Robert Kondziolka & Brian Keel – SRP
APS Transmission Planning
Phoenix, Arizona
June 9, 2009
Agenda

1. Welcome, Introductions, and Stakeholder Meeting Overview
2. Status of Action Items
3. APS Planning
   a. APS Planning Calendar & Methodology
   b. APS Filed Ten-Year Plan Review
   c. 2009/2010 Study Assumptions - Ten-Year Plan and NERC/WECC Reliability
   d. Interconnection Requests, Transmission Service Requests, and Requests Received for Economic Planning Studies
   e. Stakeholders invited to submit requests for additional transmission studies
   f. Comments/Questions
4. SRP Planning
   a. SRP Planning Calendar & Methodology
   b. SRP Filed Ten-Year Plan Review
   c. Interconnection Requests and Transmission Service Requests
   d. Requests Received for Economic Planning Studies
   e. Stakeholders invited to submit requests for additional transmission studies
   f. Comments/Questions
5. Current Activities Update
6. Stakeholder Questions/Comments
7. Action Items
Welcome

Introductions

Meeting Overview
2. Status of Action Items

- No Action Items from 4th Quarter Stakeholder Meeting (December 10, 2008)
3.a. Calendar & Methodology

- WECC/TEPPC/WestConnect Planning Calendar
- APS Planning Calendar
- Planning Process/Methodology

June 9, 2009
2009 Synchronized Study Plan
WECC PCC / WECC - TEPPC / WESTCONNECT

- WECC TEPPC Economic Studies Submittal Deadline for 2009
- WECC/PCC Annual Study Program Completed
- Base Cases Preparation For 10yr Plan
- Deadline for submitting request for 2010 Economic Studies WECC / TEPPC
- 10yr Plan Study results
- WECC / TEPPC Economic Studies Submittal Deadline for 2010
- BTA study results Even # years
- SWAT Study results
- WestConnect Plan Approved
- WestConnect Study results
- SWAT Study Plans Approved
- 2nd Qtr Stakeholder Meeting
- 4th Qtr Stakeholder Meeting
- TEPPC Results including Economics studies

Study Work
10yr plans
Subregional SWAT groups
Westconnect Group
WECC PCC
WECC-TEPPC

June 9, 2009
APS & SRP 2nd Quarter Stakeholder Meeting
Planning Calendar for Ten-Year Planning Cycle

**January (Jan.)**
- 10yr Plan – Filed with ACC by Jan. 31
- APS Corporate Load Forecast

**February (Feb.)**
- APS Corporate Load Forecast

**March (Mar.)**
- Develop 10yr base cases from AZ seed cases

**April (Apr.)**
- 10yr. Plan study effort – Determination of projects, timings, and scope

**May**
- APS Corporate Load Forecast – Post Summer

**June (Jun.)**
- 10yr. Plan – New load forecast sensitivity

**July (Jul.)**
- 10yr. Plans filed by others

**August (Aug.)**

**September (Sep.)**
- WestConnect Coordinated base case development
- Arizona Utilities coordinated seed case development – from WestConnect cases
- 2nd Quarter Stakeholder Meeting – Stakeholder input on studies, request study alternatives, updates on current projects
- Sep. 1 – Network Transmission Customers and all other Transmission Customers Load & Resource Forecast
- Oct. 31 – Deadline to submit Economic Study Requests for 4th Quarter Meeting review
- 4th Quarter Stakeholder Meeting – Review draft of current 10yr plan, discussion Economic Study requests, receive stakeholder input

**October (Oct.)**

**November (Nov.)**

**December (Dec.)**

**Other Subregional Coordination**

**Activities Throughout the Year**
- APS/SRP Coordination Meeting
- APS/WAPA Coordination Meeting
- WestConnect Meetings
- SWAT Meetings
  - CATS-EHV
  - CATS-HV
  - CRT
  - AZ/NM
  - SATS
  - Renewables
  - Short-circuit Working Group
Exhibit 1 – APS Attachment E

1. Generator Interconnection Request studies are performed pursuant to the Large Generator Interconnection Procedure contained in the Transmission Provider’s Open Access Transmission Tariff (OATT). Transmission Service Requests are also performed pursuant to OATT procedures.

