

Operational Updates to South of Allston (SOA)

2016 - 2017



Agenda

- South of Allston Dynamic Total Transfer Capability (TTC)
- Implementation of Peak Reliability's System Operating Limit Methodology for Operations Horizon v8.1
- Keeler-Allston/Pearl-Keeler RAS Automation

SOA Dynamic TTC

Prior to June 1, 2016

- BPA's Operations Planning engineers assumed conservative assumptions when calculating SOA TTC for outage studies
- Studies were updated to reflect actual generation when high flows were observed

On June 1, 2016

- Outage Study TTCs are posted for Hourly TTC Path Limits
- BPA's Operation Planning engineers developed a dynamic TTC that takes into account a range of generation scenarios in real-time

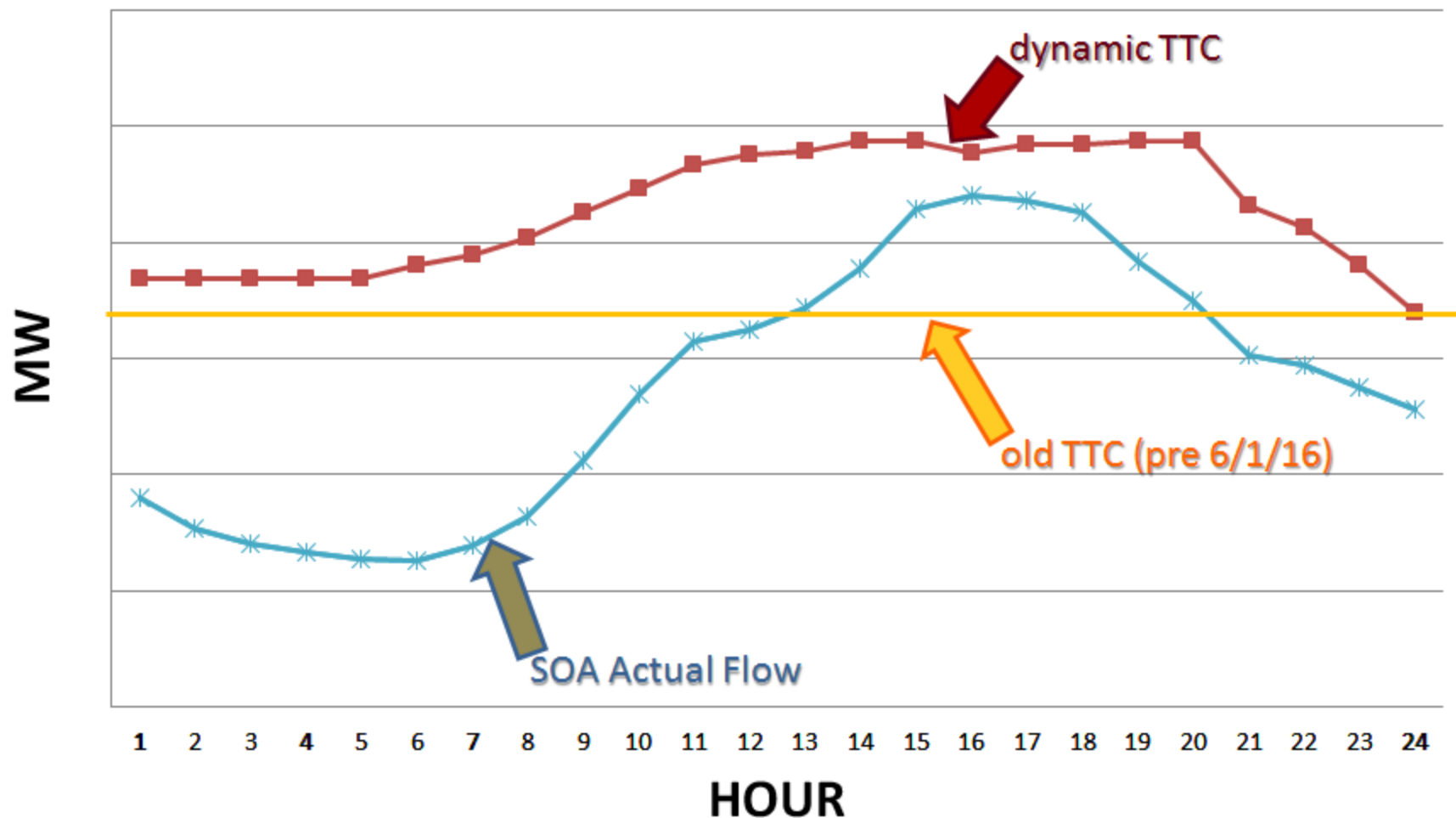
Real-time SOA Dynamic TTC

80 generation scenarios are studied to generate the table that the improved dynamic TTC uses

		River Road OFF				
		PAC: Swift+Merwin+Yale				
		0 MW	150 MW	300 MW	450 MW	600 MW
PGE: Beaver+PW1+PW2	0 MW	3025	3200	3200	3200	3200
	150 MW	3085	3200	3200	3200	3200
	300 MW	3110	3200	3200	3200	3200
	450 MW	3060	3200	3200	3200	3200
	600 MW	3030	3200	3200	3200	3200
	750 MW	2975	3200	3200	3200	3200
	900 MW	2910	3200	3200	3200	3200
	1050 MW	2880	3200	3200	3200	3200

		River Road ON				
		PAC: Swift+Merwin+Yale				
		0 MW	150 MW	300 MW	450 MW	600 MW
PGE: Beaver+PW1+PW2	0 MW	3170	3200	3200	3200	3200
