

Software Design(Interface)

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# Requirement Overview

**Background:**

Suncor’s Plants use field data collection devices to capture daily production values as well as consumed feed stock values. This data is derived from measurement tools located on-site, and is interfaced into a variety of Historian systems as daily raw inventory values. Reconciled values are then calculated in Reconciliation Systems in order to correct inaccuracies present in the raw data. These systems are managed by the Operations team at the Plants. Currently, Suncor does not leverage SAP PP for their production process and simply performs Goods Receipt / Goods Issue postings manually on a periodic basis after reconciliation takes place.

# Systems

|  |  |  |  |
| --- | --- | --- | --- |
| **Locations** | **Plant Code** | **Reconciliation tool (informational purposes only)** | **Source System for values to be posted in S/4** |
| Sarnia Refinery | CP03 | Honeywell PB | Azure IoT |
| Montreal Refinery | CP01 | Honeywell PB | Azure IoT |
| Oil Sand and In Situ | AP01,AP02,AP03 | DPS | Azure IoT |
| Fort Hills |  | DPS | Azure IoT |
| Terra Nova | EP01 | Excel | Azure IoT |
| Edmonton Refinery | CP04 | Honeywell | Azure IoT |
| Montreal Sulphur | CP02 | Excel | Azure IoT |
| Commerce City Refinery | GP01/GP02 | Sigmafine | Azure IoT |
| Burrard Terminal |  | Excel | Azure IoT |



# Log Files

# Versions

Versions are kept in the project file ie . <Version>1.0.15</Version>

# Environments

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Sandbox** | **DEV/TEST** | **Prod** |
| AD group |  | RG-ARM-PBIDEV-CONTRIBUTOR |  |
| App Service | R2PDashboardSandbox.azurewebsites.net | pbidevarmfncuw2001 |  |
| Azure Function | aaasbxarmfapuw2015 | pbidevarmfncuw2001 |  |
| Subscription | SuncorABOSandbox | SuncorEnergyIT-DEV |  |
| Storage Account | aaasbxarmstauw2015 | pbidevarmsta001 |  |
| Resource Group | aaasbxarmrgp015 | pbidevarmrgp001 |  |
| HTTP Listener for  Material Movement | https://aaasbxarmfapuw2015.azurewebsites.net/api/MaterialMovement | https://pbidevarmfncuw2001.azurewebsites.net/  api/MaterialMovement |  |
| HTTP Listener for  Custody Tickets | https://aaasbxarmfapuw2015.azurewebsites.net/api/CustodyTicket | https://pbidevarmfncuw2001.azurewebsites.net/  api/CustodyTicket |  |
| Database | inmdevarmsvruw2001.database.windows.net  /inmdevarmsqluw2001 | pbidevarmsvruw2001.database.windows.net/  pbidevarmsdbuw2001 |  |

# Current Date Override

If the users drops the file createDate.txt in the system directory, then the service will use the date within the file as the current date. Otherwise, the current date will default to today.

The preferred date format is YYY-MM-DD

Ie. 2021-01-03

# Heartbeat

# Production Interfaces

|  |  |
| --- | --- |
| Plant Code | Location |
| CP01 | Montreal |
| CP02 | Montreal Sulphur |
| CP03 | Sarnia |
| CP04 | Edmonton |
| EP01 | Terra Nova |
| GP01 | Commerce City (East Plant) |
| GP02 | Commerce City (West Plant) |
| AP01 | Oil Sands - Base Plant |
| AP02 | Firebag |
| AP03 | Mackay River |

## Date Validation (10 day pivot)

Production dates are used in all of the production interfaces. Dates and quantities are retrieved from the current month when the current day of the month > day 10. If current day is less than or equal to day 10, then the prior month is also retrieved and posted to S4.

## Commerce City (Denver)

File Type:Excel

Sheet : use 1st sheet

Note : single day file

Mappings :

|  |  |  |
| --- | --- | --- |
| TagBalance | Production | Inventory |
| Movement Type | Sigmafine | Sigmafine |
| System | Production | Inventory Snapshot |
| Tag | Column C | Material Code (Column T) |
| Tank |  | Column B |
| Balance Date | Row 3 Column M | Row 11 Column F |
| Quantity | Production BBL |  |
| Opening Inventory | Opening BBL |  |
| Closing Inventory | Closing BBL | Volume (Column C) |
| Purchase | Purchase BBL |  |
| Sale | Sale BBL |  |

Warnings:

1. Invalid Date - ERROR
2. Invalid Production, OI, CI, Purchase, Sale value
3. No Tag Mapping
4. Invalid Date

## Montreal Sulphur

File Type:Excel

Sheet : use 1st sheet

Mappings :

|  |  |  |  |
| --- | --- | --- | --- |
| TagBalance | File Type 2 - SBS | File Type 3 - Sulphur | File TYpe 5 - Caustic |
| Sheet | Sheet are months | Sheet are months | Daily |
| Movement Type | MTL SP | MTL SP | MTL SP |
| System | Production | Production | Production |
| Tag | 2 | 3 | 5 |
| Balance Date | Column A | Column A | Column B |
| Quantity | Column Q | Column L | Column I **\* -1** |
| Opening Inventory | Prio Row of  Column C + Column F + Column I + Column M  (All 4 tanks) | Prior Row  Column M | Prior Row  Column H |
| Closing Inventory | Column C + Column F + Column I + Column M  (All 4 tanks) | Column M | Column H |
| Purchase |  | Column K | Column D |
| Sale | Column O | Column J |  |

Warnings:

1. Invalid Year- ERROR
2. Invalid Production, OI, CI, Purchase, Sale value
3. No Tag Mapping
4. Invalid Date

## Honeywell PB (Edmonton, Montreal, Sarnia)

File Type:Propriety

Note : single day file

|  |  |
| --- | --- |
| TagBalance | Honeywell PB |
| Movement Type | Honeywell PB |
| System | Production |
| Tag | PRODUCT\_CODE in START PRODUCT REC |
| Balance Date | ACCOUNT\_DATE in NP UPLOAD FILE |
| Quantity | AMMDT Quantity (see below) |
| Opening Inventory | OPENING\_INVENTORY in START PRODUCT REC |
| Closing Inventory | CLOSING\_INVENTORY in START PRODUCT REC |
| Purchase | RECEIPT\_QUANTITY in START PRODUCT REC |
| Sale | SHIP\_QUANTITY in START PRODUCT REC |

Example Format

<<NP UPLOAD FILE>>

<<DEFAULTS>>

DATEFORMAT,DD/MM/YYYY

DATETIMEFORMAT,DD/MM/YYYY HH24:MI:SS

<<END DEFAULTS>>

ACCOUNT\_DATE,30/09/2020 00:59:00

<<START BALANCE REC>>

BALANCE\_GROUP\_NAME,BILAN\_GAZ\_COMB

<<START PRODUCT REC>>

PRODUCT\_CODE,14BUT\_CONS

OPENING\_INVENTORY,0.000

CLOSING\_INVENTORY,0.000

NET\_INVENTORY,0.000

RECEIPT\_QUANTITY,0.000

RECEIPT\_LITRES\_SAP,0.000

SHIP\_QUANTITY,0.000

SHIP\_LITRES\_SAP,0.000

NET\_CONSUMPTION,24274.570

NET\_YIELD,

<<END PRODUCT REC>>

<<START PRODUCT REC>>

PRODUCT\_CODE,14GAZ\_NAT\_CONS

OPENING\_INVENTORY,0.000

CLOSING\_INVENTORY,0.000

NET\_INVENTORY,0.000

RECEIPT\_QUANTITY,239679.600

RECEIPT\_LITRES\_SAP,239680.000

SHIP\_QUANTITY,0.000

SHIP\_LITRES\_SAP,0.000

NET\_CONSUMPTION,239700.310

NET\_YIELD,20.720

<<END PRODUCT REC>>

<<END BALANCE REC>>

REFINERY\_GAIN\_LOSS,-1740391.540

<<END NP UPLOAD FILE>>

InputProductCalc = CLOSING\_INVENTORY + SHIP\_QUANTITY + NET\_CONSUMPTION - OPENING\_INVENTORY - RECEIPT\_QUANTITY

OutputProductCalc = OPENING\_INVENTORY + RECEIPT\_QUANTITY + CLOSING\_INVENTORY - SHIP\_QUANTITY - NET\_CONSUMPTION

AMMDT Quantity = if NET\_YIELD - InputProductCalc = 0 THEN NET\_YIELD (absolute value and tolerance of 1)

AMMDT Quantity = if NET\_YIELD - OutputProductCalc = 0 THEN NET\_YIELD \* **-1** (absolute value and tolerance of 1)

Warnings:

1. Invalid Production, OI, CI, Purchase, Sale value
2. Net Yield does not match InputProductCalc or OutputProductCalc (tolerance of 1)
3. No Tag Mapping
4. Invalid Date

