



ASPEN LEAFLET

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Classes in 2013

A *OneLiner* class will be held in Burlingame, California on February 26-28, 2013. Class information is available in the [Events](#) page of our web site. You can sign up on-line. Another *OneLiner* will be held at a location east of the Rockies in September 2013.

We are planning a *DistriView* class in Burlingame, California in March or April, 2013. We will announce this class in January.

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New Users in 2011 and 2012

ASPEN *DistriView*™

- Baccari Associates, Sheridan, NY
- Bandeirante Energia SA, Mogidas Cruzes, CP, BRAZIL
- CELPA, Sao Paulo, SP, BRAZIL
- ESCELSA, Carapina Serra, ES, BRAZIL

Relay Loadability Studies

Reliability Standard PRC-023, enacted by FERC in 2010, requires transmission owners, generator owners, and distribution providers to set their phase relays in such a way that the relays protect the electric network from short circuits, but do not limit transmission loadability or interfere with system operators' ability to maintain system reliability.

The PRC-023 standard applies to phase relays that protect transmission lines and transformers 200 kV and above, plus some lines and transformer between 100 kV and 200 kV that the planners deemed critical to the reliability of the electrical network. NERC enforces these requirements through an auditing program. More information on PRC-023 can be found in NERC's web site: www.nerc.com

Several years ago we implemented a Check Relay Loadability command in *OneLiner* to check the loadability of overcurrent and distance phase relays. With a single Check Relay Loadability command, you can direct the program to check all the phase relays in the system, or just the relays in a specific location, area, or zone that are within a certain nominal-kV range. Specifically, the Check Relay Loadability command performs the following tasks for each phase relay that is on a transmission line that has a non-zero current rating:

1. Computes a load current as a multiple of the line's current rating. We call this the "calculated load current"
2. Simulate the relay's response to the calculated load current, with the voltage magnitude and the power-factor angle at the prescribed values. The relay passes the test if it does not trip. Otherwise it is flagged.
3. Output the above results to a text report or a CSV-formatted report. The CSV report includes the key relay settings for auditing purposes.

We have improved this command since then to make the checking process more comprehensive. For example, in v11.9, instead of checking just zone 3 of distance relays, *OneLiner* checked all the tripping zones, in the forward and reverse direction, to see if they trip on load. The fastest zone that trips, if any, is indicated in the report.

- Hestco, Inc., Benton, AR
- Imperial Irrigation District, Imperial, CA
- Pterra, Albany, NY
- Skipper Electrical Ltd, Mambrobi Accra, GHANA
- Spatial Business Systems, Inc, Lakewood, CO
- UNIFEI, Itajuba, MG, BRAZIL

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ASPEN Line Constants Program™

- AES Sul Distribuidora Gaucha de Energia, Sao Leopoldo, RS, BRAZIL
- City Utilities of Springfield, MO
- Kansas City Power and Light, KS
- KEC International, Shuwaikh, KUWAIT
- Middle East Engineering & Dev. Co., Jeddah, SAUDI ARABIA
- Navopache Electric Coop, Lakeside, AZ
- Peak Power Engineering, Golden, CA
- POWER Engineers, Inc, Haily, ID
- Technotran Engineering, Al Khobar, SAUDI ARABIA
- Teshmont Consultants LP,

In the latest version of *OneLiner* (v11.10), the program calculates and outputs an additional “load current threshold”, regardless of the relay location and whether a current rating is available. The load current threshold is the minimum load current that will cause the relay to trip. For a relay that passed the test in step (2), the difference between this threshold and the calculated load current gives you an idea how close the relay is to the tripping point.

In addition to the reports of the Check Relay Loadability command, you have the option of using graphics to document the loadability checks. In figure 1, the calculated load current in primary amps is shown as a vertical line in a plot of the overcurrent relay curve. This relay clearly passed the loadability test because its curve begins to the right of the calculated load current. A transformer damage curve in this plot, appearing to the right of the relay, shows that the relay is still sensitive enough to protect the transformer. You can store such plots in a Curve Collection files for later retrieval, in case of an audit.

