

AAK – methodology for calculating “Verified Deforestation Free” volumes 2.0

March 2026

Introduction

AAK established clear targets in 2020 to achieve 100 percent VDF by 2025. The guidance of the 100 percent VDF claim can be achieved if there is no observed deforestation and peat conversion since 31st December 2015 at the point of harvesting, or there has been verified remediation of deforestation or peat conversion post 31st December 2015.

In 2018, AAK developed a methodology to produce an estimate of VDF volumes. This methodology calculates an overall “Verified Deforestation Free” (VDF) score based on AAK’s mills and refineries lists. For each mill a refinery sources from, a VDF score is estimated by considering the mill’s RSPO certification status, geospatial monitoring status, grievance status and estimated proportion of concessions vs. smallholders sourced from. Mill’s VDF scores are then averaged over the total volume sourced by a refinery (assuming all mills contribute equal volumes to the refinery), and an overall VDF score for a refinery is calculated. This methodology has been used by AAK to calculate and report on VDF volumes & percentage every half yearly since then.

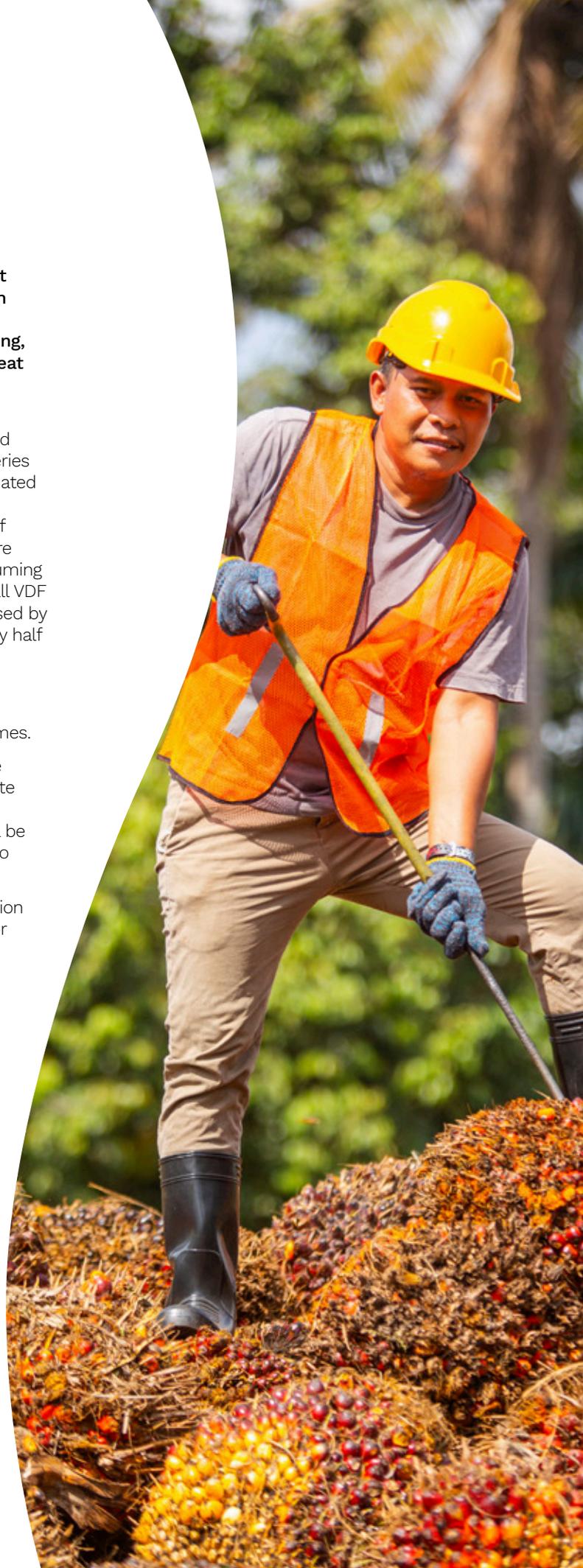
As part of our continuous improvement approach, the data collection & methodology have improved and are aligned with industry practices on how to calculate & improve the VDF volumes.

