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January 30, 2018

**BIDDING DOCUMENT
FOR
IN LINE INSPECTION
OF
12" Ashdod – Plugot & 8" Ashdod –
Jerusalem**

Prepared & Issued by:

Petroleum & Energy Infrastructures Ltd. (PEI)





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1. GENERAL

1.1 INTRODUCTION -

Petroleum & Energy Infrastructures Ltd. (PEI) intends to carry out an inspection using an intelligent tool for geometric measurement, estimation of metal losses, cracks and other defects on the two underground service pipelines used for petroleum distillates delivery.

The first pipeline:

32.6 km long 12" pipeline section of entire Ashdod – Eshel pipeline. The pipeline is used for delivering distillates and runs from the Ashdod area to the Eshel tank farm Site totaling 69 km in length and it consists of two sections:

- 12" section Ashdod - Plugot , 32.6 km long.
- 6" section Plugot - Eshel, 36.4 km long

The pipeline was built in 1983. Since then this pipeline has been partly renewed. The pipeline has never been inspected by an Intelligent Pig.

The pipeline passes through urban areas, agricultural land, crossing roads, highways and railways. There are some tie-ins (Tee-type) connecting to this pipeline.

All the relevant pipeline data is presented below.

The second pipeline:

58.5 long 8" Ashdod – Jerusalem pipeline

The pipeline was built in 1972. The pipeline is used for delivering distillates and runs from the Ashdod area to the Jerusalem Pi - Gllot tank farm Site. Since then this pipeline has been partly renewed. The pipeline has never been inspected by an Intelligent Pig.

The pipeline passes through urban areas, agricultural land, crossing roads, highways and railways. There are some tie-ins (Tee-type) connecting to this pipeline.

All the relevant pipeline data is presented below.



1.2 OBJECTIVE

The objective of the present pigging program including in-line inspection is to assess the integrity of the pipeline in quantifiable term and generate base line data for future assessments.

1.3 MAIN CONTRACTOR

The Main Contractor (hereinafter – Contractor) is defined as an Israeli Piping Contractor approved by PEI, who will hire an international well-known Non Destructive Examination Company (hereinafter - NDEC).

.14 PIPELINE TECHNICAL INFORMATION –

The first pipeline - 12" section Ashdod - Plugot

- Nominal pipe diameter: 12"
- Type – API 5L X52
- Nominal wall thickness 0.250"-0.375"
- Length: 32.6 km
- Age of pipeline: 35 years
- Liquid – all types of distilled oil
- Max operating pressure – 90 (bar)
- Design pressure – 100 (bar)
- Max operating temperature – 55 degrees Celsius
- Flow rate – 105-700 (m³/h)
- Lateral T –several lateral equal tees along the pipe (no guide bars)
- Launcher location: Ashdod.
- Receiver location: Plugot,
- Depth of burial: normally 4 feet, some places 10 feet or more.
- Map of pipeline: to be provided to successful bidder.

The second pipeline - 8" Ashdod – Jerusalem

- Nominal pipe diameter: 8"
- Type – API 5L X42/X52



- Nominal wall thickness 0.219"-0.344"
- Length: 58.5 km
- Age of pipeline: 46 years
- Liquid – all types of distilled oil
- Max operating pressure: section #1 Ashdod-Mesilat Zion – 90 (bar) , section #2 Mesilat Zion -Jerusalem – 70 (bar)
- Design pressure – 100 (bar)
- Max operating temperature – 55 degrees Celsius
- Flow rate – 105-170 (m³/h)
- Lateral T –several lateral equal tees along the pipe (no guide bars)
- Launcher location: Ashdod.
- Receiver location: Jerusalem.
- Depth of burial: normally 4 feet, some places 10 feet or more.
- Map of pipeline: to be provided to successful bidder.

2. SCOPE OF WORK

The scope of work comprises of In-line inspection of **12" Ashdod-Plugot** and **8" Ashdod – Jerusalem** pipeline by running **intelligent pig based on ultrasonic technique (compression wave or shear wave)** to detect and quantify internal/external corrosion/mechanical defects and other anomalies preceded by gauging, cleaning and Caliper (Geometry) pig runs. The intelligent pig proposed by the bidder should be able to generate valid and interpretable data at the velocities mentioned in the bid document. The scope of work shall be read in conjunction with Technical specifications and other terms and conditions of the BID document. As part of the proposal, Bidder shall fill in the forms in Appendixes A,B,C.

