

JOB SAFETY ANALYSIS (JSA)
TANK MODIFICATION AND REPAIR WORK

JSA Number:				JSA Title:							
Area:				Activity:		Hydro jetting , removal and cleaning of sludge etc		Date			
Task Description		Hydro jetting , removal and cleaning of sludge etc									
			Uncontrolled Risk						Residual Risk		
Step	Activity	Hazard	H	M	L	Control Measures			H	M	L
1.	Site preparation	<ul style="list-style-type: none"> Poor communication between work parties. Inexperience persons / lack of safety awareness Heat stress Noise Vehicles Movement 		M		<ul style="list-style-type: none"> DESCON employees shall have mandatory training. Work permit from the client, with all concurring parties signatures approval must be obtained prior to start of work and display at site Safety requirements stated on the work permit must be available on site and strictly followed Toolbox talk shall be conducted to all personnel on site & documented before start of work. Appropriate PPE shall be worn by all personnel at site. Assigned trained dedicated Banks man for job with reflective jacket. No water no work policy shall be followed. Work Schedule according to heat Index Ear protection shall be worn where required. Noise meter will be made available at site. Maintenance of equipment on regular basis. Use of Approved/Trained license drivers. Vehicle movements on site shall be controlled by banks man Appropriate signage to be provided. 					L

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2.	Transportation of material to Work location including removal of sludge drums etc By Using Crane ,Trailer, Boom Truck Pickup etc	<ul style="list-style-type: none"> Failure of equipment /crane /Trailer/ Pickup/ Truck etc Road traffic accident during transportation of Tanks shell plates, pipe spools/ supports and other material. Body part injury during loading and unloading operation 		M		<ul style="list-style-type: none"> Conduct toolbox talk and LMRA prior to start of work at the specific location. Ensure the condition of equipment, inspected, sticker Placed and for appropriate color code. All rigging gear shall be certified. Synthetic belt or nylon sling shall be used instead of steel wire rope for holding of material. Ensure crane operators and riggers fully understand all work tasks and hazards. Load shall be secured on the trailer bed to prevent accidental fall. Crane operator shall have the third party, certified and applicable license. Use proper tag line during loading /off loading material. Access route shall be surveyed before transporting the Shell Plates ,pipes & support material etc. Barricade with appropriate sign board on the effective area. Riggers shall be experienced and third party certified. 					L

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		<ul style="list-style-type: none"> Pinch point. Vehicle hit to existing facility 				<ul style="list-style-type: none"> Use leather gloves for hand protection. Keep away body parts (hand, feet, head, e.t.c) from the line of fire (LOF). Suitable length of trailer shall be arranged according to length of Shell Plates, pipe spools, supports etc. Red flag at the back end of long pipe spool shall be provided. Site specific traffic rules shall be followed. All vehicle movements will be controlled by a certified banks man. Banks man shall be provided for reversing vehicle. 			

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3.	Confined space entry.	<ul style="list-style-type: none">• Lake of Communication• Ventilation.• Damage material• Oxygen deficiency accumulation of toxic gases• Physical hazards	H			<p>All personnel working in confined space must have confined space training.</p> <p>PRL confined space procedure shall be followed.</p> <p>Hole watcher is attentive all the time during confined space activity. Lighting provided in CSE to be 24V.</p> <p>Easy communication between hole watcher and supervisor is established all the time.</p> <p>Ensure that passage and transport rout is clear during confined space activities. Proper access/agrees should be maintained.</p> <p>Gas test to be done by AGT prior to entering into the confined space.</p> <p>A trained and qualified individual should outside the tank with the responsibility of ensuring the safety of authorized entrants (Fabricator, Fitter, Welder e.tc) through the performance pre-entry briefing, checking and inspecting PPE, equipment and tools and performing regular</p>					L

						monitoring in ensuring person working inside pipe remains safe for entry and occupation.			
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		<ul style="list-style-type: none"> Improper stacking of material Unauthorized entrant Lack of oxygen /oxygen/ air deficiency 				<ul style="list-style-type: none"> A written rescue plan that has provision for conducting a timely rescue of individuals working inside the pipe (Confined Space) should be kept on site. Raising the alarm in the event of an emergency using the radio/mobile phones provided to them. Ensure effective communication systems for the entry are tested. Proper light should be provided less than 25v. All material stack proper and category wise. Rescue arrangement shall be made while working more than five meter inside large bore size. PRL SHE&S Procedure shall be followed. Close supervision required while working inside. Execute the work under close supervision and presence of hole watcher. Proper air supply to be provided or air mover will be provided. Proper ventilation shall be there. Working crew shell be trained for confined space working. 			