2. All requests for economic planning studies received by the Transmission Provider are forwarded to TEPPC for inclusion in the TEPPC Master List. TEPPC will evaluate only those requests that have regional impacts.
3.b. APS Ten Year Plan Projects 2009-2018

Plan Filed Jan. 29, 2009
2009:
- Dugas & Sugarloaf 500/69kV substations
- Milligan 230/69kV substation

2010:
- Bagdad 115kV relocation
- TS9-Pinnacle Peak 500/230kV line

2012:
- Flagstaff 345/69kV substation
- TS12 230/69kV substation

2013:
- Mazatzal 345/69kV substation
- D. Basin-Pinal Central 230kV line
- Sundance-Pinal Central 230kV line

2014:
- Delany-Sun Valley 500kV line
- Hassayampa-N.Gila 500kV line

2016:
- Sun Valley-TS9 500kV line
PHOENIX METROPOLITAN AREA TRANSMISSION PLANS 2009-2018

June 9, 2009

APS & SRP 2nd Quarter Stakeholder Meeting
PHOENIX METROPOLITAN AREA TRANSMISSION PLANS 2009-2018

2012:
- TS6 230/69kV substation

2014:
- Sun Valley-Trilby Wash 230kV

2015:
- Trilby Wash-Palm Valley 230kV
Yuma Area Transmission Plans 2009-2018

2014:
- Palo Verde Hub-North Gila 500kV #2 line
- North Gila-TS8 230kV line

Substation locations and line routings depict an electrical connection only and do not reflect any assumed physical locations or routing.
<table>
<thead>
<tr>
<th>Project Name</th>
<th>Previous in-service date</th>
<th>New in-service date</th>
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<tbody>
<tr>
<td>Palo Verde Hub-Sun Valley 500kV line</td>
<td>2010</td>
<td>2014</td>
</tr>
<tr>
<td>Sun Valley-Trilby Wash 230kV line</td>
<td>2010</td>
<td>2014</td>
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<tr>
<td>Palm Valley-TS2-Trilby Wash 230kV line</td>
<td>2010</td>
<td>2015</td>
</tr>
<tr>
<td>Sun Valley-TS9 500kV line</td>
<td>2012</td>
<td>2016</td>
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<tr>
<td>Flagstaff 345/69kV substation</td>
<td>2010</td>
<td>2012</td>
</tr>
<tr>
<td>Mazatzal 345/69kV substation</td>
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<td>Desert Basin-Pinal Central 230kV line</td>
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<td>Sundance-Pinal Central 230kV line</td>
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<td>TS12 230/69kV substation</td>
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<td>Palo Verde Hub-North Gila #2 500kV line</td>
<td>2012</td>
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<td>2012</td>
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<td>Jojoba 230/69kV substation</td>
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<td>Avery 230/69kV substation</td>
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</tr>
<tr>
<td>TS2 230/69kV substation</td>
<td>2011</td>
<td>TBD</td>
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</table>

* It should be noted that in-service dates shown in this table are based on load projects, not potential interconnections. New generation interconnections may accelerate the in-service date.
3.c. 2009/2010 Study Assumptions

- Coordinated Base Cases (Seed Cases)
  - 2010 - 2009 Summer Operating case
  - 2013 - WECC 2013 HS Case
  - 2019 - CATS-EHV 2018 coordinated case
- 69kV transmission models incorporated
- Most up-to-date forecasts for peak summer loads
3.c. 2009 NERC/WECC Reliability Studies

- **Summer Peak cases**
  - TPL-001 & TPL-002
    - Thermal analysis (All 10 years)
    - Post-Transient (All 10 years)
    - Transient Stability (2013 & 2018)
  - TPL-003 & TPL-004 (2013 & 2018)