STANDARDS –

The applicable standards for the ILI (execution, performance, data analysis, reports format ect) shall be –

API 1163 (last edition)

ASME B31 G

ASME B31.4



NACE RP 0102 (last edition)

ASNT ILI – PQ-(last edition)

2.1 DETAILED SCOPE OF WORK

- Item wise scope of work envisaged under the Scope of Work shall consist of following as a Minimum. It shall be bidder responsibility to carry out complete job successfully to generate valid and interpretable data about the pipeline.
- In case the existing launcher and receiver are not fit to carry out the bidder inspection tools, bidder shall design, manufacture, conduct a test and install new temporary launchers and receivers fitted to the proposed inspection tools. All work shall be done according to ASME B31.4. PEI will supply to the Bidder D-2000 Quick Opening Clamp Ring Closures for all temporary launchers and receivers. The existing launchers and receivers must be dismantled and stored at the facility. After successful completion of all pigging activities temporary launchers and receivers will be detached, prepared for long term storage and transported by bidder to PEI storehouse. All the existing launchers and receivers will be installed back.
- Mobilization of all personnel, equipment, above ground markers, Gauging Pigs, Cleaning pigs, Caliper pigs, intelligent pig, pig locating device, pig tracking personnel and devices, spares and consumables etc, communication, transportation of the same to work place.
- A team of at least 2 qualified personnel shall be deployed for carrying out the work. All facilities /services, tools, consumables and equipments which the CONTRACTOR feels necessary to fulfill the WORK shall have to be arranged and transported to work site by him at no extra cost and time to the COMPANY.
- Supply and placement of required number of above ground markers on the pipeline at approx 1 Km interval along the pipeline. Markers shall be with GPS capabilities as standard. The location of each marker will be signed and measured by authorized land surveyor. These markers shall be retrieved back after completion of inspection work by Contractor.
- Mobilization of adequate numbers of transmitters, receivers and personnel for tracking of pig for pipeline under scope of work without waiting for turnaround time.



- Preparation and submission of total work procedure and operation manual for various pigging activities for COMPANY approval before start of work.
- Preparation and submission of Contingency plan for Stuck up Tool.
- Providing fork lift/crane for handling of different pigs from workshop to launcher/receiver and back.
- Organize placement of various types of pigs into launcher and retrieval of the pig from the receiver.
- Carrying out adequate number of pig runs of all pigging activities e.g. Gauge pigs, Cleaning pigs (brush and magnet separately), Electronic Geometry pigs and ultrasonic intelligent pig as per technical specification, approved procedure and direction of Engineer-In-charge for the entire length. Bidder to note that no pig train shall be permitted.
- Assistance to owner by way of advice for removal /retrieval of stuck up tool/pig in case of such eventuality during normal pigging.
- Preparation of Preliminary report based on results of Corrosion Detection Pigging giving location/sites for Dig verification to be carried out by Owner.
- Demobilization of all Contractors' tools, personnel, equipment after successful completion of all pigging activities.

3. TECHNICAL SPECIFICATIONS

3.1 INTENT

The intent of the specification is to set forth the requirements of the In-line inspection of the pipeline (ILI).

This requirement is not intended to be all inclusive and use of guidelines set-forth does not relieve the CONTRACTOR to his responsibility to carry out all activities successfully as defined in Scope of WORK and to obtain valid, interpretable and physically verifiable data from the intelligent pig runs about the condition of the pipeline.

3.2 TECHNIQUE FOR INTELLIGENT PIGGING

The Corrosion detection tool used for In-line Inspection shall be Ultrasonic inspection tool based on compression wave or shear wave (UT) Technology.



3.3 PRE-INSPECTION ACTIVITIES –

Following activities are envisaged prior to running of UT intelligent pig.

Above ground marker (AGM) installation:

Contractor to supply adequate numbers of AGM for installation at 1 Km interval along the pipeline. Markers shall be required for caliper and intelligent pig runs only. These markers shall be retrieved back after completion of inspection work by Contractor.

