

**बिड दस्तावेज़ / Bid Document**

बिड विवरण / Bid Details	
बिड बंद होने की तारीख/समय / Bid End Date/Time	28-01-2026 11:00:00
बिड खुलने की तारीख/समय / Bid Opening Date/Time	28-01-2026 11:30:00
बिड पेशकश वैधता (बंद होने की तारीख से) / Bid Offer Validity (From End Date)	155 (Days)
मंत्रालय/राज्य का नाम / Ministry/State Name	Pmo
विभाग का नाम / Department Name	Department Of Atomic Energy
संगठन का नाम / Organisation Name	Uranium Corporation Of India Limited
कार्यालय का नाम / Office Name	Jaduguda
वस्तु श्रेणी / Item Category	Testing Service for On-Board /Commissioned Equipment/ Instrument related to Plant - NDT, Civil, Mechanical, Radiological; Carbonation test, Cover Meter Test, Crack width measurement in reinforcement concrete structures, Half Cell Potential difference..
अनुबंध अवधि / Contract Period	6 Month(s)
एमएसएमई के लिए अनुभव के वर्षों और टर्नओवर से छूट प्रदान की गई है / MSE Relaxation for Years of Experience and Turnover	No
स्टार्टअप के लिए अनुभव के वर्षों और टर्नओवर से छूट प्रदान की गई है / Startup Relaxation for Years of Experience and Turnover	No
विक्रेता से मांगे गए दस्तावेज़ / Document required from seller	Experience Criteria, Certificate (Requested in ATC) *In case any bidder is seeking exemption from Experience / Turnover Criteria, the supporting documents to prove his eligibility for exemption must be uploaded for evaluation by the buyer
क्या आप निविदाकारों द्वारा अपलोड किए गए दस्तावेज़ों को निविदा में भाग लेने वाले सभी निविदाकारों को दिखाना चाहते हैं? संदर्भ मेनू है / Do you want to show documents uploaded by bidders to all bidders participated in bid?	Yes (Documents submitted as part of a clarification or representation during the tender/bid process will also be displayed to other participated bidders after log in)
बिड लगाने की समय सीमा स्वतः नहीं बढ़ाने के लिए आवश्यक बिड की संख्या / Minimum number of bids required to disable automatic bid extension	1

बिड विवरण/Bid Details	
दिनों की संख्या, जिनके लिए बिड लगाने की समय-सीमा बढ़ाई जाएगी। / <b>Number of days for which Bid would be auto-extended</b>	7
ऑटो एक्सटेंशन अधिकतम कितनी बार किया जाना है। / <b>Number of Auto Extension count</b>	1
बिड से रिवर्स नीलामी सक्रिय किया/Bid to RA enabled	No
बिड का प्रकार/Type of Bid	Two Packet Bid
तकनीकी मूल्यांकन के दौरान तकनीकी स्पष्टीकरण हेतु अनुमत समय /Time allowed for Technical Clarifications during technical evaluation	3 Days
अनुमानित बिड मूल्य /Estimated Bid Value	1343725
मूल्यांकन पद्धति/Evaluation Method	Total value wise evaluation
मूल्य दर्शाने वाला वित्तीय दस्तावेज ब्रेकअप आवश्यक है / <b>Financial Document Indicating Price Breakup Required</b>	Yes
मध्यस्थता खंड/Arbitration Clause	No
सुलह खंड/Mediation Clause	No

#### ईएमडी विवरण/EMD Detail

एडवाइजरी बैंक/Advisory Bank	State Bank of India
ईएमडी राशि/EMD Amount	13437

#### ईपीबीजी विवरण /ePBG Detail

एडवाइजरी बैंक/Advisory Bank	State Bank of India
ईपीबीजी प्रतिशत (%) /ePBG Percentage(%)	5.00
ईपीबीजी की आवश्यक अवधि (माह) /Duration of ePBG required (Months).	11

(a). जेम की शर्तों के अनुसार ईएमडी छूट के इच्छुक बिडर को संबंधित कैटेगरी के लिए बिड के साथ वैध समर्थित दस्तावेज प्रस्तुत करने है। एमएसई कैटेगरी के अंतर्गत केवल वस्तुओं के लिए विनिर्माता तथा सेवाओं के लिए सेवा प्रदाता ईएमडी से छूट के पात्र हैं। व्यापारियों को इस नीति के दायरे से बाहर रखा गया है।/EMD EXEMPTION: The bidder seeking EMD exemption, must submit the valid supporting document for the relevant category as per GeM GTC with the bid. Under MSE category, only manufacturers for goods and Service Providers for Services are eligible for exemption from EMD. Traders are excluded from the purview of this Policy.

(b). ईएमडी और संपादन जमानत राशि, जहां यह लागू होती है, लाभार्थी के पक्ष में होनी चाहिए। / EMD & Performance security should be in favour of Beneficiary, wherever it is applicable.

**लाभार्थी /Beneficiary :**

Chief Manager (A/cs) Works  
JADUGUDA, Department of Atomic Energy, URANIUM CORPORATION OF INDIA LIMITED, PMO  
(Posi Babu I)

बोली विभाजन लागू नहीं किया गया/ Bid splitting not applied.

