

Ref. No.: IPRC/EPSFD/RFP-IPP/02

***REQUEST FOR PROPOSAL (RFP)
FOR ESTABLISHING
ISROSENE PRODUCTION PLANT (IPP)***



**ISRO PROPULSION COMPLEX
INDIAN SPACE RESEARCH ORGANISATION
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1 INTRODUCTION

Indian Space Program envisages production & commercialization of Satellite Launch Vehicles. Towards this, Indian Space Research Organisation (ISRO) enters in to realization of Semicryo engine development for the future launch vehicles. This Semicryo engine uses ISROSENE (Propellant grade Kerosene) as fuel and Liquid Oxygen as oxidizer.

Isrosene Production process involves catalytic hydrogenation of Linear Alkyl Benzene (LAB) Raffinate to reduce the aromatic content from 24 % (max.) to less than 5% by volume. The feed stock (LAB Raffinate) has Sulphur content less than 20 mg/kg. Isrosene that is used to power launch vehicle should have high energy content, stable combustion and no or low coke/soot formation. Other significant performance properties of Isrosene are stability, fluidity, non-corrosivity and cleanliness.

In general, rocket propellant grade kerosene should have the following specifications: aromatics < 5% by volume, sulphur content < 20 mg/kg, existent gum content < 1 mg/100 ml and particulates < 0.26 mg/liter. Detailed specifications and test methods are given in Section 3.

ISRO is planning to setup a 3000 liters per day capacity Isrosene Production Plant (IPP) at ISRO Propulsion Complex (IPRC), Mahendragiri (or) at Contractor's site anywhere in India.

This Request for proposal (RFP) is for inviting quotations from capable contractors to carry out the project under the following three options.

- **Option 1:** For Establishing a new Plant at IPRC, Mahendragiri on turnkey basis with IPRC/ ISRO funding.
- **Option 2:** For Establishing a new Plant at Contractor's site anywhere in India on turnkey basis with IPRC/ ISRO funding.
- **Option 3:** For Establishing a new Plant at Contractor's site anywhere in India with Contractor's own cost.

For Option 1 & 2: The envisaged work involves establishing a new plant including design, detailed engineering, procurement, civil & structural works, fabrication, testing, supply, erection, installation, commissioning and Operation & Maintenance of Isrosene production plant for a period of 3 years and Supply of Isrosene as and

when required for Semi-cryogenic Project as per the terms and conditions mutually agreed upon. Details are given in **section 2 to 11**.

For Option 3: Manufacture & supply of Isrosene as and when required as per the terms and conditions mutually agreed upon for a period of 20 years at price per metric ton with revision in price every year. Details are given in **Annexure-3**.

Bidders shall quote for the three options given above. Bidders not submitting their quote for any of the option shall provide reasons for the same.

Bidders Eligibility Criteria

- a) Past experience in the establishment of chemical Production Plant having catalytic hydrogenation process.
- b) Minimum 5 years experience in the Plant operation and maintenance involving catalytic hydrogenation process.
- c) Average annual financial turnover during last three years, ending 31st March, 2015 shall be a minimum of Rs. 21 Crores.
- d) Experience of having successfully completed chemical Production Plant projects during last 10 years ending 30th September 2015.
 - One project costing more than Rs. 56 Crores (or)
 - Two projects costing more than Rs. 35 Crores each (or)
 - Three projects costing more than Rs. 28 Crores each.
- e) Documentary proof for the above shall be provided to the Department within 1 month from the date of publication of the tender. Copy of annual reports for the last 3 years shall be provided.

Prerequisite for bidding:

- 1) Bidders qualifying the eligibility criteria mentioned above and willing to participate in this tender have to demonstrate catalytic hydrogenation process to produce Isrosene on continuous mode in lab scale.
- 2) Contractor's lab or R&D lab of others may be used for demonstration of Isrosene production in lab scale.
- 3) Within 1 month from the date of publication of tender, interested bidders shall communicate their willingness to the Department along with supporting documents for meeting the eligibility criteria and a brief proposal and plan of

action mentioning the envisaged experimental lab setup, details of catalyst, process scheme and other technical details.

- 4) **Demonstration:** After successfully establishing the experimental laboratory setup, bidders shall collect 10 liters of Raw material (LAB raffinate) from IPRC, Mahendragiri for conducting lab level experiments at their end and demonstrate the process in presence of ISRO personnel. The demonstration of Isrosene production in lab scale has to be completed within 4 months from the date of publication of tender. No separate cost will be provided for the demonstration of Isrosene production in lab scale.
- 5) Details of the process, catalyst and process conditions along with Isrosene product sample (minimum of 200 ml) shall be supplied at IPRC, Mahendragiri for verification of aromatic content.
- 6) Department shall analyse to confirm the aromatic content in the sample to less than 5.0 % by volume.
- 7) Bidders meeting the eligibility criteria and the product sample specification in the lab scale production are only eligible for submitting the techno-commercial and price bid. Quotation shall be submitted within 6 months from the date of publication of the tender, on two part bid basis viz. Techno - Commercial bid and Price bid. Quotations satisfying technical specifications and commercial terms & conditions only will be considered for opening the price bid. The quotation shall have a validity period of 180 days from the date of price bid opening.

Some of the key words used in this document are defined as follows:

- **“Department”** (Purchaser) shall mean and include the President of India acting through the Director, ISRO Propulsion Complex (IPRC) and any representative(s) of the Department duly authorized on his behalf.
- **“Contractor”** shall mean the individual or firm or company whether incorporated or not, chosen by the Department among the bidders to this tender enquiry, under-taking the works and shall include the legal personal representatives of such individuals or the persons composing such firm or company, or the successors of such firm or company and the permitted assignee of such individual or firm(s) or company.
- **“Contract”** shall mean the formal agreement to be executed between the President of India and the bidder, whom the Department may choose, based on

the documents forming this tender enquiry and acceptance thereof by the bidder and together with the documents as referred to therein including the specifications, designs, drawings and instructions issued from time to time by the Department.

- **“Site”** shall mean the land or other places on which work is to be executed under the Contract.
- **“SCP”** shall mean Semi Cryogenic Project.
- **“IPP”** shall mean Isrosene Production Plant.
- **“RFP”** shall mean this Request For Proposal document.

2 LOCATION AND CLIMATIC CONDITION (For Option: 1)

Geographical Location of Mahendragiri

IPRC, Mahendragiri is situated in Tirunelveli District, Tamil Nadu State, India. The nearest major towns are Nagercoil, which is 25 km Southward and Valliyoor, which is 15km Northward. IPRC, Mahendragiri is aside of Kanyakumari - Madurai National Highway (NH7) at a distance of 25km Northward from Kanyakumari. The Major railway station is at Nagercoil. The nearest International airport is at Thiruvananthapuram, which is 90 km away in South West direction. The nearest sea port is at Thoothukudi, which is 100Km away in North East direction. The nearest major sea port is at Chennai, which is 650km Northward.

Climatic Condition at IPRC, Mahendragiri

The climatic condition at Mahendragiri is tropical and windy with gusts. Normal monsoon period is June-July and October - November. The climatological data of Mahendragiri is as follows:

Rainfall

Maximum daily rainfall	: 50 mm
Maximum monthly rainfall	: 120 mm
Average annual rainfall	: 550 mm

Temperature

Maximum temperature in shade	: 311 K (38° C)
Minimum temperature	: 293 K (20° C)

Humidity

Maximum relative humidity	: 80 %
Minimum relative humidity	: 25 %
Type of climate	: Tropical

Wind loads

Equipments shall be designed for an operating wind speed of 120 km/hr and survival wind speed of 240 km/hr, considering 3 seconds gust. Depending on the configuration of equipments, suitable drag coefficient shall be considered while computing the actual wind loads.

Seismic zone

The system shall be designed for seismic load conforming to zone 3 as per IS: 1893 latest edition.

3 SPECIFICATIONS AND TEST METHODS

A. General specification of RP-1 fuel (**Isrosene**) and its test method are given below.

S. No.	PARAMETERS	SPECIFICATION	ASTM TEST METHOD
1.	Initial boiling point, °C	Report	D- 86
2.	Fuel evaporated (10%), °C	185-210	
3.	Fuel evaporated (50%), °C	Report	
4.	Fuel evaporated (90%), °C	Report	
5.	End Point, °C	274 Max.	
6.	Residue, % by vol.	1.5 Max.	
7.	Distillation loss, % by vol.	1.5 Max.	
8.	Density@15 °C, g/ml	0.799-0.815	D-1298/ D-4052
9.	Existent Gum, mg/100ml	1.0 Max.	D- 381
10.	Total Sulphur, mg/kg	20 Max.	D- 5453
11.	Mercaptan sulphur, mg/kg	3.0 Max.	D-3227
12.	Freezing point , °C	-51 Max.	D- 2386
13.	Viscosity@ - 20 °C, cst	16.5 Max.	D- 445
14.	Aromatics, % by vol.	5.0 Max.	D- 1319
15.	Heat of Combustion (cal/g), net corrected	10277 Min.	D- 240
16.	Olefins, % by vol.	2.0 Max.	D-1319
17.	Hydrogen content, % mass	13.8 Min.	D-3343
18.	Copper strip corrosion	1.0 Max.	D- 130
19.	Water reaction interface/ Separator rating	1b Max.	D-1094
20.	Flash point (PMC), °C	60 Min.	D- 93
21.	Particulate, mg/l	0.26 Max.	D-5452

B. Specifications of Raw materials

(i) Feedstock: Linear Alkyl Benzene (LAB) Raffinate

Sl. No.	PARAMETERS	SPECIFICATION	ASTM TEST METHOD
1.	Distillation range, °C	175 to 248	D-86
2.	Aromatics, volume %	24 Max.	D-1319
3.	Total Sulphur, mg/kg	20 Max.	D-5453
4.	Density, g/cc	0.822 ± 0.01	D-1298/D-4052
5.	Flash point, °C	63 Min.	D-93

(ii) Reactant: Gaseous Hydrogen

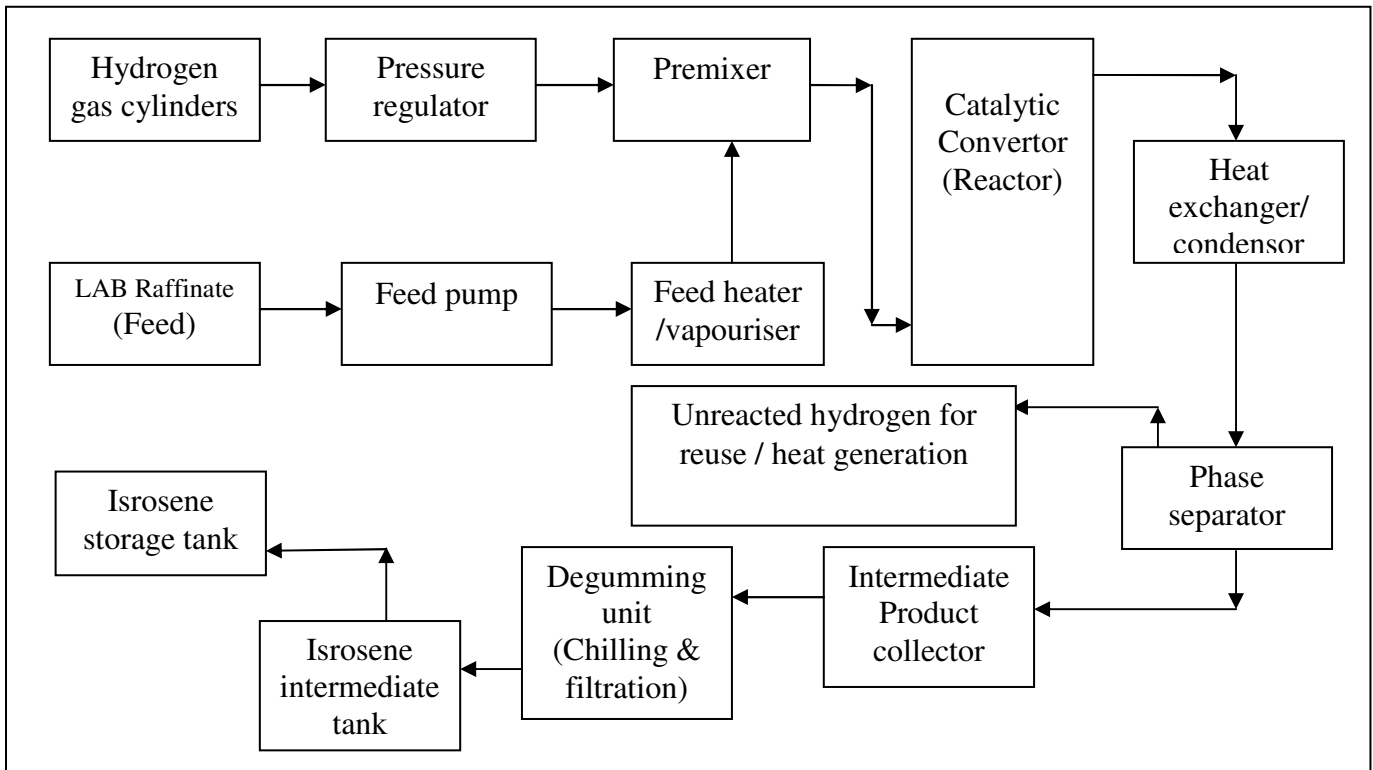
Sl. No.	PARAMETERS	SPECIFICATION
1.	Purity, % by vol.	> 99.995
2.	Helium content, ppm (v)	< 39
3.	Nitrogen, moisture and total hydrocarbons content (moisture content should be < 2ppm (v)), ppm (v)	< 9
4.	Oxygen + Argon content, ppm (v)	< 1
5.	Carbon dioxide & carbon monoxide content, ppm (v)	< 1
6.	Particulate fineness, micrometer	15 (nom.)
7.	Oil content, mg/m ³	< 3

4 DESCRIPTION OF ISROSENE PRODUCTION PROCESS AND PRODUCTION PLANT

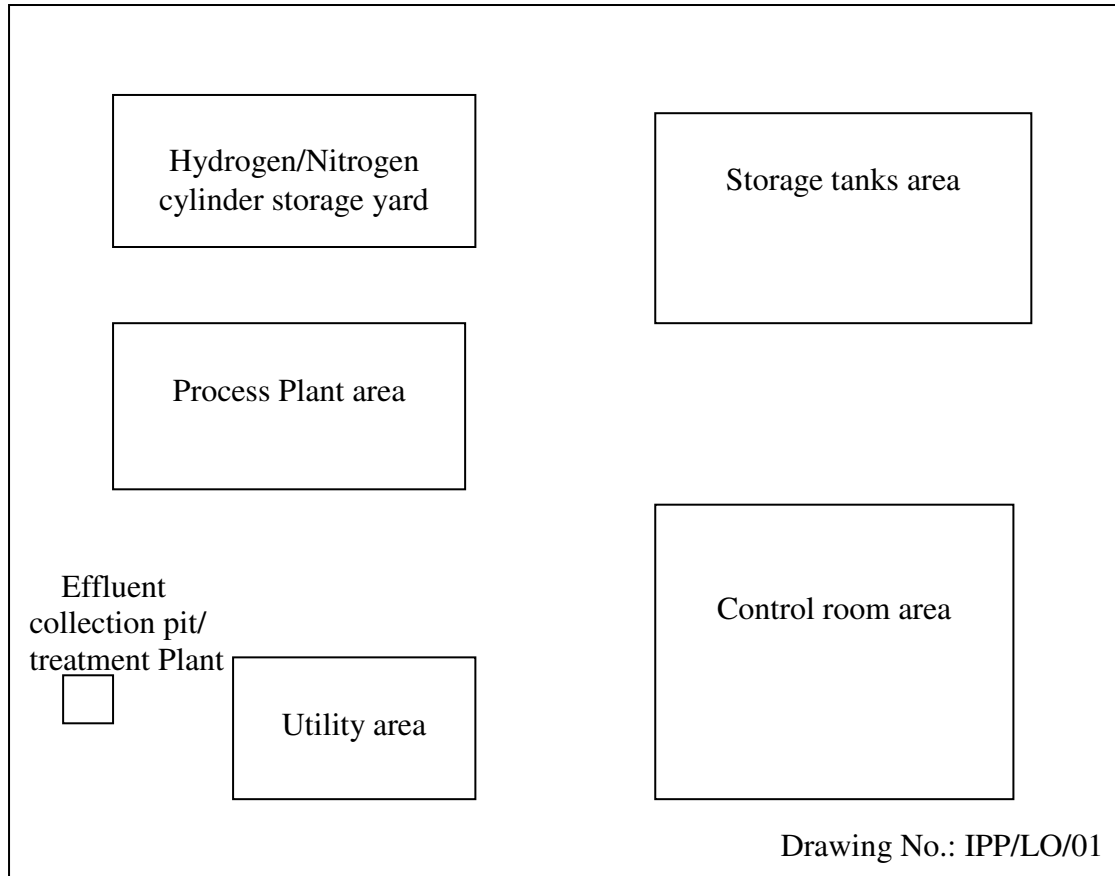
4.1 Brief process of Isrosene production

- The reduction of aromatics in hydrocarbon stream can be carried out by catalytic hydrogenation using metal catalysts. Best results can be achieved by passing a mixture of hydrogen gas and hydrocarbon over a fixed bed having a desired catalyst on supporting material.
- The temperature, pressure, LAB Raffinate to hydrogen mixture ratio, space velocity etc., are the process parameters which determine the conversion.
- Hydrogenation of feed raw material is conducted in a fixed bed stainless steel tubular reactor system packed with suitable catalyst in tubes designed to suitable bed height.
- The whole system is to be auto controlled by SCADA operating system.
- A pump is used to supply feed LAB Raffinate continuously from a feed vessel to a heater/vapouriser.
- Hydrogen gas is supplied from high pressure gas cylinders. Pressure regulator shall be installed in the feed line. Hydrogen gas quality shall be checked periodically by sample analysis.
- A premixing cum heating vessel is provided for obtaining right mixture of LAB Raffinate and hydrogen gas at desired temperature and pressure.
- The above mixture enters the fixed bed catalytic reactor maintained at desired temperature and pressure. After the conversion, it is passed through heat exchanger/condensor to cool the reacted mixture.
- A separator is to be provided to separate liquid and gas. Liquid is collected in a holding tank.
- **Degumming process:** The converted liquid is then chilled to about minus 20 °C temperature and filtered through 2 micron (abs) filter element in order to remove the precipitated gum/ wax content thereby obtaining Isrosene which is analyzed and conformed for specifications mentioned in Section 3, Sl.No. 9, 14 and 21
- **Recovery of unreacted hydrogen:** Unreacted hydrogen gas stream from the separator may be recovered for reuse in the process or burnt to generate hot gases for using in the process as a heating medium.

