

Primary Power, LLC

Summary of Proposal

2016 PJM Regional Transmission Expansion Plan

Transmission Expansion Advisory Committee

November 18th, 2011

Scope of our 2016 Analysis

- **Based on 2016 on-peak base case with 2011 load forecast and related contingency files.**
- **Power World Simulator and PVQV module.**
- **Analyses intended to parallel, but not fully replicate, efforts by PJM staff to identify voltage violations in 2016 and proposed solutions.**
- **Off-peak case not in scope of analysis.**

Modeling effort led by Thomas M. Piascik, Project Manager.

Scope of our 2016 Analysis

- 1. Identification of initial (starting) voltages at 500kV busses.**
- 2. Removal of approximately 1,700 MW of “at-risk” generation identified through PPLLC’s internal analyses.**
- 3. Removal of nine major baseline reactive projects that had been approved in prior RTEPs under assumptions about load growth that are no longer valid.**
- 4. For starting voltages reduced as a result of steps 2 and 3, identify 500kV busses where the starting voltages and/or the voltage drop as a result of running contingencies exceeds NERC and PJM criteria.**
- 5. In PJM LDAs where there is a preponderance of low starting voltages, utilization of CETO and CETL values along with Power World’s PVQV module to develop P-V curves. This analysis performed along certain transmission paths where 500kV voltage collapse is likely to occur.**

