



C2M v2.9

4.2.1.2 Manage VEE and VEE Exceptions

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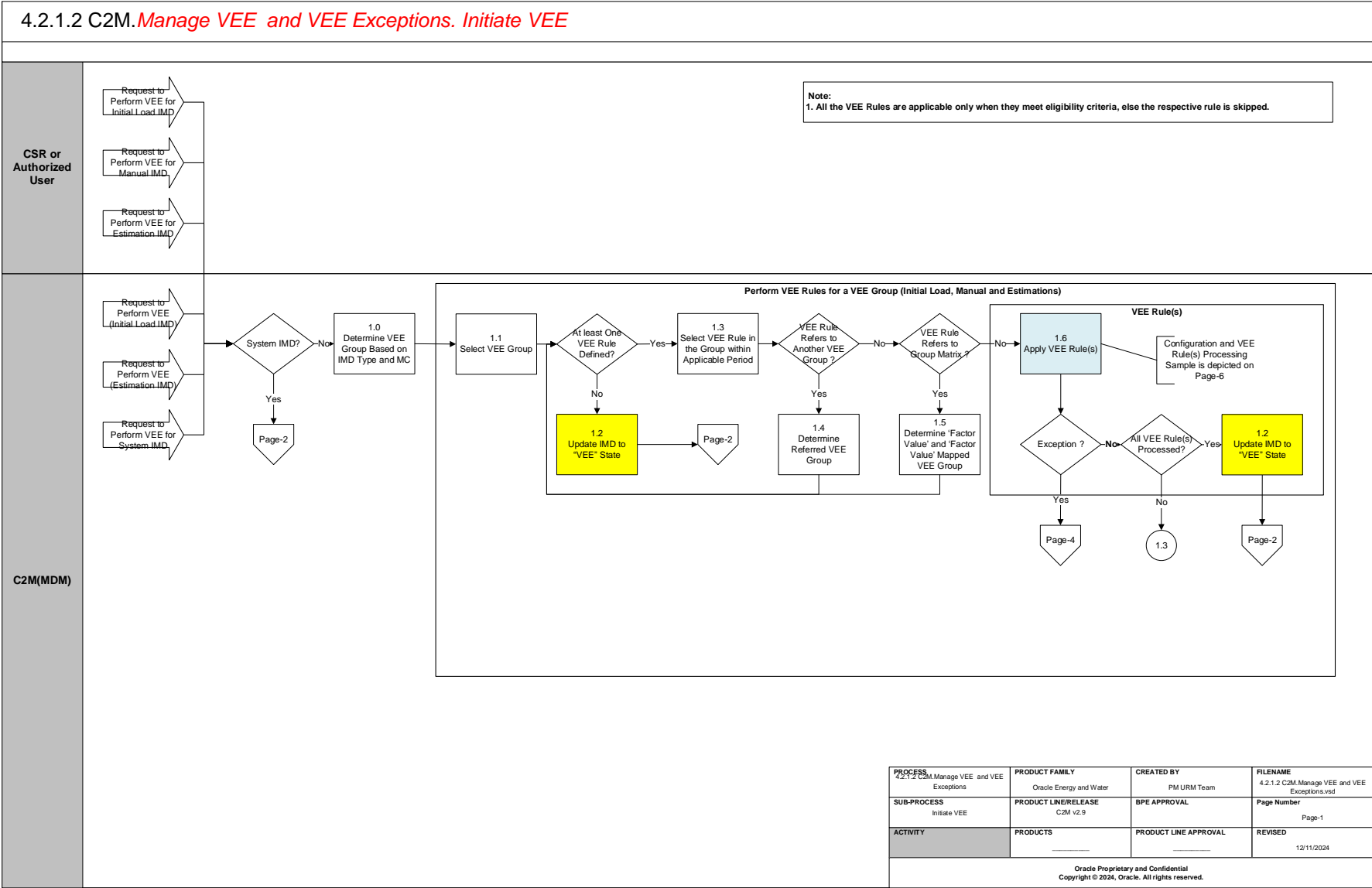
Brief Description

Business Process:	4.2.1.2 C2M.Manage VEE and VEE Exceptions
Process Type:	Sub-Process
Parent Process:	4.2.1 C2M.Collect and Process Device Measurements
Sibling Processes:	4.2.1.1 C2M.Upload Device Measurements, 4.2.2.1 C2M.Calculate Usage, 5.5.5.1 C2M.Manage Service Investigative Orders

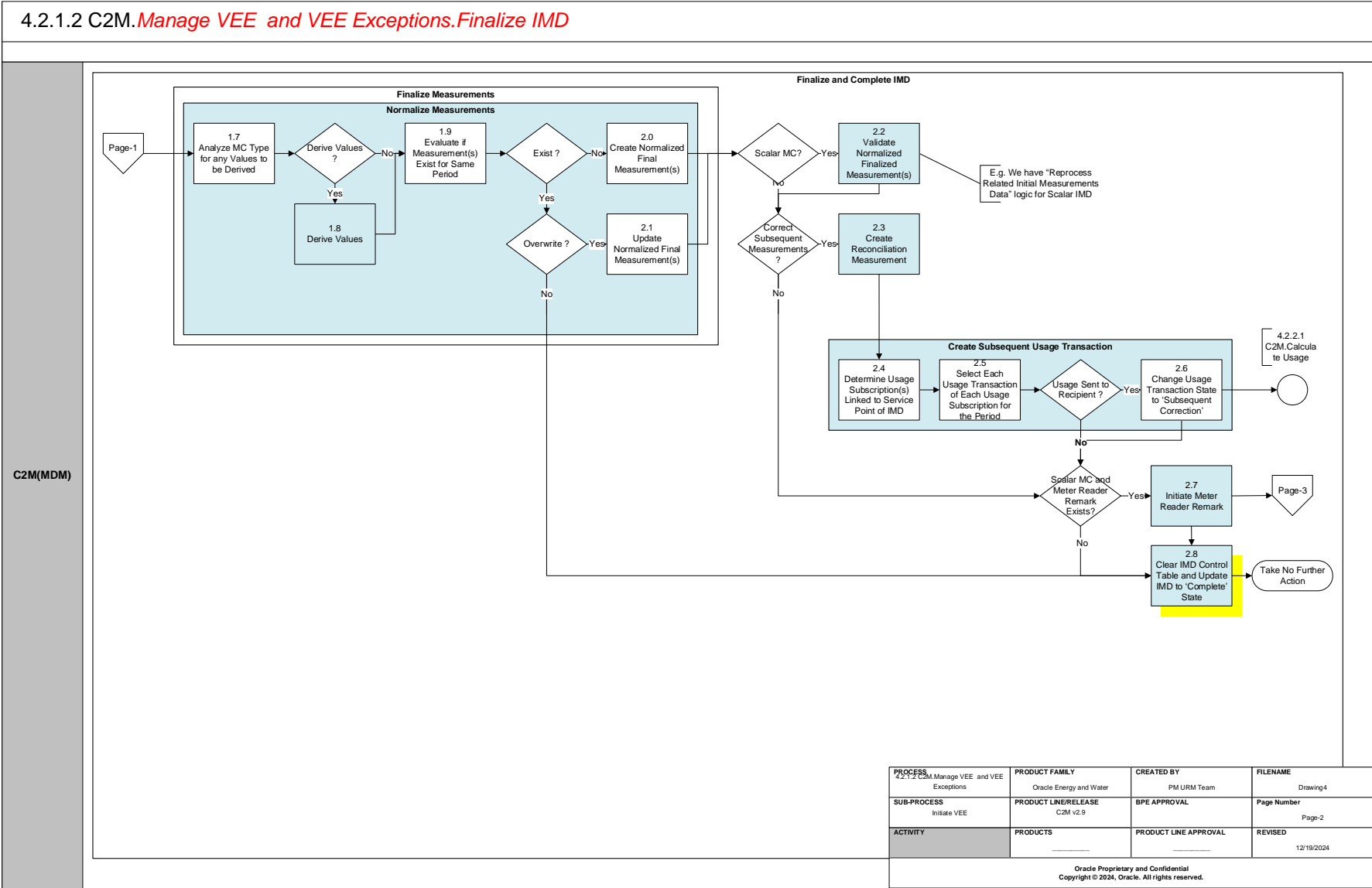
This process gets initiated when the IMD is loaded into the system, has passed the VEE Ready state across its life-cycle and is ready for VEE Processing. The various types of IMDs i.e. Initial Load, Manual, and Estimation can have VEE process invoked either through System or by User. For System IMDs, VEE process is skipped as it involves reprocessing of existing measurements due to change in Meter multiplier or Installation constant.

During the VEE process, various VEE rules configured logically under a VEE Group, assigned for the respective IMD MC Type are applied. Each of the rules may be a single rule or can refer to another group of VEE Rules through specific selection criteria. These VEE rules fall into different categories such as common validation rules for validation and replacements, estimation rules for missing measurements, and consumption rules to check the sanity of consumption. Any exceptions encountered, during the VEE process, may lead to either termination of the whole VEE Process or continuation based on the severity of exception, followed by Exception Processing. With the successful pass through of the VEE, the IMD moves towards normalization and finalization, where on Usage Transaction related processes take on. For Scalar MCs, if a Meter Reader Remark exists, then Reader Remark processing is initiated and processed.