General Schematic block diagram of Isrosene production process



Isrosene Production Plant layout (Tentative)



4.2 DESCRIPTION OF THE PLANT

Isrosene Production plant with a capacity of 3000 liters per day is being established for production of Isrosene fuel for Semi Cryogenic Engine. The overall plant layout envisaged is shown in the Drawing No.: IPP/LO/01. The plant consists of the following facilities.

4.2.1 STORAGE TANKS AREA

The storage tank area consists of four vertical cylindrical tanks made of SS material each having water capacity of 100 m³ to store the raw material LAB raffinate for 3 months continuous production. Three tanks will be used for normal storage and the fourth one will be a standby tank. All the tanks shall be vertical with fixed roof construction as per API 650 code. The vertical tanks shall be sloped at the bottom center for collection and easy removal of water contamination. The tanks shall be provided with steps and platform for easy climbing and servicing.

The finished product (Isrosene) is stored in 25 m³ capacity (1 No. for Option: 1 & 2 Nos. for Option: 2) horizontal cylindrical tank with 2:1 ellipsoidal dished ends made of SS material designed to 5 ksc design pressure as per ASME Sec. VIII Div. I pressure vessel code. The tank shall have working platforms all-around.

All the storage tanks needs to be equipped with filling, withdrawal, nitrogen blanketing, venting, safety relieving devices, level, temperature and pressure sensing and transmitter systems controlled from a remote control room along with local monitoring. Transfer pumps (2 Nos.) each of capacity 10 m³/hr shall be provided for handling LAB raffinate from transportation tankers to 100 m³ capacity storage tanks, filling in feed vessel for process and transfer between tanks. Separate pumps of similar capacity (10 m³/hr) shall be provided for handling Isrosene from 25 m³ capacity Isrosene tank for filling into tankers.

All the above tanks shall be placed inside dike wall designed to comply with the CCoE norms. Open Shed shall be provided to protect the transfer pumps and the Isrosene tank (25 m³) area alone. Concrete platform shall be provided for tanker at loading and unloading area as per norms. The dike trench shall be connected to a collection pit and provided with effluent transfer pumps to transfer the contents to underground (U/G) RCC effluent collection pit for treatment and disposal. Hydrocarbon detectors shall be provided in the storage tank area.

4.2.2 PROCESS PLANT BUILDING

The process plant building houses all the process and auxillary equipments. The building consists of structurals for mounting the equipments at various levels

depending on the requirements, approach platforms, ladders, walkways, pipe racks, pipe supports etc. A hoist (5 T capacity) shall be provided for easy handling of reactor tubes during catalyst regeneration and reloading. RCC staircases at diagonally opposite locations shall be provided to approach different levels and as an emergency escape path in case of fire. The building shall have louvers and sheet roofing. The ground floor shall have trenches to collect the washings in a drain pit before transferring to the effluent collection pit. Pipe racks with supports shall be provided from utilities shed, storage tanks area, control room area and cylinder yard for running pipes and cables (Electrical & Instrument). Hydrogen gas detectors and hydrocarbon detectors shall be provided in the process plant area.

4.2.3 UTILITIES SHED

The utilities shed houses Air compressors, heating source, chiller plant, soft water generation plant and related local control panels and pumps. Other utility equipments like soft water tank, air receivers, scrubber, cooling towers and pumps, blowers and chimney/stack etc. may be provided near the utility shed. Drain pit shall be provided near the building to discharge water from scrubber before transferring to the effluent collection pit.

4.2.4 HYDROGEN AND NITROGEN CYLINDERS STORAGE YARD

The hydrogen and Nitrogen cylinders storage yard houses both hydrogen cylinders and nitrogen cylinders. Pressure regulation modules shall be provided as per the process requirements with necessary piping for filling and withdrawal. The stacking/skid arrangement for Hydrogen cylinders shall be planned. For handling the cylinders using mobile crane, the shed shall have steel structure with removable type sheet roof. Hydrogen gas detectors shall be provided in the shed.

4.2.5 CONTROL ROOM AREA

Control room area consists of the following buildings; control room, MCC room with separate partition for UPS room, Battery room, Analytical laboratory room, Plant office, Maintenance shop, Store ,operators change room and toilets, Open shed for DG set, Diesel storage tank and transfer pumps .

4.2.6 FIRE FIGHTING SYSTEM

Fire fighting system consists of Fire hydrant system, Deluge system for storage tank area and process plant area, Sprinkler system for all other hazardous areas and Foam system for storage tank area. Control room and other non-hazardous areas shall have fire and smoke detection system as per NFPA guidelines. Fire fighting pumps consists of jockey pump, electrical main pump and Diesel main

pump of sufficient capacity located in the fire pump house inside the plant. The capacity of Ground Level Reservoir (GLR) should meet the fire fighting requirement. No separate GLR is required at the plant for fire fighting, if the plant is at IPRC, Mahendragiri. Separate and dedicated GLR shall be planned at the Plant site for Option: 2.

4.2.7 EFFLUENT COLLECTION/ DISPOSAL SYSTEM

Scrubber shall be provided to remove hydrocarbon vapour using water or suitable scrubbing medium before venting. Effluent collection pits of sufficient capacity (150 m³) shall be provided in the layout for hydrocarbon contaminated waste/wash water and a soak pit for discharging waste/rejected water from soft water plant. Effluent treatment Plant (ETP) shall be included for treating and safe ground discharging of hydrocarbon contaminated water collected in the collection pit to meet the statutory requirements of Pollution Control Board.

5 SCOPE OF WORK

The prime objective of this project is to produce ISROSENE (rocket propellant grade kerosene) and supply as and when required for semi cryogenic project. The scope of work mainly comprises of the following.

- a. Establishment of a new Isrosene Production Plant with a capacity of 3000 liters per day on turnkey basis with complete IPRC/ISRO funding at IPRC, Mahendragiri or at Contractor's site anywhere in India. The process shall be designed in such a way that production capacity of Isrosene production plant shall be 20 % higher than the design capacity.
- b. The scope of work envisaged includes Process design, detailed engineering, Civil, structural and electrical works, procurement of materials, fabrication, erection, installation, testing and commissioning with fully automatic system including process and utilities system, electrical system, instrumentation and control system, safety and fire fighting system, CCTV and communication system, pollution control measures with effluent collection, treatment and disposal making a full-fledged production facility.
- c. The process of manufacturing Isrosene involves catalytic hydrogenation of Linear Alkyl Benzene (LAB) raffinate to reduce aromatics content. Also lowering the temperature and then filtration to bring down the existent gum content and particulates.
- d. Commissioning and performance testing of the plant by conducting trial runs followed by demonstration of 3600 liters per day production (20% higher than planned production capacity).
- e. Operation & Maintenance of the Isrosene Production Plant for a period of 3 years and supply Isrosene as and when required as per the mutually agreed terms and conditions. Detailed scope of the Contractor and Department for operation and maintenance is mentioned in Section 6.24.

After 3 years of Operation & Maintenance, a separate contract will be entered into.

6 RESPONSIBILITIES OF THE CONTRACTOR

6.1 TECHNICAL PROJECT REPORT

- a. Provide process details for the production of Isrosene. The process shall be designed in such a way that production capacity of Isrosene production plant shall be 20 % higher than the design capacity. The Plant shall be designed for an operational life of minimum 20 years
- b. Provide Technical project design report with Process Flow diagrams (PFD), P&IDs, Material & Energy balances, Plant layout, Equipment layout, firefighting equipment layout, CCTV and communication system layout, Electrical load details in process and utility panels, etc.
- c. Define the requirement & consumption of raw materials & utilities including catalyst for one metric ton of Isrosene production. Provide all the process parameters like temperature, pressure etc. for the operation of the plant.
- d. Provide details on requirement of land, Plant buildings, electrical systems and civil foundations drawings for process equipments, power requirements etc.
- e. After awarding the contract, within one month the Contractor shall submit a detailed Technical Project Report covering all the aspects of the plant. Department will organize a review to finalise the requirements stated in the Technical Project Report submitted by the Contractor.
- f. Cost incurred for the preparation of technical project report including consultancy charges, if any, shall be quoted in the price bid format.

6.2 DESIGN REPORT

- a. After finalizing the requirements in the Technical Project report, the contractor shall prepare details such as design calculations for the equipments, sizing of the fluid circuits, sizing of flow components and details of instrumentation and control systems, Safety systems, fire fighting system etc. with detailed P&ID, material & energy balances and engineering documents for the plant. Plant layout, Equipment layout, piping layout, isometrics, Civil and electrical requirements, Structural design etc. shall also be part of the design report. Design report shall be provided within 3 months from the date of awarding the contract.
- b. Cost incurred for the preparation of design report including consultancy

charges, if any, shall be quoted in the price bid format.

6.3 DETAILED ENGINEERING

- a. Based on the approved design evolved during the Department design reviews, the Contractor shall carry out detailed engineering. The contractor shall submit detailed applicable design/specifications/ fabrication drawings of all the systems, sub systems, main equipments, auxiliary equipments & components, analytical equipments, instrumentation and control system, safety items/equipments, static and instrumentation earthing, storage tanks for raw materials & final product and intermediate storage/process vessels, gas cylinders etc. for the establishment of Isrosene production plant
- b. The detailed P&IDs, piping and equipment layout, isometric drawings and bill of materials for all the systems of the plant. Detailed layouts and isometric views shall be made in Auto-cad based software and stored/saved in Compact discs as well as a set of hard copy
- c. Provide information regarding erection and installation plan, periodical maintenance, periodicity of testing equipments/components.
- d. Provide operating procedures/ manuals for plant start up/operation/shut down.
- e. Submit detailed documents for maintenance (routine, preventive & break down) and troubleshooting
- f. Detailed engineering shall be completed within 6 months from the date of awarding the contract. The detailed engineering documents shall be submitted to the Department at least 2 weeks in advance for perusal. Detailed Engineering Review (DER) meeting will be organized by the Department and necessary modifications/changes, if any required shall be incorporated by the Contractor.
- g. Cost incurred for the Detailed Engineering including consultancy charges, if any, shall be quoted in the price bid format.

6.4 HAZOP ANALYSIS

- a. The contractor shall provide details on safety precautions, fire fighting, emergency management plans etc., for conducting HAZOP studies
- b. The Contractor shall submit the design of the system with P&I diagrams to a reputed third party consultant for carrying out Hazards and Operability (HAZOP) analysis as per established norms.

- c. The recommendations of the HAZOP analysis shall be incorporated in the scope of work by Contractor.
- d. The contractor shall provide necessary safeguards as per the recommendations of HAZOP analysis and suitable firefighting systems and pollution monitors as per the requirements.
- e. The price for the HAZOP analysis and the consultant proposed to-be engaged for this purpose shall be quoted in the price bid.

6.5 GENERAL POINTS ON EQUIPMENTS AND INSTRUMENTS

- a. Procurement, supply of brand new items and transportation to the plant site for Isrosene production plant.
- b. All the process vessels, equipments, components, instruments, pipes & pipe fittings shall be made of SS 304L/ SS 316L/ SS 310S. For high temperature service, SS 310S shall be considered.
- c. All the pumps, blowers and compressors shall have one working and one standby for redundancy.
- d. Equipments/vessels shall have 600 NB size manholes for internal inspection and maintenance.
- e. All pressure vessels shall have WNRF flanges and designed for vacuum wherever pump transfer is envisaged.
- f. All cold formed domes shall be solution annealed as per code to relieve stresses.
- g. The entire inner surface of the 4 m³ product tank & 25 m³ Isrosene storage tank shall be mechanically polished to remove rough surfaces.
- h. Corrosion allowance shall be considered as per code for an operational life of minimum 20 years.
- i. The entire inner and outer surface of vessels/equipments shall be pickled and passivated.
- j. The fabrication, testing and cleaning of the vessels/equipments shall follow the procedure given in section 6.16

6.6 PROCESS EQUIPMENTS

- a. Tentative list of process equipments and storage vessels/tanks and their

quantity and capacities for the plant are listed below. However Contractors shall include or remove items specific to the proposed process.

1) Catalytic Reactors (2 Nos.), 2) Feed Vessel (4 m³), 3) Preheater 4) Flash vessel 5) Premixer 6) Phase Separator 7) Demister vessel 8) Intermediate collecting vessel (4 m³) 9) Heat exchangers/Condensers 10) Sub cooler and chiller 11) Filters for degumming (2 Nos.) 12) Product tank (4 m³) 13) Scrubber with internals 14) Blow down vessels 15) Chimney/stack 16) Isrosene storage tank (25 m³) - (1 No. for Option: 1 & 2 Nos. for Option: 2) 17) Raw material storage tank -4 Nos. (100 m³) 18) Air receivers-2 Nos. (1 m³) 19) Soft water tank 20) Diesel tank (1 m³) 21) Spare catalyst holding tubes for reactor (Numbers to be specified as per design)

- b. Two catalytic fixed bed tubular reactors are envisaged to ensure continuous production by redirecting the process flow through one of the reactor during insitu catalyst regeneration in the other. Also two filtration systems are being envisaged for degumming to have continuous operation during filter cleaning and servicing.
- c. General Arrangement (GA) drawing with major specifications including material of construction and weight for each of the listed equipments shall be submitted in the quotation.

6.7 AUXILLARY EQUIPMENTS

- a. Auxiliary equipments include various pumps and utility equipments along with high pressure gas cylinders for storage of Hydrogen and nitrogen gas.
- b. The tentative lists of auxiliary equipments required for the plant and their quantity and capacities are listed below. However Contractors shall include or remove items specific to the proposed process.

1) Chiller plant consisting of associated systems and pumps, 2) Heating source with connected systems (Hot gas or Hot oil type), 3) Air compressors with air drier system for moist free air - 2 Nos., 4) Cooling tower with basin and circulation pumps, 5) Soft water plant 6) Electric hoist for process area (5 T), 7) Hydrogen cylinders and valves with pressure regulation modules 8) Nitrogen cylinders and valves with pressure regulation modules 9) Feed pumps (metering), 10) Isrosene transfer pumps (5 m³/hr) for transfer from product

tank (4 m³) to 25 m³ storage tank 11) Raw material transfer pumps (10 m³/hr), to transfer from tanker to storage tanks and storage tanks (100 m³) to feed vessel 12) Isrosene transfer pumps (10 m³/hr) to transfer from 25 m³ storage tank to tanker/IPRC storage facility 13) Air blowers for vent stack/chimney & scrubber, 14) Raw water & Soft water pumps for soft water plant, 15) Diesel transfer pumps for DG set, 16) Effluent transfer pumps from process, storage and utility drain pits to effluent collection pit.

- c. High pressure hydrogen and nitrogen gas cylinders: For Option: 1, Contractor shall provide suitable number of hydrogen gas cylinders (1.75 m³, 350 Bar) for 5 days of plant consumption and nitrogen gas cylinders (1.0 m³, 300 Bar) for 7 days consumption for blanketing, purging and leak testing or minimum of 2 Nos. whichever is greater.

For Option: 2, Contractor shall provide suitable capacity hydrogen gas cylinders and nitrogen gas cylinders as per the proposed Plant requirements for continuous operation. Number of cylinders for both hydrogen and nitrogen gases of specified capacity shall be clearly worked out and mentioned in the quotation. Equipments for charging gases in cylinders shall be planned if required.

- d. Isrosene Pumping system: For Option: 1, Contractor shall provide pumping system for the transfer of Isrosene product from finished product storage tank (25 m³) located at the plant to the Isrosene storage facility of IPRC which is adjacent (approx. 400 m away) to Isrosene Production Plant. Yard piping to transfer Isrosene product from the Plant to IPRC storage facility will be provided by IPRC.

For Option: 2, Contractor shall provide pumping system for filling Isrosene product from Storage tank (25 m³) at Plant site to road tankers for transportation to IPRC, Mahendragiri.

- e. Major specifications including material of construction and weight for each of the listed equipments shall be submitted in the quotation.

6.8 VALVES, PIPES, PIPE FITTINGS, INSULATION, FLEXIBLE HOSES, STUD & BOLTS AND GASKETS

Contractor shall provide complete list of Pipes, Pipe fittings, Valves, Insulations (Cold & Hot), Studs & bolts and gaskets as per the P&ID.

- a. Valves: Detailed list of valves specifying type, size, MOC, connection, rating, service and quantity with unit cost shall be provided in the quotation. Special valves and severe service valves shall be listed separately with specifications, quantity and unit cost in the quotation.
- b. Pipes & Pipe fittings: Detailed list of Pipes and pipe fittings specifying MOC, size, schedule, service and quantity with unit cost shall be provided in the quotation. Flanges shall be of WNRF/ WNRJ type for high pressure lines.
- c. Insulation: Insulation material for pipes and equipments shall be provided. Material for hot and cold insulation shall be specified along with size, quantity and unit cost in the quotation.
- d. Flexible hoses: Required quantity shall be estimated and quoted in lumpsum.
- e. Studs & bolts: Required quantity shall be estimated and quoted in lumpsum.
- f. Gaskets: For low pressure application, all gaskets shall be SS & PTFE spiral wound with SS inner and outer ring. Metallic gasket shall be used for high pressure application. Required quantity shall be estimated and quoted in lumpsum.

