none"> <li>Before introducing steam walk down through the system to check its proper alignment and integrity</li> <li>During first steam introduction, to verify the tight close of each isolation valve, an open bleeder or existing opening downstream of the isolation valve shall be monitored until it has been assured as positive shutoff.</li> </ul>	2	A	L	
			Work at height		<ul style="list-style-type: none"> <li>Application of LOTO devices according to HEA previously reviewed and approved</li> <li>Use of appropriate PPE's</li> </ul>				<ul style="list-style-type: none"> <li>During warm up, walk down through the system to check for free thermal expansion and water hammering.</li> <li>Request permission for air blowing at night due to high noise levels.</li> <li>Green tagged scaffolding must be used for work at height activity.</li> </ul>				

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 		PROJECT	Standby SRU & Additional Tanks		
			IOCL Paradip Refinery		
		CLIENT	INDIAN OIL CORPORATION LIMITED		
JOB SPECIFICATION STEAM BLOWING OF PIPELINES AND EQUIPMENT.	Project No. 080557C001	Document No. 080557C-000-JSC-0093-008		Rev. No. A	Page 15 of 18

			Over pressuring of the system	<ul style="list-style-type: none"> <li>• Steam to be introduce slowly to allow for close inspection for leaks</li> <li>• If high noise is expected, the high noise sign, and hearing protection must be used.</li> <li>• Org chart and contact number of personnel required during the steam blowing</li> <li>• Confirm that line is completely depressurized and drained after hydro testing by opening vent &amp; drain points – close afterwards.</li> <li>• Verify pipe support guides are in place and of proper length. Spring hanger pins to be removed prior to activity.</li> <li>• Continuous monitoring of drain lines, stream traps to check the condensate is free flowing without obstruction.</li> <li>• Loose materials to be removed or secured properly.</li> <li>• Steam blowing shall be supplied and controlled by opening valves gradually.</li> </ul>	4	D	H	<ul style="list-style-type: none"> <li>• Job specific training to be completed.</li> <li>• Tie off tools policy to be followed.</li> <li>• All scaffold materials re-positioned if necessary for expansion.</li> <li>• Un – insulated steam pipe to be barricaded min: 1.5 m to prevent touching.</li> <li>• PPE- Heat resistance gloves to be available for surveillance crew.</li> </ul>	2	A	L	
			Fall hazards									
			Falling of materials									
			Personal injury.									
			Burn									

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					<ul style="list-style-type: none"> <li>Marked up P &amp; ID's – System limits to be correctly identified.</li> </ul>								
4	Blow complete /Clean up and Re-instatement	NR	PERSONNEL INJURY	<ul style="list-style-type: none"> <li>Personal injury</li> <li>Slip &amp; Fall</li> </ul>	<ul style="list-style-type: none"> <li>Ensure area is free of obstacles</li> <li>All temporary steam supply to be removed to avoid someone turns on valve.</li> <li>Job site to be restored to original</li> </ul>	4	D	H	<ul style="list-style-type: none"> <li>Care is to be taken to ensure that the correct lock and tag are removed</li> <li>After completion of job barricading should be removed</li> <li>Housekeeping will be maintained in a good &amp; orderly manner.</li> </ul>	2	A	L	Site Engineer
						3	C	M		2	A	L	

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5	Environmental aspects	NR	Noise	Disturb to the surroundings	<ul style="list-style-type: none"> <li>Inspected equipment must be used and free from damaged.</li> </ul>	3	C	M	<ul style="list-style-type: none"> <li>Programmed activities to minimise disturb- Utilize noise silencer</li> <li>Provide temporary piping / similar to route all water drain points to a suitable collection location</li> </ul>	2	B	L	Site In-charge /Site Engineer
			Waste water	Water discharge and consumption	<ul style="list-style-type: none"> <li>Waste water management procedure – Sampling &amp; Lab analysis of steam condensate prior to discharge</li> </ul>	3	C	M		2	B	L	
6	Emergency Situation	NR	Person suspended at height during falling	May become unconscious if not rescued in time	<ul style="list-style-type: none"> <li>Only trained workmen to be engaged.</li> </ul>	3	A	L	<ul style="list-style-type: none"> <li>Supervisor, gang leader, site engineer to be trained in emergency rescue from height using rescue device.</li> <li>Effective communication to be maintained between contractor and construction contractor during emergency situation</li> </ul>	2	A	L	
			Failure of pressurized parts	Burn injury	<ul style="list-style-type: none"> <li>Constant supervision to be maintained.</li> <li>Access to work area to be maintained all the time</li> <li>Inform to ERT leader about work location</li> </ul>	3	A	L		2	A	L	
			In effective communication	Uncontrolled situation	<ul style="list-style-type: none"> <li>Communication system to be followed as per ERP</li> </ul>	3	A	L		2	A	L	

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14. Attachment 2: Pre-commissioning format – Flushing / Blowing.

<b>PRECOMMISSIONING – QUALITY CONTROL REPORT</b>  <b>PIPING/ EQUIPMENT</b>  <b>CLEANING</b>
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<b>MC PACKAGE:</b>		<b>UNIT:</b>		<b>SYSTEM:</b>				
Cleaning method		W : WATER FLUSHING A : AIR BLOWING	S : STEAM BLOWING H : HYDROJETTING	M : MECHANICAL CLEANING				
LINE No.	P&ID No.	CLEANING METHOD	REMARKS	DATE	WITNESSING			
					CONTRACTOR	PMC	OWNER	THIRD PARTY

**NOTE: THIRD PARTY IF APPLICABLE**

QCR ACCEPTANCE				
INSPECTORS	CONTRACTOR	PMC	OWNER	THIRD PARTY
NAME				
SIGNATURE				
DATE				

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