	150 MW	3180	3200	3200	3200	3200
	300 MW	3200	3200	3200	3200	3200
	450 MW	3200	3200	3200	3200	3200
	600 MW	3200	3200	3200	3200	3200
	750 MW	3200	3200	3200	3200	3200
	900 MW	3150	3200	3200	3200	3200
	1050 MW	3125	3200	3200	3200	3200

Motivation for Improved Dynamic TTC





PEAKRELIABILITY
assuring the wide area view

**SYSTEM OPERATING LIMITS
METHODOLOGY FOR THE
OPERATIONS HORIZON**

Effective April 1, 2017

Rev. 8.1

By

Peak Reliability



Before April 1, 2017

- BPA and many utilities in the Western Interconnection managed transmission systems based on “path” (e.g. COI, South of Allston) limits
- Studies established transfer limits which became the System Operating Limit (SOL) of the path and the TTC for commercial sales
- Reliability was maintained by operating the path within the path SOL

What Drove the SOL Methodology Change?

- NERC White Paper, “System Operating Limit Definition and Exceedance Clarification”, January 2015
- WECC Path Operator Implementation Task Force (POITF) recommendations, 2015
- TOP-001-3 and TOP-002-4 NERC reliability standards effective April 1, 2017

April 1st Changes

POTF Basic Principle

Path
Rating/SOL

Path TTC:

- Not an SOL
- Respects SOLs
- Respects three-phase rating process, commercial issues, contracts, and allocations

SOLs:

- Facility Ratings
 - Voltage limits
 - Stability limits
- These are observed pre- and post-contingency.