6.9 INSTRUMENTATION & CONTROL SYSTEM

- a. Provide state of the art instrumentation system with redundant PLCs, SCADA, Data acquisition systems, signal conditioners, PC based operator stations and HART protocol compatible field transmitters/sensors.
- b. Programmable Logic Controller (PLC) shall be procured from reputed brands of Siemens or Honeywell. Industrial grade (PLC) with redundant configuration is sufficient instead of SIL compliant system.
- c. All electrical equipments and Field instruments shall be compatible for Group IIB/ II C environment wherever applicable.
- d. Modular panels with operator stations and engineering station is to be provided.
- e. Required junction boxes and cubicles (if required) to be provided.
- f. Wherever required, provide armoured cables and fire retardant cables.
- g. Rugged instrumentation racks to be provided for mounting signal conditioners, DAS, PLCs etc.
- h. Parallel redundant uninterrupted power supply (UPS) for the instrumentation

systems to be provided. (With a minimum backup time of 30 minutes)

- i. The preferred make for pressure transmitters are M/s. Honeywell / Rosemount model 3051
- j. Pressure transmitters should have 2/5 way manifold depends on Absolute/ Differential type
- k. The preferred make for Temperature transmitters are M/s. Smar / Rosemount
- l. The preferred make for Radar Type Level transmitters are M/s. Rosemount / Vega
- m. The preferred make for Solenoid valves is M/s Asco
- n. Barriers shall be provided wherever required. Preferred make shall be M/s Pepperl & Fuchs (P&F)
- o. Contractor shall provide complete list of Instruments, components and control system based on the P&ID mentioning the size, working range, service and quantity with unit cost in the quotation. Generic list of items are listed below, however any other instruments specific to the process proposed by the contractor shall be included. Also if any of the instruments, components and system mentioned below are not required, it shall be removed and indicated.

Instruments and components: 1) Actuated on-off ball valves, 2) Breather valves, 3) Flow control valves, 4) Level gauges, 5) Radar type level transmitters, 6) Mass flow meters, 7) Pressure and temperature control valves, 8) Pressure gauges, 9) Pressure transmitters, 10) Rupture disks, 11) Safety relief valves, 12) Temperature gauges, 13) Temperature element/transmitters, 14) Signal and control cables (Various sizes and quantity) 15) Cable trays (various sizes and quantity), 16) Cable glands, 17) Junction boxes, 18) Miscellaneous items like Instrument tubings, fittings, Air header, Structural steel for mounting, CS pipes, Anchor fasteners etc.

PLC based Control system with redundant configuration: 1) Controllers (CPU, Network I/O bus, I/O Network interface card), 2) Power supply modules (System power supply, I/O power supply, Field power supply), 3) Control Network equipments (I/O bus to control network, Main controller to operator station network), 4) All communications equipments required for communication between controllers and I/O modules, 5) Analog and Digital Input and Output modules (Specify the number of modules under each category with spares), 6)

Cabinets for controllers and I/O modules, 7) Operator consoles & server (21 “ LED monitors – 2 Nos with latest configuration Industrial PC with OS license), 8) Software shall include required engineering and Operator licenses with Functional block diagram, Instruction I/O list, Ladder diagram, Sequential functional chart and structured text along with interactive process operation graphics/mimics, displays, alarm reports and trending, 9) UPS (30 kVA)

6.10 ELECTRICAL SYSTEM/EQUIPMENTS

- a. Provide internal power distribution to all the field instruments and electrical equipments inside the plant
- b. Provide static earthing, instrumentation earthing and power body earthing for the plant and equipments. Provide scheme of earthing for necessary approval by department before implementing.
- c. Provide lightning arresters for stack/chimney and for the plant as a whole.
- d. Single-line diagram (SLD) drawings shall be provided for utility and process MCCs with make of components and rating along with the quotation.
- e. The methodology for automatic changeover from EB to DG and vice versa shall be provided with suitable sequence embedded in the process control logic.
- f. Contractor shall provide complete list of electrical systems along with their power distribution based on the plant layout mentioning the size and quantity with unit cost in the quotation. Generic list of items are listed below, however any other electrical systems/ equipments specific to the process proposed by the contractor shall be included or removed.

1) Process MCC, 2) Utility MCC, 3) DG set (500 kVA) with automatic changeover system, 4) Armoured LT cables (various schedules-to be listed), 5) Push button stations (Flame proof and Industrial), 6) Cable trays (various schedules-to be listed), 7) Earthing for static (No. of earth pits, No. of GI strips of various sizes), 8) Earthing for instrumentation (No. of earth pits, No. of CU strips of various sizes), 9) Earthing for lightning protection (No. of earth pits, No. of GI strips of various sizes for roof conductor and down comer), 10) Other miscellaneous works/items to be listed with quantity.

6.11 LABORATORY ANALYTICAL EQUIPMENTS

For Option: 1, all analytical instruments shall be provided by IPRC as free issue

material for Operation and Maintenance by the Contractor.

For Option: 2, the list of laboratory analytical instruments required for conducting quality checks of the raw materials and product are listed below.

1) FTIR Instrument for Aromatic content, 2) Existent gum analyser for Gum content, 3) Particulate analyser and 4) Density meter.

All the above analysers shall confirm to ASTM test methods mentioned in Section 3. Make and model of the instrument shall be specified in the quotation. Laboratory Instruments shall be procured after concurrence with the Department.

6.12 SAFETY SYSTEMS/EQUIPMENTS

- a. Provide pollution monitors, safety devices, fire fighting measures, Effluent treatment plant (ETP) for treating liquid effluents if any, produced during process/maintenance/leakage/spills to meet the statutory requirements of Pollution control board.
- b. PPEs for the crew during the 3 years Operation and maintenance period for the plant shall be listed and quoted.
- c. Proposed effluent treatment and disposal scheme shall be clearly mentioned in the quotation
- d. Generic list of items are listed below, however any other safety systems/equipments specific to the process proposed by the contractor shall be included or removed in the quotation.

1) Hydrogen detector & transmitter, 2) Hydrocarbon detector & transmitter, (Both the detectors shall have local audio and visual alarms) 3) Flame arrestors, 4) Pollution monitor for stack/chimney with remote monitoring, 5) List of PPEs for operation and maintenance crew, 6) Effluent treatment unit (with breakup of equipments and systems)

6.13 FIRE FIGHTING EQUIPMENTS

- a. Fire fighting system shall be designed as per standard code. The following design considerations shall be taken for the design of fire hydrant system, sprinkler/deluge system and foam system.

Sl. No	Fire fighting system	Flow rate or design density	Duration
1	Fire hydrant system	946 lpm	1 hr
2	Water sprinkler and Deluge system for process, utility and storage tank area.	25 lpm/ m ²	1 hr
3	Foam system for storage tank area <ul style="list-style-type: none"> • Storage tank • Dyke area 	6.5 lpm/ m ² 4.1 lpm/ m ²	30 minutes

- b. Control room and other non hazardous areas shall have fire and smoke detection systems as per NFPA guidelines.
- c. Deluge system shall be provided for storage tank area and process plant area. Sprinkler system shall be provided for all other hazardous areas. Foam system shall be provided for storage tank area.
- d. No Sprinkler / Deluge system is required for the open shed in the Hydrogen cylinder storage yard, however hydrogen detectors and transmitters shall be provided.
- e. For option 1, No separate GLR is required at the plant for fire fighting. GLR of sufficient capacity is available nearby for this complex and water can be delivered for firefighting from GLR at one point in the plant site.
For Option: 2, Separate and dedicated GLR shall be planned at the Plant site.
- f. Fire fighting pumps, Jockey pump, Electrical main pump and Diesel main pumps of required capacity shall be provided.
- g. Contractor shall clearly mention the proposed piping for the fire hydrant system whether it is under ground or over the ground in the quotation.
- h. Generic list of items under firefighting systems are given below, however contractor shall include or remove items based on the proposed design/ layout.
- 1) Fire hydrant system (Detailed list of items with MOC, size, rating and quantity), 2) Portable Fire extinguishers & sand buckets (Type, capacity and quantity) 3) Sprinkler and deluge system with control panel (Detailed list of items with MOC, size, rating and quantity), 4) Fire detection and alarm system (Fire alarm control panel, repeater panel, smoke and flame detectors, manual call points and related installation materials) with PC and programming

software and 5) Foam system (Detailed list of items with MOC, size, rating and quantity), 6) Fire fighting pumps (Jockey, Electrical main pump & Diesel main pump- 1 No. each)

6.14 CCTV & COMMUNICATION SYSTEM

a. Provide necessary Communication systems (Public Address system) and Closed Circuit Television (CCTV) of reputed brand for the plant. Price per unit camera shall be given in price bid

b. Generic list of items with tentative numbers are given below under CCTV & communication systems, however contractor shall include or remove items based on the proposed design and layout.

1) IP based full HD, Ex-proof PTZ camera for Group IIC hazardous area including housing and lens for Process plant area (6 Nos.), Storage tank area (1 No.) and Hydrogen cylinders storage yard (1 No.),

2) IP based full HD, Non-flameproof PTZ camera for Utility area (1 No.) and Control room (1 No.)

3) Desktop station for control room with control software and keyboard/Joystick, 16 channel network video recorder with 36Terabyte hard disk, network switch, armoured cables for camera power supply, Optical Fibre signal cables, conduit for OFC cables, patch cord from network switch in field to server, Media convertors, etc.(Detailed list of items shall be mentioned in the quote)

4) LED Display monitors (48") - 2 Nos.

5) Industrial multichannel public address system (1 page in broadcast mode and 8 private in point to point mode) consisting of desktop station for control room, Field call stations (Non-flame proof- 4 Nos.) & Hazardous area flame proof IIC - 5 Nos.), Loud speakers non-flameproof (6W indoor-2 Nos.), Horn type loud speakers Hazardous area Flameproof IIB/IIC (15 W, IP66 - 9 Nos.), Armoured audio signal cables (with Schedule and quantity), Power supply unit for field call station etc.

6.15 CIVIL WORKS AND STRUCTURAL WORKS

The Contractor is also responsible for the construction of buildings including civil, electrical, air conditioning and structural works for the entire plant for

both the options. Detailed cost break up for each element for both civil works and structural work shall be provided in the quotation.

For Option: 1, Department will identify the plant site for the establishment of the plant inside IPRC, Mahendragiri.

For Option: 2, Plant buildings shall be newly constructed in a vacant land owned by the contractor. Also, the Contractor shall identify the proposed site for obtaining necessary clearance from the Department. Separate and dedicated utilities and GLR for firefighting shall be planned at the Plant site.

Details of the plant facilities are described in section 4.2. The overall plant layout envisaged is shown in the Drawing No.: IPP/LO/01. The list of facilities and the tentative building area are given below,

- Storage tank area consisting of foundations for tanks (4 Nos. of 100 m³ vertical tank and 25 m³ horizontal tank (1 No. for Option: 1 & 2 Nos. for Option: 2) surrounded by dike wall and trenches with a tentative overall area of 25 m X 25 m. Transfer pumps are installed outside the dike and open shed shall be provided for 25 m³ horizontal Isrosene tank and the pumps area.
- Process Plant area description is given in section 4.2.2 with a tentative area of 20 m X 15 m. It consists of concrete foundation and structural works for mounting equipments at various levels. Details on the structurals for the process plant building shall be given in the quotation mentioning the quantity of materials viz, channels, beams, chequered plates, gratings, pipes, platforms, walkways, industrial sheet roofing and louvers with fabrication and erection works.
- Utilities shed description is given in section 4.2.3 with a tentative area of 15 m X 15 m. It consists of concrete foundation with sheet roofing and louvers.
- Hydrogen and Nitrogen cylinder storage yard description is given in section 4.2.4 with a tentative area of 15 m X 15 m. It consists of open shed with removable type roof for handling of cylinders.
- Control room area consists of the following buildings with tentative building areas; control room (10 m X 10 m), MCC room (10 m X 10 m) with separate partition for UPS room & Battery room, Analytical laboratory room (7 m X 7 m), Plant office (5 m X 5 m), Maintenance shop (10 m X 5 m), Store room (10 m X 10 m), operators change room (5 m X 5 m) and toilets, Open shed for DG set,

Diesel storage tank and transfer pumps (10 m X 10 m)

- Other buildings and facilities include fire pump house, U/G reservoirs for raw water storage, effluent collection pit, GLR for firefighting, Structural works related to external pipes and cable racks and their supporting columns, foundations & pedestals for external equipments & pipe & cable racks, 5.5 m wide plant internal roads and approach roads, lightning protection for the plant, plant fencing etc.
- Electrical works associated with buildings and plant as a whole including Main Light Distribution Board (MLDB), Power Distribution Board (PDB), Light Distribution Board (LDB), Street Light Distribution Board, Light Fixtures, Flame Proof Lights, Industrial Lights, Street Lighting and corresponding LT cables.

6.16 ERECTION AND INSTALLATION

- a. Fabrication: All the fluid circuits shall be fabricated at the site as per the approved layout/ isometrics and also considering site conditions. All the circuits shall be fabricated primarily by welding. The other joints such as flanges, threaded unions, etc may be resorted to in such cases where removal of the joints becomes inevitable like pressure gauges/ transmitters, safety relief valves, rupture disc devices, etc. After pre-fabrication of piping spools, the ends shall be blanked off by proper closures.
- b. Welding: All the welding of SS pipe-lines/vessels/equipments shall be performed by Gas-purged Tungsten Arc Welding (GTAW) with Gaseous Argon (99.995 % purity) as the purge medium. In case of welding very thick stainless steel pipe-lines, welding up to the initial 15 mm thickness shall be performed by GTAW and for the remaining thickness by Shielded Metal Arc Welding (SMAW) with Gaseous Argon as the purge medium. The welding processes shall comply with the requirements of Section IX, ASME. All the welding should be done only by qualified welders including structural works. The welding procedure qualification and welder's performance qualification shall be done as per ASME Section IX. Efficiency of weld shall be 1.
- c. Testing: The following tests shall be performed after fabrication of pipe-lines/vessels/equipments and wherever applicable. Contractor shall inform Department well in advance during the testing phase; however it is the discretion of the department to participate.

- i) Dye penetrant test: All the socket welded joints shall be subject to Dye Penetrant Test (DPT) at the root, intermediate and final passes. All the butt and miter welded joints shall be subjected to DPT at the root pass.
- ii) Radio-graphic test: All the SS butt (100%) welded joints shall be subject to radio-graphic test to 2-T sensitivity. Generally, the radio-graphic tests shall be done with X-rays. Alternatively, the gamma rays may be used in locations where the joint is inaccessible to X-ray equipments. All the radio-graphic films shall be preserved along with joint identification numbers marked on the films. Department personnel have the rights to review/verify whenever required.
- iii) Hydro test: All the fabricated pipe-lines shall be subject to pressure test with hydraulic medium at 1.5 times the MAWP and as per code for vessels/equipments.
- iv) Pneumatic leak test: All the pipe-lines/vessels/equipments after final assembly with flow components shall be subject to Pneumatic leak test with GN_2 at 90% of MAWP to validate bubble-tightness
- v) Cleaning: The fabricated SS pipe-lines/vessels/equipments shall be cleaned as per the following procedure
 - a) Mechanical cleaning: All the metallic surfaces with scales and newly welded surfaces shall be cleaned by scrubbing with SS wire brush. The loose particles generated by mechanical cleaning shall be removed by blowing with compressed air, sucking or washing with water.
 - b) De-greasing: This is to remove oil and grease. This is achieved by using trichloroethylene or perchloroethylene.
 - c) Pickling: In order to remove rusts and scales, the inner and outer surfaces shall be washed with water and pickled with a solution containing Hydro-fluoric acid (HF) and Nitric acid (HNO_3). The composition of the pickling solution and duration are to be adjusted after trial test on a sample piece to remove uniformly less than 25 μm thick material. Mostly, the composition is as follows:
 - (1) 5% hydro fluoric acid (by wt)
 - (2) 15 to 20% nitric acid (by wt)
 - (3) Balance waterThe pickling process shall be followed by rinsing with DM water.
 - d) Passivation: The inner and outer surfaces shall be passivated with a solution of the following composition at ambient temperature.

- HNO₃ : 25% by volume
- Water : 75% by volume

Duration of the passivation shall be 2 hours minimum. Finally the surface should be rinsed with demineralised water.

- e) The external surface of the weld joints shall be pickled and passivated by hand-mopping

During erection and installation, Contractor shall arrange third party business liability insurance as mentioned in section 10.31.7 & 10.31.8 respectively. Cost incurred for the same shall be included in the quotation.

6.17 COMMISSIONING

After satisfactory erection and installation of the entire plant, the plant shall be commissioned by the Contractor in presence of Department personnel and Third Party Inspection agency.

Cost of Raw materials, manpower, utilities including fluids such as GH₂, GN₂ and DM water etc. for the commissioning trial and process optimization shall be included in the quotation.

The procedure for commissioning shall comprise the following:

- a) Verification of all instruments
- b) Functional check of all flow components (including evaluation of response time of Electro Pneumatic and control valves)
- c) Filling of all systems with the DM water, pressurising to the Maximum Expected Operating Pressure (MEOP) to validate structural integrity.
- d) Hydraulic testing of fluid circuits and Pressure Vessels to 1.5 times of MAWP.
- e) Flow trial to evaluate the flow characteristics of the circuits such as pressure drop at the working flow rates
- f) Flow Functional validation of all flow components and instruments
- g) Medium substitution with GN₂.
- h) Pneumatic leak test of Pressure Vessel and Fluid Circuit at MEOP

After process optimization, trials have to be conducted in the presence of ISRO team and should meet all the specifications laid down in the document. The plant will be declared operational only after the successful completion of the evaluation trials.

The party has to reprocess the unqualified/rejected batches which may arise

during commissioning trials. If disposal is required, clearance should be obtained from Joint co-ordination committee (JCC) and detailed procedure and checklist for disposal shall be evolved.