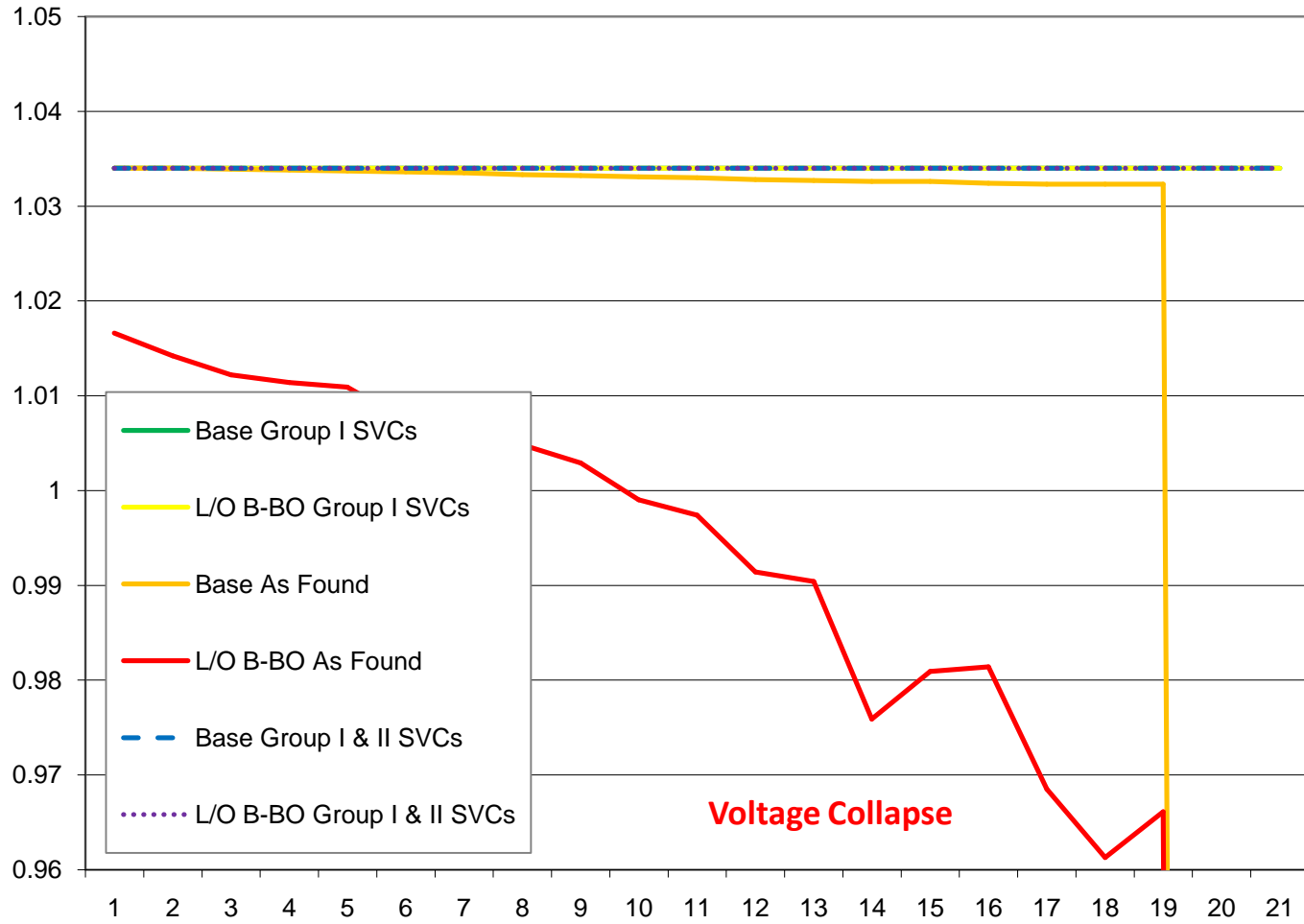
Preliminary Results

- 1. Out of a total of (124) 500kV busses in the 2016 Base Case, (26) were found to have starting voltages less than 1.04 per unit (generally considered unacceptable).**
 - a. Many of these busses are in the Dominion Virginia Power (“DVP”) zone, but there are several in the American Electric Power (“AEP”) and Allegheny Power (“AP”) zones, as well as in MAAC.**
- 2. Approximately 1,700 MW of coal-fired generation was then removed from the 2016 Base Case. Nine (9) major baseline reactive projects that had been approved in prior RTEPs were then removed.**

