**Process Understanding**

* Purpose & sequence of 4 distillation columns
* Purpose of column 1
* Purpose of column2
* Purpose of Column3
* Purpose of column4
* Main feeds, products, by-products
* For column 0
  + Main feed is Napthalene +anthracene
  + Top product is water and product that goes for storage
  + Bottom product goes to column2 through feed preheater
  + Critical Process Variables ?
  + Normal operating ranges (T, P, flow, composition )
  + Any critical tags?
  + Known faulty sensors / drifting instruments
  + Common issues: spikes, flatlines, impossible values
  + Behavior during maintenance/shutdown
  + Alarm/event logs linked to tags
  + Min/max physically possible per tag
  + Normal operating ranges
  + Max realistic rate of change
  + Policy for missing/out-of-range values
* For column 01
  + Main feed is
  + It comes from C00 through E02(feed preheater)
  + The reflux process is through tank T-01, it has 2 condenser main and vent condenser and top product goes to column02 through feed preheater
  + Top product is water and product that goes for storage
  + Bottom product is Anthracene Oil goes to storage through product cooler through feed preheater
  + The flow of bottom product is controlled by level of tank 1   
    so what are critical values or factors behind that
  + Critical Process Variables ?
  + Normal operating ranges (T, P, flow, composition )
  + Any critical tags?
  + Known faulty sensors / drifting instruments
  + Common issues: spikes, flatlines, impossible values
  + Behavior during maintenance/shutdown
  + Alarm/event logs linked to tags
  + Min/max physically possible per tag
  + Normal operating ranges
  + Max realistic rate of change
  + Policy for missing/out-of-range values
* For column 02
  + Main feed is XYZ
  + It comes from top product of C01 through E07(feed preheater innco1 PID)
  + The reflux process is through tank T-02, it has 2 condenser main and vent condenser and top product goes to column02 through feed preheater
  + Top product is Light Oil and it again goes to column 1/storage?
  + Bottom product is Product Liquid goes to column 3 through feed preheater E12
  + The flow of bottom product is controlled by level of tank T-02   
    so what are critical values or factors behind that
  + Critical Process Variables ?
  + Normal operating ranges (T, P, flow, composition )
  + Any critical tags?
  + Known faulty sensors / drifting instruments
  + Common issues: spikes, flatlines, impossible values
  + Behavior during maintenance/shutdown
  + Alarm/event logs linked to tags
  + Min/max physically possible per tag
  + Normal operating ranges
  + Max realistic rate of change
  + Policy for missing/out-of-range values
* For column 03
  + Main feed is Process Liquid
  + It comes from bottom product of C02 through E12(feed preheater innco1 PID)
  + The reflux process is through tank T-02, it has 2 condenser main and vent condenser and top product goes to storage tank from sheet 1 T-00
  + Top product is Napthalene Oil
  + Bottom product is Wash Oil goes to storage through Product Cooler E16
  + The flow of bottom product is controlled by level of tank T-02   
    so what are critical values or factors behind that
  + Critical Process Variables ?
  + Normal operating ranges (T, P, flow, composition )
  + Any critical tags?
  + Known faulty sensors / drifting instruments
  + Common issues: spikes, flatlines, impossible values
  + Behavior during maintenance/shutdown
  + Alarm/event logs linked to tags
  + Min/max physically possible per tag
  + Normal operating ranges
  + Max realistic rate of change
  + Policy for missing/out-of-range values

At column 01, 02, 03 logic of controlling: top product flow rate is controlled by level reflux tank values for that…

* ~~Critical process variables (per column)~~
* ~~Normal operating ranges (T, P, flow, composition)~~
* ~~Operating mode: continuous / batch / mixed~~
* ~~Typical cycle times (startup, steady, shutdown)~~

**~~2. Instrumentation & Tags~~**

* ~~Complete tag list: name, description, units~~
* ~~Critical tags for quality & safety~~
* ~~Measurement principles & locations~~
* ~~Calibration frequency~~
* ~~Calculated vs. direct measurement tags~~
* ~~Redundant sensors available~~

**~~3. Data Acquisition~~**

* ~~Tag update frequency (exact/min/max)~~
* ~~Timestamp type (process time / logging time)~~
* ~~Constant value tags (setpoints/manual)~~
* ~~SCADA filtering/smoothing already applied~~

**~~4. Data Quality Issues~~**

* ~~Known faulty sensors / drifting instruments~~
* ~~Common issues: spikes, flatlines, impossible values~~
* ~~Environmental effects (season, humidity, temp)~~
* ~~Behavior during maintenance/shutdown~~

**~~5. Operations & Maintenance~~**

* ~~Access to maintenance logs~~
* ~~Replacement signals or missing data during downtime~~
* ~~Events causing plant-wide resets~~

**~~6. Events & Context Tags~~**

* ~~Tags for plant mode (startup, steady, shutdown)~~
* ~~Alarm/event logs linked to tags~~
* ~~Operator logbook availability~~

**~~7. Historical Data & References~~**

* ~~Historical trends for key tags~~
* ~~Aspen/HYSYS simulation ranges~~
* ~~Lab analysis data for correlation~~

**~~8. Cleaning Rules~~**

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**~~9. Documentation~~**

* ~~Digital P&ID with instrument numbers~~
* ~~Control narrative / DCS logic~~
* ~~Relevant SOPs~~