The liquid wax obtained during degumming shall be collected in drums. Clearance shall be obtained from JCC for disposal.

6.18 PERFORMANCE TESTS

- a. Demonstration of Plant capacity for the production of Isrosene product to the design capacity (3000 LPD) and 20 % higher than the design capacity (3600 LPD) for a period of one week each.
- b. Cost for performance test shall include production costs in terms of raw materials, catalyst and utilities based on plant consumption norms for 2 weeks at 3000 LPD and 1 week at 3600 LPD along with plant operating cost. Total Operating cost for performance test with cost break-up shall be provided in the quotation. Isrosene produced during commissioning and performance tests will be utilized by the Department without paying any additional cost.

6.19 SPARE PARTS FOR 3 YEARS OPERATION

- a. Supply of adequate plant spare parts for ensuring continuous operation of plant for a period of three years in addition to the warranty period of 2 years from the date of commissioning.
- b. The supply of consumables and spare parts during warranty period at no extra cost is the scope of the Contractor.
- c. The price bid shall also have a list of recommended spare parts for 3 years operation with break up cost, in addition to the warranty period.

6.20 STATUTORY APPROVALS

The Contractor shall be responsible for obtaining all the necessary approvals of Local authorities and all the necessary clearances that may be required for the plant layout and for operating the plant including LAB Raffinate storage, Isrosene intermediate storage, Hydrogen storages etc. The cost incurred for obtaining all the necessary statutory approvals shall be quoted lump sum in the price bid format. Tentative list of approvals and statutory clearance are given below. Any other approval specific to the proposed process by the contractor shall be suitably added or removed.

- a. Plant layout approvals
- b. CCE design approvals for LAB Raffinate, Isrosene storages and high pressure gas cylinders.
- c. All fees and charges to PCB for necessary approvals.
- d. Letters of consent from PCB under water and air pollution acts.
- e. Concurrence to be obtained from Ministry of Petroleum and Natural gas for LAB Raffinate supply.

6.21 LICENSES

The Contractor shall be responsible to pay and obtain necessary license from the Ministry of petroleum for the procurement of LAB Raffinate. Other CCE licenses for LAB Raffinate storages and Isrosene storage shall also be obtained. The cost incurred for obtaining all the necessary licenses shall be quoted lump sum in the price bid format. Tentative list of licenses to be taken by the Contractor is given below. Any other licenses specific to the proposed process by the contractor shall be suitably added or removed

- i) CCE license for LAB Raffinate storages and Isrosene storage
- ii) All fees and charges to PCB under Water and Air Acts including the consent fee. *Consent fee paid shall be reimbursed by the Department at actual.*

6.22 CATALYST

- a. The contractor should provide details of the proposed Catalyst system (Type of catalyst, Availability (proprietary/commercial), Catalyst life and regeneration capability, consumption co-efficient etc.). All the above information shall be provided along with the quotation.
- b. Preparation/supply and characterization of catalyst for packing in the reactor tubes/bed and other related technicalities shall be provided.
- c. The equipments needed for regeneration of the catalyst shall be planned within the plant.
- d. Procurement, preparation, qualifying and packing of hydrogenation catalysts in reactor as per the process requirement during commissioning and plant operation.
- e. The Contractor shall provide confirmation to supply proprietary items, if any, like catalyst etc. and to render continuous back up support as and when required for the entire life of Plant during operation and maintenance from the

date of commissioning. Contractor shall confirm the price of catalyst for another 5 years after the Operation and maintenance period of 3 years and the price with escalation formula shall be quoted separately in the price bid.

- f. Catalyst cost shall be accounted in the raw materials as per the consumption co-efficient for working out the variable operating cost.

6.23 TRANSPORTATION OF RAW MATERIALS

- a. Procurement & Transportation of Raw material (LAB Raffinate) from supplier to plant site for commissioning and performance trials and during operation and maintenance is the scope of the contractor.
- b. Cost towards transportation of LAB raffinate from manufacturer to the plant site shall be accounted in the unit cost of raw materials.

6.24 OPERATION & MAINTENANCE OF THE ISROSENE PRODUCTION PLANT

The Contractor shall take care of the operation and maintenance of the plant for three years after successful commissioning and acceptance by the Department.

I. Scope of the Contractor

- a) The Contractor shall undertake the entire responsibility for operation, maintenance and repair of the Plant including utility units, procurement of raw materials and its transportation to the site for the supply of Isrosene as and when required, treatment of effluent, if any and disposal.
- b) **Maintenance of the plant:** Maintenance cost for the plant includes procurement of consumables for maintenance activities, arranging comprehensive AMC for UPS and DG set, maintenance of fire hydrants, fire fighting equipments and other maintenance related activities in the plant (civil, electrical, mechanical, air conditioning etc.,).
- c) The Contractor shall maintain the quality of Isrosene in accordance with the specifications mentioned in Section 3.
- d) The Contractor shall mobilize man-power for operating the plant on 3 shifts and to carry out the tasks as per the scope mentioned in section 6.24; I (a) and provide them with all welfare measures, transportation facilities and insurance coverage. The Contractor shall also provide his employees with all statutory amenities, conforming to the various regulations and shall be solely liable for their staff and other labourers, either engaged directly or on subcontract or

daily wages, including payment of wages and providing facilities and amenities, complying with the payment of wages Act, workman's compensation Act and all other laws applicable and incidental to the deployment of personnel employed or engaged by them. The manpower required for the plant operation & maintenance in 3 shifts (from Management to technical and non-technical level in different categories with qualification, experience) shall be clearly worked out and mentioned for arriving at the operating cost.

- e) The Contractor is responsible for safe and secure operation of the plant. The Contractor is solely responsible for the safety of the personnel employed by them.
- f) The Contractor shall strictly follow all the safety norms, rules, regulations and process & maintenance procedures of the plant.
- g) **License renewals:** The Contractor shall be responsible to pay and obtain necessary license renewals from the Ministry of petroleum for the procurement of LAB Raffinate. Other CCE licenses for LAB Raffinate storages and Isrosene storage shall also be obtained. The cost incurred for obtaining all the necessary license renewals for consecutive years under the operation and maintenance period will be paid at actuals. Tentative list of licenses to be renewed by the Contractor on annual basis is given below. Any other licenses specific to the proposed process by the contractor shall be suitably added or removed
 - i. CCE license for LAB Raffinate storages and Isrosene storage
 - ii. All fees and charges to PCB under Water and Air Acts including the consent fee. *Consent fee paid shall be reimbursed by the Department at actual.*
- h) **Plant Insurance:** The Contractor shall arrange insurance through a public limited insurance company to cover the cost of the plant as a whole and the insurance shall cover for fire, terrorism, buildings, plant and machinery. *The annual insurance premium paid shall be reimbursed at actual.* The insurance policy shall be in favour of the Department and the original policy deposited with the Department and shall be renewed periodically by the contractor. The compensation if any paid by the insurance company in case of any claim, shall be paid to the Contractor by the Department once the repair/ replacement is completed. Joint Co-ordination Committee (JCC) shall also finalize the mode of handing over the money received by the Department from

the insurance company to the Contractor to meet the expense of the repair / replacement as and when required.

The Contractor shall arrange their own insurance coverage for their personal involved in the operation of the plant.

- i) The Contractor shall maintain all the documents and manuals related to the plant including Periodical & Breakdown maintenance records, Standard Operating Procedures (SOP), Operation checklists, list of master equipments, Equipment maintenance checklist, Instruments & sensors calibration records, Hydrostatic pressure testing records (for storage vessels, cylinders, process pipelines, Reactors and other process equipments), process & maintenance log sheets, raw material transportation log sheets, analysis and qualification reports for the raw materials, product, catalyst etc.
- j) The Contractor shall operate the DG set and carry out minor maintenance. A separate log sheet shall be maintained for the operation & maintenance of the DG set.

II. Department scope

- a) For Option: 1, Department will provide water, power and other utilities required for the operation and maintenance of the plant on chargeable basis. The charges prevailing now are given below
 - Water – Rs. 25 per m³
 - Electric power – Rs. 8 per kWh
 - Gaseous hydrogen – Rs. 145 per Nm³
 - Gaseous nitrogen – Rs. 20 per Nm³
- b) The Department shall assist the Contractor for obtaining /renewal of the licenses and insurance etc. However, the Contractor shall be responsible to pay the license fee and permit fee for their renewal during the period of operation & maintenance contract as indicated in the section (g & h) of Contractors scope.
- c) The Department shall provide Plant, Equipments/machinery, maintenance shop, change room for the Contractor's employees and other infrastructural facility required for the plant operation and maintenance.
- d) The Department shall verify the process log sheets, Periodic and breakdown maintenance log sheets, Safety & operation checklists, analysis reports etc., and countersign as and when required.
- e) The Department shall inspect the product and conduct quality control checks as and when required.

- f) For Option: 2, Transportation of finished product from plant site to the IPRC/SHAR is the responsibility of the Department. Separate contract for transportation using Department road tankers will be executed after the plant commissioning.
- g) The Department shall constitute a Joint Co-ordination Committee (JCC) consisting of members from ISRO and Contractor. JCC shall monitor plant operation, Production schedule, manpower utilization, operation & maintenance of the plant, security and resolve any issues arising out of the administration. Any deviation or any modification called for towards operation of the plant and logistics shall be projected to the JCC before initiating any action. Any augmentation to the plant, existing establishment etc. shall be discussed in the JCC before proceeding with such proposals.

III. Plant Operating cost and price variation:

Plant operating cost consists of Fixed and Variable operating cost.

- a) **Fixed operating cost:** The fixed cost elements namely salaries for operating manpower/labour (list of personnel from Management level to technical and non technical level in different categories with qualification, experience shall be mentioned for 3 shift plant operation & maintenance), maintenance cost, administrative expenses, profit will be fixed for 3 years. The same shall be quoted as operation and maintenance cost of the plant for 3 years with break up costs in the price bid. Payment will be paid on prorata monthly basis irrespective of Isrosene supply to Department during the Operation & maintenance period.
- b) **Variable operation cost:** Variable cost elements per metric ton of the product like cost of raw materials including their transportation costs, catalyst, utilities etc. based on consumption norms and their corresponding unit cost shall be worked out in detail for the first year and quoted. Plant operation shall be considered for 300 days in a year at 80 % of nominal capacity of 3000 liters per day. Variable operating cost shall be paid for the quantity of Isrosene supplied to IPRC/ISRO.

For price fixation in subsequent years, variable costs per metric ton of Isrosene will be reviewed during the month of April every year based on the actual market price of raw materials and utilities, certified by the Contractor's Chartered Accountant. The Contractor shall produce

documentary proof for review of variable cost by the Department to fix the price as mentioned above.

- c) **Product cost:** The cost of product shall include fixed & variable operating costs.

7 RESPONSIBILITIES OF THE DEPARTMENT

7.1 ESTABLISHMENT AT IPRC (OPTION: 1)

- 7.1.1 Provide detailed specifications of raw materials and Isrosene product to the bidders.
- 7.1.2 Review of the process technology and plant design including adequacy of safety systems and HAZOP document.
- 7.1.3 Identification of Site with necessary safety clearance for Isrosene production plant. Land will be provided without any cost for establishing the plant inside IPRC, Mahendragiri.
- 7.1.4 Electrical power, hydrogen gas, nitrogen gas and water shall be provided by the Department for erection, commissioning and Operation & maintenance of the plant on chargeable basis. The prevailing charges are given in Section 6.24 II (a)
- 7.1.5 Department will review all civil, structural and related works for the plant buildings designed by the contractor for the design and adequacy as per ISRO standards and accord necessary approval and clearances for the buildings.
- 7.1.6 Electrical power and raw water for plant erection, commissioning and operation & maintenance will be made available at one location in the plant site by the Department. Water for firefighting from nearby GLR will also be made available at one location in the plant site.
- 7.1.7 Department will provide yard piping to transfer Isrosene product from the Plant to IPRC storage facility.
- 7.1.8 Hydrogen and Nitrogen gas charging points will be made available at one location in the plant.
- 7.1.9 Participation in Joint Technical Review meetings at IPRC / Contractors factory.
- 7.1.10 Conducting technical and safety audit of the process/ plant to ensure conformity to approved process.
- 7.1.11 Participation in the initial process developmental trials, if any and evaluation of the product as per the specifications and clearance during the initial process developmental trials.
- 7.1.12 Provide Laboratory analytical equipments for installing in the Isrosene plant at IPRC, Mahendragiri for analysis.

7.2 ESTABLISHMENT AT CONTRACTOR'S SITE (OPTION: 2)

- 7.2.1 Provide detailed specifications of raw materials and Isrosene product to the

Contractor.

- 7.2.2 Review of the process technology and plant design including adequacy of safety systems and HAZOP document.
- 7.2.3 Site identified by the Contractor, equipment layout and building plans for the Plant shall be reviewed by IPRC.
- 7.2.4 Department will review all civil, structural and related works for the plant buildings designed by the contractor for the design and adequacy as per ISRO standards and accord necessary approval and clearances for the buildings.
- 7.2.5 Transportation of finished product from plant site to the IPRC/ SHAR is the responsibility of the Department. Separate contract for transportation using Department road tankers will be executed after the plant commissioning
- 7.2.6 Participation in Joint Technical Review meetings at IPRC / Contractors factory.
- 7.2.7 Conducting technical and safety audit of the process/ plant to ensure conformity to approved process.
- 7.2.8 Participation in the initial process developmental trials, if any and evaluation of the product as per the specifications and clearance during the initial process developmental trials

8 SAFETY, QUALITY CONTROL AND INSPECTION

8.1 SAFETY

The Contractor should strictly adhere to the quality and safety norms and procedures as per mutually agreed terms to be followed during the production, storage and filling.

8.1.1 The proposal shall specify the Industrial Safety aspects practiced by the company, safety standards, safety systems available and experience in handling toxic and flammable materials.

8.1.2 The proposal shall also include specific safety measures available in place for handling the process described in the RFP. If such safety measures are not available a detailed plan for implementing the same should be included in the proposal.

8.1.3 The Contractor shall make necessary arrangements for any emergency accident relief measures. Details of safety precautions & firefighting measures shall also be properly planned and documented.

8.2 QUALITY CONTROL

The prime responsibility for carrying out stage wise inspection and testing during fabrication of process equipments at manufacturer's site shall rest with the Contractor/ third party inspection agency. Pre-delivery inspection shall be carried out as per mutually agreed QAP. The purchasers representatives shall have right to visit and inspect at any point of time at contractors/ sub contractors works related to the Department and necessary support by the Contractor shall be provided. The participation during pre-delivery inspection and review & acceptance of technical project report and detailed engineering document by the purchaser's representatives shall not absolve the Contractor's liability to comply with the technical specifications.

Quality control measures shall be taken up by the Contractor during the plant operation at all the three levels as below using analytical facility.

A. Raw material testing:

The raw material batch/lot shall be tested for their purity and meet the required specifications as given in section 3.B.

B. In-process quality control:

All process parameters shall be logged in real-time and report shall be

generated for every day or lot as per the laid down procedures.

C. Finished product testing:

The properties of the final product Isrosene shall meet the specifications mentioned in Section 3, Sl.No. 9, 14 and 21.

8.3 SCOPE OF THIRD PARTY INSPECTION

All the bought-out materials and the works during fabrication at the Contractor's/Sub-contractor's factory and erection, installation & commissioning at the plant site shall be inspected by one of the following reputed CCE approved Third Party Inspection (TPI) agencies as per the approved QAP to meet the requirements of codes and standards.

- Bureau Veritas Industrial Services Pvt Ltd (BVIS)
- Lloyds Register Industrial Services Pvt Ltd (LRIS)

The broad scope of inspection during fabrication at the Contractor's factory shall be as follows. However, the detailed scope of inspection shall be given in the QAP.

- a. Approval of the design calculation and fabrication drawings prepared by the fabricator to ensure that details are as required by the codes, standards and regulations.
- b. Identification of raw materials (plates, pipes, fittings, etc.,) against material test certificates and stamping.
- c. Review of material test/IGC test/ UT test certificates.
- d. Qualification/Review of welding procedure and welders.
- e. Checking of weld seams alignment and checking of second side after preparation of weld grooves to sound metal.
- f. Review of heat treatment records.
- g. Checking of alignments and welding of nozzle connections and other parts.
- h. Witness of non-destructive tests like Dye Penetrant tests during fabrication.
- i. Review of radiographic films.
- j. Visual internal and external examination of vessel/equipment for final workmanship.
- k. Witness of hydraulic test and leak test.

- l. Review of mechanical & chemical cleaning and mechanical polishing of the vessel.
- m. Final dimensional check including check up of internal and external attachments.
- n. Examine final documents and as built drawings and countersigning the same.
- o. Stamping of the vessel/equipment.
- p. Issuing of all relevant certificates and final release note.

It shall be Contractor's responsibility to arrange & co-ordinate with the TPI agency. The maximum charges for inspection by the TPI agency shall be separately mentioned in the quotation on lump sum basis. However the payment of charges for inspection shall be made only upon production of invoice by the TPI agency, subject to the ceiling to be mentioned in the Contract.

Apart from inspection by the TPI agency, the Department's representative(s) shall inspect the system at any stage of fabrication and erection. Upon completion of fabrication, the Contractor shall organize Pre-Shipment Review (PSR) meeting at their office/ factory, in which the Contractor, the Department's representative(s) and the TPI agency shall participate. Upon satisfactory review of the test certificates and inspection reports of fabrication, the Department will accord the shipment clearance.

The Department shall have the right to waive their participation in the Pre-shipment Review by a notification to the Contractor within 1 week of the receipt of intimation from the Contractor. In such case, the documents shall be sent to the Department. Upon review of the documents, the Department will issue the shipment clearance.

Erection, installation & commissioning of the plant at the site shall be inspected by TPI agency as per the approved layout drawings and codes & standards.