**एमआईआई अनुपालन/MII Compliance**

एमआईआई अनुपालन/MII Compliance	Yes
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**एमएसई खरीद वरीयता/MSE Purchase Preference**

एमएसई खरीद वरीयता/MSE Purchase Preference	Yes
सूक्ष्म और लघु उद्यम मूल उपकरण निर्माताओं को खरीद में प्राथमिकता, यदि उनका मूल्य $L1+X\%$ तक की सीमा में हो / Purchase Preference to MSE OEMs available upto price within $L1+X\%$	15
सूक्ष्म और लघु उद्यम को खरीद में प्राथमिकता के लिए बिड की मात्रा का अधिकतम प्रतिशत / Maximum Percentage of Bid quantity for MSE purchase preference	100

1. Purchase preference to Micro and Small Enterprises (MSEs): Purchase preference will be given to MSEs as defined in Public Procurement Policy for Micro and Small Enterprises (MSEs) Order, 2012 dated 23.03.2012 issued by Ministry of Micro, Small and Medium Enterprises and its subsequent Orders/Notifications issued by concerned Ministry. If the bidder wants to avail the Purchase preference for services, the bidder must be the Service provider of the offered Service. Relevant documentary evidence in this regard shall be uploaded along with the bid in respect of the offered service. If L-1 is not an MSE and MSE Service Provider (s) has/have quoted price within  $L-1+15\%$  of margin of purchase preference /price band as defined in the relevant policy, then 100% order quantity will be awarded to such MSE bidder subject to acceptance of L1 bid price. The buyers are advised to refer to the [OM No.1 4 2021 PPD dated 18.05.2023](#) for compliance of Concurrent application of Public Procurement Policy for Micro and Small Enterprises Order, 2012 and Public Procurement (Preference to Make in India) Order, 2017. Benefits of MSE will be allowed only if the credentials of the service provider are validated on-line in GeM profile as well as validated and approved by the Buyer after evaluation of submitted documents.

2. Estimated Bid Value indicated above is being declared solely for the purpose of guidance on EMD amount and for determining the Eligibility Criteria related to Turn Over, Past Performance and Project / Past Experience etc. This has no relevance or bearing on the price to be quoted by the bidders and is also not going to have any impact on bid participation. Also this is not going to be used as a criteria in determining reasonableness of quoted prices which would be determined by the buyer based on its own assessment of reasonableness and based on competitive prices received in Bid / RA process.

**एक्सेल में अपलोड किए जाने की आवश्यकता /Excel Upload Required :**

Price Bid Post NDT - [1763439362.xlsx](#)

**अतिरिक्त योग्यता /आवश्यक डेटा/Additional Qualification/Data Required**

**Accreditation Documents of the desired Labs:**NABL ACCREDITATION

**Buyer to upload detailed list of equipments/samples, tests to be conducted and technical specifications of equipment/sample to be tested:**[1763439370.pdf](#)

**Payment Terms:**[1763439377.pdf](#)

Buyer to provide price bifurcation format in which Service Provider will submit the breakup of the lumpsum cost quoted.:[1763439383.pdf](#)

**Testing Service For On-Board /Commissioned Equipment/ Instrument Related To Plant - NDT, Civil, Mechanical, Radiological; Carbonation Test, Cover Meter Test, Crack Width Measurement In Reinforcement Concrete Structures, Half Cell Potential Difference.. ( 1 )**

**तकनीकी विशिष्टियाँ /Technical Specifications**

विवरण/ Specification	मूल्य/ Values
<b>कोर / Core</b>	
Type of tests required	NDT , Civil , Mechanical , Radiological
Details of tests required	Carbonation test , Cover Meter Test , Crack width measurement in reinforcement concrete structures , Half Cell Potential difference test , Rebound Hammer Test , Ultrasonic Pulse Velocity Tests , Magnetic Particle Testing , Penetrant Testing Facility , Radiography Testing Facility , Ultrasonic Testing Facility , Visual examination , Noise & vibration , Eddy Current Testing facility
Eligible Testing Lab	NABL Labs , CSIR Labs
Testing location	Premise (onsite)
Time within which samples/instruments need to be tested once provided by buyer	Depending on the instrument, schedule to be provided in Scope of Work
Reports required	Test Report , Fitness Certificate
<b>एडऑन /Addon(s)</b>	

**क्रेता द्वारा निर्धारित न्यूनतम मूल्य/Minimum Floor Price defined by Buyer**

क्रेता द्वारा निर्धारित न्यूनतम मूल्य/Minimum Floor Price defined by Buyer	No
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**अतिरिक्त विशिष्टि दस्तावेज़ /Additional Specification Documents**

**प्रेषिती/रिपोर्टिंग अधिकारी /Consignees/Reporting Officer and Quantity**

क्र.सं./S.No.	प्रेषिती/रिपोर्टिंग अधिकारी /Consignee Reporting/Officer	पता/Address	संसाधनों की मात्रा / Quantity	अतिरिक्त आवश्यकता /Additional Requirement
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क्र.सं./S.N o.	प्रेषिती/रिपोर्टिंग अधिकारी /Consignee Reporting/Officer	पता/Address	संसाधनों की मात्रा / Quantity	अतिरिक्त आवश्यकता /Additional Requirement
1	Sulabh Kumar Bais	832102,AT/PO-JADUGUDA MINES MAIN BUILDING URANIUM CORPORATION OF INDIA LTD	1	N/A

## क्रेता द्वारा जोड़ी गई बिड की विशेष शर्तें/Buyer Added Bid Specific Terms and Conditions

### 1. Generic

OPTION CLAUSE: The buyer can increase or decrease the contract quantity or contract duration up to 25 percent at the time of issue of the contract. However, once the contract is issued, contract quantity or contract duration can only be increased up to 25 percent. Bidders are bound to accept the revised quantity or duration

### 2. Forms of EMD and PBG

Bidders can also submit the EMD with Account Payee Demand Draft in favour of

URANIUM CORPORATION OF INDIA LIMITED  
payable at  
JADUGUDA

Bidder has to upload scanned copy / proof of the DD along with bid and has to ensure delivery of hardcopy to the Buyer within 5 days of Bid End date / Bid Opening date.

### 3. Forms of EMD and PBG

Bidders can also submit the EMD with Payment online through RTGS / internet banking in Beneficiary name

URANIUM CORPORATION OF INDIA LIMITED  
Account No.  
33135840169  
IFSC Code  
SBIN0000227  
Bank Name  
STATE BANK OF INDIA  
Branch address  
JADUGUDA

Bidder to indicate bid number and name of bidding entity in the transaction details field at the time of on-line transfer. Bidder has to upload scanned copy / proof of the Online Payment Transfer along with bid.

