Peak Reliability

WHITE PAPER

ECC Final State Design

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ECC Final State Design Summary

Peak Reliability's Enhanced Curtailment Calculator (ECC) tool has been under development by Peak since 2014. The primary driver for building the ECC is to provide a reliability tool that also is able to consider the contributing flows to System Operating Limit (SOL) exceedances, thus allowing the ECC and its users to make decisions about system changes aimed at reducing the flows. As the Western Interconnection evolves, there exists a need to provide an orderly and efficient means to address reliability issues that will arise. Historically, Balancing Authority (BA) areas primarily consisted of generation assets owned and managed by a single parent company. As additional types of resources and varied ownership and operating structures of those resources arise within the native BAs, it will become more difficult for the native BA operator to efficiently resolve reliability issues independently, using its own assets. Rather than being forced to resolve issues unilaterally, BAs, Transmission Operators (TOP) and Market Operators willl need to effectively resolve reliability issues while also preserving the ability of those with appropriate rights to use their transmission systems.

Also, as organized markets and consolidation of operations between BAs continue to develop, new system dispatches will result in new seams reliability issues. The reliability issues will occur on a transmission system that was not designed for the resulting flows nor for which transmission service was studied and sold. Those impacted entities will either need to address seams issues through separate, uncoordinated processes or rely on a common interconnection-wide relief methodology. The ECC will provide that common coordinated process by performing an orderly, efficient allocation of relief between impacting parties based on previously coordinated criteria. The result will be an interconnection that continues to operate in an orderly and efficient manner.

The ECC final state design is based upon the existing ECC Elements that can be monitored pre-contingency or post-contingency for loss of other Bulk Electric System (BES) equipment and will assign Relief Obligations when System Operating Limit (SOL) exceedances occur. The first step in this Relief Obligation assignment process is to determine if external BAs and/or TOPs have a material contribution to the SOL exceedance. For the ECC final state, an entity has a material impact when an individual Impact Layer component (e-Tag, Dynamic Transfer, BA ACE, or generation serving load for a BA) is equal to or greater than a 10% Impact Threshold. If the ECC identifies no Impact Layer components above the 10% Impact Threshold, then that ECC Element would remain a local issue that the BA, TOP and RC would resolve with existing methods.

Once the Impact Layer components above 10% Impact Threshold are identified, the ECC Relief Obligation allocation will be calculated using all individual Impact Layer components that are above the Impact Threshold, including e-Tags, Dynamic Transfers, ACE and generation serving load (GTL) for a given BA. The ECC will use a 15-bucket methodology to assign the Impact Layer components a priority, and then the Relief Obligation will only identify entities that have Relief Obligation up to the last of the 15 buckets needed to obtain the required relief. The ECC will present the Impact Layer components that were used in the Relief Obligation assignment; however, those Impact Layer components do not have to

be used in providing the relief. Instead, the ECC tool will provide flexibility for the BAs and TOPs to utilize alternate means to provide their required relief by showing a broader set of relief options from the various ECC Impact Layers.

The e-Tag and Dynamic Transfer Impact Layer components will calculate based on the real-time value from the tag or from the telemetry provided by Peak. When e-Tags or Dynamic Transfers are used to assign Relief Obligation, the ECC will respect transmission priorities so that non-firm Relief Obligations are requested prior to firm Relief Obligations using a 15-bucket approach. Once an e-Tag or Dynamic Transfer is identified above the Impact Threshold, the ECC will assign the Relief Obligation to the source or sink BA based on a proportional allocation that assigns relief to both the source and sink entities.

The ACE Impact Layer components will assign a Relief Obligation to any BA above the Impact Threshold and that is outside its ACE Threshold, currently defined as equal to BA L_{10}. The ACE Impact Layer components will be assigned to the zero transmission priority so that they are aligned with the first e-Tags when determining Relief Obligation. Those entities assigned a Relief Obligation also will be requested to go on “tight control” to minimize changes from ACE movements.

The Generation to Load (GTL) Impact Layer components reflect the ECC’s calculation to balance generation and load within a BA or market area once e-Tags, Dynamic Transfers and ACE are served. The ECC will assign GTL components above the Impact Threshold to the highest transmission priority so that they are aligned with the most firm e-Tags when determining Relief Obligation.