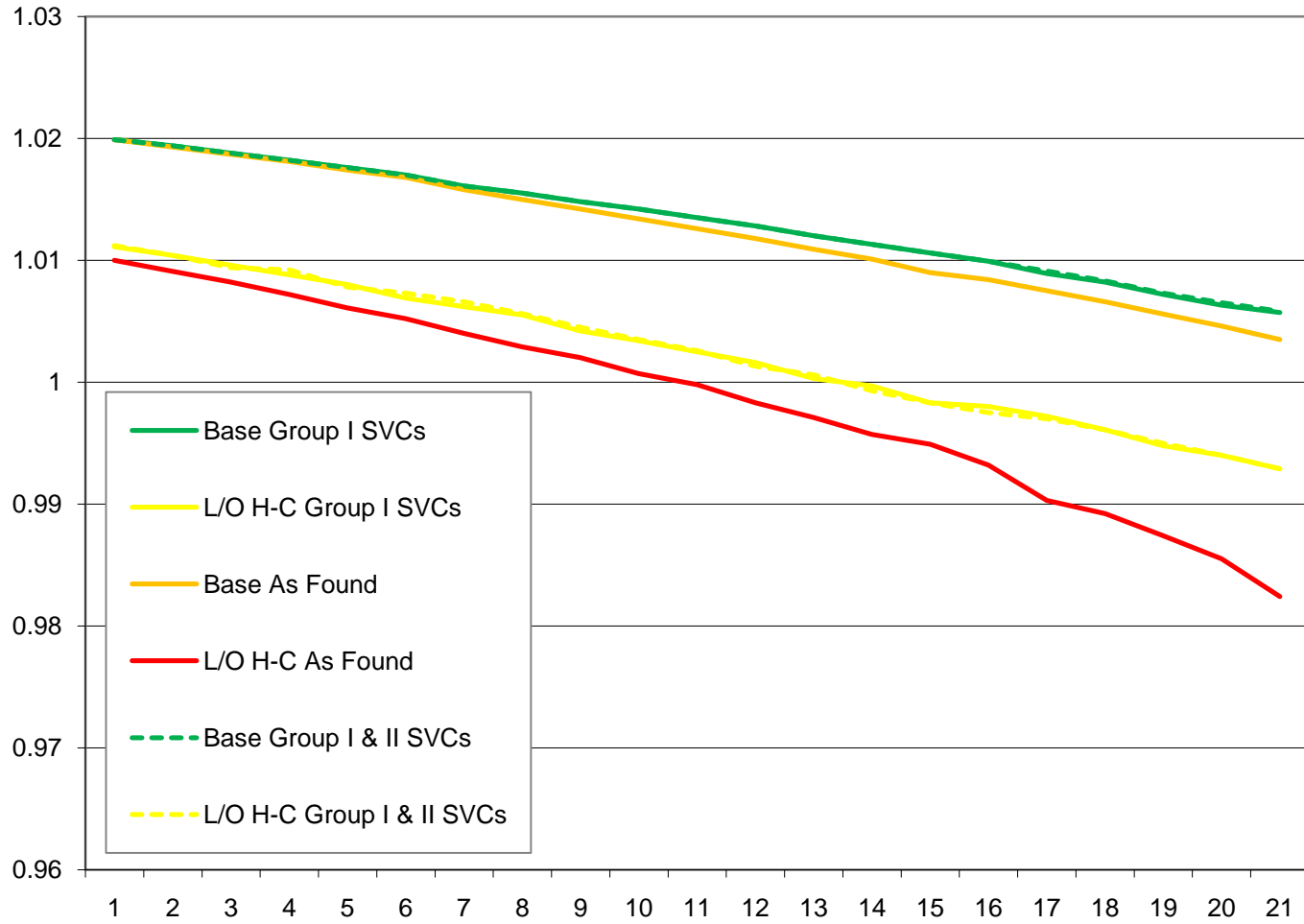
Preliminary Results

- 2. (continued) As a result of these modifications, in addition to the 500kV busses with initial starting voltages less than 1.04 per unit,**
 - a. Numerous 500kV busses had starting voltages below this level,**
 - b. With several of those below 1.0 per unit.**
- 3. Contingencies were run for the 2016 Base Case.**
 - a. In many instances, the cases would not converge.**
- 4. P-V curves were developed for the as-found 2016 Base Case with transfers of up to 2,000 MW into MAAC.**
 - a. Examples of P-V plots are shown on the next slides.**

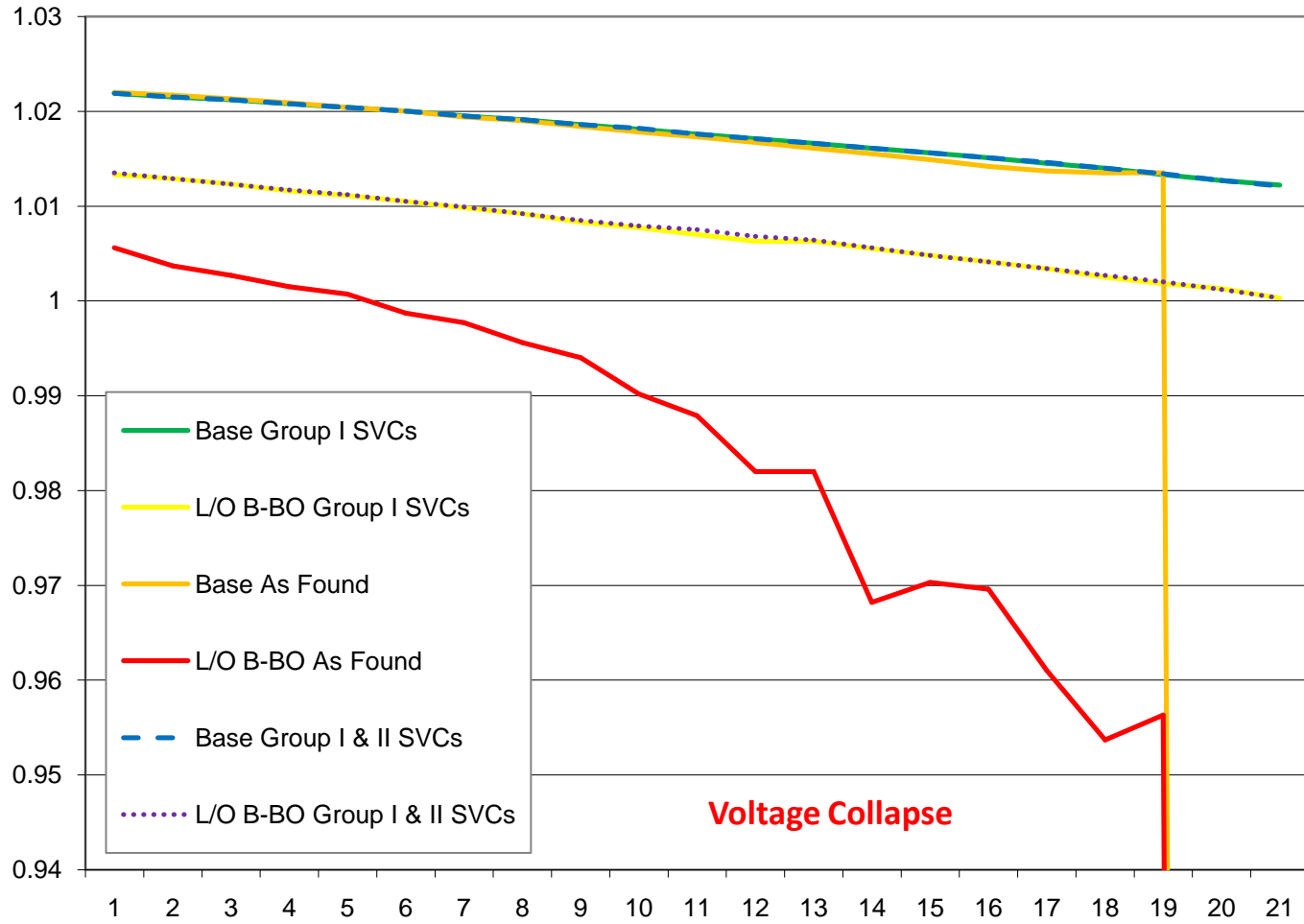
Station "A" - Voltage Transfer to MAAC Base Case and with L/O B-BO



