

Amendment to:

A.) Section I-Invitation for Bids (IFB)

Sl. No	Provisions as in Invitation for Bids (IFB) of published bid document	Modification now made																																																						
1.	Para 6 of IFB																																																							
	<p>The Invitation for Bids (IFB) and the bidding documents are available at the Project website http://www.ncscm.org. Interested bidders can download the bidding documents and commence preparation of bids to gain time. The downloaded bidding document can be submitted along with non-refundable fee (through a demand draft) mentioned in the Table towards the cost of the bidding documents. However, in case of any discrepancy between the documents downloaded by the prospective bidder and the bidding documents (hard copy) available from the Project office, the latter shall prevail.</p> <p>The facility to download the bidding documents will be available from Dt. 02/01/2014 to Dt. 17/02/2014 up to 17.00Hrs.</p> <table border="0"> <tr> <td>(a)</td> <td>Price of bidding document (non-refundable)</td> <td>Rs. 2,100.00 (Including VAT)</td> </tr> <tr> <td>(b)</td> <td>Postal charges, inland</td> <td>Rs. 500.00</td> </tr> <tr> <td>(c)</td> <td>Postal charges, overseas</td> <td>Rs. 2,000.00</td> </tr> <tr> <td>(d)</td> <td>Date of commencement of sale of bidding document</td> <td>02/01/2014</td> </tr> <tr> <td>(e)</td> <td>Last date for sale of bidding document</td> <td>17/02/2014</td> </tr> <tr> <td>(f)</td> <td>Last date and time for receipt of bids</td> <td>18/02/2014 up to 10.00 Hrs</td> </tr> <tr> <td>(g)</td> <td>Date and Time of opening of bids</td> <td>18/02/2014 at 10.30 Hrs</td> </tr> <tr> <td>(h)</td> <td>Place of opening of bids</td> <td>National Centre for Sustainable Coastal Management, Ministry of Environment and Forests, Koodal Building, Anna University Campus, Chennai-600025, Tamil Nadu, India</td> </tr> <tr> <td>(i)</td> <td>Address for Communication</td> <td>National Centre for Sustainable Coastal Management, Ministry of Environment and Forests,</td> </tr> </table>	(a)	Price of bidding document (non-refundable)	Rs. 2,100.00 (Including VAT)	(b)	Postal charges, inland	Rs. 500.00	(c)	Postal charges, overseas	Rs. 2,000.00	(d)	Date of commencement of sale of bidding document	02/01/2014	(e)	Last date for sale of bidding document	17/02/2014	(f)	Last date and time for receipt of bids	18/02/2014 up to 10.00 Hrs	(g)	Date and Time of opening of bids	18/02/2014 at 10.30 Hrs	(h)	Place of opening of bids	National Centre for Sustainable Coastal Management, Ministry of Environment and Forests, Koodal Building, Anna University Campus, Chennai-600025, Tamil Nadu, India	(i)	Address for Communication	National Centre for Sustainable Coastal Management, Ministry of Environment and Forests,	<p>The Invitation for Bids (IFB) and the bidding documents are available at the Project website http://www.ncscm.org. 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However, in case of any discrepancy between the documents downloaded by the prospective bidder and the bidding documents (hard copy) available from the Project office, the latter shall prevail.</p> <p>The facility to download the bidding documents will be available from Dt. 02/01/2014 to Dt. 24/02/2014 up to 17.00Hrs.</p> <table border="0"> <tr> <td>(a)</td> <td>Price of bidding document (non-refundable)</td> <td>Rs. 2,100.00 (Including VAT)</td> </tr> <tr> <td>(b)</td> <td>Postal charges, inland</td> <td>Rs. 500.00</td> </tr> <tr> <td>(c)</td> <td>Postal charges, overseas</td> <td>Rs. 2,000.00</td> </tr> <tr> <td>(d)</td> <td>Date of commencement of sale of bidding document</td> <td>02/01/2014</td> </tr> <tr> <td>(e)</td> <td>Last date for sale of bidding document</td> <td>24/02/2014</td> </tr> <tr> <td>(f)</td> <td>Last date and time for receipt of bids</td> <td>25/02/2014 up to 10.00 Hrs</td> </tr> <tr> <td>(g)</td> <td>Date and Time of opening of bids</td> <td>25/02/2014 at 10.30 Hrs</td> </tr> <tr> <td>(h)</td> <td>Place of opening of bids</td> <td>National Centre for Sustainable Coastal Management, Ministry of Environment and Forests, Koodal Building, Anna University Campus, Chennai-600025, Tamil Nadu, India</td> </tr> <tr> <td>(i)</td> <td>Address for Communication</td> <td>National Centre for Sustainable Coastal Management, Ministry of Environment and</td> </tr> </table>	(a)	Price of bidding document (non-refundable)	Rs. 2,100.00 (Including VAT)	(b)	Postal charges, inland	Rs. 500.00	(c)	Postal charges, overseas	Rs. 2,000.00	(d)	Date of commencement of sale of bidding document	02/01/2014	(e)	Last date for sale of bidding document	24/02/2014	(f)	Last date and time for receipt of bids	25/02/2014 up to 10.00 Hrs	(g)	Date and Time of opening of bids	25/02/2014 at 10.30 Hrs	(h)	Place of opening of bids	National Centre for Sustainable Coastal Management, Ministry of Environment and Forests, Koodal Building, Anna University Campus, Chennai-600025, Tamil Nadu, India	(i)	Address for Communication	National Centre for Sustainable Coastal Management, Ministry of Environment and
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	Koodal Building, Anna University Campus, Chennai-600025, Tamil Nadu, India Phone:914422300108 Fax: 9144 22200158	Forests, Koodal Building, Anna University Campus, Chennai-600025, Tamil Nadu, India Phone: 914422300108 Fax: 91 44 2220 0158
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B.) Section II- Bidding Data Sheet (BDS)