This document presents the updated methodology to calculate VDF volumes in AAK palm oil supply chain. It is important to note that the methodology will keep evolving as the industry makes progress in reaching a consensus on the reporting of VDF. It will be crucial for AAK to stay up to date with the latest development to remain a credible actor within the palm oil sector.

With the enforcement and implementation of the European Union Deforestation Regulation (EU-DR), AAK will comply to the law for imports into the EU.

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List of abbreviations

- **FFB:** Fresh fruit bunches
- **IP:** Identity Preserved (IP); The Identity Preserved (IP) supply chain certification system ensures that all RSPO-certified sustainable palm oil and its derivatives delivered to the end user are uniquely identifiable to a specific mill and its supply base and are kept physically isolated from all other oil palm sources
- **IP mill:** A specific mill that has been certified according to the IP supply chain certification system
- **MB:** Mass Balance (MB); Products containing RSPO-certified as well as non-certified palm oil can be certified according to this model. It must be ensured that the processed quantity of RSPO-certified palm oil corresponds to the purchased quantity of certified palm oil.
- **RSPO:** Round Table for Sustainable Palm Oil
- **RSPO P&C:** RSPO Principles and Criteria
- **SG:** Segregated (SG) RSPO Certified Sustainable Palm Oil from different certified sources that is kept separate from ordinary palm oil throughout the supply chain.
- **TTP:** Traceability to Plantation
- **VDF:** Verified Deforestation Free

Methodology

Guidelines

Grievances and alerts

- Alerts raised by Satellite monitoring (3rd party service provider appointed by AAK/ 3rd party NGO/ Customers) should not affect VDF scores until they have been verified – we take the “innocent until proven guilty” approach.
- Cross-commodity grievances are not considered for the VDF qualification of a mill. The guidance around this remains unclear in the industry, hence AAK focuses on grievances related to the commodities that AAK is sourcing globally.
- Following the accepted norm within the industry, we assume that if a mill is part of a company group that has been linked to a grievance, all mills under the same company group should not qualify as VDF – even if the other mills are not directly involved in the grievance.
- Volumes or suppliers with past deforestation after AAK’s established cut-off date can only be classified as VDF again when the grievance raiser has accepted the remediation and compensation plan (e.g., recovery plan, demonstrable progress), with reference to AAK’s Grievance Mechanism standard operation procedure.

Volumes from a mill to a refinery

- The volume a mill supplies to a refinery is often unknown. Where necessary, it is assumed that each mill in a refinery’s supply chain supplies an equal volume to the refinery (i.e., mills are weighted equally).

FFB volumes

- For Indonesia, Malaysia and Latin America, there is data available on what proportion of the volume a mill may source from outside concessions/own plantations and 3rd party. For other countries, there may not be data available. In that case, a 50–50 percent split is assumed.

All volumes sourced by a mill outside a mill’s own concessions without any evidence such as 3rd party verification or satellite monitoring are assumed to be 0 percent VDF.

Monitoring scope

- All AAK’s supply base are actively monitored through AAK’s monitoring services.

Data sets needed

The following data sets are needed to calculate “verified deforestation free” volumes:

