Pseudo Logic for GMR Coal Stack Yard Management

* **Pile-wise Data Entry:**
* For each Sub-pile (e.g., A1 to 4D):
  + Input source details: Wagon, Trucks.
* **Input Parameters:**
* **Accept and record:**
  + STACKING DATE, RAKE NO, SPUR, SUB PILE, TOP/BOTTOM, STACKING QNTY, GCV, RECLAIM DATE, RC-QNTY.
* **Calculate Derived Parameters:**
* AVAILABLE QUANTITY = STACKING QNTY - RECLAIM QNTY.
* AGING = TODAY'S DATE - STACKING DATE.
* TOP GCV = GCV if stacked at the top.
* TOP QNTY = STACKING QNTY if stacked at the top.
* BTM GCV = GCV if stacked at the bottom.
* BTM QNTY = STACKING QNTY if stacked at the bottom.
* Coal above 3500 GCV = AVAILABLE QNTY if GCV > 3500.
* Coal between 3100-3500 GCV = AVAILABLE QNTY if 3100 ≤ GCV ≤ 3500.
* Coal below 3100 GCV = AVAILABLE QNTY if GCV < 3100.
* **Output Calculations:**
* AVAILABLE QUANTITY = Sum of all calculated AVAILABLE QUANTITY.
* PILE WTD GCV = Weighted average GCV from AVAILABLE QUANTITY.
* TOP GCV = Average GCV for coal stacked at the top.
* TOP QNTY = Sum of all top-stacked coal quantities.
* BOTTOM GCV = Average GCV for coal stacked at the bottom.
* BOTTOM QNTY = Sum of all bottom-stacked coal quantities.
* MAX AGING = Maximum aging value among all piles.
* AVERAGE AGING = Average of aging values greater than 0.
* Coal >3500 GCV = Sum of quantities where GCV > 3500.
* Coal 3100-3500 GCV = Sum of quantities where 3100 ≤ GCV ≤ 3500.
* Coal <3100 GCV = Sum of quantities where GCV < 3100.

**Coal Feeding Decision:**

**All thresholds will be based on lower gcv of 3000 based on 4 categories of coal**

**1) Direct feeding - Direct feeding when incoming coal is within range and stock yard is healthy (low gcv coal <10%)**

**--** IF:- **[** Is incoming coal GCV less than UCL ?

Is incoming coal GCV greater than LCL?

Is Percentage of coal in yard above 3500 KCAL is less than 10%? **]**

If all conditions are true, returns TRUE, then returns 1.

If any condition is false, returns FALSE, then returns 0.

**2) Direct feeding -Direct feeding when coal quality is good (3500-3900) and good coal quantity is high (> 80%)**

**--** IF:- **[** Checks if the value in incoming coal GCV is greater than 3500.

Checks if the value in incoming coal GCV is less than 4000.

Checks if the value in Percentage of coal below 3100 is greater than 70%.**]**

If all conditions are true, returns TRUE, then returns 1.

If any condition is false, returns FALSE, then returns 0.

**3) Direct feeding -Direct feeding when coal quality is low and good coal quantity is not available**

**-- IF :- [** Checks if the value in incoming coal GCV is less than 3000.

Checks if the value in incoming coal GCV is greater than 2300.

Checks if the value in Percentage of coal in yard above 3500 KCAL is greater than 80%.**]**

If all conditions are true, returns TRUE, then returns 1.

If any condition is false, returns FALSE, then returns 0.

**4) Blending with direct feeding -Blending when incoming coal is within range , low GCV coal >10% , blending option available to maintain GCV range**

**-- IF :- [** Checks if the value in incoming coal GCV is greater than the value in LCL.

Checks if the value in incoming coal GCV is less than the value in UCL.

Checks if the value in Percentage of coal in yard above 3500 KCAL is greater than 10%.

Checks if the value in Sum of Blending possibility is greater than 0. **]**

If all conditions are true, returns TRUE, then returns 1.

If any condition is false, returns FALSE, then returns 0.

