

SCOPE OF WORK

1. The scope of work includes but not limited to the following:

- A. Radiography of welds joints on high-pressure lines and vessels by gamma rays at different elevations.
- B. MP Inspection of welds joints of pressure vessels, tanks, Machinery parts and high-pressure pipelines as per requirements of NFL.
- C. Ultrasonic testing of welds joints on pipes, vessels, Machinery parts etc. located at different elevations.
- D. D P Testing of welds joints on pipes, vessels, Machinery parts etc.
- E. Thickness Measurement of pipes, vessels etc.
- F. Stress Reliving job of weld joints.
- G. Helium Leak Testing of equipment/vessel

2. TECHNICAL TERMS AND CONDITIONS:

All the manpower, materials such as instruments with all its accessories & auxiliaries, IR-192 or other sources. Survey meter and all consumables etc. etc. as required for carrying out the NDT jobs as per scope of work detailed above are to be arranged by the party themselves at their own cost. All the jobs are to be taken up simultaneously and as such adequate manpower must be available for each of the above jobs separately. **ISNT/ASNT level II qualified person(s)** having the valid certificate(s), must be deputed for the job. The photocopy of the same is required to be submitted to NFL for taking up the job by contractor. NFL SHALL SUPPLY HELPERS IN THE FORM OF CASUAL LABOUR FREE OF COST FOR ASSISTANCE ONLY.

A. RADIOGRAPHY

- i. Party has to ensure the strength of the source brought at our site is sufficient to carry out Radiography of pipelines having wall thickness up to 30 mm of CS/SS having no gamma hole. If due to poor source strength the job takes longer time than normal, no unit charges shall be payable for the day.
- ii. Party has to ensure quality job and in case the rejection of shots is more than 50%, the unit charges for that day shall not be payable. In any case the payment shall not be made for any rejected shots due to poor quality of job.
- iii. **Party has to take clearance from BARC for carrying out radiography job at our site.**
- iv. NFL will provide Dark Room facility.
- v. The Radiography job will normally be carried out during night hours. No Extra charges for working in the night/beyond eight hours shall be payable.
- vi. Rate should be quoted for 4" wide film exposure per inch running length as well as unit charges against the appropriate column in the schedule of rates.

B. MP INSPECTION

- i. MP inspection is intended to reveal any surface / subsurface defects like cracks, pin holes etc. of weld joints of pipes including inside & outside surfaces of tanks, vessels, forgings & M/c parts etc. The magnetic yoke to be used inside the vessels should be of permanent magnet as 220 V supply inside the vessels is not allowed. Outside jobs are to be carried out by AC/DC type Yoke. **Party has to bring their own MPI instrument & consumables.**

C. ULTRASONIC TESTING:

- i. Ultrasonic testing is intended to check erosion or flaw, if any in weld joints of high-pressure steam & gas pipelines, vessels existing in our plant at different elevations.
- ii. For carrying out ultrasonic testing job, the party shall have to bring their own instrument with all its accessories along with probes of 2 MHz & 5 MHz and of size 10 mm dia. As well as 20 mm dia. Party should also bring angle probes of 2 MHz & 5 MHz of different angles & TR probes also.
- iii. In case of defects, if observed, the same shall have to be brought to the notice of the Engineer-in-charge immediately & a report is to be submitted.

D. DYE PENETRANT TESTING:

- i. Dye penetrant testing is intended to check flaws, if any in weld joints of high-pressure steam & gas pipelines, vessels existing/newly fabricated, machinery parts etc. in our plant at different elevations.
- ii. **NFL shall supply D P Test material free of cost.**
- iii. In case of defects, if observed, the same shall have to be brought to the notice of the Engineer-in-charge immediately & a report is to be submitted.

E. THICKNESS MEASUREMENT:

- i. Carrying out thickness measurement of different pipe lines (hot & cold) existing in our plant at different elevations and making report of the same.
- ii. For carrying out thickness measurement job, the party shall have to bring their own instrument with all its accessories along with probes for cold & hot jobs.