- **Maximum Load Serving Capability for Phx & Yuma (All 10 years)**
  - TPL-001 & TPL-002 Thermal and Post Transient

- **Winter Load cases (2013 & 2019 WECC cases)**
  - Thermal, Transient Stability, & Post Transient
  - TPL-001 thru TPL-004
<table>
<thead>
<tr>
<th>TPL -001 (n-0)</th>
<th>Thermal</th>
<th>Transient Stability</th>
<th>Post Transient</th>
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<table>
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<th>Post Transient</th>
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<td>2013 SIL (Lines, xfmrs, gens)</td>
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<tr>
<td>2013 PEAK (Lines, xfmrs, gens)</td>
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<tr>
<td>2013 MLSC (Lines, xfmrs, gens)</td>
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<tr>
<td>2018 SIL (Lines, xfmrs, gens)</td>
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<td>2018 PEAK (Lines, xfmrs, gens)</td>
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<td>2018 MLSC (Lines, xfmrs, gens)</td>
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<th>Post Transient</th>
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<td>X</td>
<td>X</td>
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<td>2013 N-1-1</td>
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<td>X</td>
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<tr>
<td>2013 Bus Section</td>
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<tr>
<td>2018 Stuck Breaker/Breaker Failure</td>
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<td>X</td>
<td>X</td>
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<tr>
<td>2018 N-1-1</td>
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<tr>
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<th>Post Transient</th>
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<tr>
<td>2013 Common Corridor</td>
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<td>2018 Major Substations With/Without Generation</td>
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<td>2018 Stuck Breaker/Breaker Failure</td>
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<td>2018 Common Corridor</td>
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<td>NERC STANDARD</td>
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<td><strong>TPL -001(n-0)</strong></td>
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<td>2019 GENERATION</td>
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<td>2013 REACTORS</td>
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<td>2019 REACTORS</td>
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<td><strong>TPL-003 (n-2)</strong></td>
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<tr>
<td>2013 Stuck Breaker</td>
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<td>X</td>
<td>X</td>
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<tr>
<td>2013 N-1-1</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>2019 Stuck Breaker</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>2019 N-1-1</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td><strong>TPL-004 (n-xx)</strong></td>
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<td>2013 Loss of All Generation Units at a Station</td>
<td>X</td>
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<tr>
<td>2013 Common Corridor</td>
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<tr>
<td>2019 Loss of All Generation Units at a Station</td>
<td>X</td>
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<tr>
<td>2019 Common Corridor</td>
<td>X</td>
<td>X</td>
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</tbody>
</table>
3.d. Interconnection & Study Requests

- Generation Interconnection requests
  - APS OASIS contains Generation Interconnection Queue
    - 23 Solar projects - 6442 MW
    - 7 Wind projects - 2835 MW
    - 5 Others (Coal, NG, Biomass, etc.) - 1421 MW

- 4 Transmission Interconnection Requests
  - Currently no Transmission Service Requests under Study
  - Currently no Economic Study Requests
3.e. Stakeholder Study Requests

- Study requests can be taken at today’s meeting

- Study requests can be made at any time to:
  - apstransmission@aps.com
3.f. Comments & Question

- Comments!!!!!!!

- Questions????????
4.a SRP Planning - Calendar & Methodology

- WECC/TEPPC/SWAT Planning Calendar
- SRP Planning Calendar
- Assumptions and Methodology
- Types of Studies Performed
- Filed 2009–2018 Ten Year Plan
2009 Synchronized Study Plan
WECC PCC / WECC - TEPPC / WESTCONNECT

WECC/TEPPC Economic Studies Submittal Deadline for 2009

WECC/TEPPC Economic Studies Submittal Deadline for 2010

Base Cases Preparation For 10yr Plan

Deadline for submitting request for 2010 Economic Studies WECC / TEPPC

10yr Plan Study results

WECC / TEPPC Economic Studies Submittal Deadline for 2010

BTA study results Even # years

10yr Planning studies Filing w/ACC

SWAT Study results

WestConnect Plan Approved

2nd Qtr Stakeholder Meeting

WestConnect Study results

SWAT Study Plans Approved

4th Qtr Stakeholder Meeting

TEPPC Results including Economics studies

Study Work
10yr plans Subregional SWAT groups Westconnect Group WECC PCC WECC-TEPPC