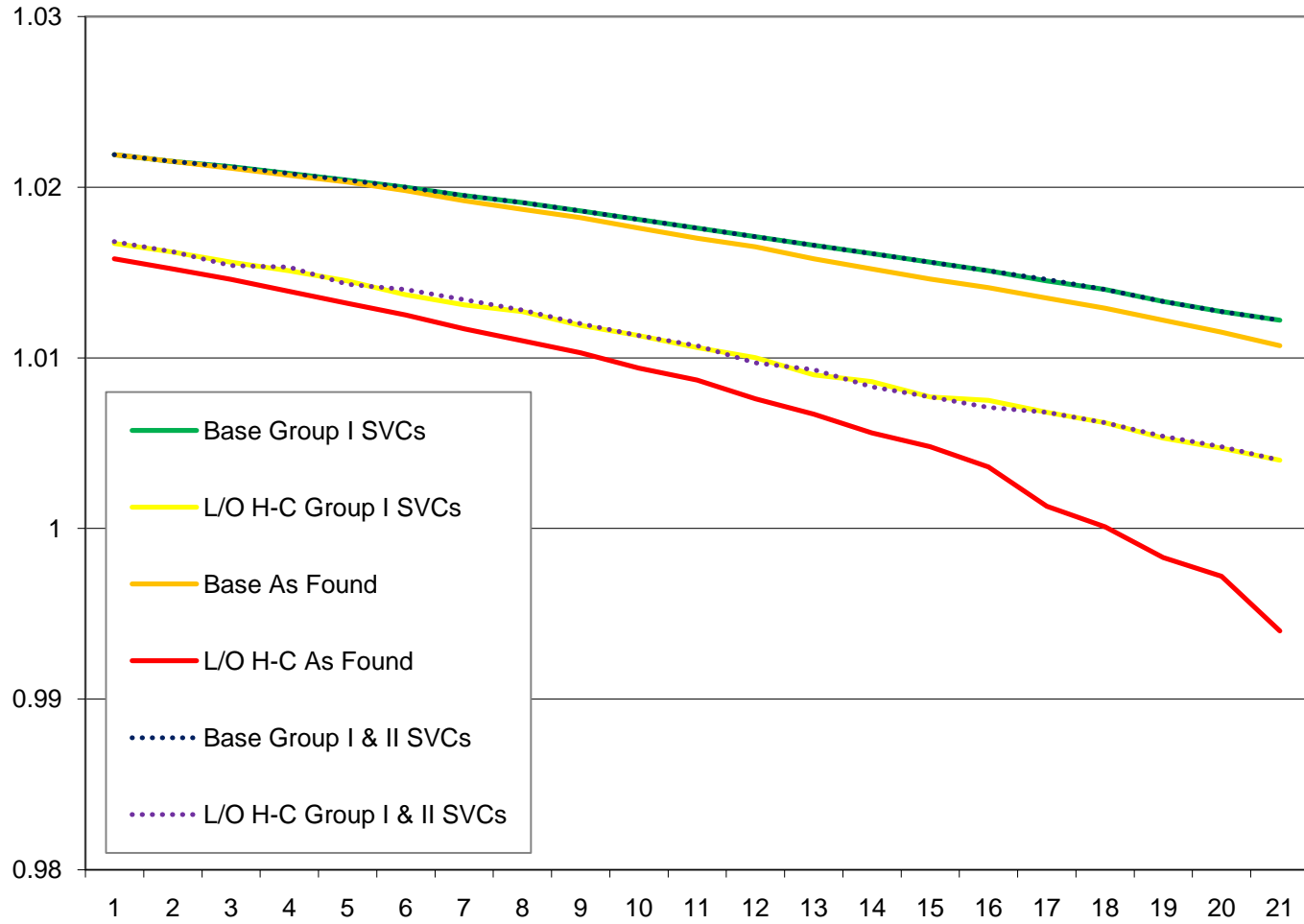
Station "A" Voltage Transfer to MAAC Base Case and with L/O H-C