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4	Preparation of water jetting Tightening(manual and by machine)	<ul style="list-style-type: none">• Damage of original flange of pipeline• Property damage• Machinery, equipment or portable tools in poor condition/substandard• Damage of stud threads • Use of uncertified / un-calibrated equipments • Personal injury		M		<ul style="list-style-type: none">• Proper and valid PTW to be obtained where applicable• Supervisor to conduct Tool box Talks and fill SAP Sheet before start of activity.• Engineer/Supervisor to plan the job before starting activity.• Supervisor to ensure the availability of Method Statement, Safe Work Method Statement & Risk Assessment at job location• Supervisor having good communication skills• Communication to manpower in the language they understand• Proper communication means (e.g. radio) to be provided• Deployment of skilled manpower• Follow safety precautions for rigging job.• Use tools as per job requirement• Physical inspection of tools before each use for wear & tear• Supervisor to ensure availability of proper and sufficient quantity of PPE’S				

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		<ul style="list-style-type: none"> • Damage of threads of studs • Leaking during hydro testing • Defective equipment • Uncelebrated gauges • Unauthorized entry 				<ul style="list-style-type: none"> • Use all PPE'S as per job requirement • Keep away hands and body parts away from the trap point. • Pre/post inspection of equipment/ machinery will be conducted. • Tightening of studs will be in sequence to make leak proof joints. • Gaskets will be placed between flanges. • Adequate supervision will be at all work places. • Calibrated equipment with certificates will be used • Use of proper and defect free tools / equipment • Safety device of equipment in functioning condition (e.g. relief valve) • Pressure relief safety valve (PRSV) Gauges tested and calibrated. Manifest tested and certified. • At appropriate distance & proper hard barricade for above and underground job points. • Use appropriate safety signboards for air flushing / cleaning job 			

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		<ul style="list-style-type: none">Slipping/trippingPersonal injury				<ul style="list-style-type: none">Barricade the affected areas with sign board.Full time supervision of the job.Inspect affected areas to ensure it does not conflict with other activities.All connection to be checked for tightness and secured with correct hose clamps safely and whip device.					
	Filling of water in line / tanks with pump/manual	<div>Leaking</div> <div>Property damage</div> <div>Personal injury</div> <div>Environmental problem</div>		M		<ul style="list-style-type: none">Engineer/Supervisor to plan the job before starting activity.Information to working groups in surrounding area about this activity.Supervisor to recheck isolation and lock out / tag out before starting jobUse of proper tools for the job & no misuse of toolsCrew will be available to tight the flanges during water filling if needed.Water filling will be done smoothly to ensure leak proofing.Securing from tripping hazard will be ensured by proper house keepingApply Lock out/Tag out procedure to each valve isolating					

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						from connected system. • Use appropriate blind valve. • Team will be alert to attend any leakage.			
	Building up required test pressure ready for water jetting	• Working without PTW • Improper planning • Unauthorized personnel entry • Uncelebrated gauges		M		• Engineer/Supervisor to make sure valid PTW made available on site. • Engineer/Supervisor to plan the job before starting activity. • Supervisor to conduct TSTI and step back 5x5 & communicate hazards associated with the job to working group • Information to working groups in surrounding area about this activity. • Area will be properly barricaded • Patrolling of the barricaded area will be done from outside the barrier • Supervisor to have sufficient communication means e.g. radio or cell phone • Supervisor to recheck isolation and lock out / tag out before starting job			

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		<ul style="list-style-type: none"> • Poor lighting during evening / night • Use of Improper tools • Personal injury • Property Damage • Damage of flange • Environmental problems • Improper access and egress. 				<ul style="list-style-type: none"> • Adequate lighting arrangement should be made available (100~150 Lux Minimum). • Use of proper tools for the job & no misuse of tools • Appropriate PPE'S will be worn as per job requirement and job atmosphere / environment • Workers attending equipment will not leave the equipment un-attended and wear applicable PPE'S • Supervisor to communicate & ensure that no tightening of flanges will be done whilst the line is under pressure. Place warning tag Do not Operate & Under Pressure. • Only calibrated gauges to be used • Periodic checks for leakage to be done • Maintain working area clean and tidy. • Pressure will be built smoothly. • Pressure will be recorded during building up pressure. • Team will be alert during the phase. • Signboards of hydro testing will be placed. 			

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		<ul style="list-style-type: none"> Heat stress Improper communication Poor emergency response 				<ul style="list-style-type: none"> Authorized entry will be ensured to avoid personal injury in case of leaking. Proper access will be provided for emergency. Only suitably qualified and experienced personnel will be deployed at all work faces. Adequate venting will take place at all high points to release entrapped gas / air Ensure availability of cold water at job site in summer Drink water frequently to avoid dehydration in summer Ensure availability of heat stress shelter at job site in summer Act as per instructions against each flag color to prevent yourself from heat stress in summer Ensure availability of 1st aider, 1st aid kit and list of 1st aiders at job site List of emergency numbers to be made available Sup. To have Descon Emergency Numbers Card Vehicle to be there at job site to be used in case of medical 			