9 TECHNICAL REVIEW AND DOCUMENTATION

The following documents shall also be provided by the contractor,

9.1 Along with quotation:

- Preliminary technical project report
- Process flow diagrams with functional description.
- Preliminary engineering with P&ID, major specifications, equipment GA drawings, Plant layout, layout of firefighting system with location of detectors & other safety systems and layout with location of CCTV and communication equipments.
- Documentary proof for the details given in techno-commercial bid format.

9.2 After awarding contract:

9.2.1 Preparation of all documentation for reviews and meetings is the responsibility of the Contractor. The reviews shall be based on mutually agreed schedules in each phase. Deviations in the process, design, fabrications, if any, are to be discussed with the Department and clearly documented and possible end effects to be brought out at each phase.

9.2.2 Contractor / Contractors' representatives can visit the Department premises for participation in Joint Technical and Managerial reviews on the progress of execution after entering into the Contract. The Department's representatives may visit the Contractor's & their Sub-contractor's premises for participation in Joint Technical Reviews such as Technical Project Report Review & Detailed Engineering Document Review and Managerial Reviews on the progress of the execution after entering into the Contract.

9.2.3 All documents, data sheets, calibration certificates, operating manuals shall be furnished in English and SI units. Three copies of all the documents mentioned below shall be provided to the Purchaser both hard copy as well as soft copy.

- a) Technical project report regarding the proposed Process for Isrosene Production with P&ID and material & energy balances, details of raw materials and their consumption rate, power consumption, water requirement, utilities requirement etc.
- b) Design report for project including design calculations for all process vessel, piping, structures etc.

- c) Detailed engineering documents with Plant layout, Equipment layout & Building/Structural layouts, Piping layouts, isometrics drawings etc.
- d) Documents on requirement of land, design of buildings, electrical systems, civil foundations for equipments, pipe racks, pipe supports, structurals etc including load details.
- e) Applicable design/specifications/ fabrication drawings of all the systems, sub systems, main equipments, auxiliary equipments & components, pipelines, analytical laboratory equipments (for Option: 2), safety items/equipments, tanks, gas cylinders etc.
- f) Documents on schematic power distribution diagram, static earthing, instrumentation earthing, power body earthing and lightning arresters for equipments wherever necessary.
- g) Product details and specifications document/catalogue on all the bought out items.
- h) Operating procedures/ manuals for Plant start up/shut down.
- i) Detailed documents for maintenance (routine, preventive & break down) and troubleshooting.
- j) A plan (PERT chart/Schedule) with detailed breakup for various activities including duration for completion of technical project report, design, detailed engineering, HAZOP, procurement/fabrication, testing, supply of equipments, installation and commissioning/ performance testing etc., to set up the Isrosene Plant, Production checklist, Quality plan, Safety plan, standard operating procedure, Emergency preparedness plan and minimum manpower requirement.
- k) Proposed plan for pollution control, effluent treatment & disposal methods if any required to comply with respective state PCB.
- l) Proposed plan for personal safety and fire fighting systems.
- m) Details about various statutory clearances such as PESO, respective state PCB etc., and permits required for establishing the Plant, design codes and third party inspection clearances and documents.
- n) Documents on the hydrogenation catalyst preparation, characterization, packing in reactors and regeneration scheme, estimated life of catalyst etc.

- o) List of consumables and adequate spare parts for ensuring continuous operation of plant for a period of three years in addition to the warranty period of 2 years from the date of commissioning.

10 INSTRUCTION TO BIDDERS

- Bidders may visit the site for assessment and submitting the offers under prior intimation for arranging entry pass. (For Option:1)
- Department has rights to visit the site identified by the Contractor (For Option:2)
- Bids shall be submitted in two parts.

10.1 Two Part Bid

The offer shall be submitted in **TWO PARTS** in separate templates – **TECHNO-COMMERCIAL BID & PRICE BID** with detailed break up for Option: 1, Option: 2 and Option: 3. Deviations from specifications and other conditions, if any, should be clearly indicated in the bid. Bidders shall quote for the three options. Bidders not submitting their quote for any of the option shall provide reasons for the same. The offer shall have a minimum validity period of 180 days from the date of price bid opening.

10.1.1 Techno-commercial Bid

Bidders shall comply all the technical and commercial aspects given in RFP for Option: 1 and Option: 2. Techno-commercial bid shall contain all technical details of the proposed plant as well as information and confirmation on all aspects. It shall also contain confirmation on all Commercial Terms & Conditions, wherever applicable, if any and any additional information the bidder would like to provide.

Under any circumstances, the Techno-commercial bid' shall not mention prices of any items.

The techno-commercial bid shall contain a blank price bid for all the categories given in Enclosure-II along with individual breakup. The techno-commercial bid shall also include "a blank price bid" for all items that states the factors which are considered for pricing of the product without the price. Price shall be given only in the price bid. The basis of pricing is very important to evaluate the reasonableness of the pricing.

Bidders shall submit the techno-commercial bid for Option: 1 & Option: 2 individually as per the format enclosed (Enclosure-I).

10.1.2 Price Bid

The bidder shall quote the Total Bid amount to set up the Plant along with the individual break-up costs for Option: 1 and Option: 2. The costs for the systems and sub-systems shall be indicated separately in the price bid format

enclosed (Enclosure-II).

The supply of consumables and spare parts during warranty period at no extra cost is the scope of the Contractor. The price bid shall also have a list of recommended spare parts for 3 years operation with break up cost, in addition to the warranty period. Maintenance cost of the plant for 3 years including warranty period shall also be mentioned in the price bid separately.

10.1.3 Bid Evaluation

Bidders shall be evaluated based on the following

- The Cost of the Plant.
- Production cost of Isrosene at IPRC as well as at Contractor's site.

Production capacity of 80% of the nominal capacity (3000 LPD) and operation of 300 days per annum with a Plant life of 20 years shall be considered for arriving at the Production cost of Isrosene.

10.2 Technical Details

Detailed information on the following with supporting documents shall be furnished.

- 10.2.1 A complete Technical detail regarding the proposed Process for Isrosene Production with details of raw materials and their consumption rate, power consumption, water requirement, utilities, raw materials etc. shall be submitted along with the Techno Commercial bid. This description should include the process flow sheet, list of process equipments & their capacity, list of storage facilities (Raw material storage, intermediate & final product, utilities), laboratory analytical instruments (for Option:2), details of safety, fire fighting and CCTV & communication equipments. Raw material storage (LAB Raffinate) for 3 months, Isrosene intermediate storage for 1 day, Isrosene storage for 7 days for Option: 1 & 14 days for Option: 2, Suitable number of Gaseous Hydrogen and Nitrogen cylinders for Option: 1&2.
- 10.2.2 The proposal should list out a plan with detailed time breakup for various activities such as completion of technical project report, design, detailed engineering, HAZOP, procurement/fabrication, testing, supply of equipments, installation and commissioning/ performance testing etc., to set up the Isrosene Production Plant.

- 10.2.3 Proposed plan for personnel safety, pollution control, effluent treatment and disposal methods to meet PCB requirements and fire fighting systems.
- 10.2.4 Details about various statutory clearances, permits required for establishing the plant, design codes and third party inspection clearances & documents.
- 10.2.5 All the materials to be used for the manufacturing of the Plant shall be of International quality.

10.3 Commercial Terms

The bidder shall submit quotation for the entire works mentioned herein. The incomplete quotations shall be summarily rejected. The deviation, if any, in the bidder's proposal with respect to this document shall be explicitly mentioned in the schedule of deviations to be provided in the quotation. If the bidder does not mention any deviation, it shall be construed by the Department that the bidder agrees to comply with each and every aspect of this document.

10.4 Prices and Payment Terms

The bidder shall quote firm and fixed prices valid till the commissioning and final acceptance of the Isrosene production Plant to the satisfaction of the Department.

10.4.1 Payment Terms

Milestone payment will be considered as follows:

- 1) 20% after review and mutual agreement of Technical Project Report, Design Report and Detailed Engineering, against bank guarantee for equal amount valid till final acceptance of the Plant.
- 2) 40% cost of each items upon receipt at Purchaser's Plant site on prorata basis.
- 3) 20% upon satisfactory completion of erection.
- 4) 20% upon satisfactory completion of commissioning and acceptance of the Plant, against Performance Bank Guarantee (PBG) of 10 % of the total plant cost.

The Contractor shall furnish Performance Bank Guarantee in the form of unconditional irrevocable bank guarantee to the extent of 10% of the total

Plant contract value valid from the date of commissioning and acceptance and 6 months beyond the date of completion of warranty period of 24 months.

10.5 Price Variation

The price is fixed with provision for price adjustment as given below:

a) Import Materials

For import content of materials, the price shall be deemed to be with reference to the exchange rates applicable on the date of signing of contract. Any revision in the FE rates, between awarding of contract and at the time of actual remittance of payment, shall be adjusted in the price payable to the Contractor for 80% value of the import materials (except for the 20% advance paid), using bank exchange rates, against documentary evidence.

Change of source shall be allowed by converting the equivalent currency from INR to other currencies indicated above or vice versa.

b) Indigenous Materials & Services

For all prices (viz. indigenous materials & services) other than the import content of materials, the price shall be deemed to be with reference to the All India Consumer Price Index for Industrial workers- AICPI (IW) as applicable on previous month of awarding of contract.

Price variation for such items for 80% value of the materials/ services (except for the 20% advance paid) shall be calculated as per the following formula

$$V = C \times \frac{(I_x - I_b)}{I_b}$$

V = Price increase in INR

C = 80 % of the quoted price for indigenous items in INR

I_x = Previous month AICPI (IW) for the invoice for indigenous materials and services

I_b = AICPI (IW) for previous month of contract awarding year.

c) The clauses 10.5 (a) & 10.5 (b) will not be applicable beyond the execution period if the work is delayed due to reasons not attributable to the Department.

Payment will be made as per the actual quantity consigned to the site. However, the quantity to be ordered shall be mutually agreed during detailed engineering.

Note: (i) No Price variation is applicable wherever advance/stage wise payment has been made

(ii) In Statutory levies also, the price variation shall be made against documentary evidence.

10.6 Quantity Variation

The Unit prices quoted for items shall remain valid as long as price of actual quantity installed is within $\pm 10\%$ of the total contract value.

For variation above $\pm 10\%$, due to any change in scope of work, a Joint Review Board including Contractor's representatives shall be constituted to arrive at the price on mutual agreement without holding the work.

10.7 General instructions

10.7.1 If the Party includes data in their proposals that they do not want to be disclosed to others for any purpose, or used by ISRO except for evaluation purposes, it shall be marked on the title page with such a legend.

10.7.2 The party shall get prior approval of ISRO for utilizing foreign personnel if any, in the execution of this contract.

10.7.3 The party shall be responsible for all regulatory record keeping requirements associated with the use of licenses and license exemptions/exceptions.

10.7.4 ISRO team will visit the party's site (if deemed necessary) to assess the technical capabilities.

10.7.5 ISRO has right to reject the proposals which are in-complete or found unsuitable.

10.7.6 The party's initial proposal should contain their best terms from technical and commercial standpoint.

10.7.7 Based on the project demand, annual requirement may vary on either side and the party shall not use any penalty clause based on our fluctuating requirement.

10.7.8 ISRO may determine that a proposal is unacceptable if the prices proposed are

materially unbalanced between line items or sub-line items. Unbalanced pricing exists when, despite an acceptable total evaluated price, the price of one or more contract line items is significantly overstated or understated. The proposal may be rejected if ISRO determines that the lack of balance poses an unacceptable risk to the Department.

10.7.9 The party is wholly responsible for developing the technology, producing the Isrosene and supply to ISRO strictly as per ISRO's specifications.

10.7.10 ISRO reserve the right to short close the RFP without assigning any reasons to the party.

10.8 Execution Period

The entire work is to be completed within 24 months from the date of signing the Contract. However, the detailed schedule shall be mutually discussed and agreed upon. The bidder shall submit a Master schedule about their realization plan so as to comply with the overall execution period stated herein, in the form of a Gantt chart, indicating the sequence and duration of the various phases of work.

10.9 Liquidated Damages

Due to reasons not attributable to Department, if the Contractor fails to complete the work or fails to meet delivery date within the time specified in the Contract or any extension thereof, the Department will recover from the Contractor as Liquidated Damages (LD) a sum of one half of one percent (0.5 %) of the total value of contract for each calendar week of delay or part thereof. The total liquidated damages shall not exceed 10 % of the contract value.

10.10 Packing & Forwarding and Transportation

The Contractor has to take the responsibility for the transportation and safe delivery of all items to the Site. Insurance is not required at the Department cost.

a. Indigenous items

All the equipments, flow components, instruments, pipes, pipe fittings shall be blanked off by closures and shall be properly packed and transported to the Plant site. The prices towards packing & forwarding, freight, etc are to be

paid by the Contractor and it shall be mentioned in the quotation..

Upon receipt of the consignment, the Contractor shall unload and store the items at the Plant site. It shall be the Contractor's responsibility to construct temporary sheds/ buildings for proper storage of the fabricated system to protect them from the vagaries of nature at no extra cost.

b. Imported items

The Contractor shall be responsible for customs clearance and transportation of consignment from seaport/airport to Site.

Phytosanitary certificate: As per "Plant Quarantine (Regulation of Control into India) Order 2003", articles packed with packaging material of plant origin viz hay, straw, wood shavings, wood chips, saw dust, wood waste, wooden pallets, dunnage mats, wooden packages, coir pith, peat or sphagnum moss, etc will be allowed entry by Customs (Department of India) only with a "Phytosanitary certificate". Therefore, the Contractor shall ensure that the consignment is accompanied by such a certificate issued by the Plant Quarantine authority in the country of origin, if any of the above - mentioned packaging material is used. In case of delay/denial in customs clearance (in India), the entire responsibility including additional expenditure shall solely rest with the Contractor

c. Dispatch

The Contractor shall arrange to dispatch the fabricated items on FOR Site basis as per Incoterms 2010.

The ultimate consignee shall be as follows: (For Option: 1)

Purchase & Stores Officer (Stores)
ISRO Propulsion Complex
Department of Space, Government of India,
Mahendragiri 627 133
Tirunelveli District, Tamil Nadu. India.

Marking: The Contractor shall ensure that the consignment is legibly and properly marked for correct identification.

Packing: The Contractor shall pack and crate the items in such a manner so as to protect them from damage and deterioration during transportation. The Contractor shall be held responsible for all damages due to improper or inadequate packing.

The Contractor shall provide the complete shipping information by fax/email immediately after shipment. The Contractor shall also ensure that one copy of the packing list is enclosed in each package.

The copies of the delivery documents shall be mailed to the Department within 2 weeks from the date of shipment. The Contractor shall bear demurrage, if any, incurred by the Department due to delayed dispatch of the delivery documents

10.11 Taxes and Duties

- a) Department will reimburse all taxes and duties at actuals for the materials which are directly consigned for the Department and for the services provided by the Contractor against documentary evidence.
- b) Forms C or D for concessional rate of CST for interstate purchase will not be issued by the Department.
- c) The statutory deductions on account of Income tax shall be made as per the extant provisions contained in the Indian Income Tax Act, 1961 and tax deducted-at-source certificate will be issued to the Contractor.
- d) ISRO is exempted from payment of Excise duty. Excise Duty Exemption Certificate (EDEC) will be provided by Department in favour of Original Equipment manufacturer provided (i) the tender has been received from the sole selling agent of the OEM concerned (for which documentary proof shall be produced), and (ii) a request for issue of EDEC was made in the original offer itself.
- e) ISRO is exempted from payment of Custom duty. Custom Duty Exemption Certificate will be provided by Department for those imported items consigned to the Department against invoice submitted by the Contractor/Sub-vendor.

10.12 Service tax

Service taxes are applicable for technical project report, design report, detailed engineering, HAZOP analysis, Erection, Installation, commissioning, performance testing and third party inspection.

10.13 Indemnity

The Contractor hereby warrants and be deemed to have warranted that all the materials supplied against the Contract are free and clean of infringement of any patent, copyright or trade mark, and shall at all times indemnify the

Purchaser against all claims which may be made in respect of the Isrosene Production Plant for infringement of any right protected by the patent registration of design or trade mark and shall take all risk of accidents or damages which may cause a failure of the supply from whatever cause arising and the entire responsibility for the sufficiency of all the means used by him for the fulfillment of the Contract.

10.14 Warranty

The Contractor shall remedy at their own expense, the defects solely attributable to faulty workmanship of Plant with the equipments supplied under this Contract within 2 years from the date of commissioning and final acceptance of the plant.

10.15 Force Majeure Circumstances

The term "Force majeure Circumstances" shall mean inevitable accident, strike, lock-outs, other conflicts like natural calamities, acts of God, acts of Public enemy, war, freight embargoes, riots and public commotion; breach of public order, lightning, fire, thunder storm cyclone, earthquake, flood, explosion, and restrictions imposed by the Government any other circumstance over which the Contractor has no control. If the commissioning of the Plant is delayed due to the reasons of force majeure circumstances, the Contractor shall, without delay, but within 30 days, notify to the Purchaser, in writing, of his claim for extension of time. The Purchaser on receipt of such notice may agree to extend the Contract delivery period as may be as reasonable, but not more than 6 months. After the extended period of time, if the Contractor fails to resume the execution of the Contract, the purchaser shall terminate the Contract.

10.16 Settlement of Disputes

All the disputes concerning question of fact arising under the Contract shall be decided by the Purchaser subject to a written appeal by the Contractor to the Purchaser whose decision shall be final to the parties hereto. The Purchaser shall decide about the nature of the dispute ie, whether the dispute relates to question of fact or not. Any other dispute or difference including those considered as such by only one of the parties arising out of or in connection with the Contract shall be, to the extent possible, settled amicably between the parties. If amicable settlement cannot be reached, then all

disputes shall be settled by Arbitration.

