

LIVE LINE MAINTENANCE: PRINCIPLES AND PRACTICES

September 22-24 (\$1575)

Presented jointly by Dr. G. Gela, Tom Verdecchio, and PDC

This course is for utilities or contractors considering live line maintenance practices on overhead transmission lines up to 765 kV. The history, tools, theory, industry best practices, and the economic value of live working will be covered, as well as the procedures for calculating minimum approach distances, designing structures to be live-work friendly, and overvoltage controls, and an in-depth review of IEEE 516-2009 will be included.

[1.7 CEUs]



POWER CABLE RATINGS AND SOIL CONSIDERATIONS

September 28-October 1 (\$2475)

Presented jointly by Geotherm, Inc., Dr. George Anders, and PDC

Underground cables generally have lower ratings than overhead lines, and the cost per ampere is much higher. Wind farms are using underground cables to collect power from distributed wind generation. From the standpoint of ratings, both over-designing and under-designing are very costly, so it is desirable to confidently rate the cables near their ultimate limit. Important issues include:

- ◆ Ampacity audits and uprating
- ◆ Soil dry-out - is it really an issue?
- ◆ Shield/sheath bonding of extruded cables
- ◆ Fluidized Thermal Backfill™, other fills
- ◆ Conductor size vs. additional special backfill
- ◆ Temperature monitoring; dynamic rating

Dr. George Anders will speak on special topics, e.g.:

- ◆ Effects of cable crossings
- ◆ Deep cable ampacities
- ◆ Cables in tunnels
- ◆ Wind farms and Data Centers
- ◆ Other special topics selected by students

And recently introduced:

- ◆ Hands-on discussion of various soils and materials
- ◆ Formulate FTB, concrete, thermal grout mix designs

[2.8 CEUs]

EXTRUDED-DIELECTRIC POWER CABLE SYSTEMS – DESIGN, INSTALLATION, OPERATION

October 5-7 (\$1775)

Extruded-dielectric cables are now in service through 500 kV worldwide, and there are extensive installations in the United States at 345 kV. We will discuss design aspects, including analytical studies, installation considerations, factory and commissioning tests, general operation considerations, utility power system effects, and maintenance practices, focusing on XLPE-insulated cables as well as EPR-insulated cables. There will be special discussions of hybrid lines, where short sections of UG cables may be the only way a utility can permit a long OH line, as well as reconductoring existing pipes with XLPE or EPR cables.

Includes analytical calculations.

[2.1 CEUs]



HPFF & HPGF PIPE-TYPE CABLE SYSTEMS – DESIGN, INSTALLATION, OPERATION

November 4-6 (\$1775)

This 3-day course focuses on the design, ampacity, specification, installation, uprating, maintenance practices, dielectric fluid-handling systems, and life evaluation of both high-pressure gas-filled (HPGF) cables and high-pressure fluid-filled (HPFF) cables. There are extensive slide presentations on cable manufacturing and pipe and cable installation.

Topics include ampacity calculations, cathodic protection systems, pumping plant requirements, dissolved gas analysis (DGA), cable ampacity, uprating methods using fluid circulation and forced-cooling, relocation and extension of existing lines, and many other topics relevant to pipe-type cables including several presentations on state-of-the-art trenchless water crossings.

Includes analytical calculations.

[2.1 CEUs]



Participants: PDC courses are intended for engineers and field personnel concerned with the planning, design, installation, operation and maintenance of underground cables and overhead lines. Any of our courses can be presented on-site at utilities and elsewhere. Please give us a call to discuss your interests and so we can recommend the best courses for you to attend.

Continuing Education: PDC is a Continuing Education Provider in the State of Florida (0003531). **Learning outcomes** for our courses are available on our web site or by request.

General Course Considerations: Each course includes a comprehensive course notebook, coffee breaks, and lunch. The courses are scheduled so that there is adequate time to ask questions during the formal presentation, during breaks, or after class. Students are responsible for travel and living expenses. Based on favorable comments from past students, all of our scheduled courses are held in the St. Pete/Tampa, FL area where we have arranged reduced rate hotel room blocks at The Alden, 5900 Gulf Blvd, St. Pete Beach, FL, 727 360-7081.



We will issue course completion certificates indicating the number of Professional Development Hours (PDHs) and Continuing Education Units (CEUs) earned based on national guidelines and the number of classroom hours that are satisfactorily completed.

Power Delivery Consultants, Inc.

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Find more details and registration information at our web site:

<http://www.pdc-engineering.com>

Live Line Maintenance: Principles and Practices

(Sept 22-24) E. Surmanis, P.E.,
Dr. George Gela (Consultant) T. Verdecchio (Consultant)

Power Cable Ratings & Soil Considerations

(Sept 28-Oct 1) Deepak Parmar (Geotherm)
Dr. George Anders (Consultant) R.I. Mosier, P.E.

**Extruded Dielectric Power Cable Systems –
Design, Installation, Operation**

(Oct 5-7) R.I. Mosier, P.E. P.L. Tirinzoni, P.E.

**HPFF & HPGF Pipe-Type Cable Systems –
Design, Installation, Operation**

(Nov 4-6) E. Surmanis, P.E. D. Koonce

T&D ENGINEERING SERVICES

PDC's experienced engineering staff offers services in a variety of areas including:

- Rating/uprating of overhead and underground transmission lines
- Initial planning studies to compare the suitability – both technical and economic – of various cable & conductor options
- Reconductoring existing pipes with XLPE cables
- Specialists in cable design for HDD installations
- Environmental impact reviews, including support in permit applications and hearings
- Evaluate pipe-type and extruded cable system components and ancillary systems
- Purchase and installation specifications
- Factory audits, witness testing
- Bid preparation and proposal evaluation
- Review of vendor's drawings and calculations
- Client representative for factory inspection and acceptance tests
- Preparation of Operation & Maintenance (O&M) manuals, and on-site training
- Evaluation of overhead live-line work procedures
- Evaluating novel materials and installation techniques
- Equipment life evaluation and extension
- Assessment and replacement of aging conductors

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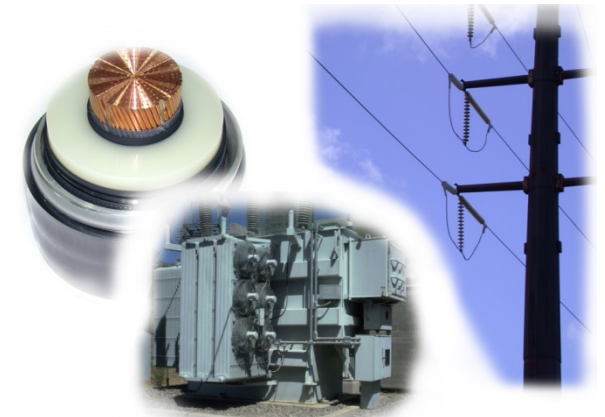
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ELECTRIC POWER TRANSMISSION COURSES

HELD IN ST. PETE BEACH, FL



Our courses are presented by practicing engineers with depth of analytical and field experience.

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