QUANTA TECHNOLOGY

REPORT

SDG&E Integration Capacity Analysis Data Validation Plan Assessment

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EXECUTIVE SUMMARY

Purpose

This Integrated Capacity Analysis (ICA) Data Validation Plan Assessment is submitted as ordered by the California Public Utilities Commission in Rulemaking (R.) 14-08-013 on January 27, 2021. The ruling ordered the investor-owned utilities (IOUs) to retain an independent technical expert within 60 days of the ruling to review their ICA data validation plans and review the IOU's data validation efforts. Quanta Technology was selected as the independent technical expert.

Sixty days after Quanta Technology was selected, the IOUs submitted improved ICA data validation plans that document the results of the IOUs data validation efforts, deficiencies discovered, efficiencies realized in ICA implementation, and plans for ICA improvements.

Within 30 days after the IOUs submitted their data validation plans, Quanta Technology is scheduled to provide a report to the Energy Division's DRP Section at the conclusion of the IOUs ICA data validation plan assessment. The 30th day is scheduled as June 28, 2021.

A report is being submitted for each IOU that includes the following topics:

- Review of the resubmitted, improved data validation plans
- Recommendations on best practices for data validation
- Areas for improvement of the data validation plans
- Sufficiency of the data validation efforts
- Recommendations for additional data verification if required

This assessment is a review of the improved data validation plan submitted by San Diego Gas & Electric (SDG&E) in Advice Letter 3773-E. While the assessment does not cover the actual model building, engineering analysis, and post-processing, it does cover the data validation for those processes.

Methodology

To ensure that the assessments of each IOU's improved data validation plans were balanced and equitable, Quanta Technology developed a reference ICA data validation program structured to align with the ICA process. It also encompasses the program management activities required to sustain a sufficient data validation program along with example activities that should take place at each step of the ICA process. Figure E-1 shows the structure of the reference ICA data validation program.

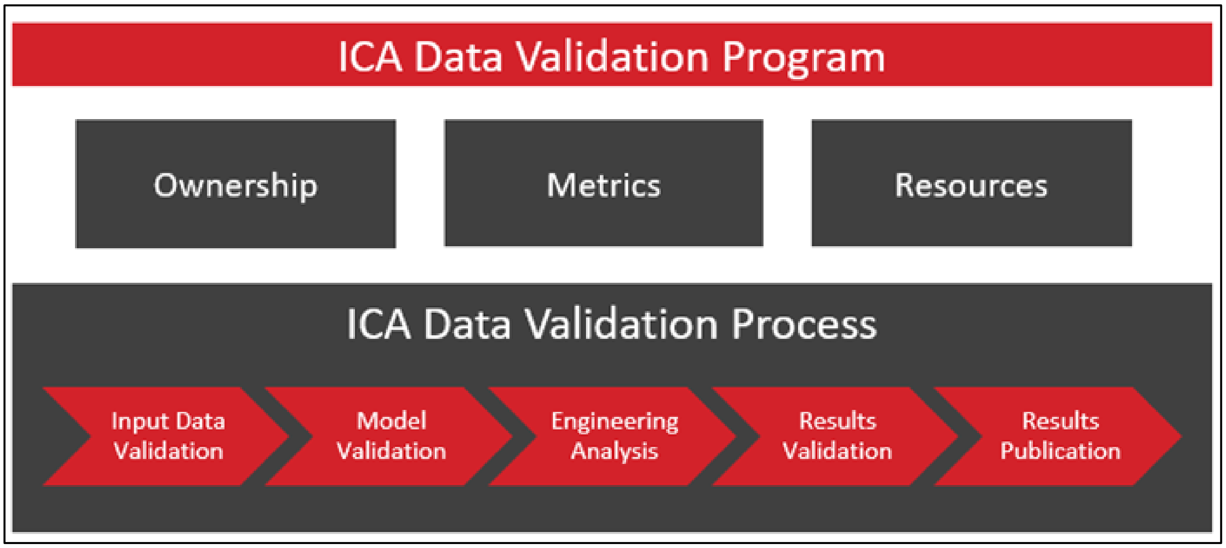

Figure E-1. Reference ICA Data Validation Program Framework

Quanta Technology assessed each IOU's improved data validation plan relative to the reference framework to identify areas for improvement and recommendations. The program management layer of the framework encompasses the need for an identified, recognized owner of the ICA results, metrics to monitor the process and ensure the quality of the output at each stage of the process, and the resources to support any manual intervention activities or investigations into potential issues.