10.17 Arbitration

Any dispute, disagreement or question arising out of or relating to or in consequence of the Contract or to its fulfillment, or the validity of enforcement thereof which cannot be settled mutually or the settlement of which is not herein specifically provided for, shall within 30 days from the date either the party informs the other in writing that such dispute, disagreement exists, be referred to arbitration. The arbitrator shall be a person not below the rank of Joint Secretary and shall be appointed by the Secretary, Department of Space. These arbitration proceedings shall be conducted at Tirunelveli.

The arbitration proceedings shall be conducted in accordance with the Arbitration and conciliation Act 1996 (Act 26 of 1996) as amended from time to time and the decision of the Arbitrator shall be final and binding on the parties thereto. Each party shall bear its own cost of preparing and presenting its case. The cost of Arbitration including the fees and expenses of the Arbitrator shall be shared equally by the parties unless the award provided otherwise. The enforcement of the award shall be governed by the rules and procedures in force in the state of Tamilnadu.

Performance under this Contract shall, however, continue during arbitration proceedings and no payment due or payable by the parties hereto shall be withheld unless any such payment is/or forms a part of the subject matter of arbitration proceedings.

10.18 Secrecy

10.18.1 Each party shall under take to deem confidential any information related to this contract or submitted under its conditions and to use such information only for the purposes of this contract and also shall not allow any disclosure of the information therein. The parties shall ensure the confidentiality in respect of the assembled products and their parts during fabrication and operation.

10.18.2 The restriction stipulated above shall not relate to the information, submitted to a formal participant or the third party for participation in the activities, foreseen by this Contract. In this case, the informed party shall undertake in

advance the obligations and restrictions set forth above. These restrictions shall not relate to the information which shall be disclosed by law or at the request of either party's Government agency.

10.18.3 Either party shall undertake not to issue any statement concerning the contents from the other party.

10.18.4 The Contractor undertakes to get written obligations on maintaining the confidentiality from their sub-contractors.

10.18.5 The Purchaser undertakes that the design and engineering of the plant shall not be reproduced, copied or modified to any third party other than the executor identified by IPRC.

10.18.6 The technical information, drawings, specifications, records and other documents shall not be copied, transcribed, traced or reproduced in any other forms otherwise in whole and or duplicated, modified, divulged and/or disclosed to any third party and not misused in any other form whatsoever by the Contractor without the purchaser's consent in writing, except to the extent, require for the execution of the contract. The technical information, drawings, specifications and other related documents shall be returned to the Purchaser with all the approved copies and duplicates, if any, immediately after they have been used for the agreed purpose.

10.18.7 The party which breaks the above mentioned conditions of confidentiality shall take all actions, in accordance with the laws of India, for settlement of the arisen disputes with the third party and shall bear all the expenses, arising in connections with the above said settlement.

10.19 Sub-Contracting

The Contractor shall not, unless prior permission is obtained in writing from the Department, transfer or sublet the work under this contract, either in whole or in part, and shall not float a company nor set-up an association with another company for the fulfillment of the contractual obligations vested with them.

10.20 Short Closing or Termination of the contract

10.20.1 Under normal circumstances, short closing/termination of the Contract is not foreseen. However, in case of continued non- performance of the Contract resulting in inordinate delays in the delivery dates in spite of repeated written

requests by the Department for meeting the delivery schedule as provided in the Contract, Department reserves the right to terminate wholly or partly the Contract by giving a notice of one month.

10.20.2 In case of major changes in the policies of the Government of India, as a result of which, the Department is compelled to curtail its requirements wholly or partly, the Department and the Contractor shall enter into negotiations to mutually agree to terminate this Contract wholly or partly.

10.20.3 The Department will have the right, at any time, to cancel the contract either wholly or in part by giving written notice. The Contractor shall undertake to observe the instructions of the Department as to the winding up of the contract both on his own part and on the part of his sub-contractors.

10.20.4 In the case of cancellation of the contract by the Department without any fault of the Contractor, the Contractor shall forthwith take the necessary steps to implement the Department's instructions. The period to be allowed to implement shall be fixed by the Department after consultation with Contractor and, in general, shall not exceed 3 months.

10.20.5 Subject to the Contractor conforming with the instructions referred to the above point, the Department will take over from the Contractor at a fair and reasonable price all finished parts not yet delivered to the Department, all unused and undamaged materials, bought-out components and articles in course of fabrication in the possession of the Contractor for the performance of the contract, except such material, the Contractor shall, with the agreement of the Department, elect to retain.

10.20.6 The Department will, in no circumstances, be liable to pay any sum which, when added to the other sums paid, due or becoming due to the Contractor under the contract and its amendments, if any, exceeds the total payment for the work set forth in the contract and its amendments, if any.

10.20.7 The ownership of all materials, part and unfinished work paid for by the Department under the provisions of this Section shall be vested in or transferred to the Department as soon as they have been paid for.

10.21 Applicable law and Infringement Thereof

The contract shall be governed by the laws of India for the time being in force. The courts of the state only shall have jurisdiction to deal with and decide any

legal matters or dispute whatsoever arising out of the contract.

10.22 Training

Contractor shall give three weeks training regarding operation & maintenance and troubleshooting of Isrosene production plant for the team deputed by the department without any cost.

10.23 Modifications in the Contract

This contract may be amended or modified only in writing signed by both the parties or their duly authorized agents or representatives by a change order issued by the Department and accepted by the Contractor, pursuant to the terms stated therein.

10.24 Contractor's Default Liability

10.24.1 The department shall reserve the right to terminate the contract in the circumstances detailed hereunder.

- a. If the Contractor fails to rectify, re-construct or replace any defective system/ sub-system/ equipment within a period of 60 days after the Department having given a notice to the Contractor to rectify, re-construct or replace the said defective system/ sub-system/ equipment or the Contractor delays, suspends or is unable to complete the system/ sub-system/ equipment by the date mutually agreed upon
- b. If the Contractor commits breach of any of the terms and conditions of the contract.

10.24.2 When the Contractor makes themselves liable for action under the circumstances mentioned above, the Department will have power to forfeit the security deposit of the Contractor and the Contractor shall have no claim for damages whatsoever on such forfeiture.

10.24.3 The work remaining to be completed at the time of termination of the contract shall be got executed through any other Contractor, in which case the expenses, which may be incurred in excess of sums, which would have been paid to the original Contractor, had the whole work been executed by them, shall be borne by the original Contractor and shall be recovered from them.

10.24.4 If this contract happens to be terminated as provided in Section 10.20, the Department, in addition to any other right provided in this article, may require

the Contractor to transfer title and deliver to the Department in the manner and as directed by the Department.

a. any completed system/ sub-system / equipment,

b. such partially completed system/ sub-system/ equipment, drawings, information, which the Contractor specifically produced/ acquired for the performance of the contract.

10.24.5 The Department will pay to the Contractor as per the quoted prices in the contract for completed system/ sub-system/ equipment delivered to and accepted by the Department and for manufacturing materials delivered and accepted. For the partially completed system/ sub-systems/ equipment accepted by the Department, payment will be made at mutually agreed prices. For the plant at IPRC, after termination of the contract, the balance items of work shall be got executed by the Department through other agencies.

10.25 Modifications to Specifications & Qualitative Requirements

10.25.1 The Department shall reserve the right at any time to modify the qualitative requirements, specifications, patents or drawings relating to the work covered by the contract. The Contractor shall inform the Department, within 30 days, of any objection they have to the modifications required.

10.25.2 The Department may also accept modification proposed by the Contractor on his own initiative or on behalf of sub-contractors.

10.25.3 Unless the Department directs otherwise, the Contractor shall, in either case, submit within a reasonable time limit to be specified by the Department, an estimate of the effect of any such modification in the cost of performance of the contract and/ or on the delivery schedule. In the light of these estimates, the Department will decide whether and if so at what stage, the modifications are to be introduced and shall advise the Contractor in writing together with the Department's new limits of liability. When a modification or other change is so authorised, the Contractor shall proceed with action in accordance with the Department's direction.

10.25.4 Modifications shall be classified as :

- Any changes in the scope of work, for which unit rates are available in the contract.

- If unit rates are not available in the Contract, then changes shall be implemented through amendment signed by both parties after mutual agreement on the terms and conditions of the amendment. A Joint Review Board including Contractor's representatives shall be constituted to arrive at the price & schedule on mutual agreement without holding the work. Formal amendment shall be released within 10 weeks.

10.26 Compliance with Standards

All the materials supplied or used shall be new and of first quality and manufactured and tested in accordance with the latest editions of the relevant Indian/ International standards. Wherever imported components are used, they shall be manufactured in accordance with the relevant standards published in the country of manufacture after allowing for specific aspects under Indian conditions such as tropical climate, etc. Any material or work, where no specific standard is applicable, shall be fabricated as per the instructions and directions of the Department.

All the electrical equipments used shall conform to the latest Indian Electricity Rules as regards safety, earthing and other essential provisions specified therein for installation and operation of electrical parts.

10.27 Co-ordination with other Contractors & Inter-facing of Works

The Contractor should extend all co-operations required to execute the works under the scope of department based on mutually agreed terms.

10.28 Patent Rights

The Contractor shall fully indemnify the Department against any action, claim or proceedings relating to infringements or use of any patent or design or any alleged patent or design rights and shall pay any royalty which may be payable in respect of any claims made under or any action brought against the Department. In respect of such matters as aforesaid, the Contractor shall be set at liberty, at their own expense, to settle any dispute or to conduct any litigation that may arise there-from. The Contractor shall not be liable to indemnify the Department on the infringement of the patent or design or any alleged patent or design right which is the direct result of an order passed by the Department.

10.29 Assignment

The contract shall be binding upon the successors and assignees of the parties hereto. It shall not be assigned in whole or in part by either party without prior written consent of the other. If the Contractor becomes insolvent or being a firm or company whether incorporated or not is dissolved or goes into bankruptcy or is caused to be wound up except for re-construction purposes or carried on its business under a receiver, the representatives in law of the estate of the Contractor or any such receiver, liquidator or any person in whom the agreement may be vested shall forthwith give notice thereof in writing to the Department and shall remain liable for the successful performance of the Contractor or the successors of their obligations under this contract under any circumstances.

10.30 Rights of the Department

10.30.1 Right to Illustrate and Explain Plans

- a. The various parts of the contract are intended to be complementary to each other but should any discrepancy appear or any mis-understanding arise, the explanation of the Department will be final and binding.
- b. The correction of any errors or omissions of specifications may be made by the Department, when such correction is necessary to bring out clearly the intention which is indicated by a reasonable interpretation of the specifications as a whole.
- c. Wherever in the specifications which are a part of the contract or which may be furnished to the Contractor for directing the work, the terms and descriptions of various qualities of workmanship, materials, structures, processes, plant or other features of the contract are described in general terms, the meaning or fulfillment of which must depend upon individual judgments, then in all such cases, the question of shall be decided by the Department and said material shall be furnished, said work shall be done, and said structure or feature shall be constructed, furnished or carried out in full and in accordance with their interpretation of the same and to their full satisfaction and approval, provided such interpretation is not in direct conflict with the specifications or generally accepted good practice.

10.30.2 Right to Direct Work

- a. The Department will have the right to direct the manner in which all work under this contract shall be done, in so far as it may be necessary to secure the safe and proper progress and the specified quality of the work and all work shall be done and all material shall be furnished to the satisfaction and approval of the Department.
- b. Whenever, in the opinion of the Department, the Contractor has made marked departures from the schedule of completion laid down in the contract or when untoward circumstances force departure from the said schedule, the Department, in order to assure compliance with the schedule and the provisions of the contract, shall direct the order, pace and method of doing the work, which shall be adhered to by the Contractor.
- c. If, in the judgment of the Department, it becomes necessary at any time to accelerate the overall execution of work, the Contractor when ordered and directed by the Department will cease work at any particular point and transfer their men to such other point or points and execute such portion of their works, as may be required, to enable others to hasten and properly engage and carry on their work, as directed by the Department.
- d. The work by the Contractor at IPRC beyond normal working hours (08:45 to 17:15 hr) on working days and any time on holidays (including Saturdays and Sundays) shall be permitted only with prior approval of the Department. The Department may also direct the Contractor to operate extra shifts over and above normal day shift to ensure completion of the contract on schedule if, in the opinion of the Department, such work is required.

10.30.3 Right to Order Modifications of Methods and Equipment

If at any time the Contractor's methods, materials or equipments appear to the Department to be unsafe, inefficient or inadequate for securing the safety of the workmen or the public, the quality of work or the rate of progress required, the Department may order the Contractor to ensure their safety and increase the efficiency and adequacy and the Contractor shall promptly comply with such orders. If at any time the Contractor's work-force and equipment are in the opinion of the Department, inadequate for securing the necessary progress, as herein stipulated, the Contractor shall, if so directed, increase the

work-force and equipment to such an extent as to give reasonable assurance of compliance with the schedule of completion. The absence of such demands from the Department will not relieve the Contractor of their obligations to secure the quality, the safe conducting of the work and the rate of progress required by the contract and the Contractor alone shall be and remain liable and responsible for the safety, efficiency and adequacy of their methods, materials, work-force and equipment, irrespective of whether or not they make any change as a result of any order or orders received from the Department.

10.31 Contractor's Functions

- 10.31.1 The Contractor shall provide everything necessary for the proper execution of the work according to the intent and meaning of the specifications whether the same may or may not be particularly shown or described therein, provided that the same can reasonably be inferred there-from and if the Contractor finds any discrepancy there-in, they shall immediately and in writing refer the same to the Department whose decision shall be final and binding on the Contractor.
- 10.31.2 If any part of the Contractor's work depends for proper execution upon the work of any other Contractor, the Contractor shall inspect and promptly report in writing to the Department any defect in such work of the other contractors that render it un-suitable for proper execution of the work under this contract. Their failure to so inspect and report shall constitute acceptance of the other Contractor's work as fit and proper for the reception of their work, except as to defects which may develop in the work of the other contractors after proper execution of the work. To ensure proper execution of their subsequent work, the Contractor shall measure the work already in place and shall at once report to the Department any discrepancy between the executed work and the drawings.
- 10.31.3 The Contractor shall not sell, assign, mortgage, hypothecate or remove equipments or materials which have been erected or which may be necessary for the completion of the contract without the written consent of the Department.
- 10.31.4 In the execution of the work, no person other than the Contractor, or their duly appointed representatives, their sub-contractors and their workmen, shall

be allowed to do work at the site except by the special permission, in writing by the Department.

- 10.31.5 The Contractor shall proceed with the work to be performed under this contract and each and every part and detail thereof, in the best and most workmen-like manner by engaging qualified, careful and efficient workers and do the several parts thereof at such time and in such order as the Department directs and finish such work in strict conformance with the plans, drawings and/ or specifications, and any changes, modifications or amplifications thereof made by the Department.
- 10.31.6 The Contractor's personnel shall not be permitted to reside inside the Department's premises after the work during execution of the plant work at IPRC. The Contractor shall make their own arrangement for transportation, accommodation, food, health care, communication, insurance etc. for their personnel.
- 10.31.7 During erection and commissioning of Isrosene Production Plant, the Contractor shall provide Third party business liability insurance to cover damages caused by fault of the Contractor to the Department and third parties. The liability shall be Rs 20 lakhs for body injury resulting in permanent disability or death to each person and Rs 1 crore for loss of tangible assets.
- 10.31.8 It is the responsibility of the Contractor for arranging necessary Workmen's Compensation Policy for their employees and labourers as per statutory requirements. For option: 1, it is compulsory to produce records of insurance details to the safety division of IPRC for obtaining "Safety Permit" to commence site work by Contractor.
- 10.31.9 The movement of isotope source for radiography purpose shall be permitted only with the prior approval of Atomic Energy Regulatory Board (AERB).
- 10.31.10 In respect of observance of local rules, administrative orders, working hours and the like, the Contractor and their personnel shall co-operate with the Department.

10.32 Supply of Tools, Tackles and Other Materials

- 10.32.1 For full completion of the work, the Contractor shall, at their own expense, furnish all necessary erection tools, machine tools, power tools, tackles,

hoists, cranes, derricks, cables, slings, skids, scaffolding, work benches, tools for rigging, cribbing and blocking, welding machines, pre-heating and stress relieving equipment, X-ray and all associated protective equipments, appliances, materials and supplies required to accomplish the work under the contract unless otherwise provided for. Adequacy of such tools shall be subject to final determination of the Department.

10.32.2 The Contractor shall also furnish all necessary expendable devices like anchors, grinding and abrasive wheels, plugs, hacksaw blades, taps, dies, drills, reamers, chisels, files, carborundum stones, oil stones, wire brushes, necessary scaffolding, ladders, wooden planks, timbers, sleepers, and consumable materials like oxygen, acetylene, argon, lubricating oils, greases, cleaning fluids, cylinder oil, graphite powder and flakes, fasteners, gaskets, temporary supports, stainless steel shims or various thicknesses as required, cotton waste, PTFE tapes and all other miscellaneous supplies of every kind required for carrying out the work under the contract.

10.32.3 The Contractor shall provide all reasonable facilities including tools, personnel, etc and ensure co-ordination with the Department and their inspection agencies so as to enable them to carry out all supervision, measurements, checks, etc in a satisfactory manner. For option: 1, the Contractor shall not dispose, transport or withdraw any tools, tackles, equipments and materials provided by them for the contract without taking prior written approval from the Department and the Department at all times shall have right to refuse permission for disposal, transport or withdrawal of tools, tackles, equipment and material if in their opinion, the same will adversely affect the efficient and expeditious completion of the work.

10.33 Protection of Work

10.33.1 The Department will not be responsible or held liable for any damage to person or property consequent upon the use, misuse or failure of any construction/ fabrication tools and equipment used by the Contractor or any of their sub-contractor's, even though such construction tools and equipment may be furnished, rented or loaned to the Contractor or any of their sub-contractor. The acceptance and/ or use of any such construction tools and equipment by the Contractor or their sub-contractors shall be construed to mean that Contractor accepts all responsibilities for and agree to indemnify

and save harmless the Department from any and all claims for said damages resulting from said use, misuse or failure of such construction tools and equipment.