## Honeywell PB (Sarnia - splits Shell/Suncor)

## TerraNova

File Type:CSV

Mappings :

|  |  |
| --- | --- |
| TagBalance | DPS File |
| Movement Type | OPIS |
| System | Production |
| Tag | name |
| Balance Date | ts - 1 day |
| Quantity | value |

Warnings:

1. Invalid Date
2. Invalid Production value
3. No Tag Mapping
4. Invalid Date

## Oilsands (Firebag, Mackay River) - DPS

File Type:Excel

Sheet “Azure Load”

Mappings :

|  |  |
| --- | --- |
| TagBalance | DPS File |
| Movement Type | DPS |
| System | Production |
| Tag | Plant + \_ + Material Description OR Product Code in DPS |
| Balance Date | Transaction Date |
| Quantity | Production |

Warnings:

1. If sheet “Azure Load” not found
2. If UOM not found
3. If UOM conversion not found
4. Invalid Production value
5. No Tag Mapping
6. Invalid Date

# Custody Ticket Interface

Refer to Production section for CommerceCity

# Inventory Ticket Interface

Rollup S4 Material,

Quantity goes into closing.

Any Confidence < 90% , target confidence is 0 ( for the json)

# Material Movement Interface

HTTP Listener : ~/api/MaterialMovement

Table : MaterialMovement

Mappings :

|  |  |
| --- | --- |
| MaterialMovement Table | Recieved Json |
| MaterialMovement\_id |  |
| MaterialDocument | MaterialDocument |
| Material | Material |
| System | System |
| MovementType | MovementType |
| MovementTypeDesc | MovementTypeDesc |
| Plant | Plant |
| HeaderText | HeaderText |
| PostingDate | PostingDate |
| ValuationType | ValuationType |
| Quantity | Quantity |
| QuantityInUoe | QuantityUoe |
| QuantityInL15 | QuantityL15 |
| UnitOfEntry | uoe |
| UnitOfMeasure | uom |
| EnteredOn | EnteredOn (default to NOW if empty) |
| EnteredAt | EnteredAt (default to R2PLoader if empty) |
| Quantity | Quantity |
| Tag | Lookup from Material and Plant |

# Material Ledger Interfaces

# Production Hierarchy Interfaces

# Operational

## Modifying Tags

If the use drops the file tagMappings.csv into the system directory, then the service will upload the tag mappings into the database which will be used for processing.

The format of the file is :

Tag,Plant,WorkCenter,MaterialNumber,DefaultValuationType,DefaultUnit

14BUT\_CONS,CP01,PRODMP01,10117,SUNCOR,L15

….

This tag mapping will first be processed before any other upload occurs.

Once the tag mappings are processed and loaded into the system, the file is renamed to tagMappings.processed.csv.

## Log Files

The R2P process is running on my private storage account, and accessible via Azure Storage Explorer (as per previous email).

if you drop a file in CPXX/ImmediateScan directory, the watchdog process will run every 1 minute (can be throttled to whatever we want).

Once processed,

1. log entries will be added to system/AzureDataHubProductionLoad.log,

2. the file will be moved to CPXX/archived

3. a json output will be created in CPXX/tempJsonOutput

Montreal Sulphur (CP02) is also setup and scraping XLSX files.

An interesting note for Montreal Sulphur :

if no tag Mapping for Montreal Sulphur (2,3,5) then catastrophic failure

- files are left unprocessed in the immediateScan directory

- please comment if this should be changed

Plant Code currently comes from directoyr

Error Handling

- scan on all directories happens every 5 minutes

- if day is < 10 and not January, then load prior month as well

- if no tag Mapping for Montreal Sulphur (2,3,5) then catastrophic failure

- files are left unprocessed from the immediateScan directory

1. removed Tank and Quantity Timsestamp

Only exporting the following :

Date,

Tag,

System (Honeywell PB, MTL SP),

MovementType (Always Production),

Material (from TagMapping),

Plant,

WorkCenter (from TagMapping),

ValType (from TagMapping),

BalanceDate,

Quantity,

StandardUnit

2. appended timestamp (yyyyMMddHHmmss) to archived file

3. added special logic for 0 length source files

# Azure Storage

Users as members of AD Group SG-pbidevarmsta001-SAP\_IOT\_Data-RW can mount fileshare from their Windows 10 computer \\pbidevarmsta001.file.core.windows.net\sap-iot-data. Windows 7 machine from on-prem will not work.

# Appendix

Document how to use Azure File Share.

https://docs.microsoft.com/en-us/azure/storage/files/storage-how-to-use-files-windows#