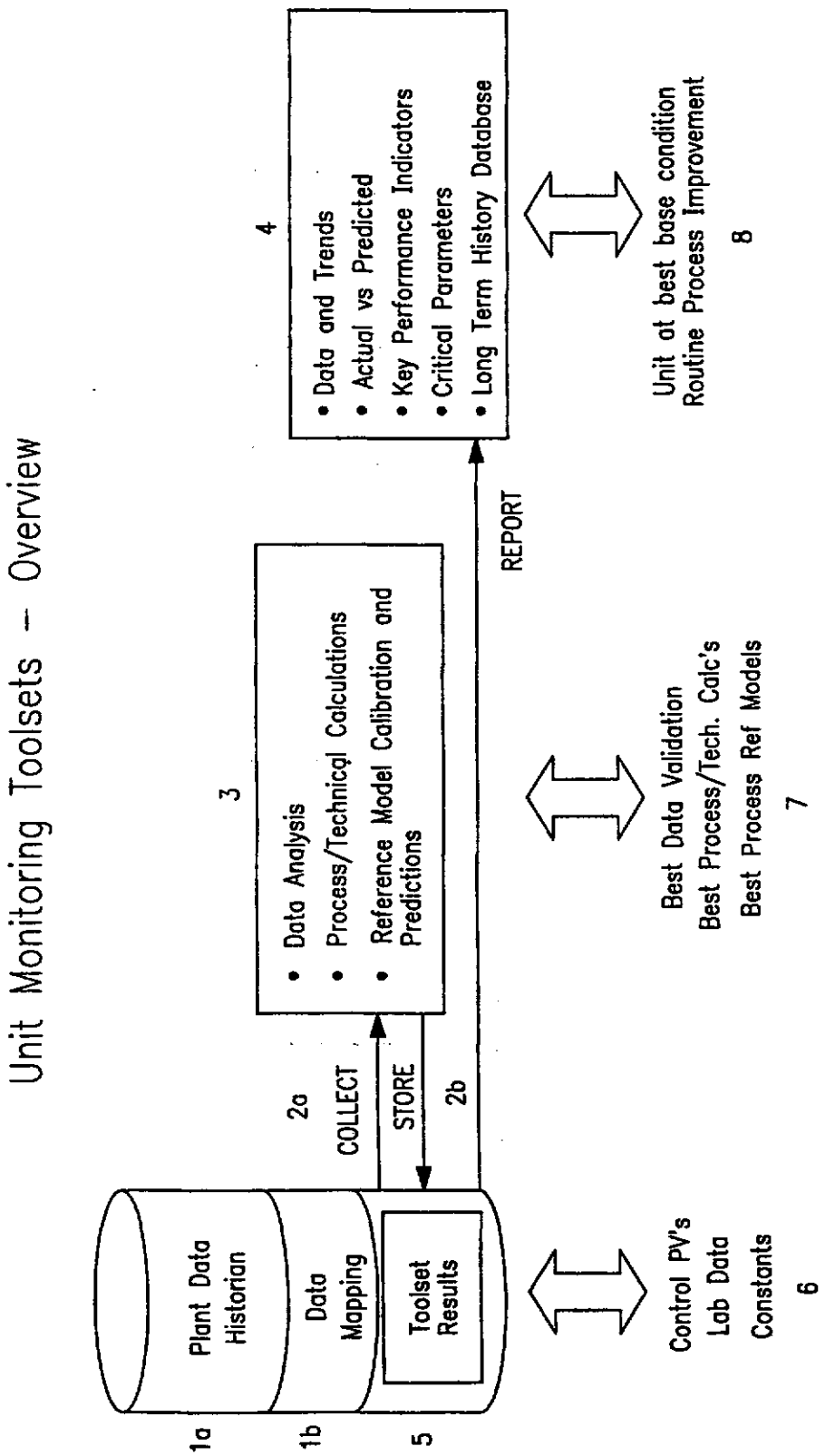

Unit Monitoring Toolsets - Overview
Plant Data Historian
Data Mapping
Toolset Results
1a
1b
5
2a
COLLECT
STORE
2b
3
• Data Analysis
• Process/Technical Calculations
• Reference Model Calibration and Predictions
REPORT
4
• Data and Trends
• Actual vs Predicted
• Key Performance Indicators
• Critical Parameters
• Long Term History Database
Control PV's
Lab Data
Constants
6
Best Data Validation
Best Process/Tech. Calc's
Best Process Ref Models
7
Unit at best base condition
Routine Process Improvement
8

