भारत सरकार/GOVERNMENT OF INDIA
अंतरिक्ष वभाग/DEPARTMENT OF SPACE
क्रय यूनिट-।।।/PURCHASE UNIT-III
वक्रम साराभाई अंतरिक्ष केंद्र/VIKRAM SARABHAI SPACE CENTRE
तिरुवनंतपुरम/THIRUVANANTHAPURAM – 695 022
Tel: (0471) 2563676/3775/3617
email: spso_prso_pur@vssc.gov.in, pso1_prso_pur@vssc.gov.in

EXPRESSION OF INTEREST

No. PCM/CSG/APD/NTPF-EOI-01/2023 **Date: 21/02/2023**

सरकार स्वा मत्व कंपनी प्रचा लत (गोको) वधा में ना भक ईंधन कॉम्प्लेक्स, हैदराबाद में स्था पत वीएसएससी की नियोबियम थ र्मट उत्पादन सु वधा में नियोबियम थ र्मट के प्रचालन, उत्पादन तथा आपूर्ति के लए "अ भरु च की अ भव्यक्ति" हेतु निमंत्रण।

INVITATION FOR "EXPRESSION OF INTEREST" FOR OPERATION, PRODUCTION AND SUPPLY OF NIOBIUM THERMIT AT NIOBIUM THERMIT PRODUCTION FACILITY OF VSSC, SET UP AT NUCLEAR FUEL COMPLEX, HYDERABAD ON "GOVERNMENT OWNED COMPANY OPERATED (GOCO) MODE.

इच्छुक प्रत्या शत निर्माता हमारे संदर्भ सं. **PCM/CSG/APD/NTPF-EOI-01/2023** का उद्धरण करते हुए **07/04/2023 [16:00 Hrs.]** को या उससे पहले निम्न लखत पते पर अपनी अ भरु च की अ भव्यक्ति दे सकते हैं।

VSSC invites, EOI from prospective bidders for **OPERATION, PRODUCTION AND SUPPLY OF NIOBIUM THERMIT AT NIOBIUM THERMIT PRODUCTION FACILITY OF VSSC, SET UP AT NUCLEAR FUEL COMPLEX, HYDERABAD ON "GOVERNMENT OWNED COMPANY OPERATED (GOCO) MODE.** Interested parties may furnish their **Expression of Interest in Sealed Envelope** quoting our **Reference No. PCM/CSG/APD/NTPF-EOI-01/2023 on or before 07/04/2023 [16:00 Hrs]** to the following address:

नोट:- मेक इन इं डया नीति के अनुसार केवल श्रेणी-। और श्रेणी-।। के स्थानीय आपूर्तिकार इस बोली में भाग लेने के पात्र हैं।

Note:- Only Class-I and Class-II Local suppliers as per Make in India policy are only eligible to participate in the bid

वरि. क्रय एवं भंड़ार अ धकारी / Sr. Purchase & Stores Officer,
क्रय यूनिट III /Purchase Unit- III,
आरएफएफ क्षेत्र, इसरो पीओ/RFF Area, ISRO. PO,
तिरुवनंतपुरम/Thiruvananthapuram- 695022.
फोन/Ph: 0471-256 3775/3609

EOI documents are available at our website www.isro.gov.in and www.vssc.gov.in.

हस्ताक्षरित/Sd/-

वरि.प्रधान, क्रय एवं भंड़ार/Sr.Head, Purchase & Stores

Government of India
Department of Space
Vikram Sarabhai Space Centre
Indian Space Research Organisation
Thiruvananthapuram-695022, Kerala

No. PCM/CSG/APD/NTPF-EOI-01/2023 Date: 21/02/2023

INVITATION FOR EXPRESSION-OF-INTEREST

Vikram Sarabhai Space Centre (VSSC) invites **Expression-Of-Interest (EOI)** for Operation & Maintenance, production and supply of Niobium Thermit at Niobium Thermit Production Facility of VSSC, set up at Nuclear Fuel Complex, Hyderabad on **"Government Owned Company Operated (GOCO) mode".** It is proposed to entrust the scope of operation and production of Niobium Thermit to VENDORS on Government Owned Company Operated mode at an annual rate of 3 Tonnes / year.

The processing of Niobium Thermit includes processing steps such as Columbite Tantalite (CT Ore) handling, solvent extraction of Tantalum & Niobium, scrubbing, stripping, pyrohydrolysis and calcination and grinding & sieving on both Tantalum and Niobium Streams, Aluminothermic reduction and Hydriding of thermit. CT Ore and Niobium are notified as prescribed substances under DAE. Safety and quality are of utmost importance while working in this environment. Overall management of the production, operation & maintenance needs to be taken care and all technical issues must be addressed on a timely manner adhering to the stipulated production schedule as projected by VSSC.

