PJM Fuel Security Phase III Scenario Planning

July 11th, 2019
### Phase I
- Winter weather, load, forced outage rates
- Generation retirements
- Non-firm gas availability
- Pipeline disruptions
  - Fixed duration
  - High vs. medium impact
  - “Looped” vs. “non-looped”
- Oil refueling rate
- Dispatch procedure

### Phase III
- Availability of SCADA
- Pipeline repair/bypass time
- Supply disruption/reductions
- Pipeline transfer capacity constraints
- Weather
- Duration of events
Large-scale SCADA Compromise (Nation-State)

The production environment and source code of a SCADA vendor with substantial market share is compromised, resulting in an extended period of unavailability. Asset owners are required to function in “local” operation for a period of multiple days to multiple weeks.

Physical Attack (Non-State Actors)

A coordinated attack is executed at double-digit number of sites within the gas delivery network (pipelines, compressor stations, etc.), resulting in multiple disruptions. Time requirements for partial or complete service restoration ranges from days to weeks depending on location.

Company Targeting (Nation-State)

An Advanced Persistent Threat (APT) actor targets 1-2 large owner/operators for the purpose of creating maximum cyber effects to SCADA systems and underlying IT infrastructure.
Loss of SCADA Resulting in “Local Operations”

Pipeline operations are executed manually at compressor stations without remote visibility. Variable sensitivities tied to duration and operating (demand) conditions.

Mean Time to Recover for Pipeline Damage

The time needed to repair or bypass a damaged segment of pipeline (or compressor) based on location, availability of personnel and equipment, and inspection.

Gas Pipeline Transfer Capacity

Constraints associated with back-feed or transfer pipe size/location relative to disruptions. Variable sensitivities tied to duration and operating (demand) conditions.

High Impact Loss of Supply

Disruption or compromise of regional storage facilities or primary regional production facilities.
Large-scale SCADA Compromise (Nation-State)

Loss of SCADA Resulting in “Local Operations”

Gas Pipeline Transfer Capacity

Duration and Conditions

Viable Modeling Scenario
Scenario Building Discussion

Physical Attack
(Non-State Actors)

Mean Time Recovery for Pipeline Damage

Loss of Supply

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Loss of SCADA Resulting in “Local Operations”

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Gas Pipeline Transfer Capacity

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Company Targeting (Nation-State)

Viable Modeling Scenario
Overview of Government Partners in the Phase III Study

• Validation of potential credible scenarios
• Assistance with determination of realistic outage duration estimates
• Encouragement of pipelines to supply data to PJM and assist in scenario development and duration analysis
• Monitoring and review of preliminary results.