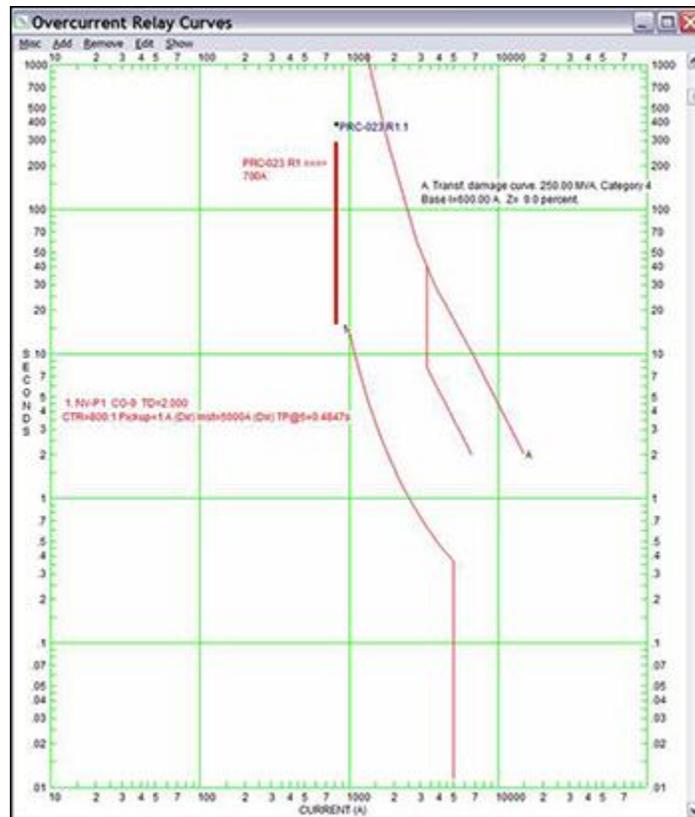


Figure 1

Figure 2 shows a distance relay with a load region plotted as a wedge-shaped area to the right of the relay characteristics. This picture was generated by the Load Region command in the Distance Relay Window. This phase distance relay passed the loadability test because the load region is outside of all the protective zones. For the first

Winnipeg, MB,
CANADA

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ASPEN Line Database™

- E. Kentucky Power
Coop, Winchester,
KY
- Iberdrola USA,
Rochester, NY
- Intermountain REA,
Sedalia, CO
- Jacksonville Electric
Authority, FL
- LG&E and KU
Services Co,
Lexington, KY
- Relay Application
Innovation,
Pullman, WA
- Salt River Project,
Tempe, AZ
- Vectren Corporation,
Evansville, IN

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ASPEN OneLiner™

- A2V Partners,
Springfield, MO
- ABB Sinai
Engineering Corp,
Edmonton, AB,
CANADA
- ALSTOM Grid, La
Prairie, QC,
CANADA
- AITran Solutions
Corp, Cranbury, NJ
- CELPA, Sao Paulo,
SP, BRAZIL
- CIIMA+, Sherbrooke,
QC, CANADA
- Dashiell, Sulphur, LA

time, in *OneLiner* v11.10, you can store this kind of plot within the Curve Collection file, also, for later retrieval.

The Check Relay Loadability reports and the Curve Collection files can all be used as evidence that your organization has checked the loadability of your phase relays according to the requirements of PRC-023.

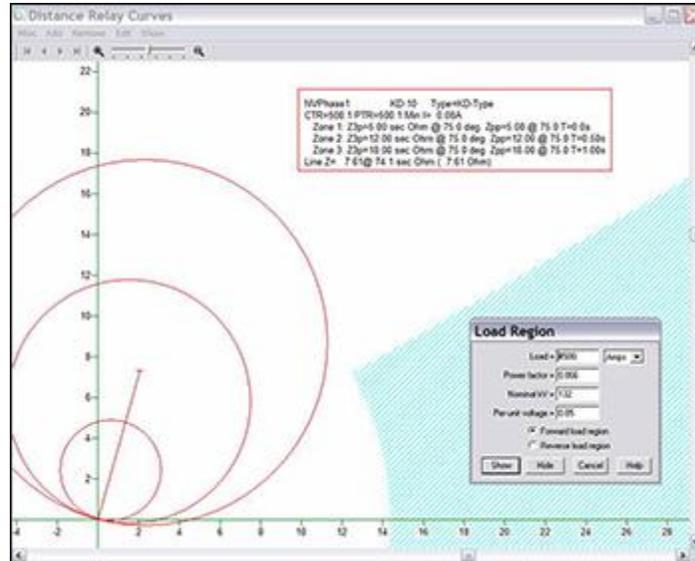


Figure 2

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OneLiner Relay Data Import

An “Import” button was added to the relay-group dialog box and to the relay dialog boxes in v11.7. These buttons let you import relay settings into *OneLiner* from a number of other sources, including relay manufacturers’ setting files:

- SEL-5010 database: Setting data in an SEL-5010 MDB database.
- SEL-5010 export database: Setting data in an MDB file exported by the SEL-5010 program.
- SEL-5030 *acSELeRator*® export files: Setting data in text files exported by SEL-5030. These text files are in a single folder.
- GE UR and 469 relay setting export files: Setting data in text files with .CSV or .URS extension. The support for .URS files is new in v11.10.
- ASPEN Database text data file: Setting data exported from ASPEN Relay Database with .txt extension.
- ASPEN OneLiner relay data: Setting data exported from OneLiner with .rat extension.