Sl. No	Provisions as at Section II - Bidding Data Sheet of published bid document	Modification now made
1.	ITB 24.1	
	<p>For bid submission purposes, the Purchaser's address is: National Centre for Sustainable Coastal Management Ministry of Environment and Forests Koodal Building, Anna University Campus, Chennai-600025, Tamil Nadu, India Phone: +91 44 22300108, Fax: 91 44 2220 0158 The deadline for the submission of bids is: Date: 18/02/2014 Time: 10:00 A.M. Add at the end of ITB Clause 24.1 the following: "In the event of the specified date for the submission of bids, being declared a holiday for the Purchaser, the bids will be received upto the appointed time on the next working day."</p>	<p>For bid submission purposes, the Purchaser's address is: National Centre for Sustainable Coastal Management Ministry of Environment and Forests Koodal Building, Anna University Campus, Chennai-600025, Tamil Nadu, India Phone: +91 44 22300108, Fax: 91 44 2220 0158 The deadline for the submission of bids is: Date: 25/02/2014 Time: 10:00 A.M. Add at the end of ITB Clause 24.1 the following: "In the event of the specified date for the submission of bids, being declared a holiday for the Purchaser, the bids will be received upto the appointed time on the next working day."</p>
2.	ITB 27.1	
	<p>The bid opening shall take place at: In The office of :- The Director National Centre for Sustainable Coastal Management Ministry of Environment and Forests Koodal Building, Anna University Campus Chennai-600025, Tamil Nadu, India Phone: +91 44 22300108, Fax: 91 44 2220 0158 Date: 18/02/2014 Time: 10.30A.M. Add at the end of ITB Clause 27.1 the following: "In the event of the specified date of the bid opening being declared a holiday for the Purchaser, the bids shall be opened at the appointed time and location on the next working day."</p>	<p>The bid opening shall take place at: In The office of :- The Director National Centre for Sustainable Coastal Management Ministry of Environment and Forests Koodal Building, Anna University Campus Chennai-600025, Tamil Nadu, India Phone: +91 44 22300108, Fax: 91 44 2220 0158 Date: 25/02/2014 Time: 10.30A.M. Add at the end of ITB Clause 27.1 the following: "In the event of the specified date of the bid opening being declared a holiday for the Purchaser, the bids shall be opened at the appointed time and location on the next working day."</p>

Amendment to:

C.) Section VI. Schedule of Requirements: Technical Specifications

Lot 1. : Stable Isotope Ratio Mass Spectrometer with Carbonate, Water and Gas preparation devices

Specification as at Section VI - Schedule of Requirements-Lot 1. Technical Specifications			Modification now made (Blue)		
S.No	Particulars	Specifications	S.No	Particulars	Specifications
	Instrument generals:	<p>One gas source stable isotope ratios Mass spectrometer (IRMS) having large geometry with high precision in the performance meg range determination of H/D, $^{18}\text{O}/^{16}\text{O}$, $^{13}\text{C}/^{12}\text{C}$ and $^{15}\text{N}/^{14}\text{N}$. The IRMS should be universal triple collector and HD collectors, Seven cups configuration to measure simultaneously m/z 28,32,40 for gas ratios of N₂/O₂/Ar, isotopic measurements of m/z 32, 33, 34, 28, 29, 44 to 46, and simultaneously measurements of Ne/Ar (m/z 20 and 40) and 29 and 28 of N₂ ratios. IRMS must be capable of measuring extremely small amounts and low background concentration of natural sample as well as carbonates and organic materials via dual inlet mode but with a clear options for optimized operation in continuous flow mode.</p> <p>The system should be sturdy and robust with a flexible and open platform for the connection of inlet system and preparation devices. The set up should have high quality data acquisition microprocessor and controlled through a comprehensive software suite to achieve fast sampling rates and to enable the unit to be easily setup turned and run automatically</p>		Instrument generals:	<p>One gas source stable isotope ratios Mass spectrometer (IRMS) having large geometry with high precision in the performance meg range determination of H/D, $^{18}\text{O}/^{16}\text{O}$, $^{13}\text{C}/^{12}\text{C}$ and $^{15}\text{N}/^{14}\text{N}$. The IRMS should be universal triple collector and HD collectors with suitable cup configuration to measure simultaneously m/z 28, 32, 40 for gas ratios of N₂/O₂/Ar; isotopic measurements of m/z 32, 33, 34, 28, 29, 44 to 46, and simultaneously measurements of Ne/Ar (m/z 20 and 40) and 29 and 28 of N₂ ratios. IRMS must be capable of measuring extremely small amounts and low background concentration of natural sample as well as carbonates and organic materials via dual inlet mode but with clear options for optimized operation in continuous flow mode.</p> <p>The system should be sturdy and robust with a flexible and open platform for the connection of inlet system and preparation devices. The set up should have high quality data acquisition microprocessor and controlled through a comprehensive software suite to achieve fast sampling rates and to enable the unit to be easily setup turned and run automatically</p>
	Quotation generals	The company quoting for the IRMS shall provide a track record of performance (in the form of the list of scientific publications arising		Quotation generals	The company quoting for the IRMS shall provide a track record of performance (in the form of the list of scientific publications arising

		<p>out of the IRMS) and shall provide worldwide user lists for last 5 years. Quotation shall include full length of specification of mass spectrometer performance (shall match with the company's brochure/factory reports), including both internal and external precision in the measurement of H, C, O and N isotope ratios on standard gases.</p> <p>The installation/ factory engineer should install and demonstrate the various performance parameters of the IRMS accordingly to those mentioned in the factory reports and / or quoted in the deal.</p>			<p>out of the IRMS) and shall provide worldwide user lists for last 5 years. Quotation shall include full length of specification of mass spectrometer performance (shall match with the company's brochure/factory reports), including both internal and external precision in the measurement of H, C, O and N isotope ratios on standard gases.</p> <p>The installation/ factory engineer should install and demonstrate the various performance parameters of the IRMS accordingly to those mentioned in the factory reports and / or quoted in the deal.</p>
	Instruments configurations/ specifications:	Instruments configurations/ specifications:		Instruments configuration/ specifications:	Instruments configurations/ specifications:
1.	Mass range	At least 1-96 amu	1.	Mass range	At least 1-96 amu
2.	Mass resolution	For C, N, O: $m/\Delta m > 110$ (10% valley); For H: $m/\Delta m > 10$ (10% valley)	2.	Mass resolution	For C, N, O: $m/\Delta m > 100$ (10% valley); For H: $m/\Delta m > 10$ (10% valley)
3.	Ion source linearity:	Better than 0.02 %/nA at a beam intensity of 2×10^{-8} A for CO ₂ , measured on the 45/44 ratio.	3.	Ion source linearity:	Better than 0.02 %/nA at a beam intensity of 2×10^{-8} A for CO ₂ , measured on the 45/44 ratio.
4.	Absolute Sensitivity	At least 850 molecules/ion CO ₂ m/z44 ion under normal dual-inlet operation condition	4.	Absolute Sensitivity	At least 850 molecules/ion CO ₂ m/z44 ion under normal dual-inlet operation condition
5.	Abundance sensitivity:	The contribution of the mass 44 to mass 45 intensity should be less than 4 ppm under dual-inlet operating conditions.	5.	Abundance sensitivity:	The contribution of the mass 44 to mass 45 intensity should be less than 4 ppm under dual-inlet operating conditions..
6.	H3+ factor:	≤ 10 ppm/nA.	6.	H3 + factor:	≤ 10 ppm/nA.

