

A Static Transfer Switch (STS) Application to Enhance Power Quality at an Automobile Components Plant

Jon Jipping

Principal Engineer - Transmission Planning

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Focus of today's discussion:

STS at Detroit Edison Norway Substation feeding Ford components facility

- Justification and economics for the STS
- Application considerations
- Summary of experience--The good & the not as good

Overall Status

- January 1996 a Tailored Collaboration was signed with EPRI
- Design meetings were held with switch manufacturer in March 1996
- STS received in September 1996, installed, tested, & placed in service in November 1996
- 20+ months of experience

Justification/economics:

- Declining reliability during 1st year of Special Manufacturing Contract (SMC)
- Avoid SMC service guarantee payments
- New technology offers PQ mitigation opportunities, but requires substantial investment in time (study, design, monitor, etc.) and dollars for equipment

Justification/economics:

- Reduce plant disturbances (outages and sags) from level unsatisfactory to customer in 1995 to no more than 2 per year
- Selection team composed of planning, operations, engineering, marketing, and customer personnel

Application considerations:

Background

- Alternatives examined: STS, Series Comp., SMES, Solid State LTC, Battery Storage Systems
- Key considerations: cost, delivery, probability of success
- Ability to modify subtransmission network made STS best solution
- Circuit work in area--PTM & rebuilds

Application considerations:

Status

- Independence of feeds crucial to mitigate PQ problems--criteria: any fault on preferred feed should not result in unacceptable voltage on the alternate; faults on 40- & 120-kV source were studied
- STS “options”--SCADA, bypass, motor ops, backup A/C, ATO remains in plant power house

One year plus of STS experience: Status

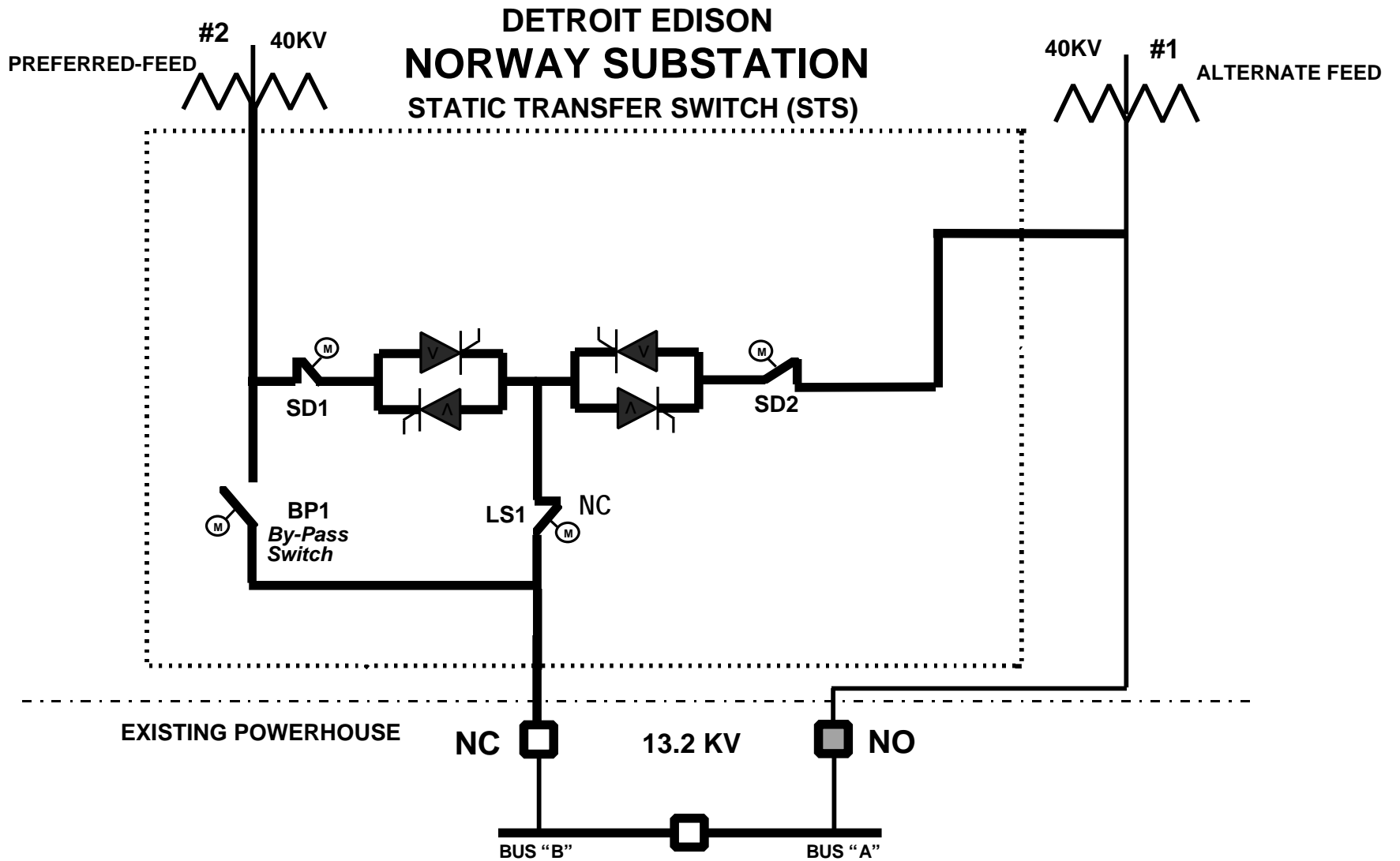
- Outage & sag history
 - Eleven disturbances avoided
 - ✦ 6 outages to 40-kV preferred feed
 - ✦ 2 voltage sags from area 120-kV outages
 - ✦ 3 voltage sags from distribution outages
 - One disturbance occurred due to STS malfunction in December 1997
 - 17 disturbances impacted plant in 1995