3.4 PIG TRACKING -

The movement of any type of pig put into the line during pre-inspection or intelligent pigging shall be required to be monitor along the pipeline length from launcher to receiver trap. The pig tracking system should be capable of working under overhead high voltage transmission lines. Bidder to propose a tracking system which shall be able to detect pig passage in the existing pipe cover. The transmitter should have adequate battery life so that stuck up pig can be located within reasonable time frame. The pig tracking system should be capable of locating the stuck up pig in the range of ± 5 Meter. The BIDDER shall detail out the complete methodology of pig tracking proposed to be deployed by him including complete technical details of the equipment and device proposed to be used for this purpose.

3.5 Procedure document and Operation Manual

Contractor shall submit operation manual for pigs and procedure document for execution of the field activities for the pipeline covered under scope of work before commencing the job for PEI approval.

The document shall include as a minimum data sheets of pigs deployed at site, list of items to be mobilized, launching & receiving procedure, pig tracking procedure, reporting formats for each type of pig run, format for preliminary report , specific considerations to be observed during pigging etc.

4. PRE-INSPECTION PIG RUNS :

Prior to launching of corrosion detection pig, CONTRACTOR shall complete all activities required to establish pigability and adequate cleanliness of pipeline to the satisfaction of the CONTRACTOR and to verify the internal geometry of the pipeline with relation to ovality, dent etc. and to ensure that internal bore restriction at any location does not exceed the limitation of proposed tools to be used subsequently.



4.1 Gauge Pig run:

CONTRACTOR shall run a gauging pig with the gauging plate made of Aluminum and its diameter should be adequate to ensure minimum pipeline internal diameter according to spec of the tools (caliper/UT). CONTRACTOR cleaning and gauging pig assemblies should be able to pass over or negotiate lateral tees or bends of sizes or radii given in this document. The cups/disc should have requisite resistance to wear and tear to maintain effective seal throughout the entire run time.

4.2 Cleaning Pig runs:

CONTRACTOR shall carry out at least one run of cleaning pig to decide the number of cleaning runs required and the choice of the cleaning pig for subsequent cleaning runs as suitable for the purpose to obtain internal condition adequately clean so as to obtain valid and interpretable inspection data from the intelligent pig and to safeguard caliper and intelligent pig against damage due to debris. The cleaning pigs for successive cleaning pig runs including configuration of each pig shall be selected by the CONTRACTOR in such a manner that effective cleaning is achieved with minimum number of runs and then the same should not get lodged into the pipeline.

5. INSPECTION PIG RUNS –

5.1 Electronic Geometry (CALIPER) Pig run –

The electronic geometry (caliper) pig should be capable of recording the entire length of the pipeline from launcher to receiver in one single run and therefore its electronic recorder system should have requisite data storage capacity. Battery life therefore should be adequate to commensurate with the run time required to travel the entire pipe length and the drive cups should have requisite resistance to wear and tear to maintain effective seal throughout the entire run time. The measurement shall cover the entire 360° of internal pipe wall circumference using properly oriented and sufficient quantity of sensors. The tool should be capable to identify and locate the following features as a minimum:

- Individual Girth weld
- Dent, ovality, buckles, or any other out of roundness, change in pipeline ID and difference of thickness.
- Bend with bend radius and degree of bend.



- Valves or any partially closed valves.

5.1.1 DEFECT SIGNIFICANCE –

The following information/performance is expected out from the Geometry survey. The electronic geometry pig/Caliper pig, deployed by Contractor should be able to perform inspection of pipelines as per following detection and sizing specifications.

Type of defect	Minimum detection level	Sizing accuracy
Dent	2% of ID	0% to -25% of measured value or +/- 1% of ID
Ovality	5% of ID	0% to -25% of measured value or +/- 2% of ID
Change in ID	1% of ID	+/- 1% of ID

Location Accuracy	
Axial	+/- 1.0 m from nearest marker or pipeline feature.
Circumferential	+/- 15 degree

5.1.2 Electronic Geometry (CALIPER) Pig Report –

Contractor on completion of the CALIPER run (2 days) shall submit to PEI summary report of the geometry tools. The report shall contain detailed data on all detected defects including circumferential location, distance from magnet marker/pipeline feature, pipe joint length, valves etc to enable PEI to locate the defect in the field. The report shall also include information about the data quality, general pipeline conditions and major observations during inspection. Also the report shall include a listing of:

- Total number of dents
- Total number of ovalities
- Number of dents 2-<6% ID
- Number of dents \geq 6% ID
- Orientation plot of all dents over the full pipeline length
- Orientation plot of all ovalities over the full pipeline length
- Min ID of pipeline



IMPORTANT - The report shall include an unequivocal statement about the ability of the pipeline to run the intelligent pig.