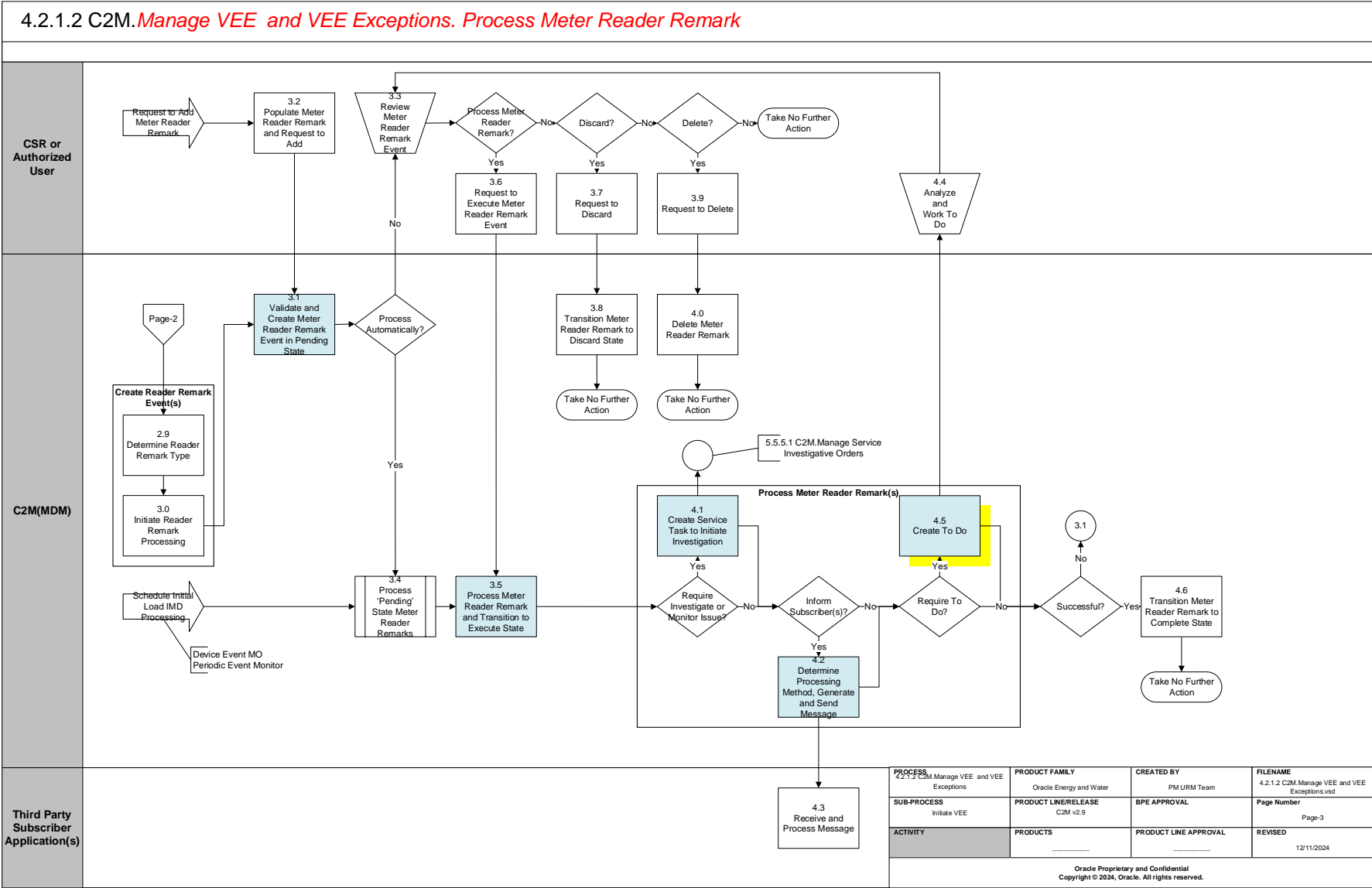
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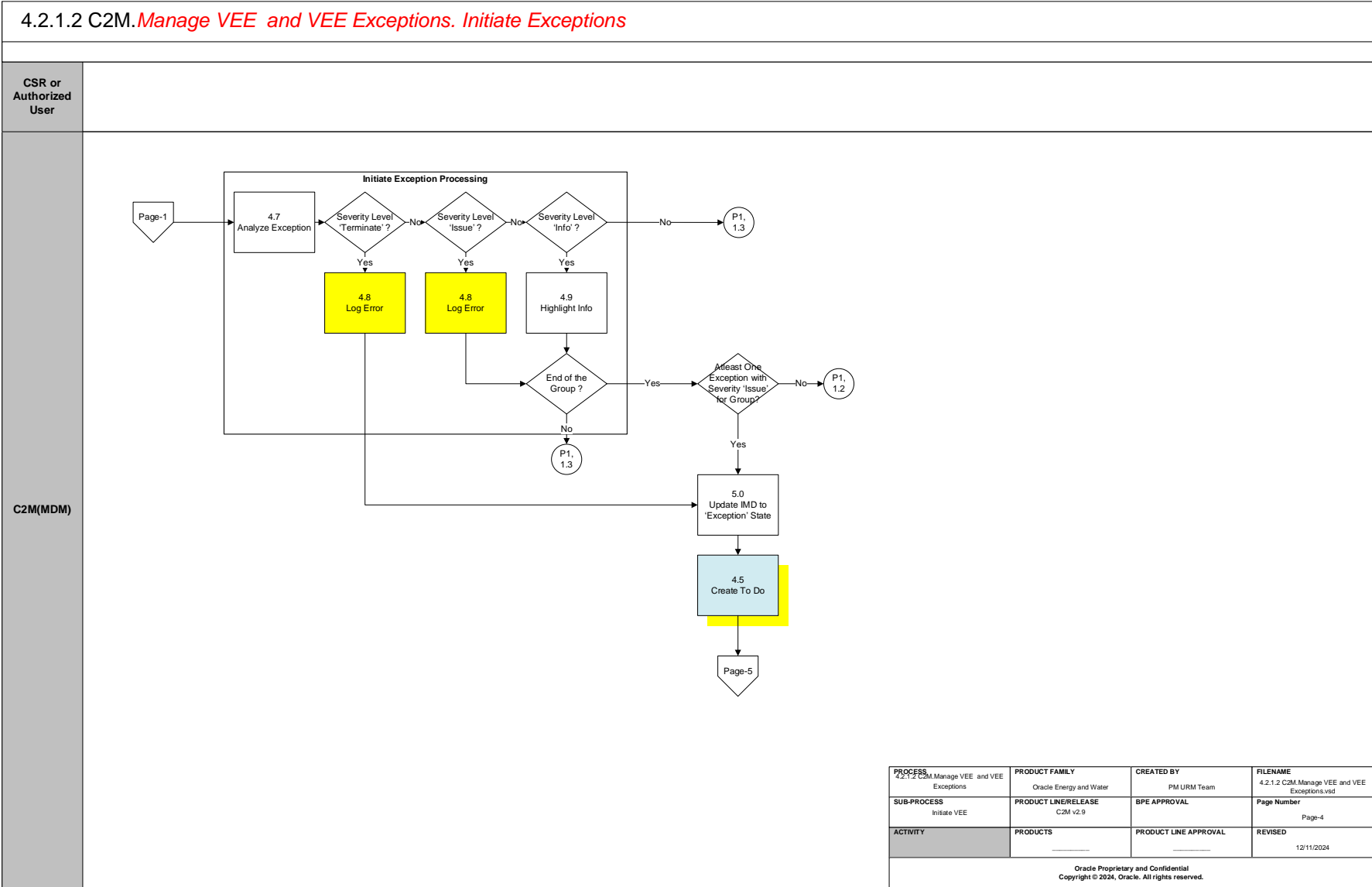
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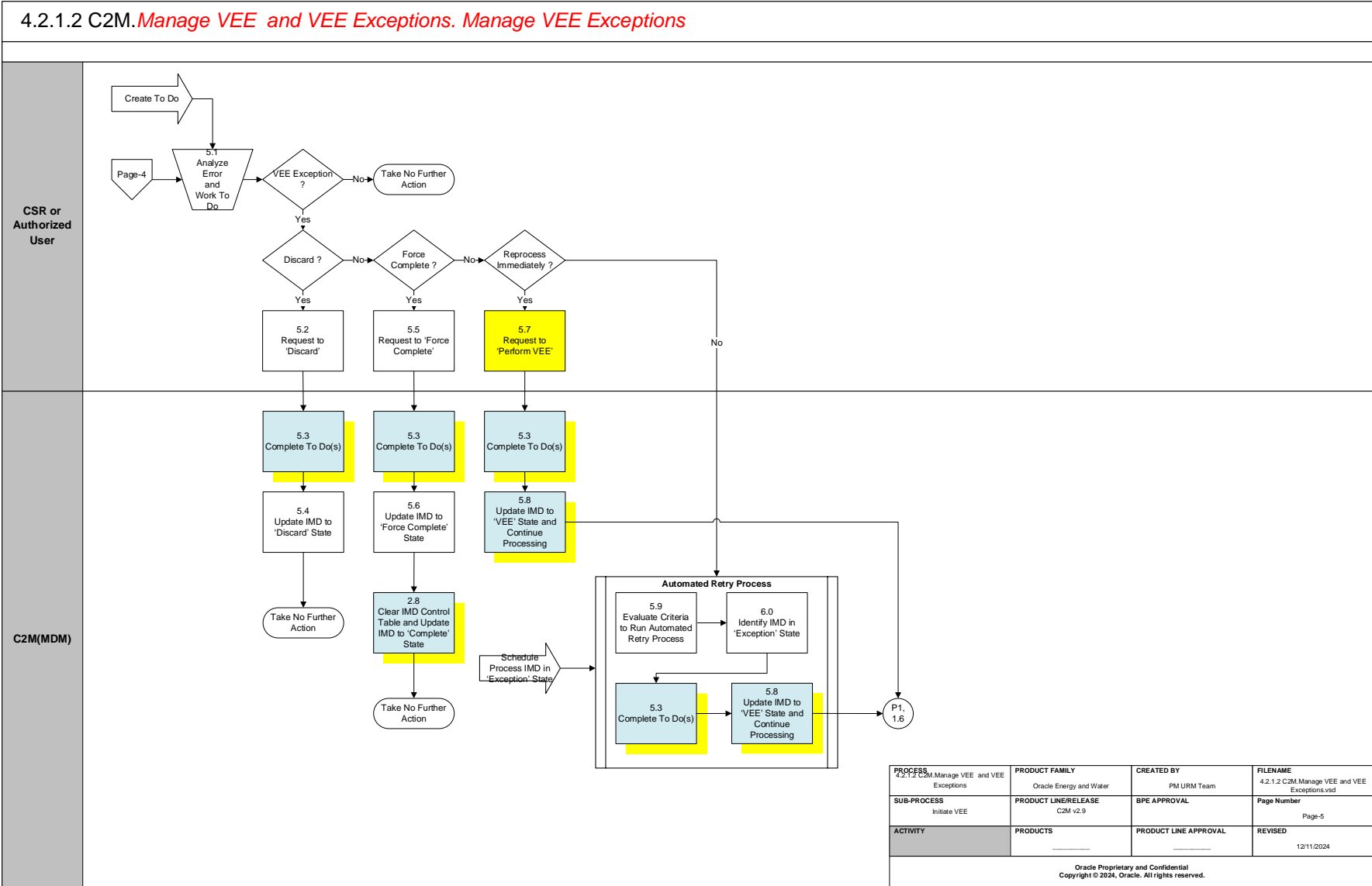
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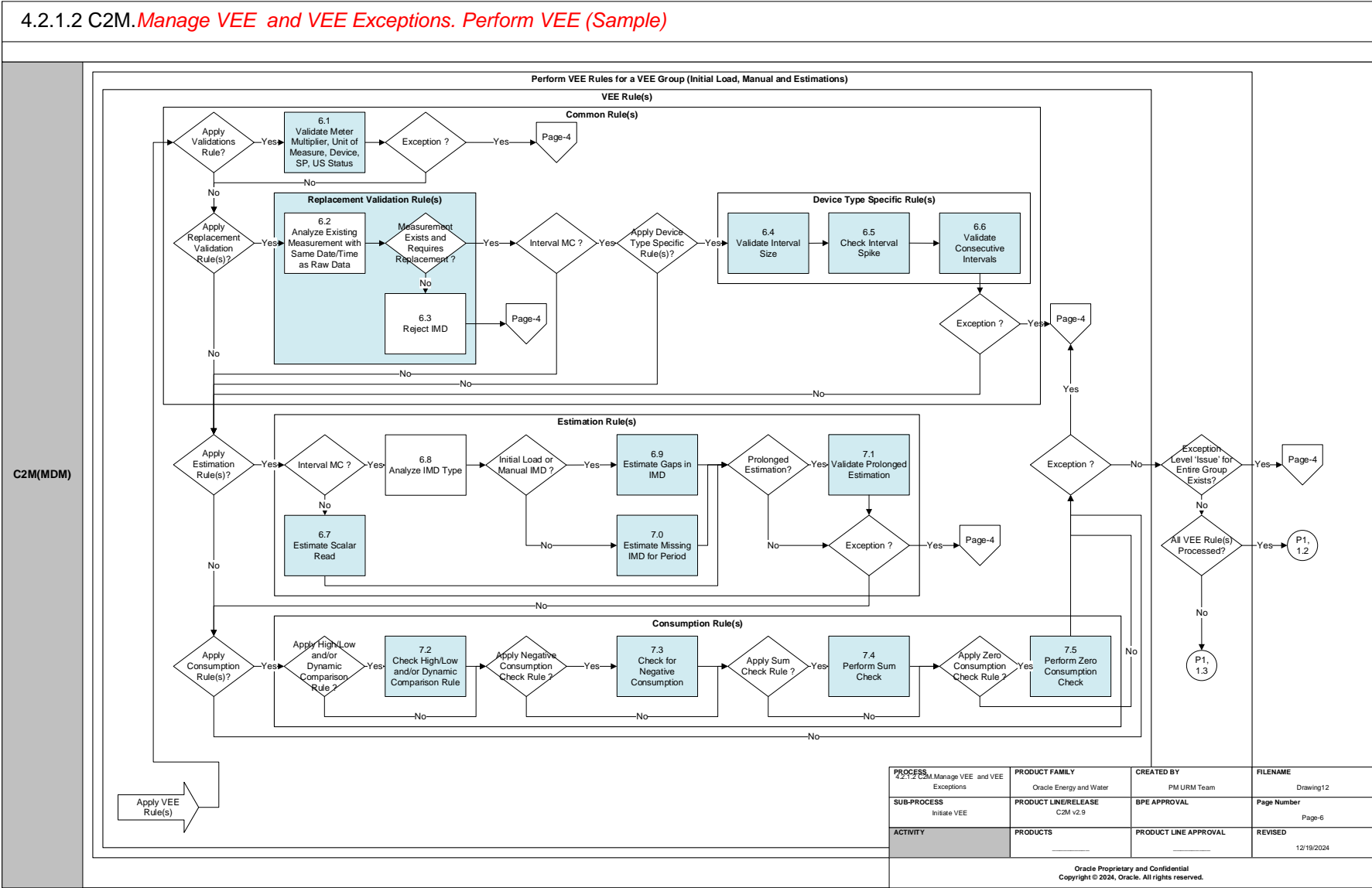
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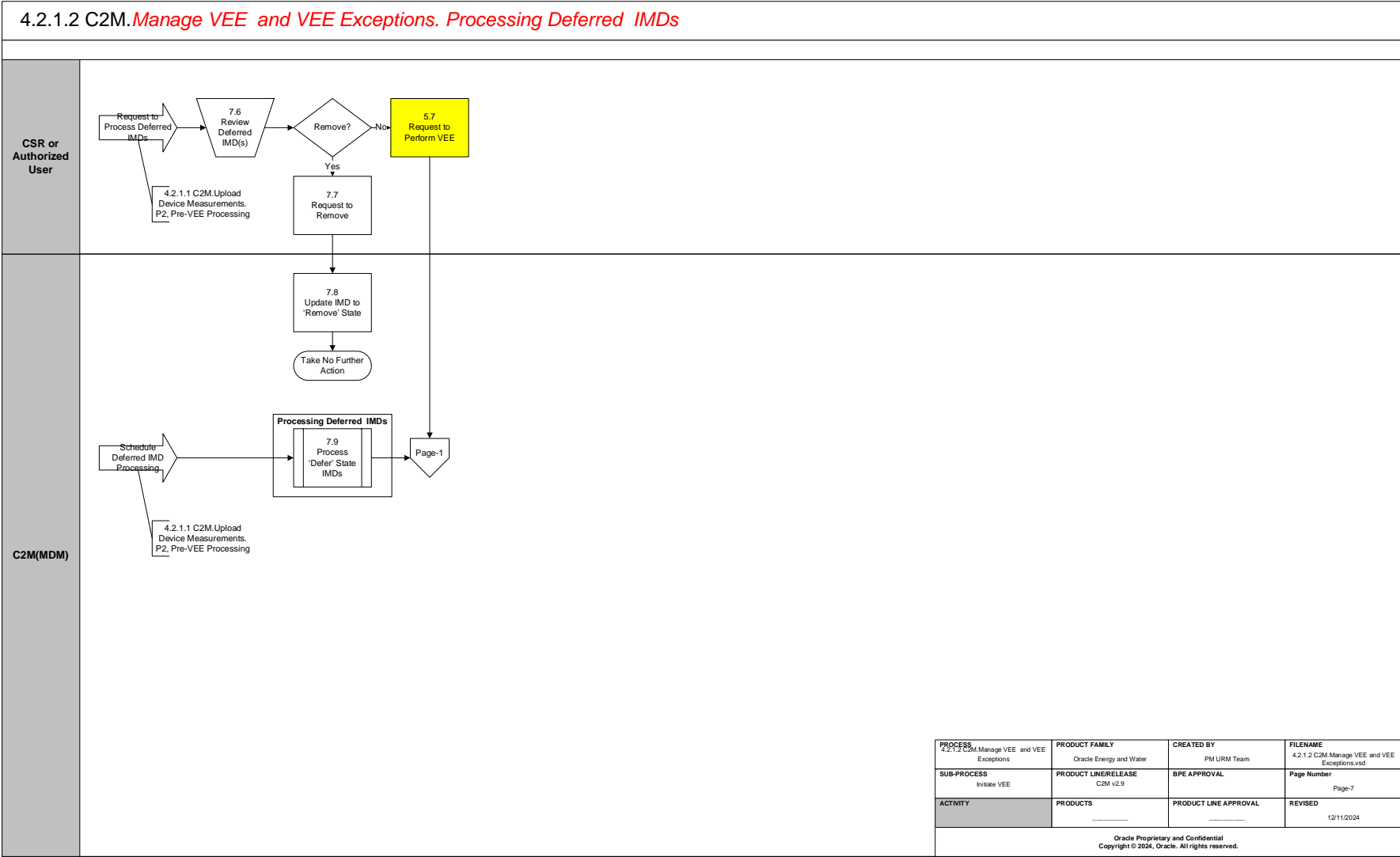
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Detail Business Process Model Description