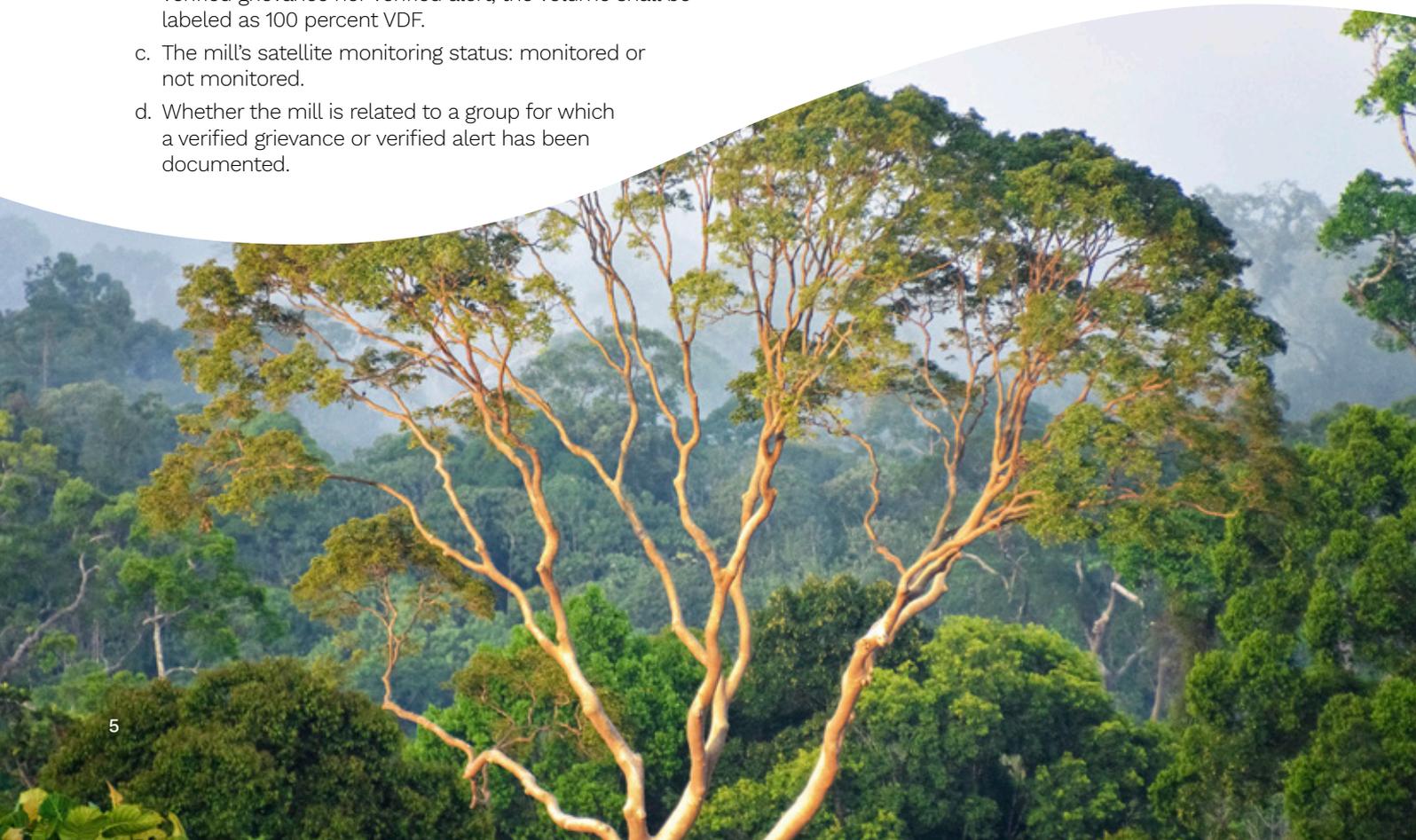
- Segregated (SG) RSPO volumes per AAK site – supplied by AAK.
 - To determine the amount of SG RSPO volumes bought per AAK site, final purchase data as recorded by AAK will be used.
- Inter-company principles
 - AAK Singapore is the Tropical Oils Hub of AAK conducting all the physical sourcing & trading activities at origin, especially from Indonesia & Malaysia. AAK Singapore ships all its bought volumes (physical) to all other AAK sites. Hence, no VDF score will be calculated for AAK Singapore; to avoid double counting.
 - The same principle applies to other inter-company (components factory) transfers of volumes from one AAK refinery to another AAK refinery.
- Grievance cases related to deforestation, peat, and/or environmental allegations (which includes grievances per mill group company raised by NGOs and any other stakeholders) – supplied by AAK; as reference at AAK’s Grievance Tracker.
- AAK’s bi-weekly verified alerts from monitoring services – supplied by AAK.
- Cleaned mill list per supplier per refinery, including information on:
 - The RSPO status of a mill – supplied by 3rd Party independent Service provider.
 - For mills based in LATAM, information from the Supplier Engagement Platform (SEP) and based on information from RSPO website.
 - For other mills, information from the 3rd Party Independent service provider database and based on information from the RSPO website on palm oil mills.
 - Proportion of volumes a mill sources outside concessions – supplied by 3rd party independent service provider.
 - For all other mills, see “Assumptions” page 3.