The ICA data validation process spans the entire ICA process and has five stages:

1. **Stage 1: Input Data Validation**—Ensure that input data is sensible and complete. The input data is used to build the CYME or Synergi models and includes GIS and tabular data. Datasets include circuit topology, conductor size, equipment settings, and existing or queued generation.
2. **Stage 2: Model Validation**—Ensure that the CYME or Synergi models properly interpret the data, and the models reflect field conditions.
3. **Stage 3: Engineering Analysis**—Ensure the process runs successfully using the streamlined ICA process and manual intervention. This effort can include using commercial software packages to run the analysis and help minimize human error.
4. **Stage 4: Results Validation**—Ensure that ICA results are sensible before publication. Cases to evaluate include potential invalid zero capacity results.
5. **Stage 5: Results Publication**—Verify that the published results reflect the results of the engineering analysis.

Results

1. **ICA Data Validation Program Management:** The filed report does not directly address overall ICA data validation program management.
2. **Input Data Validation:** The filed report acknowledges potential issues and a monthly process, and criteria that support identifying those issues.

3. **Model Validation:** The filed plan provides an updated, appropriate listing of potential errors, descriptions, and action plans.
4. **Engineering Analysis:** SDG&E is currently investigating and validating the cause of its high quantity of load ICA results equaling zero. Potential process errors are being identified along with providing descriptions and action plans.
5. **Results Validation:** Results validation efforts are covered effectively. For this report, they are covered under Engineering Analysis.
6. **Results Publication:** The filed report stated there were no additional improvements beyond what was provided in the 2019 original data validation plan.

Table E-1 summarizes Quanta Technology's recommendation for SDG&E's ICA data validation plan.

Table E-1. Focus Area Recommendations

Focus Area	Recommendations
Program Management	• Identify a business owner for the overall ICA process with potential responsibilities • Establish metrics to track the quality of the ICA results and identify potential issues • Document the planned resources and qualifications for those involved in the ICA data validation process
Input Data Validation	• Implement the use of metrics to monitor accuracy and identify potential issues that need resolution
Model Validation	• Connect the identified action plans with the recommendation to have a business owner for the overall ICA process • Implement a tracking and reporting process to monitor the action plans
Engineering Analysis	• Connect the identified action plans with the recommendation to have a business owner for the overall ICA process • Implement a tracking and reporting process to monitor the action plans • When Synergi software is updated, a comparison of the ICA results before and after should be performed and evaluated to confirm they are correct
Results Validation	• Implement the use of metrics to monitor the ICA results to identify potential issues
Results Publication	• Add action steps to ensure that issues identified in the mapping process are tracked and resolved

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1 INTEGRATION CAPACITY ANALYSIS DATA VALIDATION PROGRAM ASSESSMENT PROCESS

1.1 Overview

Quanta Technology began the integration capacity analysis (ICA) data validation program assessment process with two parallel tasks:

- Review existing investor-owned utility (IOU) ICA data validation efforts to develop a baseline understanding of each IOU's practices
- Develop a reference ICA data validation program framework to assess the ICA data validation plans and structure recommendations

Upon completing these tasks, Quanta Technology provided recommendations to each IOU for consideration in developing their improved data validation plans.

Lastly, Quanta Technology assessed the filed improved data validation plans using the reference ICA data validation program framework and provided the results in this report. The assessment was performed from the perspective of the generation ICA methodology and results. However, many of the findings and recommendations could apply to load ICA. This assessment was neither a validation of the ICA results nor a review of any engineering analysis, assumptions, or modeling efforts required to develop the ICA results and maps.

1.2 Review of Existing ICA Data Validation Efforts

Before the IOUs submitted their improved data validation plans, Quanta Technology met with each IOU and reviewed their current data validation efforts. This review covered all steps of the ICA process, including input data for the process and publishing results. After reviewing the IOUs' current practices, Quanta Technology provided recommendations for inclusion in the improved data validation plans.

1.3 Reference ICA Data Validation Program Framework

The reference ICA data validation program is structured to align with the ICA process. It encompasses the program management activities required to sustain a data validation program and some example activities that should take place at each step of the ICA process. Figure 1-1 shows the structure of the reference ICA data validation program.