1.0 Determine VEE Group Based on IMD Type and MC

Actor/Role: C2M(MDM)

Description:

C2M(MDM) validates the date/time based on the IMD Type and determines the [VEE Group configured for the Measuring Component](#) derived from the IMD.

Business Object (Y)

Business Object

D1-InitialLoadIMDInterval
D1-InitialLoadIMDScalar
D1-ManualIMDInterval
D1-ManualIMDScalar
D1-EstimationIMDInterval
D1-EstimationIMDScalar

Configuration required (Y)

Entities to Configure:

VEE Rules
VEE Group
Measuring Component

1.1 Select VEE Group Group: Perform VEE Rules for a VEE Group (Initial Load, Manual and Estimations)

Actor/Role: C2M(MDM)

Description:

C2M(MDM) selects the VEE Group based on the Measuring Component to perform VEE process.

Process Plug-in enabled (Y)

Available Algorithm(s):

D1-INIT-VEE (Perform VEE for Initial Load IMD)
D1-PVSIIMDIL (Perform VEE for Subtractive Interval Initial Load IMD)
D1-MNOV-VEE (Perform VEE for Manual IMD)
D1-ESTM-VEE (Perform VEE for Estimation IMD)

Business Object (Y)

Business Object

D1-InitialLoadIMDInterval
D1-InitialLoadIMDScalar
D1-ManualIMDInterval
D1-ManualIMDScalar

D1-EstimationIMDInterval
D1-EstimationIMDScalar
D1-InitialLoadIMDSubrInterval

1.2 Update IMD to “VEE” State Group: Perform VEE Rules for a VEE Group (Initial Load, Manual and Estimations)

Actor/Role: C2M(MDM)

Description:

C2M(MDM) updates the IMD to VEE State.

Process Plug-in enabled (Y) **Available Algorithm(s):**

F1-AT-RQJ (Transition to Default Next Status)
--

Business Object (Y) **Business Object**

D1-InitialLoadIMDInterval
D1-InitialLoadIMDScalar
D1-ManualIMDInterval
D1-ManualIMDScalar
D1-EstimationIMDInterval
D1-EstimationIMDScalar

1.3 Select VEE Rule in the Group within Applicable Period Group: Perform VEE Rules for a VEE Group (Initial Load, Manual and Estimations)

Actor/Role: C2M(MDM)

Description:

C2M(MDM) selects the [VEE Rules configured in the VEE Group](#) as per the configured sequence and filters the Rules based on their applicability with respect to the Execution date for IMD. A rule is applicable for IMD if the VEE Execution date falls between the Start date and End date of the rule Life time. If there is no End date specified for VEE Rule, the Execution date should be after the [Life time](#) Start Date of the VEE Rule.

Process Plug-in enabled (Y) **Available Algorithm(s):**

D1-INIT-VEE (Perform VEE for Initial Load IMD)
D1-MNOV-VEE (Perform VEE for Manual IMD)
D1-ESTM-VEE (Perform VEE for Estimation IMD)

Business Object (Y) **Business Object**

D1-InitialLoadIMDInterval
D1-InitialLoadIMDScalar
D1-ManualIMDInterval
D1-ManualIMDScalar
D1-EstimationIMDInterval

Configuration required (Y/N) Entities to Configure:

D1-EstimationIMDScalar
D1-InitialLoadIMDSubrInterval
VEE Rules
VEE Group

1.4 Determine Referred VEE Group Group: Perform VEE Rules for a VEE Group (Initial Load, Manual and Estimations)

Actor/Role: C2M(MDM)

Description:

C2M(MDM) determines the [VEE Group referred by the VEE Rule](#).

Process Plug-in enabled (Y) Available Algorithm(s):

D1-INIT-VEE (Perform VEE for Initial Load IMD)
D1-MNOV-VEE (Perform VEE for Manual IMD)
D1-ESTM-VEE (Perform VEE for Estimation IMD)

Business Object (Y) Business Object

D1-InitialLoadIMDInterval
D1-InitialLoadIMDScalar
D1-ManualIMDInterval
D1-ManualIMDScalar
D1-EstimationIMDInterval
D1-EstimationIMDScalar
D1-InitialLoadIMDSubrInterval

Configuration required (Y/N) Entities to Configure:

VEE Rules
VEE Group

1.5 Determine 'Factor Value' and 'Factor Value' Mapped VEE Group Group: Perform VEE Rules for a VEE Group (Initial Load, Manual and Estimations)

Actor/Role: C2M(MDM)

Description:

C2M(MDM) dynamically determines the factor value for a VEE Rule and determines the [VEE Group mapped to the Factor value](#).

Process Plug-in enabled (Y) Available Algorithm(s):

D1-INIT-VEE (Perform VEE for Initial Load IMD)
--

Business Object (Y)	Business Object	D1-MNOV-VEE (Perform VEE for Manual IMD)
		D1-ESTM-VEE (Perform VEE for Estimation IMD)
Configuration required (Y/N)	Entities to Configure:	D1-InitialLoadIMDInterval
		D1-InitialLoadIMDScalar
		D1-ManualIMDInterval
		D1-ManualIMDScalar
		D1-EstimationIMDInterval
		D1-EstimationIMDScalar
		D1-InitialLoadIMDSubtrInterval
		VEE Rules
		Factors

1.6 Apply VEE Rule(s) Group: Perform VEE Rules for a VEE Group (Initial Load, Manual and Estimations)

Group: VEE Rule(s)

Actor/Role: C2M(MDM)

Description:

C2M(MDM) initiates applying VEE Rule(s) processing.

Process Plug-in enabled (Y) **Available Algorithm(s):**

Business Object (Y)	Business Object	D1-INIT-VEE (Perform VEE for Initial Load IMD)
		D1-MNOV-VEE (Perform VEE for Manual IMD)
Configuration required (Y/N)	Entities to Configure:	D1-ESTM-VEE (Perform VEE for Estimation IMD)
		D1-InitialLoadIMDInterval
		D1-InitialLoadIMDScalar
		D1-ManualIMDInterval
		D1-ManualIMDScalar
		D1-EstimationIMDInterval
		D1-EstimationIMDScalar
		D1-InitialLoadIMDSubtrInterval

1.7 Analyze MC Type for any Values to be Derived Group: Finalize and Complete IMD

Group: Finalize Measurements

Group: Normalize Measurements

Actor/Role: C2M(MDM)**Description:**

C2M(MDM) analyses the Measuring Component Type to determine the Measurement BO and populate the data by mapping with Post-VEE Raw Measurement data. It further checks if there are any algorithms configured to derive other values based on current values.

Process Plug-in enabled (Y) **Available Algorithm(s):**

D1-AUTO-NORM (Normalize Measurements)
Value Derivation Algorithms

Business Object (Y) **Business Object**

D1-InitialLoadIMDInterval
D1-InitialLoadIMDScalar
D1-ManualIMDInterval
D1-ManualIMDScalar
D1-EstimationIMDInterval
D1-EstimationIMDScalar
D1-SystemIMDScalar
D1-SystemIMDInterval

1.8 Derive Values Group: Finalize and Complete IMD

Group: Finalize Measurements

Group: Normalize Measurements

Actor/Role: C2M(MDM)**Description:**

C2M(MDM) derives other values based on the current measurements.

Process Plug-in enabled (Y) **Available Algorithm(s):**

D1-SNORMIMD (Scalar Normalize measurements (overwrite identical existing Measurements))
D1-AUTO-NORM (Normalize Measurements)
Value Derivation Algorithms

Business Object (Y) **Business Object**

D1-InitialLoadIMDInterval
D1-InitialLoadIMDScalar
D1-ManualIMDInterval
D1-ManualIMDScalar
D1-EstimationIMDInterval

D1-EstimationIMDScalar
D1-SystemIMDScalar
D1-SystemIMDInterval

1.9 Evaluate if Measurement(s) Exist for Same Period Group: Finalize and Complete IMD

Group: Finalize Measurements

Group: Normalize Measurements

Actor/Role: C2M(MDM)

Description:

C2M(MDM) checks if there exists any finalized measurement whose date/time matches with the current measurement.

Process Plug-in enabled (Y) Available Algorithm(s):

D1-SNORMIMD (Scalar Normalize measurements (overwrite identical existing Measurements))
D1-AUTO-NORM (Normalize Measurements)
Value Derivation Algorithms

Business Object (Y) Business Object

D1-InitialLoadIMDInterval
D1-InitialLoadIMDScalar
D1-ManualIMDInterval
D1-ManualIMDScalar
D1-EstimationIMDInterval
D1-EstimationIMDScalar
D1-SystemIMDScalar
D1-SystemIMDInterval

2.0 Create Normalized Final Measurement(s) Group: Finalize and Complete IMD

Group: Finalize Measurements

Group: Normalize Measurements

Actor/Role: C2M(MDM)

Description:

C2M(MDM) creates normalized measurements if there does not exist finalized measurement matching the same date/time as of the current measurement.

Process Plug-in enabled (Y) Available Algorithm(s):

D1-SNORMIMD (Scalar Normalize measurements (overwrite identical existing Measurements))
--

Business Object (Y)	Business Object	D1-AUTO-NORM (Normalize Measurements)
		Value Derivation Algorithms
		D1-InitialLoadIMDInterval
		D1-InitialLoadIMDScalar
		D1-ManualIMDInterval
		D1-ManualIMDScalar
		D1-EstimationIMDInterval
		D1-EstimationIMDScalar
		D1-SystemIMDScalar
		D1-SystemIMDInterval

2.1 Update Normalized Final Measurement(s) Group: Finalize and Complete IMD

Group: Finalize Measurements

Group: Normalize Measurements

Actor/Role: C2M(MDM)

Description:

C2M(MDM) updates the existing measurement with current measurement.

Process Plug-in enabled (Y) **Available Algorithm(s):**

Business Object (Y)	Business Object	D1-SNORMIMD (Scalar Normalize measurements (overwrite identical existing Measurements))
		D1-AUTO-NORM (Normalize Measurements)
		Value Derivation Algorithms
		D1-EVAL-EXMS (Reevaluate Existing Measurements)

Business Object (Y)	Business Object	D1-InitialLoadIMDInterval
		D1-InitialLoadIMDScalar
		D1-ManualIMDInterval
		D1-ManualIMDScalar
		D1-EstimationIMDInterval
		D1-EstimationIMDScalar
		D1-SystemIMDScalar
		D1-SystemIMDInterval

Configuration required (Y/N) **Entities to Configure:**

Overwrite Identical Existing Measurement(s)

2.2 Validate Normalized Finalized Measurement(s) Group: Finalize and Complete IMD**Actor/Role:** C2M(MDM)**Description:**

C2M(MDM) performs any validations on the normalized data over here. For Scalar Estimate IMD, C2M(MDM) checks if there exists an Initial Measurement Data (IMD) in the Error state where its Measuring Component (MC) has a related MC with a relationship type flag of 'Consumption Check' that is equal to the current IMD's MC. If C2M(MDM) finds such an IMD, it transitions that IMD to the VEE state.