Relief Obligations will be effective immediately upon issuance from the ECC and terminate at the end of the clock hour. A re-evaluation to reissue the ECC Relief Obligation that includes the transactions approved to begin at the top of the hour will be performed at 45 minutes after the hour. No Relief Obligation assignments will be made from the future time points ECC calculates; all Relief Obligation will be for pre-contingency and post-contingency Element exceedances occurring in real-time.

To be effective, the ECC Relief Obligation requests must be enacted by all entities in the Western Interconnection. Peak believes there is enforcement under the current NERC IRO and TOP standards; however, while the current NERC standards provide enforcement, participation by ECC Task Force (ECCTF) membership in an upcoming five-year review Standards Authorization Request of IRO-006-WECC-2 is being solicited to ensure that ECC has the proper standards support to ensure adherence and compliance with Relief Obligation requirements.

Lastly, the ECC will continue to support the business requirements of the Western Interconnection Unscheduled Flow Management Plan (WIUFMP) and issuance of events for Elements configured as Qualified Paths. The business rules presented within this White Paper would apply to other Elements defined within the ECC; the Qualified Paths will continue to be treated in accordance with the WIUFMP.

Definitions

ACE Impact – The resulting flow on an Element due to positive (over generation) or negative (under generation) BA ACE.

ACE Threshold – Currently set equal to BA L_{10}; the bounds within which a BA operates its ACE under “tight control”.

Activated Element – An ECC Element that has been activated within the ECC tool for situational awareness monitoring and use under the Relief Obligation phase.

Calculated Impact Flow (CIF) – The sum of all individual Impact Layers in a given assignment bucket as contributed by a single entity.

Element – Any ECC-created single BES equipment or grouping of BES equipment that is defined in ECC.

Generation to Load (GTL) – The flow impact on an Element due to generation in a BAA serving load in that BAA.

Impact Layer – Consists of the various sources of flow on an element, including e-Tags, Dynamic Transfers, ACE and BA generation serving native load.

Impact Threshold – The level of percent impact (PTDF or OTDF) on the Element that, when exceeded, determines participation for shared mitigation responsibilities through the ECC.

Inactivated Element – An ECC Element that is not enabled so that the definition exists but no active calculations are occurring.

Relief Obligation – Entity’s share of the required relief on ECC element based on the methodology defined in this white paper.

Introduction

Peak Reliability's Enhanced Curtailment Calculator (ECC) tool has been under development by Peak since 2014. As the project has moved through various phases of development, Peak has worked with the industry, primarily through the ECC Task Force (ECCTF), to collect input regarding functional requirements and business rules.

The ECC project consists of four phases:

1. **Real-time situational awareness phase** – Provides real-time view of flows on elements and associated contributions to those flows (tagged flows and non-tagged flows such as native generation/load serving). Completed June 7, 2016.
2. **Qualified Path management phase** – Integrating webSAS functionality into the ECC to support the Western Interconnection Unscheduled Flow Management Plan (WIUFMP). The ECC calculates new factors every five minutes based on current system topology, load and generation in order to obtain the highest degree of accuracy possible. Completed June 27, 2017.
3. **Future hour assessment** – Peak is currently building this phase of the project, expected by the end of Q3 2018. This will support future hour situational awareness for both Qualified Paths (as the WIUFMP addresses next hour anticipated issues although the Path Operators still will issue at their discretion), as well as other transmission elements defined in the ECC.
4. **Expanded methodology to address all transmission elements in the Western Interconnection** – This functionality is the final phase of the original ECC project and is expected to be in service by the end of 2019.

This white paper addresses the fourth planned phase of design and development. The ECC tool will be designed to visualize contributing factors to potential System Operating Limit (SOL) exceedances occurring either pre-contingency or post-contingency. When a real-time exceedance is detected, the ECC tool will calculate MW Relief Obligations based on the criteria developed with the ECCTF and detailed in this paper. These criteria are designed to assign the obligation to the entities that have a material flow impact on the Element experiencing an exceedance. The assigned MW Relief Obligation can be satisfied by the BA(s) in several ways either by using the optimized approach calculated by the ECC or alternative means.

During the Final State design phase and development of the requirements documentation, any applicable design elements that are intended to undergo periodic review will be designed with sufficient flexibility. Additionally, any associated business practices that implement the flexible design elements in ECC will be drafted in concurrence with the requirements documents.