June 9, 2009
APS & SRP 2nd Quarter Stakeholder Meeting
## Planning Calendar for Ten-Year Planning Cycle

### SRP Transmission Planning – 10 Yr Plan
- **Jan.**
  - 10yr Plan – Filed with ACC by Jan. 31
- **Feb.**
- **Mar.**
  - SRP Corporate Load Forecast
- **Apr.**
  - Develop 10yr base cases from AZ seed cases
- **May**
  - 10yr. Plan study effort – Determination of projects, timings, and scope
- **Jun.**
  - Sep. 1 – Network Transmission Customers and all other Transmission Customers Load & Resource Forecast
- **Jul.**
- **Aug.**
  - SRP Corporate Load Forecast – Post Summer
- **Sep.**
  - Oct. 31 – Deadline to submit Economic Study Requests for 4th Quarter Meeting review
- **Oct.**
  - 10yr. Plan – New load forecast sensitivity
- **Nov.**
  - 4th Quarter Stakeholder Meeting – Review draft of current 10yr plan, discussion Economic Study requests, receive stakeholder input
- **Dec.**

### Stakeholder Input
- **Jan.**
  - WestConnect Coordinated base case development
- **Feb.**
  - 10yr. Plans filed by others
- **Mar.**
  - Arizona Utilities coordinated seed case development – from WestConnect cases
- **Apr.**
  - 2nd Quarter Stakeholder Meeting – Stakeholder input on studies, request study alternatives, updates on current projects
- **May**
- **Jun.**
- **Jul.**
- **Aug.**
- **Sep.**
- **Oct.**
- **Nov.**
- **Dec.**

### Other Subregional Coordination

#### Activities Throughout the Year
- APS/SRP Coordination Meeting
- SRP/WAPA Coordination Meeting
- WestConnect Meetings
- SWAT Meetings
  - CATS-EHV
  - CATS-HV
  - CRT
  - AZ/NM
  - SATS
  - Renewables
  - Short-circuit Working Group
1. Generator Interconnection Request studies are performed pursuant to the Large Generator Interconnection Procedure contained in the Transmission Provider’s Open Access Transmission Tariff (OATT). Transmission Service Requests are also performed pursuant to OATT procedures.

2. All requests for economic planning studies received by the Transmission Provider are forwarded to TEPPC for inclusion in the TEPPC Master List. TEPPC will evaluate only those requests that have regional impacts.
4.a 2009-2018 Study
Assumptions/Methodology

- Coordinated Base Cases (Seed Cases)
  - 2008 - 2009 Summer Operating case
  - 2013 - CATS-EHV 2013 coordinated case
  - 2018 - CATS-EHV 2018 coordinated case
- 69kV transmission models incorporated
- Most up-to-date forecasts for peak summer loads
### 4.a 2009-2018 Study

**Assumptions/Methodology**

- **NERC Compliance Studies Cases**
  - 2010 & 2015 Summer Peak Cases
  - 2010 & 2015 Maximum Load Serving Capability Cases

- **Summer Peak cases**
  - Thermal analysis
  - Post-Transient
  - Transient Stability
4.a 2009-2018 Study
Assumptions/Methodology

- Maximum Load Serving Capability (Phx)
  - Thermal and Post transient
## Planning Methodology

