**Title: A Comprehensive Analysis for Optimizing Thin Film Deposition for Manufacturing Efficiency**

**Data Visualisation Dashboard (Tableau):**

<https://public.tableau.com/views/VariabilityinSiO2DepositioninSemiconductorManufacturing/Dashboard1?:language=en-US&:display_count=n&:origin=viz_share_link>

A screenshot of a graph

Description automatically generated

**Data Analysis Tools Used:**

* Excel
* Tableau

**Introduction:**

This report investigates into the variability of silicon dioxide (SiO2) film deposition thickness in thin film growth processes, a crucial step in semiconductor manufacturing. The target thickness for SiO2film is set at 2000 microns (μm), also referred as 2 millimetres (mm), and maintaining precision in deposition is essential for optimal semiconductor device functionality.

**Summary of Key Metrics:**

*Deposition Sources Analysis:*

* Source 1:
  + Median Thickness: 1996 μm
  + Average Thickness: 1995.11 μm
  + Standard Deviation: 7.53 μm
* Source 2:
  + Median Thickness: 2000.50 μm
  + Average Thickness: 2005.19 μm
  + Standard Deviation: 14.87 μm

*Outliers and Variation:*

* Source 1 demonstrates a near-symmetrical result with an average close to the median, while Source 2 exhibits a higher average, indicative of potential outliers with thicknesses exceeding desired expectations.
* The standard deviation for Source 2 is higher, suggesting a wider spread of thicknesses

*Site-Specific Variations:*

* Thickness variations across different sites (Site 1, Site 2 and Site 3) on the same wafer are observed.
* Standard deviations indicate consistent variation across sites, with differences within approximately 2 μm for both deposition sources.

**Recommendations:**

* Further optimization of the deposition process is recommended to minimize outliers and achieve more consistent SiO2 film thicknesses, particularly for Source 2.
* Implementing robust monitoring and control measures is crucial to minimize variations and maintain SiO2 film thickness closer to the target requirement of 2000 μm.
* Site 2 consistently shows a lower SiO2 film thickness compared to other sites. This site-specific variation should be considered in device development in that area.