Background

As the Western Interconnection evolves, there must be an orderly and efficient means to address reliability issues that will arise. The ECC provides a reliability tool that also is able to consider the contributing flows to SOL exceedances, thus allowing the ECC and its users to make decisions about system changes aimed at reducing the flows.

Historically, Balancing Authority (BA) areas primarily consisted of generation assets owned and managed by a single parent company. As additional types of resources and varied ownership and operating structures of those resources arise within the native BAs, it will become more difficult for the native BA operator to efficiently resolve reliability issues independently, using its own assets. Rather than being forced to resolve issues unilaterally, BAs, Transmission Operators (TOP), and Market Operators now can more effectively resolve reliability issues while also preserving the ability of those with appropriate rights to use their transmission systems.

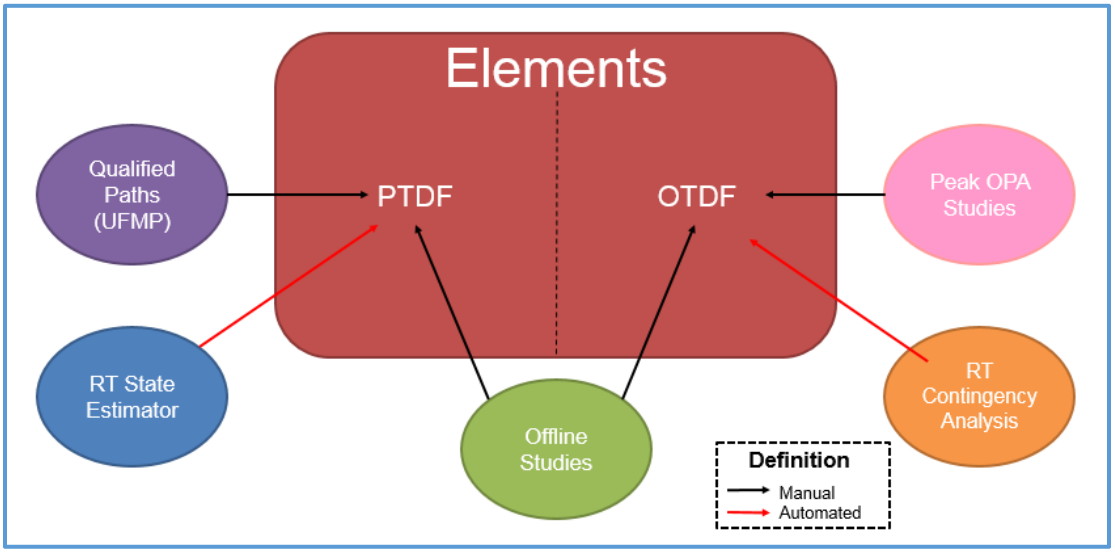
Also, as organized markets and consolidation of operations between BAs continues to develop, new system dispatches will result in new seams reliability issues. The reliability issues will occur on a transmission system that was not designed for the resulting flows nor for which transmission service was studied and sold. Those impacted entities will either need to address seams issues through separate, uncoordinated processes or rely on a common interconnection-wide relief methodology. The ECC will provide that common coordinated process by performing an orderly, efficient allocation of relief between impacting parties based on previously coordinated criteria. The result will be an interconnection that continues to operate in an orderly and efficient manner.

Element Definition

The first step in monitoring equipment with the ECC tool is to define the specific types of Elements. Elements are broadly defined as any single BES equipment or grouping of BES equipment that is defined in ECC and capable of being monitored for situational awareness. Elements are further delineated as being either Activated or Inactivated. Inactivated Elements are created manually based off of operational planning studies or by real-time operations staff who see a need for a given Element. Peak is also implementing a feature where SOL exceedances identified on equipment in Peak's state estimator or real-time contingency analysis results are passed to the ECC automatically, thus being available for monitoring by operators around the Western Interconnection. Peak and the ECCTF envision that any Bulk Electric System (BES) facility or Path with an SOL can be defined as an element, monitored using the ECC, and exceedances mitigated with the Relief Obligation design detailed in this document. Inactivated Elements are manually or programmatically enabled to become Activated Elements in ECC for monitoring. Force monitored elements are also considered Activated Elements in ECC.

Figure 1 depicts the element definition process and the various inputs that drive element definition.