7.	The sample type, size and precision required under normal conditions are:	Sample	Quantity	Precision	7.	The sample type, size and precision required under normal conditions are:	Sample	Quantity	Precision																														
		1. Carbonate	<50 µg	$^{18}\text{O}/^{16}\text{O}$ - 0.07‰; $^{13}\text{C}/^{12}\text{C}$ - ≤0.03‰.			1. Carbonate	<50 µg	$^{18}\text{O}/^{16}\text{O}$ - 0.07‰; $^{13}\text{C}/^{12}\text{C}$ - 0.03‰.																														
		2. Organic matter	10-50 µg C & ≤50 µg N	$^{13}\text{C}/^{12}\text{C}$ - ≤0.2‰; $^{15}\text{N}/^{14}\text{N}$ - ≤0.2‰			2. Organic matter	10-50 µg C & ≤50 µg N	$^{13}\text{C}/^{12}\text{C}$ - ≤0.2‰; $^{15}\text{N}/^{14}\text{N}$ - ≤0.2‰																														
		3. Water	<1 ml	$^{18}\text{O}/^{16}\text{O}$ -≤0.08‰; H/D- ≤1.0‰.			3. Water	<1 ml	$^{18}\text{O}/^{16}\text{O}$ -≤0.08‰; H/D- ≤1.0‰.																														
8.	Precision for normal operation in dual-inlet mode	<table border="1"> <thead> <tr> <th>Isotope reference gas</th> <th>Internal precision (‰) (2σ mean)</th> <th>*External precision(‰) (1σ)</th> </tr> </thead> <tbody> <tr> <td>$\text{CO}_2(\delta^{13}\text{C})$</td> <td>0.006 or less</td> <td>0.04 or less</td> </tr> <tr> <td>$\text{CO}_2(\delta^{18}\text{O})$</td> <td>0.01 or less</td> <td>0.06 or less</td> </tr> <tr> <td>$\text{H}_2(\delta\text{D})$</td> <td>0.1 or less</td> <td>0.8 or less</td> </tr> <tr> <td>$\text{N}_2(\delta^{15}\text{N})$</td> <td>0.01 or less</td> <td>0.1 or less</td> </tr> </tbody> </table>			Isotope reference gas	Internal precision (‰) (2σ mean)	*External precision(‰) (1σ)	$\text{CO}_2(\delta^{13}\text{C})$	0.006 or less	0.04 or less	$\text{CO}_2(\delta^{18}\text{O})$	0.01 or less	0.06 or less	$\text{H}_2(\delta\text{D})$	0.1 or less	0.8 or less	$\text{N}_2(\delta^{15}\text{N})$	0.01 or less	0.1 or less	8.	Precision for normal operation in dual-inlet mode	<table border="1"> <thead> <tr> <th>Isotope reference gas</th> <th>Internal precision (‰) (2σ mean)</th> <th>*External precision(‰) (1σ)</th> </tr> </thead> <tbody> <tr> <td>$\text{CO}_2(\delta^{13}\text{C})$</td> <td>0.006 or less</td> <td>0.04 or less</td> </tr> <tr> <td>$\text{CO}_2(\delta^{18}\text{O})$</td> <td>0.01 or less</td> <td>0.06 or less</td> </tr> <tr> <td>$\text{H}_2(\delta\text{D})$</td> <td>0.1 or less</td> <td>0.8 or less</td> </tr> <tr> <td>$\text{N}_2(\delta^{15}\text{N})$</td> <td>0.01 or less</td> <td>0.1 or less</td> </tr> </tbody> </table>			Isotope reference gas	Internal precision (‰) (2σ mean)	*External precision(‰) (1σ)	$\text{CO}_2(\delta^{13}\text{C})$	0.006 or less	0.04 or less	$\text{CO}_2(\delta^{18}\text{O})$	0.01 or less	0.06 or less	$\text{H}_2(\delta\text{D})$	0.1 or less	0.8 or less	$\text{N}_2(\delta^{15}\text{N})$	0.01 or less	0.1 or less
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*using the attached carbonate & water preparation devices.			*using the attached carbonate & water preparation devices.																																				
9.	Ion source:	High sensitivity should be self-aligning gas tight electron impact ion source and optimised for CO_2 , N_2 and H_2 measurement with extremely low and stable H_3^+ abundances. Ion Source Housing : Stainless steel mono - block design without welding seams . The ion source housing shall be capable of baking to 90°C or better using integrated heaters.			9.	Ion source:	High sensitivity should be self-aligning gas tight electron impact ion source and optimized for CO_2 , N_2 and H_2 measurement with extremely low and stable H_3^+ abundances. Ion Source Housing : Stainless steel mono - block design without welding seams . The ion source housing shall be capable of baking to 90°C or better using integrated heaters.																																
10	Vacuum system:	Automatic, maintenance free turbo pumps (250 L/s) along with suitable rotary pumps (preferably Edwards or Hitachi) with no requirement of cooling water. Automatic system protection in case of vacuum system/power failure. The instrument control panel should display the status of the vacuum system.			10	Vacuum system:	Automatic, maintenance free turbo pumps with Differential Pumping system (preferably Edwards or Hitachi) with no requirement of cooling water. Automatic system protection in case of vacuum system/power failure. The instrument control panel should display the status of the vacuum system.																																

11.	Dual inlet system:	Viscous gas flow dual inlet system using a mono block design along with all metallic valves along with a turbo molecular pump for the waste line. Automatically adjustable gas storage bellows for automated pressure adjustment through computer control is necessary. Pressure transducers for variable volumes for reference gas & sample gas monitoring. The changeover valve shall be mounted directly on the ion source so as to minimize the dead volume and the gas path length. The inlet system shall be bakeable up to 90°C or better by integrated heaters. A micro dual inlet system shall be provided to measure extremely small amount of samples	11.	Dual inlet system:	Viscous gas flow dual inlet system using a mono block design with suitable valves and a turbo molecular pump for the waste line. Automatically adjustable gas storage bellows for automated pressure adjustment through computer control is necessary. Pressure transducers for variable volumes for reference gas & sample gas monitoring. The changeover valve shall be mounted directly on the ion source so as to minimize the dead volume and the gas path length. The inlet system shall be bakeable up to 90°C or better by Integrated heaters. The dual inlet system shall be capable of measuring extremely small amount of samples(< 500 µl) without loss in sensitivity
12.	Continuous flow system:	High linearity at least 0.002 per mil/nA.	12.	Continuous flow system:	High linearity at least 0.02 per mil/nA.
13.	Continuous flow and dual-inlet interface:	There should be a Continuous Flow interface with automated gas dilution system that could be coupled with an Elemental Analyzer (EA). It should be compatible with an EA to measure C, H N & O in solid samples and in water samples.	13.	Continuous flow and dual-inlet interface:	There should be a Continuous Flow interface with automated gas dilution system that could be coupled with an Elemental Analyzer (EA). It should be compatible with an EA to measure C, H N & O in solid samples and in water samples.
14.	Computer system:	Compatible PC with 19 TFT and a colour laser network printer	14.	Computer system:	Compatible PC with 19 TFT and a colour laser network printer
15.	Automatic carbonate sample preparing device:	Carbonate preparation device with acid dosing valve with provision for at least 46 samples and individual acid reaction of each sample. It shall be compatible with dual inlet system. The device shall be fully automatic and controlled by microprocessor with automated leak test and provision for individual vial leak test so as to prevent sample loss. Minimum carbonate measurable shall be <20 µg. The device shall yield a precision (1 σ standard	15.	Automatic carbonate sample preparing device:	Carbonate preparation device with acid dosing valve with provision for at least 40 samples and individual acid reaction of each sample. It shall be compatible with dual inlet system. The device shall be fully automatic and controlled by microprocessor with automated leak test and provision for individual vial leak test so as to prevent sample loss. The instrument shall yield a precision (1 σ

