

Dispatch Anomaly –

2 June 2009

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Background

On 2 June 2009 a constraint equation was invoked to manage transient stability bound in dispatch such that negative settlement residues began to accumulate on the NSW to Victoria interconnector. NEMMCO has found that critical terms had been omitted in the formulation of the constraint equation. This affected the dispatch outcomes of 41 dispatch intervals (DI) on that day.

Event Detail

The Upper Tumut Murray 330kV line was not in service on Tuesday, 2 June 2009 from 07:00hrs to 16:25hrs due to a planned outage. The outage constraint equation V::N_MSUTQE_R was invoked to manage Victorian generators and interconnectors to avoid transient instability for a fault on a Hazelwood to South Morang 500kV line. The constraint was binding for 41 Dispatch Intervals (DI) between 07:30hrs and 13:15hrs.

From 07:40hrs, the binding constraint caused price separation between New South Wales and Victoria. Counter-price flow was observed on the VIC-NSW interconnector, i.e. more expensive energy was dispatched from New South Wales to the lower priced Victoria region, causing negative residues to be accrued on the NSW-Victoria directional interconnector. A constraint equation was invoked to manage these negative residues, in accordance with procedures¹, between 07:55hrs and 10:20hrs. The negative residues accrued whilst the incorrect constraint was in place amounted to \$3404.

Analysis

The appearance of negative settlement residues on this day was considered by control room staff to be consistent with the outage condition and the binding stability constraint equation. Off-line review of the circumstances revealed an apparent inconsistency in the formulation of the stability constraint equation in that there was no term on the left-hand side (LHS) for the Murray power station generation even though all other generators in the northern Victorian region were represented. Murray generation was significant at the time of the event. If it had been included,

¹ See section 18 of PSO Operating Procedure SO_OP3705 at <http://www.nemmco.com.au/powersystemops/3705.html>

then the constraint equation would not have bound, because the the aggregate value of the terms on the left-hand side of the equation would have been significantly reduced. This would have relaxed the constraint equaiton, allowing the dispatched flow from NSW to Victoria to be reduced, or possibly reversed. Accordingly, it is likely that the negative settlement residues would have been reduced or eliminated, and NEMMCO's intervention to deal with them would not have been required. The power system remained secure throughout the event.

Constraint equations relating to the transmission network between NSW and Victoria were modified as part of the package of work for the abolition of the Snowy region over 12 months ago. This incident prompted a systematic check of all constraint equations in the library revised for the Snowy abolition. Of the 3000 constraint equations that were updated, one other constraint equation was found to be incorrect. Both of these constraint equations were revised on the 3 June for use under similar outage conditions on 4 June.

Since the Snowy abolition, the checking processes for changes to constraint equations have been improved and such an error would now be much more unlikely.

In addition a Bulk Constraint Updating Tool will be shortly available for service. This will significantly reduce the manual workload involved in making similar changes to a large number of constraints and so should be greatly reduce the risks inherent in such large changes to the constraint library.

Conclusion

NEMMCO identified a number of dispatch intervals between 07:00hrs and 16:25hrs on 2 June 2009 as affected by a dispatch anomaly.

A transient stability constraint equation for the outage of the Murray-Upper Tumut line was binding for 41 DIs, which affected dispatch outcomes for the New South Wales and Victoria regions, and caused negative residues to be accrued on the NSW-Victoria directional interconnector. The constraint equation was modified on 3 June to include all relevant terms.