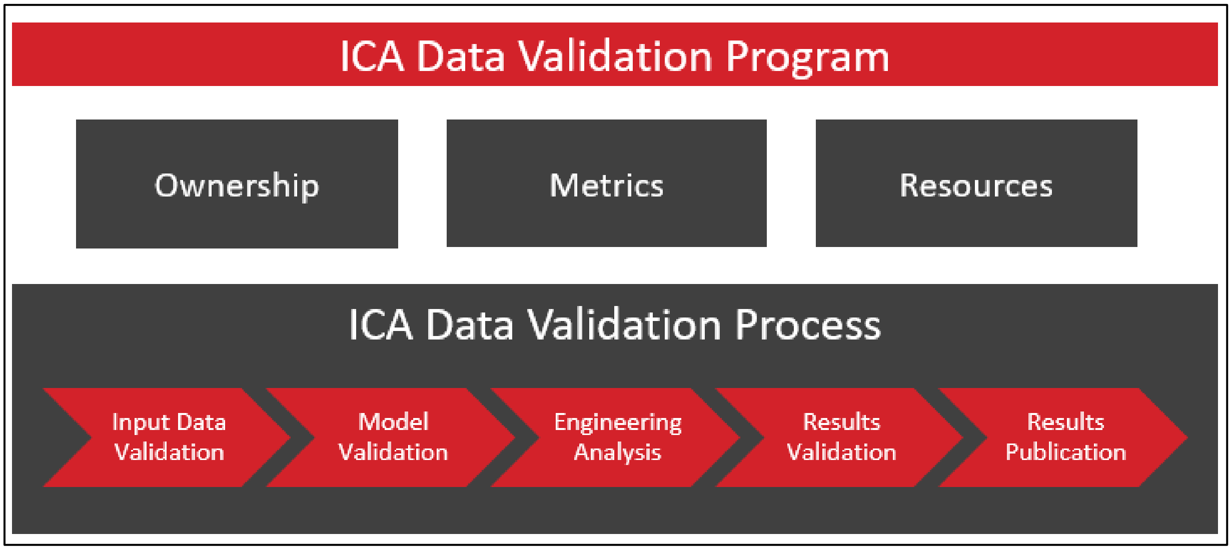


Figure 1-1. Reference ICA Data Validation Program Structure

The potential issues and metrics identified in this assessment are not an exhaustive set of issues that data validation could help address. Instead, the issues and metrics highlight the types of activities that the utilities should include in their data validation efforts. Given the complexity of the ICA process and the different system architectures that support the process at each IOU, identifying all potential issues and metrics was outside the scope of this assessment.

1.3.1 ICA Data Validation Program Management

The reference framework's program management layer includes the organizational ownership, objectives, and resources required to maintain a healthy data validation function. While some data validation activities can be and have been automated, there is still a need for an organization responsible for the quality of the ICA results.

1.3.1.1 Ownership

To ensure that there is long-term, ongoing improvement in the ICA results, each IOU should have an identified business owner solely responsible for those results. The business owner's responsibilities should include, but not be limited to, the following:

- Establishing performance targets and metrics for ICA results
- Establishing a long-term strategy to maintain ICA results quality
- Validating sample results regularly (spot-checking)
- Managing resources that support ICA validation
- Documenting the ICA process
- Tracking and implementing identified needs for improvement

The responsibilities listed above provide strategic direction, identify specific objectives, and provide structure for the data validation activities.

1.3.1.2 Metrics

The ICA business owner should establish metrics to ensure that the ICA process is functioning as designed and that the results are of sufficient quality. These metrics should be defined to assess the state of the data in each step of the process.

While individual values for the metrics are informative (e.g., there are currently 100 nodes with zero hosting capacity), trends in the metrics can help identify emerging issues in the input data or process (e.g., the count of nodes with zero hosting capacity is not changing over time) or show improvements in quality (e.g., the count of nodes with zero hosting capacity is decreasing on feeders that have recently had limiting factors mitigated). The metrics should also be tracked to support analysis at various levels of system granularity (e.g., system-level, feeder-level, node-level, etc.) and troubleshoot potential data issues.

Section 1.3.2, which covers the ICA process steps, includes example metrics that could support data validation at each step of the ICA process.

1.3.1.3 Resources

While portions of the ICA data validation program can be automated, there will be a need for resources that can correct models with convergence issues, perform spot-checks of results, and investigate any issues identified by the ICA metrics or the validation process.

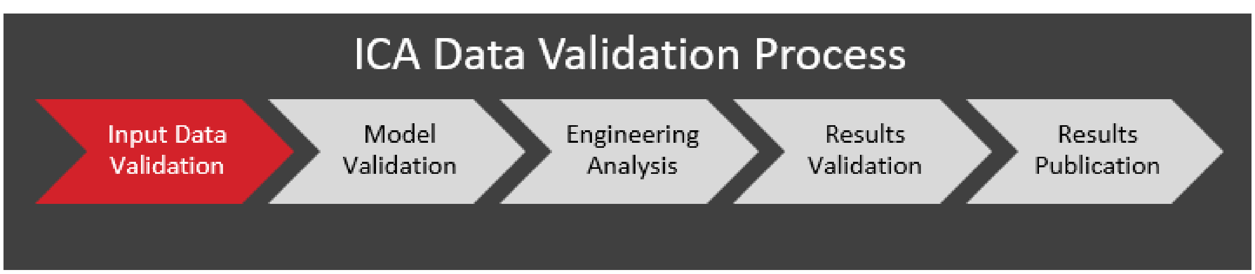
The resources should have experience with their utility's distribution engineering practices, circuit models, and design standards. They should also be familiar with the ICA methodology, their utility's implementation of the methodology, and the entire ICA process from the input data sources to the publication of the results.