Figure 1. Element Definition Process Inputs



Relief Obligation Assignment

After an Element has been identified with more than one entity obligated to provide relief, the ECC tool then would assign the Relief Obligation to each entity. Peak and the ECCTF have engaged in multiple conversations considering how to assign relief amounts to parties. Discussions have centered on whether to assign specifically to Impact Layers in a certain order of operations. However, two main concerns always arise when discussing Relief Obligation assignments:

1. My entity has an Open Access Transmission Tariff (OATT) or other policy concern with ECC being prescriptive.
2. My entity would prefer to take a different action than the one prescribed in the order that was designed into the ECC tool.

A prescriptive approach to solve SOL exceedances will not work for every exceedance scenario that occurs, and it is not the desired approach in the West. Additionally, the ECC tool should not be designed to force an entity to choose whether to meet the ECC obligation or maintain compliance with its OATT or other mandatory policies and procedures.

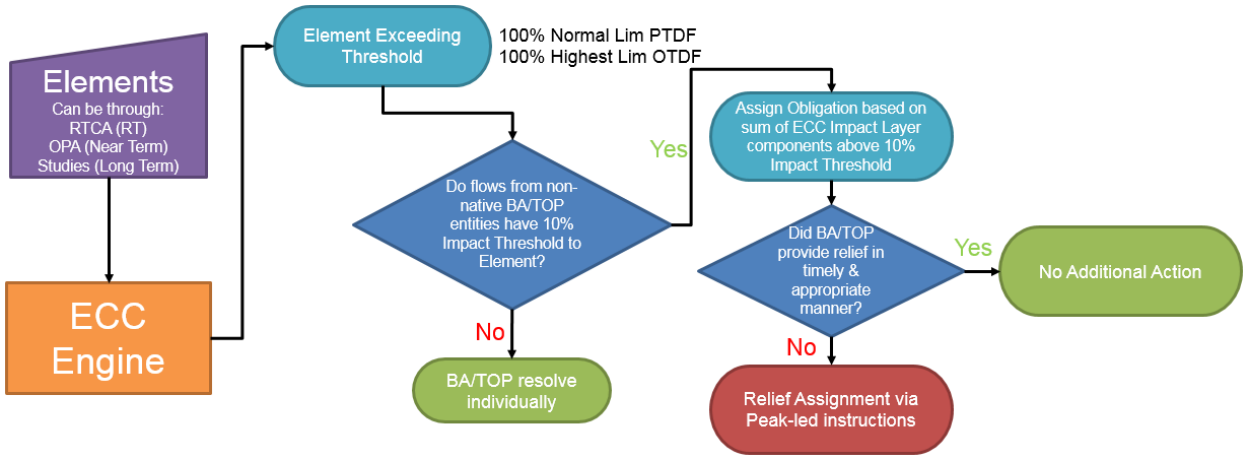
The ECC tool can monitor any Element on the BES. Once an Element is defined as previously described and then experiences an SOL exceedance, the first step in this process is to determine if external BAs and/or TOPs have a material contribution to the SOL exceedance as represented by 10 percent in the Figure 2 flowchart. As an example in the current ECC functionality, for e-Tag curtailments to occur to achieve relief on a Qualified Path, the e-Tag must have a 10 percent flow impact on the Qualified Path. This material Impact Threshold will allow for proper identification of significant flow impact and potential

relief from the non-native reliability entities. If no other BA or TOP entities meet the 10 percent Impact Threshold, then the BA and TOP native to the Element equipment should address the exceedance with their own actions.

Under this approach, each entity is given a Relief Obligation based on its percent impact to the flow on the Element experiencing an exceedance. For example, if an Element needs 100 MW of relief and an entity's Impact Layer components have a 10 percent impact to the Element's flow, then that entity would be assigned 10 MW of Relief Obligation.

Figure 2 illustrates the lifecycle of an element and its treatment when experiencing an SOL exceedance.

Figure 2. Element Relief Obligation Assignment Process



A key component of this approach is that the Relief Obligation then can be provided in the manner determined by the BA/TOP entity. This relief could be provided through system reconfiguration, ACE offsets, e-Tag curtailments or generation redispatch. The ECC tool would provide detailed information on the impacts from the Impact Layer components, but the ECC would not dictate any specific mitigation method to use. Peak will utilize the ECC tool and ensure the assigned relief is provided by each entity.