### 4. Forms of EMD and PBG

Successful Bidder can submit the Performance Security in the form of Account Payee Demand Draft also (besides PBG which is allowed as per GeM GTC). DD should be made in favour of

URANIUM CORPORATION OF INDIA LIMITED  
payable at  
JADUGUDA

. After award of contract, Successful Bidder can upload scanned copy of the DD in place of PBG and has to ensure delivery of hard copy to the original DD to the Buyer within 15 days of award of contract.

### 5. Forms of EMD and PBG

Successful Bidder can submit the Performance Security in the form of Payment online through RTGS / internet banking also (besides PBG which is allowed as per GeM GTC). On-line payment shall be in Beneficiary name

URANIUM CORPORATION OF INDIA LIMITED

Account No.

33135840169

IFSC Code

SBIN0000227

Bank Name

STATE BANK OF INDIA

Branch address

JADUGUDA

. Successful Bidder to indicate Contract number and name of Seller entity in the transaction details field at the time of on-line transfer. Bidder has to upload scanned copy / proof of the Online Payment Transfer in place of PBG within 15 days of award of contract.

#### 6. Buyer Added Bid Specific ATC

Buyer Added text based ATC clauses

**"Post - NDT (Non Destructive Test) of structures for checking the vibration and structural integrity at J aduguda Mill, Tailings Pond Stage-1 and 3 , Barrage Dam, WTP , ETP and STP (2025-2026)."**

**Estimated amount = Rs. 13,43,725.00 /-**

**Duration of Bid = 06 Months (180 days)**

**Earnest Money Deposit (EMD) (D.D./Banker's cheque only in favour of Uranium Corporation of India Limited Only)**

**EMD Amount = Rs. 13,437.00 /-**

**The eligible criteria to qualify in Techno commercial Part are as below:-**

**1)** Average Annual financial turnover during the last 3(Three) consecutive financial years ending on 31<sup>st</sup> March of the previous financial shall be at least **30% (4.03 Lakhs)** of the estimated cost supported by the audited annual accounts of each financial year.

**2)** Bidder shall have successfully completed similar works during last 7 years ending last day of month previous to the one in which bids are invited should be either of the following:

a) Three(3) similar completed works costing not less than the amount equal to **40% (5.37 lakhs)** of the estimated cost

or

b) Two (2) similar completed works costing not less than the amount equal to **50% (6.72 lakhs)** of the estimated cost

or

c) One (1) similar completed works costing not less than the amount equal to **80% (10.75 lakhs)** of the estimated cost.

The corporation may request to the bidder to visit the proposed work site to well acquaint about the site work before filling the rate /submit the Bid

**3) Bidders must attach Work Order and work done certificate mentioned executed amount and date of completion. (Completed work only will be considered incomplete work or work in progress will not be c**

onsidered for qualification)

4) Similar works means “Experience in execution of work with any Central / State Govt Organization / PSU for NDT for structural stability and vibration assessment in any industrial processing plants in India .”

5) Bidder must have NABL Accreditations for all the tests to be done and all the certificates with “Scope of Accreditation” must be uploaded with the bid for the qualification.

6) All the persons deployed for testing should be minimum “NDT Level-II certified” and “all the test reports must be signed by NDT Level-III” as per ASNT SNT TC 1a Norms. All the certificates must be uploaded with the bid for the qualification.

#### **7) SCOPE OF WORK -**

To do Post - NDT (Non Destructive Test)for structural stability and vibration assessment at Jaduguda Mill, Tailings Pond Stage-1 and 3 (Retaining walls, Spillway gate Channels), Barrage Dam, WTP (Water Treatment Plant), ETP (Effluent Treatment Plant) and STP (Sewage Treatment Plant) for various structures like -Ground Hopper Grizzly, Jaw and Cone crushers, Grinding Circuits, Neutral filter, Leaching/Neutralizing Pachuc a, leaching tanks, Fine Ore Bins, Disc Filter House, Chemical House, Tailings Plant, Magnetite Plant, Pilot Plant Structures, Burnt Lime Silos, Bridge of Barrage, Compressor House, Boiler House, Ion exchange related structures etc. List of tests with minimum numbers are being mentioned below. However the list is not exhaustive and if at any point of time during the execution of the contract, it has been observed that any test which is required to be done in order to complete the structure stability analysis that is to be conducted by the contractor at no extra cost to UCIL.

#### **List of Test to be conducted at site-**

- 1) Visual Inspection - All RCC and Structures complete.
- 2) Cover Meter Test – All Important RCC Structures only.
- 3) Compressive Strength Test by Core Cutter at 4-5 locations as per site requirement.
- 4) Acoustic Emission Test - 100 Nos.
- 5) Acoustic Noise measurement - 25 Nos.
- 6) Half Cell Potentiometer Test – 25 Nos.
- 7) Eddy Current Testing – 100 Nos.
- 8) Rebar Diameter Test – 150 Nos.
- 9) Magnetic Particle Test- 150 Nos.
- 10) Ultrasonic Pulse Velocity Test - 300 Nos.
- 11) Ultrasonic Flaw Detection Test - 150 Nos.
- 12) Ultrasonic Thickness Test - 150 Nos.
- 13) Dye Penetration Test - 150 Nos.
- 14) Vibration Analysis Test - 300 Nos.
- 15) Rebound Hammer Test - 300 Nos.

Total No of test samples - 1900 Nos. (Approx)

Note - Above mentioned test of list with quantity is minimum and if required may be increased as per site requirement or as per instruction of Engineer In Charge. All the above mentioned tests are to be performed as per the guidelines and technical details mentioned below.

#### **List of Technical Staff-**

- 1) **NDT Level-II certified** - 02 Nos.(For Site Activities)
- 2) **NDT Level-II certified** - 01 Nos.(Site In charge and test reports certification) Note-All the above technical staff should have minimum experience of 02 year.