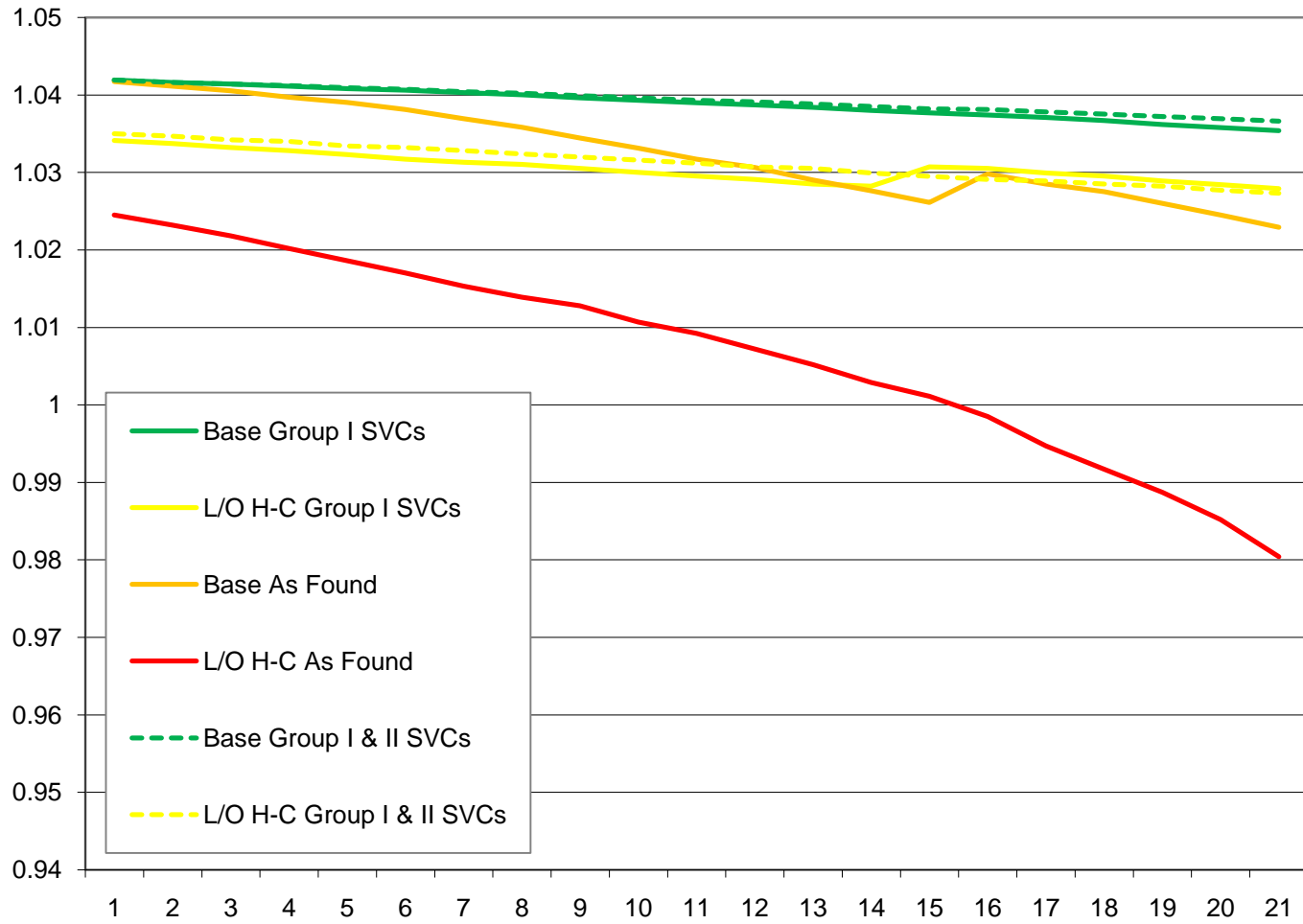
Station "B" Voltage Transfer to MAAC Base Case and with L/O B-BO