Should an entity fail to meet its Relief Obligation in a timely and appropriate manner, Peak will use its authority as the Reliability Coordinator to issue operating instructions to the responsible entity or entities. In keeping with the flexibility of this process, Peak would not use a prescriptive action each time but work with the responsible entity or entities to find appropriate relief.

Regulatory Issues

Regulatory requirements that may be impacted must be considered as Peak and the ECCTF work toward industry agreement on the use of the ECC tool to provide an assigned Relief Obligation on Element exceedances. The current NERC standard that governs all Interconnection-wide transmission loading relief processes is IRO-006-5, "Reliability Coordination — Transmission Loading Relief (TLR)" and more specifically IRO-006-WECC-2, "Qualified Transfer Path Unscheduled Flow (USF) Relief" for the Western Interconnection, also known as the WIUFMP. The IRO-006 variant for the Western region requires that entities must respond to the assistance requested under the WIUFMP, however the scope of equipment under the WIUFMP rules is limited to only the Qualified Paths.

Several existing NERC standards support Peak, as the Reliability Coordinator, using the ECC to issue Relief Obligation assignments to entities, including:

- IRO-001-4, R4 – This standard requirement states that the Reliability Coordinator shall address the reliability of its area via direct actions or Operating Instructions.
- IRO-002-5, R5 – This standard requirement states that each Reliability Coordinator shall monitor Facilities within its area and within neighboring Reliability Coordinator Areas to identify any SOL exceedances and to determine any IROL exceedances.
- TOP-001-3, R1 – This standard requirement states that each TOP shall address the reliability of its area via its own actions or by issuing Operating Instructions.
- TOP-001-3, R2 – This standard requirement states that each BA shall address the reliability of its area via its own actions or by issuing Operating Instructions.
- TOP-001-3, R7 – This standard requirement states that TOPs must support their neighbors after they have implemented comparable Emergency[1]procedures.
- IRO-006-WECC-2 – This standard continues to address the treatment of Qualified Paths under the Unscheduled Flow Mitigation Plan for the Western Interconnection.

The conclusion reached by the ECCTF is that NERC standard TOP-001-3 Requirement 7 for TOPs govern actions to take when a SOL or IROL exceedance occurs; that requirement requires TOPs in the same Reliability Coordinator area to assist neighboring TOPs that request assistance or have implemented comparable Emergency procedures. The conclusion reached is that mitigation actions initiated by the ECC can be fulfilled through this existing provision in the NERC standards.

While the ECCTF conclusion indicates no need for a NERC Standards Authorization Request (SAR) for IRO-006-WECC-2, WECC recently initiated the five-year review for the IRO-006 regional variant as required for any Regional Reliability Standards. Peak and the

1. "Emergency" is defined in the NERC Glossary of Terms as follows: Any abnormal system condition that requires automatic or immediate manual action to prevent or limit the failure of transmission facilities or generation supply that could adversely affect the reliability of the Bulk Electric System.

ECCTF discussed this SAR and believe it is a good opportunity to review the existing standards and identify changes that may result from the ECC final state design; Peak is soliciting ECCTF stakeholders to participate in the IRO-006-WECC-2 SAR review.

Business Rules for ECC "Final State" Relief Obligation

The following rules describe the current approach that Peak is recommending to implement the Relief Obligation approach in ECC.

1. **ECC Relief Obligation allocation**: Will be calculated as the sum of all individual Impact Layer components that are above the Impact Threshold. Any e-Tag, generator serving load (GTL), ACE or Dynamic Transfer above the selected Impact Threshold factor would be considered to have a material contribution to flows on the Element. Those impacts would be summed together to determine the total Calculated Impact Flow (CIF) on the Element by that entity as defined in the "Transmission Priorities" and other business rules. As an example, the following tables show individual components and whether they are selected as a component of the CIF when above a 10 percent Impact Threshold. The example also shows that transactions will be assigned to buckets according to the 15-bucket assignment methodology described below in the "Transmission Priorities" rule. Relief requested will be allocated to the BAs based on the buckets. If the bucket impact is greater than the remaining relief, then the remaining relief will be allocated pro rata according to each BA's total impact in that bucket (CIF).