**A. Field Probing Test**

1. Detailed Study /Verification of existing layout drawings of the buildings along with study of structural system.
2. Detailed 100% physical inspection and observation of existing distress features in the building if any.
3. Dimensional verification of existing typical RC members and others members in the building
4. Carrying out Rebound Hammer Test on randomly selected RC members of the building to determine surface hardness/strength of the in-situ concrete.
5. Carrying out Ultra sonic pulse velocity test on randomly selected columns and beams of the building for assessment of concrete quality and in situ strength
6. Carrying out Cover Meter Test on RC members selected at random to determine the cover and also mapping of existing peripheral rebars in randomly identified RC Members of the building
7. Inspection and observations of structural steel sections in detail for identification of damaged , distress, abnormal deflection , distortion etc
8. Carrying out Ultrasonic thickness gauge on structural steel sections at random (i.e. trusses, girders, stiffeners etc.) for thickness verification
9. Carrying out measurement of weld thickness at random on welded regions
10. Carrying out DPT/MPT test on welded region at random for assessment of quality of weld

**B. Corrective action / Restoration Measures of Building / Structure**

Based on the extent of distress features observed in the building appropriate restoration /remedial measures will be worked out for distressed regions of RC members and furnished along with sketches , Specification etc.

- B. Furnishing detailed report along with test, photographs, sketches etc.

Note:-Contractors are advised to see the area get acquainted with the actual features of the land where work is to be executed and get other related information before quoting their rates for carrying out the work successfully.

**TECHNICAL SPECIFICATION**

**SPECIFICATION FOR NON DESTRUCTIVE TESTING**

**1.0 Scope and objectives:**

**The tests to be conducted and the specifications applicable to the extent only be referred as per Schedule of quantities. The specification made are in general and to be applicable as per latest codes and inventions.**

The scope and objectives are given in the proposal is to assess the condition of building by reconnaissance survey by visual inspection and NDT testing tools the portion of members of the structure they got damaged or likely to be damaged which intricate the functioning of building. The main objectives of this investigation were to assess the condition of the concrete and the steel reinforcement in the damaged members with particular reference to corrosion of reinforcement. The insitu tests were chosen to achieve this objective and based on the assessment; recommendations for remedial measures were formulated to control corrosion and also to extend service life of the building. Necessary hard copy documentation for damaged portions with identified location of members are very much useful for implementation of repairs methodology.

**2.0 Investigation**

**2.1) Reconnaissance survey:**



Party has to carry out preliminary survey and decide the locations based on the distress condition of the members where tests are to be conducted and are to be classified as given elsewhere and the type of tests to be adopted shall be decided along with the Engineer-in-Charge.

## **2.2.) Sampling:**

Type of Samples to be taken shall be decided based on the type of test to be carried out and the samples shall be undisturbed. Core shall be extracted within 300mm distance from the distressed portion to get undisturbed sample. Sample shall indicate true representation of the material condition of structure and the positions of sample shall be decided accordingly. In case of more severity, good number of samples can be obtained to enable proper assessment of condition of structural members. Number of samples to be taken is indicated in the BOQ.

## **2.3) Visual Documentation of Mapping**

A detailed visual inspection shall be carried out on all portal columns, gable beams and gantry girders of the main plant building. Visual damage consists of minor and major cracks. The crack width, length and orientation of the cracks shall be documented in the form of Annexure showing the documentation and mapping of the visual inspection of the damaged structural members. Photographic documentation of the damaged members shall be made and documented. On the basis of visual inspection and documentation, the RCC portal columns and the other structural RCC members shall be categorized as given below and a separate rehabilitation methodology shall be suggested.

- . Fairly damaged
- . Moderately damaged
- . Severely damaged
- . **Fairly damaged**

The RCC members exhibit minor cracks and the crack depth extended upto plaster thickness. This damage also includes the de-lamination of plaster.

- . **Moderately damaged**

This type of damage is categorized based on the width of crack between 5 mm and 10 mm and the numbers of cracks are more as compared to fairly damaged members. These members also exhibited hair crack, de-bonding of plaster, and minor crack in the parent concrete.

- . **Severely damaged**

These members exhibit major cracks in the parent concrete having crack width more than 15 mm. These members also exhibited hair crack, de-bonding of plaster, and minor crack in the parent concrete. From the above classification, three members from each category shall be identified for in-situ testing members namely Main gable beams, columns and gantry beams etc., these members shall be subjected to the following in-situ tests:

- (i) Rebound hammer test
- (ii) Ultrasonic pulse velocity test
- (iii) Core sampling and testing
- (iv) PH and Chloride content determination
- (v) Measurement of electrochemical parameters, such as half cell potential, corrosion rate of the rebar and resistivity.

## **4.2 Test methods and procedures**

### **(i) Rebound Hammer Test**

This is a surface hardness test and consists essentially of impacting the concrete surface in a standard manner. This is achieved by activating a mass by a given energy and measuring the indentation or rebound. The most commonly and widely used instrument is a "Rebound Hammer". Test procedure consists of applying the hammer on the concrete surface and observing the values in the digital display form. Before applying the hammer, the surface of the concrete is cleaned and smoothened. The procedure for determining

g the rebound values has been specified in IS-13311 (Part-II). It should be noted that the rebound values reflect the concrete quality up to a depth of 50 mm from the surface of the member. However, the Rebound Hammer values provide a quick inexpensive means of checking the quality of concrete. It has many serious limitations, which should be recognized. The main factors that affect the readings are follows

- . Size and age of concrete
- . Surface texture
- . Concrete mix characteristics
- . Carbonated concrete, and
- . Moisture content
- . Position of hammer held against the surface

In any practical situation, it is very unlikely that the strength prediction can be made to accuracy better than  $\pm 25\%$ . The calculation of coefficient of variation may yield an indication of concrete uniformity. If the coefficient of variation is 4% of test results on an individual member, it corresponds to good quality of concrete construction. The application of surface hardness measurement can be used for checking the uniformity of concrete, comparing a given concrete with a specified requirement, approximate estimation of strength by using laboratory calibrated graphs and abrasion resistance classification.