FIG. 1

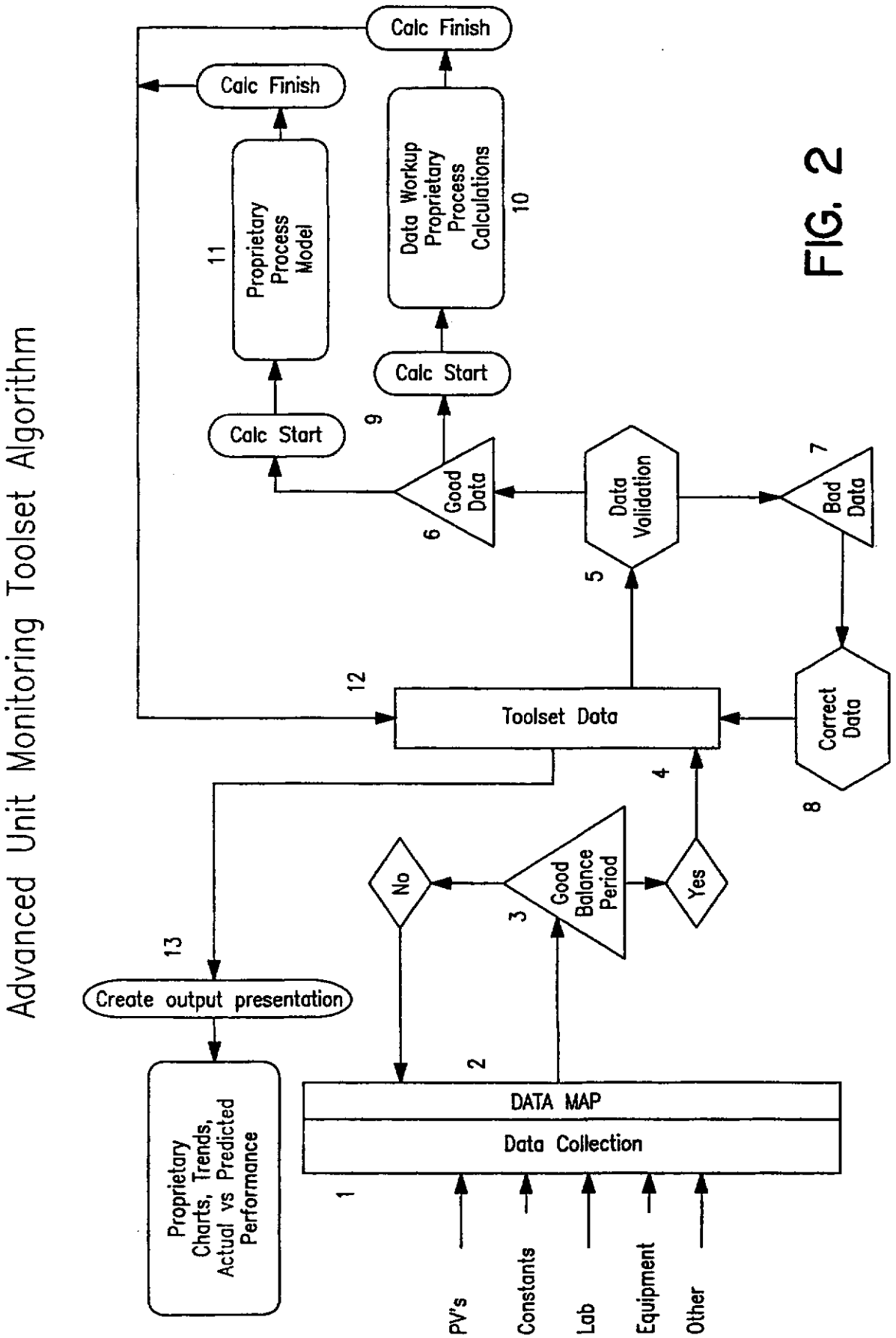

Advanced Unit Monitoring Toolset Algorithm
Calc Finish
Calc Finish
Proprietary Process Model
11
Data Workup Proprietary Process Calculations
10
Calc Start
Calc Start
9
Good Data
6
Data Validation
5
Bad Data
7
Toolset Data
12
Correct Data
8
4
No
Good Balance Period
3
Yes
13
Create output presentation
2
DATA MAP
Data Collection
1
Proprietary Charts, Trends, Actual vs Predicted Performance
PV's
Constants
Lab
Equipment
Other