Assigned BA	Transaction	Impact Percent	Transaction MW	Impact MW	Tx Priority	On/Off	Bucket
BA1	BA2_TAG_BA1	10.00%	100 MW	10 MW	7-F	Off	15
	BA3_TAG_BA2	5.70%	NOT INCLUDED				
BA2	BA1_TAG_BA2	25.00%	80 MW	20 MW	1-NS	On	4
BA2	DYN_BA2	20.00%	50 MW	10 MW	7-F	On	15
	BA1 ACE	7.50%	NOT INCLUDED				
BA3	BA3 ACE	25.00%	200 MW	50 MW	0	Off	1
BA2	GEN1 serving BA2	15.00%	100 MW	15 MW	7	On	15
BA2	GEN2 serving BA2	10.00%	300 MW	30 MW	7	On	15
	GEN3 serving BA1	9.90%	NOT INCLUDED				
	GEN4 serving BA3	5.25%	NOT INCLUDED				

	Bucket	
Priority	Off-Path	On-Path
0	1	2
1	3	4
2	5	6
3	7	8
4	9	10
5	11	12
6	13	14
7	15	

Bucket	Impact
1	50 MW
4	20 MW
15	65 MW

Relief Requested =	1-50 MW	51-70 MW	71-135 MW
Relief Obligation for BA1	0	0	10 MW * (Relief Requested-70 MW)/65 MW
Relief Obligation for BA2	0	1-20 MW	20 MW + 55 MW * (Relief Requested-70 MW)/65 MW
Relief Obligation for BA3	1-50 MW	50 MW	50 MW
Buckets Impacted	1	1,4	1,4,15

2. **Relief Obligation Target:** When the ECC tool is calculating how much relief is needed on a given Element, the default target would obtain relief to return to 100% of the highest available limit on an Element post-contingency or 100% of the continuous limit on an Element pre-contingency. The guiding principles for ECC setting a relief target are to maximize the use of the BES while allowing for effective and flexible responses needed to obtain the required flow relief. The ECC tool will allow real-time operators to adjust the relief requirement so that there is flexibility for various system conditions and operational knowledge to influence that relief. For example, there may be ECC elements that operators know will have rapid flow changes where setting relief to move below 100% of the limit is a better operational practice. The ECC tool will be designed to allow the operators to reduce or eliminate relief requirements on an entity if it is in a system condition where it cannot assist on ECC Relief Obligations. In general, Peak would expect that the majority of Relief Obligation targets would move to the range of 95% to 100% of the associated limit.

3. **Relief Obligation Time Duration**: Any Relief Obligation assignment will be effective immediately and terminate at the top of the current hour. For example, a Relief Obligation assignment issued at 09:07 would remain in effect until 10:00. This amount of time allows entities to meet their assigned Relief Obligation and allows time for curtailments to e-Tags and other mitigation approaches to go into effect.

   At 45 minutes after the hour, any ECC elements requesting relief will be recalculated using the latest ECC results to determine whether the Relief Obligation should be extended to the top of the next hour. In the example above, the recalculation occurs at 9:45 and, if the ECC element still requires relief, then the ECC assigns new Relief Obligations that remain in effect until 11:00. The recalculation at 45 minutes after the hour will take into account the CONFIRMED tags that will ramp in at the top of the hour but are not yet IMPLEMENTED. This reassessment allows consideration of the majority of scheduling and generation changes that occur at the top of each hour.

   If the RC Operators see an active ECC event which needs additional relief within the hour, then the event may be reissued to request that additional relief. Any issuance of ECC relief would be maintained for a minimum of 15 minutes before asking for additional relief.

   If an ECC event is no longer necessary due to changes where the element is no longer above its limit, then the RC operator may terminate the event and Relief Obligations are lifted.

4. **Relief Obligation Completion:** The ECC will have one of three outcomes after an ECC Relief Obligation event completes:

   a. the Relief Obligation for the Element was met, and no additional action is needed.

   b. the Relief Obligation was recalculated prior to the top of the hour, and relief was still needed and extended for the next hour.

   c. the Relief Obligation was NOT met, and the RC will need to take additional steps to assist the BAs/TOPs with the issue. This may include RC-initiated curtailments as described in the “RC-Initiated Curtailments” rule.

5. **Relief Obligation Verification**: In order to determine Relief Obligations needed to relieve flow exceedance on an element, assign obligations to entities and verify that the needed relief has been met by each entity and as a whole, a methodology has been developed for implementation in the ECC tool.