**5) Blending with direct feeding -Blending when incoming coal is out of range, blending option available to maintain GCV range.**

**-- IF :- [** Checks

if incoming coal GCV is greater than UCL.

OR

if incoming coal GCV is less than LCL.

Checks if the value in Sum of Blending possibility is greater than 0.**]**

If all conditions are true, returns TRUE, then returns 1.

If any condition is false, returns FALSE, then returns 0.

**6) Stacking-if there no blending suggestion and direct feeding suggestion then suggestion for stalking.**

**--** Checks if the all Coal Feeding Decision are False, then Stacking.

* **Summary Of All Pile Stacking Coal:**
  + **Spur-Wise Stacking:**
    - Calculate the number of Spurs being utilized (out of 12 Spurs) for each pile based on the input spur numbers.
    - If any sub-pile uses more than 2 Spurs, trigger a warning.
  + **Coal Quantity and Quality Pile-wise:**
    - To calculate all Piles Coal stock, take the outputs of 16 sub-piles.
    - Also added coals which are coming from trucks.
  + LAST COAL RAKE GCV:
    - Input Parameters:
      * Sample Collection Date, Rake No, SIDING NO, ARBG.C.V-k.cal/kg.
    - Calculate Derived Parameters:
      * Calculating how many Spurs (10 spur, SILO, DB) are using and amount of coal.
* **Blending:** 
  + **Input Parameters:** All pile summary values, Quantity top, GCV top, GCV BTM and Aging.
  + **Calculate Derived Parameters:** 
    - **Quantity top**: If Top quantity is getter than 1000? then take pile Top quantity else sum of top and button quantity.
    - **GCV top:** If Top quantity is getter than 1000 then take pile Top GCV else take PILE WTD GCV.
    - **GCV BTM:** Bottom GCV of that pile.
    - **Aging:** Average aging of the pile.
    - **Blended GCV@20%:** If the Quantity top exceeds 20% of 3700, then it computes a weighted sum of Incoming Coal GCV and Top Pile GCV using respective weights of 0.8 and 0.2.
    - **Blended GCV @15%:** If the GCV top exceeds 15% of 3700, then it computes a weighted sum of Incoming Coal GCV 85% and Top Pile GCV 15%.
    - **Blended GCV @10%:** If the ‘Blended GCV@20%’ exceeds 10% of 3700, then it computes a weighted sum of Incoming Coal GCV 90% and Top Pile GCV 10%.
    - **Blending possibility @ 20%:** If ‘Blended GCV@20%’ > LCL and ‘Blended GCV@20%’ < UCL, then return values of ‘Blended GCV@20%’.
    - **Blending possibility @ 15%:** If ‘Blended GCV @15%’ > LCL and ‘Blended GCV @15%’ < UCL, then return values of ‘Blended GCV @15%’.
    - **Blending possibility @ 10%:** If ‘Blended GCV @10%’ > LCL and ‘Blended GCV @10%’ < UCL, then return values of ‘Blended GCV @10%’ **.**
    - **Blending possible:** Checks whether the sum of Blended GCV@20%, Blended GCV @15%, and Blended GCV @10%is greater than 0. than returns 1; otherwise, it returns 0.
    - **Priority as per aging:** Checks the value of Blending possible is equal to 1 AND checks the result of the subtracts the average value of aging from the value pile wise aging is greater than 0. if both conditions are true then 1 else 0.
    - **Priority to create approach to bottom coal:** Checks whether the difference between the values of GCV BTM and GCV Top is greater than 100, then formula returns 1; otherwise, it returns 0.
    - **PRIORITY:** Checks whether the value in cell Blending possible is equal to 1. If it is, the formula returns the sum of the values in cells Priority as per aging, Priority to create approach to bottom coal, and Blending possible. If not, it returns 0.

**QNA:-**

* 1. Type of data input? (like – HMI or Control room)
  2. What is SPUR?
  3. How define max aging ?
     + If Rclm qt = Stk Qt =0 , then Avg aging or max aging is 0.
  4. Needed Validation :-
     + Rclm qt never more than Aval qt .
     + Aging 0 concept.
     + If aging is zero those entries are archived to the another table.