		Deviation) of <0.04 and <0.06 for $\delta^{13}\text{C}$ & $\delta^{18}\text{O}$ respectively.			standard deviation) of <0.04 and <0.06 for $\delta^{13}\text{C}$ & $\delta^{18}\text{O}$ respectively for a carbonate sample size $\leq 20 \mu\text{g}$.
16.	Water Sample preparation device:	A fully automated water equilibration device for measuring i) dissolved inorganic carbon (DIC), ii) hydrogen and iii) oxygen isotopes in water and shall be compatible with dual inlet system. It shall yield a precision (1 σ standard deviation) better than 0.04‰ ($\delta^{13}\text{C}$) 0.8‰ (δD) & 0.06‰ ($\delta^{18}\text{O}$). Additionally, the supplier should also quote for online continuous flow analysis of isotopes in water with necessary liquid auto sampler.	16.	Water Sample preparation device:	A fully automated water equilibration device for measuring i) dissolved inorganic carbon (DIC) minimum sample size of 50 μl , ii) hydrogen and iii) oxygen isotopes in water. It shall yield a precision (1 σ standard deviation) better than 0.04‰ ($\delta^{13}\text{C}$) 0.8‰ (δD) & 0.06‰ ($\delta^{18}\text{O}$) for a preferably sample size < 500 μl , except for DIC. Additionally, the supplier should also quote the online continuous flow analysis of isotopes in water with necessary liquid auto sampler.
17.	Elemental analyser for C,H,N and O for solid samples:	A fully automated high-precision flash combustion (~14000C) Elemental Analyser (EA) for measuring the carbon and nitrogen concentration and connected to IRMS for the respective ($^{13}\text{C}/^{12}\text{C}$, $^1\text{H}/^2\text{H}$, $^{15}\text{N}/^{14}\text{N}$ and $^{18}\text{O}/^{16}\text{O}$) isotope analysis. The EA should have a random auto-sampler for unassisted operation. Consumables and spares should be provided for approximately 3000 samples and 2 sets of reducing and oxidizing columns including chemicals and traps. The EA should operate from the main computer itself.	17.	Elemental analyser for C,H,N and O for solid samples:	A fully automated high- temperature catalytic combustion (~1400 deg.C) Elemental Analyser (EA) for measuring the carbon and nitrogen concentration and connected to IRMS for the respective ($^{13}\text{C}/^{12}\text{C}$, $^1\text{H}/^2\text{H}$, $^{15}\text{N}/^{14}\text{N}$ and $^{18}\text{O}/^{16}\text{O}$) isotope analysis. The EA should have a random auto-sampler for unassisted operation. Consumables and spares should be provided for approximately 3000 samples and 2 sets of reducing and oxidizing columns including chemicals and traps. The EA should operate from the main computer itself.
	Additional requirements:			Additional requirements:	
18.	Manual and diagnostic tools:	Full service manuals with complete circuit diagrams and circuit descriptions to be supplied both as hard copy as well CDs, along with diagnostic tools including interface cards and software, plus any specialized & general mechanical tools required for instrument servicing or repair should be provided. The quotation should include a clear statement	18.	Manual and diagnostic tools:	Full service and operation manuals with complete circuit diagrams and circuit descriptions to be supplied both as hard copy as well CDs, along with diagnostic tools including interface cards and software, plus any specialized & general mechanical tools required for instrument servicing or repair should be provided.

		of all site requirements for installation and operation of the equipment specified. It also need to mention what items would be provided by the supplier (apart from IRMS) and the site requirements for installation and operation of the equipment.			The quotation should include a clear statement of all site requirements for installation and operation of the equipment specified. It also need to mention what items would be provided by the supplier (apart from IRMS) and the site requirements for installation and operation of the equipment.
19.	Supporting equipments to be supplied along with the IRMS	<p>The supporting facilities for the Mass Spectrometer should include:</p> <p>Compressor: For generating compressed air for the system and associated peripherals.</p> <p>Cooling device: A cryogenic cooling device for trapping moisture.</p> <p>Liquid nitrogen container: Two 25 litre and two 10 litre liquid nitrogen containers for storing liquid nitrogen.</p> <p>Power back up: A compact UPS with appropriate rating and power back up for not less than 2 hrs.</p> <p>Note: DETAILED TECHNICAL BROCHURES ALONG WITH THE QUOTATIONS SHOULD BE PROVIDED</p>	19.	Supporting equipments to be supplied along with the IRMS	<p>The supporting facilities for the Mass Spectrometer should include:</p> <p>Compressor: For generating compressed air for the system and associated peripherals.</p> <p>Cooling device: A cryogenic cooling device for trapping moisture.</p> <p>Liquid nitrogen container: Two medium size (preferably 25 litre) and two small size (preferably 10 litre) liquid nitrogen containers.</p> <p>Power back up (optional): A compact UPS with appropriate rating and power back up for not less than 2 hrs.</p> <p>Note: DETAILED TECHNICAL BROCHURES ALONG WITH THE QUOTATIONS SHOULD BE PROVIDED</p>
20.	Standards	The supplier should provide all necessary gas/ liquid/ solid reference standards for the O, C, H and N analysis in water and sediments. The cost of the same may be quoted separately.	20.	Standards	The supplier should provide all necessary gas/ liquid/ solid reference standards for the O, C, H and N analysis in water and sediments. The cost of the additional set may be quoted separately.
21.	External spare parts:	<p>(a) Required gases in 47L steel cylinders should be supplied along with regulators and gas supply lines to the instrument including traps.</p> <p>(b) Sealing device for preparation of samples for elemental analyser.</p>	21.	External spare parts:	<p>(a) Required gases in 47L steel cylinders should be supplied along with regulators and gas supply lines to the instrument including traps.</p> <p>(b) Sealing device for preparation of samples for elemental analyser.</p>

Lot 2.High Resolution Inductively Coupled Plasma Mass Spectrometer (HRICPMS)

