

Scheduled Actions Tool



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Scheduled Actions Add-on Background



- Feature requested by ISO New England
 - Used to visualize scheduled equipment outages
 - With specific formatting within a case
 - CROW CSV files can be loaded directly
 - CROW = (Control Room Operations Window)
- Implemented with the flexibility for other applications
 - Possible extension to replace current Time Step tool, or just use as another tool

Scheduled Actions

Case Objects



- **Scheduled Action**
 - Defines an action (Open, Close, Set To, Change By)
 - Specifies the target device (Branch, Shunt, Load, Generator)
 - Links to Scheduled Action Group for time data
- **Scheduled Action Group**
 - Defines the timeframe: Start Time and End Time
 - Specifies a Scheduled Action Status
 - Scheduled Actions link to the Action Group to determine their timeframe and status
- **Scheduled Action Status**
 - Provides organizational tags for action groups
 - Allows certain types of action groups to be view-only, never applying the actions to the system

Scheduled Action Group



The screenshot shows the 'Scheduled Actions' dialog box. The top section contains scheduling parameters: Start Time (6/25/2015 00:00), View Time (6/25/2015 00:00), End Time (7/1/2015 12:00), Resolution (1 Hour), and Animation (1 Second). Below these are 'Play' and 'Stop' buttons, and a 'Save Snapshot' button with an 'Apply Outages' checkbox. The bottom section is a table with columns: Ticket Number, Description, Start Time, End Time, and Status. A blue arrow points to the 'Ticket Number' column header, which is labeled 'Group name'.

| | Ticket Number | Description | Start Time | End Time | Status |
|---|---------------|-------------|------------------|------------------|-------------|
| 1 | 1-1 | | 06/25/2015 00:00 | 06/26/2015 00:00 | Preliminary |
| 2 | 1-2 | | 06/25/2015 00:00 | 07/02/2015 00:00 | Preliminary |
| 3 | 1-3 | | 06/25/2015 06:00 | 06/25/2015 12:00 | Preliminary |
| 4 | 1-4 | | 06/01/2015 12:00 | 06/25/2015 18:00 | Negotiate |

Scheduled Action



Scheduled Actions

Start Time: 6/25/2015 00:00 | View Time: 6/25/2015 00:00 | End Time: 7/ 1/2015 12:00 | Resolution: 1 Hours | Animation: 1 Seconds

Buttons: Play, Stop, Save Snapshot, Apply Outages

Tabbed interface: Schedule Groups | **Actions** | Statuses | Gantt Chart

| | Ticket Number | Start Time | End Time | Device | Action | Field | Value |
|---|---------------|------------------|------------------|-------------------|--------|-------|-------|
| 1 | 1-1 | 06/25/2015 00:00 | 06/26/2015 00:00 | Branch '1' '2' '1 | Open | None | 0 |
| 2 | 1-2 | 06/25/2015 00:00 | 07/02/2015 00:00 | Branch '1' '3' '1 | Open | None | 0 |
| 3 | 1-1 | 06/25/2015 00:00 | 06/26/2015 00:00 | Gen '1' '1' | Open | None | 0 |
| 4 | 1-3 | 06/25/2015 06:00 | 06/25/2015 12:00 | Branch '3' '4' '1 | Open | None | 0 |
| 5 | 1-4 | 06/01/2015 12:00 | 06/25/2015 18:00 | Branch '6' '7' '1 | Open | None | 0 |
| 6 | 1-4 | 06/01/2015 12:00 | 06/25/2015 18:00 | Branch '6' '7' '2 | Open | None | 0 |

Scheduled Action Group

Buttons: OK, Help, Delete All, Cancel

Scheduled Action Status



Start Time: 6/25/2015 00:00

View Time: 6/25/2015 00:00

End Time: 7/ 1/2015 12:00

Resolution: 1 Hours

Animation: 1 Seconds

Buttons: Play, Stop, Save Snapshot, Apply Outages

| | Name | Active |
|----|----------------|--------|
| 1 | Preliminary | YES |
| 2 | Submitted | NO |
| 3 | Withdrawn | NO |
| 4 | Negotiate | NO |
| 5 | Study | YES |
| 6 | Interim Approv | NO |
| 7 | Approved | YES |
| 8 | Denied | NO |
| 9 | Cancelled | NO |
| 10 | Implemented | YES |
| 11 | Completed | NO |
| 12 | Recalled | NO |

Buttons: OK, Help, Delete All, Cancel

Active determines if action will be applied

Default Statuses are provided, but user can define whatever they want

Scheduled Actions GUI



- Gantt Chart
 - Customized case information display showing the interaction of Scheduled Action Groups over a specified timeframe
- Time control
 - Set the time window of interest with Start Time and End Time, set the display resolution, and set the specific time of interest
 - Scroll over the specified time frame with the slider and arrows, set a specific view time with the calendar control
 - Export a snapshot of the case at a specific point
 - Specify if active action groups should be applied to the case
- Animation control
 - Set Simulator to automatically scroll over the specified timeframe, holding each time step for a specified period