Process Plug-in enabled (Y) **Available Algorithm(s):**

D1-REP-RLIMD (Reprocess Related Initial Measurement Data(s))
--

Business Object (Y) **Business Object**

D1-InitialLoadIMDInterval

D1-InitialLoadIMDScalar

D1-ManualIMDInterval

D1-ManualIMDScalar

D1-EstimationIMDInterval
--

D1-EstimationIMDScalar
--

D1-SystemIMDScalar

D1-SystemIMDInterval

2.3 Create Reconciliation Measurement Group: Finalize and Complete IMD**Actor/Role:** C2M(MDM)**Description:**

C2M(MDM) if identifies a need to correct subsequent measurements then it creates a reconciliation measurement.

Process Plug-in enabled (Y) **Available Algorithm(s):**

D1-CRRCNLIMD (Create Reconciliation IMD)
--

Business Object (Y) **Business Object**

D1-InitialLoadIMDInterval

D1-InitialLoadIMDScalar

D1-ManualIMDInterval

D1-ManualIMDScalar

D1-EstimationIMDInterval
--

D1-EstimationIMDScalar
--

D1-SystemIMDScalar

D1-SystemIMDInterval

2.4 Determine Usage Subscription(s) Linked to Service Point of IMD Group: Finalize and Complete IMD**Actor/Role:** C2M(MDM)**Description:**

C2M(MDM) using the Measuring Component information on the measurement data determines the Device Configuration, Service Point related to the Device Configuration, and finally the Usage Subscription(s) linked to the Service Point.

Process Plug-in enabled (Y) **Available Algorithm(s):**

D1-TRAN-UT (Transition Usage Transaction(s))

Business Object (Y) **Business Object**[D1-InitialLoadIMDInterval](#)[D1-InitialLoadIMDScalar](#)[D1-ManualIMDInterval](#)[D1-ManualIMDScalar](#)[D1-EstimationIMDInterval](#)[D1-EstimationIMDScalar](#)

D1-SystemIMDScalar

D1-SystemIMDInterval

Configuration required (Y/N) **Entities to Configure:**

Device Configuration

Service Points

Usage Subscription(s)

Usage Transaction(s)

2.5 Select Each Usage Transaction of Each Usage Subscription for the Period Group: Finalize and Complete IMD**Actor/Role:** C2M(MDM)**Description:**

C2M(MDM) for each Usage Subscription determines the Usage Transaction(s) that fall within the period of IMD.

Process Plug-in enabled (Y) **Available Algorithm(s):**

D1-TRAN-UT (Transition Usage Transaction(s))

Business Object (Y) **Business Object**[D1-InitialLoadIMDInterval](#)[D1-InitialLoadIMDScalar](#)[D1-ManualIMDInterval](#)[D1-ManualIMDScalar](#)

Configuration required (Y/N) Entities to Configure:

D1-EstimationIMDInterval
D1-EstimationIMDScalar
D1-SystemIMDScalar
D1-SystemIMDInterval
Usage Subscription(s)
Usage Transaction(s)

2.6 Change Usage Transaction State to ‘Subsequent Correction’ Group: Finalize and Complete IMD

Actor/Role: C2M(MDM)

Description:

C2M(MDM), for each Usage Transaction, checks if the Usage information has already been sent out, by checking for ‘Sent’ state, and if yes, it updates the Transition Condition to ‘Sub-sequent Correction’ state.

Process Plug-in enabled (Y) Available Algorithm(s):

Business Object (Y) Business Object

D1-TRAN-UT (Transition Usage Transaction(s))
D1-InitialLoadIMDInterval
D1-InitialLoadIMDScalar
D1-ManualIMDInterval
D1-ManualIMDScalar
D1-EstimationIMDInterval
D1-EstimationIMDScalar
D1-SystemIMDScalar
D1-SystemIMDInterval

2.7 Initiate Meter Reader Remark Group: Finalize and Complete IMD

Actor/Role: C2M(MDM)

Description:

C2M(MDM) initiates processing of Meter Reader Remark.

Process Plug-in enabled (Y) Available Algorithm(s):

Business Object (Y) Business Object

D1-CRE-RR (Create Reader Remark)
D1-InitialLoadIMDScalar

2.8 Clear IMD Control Table and Update IMD to 'Complete' State Group: Finalize and Complete IMD**Actor/Role:** C2M(MDM)**Description:**

C2M(MDM) updates the status of IMD to 'Complete' and updates the most recent measurement date/time.

Process Plug-in enabled (Y) **Available Algorithm(s):**

D1-UPDMSDTTM (Update Most Recent Measurement Date/Time on Scalar MC)
D1-UPD-DTMC (Update Latest Measurement Date/Time on MC with Consumption Sync Service and Measurement Data Foundation)
D1-UDTSIWOCI (Update Latest Date/Time on Subtr Intval MC w/ Maint Read and Cons Sync)

Business Object (Y)**Business Object**

D1-InitialLoadIMDInterval
D1-InitialLoadIMDScalar
D1-ManualIMDInterval
D1-ManualIMDScalar
D1-EstimationIMDInterval
D1-EstimationIMDScalar
D1-SystemIMDScalar
D1-SystemIMDInterval

2.9 Determine Reader Remark Type Group: Create Reader Remark Event(s)**Actor/Role:** C2M(MDM)**Description:**

C2M(MDM) determines Meter Reader Remark type based on the reader remark in the IMD data.

Process Plug-in enabled (Y) **Available Algorithm(s):**

D1-CRE-RR (Create Reader Remark)

Business Object (Y)**Business Object**

D1-InitialLoadIMDScalar

3.0 Initiate Reader Remark Processing Group: Create Reader Remark Event(s)**Actor/Role:** C2M(MDM)**Description:**

C2M(MDM) initiates Meter Reader Remark event processing for those scalar MCs where a Meter Reader remark is available in IMD raw data.

Process Plug-in enabled (Y)	Available Algorithm(s):	D1-CRE-RR (Create Reader Remark)
Business Object (Y)	Business Object	D1-InitialLoadIMDScalar

3.1 Validate and Create Meter Reader Remark Event in Pending State

Actor/Role: C2M(MDM)

Description:

C2M(MDM) validates if the required data is available for creating a Meter Reader Remark.

Further, if the request to create Meter Reader Remark is made by a CSR or Authorized User, C2M(MDM) checks if there exists any other Meter Reader Remark of same type for the device in non-final state. If Meter Reader Remark exists, C2M(MDM) reports an error to the User.

Process Plug-in enabled (Y)	Available Algorithm(s):	D1-DFLT-RRIN (Default Reader Remark Inputs) D1-RRECK-VAL (Reader Remark Existence Check)
Business Object (Y)	Business Object	D1-ReaderRemark

3.2 Populate Meter Reader Remark and Request to Add

Actor/Role: CSR or Authorized User

Description:

CSR or Authorized User populates data to create Meter Reader Remark and requests to add.

3.3 Review Meter Reader Remark Event

Actor/Role: CSR or Authorized User

Description:

CSR or Authorized User reviews Meter Reader Remark created in the system.

3.4 Process 'Pending' State Meter Reader Remarks

Actor/Role: C2M(MDM)

Description:

The volume of Meter Reader Remarks that C2M(MDM) receives with raw meter data is significant. Therefore in most of the cases Meter Reader Remarks in 'Pending' status are being processed by batch process. Business determines how often this batch process should run to process Pending Meter Reader Remarks.

Business Object (Y)	Business Object	D1-ReaderRemark
Customizable process (Y/N)	Process Name	

Device Event MO Periodic Monitor Process (D1-DVEVT)

3.5 Process Meter Reader Remark and Transition to Execute State

Actor/Role: C2M(MDM)

Description:

C2M(MDM) validates if the Meter Reader Remark is eligible for processing and accordingly processes it. If the Reader Remark is not eligible further processing does not take place and Meter Reader Remark is directly completed. However this is not a majority case.

Process Plug-in enabled (Y) **Available Algorithm(s):**

D1-RR-ELIG (Reader Remark Eligibility)

Business Object (Y) **Business Object**

[D1-ReaderRemark](#)

3.6 Request to Execute Meter Reader Remark Event

Actor/Role: CSR or Authorized User

Description:

CSR or Authorized User if wishes to execute the Meter Reader Remark immediately, User can make a request to process it.

Business Object (Y) **Business Object**

[D1-ReaderRemark](#)

3.7 Request to Discard

Actor/Role: CSR or Authorized User

Description:

CSR or Authorized User if wishes to discard the Meter Reader Remark, User can make a request to discard it.

Business Object (Y) **Business Object**

[D1-ReaderRemark](#)

3.8 Transition Meter Reader Remark to Discard State

Actor/Role: C2M(MDM)

Description:

C2M(MDM) transitions Meter Reader Remark to discard state. When a Meter Reader Remark is discarded it still remains in the system.

Business Object (Y) **Business Object**

[D1-ReaderRemark](#)

3.9 Request to Delete

Actor/Role: CSR or Authorized User

Description:

CSR or Authorized User if wishes to delete Meter Reader Remark, User can make a request to delete it.

Business Object (Y)	Business Object	D1-ReaderRemark
---------------------	-----------------	---------------------------------

4.0 Delete Meter Reader Remark

Actor/Role: C2M(MDM)

Description:

C2M(MDM) deletes Meter Reader Remark from the system.

Business Object (Y)	Business Object	D1-ReaderRemark
---------------------	-----------------	---------------------------------

4.1 Create Service Task to Initiate Investigation Group: Create Reader Remark Event(s)

Actor/Role: C2M(MDM)

Description:

C2M(MDM) creates Service Task to monitor Service Point and Initiate Investigation.

Process Plug-in enabled (Y)	Available Algorithm(s):	D1-DVCEVTSIM (Create Service Issue Monitor from Device Event)
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Business Object (Y)	Business Object	D1-ReaderRemark
---------------------	-----------------	---------------------------------

4.2 Determine Processing Method, Generate and Send Message Group: Create Reader Remark Event(s)

Actor/Role: C2M(MDM)

Description:

C2M(MDM) determines subscribers interested in the Reader Remark message, determines processing method, generates message, and sends outbound message to respective subscribers.

Process Plug-in enabled (Y)	Available Algorithm(s):	D1-RRSENDSUB (Send to Subscribers for Reader Remark)
-----------------------------	-------------------------	--

Business Object (Y)	Business Object	D1-ReaderRemark
---------------------	-----------------	---------------------------------

4.3 Receive and Process Message

Actor/Role: Third Party Subscriber Application(s)**Description:**

Third Party Subscriber Application(s) receive and process Meter Reader Remark message.

4.4 Analyze and Work To Do**Actor/Role: CSR or Authorized User****Description:**

CSR or Authorized User analyzes the To Do created and determines the action for the issue. User performs work to address the To Do task.

Process Plug-in enabled (Y) **Available Algorithm(s):**

D1-CRE-RR-TD (Create To Do Entry for Reader Remark)

Business Object (Y) **Business Object**

D1-ReaderRemark

4.5 Create To Do Group: Create Reader Remark Event(s)**Actor/Role: C2M(MDM)****Description:**

C2M(MDM) creates a [To Do entry](#) for the CSR or Authorized User to review the issue, problem and attempt to work on it.

Note: Only one To Do Entry is created for the Exception List of "Open" exceptions that have a severity of "Terminate" or "Issues".

Process Plug-in enabled (Y) **Available Algorithm(s):**

D1-CRE-IMDTD (Create To Do)
D1-CRE-RR-TD (Create To Do Entry for Reader Remark)

Business Object (Y) **Business Object**

D1-InitialLoadIMDInterval
D1-InitialLoadIMDScalar
D1-ManualIMDInterval
D1-ManualIMDScalar
D1-EstimationIMDInterval
D1-EstimationIMDScalar
D1-ReaderRemark

Configuration required (Y/N) **Entities to Configure:**

Exception Type
Exception Severity
To Do Role
To Do Type

4.6 Transition Meter Reader Remark to Complete State

Actor/Role: C2M(MDM)

Description:

C2M(MDM) updates the Meter Reader Remark to complete state.

Process Plug-in enabled (Y) **Available Algorithm(s):**

F1-AT-RQJ (Transition to Default Next Status)

Business Object (Y) **Business Object**

[D1-ReaderRemark](#)

4.7 Analyze Exception Group: Initiate Exception Processing

Actor/Role: C2M(MDM)

Description:

When an exception takes place during VEE Processing, C2M(MDM) analyzes the severity of the exception based on the configuration.

Process Plug-in enabled (Y) **Available Algorithm(s):**

D1-INIT-VEE (Perform VEE for Initial Load IMD)
D1-MNOV-VEE (Perform VEE for Manual IMD)
D1-ESTM-VEE (Perform VEE for Estimation IMD)
D1-TRN-EXCP (Transition on Exception)

Business Object (Y) **Business Object**

[D1-InitialLoadIMDInterval](#)
[D1-InitialLoadIMDScalar](#)
[D1-ManualIMDInterval](#)
[D1-ManualIMDScalar](#)
[D1-EstimationIMDInterval](#)
[D1-EstimationIMDScalar](#)

Configuration required (Y/N) **Entities to Configure:**

Exception Severity for VEE Rules

4.8 Log Error Group: Initiate Exception Processing

Actor/Role: C2M(MDM)

Description:

C2M(MDM) logs error, if it comes across an exception of severity 'Issue' or "Terminate" during VEE processing.