1.3.2 ICA Data Validation Process

This section presents the focus of data validation efforts at each step of the ICA process with some potential issues that could be identified at each step. The ICA data validation process spans the entire ICA process from input data to results publication.

1.3.2.1 Input Data Validation

The initial stage of the data validation process is a critical gate to ensure that the data being used throughout the ICA process is of sufficient quality and will lead to valid results. This stage can be complex when considering the multiple sources and high volume of data required for ICA.



The objective is of this stage is to ensure that the data being used for the calculations is complete and sensible. Since the data has not been transformed into models at this stage, each dataset is checked for internal consistency. For the ICA process, the following datasets should be included in the input data validation program. Examples of potential issues are also provided:

- **Asset Data:** Incorrect data such as conductor size or equipment capacity could adversely impact hosting capacity results by imposing improper limits or excessive allowances.
- **Equipment Settings:** Incorrect equipment settings would improperly characterize system performance. For example, incorrect capacitor and voltage regulator model settings could lead to incorrect voltage analysis.
- **Distribution Circuit Topology:** Incorrect circuit topology could result in equipment, load, or generators being modeled at the wrong node or segment of a circuit.
- **Load Profiles:** If a circuit's load profile does not reflect its normal operating configuration, the ICA results could be artificially limited due to temporary operating conditions (e.g., temporary load transfers or outages).
- **Existing and Queued Generators:** Missing or incorrectly modeled generators could result in artificially high or low integration capacity.

If existing data validation programs are in place for any input datasets, the ICA data validation business owner should coordinate with the business owner(s) for those datasets. Awareness of input data issues could prevent the issue from propagating through the ICA process to publication. Likewise, the ICA business owner might identify a potential issue with the input dataset that should be communicated to that data's business owner.

Table 1-1 includes some of the potential issues, example metrics, and potential corrective actions that can be addressed during input data validation. These potential issues highlight the types that IOUs could consider at this stage in the process.

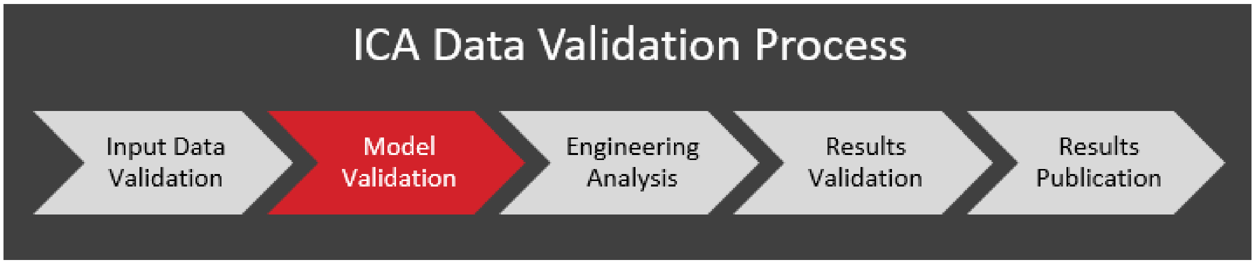
Table 1-1. Potential Issues Identified during Input Data Validation

Potential Issue	Example Metrics	Potential Corrective Actions
Missing or incomplete asset data	• Types of infrastructure data discrepancies as a percentage leading to incorrect ICA results	• Monitor causes of inaccurate results and develop a sample field verification plan for high causes of incorrect results • Field verification can be done using SCADA data and/or limited field checks • Review practice of updating GIS data
Missing or incomplete equipment settings	• Number of limitations due to improper voltage settings	• Confirm capacitor and regulator settings match field implemented settings
Inclusion of abnormal operating conditions	• Time and duration of abnormal events on distribution feeders	• Exclude data recorded during temporary abnormal operating

Potential Issue	Example Metrics	Potential Corrective Actions
		conditions that would artificially skew ICA results (e.g., public safety power shutoff events or temporary load transfers)

1.3.2.2 Model Validation

This second stage of the data validation process ensures that the models used to perform the calculations are complete and sensible. The conditioning process should be consistent across distribution planning activities, such as interconnection studies and ICA.



During this stage, the objective is to validate that equipment, asset, and generation data is correct in the context of the distribution circuit model. While datasets are checked for internal consistency in the previous stage, now that the datasets have been transformed into a model, it is possible to check if data that appears valid out of context is sensible (e.g., a span of #6 ACSR between spans of #336 ACSR or a *C* phase-to-ground tap being fed off an *AB* phase-to-phase line section). Some areas of focus during model validation include equipment settings, asset sizes and ratings, phase mapping, and existing and queued generation.