5.2 Intelligent Pig run

Upon completion of all preceding activities (cleaning, gauging, caliper runs) and based on their results CONTRACTOR shall intimate about his readiness for running the UT corrosion detection pig. PEI shall indicate the exact time of launching the corrosion detection pig in consultation with CONTRACTOR.

Marker devices should be placed at approximately 1 KM interval as mentioned, prior to running of Intelligent Pig.

The intelligent pig proposed by the BIDDER should be capable of identifying the following anomalies keeping in view the defect significance detailed below:

- **X,Y,Z mapping** of the entire run (including x,y,z mapping of all anomalies) along the pipeline
- General corrosion
- Pitting corrosion
- Circumferential gouging
- Defect depth at % of wall thickness or mm
- Defect extension, axial and circumferential
- Defect location both with regard to traveled distance from starting point or intermediate reference point and from relevant weld.
- The location accuracy by lengthwise distance should be less than ± 0.1 m from the nearest girth weld and not more than ± 0.5 m from the launcher trap.
- The location accuracy by orientation should be less than $\pm 5^\circ$ for the 6" diameter pipe
- Wall thickness measurement of defective pipe
- Axial gouging
- Location of girth welds, valves, lateral joints
- Proximity of any ferrous object to pipeline.
- Manufacturing defects
- Metal loss in dents



5.2.1 ACCURACY OF DEFECTS

The best accuracy offered and guaranteed by the BIDDER for each category of defect should be clearly spelt out. The BIDDER must define the "pitting corrosion", general corrosion and the accuracy offered by him in each case for

- a) Depth of corrosion
- b) Axial and circumferential location of corrosion and
- c) Length of corrosion.

5.2.2 PRELIMINARY REPORT:

Contractor on completion of the UT inspection shall furnish a preliminary inspection report indicating all detected defects including sizing of defects, chainage of defects, circumferential location, distance from magnet marker/pipeline feature, pipe joint length etc to enable PEI to locate the defect in the field. The preliminary inspection report shall also include information about the data quality, general pipeline conditions and major observations during inspection. 10 numbers of most injurious metal loss defects to be identified in the pipe line shall be stated in the report.

The preliminary report shall be submitted within two weeks from the date of completion of the UT ILI.

6. FINAL WORK REPORT

The BIDDER shall include in his offer the most appropriate reporting procedure envisaged for the subject pipeline. This will have to be mutually agreed between the successful BIDDER and PEI however, any reporting system shall include but not limited to the following:

- Preliminary site report for each running of cleaning, caliper, intelligent pig runs stating comments/observations of each run, pig condition, operating parameters and total time required.
- A detailed report in respect of running each of the pre-inspection tool such as cleaning pig, caliper pig.
- A detailed report on the geometry survey of pipeline incorporating the following supplemented with raw/processed data logs.
- List of Significances with
 - Feature information



- Feature type
 - Feature description
 - Feature log Distance
 - Feature Clock orientation
 - Feature length
 - Feature depth (Change in ID)
- Velocity plot
 - Temperature Plot if applicable.
 - Survey Log and enlargement areas of special interest
 - Detailed report about running of the intelligent pig including but not limited to the operational and functional details.
 - Details describing the type, size, internal/external discrimination and location of individual metal loss defects. The location and orientation of each defect should be suitably listed with reference to permanent pipeline features, girth weld no., relative and absolute distance and severity of the defect.
 - A detailed report in respect of each defect for which sizing has to be done indicating its length, width, depth, axial and circumferential location suitably referenced.
 - Depth based feature distribution against pipe length of all metal loss features.
 - Severity analysis for all metal loss features having metal loss greater than 20% for all detected features.
 - Suitable histograms between absolute distance of pipeline and no. of defects.
 - Report on inter-active corrosion due to clustering of pits.
 - Velocity of the intelligent pig along the length of the pipeline.
 - Recommendations on section to be replaced (if any) and remaining life prediction.
 - Maximum allowable operating pressure (MAOP) calculated according to ANSI B31.4 paragraph 451.6.2, for metal loss; not near and near welds (although it is not covered by ANSI B31.4).
 - MAOP for lamination defects, estimated according to the experience of the contractor divided in 3 categories, very severe, possibly sever, and no sever defects.