Process Control



Scheduled Actions

Start Time: 6/25/2015 00:00 | View Time: 6/25/2015 00:00 | End Time: 7/1/2015 12:00 | Resolution: 1 Hours | Animation: 1 Seconds

Buttons: Play, Stop, Save Snapshot, Apply Outages

Schedule Groups | Actions | Statuses | Gantt Chart

| | Ticket Number | Description | Start Time | End Time | 06/00 | 06/01 | 06/02 | 06/03 | 06/04 | 06/05 | 06/06 | 06/07 | 06/08 | 06/09 | 06/10 | 06/11 | 06/12 | 06/13 | 06/14 | 06/15 | 06/16 | 06/17 | 06/18 | 06/19 | 06/20 | 06/21 | 06/22 |
|---|---------------|-------------|------------------|------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1-1 | | 06/25/2015 00:00 | 06/26/2015 00:00 | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | 1-2 | | 06/25/2015 00:00 | 07/02/2015 00:00 | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 1-3 | | 06/25/2015 06:00 | 06/25/2015 12:00 | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 1-4 | | 06/01/2015 12:00 | 06/25/2015 18:00 | | | | | | | | | | | | | | | | | | | | | | | |

Buttons: OK, Help, Delete All, Cancel

Case Information Displays



- **In Outage?** field in case information displays indicates if an object is referenced by a current Scheduled Action
 - NONE – not referenced by a Scheduled Action
 - APPLIED – referenced and Apply Outages option is enabled
 - INACTIVE – referenced and Scheduled Action Status has Active = NO
 - ACTIVE – referenced and Apply Outages option is not enabled

| | From Number | From Name | To Number | To Name | Circuit | In Outage? |
|----|-------------|-----------|-----------|---------|---------|------------|
| 1 | 1 | One | 2 | Two | 1 | APPLIED |
| 2 | 1 | One | 3 | Three | 1 | APPLIED |
| 3 | 2 | Two | 3 | Three | 1 | NONE |
| 4 | 2 | Two | 4 | Four | 1 | NONE |
| 5 | 2 | Two | 5 | Five | 1 | NONE |
| 6 | 2 | Two | 6 | Six | 1 | NONE |
| 7 | 3 | Three | 4 | Four | 1 | NONE |
| 8 | 4 | Four | 5 | Five | 1 | NONE |
| 9 | 7 | Seven | 5 | Five | 1 | NONE |
| 10 | 6 | Six | 7 | Seven | 1 | INACTIVE |
| 11 | 6 | Six | 7 | Seven | 2 | INACTIVE |

CROW CSV Files



- Load into Scheduled Actions tables to create groups and actions
- Default options will read Trans_Outage and Gen_Outage file types
 - Specific fields must be available within the files
- Identify objects by Labels
 - Specific label format is required

```
Trans_Outage,PROBENE,Version 101,Hour Beginning,20120616  
TICKETNUM,OUTAGE_NAME,CO_SHORT_NAME,STARTDT,ENDDT,STATUS,SUBMITDT,BPC_CUTOFF,EQUIPTYPE,STATION,VOLTAGE,EQUIPNAME,EVENTSTATUSCHANGE,EQUIPSTARTDT,EQUIPENDDT  
1-08000074,1-08000074C64,,9/3/2008 8:00,8/1/2012 0:00,Implemented,,,Line,SUB1,138,BRANCH_2_3,0,9/3/2008 8:00,8/1/2012 0:00
```

```
Gen_Outage,PROBENE,Version 101,Hour Beginning,20120616  
TICKETNUM,OUTAGE_NAME,STARTDT,ENDDT,UNITPNODEID,STATION,VOLTAGE,EQUIPNAME,OUTAGETYPE,PHYSICALREDUCTION,FCMEXEMPTMW  
1-12000209,1-12000209Lowd,6/1/2012 0:00,7/1/2012 0:00,1,SUB1,,GEN1,1,13.5,0
```

CROW CSV File With Settings



- Allows non-default formats to be user-defined based on the headers in the file
- Specify file and Simulator will determine the headers
- Specify headers and field values to determine the action parameters

Scheduled Action CSV Import Settings

Header line: First File: G:\Marketing\WECC PowerWorld Users Group\Jun Browse

Device Mapping Action Definition Outage Definition

Type Header EqType Label Formats Identifier Format New Edit

Branches Values LN Label Format Identifier Format

Generators Values UN Label Format Identifier Format

Switched Shunts Values Label Format Identifier Format

Loads Values Label Format Identifier Format

OK Help Save to AUX Load from AUX Cancel