Table 1-2 includes some potential issues, example metrics, and potential corrective actions addressed during model validation. These potential issues highlight the types of issues that the IOUs could consider at this stage in the process.

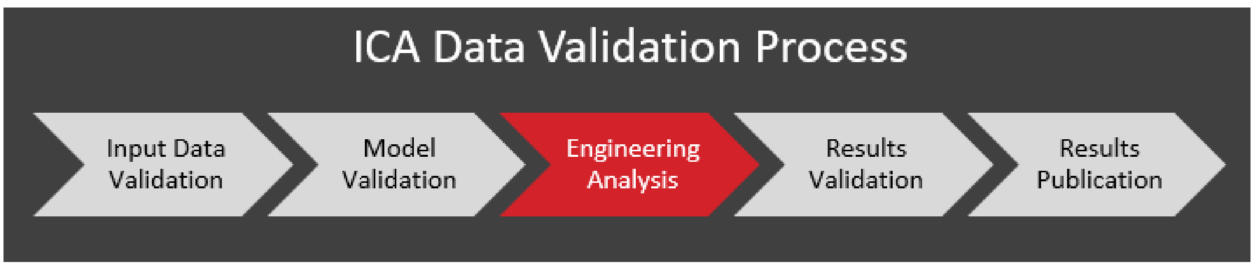
Table 1-2. Potential Issues Identified during Model Validation

Potential Issue	Example Metrics	Potential Corrective Actions
Incorrect asset data	• Invalid or default material types	• Communicate incorrect data and propose a fix to input dataset owners
Preexisting conditions in the model	• Presence of over-/under-voltage or thermal overloads	• Verify that the model reflects field conditions • Modify the model to reflect field conditions

Potential Issue	Example Metrics	Potential Corrective Actions
The model will not converge	Not applicable	• Correct asset data and equipment settings • Temporarily modify load flow algorithm parameters and investigate the impact on ICA results • Work with software developers to solve convergence issue

1.3.2.3 Engineering Analysis

This third stage of the data validation process includes the automated ICA process and the manual intervention required to run the process successfully.



Given the amount of computation required to implement the ICA methodology, using commercial software packages to run the analysis will help minimize human error. However, even with the use of commercial software, there are still situations that require manual intervention. For example, if the ICA process fails, a root cause analysis will need to be performed, and the model will need to be modified so that the ICA process can run successfully.

A best practice to reduce potential human errors when manual intervention is required is using a standardized approach to identify and resolve issues with the distribution circuit models and the ICA process.

1.3.2.4 Results Validation

The objective of the results validation stage is to ensure that the engineering analysis results are sensible.

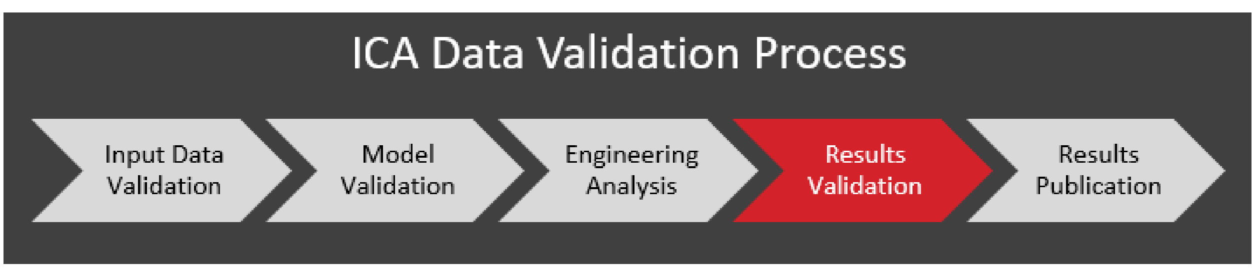


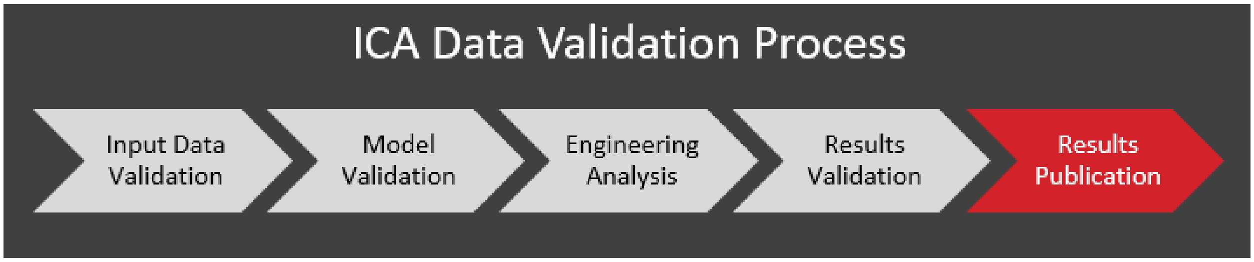
Table 1-3 includes some potential issues, example metrics, and potential corrective actions addressed during results validation. These potential issues highlight the types of issues that the IOUs could consider at this stage in the process.