Interested VENDORS having adequate know-how, in-house facilities, qualified and skilled technical personnel, experience in chemical/ore/mineral processing/liquid propellant plants and having sound financial background, commitment and desirous of long-term partnership with ISRO are invited to participate in the Expression-Of-Interest. On receipt of EOI, VSSC shall evaluate and assess the suitability prior to short-listing of Vendors. This call for EOI does not carry with it any guarantee for allotment of contract.

EOI document can be downloaded from website www.isro.gov.in and the same also shall be submitted within the due date and time. **"Expression of Interest"** with all essential information shall reach the Senior Purchase and Stores Officer, Purchase Unit III, Vikram Sarabhai Space Centre, ISRO Post, Thiruvananthapuram 695 022, Kerala, on or before…….. This EOI is issued as a "Pre-Bid Qualification". Inadequate or incomplete information will result in rejection of the offer. VSSC reserves the right to accept or reject all or any of the EOI. Mere compliance to the EOI terms does not guarantee further consideration for qualification.

Senior Purchase and Stores Officer,
Purchase Unit III,
Vikram Sarabhai Space Centre,
ISRO P.O.,
Thiruvananthapuram - 695 022
Kerala State

Government of India
Department of Space
Vikram Sarabhai Space Centre
Indian Space Research Organisation
Thiruvananthapuram-695022
Kerala

No. **PCM/CSG/APD/NTPF-EOI-01/2023** Date: 21/02/2023

INVITATION FOR EXPRESSION-OF-INTEREST

"Expression-Of-Interest (EOI) for Operation, production and supply of Niobium Thermit at Niobium Thermit Production Facility of VSSC, set up at Nuclear Fuel Complex, Hyderabad on "Government Owned Company Operated (GOCO) mode"

1. Preamble

Vikram Sarabhai Space Centre (VSSC) is the lead Center of Indian Space Research Organisation (ISRO) that specializes in the design and realization of satellite launch vehicles. Towards the indigenization of Columbium alloy required for satellite thrusters, ISRO has setup a Niobium Thermit Production Facility (NTPF) with a capacity of 3 T/ Annum for producing Niobium Thermit with the technical support of Nuclear Fuel Complex (NFC) Hyderabad. ISRO decided to look forward for participation of private and public establishments for the regular operation & maintenance, production and supply of Niobium Thermit production facility. All the systems of the plant are erected and commissioning is in progress. Operation, production and maintenance of this plant through VENDORS is being explored under the Government Owned Company Operated (GOCO) mode.

Objective is to carry out the operation and processing of Columbite Ore in batches at NTPF facility at Hyderabad and supply finished product i.e Niobium Thermit by the VENDOR as per the schedule finalized by VSSC. All the necessary facilities, equipments and Columbite Tantalite (CT Ore) shall be provided by VSSC.

2. Scope of work

The processing of Niobium Thermit includes processing steps such as Columbite Tantalite (CT Ore) handling, solvent extraction of Tantalum & Niobium, scrubbing, stripping, pyrohydrolysis and calcination and grinding & sieving on both Tantalum and Niobium Streams, Aluminothermic reduction and Hydriding of thermit. Operation of plant with PLC based control system, preventive and breakdown maintenance, safety implementation and quality checks are under the scope of the contractor. Overall management of the production & maintenance needs to be taken care and all technical issues must be addressed on a timely manner adhering to the stipulated production schedule as projected by VSSC. Working hours shall be three/two/single shifts (8 hrs/shift) duties depending on the process requirements.

The scope includes procurement of raw materials, spares, safety items and AMC for equipments. Production, operation and maintenance of the plant. The maintenance and upkeep of process logs, facility operation logs and quality control function also form part of the processing activity. Quality assurance will be taken care by VSSC. CT Ore and Niobium are notified as prescribed substances under DAE. Safety and quality are of utmost importance while working in this environment. Niobium processing being hazardous in nature, the VENDOR should be conversant with safety practices and carry out all the activities with utmost safety. Compliance of safety in the various processes are to be ensured by the VENDOR through their Safety Officer. VSSC will conduct overall safety surveillance for all the process activities. Vendor also need to provide the manpower as per the required skill sets/qualifications.

It is envisaged that the Contract period is 3 years and extendable by another 2 years based on satisfactory completion and mutual consent at the end of 3rd and 4th year, after review and Department approval. The first three months of the CONTRACT will be a trial phase wherein VSSC will provide all the necessary training to the VENDOR in the processing aspects of NTPF.