Schedule of Requirements-Lot 2.Technical Specifications			Modification now made(Blue)		
S.No.	Particulars	Specifications	S.No	Particulars	Specifications
	Instrument Generals	<ul style="list-style-type: none"> Automated, High Resolution Inductively Coupled Plasma Mass Spectrometer (HR-ICP-MS) system based on a double focusing system consisting of electrostatic and magnetic analyzer with single collector for trace element/isotopic analysis of corals, marine sediments, seawater samples, for a wide range of concentrations. System should be able to handle seawater sample analysis smoothly without any adverse impact on the cones The system should be capable of performing trace levels(parts per million) to ultra trace level (parts per trillion) multi elemental/isotopic analysis in aqueous media with high accuracy and precision for R & D applications. The instrument credibility should have been established for at least last eight years in the form of research publications in internationally reputed Oceanographic science journals. Accuracy and precision have to be demonstrated. The supplier should provide a complete list of users worldwide with full address, e-mail and telephone numbers. Equipments should be operated at 220V ± 10 %, and 50 Hz power supply. The system should comprise of the following components: <ul style="list-style-type: none"> New addition 		Instrument Generals	<ul style="list-style-type: none"> Automated, High Resolution Inductively Coupled Plasma Mass Spectrometer (HR-ICP-MS) system based on a double focusing system consisting of electrostatic and magnetic analyzer with single collector for trace element/isotopic analysis of corals, marine sediments, seawater samples, for a wide range of concentrations. System should be able to handle seawater sample analysis smoothly without any adverse impact on the cones The system should be capable of performing trace levels(parts per million) to ultra trace level (parts per trillion) multi elemental/isotopic analysis in aqueous media with high accuracy and precision for R & D applications. The instrument credibility should have been established for at least last eight years in the form of research publications in internationally reputed Oceanographic science journals. Accuracy and precision have to be demonstrated. The supplier should provide a complete list of users worldwide with full address, e-mail and telephone numbers. Equipment should be operated at 220V ± 10 %, and 50 Hz power supply. The system should comprise of the following components: <p>Resolution: (High Resolution System) with computer controllable resolution from almost 300 to greater than 10,000 at 10% valley. All resolutions can be switched in one analysis.600 to 20,000 (FWHM). Resolution tuning should not be required.</p>

<p>1.</p>	<p>Sample Introduction System The sample introduction system should consist of pneumatic nebulizer with provision for using other types of nebulizers and with Peltier Cooling for spray chamber. It should have computer controlled peristaltic pumps with minimum of three channels. Strong acid resistant (HF&Perchloric acid) spray chamber should be provided. High matrix capability: system should be capable of carrying out direct and routine analysis of high matrix samples (e.g., sea water without dilution).</p>	<p>1.</p>	<p>Sample Introduction System The sample introduction system should consist of pneumatic nebulizer with provision for using other types of nebulizers and with Peltier Cooling for spray chamber. It should have computer controlled peristaltic pumps with minimum of three channels. Strong acid resistant (HF&Perchloric acid) spray chamber should be provided. High matrix capability: system should be capable of carrying out direct and routine analysis of high matrix samples (e.g., sea water without dilution).</p>
<p>2.</p>	<p>Ion Source Argon plasma torch RF generator with minimum output power of 1.5 kW or more and minimum frequency of ~27 MHz. Analysis of <i>Alkali and Alkaline Earth Metals should be software selectable.</i></p>	<p>2.</p>	<p>Ion Source Argon plasma torch RF generator with minimum output power of 1.5 kW or more and minimum frequency of ~27 MHz. Analysis of <i>Alkali and Alkaline Earth Metals should be software selectable.</i></p>
<p>3.</p>	<p>Cooling System Adequate water re-circulating chiller should be provided for continuous cooling of RF generator, RF load coil and ICP interface.</p>	<p>3.</p>	<p>Cooling System Adequate water re-circulating chiller should be provided for continuous cooling of RF generator, RF load coil and ICP interface.</p>
<p>4.</p>	<p>Vacuum System Rugged vacuum pump with low noise which should ensure a short startup time of 45 Min or less. The pressure in the analyzer should be in the range of 10^{-6} to 10^{-7} mbar (during operation) with full gas load. Platinum tipped skimmer and sampling cones, with easy to remove and clean options.</p>	<p>4.</p>	<p>Vacuum System Rugged vacuum pump with low noise which should ensure a short startup time of 45 Min or less. The pressure in the analyzer should be in the range of 10^{-6} to 10^{-7} mbar (during operation) with full gas load. Platinum tipped skimmer and sampling cones, with easy to remove and clean options.</p>
<p>5.</p>	<p>Mass Analyzer System The mass analyzer should consist of double focusing electrostatic and magnetic sector field. Scanning speed of 5000 amu or higher, Signal Stability: < 3 % RSD in 10 min and < 4 % RSD in 1 hr</p>	<p>5.</p>	<p>Mass Analyzer System The mass analyzer should consist of double focusing electrostatic and magnetic sector field. Scan Speed: (Magnetic) 7 to 240 to 7 amu in less than 150 ms or better / Scan Speed: (Electric) Less than 1 ms / jump irrespective of mass range or better</p>
<p>6.</p>	<p>Gas Flow Control System The gas flow control system should be microprocessor based precise electronic mass flow controller for all gas channels (minimum five nos.)such as plasma support, auxiliary and sample carrier gases with provision for additional controllers for Laser Ablation, and Oxygen</p>	<p>6.</p>	<p>Gas Flow Control System The gas flow control system should be microprocessor based precise electronic mass flow controller for all gas channels (minimum five nos.)such as plasma support, auxiliary and sample carrier gases with provision for additional controllers for Laser</p>

	supply (accessory for organic samples) The gas flow control system should have computer controlled safety interlocks and automatic gas flow controls for startup and shutdown operation.		Ablation, and Oxygen supply (accessory for organic samples) The gas flow control system should have computer controlled safety interlocks and automatic gas flow controls for startup and shutdown operation.
7.	Detector System Dynamic range: in the order of 10^8 cps or better Detector background noise should be less than 2 cps High sensitivity: 1×10^8 cps/ppm or better for In 115 or similar mid masselement(to be backed by certificate from a reputed laboratory). Stability: better than 0.5% drift per hour	7.	Detector System Dynamic range: in the order of 10^8 cps or better Detector background noise should be less than 2 cps High sensitivity: 1×10^8 cps/ppm or better for In 115 or similar mid masselement(to be backed by certificate from a reputed laboratory). Stability: better than 0.5% drift per hour
8.	Auto Sampler Auto sampler for handling 30 or more samples vials of about ~10 mlcapacity each with cover for anti-contamination process.	8.	Auto Sampler Auto sampler for handling 30 or more samples vials of about ~10 mlcapacity each with cover for anti-contamination process.
9.	Instrument Control and Data Acquisition & Processing Suitable software interface should be provided for operation and data Acquisition LED monitor with laser jet printer.	9.	Instrument Control and Data Acquisition & Processing Suitable software interface should be provided for operation and data Acquisition LED monitor with laser jet printer.
10.	Spare Parts and consumables Spare components for trouble-free operation required for next five years after completion of warranty period should be clearly listed and quoted separately as option. Spares/consumables that will be supplied free of cost with the system should also be listed. Two additional sets of skimmer and sampling cones should be provided with the system as consumables.	10.	Spare Parts and consumables Spare components for trouble-free operation required for next five years after completion of warranty period should be clearly listed and quoted separately as option. Spares/consumables that will be supplied free of cost with the system should also be listed. Two additional sets of skimmer and sampling cones should be provided with the system as consumables.
11.	Installation and Acceptance Testing Installation and acceptance testing requirements should be explicitly mentioned along with the technical bid/ specification.	11.	Installation and Acceptance Testing Installation and acceptance testing requirements should be explicitly mentioned along with the technical bid/ specification.
12.	Software Upgrades The firm should provide free software upgrades from time-to-time at least for six years after the installation.	12.	Software Upgrades The firm should provide free software upgrades from time-to-time at least for six years after the installation.
13.	Calibration standards: The supplier should provide all necessary tune solutions for optimizing the instrument A set of multi-element calibration/standards of appropriate	13.	Calibration standards: The supplier should provide all necessary tune solutions for optimizing the instrument A set of multi-element calibration/standards of appropriate