Process Plug-in enabled (Y) **Available Algorithm(s):**

D1-INIT-VEE (Perform VEE for Initial Load IMD)

Business Object (Y)	Business Object	D1-MNOV-VEE (Perform VEE for Manual IMD)
		D1-ESTM-VEE (Perform VEE for Estimation IMD)
		D1-TRN-EXCP (Transition on Exception)
		D1-InitialLoadIMDInterval
		D1-InitialLoadIMDScalar
		D1-ManualIMDInterval
		D1-ManualIMDScalar
		D1-EstimationIMDInterval
		D1-EstimationIMDScalar
Configuration required (Y/N)	Entities to Configure:	Exception Severity for VEE Rules

4.9 Highlight Info Group: Initiate Exception Processing

Actor/Role: C2M(MDM)

Description:

C2M(MDM) highlights information, if it comes across an exception of severity 'Info' during VEE Processing.

Process Plug-in enabled (Y)	Available Algorithm(s):	D1-INIT-VEE (Perform VEE for Initial Load IMD)
		D1-MNOV-VEE (Perform VEE for Manual IMD)
		D1-ESTM-VEE (Perform VEE for Estimation IMD)
		D1-TRN-EXCP (Transition on Exception)
Business Object (Y)	Business Object	D1-InitialLoadIMDInterval
		D1-InitialLoadIMDScalar
		D1-ManualIMDInterval
		D1-ManualIMDScalar
		D1-EstimationIMDInterval
		D1-EstimationIMDScalar
Configuration required (Y/N)	Entities to Configure:	Exception Severity for VEE Rules

5.0 Update IMD to 'Exception' State

Actor/Role: C2M(MDM)

Description:

C2M(MDM) automatically updates IMD status to 'Exception'

Process Plug-in enabled (Y) **Available Algorithm(s):**

F1-AT-RQJ (Transition to Default Next Status)
--

Business Object (Y) **Business Object**

D1-InitialLoadIMDInterval

D1-InitialLoadIMDScalar

D1-ManualIMDInterval

D1-ManualIMDScalar

D1-EstimationIMDInterval
--

D1-EstimationIMDScalar
--

Configuration required (Y/N) **Entities to Configure:**

Exception Severity

5.1 Analyze Error and Work To Do

Actor/Role: CSR or Authorized User

Description:

CSR or Authorized User analyzes the error logged and respective To Do created to determine the corrective action. User performs work to resolve the error.

Process Plug-in enabled (Y) **Available Algorithm(s):**

D1-CRE-IMDTD (Create To Do)

Business Object (Y) **Business Object**

D1-InitialLoadIMDInterval

D1-InitialLoadIMDScalar

D1-ManualIMDInterval

D1-ManualIMDScalar

D1-EstimationIMDInterval
--

D1-EstimationIMDScalar
--

5.2 Request to 'Discard'

Actor/Role: CSR or Authorized User

Description:

When the IMD is in 'Exception' state and CSR or Authorized User decides that the IMD cannot be used, can manually make request to discard it.

Business Object (Y) **Business Object**

D1-InitialLoadIMDInterval

D1-InitialLoadIMDScalar
D1-ManualIMDInterval
D1-ManualIMDScalar
D1-EstimationIMDInterval
D1-EstimationIMDScalar

5.3 Complete To Do(s)**Actor/Role:** C2M(MDM)**Description:**

C2M(MDM) find all non-completed To Do entries and completes them before reprocessing.

Process Plug-in enabled (Y) **Available Algorithm(s):**

D1-COMP-TD (Complete To Do Entries for Initial Measurement Data)
--

Business Object (Y) **Business Object**

D1-InitialLoadIMDInterval
D1-InitialLoadIMDScalar
D1-ManualIMDInterval
D1-ManualIMDScalar
D1-EstimationIMDInterval
D1-EstimationIMDScalar

5.4 Update IMD to 'Discard' State**Actor/Role:** C2M(MDM)**Description:**

C2M(MDM) updates IMD to 'Discard' state indicating that it cannot be used further. However it remains in the system.

Business Object (Y) **Business Object**

D1-InitialLoadIMDInterval
D1-InitialLoadIMDScalar
D1-ManualIMDInterval
D1-ManualIMDScalar
D1-EstimationIMDInterval
D1-EstimationIMDScalar

5.5 Request to 'Force Complete'**Actor/Role:** CSR or Authorized User

Description:

When the IMD is in 'Exception' state and CSR or Authorized User decides that the IMD should be 'Completed' despite of open Exceptions and corrections to be performed, User can manually make request to Force Complete it.

Business Object (Y)**Business Object**

D1-InitialLoadIMDInterval
D1-InitialLoadIMDScalar
D1-ManualIMDInterval
D1-ManualIMDScalar
D1-EstimationIMDInterval
D1-EstimationIMDScalar

5.6 Update IMD to 'Force Complete' State

Actor/Role: C2M(MDM)

Description:

C2M(MDM) updates IMD to 'Force Complete' state.

Business Object (Y)**Business Object**

D1-InitialLoadIMDInterval
D1-InitialLoadIMDScalar
D1-ManualIMDInterval
D1-ManualIMDScalar
D1-EstimationIMDInterval
D1-EstimationIMDScalar

5.7 Request to 'Perform VEE'

Actor/Role: CSR or Authorized User

Description:

When the IMD is in Exception state or deferred State and User could resolve the exception, User can decide to manually invoke VEE reprocessing immediately for the IMD by making a request to 'Perform VEE' to the system.

Business Object (Y)**Business Object**

D1-InitialLoadIMDInterval
D1-InitialLoadIMDScalar
D1-ManualIMDInterval
D1-ManualIMDScalar
D1-EstimationIMDInterval

D1-EstimationIMDScalar
--

5.8 Update IMD to ‘VEE’ State and Continue Processing Group: Automated Retry Process

Actor/Role: C2M(MDM)

Description:

C2M(MDM) updates the IMD to VEE state and continues re-processing.

Process Plug-in enabled (Y) Available Algorithm(s):

D1-IMD-RETRY (Retry Initial Measurement Data Processing)
--

Business Object (Y) Business Object

D1-InitialLoadIMDInterval
D1-InitialLoadIMDScalar
D1-ManualIMDInterval
D1-ManualIMDScalar
D1-EstimationIMDInterval
D1-EstimationIMDScalar

5.9 Evaluate Criteria to Run Automated Retry Process Group: Automated Retry Process

Actor/Role: C2M(MDM)

Description:

Batch process is configured for this automated retry process. Batch parameters govern whether the processing is further restricted by batch code, business object, status, etc. This batch process invokes monitoring rules associated with the current state of IMD.

Business Object (Y) Business Object

D1-InitialLoadIMDInterval
D1-InitialLoadIMDScalar
D1-ManualIMDInterval
D1-ManualIMDScalar
D1-EstimationIMDInterval
D1-EstimationIMDScalar

Configuration required (Y/N) Entities to Configure:

Automated Retry
Retry until Date/Time

6.0 Identify IMD in ‘Exception’ State Group: Automated Retry Process

Actor/Role: C2M(MDM)

Description:

Batch Process continuously monitors to identify the IMD in 'Exception' state to start reprocessing. Currently, the Batch process used for reprocessing the IMDs in 'VEE Exception' is IMD Monitor – Physical Devices.

Business Object (Y)**Business Object**

D1-InitialLoadIMDInterval
D1-InitialLoadIMDScalar
D1-ManualIMDInterval
D1-ManualIMDScalar
D1-EstimationIMDInterval
D1-EstimationIMDScalar

Configuration required (Y/N)**Entities to Configure:**

Automated Retry
Retry until Date/Time

Customizable process (Y/N)**Process Name**

IMD Monitor – Physical Devices (D1-IMD)

6.1 Validate Meter Multiplier, Unit of Measure, Device, SP, US Status Group: Perform VEE Rules for a VEE Group (Initial Load, Manual and Estimations)

Group: VEE Rule(s)**Group: Common Rule(s)****Actor/Role: C2M(MDM)****Description:**

Common rules are rules that can be applicable to an IMD irrespective of the type of meter i.e. Scalar or Interval. The Meter Multiplier Rule ensures that the Meter Multiplier value of the current Measurement Data matches the Meter Multiplier value stored on the Measuring Component. The Unit of Measure rule will check to ensure that the Unit-of-Measure (UOM) of the incoming data matches the UOM specified on the Measuring Component. C2M(MDM) also ensures IMD exists for sibling MCs. The inactive measurement check rule ensures that no IMD is received for a state where a device is disconnected, install event is not present, or there is no active Usage Subscription.

Process Plug-in enabled (Y/N)**Available Algorithm(s):**

D1-INIT-VEE (Perform VEE for Initial Load IMD)
D1-MNOV-VEE (Perform VEE for Manual IMD)
D1-ESTM-VEE (Perform VEE for Estimation IMD)
D2-REGMULCHK (Multiplier Check)
D2-UOMCHK (Unit of Measure Check)
D2-ENSIMDMC (Ensure Initial Measurement Exists for Sibling Measuring Components)

Business Object (Y/N)	Business Object	D2-VRFYTRES (Verify Threshold for Check Disconnected Device)
		D2-INACTVCHK (Inactive Measurement Check)
Configuration required (Y/N)	Entities to Configure:	D2-RegisterMultiplierCheck
		D2-UOMCheck
		D2-EnsureIMDExistsForSibling
		D2-InactiveMeasurementCheck
Configuration required (Y/N)	Entities to Configure:	Multiplier Check
		Unit of Measure
		VEE Rule for Inactive Measurement Check

6.2 Analyze Existing Measurement with Same Date/Time as Raw Data Group: Perform VEE Rules for a VEE Group (Initial Load, Manual and Estimations)

Group: VEE Rule(s)

Group: Common Rule(s)

Actor/Role: C2M(MDM)

Description:

C2M(MDM) system analyses if there exists any existing Measurement in the same period as of the current measurement. Further, it analyses if the existing measurement is system read or manually edited.

Process Plug-in enabled (Y/N) **Available Algorithm(s):**

Business Object (Y/N)	Business Object	D1-INIT-VEE (Perform VEE for Initial Load IMD)
		D1-MNOV-VEE (Perform VEE for Manual IMD)
		D1-ESTM-VEE (Perform VEE for Estimation IMD)
		D2-VLMSRCOND (Final Measurement Replacement Check)
		D2-VALFINRPL (Final Measurement Replacement - Validation)
Business Object (Y/N)	Business Object	D2-FinalMeasurementValidation

6.3 Reject IMD Group: Perform VEE Rules for a VEE Group (Initial Load, Manual and Estimations)

Group: VEE Rule(s)

Group: Common Rule(s)

Actor/Role: C2M(MDM)

Description:

When the measurement exists with same date/time as the raw data, C2M(MDM) validates the applicability of replacement, and determines if the raw reading will be rejected completely or rejected only if the existing measurement is manually user-edited. Further, C2M(MDM) also has functionality to validate rejection based on Condition codes, Value change tolerance, Percentage change tolerance or combination of these.

Process Plug-in enabled (Y/N) **Available Algorithm(s):**

D1-INIT-VEE (Perform VEE for Initial Load IMD)
D1-MNOV-VEE (Perform VEE for Manual IMD)
D1-ESTM-VEE (Perform VEE for Estimation IMD)
D2-VLMSRCOND (Final Measurement Replacement Check)
D2-VALFINRPL (Final Measurement Replacement - Validation)

Business Object (Y/N) **Business Object**

D2-FinalMeasurementValidation

Configuration required (Y/N) **Entities to Configure:**

Replacement Handling Method
VEE Rule for Final Measurement Replacement

6.4 Validate Interval Size Group: Perform VEE Rules for a VEE Group (Initial Load, Manual and Estimations)

Group: VEE Rule(s)

Group: Common Rule(s)

Actor/Role: C2M(MDM)

Description:

C2M(MDM) checks to ensure that the Interval Size of the Initial Measurement Data matches the defined value in the Measuring Component Type.

Process Plug-in enabled (Y/N) **Available Algorithm(s):**

D1-INIT-VEE (Perform VEE for Initial Load IMD)
D2-INTSIZVAL (Interval Size Validation)

Business Object (Y/N) **Business Object**

D1-InitialLoadIMDInterval
D2-IntervalSizeValidation (Interval Size Validation)

Configuration required (Y/N) **Entities to Configure:**

VEE Group and Rules
SPI on Measuring Component

6.5 Check Interval Spike Group: Perform VEE Rules for a VEE Group (Initial Load, Manual and Estimations)

Group: VEE Rule(s)

Group: Common Rule(s)

Actor/Role: C2M(MDM)**Description:**

C2M(MDM) examines interval data to identify intervals with suspiciously high usage relative to surrounding intervals.

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D1-INIT-VEE (Perform VEE for Initial Load IMD)
		D2-INTSPKCHK (Interval Spike Check)
Business Object (Y/N)	Business Object	D1-InitialLoadIMDInterval
		D2-IntervalSpikeCheck (Interval Spike Check)
Configuration required (Y/N)	Entities to Configure:	Spike Tolerance Values

6.6 Validate Consecutive Intervals Group: Perform VEE Rules for a VEE Group (Initial Load, Manual and Estimations)

Group: VEE Rule(s)

Group: Common Rule(s)

Actor/Role: C2M(MDM)**Description:**

C2M(MDM) validates the incoming IMD for the presence of consecutive sets of measurement values or condition codes or both that is configured. This validation aids to find faulty meters that are reporting consecutive outage codes, zero measurements, or negative values. It can also be used by water utilities to identify leaks based on the interval never reaching zero.