3. Facilities and Process equipments of VSSC NTPF at NFC Hyderabad

The facility is housed at NTPF site adjacent to NFC Hyderabad. The facility consists of two streams of processing for Tantalum extraction stream and Niobium stream. The processing facilities of Niobium Thermit will be provided to the VENDOR. The major equipments required for Niobium thermit processing are Ore dissolution reactors, solvent extraction vessels, precipitators filtration system, calcination and Hydriding furnaces, chemical laboratory, air conditioning and fume extraction systems, PLC based control system and transformers are already realized and erected at NTPF. VSSC will provide an office for the VENDOR at NTPF premises.

4. Major operations during processing

	Operation	Activities involved
1.	Raw material procurement & Ore processing	CT Ore will be supplied by VSSC as FIM. Procurement of other chemicals and solvents, handling, storing and processing shall be under the scope of the vendor.
2.	Feed preparation	Niobium raffinate preparation with necessary solvents such as Tri Butyl Phosphate TBP and Kerosene.
3.	Solvent Extraction	Extraction of Niobium through air lift extractors/ mixer settler.
4.	Stripping	Stripping with DM water to get pure solution.
5.	Solvent regeneration	Regeneration of solvent using Na_2CO_3 solution and returning to solvent extraction.
6.	Precipitation	The stripped Tantalum solution containing fluoro tantalic acid

		is allowed to flow to a precipitation tank by gravity. Ammonia gas and DM water will be fed through to form ammonium hydroxide which further reacts with fluoro tantalic acid to obtain Tantalum hydroxide.
7	Filtration and Repulping	The precipitated Tantalum hydroxide will be filtered through a vacuum filter. The filter cake collected will be sent to repulping tank for washing.
8.	Pyrolysis and Calcination	The tantalum wet cake is heated in a muffle furnace to remove fluoride with presence of steam (pyrohydrolysis) and then calcined to remove water vapour.
9.	Rod Milling and sieving	The calcined tantalum oxide will be sent to SS Rod mill which will be ground again. The ground tantalum pentoxide powder will be sieved to get tantalum oxide powder. Tantalum oxide powder is packed in PE bags/carboys for dispatch.
10.	Niobium Oxide Separation	Feed raffinate containing fluoro niobate from tantalum extraction unit will be collected and sent to an alkali treatment tank.
11.	Filtration Washing, and Drying	The precipitate slurry will be transferred to a vacuum filter and the filtered cake is sent to washing tank. The filtered sodium niobate will be dried at 110 °C.
12.	Dissolution of Sodium Niobate	Dried sodium niobate will be dissolved with 40% commercial hydrofluoric acid to obtain fluoro niobic acid.
13.	Feed preparation	The concentrated feed obtained from the settling tank is pumped to a feed preparation tank to get the required parameters like free acidities of HF, H2SO4 and total oxide.
14.	Solvent extraction	The feed solution from the feed storage tank is allowed to flow into the extraction unit with mixer settler. The stripped fluoro niobic acid will be collected in setting tank.
15.	Precipitation	The stripped niobium solution in the settling tank containing fluoro niobic acid allowed to flow to a precipitation tank. Ammonia gas and DM water will be fed through to form ammonium hydroxide which further reacts with fluoro niobic acid to obtain Niobium hydroxide precipitate.
16.	Filtration and repulping	The precipitated niobium hydroxide will be pumped to a vacuum filter. The filter cake collected is sent to repulping tank fir washing.
17.	Pyrohydrolysis/ Calcination	The niobium hydroxide wet cake from the vacuum filter will be heated in a muffle furnace to form niobium oxide. This is again calcined to obtain low LOI niobium oxide.

18.	Grinding, sieving and blending	The calcined niobium oxide will be ground again by using SS rod mill and sieved to minus 60 mesh size. The niobium oxide powder will mixed with calculated amount of aluminium metal powder in a blender for Niobium thermit production.
19.	Retort preheating	Retort preheating furnace is provided for preheating to make the alumina liner fit properly inside the thermic reduction unit.
20.	Alumino thermic reduction	The Niobium oxide and Aluminum powder mixture is placed inside preheated reduction unit to obtain hardened niobium thermit.
21.	Hydriding/ Dehydriding	Hydriding is done through hydriding furnace using hydrogen gas to increase the brittleness of niobium. The chunklets are dehydrated under Argon atmosphere.
22.	Analysis	Niobium thermit will be analysed batchwise and stored in polythene bags for dispatch.
23.	Documentation	Generation of production document based on log sheet / log book information as well as product evaluation parameters from laboratory/plant facility.
24.	Quality	Quality control of all the process operations by qualified engineers/supervisors and recording all the parameters in separate log books. Real-time alerting of quality lapses and corrective action.
25.	Safety	Deploying qualified safety engineer for surveillance of all the activities and processing as per safety norms. Ensuring man & material limit for all the activities. Real-time alerting of safety lapses and corrective actions. Arrangements for Fire hydrant operation & maintenance, fire-fighting shall be made by VSSC.
26.	Effluent Treatment	Effluent treatment plant for three streams: solid, liquid and gaseous effluents
27.	PLC and Electrical panel room	Operation and monitoring of PLC/electrical systems in total plant including PLC and electrical panel room and transformer
28.	Maintenance	Preventive and Breakdown Maintenance of plant systems including electrical, mechanical and instrumentation