Table 1-3. Potential Issues Identified during Results Validation

Potential Issue	Example Metrics	Potential Corrective Actions
Invalid zero capacity results	• Count of zero node-hour results • Distribution of limit triggers, for example, dominant reverse flow for operational flexibility scenario	• Implement rule-based screening of zero hosting capacity sections to identify potential suspects (e.g., identifying zero reverse flow at upstream switching locations). • Track trends in the count of zero node-hour results at each analysis refresh. Any significant changes (increase or decrease) could indicate an issue in the analysis. • Develop criteria (e.g., > 10% results) to flag a need for manual validation.
Invalid results due to incomplete load profile data	• Count of node-hour results	• A count of node-hour results less than 576 could flag missing input data or failed engineering analysis. This metric could trigger manual validation unless input data is intentionally excluded (e.g., newly energized feeder).
Invalid results due to load profile processing	• Variation of nodal results over 576 h simulations	• Comparison of load profile variation with nodal results variation could signal an analysis error (e.g., if a load profile varies over time but the hosting capacity at a node does not).
Invalid limiting factor	• Percentage breakdown of limiting factors • Variation of limiting factors at a node	• Track trends in limiting factors. Any significant changes should be verified to see if they are a result of completed upgrade projects • If a node has multiple limiting factors over the analysis period, it could be a sign to verify the results.

1.3.2.5 Results Publication

Once the analysis results have been verified, the results are published to the IOUs' web-based mapping systems. The objective of the final stage of the data validation process is to ensure that the published data matches the validated results.



Map symbology, displayed data, and downloaded data are compared with the validated results during this stage. This stage can be facilitated with unit tests for the data extraction processes that support the publication of the ICA results. Sample verification, or spot-checking, can also be used to verify that the correct information has been published.

2 SDG&E ICA DATA VALIDATION ENHANCEMENT ASSESSMENT

This section provides an assessment of SDG&E's Improved Integrated Capacity Analysis Data Validation Plan as filed on May 28, 2021, in Advice Letter 3773-E. The assessment provided here is based on the information provided in the filed plan. A recommended process was provided before their plan submittals, and it is in section 1.

Following is an assessment of SDG&E's improved data validation plans using the reference framework's structure. Where there are areas for improvement, recommendations are made to ensure the sufficiency of their data validation efforts.

2.1 ICA Data Validation Program Management

2.1.1 Assessment

2.1.1.1 Business Owner

The filed report does not identify a business owner with sole responsibility for the ICA results. In the utility industry, a distribution planning group often leads the Synergi/CYME analysis required for ICA. However, a key topic in this assessment is the data validation ownership, which may not be included in the responsibilities of those performing the Synergi/CYME analysis.

2.1.1.2 Metrics

The filed report does not identify metrics used to ensure that the ICA process functions as designed and that the results are high quality.

Metrics facilitate monitoring the ICA results and this monitoring provides assurance that the results are proper. If the metrics identify unexpected or inaccurate results, additional metrics can be used to determine the causes. Once the causes are identified, solutions can be pursued.

2.1.1.3 Resources

The filed report does not identify the resources plan or requirements for the ICA data validation process.

2.1.2 Recommendations

2.1.2.1 Business Owner

It is recommended that SDG&E identify a business owner for the overall ICA process with potential responsibilities as listed in section 1.3.1.1.

2.1.2.2 Metrics

It is recommended that SDG&E implement metrics such as listed throughout section 1.

2.1.2.3 Resources

It is recommended that SDG&E document the planned resources and qualifications for those involved in the ICA data validation process. Recommended qualifications are provided in section 1.3.1.3.

2.2 ICA Data Validation Process

Overall, SDG&E acknowledges that it has observed and recorded errors that impacted the ICA analysis. As stated in the filing, "The errors were observed at three process levels: Model Build Process, ICA processing, and Mapping process. SDG&E's Improved Data Validation Effort focuses on resolving errors such that efficacy, data quality and system performance will improve."

This acknowledgment is important to moving forward with identifying potential issues and resolving them.