The primary monitoring and verification of an Element will be to ensure the flow is reduced by the amount of relief needed. This monitoring is at the element level and independent of tracking individual entity relief response. The secondary monitoring and verification process will implement an event snapshot functionality built into the ECC tool that calculates the element flow and all contributing components to each Impact Layer. The tool will then create a snapshot page for each entity that has a Relief Obligation which shows the impacts of that entity by layer as well as any subcomponents of each layer. ECC will recalculate all layers and components during the exceedance event every 5 minutes so the entity can monitor how actions it takes affect the relief on the flow of the element in exceedance. A final snapshot will be taken at the end of the determined Relief Obligation period. The sum of the Impact Layers to the element at the end of the event will be subtracted from the sum of the Impact Layers at the beginning of the event to determine the MW relief that the entity achieved. It is important to note that an entity's MW Relief Obligation will not change during the event.

Peak and the ECC tool will have processes to address non-compliance; additionally, there will be a process for an entity to interface with Peak or the ECC tool to indicate there are system conditions that prevent compliance with the relief assigned to them.

6. **RC-Initiated Curtailments (if necessary):** A Reliability Coordinator's role is to ensure reliability and security of the BES. Peak believes this ECC final state design must include the ability for an RC to initiate e-Tag curtailments when reliability issues create emergency conditions, thus warranting immediate relief. This functionality would be defined for specific scenarios such as when an ECC Element is above 125 percent of its Highest Available Limit AND initial mitigation approaches did not provide effective relief. Peak would send notification via the Peak Reliability Messaging Tool (RMT) during the usage of this ECC functionality as part of real-time events.

7. **Impact Threshold**: The Impact Threshold percentage setting will determine the Relief Obligation assigned to a given BA. All impacts to the element exceedance that are greater than the Impact Threshold will be added up and assigned to each BA by their percent contribution to the event. The ECCTF performed a technical analysis on this issue that involved analyzing several historical element exceedance events over an eight-month timeframe (June 2017 through January 2018) and observing the number and types of tags selected for three Impact Thresholds (3%, 5% and 10%). The selected events were both on the Qualified Paths and off Qualified Paths and included the various element Impact Layers (ACE, Tags, Dynamic Transfers and GTL).

The results of this analysis confirmed previous qualitative analyses and discussions on the issue. Setting the Impact Threshold too low will result in more Impact Layer components belonging to more entities within the Interconnection, resulting in a much wider participation in Relief Obligation. Setting the Impact Threshold too high will result in focusing the Relief Obligation assignments too narrowly upon the local entities contributing to impact on the overloaded Element. The ECCTF consensus position is to set the initial Impact Threshold at 10 percent to avoid the Relief Obligations being spread too narrowly or too broadly; the 10 percent threshold is consistent with the WIUFMP.

8. **e-Tag and Dynamic Transfer Assignment:** When looking at the Impact Layers involved in calculating Relief Obligation, the ACE and GTL layers are clearly attributed to the applicable BA, whereas the e-Tag and Dynamic Transfer layers will have both a Source BA and Sink BA. For these Impact Layers, the Relief Obligation will be assigned in a proportional manner that provides the relief requested but does not unduly burden responding entities.

9. **ECC will Respect Transmission Rights:** When calculating the Relief Obligation, Peak's interest is in obtaining that amount of relief from a given entity. However, transactions like e-Tags and Dynamic Transfers use transmission rights with varying firmness that prioritize Transmission Provider obligation per their Open Access Transmission Tariffs. When calculating Relief Obligation, the ECC would respect these transmission rights and assign Relief Obligations up to the level of firmness required to provide the necessary relief.

10. **Transmission Priorities:** In addition to the transmission prioritization discussed in the "ECC will Respect Transmission Rights" rule, there is a question of whether to break the transmission priorities into buckets. This concept is similar to the 16-bucket methodology used in the WIUFMP but here with this design would need to assign this priority to all the ECC Impact Layers. The ECCTF wants to retain Off and On Path buckets for the non-firm transmission priorities and then collapse to a single firm transmission priority bucket, deemed as the 15-bucket approach.