5. Human Resource and HR policy

The VENDOR shall provide the production team (technical and skilled) for processing of Niobium Thermit at NTPF, Hyderabad. The screening of the proposed Production Team of VENDOR for their technical capability will be done by VSSC
The Production Team should be qualified and experienced and should possess requisite skill-sets for operation of chemical and ore/mineral processing facilities and to perform operation and production work as specified.

Production and maintenance team of 35 to 40 personnel (approx.), comprising of Graduate Engineers, Diploma Engineers and Technicians having relevant experience in chemical, mechanical, Electrical & instrumentation, and unskilled helpers may be required to be deployed by the VENDOR for the production and supply of Niobium thermit in the GOCO mode.

The VENDOR shall have an HR policy for retaining trained personnel. This is very essential to ensure production activities without any attrition of safety, quality and delivery schedule.

6. Training of VENDOR personnel

VSSC will impart necessary training for the production team deployed by the VENDOR during the trial phase of initial 3 months.

7. Other requirements

Security : Production Team shall comply with the security regulation of VSSC and NFC Hyderabad.

Safety : Production Team shall follow all safety and radiation guidelines laid down by ISRO and DAE from time to time.

Secrecy : The VENDOR and their production team shall abide by the INDIAN OFFICIAL SECRETS ACT in vogue and shall provide information of awareness of the above in writing. Suitable NDA agreement shall be signed with the selected vendors during contract finalization stage.

8. Criteria for scrutiny of EOI proposals

8.1 General

The EOI shall contain complete information of the VENDOR, its human resources, infrastructure, assets, financial standing, line of business and credentials.

8.2 Essential criteria for evaluation of EOI

8.2.1 VENDORS registered in India only need to participate.

8.2.2 VENDOR should have prior experience of minimum 2 years in working with processing of chemical/ore/mineral/liquid propellant plants.

8.2.3 Vendor should be familiar with operation of Control room, DCS, PLC based systems etc. Previous similar plant operation to ISRO/DAE/DRDO/other reputed establishments will be preferred.

8.2.3 In event of response from VENDORS already executing ISRO contracts, past performance will be considered.

8.2.4 The VENDOR should have an established management structure, financial standing and shall possess human resources with adequate knowledge, skill and experience in the areas of processing of chemical plant/ propellants/explosives.

8.2.5 VSSC reserves the right to select the company based on EOI assessment and subsequent discussion meetings to represent the company profile and experience. A party who is selected based on EOI assessment shall be only qualified for issuing the Request For Proposal (RFP).

Note:

1. All information for the clauses given in 8.1 and 8.2 need to be supported with documentary evidence by the vendor. Brochure, if any detailing the VENDOR profile may also be submitted. Copy of the previous similar purchase/work orders executed by the VENDOR including the scope of work carried out are to be appended.
2. The final evaluation of the responses will be based on inputs furnished against our criteria, assessment based on facility visit, if required, feedback from customers and overall assessment.

VENDORS who are meeting the requirements as specified in clause 8 of the EOI and are interested in associating with ISRO for production of Niobium Thermit at NTPF, Hyderabad shall submit their interest in writing along with copies of supporting documents for verification/evaluation at VSSC. Qualified VENDORS will be shortlisted and detailed proposals from such VENDORS will be solicited through a RFP.

A checklist (Annexure-1) for the supporting documents to be submitted by the VENDOR along with the EOI is enclosed.

Annexure - I

Checklist for the supporting documents

(Filled checklist to be submitted by the Vendor along with the Expression of Interest)

Sl. No	**Document / Proof**	**Attached or Not-attached with EOI**	**Remarks**
1.	Company registration details		
2.	Proof for minimum 2 years experience in the area chemical/ore/mineral/liquid propellant processing plants		
3.	Copies of similar purchase/work orders executed by the Company		
4.	Company profile, management structure and human resources and their experience, financial statement for two years.		
5.	Company brochure		
6.	Any other points to be included		
7	Vendor should have valid registration of GST. Vendor should submit GST registration details.		
8	Vendor should submit PAN Card details		
9	Vendor should submit bankers details		