HEEVA/AERA/ Consultation paper 24.7.2026

TO:
The Regulatory Authority
AERA, New Delhi

SUBJECT: Technical & Financial Justification for the 3-Tank Configuration at the Satellite Fuel Farm, Bengaluru Airport (Ref: Consultation Paper No. 03/2026-27, Section 5.2.5)

Dear Sir,

We, Heeva Engineering Designs (HED) is a multidisciplinary engineering design consultancy based in Bangalore, India, specializing in the planning, design, and detailed engineering of Aviation Fuel Farms, Airport Hydrant Fuel Systems, Petroleum Storage Terminals, Pipelines, and associated fuel handling infrastructure. Our multidisciplinary team provides integrated engineering services covering Civil & Structural, Mechanical, Electrical, Instrumentation & Automation, Architectural, and MEP disciplines, delivering complete engineering solutions from concept development and FEED through detailed engineering, construction support, and commissioning assistance. HED has extensive experience in the design of aviation fuel infrastructure and is well versed with international and national engineering standards, including NFPA, EI/JIG, OISD, BCAS, and other globally accepted aviation fuel storage and handling guidelines.

AERA's consultation process provides an important opportunity for stakeholders, including independent technical experts, to contribute towards the development of safe, reliable, and efficient airport infrastructure. Our comments are based solely on established engineering principles, international best practices, and recognized aviation fuel standards, and are intended to assist AERA in arriving at a technically robust and well-informed regulatory decision in the interest of safety, operational reliability, and long-term sustainability.

This representation addresses the preliminary views expressed by the Authority in Section 5.2.5 (iii–vi) regarding the proposed expansion of the Satellite Fuel Farm at Kempegowda International Airport, Bengaluru.

The Authority has proposed:

1. Deferring/deleting one 6640KL storage tank, reducing the initial installation from 3 tanks to 2 tanks.
2. Scaling down the allowed Capital Expenditure (Capex) proportionally by roughly 31% (reducing the project base cost from ₹287.66 Cr to ₹199.45 Cr).

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As the specialized engineering design firm for fuel infrastructure, Heeva Engineering Designs respectfully submits that reducing the facility to 2 tanks violates strict Aviation Quality Control (QC) operational mandates and that a pro-rata 33% Capex reduction is technically and financially invalid due to non-scalable common infrastructure costs.

1. TECHNICAL & QUALITY CONTROL JUSTIFICATION (THE 3-TANK MANDATE)

The Authority's recommendation to reduce storage capacity to 2 tanks assumes fuel storage operates on a continuous, static volumetric basis. However, in Aviation Turbine Fuel (ATF) handling, tankage cannot be treated as a single continuous volume due to strict international quality control and safety standards (e.g., Joint Inspection Group - JIG 1/2, API/IP, and DGCA guidelines).

A minimum 3-tank configuration per grade/farm is mandatory to achieve the "3-Tank Operational Cycle":

TANK 1: RECEIVING ---> TANK 2: SETTLING ---> TANK 3: DELIVERING

Why a 2-Tank System Fails Operational & Mandatory Standards:

- Quality Control & Settling Time: ATF delivered to a storage tank requires a mandatory minimum settling time to allow free water and particulate matter to settle out before testing and certification.
- Contamination Risk (Simultaneous Operations): If only 2 tanks are installed:
    - Tank 1 is in Delivery to aircraft.
    - Tank 2 is Receiving fresh batch fuel.
    - Vulnerability: There is no tank available for Settling & Quality Testing. If Tank 1 empties before Tank 2 completes receiving and mandatory settling/testing, fuel transfer to the airport hydrant system must cease entirely, creating an unacceptable risk of operational shutdown at a major international airport.
- Redundancy & Maintenance: In a 2-tank setup, routine maintenance, internal tank inspections, cleaning, or emergency isolation leaves the entire fuel farm operating on a single tank, making compliant operations impossible.

Conclusion on Operating Philosophy: The 3-tank design is not an issue of "creating excess volumetric capacity"; it is a functional process requirement to ensure safe, un-contaminated, and uninterrupted supply to aircraft.

2. FINANCIAL & COST DYNAMICS (NON-LINEAR CAPEX SCALING)

The Authority has reduced the allowable base capital cost from ₹287.66 Crores to ₹199.45 Crores,a direct over 33.33% reduction. This assumes that Capex scales linearly with the number of storage tanks (i.e., removing 1 of 3 tanks removes 1/3rd of the total cost).

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From an engineering design and cost-estimation standpoint, this assumption is incorrect.

Breakdown of Fixed vs. Variable Capital Expenditure:

The cost of a Satellite Fuel Farm comprises two major components:

1. Common / Civil / Utility Infrastructure (Fixed Costs): These costs are required on Day-1 regardless of whether there are 2 tanks or 3 tanks.
2. Tank Shell, bottom and roof and other associated facilities on the tank & Dedicated Piping (Variable Costs): Only the direct plate materials, dedicated tank valves, and foundation slab for the 3rd tank scale down.

SATELLITE FUEL FARM TOTAL CAPEX STRUCTURAL BREAKDOWN

A) FIXED / COMMON INFRASTRUCTURE,

Land Development, Grading, Admin, Sub-station buildings, Boundary Walls, Roads, & Drainage, Firewater Tanks (2 Nos.), Fire Pumping Station, Offloading / Receiving Pumps, Filtration Units (Filter Water Separators), Truck unloading gantry and pump house, Hydrant Main Pumping Station, workshop, Variable Frequency Drives (VFDs), Electrical Substation, Transformers, DG Sets, & HT/LT Distribution, PLC/SCADA Automation, Control Room, Terminal Management System, Slop Tanks, Oily Water Separators, & Environmental Systems, leak detection system, emergency shutdown system, etc.

B) VARIABLE TANK COST

Tank Fabrication, Steel Plates for the construction of this tank, Tank Foundation, Direct Inlet/Outlet Tank Valves & Gauging Instruments and other appurtenances.

Financial Impact of Removing 1 Tank:

- The 3rd storage tank shell, internal floating roof, foundation, and other appurtenances represents only small portion of 31% of overall Satellite Fuel Farm project Capex.
- The common facilities listed above must be 100% built upfront to support the operational design flow of the Satellite Fuel Farm.

Therefore, removing the 3rd tank does not reduce the overall project cost by 31%. Reducing the budget to ₹199.45 Crores severely underfunds the critical, non-scalable utility and safety infrastructure required to operate even a 2-tank facility.

3. PROPOSED REVISED SUBMISSION & RECOMMENDATION

In light of the technical and financial facts, Heeva Engineering Designs recommends the following to the Regulatory Authority:

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1. Reinstatement of the 3-Tank Configuration on Technical Grounds: 3-tank configuration is mandated by Aviation Fuel Quality & Operations Standards (JIG / DGCA) to maintain the *Receive-Settle-Deliver* cycle. Deferring the 3rd tank jeopardizes fuel certification compliance and airport operational resilience. Hence 3 tanks are required.

2. Submission of a Detailed Asset-Wise Cost Breakdown (if Phased Capex is Enforced): If the Authority maintains its decision to phase the 3rd storage tank despite its operational and quality control necessity, deduction of one tank cost be Limited to Specific to the one tank alone based on actuals as there are fixed cost (irrespective of tanks).

Thanking you

Yours Sincerely

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