Necessary correction if required, shall be made for the rebound number based on the above factors held while testing.

Steps to be followed to conduct Rebound Hammer test are:

- . All members are to be marked with well defined grid points – spacing of 200 – 300 mm preferred
- . Each grid point is to be cleaned and the surface is smoothened
- . A minimum of 6 readings are to be obtained at each point and the average is considered omitting too low and too high values.
- . Do not repeat impacts on same point
- . A hammer of 0.225 kg m impact energy may be used for normal concrete and structural members of medium size
- . A statistical analysis gives indication on overall quality and variability
- . De-lamination of cover concrete can be identified
- . The very high rebound numbers greater than 50 may represent

Carbonated concrete to be confirmed by chemical test

Based on the rebound hammer readings obtained, the quality of concrete cover can be classified as follows.

COMPARATIVE HARDNESS OF THE COVER ZONE	
Average rebound number	Quality of concrete
Above 40	Very good layer
Between 30 and 40	Good layer
Between 20 to 30	Fair

Less than 20	Poor concrete
Less than 10	Delaminated

## (ii) Ultrasonic pulse velocity test

Before attempting this test, identification of reinforcement bars in the members shall be done using proof meter or any other instrument to get accurate results of pulse velocity. The selection of points shall be unhindered path for pulse propagation direction.

Ultrasonic Pulse Velocity test is basically a wave propagation test and consists of transmitting ultrasonic pulses of 50 – 60 KHz frequency through a concrete medium and measuring the travel time of ultrasonic pulses for known or measured length. The length divided by time gives the velocity which can be correlated to concrete quality. Based on correlation graphs, approximate estimation of concrete compressive strength can also be made with a variation of  $\pm 20\%$ . UPV values can also be suitably interpreted to assess qualitatively the condition of concrete with regard to homogeneity, uniformity and integrity etc.

As the primary objective of the investigation is to assess the condition of the insitu concrete, the ultrasonic pulse velocity test shall be adopted. For path length below 2.00 m, 54 KHz frequency transducer is suitable and for path length of 2 m and above, 24 KHz frequency transducer is found to be more suitable. The pulse velocity values can be used to establish the following characteristics of the concrete structure.

- . Homogeneity
- . The presence of cracks, voids, and other imperfections
- . Changes in the structure of the concrete which occur with time
- . The quality of the concrete in relation to standard requirements
- . The quality of one element of concrete in relation to another
- . The values of elastic moduli of concrete

The measurement of pulse velocity can be made in three ways as outlined and is explained in figure given below.

- i. Direct method
- ii. Semi direct method
- iii. Indirect or surface transmission

The direct transmission method is generally preferred, since the maximum energy of the pulse is being directed at the receiving transducer and this gives maximum sensitivity. In this investigation, direct transmission method shall be adopted based on the accessibility and 54 KHz frequency transducers or of required frequency shall be used to test all the blocks since the path lengths wherever less/more than 2.0 m.

As stated earlier, the primary objective of this investigation shall be to assess the present condition of the concrete, to identify any weak zones or presence of voids, cavities, etc. In order to achieve this objective, it is necessary to take pulse velocity measurements on a number of points which are close to each other so that adequate data would be available to make a reliable assessment and while selection, the location of points shall meet this objective

### Testing procedure for ultrasonic scanning

The procedure for determining the ultrasonic pulse velocity values has been specified in IS-1331(Part-I)

- . Dividing the members into well defined grid points-spacing of 200 – 300 mm preferred and identical to rebound hammer survey
- . Each grid point is prepared to obtain smooth surface- a through cleaning
- . Application of acoustical coupling – grease, thick oil, petroleum jelly
- . Transmitting the pulses by placing the transmitter in one end and receiving at other end

- . Recording the transit time displayed by the instrument – a reliable steady reading to recorded (T)
- . Measurement of length between transmitter and receiver (L)
- . Calculation of velocity,  $V = L/T$

From the pulse velocity measurement, the quality of concrete is rated as follows:

UPV value KM/Sec (V)	Concrete quality
Greater than 4.00	Very good to excellent
Between 4.00 and 3.50	Good, but slight porosity may exist
Between 3.50 and 3.00	Satisfactory but loss of integrity is suspected
Less than 3.00	Poor and loss of integrity exists

The figure given below shows the behavior of ultrasonic pulses in concrete medium in different conditions.

#### **Behavior of Ultrasonic Pulse in concrete medium in different condition**

Based on the rebound values and UPV values the interpretation on the condition of concrete with respect to corrosion are given in the following table

Identification of corrosion prone locations based on UPV and hammer readings

S. No.	Test results	Interpretations
1	High UPV values, high impact hammer nos.	Not corrosion prone
2	Medium range UPV values, low impact hammer nos.	Surface delaminating, low quality of surface concrete, corrosion prone
3	Low UPV, high impact hammer numbers	Not corrosion prone, however, to be confirmed by chemical tests, carbonation, pH
4	Low UPV values, low impact hammer numbers	Corrosion prone – requires chemical and electrochemical tests

#### **iii) Core sampling and testing**

The rebound hammer test and ultrasonic pulse velocity test give indirect evidence of concrete quality whereas a more realistic assessment on concrete can be made by core sampling and testing. The cores can be tested for compressive strength, chemical analysis, petrography examination etc. Normally 75 mm to 100 mm diameter is used for cores for compression testing. The cores should have a length/diameter ratio between 1.0 and 2.0. The number of cores required will depend upon the purpose of testing. However, the number of cores must be sufficient to be representative of concrete under examination as well as to provide a strength estimate of acceptable accuracy.

Cores were extracted by means of rotary cutting tool with diamond bits. The base should have a solid support to prevent relative movement. Water supply should be continuous to lubricate the cutter and applied pressure should be uniform.

The core drilling operation was carried out in the following manner.

