CIVIL AVIATION SAFETY AUTHORITY OF PAPUA NEW GUINEA

SAFETY ALERT BULLETIN (SAB)

SAB NO: 01/2024 Revision 1

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A SAB is issued under section 12(k) of the Civil Aviation Act 2000(as amended). It contains important safety information and may include recommended action. SAB content should be especially valuable to air operators in meeting their statutory duty to provide service with the highest degree of safety in the public interest. Besides specific action(s) recommended in a SAB, an alternative action may be as effective in addressing the safety issue in the SAB.

TITLE: AVIATION FUEL SUPPLY DISRUPTION AND FUEL QUALITY MANAGEMENT

OBJECTIVE: This SAB provides safety guidance information for:

- All Owners of PNG-registered aircraft
- All Air Operators of PNG-registered aircraft.
- Part 144 Supply Organizations.
- Part 145 Aircraft Maintenance Organisations.

APPLICABILITY: This SAB is applicable to personnel who are engaged in aircraft ground-handling, aircraft re-fueling operations, aircraft maintenance, maintenance control and continuing airworthiness, airline operations, and others undertaking an aviation activity and service including:

A. Air Operators
B. Aircraft Ground-handlers and Refuellers
C. Part 144 Supply Organisations
D. Part 145 Aircraft Maintenance Organisations
E. Pilots
F. Aircraft Maintenance Engineers
G. Other participants as applicable.

1. BACKGROUND:

On 23 February 2024, the Managing Director and Chairman of Puma Energy Ltd wrote to the Director notifying of “Imminent Jet A1 Stockout..”.

On 29 February 2024, Prime Minister of Papua New Guinea, Hon. James Marape issued a Media Release addressing the fuel crisis by invoking provisions of the Essential Services Act 2002 (ESA). National Gazette No. G119 dated 28 February 2024 declared a period of emergency under section 3 of the ESA, which gives "emergency powers" to the Government to give directions to companies in the fuel and banking sector in the best the interest of PNG.

Based on the above developments, CASA is taking steps to ensure operational safety of aircraft and continue dialogue with the aviation industry during the period of emergency.

The above fuel crisis situation is unprecedented and has resulted in several general enquiries and requests from the aviation Industry participants to CASA seeking advice on their intent to import, store and distribute their own Jet A-1 fuel in order to continue to operate aircraft. However, it has also opened up the potential for non-144 approved fuel suppliers and distributors to proliferate sub-standard aviation fuel, offering 'quick solutions' for un-suspecting owners and air operators.

This SAB provides Industry with guidance on PNG's regulatory requirements on fuel supply and distribution to all PNG-registered aircraft. Owners of aircraft and air Operators are reminded that they are ultimately responsible for ensuring the continued airworthiness of the aircraft under rule 91.101(a). This includes ensuring that the quality of fuel "into-plane" are to airworthiness standards acceptable to the Director. Owners and air Operators are encouraged to be vigilant with the sourcing of fuel supply and to carry out safety risk assessments on its fuel quality management system as required under Rule Part 100. Aviation Safety is a shared responsibility and CASA encourages owners of aircraft and aircraft operators to strictly adhere to the guidelines of this SAB in order for us to work together and safely manage this unprecedented fuel crisis situation.

CASA will continue our surveillance both on Part 144 supply organisations and air operators including spot checks to verify that fuel water contamination checks and other safety checks are being carried out on 'into-plane' fuel. Section 5 of this SAB provides a list of Part 144-approved aviation fuel suppliers. All aviation fuel used for 'into-plane' operations should be sourced only through a PNG Part 144 approved organisation. Aircraft owners and air operators should encourage non-Part 144 approved fuel suppliers to make the necessary arrangements with CASA to be Part 144 approved to enable them to supply fuel after the period of emergency.

2. REGULATORY REQUIREMENTS FOR THE SUPPLY AND/OR DISTRIBUTION OF AVIATION FUEL IN PNG

Section 3 of the Civil Aviation Act defines "Aeronautical product" as "…anything that comprises or is intended to comprise any part of an aircraft or that is intended to be installed in or fitted or supplied to an aircraft, ***and includes fuel*** and other similar consumable items necessary for the operation of the aircraft".

Rule 144.1 states the purpose of Part 141 Supply Organisation Certification rules, as prescribing rules governing the certification of organisations ***who supply or distribute aeronautical products***.
Rule 144.5 prescribes the requirement for holding a Part 144 Supply Organisation Certificate. The said provision is reproduced below for ease of reference (bold emphasis is mine).