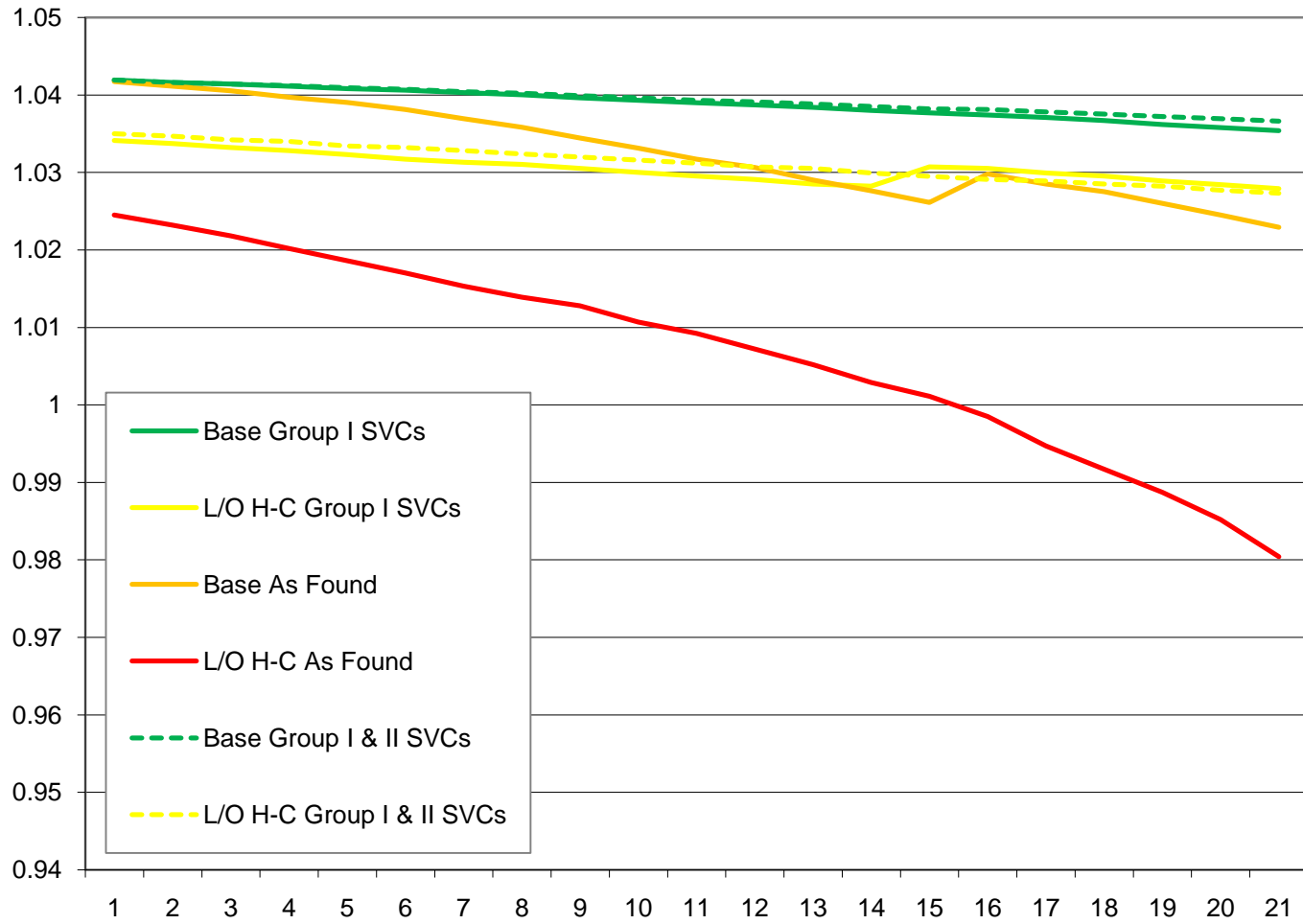
Station "B" Voltage Transfer to MAAC Base Case and with L/O H-C