	concentrations for the analysis should be included.		concentrations for the analysis should be included.
14.	Additional Requirements Gas Supplies: System should be supplied with all the necessary gases with cylinders, regulators, purifiers (especially Hg trap), panel, and plumbing.	14.	Additional Requirements Gas Supplies: System should be supplied with all the necessary gases with cylinders, regulators, purifiers (especially Hg trap), panel, and plumbing.
15.	Manuals & circuit diagrams A complete set of operational and maintenance manuals containing complete circuit diagrams should be provided in hardcopy as well as electronic copy.	15.	Manuals & circuit diagrams A complete set of operational and maintenance manuals containing complete circuit diagrams should be provided in hardcopy as well as electronic copy.
16.	Laser Ablation System A laser ablation system is required for in situ elemental and isotopic analysis. The laser system should be compatible with the HRICPMS . The quotation should include a laser ablation system with the following specifications. It should be an Excimer, Nanosecond-pulse, UV laser system Sample fluence > 5 J/cm ² Beam Delivery System should be able to deliver homogeneous beam coupled to X-Y-Z stage (with minimum travel along X, Y and Z directions) Various designs/sizes (volume) of ablation cells and their features should be stated. All the parameters including laser firing, focusing, spot size control, sample maneuvering etc. should be software controlled and compatible with HRICPMS software. color video microscope and high resolution CCD camera with computercontrolled zoom lens for clear viewing of the sample. Should have options of single point, multipoint, line scan, area scan, area raster, depth profiling or draw a pattern to facilitate different mode of analyses. The company must ensure that the laser ablation unit is completely compatible with the HR-ICP-MS including automatic triggering capability. The Laser system with the above specifications should be quoted separately. After Sale Support for the Laser Ablation System should be provided by the bidder (to be backed by certificate)	16.	Laser Ablation System (to be quoted under Optionals) A laser ablation system is required for in situ elemental and isotopic analysis. The laser system should be compatible with the HRICPMS . The quotation should include a laser ablation system with the following specifications. It should be Nanosecond-pulse, UV laser system Sample fluence > 5 J/cm ² , Wavelength: 213 nm . Beam Delivery System should be able to deliver homogeneous beam coupled to X-Y-Z stage (with minimum travel along X, Y and Z directions) Various designs/sizes (volume) of ablation cells and their features should be stated. All the parameters including laser firing, focusing, spot size control, sample maneuvering etc. should be software controlled and compatible with HRICPMS software. color video microscope and high resolution CCD camera with computercontrolled zoom lens for clear viewing of the sample. Should have options of single point, multipoint, line scan, area scan, area raster, depth profiling or draw a pattern to facilitate different mode of analyses. The company must ensure that the laser ablation unit is completely compatible with the HR-ICP-MS including automatic triggering capability. The Laser system with the above specifications should be quoted separately. After Sale Support for the Laser Ablation System should be provided by the bidder (to be backed by certificate)

17.	MicroMill Sampling Preparation Device (optional) MicroMill is a microsampling device designed for high resolution milling of coral, rock or hard tissue samples with supporting hardware and software. High-precisionmilling. Sample height detection and tilt correction by a drill-tip sensor. Sample map navigation increases sample-area field-of-view. 50mm of computer-driven sample movement on X, Y and Z axes. Sub-sampling path interpolation.	17.	MicroMill Sampling Preparation Device (optional) MicroMill is a microsampling device designed for high resolution milling of coral, rock or hard tissue samples with supporting hardware and software. High-precisionmilling. Sample height detection and tilt correction by a drill-tip sensor. Sample map navigation increases sample-area field-of-view. 50mm of computer-driven sample movement on X, Y and Z axes. Sub-sampling path interpolation.
18	New addition	18.	User Safety : All areas of the instrument where the user has to access should be at ground potentialfor best safety.

Lot 3. Wave length Dispersive X-ray Fluorescence Spectrometer WDXRF

Technical Specifications			Modification now made (Blue)		
Lot 3 – Wave length Dispersive X-ray Fluorescence Spectrometer WDXRF			Lot 3 – Wave length Dispersive X-ray Fluorescence Spectrometer WDXRF		
S.No.	Particulars	Specifications	S.No.	Particulars	Specifications
1	General	Fully Automated sequential Wave length Dispersive X-ray Fluorescence Spectrometer (WDXRFS) for high speed, accurate and high precision qualitative, semi quantitative and quantitative analysis (from ppm to 100% concentration level) of elements from Be (at.no.4) to U (at.no.92) in physico-chemical, geological and biological materials. The proposed WDXRF model should be of very recent technology & integrated with highest precision. It should have fully digitized instrumentation, high endurance electronics and fully automated for unsupervised analysis. The purpose being major, minor and trace element analysis of geological materials which includes different kinds of rocks, soil,	1	General	Fully Automated sequential Wave length Dispersive X-ray Fluorescence Spectrometer (WDXRFS) for high speed, accurate and high precision qualitative, semi quantitative and quantitative analysis (from ppm to 100% concentration level) of elements from Be (at.no.4) to U (at.no.92) in physico-chemical, geological and biological materials. The proposed WDXRF model should be of very recent technology & integrated with highest precision. It should have fully digitized instrumentation, high endurance electronics and fully automated for unsupervised analysis. The purpose being major, minor and trace element analysis of geological materials which includes different kinds of rocks, soil, mineral concentrate, and