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D2-VALCONSIN (Validate Consecutive Interval Configuration data)
		D2-CONSINTRV (Consecutive Interval Check)
Business Object (Y/N)	Business Object	D2-ConsecutiveIntervalCheck
Configuration required (Y/N)	Entities to Configure:	D2-VALCONSIN (Validate Consecutive Interval Configuration data)

6.7 Estimate Scalar Read Group: Perform VEE Rules for a VEE Group (Initial Load, Manual and Estimations)

Group: VEE Rule(s)

Group: Estimation Rule(s)

Actor/Role: C2M(MDM)**Description:**

C2M(MDM) estimate Scalar value for Estimate IMD Scalar using various estimation techniques.

Process Plug-in enabled (Y/N) **Available Algorithm(s):**

D1-ESTM-VEE (Perform VEE for Estimation IMD)
D2-SCAPROEST (Estimate Scalar Based on Profile Data)
D2-SCACALINT (Scalar Calculation from Interval)
D2-SCALAREST (Estimate Scalar Amount Based on Historical Data)

Business Object (Y/N) **Business Object**

D1-EstimationIMDScalar
D2-ScalarProfileEstimation
D2-ScalarCalcFromInterval
D2-ScalarEstimation

6.8 Analyze IMD Type Group: Perform VEE Rules for a VEE Group (Initial Load, Manual and Estimations)

Group: VEE Rule(s)

Group: Estimation Rule(s)

Actor/Role: C2M(MDM)

Description:

C2M(MDM) system analyses if the IMD is an Estimate IMD or Manual IMD to take further course of Estimation process.

Process Plug-in enabled (Y/N) **Available Algorithm(s):**

D1-INIT-VEE (Perform VEE for Initial Load IMD)
D1-MNOV-VEE (Perform VEE for Manual IMD)
D1-ESTM-VEE (Perform VEE for Estimation IMD)

Business Object (Y/N) **Business Object**

D1-ManualIMDInterval
D1-ManualIMDScalar
D1-EstimationIMDInterval
D1-EstimationIMDScalar

6.9 Estimate Gaps in IMD Group: Perform VEE Rules for a VEE Group (Initial Load, Manual and Estimations)

Group: VEE Rule(s)

Group: Estimation Rule(s)

Actor/Role: C2M(MDM)

Description:

C2M(MDM) proceeds forward to estimate the gaps in the Initial Load IMD and the Manual IMD. This estimation is invoked manually using various types of estimation techniques for actual estimation.

Process Plug-in enabled (Y/N) **Available Algorithm(s):**

D1-INIT-VEE (Perform VEE for Initial Load IMD)
D1-MNOV-VEE (Perform VEE for Manual IMD)
D2-INTINTEST (Interval Interpolation Estimation)
D2-INTAVGEST (Interval Averaging Estimation)
D2-INTPROEST (Interval Profile Estimation)
D2-INTADJSCA (Interval Adjustment Based on Related Scalar Measurement)

Business Object (Y/N) **Business Object**

D1-InitialLoadIMDInterval
D1-ManualIMDInterval
D2-IntervalInterpolationEst
D2-IntervalAveragingEstimation
D2-IntervalProfileEstimation
D2-IntervalAdjustmentFrmScalar

Configuration required (Y/N) **Entities to Configure:**

VEE Group for Estimation

7.0 Estimate Missing IMD for Period Group: Perform VEE Rules for a VEE Group (Initial Load, Manual and Estimations)

Group: VEE Rule(s)

Group: Estimation Rule(s)

Actor/Role: C2M(MDM)

Description:

C2M(MDM) validates if the gap between the last continuous reading and current IMD is more than a configured period, and if so it raises an exception otherwise it will fill the gap on a real-time with estimated IMDs. For any gaps that are not filled, C2M(MDM) uses periodic estimation to fill those gaps.

Process Plug-in enabled (Y/N) **Available Algorithm(s):**

D1-ESTM-VEE (Perform VEE for Estimation IMD)
D2-INTINTEST (Interval Interpolation Estimation)
D2-INTAVGEST (Interval Averaging Estimation)
D2-INTPROEST (Interval Profile Estimation)
D2-INTADJSCA (Interval Adjustment Based on Related Scalar Measurement)
D2-CREESTVAL (Create Estimation IMD Rule - Validation)

Business Object (Y/N)	Business Object	D2-CREESTIMD (Create Estimation IMD Rule)
		D1-EstimationIMDInterval
		D2-IntervalInterpolationEst
		D2-IntervalAveragingEstimation
		D2-IntervalProfileEstimation
		D2-IntervalAdjustmentFrmScalar
Configuration required (Y/N)	Entities to Configure:	D2-CreateEstimationIMDRule
		VEE Rule for Create IMD for gap

7.1 Validate Prolonged Estimation Group: Perform VEE Rules for a VEE Group (Initial Load, Manual and Estimations)

Group: VEE Rule(s)

Group: Estimation Rule(s)

Actor/Role: C2M(MDM)

Description:

C2M(MDM) validates to check if the estimation of measurements has been undergoing beyond configured number of days. If so it raises an exception and can also lead to creation of Service Investigative Order (SIO).

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D2-PROESTVAL (Prolonged Estimation Check - Validation)
		D2-PROESTCHK (Prolonged Estimation Check)
Business Object (Y/N)	Business Object	D2-ProlongedEstimationCheck
Configuration required (Y/N)	Entities to Configure:	VEE Rule for Prolonged Estimation Check

7.2 Check High/Low and/or Dynamic Comparison Rule Group: Perform VEE Rules for a VEE Group (Initial Load, Manual and Estimations)

Group: VEE Rule(s)

Group: Consumption Rule(s)

Actor/Role: C2M(MDM)

Description:

C2M(MDM) checks the Initial Measurement for high or low consumption. “High Tolerance” or “High Tolerance Factor” and “Low Tolerance” or “Low Tolerance Factor” is defined against which the check is performed. Further, on an advanced level, C2M(MDM) also provides functionality to compare and check value derived based on the measurement to a value derived statistically based on the history values. This helps Utilities to look for unusual usage patterns.

Process Plug-in enabled (Y/N) **Available Algorithm(s):**

D1-INIT-VEE (Perform VEE for Initial Load IMD)
D2-HILO-CHK (High/Low Check)
D2-DYNCOMVAL (Dynamic Comparison - Validation)
D2-DYNCOMCHK (Dynamic Comparison Check)

Business Object (Y/N) **Business Object**

D1-InitialLoadIMDInterval
D1-InitialLoadIMDSector
D2-VEERuleHighLowCheck (High/Low Check)
D2-DynCompValidation

Configuration required (Y/N) **Entities to Configure:**

VEE Group and Rules
High Tolerance or Tolerance Factor
Low Tolerance or Tolerance Factor
Historical Percentage Required
Historical Pre-Window
Historical Post-Window
Comparison Method (Average / Max)

7.3 Check for Negative Consumption Group: Perform VEE Rules for a VEE Group (Initial Load, Manual and Estimations)

Group: VEE Rule(s)

Group: Consumption Rule(s)

Actor/Role: C2M(MDM)

Description:

C2M(MDM) will check if consumption has any negative values.

Process Plug-in enabled (Y/N) **Available Algorithm(s):**

D1-INIT-VEE (Perform VEE for Initial Load IMD)
D2-NCON-CHK (Negative Consumption Check)

Business Object (Y/N) **Business Object**

D1-InitialLoadIMDInterval
D1-InitialLoadIMDSector
D2-NegativeConsumptionCheck (Negative Consumption Check)

Configuration required (Y/N) **Entities to Configure:**

VEE Group and Rule

7.4 Perform Sum Check Group: Perform VEE Rules for a VEE Group (Initial Load, Manual and Estimations)

Group: VEE Rule(s)
Group: Consumption Rule(s)

Actor/Role: C2M(MDM)
Description:
C2M(MDM) evaluates whether consumption for the current Initial Measurement Data is within a tolerance of the sum of the consumption during the same period for any measuring components related to the current one.

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D1-INIT-VEE (Perform VEE for Initial Load IMD)
		D2-SUM-CHK (Sum Check)
Business Object (Y/N)	Business Object	D1-InitialLoadIMDInterval
		D1-InitialLoadIMDScalar
		D2-SumCheck (Sum Check)
Configuration required (Y/N)	Entities to Configure:	Percentage Tolerance
		Tolerance
		Meter Multiplier Tolerance

7.5 Perform Zero Consumption Check Group: Perform VEE Rules for a VEE Group (Initial Load, Manual and Estimations)

Group: VEE Rule(s)
Group: Consumption Rule(s)

Actor/Role: C2M(MDM)
Description:
C2M(MDM) evaluates if there exists zero consumption or an outage occurred for the current Initial Measurement Data within the IMD's period.

Process Plug-in enabled (Y/N)	Available Algorithm(s):	D1-INIT-VEE (Perform VEE for Initial Load IMD)
		D2-ZEROCNCHK (Zero Consumption Check)
		D2-OACHKVAL (Zero Consumption Outage Activity Validation)
Business Object (Y/N)	Business Object	D1-InitialLoadIMDInterval
		D1-InitialLoadIMDScalar

Configuration required (Y/N) Entities to Configure:

D2-ZeroConsumptionCheck
Outage Bottom Range Condition
Outage Top Range Condition

7.6 Review Deferred IMD(s)

Actor/Role: CSR or Authorized User

Description:

CSR or Authorized User reviews IMD(s) in 'Defer' state.

7.7 Request to Remove

Actor/Role: CSR or Authorized User

Description: When the IMD is in 'Deferred' state and when CSR or Authorized User decides that the IMD can be removed, CSR or Authorized User can manually make [request to remove](#) it.

Business Object (Y) Business Object

D1-InitialLoadIMDInterval
D1-InitialLoadIMDScalar
D1-ManualIMDInterval
D1-ManualIMDScalar

7.8 Update IMD to 'Remove' State

Actor/Role: C2M(MDM)

Description: C2M(MDM) updates IMD to 'Remove' state.

Process Plug-in enabled (Y/N) Available Algorithm(s):

F1-AT-RQJ (Transition to Default Next Status)
--

Business Object (Y) Business Object

D1-InitialLoadIMDInterval
D1-InitialLoadIMDScalar
D1-ManualIMDInterval
D1-ManualIMDScalar

7.9 Process 'Defer' State IMDs

Actor/Role: C2M(MDM)

Description:

C2M(MDM) processes IMD(s) isolated in 'Deferred' status of the various IMD business objects. The deferred status is used to isolate IMDs for older time periods. This helps to trap scenarios where a device has suddenly sent IMDs covering a large window of time which will slow down core IMD processing.

Business Object (Y)	Business Object
	D1-InitialLoadIMDInterval
	D1-InitialLoadIMDScalar
	D1-ManualIMDInterval
	D1-ManualIMDScalar
	D1-EstimationIMDInterval
	D1-EstimationIMDScalar
	D1-SystemIMDScalar
	D1-SystemIMDInterval
Customizable process (Y/N)	Process Name
	D1-IMDDF - IMD Monitor - Deferred IMDs

Test Assets related to the Current Process

Testing Asset Sr.No	Testing Asset-Flows	No Of Data sets
1	URM-C2M-4212-001-Perform-VEE-For-Manual-Scalar-IMD	12
2	URM-C2M-4212-002-Perform-VEE-For-Manual-Interval-IMD	12
3	URM-C2M-4212-003-Perform-VEE-For-Initial-Load-Scalar-IMD	12
4	URM-C2M-4212-004-Perform-VEE-For-Initial-Load-Interval-IMD	12