2.2.1 Input Data Validation

2.2.1.1 Assessment (Monthly Updates)

As stated in the filing, "since all imported data reside in platforms outside Synergi, errors are often due to data integrity of the host platforms or broken interfaces between Synergi and the host platforms."

SDG&E's ICA process considers a monthly process for identifying significant circuit changes that may result in improper ICA results. The process is established via the criteria provided in Table 2-1, which was extracted from the filed plan. This process and criteria are appropriate.

Table 2-1. SDG&E Trigger Criteria

Trigger	Description
Significant system changes	Changes in network configuration, number of distribution line devices, equipment rating changes, etc.
Queued generation	Update ICA once a significant nameplate of new interconnection application(s) are received by SDG&E.
Approved generation	Update ICA once a significant nameplate of interconnection application(s) are approved for interconnection.

2.2.1.2 Recommendations

The only recommendation in this process is to use metrics to monitor accuracy and identify potential issues that need resolution, as discussed in section 2.1.2.2.

2.2.2 Model Validation

2.2.2.1 Assessment

Table 2-2 shows the original 2019 SDG&E data validation plan model building process (also provided in this filing).

Table 2-2. SDG&E Original Data Validation Model Building Process

Flag/Script	Description
Model did not converge	For various reasons, a model may not converge, i.e. missing equipment, missing conductors, no profile, etc.
Missing settings for equipment; i.e. regulators, relays	During the automation of the model building process, settings from different equipment is pulled into the models from different source tables. If the source table is missing a value or is not within the excepted settings range, an error gets triggered for the engineer to review and resolve.
Flat profiles or no profile for a feeder	An automated flag is triggered when there is no profile or a flat profile for a given feeder.
Large queued generation on single phase line section	During the addition of queued generation to the circuit model, a flag is triggered that captures large generation on a single-phase line. When the flag is triggered, an engineer reviews the validity of the location of the generator.
Customer class with missing load profile curve	An automated flag is triggered when a load profile is missing for a residential, industrial or commercial class.

This process effectively listed potential causes of inaccurate ICA results, although it did not identify action plans.

Following are additional issues that may improperly impact the ICA results. An effective action plan is provided for each item

Table 2-3. SDG&E Updated Additional Model Building Process Flags

Error	Error Description and Data Source	Action Plan
Customer class with missing load profile curve	The sources of load data are billing data and Smart Meter data. Missing and invalid load data make customer load profile creation and peak load data difficult to determine due to the absence of customer data.	For various reasons, smart meters have the potential to cease capturing and recording actual load, leaving gaps in load data. Develop an alternative to fill load data gaps, review and improve load profile creation.
Missing settings for equipment; i.e. regulators, relays	Substation and distribution-control equipment such as breakers, voltage regulators, reclosers are maintained by a variety of SDG&E teams. Missing or invalid equipment data include protection settings, equipment impedances, voltage regulator settings, circuit breakers, substation transformer sizes, and source impedances.	Establishing new communication channels with SDG&E data owners to improve quality control and quality assurance for substation and distribution equipment data. Review possible erroneous outlier data.
Large queued generation on single phase line section	Generation data connected and queued, is captured in Distribution Interconnection Information System (DIIS). Synergi extracts generation data monthly and integrates generation data with load data for ICA Analysis. Error in extracting and loading generation data could be due to data accuracy or generation location not matching with sections of circuit models.	Review and improve quality control of DIIS data entry and interface between DIIS and Synergi. Review possible erroneous outlier data.

Table 2-4. SDG&E New Improved Model Building Process Flags

Error	Error Description and Data Source	Action Plan
Missing or invalid GIS distribution equipment and equipment data in powerflow model	Distribution equipment was extracted from GIS. Missing or invalid equipment and equipment data include conductor type, conductor length, number of conductors, conductor impedance.	Review GIS data entry and Synergi data mapping to ensure accuracy. Establish error data logs. Review possible erroneous outlier data.
Missing and invalid Load Profiles	Load profiles are created in LoadSEER and are derived from actual recorded SCADA loading data. Load profiles are created for 24-hour interval, peak and minimum load, each month of the year. Synergi loads are scaled by circuit loading profiles for use in ICA.	Develop an alternative to missing recorded actual load for a successful model extract. Review and improve load records and loading profiles to improve data quality.
Missing substation data	Substation data is critical for ICA analysis. Synergi imports substation information such as transformer impedance, voltage regulator relay information, circuit breakers, substation capacitors and transmission data.	Review and improve quality control of substation database entries into Synergi.

2.2.2.2 Recommendations

The items listed above with follow-up actions are appropriate. Two recommendations are provided here:

1. Connect these actions with the recommendation to have a business owner as recommended in section 2.1.2.1
2. Implement a tracking and reporting process to monitor the action plans

2.2.3 Engineering Analysis

2.2.3.1 Assessment

SDG&E is currently investigating and validating the causes of its high quantity of load ICA results equal to zero. Recent Synergi software updates are expected to improve the accuracy of the results. Once this upgrade is completed, SDG&E plans to update and review the distribution of generation and load ICA results.