- (i) The presence of steel reinforcement was first identified using a metal detector.
- ii) The exact location was identified using a cover meter.
- iii) The location is selected to ensure avoidance of reinforcement
- iv) The core drilling machine was brought and fixed into the marked location using anchor bolts.
- v) After ensuring that the bit was in the right location, the drilling operation was carried out.
- vi) After reaching the required depth, the drilling operation was stopped, the drilled core was extracted and identification mark was made.

The locations for core sampling can be selected based on the guidelines given in Table. When a core is cut and taken out, it is in a wet condition. Observation of the core may give an idea of the aggregate type, size, distribution, etc. But, other features such as location and size of the reinforcement, honeycombing, cracks, and defects are observed in a dry core. Table below shows how the condition of concrete can be interpreted after the visual examination of the core is completed.

#### INTERPRETATION FROM CORE SAMPLING AND TESTING

S.N.	Test results	Interpretations
1	Integral core with well distributed aggregates and mortar matrix with normal density	Not corrosion prone
2	Presence of surface voids and low density concrete in cover regions	Corrosion prone
3	Weight loss of reinforcement, if any	Corrosion

#### Compressive strength

The concrete core samples extracted were dressed to the required length and capping shall be done by using sulphur compound. **Determination of compressive strength of the samples shall be obtained by following standard test procedure as per IS-516-1959.** Correction factor was applied for the individual core samples according to direction of core extraction. Estimation of concrete core samples equal to cube compressive strength shall be established by appropriate method.

#### Carbonation test

Concrete is alkaline in nature. The pH value of concrete at the time of construction is around 12.50. During the course of time, carbon-di-oxide from external environment enters inside the concrete. Because of the chemical action of carbon-di-oxide on the hydrated cement components, the pH gets reduced to 7 to 9. The change can be detected by phenolphthalein test. A solution of phenolphthalein in dilute alcohol is usually used because it has very strong pink alkalinity. But it becomes colourless on the concrete surface which no longer remains alkaline due to the action of carbon-di-oxide, thus shows sign for the corrosion of steel re-bars. The change in colour of phenolphthalein takes place as pH value changes from 10 – 8.20. Once the pH value reduces below 10, passive layer in the rebar is broken. The depth of carbonation can be established by this test using core sample.

#### iv) Measurement of Electrochemical parameters.

#### Half cell potential survey

Corrosion being an electrochemical phenomenon, the electrode potential of steel rebar with reference to a standard electrode undergoes changes depending on corrosion activity. A systematic survey on well defined grid points give useful information on the presence or probability of corrosion activity. The grid points used for other measurements, namely, Rebound Hammer and UPV can be used for making data more meaningful. The common standard electrodes used are (i) Copper-copper sulphate Electrode (CSE) (ii) Silver-Silver, Chloride Electrode (SSE) (iii) Standard Calomel Electrode (SCE). The measurement consists of giving an electrical connection to the rebar and observing the voltage difference between the rebar and a reference electrode in contact with concrete surface. A simple field arrangement is shown in Figure given below. Generally, the potential values become more and more negative as the corrosion becomes more and more active. However, less negative potential values may also indicate the presence of corrosion activity, if it

he pH values of concrete are less. The general guidelines for identifying the probability of corrosion based on half cell potential values as suggested in ASTM C 876 are given in the following table.

Corrosion	Potential
> 95%	More negative than -350mV
50%	-200 to -350 Mv
< 5%	More positive than - 200 mV

It is important to realize that the potential of any metal in cement concrete environment is a function of a large number of variables such as concrete composition, pore liquid, concrete resistivity, cover thickness, degree of polarization, etc. Hence, no quantitative conclusion can be drawn from it. Potentials do not give information on the amount of corrosion.

### Resistivity Mapping

The corrosion of a specific length of reinforcement is dependent on the algebraic summation of the electrical currents originating from the corroding sites on the steel and flowing through the moist surrounding concrete to non-corroding sites. Hence the electrical resistance of concrete plays an important role in determining the magnitude of corrosion at any specific location. This parameter is expressed in terms of "Resistivity" in ohm centimeter or kilo ohms centimeter. The factors which govern the resistivity values are:

- Constituents of concrete
- Chemical contents of concrete such as moisture, chloride level, and other ions regardless of whether or not these were introduced by formulation, atmospheric or sea water penetration.
- Type of pore structure of concrete.

Table below indicates the general guidelines of resistivity values based on which areas having probable corrosion risk can be identified in concrete structures.

### CORROSION RISK RESISTIVITY

Resistivity (ohm-cm)	Corrosion probability
Greater than 20,000	Negligible
10,000- 20,000	Low
5,000 - 10,000	High
Less than 5,000	Very high

For a general monitoring, a resistivity check is important because long-term corrosion can be anticipated in concrete structure where accurately measured values are below 10,000 ohm-cm. Further, if resistivity values fall below 5,000 ohm-cm corrosion must be anticipated at a much earlier period (possibly within 5 years) in the life of a structure. The principle of resistivity testing in concrete is similar to that adopted in soil testing. However, when applied in concrete, a few drawbacks should be realised. The method essentially consists of using a probe technique in which a known current is applied between two outer probes and the voltage drop between the inner two elements is read off allowing for a direct evaluation of resistance R. and thereby resistivity. The principle of four-probe resistivity testing in Figure given below. The following drawbacks are important to note while analyzing and interpreting the resistivity values.

- The value obtained represents only the average evaluation over the depth regulated by the chosen

n probe spacing and not that of concrete at steel interface.

- Skin effect of concrete with varying drying conditions.
- The instrument should have adequate 'IR' drop compensation for measurement.

Following table gives some guidelines for a qualitative identification of corrosion prone areas based on combined results of half cell potential and resistivity.