### NERC STANDARD | Type of Studies Completed
--- | --- | --- | ---
TPL-001 (N-0) | Thermal | Transient Stability | Post-transient
2010 | Peak | X | |
2010 | Low Load | X | |
2015 | Peak | X | |
2015 | Low Load | X | |
2015 | All-in | X | |
TPL-002 (N-1) | Thermal | Transient Stability | Post-transient
2010 | Peak | X | X
2010 | SIL | X | X
2010 | MLSC | X | X
2015 | Peak | X | X
2015 | SIL | X | X
2015 | MLSC | X | X
TPL-003 (N-2) | Thermal | Transient Stability | Post-transient
2010 | Contingency of towers | X | X | X
2010 | Stuck breaker | X | X | X
2010 | Common Corridor | X | X | X
### Planning Methodology

<table>
<thead>
<tr>
<th>NERC STANDARD</th>
<th>Type of Studies Completed</th>
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<tbody>
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<td><strong>TPL-003 (N-2)</strong></td>
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<tr>
<td>2015 Contingency of towers</td>
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<td>2015 Stuck breaker</td>
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<tr>
<td>2015 Common Corridor</td>
<td>X</td>
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<tr>
<td><strong>TPL-004 (N-X)</strong></td>
<td>Thermal</td>
</tr>
<tr>
<td>2010 Substations with generation</td>
<td>X</td>
</tr>
<tr>
<td>2010 Common Corridor/Substation without generation</td>
<td>X</td>
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</tbody>
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4.b
SRP Ten Year Plan Projects
2009-2018

Filed
2011:
- Browning-Pinal Central 500kV
- Pinal Central 500/230kV substation

2013:
- Pinal West-Pinal Central 500kV

2014:
- Delany-Sun Valley 500kV
- Hassayampa-N.Gila 500kV line

2016:
- Sun Valley-TS9 500kV

2020:
- Pinal Central-Abel #2 500kV
2011:
- Dinosaur-Pinal Central 230kV

2012:
- Abel-Schrader 230kV

2013:
- Desert Basin-Pinal Central 230kV line

2014:
- Abel-Santan 230kV

2016:
- RS24 230/69kV substation
## Electric System Additions/Upgrades

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Year</th>
</tr>
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<tbody>
<tr>
<td>Mead-Phoenix 500kV series capacitors</td>
<td>2009</td>
</tr>
<tr>
<td>Coronado-Silver King 500kV series capacitors</td>
<td>2009</td>
</tr>
<tr>
<td>Coronado #2 500/345kV transformer</td>
<td>2009</td>
</tr>
<tr>
<td>4-150MVAR Shunt capacitor banks @P. Buttes, P. Peak, Rogers and Ward 230kV</td>
<td>2009</td>
</tr>
<tr>
<td>Silver King-Goldfield 230kV line upgrade</td>
<td>2009</td>
</tr>
<tr>
<td>Kyrene 3rd 500/230kV transformer</td>
<td>2011</td>
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4. SRP Planning - Study Requests

- Generation Interconnection Requests
- Transmission Interconnection Requests
- Transmission Service Requests
- Economic Study Requests
4.c. SRP Planning – Study Requests

Generation Interconnection Requests listed below are for SRP solely owned transmission:

- **4 Natural Gas projects - 2516 MW**
- **2 Wind projects - 1200 MW** (IFES Studies are being performed as a Cluster Study)

The joint interconnection requests are listed on SRP OASIS website @ http://www.oasioasis.com/SRP/index.html
4.c. SRP Planning - Study Requests

- Currently there are no Transmission Interconnection Requests under study
4.c. SRP Planning - Study Requests

- Currently there are no Transmission Service Requests under study
4.d. SRP Planning - Study Requests

- Currently there are no Economic Study Requests
4.e. Stakeholders Requests

- SRP invites Stakeholders to submit request for additional transmission studies
4.f. SRP Planning – Comments & Questions

- Stakeholder comments/questions on 2008 Study Results or 2009 Study Requests

- Requests can be made at any time to:
  - SRP.TransmissionPlanning@srpnet.com
5. Current Activities Update
6. Stakeholder Questions and Comments

- Open discussion

Reference Material

7. Action Items

- Review any action items identified for follow up
- Information addressing action items to be posted on APS and/or SRP OASIS and WestConnect website