FORENSIC DATA AUDIT & SAP INGESTION SCHEMA SPECIFICATION

Technical Root Cause Analysis of Data Defects in NextGen Materialreport | Phase 0 Discovery

Executive Technical Summary: Forensic examination of NextGen Materialreport (5,551 SKUs / €56.34M inventory across 19 plants) revealed that it represents an unrefreshable point-in-time flat snapshot (14 of 17 SAP BW crosstabs broken with #REF!). This audit documents 4 proven reporting anomalies and 10 structural SAP ERP data omissions that must be resolved in Phase 0 prior to automated algorithmic deployment.

1. Four Verified Forensic Data Anomalies in Baseline Dataset

1. €3,172,418 Reporting Label Defect: Column 'delta vs. last month' (-€2.84M) calculates M-1 vs M-2 instead of M0 vs M-1 (+€334,915), obscuring an actual inventory increase with an inverted sign.
2. -€203,830.47 Balance Decomposition Variance: The sum of the 7 inventory sub-components (€56.54M) does not balance against Valuated Stock (€56.34M across 41 SKUs); all 120 combinatorial subsets fail to reconcile.
3. The 'Infinite' Coverage Artifact (€20.82M): 2,892 items (€20.67M = 36.7% of inventory) lack any row in the Forecast sheet, misleading Power Query into assigning '99999' and tagging €3.34M of active Finished Goods (FERT) as non-moving.
4. Omitted External Toll Stock (€1,448,814.91): 'Provided to Supplier' (third largest category after Free and Q-Stock) is omitted from standard management cockpits.

2. The 10 Critical SAP ERP Data Gaps & Phase 0 Technical Remediation

Data Gap & Priority	SAP Table & Field	Operational & Clinical Risk	Phase 0 Ingestion Solution
1. Missing Batch Shelf-Life & Expiry Dates (SLED)	Table: MCHB / MCHA Field: VFDAT (Shelf Life Expiration Date) Tx: MSC3N / MB5M	Risk of dispatching lots with <180 days remaining shelf life to surgical clinics, causing shipment rejection, SLA penalties, and €7.41M SLOB write-offs instead of proactive STO re-allocation.	Join MCHB-VFDAT on batch level; configure 180-day minimum hospital shelf-life buffer and FEFO dynamic routing.
2. Missing Multi-Level BOMs & Component Linkages	Table: MAST / STPO Field: IDNRK (Component), MENGE (Quantity) Tx: CS03 / CS12	Blind inventory reductions in raw materials (Octenidine API: €5.8M) or packaging (VERP: €3.9M, e.g. dispenser pumps) paralyze packaging lines of high-margin finished goods (FERT: €36.6M).	Ingest multi-tier BOM explosion from MAST/STPO; lock critical component safety buffers before approving finished goods reductions.
3. Unfulfilled Demand & Lost Sales Suppression	Table: VBAP / VBBE Field: ABGRU (Reason for Rejection), OMENG Tx: VA05 / MD04	Stockout Death Spiral & The 'Infinite' Coverage Artifact: Billed sales suppress true demand, while 2,892 items (€20.67M = 36.7% of total stock) lack any forecast row, causing Power Query to assign '99999' (infinite coverage) and falsely tagging €3.34M in active finished goods (FERT) as non-moving sediment.	Reconstitute true market demand by ingesting rejected order lines (ABGRU) and backorders from VBBE.
4. Missing 24-Month Time-Series & Seasonality	Table: MSEG / MKPF Field: BWART (Movement Type), BUDAT (Posting Date) Tx: MB51 / MC.9	€3.17M Reporting Label Defect & Seasonality Distortion: Column 'delta vs. last month' (-€2.84M) actually computes M-1 vs M-2 (instead of M0 vs M-1: +€334,915), creating a €3,172,418 swing with inverted sign that deceives management. Furthermore, flat annual averages blind planning to winter infection surges.	Extract 24 months of historical material movements (movement types 101, 201, 261, 601) to calibrate seasonal multipliers.
5. QC Quarantine Diagnostics & LIMS Integration	Table: QALS / QAMV Field: STAT35 (Usage Decision), PRUEFLOS Tx: QA33 / QA11	€5.42M detained for an average of 17.2 days without diagnostic root cause, risking regulatory non-compliance by confusing GMP-mandated 14-day sterility incubation with administrative delays.	Decompose quarantine lead times into microbiological incubation (hard stop) vs HPLC chemical assays and Qualified Person sign-off queue.
6. Missing Country Marketing Authorizations (MA)	Table: Regulatory MA Field: Country Code, Packaging PZN / CIP / PL Tx: Custom / MM03	Criminal pharmaceutical offense: Transferring German-labeled octenisept (PZN) to Polish or French hospital subsidiaries without local registration dossier, language leaflet, or national packaging approval.	Build regulatory authorization cross-reference table to hard-restrict STO replenishment suggestions to legally compliant product-market pairs.
7. Shop Floor WIP & Reactor Changeover Sequencing	Table: AFKO / AFPO Field: GAMNG (Order Qty), AUFNR, CRHD (Work Center) Tx: COOIS / CM01	Canceling or postponing production orders on lines that are already sanitized and set up generates equipment idle losses far exceeding inventory holding savings.	Correlate inventory recommendations with open shop floor orders (AFKO) and plant-specific minimum batch compounding sizes.
8. Master Data Defect: 34.1% SKUs with Lead Time = 0	Table: MARC Field: PLIFZ (Planned Delivery Time in Days) Tx: MM02 / SE16N	1,895 active SKUs (34.1% / €19.3M) show Lead Time = 0 or blank (including 896 purchased items). Moreover, 'MRP lot size' (MARC-DISLS) is ambiguous: if it represents a procedure key rather than base lot quantity, the €2.8M batch-sizing saving requires recalibration.	Batch update MARC-PLIFZ using historical measured vendor delivery lead times (or default empirical 21-day safety buffer).

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9. Hazardous Goods Storage Caps (ADR, ATEX, Seveso III)	Table: Hazardous Master Field: UN-Number (UN 1987), Flash Point, Storage Class Tx: WM / EWM	Concentrating alcohol-based disinfectants in central hubs risks violating industrial fire safety permits and exceeding Seveso III upper-tier explosive volume thresholds.	Embed site-specific flammable storage tonnage caps as hard linear optimization boundary constraints.
10. Uniform 15% Holding Cost Distortion	Table: Controlling Master Field: WACC + Category Specific Storage Rate Tx: CO-PC	Balance Decomposition Gap (-€203,830.47 across 41 SKUs) & Omitted External Toll Stock: The 7 balance subcomponents (€56.54M) fail to reconcile with Valuated Stock (€56.34M) across all 120 combinatorial subsets. Additionally, €1,448,814.91 in toll stock (Provided to Supplier) is omitted, while flat 15% holding costs distort lot economics.	Deploy differentiated holding cost schedule (2% to 28%) factoring in capital cost, cold storage, flammability, and shelf-life decay.