- Diesel Injection Sales & Service, Mount Pearl, NL, CANADA
- EASi, Troy, MI
- Electricidad de Potencia SAC, Lima, PERU
- Elliniki Technodomiki - Anemos SA, Athens, GREECE
- ENOSERV, Tulsa, OK
- ES P&C Consulting Inc, Maple, ON, CANADA
- Flynn Resource Consultants Inc, Discovery Bay, CA
- Freeport-McMoran Morenci Inc, Morenci, AZ
- Global Substation Solutions, Tyne & Wear, UNITED KINGDOM
- INECO, Madrid, SPAIN
- Intermountain REA, Sedalia, CO
- IPS Energy USA, Bargersville, IN
- JYG Ingenieria, Ciudad de Panama, PANAMA
- Liberty Utilities, Tahoe Vista, CA
- Luminant Generation Co, Dallas, TX
- MelTran, Inc, Pittsburgh, PA
- metaGRA engineering LTD, Delta, BC, CANADA
- National Renewable Energy Lab, Golden, CO
- Patterson Power Engineering, Chattanooga, TN
- Prairie Power Inc., Jacksonville, IL
- Preston Waller & Associates,

- *ASPEN Relay Database.*
- *ENOSERV® PowerBase.* This is new in v11.10. Please call or write us if you are interested.

An improved user interface in v11.10 lets you import multiple relay elements into *OneLiner* at the same time. For example, you can create a phase distance relay, a phase overcurrent relay and a ground distance relay from a SEL-5030 folder, with a single push of the Import button. See Figure 3.

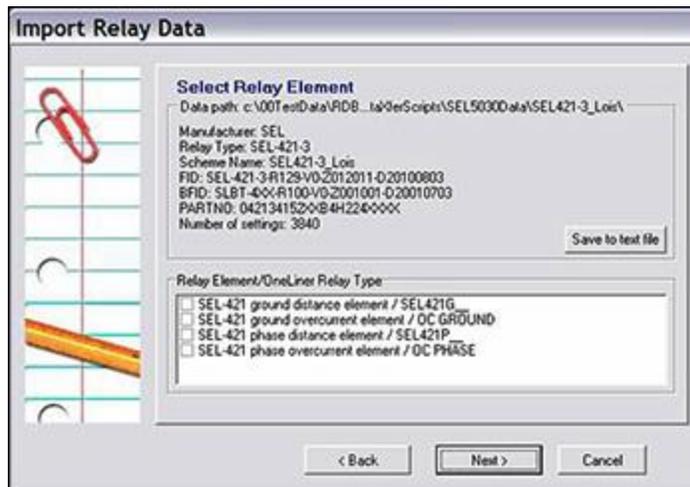


Figure 3

The relay-import feature works seamlessly with the manufacturer-specific distance relay models for SEL and GE relays. When you import the setting data for a SEL-421 phase distance relay from a SEL-5030 file, for example, OneLiner will create a new distance-relay object using the manufacturer-specific SEL-421P__ model which simulates SEL's unique way of implementing positive-sequence polarized mho characteristic, compensator-distance mho characteristic, quadrilateral characteristic, negative- and zero-sequence voltage directional logic, and load encroachment settings.

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- Salisbury, MD
- Quanta Technology,
Raleigh, NC
 - SAIC Energy,
Hendersonville, TN
 - Salient Power
Engineering,
Arvada, CO
 - SGC Engineering,
Arvada, CO
 - Systems Control, Iron
Mountain, MI
 - TAESA, Rio de
Janeiro, RJ,
BRAZIL
 - TranServ
International,
Minneapolis, MN
 - Utility System
Efficiencies,
Carmichael, CA

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ASPEN Power Flow™

- AES Sul Distribuidora
Gaucha de
Energia, Sao
Leopoldo, RS,
BRAZIL
- Dixie Electric
Membership Coop,
Baton Rouge, LA
- Elliniki Technodomiki-
Anemos SA,
Athens, GREECE
- HydroOne, Toronto,
CANADA
- Imperial Irrigation
District, Imperial,
CA
- INECO, Madrid,
SPAIN
- Independent Power
Transmission
Operator, Athens,
GREECE
- National Grid Corp,
Quezon City, THE

PHILIPPINES

- Rising Edge
Engineering Ltd,
Calgary, AB
- Salient Power
Engineering,
Arvada, CO

ASPEN Relay Database™

- CELPA, Sao Paulo,
SP, BRAZIL
- Dow Chemical
Company,
Freeport, TX
- Freeport-McMoran
Morenci Inc,
Morenci, AZ
- Iberdrola
Renewables,
Portland, OR
- Intermountain REA,
Sedalia, CO
- Madison Gas and
Electric, WI
- SLAC National
Accelerator Lab,
Stanford, CA

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