Station "C" Voltage Transfer to MAAC Base Case and with L/O H-C



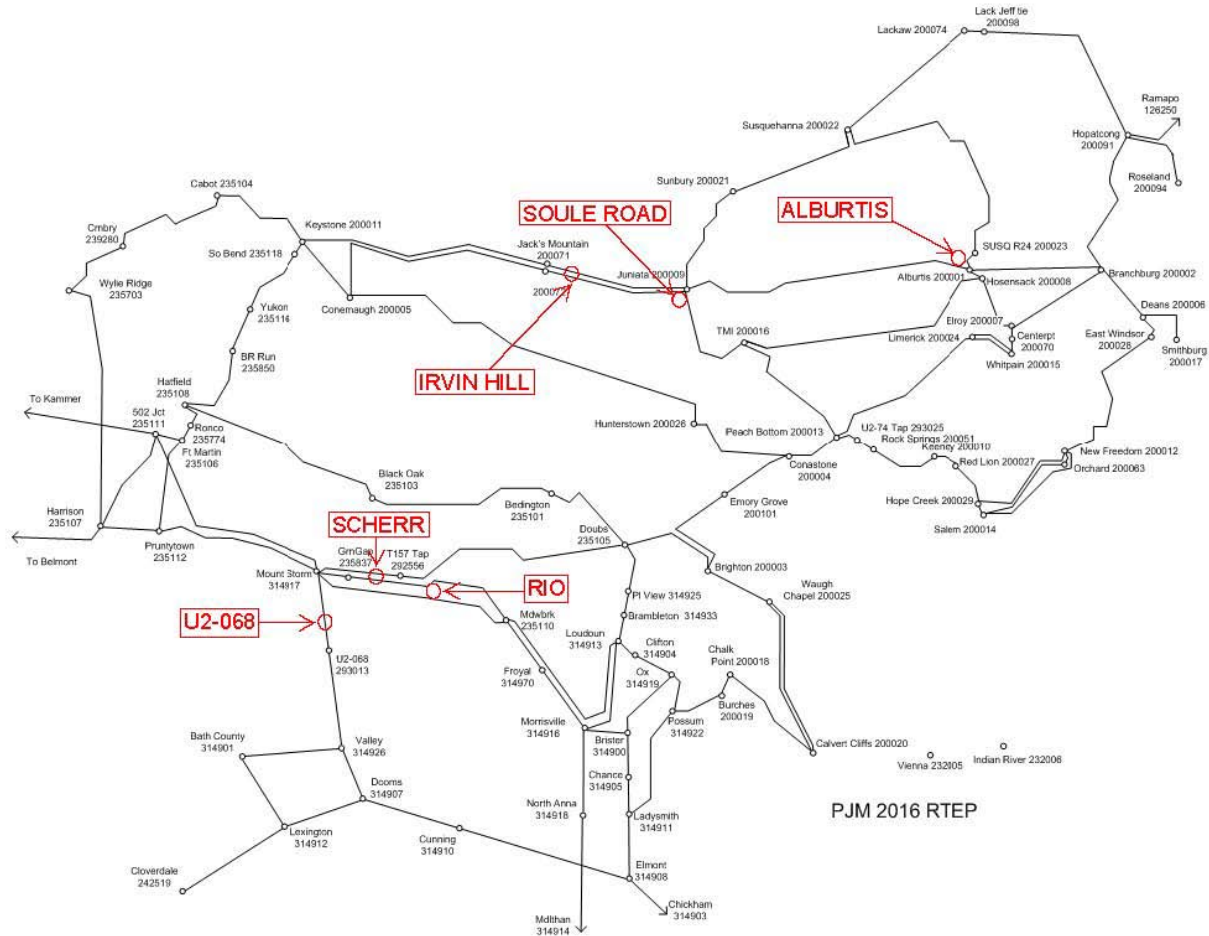
Station "D" Voltage Transfer to MAAC Base Case and with L/O H-C