"144.5. Requirements for Certificate

Any person ***who supplies and issues a release note*** for:

(1) ***an aeronautical product broken from a batch of aeronautical products*** conforming to aeronautical standards acceptable to the Director; or

(2) ***an aeronautical product,*** material or item of equipment whose design requires it to be held under specially controlled storage conditions to ensure that ***the product continues to conform to airworthiness standards acceptable to the Director***; or

3) ***an aeronautical product***, material or item of equipment that, in the absence of documents specified in 144.109(a)(3)(i), requires inspection or testing- to ***determine its conformity to airworthiness standards acceptable to the Director-***

shall hold a supply organisation certificate issued under this Subpart.**"**

Rule 144.109 prescribes requirements that an applicant for a Part 144 Supply Organisation Certificate ***must*** establish supply control procedures to inspect, test and determine that an aeronautical product conforms to airworthiness standards acceptable to the Director. The said provision is reproduced below for ease of reference (bold emphasis is mine).

"144.109. Supply Control Procedures

(a) An applicant for the grant of a supply organisation certificate must establish supply control procedures for-

(1) the ***identification of each aeronautical product***…; and

(2) to ***inspect***, and if applicable, ***test*** an aeronautical product to ***determine*** that it ***conforms to airworthiness standards acceptable to the Director***, ***has no unsafe features, and is fit for use***; and

3) for ***determining that each aeronautical product*** other than a standard part, c***onforms with acceptable airworthiness standards*** ….

4) …

5)…

6)…

7)…

8)…

9…**"**

Rule 144.17 prescribes the requirement for holders of a Part 144 Supply Organisation Certificate to notify the Director within 30 days of when they cease their supply activities. The said provision is reproduced below for ease of reference (bold emphasis is mine).

"144.17. Notification of ceasing supply

A holder of a supply organisation certificate who ceases supply activity must notify the Director in writing within 30 days of the date of cessation and request revocation of the supply organisation certificate."

3. AVIATION FUEL CONTAMINATION:

The quality of 'into-plane' fuel is critical to aircraft operational safety and the continuing airworthiness of aircraft.

Three (3) most common causes to Aviation Fuel Contamination

1. **Water** -is everywhere and happens to be the most prevalent and potentially damaging contaminant in Jet Fuel. There are three (3) forms of water contamination common to Jet Fuels:
    a. Dissolved water in fuel which appears clear.
    b. Dispersed water in fuel which appears hazy.
    c. Free water in fuel accumulates in tank bottoms, walls and found emulsified in fuel.

2. **Particulates –** are also everywhere, often found as sediments and suspended in fuel. There are three (3) major sources of particulate contamination often found in Jet fuel:

    a. Foreign debri including metal chips, including coating materials and rubber components are common.
    b. Fine particulates like clay, rust or dirt and CMAS (calcium, magnesium and alumino-silicate) are found in Jet fuels.
    c. Residuals and sludges in the form of degraded fuel components and biofilms are common in fuels stored for longer periods of time or when fuel is exposed to extreme weather events causing accelerated fuel degradation.

3. **Microbiological Growth (MBG)** – microbes are everywhere and MBG is one of the most concerning contaminants in aviation fuels. It is responsible for operational problems, corrosion and flight safety. They are in the air we breathe and in aviation fuel systems. Two types of microbes found in aviation fuels are bacteria and fungi (include molds and yeasts). Some require oxygen environments to survive (aerobes) and some require environments without oxygen (anaerobes), while others can survive in both environments (facultative). Over 100 species of microbes are known to cause serious fuel and fuel system damage.

Figure 1- Pictures of Aviation fuel contaminated with dissolved water, dispersed and free water

4. CASA LITERATURE REVIEW OF SERIOUS INCIDENTS ARISING FROM THE UPLIFT OF CONTAMINATED FUEL

The below serious incidents, although rare, show how it is still possible for entirely avoidable primary contamination to overwhelm the filtration process at fuel uplift and lead to the generation of hazardous secondary contaminant.