- 10.33.2 The Contractor and their sub-contractors shall be responsible during work for protection of the work which has been completed by the other contractors. The necessary care shall be taken to see that no damage to the same is caused by their own men during the course of execution of their work.
- 10.33.3 All other work completed or in progress as well as machinery and equipment that are liable to be damaged by Contractor's work shall be protected by the Contractor and such protection shall remain and be maintained until its removal is directed by the Department.
- 10.33.4 The Contractor shall effectively protect all the works from action of weather and from damages or defacement and shall cover finished parts where required for their thorough protection.
- 10.33.5 The Contractor shall cover the work by a Contractor's all-risk policy during the currency of the contract

10.34 Site Personnel

The Contractor shall identify a Resident Manager, Resident Quality Engineer, Resident Safety Officer and Resident Safety Supervisor. The names of identified persons shall be communicated in writing to the Department and approved by the Department to supervise the work under the Contract.

- The Resident Manager shall have full technical capability and complete administrative and financial powers to expeditiously & efficiently execute the work under the Contract. Any written orders or instructions which the Department may give to the Contractor's Manager shall be deemed to have been given to the Contractor.
- Resident Quality Engineers shall be responsible for overall quality monitoring at site for co-ordination with the Department and inspection agencies to enable them to carry out quality related inspection works in a satisfactory manner.
- Resident Safety Officer and safety supervisor shall be responsible for carrying out fabrication, erection & commissioning works in a safe manner.

The Contractor's Manager shall maintain an office on or adjacent to the site of work and shall at all times keep in the site office a complete set of documents and drawings pertaining to this contract. The Department will normally communicate directly with the Contractor's Manager at site.

10.35 Department Facilities (for option: 1)

The Contractor may have access to the Departments' qualified first aid personnel and ambulance in case of accidents, subject to the availability of the same. However, the Contractor shall make his own medical and transport arrangements to take care of his employees in case of accident. The Contractor shall provide a first aid kit at the work site to meet the requirements of minor injuries.

10.36 Employment of Labours

The Contractor will be expected to employ, on the work, only his regular skilled employees with experience of this particular work. No female labour shall be employed after normal working hours. No person below the age of 18 years shall be employed.

The Contractor shall pay to each person, wages not less than those specified by Minimum Wages Act. The employees / labour for carrying out all the site works shall be identified well in advance by the Contractor and necessary approval shall be obtained from the Department for entry to the work site (for option: 1). All the statutory rules and regulations pertaining to employment of labours are to be followed.

10.37 Reporting

The Contractor must report the following information to the Department by the end of every week during the work at Department's site.

- a) Number of men employed, by trades.
- b) Progress achieved.
- c) Expected dates for completion of individual works. Any actual or likely delay in the execution of work.

10.38 Working and Safety Regulations

The Contractor shall observe all statutory and legal requirements enforced by Central and State Government applicable to the work as well as any local regulations applying to the site. Particular attention is drawn to the following;

- i. Contractor shall comply with all the security regulations.
- ii. Smoking, use of mobile phone, camera, matchbox, lighter and any other source of ignition is strictly prohibited inside the site.
- iii. Contractor shall establish a safe work procedure and strictly comply with.
- iv. All electricity rules and regulations.
- v. Standard safety procedures to be followed in scaffolding, operating hoisting equipments, welding & gas cutting, grinding, painting, radiography.
- vi. Statutory requirements for inspection and test of all lifting appliances and auxiliary lifting gear.
- vii. Contractor shall ensure that all persons employed at site use necessary standard Personal Protective Equipments.
- viii. In case of accident, the Department shall be informed in writing forthwith. The Contractor shall strictly follow the regulations laid down by the Factory Inspector, Central and State Government authorities in this regard.
- ix. For option: 1, the Contractor shall notify the Department of his intention to bring on to the site any equipment such as space heating or welding apparatus, or any container holding liquid or gaseous fuel or other substance, which might create a hazard. The Department will have the right to prohibit the use of such equipment or to prescribe the conditions under which such equipment may be used.
- x. Structural erection work shall conform to IS 7205 (latest edition).
- xi. The Contractor shall obtain necessary “**safety permit**” from Safety Division. Only after obtaining the above permits, the Contractor shall start the construction works.

10.39 Electrical Safety Regulations

- 10.39.1 For option: 1, The Contractor shall arrange temporary Power Distribution Panel (PDP) with Moulded Case Circuit Breaker (MCCB), Earth Leakage Circuit Breaker (ELCB) and calibrated energy meter for taking electrical power from Department’s power termination point. Necessary power cabling from the Department’s power termination point to the Contractor’s PDP and from the Contractor’s PDP to the Contractor’s utility points shall be arranged by Contractor. PDP shall be grouted properly. All temporary cabling must comply

with rules & regulations and subject to Department's satisfaction. After making all temporary power cabling, Contractor shall formally apply to Department for safety and work permits. After ascertaining the compliance of the Contractor's temporary cabling with Department safety regulations, Department will energize the Contractor's PDP. The Contractor shall employ a full time electrician to maintain his temporary installations. The Contractor shall not however have any claim against the Department in the event of any failure, interruption/ insufficiency of these services. If required, the Contractor may employ a portable Diesel Generator (DG) set to get regular power supply.

10.39.2 For option:1, the PDP shall be provided with MCCB & ELCB for connecting Contractor's electrical equipments like welding, drilling, cutting, grinder machines. The Department will not grant permission to plug-in until the Department is satisfied that:

- (a) The appliance is in good condition.
- (b) The appliance is fitted with suitable cable and cabling shall be done with earthing.
- (c) The panel shall be grouted properly. All power and welding cables used shall be of double insulated cable of suitable capacity. No weight of any description shall be imposed on any such cable and no ladder or similar equipment shall rest against or be attached to it. The voltage for all portable equipments like drilling machines, temporary lighting etc, shall be $230 \pm 5\%$ volts.

10.39.3 Contractor shall have separate welding return cable.

10.39.4 Power cables and welding cables shall be routed properly.

10.39.5 For Option: 1, no electric cable in use by the Department / Contractor will be disturbed without prior permission.

10.39.6 For Option: 1, In no circumstances Contractor shall interfere with fuses and electrical equipment belonging to the Department or other Contractors. Before the Contractor connects any electrical appliance to any plug or socket, Contractor shall

- a. Ensure Department that the appliances are in good working condition.
- b. Inform the Department of the maximum current rating, voltage and phase of the appliance.

- c. Obtain permission of the Department detailing power requirement, to which the appliance may be connected

10.40 Clean-up of Work Site at IPRC

The Contractor shall not store or place the equipment, materials or erection equipment on the drive ways and streets and shall take care that their work in no way restricts or impedes traffic or passage of men and material. During erection, the Contractor shall without any additional payment, at all times keep the working and storage area used by him free from accumulation of loose or combustible material, waste materials or rubbish to avoid fire hazard and hindrance to other works of the Department. If the Contractor fails to comply with these requirements, the Department will proceed to clear those areas and the expenses incurred by the Department in this regard shall be payable by the Contractor. Before completion of the work, the Contractor shall remove or dispose in a satisfactory manner all scaffolding, temporary structures, sheds, buildings, stores, waste and debris and leave the premises in a condition satisfactory to the Department.

10.41 Purchase of Materials

The selection of equipments, components, materials, etc, with appropriate and suitable specifications shall be the responsibility of the Contractor, as overall performance of the system rests with the Contractor. Accordingly, the selection and purchase tasks shall be handled by the Contractor immediately after the approval of the Detailed Engineering Review (DER) documents by the Department. The Contractor shall process purchase action generally with the identified sub-vendors/ sub-contractors as approved by the Department and if necessary any additional sub-vendor/ sub-contractor with proper justification as recommended by the Contractor and approved by the Department.

The criteria for selection of the particular product and the reasoning involved therein shall be submitted to Department for necessary approval.

The Department will provide necessary end-use certificate for obtaining the required license for import of items.

In keeping with the terms of the contract, the Contractor shall undertake the responsibility for storage, handling, packaging and transportation involved to

the accepted level of any sub-systems/ equipment covered by the scope of the work in the contract.

10.42 Gate Pass (For option: 1)

For Contractor's equipment, tools, materials, etc. which are to be taken out from IPRC Mahendragiri campus after completion of work, proper entry shall be made at the main gate duly endorsed by CISF. The Department shall issue necessary gate passes for taking out the Contractor's materials, as and when required and after completion of work.

10.43 Limitation of Liability

The Warranties, representations, obligations and liabilities of the Contractor for non-performance/breach as set forth herein are exclusive, and in substitution of any other warranties, conditions, representations, obligations and liabilities, express or implied, arising by law or otherwise. The total cumulative and aggregate liability of Contractor in connection with the contract including liquidated damages and damage to the property of Department shall not exceed 20% of the contract price excepting, however, Contractor's cost of completing his scope of supply, of rectification work or of repairs or replacements as well as any amounts recovered under Contractor's insurance. Notwithstanding anything contained in the Contract, in no event shall Contractor be liable to Department by way of indemnity or by reason of negligence or breach of contract or in tort or otherwise for loss of production or products, loss of profits, damages or losses claimed by third parties, loss of use, loss of contracts, increased cost of operation, maintenance or staffing needs, any other financial or economic loss, or any indirect, incidental, special punitive or consequential damages of any description and howsoever arising in connection with the Contract.

10.44 Security Deposit

The Contractor shall provide security deposit upon award of contract in the form of an unconditional irrevocable bank guarantee from any nationalized/scheduled bank approved by RBI for 10% of the Contract value and shall be valid till final acceptance of the plant by the Department.

10.45 Integrity Pact

The Contractor shall enter into an agreement on Integrity Pact given as per

Form No. DOS:PM:01 provided in annexure-1.

10.46 Memorandum of Understanding

The Contractor shall enter into an MOU on establishment of Isrosene production plant as given in annexure-2

10.47 Format for Techno-commercial price bid

The contractor shall refer the format for Techno-commercial bid as given in Enclosure-I & III

10.48 Format for price bid

The contractor shall refer the format for price bid as given in Enclosure-II & IV.

**PROFORMA FOR
INTEGRITY PACT**

If the value of any procurement is above 10.00 crores (Rupees ten crores only), it would be mandatory to sign the Integrity pact with the tenderer/contractor

This Integrity Pact is made and executed on this theday of (month & year), at(place) by (name of the Centre/Unit) hereinafter referred to as “The Principal”

and

..... (name of the tender/prospective tender) hereinafter referred to as “The Tenderer/ Contractor”.

1. Preamble

1.1 The Principal intends to award, under laid down organizational procedures, a contract for (details of the goods, services, etc.).

1.2 The Principal values full compliance with all relevant laws of the land, rules, regulations, economic use of resources and of fairness/transparency in its relations with the Tenderers / Contractors. In order to ensure transparency, equity and competitiveness in public procurement, the Principal has evolved a code of Integrity under which its official or a Tenderer/Contractor participating in a procurement process is prohibited to –

- (a) make any offer, solicit or accept any bribe, reward or gift or any material benefit, either directly or indirectly, in exchange for an unfair advantage in the procurement process or to otherwise influence the procurement process;
- (b) make any omission, or misrepresentation that may mislead or attempt to mislead so that a financial or other benefit may be obtained or an obligation avoided;
- (c) resort to collusion, bid rigging or anti-competitive behaviour that may impair the transparency, fairness and progress of the procurement process;
- (d) improperly use the information provided by the Centre/Unit to the tenderer/contractor with an intent to gain unfair advantage in the procurement process or for personal gain;
- (e) carry out any financial or business transaction between the Tenderer/Contractor and any official of the Centre/Unit;
- (f) resort to any coercion or any threat to impair or harm, directly or indirectly, any party or its properly to influence the procurement process; and
- (g) obstruct any investigation or audit of a procurement process.

1.3 In order to ensure the adherence to the above Code of Integrity, the Principal will appoint an

Independent External Monitor (IEM) who will monitor the process and the execution of the contract for compliance with the principles mentioned above.

1.4 In case of any violation of the above Code of Integrity by the Tenderer/Contractor, the Principal shall take appropriate measures, including –

- (a) exclusion of the Tenderer/Contractor from the procurement process;
- (b) calling off pre-contract negotiations and forfeiture or encashment of Earnest Money deposit, if any;
- (c) recovery of payments made by the Centre/Unit along with interest thereon at bank rate;
- (d) cancellation of the relevant contract and recovery of compensation for loss incurred by the Centre/Unit;
- (e) debarment of the Tenderer/Contractor from participation in future procurements of the Department for a period not exceeding two years.

2. Commitments of the Principal

2.1 The Principal commits itself to (i) follow the Code of Integrity given in para 1.2 above, (ii) take all measures necessary to prevent corruption, and (iii) specifically observe the following principles:

- (a) No employee of the Principal. Personally or through family members, or others, will in connection with the tender for, or the execution of a contract, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.
- (b) The Principal will, during the tender process, treat all tenderers with equity and reason. The Principal will, in particular, before and after the tender process, provide to all tenderers the same information and will not provide to any tenderer confidential/additional information through which the tenderer concerned could obtain an advantage in relation to the process or the contract execution.
- (c) The Principal will exclude from the process all known prejudiced persons.

2.2 If the Principal obtains information on the conduct of any of its employees which is a criminal offence under the Indian Penal Code (45 of 1860)/Prevention of Corruption Act, 1988 (49 of 1988), or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Officer (VO) or the Chief Vigilance Officer (CVO) of the Department of Space, and, in addition, can initiate disciplinary action under the relevant service rules.

3. Commitments of the Tenderer(s)/Contractor(s)

3.1 Tenderer/Contractor commits himself to follow the Code of Integrity given in para 1.2 above and take all measures necessary to prevent corruption. He specifically commits himself to observe the following principles during his participation in the tender process and during the contract

execution:

- (a) The Tenderer/Contractor will not, directly or through any other person or firm, offer, promise or give to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material or other benefits which he/she is not legally entitled to, in order to obtain, in exchange, any advantage of any kind whatsoever during the tender process or execution of the contract.
- (b) The Tenderer/Contractor will not enter with other Tenderers/Contractors into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of tenders or any other actions to restrict competitiveness or to introduce cartelization in the tendering process.
- (c) The Tenderer/Contractor will not commit any offence under the relevant Indian Penal Code (45 of 1860)/Prevention of Corruption Act, 1988 (49 of 1988), Further, the Tenderer/Contractor will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
- (d) The Tenderer/Contractor of foreign origin shall disclose the name and address of the Agents/Representatives in India, if any. Similarly, the Tenderer/Contractor of Indian Nationality shall furnish the name and address of their foreign principals, if any. Further, details as mentioned in the "Guidelines on Indian Agents of Foreign Suppliers" shall be disclosed by the Tenderer/Contractor.
- (e) The Tenderer/Contractor shall, when presenting his tender, disclose any and all payments he has made or is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.
- (f) The Tenderer/Contractor, on a specific request by the principal, shall provide necessary information/documents whatsoever sought for by the Principal or allow access to the relevant record, documents, accounting record, books of accounts, financial statements, etc., of the Tenderer/Contractor.

3.2 The Tenderer/Contractor will not instigate third persons to commit the offences outlined above or be an accessory to such offences.

4. Disqualifications from tender process and exclusion from future contracts

If the Tenderer/Contractor, before award or during execution, has committed a transgression through a violation of para 3 above or in any other form such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Tenderer/Contractor from the tender process or take action as per the procedure mentioned in the "Guidelines on Banning of business dealing"

5. Compensation for Damages

5.1 If the Principal has disqualified the Tenderer/Contractor from the tender process prior to the award according to para 4 above. The Principal is entitled to demand and recover the damages equivalent to Earnest Money Deposit.

5.2 If the Principal has terminated the contract according to para 4 above, or if the Principal is entitled to terminate the contract according to para 4 above, the Principal shall be entitled to demand and recover from the Tenderer/Contractor liquidated damages of the Contract value or the amount equivalent Performance Bank Guarantee.

6. Previous Transgression

6.1 The Tenderer/Contractor shall declare that no previous transgression occurred in the last three years with any other company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise/Government Department in India that could justify his exclusion from the tender process.

6.2 If the Tenderer/Contractor makes incorrect statement on his subject, he can be disqualified from the tender process and action taken as per the procedure mentioned in “Guidelines on Banning of business dealing”.

7. Equal treatment of all Tenderer(s)/Contractor(s)/Subcontractor(s)

7.1 The Tenderer/Contractor undertake(s) to demand from all subcontractor(s) a commitment in conformity with his Integrity pact, and to submit it to the Principal before signing of the contract/release of order.

7.2 The Principal will enter into agreements with identical conditions as this one with all Tenderers, Contractors and Subcontractors for the subject procurement.

7.3 The Principal will disqualify from the tender process all Tenderers/Contractors who do not sign this Integrity Pact or violate its provisions.

8. Criminal charges for violation by Tenderer/Contractor/Subcontractor

If the Principal obtains knowledge of conduct of a Tenderer, Contractor or Subcontractor, or of an employee or a representative or an associate of a Tenderer, Contractor or Subcontractor which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the same to the Vigilance Officer of the Principal, who will take further necessary action in the matter.

9. Independent External Monitor/s

9.1 In terms of para 1.3 above, the Principal will appoint competent and credible Independent External Monitor (IEM) for this Integrity Pact. The task of the IEM is to review independently and objectively, whether, and to what extent, the parties comply with the obligations under this agreement.

9.2 The IEM is not subject to instructions by the representatives of the parties perform his

functions neutrally and independently. He reports to the Head of the Principal's Office.

9.3 The Tenderer/Contractor accepts that the IEM has the right to access, without restriction, to all documentation of the Principal including that provided by the Tenderer/Contractor relating to the subject procurement. The Tenderer/Contractor will also grant the IEM upon his request and demonstration of a valid interest, unrestricted and unconditional access to his documentation relating to the subject procurement. The above condition shall also be applicable to sub-contractor/s. The IEM is under contractual obligation to treat the information and documents of the Tenderer/Contractor/Subcontractor(s) with confidentiality.