11. **Dynamic Transfer Priority**: Calculated Impact Flow based on scheduled Dynamic Transfers should reflect the priority of the transmission profile found on the related e-Tag. The Dynamic Transfers would respect the 15-bucket prioritization.

12. **Off-Element (Off-Path) Designation**: An e-Tag or Dynamic Transfer would be considered Off-Element if there is no transmission rights across the Transmission Provider related to the Element's Transmission Operator(s); Off-Element transactions would find the lowest transmission priority across all utilized. An e-Tag or Dynamic Transfer would be considered On-Element if there are transmission rights across the Transmission Provider related to the Element's Transmission Operator(s); On-Element transactions would use the lowest transmission rights from the Transmission Provider associated with the Element's Transmission Operator.

13. **BA ACE Priority**: Calculated Impact Flow based on a BA's ACE deviation is considered the lowest priority equal to the 0-NX tag priority bucket. When actual frequency is on schedule, ACE is the mismatch between scheduled and actual interchange by a BA, so any impact from it should be considered to be flowing on the system with no right to do so. Today, when a component of the BES is near or above its SOL limit, then one of the first steps that Peak performs is to investigate ACE Impacts. If an entity's ACE is contributing to the flow of the element above its SOL, Peak will request the entity go on "tight control" where the BA operates ACE within the L_{10} value which historically was part of the NERC BAL CPS2 performance.

    The ECC tool should take a similar approach with ACE in looking for those entities who are contributing to the exceedance on an ECC element. BAs who are within the historical L_{10} bounds should not be expected to additionally restrict ACE. Therefore, the BAs who have an ACE Relief Obligation would have to meet two conditions: 1) the ACE Impact would need to be above the Impact Threshold of +10%, AND 2) the BA ACE value would need to be outside the ACE Threshold which initially would be set equal to the L_{10}. These BAs also would receive a request from the ECC tool to go on "tight control" as part of the ACE layer response.

    Due to the transient nature of ACE, BAs that are providing counterflow could move in a manner that would add to the flow of the ECC element above its exceedance. The ECC tool will calculate how much counterflow impact is lost if those BAs were to move to the nearest ACE Threshold (positive or negative). The ECC tool then will sum those counterflow losses and add that much MW relief to the overall obligation. For example, if three BAs were providing 15 MW of counterflow impact on an ECC element on which 100 MW of relief is requested, the ECC then would calculate 115 MW of relief required across the various Impact Layer buckets.

14. **BA Generation to Load Priority**: Calculated Impact Flow based on a BA's Generation to Load (GTL) is considered to be the highest priority, equal to the most firm or 7 transmission priority bucket. Since the "15-bucket" approach is being proposed, there is no subdivision of GTL into Off or On Path assignment. The order of operations that ECC follows is to account for the flows from ACE, Dynamic Transfers and e-Tags prior to the GTL layer calculation. The GTL layer should represent residual generation within a BA or market area that is not scheduled and is going to serve native load. FERC has affirmed that network and native load service should be equal to the highest curtailment priorities, and other industry tools like the IDC use this approach of setting flow like the ECC GTL layer to the highest priority.

15. **Phase Shifter and DC Line Impacts**: The effect of phase shifter flow and DC lines internal to the Interconnection on ECC Elements is captured in the topological information used by the ECC and is inherently present in the resulting Calculated Impact Flows. No additional assignment of Relief Obligation based on phase shifter or DC flows will be made. However, an entity's Relief Obligation may be met through adjustment of one or more phase shifters or adjustment of the DC line set point.

16. **Real-time Data Driven Obligation Assignment**: ECC is intended to be a real-time advisory tool with insight into future scenarios, so any Relief Obligation assignments will be based on current conditions and real-time data in the ECC. There will not be an assignment to provide relief based on future conditions or projected data.

17. **Unscheduled Flow Mitigation Plan**: The support of the Unscheduled Flow Mitigation Plan would remain in place for those Elements approved as Qualified Paths.

18. **ECC Elements and Peak SOL Methodology**: The Elements in ECC will be defined in accordance with Peak's SOL methodology as follows:
    d. Post-contingency thermal overload should be modeled as OTDF in the ECC.
    e. Pre-contingency thermal overload should be modeled as PTDF in the ECC.
    f. Voltage limitation should be modeled as Proxy PTDF in the ECC.
    g. Stability limitation should be modeled as Proxy PTDF in the ECC.