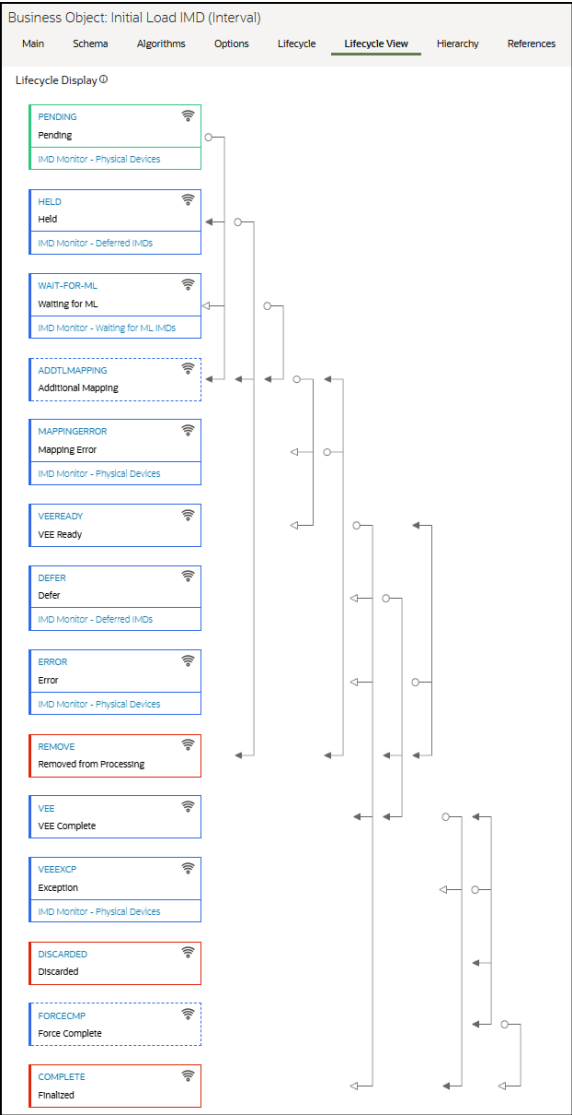
Document Control

Change Record

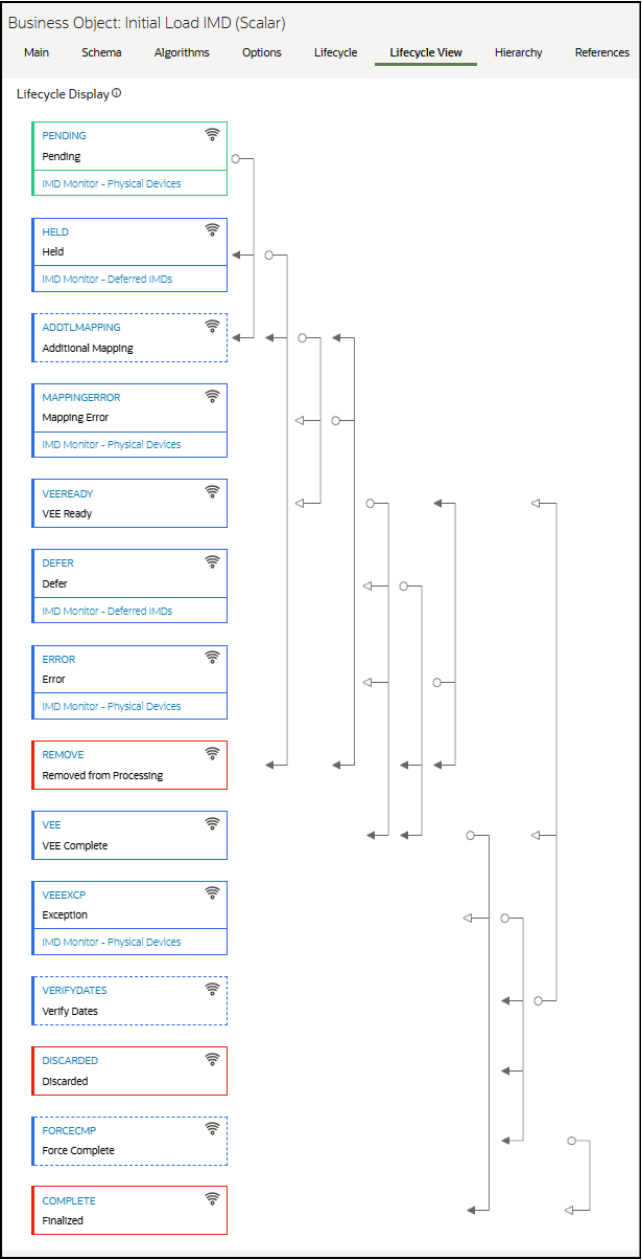
Date	Author	Version	Change Reference
9/13/2011	Srinivas Rao Kanteti	1	Initial Draft
5/4/2015	Srinivas Rao Kanteti	2	Revision (Included Meter Reader Remark Process)
6/19/2015	Srinivas Rao Kanteti	3	Revision (Updated VEE Process)
8/24/2015	Srinivas Rao Kanteti	4	Restructured VEE Rules Page based in feedback
11/17/2015	Walter Wolanski		Review
11/19/2015	Galina Polonsky		Review, Approved
6/5/2019	Satya Kalavala		Updated format for v2.7
10/08/2024	Kunal Nerkar		Updated document and Visio for C2M v2.9
11/15/2024	Ashish Shukla		Reviewed
12/18/2024	Galina Polonsky		Review, Approved