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						emergency / personal injury				
5	Water jetting /cleaning removal of sludge from tank	<ul style="list-style-type: none">Damage equipment / poor maintenance	H			<ul style="list-style-type: none">Equipment should be inspected before used.Proper equipment maintenance should be done.				L
		<ul style="list-style-type: none">In experience person	H			<ul style="list-style-type: none">Operator should be experience and qualified				L
		<ul style="list-style-type: none">Falling over /slip trip and fall		M		<ul style="list-style-type: none">House keeping and job area to be reviewed and clean up if necessary prior to commencing job.Extreme care to be taken inside confined space				L
		<ul style="list-style-type: none">Non Protection of body part	H			<ul style="list-style-type: none">Ensure standard PPE is worn as a minimum and wear other item identified				L
		<ul style="list-style-type: none">Hazardous Atmosphere		M		<ul style="list-style-type: none">Carefully read and follow the confined space entry permit requirements ie breathing apparatus LEL etc				L
		<ul style="list-style-type: none">Cutting of limbs/ hit to body part.		M		<ul style="list-style-type: none">Hose restrainers to be installed on hoses before commencing work.Hand gun fitted with control trigger , cleaning to be control be by hand gun.Safety watch should be provided,Area should be barricaded.				L

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						<ul style="list-style-type: none">Gun barrel to be minimum of 1.2 metersGun hose or lance operator to ensure his stance is braced and firm.To avoid direct pressure of jet at limbs work facing away from the body.				
		<ul style="list-style-type: none">Noise		M		<ul style="list-style-type: none">Ear muff / plug must be worn by all people in the immediate vicinity of the work being carried out and at the jet.				L
		<ul style="list-style-type: none">Whipping around		M		<ul style="list-style-type: none">All hose connections must be fitted with clips or some method of restraining device at all time.				L
		<ul style="list-style-type: none">Injury to operators		M		<ul style="list-style-type: none">Pressure ratings to be checked , al hoses and fittings to be checked from damage prior to use.				L
		<ul style="list-style-type: none">Overriding safety switch		M		<ul style="list-style-type: none">No live gunning will be permitted at any time.				L
6	<ul style="list-style-type: none">Manual handling / Shifting of sludge	<ul style="list-style-type: none">Pinch points.Hand injury		M		<ul style="list-style-type: none">Supervisor will be responsible to complete safe activity pre-Use appropriate PPE'S as per job requirement.Maintain good housekeeping to avoid injuries.Plan before manual liftingUse manual handling / lifting Aids like trolley etc.				L

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		<ul style="list-style-type: none"> Drop of material. Keeping load away from body Muscular skeletal disease, Back pain Lifting by bending back Lifting unmanageable load 				<ul style="list-style-type: none"> Ensure no obstruction at job point, access/egress When long period of manual handling is required, give appropriate breaks. Keep the load as close to body as possible. Move feet rather than twisting back during manual handling. Avoid wearing tight clothing which may restrict body movement Ensure strong gripping during manual handling Bend your knees and not back during manual handling / lifting Use legs as the pivot point to raise or lower body with the back straightened when lifting or lowering load Shoulders should be kept level. Look ahead, not down at the load, once it has been held securely. Material handling tools or equipment, such as barrows and trolleys, should have handle heights that are between the 			

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		<ul style="list-style-type: none">Exhaustion				<p>shoulder and waist.</p> <ul style="list-style-type: none">Such tools or equipment should be well maintained, with wheels that run smoothly.Assistance should be provided to handlers negotiating a slope or ramp.Loads should travel over a smooth & even surface.				
7	Extended hour/night Works (Actual works will be the same as day work)	<ul style="list-style-type: none">Inadequate lighting in and around work areas, causing shadows or poorly lit work areas that could result in unsafe acts and injuries taking place		M		<ul style="list-style-type: none">Adequate lighting at work area and Access/Egress area. Emergency route to muster point to be clearly illuminated.Proper cable managementUse clear safety glass for night work for good visibility.Warning Lights and sign boards.Trained Flag man for equipment movement provided with signal torch.Close supervision required while working in night shift.				L
8	Emergency Procedure / Response	<ul style="list-style-type: none">Poor Communication		M		<ul style="list-style-type: none">Educate the workforce about Emergency Procedure.All safety sign board shall be displayed properly at site.In case of any Emergency all work will be stopped, Shut				L

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		<ul style="list-style-type: none">Improper Access/ Egress				<div>down all running equipment & Machineries and reported to Muster Point</div> <ul style="list-style-type: none">Proper Access & Egress shall be available.All Workforces shall know the Muster Point location.PRL Emergency Procedure to be followed.Emergency # 00000000PRL Medical # 00000000					
9	House keeping	<ul style="list-style-type: none">Trips and fallSharp ObjectsEquipment damage		M		<ul style="list-style-type: none">All waste generated shall be contained and disposed off in designated waste skips.Do not store materials/equipments inside the plant area.Use Proper Personal protective equipment for handling of waste.All materials shall be removed from the site to a safe storage location immediately after the work.					L

Approved

Signature

Print

Date

Performing Party

Signature

Print

Date