Technical Specifications			Modification now made (Blue)		
Lot 3 – Wave length Dispersive X-ray Fluorescence Spectrometer WDXRF			Lot 3 – Wave length Dispersive X-ray Fluorescence Spectrometer WDXRF		
S.No.	Particulars	Specifications	S.No.	Particulars	Specifications
		mineral concentrate, and beneficiated products; physic chemical products and biological materials.			beneficiated products; physic chemical products and biological materials.
2	X-ray Generator	Solid state high frequency generator with ratings of 60 -70 kV and 120-160 mA, with a minimum of 4.0 kW.	2	X-ray Generator	Solid state high frequency generator with ratings of 60 -70 kV and 120-170 mA, with a minimum of 4.0 kW.
		The generator stability should be around $\pm 0.0005\%$ per 1% variation.			The generator stability should be around $\pm 0.0005\%$ per 1% variation of main supply.
		Generator should not switch off and on during loading and unloading of samples on measuring position.			Generator should not switch off and on during loading and unloading of samples on measuring position. Change the kv,ma parameter set for the analysis (by turret or similar mechanism) Generator should not switch off and on and also should not Change the kV, mA parameters set for the analysis (by turret or similar mechanism) during loading and unloading of samples on measuring position.
		Mains (Max. line) voltage should vary from -15% (minimum) to +10% (maximum).			Generator should be stable.
		Solid State Generator should have kV and mA selectable in suitable steps			Solid State Generator should have kV and mA selectable in suitable steps
		A built in microprocessor should control all important functions of generator and spectrometer and allow service testing from remote locations and monitor tube life, water flow, temperature status etc.			A built in microprocessor should control all important functions of generator and spectrometer and allow service testing from remote locations and monitor tube life, water flow, temperature status etc.
3	X-Ray tube	High Performance Rh end window tube	3	X-Ray tube	High Performance Rh end window tube

Technical Specifications			Modification now made (Blue)		
Lot 3 – Wave length Dispersive X-ray Fluorescence Spectrometer WDXRF			Lot 3 – Wave length Dispersive X-ray Fluorescence Spectrometer WDXRF		
S.No.	Particulars	Specifications	S.No.	Particulars	Specifications
		compatible with the above generator Ratings.			compatible with the above generator Ratings
		Ceramic insulation and tapered nose which can be operated with programmable setting with minimum distance between samples to X-ray tube target.			Ceramic insulation and tapered nose which can be operated with programmable setting with minimum distance between samples to X-ray tube target.
		Very thin Be window (less than 50 micron) for achieving maximum primary X-rays intensity and brilliance.			Very thin Be window (less than or equal to 50micron) for achieving maximum primary X-rays intensity and brilliance.
		Additional tubes with various anode materials should be quoted separately. The spare X- ray tube shall be capable of keeping in normal room temperature and normal room condition. Warranty period for the tube as well other spares should be provided.			Additional tubes with various anode materials should be quoted separately. The spare X- ray tube shall be capable of keeping in normal room temperature and normal room condition. Warranty period for the tube as well other spares should be provided.
4	SPECTRO METER	The spectrometer should be microprocessor controlled and compatible with dual core processor PC.	4	SPECTROMETER	The spectrometer should be microprocessor controlled and compatible with dual core processor PC.
		The spectrometer should be equipped with a eight to nine position bi-directional crystal changer and the same should be supplied with PET(002), GE-111, TLAP, LIF-200, LIF-220, LIF-420, ADP(101) and multi layer synthetic crystals with larger 2d values that are suitable analysing the entire range of elements including Sodium, Magnesium, Carbon, Boron and Beryllium.			The spectrometer should be equipped with a eight to nine position bi-directional crystal changer and the same should be supplied with PET(002), GE-111, TLAP, LIF-200, LIF-220, LIF-420, ADP(101) and multi layer synthetic crystals with larger 2d values that are suitable analysing the entire range of elements including Sodium, Magnesium, Carbon, Boron and Beryllium.

Technical Specifications			Modification now made (Blue)		
Lot 3 – Wave length Dispersive X-ray Fluorescence Spectrometer WDXRF			Lot 3 – Wave length Dispersive X-ray Fluorescence Spectrometer WDXRF		
S.No.	Particulars	Specifications	S.No.	Particulars	Specifications
		Motorized filter changer with at least three suitable filters, motorized collimator changer with at least three suitable collimators should be offered. The collimator should be automatically controlled with analytical software.			Motorized filter changer with at least three suitable filters, motorized collimator changer with at least three suitable collimators should be offered. The collimator should be automatically controlled with analytical software.
		To enable fast evacuation, the chamber volume should be low, with suitable vacuum pump.			To enable fast evacuation, the chamber volume should be low, with suitable vacuum pump.
		For maximum speed & highest sample through put all instrument parameters must be set simultaneously.			For maximum speed & highest sample through put all instrument parameters must be set simultaneously.
		The sample spinner with about 0.5 revolutions per second (rps) should be inbuilt.			The sample spinner with about 0.5 revolutions per second (rps) should be inbuilt.
		The design of the spectrometer should provide very close coupling between the anode of X-ray tube and sample.			The design of the spectrometer should provide very close coupling between the anode of X-ray tube and sample.
5.	OPTIX	Closely coupled optics for increased intensity	5.	OPTIX	Closely coupled optics for increased intensity
		The primary collimator positions (four) and choice of collimators ranging from ultra high resolution(150 micron), coarse (300 & 500 micron) to extra coarse(700 micron) should be provided to optimize the measuring conditions per elements			The primary collimator positions three or more and choice of collimators ranging from ultra high resolution(150 micron), coarse (300 & 500 micron) to extra coarse(700 micron) should be provided to optimize the measuring conditions per elements
		Six or more selectable channel masks should be made available to provide optimal peak to background ratios evaluation and eliminate radiation from sample holder/ masks.			Three or more or more selectable channel masks should be made available to provide optimal peak to background ratios evaluation and eliminate radiation from sample holder/ masks.
6.	GONIOMETER	Gearless, microprocessor controlled goniometer using optical encoders which	6.	GONIOMETER	Microprocessor controlled goniometer using optical encoders or similar mechanism

Technical Specifications			Modification now made (Blue)		
Lot 3 – Wave length Dispersive X-ray Fluorescence Spectrometer WDXRF			Lot 3 – Wave length Dispersive X-ray Fluorescence Spectrometer WDXRF		
S.No.	Particulars	Specifications	S.No.	Particulars	Specifications
		can be configured to cover all elements from Beryllium (Be) to uranium (U) in sequential mode			which can be configured to cover all elements from Beryllium (Be) to uranium (U) in sequential mode
		Total angle range: 0-145°2θ or higher			Total angle range: 0-145°2θ or higher
		Angular accuracy must be $\geq 0.0025^\circ$ (for θ , 2θ)			Angular accuracy must be $\geq 0.0025^\circ$ (for θ , 2θ)
		Angular reproducibility must be around 0.0002° (for θ , 2θ)			Angular reproducibility must be around 0.0002° (for θ , 2θ)
		To ensure shortest analysis slewing speed should be around $40^\circ 2\theta$ per second			To ensure shortest analysis slewing speed should be around $40^\circ 2\theta$ per second
		The goniometer design should be such that it should maintain with high speed, consistent accuracy and reliability.			The goniometer design should be such that it should maintain with high speed, consistent accuracy and reliability.
7.	DETECTORS		7.	DETECTORS	
		Provision for two types of detectors is essential			Provision for two types of detectors is essential
		Gas Flow Proportional counter [Ar(90%)/CH ₄ (10%)]			Gas Flow Proportional counter [Ar(90%)/CH ₄ (10%)]
		Scintillation detector			Scintillation detector
		Third sealed detector (Xenon sealed detector) must be part of the Spectrometer for analysis of elements Ca, Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Cu and Zn for better LOD and maximum CPS (4400 KCPs)			Thirdsealed detector or equivalent technology. (Xenon sealed detector) can be part of the Spectrometerfor analysis of elements Ca, Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Cu and Zn for better LOD and maximum CPS (4400 KCPs) may be quoted as an optional item.
		A gas flow detector should be capable of operating at 17-145°2θ range to cover low Z elements.			A gas flow detector should be capable of operating at 17-145°2θ range to cover low Z elements.
		For heavy elements, a scintillation detector should be mounted at the same crystal-detector distance as the like flow			For heavy elements, a scintillation detector should be mounted at the same crystal-detector distance as the like flow counter

