

## POWER CABLE RATINGS AND SOIL CONSIDERATIONS

September 15-18 (\$3100)

Presented jointly by Dr. George Anders and PDC

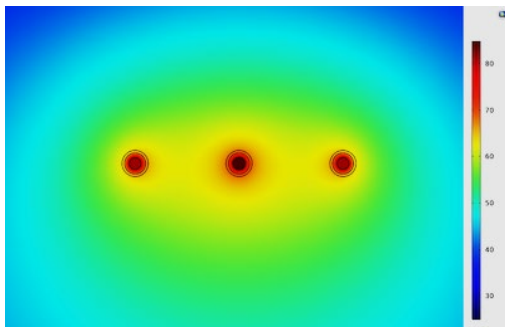
Underground cable systems generally have lower ratings than overhead lines, and the cost per ampere is much higher. In addition to traditional underground T&D systems, wind farms are using underground cables to collect power from distributed wind generation. From the standpoint of ratings, both over-designing 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 participants

[2.8 CEUs]



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

September 21-23 (\$2220)

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. There will also be special discussions on HVDC cable systems and submarine cable systems.

Includes analytical calculations.

[2.1 CEUs]



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

September 28-30 (\$2220)

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, reconductoring, 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]



*The courses will be held in Chester, VA, just outside Richmond, VA. This location offers many nearby hotels and convenient airports. Please contact us if you would like suggestions.*

*Courses include:*

- *Real-world case studies*
- *Taught by industry experts*
- *Practical design + field insights*

*Who Should Attend:* PDC courses are intended for engineers and field personnel concerned with the planning, design, installation, operation and maintenance of underground cables. 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) and an approved sponsor of continuing education for professional engineers in New York State (NY Sponsor #235). *Learning outcomes* for our courses are available on our website or by request.

*General Course Considerations:* Each course includes a comprehensive course notebook. 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.

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.

*An MBE-certified small business*

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**Power Cable Ratings & Soil Considerations**  
(Sept 15-18) Dr. George Anders (Consultant)  
J.A. Williams, P.E. and R.I. Mosier, P.E.

**Extruded Dielectric Power Cable Systems –  
Design, Installation, Operation**  
(Sept 21-23) R.I. Mosier, P.E. P.L. Tirinzoni, P.E.

**HPFF & HPGF Pipe-Type Cable Systems –  
Design, Installation, Operation**  
(Sept 28-30) E. Surmanis, P.E. D. Koonce

### T&D ENGINEERING SERVICES

PDC's experienced engineering staff offers services in a variety of areas, AC and DC, 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
- Highly-experienced field observers for transmission cable projects

**PDC**  
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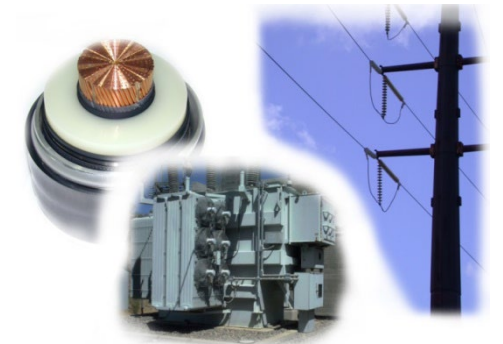
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## ELECTRIC POWER TRANSMISSION COURSES

HELD IN RICHMOND, VA AREA



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& New York State PE Continuing Education Approved  
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