Attachments

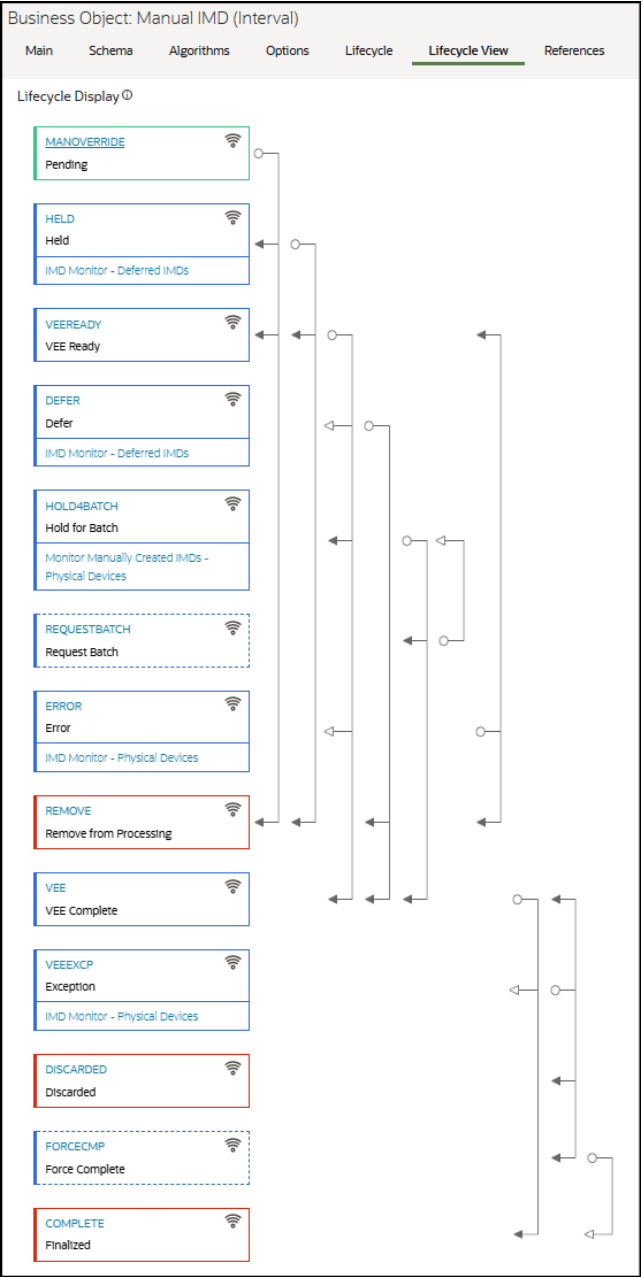
Initial Load IMD Interval Lifecycle



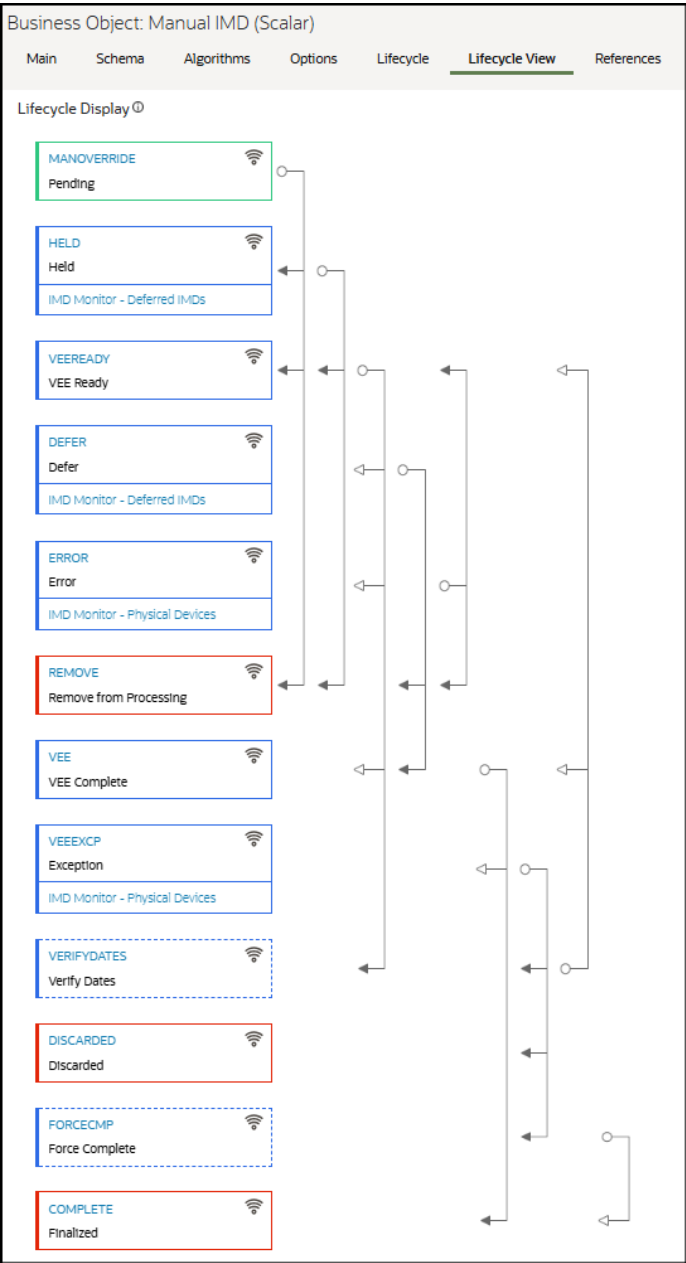
Initial Load IMD Scalar Lifecycle



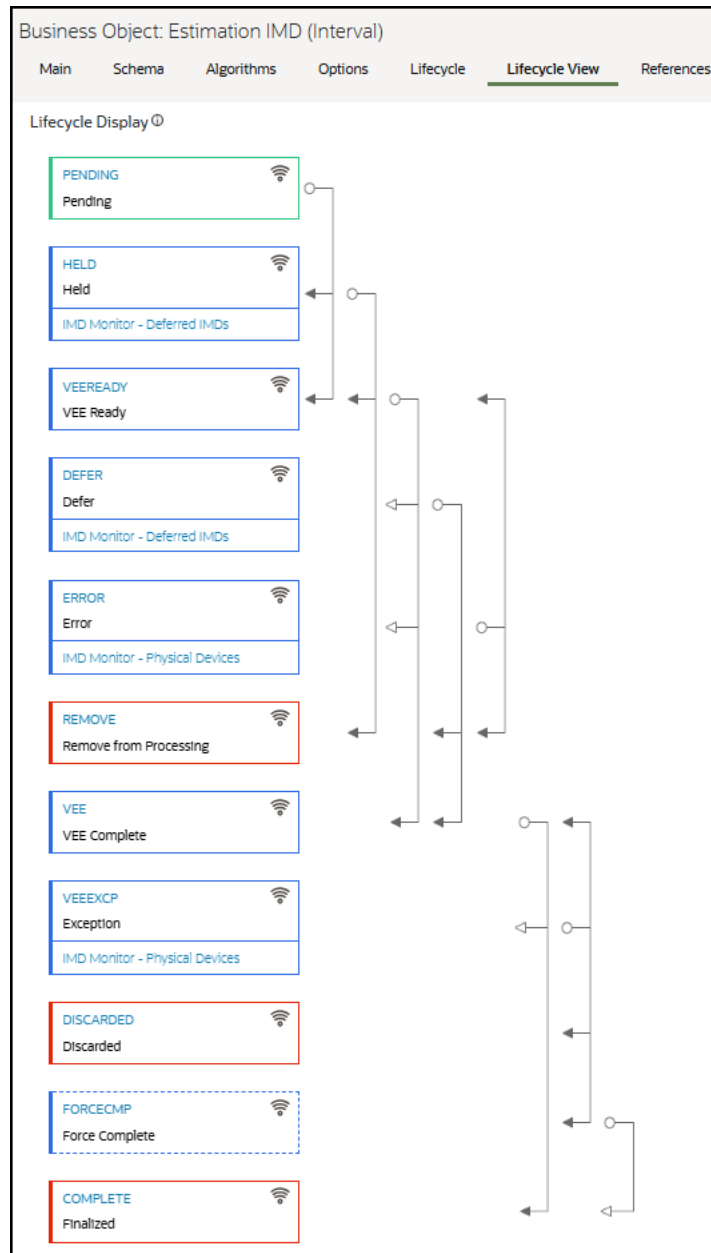
Manual IMD Interval Lifecycle



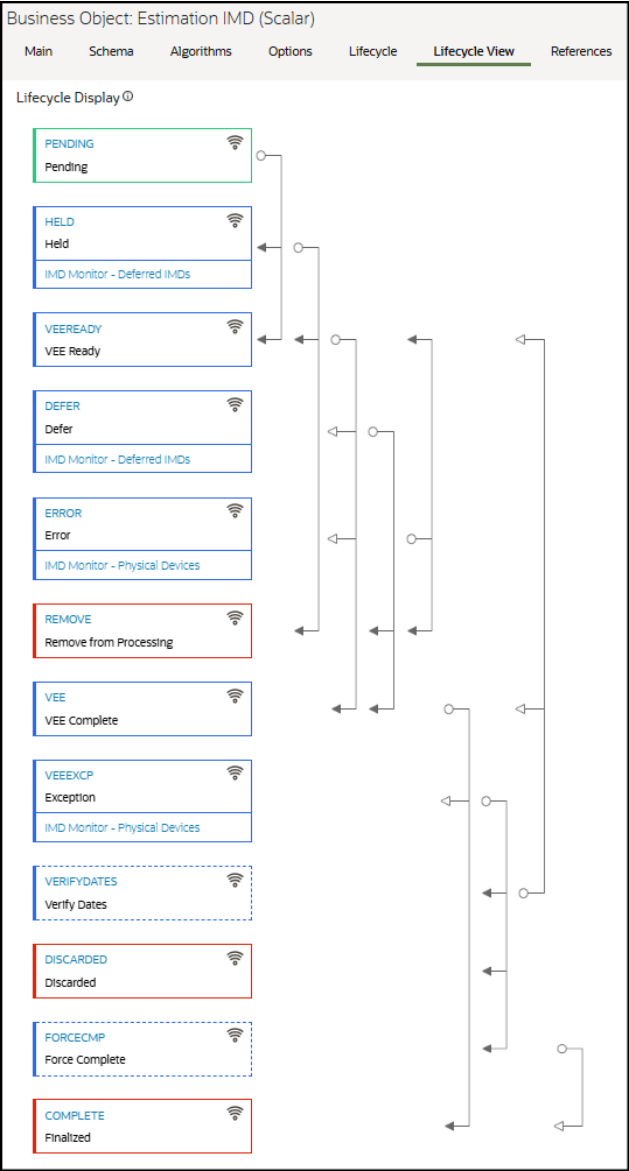
Manual IMD Scalar Lifecycle



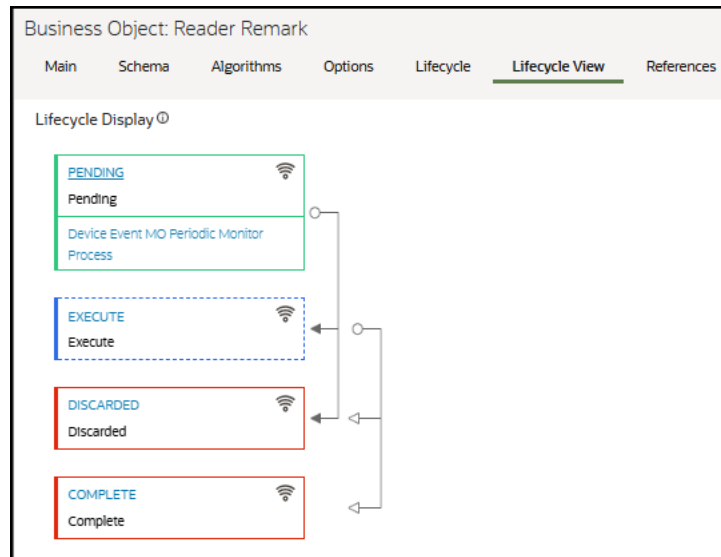
Estimate IMD Interval Lifecycle



Estimate IMD Scalar Lifecycle



Reader Remark Lifecycle



VEE Group for a MC

Measuring Component: W- AMTR-001 / Water Interval CCF - 60 min

AddSearchBookmarkRefresh

MainLog

Measuring Component

Main

Information

W- AMTR-001 / Water Interval CCF - 60 min

Measuring Component

Type

Water Interval CCF - 60 min

Device Configuration

Water Smart Meter / Effective Date/Time:12-01-2018 7:07:10 PST / Water Auto Read - CCF - 60 min Intervals / 2 Measuring Component(s) / Active

Consumption Reference Measuring Component

How To Use

Additive

Number of Digits Left

5

Number of Digits Right

4

Channel Multiplier

1.000000

Processing Information

Most Recent Read Date/Time

04-24-2019 0:00:00 PDT

Last Contiguous Read Date/Time

04-24-2019 0:00:00 PDT

Most Recent Non Estimated Read Date/Time

04-24-2019 0:00:00 PDT

Related Statistics

Related Statistics Measuring Components

Water Channel Statistics - Last Month / W- AMTR-001 / Water Interval CCF - 60 min

Water Channel Statistics - Same Month Last Year / W- AMTR-001 / Water Interval CCF - 60 min

Water Channel Statistics - Prior 13 Months / W- AMTR-001 / Water Interval CCF - 60 min

Record Actions

EditDelete

Record Information

Related Projection Measuring Components

Related Projection Measuring Components

VEE Groups

Manual Override: Validations - Water Scalar - Residential

Fallback VEE Groups

Enable ML Based Validation

Initial Load

Streaming Initial Load

Estimation

Projection

Initial Measurement Data History

Initial Measurement Data

1	04-25-2019 0:00:00 PDT - 04-26-2019 0:00:00 PDT / Exception
2	04-24-2019 0:00:00 PDT - 04-25-2019 0:00:00 PDT / Exception
3	04-23-2019 0:00:00 PDT - 04-24-2019 0:00:00 PDT / Finalized
4	04-23-2019 0:00:00 PDT - 04-24-2019 0:00:00 PDT / Exception
5	04-22-2019 0:00:00 PDT - 04-23-2019 0:00:00 PDT / Finalized
6	04-22-2019 0:00:00 PDT - 04-23-2019 0:00:00 PDT / Finalized

4.2.1.2 C2M.Manage VEE and VEE Exceptions

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VEE Rules in a VEE Group

VEE Group: Validations - Water Scalar - Residential

Add

Search

Bookmark

Refresh

Main

VEE Group

VEE Group

Main

VEE Group

VAL-W-S-RES

Description

Validations - Water Scalar - Residential

Detailed Description

This group holds validation rules and should typically be invoked by a parent VEE Group.

Record Actions

Edit

Duplicate

Delete

Record Information

VEE Rules List

Add Rule

Resequence Rules

	VEE Rule / Eligibility Criteria	Category	Referenced VEE Group	VEE Group Matrix (Factor)
1	Inactive Measurement Check (SIM)	Validation Rules		
2	Zero Consumption (SIM)	Validation Rules		
3	Negative Consumption Check	Validation Rules		
4	High / Low Consumption Check	Validation Rules		
5	Exception Handler (create specific To Do)	Validation Rules		

Referencing VEE Rules List

	VEE Rule / Eligibility Criteria	Category	Referenced VEE Group	VEE Group Matrix (Factor)
--	---------------------------------	----------	----------------------	---------------------------

Referencing VEE Group Factors List

	VEE Group Matrix (Factor)	Characteristic Type	Characteristic Value
1	Validation Groups - Water Scalar Standard	Service Point Type for VEE Groups and Profile	Water Residential

Referencing Measuring Component Type List

	Measuring Component
--	---------------------

Referencing Measuring Components List

	Measuring Component
1	W- AMTR-001 / Water Interval CCF - 60 min

VEE Rule Lifetime

VEE Rule: Spike Check

SearchBookmarkRefresh

Main

VEE Rule

Show All Rules

Interval Spike Check

VEE Group: Validations - Water Interval - Residential
VEE Rule: VAL-W-I-RES-SPIKE
Sequence: 7
Description: Spike Check
Detailed Description: This Spike Check has a higher spike percentage because it's for residential data that often doesn't have high demand. The condition code of "Spike - Treat As Missing" has been used to enable automatic estimation over the spike data.
Category: Validation Rules
Start Date: 01-01-2010
End Date:
Minimum Number of Intervals: 10
Spike Check Method: Entire Interval Cut
Spike Tolerance (%): 700
Check Historical Data Upon Failure: Yes
Historical Check Days: 30
Condition Value to Interval Spike(s): Spike - Treat As Missing

Record Actions

EditDuplicateDelete

Record Information

Insufficient Input Data Exception

Exception Type: Insufficient Input Data
Exception Severity: Information

Interval Spike Check Exception

Exception Type: Interval Spike Detected
Exception Severity: Information

Eligibility Criteria List

Add

Filters: VEE Group VAL-W-I-RES , VEE Rule VAL-W-I-RES-SPIKE

Referred VEE Group for VEE Rule

VEE Group: Water Interval - Initial Load

AddSearchBookmarkRefresh

Main

VEE Group

Main

VEE Group: ASSIGN-W-I-INIT-LOAD
Description: Water Interval - Initial Load
Detailed Description: This group is expected to be assigned to Measuring Components.

Record Actions

EditDuplicateDelete

Record Information

VEE Rules List

Add RuleResequence Rules

	VEE Rule / Eligibility Criteria	Category	Referenced VEE Group	VEE Group Matrix (Factor)
1	Invoke Validation Rules: Interval Standard	Validation Rules		Validation Groups - Water Interval Standard
2	Invoke Estimation Rules: Interval Standard	Estimation Rules	Estimations - Water Interval - Primary	
3	Invoke Validation Rules: Interval Common	Validation Rules	Validations - Water Interval Common	

Referencing VEE Rules List

Referencing VEE Group Factors List

4.2.1.2 C2M.Manage VEE and VEE Exceptions

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VEE Group Matrix for a VEE Rule

VEE Rule: Invoke Validation Rules: Interval Standard

Search

Bookmark

Refresh

Main

VEE Rule

Show All Rules

Main

VEE GroupWater Interval - Initial Load

VEE RuleASSIGN-W-I-INIT-LOAD-VIS

Sequence1

DescriptionInvoke Validation Rules: Interval Standard

Detailed Description

CategoryValidation Rules

Start Date01-01-2010

End Date

Record Actions

EditDuplicateDelete

Record Information

Insufficient Input Data Exception

Exception TypeInsufficient Input Data

Exception SeverityInformation

VEE Group Matrix (Factor)

VEE Group Matrix (Factor)Validation Groups - Water Interval Standard

If Group Not FoundSkip

Eligibility Criteria List

Add

Factor

Main

FactorW-VALGROUP-I-S

DescriptionValidation Groups - Water Interval Standard

Factor ClassVEE Group

Characteristic Source AlgorithmFactor Characteristic Source: Service Point

Factor Characteristic TypeService Point Type for VEE Groups and Profile

Record Actions

EditDeleteDuplicate

Record Information

Factor Char Value and Factor Value List

	Factor Char Value/Factor Value Details	Add	Edit	Delete
1	Water Commercial	+		
2	01-01-2010 0:00:00, Validations - Water Interval - Large Commercial			
3	Water Industrial	+		
4	01-01-2010 0:00:00, Validations - Water Interval - Industrial			
5	Water Residential	+		
6	01-01-2010 0:00:00, Validations - Water Interval - Residential			

Error and To Do

Initial Measurement: 01-01-2020 1:00:00 PST - 02-01-2020 0:00:00 PST / Manual / Exception

Search

Bookmark

Refresh

Main

Log

Initial Measurement Log

Filters: Initial Measurement Data ID 58499676191928

	Date/Time	Details	Status Reason	User	Log Type	Related Object
1	02-19-2024 6:52:02	UOM:CCF-W does not match KWH on Measuring Component Type		Radhakrishnan , Reshma (RRADHAKR)	Exception	IMD Exception - Open, 02-19-2024 6:52:02

Exception Summary

Filters: Initial Measurement Data ID 58499676191928

	VEE Exception	Exception Status	Exception Severity ⓘ	Create Date/Time	VEE Group ⓘ	VEE Rule
1	Insufficient Input Data / Information / Closed	Closed	Information	02-19-2024 6:52:02	Validations - Electric Scalar Common	Multiplier Check
2	Unit of Measure Discrepancy / Issues / Open	Open	Issues	02-19-2024 6:52:02	Validations - Electric Scalar Common	Unit of Measure Check

Initial Measurement Exception Detail

Main ⓘ

Record Information ⓘ

Exception Type: Unit of Measure Discrepancy

Initial Measurement Data: 01-01-2020 1:00:00 PST - 02-01-2020 0:00:00 PST / Manual / Exception

VEE Group: Validations - Electric Scalar Common

VEE Rule: Unit of Measure Check

Exception Severity ⓘ: Issues

Exception Status: Open

Comments

Message: UOM:CCF-W does not match KWH on Measuring Component Type

To Do Type

To Do Role

Replacement Rule Configuration

VEE Rule: Final Measurement Replacement

Search

Bookmark

Refresh

Main

VEE Rule

Show All Rules

Main

VEE Group

Validations - Water Scalar Common

VEE Rule

VAL-W-S-COMMON-FMR

Sequence

3

Description

Final Measurement Replacement

Detailed Description

Category

Validation Rules

Start Date

01-01-2010

End Date

General Rule Parameters

Replacement Method

Reject Based on Configuration

Replacement Condition Value

No Read - System

Additional Replacement Parameters

Replace Manually Edited Data?

No

Use Early and Late MC Type Settings?

Yes

Replacement Evaluation Type

Both Value And Percentage Change

Value Change Tolerance

0.1

Percentage Change Tolerance

1

Record Actions

Edit

Duplicate

Delete

Record Information

Business Object

Final Measurement Replacement

Condition Code Prioritization by Group

Sequence	Condition Code Group
10	Super
20	No Read - Outage Regular
30	Proration
40	No Read - Outage Fill System Estimate External Estimate Office Estimate
50	No Read - System No Read - Field No Read - Disconnected Missing Spike - Treat As Missing Bad AMI Data - Treat As Missing

Measurement Replacement Exception

Exception Type

Measurement Replacement Exception

Exception Severity

Issues

Eligibility Criteria List

Add

Filters: VEE Group VAL-W-S-COMMON , VEE Rule VAL-W-S-COMMON-FMR