Technical Specifications			Modification now made (Blue)		
Lot 3 – Wave length Dispersive X-ray Fluorescence Spectrometer WDXRF			Lot 3 – Wave length Dispersive X-ray Fluorescence Spectrometer WDXRF		
S.No.	Particulars	Specifications	S.No.	Particulars	Specifications
		counter and in an offset position and can vary with suitable designation			and in an offset position and can vary with suitable designation
		New addition			P-10 gas cylinders (5No) along with regulators and flow line)
		New addition			Cooling System : External water chiller to be provided, after warranty service to be provided by the supplier of XRF. Water flow : 11 l/min
8.	COUNTING ELECTRONICS	Multi channel analyzer or similar arrangement to discriminate peaks of higher energies	8.	COUNTING ELECTRONICS	Multi channel analyzer or similar arrangement to discriminate peaks of higher energies
		Digital Automatic gain Control (AGC) or similar arrangement for pulse shrinking correction			Digital Automatic gain Control (AGC) or similar arrangement for pulse shrinking correction
9.	SAMPLE HANDLING & PRESENTATION	The sample presentation system should be capable of handling solids, loose & compressed powders and fused beads in a variety of sample holders.	9.	SAMPLE HANDLING & PRESENTATION	The sample presentation system should be capable of handling solids, loose & compressed powders and fused beads in a variety of sample holders.
		The X-ray path medium should be selectable by the operator or be programmable for automatic selection when working with a sample changer depending on the design.			The X-ray path medium should be selectable by the operator or be programmable for automatic selection when working with a sample changer depending on the design.
		Programmable primary beam filter for modifying X-ray excitation. A variety of interchangeable Cu, Al, Fe, Au etc. sample holder masks.			Programmable primary beam filter for modifying X-ray excitation. A variety of interchangeable Cu, Al, Fe, Au etc. sample holder masks.
		On line matrix correction facility & reporting shall be available.			On line matrix correction facility & reporting shall be available.
		There should be a provision for incorporating geological reference material			There should be a provision for incorporating geological reference material during the

Technical Specifications			Modification now made (Blue)		
Lot 3 – Wave length Dispersive X-ray Fluorescence Spectrometer WDXRF			Lot 3 – Wave length Dispersive X-ray Fluorescence Spectrometer WDXRF		
S.No.	Particulars	Specifications	S.No.	Particulars	Specifications
		during the analysis of unknown samples in addition to the standard (concentration) provided by the manufacturer in the software.			analysis of unknown samples in addition to the standards in the software.
		New addition			Semi quantitative analysis of unknown samples with relevant software and reference standards and monitor samples (for recalibration) as an optional item).
10.	COMPUTER AND PERIPHERALS				
	HARDWARE	System compatible high end PC, preferably with 21" high resolution, high contrast ratio, reputed make LCD monitor of high-quality, 3 rd generation intel core i7 – 3770, greater than 3.0 GHz or higher, onboard dedicated graphics 2GB, sound, network card, 4 GB DDR2 RAM 667 MHz, 1 TB Hard Disk, 6 USB ports, PS2 optical mouse, 105+ Windows Key board along with a A4 size colour laser Printer with 4 MB RAM.		HARDWARE	System compatible high end PC, preferably with 21" high resolution, high contrast ratio, reputed make LCD monitor of high-quality, 3 rd generation intel core i7 – 3770, greater than 3.0 GHz or higher, onboard dedicated graphics 2GB, sound, network card, 4 GB DDR2 RAM 667 MHz, 1 TB Hard Disk, 6 USB ports, PS2 optical mouse, 105+ Windows Key board along with a A4 size colour laser Printer with 4 MB RAM.
	SOFTWARE FOR QUALITATIVE AND QUANTITATIVE ANALYSIS				
		For maximum speed different instrument conditions shall be selectable within one scan.			For maximum speed different instrument conditions shall be selectable within one scan.
		9.2.2 Both digital and graphical recording of continuous and step scan shall be possible.			Both digital and graphical recording of continuous and step scan shall be possible.
		Selection shall be possible of linear root & log scales for count rates as a function of 2θ, wavelength, energy or atomic number.			Selection shall be possible of linear root & log scales for count rates as a function of 2θ, wavelength, energy or atomic number.
		9.2.3 Software program manuals, etc. on CDs/DVDs and Hard Copies. Software			Software program manuals, etc. on CDs/DVDs and Hard Copies. Software

Technical Specifications			Modification now made (Blue)		
Lot 3 – Wave length Dispersive X-ray Fluorescence Spectrometer WDXRF			Lot 3 – Wave length Dispersive X-ray Fluorescence Spectrometer WDXRF		
S.No.	Particulars	Specifications	S.No.	Particulars	Specifications
		should be updated free of charge during warranty			should be updated free of charge during warranty
11.	Auto sampler	-	11.	Auto sampler	Automatic sample changer of more than 20 samples as optional
12.	POWER SUPPLY	Power requirements for the instrument should be 220-240 VAC (preferably equal to 230VAC) 50A fused single phase, 50Hz frequency as prevailed in India.	12.	POWER SUPPLY	Power requirements for the instrument should be 220-240 VAC (preferably equal to 230VAC) 50A fused single phase, 50Hz frequency as prevailed in India.
13.	OTHER TERMS AND CONDITIONS				
	INSTALLATION & COMMISSIONING:	Supplier of the equipment must provide pre-installation advice		INSTALLATION & COMMISSIONING:	Supplier of the equipment must provide pre-installation advice
		The system should be complete in all respects. The firm must ensure complete integration of all subsystems with cables, connectors as required and show the performance of the equipment as per the inspection criteria at site			The system should be complete in all respects. The firm must ensure complete integration of all subsystems with cables, connectors as required and show the performance of the equipment as per the inspection criteria at site
		The equipment should be calibrated to the International Standards			The equipment should be calibrated to the International Standards
		CRM and standards for rare earth elements should be included			CRM and standards for rare earth elements should be included as optional items
14.	Quality & Safety	ISO 9001:2000 certified Fully radiation protected system; radiation < 1 µSv/h	14.	Quality & Safety	ISO 9001:2000 certified Fully radiation protected system; radiation < 1 µSv/h