The format and pro forma of the above report shall be mutually agreed upon between the successful BIDDER and PEI

- All the data generated by the CONTRACTOR shall be compiled in CD having user friendly operation on a PC along with the software necessary for review/analysis of data. This is required to facilitate selection of significant defects, their chainage and sizing. This CD will be submitted by CONTRACTOR, as a part of report. Contractor to provide three sets of CD consisting all generated data along with compatible operating software.
- The report format will be similar to the reports as shown in appendixes 3a,3b,3c,3d of " Specifications and requirements for intelligent pig inspection of pipelines" last version .
- Pipeline operators forum
- Final report shall be submitted by CONTRACTOR on 3 hard copies

7. TERMS OF PAYMENT

Progress payment shall be released to CONTRACTOR after successful on inspection of PEI pipeline against running account bills duly certified by Engineer-in-Charge. The basis for payment shall be as below:

- i) **10%** against completion of field activities for cleaning and gauging pigging and acceptance by Owner of Cleaning report (5% for each pipeline)
- ii) **10%** against completion of field activities for electronic geometry pigging and acceptance by Owner of electronic geometry report (5% for each pipeline)
- iii) **20%** against completion of field activities for UT inspection tool and confirmation by Contractors Head Office that verifiable and interpretable data has been generated by UT inspection tool which will meet the specifications as mentioned in Technical Specification of bid Document (10% for each pipeline)
- iv) **30%** on submission of Preliminary report on UT inspection run reporting the verifiable defects as per technical specification (15% for each pipeline)
- v) **20%** on submission and acceptance of Final Work Report by OWNER (10% for each pipeline)
- vi) **10%** on completion of all works covered under scope of work (5% for each



pipeline)

In case Intelligent Pigging is not successful or not possible due to the physical condition of the pipe, payment against (i) and (ii) above shall be made to contractor and payment against clause No. (iii), (iv), (v) & (vi) above shall not be made.

7.1 PAYMENT OF STANDBY CHARGES

- a) "Standby" means any prolonged work stoppage beyond 96 hours due to unforeseen reasons such as flow stoppage and / or reasons solely attributable to OWNER.
- b) No standby charges are admissible if OWNER provides work front to the CONTRACTOR within 96 hours from the time of work stoppage. In the event OWNER fails to provide work front to CONTRACTOR within 96 hours from the time of work stoppage due to flow stoppage in the pipeline or reasons solely attributable to OWNER then standby charges are admissible to the contractor on completed day (24 hours) basis for the period commencing after the expiry of 96 hours of the work stoppage till the time work front is provided by OWNER. However, it is responsibility of the contractor to maintain a record of stoppage of work in a log book and get it certified by Engineer-in- charge.
- c) No standby charges shall be applicable if the works are completed within the scheduled completion period.
- d) Standby Charges shall be applicable only for the number of days by which the time schedule gets extended for reasons solely attributable to OWNER.
- e) Standby Charges as above shall be applicable only when contractor has mobilized fully their resources as specified in the Contract including UT inspection tools and manpower.
- f) Bidder shall state Standby charges in the bill of quantities

8. TIME SCHEDULE -



DESCRIPTION	TIME OF COMPLETION
Execution of in-line inspection of PEI pipelines 12"+8", detection of defects and pipelines features, by intelligent pigging in sequence of running of cleaning pigs followed by gauging, electronic geometry (caliper) and intelligent pig with X,Y,Z mapping., pig tracking interpretation of data, data analysis, preparing WORK report of inspection findings, including mobilization and demobilization of pigging equipment, design, manufacture and installation of new launchers fitted to the proposed inspection tools, inspection tools, manpower, pigging tools, tracking equipment, pipeline markers and pig tracking device etc. for pipeline covered under THE BIDDING DOCUMENT.	04 (four) MONTHS

- 1) Time of completion shall be reckoned from the date of work commencement order
- 2) The time indicated above is for completing the all WORKS in all respects as per DRAWINGS, specifications and provision of CONTRACT and instructions of ENGINEER-IN-CHARGE.
- 3) The Time of Completion stipulated above is inclusive of time required for mobilization of equipments and personnel at site by the CONTRACTOR as well as for demobilization