S.No.	Test results	Interpretations
1	High resistivity greater than 10,000 ohm cm and low potentials-more positive than -200 mV (CSE)	No active corrosion – relatively cathodic
2.	Low resistive below 10,000 ohm cm and potentials between - 200 mV to -250 mV (CSE)	Initiation of corrosion activity -relatively anodic
3.	Low resistivity about 5,000 ohm cm and potentials -200 mV to -350 mV (CSE)	Presence of corrosion activity-anodic
4.	Low resistivity below 5,000 ohm cm and potential more negative than -350mV (CSE)	High intensity of corrosion –fully anodic
5.	Higher potential gradient and high conductivity	High rate of corrosion

#### RESISTIVITY MEASUREMENT

• Measurement of corrosion Rate in reinforced concrete structures, determination of actual rate at which the reinforcement is corroding assumes larger importance. One method is known as “Linear Polarization Resistance” (LPR) method for the on-site study of corrosion rates of steel in concrete. The fundamental principle of Linear Polarization is based on the experimentally observed assumption that for a simple model corroding system, the polarization curve for a few milli Volts around the corrosion potential obeys a quasi-linear relationship. The slope of this curve is the so called “Polarization Resistance” ( $R_p$ ). From this slope, the corrosion rate can be determined using Stern-Geary equation

For on-site measurements, the testing system consists of a Potentionstat, counter electrode, reference electrode, and the reinforcement as working electrode. It is necessary that, for measurements in concrete, the potentionstat should have electronic ohmic compensation (IR drop) or otherwise, the value is to be obtained by calculation or separate experiments. A commercial instrument known as GECOR-6 was used for measuring the corrosion current in the reinforcement. This works on the principle of LPR technique. A typical test set up using GECOR-6 is shown in figure given below. Report of test results with different test results shall be made.

S. No.	Type of Tests to be performed	Test method specification
1	Cover Meter Test	BS 1881 (Part-204)
2	Compressive Strength Test by Core Cutter	IS:516-1959
3	Acoustic Emission Test	ASME SEC V, Article 13
4	Acoustic Noise measurement	ISO 11204

5	Half Cell Potentiometer Test	IS 516 (Part-5/Sec-2)
6	Eddy Current Testing	ASME SEC V, Article 08, ASTM E2884
7	Rebar Diameter Test	BS 1881 (Part-204)
8	Magnetic Particle Test	ASME SEC V, AWS D1.1, IS 3703, IS 5334, BS EN ISO 17638
9	Ultrasonic Pulse Velocity Test	IS 516 (Part-5/Sec-1), IS 13311 (Part-1)
10	Ultrasonic Flaw Detection Test	IS : 8791
11	Ultrasonic Thickness Test	ASTM E797, IS 11630, BS EN ISO 17640-1, ASTM E 114
12	Dye Penetration Test	AWS D1.1, BS EN ISO 3452-1, IS 3658
13	Vibration Analysis Test	ISO 20816-1
14	Rebound Hammer Test	IS 13311 (Part-2)

**8) PENALTY:** Penalty Clause will not be applicable.

**9) Labour escalation-** Labour escalation will not be paid in this contract.

**10) Security Deposit /Performance Security-**

In addition to ePBG- 5% as mentioned in Gem Bid, additional 5 % ePBG as Security deposit shall be applicable. Therefore Total amount of Security deposit shall be limited to 10 % of the awarded value of work. (As per Schedule- F of GCC Page No. 80 of 80 of NIT).

ePBG Detail-

Advisory Bank - State Bank of India

ePBG Percentage - 10.00 %

SD Amount - Rs. 1,34,373.00 /-

Duration of ePBG required - 11 months

**11) EMD Details -**

Advisory Bank - State Bank of India

EMD Amount - Rs. 13,437.00 /-

**12) Earned Leave with wages Max 15 days per year per manpower is to be paid to all contract**



worker as per Section 79) Annual leave with wages of Factories Act 1948 and No separate payment will be done by the UCIL to contractor for this statutory compliance . Contractor has to consider this fact; accordingly rate may be quoted by contractor.

**13) Schedule of Quantity-**

Uranium Corporation Of India Limited			
<b>SOQ : "Post - NDT (Non Destructive Test) of structures for checking the vibration and structural integrity at Jaduguda Mill, Tailings Pond Stage-1 and 3 , Barrage Dam, WTP , ETP and STP (2025-2026)"</b>			
S.L. No.	Description	Unit of Measurement	Quantity

1	<p>Post - NDT (Non Destructive Test) of structures for checking the vibration and structural integrity including test like -</p> <ol style="list-style-type: none"> <li>1) Visual Inspection - All RCC and Structures complete.</li> <li>2) Cover Meter Test - All Important RCC Structures only.</li> <li>3) Compressive Strength by Corecutter 4-5 Nos.</li> <li>4) Acoustic Emission Test - 100 Nos.</li> <li>5) Acoustic Noise measurement - 25 Nos.</li> <li>6) Half Cell Potentiometer Test - 25 Nos.</li> <li>7) Eddy Current Testing - 100 Nos.</li> <li>8) Rebar Diameter Test - 150 Nos.</li> <li>9) Magnetic Particle Test- 150 Nos.</li> <li>10) Ultrasonic Pulse Velocity Test - 300 Nos.</li> <li>11) Ultrasonic Flaw Detection Test - 150 Nos.</li> <li>12) Ultrasonic Thickness Test - 150 Nos.</li> <li>13) Dye Penetration Test - 150 Nos.</li> <li>14) Vibration Analysis Test - 300 Nos.</li> <li>15) Rebound Hammer Test - 300 Nos.</li> </ol> <p>Total No of test samples - 1900 Nos. (Approx)</p> <p>Note- All the RCC and Steel Structures of Jaduguda Mill, Tailings Pond Stage-1 and 3 (Retaining walls, Spillway gate Channels), Barrage Dam, WTP (Water Treatment Plant), ETP (Effluent Treatment Plant) and STP (Sewage Treatment Plant) are to be covered in the Post NDT Testing. Above mentioned test of list with quantity is minimum and if required may be increased as per site requirement or as per instruction of Engineer In Charge.</p>	LS	1.00
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#### 7. Buyer Added Bid Specific ATC