Steps to calculate VDF volumes

Goal: To calculate the volume that can be labelled as VDF for each AAK site and supplier in AAK's supply chain (Fig. 1).

1. RSPO Standard – volume supplied by IP mills/RSPO SG supply chain.
 - a. Check the IP-certified mills for that refinery to determine whether any mill in the list is linked to a group for which a verified grievance or verified alert has been raised. Only take IP-certified mills into account here.
 - b. If there are no verified grievances or verified alerts related to the mill list or refinery's mill list, all SG volumes that a refinery supplied to AAK shall be taken as 100 percent DF.
 - c. If there are verified grievances or verified alerts related to the IP mill list or refinery's IP mill list, calculate the proportion of volume that the mills with verified grievances supplied (assuming equal weights), count it as 0 percent VDF, and subtract that from the total SG volume a refinery supplied. The remaining SG volume is 100 percent VDF.
2. For non-SG volumes, examine each direct mill or refinery's mill list and determine the following for each mill:
 - a. The mill's RSPO status MB-certified or not-certified.
 - b. In the event of the volumes supplied by a refinery or mill was from IP-certified mill which linked to no verified grievance nor verified alert, the volume shall be labeled as 100 percent VDF.
 - c. The mill's satellite monitoring status: monitored or not monitored.
 - d. Whether the mill is related to a group for which a verified grievance or verified alert has been documented.
 - e. If a mill is linked to a group for which a verified grievance or verified alert has been raised, 0 percent of the volume coming from that mill can be labelled as VDF.
 - f. If a mill is MB-certified or conventional and is not linked to a group for which a verified grievance or verified alert has been raised, the proportion of volume that comes from known and verified TTP can be labelled as 100 percent VDF.
 - g. In the event where TTP data is available (GPS Coordinates and/or polygons formats), the proportion of TTP available per supplier must undergo validation and is subjected to satellite monitoring, without any connection to a group for which a verified grievance or verified alert has been raised, may also be labelled as VDF.
 - h. If a mill is MB-certified or conventional and is not linked to a group for which a verified grievance or verified alert has been raised, consider FFB 3rd party suppliers volumes coming from jurisdictions classified as negligible risk as VDF, as per the methodology established by the PPBC (Production and Protection beyond Concessions) POCG working group.
 - i. Please refer to Annex 3 for the detail calculation to obtain the final VFD scores.



3. Calculate, per AAK site, per supplier, the total volume that can be labelled as 100 percent VDF.

The VDF calculation and scores will be verified by appointing 3rd party independent auditor. Refer to Independent 3rd Party Verification Guidance & Checklist in Annex 1. This enables us to eliminate the assumptions by applying actual data that is available from our Tier 1

with reference to AAK's Policy & Code of Conduct of Responsible Sourcing as well as our grievance tracker. Tier 1 shall use AAK's VDF methodology to do the calculation (pre-liminary score) every reporting period (6 monthly), AAK will adopt the preliminary calculation (score) submitted by Tier 1 and subsequent score reported after annual 3rd party verification.