Post April 1, 2017

- Path SOLs are no longer used for thermally limited Paths
 - SOA is a thermally limited path
- To ensure system reliability, BPA monitors SOA area using real-time reliability assessment tools for thermal and steady-state voltage issues
- BPA continues to study SOA path to set path TTC

Keeler-Allston/Pearl-Keeler RAS Automation

May 3, 2017



South of Allston RAS

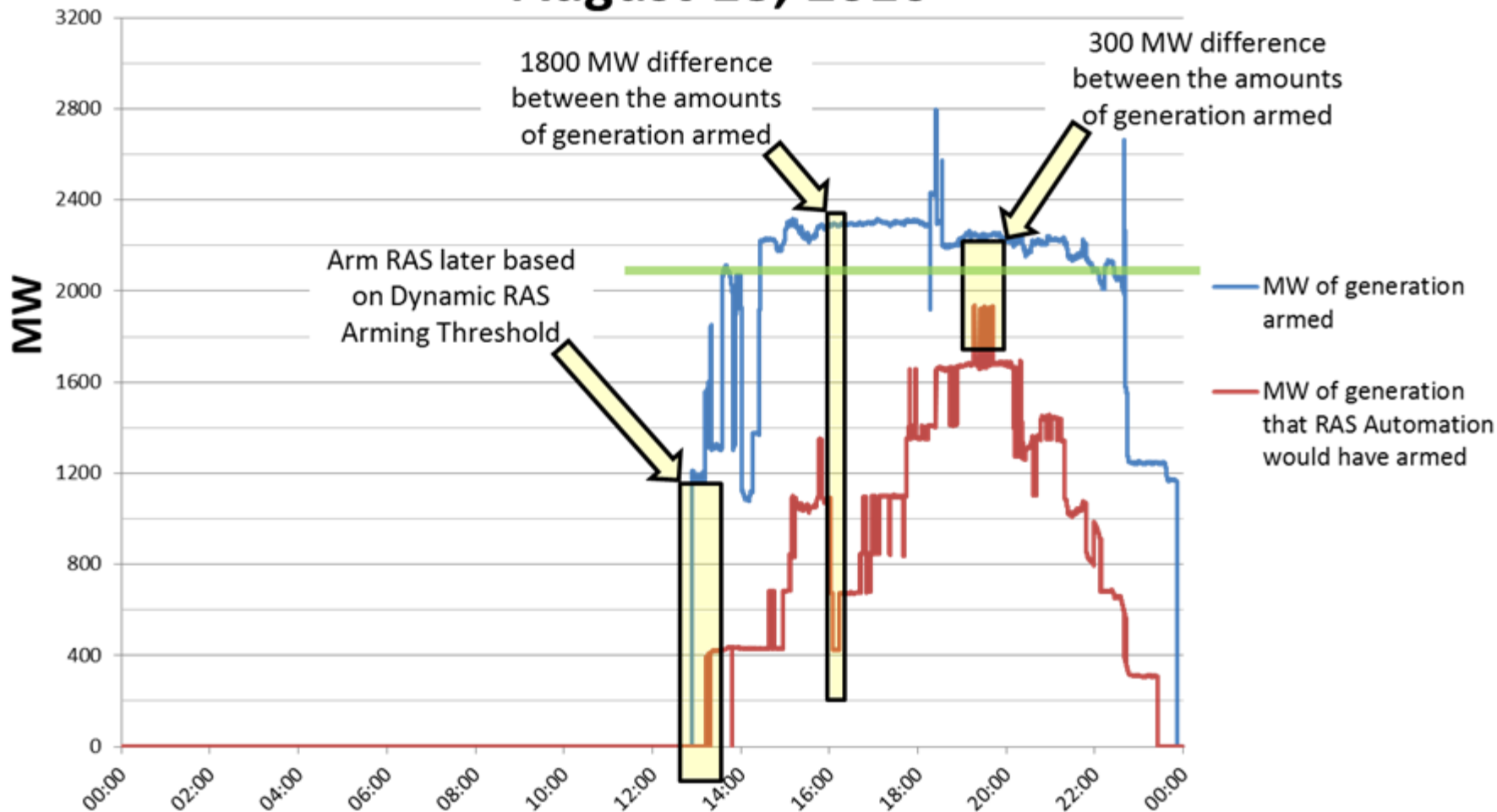
- Keeler – Allston RAS was installed soon after the August 10, 1996 event that created a massive system blackout in the western power grid
- BPA RAS dispatchers could arm up to 2,700 MW of generation for dropping if the Single Line Loss (SLL) of Keeler – Allston 500kV contingency were to occur
- In 2016, BPA transmission planning and operations re-evaluated and reduced the amount of N-1 RAS Gen Drop from 2,700 MW to 2,200 MW