FIG. 2

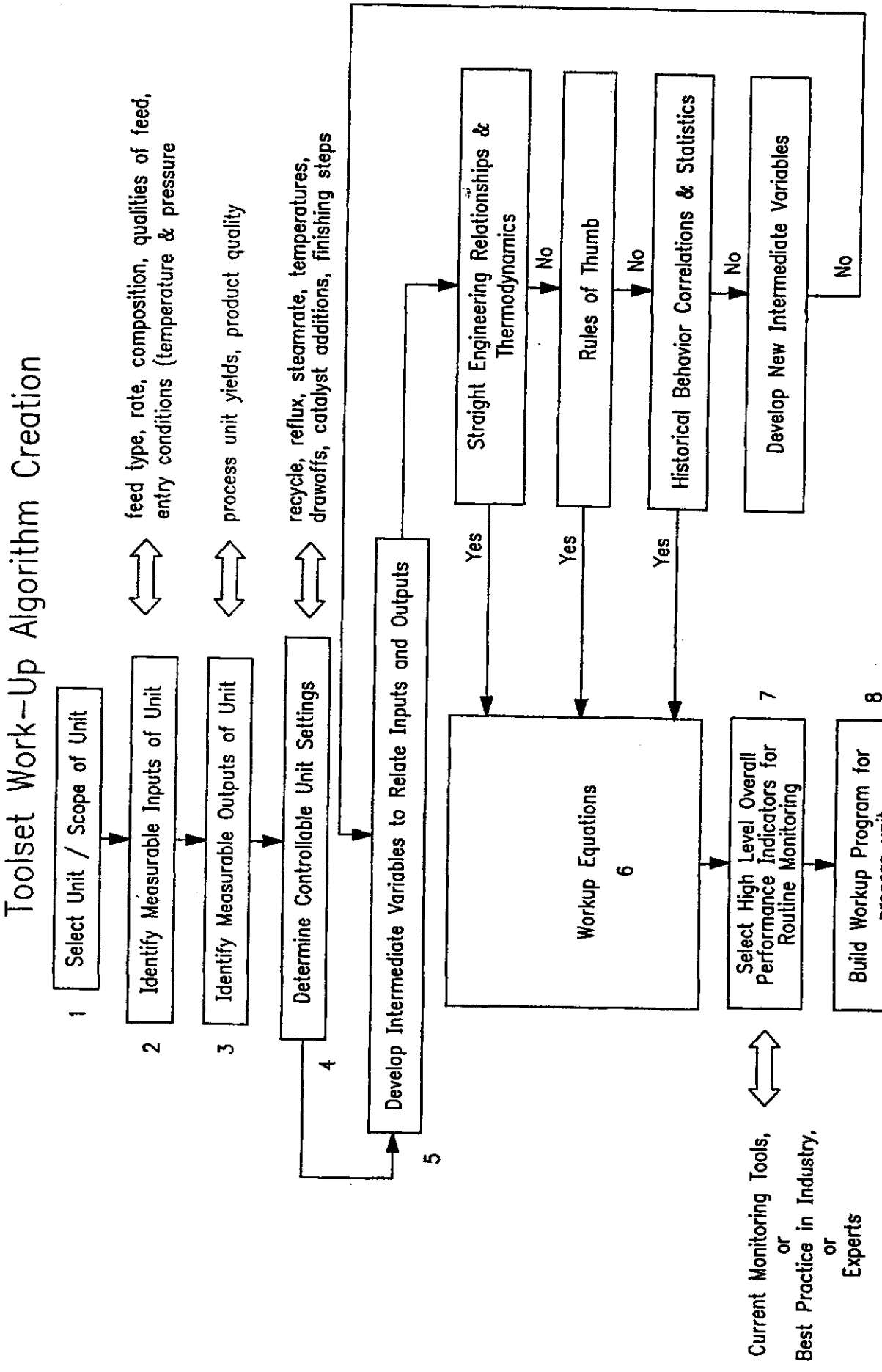

Toolset Work-Up Algorithm Creation
1 Select Unit / Scope of Unit
2 Identify Measurable Inputs of Unit
feed type, rate, composition, qualities of feed, entry conditions (temperature & pressure
3 Identify Measurable Outputs of Unit
process unit yields, product quality
4 Determine Controllable Unit Settings
recycle, reflux, steamrate, temperatures, drawoffs, catalyst additions, finishing steps
5 Develop Intermediate Variables to Relate Inputs and Outputs
Straight Engineering Relationships & Thermodynamics
No
Rules of Thumb
No
Historical Behavior Correlations & Statistics
No
Develop New Intermediate Variables
No
Yes
Yes
Yes
Workup Equations
6
7 Select High Level Overall Performance Indicators for Routine Monitoring
8 Build Workup Program for process unit
Current Monitoring Tools, or Best Practice in Industry, or Experts