F. STRESS RELIEVING :

- i. Complete Stress Relieving Job will be carried out as per standard engineering practice and as per schedule given by Engineer-in-charge of NFL.
- ii. Contractor will engage NDT Engineer having expertise and experience of carrying out Stress Relieving Job as per applicable Engineering standards/practices.
- iii. Total Inch dia. of surface to be stress relieved: **200 inch**
- iv. No. of days: 06 days
- v. Total No. of Visit: **03 visit.**
- vi. The party has to engage highly skilled manpower having expertise and experience of carrying out Stress Relieving Job as per applicable Engineering standards/practices. Contractor shall depute sufficient quantity of well-experienced and qualified staff for carrying out stress relieving job at NFL Site (minimum 01 NDT Engineer as mentioned above + 1 helper).
- vii. Contractor shall make all arrangement for execution of work at site i.e. all consumable/non consumable (returnable) like compensating lead, instrument with accessories, temperature recorder, control pane board, thermocouple etc, and all type of safety equipment i.e. personal protective devices required for staff. Any other equipment/accessories required for carrying out stress relieving job shall be under Party's scope.
- viii. Contractor shall be required to bring minimum 01 sets of 6 point temperature recorder & six point control panel & all the 6 points of said set must be operatable at site for operation of the stress relieving machines as per requirement.
- ix. Recorded reports / graph of the stress-relieved joints shall be submitted to Engineer in Charge immediately after the completion of job.
- x. Normally the stress-relieving job shall be carried out as per directions of engineer in charge during any time of a day. Contractor's staff shall be required to work on Sundays/holidays and beyond normal working hours as per job requirement and these days/hours shall be considered as normal duty

G. Helium leak testing:

Helium leak testing of equipment/vessel etc. inclusive of HLD instrument with accessories, tools & tackles (Non sparking), necessary material, consumables like adhesive tape etc., along with all type of safety equipment (i.e. personal protective devices required for his staff) with handling charges (for two days) as per below obligations:-

- i. Contractor shall make all arrangement for execution of work at site i.e. all type of skilled/unskilled manpower, HLD instrument with accessories, tools & tackles (Non sparking), necessary material, consumables etc., along with all type of safety equipment (i.e. personal protective devices required for his staff).
- ii. Contractor shall depute well-experienced & qualified staff for carrying out above job.

- iii. Contractor shall provide evaluation results on the spot for immediate action; however, three copies of well documented final report along-with representation of defects shall be handed over to Engineer-in-charge for record within 14 days after completion of the job, but before submission of bill for payment, which shall be entertained only after completion of all the obligations on contractor's part.
- iv. Normally Helium test shall be carried out as per directions of Engineer-in-charge during any time 24 Hrs a day. Contractor's staff shall be required to work on Sundays/holidays and beyond normal working hours as per job requirement and these days/hours shall be considered as normal duty.
- v. Contractor shall bring all the tools and tackles for the handling of Helium Gas filled cylinders at site like cylinder regulator, spanners and keys etc.
- vi. Helium Gas for Testing shall be provided by NFL.
- vii. NFL will hand over the job with proper safety work permit.
- viii. Water, Power, Air, if required for job shall be provided.
- ix. NFL shall provide a small space for storing material, however safe custody of that material shall be in contractor's scope.
- x. Scaffolding will be provided (if required).
- xi. Necessary help for shifting Helium gas cylinder will be provided; NFL is not responsible for any damage during shifting.
- xii. Boarding & lodging in our guest house and Local Conveyance shall be provided free of cost (only for helium leak testing).

3. Contractor's Obligations:

- i. Boarding & lodging and Local Conveyance shall be arranged by the party for the all the jobs except Helium Leak Testing.
- ii. Normally Notice of 2 days shall be given for starting the job but the Contractor should be able to mobilize within 24 hours, if necessity so arises.
- iii. All necessary tools and tackles, consumables (except DPT material) to carry out the job shall be in party's scope.
- iv. All applicable/valid Instrument calibration Certificates shall be made available by the party before starting of the job.
- v. The strength of radiography source shall be adequate and up to the satisfaction of Engineer-in-charge.
- vi. Any legal/statutory clearances required to bring the material/Instrument at NFL site shall be in party's scope.

4. NFL's Obligations:

- 1. Water, power, scaffolding material (including erection/removal), floodlights and insulation
- 2. Jobs will be handed over with proper work permit.
- 3. NFL shall provide space for safe custody of contractor's instrument and material.

5. No Extra charges for working in the night/beyond eight hours shall be payable.

6. The party has to engage highly skilled manpower having **Level II qualification from ISNT/ASNT** or equivalent for executing the job and maintain high standards of workmanship. **Party must furnish list of Level II personnel available with them for carrying out different jobs as per scope of work along with quotation for eligibility.**