SOA RAS Automation

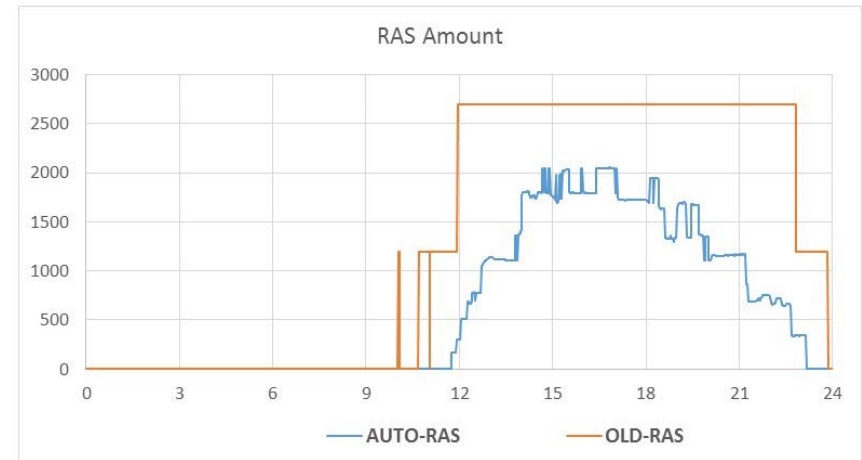
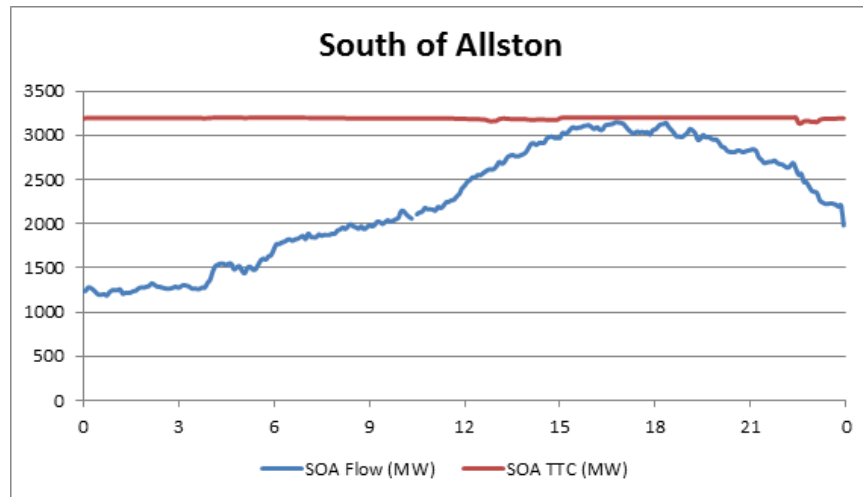
- SOA RAS Automation arming allows BPA to arm a more precise amount of generation, compared to manual RAS arming
- Result: Over-arming is greatly reduced, in both MW amount and duration