FIG. 3

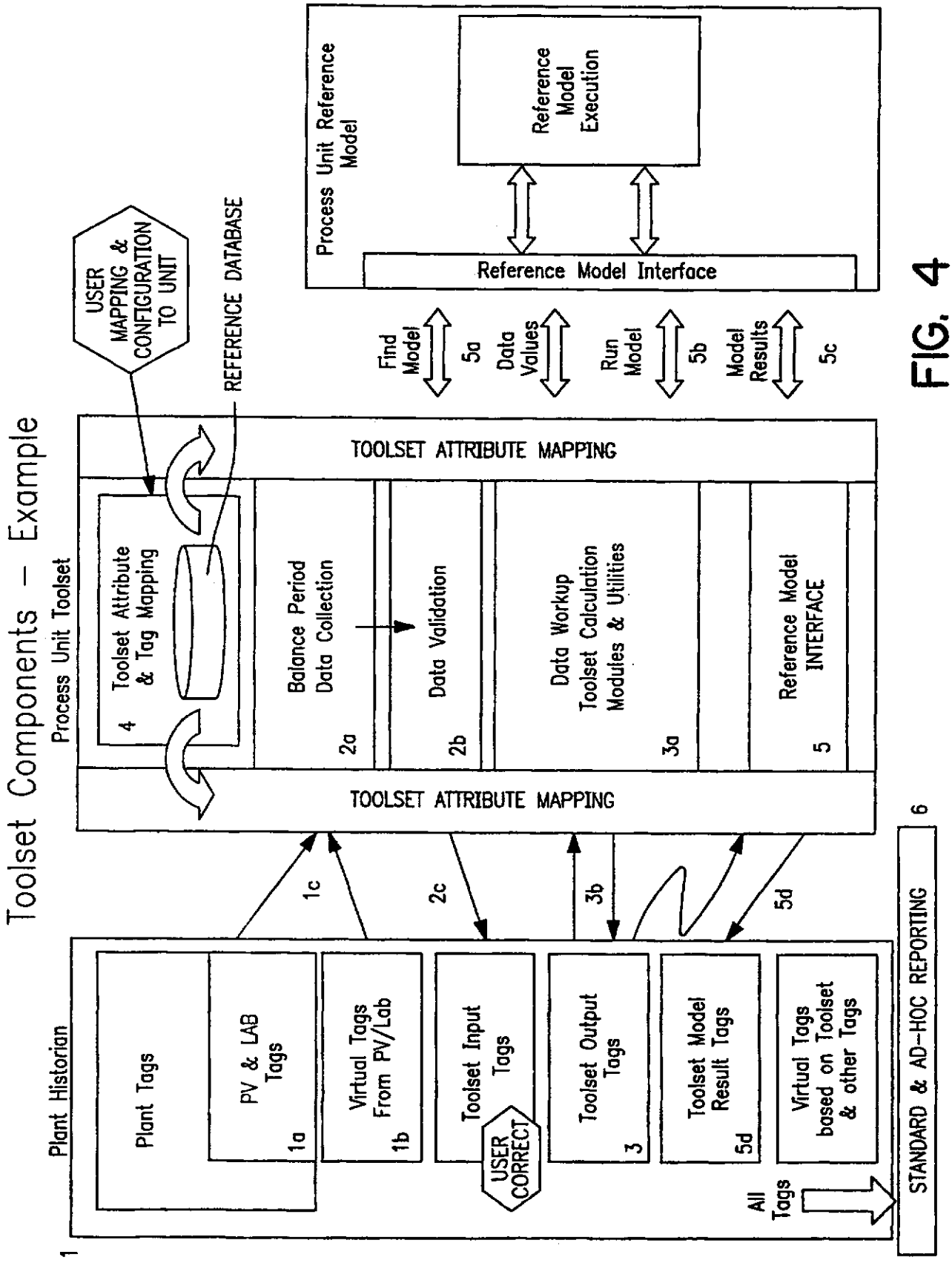

Toolset Components – Example
Process Unit Toolset
Plant Historian
Plant Tags
PV & LAB Tags
1a
Virtual Tags From PV/Lab
1b
Toolset Input Tags
USER CORRECT
Toolset Output Tags
3
Toolset Model Result Tags
5d
Virtual Tags based on Toolset & other Tags
All Tags
1
1c
2c
3b
5d
6
STANDARD & AD-HOC REPORTING
TOOLSET ATTRIBUTE MAPPING
4
Toolset Attribute & Tag Mapping
Balance Period Data Collection
2a
Data Validation
2b
Data Workup Toolset Calculation Modules & Utilities
3a
Reference Model INTERFACE
5
TOOLSET ATTRIBUTE MAPPING
USER MAPPING & CONFIGURATION TO UNIT
REFERENCE DATABASE
Find Model
5a
Data Values
Run Model
5b
Model Results
5c
Process Unit Reference Model
Reference Model Execution
Reference Model Interface

FIG. 4