1. **Airbus A333, Hong Kong China, 2010** - On 13 April 2010, a Cathay Pacific Airbus A330-300 en route from Surabaya to Hong Kong experienced difficulty in controlling engine thrust. As these problems worsened, one engine became unusable and a PAN and then a MAYDAY were declared prior to a successful landing at destination with excessive speed after control of thrust from the remaining engine became impossible. Emergency evacuation followed after reports of a landing gear fire. Saltwater contamination of the hydrant fuel system at Surabaya after alterations during airport construction work was found to have led to the appearance of a polymer contaminant in uplifted fuel.
2. **B773, Dhaka Bangladesh, 2016** - On 7 June 2016, a GE90-115B engined Boeing 777-300 made a high speed rejected takeoff on a 3200m long runway 14 at Dhaka after right engine failure was annunciated at 149KCAS - just below V1. Neither crew nor ATC requested a runway inspection and 12 further aircraft movements occurred before it was closed for inspection and recovery of 14 kg of debris. The Investigation found that engine failure had followed Super Absorbent Polymer (SAP) contamination of some of the fuel nozzle valves which caused them to malfunction leading to Low Pressure Turbine (LPT) mechanical damage. The origin of the contaminant was not identified.
3. **C550, en route, north of Savannah, GA USA, 2019** - On 9 May 2019, a Cessna 550 level at FL 350 experienced an unexplained left engine rundown to idle and the crew began descent and a diversion to Savannah. When the right engine also began to run down passing 8000 feet, an emergency was declared and the already-planned straight-in approach was successfully accomplished without any engine thrust. The ongoing Investigation has already established that the likely cause was fuel contamination resulting from the inadvertent mixing of a required fuel additive with an unapproved substance known to form deposits which impede fuel flow when they accumulate on critical fuel system components.
4. **A321, vicinity London Gatwick, UK 2020** - On 26 February 2020, after a difficult Airbus A321 left engine first flight of the day start, the same happened on the third sector with en-route engine abnormalities then affecting both engines. With no fault found during post flight maintenance inspections and despite similar engine starting problems, both engines then malfunctioned after takeoff from Gatwick. A MAYDAY return followed. Investigation found that the cause was fuel system contamination by addition of approximately 38 times the correct quantity of biocide during earlier scheduled maintenance and that the release of the aircraft to service for the flight had followed inadequate troubleshooting action.

5. SUPPLY CONTROL & QUALITY ASSURANCE OF AVIATION FUELS IN PNG?

Part 144 approved fuel suppliers have demonstrated that the fuel they supply are refined to a specification and delivered as such to an on-airport storage facility. They drain this aviation fuel on a daily basis to remove any water which may have resulted from condensation so as to minimise the chances of microbial proliferation. Before being taken from bulk storage and uplifted by an aircraft, fuel is then filtered as least twice to ensure that it is free from particulate matter which could affect aircraft fuel systems and to ensure that any remaining traces of free water are removed.

The above quality assurance standards may not be adhered to by non-Part 144 approved fuel suppliers and therefore, should not be used. Owners of aircraft and air operators must ensure that all aeronautical products, including aviation fuel, imported into PNG for use on PNG-registered aircraft, must be subjected to the supply control procedures and quality assurance checks of a properly certificated Part 144 Supply Organisation to assure the Director that the quality of the fuel is to an acceptable airworthiness standard.

Owners of aircraft and air operators may apply for their own Part 144 SOC and/or they may have an agreement with an existing Part 144 SOC holder listed in the below table. CASA will conduct on-going safety oversight and monitoring on the Part 144 SOC holder and those agreements.

There are a total of six (6) Supply Organisation Certificate holders who are currently certificated under Part 144 to supply or distribute fuel to PNG-registered aircraft in PNG.

The following table provides more details on their approvals:

Part 144 SOC No.	**Name of SOC**	**SOC Issue Date**	**SOC Expiry Date**
144/006	Puma Energy Ltd	01 November 2010	30 September 2026
144/008	Exxon Mobil PNG	01 May 2013	30 June 2026
144/001	Puma Energy Refining Ltd	01 April 2013	31 January 2025
144/005	Pacific Energy Aviation Ltd	25 April 2011	31 October 2024
144/011	Native Industries Ltd	09 Dec 2022	31 December 2025
144/007	PNG Ground Services Ltd	01 April 2013	31 December 2025
144/012	Total Energies Marketing Asia-Pacific Middle East-PNG	01 April 2024	30 September 2026

6. INDUSTRY REPORTING OF NON-PART 144 APPROVED FUEL SUPPLIERS

Owners of aircraft and air operators are encouraged to report all non-Part 144 Approved fuel suppliers through our confidential reporting line: (+675) 3027 528 or toll free line (+675) 1802333.

RECOMMENDED SAFETY ACTIONS: Owners of aircraft and all Air Operators are strongly encouraged to:

(I) Only source fuel from and/or through agreements with Part 144 approved fuel suppliers and distributors listed in the table provided in section 5 of this SAB to ensure the highest level of quality of 'into-plane' fuel and the safety of the travelling public; and

(II) Advise their fuel suppliers who are not currently approved under Part 144 to make the necessary application arrangements with CASA to complete the 5-phase organizational certification process under Part 144 to enable them to supply and distribute fuel after the emergency period.

Failure to take the above recommended actions may lead to the uplift of contaminated aviation fuel 'into-plane' and compromise the safety of the travelling public.

RELATED REFERENCE MATERIALS:

1. ICAO Doc 9977 – Manual of Civil Aviation Jet Fuel Supply *(ICAO,1st Edition, 2012)*.

2. UK CAA CAP 748 -Aircraft Fueling and Fueling Installation Management *(First Edition, July 2004).*

ENQUIRIES:

For any further enquiries regarding the contents of this Safety Alert Bulletin (SAB), you may contact the CASA PNG Manager Airworthiness Branch:

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