SOA RAS Automation Testing

August 18, 2016



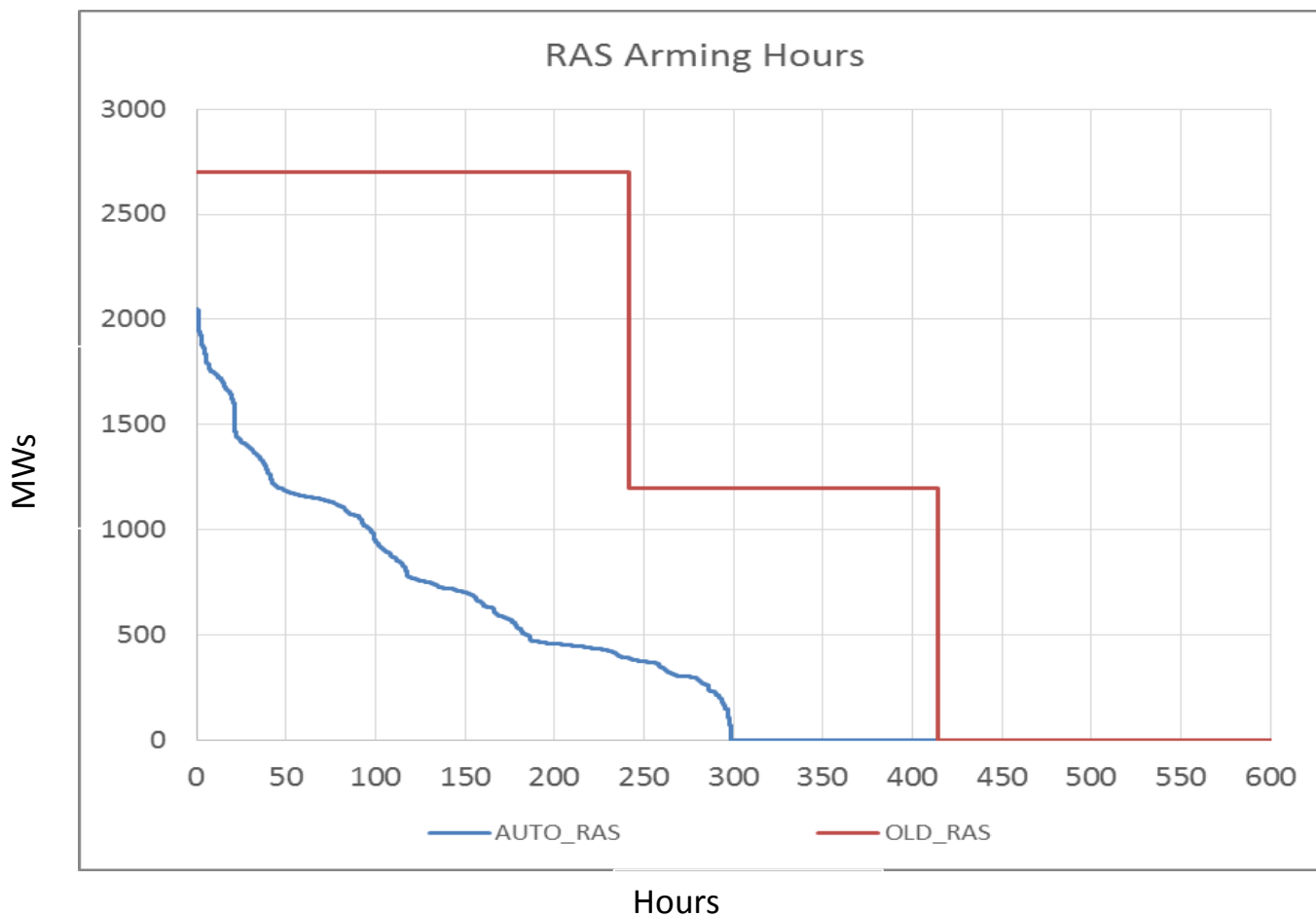
SOA RAS Automation



8/31/17: Amount of SOA flows Reached 3,150 MW
The new Automatic Arming responded with 2,000 MW of arming as adequate for system reliability, when the old methodology would have armed 2,700 MW

SOA RAS Automation

2017 RAS Arming MW-Hours



Summary of Operational Updates

- SOA has a dynamic TTC that takes into account actual generation conditions
- Operational transition from thermal path SOLs to real-time reliability assessment
- RAS Automation - arming less gen drop while also providing system reliability