9. BILL OF QUANTITIES –

DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL PRICE
Execution of in-line inspection of two PEI pipelines 12"+8", detection of defects and pipelines features, by intelligent pigging in sequence of running of cleaning pigs followed by gauging, electronic geometry (caliper) and intelligent pig with X,Y,Z mapping etc., pig tracking interpretation of data, data analysis, preparing WORK report of inspection findings, including mobilization and demobilization of pigging equipment, design, manufacture , installation of new temporary launchers and receivers fitted to the proposed inspection tools including, painting (primer + epoxy 300 mic + sandblasting sa 2.5). The existing launchers and receivers must be dismantled and stored at the facility and after successful completion of all pigging activities temporary launchers and receivers will be detached, prepared for long term storage and transported by bidder to PEI storehouse. Existing launchers and receivers shall be reassembled by contractor. Inspection tools, manpower, pigging tools, lifting tools, tracking equipment, pipeline markers and pig tracking device etc. for all pipeline covered under THE BIDDING DOCUMENT 8"+12".	COMPLET	1		
Standby charges (as per paragraph 7.1).	Day	6		

10. ABNORMAL SITUATIONS

The objective of this section is to write down foreseeable abnormal circumstances for taking appropriate measures, when such a condition arises during implementation of Project.

The following abnormal conditions have been foreseen by the PEI. However, if the BIDDER foresees any other abnormal condition, he is free to make a mention of the same in his technical BID offer:

•Tool failure



CONTRACTOR is required to get valid interpretable and physically verifiable data for pipeline covered under scope.

In case CONTRACTOR is not able to perform fully to the satisfaction of PEI and generate valid data for the pipeline covered under SCOPE OF WORK during the live runs of electronic geometry pig and live intelligent pig, the payment shall be made as per Terms of Payment.

In case CONTRACTOR'S equipment fails to perform electronic geometry pre-inspection and/or intelligent pigging inspection to generate valid data for pipeline, CONTRACTOR will make extra runs, (with no extra payment by PEI), of Pigs to get valid and physically verifiable data. The schedule completion date shall remain unaltered under such circumstances.

• **Stuck -Up tool**

The BIDDER shall detail out a contingency plan in his BID as proposed by him in case any of the pigs get stuck up. The plan shall identify procedure for exactly locating the stuck up pig, equipment, including SPREAD and support facilities required to retrieve the pig and maintain the flow with minimum loss of time and optimum efforts.

In the event of the pig getting stuck in the any segment of the pipeline during any Pigging activity CONTRACTOR shall assist PEI in retrieval of the tool. The assistance in the field will be limited to his providing advice. After retrieval of the pig, decision to continue with the next phase of activities shall be taken by PEI. Locating the Stuck up pig shall be the responsibility of the CONTRACTOR. Reverse flow is not possible.

If Pig do not move from stuck up location, by any measure, then the pipeline section shall have to be cut for retrieval of Pig. Hot tapping, bypass loop installation, Pipe cutting etc. before pig retrieval and Necessary erection, fabrication and modification of pipe with new pipe piece after retrieval of pig shall be done by PEI. If Gauge pig get stuck due to some anomaly/reduction in diameter of pipeline then cost of replacement will be borne by Owner. However, locating the stuck pig is responsibility



of Pigging Contractor with an accuracy of +/- 15 M. If Gauge Pig get stuck due to Contractor's fault then replacement cost shall be borne by Pigging Contractor. After Gauge pigging, any subsequent pig get stuck then replacement cost shall be borne by Pigging Contractor. After fabrication & erection and resumption of flow, pigging Contractor shall run Gauge pig to check internal restriction, if any.



APPENDIX A

PROFORMA FOR GAUGING PIG, BRUSH CLEANING PIG, MAGNET CLEANING PIG
DETAILS DIAMETER OF TOOLS: 8", 12"

No	Description	Bidders details
1.0	GAUGE PIG	
1.1	Minimum of ID that the GAUGE pig pass without damaging pig and pipe	
1.2	Number of modules and length of tool	
1.3	Weight of gauge pig	
1.4	Bend radius able to negotiate	
1.5	Diameter of Aluminum Gauge plate	
1.6	Schematic sketch of pig enclosed indicating configuration.	
2.0	BRUSH CLEANING PIG	
2.1	Minimum of ID that the BRUSH CLEANING pig pass without damaging pig and pipe	
2.2	Number of modules and length of tool	
2.3	Weight of Brush cleaning pig	
2.4	Bend radius able to negotiate	
2.5	Number of brushes mounted on pig	
2.6	Schematic sketch of BRUSH pig indicating configuration.	
3.0	OTHER CLEANING PIG	
3.1	Minimum of ID that the CLEANING pig pass without damaging pig and pipe	
3.2	Number of modules and length of tool	
3.3	Weight of pig	
3.4	Bend radius able to negotiate	
3.5	Schematic sketch of pig enclosed indicating configuration.	