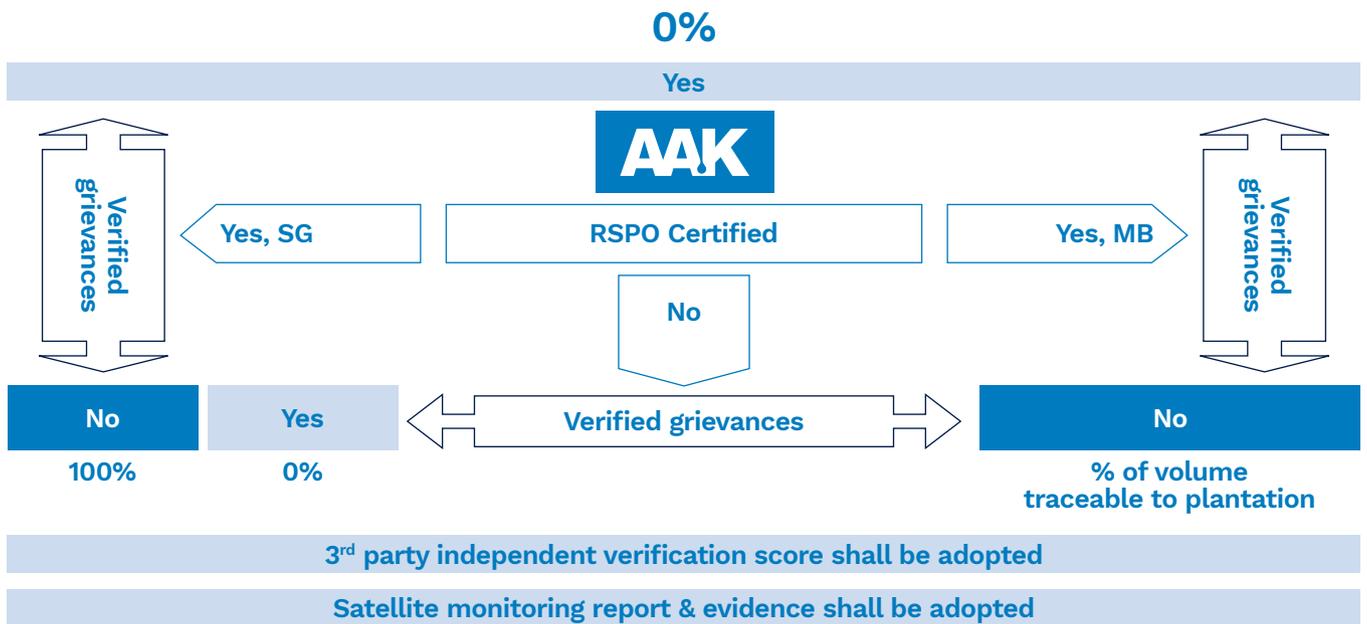


Fig. 1: Schematic overview of calculating VDF per AAK site per supplier.



Annex 1 – Independent 3rd Party Verification Guidance & Checklist

Guidance

Purpose and Scope

To ensure and increase the data credibility and reliability of data collection process, AAK requires Selected supplier (by size – volumed) to undergo an annual third-party verification assessment against the requirements in this VDF palm oil protocol. This verification assessment is executed by a third-party verification body. As part of the verification outcome, the assumptions shall be eliminated by applying actual data (to address the unknown, such as volume per mill). Ultimately, the annual verification will cover bi-annual reporting scores that are submitted to AAK.

All selected AAK suppliers are subject to verification. Other suppliers in the supply chain may be subject to verification.

Summary of the Verification Process

The verification process starts with identifying a verification strategy and verification planning based on pre-information gathered by the verification body (provided by both AAK & Supplier). Subsequently, the verification assessment is conducted at the selected facilities & the supplying mill linked to the refinery (Which were those supplying to AAK). The verification body then compiles a detailed report and issues a verification statement (Attestation) confirming that the supplier has been independently verified and that a chain of custody is in place demonstrating traceability to a deforestation-free and peat conversion-free origin of the palm oil supplied to AAK at the end of the process.

Verification Body Qualification.

The independent verification assessments shall be conducted by an approved verification body.

The verification body shall comply with the following requirements:

- a) The verification body is recognized by a national authority or an accreditation body that is a member of the International Accreditation Forum.
- b) The verification body conducts verification assessments in conformity with ISO 19011 Guidelines for quality and/or environmental management systems verification.
- c) The workflow of the verification process complies with the requirements of ISO/CE 17065:2012.