## अस्वीकरण/Disclaimer

The additional terms and conditions have been incorporated by the Buyer after approval of the Competent Authority in Buyer Organization, whereby Buyer organization is solely responsible for the impact of these clauses on the bidding process, its outcome, and consequences thereof including any eccentricity / restriction arising in the bidding process due to these ATCs and due to modification of technical specifications and / or terms and conditions governing the bid. If any clause(s) is / are incorporated by the Buyer regarding following, the bid and resultant contracts shall be treated as null and void and such bids may be cancelled by GeM at any stage of bidding process without any notice:-

1. Definition of Class I and Class II suppliers in the bid not in line with the extant Order / Office Memorandum issued by DPIIT in this regard.
2. Seeking EMD submission from bidder(s), including via Additional Terms & Conditions, in contravention to exemption provided to such sellers under GeM GTC.
3. Publishing Custom / BOQ bids for items for which regular GeM categories are available without any Category item bunched with it.
4. Creating BoQ bid for single item.
5. Mentioning specific Brand or Make or Model or Manufacturer or Dealer name.
6. Mandating submission of documents in physical form as a pre-requisite to qualify bidders.
7. Floating / creation of work contracts as Custom Bids in Services.
8. Seeking sample with bid or approval of samples during bid evaluation process. (However, in bids for [attached categories](#), trials are allowed as per approved procurement policy of the buyer nodal Ministries)
9. Mandating foreign / international certifications even in case of existence of Indian Standards without specifying equivalent Indian Certification / standards.
10. Seeking experience from specific organization / department / institute only or from foreign / export experience.
11. Creating bid for items from irrelevant categories.
12. Incorporating any clause against the MSME policy and Preference to Make in India Policy.
13. Reference of conditions published on any external site or reference to external documents/clauses.
14. Asking for any Tender fee / Bid Participation fee / Auction fee in case of Bids / Forward Auction, as the case may be.
15. Any ATC clause in contravention with GeM GTC Clause 4 (xiii)(h) will be invalid. In case of multiple L1 bidders against a service bid, the buyer shall place the Contract by selection of a bidder amongst the L-1 bidders through a Random Algorithm executed by GeM system.
16. Buyer added ATC Clauses which are in contravention of clauses defined by buyer in system generated bid template as indicated above in the Bid Details section, EMD Detail, ePBG Detail and MII and MSE Purchase Preference sections of the bid, unless otherwise allowed by GeM GTC.
17. In a category based bid, adding additional items, through buyer added additional scope of work/ additional terms and conditions/or any other document. If buyer needs more items along with the main item, the same must be added through bunching category based items or by bunching custom catalogs or bunching a BoQ with the main category based item, the same must not be done through ATC or Scope of Work.

Further, if any seller has any objection/grievance against these additional clauses or otherwise on any aspect of this bid, they can raise their representation against the same by using the Representation window provided in the bid details field in Seller dashboard after logging in as a seller within 4 days of bid publication on GeM. Buyer is duty bound to reply to all such representations and would not be allowed to open bids if he fails to reply to such representations.

**All GeM Sellers/Service Providers shall ensure full compliance with all applicable labour laws, including the provisions, rules, schemes and guidelines under the four Labour Codes i.e. the Code on Wages, 2019; the Industrial Relations Code, 2020; the Occupational Safety, Health and Working Conditions Code, 2020; and the Code on Social Security, 2020 as and when notified and brought into force by the Government of India.**

**For all provisions of the Labour Codes that are pending operationalisation through rules, schemes or notifications, the corresponding provisions of the pre-existing labour enactments (such as The Minimum Wages Act, 1948, The Payment of Wages Act, 1936, The Payment of Bonus Act, 1965, The Equal Remuneration Act, 1976, The Payment of Gratuity Act, 1972, etc. and relevant State Rules) shall continue to remain applicable.**

**The Seller/ Service Providers shall, therefore, be responsible for ensuring compliance under:**

- **All notified and enforceable provisions of the new Labour Codes as mentioned hereinabove; and**
- **All operative provisions of the erstwhile Labour Laws until their complete substitution.**

**All obligations relating to wages, social security, safety, working conditions, industrial relations etc. and any other statutory requirements shall be strictly met by the Seller/ Service Provider. Any non-compliance shall constitute a breach of the contract and shall entitle the Buyer to take appropriate action in accordance with the contract and applicable law.**

This Bid is governed by the [सामान्य नियम और शर्तें/General Terms and Conditions](#), conditions stipulated in Bid and [Service Level Agreement](#) specific to this Service as provided in the Marketplace. However in case if any condition specified in सामान्य नियम और शर्तें/General Terms and Conditions is contradicted by the conditions stipulated in Service Level Agreement, then it will over ride the conditions in the General Terms and Conditions.

जेम की सामान्य शर्तों के खंड 26 के संदर्भ में भारत के साथ भूमि सीमा साझा करने वाले देश के बिडर से खरीद पर प्रतिबंध के संबंध में भारत के साथ भूमि सीमा साझा करने वाले देश का कोई भी बिडर इस निविदा में बिड देने के लिए तभी पात्र होगा जब वह बिड देने वाला सक्षम प्राधिकारी के पास पंजीकृत हो। बिड में भाग लेते समय बिडर को इसका अनुपालन करना होगा और कोई भी गलत घोषणा किए जाने व इसका अनुपालन न करने पर अनुबंध को तत्काल समाप्त करने और कानून के अनुसार आगे की कानूनी कार्रवाई का आधार होगा।/In terms of GeM GTC clause 26 regarding Restrictions on procurement from a bidder of a country which shares a land border with India, any bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority. While participating in bid, Bidder has to undertake compliance of this and any false declaration and non-compliance of this would be a ground for immediate termination of the contract and further legal action in accordance with the laws.

**---धन्यवाद/Thank You---**