The deficiencies or causes in the software are not provided, so this software update's potential success is uncertain. Additional information on what specific issues have been identified and will be resolved would be useful information

Following is the 2019 original SDG&E data validation plan ICA process (provided in this filing). Although this did identify issues, no action plan was provided.

Table 2-5. SDG&E Original Data Validation ICA Process

Flag/Script	Description
All of the 576 ICA results are flat/zero	This flag captures when the ICA results are all zero or all results are similar.
Results do not include all of the 576 data points	This flag captures when the ICA results do not include all 576 data points because the model stops at a particular point in the process.
Cannot find a tie switch on a circuit model	This flag captures GIS discrepancies in switch types or the model cannot locate a tie switch.
Protection fault data error	This flag captures when there is missing protection data.
Zero values for similar hours for all circuits at a given substation.	This flag identifies when all the ICA results are the same or are zero.

Provided in this filing are updated and additional process flags which are effective. In addition, these do provide an action plan per item.

Table 2-6. SDG&E Updated Additional ICA Process Flags

Error	Error Description and Data Source	Action Plan
All of the 576 ICA results are flat/zero	Available generation capacity for interconnection is calculated per sections (aka feeder nodes) in 24-hour intervals, peak and minimum days for 12 months. “Flat” ICA results indicate the same generation value for a large number of intervals and/or sections of a feeder.	Solicit support from the software developer for a deep dive review of the algorithm. Review the benefits and impacts of injecting generation connection from 0 to 30 MW at 0.5 MW intervals. Evaluate system computing capacity or constraints in running heavy loaded calculations.
Protection fault data error	Often encountering issues for Protection Analysis such as cannot locate furthest section of the feeder, no relay setting.	Solicit support from the software developer for a deep dive review of the algorithm. Review ICA computation logics.
Results do not include all of the 576 data points	Often ICA analysis returns results for less than 12 months.	Review ICA computation logics and data inputs from Model Building Process step.

Table 2-7. SDG&E New Additional ICA Process Flags

Error	Error Description and Data Source	Action Plan
Operational Flexibility Analysis issues	Operation Flexibility Analysis calculates available generation capacity for a section tied to another feeder. Operation Flexibility calculates the amount of additional generation that can be exported through the closest upstream SCADA sectionalizing device or circuit breaker.	Operation Flexibility Analysis results are often based on downstream customer loading and resources whose consumption/output can vary significantly for various hours. Review the OFA analysis to improve performance and results.
Negative ICA results	ICA analysis occasionally return negative ICA results that have no value for the users.	Review ICA computation logics after powerflow software update.
Powerflow software update	Investigating and validating the underlying cause of its high count of load ICA results equal to zero.	Update Synergi powerflow software version to improve quality of ICA results

2.2.3.2 Recommendations

Similar to the recommendations in section 2.2.2.2, the items listed above with follow-up actions are appropriate. Three recommendations are provided here:

1. Connect these actions with the recommendation to have a business owner as recommended in section 2.1.2.1
2. Implement a tracking and reporting process to monitor the action plans.
3. When the Synergi software is updated, the ICA results could potentially be different. A comparison of the results before and after the upgrade should be performed. If discrepancies are identified between results, an additional evaluation should be performed to confirm the new results are correct prior to updating the ICA map.

2.2.4 Results Validation

2.2.4.1 Assessment

Results validation follow-up action plans are effectively covered in section 2.2.3. The key item not covered is how potential issues are effectively identified, and the potential cause also identified.

2.2.4.2 Recommendations

A key recommendation throughout this report is the use of metrics to monitor the ICA results to identify potential issues. See section 2.1.2.2.

2.2.5 Results Publication

2.2.5.1 Assessment

Following is SDG&E's 2019 original data validation plan mapping process (provided in this filing). This filing states that SDG&E believes no additional improvements are needed in this process. Although flags are identified with a description, no specific action plan is provided for both items.

Table 2-8. SDG&E Original Data Validation Mapping Process

Flag/Script	Description
Mismatches on number of line sections	This flag captures when the amount of line sections containing ICA results does not equal the amount of line sections on the GIS circuit map.
Comparison of percent change of ICA ranges; i.e., Percentage of ICA results that have a zero value.	This flag will trigger an engineering review of a comparison of a large percentage change of ICA results.

2.2.5.2 Recommendations

For the flags listed above, no action steps are provided. Action steps are appropriate and should be added to ensure they are tracked and resolved.