The verification body shall apply a four-eyes principle. This means that the work of the verifier conducting the verification assessment should be reviewed by an appointed reviewer who reviews the verification assessment findings and the report of the verifier. The verifier of the approved verification body shall comply with the following minimum requirements:

- a) Demonstrable experience with RSPO P&C certification or demonstrable field experience in the palm oil sector and familiarity with field-level initiatives in the palm oil sector.
- b) Knowledge and understanding of satellite monitoring techniques and how to verify its accuracy.
- c) Successful completion of an ISO 19011, 9001, or 14001 auditor courses.

Verification Strategy & Implementation

Frequency of Verification Assessment

- a) The verification body shall conduct an independent verification assessment at least annually and not later than 15 months after the previous verification assessment.
- b) Upon request – E.g., Project based.

Scope of Supplier Verification

- a) Verification body to review protocol and relevant documents. Verification preparation, planning and sample selection, this includes full mill list supplied by Supplier to AAK over certain delivery period.
 - Request procedures or other documentation the supplier has in place to ensure the chain of custody of the AAK/VDF volume.
 - Request an overview of the incoming/outgoing transactions of AAK/VDF volume and any conversion factors, applied.
 - In the case the supplier has multiple sites from which it handles AAK/VDF volume, the verifier should understand how the data is handled, and whether there is a central location that can be verified.
 - Request the agreed mill list to understand how many mills supply the tanks and request the volume supplied per mill.
 - Understand the segregation process that is applied.
 - Understand whether there are any mills reported in the supply base for which one or more of their FFB sources has received a deforestation alert. The alert might have originated from either the supplier or parent company satellite system or AAK's monitoring system. In the latter case, AAK has to communicate to the verification body whether there are any mills with such alerts via AAK's Grievance Tracker.

- b) Steps to calculate VDF volume:

- Calculation Percentage Deforestation Free formula = Volume Supply X deforestation free Palm Oil Mill as follows:
 - i) Deforestation indication reports
 - ii) Work tools GIS Software and excel
 - iii) Assuring the calculation of the report has been correct

- c) Sampling methodology:

- To determine the number of supplying mills for each refinery for sampling, the square root number is taken (rounded) of the total number of supplying mills. The samples of mills for verification are then selected.

- d) Verification Type

- Desk and/or On-site Verification
 - i) Verification body may decide to conduct desk/or on-site verification of the mills that are within the verification sample if the following factors arise:
 1. Any inaccuracy or incomplete of information provided by supplier,
 2. There is a deforestation alert for which follow-up evidence has not been provided,
 3. Need of on-site verification as part of the physical check.
 4. Missing of (Verification body) check list information (Attached CU template as ref)



e) Verification report

The verification report shall present the findings of the verification assessment, with a detailed description VDF percent of each refinery. The verification report shall include, at a minimum of below and shall be shared with the verified supplier.

- date and time of the assessment.
 - name of the verifier, reviewer, and verification body.
 - scope of the verification assessment (product, facilities within the scope, version number of VDF palm oil protocol).
 - verified sites via on-site or desk verification.
 - verification strategy and sampling methodology adopted.
 - description of the facility/facilities verified.
- a brief description of the QMS implemented (as far as it concerns the VDF palm oil protocol requirements), describing the processes for handling traceability incoming and outgoing data.
 - a brief description of the supply chain and monitoring system.
 - description and review of any deforestation alerts.
 - final statement on the outcome of the assessment. Such as may be included demonstrating additional information such as photos or copies of documentation or satellite images.

The verification report shall be shared with the verified supplier.



Annex 2 – Independent 3rd Party satellite monitoring report

Guidance

Purpose and Scope

To ensure the continuous improvement of data accuracy and reliability, AAK requires to eliminate the assumptions made by applying actual data (to address the unknown, such as volume per mill). Suppliers who have TTP data available might consider sharing the data with AAK for satellite monitoring analysis. Selected supplier (with TTP data shared to AAK) to undergo a satellite monitoring analysis against the specific requirements in this VDF palm oil protocol. This satellite analysis is executed by a selected satellite monitoring service.