One year plus of STS experience: Status (cont'd)

- SMC service guarantee payments avoided; two year payback.
- STS performance
 - First year: 96.6% availability
 - July 8 replacement of A/C units
 - Gate drive component replacement (attributed to high temperature)
 - Minor adjustments--cabinet leaks, phase angle inhibit, fine tune voltage transfer settings

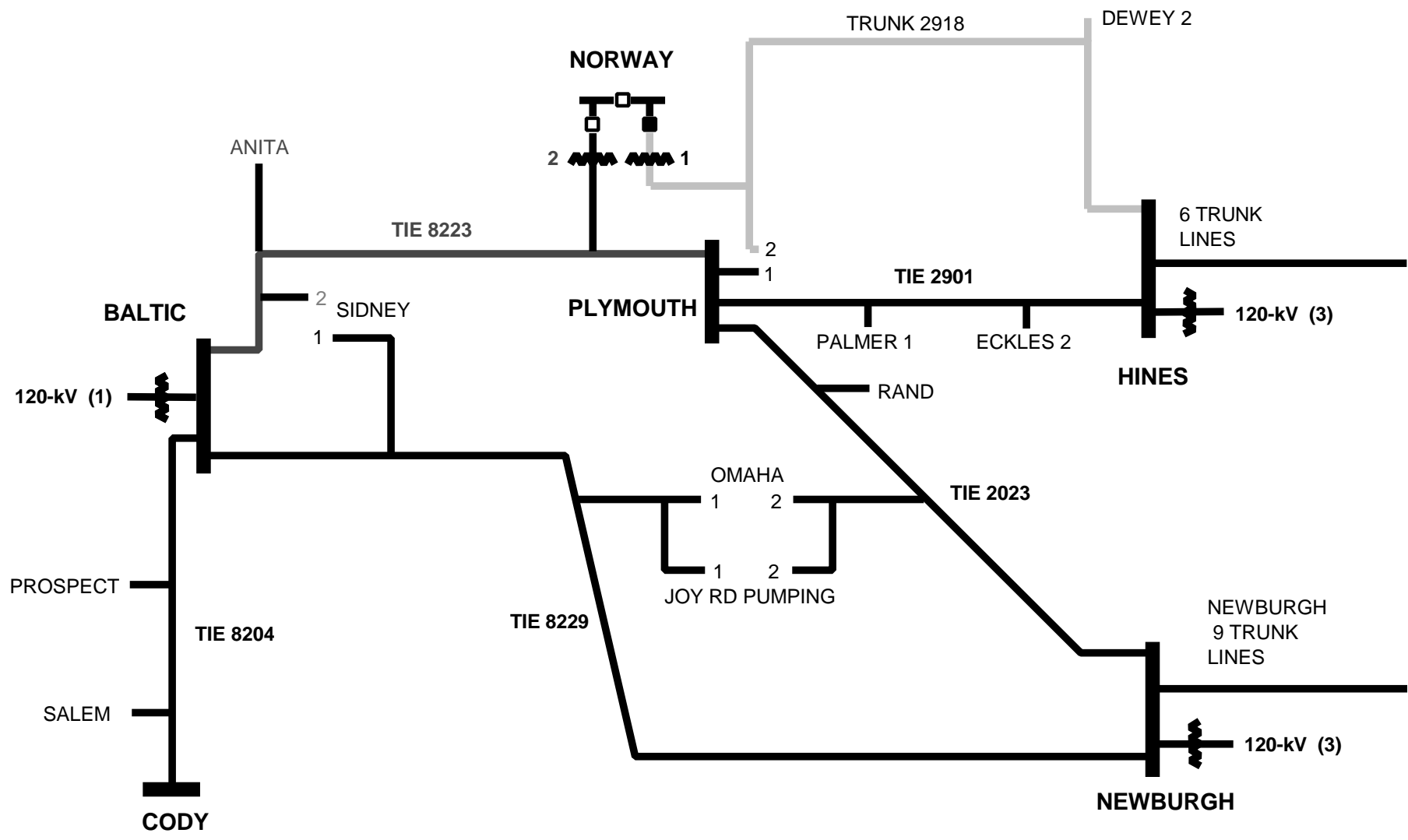
Key Issues & Next Steps

- Maintain availability
- Restore customer's confidence
- Prompt resolution of issues & problems
 - Monitor and analyze each transfer
 - STS operation database
- STS is under consideration for other locations



Detroit Edison Norway Substation





Detroit Edison 41.57 kV Subtransmission Network