9.4 The Principal will provide to the IEM sufficient information about all meetings among the parties related to the subject procurement provided such meetings could have an impact on the contractual relations between the Principal and the Tenderer/Contractor. The parties offer to the Monitor the option to participate in such meetings.

9.5 As soon as the IEM notices, or believe to notice, a violation of this Pact, he will so inform the Principal and request the Principal to discontinue or take corrective action, or to take other relevant action. The IEM can in this regard submit non-binding recommendations. Beyond this, the IEM has no right to demand from the parties that they act in a specific manner or refrain or tolerate action.

9.6 The IEM will submit a written report to the Head of the Principal's Office within four weeks from the date of reference or intimation to him by the Principal and, should the occasion arise, submit proposals for correcting problematic situations.

9.7 If the IEM has reported to the Head of the Principal's Office a substantiated suspicion of an offence under the relevant Indian penal Code/Prevention of corruption Act, and the Head of the Principal's Office has not, within a reasonable time, taken visible action to proceed against such offence or reported it to the Chief Vigilance Officer of the Department, the IEM may also transmit this information directly to the Central Vigilance Commission, with a copy to the Chief Vigilance Officer of the Department.

10. Duration of the Integrity Pact

10.1 This integrity Pact shall be treated as part and parcel of Purchase Order/ Contract, if any, placed by the Principal on the Tenderer/ contractor. The validity of this Integrity Pact begins when both parties have legally signed it. It expires for the successful Tenderer/ Contractor 12 (twelve) months after the last payment under the contract, and for all other Tenderers/ Contractors, 6 (six) months after the contract has been awarded.

10.2 If any claim is made/ lodged during the periods aforementioned, the same shall be binding and continue to be valid despite the lapse of this Integrity Pact as specified above, unless it is discharged/determined by the Head of the principal's office.

11. Other provisions

11.1 This integrity Pact is subjected to Indian Law, and the place of performance & jurisdiction

shall be the place where the Principal's Office is located.

11.2 Changes and supplements as well as termination notice need to be made in writing.

11.3 If the Tenderer/Contractor is a partnership firm or a consortium, this Integrity Pact must be signed by all partners or consortium members.

11.4 Should one or several provisions of this Integrity Pact turn out to be invalid, the reminder of this pact would remain valid. In this case, the parties will strive to come to an agreement to their original intentions.

11.5 In the event of any contradiction between the Integrity Pact and its Annexures, the clause in the Integrity Pact only will prevail.

.....
(For & on behalf of the Principal)
(Office seal)

.....
(For & on behalf of Tenderer/Contractor)
(Office seal)

Place:

Date:

Witness 1:
(Name & Address)

Witness 2:
(Name & Address)

MEMORANDUM OF UNDERTAKING

I/ We hereby submit the quotation for the execution for the President of India of the work specified in the underwritten memorandum within the time specified in such memorandum, at a total price as specified and in all respects in accordance with the specifications, design, drawings and instructions in writing referred to in this document and with such materials as provided for by and in all other respects in accordance with such conditions as are applicable.

Should this tender be accepted in whole or in part, I/ We hereby agree to abide by and fulfill all the terms and provisions of the said conditions annexed hereto and all the terms and provisions contained in the tender enquiry documents which have been read by me/ read and explained to me so far as applicable or in default thereof to forfeit and pay to the President of India or his successors in office the sum of money mentioned in the said conditions.

I/ We agree to execute all the works referred to in the tender enquiry documents upon the terms and conditions contained or referred to therein and to carry out such deviation/ variation as may be ordered in excess of original scope at the rates to be determined in accordance with the provision contained in this document.

Witness

Bidder

(Signature)

(Signature)

Name:

Name:

Designation:

Designation:

Address:

Address:

Option 3: For Establishing a new Plant at Contractor's site anywhere in India with Contractor's own cost and manufacture & supply of Isrosene as and when required as per the terms & conditions mutually agreed upon for a period of 20 years at price per metric ton with revision in price every year.

SCOPE OF THE CONTRACTOR:

- 1) Establishment of a new Isrosene Production Plant with a nominal capacity of 3000 liters per day with dedicated utilities and all brand new items & reputed make. The process shall be designed in such a way that production capacity of Isrosene production plant shall be 20 % higher than the design capacity.
- 2) Manufacture & supply of Isrosene as and when required as per the terms & conditions mutually agreed upon for a period of 20 years at price per metric ton with revision in price every year.
- 3) Contractor shall maintain the quality of Isrosene and raw materials in accordance with the general specifications given in Section 3. The properties of the final product Isrosene shall meet the specifications mentioned in Section 3, Sl.No. 9, 14 and 21.

GENERAL:

- a) In general the Contractor shall follow the technical input given for option: 1 & 2 as a guideline. Also the Contractor shall follow techno-commercial terms of option: 1& 2, wherever applicable.
- b) Department has the rights to visit the Plant site identified by the Contractor.
- c) Contractor shall involve technical personnel assigned by the Department in all the technical reviews during establishment of the Plant from design & detailed engineering, procurement, inspection, erection, installation, commissioning and trial running of the Plant.
- d) Contractor shall follow standard design codes for fabrication of equipments and vessels in the Plant.
- e) Contractor is responsible for obtaining necessary statutory approvals, licenses, Insurance and renewals for the Plant. Plant shall be designed to meet the

requirements of Petroleum and Explosives Safety Organisation (PESO) and Pollution Control Board (PCB).

- f) Department shall constitute a Joint Co-ordination Committee (JCC) consisting of members from ISRO and Contractor. Contractor shall inform the progress of the activities in the JCC meetings.
- g) Contractor shall maintain adequate plant spare parts for ensuring continuous operation of the Plant
- h) Contractor shall provide necessary inspection / test report, release note etc., with each delivery of Isrosene during supply to the Department

SCOPE OF THE DEPARTMENT:

- 1) Department assures guaranteed purchase of product Isrosene from the newly established Plant for 20 years after successful commissioning of the Plant by the Contractor.
- 2) Department shall conduct quality control checks of Isrosene at Contractor's site as and when required.
- 3) Department shall take delivery of Isrosene from Plant site and arrange transportation using Department tankers to the destination.

TECHNICAL DOCUMENTS:

Bidders shall provide the following documents along with the quotation.

- Preliminary technical project report
- Process details and Process flow diagrams with functional description.
- Preliminary engineering with P&ID, major specifications, equipment GA drawings, Plant layout, layout of firefighting system with location of detectors & other safety systems and layout with location of CCTV and communication equipments.
- Documentary proof for the details given in techno-commercial bid format.

INSTRUCTION TO BIDDERS:

Bidders shall submit the offer in two part bid as per Section 10.1 in the RFP.

- **Techno-commercial bid:**

- The bidders shall comply all the technical and commercial aspects given in

Annexure-3 for Option: 3. Techno-commercial bid shall contain all technical details of the proposed plant as well as information and confirmation on all aspects.

- Bidders shall submit the techno-commercial bid for option: 3 individually as per the format enclosed (Enclosure-III)
 - Under any circumstances, the Techno-commercial bid shall not mention prices of any items.
 - The techno-commercial bid shall contain a blank price bid given in Enclosure-IV along with individual breakup. Price shall be given only in the price bid. The basis of pricing is very important to evaluate the reasonableness of the pricing.
- **Price bid:**
 - **Price:** The overall price of product Isrosene per MT shall be arrived including the Plant cost and operating costs (both fixed and variable) in the Enclosure-IV. The Plant cost has to be amortized over a period of 20 years in the product cost.
 - **Plant operating cost and price variation:** Plant operating cost consists of Fixed and Variable operating cost.

Quantity to be supplied / Off take per year: Contractor shall operate and maintain the Plant to produce and supply 80% of the nominal Plant capacity (3000 LPD) and operation of 300 days per annum (576 MT is the annual minimum guaranteed offtake).

Fixed operating cost: The fixed operating cost elements namely salaries for operating manpower/labour (list of personnel from Management level to technical and non technical level in different categories with qualification, experience shall be mentioned for 3 shift plant operation & maintenance), maintenance cost, administrative expenses, profit shall be worked out in detail for per metric ton of the product. Payment towards fixed operating costs will be paid on prorata monthly basis irrespective of Isrosene supply to Department.

Variable operation cost: Variable operating cost elements per metric ton of the product like cost of raw materials including their transportation costs, catalyst, utilities etc. based on consumption norms and their corresponding

unit cost shall be worked out in detail for the first year and quoted. Plant operation shall be considered for 300 days in a year at 80 % of nominal capacity of 3000 liters per day. Variable operating cost shall be paid for the quantity of Isrosene supplied to IPRC/ISRO.

During first year, the fixed and variable operating cost of Isrosene shall remain firm and fixed.

For price fixation in subsequent years, both fixed and variable operating costs will be reviewed during the month of April every year. Fixed operating costs shall be discussed & finalized with mutual consent of ISRO and the Contractor. Variable operating costs per metric ton of Isrosene shall be worked out based on the actual market price of raw materials and utilities, certified by the Contractor's Chartered Accountant. The Contractor shall produce documentary proof for review of variable operating cost by the Department to fix the price as mentioned above.

- **Excess/ Short fall of annual supplies:**

- a) Contractor shall operate and maintain the Plant to produce and supply 80% of the nominal Plant capacity (3000 LPD) and operation of 300 days per annum (576 MT is the annual minimum guaranteed offtake).
- b) If there is a short fall in the supplied quantity with respect to the annual minimum guaranteed offtake stated above due to the default of the Department, the fixed operating cost shall be paid to the Contractor upto the extent of annual minimum guaranteed offtake value.
- c) If there is a short fall in the supplied quantity with respect to the annual minimum guaranteed offtake stated above due to the default of the Contractor, the fixed operating cost shall be paid only to the extent of the supplied quantity by the Department.
- d) If the off-take quantity exceeds the annual minimum guaranteed offtake value, variable operating cost alone shall be paid for the supplied excess quantity.

Bid evaluation:

Bidders shall be evaluated based on the overall price of product Isrosene per MT quoted including the Plant costs and operating costs (Both fixed and variable) for 20 years of Plant life.

Execution Period:

The entire work is to be completed within 24 months from the date of signing the Contract. However, the detailed schedule shall be mutually discussed and agreed upon. The bidder shall submit a Master schedule about their realization plan so as to comply with the overall execution period stated herein, in the form of a Gantt chart, indicating the sequence and duration of the various phases of work in the techno-commercial bid.

Format for Techno-commercial bid

The Techno-commercial bid shall be prepared for **Option: 1 & Option: 2** individually under the following heading

S.No	Description
1	Complete profile of the Company
2	Status of the Company(Proprietary/ Partnership/PSU/Pvt.Ltd etc)
3	Address of the Associates, if any
4	List of similar Contracts executed, with full address of the customers
5	Details of Contracts/Projects now in hand
6	Details of Infrastructure such as Production Plants (Buildings/facilities, utilities, R & D structure, Manpower in different categories (Administration, Accounts, Purchase, R&D and Technical)
7	Organisational structure and list of key personnel and their expertise, etc.
8	Financial status (Annual turnover statement/balance sheet with Annual Reports for last three years and current solvency certificate)
9	Sales turnover for the last 3 years
10	Complete details of other agencies/companies to which the Contractor is going to collaborate for designing or any other activities in order to establish the Isrosene production plant
11	Process details (PFD& PID), Plant equipment details (GA drawings), Equipment & Plant layout with total fenced area required, Building details (considering details given in description of the plant) for the production of 3000 L/day capacity Isrosene plant
12	Catalyst details (Type of catalyst, Availability (proprietary/commercial), Catalyst life and regeneration capability, consumption etc.)
13	Quantity of Raw materials (LAB Raffinate & Hydrogen gas) and utilities including heating and cooling medium, Nitrogen gas, air, raw water, soft water, power etc) required per unit weight of product.
14	Details of process & auxiliary equipments and components etc.
15	Details of Instrumentation and control system with control logics, instrument details, control system configuration etc.
16	Detail of electrical system/equipment
17	Details of safety and fire fighting equipments
18	Details of CCTV system & Communication system
19	Details of civil works and structural works
20	Delivery period with activity wise schedule (Bar chart)
21	Any other information you consider as relevant

Format for Price bid

The Price bid shall be prepared for **Option: 1 & Option: 2** individually under the following heading with detailed sub lists

S.No.	Systems	Reference	Price
Plant cost			
1	Technical project report	Section 6.1	
2	Design Report	Section 6.2	
3	Detailed Engineering	Section 6.3	
4	HAZOP analysis	Section 6.4	
5	Process equipments	Section 6.6	
6	Auxiliary equipments	Section 6.7	
7	Valves, Pipes, Pipe Fittings, Insulation, Flexible hoses, studs & bolts and gaskets	Section 6.8	
8	Instrumentation & Control systems	Section 6.9	
9	Electrical systems/equipments	Section 6.10	
10	Laboratory Analytical Instruments (for Option: 2)	Section 6.11	
11	Safety Systems/equipments	Section 6.12	
12	Fire fighting equipments	Section 6.13	
13	CCTV & Communication system (Price per unit camera to be mentioned)	Section 6.14	
14	Civil works & Structural works	Section 6.15	
15	Erection and Installation	Section 6.16	
16	Commissioning	Section 6.17	
17	Performance tests	Section 6.18	
18	Statutory Approvals	Section 6.20	
19	Licenses	Section 6.21	
20	Third Party Inspection	Section 8.3	
21	Packing & Forwarding and transportation	Section 10.10	
22	Taxes and duties	Section 10.11	
23	Service tax	Section 10.12	
Total cost for Plant			
24	Operation and maintenance cost of the plant for 3 years (Fixed operating cost with break-up)	Section 6.24, III (a)	
25	Spare parts for 3 years operation (after the 2 years warranty period)	Section 6.19	
26	Variable operating cost (Raw materials, catalyst and utilities as per consumption norms)	Section 6.24, III (b)	
27	Cost of Isrosene per kg (clearly specify the basis of estimation)	Section 6.24, III (c)	
28	Cost of catalyst for 5 years after the Operation and Maintenance period of 3 years	Section 6.22 (e)	

Note: (i) Contractor shall add sub-systems (wherever required) with breakup cost for the systems listed above.

(ii) Any item not included above, to be given with break-up for each Item.

(iii) Price shall be exclusive of taxes and duties

(iv) The plant shall be designed for an operational life of minimum 20 years.

Format for Techno-commercial bid

The Techno-commercial bid shall be prepared for **Option: 3** individually under the following heading

S.No	Description
1	Complete profile of the Company
2	Status of the Company(Proprietary/ Partnership/PSU/Pvt.Ltd etc)
3	Address of the Associates, if any
4	List of similar Contracts executed, with full address of the customers
5	Details of Contracts/Projects now in hand
6	Details of Infrastructure such as Production Plants (Buildings/facilities, utilities, R & D structure, Manpower in different categories (Administration, Accounts, Purchase, R&D and Technical)
7	Organisational structure and list of key personnel and their expertise, etc.
8	Financial status (Annual turnover statement/balance sheet with Annual Reports for last three years and current solvency certificate)
9	Sales turnover for the last 3 years
10	Complete details of other agencies/companies to which the Contractor is going to collaborate for designing or any other activities in order to establish the Isrosene production plant
11	Process details (PFD& PID), Plant equipment details (GA drawings), Equipment & Plant layout with area required, Building details for the production of 3000 L/day capacity Isrosene production Plant
12	Catalyst details (Type of catalyst, Availability (proprietary/commercial), Catalyst life and regeneration capability, consumption etc.)
13	Details of process & auxiliary equipments & components, instrumentation and control system with control logics, instrument details, control system configuration, electrical system/ equipments, CCTV and communication system, civil works & structural works.
14	Quantity of Raw materials (LAB Raffinate & Hydrogen gas) and utilities including heating and cooling medium, Nitrogen gas, air, raw water, soft water, power etc) required per unit weight of product.
15	Delivery period with activity wise schedule (Bar chart)
16	Any other information you consider as relevant

Format for Price bid

The Price bid shall be prepared for **Option: 3** under the following heading with detailed sub lists

S.No.	Element	Price
1	Plant cost (with detail cost break-up like Plant & Machinery, Safety & firefighting systems, Civil, electricals & structurals, laboratory instruments, Erection, Installation & commissioning, Statutory approvals, licences & renewals, Insurance, Engineering services etc.including taxes & duties)	
2	Fixed operating costs with cost break-up	
3	Variable operating cost (Raw materials, catalyst and utilities as per Plant consumption norms)	
4	Cost of Isrosene per MT (metric ton) (clearly specify the basis of estimation)	

Note: (i) Taxes for product Isrosene shall be mentioned separately and it will be paid extra at actual for the supplied quantity.

(ii) Contractor shall add sub-elements (wherever required) with breakup cost for the elements listed above.

11 GLOSSARY OF ACRONYMS AND ABBREVIATIONS

Acronym	Abbreviation
ISRO	Indian Space Research Organisation
IPRC	ISRO Propulsion Complex
RFP	Request for Proposal
IPP	Isrosene production plant
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing and Materials
LAB	Linear Alkyl Benzene
MFC	Mass flow controller
SCADA	Supervisory Control and Data Acquisition
HART	Highway Addressable Remote Transducer
ISO	International Organisation for Standards
PID	Process and Instrumentation drawing
PBG	Performance bank guarantee
AICPI	All India Consumer Price Index
LD	Liquidated damages
FOR	Free on road
AERB	Atomic Energy Regulatory Board
RCM	Resident construction manager
EP	Electro-Pneumatic (valve)
MCCB	Molded Case Circuit Breaker
ELCB	Earth Leakage Circuit Breaker
MAWP	Maximum Allowable Working Pressure
FIM	Free Issue Materials
DER	Detailed Engineering Review
GN2	Gaseous Nitrogen
GTAW	Gas-purged Tungsten Arc Welding
HAZOP	HAZards and Operability (analysis)
SOP	Standard operating procedure