Summary of Proposal

- 1. Group I SVCs – in service 2016, or as early as 2015:**
 - a. Irvin Hill Site (Jacks Mt) – (2) 500 MVAR Modules
 - b. Rio Site (Meadowbrook) – (2) 250 MVAR Modules
 - i. Design for upgrade to (2) 500 MVAR Modules
 - c. Soule Road Site (Juniata) – (1) 500 MVAR Module
 - d. Scherr Site (Mt. Storm-Doubs) – (2) 250 MVAR Modules
 - i. Design for upgrade to (2) 500 MVAR Modules
- 2. Group II SVCs – in service 2017, or as early as 2016:**
 - a. Alburtis Site – (1) 500 MVAR Module
 - b. Mt. Storm-Valley Site – (1) 250 MVAR Module

Summary of Proposal



Summary of Qualifications

- **The Grid Plus Transmission System is being developed by Primary Power, LLC (“PPLLC”):**
 - **PPLLC is a joint venture of Tangibl and Trans-Elect**
 - **Project funding by Energy Investors Funds (“EIF”)**
 - **Tangibl is an established provider of professional engineering, management consulting and project development services to the power generation and delivery industries, with extensive project-specific experience in PJM.**
 - **Trans-Elect is one of the nation’s leading transmission development companies, and has created the Michigan Electric Transmission Company (“METC”) and has developed and constructed the critical 500kV Path 15 transmission project in California.**

Summary of Qualifications

- **Technical Qualifications**
 - **Demonstrated transmission project development, construction, financing and operating experience:**
 - Trans-Elect (METC, Path 15)
 - Tangibl (numerous transmission projects in PJM and other RTOs)
 - Plus, individuals with extensive Transmission Owner experience prior to joining Trans-Elect and Tangibl
 - **Demonstrated engineering, procurement and construction capability through Engineer-Procure-Construct (“EPC”) contract with well-known engineering-based EPC firm with extensive transmission project construction experience**
 - **Demonstrated permitting experience through Pickering, Corts & Summerson, part of the Primary Power team**
 - **Reliability compliance (e.g., NERC) capability through Tangibl and Scott Madden & Associates , part of the Primary Power team**

Summary of Qualifications

- **Financial Qualifications**
 - **Committed equity financing from the Energy Investors Funds (EIF)**
 - **EIF has provided development equity and will provide construction equity**
 - **EIF is the nation's oldest and most established private equity fund providing equity for the electric power industry**
 - **EIF has raised more than \$4 billion and provided equity financing for numerous transmission and generating projects across the country**
 - **Interested lenders have been identified and are eager to provide debt financing for the projects**

Grid Plus Transmission System

- **Grid Plus will be operated under PJM’s direction from a hardened 24/7 control center located in the mid-Atlantic region.**
- **The operating company for Grid Plus Mid-Atlantic Transmission System (“Grid Plus OpCo”) will, at the appropriate time, become a signatory to the PJM Transmission Owners Agreement, Operating Agreement, and other agreements required by the OATT.**
- **Grid Plus facilities as proposed will be subject to North American Electric Reliability Corporation (“NERC”) reliability requirements as administered by Reliability First Corporation (“RFC”).**

Grid Plus Transmission System

- **Grid Plus OpCo will be governed by a Board of Managers, and managed as an NERC-compliant electric transmission utility with a professional executive and management team.**
- **Organizational functions such as real-time operations, asset management, regulatory compliance, maintenance and accounting will be led by professional managers and staff, with non-core functions to be provided by suitable third parties under appropriate agreements.**
- **As a Transmission Owner member of PJM, Grid Plus OpCo will participate in the appropriate PJM committees and task forces.**

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