All TTP data and final satellite analysis reports are subject to further third-party validation.

Summary of satellite monitoring process

The monitoring process starts with suppliers who are willing to share full TTP data with AAK. This includes LATAM suppliers who submit their TTP data through SEP. The satellite service providers will analyze the TTP data with combined deforestation data. It is then confirming the VDF status since cut-off date till the latest available date, (e.g., 31st December 2015 – H1 2023 or 31st December 2015 – H2 2023, etc.)

Satellite service providers

The satellite monitoring shall be conducted by AAK's appointed service providers.

The service provider shall comply with the following requirements:

- a) The detection accuracy should achieve at least 90 percent.
- b) High resolution satellite imagery and spatial monitoring of forest cover change event.
- c) The procedure of satellite monitoring shall be verified by a third party at least annually.



Monitoring Strategy & Implementation

Frequency of monitoring analysis

- a) TTP data submitted by suppliers shall be updated at least half yearly. In the event where no changes in TTP data, we require suppliers to provide a statement to confirm the unchanged supply chain.
- b) Upon request – E.g., Project based.

Scope of monitoring analysis

- a) Suppliers should provide the TTP data for satellite monitoring analysis. TTP data shall aligned with AAK's latest TTP definition. TTP data shall be in GPS coordinates (decimal) and/or polygons formats.
- b) Steps of data analysis:
 - a. All deforestation data that occurred within the concession since cut-off date shall be identified.
 - b. TTP data is combined within the analysis of each palm oil mill.
 - c. The VDF percent is calculated based on the FFB tonnage percentage, if it is confirmed no deforestation since cut-off date.
- c) Sampling methodology:
 - a. All TTP data per mill shall be shared for satellite monitoring analysis. No random sampling of TTP data applies to this methodology.
- d) Satellite analysis report
 - a. The analysis report shall present the findings of the monitoring analysis, with a detailed description VDF percent of each mill, and the deforestation alerts (if detected any). The verification report shall include, at a minimum of below and shall be shared with the verified supplier.
 - i. date and time of the assessment.
 - ii. name of the mills and its parent company.
 - iii. scope of the monitoring (e.g., estates, smallholders).
 - iv. source of data
 - v. a brief description of the supply chain and monitoring system.
 - vi. description and review of any deforestation alerts.
 - vii. final statement on the outcome of the assessment. Such as may be included demonstrating additional information such as photos or copies of documentation or satellite images.
 - viii. The analysis report shall be shared with the supplier for further action.



Annex 3: Full year (FY) VDF score calculation:

Combine the First Half (FH) and Second Half (SH) scores to obtain the FY VDF Scores via weighted averages (WT) method.

*Below table is for illustration purpose, the number stated is not reflecting the actual AAK's volume nor scores.

Period	FH			SH			FY	
Status	(A) VDF %	(B) Vol MT	(C) FH WT VDF %	(D) VDF %	(F) Vol MT	(G) SH WT VDF %	(H) FY Vol MT	(I) FY WT VDF %
1 Verified/Validated Refineries	0.93	100,000	93.00%	0.945	250,000	93.94%		
2 Non verified/ New suppliers/ Refineries	0.00	0	0.00%	0.055	1,500	0.03%		
3 Total		100,000	93.00%		251,500	93.97%	351,500	93.69%

Legend:

- A = FH total weighted average (WT) VDF score in %
- B = Total volume received in FH (all grade combined)
- C = FH weighted average VDF score in %
- D = SH total weighted average (WT) VDF score in %
- F = Total volume received in SH (all grade combined)
- G = SH weighted average VDF score in %
- H = FY volume received (all grade combined)
- I = FY weighted average VDF score in %

Calculation formula for FY WT VDF%

$$(I) \text{ FY WT VDF \%} = \frac{(3B \times 3C) + (3F \times 3G)}{3B + 3F}$$

Note (1) FH & SH are indicative. Full year data will be used to quantify full year VDF.