APPENDIX B

PROFORMA FOR ELECTRONIC GEOMETRY PIG DETAILS

DIAMETER OF EGP: 10"

Sr. No	Description	Bidders details or Yes/NO
	ELECTRONIC GEOMETRY PIG	
1.0	Weight of tool	
2.0	Number of Modules of tools and length of tool	
3.0	Principle of operation	
4.0	Capability of inspecting Maximum length in single run.	
5.0	Pressure range	
6.0	Temperature range	
7.0	Battery life	
8.0	Capability of detecting 2% dent	YES/NO
9.0	Able to carry inspection at velocities mentioned in bid document	YES/ NO
10.0	Speed range for data generation	
11.0	Frequency or distance of sampling	
12.0	Capability to identify following as a minimum	
12.1	Individual girth weld	YES/NO
12.2	Dent and Ovality	YES/NO
12.3	Out of roundness	YES/NO
12.4	Valves or any partially closed valve	YES/NO
13.0	Minimum of ID that the EGP pig pass without damaging pig and pipe	
14.0	Axial accuracy of locating defect from reference marker/pipeline feature	
15.0	Accuracy of measurement (% of ID)	
16.0	Bend radius the tool is able to negotiate	
17.0	Schematic sketch enclosed indicating configuration	
18.0	Any other tool specific information	



APPENDIX C

**PROFORMA FOR ULTRASONIC INSPECTION PIG DETAILS
DIAMETER OF TOOLS: 8", 12"**

Sr. No	Description	Bidders details or Yes/NO
1.0	Wall thickness range in MM	
2.0	Speed range in m/s for data generation as per bid specification.	
3.0	Maximum speed m/s at which the tool can be operated.	
4.0	Device if proposed for pig speed control to achieve valid, interpretable and quality data as per detection and sizing specifications of tender document.	
5.0	Temperature range	
6.0	Maximum pressure	
7.0	Weight of tool	
8.0	Number of Modules of tools and total tool length	
9.0	Bend radius able to negotiate	
10.0	Capability of inspecting Maximum length in single run	
11.0	Axial sampling rate (frequency or distance)	
12.0	Circumferential sampling rate	
13.0	.Data storage capacity	
14.0	Battery life	
15.0	Minimum of ID that the UT inspection pig pass without damaging pig and pipe	
16.0	Capability to identify following as a minimum	
17.0	General corrosion	YES/NO
18.0	Pitting corrosion	YES/NO
19.0	Circumferential gouging	YES/NO
20.0	Axial gouging	YES/NO



Engineering Department

Sr. No	Description	Bidders details or Yes/NO
21.0	Location of girth weld, valves and lateral joints	YES/NO
22.0	Circumferential crack	YES/NO
23.0	Proximity of any ferrous object to pipeline	YES/NO
24.0	Manufacturing defects	YES/NO
25.0	CAPABILITY OF UT INSPECTION TOOL	
26.0	Axial accuracy of locating defect from reference marker/pipeline feature	
27.0	Axial accuracy of locating defect within pipe from upstream weld joint.	
28.0	Circumferential Accuracy	
29.0	shall be able to discriminate between external & internal defects	YES/NO
30.0	Shall be able to detect minimum 0.10t wall thickness loss with an accuracy $\pm 0.1t$ with 90% probability of detection and confidence level of 80% in sizing in case of general corrosion defect.	YES/NO
31.0	shall be capable of completing the intelligent pigging in one continuous single run for pipeline covered under Scope of Work	YES/NO
32.0	<u>X,Y,Z location mapping of the entire run including x,y,z location of all anomalies (bidder shall submit the accuracy range of the mapping)</u>	YES/NO
32.0	Any other specific information	
33.0	Schematic sketch of UT inspection tool.	Yes/NO